AutoCAD Architecture 2010

User's Guide

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Workflow and User Interface

New Features and Introduction

1

Welcome to AutoCAD Architecture 2010! Built on the new AutoCAD® 2010 platform, this release is targeted at presenting a unified user interface and a shared feature set across the Autodesk products. Using the same design principles across different products improves interoperability, and eases the transition from one product to another.

New Features in AutoCAD Architecture 2010

AutoCAD Architecture 2010 is oriented around 3 main themes:

- Unifying the user interface across Autodesk products to gain accessibility and cross-product compatibility
- Improved file format interoperability with new Import options
- Improvements to central drawing objects like walls, spaces, and AEC dimensions

Unifying the User Interface

The user interface of many central Autodesk products, like AutoCAD, AutoCAD Architecture, AutoCAD MEP, the Revit Suite, Civil 3D, and 3D Studio Max have been redesigned in order to show a common design and interaction paradigm. The main parts of the new and improved interface are the following:

The Ribbon

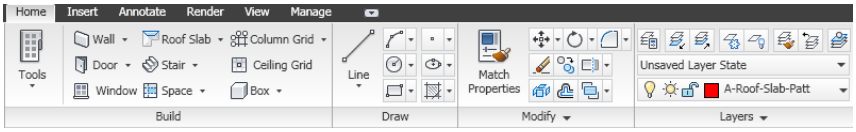
Similarly to Microsoft Office, AutoCAD Architecture 2010 now uses the ribbon as the central access point for commands. The ribbon contains a number of tabs on which commands are grouped according to conceptual task types or selected objects.

The ribbon replaces the menu bar and the toolbars as the primary command access point.

There are 2 types of ribbon tabs:

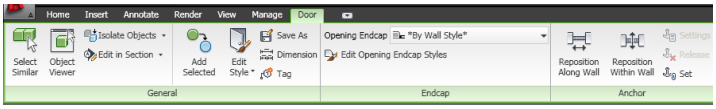
- Static tabs are available regardless of which objects are selected in the drawing area. The commands on these tabs were previously located on the menus and toolbars.

Static Home tab



- Contextual tabs display depending on the object selected in the drawing area. When you select a door, a contextual tab for doors is displayed. The commands on the contextual tabs reflect the commands on the context menu of an object.

Contextual tab for door objects

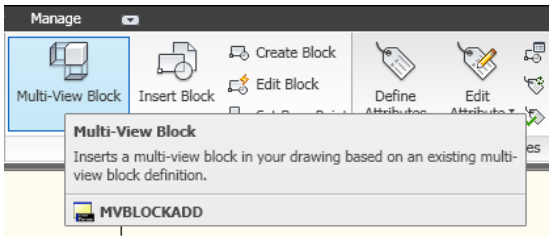


Ribbon Tooltips

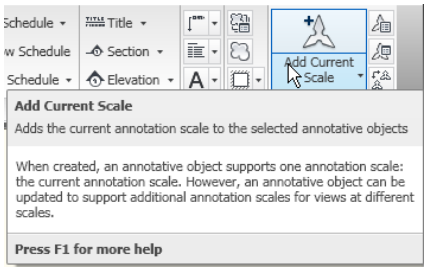
A short description displays whenever you pause the cursor over a command in the ribbon:

For some commands, an extended tooltip displays after a user-specified time interval.

Standard tooltip for command

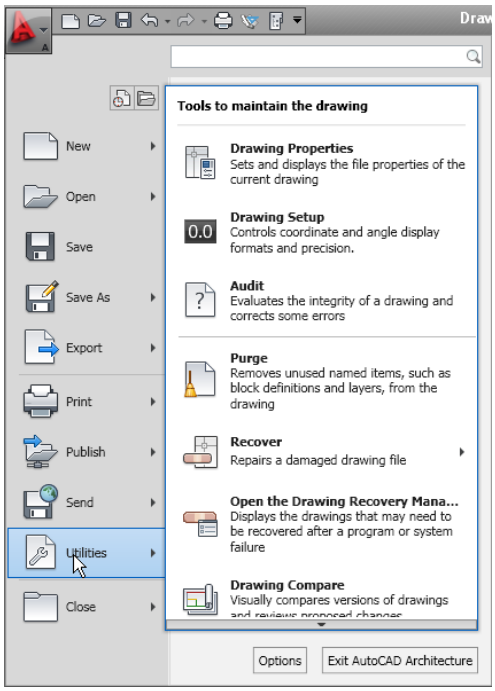


Extended tooltip for command



The Application Menu

The application menu contains basic commands pertaining to the drawing as a whole such as, Open, Save, Print, and Export. Like the menu browser it replaces, the application menu is accessed by clicking in the upper-left corner of the workspace.



The Quick Access Toolbar

The Quick Access toolbar is a customizable toolbar located at the top of the application window, just to the right of the application menu button.

By default, this toolbar contains a set of frequently used commands for the application. You can add and remove commands as needed.

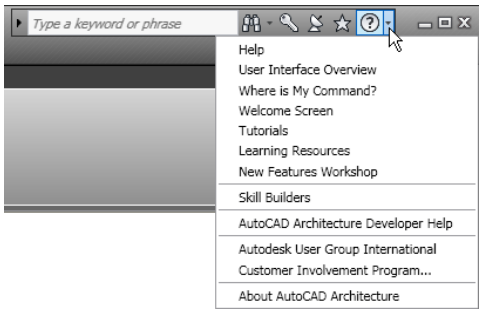
The InfoCenter Toolbar

InfoCenter is a central location where you can search for product-related help and other information sources. You can search for information through keywords (or by typing a phrase), display the Communication Center panel for product updates and announcements, or display the Favorites panel to access saved topics.

When you enter keywords or type a phrase, and then press ENTER or click the Search button, you search multiple Help resources in addition to any files that have been specified in the InfoCenter Settings dialog. The results are displayed as links on a panel. You can click any of these links to display the Help topic, article, or document.

Help Menu

With the removal of the menu bars, the commands to access Help features have been moved into the InfoCenter at the top right of the application window. Here, you can find the Help menu that lets you access Help, Tutorials, and other interactive resources.



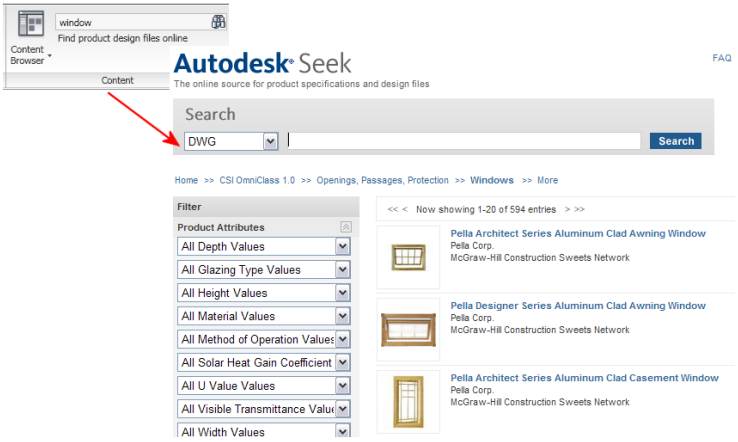
Improved Import Capabilities

In this version of AutoCAD Architecture, you can access more content and files to help you create your model and construction documents.

Autodesk Seek

You can use Autodesk Seek to find product design information. Many content providers, both corporate partners and individual contributors, publish to Autodesk Seek. Content includes 3D models, 2D drawings, specifications, brochures, and other descriptions of products or components.

Import design content into AutoCAD Architecture



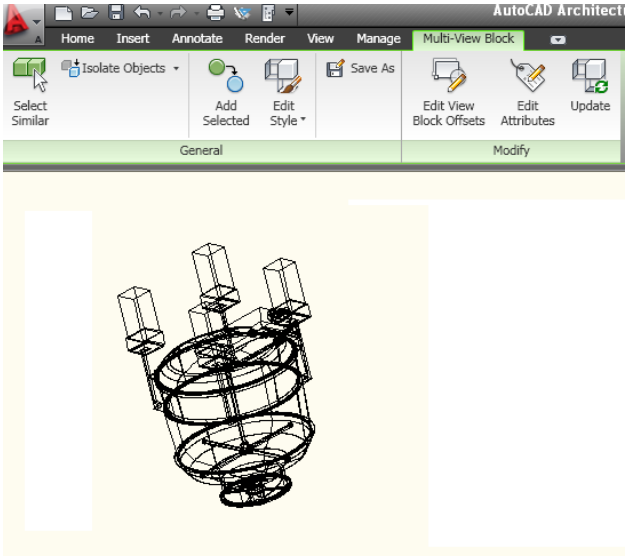
You can also share your own content with others using Autodesk Seek. Upload drawings or blocks to Autodesk Seek to give your partners and customers ready access to your content.

For more information, see “Use Autodesk Seek to Add and Share Drawings” in the AutoCAD Online Help.

Importing Inventor Files into AutoCAD Architecture

You can now import building components that were created in Autodesk Inventor, and convert them into blocks or multi-view blocks in AutoCAD Architecture. This improves interoperability between different products and is another step towards a seamless integrated workflow.

Inventor building block inserted into AutoCAD Architecture

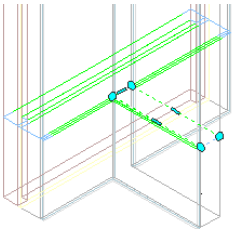


Drawing Improvements

Wall Cleanup

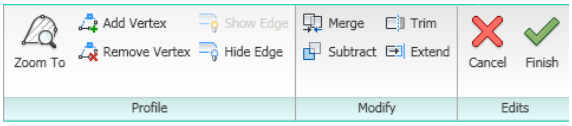
You can now use edit-in-place tools to specify wall cleanup parameters for intersecting wall segments that do not clean up on their own as they are drawn. You can use edit-in-place tools to show and hide profile edges, add and remove vertices, subtract profiles from wall components, merge profiles with wall components, and trim and extend wall components to a boundary.

When you edit a wall intersection in place, a temporary profile is created for each component in the intersecting wall segments.



Use the edit-in-place grips and the commands on the Cleanup panel of the Walls tab to make changes to the cleanup.

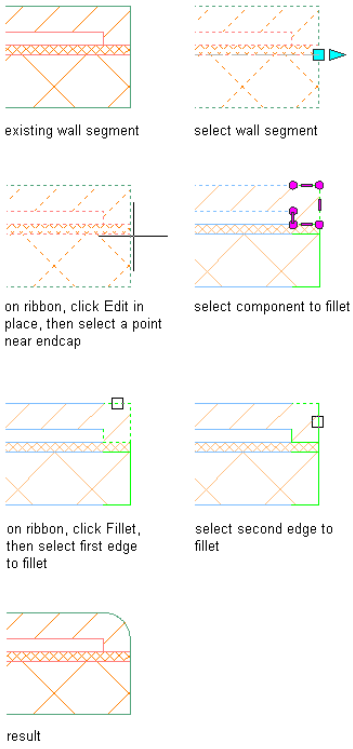
Wall Cleanup Edit-in-Place tab



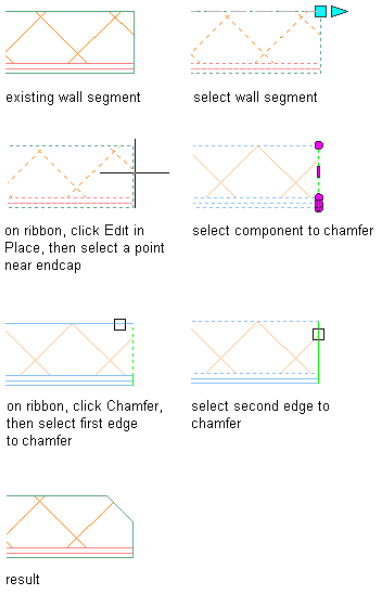
Wall Endcaps

In AutoCAD Architecture 2010, you can manipulate wall components to create appropriate wall endcap configurations. Use Fillet, Chamfer, Trim, Extend, Subtract, and Merge tools as necessary to do this. You can modify single wall components or you can modify all components at your wall endcap or opening at once. In each case, you will be using the Edit in Place feature as you modify the wall components to create your wall endcap condition.

Filleting a brick veneer corner



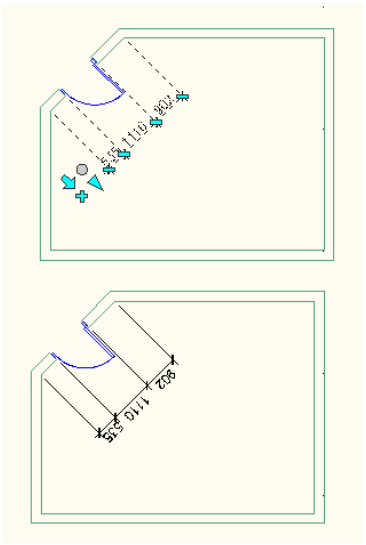
Chamfering a CMU corner



AEC Dimensions

When vertical AEC dimensions are rotated greater than 90 degrees, the dimension text flips sides. In some cases, when dimensions are part of a series of dimensions this is an undesired result.

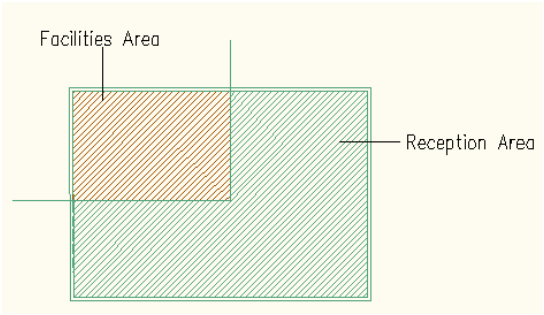
Using the Text Flip grip addresses this issue by swapping the settings of vertical text position and reading direction so that the dimension displays correctly.



Spaces

In addition to the regular objects that can be used as boundary objects for spaces, you can now also use a space separator tool that lets you separate spaces when no real object is there to separate them. This could be the case when you have different functional areas within the same room.

Using the space separator tool to create two different spaces in one room



A Quick Start for Transitioning from AutoCAD to AutoCAD Architecture

If you have previously accomplished your architectural tasks with AutoCAD and want to transition to AutoCAD Architecture, you will find that using tools specifically designed for architects provides additional productivity and benefits over the AutoCAD drafting methods you used before.

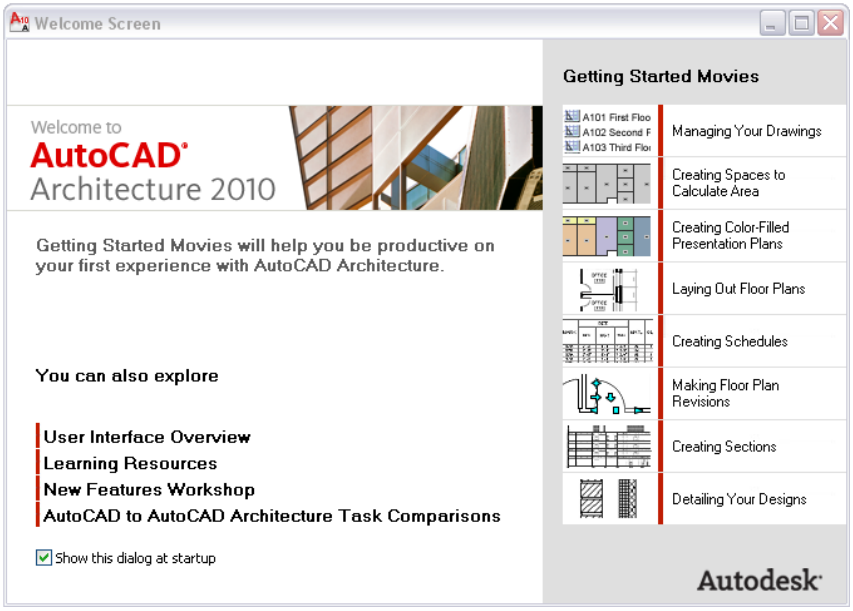
The help system is designed to simplify the transition from AutoCAD to AutoCAD Architecture. These help components will assist new users with previous AutoCAD experience to easily segue into working with AutoCAD Architecture:

- **User Interface Overview** An interactive method for exploring the AutoCAD Architecture user interface. Available from the Welcome screen, Learning Resources page, Help drop-down menu, and the main Help page.
- **Where is My Command?** A tool that lists commands by their previous menu location in AutoCAD Architecture and displays their current location on the ribbon.
  Available from the Help drop-down menu and the main Help page.
- **Getting Started Movies** Short movies about frequently used tasks in AutoCAD Architecture.
  Available from the Welcome screen, Learning Resources page, or the main Help page.

- **Learning Resources** A page with links to resources for different levels of expertise.
  Available from the Welcome screen, Help drop-down menu, and the main Help page.
- **New Features Workshop** An overview of the new features in AutoCAD Architecture.
  Available from the Welcome screen, Help drop-down menu, and the main Help page.
- **User Interface Tour** A short, introductory video about the AutoCAD Architecture user interface.
  Available from *www.autodesk.com/autocadarchitecture-uivideo*.

The Welcome screen provides centralized access to some of these components and displays when you open the application.

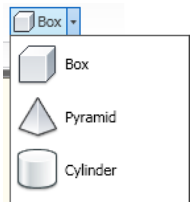
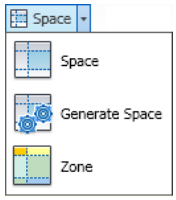
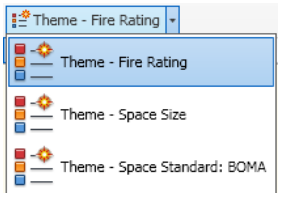
Welcome Screen



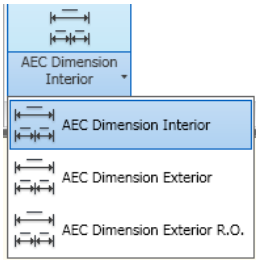
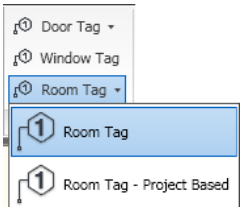
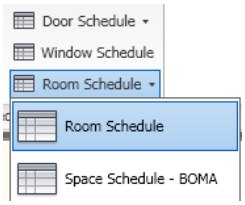
This overview of tasks and how to accomplish them in AutoCAD Architecture can help you get an easy start. For additional information about the task, open the Help topic or watch a short movie.

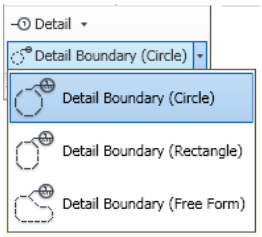
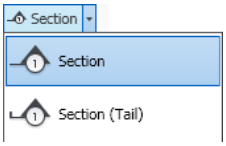
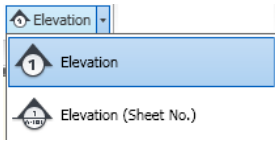
NOTE The software locations for tools, palettes, and catalogs listed below are the default locations for a standard US install. Customized installations, as well as localized versions may vary in the tools they supply and the structure of the tool palettes.

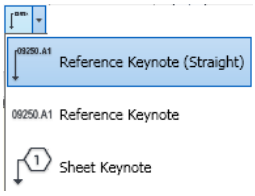
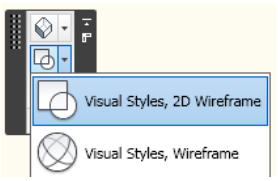
How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Work with Conceptual Massing?				

How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Design Massing Studies?	Solids	Mass Elements and Mass Groups	Home tab ➤ Build panel ➤ Box drop-down 	■ Online Help: Mass Elements and Mass Groups on page 657
Create a Space Layout and Colored Plans?				
Create Space Plans?	Polyline and Hatch	Spaces	Home tab ➤ Build panel ➤ Space drop-down 	■ Online Help: Space Types on page 1899 ■ Getting Started Movie: *Creating Spaces to Calculate Areas*
Create Color Fill Plans?	Hatching and Polylines	Display Themes and Spaces	View tab ➤ Appearance panel ➤ ➤ Themes drop-down 	■ Online Help: Process Overview: Creating Display Themes on page 2549 ■ Getting Started Movie: *Creating Color-Filled Presentation Plans*
Create Floor Plans?				
Draw Walls?	Linework or Multilines	Walls	Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall	■ Online Help: Walls on page 759 ■ Getting Started Movie: *Laying Out Floor Plans*

How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Draw Doors?	Blocks or Dynamic Blocks	Doors	Home tab ➤ Build panel ➤ Door drop-down ➤ Door	■ Online Help: Doors on page 1217
Draw Windows?	Blocks or Dynamic Blocks	Windows	Home tab ➤ Build panel ➤ Window	■ Online Help: Windows on page 1275
Draw Stairs?	Linework	Stairs	Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair	■ Online Help: Stairs on page 1363
Draw Railings?	Linework	Railings	Home tab ➤ Build panel ➤ Stair drop-down ➤ Railing	■ Online Help: Railings on page 1507
Draw Curtain Walls?	Linework	Curtain Walls	Home tab ➤ Build panel ➤ Wall drop-down ➤ Curtain Wall	■ Online Help: Curtain Walls on page 919
Add Furniture and Fixtures?				
Place Furniture, Fixtures, and Equipment?	Blocks or Dynamic Blocks	Multi-View Blocks	Insert tab ➤ Block panel ➤ Multi-View Block	■ Online Help: Multi-View Blocks on page 1881
Create Annotation and Scheduling?				

How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Dimension Drawings?	Dimensions	AEC Dimensions	Annotate tab ➤ Dimensions panel ➤ AEC Dimension drop-down 	■ Online Help: AEC Dimensions on page 2217
Add Schedule Tags?	Blocks	Tag Tools	Annotate tab ➤ Scheduling panel 	■ Online Help: Adding Tags Using Schedule Tag Tools on page 2466
Extract Schedules from Designs?	Tables	Schedules	Annotate tab ➤ Scheduling panel 	■ Online Help: Managing Schedule Tables on page 2473 ■ Learning Movie: *Creating Schedules*
Modify Block Properties for Scheduling Data?	Attributes	Property Set Definitions	Schedule Table tab ➤ General panel ➤ Edit Style drop-down ➤ Property Set Definitions	■ Online Help: Property Set Definitions on page 2510

How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Create Enlarged Plans?	Xclip	Callouts and Project Navigator	Annotate tab ➤ Callouts panel ➤ ➤ Detail Boundary drop-down 	■ Online Help: Working with Callouts on page 2419
Extract Building Sections?	Linework	Sections	Annotate tab ➤ Callouts panel ➤ Section drop-down 	■ Online Help: Placing Section Callouts on page 2435 ■ Getting Started Movie: *Creating Sections*
Extract Elevations?	Linework	Elevations	Annotate tab ➤ Callouts panel ➤ Elevation drop-down 	■ Online Help: Placing Elevation Callouts on page 2440
Mark up drawing revisions?	REVCLOUD command	Revision Clouds	Home tab ➤ Annotation panel ➤ Revision drop-down ➤ Revision	■ Online Help: AEC Content in the Content Browser on page 2564
Add Details and Keynotes?				
Create Details?	Linework	Detail Components	Home tab ➤ Details panel ➤ Detail Components	■ Online Help: Detail Components on page 2313 ■ Getting Started Movie: *Detailing Your Designs*

How do I...	with AutoCAD tools	with AutoCAD Architecture tools	Ribbon Location	More Information
Annotate Details?	Leaders	Keynoting	Home tab ➤ Annotation panel ➤ Keynote drop-down 	■ Online Help: Keynoting Tools on page 2368
Work in a Project?				
Create Presentation Graphics?	Visual Styles	Visual Styles	Floating View panel ➤ Visual Styles 	■ Online Help: "Use a Visual Style to Display Your Model" in the AutoCAD Help
Find and Manage Content?	Windows® Explorer and DesignCenter	Content Browser	Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser	■ Online Help: Content Browser Overview on page 97
Manage Layers?	Layer Properties Manager	Layer Manager, Layer Key Styles, Layer Standards	Home tab ➤ Layers panel ➤ Layer Properties	■ Online Help: Managing Drawing Layers on page 466 ■ Online Help: Working with Layer Keys on page 492 ■ Online Help: Creating and Editing Layer Standards on page 502
Manage Project Drawings?	Sheet Set Manager	Project Navigator	Quick Access Toolbar ➤	■ Online Help: A Short Overview of Drawing Management ■ Getting Started Movie: *Managing Your Drawings*

Starting AutoCAD Architecture

Use one of the following methods to start AutoCAD Architecture:

- Double-click the AutoCAD Architecture icon on your desktop.
  The icon is displayed on your desktop if you chose to create it when you installed the software.
- On the Start menu, click Programs ➤ Autodesk ➤ AutoCAD Architecture 2010 ➤ AutoCAD Architecture 2010.

NOTE AutoCAD Architecture 2010 can be run under Windows 2000, Windows XP, and Windows Vista.

Customizing Startup

You can use command-line switches in the properties of the desktop icon to specify AutoCAD Architecture startup options:

- Run a startup script when you start the software.
- Start the software with a specific template.
- Start the software with a specific profile (ARG file).
- Create several desktop icons, each with different startup options.

For more information, see "Customize Startup" in AutoCAD Help.

Finding Help

With AutoCAD Architecture 2010, you can move smoothly from 2D drafting to building information modeling in an AutoCAD-based environment. AutoCAD Architecture supports your current practices and helps you to take advantage of your knowledge of AutoCAD. Intelligent architectural objects and other powerful design and documentation features offered by AutoCAD Architecture will help you reap productivity benefits by minimizing tedious drafting and rework.

Autodesk provides many resources to ensure that you quickly become productive with AutoCAD Architecture and the many new features available in this release. Online and print documentation, real-world tutorials, and technical support channels are all available to answer your questions as you begin working with the software.

There are various available resources to help you learn about AutoCAD Architecture 2010 and AutoCAD® 2010.

Documentation	Description
AutoCAD Architecture 2010 Installation Guide	Explains how to install and configure AutoCAD Architecture 2010.
AutoCAD Architecture 2010 Help	Explains AutoCAD Architecture concepts and provides step-by-step procedures.
AutoCAD Architecture 2010 Online Tutorials	A set of exercises designed to give you an overview of the capabilities and features of AutoCAD Architecture.
AutoCAD Architecture 2010 New Features Workshop	Gives an overview of the new features in AutoCAD Architecture 2010.

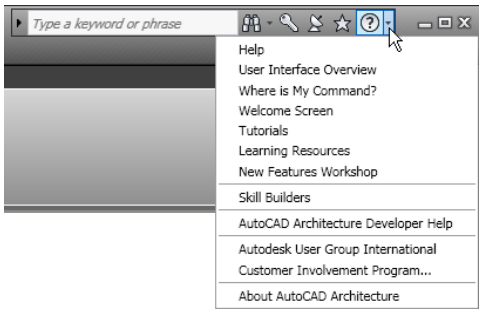
Documentation	Description
AutoCAD Architecture 2010 Getting Started Movies	Demonstrates typical and frequently used tasks in AutoCAD Architecture.
AutoCAD Architecture 2010 User Interface Overview	Provides a method to discover features in the AutoCAD Architecture user interface interactively.
AutoCAD Architecture 2010 Where is My Command?	Helps you identify the location of commands on the ribbon in AutoCAD Architecture 2010.
AutoCAD Architecture 2010 Learning Resources	Provides links to resources for different experience levels.
AutoCAD 2010 User's Guide	Provides conceptual and overview material with step-by-step procedures for AutoCAD 2010.
AutoCAD 2010 New Features Workshop	Gives an overview of the new features in AutoCAD 2010.

The advantage of online manuals is that they present information quickly while you are in a drawing session. Although online Help topics provide some conceptual and overview material, their main purpose is to help you get a task done efficiently. Therefore, the AutoCAD Architecture online Help emphasizes step-by-step procedures relevant to command selection. It also incorporates visual examples and links to more information.

Online tutorials are also an excellent way to become familiar with AutoCAD Architecture. When you use the tutorials to learn program concepts, you can keep the tutorial window open in the drawing area while you perform the steps.

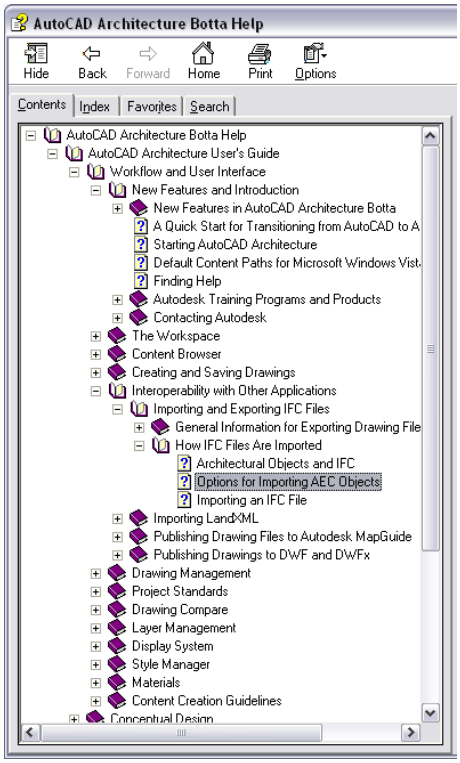
To access AutoCAD Architecture 2010 Help

With the removal of the menu bars, the commands to access Help features have been moved into the InfoCenter at the top right of the application window.



1. Click the Help button ( ) at the right side of the InfoCenter toolbar, and click Help.
2. When the Help window is displayed, click the AutoCAD Architecture 2010 Help book on the Contents tab, and then browse the contents to locate the information you need. Or use the Index or Search tabs to find specific topics.

Using the Table of Contents to browse Help



To access AutoCAD Architecture 2010 Tutorials

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, and click Tutorials.
2. When the Tutorials window is displayed, browse the Contents tab to locate the exercise you want to perform. The tutorials include datasets that correspond to the exercises.

To access the AutoCAD Architecture 2010 New Features Workshop

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, and click New Features Workshop.
2. On the Main Menu page, click the category for the feature you want to learn about.

To access the AutoCAD Architecture 2010 Getting Started Movies

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, click Welcome Screen.
2. On the Welcome screen, select a movie under Getting Started Movies on the right pane.

To access the AutoCAD Architecture 2010 User Interface Overview

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, and click User Interface Overview.
2. Hold your cursor over different sections of the user interface for more information.

To access AutoCAD Architecture 2010 Where is My Command?

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, and click Where is My Command?.
2. Click an AutoCAD Architecture 2009 menu in the left pane to display where those menu options exist on the ribbon in AutoCAD Architecture 2010.

To access AutoCAD Architecture 2010 Learning Resources

1. Click the drop-down arrow next to the Help button ( ) at the right side of the InfoCenter toolbar, and click Learning Resources.
2. Select one of the resources to learn more.

To access AutoCAD 2010 Help

1. Click the Help button ( ) at the right side of the InfoCenter toolbar, and click Help.
2. When the Help window is displayed, click the AutoCAD Help book on the Contents tab, and then browse the contents to locate the information you need. Or use the Index or Search tabs to find specific topics.

To access AutoCAD 2010 New Features Workshop

1. Click the Help button ( ) at the right side of the InfoCenter toolbar, and click Help.
2. When the Help window is displayed, click the AutoCAD Help book, and then click the New Features Workshop link under General Information.

Autodesk Training Programs and Products

Training programs and products from Autodesk help you learn the key technical features of your Autodesk software and improve your productivity. For the latest information about Autodesk training, visit *http://www.autodesk.com/autocadarchitecture-training* or contact your local Autodesk office.

Autodesk Authorized Training Centers

Be more productive with Autodesk® software. Get trained at an Autodesk Authorized Training Center (ATC®) with hands-on, instructor-led classes to help you get the most from your Autodesk products. Enhance your productivity with proven training from over 1,400 ATC sites in more than 75 countries. For more information about Autodesk Authorized Training Centers, contact *atc.program@autodesk.com* or visit the online ATC locator at *http://www.autodesk.com/atc*.

Autodesk Official Training Courseware

Autodesk publishes many courseware titles each year for users at all levels to improve their productivity with Autodesk software. The preferred training materials of Autodesk partners, these books are also well-suited for self-paced, standalone learning. All courseware simulates real-world projects with hands-on, job-related exercises. **Autodesk Official Training Courseware (AOTC)** is developed by Autodesk. **Autodesk Authorized Training Courseware (AATC)** is developed by Autodesk partners, including titles in a growing number of

languages. **Autodesk Official Certification Courseware (AOCC)** teaches the knowledge and skills assessed on the Certification examinations. Visit *http://www.autodesk.com/aotc* to browse the Autodesk Courseware catalog.

Autodesk Certification

Gain a competitive edge with your career by obtaining Autodesk Certification, validating your knowledge and skills on Autodesk products. Autodesk provides an end-to-end solution for assessing your readiness for certification, preparing for certification, and obtaining certification. For more information on Autodesk Certification, visit *http://www.autodesk.com/certification*.

e-Learning

Autodesk e-Learning for Autodesk Subscription customers features interactive lessons organized into product catalogs. Each lesson is 20-40 minutes in length and features hands-on exercises, with an option to use a simulation or the software application. You can also use an online evaluation tool that identifies gaps in skills, determines what lessons will be most helpful, and gauges learning progress.

If you are a member of Autodesk subscription, you can access e-Learning and other subscription services from within your Autodesk product. For more information about Autodesk subscription resources, visit *http://www.autodesk.com/subscription*.

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Website: *http://www.autodesk.com*

Sales Information

To purchase additional Autodesk software, contact your local reseller. For the name of the authorized reseller nearest you, call 1-800-964-6432 or access the Resellers and Training Centers website, *http://www.autodesk.com/resellers/*.

Technical Support

If you have technical questions about the products, you should contact your local reseller or check the frequently asked questions (Technical Solutions & FAQS) section and Discussion Groups on the website for AutoCAD Architecture at *http://www.autodesk.com/support*. News groups are another good source of information. You can look through the questions that have already been posted, or you can post your own questions.

Feedback

Please let us know what you think! Whether you have a suggestion for product enhancement, a compliment, or a complaint, or if you think you have found a bug, we would like to know about it.

To make comments and find additional information, visit our website at *http://www.autodesk.com/contact*.

The Workspace

2

The AutoCAD Architecture workspace is a highly customizable graphical user interface designed to accommodate the various workflows and work styles of architectural professionals. The topics in this section provide an overview of the available workspace components and describe how to access and configure them to meet your needs. For detailed instructions on using workspace components to create and edit architectural objects, refer to the relevant object-specific topics in Help (Walls, Doors, Windows, and so on).

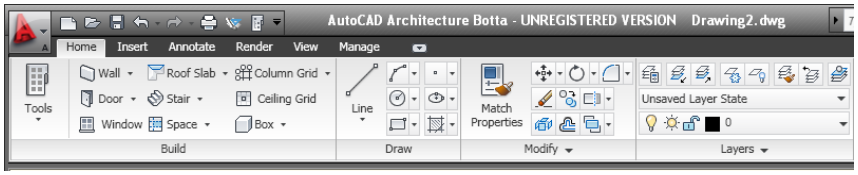
Changes to the Workspace in the 2010 Release

For the 2010 release, the workspace has been redesigned to make it easier and faster for you to find and use the tools and commands you need for the task at hand. This new user interface is described in detail in the following sections, but here are the highlights:

The Ribbon

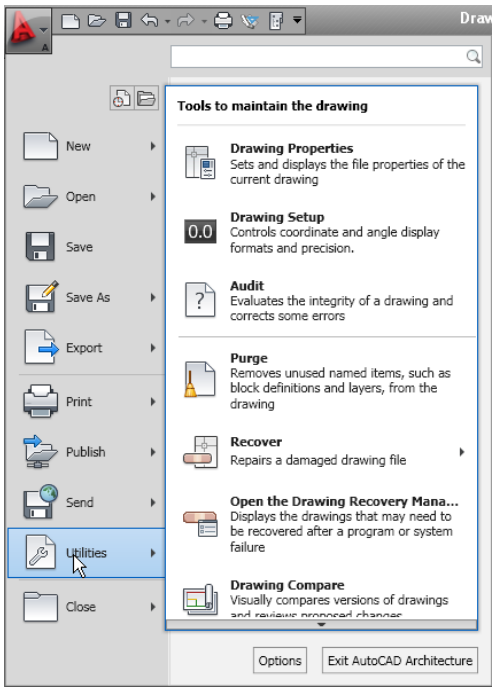
Similarly to Microsoft Office, AutoCAD Architecture 2010 now uses the ribbon as the central access point for commands. The ribbon contains a number of tabs on which commands are grouped according to conceptual task types or selected objects.

The ribbon replaces the menu bar and the toolbars as the primary command access point.



The Application Menu

The application menu contains basic commands pertaining to the drawing as a whole, such as Open, Save, Print, and Export. Like the menu browser it replaces, the application menu is accessed by clicking in the upper-left corner of the workspace.



Workspaces

AutoCAD Architecture is equipped with one single default workspace (Architecture). The menus and commands associated with the previously provided workspaces (Design, Document, Detailing, and Visualization) can now be accessed from the tabs of the ribbon.

NOTE The tool palette groups associated with the previous default workspaces are still available from the context menu of the tool palettes set.

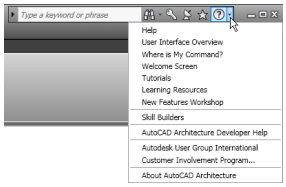
Drawing Status Bar Menu

The drawing status bar menu has been removed from AutoCAD Architecture 2010. Commands formerly found there can now be accessed from the application menu.

Commands on the old menu

Help Access

With the removal of the menu bars, the commands to access Help features have been moved into the InfoCenter at the top right of the application window. Here, you can find the online resources of InfoCenter and the Help menu, which lets you access Help, Tutorials, and other interactive resources.



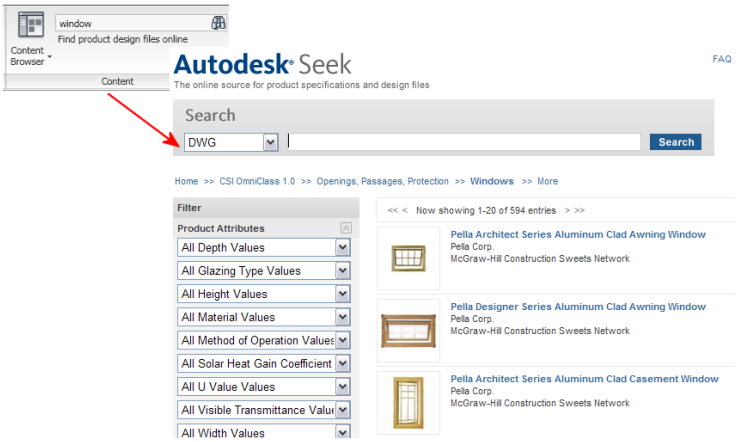
Toolbars

Toolbars have been removed from AutoCAD Architecture. Commands formerly found on toolbars can now be accessed from the ribbon.

Autodesk Seek

You can use Autodesk Seek to find product design information. Many content providers, both corporate partners and individual contributors, publish to Autodesk Seek. Content includes 3D models, 2D drawings, specifications, brochures, and other descriptions of products or components.

Import design content into AutoCAD Architecture



You can also share your own content with others using Autodesk Seek. Upload drawings or blocks to Autodesk Seek to give your partners and customers ready access to your content.

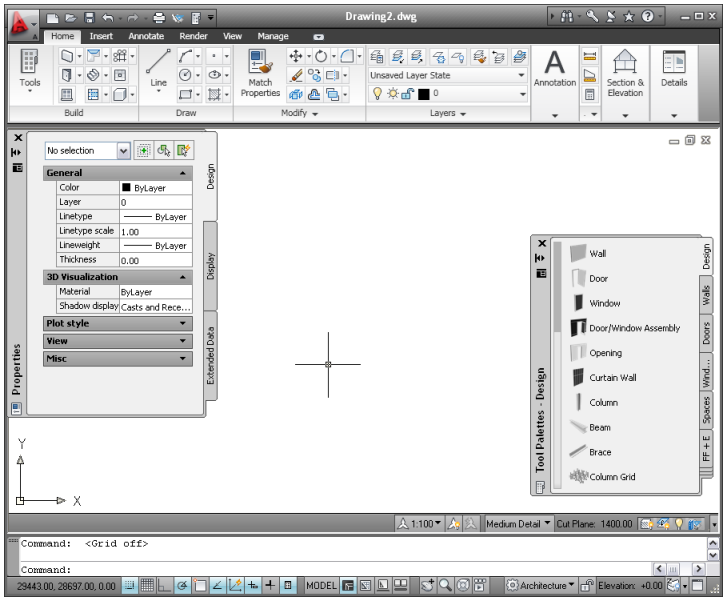
For more information, see “Use Autodesk Seek to Add and Share Drawings” in the AutoCAD Help.

The Workspace Concept

In AutoCAD Architecture, a workspace is the basic user interface that includes those controls, commands, and palettes you need for your architectural process. When you first start AutoCAD Architecture, the default Architecture workspace is displayed.

You can reconfigure the workspace according to your preferences as you work. You can move or hide various components as needed, display additional ribbon controls, or add new tools and tool palettes. If desired, you can save your customizations as a new workspace that you can access for later drawing sessions. You can also switch from one workspace to another at any time. For more information, see “Create Task-Based Workspaces” in the AutoCAD Help.

Default configuration of the Architecture workspace

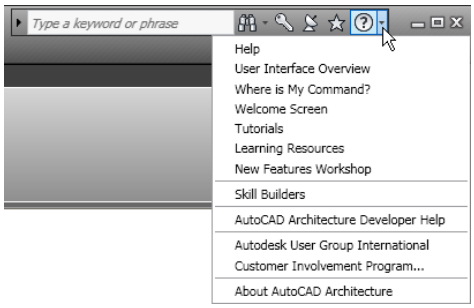


Workspace Components

The workspace consists of a drawing window with ribbon, tool palettes, and other controls that you use to set up an architectural project, create your design, and generate construction documents.

In the following sections, each component of the workspace is described in detail. Components can be turned off and on for different workspaces, depending on your requirements.

For an interactive guide to the user interface, click the Help button in the InfoCenter on the top right of the application window, and click *User Interface Overview*.

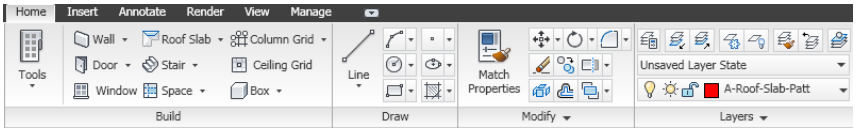


The Ribbon

The ribbon is the central location for accessing commands in AutoCAD Architecture. The ribbon is organized into tabs that reflect common tasks in the drawing process. There are 2 types of tabs:

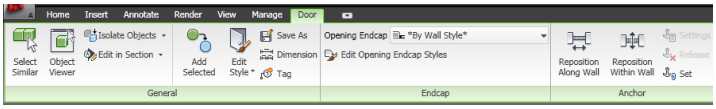
- Static tabs are available regardless of which objects are selected in the drawing area. The commands on these tabs were previously located on the menus and toolbars.

Static Home tab



- Contextual tabs display depending on the object selected in the drawing area. When you select a door, a contextual tab for doors is displayed. The commands on the contextual tabs reflect the commands on the context menu of an object.

Contextual tab for door objects

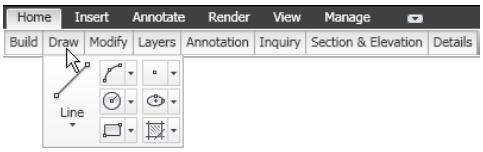


Displaying the Ribbon

To display the ribbon if it is not displayed in your workspace, or has been closed, enter **ribbon** on the command line.

You can use the ▼ button at the right of the tab names to modify the appearance of the ribbon as follows:

- To display only the panel titles of the ribbon tabs, click ▼ (Minimize to Panel Titles) at the top right of the ribbon.

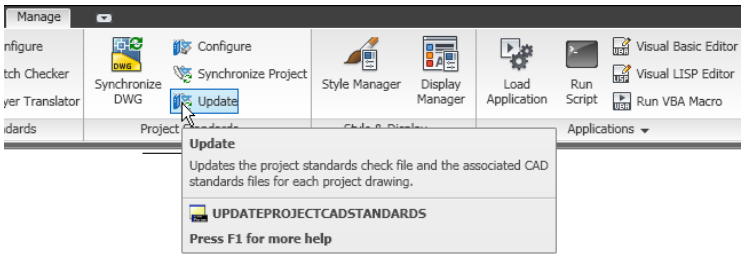


- To display only the tab names as titles, click ▼ again (Minimize to Tabs).
- To redisplay the full ribbon, click ▼ a third time (Show Full Ribbon).

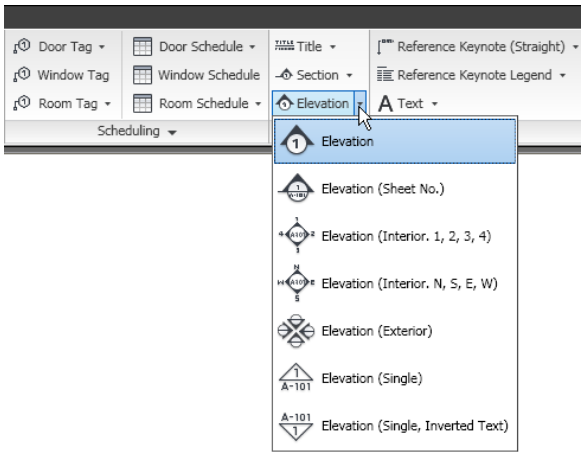
Using the Ribbon

To start a command from the ribbon

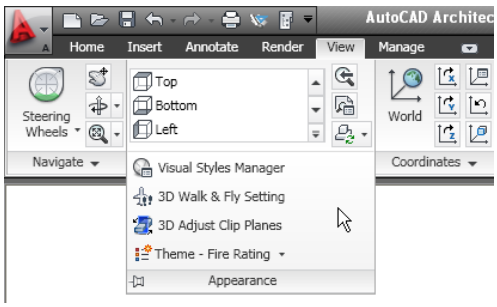
1. If the ribbon is not displayed by default, enter **ribbon** on the command line.
2. Click the desired tab.
3. Move the cursor over the commands on the tab as needed to view tooltips describing the commands.
4. Click a command.



Some ribbon commands are grouped under a drop-down menu. You can access them by clicking the arrow next to the command.



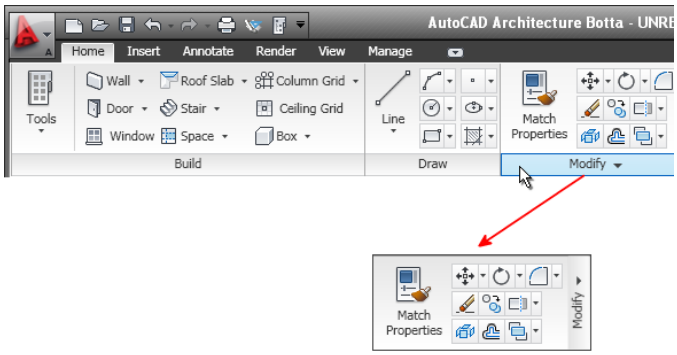
Some panels have an expansion arrow ▼ to indicate that the panel can be expanded. The expanded part typically contains commands that are less frequently used.



5 The expanded panel is displayed when you click the arrow ▼. To pin the expanded part of the panel onscreen, click .

To tear off a panel from a static ribbon tab

6 If you want a panel from a static tab to remain in your workspace when you switch to another tab, you can tear the panel off its tab and use it as a floating palette. To do so, move the cursor over the title bar of the panel, and then drag the panel off the ribbon and into the drawing area.



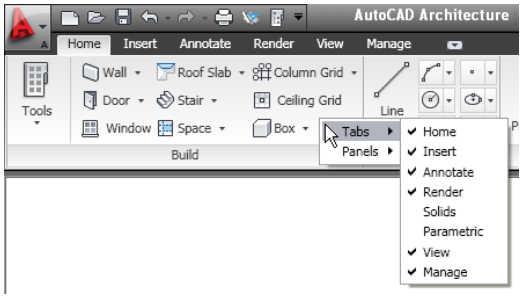
To return a floating panel to the ribbon

7 Move the cursor over the floating panel, and click Return Panels to Ribbon.

To hide and display tabs and panels

8 To hide tabs and panels or display a particular tab or panel, right-click anywhere on the ribbon and click Tabs or Panels (Show Tabs or Show Panels if you right-click on an empty area of the ribbon), and click the tab or panel name to deselect or select it.

A check mark displays beside the tab or panel name if it is selected.

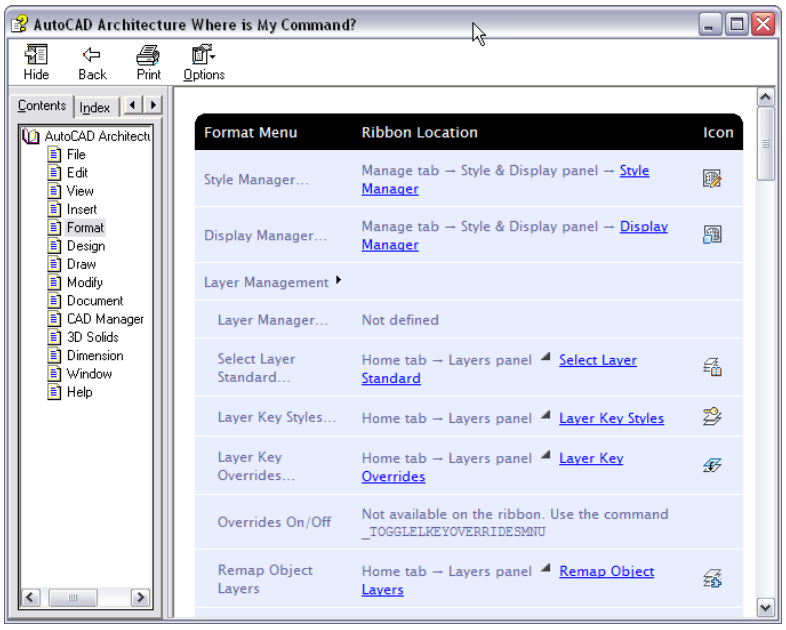


Locating Commands in the Workspace

The ribbon is intuitive and task-related, and the transition from menus and toolbars to the new user interface will in most cases be quick and easy. However, it is a new design, and the following tips might help you make a more seamless transition.

Where is My Command? Tool

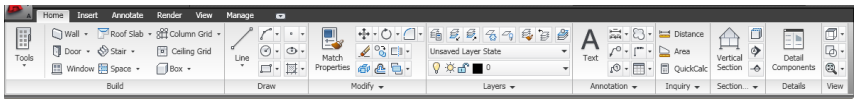
The *Where is My Command?* tool is a help file that lists commands by their previous menu location and displays their current location on the ribbon.



You can access the Where is My Command? tool from the Help menu ➤ Where is My Command, or from the landing page of the online Help.

Searching the Home Tab

The Home tab contains the most frequently used commands within the software. Basic object and drawing tools can be found here, as well as frequently used utilities like modification tools, layers and basic annotation. Use the Home tab as your starting point in a new drawing.



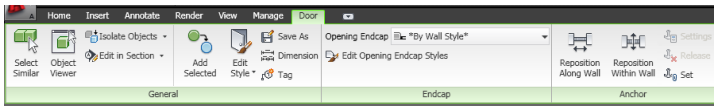
Finding Commands with the Application Menu

The application menu has a Search mode, where you can enter a command name or part of it, and see a list of locations in the user interface where the command can be accessed. For more information, see Using the Application Menu to Locate Commands on page 34.

Searching by Context

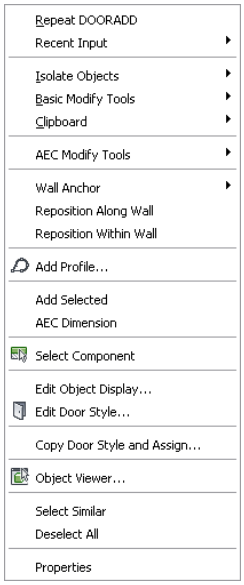
Commands that refer to a selected object can be found on the contextual tab of that object.

Door contextual tab



The command layout of the contextual tab of an object is in most cases based on the structure of commands on the context menu of the object.

Door context menu



For example, on the context menu of a door you can find the Add Selected command. On the contextual Door tab, you can find the Add Selected command on the General panel.

Finding More Information about the Ribbon

Use the following resources to find out more about the ribbon.

Click Help menu ➤ Learning Resources, and choose from these items:

- User Interface Overview (interactive)
- Tutorials

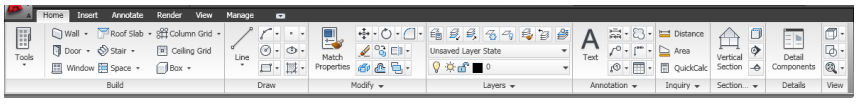
To access the Where is My Command? tool, click Help menu ➤ Where is My Command?

The Static Ribbon Tabs

The workspace comprises a set of static tabs that are optimized for architectural tasks. The default Architecture workspace for the US version of AutoCAD Architecture 2010 includes the following static tabs on the ribbon:

The Home Tab

The Home tab contains the most frequently used commands within the software. Basic object and drawing tools can be found here, as well as frequently used utilities like modification tools, layers, and basic annotation.



- **Build.** Contains the basic commands for adding the most commonly used objects, like walls, doors, and mass elements, as well as commands for opening the Tool palettes on page 56, The Properties Palette on page 82, and the Content Browser on page 97.
- **Draw.** Contains common linework tools, like lines, polylines, and rectangles, as well as hatch and boundary tools and AEC Polygons on page 1189.

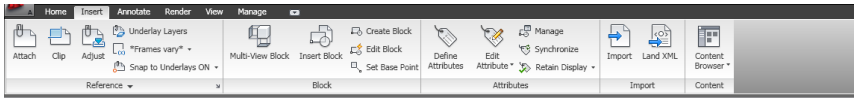
- **Modify.** Contains commands for manipulating objects and linework in a drawing. In addition to standard commands like Move, Rotate, Erase, Offset, Mirror, Scale, Array, Explode, Join, there is also a command for converting AEC objects to mass elements on page 683 and converting mass elements to 3D Solids on page 682.
- **Layers.** Contains commands that you need to work with layers. You can open the Layer Manager on page 466 and the Layer States Manager on page 485 from here.
- **Annotation.** Contains basic commands for inserting text, leaders, and dimensions. For a larger selection of annotation commands, see the Annotate tab on page 31.
- **Inquiry.** Contains commands for measuring distance and areas, and the AutoCAD list command. Furthermore, you can find commands for evaluating architectural spaces on page 2073.
- **Section and Elevation.** Contains commands for generating sections on page 2123 and elevations on page 2171 of your plan or model. To create sections and elevations with Callouts on page 2419, see the Callouts panel on the Annotate tab on page 31.
- **Details.** Accesses Detail Component Manager on page 2327 from which you can insert detail components directly into drawings or onto tool palettes.

Floating View Panel

The floating View panel offers access to the commands for views, visual styles, and the Zoom and Pan tools. This panel is not docked to the ribbon by default, and you can access it independently of the current ribbon tab. You can dock the floating View panel to the Home tab, if desired.

The Insert Tab

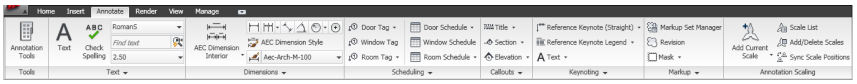
The Insert tab lets you work with references, multi-view blocks, blocks, attributes, and content from external sources like Content Browser and Autodesk Seek.



- **Reference.** Contains commands for working with external references (xrefs), DWF/DWFx files, DGN underlays, and raster images.
- **Block.** Contains commands for inserting and editing blocks and multi-view blocks on page 1890.
- **Attributes.** Contains commands for creating and editing attributes.
- Import. Contains commands for importing WMF, ACIS, 3D Studio Max, DGN, and LandXML files.
- **Content.** Contains commands for inserting content from Content Browser on page 97, from DesignCenter, or from Autodesk Inventor into your drawing.
- **Seek.** Lets you search online for prefabricated design content. For more information about Seek, see “Use Autodesk Seek to Share Drawings” in the AutoCAD Help.

The Annotate Tab

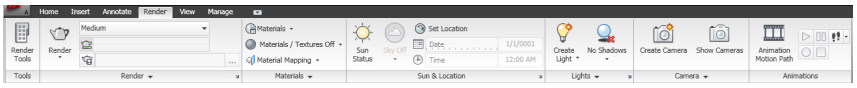
The Annotate tab contains commands that help you to mark up your drawing files.



- **Tools.** Accesses the Document tool palettes set.
- **Text.** Contains all commands for text and text styles and accesses the Fields editor.
- **Dimensions.** Contains commands for inserting and editing both AEC on page 2217 and AutoCAD dimensions.
- **Scheduling.** Contains commands for inserting schedule tables on page 2461 for basic objects, creating and inserting schedule tags on page 2465, and running a space evaluation on page 2073. Additionally, you can create schedule table styles on page 2475, and renumber property set data on page 2472.
- **Callouts.** Contains commands for placing title marks on page 2429, sections on page 2435, elevations on page 2440, and detail views on page 2430.
- **Keynoting.** Contains commands for adding sheet and reference keynotes on page 2368, keynote legends on page 2374, opening the keynote editor on page 2383, and selecting a keynote database on page 2385.
- **Markup.** Accesses commands for marking up a drawing for review. You can add revision clouds on page 2402, mask blocks on page 1865, wipeouts, open the Markup Set Manager, and load a markup DWF.
- **Annotation Scaling.** Commands here let you add the current scale to objects, display and edit the scale list, and add and delete scales for annotative objects.

The Render Tab

The Render tab contains all commands you need to work with rendering, materials, lights, cameras, and animations.

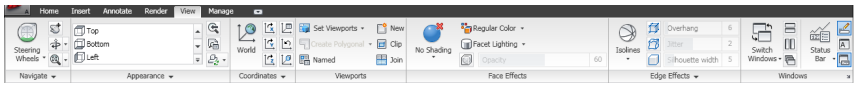


- **Render.** Contains commands for rendering a model or a region of it, defining render settings, generating a render output file, and opening the Advanced Render settings palette.
- **Materials.** Here, you can open the Materials palette, activate and deactivate materials and textures, and set the material mapping.
- **Sun and Location.** Here you can set parameters for natural sunlight.
- **Lights.** Contains commands for setting spotlights and shadows, selecting international lighting units, and enabling photometric lighting.
- **Camera.** Contains commands for creating and adjusting camera views.
- **Animations.** Contains commands for creating a WMV animation, as well as a model walk-through and fly-through.

The View Tab

The View tab is the central location for defining and changing views and navigating the drawing.

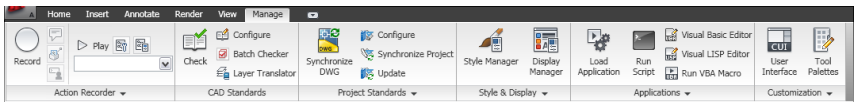
NOTE The View tab contains a number of commands also found on the application status bar.



- **Navigate.** Contains the ViewCube on page 54 and SteeringWheels on page 55, as well as the Pan, Zoom, and Orbit commands.
- **Appearance.** Here, you can select predefined views, create new views, open View Manager, select a visual style, open the Visual Styles Manager, and define Walk and Fly settings. You can access predefined display themes on page 2549. You can also adjust clip planes and access the Regenerate commands.
- **Coordinates.** Contains commands relevant to the World Coordinate System (WCS) or User Coordinate System (UCS).
- **Viewports.** Here you can switch between different viewport configurations, create new viewports, and clip and join viewports.
- **Face Effects.** Contains commands for defining object settings, including shading, color, face lighting, and x-ray.
- **Edge Effects.** Contains command for defining edge settings, including facet edges, isolines, edge overhang, jitter, and silhouette. You can also define the color of obscured edges and edge intersections here.
- **Windows.** Contains most of the commands that were on the Window menu in previous versions. Here you can switch between open drawings, arrange open windows onscreen, lock the workspace windows, display and hide the drawing window status bar on page 39, turn items on the drawing window status bar on an off, and display the text window.

The Manage Tab

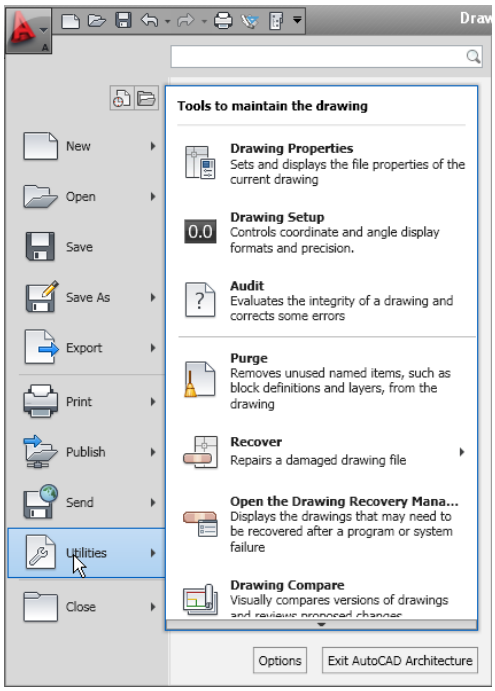
On the Manage tab, you can find features for advanced users and CAD managers.



- **Action Recorder.** Contains commands for recording and playing action macros.
- **CAD Standards.** Contains commands for configuring AutoCAD standards, check your drawing for standards violations, and start Layer Translator.
- **Project Standards.** Contains commands associated with project standards on page 387 for an AEC project. You can configure project standards, synchronize the project with its standards, synchronize standards with each other, and audit projects and drawings.
- **Style and Display.** Accesses the Style Manager on page 566, the Display Manager on page 513, the AEC Dimension Style Wizard on page 2262, the structural member catalog on page 1661, and the structural member wizard on page 1664. You can also define and insert profiles on page 1855.
- **Applications.** Contains commands for loading extra applications, like ARX, LSP, or VB applications, and running user-defined scripts and VBA macros. Also accesses the VBA Manager and the Visual Basic and Visual Lisp editors here.
- **Customization.** Accesses the User Interface Editor (CUI) and the Tool palettes on page 56.

The Application Menu

The application menu contains commands that are relevant for the drawing as a whole.



The application menu contains commands for the following file operations:

- Create new drawings and projects
- Open drawing files, project files, DGN files, and IFC files
- Save drawings to the current file format, to AutoCAD 2007 file format, as DWT file, or as DWS file
- Export files to DGN, DWF, PDF, IFC, gBXML, and DuctXML formats, and previous versions of AutoCAD
- Plot drawings
- Publish drawings to Map Guide, DWF, PDF, Seek, and eTransmit
- Access drawing setup and drawing utilities
- Access the program options
- Close drawings and projects
- Exit AutoCAD Architecture

Accessing the Application Menu

To access the application menu, click at the upper-left corner of the workspace.

The application menu remains open as long as the cursor is located inside the application menu window. To close the application menu, either activate a menu command, or click outside of the application menu window.

Using the Application Menu to Locate Commands

In the application menu, you can search for a command and then select it from the list of matches. Search results are retrieved from the following locations:

- Application menu
- Static ribbon tabs
- Any contextual tab currently on display
- Quick Access toolbar

You can enter the following strings to search for:

- Display name of the command in application menu, ribbon or Quick Access toolbar. For example, you can enter “Style Manager” or “Plot Preview.”
- Part of the display name: If you are not sure what the exact name is you can enter a part of the name, for example “Style” or “Save.” This will retrieve all commands that contain that string.
- Actual command name: You can enter the name of a command as it would be typed on the command line, for example “aecstylemanager” or “dist.” This will retrieve all locations where this command can be found.

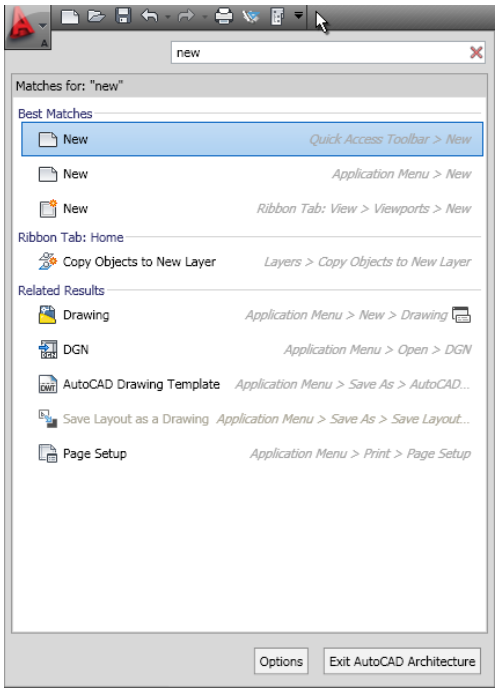
IMPORTANT When searching for AutoCAD Architecture commands, you must add the Aec prefix (for example, aecwalladd instead of walladd) to the command.

In addition to instances of the search string, the results include the contents of the associated tooltip and any search tags you have defined in the Customize User Interface editor (CUI). For information about search tags, see “Assign Search Tags” in the AutoCAD Help.

1 At the upper-left corner of the workspace, click to open the application menu.

2 In the text entry box at the top of the menu, enter the desired search term.

A list of matches replaces the regular application menu display.



3 To select one of the found commands, click it.

4 To return to the regular application menu display, click at the right side of the text entry box.

Displaying Recently Opened Documents in the Application Menu

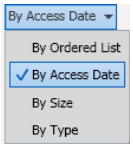
The application menu lets you display a list of recently opened documents according to preferences you specify.

1 Click to open the application menu.

2 At the top of the menu, click Recent Documents .

3 At the top of the menu, under Recent Documents, specify how you want documents grouped:

- By access date
- By Size
- By Type (DWG, APJ, and DGN)
- By Ordered List (alphabetical order)



4 At the top right of the list of documents, click to specify whether to display file type icons or preview images next to the document names.

5 If you want to keep a document in the list, regardless of its last-saved date, click its pushpin to change the image from to . The document will remain in the list until you unpin it.

Displaying Currently Open Documents in the Application Menu

The application menu lets you display currently open documents.

1 Click to open the application menu.

2 At the top of the menu, click Open documents .

3 At the top right of the list of documents, click to specify whether to display file type icons or preview images next to the document names.

Changing the Number of Recent Files and Actions in the Application Menu

Use this procedure to change the default number (9) of recent documents displayed in the application menu:

1 Click to open the application menu.

2 At the bottom of the application menu, click Options.

3 On the Open and Save tab of the Options dialog, under Application Menu, change the value for Number of recently-used files.

4 Click OK.

The Quick Access Toolbar

The Quick Access toolbar is a customizable toolbar located at the top of the application window, just to the right of the application menu button.

By default, this toolbar contains a set of frequently used commands for the application. You can add and remove commands as needed.

To add a command from the ribbon

1 On the ribbon, locate the command you want to add.

2 Right-click the command, and click Add to Quick Access Toolbar.

NOTE Not all commands can be added to the Quick Access Toolbar. If a command is ineligible, the Add to Quick Access Toolbar command is not visible in the context menu.

To add other commands to the Quick Access Toolbar

3 On the Quick Access Toolbar, click the down arrow at the right end of the toolbar, and select More Commands.

4 In the Customize User Interface Editor, select the command you want to add and drag it onto the Quick Access toolbar.

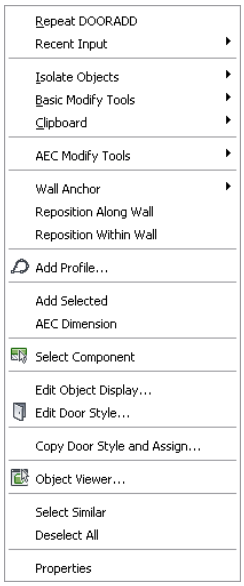
To remove a command from the Quick Access toolbar

➤ Select the command on the Quick Access Toolbar, right-click, and click Remove from Quick Access Toolbar.

Context Menus

When you right-click in the drawing area, the content of the context menu depends on the currently selected object(s). For example, if one or more door objects are selected, a door-specific context menu is displayed as shown.

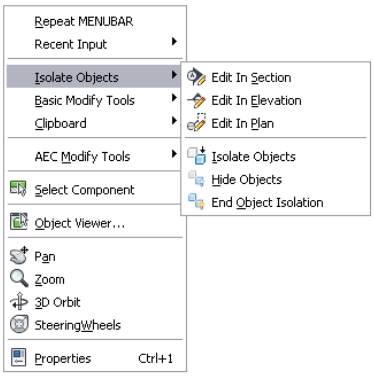
Door context menu



Most commands that can be found on the context menu of an object exist in the contextual ribbon tab of the object, too.

If more than one type of object is selected, the context menu includes only those commands that can be applied to all the selected objects. Likewise, the ribbon displays a Multiple Objects contextual tab that contains only the applicable commands. If no objects are selected, the general context menu is displayed as shown below. This menu contains non-object-specific commands.

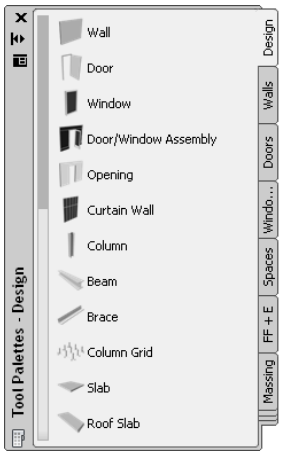
General drawing context menu



Tool Palettes

Tool palettes provide the main method for accessing tools to create objects in your model. You can have tools for standard objects as well as for objects with specific styles and properties. Tool palettes are organized by tool palette groups in a tool palettes set. You can create your own tool palettes, or you can copy existing tool palettes from the Content Browser.

Design tool palette with tools for standard design objects

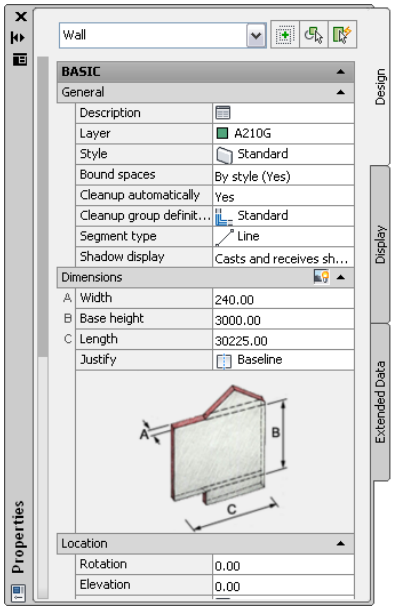


For more information, see Working with Tool Palettes on page 56.

Properties Palette

The Properties palette provides a central location to view and modify both the physical and graphical properties of an object. The object can be one you are about to draw, or one that is already selected in the drawing area. Using the Extended Data tab of the Properties palette, you can also attach other kinds of information to an object, such as classifications, notes, reference documents, hyperlinks, and property set data. You typically keep the Properties palette open during an AutoCAD Architecture session.

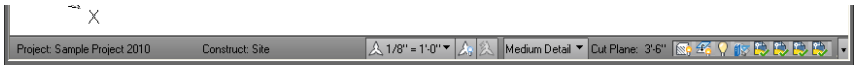
Properties Palette for a standard wall object



For more information, see The Properties Palette on page 82.

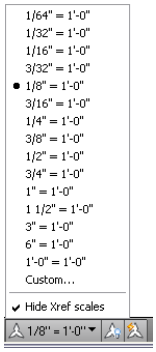
Drawing Status Bar

Located at the bottom of the drawing area, the drawing status bar displays status information about the current drawing and provides access to the following commands that can be applied to the drawing.



The drawing status bar contains the following information and controls:

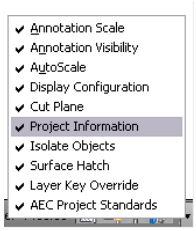
- Project Information: If the drawing is part of an AutoCAD Architecture project, this information includes the name of the project and the type of file, (such as View or Construct). For more information, see Drawing Management on page 199.
- Annotation Scale: To change the annotation scale for the current viewport, click the current value, and select a new one from the list. Changing the scale may also change the Level of Detail setting described below.



- Annotation Visibility: Click to show annotative objects for all scales. Click to automatically add scales to annotative objects when the annotation scale changes.
- Level of Detail: Shows the current display configuration of the active viewport and provides a drop-down list from which you can select another configuration.

- Cut Plane: Identifies the global cut plane height for the active display configuration and provides access to a dialog that lets you adjust the setting. For more information, see Global Cut Planes on page 367.
- (Surface Hatch Toggle): Lets you switch the display of surface hatching on or off. For more information, see Working with Surface Hatches on page 590.
- (Layer Key Overrides): Lets you switch layer key overrides on or off in the Layer Key Overrides dialog. For more information, see Layer Key Overrides on page 500.
- (Isolate Objects): Lets you hide or display objects you have selected in the drawing. For more information, see Editing Objects in Temporary Views on page 748.

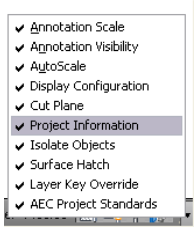
- (AEC Project Standards): When a project is loaded, click here to synchronize or configure standards for the current project. For more information, see Project Standards on page 387.
- (Autodesk Trusted DWG): This icon indicates that you have opened a DWG, DWT, or DWS file that is created using Autodesk applications or RealDWG™-based applications.
- (Manage Xrefs): Click to open the External References palette, where you can reload xrefs that are associated with your current drawing.
- Missing Standards File(s): When applicable, this warning indicates that standards files are missing in the current drawing; you can then check settings for the standards and configure them as necessary. For more information, see Configuring Project Standards on page 393.
- Drawing Status Bar Menu: A drop-down list of the settings and commands available for display on the drawing status bar.



Showing and Hiding Commands on the Drawing Status Bar

You can specify which features on the drawing status bar menu are shown or hidden as needed.

1 at the right end of the drawing status bar, click the drawing status bar menu arrow.



2 Select commands you want show, and clear commands you want to hide.

Showing and Hiding the Drawing Status Bar

The drawing status bar can be turned on and off from the ribbon or from the application status bar on page 41. Turning the drawing status bar off will increase the size of the drawing area.

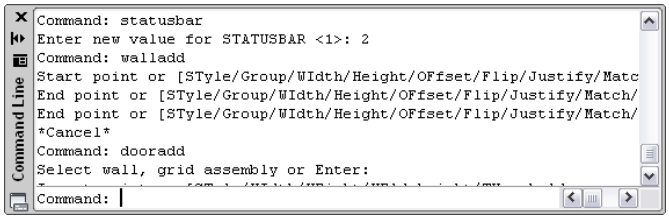
To show and hide the drawing status bar, click View tab ➤ Windows panel ➤ Drawing Status Bar.

Command Line

You can directly enter commands using the command line window located immediately below the drawing status bar.

To hide and display the command line window, click View tab ➤ Windows panel ➤ Command Line.

If you want to hide the command line window except for its title bar when you are not using it, click on the title bar of the command line window. Moving the cursor over the title bar will redisplay the command line window.



Application Status Bar

The application status bar contains settings for the current drawing session. Some settings, such as options for different elevations, only display if you are working within a project.

The group of commands on the left side of the application status bar can be displayed as icons or text labels.

Commands displayed as icons

Commands displayed as text labels

To change the display of these commands right-click any of them, and select Use Icons.

To activate or deactivate any of the commands in this group, click the icon or label. Blue indicates an active control; gray indicates an inactive control. To change the settings for one of these commands, right-click the icon or label, and click Settings.

For detailed information about these options, see “Use Precision Tools” in the AutoCAD Help.

The following commands and settings are available on the application status bar:

- Cursor coordinate values: Controls the coordinate format as either relative or absolute. For more information, see “Overview of Coordinate Entry” in the AutoCAD Help.
- (Snap): Lets you restrict the movement of the cursor to the drawing grid.
- (Grid): Lets you display a rectangular grid as a drawing aid.
- (Ortho): Lets you restrict cursor movement to horizontal and vertical directions when creating and modifying objects.
- (Polar Tracking): Lets you restrict cursor movement to specified angles.
- (Object Snap): Lets you restrict movement of the cursor to specified points on objects, such as the midpoint or an intersection point.
- (Object Snap Tracking): Lets the cursor track along alignment paths based on other object snap points when specifying points in a command. This feature can be used only in conjunction with Object Snap.

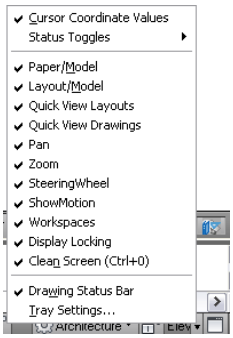
- (Dynamic UCS): Lets you temporarily and automatically align the XY plane of the UCS with a plane on a solid model while creating objects.
- (Dynamic Input): Lets you enter values for objects directly onscreen near the cursor. Dynamic input can be turned on and off during creating or editing an object in the drawing area.
- (Lineweight): Lets you turn the lineweight display component on or off for objects in the drawing. In model space, lineweights are displayed in pixels and do not change when zoomed in or out. Displaying the lineweight could create some very heavy line display.
- (Quick Properties): This feature is intended for AutoCAD objects and is turned off in AutoCAD Architecture.
- (Model Space) or (Paper Space): Switches between layouts. For more information, see “Work with Model Space and Paper Space” in the AutoCAD Help.
- (Quick View Layouts): Lets you preview model space and all layouts in a drawing as a horizontal row of images. Click on a preview image to display the layout. For more information, see Quick View Tools on page 53 and “Navigate within a Drawing (Model Space and Layouts)” in the AutoCAD Help.
- (Quick View Drawings): Lets you preview all currently open drawings with their model space and layouts. Click on the preview image to display the drawing or layout. For more information, see Quick View Tools on page 53 and “Navigate Between Open Drawings” in the AutoCAD Help.
- (ShowMotion): Provides an onscreen display that can be used to create, select, and play back cinematic camera animations called shots. These animations can be used for presentation purposes or for navigation. For more information, see “ShowMotion” in the AutoCAD Help.
- (Pan): Lets you drag the view to reposition it within the drawing area
- (Zoom): Lets you increase or decrease the apparent size of objects in the drawing area
- (SteeringWheel): Lets you display a tracking menu containing different navigation tools. For more information, see “Navigate with SteeringWheels” in the AutoCAD Help.
- (Workspaces): Lets you switch between workspaces. For more information, see The Workspace Concept on page 23.
- (Toolbar/Window Positions): Lets you switch between docked windows and toolbars and floating windows and toolbars.
- Elevation: Lets you define the elevation of the construct relative to the level you have selected. This button opens the Elevation Offset worksheet where you enter or pick the elevation offset.
- (Replace Z value with current elevation): Can be switched on or off, replacing the existing *Z* value with the current elevation.

- (Clean Screen): Click to switch between the standard screen and a full screen. In full-screen mode, all toolbars and palettes (except the tool palettes) are hidden. Hidden palettes retain their current state.

Showing and Hiding Commands on the Application Status Bar

You can show or hide individual commands on the application status bar menu.

1 At the right end of the application status bar, click the application status bar menu arrow.



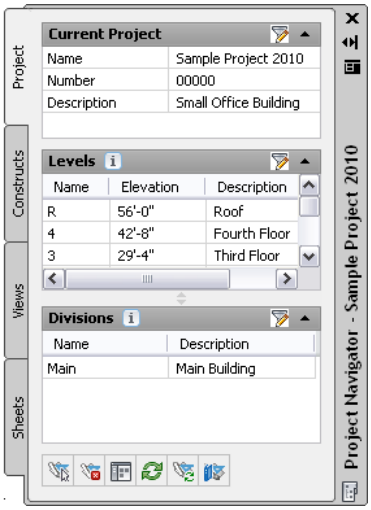
2 Select commands as desired.

NOTE Alternatively, you can click View tab ➤ Windows panel ➤ Status Bar to access these commands.

Project Navigator Palette

The Project Navigator palette is the central location to create, modify, and access AutoCAD Architecture project files. You typically have the Project Navigator palette open in the workspace while you work on a project. For more information, see Drawing Management on page 199.

Project Navigator palette



Finding Information in AutoCAD Architecture

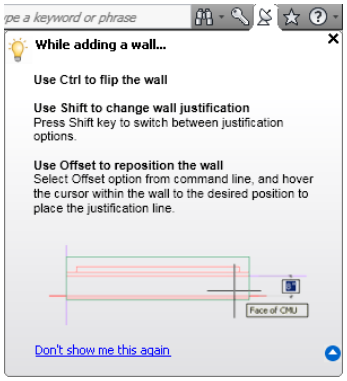
In addition to online help and tutorials, AutoCAD Architecture provides various ways to quickly access the information you need to be successful with new and existing features. Review the sections below to learn how you can get help quickly and with minimal disruption of your workflow.

InfoCenter Toolbar

InfoCenter is a central location where you can search for product-related help and other information sources. You can search for information through keywords (or by typing a phrase), display the Communication Center panel for product updates and announcements, or display the Favorites panel to access saved topics.

When you enter keywords or type a phrase, and then press ENTER or click the Search button, you search multiple Help resources in addition to any files that have been specified in the InfoCenter Settings dialog. The results are displayed as links on a panel. You can click any of these links to display the Help topic, article, or document.

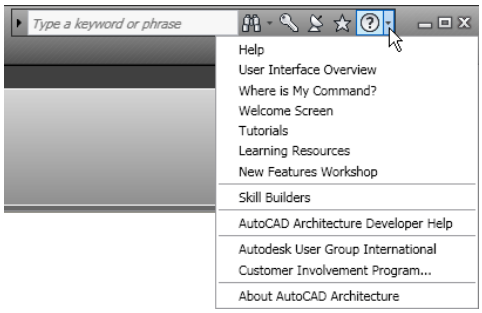
In addition, Communication Center displays Did You Know balloons for selected feature areas. These balloons provide knowledge base information and general instructional messages such as tips. You can click on the arrow icon to expand the balloon to view the detailed information.



For detailed information about InfoCenter, see “Find Information Using InfoCenter” in the AutoCAD Help.

Help Menu

With the removal of the menu bars, the commands to access Help features have been moved into the InfoCenter at the top right of the application window. Here, you can find the Help menu that lets you access Help, Tutorials, and other interactive resources.



Communication Center

Communication Center is accessed from the InfoCenter toolbar. This resource displays links to information about product updates and product announcements, and may include links to Subscription Center, CAD Manager specified files, and RSS feeds.

F1 Context Help

For many commands and dialogs you can access a context-related Help topic using one of the following methods:

- Press F1 while a command is active or a dialog is open.
- Press F1 while a ribbon tooltip is displayed.
- Click the Help button in a dialog.

Tooltips

In addition to interactive tooltips that help you to create and edit objects (see Direct Editing with Grips and Dynamic Dimensions on page 87), AutoCAD Architecture provides tooltips that display information about the command, option, or file over which you pause the cursor.

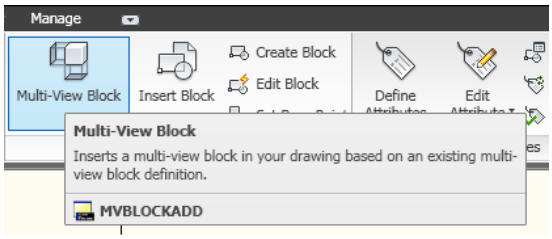
Command Tooltips

A short description displays whenever you pause the cursor over a command in any of the following locations:

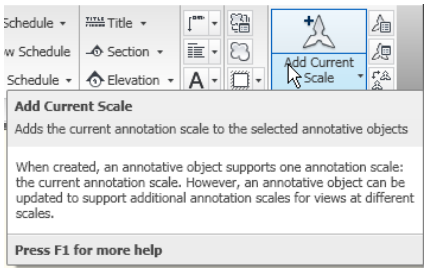
- The ribbon
- The Quick Access toolbar

For some commands, an extended tooltip displays after a user-specified time interval.

Standard tooltip for command



Extended tooltip for command



Controlling the Display of Command Tooltips

You can change the display of command tooltips. For extended tooltips you can define a time interval between the display of the basic tooltip and the extended tooltip.

1 Click ➤ Options.

2 Click the Display tab.

3 Under Window Elements, select Show Tooltips.

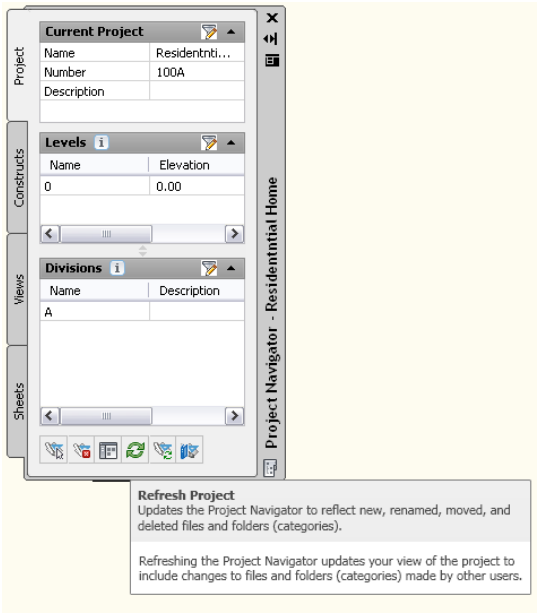
4 If you want to change the time interval between displaying the basic tooltip and the extended tooltip, select a different value for Number of seconds to delay. If you want to turn off the extended tooltip information completely, deselect Show extended Tooltips.

5 Click OK.

Dialog and Palette Tooltips

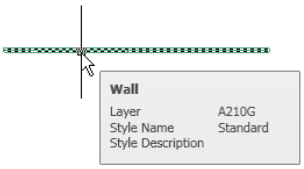
The following dialogs and palettes support extended tooltips:

- Project Browser dialog
- Project Navigator palette
- Drawing Compare palette



Object Rollover Tooltips

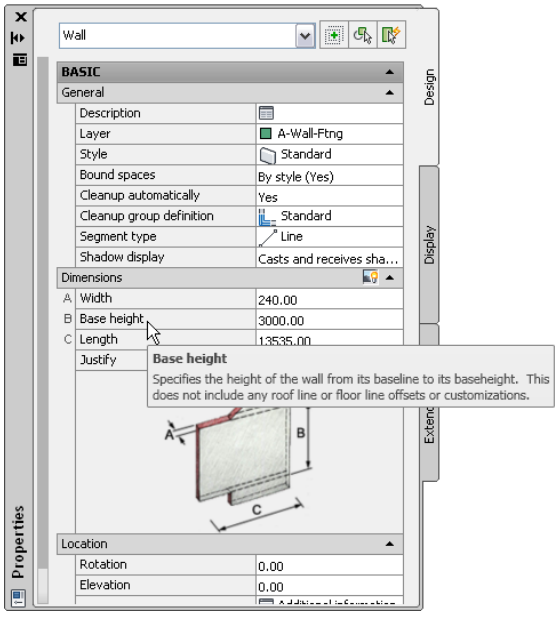
When you pause the cursor over an object in the drawing area, an informational tooltip displays basic information about the object.



Unlike the rollover tooltips provided for AutoCAD objects, such as lines or polylines, this information is standardized and cannot be changed. For information on how to configure rollover tooltips for AutoCAD objects, see “Customize Rollover Tooltips” in the AutoCAD Customization Guide.

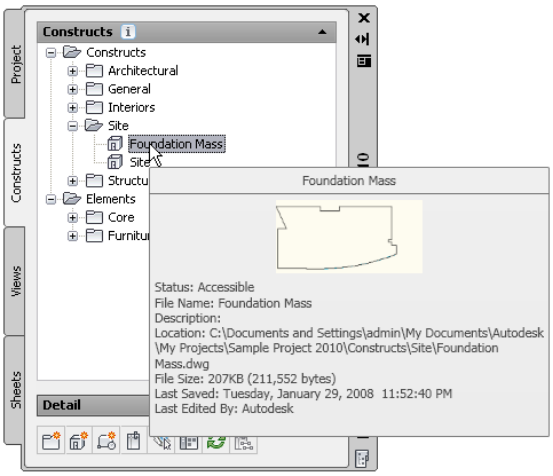
Property Palette Tooltips

The Properties palette displays tooltips when you pause the cursor over a property in the list.



Thumbnail (Preview) Tooltips

In the Project Navigator, you can display thumbnail previews of project drawings. The preview can be a graphic or a detail, or a combination of both. Displaying thumbnails can be helpful when you are navigating large projects with many drawings.



To activate preview tooltips in the Project Navigator

1 On the Quick Access Toolbar, click .

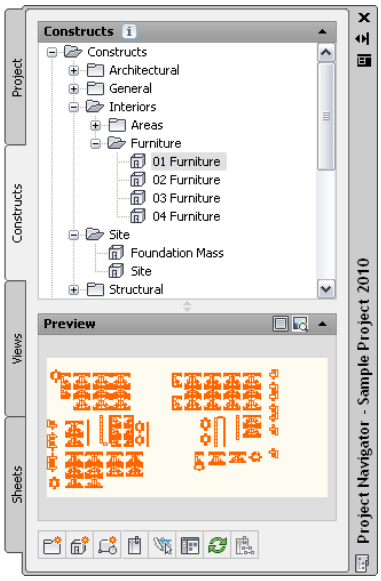
2 In the Project Navigator, open the Constructs, Views, or Sheets tab.

3 Right-click in the toolbar area at the bottom of the tab.

4 Click Tooltip Style, and select one of these options:

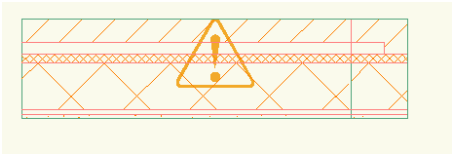
Use this option…	To display
Name	only the name of the drawing file, maximizing the file tree visibility.
Preview	only a preview image of the drawing at the size you specify (Small, Medium, or Large).
Details	only a text description of the file, identifying its location, size, last-saved date, and last editor.
Preview & Details	both a a text description and a preview image at the size you specify (Small, Medium, or Large).

5 If you want a static display of the preview image or the detailed file description, right-click in the toolbar area again, and click Preview/Details Pane. Regardless of which tooltip style is selected, this option displays a preview of a selected file in an pane below the file tree. Use the buttons on the pane's title bar to switch between the Preview pane containing the image and the Detail pane containing the text description.

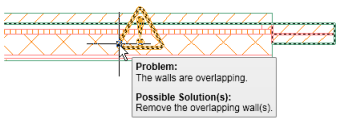


Solution Tips

The intended interaction among objects in an AutoCAD Architecture drawing depends on various rules about how objects are placed in relation to one another. Whenever the software identifies a problem with the placement of objects or their components, a solution tip icon is displayed to identify the location of the problem, as shown.



Move the cursor over the icon to display a message that describes the problem and provides one or more possible solutions. Some solution tips provide complete instructions for resolving the problem. Where more detailed instructions are required, you can press *F1* to access the relevant topic in Help.



Note that not all object configuration problems have an easily identifiable cause or a specific solution. This is often true in the case of boolean operations where an entity such as a body modifier is added to or subtracted from an object. In these cases, the solution tip identifies the kind of object or component involved and suggests corrective action. You may be advised to modify the location or the geometry of the object, but it is essentially a trial-and-error approach. The messages are tips rather than guaranteed solutions.

By default, solution tip icons are displayed when you are drafting, but not during plotting or publishing. You can change these settings in the Options dialog using the following procedure:

1 Click ➤ Options.

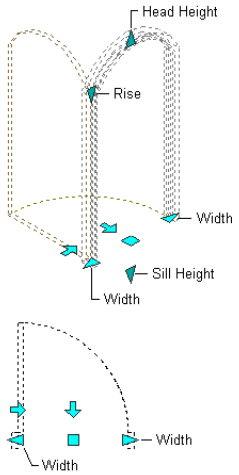
2 In the Options dialog, click the AEC Editor tab.

3 In the Solution Tip panel, select or clear Drafting and Plotting/Publishing as desired.

Object Grip Tooltips

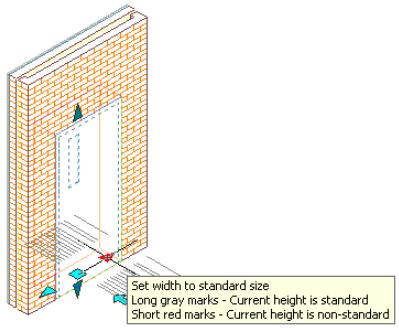
Objects in AutoCAD Architecture have grips you can use to manipulate them. Pause the cursor on a grip to display a tooltip identifying the grip's function.

Door dimension grips



Many grip tooltips contain additional information on how to use the grip.

Displaying the tooltip for door standard size



For more information, see Direct Editing with Grips and Dynamic Dimensions on page 87.

Working with Objects in the Workspace

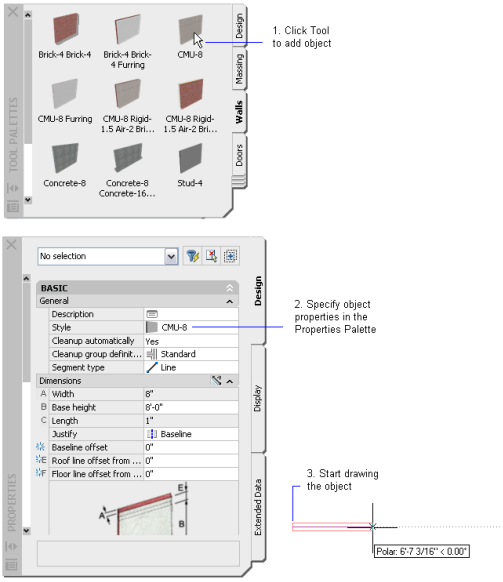
The AutoCAD Architecture workspace is where you add and manipulate the architectural objects that make up your drawings.

Adding Objects

You add objects to the drawing with tools.

Tools generally have preset creation parameters called properties. When you click an object tool to add an object in the drawing, the Properties palette opens, and you can change properties for the new object if desired. If not, you can go ahead and place the object in the drawing. For more information, see Tools on page 67.

Adding a wall to the drawing

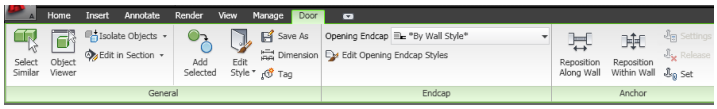


Tools are arranged on tool palettes for easy access. To open the default Design tool palette, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

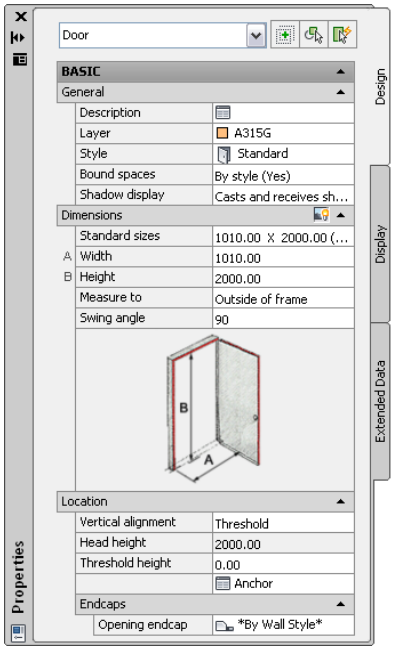
Modifying Objects

You can modify an object using any of the following methods:

- Object-specific (contextual) ribbon tab: When you select an object, an object-specific tab is displayed on the ribbon. For example, when you select a door, the Door tab displays. The object-specific tab contains commands that apply to the selected object.

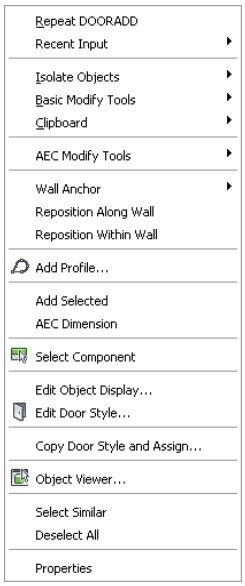


- Properties palette: The Properties palette is one of the central locations for entering and changing information about an object. This palette has categories that group the properties by type.
For detailed information, see The Properties Palette on page 82.



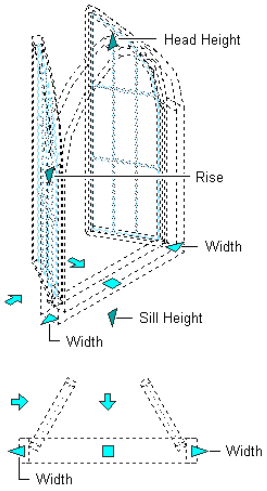
- Matching properties between objects: You can use the Match Properties command to copy the style and display properties of one AEC object and apply them to one or more other objects of the same type. For more information, see Matching Object Properties on page 94.
- Context menu: Right-click the object to display its available commands.

Door context menu



- Direct editing with grips: Commands for modifying an object are accessible from the object's grips. Click an object in a two-dimensional (2D) or three-dimensional (3D) view to display its grips.
  For detailed information about object grips, see Direct Editing with Grips and Dynamic Dimensions on page 87. Information about grip-editing is also covered in the individual object topics.

Window grips for direct editing



View and Navigation Tools

There are various ways to view the model in AutoCAD Architecture. For a complete description, see "Control the Drawing Views" and "Work with Multiple Open Drawings" in the AutoCAD Help. The following topics highlight view and navigation tools in AutoCAD Architecture.

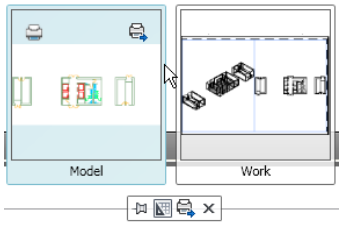
Quick View Tools

Quick View tools make navigating and selecting drawings and layouts easier.

Quick View Layouts

This feature lets you preview and easily switch between model space and all layouts in the current drawing.

Click (Quick View Layouts) on the application status bar to display a row of thumbnail images above the bar:



Click a thumbnail to navigate to that model space or layout.

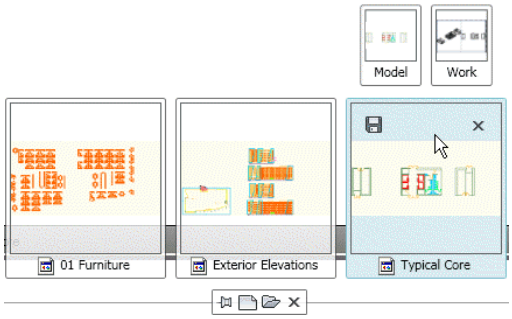
You can also easily plot or publish with the buttons that display at the top corners of the layout thumbnail when the cursor is on it.

For more information, see "Switch Between Layouts in the Current Drawing" in the AutoCAD Help.

Quick View Drawings

This feature lets you preview and easily switch between model space and layout in all currently open drawings.

Click (Quick View Drawings) on the application status bar to display a row of drawing thumbnail images above the bar:



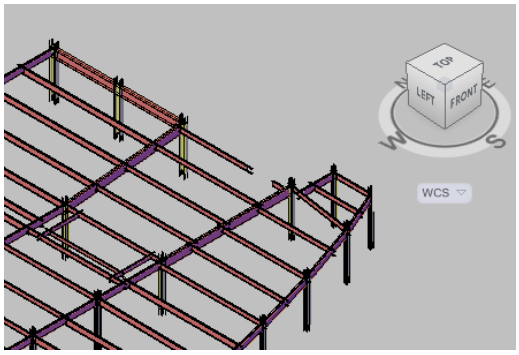
Move the cursor over a drawing image to display its Save and Close buttons as well as smaller images of the model space and layouts for that drawing. When you move the cursor over one of the model/layout images, they enlarge and the drawing images shrink.

You can also create and open a new drawing using the toolbar that displays below the drawing thumbnails.

For more information, see "Switch Between Open Drawings" in the AutoCAD Help.

ViewCube

The ViewCube is a 3D navigation tool that appears when the 3D graphics system is enabled and allows you to switch between standard and isometric views.



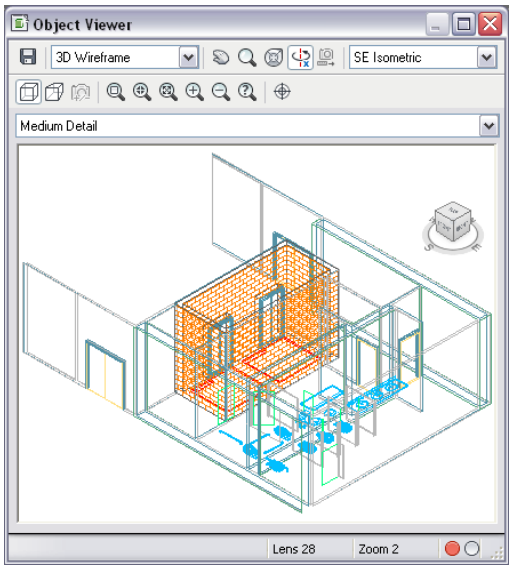
Once the ViewCube is displayed, it displays in one of the corners of the drawing window over the model in an inactive state. When you position the cursor over the ViewCube, it becomes active. You can switch to one of the available preset views, roll the current view, or change to the Home view of the model.

Displaying the ViewCube in the drawing area

➤ Click View tab ➤ Navigate panel ➤ ➤ View Cube.

NOTE The View Cube is visible by default. An exception to this are the 2D Wireframe and 3D Hidden visual styles, where View Cube is not displayed.

ViewCube is also displayed in the Object Viewers.



NOTE When ViewCube is displayed in the drawing area, you have access to a compass and can define a UCS. In an Object Viewer, no UCS option and no compass are available.

The ViewCube is always turned on in Object Viewers.

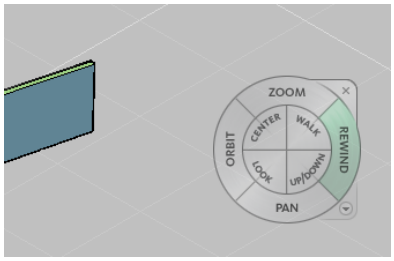
For more information, see "View Cube" in the AutoCAD Help.

For information about Object Viewer, see Object Viewer on page 731.

SteeringWheels

SteeringWheels are tracking menus that are divided into different sections known as wedges. Each wedge on a wheel represents a single navigation tool. You can pan, zoom, or manipulate the current view of a model in different ways.

SteeringWheels can save you time and clicks by combining many of the common navigation tools into a single interface. Wheels are specific to the context that a model is being viewed in.

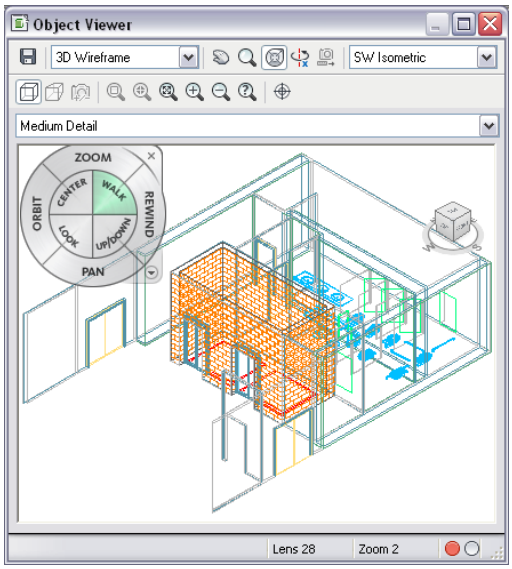


To display SteeringWheels in the drawing area, click View tab ➤ Navigate panel ➤ Full Navigation Wheel.

Alternatively, you can right-click in the drawing area (with no objects selected), and click SteeringWheels.

You can choose from several different wheels, each with its own drafting theme. Some wheels are designed for 2D navigation, while other wheels are better suited for 3D navigation.

The SteeringWheels can also be displayed in the Object Viewers.



Showing and Hiding the Steering Wheel in an Object Viewer

1 Open the Object Viewer from the context menu of an object or from the Style Manager.

2 Right-click in the view area, and click SteeringWheel.

Alternatively, you can click .

3 To close the SteeringWheel, right-click, and click Close Wheel, or click again.

For detailed information, see “SteeringWheels” in the AutoCAD Help.

ShowMotion

The ShowMotion feature lets you add movement and transitions to captured camera position called shots. You can create still shots, cinematic shots, or a recorded walk that allows you to click and drag along the path of desired animation. Shots can be grouped together to form sequences called view categories.

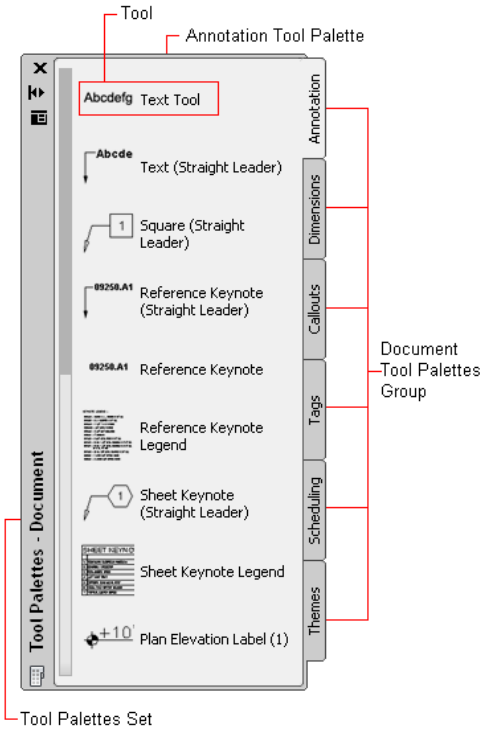
To start ShowMotion, click on the application status bar.

For detailed information, see “ShowMotion” in the AutoCAD Help.

Working with Tool Palettes

Tool palettes provide instant access to a complete inventory of AutoCAD Architecture tools—such as walls, doors, and windows—in one consistent user interface. Highly visual, tool palettes include previews of styles. You can create custom tool palettes that address your specific design needs. For example, you can create a palette to store a list of commonly used curtain wall, stair, and window tools.

Tool palette components



Tool Palettes Set

Tool palettes sets contain groups of tool palettes. You can rename the default tool palettes set or create a custom tool palettes set. Additionally, you can add, remove, and rearrange palettes and groups in the set.

You can add tool palettes to the tool palettes set from a tool catalog. For example, you could create one tool palette set for imperial tools and another for metric tools. For more information, see Specifying Different Tool Palettes for the Tool Palettes Set on page 60.

Only one tool palettes set can be active during an AutoCAD Architecture session, although you can specify different tool palettes for different user profiles. When that profile is used, the collected tool palettes will be combined into one tool palettes set.

Tool Palettes Group

A tool palettes group is a collection of tool palettes. 4 tool palettes groups are available when you start AutoCAD Architecture: Design, Document, Detailing, and Visualization. You can add, rename, remove, export, import, and rearrange tool palettes groups. Tool palettes groups are contained in the tool palettes set. For more information, see “Organize Tool Palettes” and “Save and Share Tool Palettes” in the AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

Tool Palettes

Tool palettes contain collections of tools and represent the individual tabs of a tool palettes group. A number of tool palettes are available from the AutoCAD Architecture Sample Palette catalog. You can create new tool palettes in AutoCAD Architecture or in the Content Browser. Usually you place tools on tool palettes according to tool type or design phase. For example, you could place your wall tools on a tool palette called Walls or your preliminary conceptual tools on a tool palette called Massing Study. When you create a tool

palette in the Content Browser, you can link it to AutoCAD Architecture. Whenever the tool palette is updated in the Content Browser, the changes are updated in the tool palette in AutoCAD Architecture too. This is useful for large projects where consistency of styles and tools is necessary. For more information, see Working with Tool Palettes from a Central Location on page 64.

Tools

Tools represent the individual objects you can add to a drawing. A tool contains creation parameters for the object it creates. When you add an object with a specific tool, the object has the settings you defined in the tool. This eases the design process and enhances consistency across a project.

For example, you might define a wall tool that contains the style "CMU 8 Furring" and that has automatic cleanup and a baseline offset of 1". Whenever you add a wall with this tool, the wall has the style CMU 8 Furring, it cleans up automatically, and it has an offset of 1". For more information, see Tools on page 67.

Tool Palettes and the Content Browser

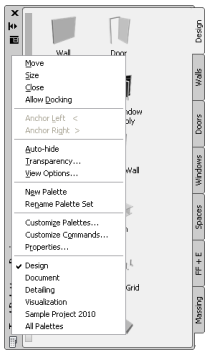
When multiple users are working on a large project, consistency of tools is especially important. Typically, the objects for the project and their styles and properties are set up by a CAD manager or system administrator, and then distributed to the team. The administrator can put tools and palettes in a central location in the Content Browser and link them to each user's computer. Whenever the tools or palettes are updated in the Content Browser, they are updated on the users' computers too. For more information, see Content Browser Overview on page 97 and Working with Tools from a Central Location on page 78.

Project Tool Palettes

When you are working with an AutoCAD Architecture project, you can design and associate a project tool palette group to the project. The project tool palettes contain the tools used in the project, and can be based on project standards. For detailed information about setting up project tool palettes, see Setting up Standard Tools in a Project on page 403.

Opening the Tool Palettes Set

To open the tool palettes, set, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .



Controlling the Appearance of the Tool Palettes Set

Typically, the tool palettes set remains open during the AutoCAD Architecture session. It is the central location from which you add objects to the drawing and start object-related commands. A number of user-definable display options let you optimally integrate the tool palettes with your workspace.

Docking the Tool Palettes Set

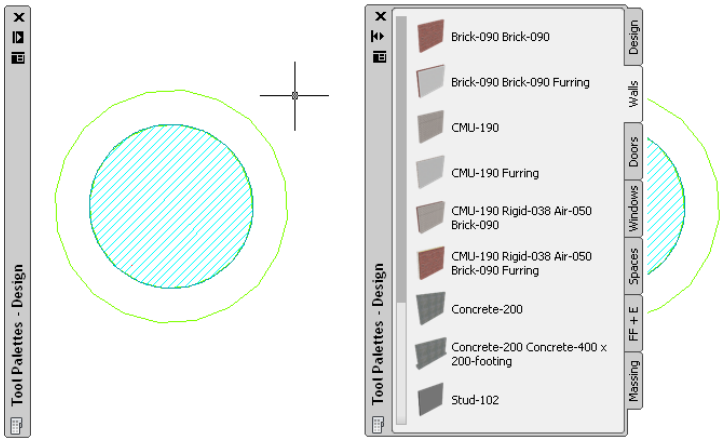
Use this procedure to dock the tool palettes set on the left or right side of your workspace.

1. In the title bar of the tool palettes set, click , and then click Allow Docking.
2. Position the cursor over the title bar, and drag the tool palettes set to one side of the workspace.
   A preview graphic shows the new position of the tool palettes set.
3. Release the tool palettes set when it is in the location you want.

Hiding the Tool Palettes Set

Use this procedure to hide the tool palettes set when it is not in use. The tool palettes set becomes hidden when you move the cursor away from it, leaving only the title bar visible. When you move the cursor over the title bar, the tool palettes set is re-displayed.

Tool palettes set hidden (left) and re-displayed (right)



1. In the title bar of the tool palettes set, click (Auto-hide).
   The tool palettes set is hidden, except for the title bar.
2. To re-display the tool palettes set, move the cursor over the title bar.

Adjusting the Transparency of the Tool Palettes Set

Use this procedure to adjust the transparency of the tool palettes set. The more transparent the tool palettes set, the more easily you can see objects in your drawing underneath it.

NOTE Transparency is not available if hardware acceleration is enabled.

1. In the title bar of the tool palettes set, click , and then click Transparency.
2. To adjust the transparency of the tool palettes set, move the slider.
3. To turn off transparency, select Turn off window transparency.
4. Click OK.

Renaming the Tool Palettes Set

Use this procedure to rename the tool palettes set, for example to name it with a project or company name.

1 In the title bar of the tool palettes set, click , and then click Rename Palette Set.

2 Enter a name for the tool palettes set, and press *ENTER*.

Specifying Different Tool Palettes for the Tool Palettes Set

Use this procedure to switch between different palette combinations in the tool palettes set.

Only one tool palettes set can be active during an AutoCAD Architecture session. You can, however, set different tool palettes for different user profiles. You do this by collecting tool palettes from several locations (paths) in a profile and letting the workspace combine them into one tool palettes set.

1 Click ➤ Options.

2 Define the tool palettes used for the current session:

- If you have created a workspace profile containing a tool palettes path, click the Profiles tab, select the desired profile, and click Set Current.
- If you have not created a workspace profile, click the Files tab, and click the Tool Palettes File Location entry. Then click Browse, and browse for a folder containing the desired tool palette.
  Add paths to all additional tool palettes to be included in the tool palettes set of this profile.

3 Click OK.

Creating a New Tool Palettes Set

Use this procedure to create a new tool palettes set.

1 Create a folder in which you will create the new tool palettes set.

The default tool palettes set is in *\Documents and Settings\<Username>\Application Data\Autodesk\ACA 2010\enu\Support\WorkspaceCatalog (Imperial/Metric)*.

2 Click ➤ Options.

3 Click the Profiles tab.

4 Click Add to List, and create a profile to contain the new tool palettes set; for example Design - Metric Palette Set.

5 Select the new profile, and click Set Current.

6 Click the Files tab.

7 Under Tool Palettes File Locations, select the support path for the previously defined folder in which you will create the new tool palettes set.

NOTE If you point to a folder already containing a tool palettes set, a new tool palettes set is not created; instead, the existing tool palettes set is used in the profile.

8 Click OK.

In the AutoCAD Architecture workspace, an empty tool palettes set is displayed.

9 To rename the tool palettes set, click , and then click Rename Palette Set.

10 Add tool palettes and tools to the new set:

If you want to…	Then…
add a new empty tool palette	see Creating a New Tool Palette on page 61.
add a tool palette from the Content Browser	see Adding a Tool Palette from a Tool Catalog in the Content Browser on page 65.
add a tool to a palette	see Creating a Tool from an Object in the Drawing on page 72.

The changes you make are saved to the tool palettes set in the new profile you created.

To revert back to your original tool palettes set, select your original profile in the Options dialog.

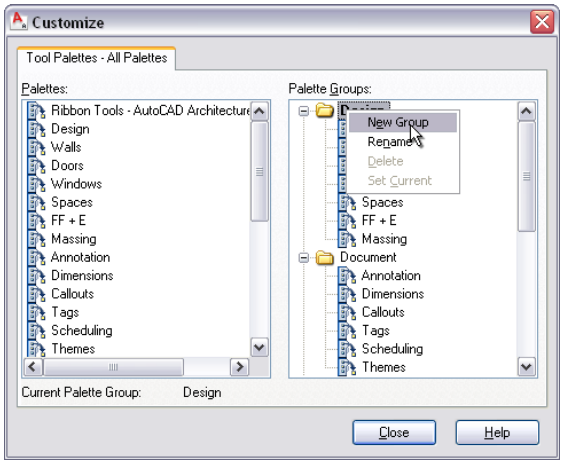
Creating a New Tool Palettes Group

Use this procedure to create a new tool palettes group.

1 In the title bar of the tool palettes set, click , and then click Customize Palettes.

Alternatively, you can click Manage tab ➤ Customization panel ➤ Tool Palettes.

2 Select a palette group, right-click, and click New Group.



3 Enter a name for the new group, and press *ENTER*.

4 Drag the new group folder to the correct position in the tree structure.

5 Select a tool palette from the left pane for the new tool palettes group, and drag it into the new group folder.

6 Click Close.

TIP The Customize dialog can be very useful for adding palettes to project palette groups. For more information, see Displaying the Project Tool Palette Group on page 411.

Creating a New Tool Palette

Use this procedure to add an empty tool palette to your tool palettes set.

After creating the tool palette, you can add tools to it. For more information, see Tools on page 67.

1 In the title bar of the tool palettes set, click , and then click New Palette.

2 Enter a name for the new tool palette, and press *ENTER*.

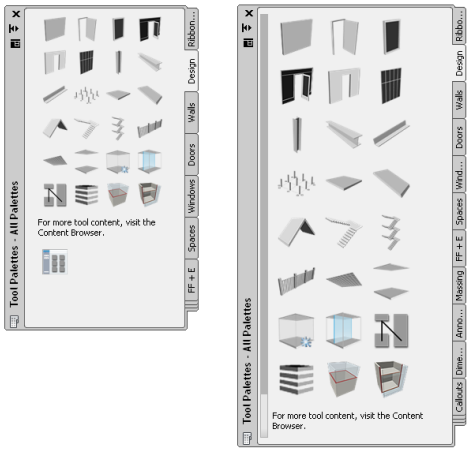
Defining the Appearance of Tool Palettes

Use this procedure to define the appearance of individual tool palettes.

The display of the tool palettes depends on the settings you specify for the overall tool palettes set, (as described in Controlling the Appearance of the Tool Palettes Set on page 58), and the settings you specify for individual tool palettes. In the tool palettes set, you specify the transparency, size, position, and auto-hide of the tool palettes set.

On the tool palette, you specify the size of tool images and their arrangement on the tool palette.

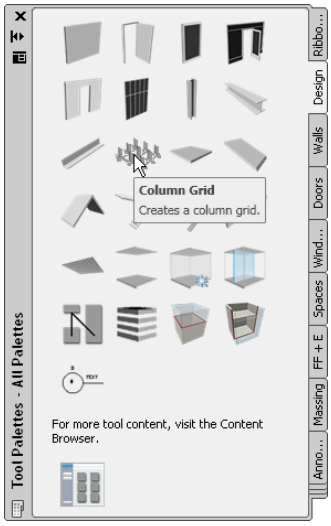
Tool palettes with different sized icons displayed



When you change tool images to a smaller size, you can display more tools on a tool palette. This might become important if you display different palettes at the same time, such as the Properties palette or the Project Navigator palette.

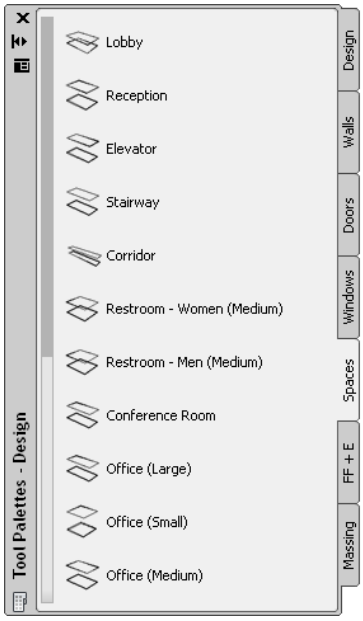
To save space, you can also display tool images without tool text below them. This method is best suited when the icons for your tools are easy to differentiate. If the icon alone proves insufficient to identify a tool, the tooltip for each icon provides additional guidance.

Icon-only display on the tool palette



You can also display tools in a single column on the tool palette. When you are using a single-column list, tool text is always displayed.

Tool palette in list view



To change the Tool palette's appearance

1. Open the tool palette that you want to change.
2. Right-click the palette, and click View Options.
3. In the View Options worksheet, select the desired View style:

If you want to…	Then…
view only tool icons	select Icon only for View style.
view tool icons and tool text	select Icon with text for View style.
view tool icons and tool text in a single column list	select List view for View style.

4 To apply these changes to all palettes in the tool palettes set, select All Palettes for Apply to.

5 Click OK.

Adding Text and Separator Lines to Tool Palettes

Use this procedure to add separator lines and text to a tool palette.

Separator lines can be useful if you want to create subdivisions on a tool palette containing many tools. To annotate a separator line, you can insert a text element.

1 Open the tool palette to which you want to add separator lines and text.

2 Right-click in the palette between the tools where the separator should go, and click Add Separator.

A separator line is inserted between the tools.

3 To add text above the separator line, right-click either to the right of the last tool before the separator line, or to the left of the separator line itself, and click Add Text.

4 Enter the text you want to display above the separator line, and press *ENTER*.

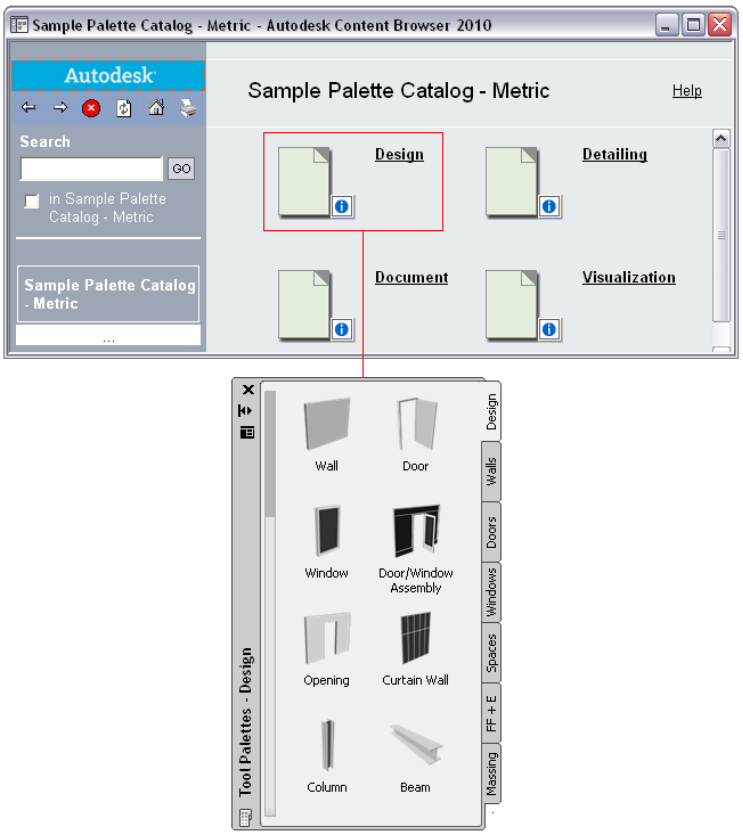
5 To edit the text, select the text item, right-click, and click Rename. Then, edit the text as necessary.

6 To delete a separator line or a text annotation, select the separator line or text, right-click, and click Delete.

Working with Tool Palettes from a Central Location

When multiple users are working on a large project, consistency of tools is especially important. Typically, the objects for the project and their styles and properties are set up by a CAD manager or system administrator, and then distributed to the team. The administrator can put tools and palettes in a central location in the Content Browser and link them to each user's computer. Whenever the tools or palettes are updated in the Content Browser, they are updated on the users' computers too. For more information, see Content Browser Overview on page 97.

Using tool palettes from the Content Browser



TIP If you are working with an AutoCAD Architecture project, you can generate a tool catalog based on the standard styles of the project. For more information, see Creating a Tool Catalog for a Project on page 405.

Adding a Tool Palette from a Tool Catalog in the Content Browser

Use this procedure to link a tool palette from a tool catalog in the Content Browser to the tool palettes set in AutoCAD Architecture.

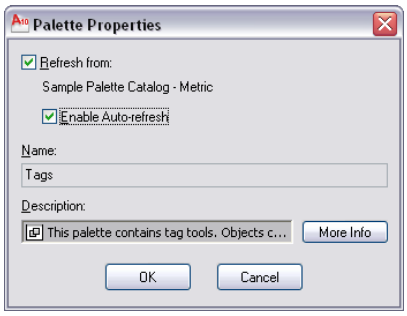
For information on creating tool palettes in the Content Browser, see Adding Content to a Tool Catalog on page 115.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Select the tool catalog containing the tool palette you want to copy, right-click, and click Properties.
3. Select Link items when added to workspace, and click OK.
4. Open the tool catalog, and navigate to the tool palette.
5. Move the pointer over the i-drop® icon next to the tool palette so that the pointer image changes to an eyedropper ( ).

   To copy multiple tool palettes, press and hold *CTRL* while clicking each palette; then position the eyedropper over any of the selected palettes.
6. Drag the palette to the tool palettes set in the AutoCAD Architecture workspace.

   The tool palette is dropped into the tool palettes set.

7 Right-click on the palette, and click Properties.



The text below the check box displays the name of the catalog in the Content Browser from which the palette is updated.

If you click that name, it opens the catalog from which the tool palette was linked.

8 Select or clear Enable Auto-refresh:

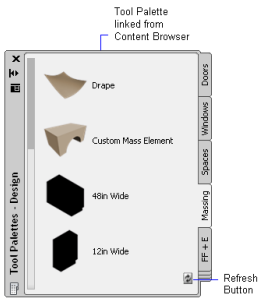
If you want to…	Then…
automatically update the linked tool palette from the Content Browser when starting AutoCAD Architecture	select Enable Auto-refresh.
update the linked tool palette manually with one of the methods described in Updating a Tool Palette from a Tool Catalog in the Content Browser on page 66	clear Enable Auto-refresh.

The name of the tool palette in the Content Browser (from which the selected tool palette is updated) is displayed under Name.

9 Click OK.

Updating a Tool Palette from a Tool Catalog in the Content Browser

Use this procedure to update a linked tool palette in the tool palettes set from its source tool catalog in the Content Browser.



1 Link a tool palette from a catalog in the Content Browser to the tool palettes set, as described in Adding a Tool Palette from a Tool Catalog in the Content Browser on page 65.

When a tool palette is linked to the tool palettes set from a catalog in the Content Browser, a Refresh button is displayed at the bottom of the palette.

2 Click the Refresh button to update your local tool palette with the latest changes from the catalog in the Content Browser.

Alternatively, you can right-click the palette, and click Refresh Palette.

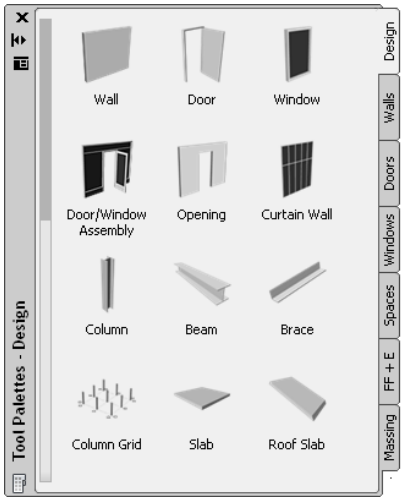
NOTE You can also update the whole palette set by clicking in the tool palettes set, and then clicking Refresh Palette Set. This command updates all linked tool palettes in the tool palettes set.

Tools

Tools represent the individual objects you can add to a drawing. A tool contains creation parameters for the object it represents. When you add an object with a specific tool, the object has the settings you defined in the tool. The use of tools speeds up the design process and enhances consistency across a project.

For example, you might define a wall tool that contains the CMU 8 Furring style and has automatic cleanup and a baseline offset of 1". Whenever you add a wall with this wall tool, the wall has the CMU 8 Furring style, it cleans up automatically, and it has an offset of 1".

Standard object tools



Based on the tool type, you can define general properties such as:

- Tool name
- Tool description (also used as the tooltip and as the tool description when the tool is copied to a tool catalog in the Content Browser)
- Description of objects inserted with this tool
- Layer key of objects inserted with this tool
- Layer overrides of objects inserted with this tool
- Object style (if the tool is style-based)
- Location of object style (if the tool is style-based)

In addition, you can define object-specific properties that apply to this tool type. For example, if you create a wall tool, you can set the wall cleanup, width, height, baseline settings, and the roof/floor lines of walls that are inserted with this tool.

Style Location

Object styles are located in Styles drawings. To assign a style to an object tool, you can either point to a style in the current drawing or to a style in an external drawing. For more information, see Styles and Support Files on page 95.

Tool Types

Tools in AutoCAD Architecture fall into 3 categories.

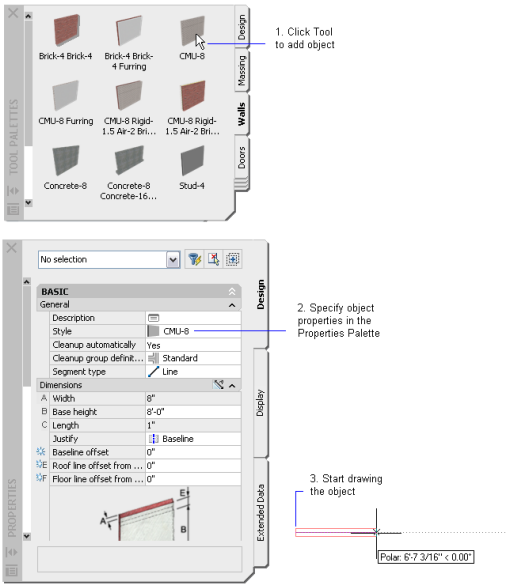
Tool Category	Description
Object tools	An object tool inserts a design object—such as a wall or a window assembly—into a drawing. An object tool has a specific style and specific object properties: for example, a wall tool might be called Brick-4 Brick-4.
Command tools	Command tools are a graphical representation of an object-related command. For example, the Browse Property Data tool opens a dialog box for browsing the property data of all objects in a drawing; the Renumber Data tool renumbers property data in selected property sets by increment or by a user-defined number. You can also create your own tools for each command. An AutoCAD general-purpose command tool lets you associate any command or macro. For commands that create an object, you can also assign basic AutoCAD object properties. For a list of available AutoCAD Architecture command tools, see Using Command Tools on page 74.
AEC Content tools	You can create tools for frequently used AEC Content items that were created with the AEC Content Wizard. For more information, see Creating a Tool from AEC Content in DesignCenter on page 73.

Project Standard Tools

When you are working with an AutoCAD Architecture project, you can set up standard styles that are updated and synchronized throughout the project lifecycle. For more information, see Setting up Standards in a Project on page 393.

Creating an Object with a Tool

Use this procedure to create an object with a tool.



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

2 Click the tool palette that contains the tool for the object you want to insert.

For example, if you want to insert a bifold double door, click the Doors palette, and navigate to the Bifold Double Door tool.

3 Click the tool.

4 On the Properties palette, enter any changes you want to make to the default values.

NOTE Certain values can be set only when you are inserting the object; for example, the position of a door along the wall into which it is inserted can be defined only when you are inserting the door. You cannot change the position for an existing door later. Values that can be set only during insertion are marked with this symbol on the Properties palette.

5 Click in the drawing where you want to insert the object.

6 Follow any additional prompts as required to insert one or more objects in the drawing, and then press *ENTER*.

Changing the Tool Properties

Use this procedure to change the properties of a tool on a tool palette.

You can set these general properties for an object tool:

- Tool name
- Tool description (also used as the tooltip and as the tool description when the copied to a tool catalog in the Content Browser)
- Description of objects inserted with this tool
- Layer key of objects inserted with this tool
- Layer overrides of objects inserted with this tool
- Object style (if the tool is style-based)

- Location of object style (if the tool is style-based)

In addition, you can define object-specific properties that apply to this object type. For example, if you create a wall tool, you can set the wall cleanup, width, height, baseline settings, and the roof/floor lines for all walls inserted with this tool.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .
2. Click a tool palette.
3. Select the tool, right-click, and click Properties.
4. Enter a name for the tool.
5. Click the setting for Description, enter a description of the tool, and click OK.
6. Expand Basic, and expand General.
7. Enter a description of the objects that you can create using this tool.
8. Specify a layer key and any layer key overrides; otherwise, the layer assignments specified in the layer key style in the drawing are used.
9. Click Browse for Style location, if the location is other than the current drawing to select an object style.
10. Add object-specific properties.

   NOTE When you click a property to enter a value, the value underneath the current property is hidden and the property field is highlighted. Enter a value for the current property in the appropriate location.

11. Click OK.

Changing a Tool Icon

Use this procedure to change the icon of a tool.

When you add a new tool to a tool palette, it displays either the icon of the tool it was copied from or a default icon. You can change the icon by selecting a new one from an image file or from an object in the drawing. You can also choose to display the icon as simple monochrome linework.

Changing the tool icon

You can use the following image formats for tool icons:

- PNG
- GIF
- JPG
- BMP
- TIFF

NOTE Icons in the tool palettes can have a maximum size of 64 x 64 pixels. Larger images are scaled when inserted. To change the display size of the tool on the palette, see Defining the Appearance of Tool Palettes on page 62

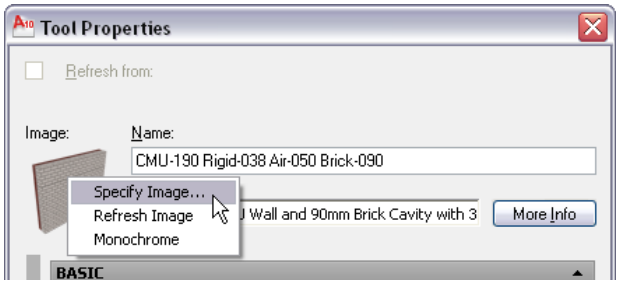
To copy an icon image from a file

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

2 Click the tool palette that contains the tool for which you want to select a new icon.

3 Select the tool, right-click, and click Properties.

4 In the Tool Properties worksheet, right-click the existing icon, and click Specify Image.



5 In the Select Image File dialog, select the image you want to use as a tool icon, and click Open.

6 Click OK.

7 To display a tool as simple monochrome linework, in the Tool Properties worksheet, right-click the existing icon, and click Monochrome.

The monochrome option is not available for all tools.

To create an icon from an object in the drawing

1 Select the tool on the tool palette, right-click, and click Set Image from Selection.

2 Select the object in the drawing you want to use as a tool icon, and press *ENTER*.

The tool icon is created with the last view direction and display configuration used in the viewer of any tool of this type. For example, if the tool viewer of the last-used wall tool is set to Top view and the Medium Detail display configuration, any wall you select in the drawing as a tool icon is displayed in Top view and with the Medium Detail display configuration.

You cannot create icons from objects that contain custom blocks, curtain walls, or door/window assemblies with nested styles. If you need to create an icon based on a custom block, specify an external image.

Changing a Tool Icon

Use this procedure to change a tool icon after editing the viewer settings of the tool.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

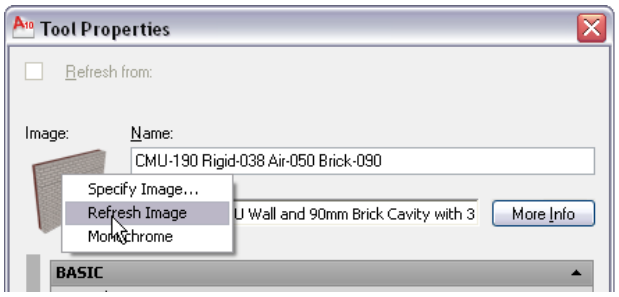
2 Click the tool palette that contains the tool icon you want to refresh.

3 Select the tool, right-click, and click Properties.

4 In the Tool Properties worksheet, change the viewer settings of the tool image.

For example, switch from a SW Isometric view to a Top view.

5 Right-click the existing icon, and click Refresh Image.



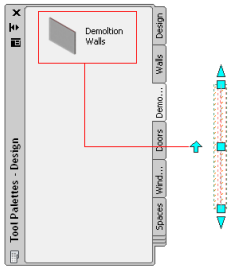
6 Click OK.

Creating a Tool from an Object in the Drawing

Use this procedure to create a tool from an object in the drawing.

You can create only object tools with this method. For information on creating command tools, see Using Command Tools on page 74.

Creating a tool from an object in the drawing



1 Create an object with the appropriate style and properties in the drawing.

IMPORTANT The drawing containing the style should be saved to a location where it will be available in the future. Otherwise, the tool will not be able to access the style, and will revert to the Standard style.

2 Open the tool palette where you want to create the new tool.

3 Select the object, and drag it onto the tool palette.

4 Define additional properties for the tool, if necessary.

For more information, see Changing the Tool Properties on page 69.

Copying a Tool from a Tool Palette

Use this procedure to copy a tool from one tool palette to another.

1 Open the tool palette that contains the tool you want to copy.

2 Select the tool, right-click, and click Copy.

3 Open the tool palette onto which you want to copy the tool, right-click, and click Paste.

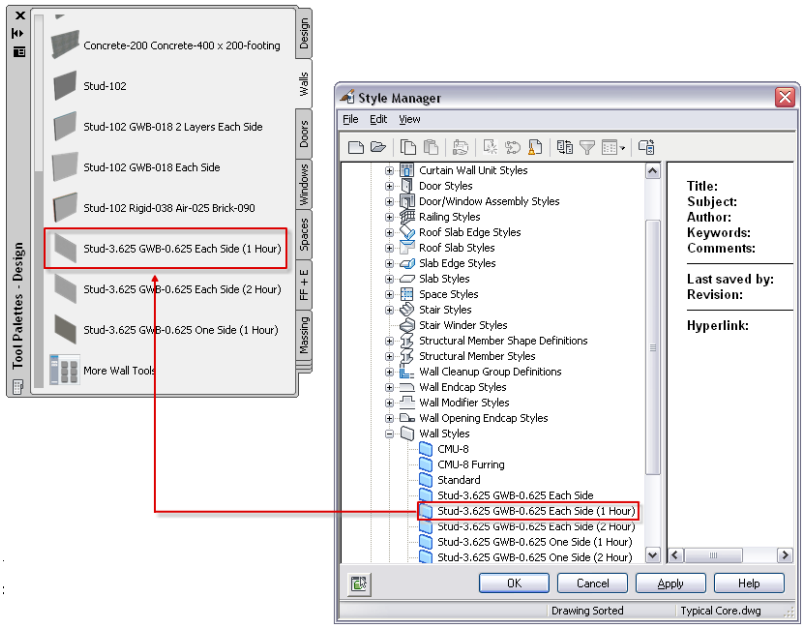
4 Change the properties of the tool, if necessary.

For more information, see Changing the Tool Properties on page 69.

Creating a Tool from the Style Manager

Use this procedure to create a tool from a style in the Style Manager.

Creating a tool from the Style Manager



1 Open the tool palette where you want to create the new tool.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Select the style from which you want to create a tool.

For example, if you want to create a wall tool with the Stud-3.625 GWB-0.625 Each Side (1 Hour) style, expand Wall Styles, and select the Stud-3.625 GWB-0.625 Each Side (1 Hour) style.

4 Drag the style to the tool palette.

A new tool with the selected style is inserted in the tool palette.

5 Click OK to close the Style Manager.

6 Define additional properties for the tool in the tool palette, if necessary.

For more information, see Changing the Tool Properties on page 69.

Creating a Tool from AEC Content in DesignCenter

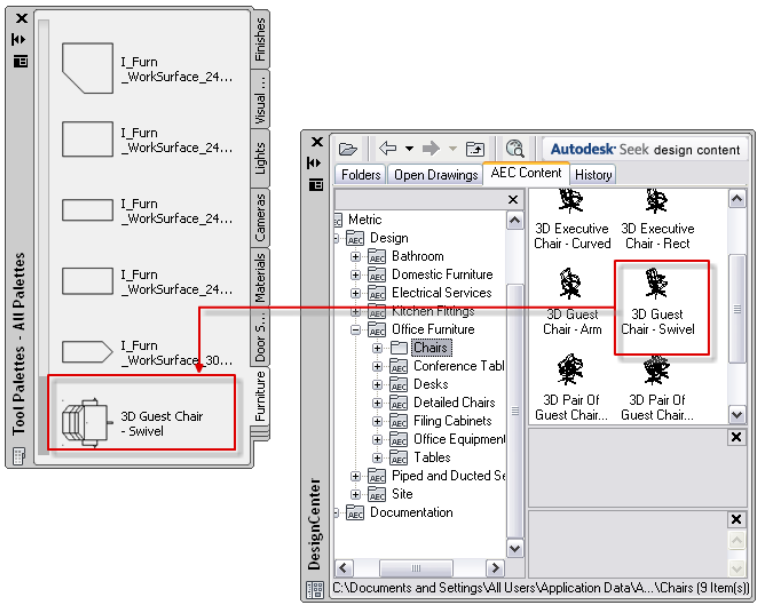
Use this procedure to create a tool from an AEC Content item in DesignCenter.

NOTE You can also create tools from blocks in DesignCenter, but they have slightly different tool options.

You can drag and drop AEC content items from a DesignCenter folder to a tool palette. For more information on creating AEC Content, see Adding AEC Content to Drawings on page 2566.

AutoCAD Architecture provides the Design Tool Catalog and the Documentation Tool Catalog in the Content Browser. These catalogs already have tools set up for predefined AEC Content and sample object styles. The catalogs are available for both metric and imperial units.

Creating a tool from AEC Content in DesignCenter



1 Open the tool palette where you want to create the new tool.

2 Click Insert tab ➤ Content panel ➤ Content Browser drop-down ➤ Design Center, and navigate to the AEC Content item from which you want to create a tool.

3 Drag the item to the tool palette.

A new tool is inserted on the tool palette.

To change the icon of the new tool, see Changing a Tool Icon on page 70.

NOTE An AEC Content tool uses the last-used viewer settings for a tool of this type to generate the tool icon. If the last-used viewer setting is Gouraud 3D view, and the user creates a tool from a 2D AEC Content item, the tool icon will be invisible. In this case, you need to change the viewer setting of the tool to a Top view, and wireframe.

4 Define additional properties for the tool, if necessary.

For more information, see Changing the Tool Properties on page 69.

Using Command Tools

Command tools are used to execute frequently used commands for tasks other than AEC object creation. For example, the Browse Property Data tool opens a dialog for browsing the property data of all objects in a drawing; the Renumber Data tool renumbers property data in selected property sets. There are a number of preconfigured command tools in the software; you can, however, create a user-defined command tool from any AutoCAD and AutoCAD Architecture command, AutoLISP routines, VBA macros and applications, and scripts.

Using Predefined Command Tools

AutoCAD Architecture provides the following predefined command tools for commonly used tasks in a default US install:

Tool	Palette Group/Palette	Description
Horizontal Section	Design/Design	Generates a horizontal section.
Vertical Section	Design/Design	Generates a vertical section.
Renumber Data	Document/Tag	Lets you renumber objects that are included in a schedule or linked to schedule tags.
Edit Property Set Data	Document/Scheduling	Lets you edit the property set data attached to selected objects and their styles.
Browse Property Set Data	Document/Scheduling	Lets you access and view the data for all property sets in a drawing.
Space Evaluation	Document/Scheduling	Starts the space evaluation.
AEC Entity Reference	Content Browser/Stock Tool Catalog/Helper Tools	Lets you create a reference copy from one object to another in AutoCAD Architecture.
Quick Slice	Content Browser/Stock Tool Catalog/Helper Tools	Lets you define a cross section through one or more three-dimensional (3D) objects in a drawing (including mass groups, AutoCAD blocks, and external references) and extract a polyline outline that can be used to produce a profile shape.
Hidden Line Projection	Content Browser/Stock Tool Catalog/Helper Tools	Lets you create flat 2D projections with hidden background lines from a 3D view of objects in your drawing.
Napkin Sketch	Content Browser/Stock Tool Catalog/Helper Tools	Lets you create freehand sketch geometry from objects in a drawing.
Chamfer	Content Browser/Stock Tool Catalog/Drafting Tools	Lets you chamfer two walls in a drawing.
Hatch and Gradient	Content Browser/Stock Tool Catalog/Drafting Tools	Lets you define the boundaries, pattern type, pattern properties, and other parameters for hatch and gradient fill objects.
Shrink Wrap	Content Browser/Stock Tool Catalog/Drafting Tools	Lets you create a profile or shrinkwrap outline around any collection of contiguous linework entities, including architectural objects.
Welding Symbols	Content Browser/Stock Tool Catalog/Drafting Tools	Lets you create and edit welding symbols.
Area	Content Browser/Stock Tool Catalog/Measurement Tools	Lets you measure the area of an object or a user-defined space.

Tool	Palette Group/Palette	Description
Attribute Extraction	Content Browser/Stock Tool Catalog/Measurement Tools	Lets you extract object data from drawings and export it to a table or external file.
Distance	Content Browser/Stock Tool Catalog/Measurement Tools	Lets you measure the distance between 2 user-selected points.
Point ID	Content Browser/Stock Tool Catalog/Measurement Tools	Lets you display the coordinates of a user-selected location.
Region/3D Solid Mass Properties	Content Browser/Stock Tool Catalog/Measurement Tools	Lets you calculate the mass properties of regions or 3D solids
Cell Anchor	Content Browser/Stock Tool Catalog/Parametric Layout & Anchoring Tools	Lets you attach objects to cell positions on layout grids and volume grids.
Curve Anchor	Content Browser/Stock Tool Catalog/Parametric Layout & Anchoring Tools	Lets you attach AEC objects to the base curve of other AEC objects or linework, such as lines, arcs, circles, mass elements, polylines, roofs, or walls.
Leader Anchor	Content Browser/Stock Tool Catalog/Parametric Layout & Anchoring Tools	Lets you anchor objects to nodes on layout curves or grids with leaders.
Node Anchor	Content Browser/Stock Tool Catalog/Parametric Layout & Anchoring Tools	Lets you attach objects to nodes on layout curves or grids.
Object Anchor	Content Browser/Stock Tool Catalog/Parametric Layout & Anchoring Tools	Lets you attach an AEC object to the base curve of another AEC object.

To use a preconfigured command tool

➤ Navigate to the location of the desired command tool in the tool palettes or in Content Browser:

- If the command tool is located on a tool palette, click it to start the command sequence.
- If the command is located in Content Browser, either drag it to the drawing area to directly start the command, or drag it to a tool palette, and start the command from there.

Using User-Defined Command Tools

AutoCAD Architecture has 2 blank command tools that can be customized for user-defined commands.

- **Command Tool:** A simple blank command tool that lets you execute a number of command sequences. Allowed commands include AutoCAD and AutoCAD Architecture commands, VBA macros and applications, AutoLISP routines, and scripts.
- **Command Tool with Properties:** Use this tool for commands that generate AutoCAD objects like lines, AutoCAD dimensions, or solids. The property settings for color, layer, linetype, and lineweight that you can set in the tool will only be used when creating AutoCAD objects. If you were to create an AEC object with this tool, the layer, color, and linetype settings specified in the display system for this object would

take precedence. If you want to create AEC objects with a command tool, the simple Command Tool is recommended.

Command tools are created by copying the blank command tool from Content Browser to a tool palette, and editing the command properties.

Creating a Simple Command Tool

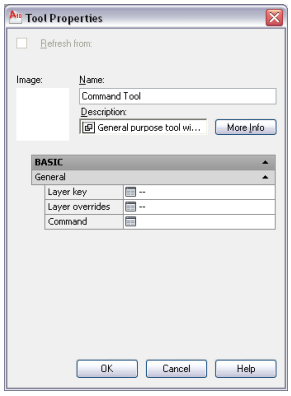
1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Helper Tools.

3 Move the cursor over the i-drop icon next to the regular command tool and drag the tool to a tool palette.

4 On the tool palette, select the command tool, right-click, and click Properties.

Command tool properties



5 Change the following tool properties as necessary:

Property	Description
Name	Lets you replace the generic command tool name with a name that describes the function of the tool.
Description	Lets you add a more detailed description to the command tool.
Layer key	Specifies the layer key to define the layer on which objects created with this command will be inserted.
Layer overrides	Defines overrides for the selected layer key.
Command	Specifies the command to be executed by the tool. The following command types are valid within the Command Tool: ■ AutoCAD and AutoCAD Architecture commands ■ AutoLISP routines ■ VBA macros and applications ■ Scripts
Image	By default, the command tool has no associated image. To add an image that illustrates the function of the tool, right-click in the empty image area, and se-

Property	Description
	lect an image as described in Changing a Tool Icon on page 70.

6 Click OK.

Working with Tools from a Central Location

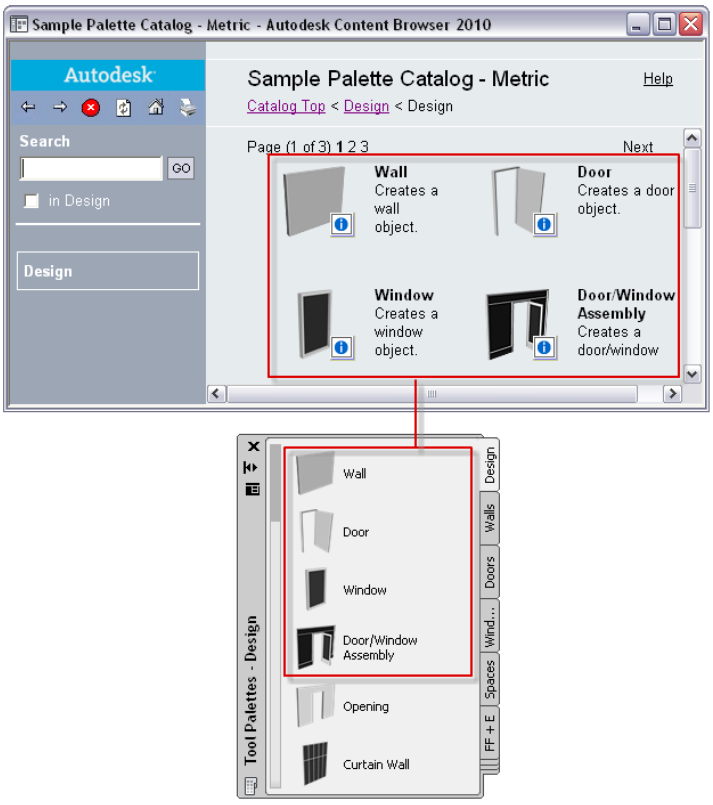
You can use the Content Browser to store and organize catalog tools in a central location. A number of stock tools are available in the AutoCAD Architecture Stock Tool Catalog. Additionally, sample catalogs contain tools with styles from the Styles drawings. You can copy these tools to a tool palette and modify them. You can also create your own tool palettes and tools in a catalog in the Content Browser, copy them to a tool palette, and retain the link from the Content Browser to the tool palette. In this case, the tool is refreshed on the tool palette when it is modified in the catalog in the Content Browser.

NOTE If you want to link a complete tool palette from the Content Browser to AutoCAD Architecture, see Adding a Tool Palette from a Tool Catalog in the Content Browser on page 65.

Linking a Tool from a Catalog in the Content Browser

Use this procedure to link a tool from a catalog in the Content Browser to a tool palette in AutoCAD Architecture.

Linking a tool from a catalog in the Content Browser



1 Open the tool palette on which you want to place a tool from the Content Browser.

2 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and navigate to the tool palette or category in the tool catalog that contains the tool you want to copy.

For more information, see Searching for Items in a Tool Catalog on page 114.

3 Move the pointer over the i-drop icon next to the tool, so that the pointer image changes to an eyedropper ( ).

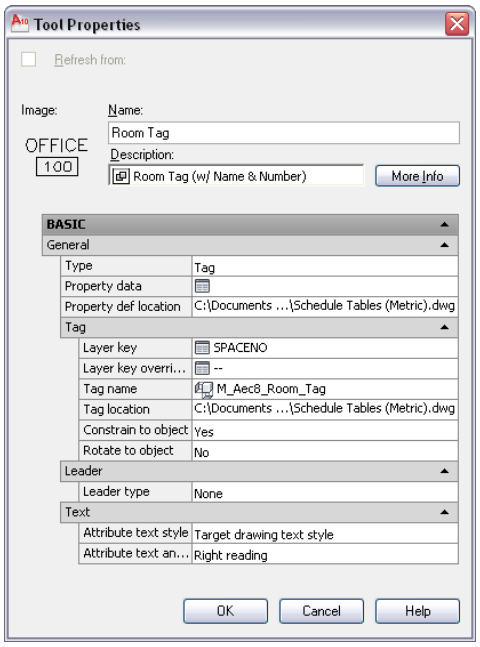
To copy multiple tools, press and hold *CTRL* while clicking each tool; then position the eyedropper over any of the selected tools. You can also select all the tools in the current category by right-clicking, and clicking Select All.

4 Drag the eyedropper to a tool palette in the tool palettes set.

5 To refresh the tool, select it, right-click, and click Refresh Tool.

Alternatively, you can select the tool in the tool palette, right-click, and click Properties. Then select Refresh from on the Properties worksheet.

Refreshing a tool from the Properties worksheet



NOTE When you select Refresh from, all tool properties on the worksheet are set to read-only. Properties for this tool must be changed in the Content Browser.

6 Click OK.

Updating a Tool in AutoCAD Architecture from the Content Browser

Use this procedure to update a tool in a tool palette when the tool is linked to the Content Browser.

NOTE You cannot change and update tools from the Stock Tool Catalog in the Content Browser. Those tools are read-only.

1 Open the tool palette that contains the tool you want to update.

2 Select the tool, right-click, and click Refresh Tool.

Updating a Tool in the Content Browser from a Linked Tool in AutoCAD Architecture

Use this procedure to update a tool in a catalog in the Content Browser with the properties of a linked tool from AutoCAD Architecture.

For example, perhaps you have a tool in the Content Browser that adds a Box mass element of 3 x 3 x 3 meters. You want to change the tool so that it adds a Box mass element of 4 x 4 x 4 meters. You would first link the mass element tool from the Content Browser to a tool palette in AutoCAD Architecture. Then, temporarily deactivate the link and change the dimension properties of the tool to 4 x 4 x 4 meters. Next, copy the tool back to the Content Browser. The Content Browser catalog is updated with the new tool properties. Finally, reactivate the link from the Content Browser tool to the AutoCAD Architecture palette.

1. Link a tool from a catalog in the Content Browser to a tool palette as described in Linking a Tool from a Catalog in the Content Browser on page 78.
2. Select the tool in the tool palette, right-click, and click Properties.
3. On the Tool Properties worksheet, clear Refresh from.

   The tool properties can now be edited.
4. Make the necessary changes to the tool properties.
5. Click OK.
6. Select the tool in the tool palette, and copy it to its original location in the Content Browser catalog.

   NOTE You can copy a tool to a catalog in the Content Browser using the Copy and Paste commands from the context menu, or by dragging the tool onto the Content Browser icon in the Windows task bar. To select multiple tools in a tool palette, use CTRL-A to select all or drag while holding the CTRL key to create a selection window.
7. Click Yes when prompted to overwrite the previous version of the tool.
8. If you want to refresh the tool in the AutoCAD Architecture tool palette from the new version stored in the Content Browser, re-open the tool properties for the tool on the tool palette, and select Refresh from.

Removing the Link of a Tool to a Catalog in the Content Browser

Use this procedure to permanently remove the link between a tool and its source tool in the Content Browser.

NOTE This action cannot be undone.

1. Open the tool palette that contains the tool you want to unlink from a catalog in the Content Browser.
2. Select the tool, right-click, and click Remove Catalog Link.

Applying the Properties of a Tool to an Existing Object

Use this procedure to apply the properties of a tool to an existing object.

You can apply the properties of a tool to an existing object in two ways:

- Apply the properties of a tool to an object of the same type: For example, apply the properties of a wall tool to an existing wall. All object tools have this functionality.

- Apply the properties of a tool to a different object type: Using this method, you convert the object to an object of the same type as the tool. For example, when you apply the properties of a wall tool to a polyline, the polyline is converted to a wall with the settings defined in the wall tool. Depending on their type, various object tool types may have commands for converting other objects. For detailed information, see the chapters for the individual objects.

  1 Open the tool palette that contains the tool with the properties you want to apply to a different object.

  2 Select the tool, and right-click.

  3 Define the object type to which to apply the tool properties:

if you want to…	Then…
apply the properties of the tool to an object of the same type	click Apply Tool Properties to <Object>. For example, to apply the tool properties of a door tool to an existing door, click Apply Tool Properties to Door.
apply the properties of the tool to an object of a different type	click Apply Tool Properties to ➤ <Object>. For example, to apply the tool properties of a door tool to an opening, click Apply Tool Properties to ➤ Door/Window Assembly, Opening, Window.

  4 Select the object to which to apply the tool properties, and press *ENTER*.

Re-Importing Styles for a Tool

Use this procedure to re-import the style of a tool that uses a style from an external Styles drawing.

When you create a tool, you can assign a style from the current drawing or from an external Styles drawing. Usually you assign a style from an external Styles drawing because you can then use that the tool in other drawings as well.

When the style in the external Styles drawing is changed, you need to update the tool to reflect these changes.

NOTE When you update the style of a tool, all existing objects inserted with this tool are also updated.

1 Open the tool palette that contains the tool for which you want to update the style.

2 Select the tool, right-click, and click Import <Style Name> <Object Name> Style.

For example, if you want to update the Brick-4 Furring-4 style of a wall tool, click Import 'Brick-4 Furring-4' Wall Style.

Deleting a Tool

Use this procedure to delete a tool from a tool palette.

When you delete a tool from a tool palette, objects in the drawing that were inserted with this tool are not deleted.

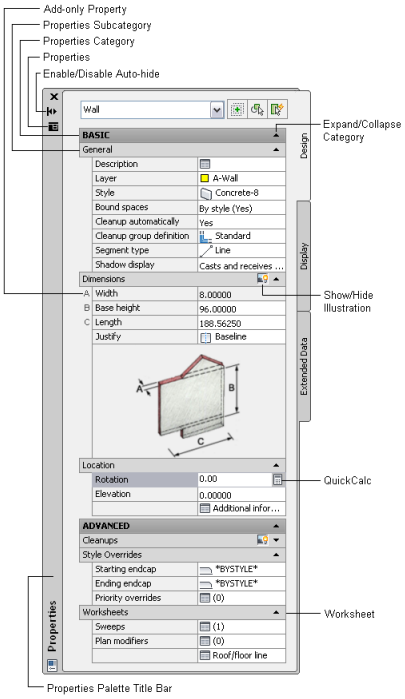
NOTE If you linked a tool palette from the Content Browser to the tool palettes set as described in Adding a Tool Palette from a Tool Catalog in the Content Browser on page 65, you cannot delete individual tools from it. To delete the tool, delete it from the palette in the Content Browser, and then update the palette in AutoCAD Architecture as described in Updating a Tool Palette from a Tool Catalog in the Content Browser on page 66.

1 Open the tool palette that contains the tool you want to delete.

2 Select the tool, right-click, and click Delete Tool.

The Properties Palette

The Properties palette provides a central location to view and modify both the physical and graphical properties of an object you are about to draw, or of objects that are selected in the drawing area. Using the Extended Data tab of the Properties palette, you can also attach other kinds of information to an object, such as classifications, notes, reference documents, hyperlinks, and property set data. You typically keep the Properties palette open during an AutoCAD Architecture session.



Opening the Properties Palette

Use any of the following methods to open the Properties palette:

- Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.
- Press *CTRL*+1.
- Double-click an object in the drawing.

Setting the Appearance of the Properties Palette

The Properties palette is usually kept open during an AutoCAD Architecture session, because it is the central location from which you add and change properties of an object.

Docking the Properties Palette

Use this procedure to dock the Properties palette on the left or right side of your workspace.

1 In the title bar of the Properties palette, click , and then click Allow Docking.

2 Position the cursor over the title bar, and drag the Properties palette to one side of your workspace.

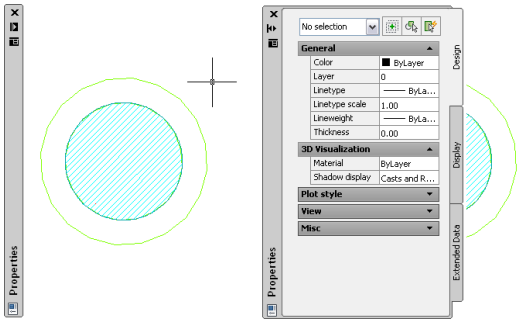
A preview graphic shows the new position of the Properties palette.

3 Release the Properties palette at the correct location.

Hiding the Properties Palette

Use this procedure to hide the Properties palette when it is not in use. The Properties palette can be configured to hide when you move the cursor away from it, leaving only the title bar visible. When you move the cursor over the title bar, the Properties palette is re-displayed.

Properties palette hidden (left) and re-displayed (right)



1 In the title bar of the Properties palette, click (Auto-hide).

The Properties palette is hidden, except for the title bar.

2 To re-display the Properties palette, move the cursor over the title bar.

Adjusting the Transparency of the Properties Palette

Use this procedure to adjust the transparency of the Properties palette. The more transparent the Properties palette, the better you can see objects in your drawing underneath it.

NOTE Transparency is not available if hardware acceleration is enabled.

1 In the title bar of the Properties palette, click and then click Transparency.

2 To adjust the transparency of the Properties palette, drag the slider towards Less or More.

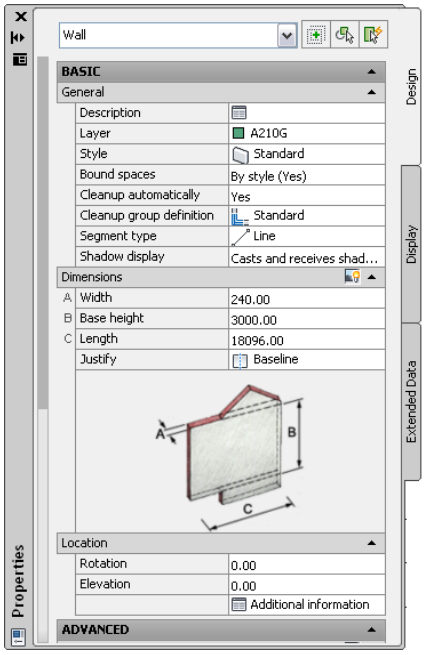
3 To turn off transparency, select Turn off window transparency.

4 Click OK.

The Design Tab

Most properties of an object are entered on the Design tab of the Properties palette.

Design tab of a wall



Based on the object, some general object properties you can enter may include:

- Description of the object
- Layer key of the object
- Layer overrides of the object
- Object style
- Location of object style

These properties are defined by the properties set in the tool used to create the object. You can change these properties for an individual object instance. For more information, see Changing the Tool Properties on page 69.

On the Design tab, you also enter object-specific design properties. The properties that are available depend on the object you are editing.

- **Dimensions:** Most objects in AutoCAD Architecture have dimension settings for width, height, and other basic features. Many objects have additional settings and the option to use AutoCAD QuickCalc. A wall, for example, has additional length and baseline justification settings, and you can use QuickCalc to calculate and apply a new rotation. For more information, see “Use the QuickCalc Calculator” in AutoCAD Help.
- **Location:** Most objects in AutoCAD Architecture have settings for the object location. Anchored objects like windows and doors also have Anchor properties.

For detailed information about entering properties for a specific object, see the individual object sections.

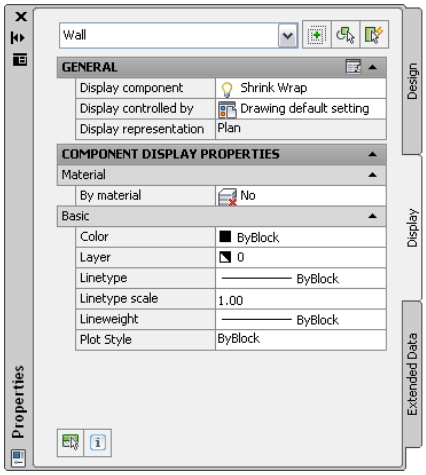
The Display Tab

Just as the Design tab of the Properties palette lets you control the physical properties of an object, the Display tab lets you control the graphical properties of an object by adjusting the settings for its individual

display components, such as boundaries and hatches. The changes you make on this tab are immediately visible in the display representation currently in effect, such as Plan or Model, and you have the option of applying your changes to other display representations as well. Also, while Design tab settings apply only to the currently selected object(s), you can specify whether a change you make to a Display tab property will apply to the selected component for all objects of that type, all objects of that style, or only the selected object. If the display component is controlled by material, your changes will apply to any object that uses that material. For detailed information on how to set up and manage the display of objects in AutoCAD Architecture, see Display System on page 513.

NOTE To hide the Display tab (or show it if it is currently hidden), enter the following command on the command line: AecChangeDisplayTabStatus.

Display properties on the Display tab

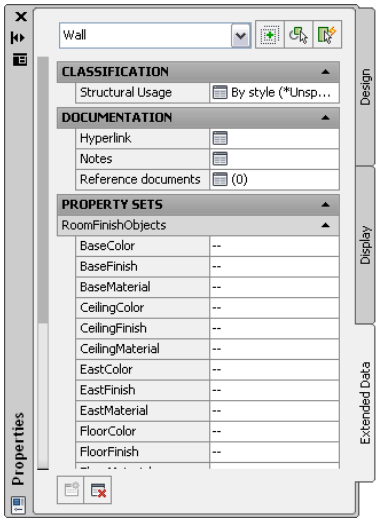


The Extended Data Tab

The Extended Data tab of the Properties palette contains the following object properties:

- **Hyperlink:** You can add a hyperlink to an object. For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.
- **Text Notes and Reference Files:** You can add a note or an associated reference file to an object.
- **Property Sets:** You can add, edit, and remove property set data for an object. For more information, see Attaching Property Set Data to Objects on page 2502.
- **Property Sets From Style:** You can add, edit, and remove property set data for the object style. For more information, see Property Set Data on page 2502.
- **Detail Component Data:** You can add, edit, and remove detail component data for an object. For more information, see Editing Detail Components in a Drawing on page 2321.

Property set data on the Extended Data tab

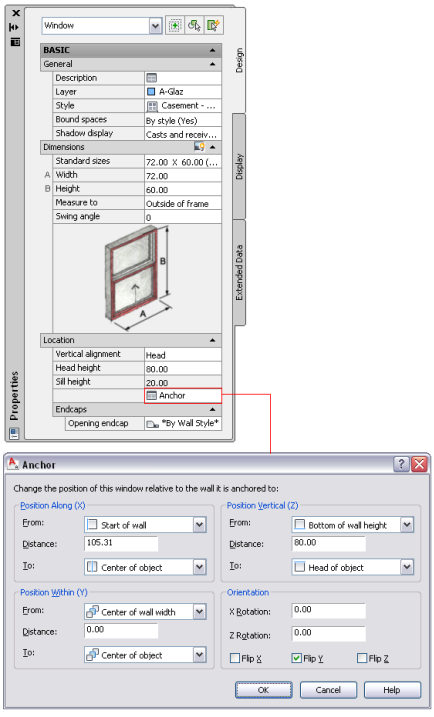


Worksheets

The properties of an object are entered and changed on the Properties palette. Most properties are directly entered and immediately updated on screen. Some objects have complex properties that are entered on worksheets accessed from the Properties palette.

Worksheets are designed to focus on a particular object-specific task. They display only when they are launched from a palette or from an object.

Opening the Anchor worksheet

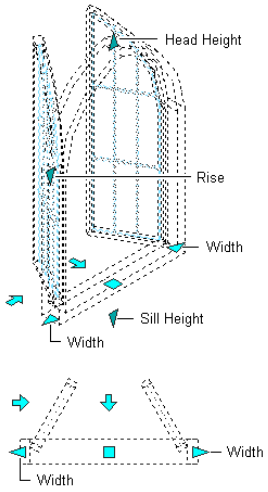


A worksheet is a modal dialog that must be closed before continuing to work in the drawing.

Direct Editing with Grips and Dynamic Dimensions

You can make design changes in the workspace without using dialogs. With a single click, you can perform design changes such as adjusting door width and window height, modifying a wall roofline, or reversing the wall direction. For some grips, the CTRL key gives you additional manipulation options, which are identified in the grip tips. For example, the Width grip of a wall can maintain either the wall baseline or the opposite face of the wall when dragged. To switch between these options, you use the CTRL key. As you make design changes, dynamic dimensions display, ensuring that your changes are precise and accurate.

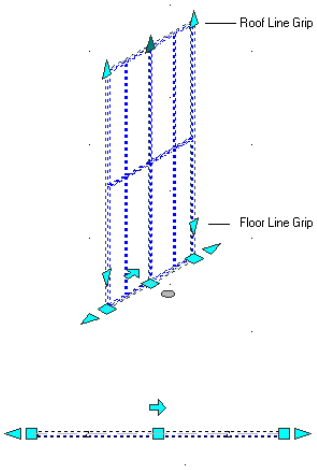
Window dimension grips in Plan view and Model view



Different grips are available, depending on the object type. For example, a wall or a freestanding railing has a direction (arrow) grip to change the direction of the object. A railing that is attached to a stair or a structural member does not have a direction grip.

Objects can also have different grips depending on the current view. For example, a structural beam has an additional Roll grip in Model views that is not visible in Plan views. Because rolling a beam is a 3D operation that you can perform only in an isometric view, it makes no sense to display the Roll grip in Plan views. Similarly, roof and floor line grips are useful only in a 3D view; therefore, they are displayed only in Model views.

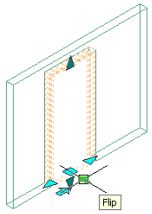
Curtain wall grips in Plan view and Model view



For detailed information about the grips for AutoCAD Architecture objects, refer to the illustrations and descriptions in the grip-editing sections of the individual object topics.

Grip Tips

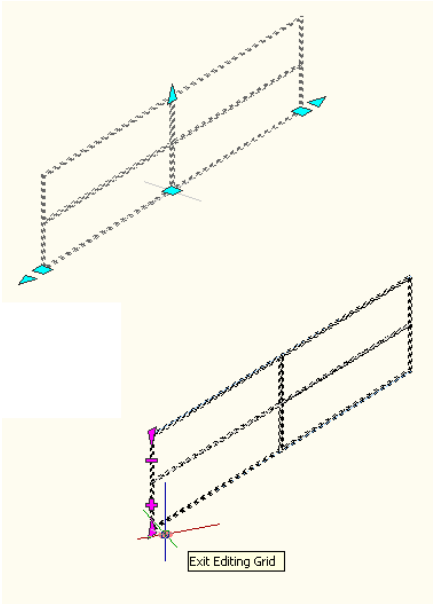
For a quick description of the function of a specific grip, you can pause the cursor over the grip to display its grip tip. Each grip has its name displayed in the grip tip, for example, Flip or Lengthen. In some cases, the grip tip contains additional information about the grip's function.



Grip Color

The color of a grip specifies whether the grip modifies a selected object or other objects in a drawing. Typically, a grip is used to change a property of a selected object. However, some grips might change the properties of all other objects in a drawing with the same style as the selected object. Other grips do not change the selected object at all, but are used to change the grip-editing mode of the object.

Grip Type and Default Color	Function
Object (Cyan)	changes a property of a selected object
Style (Magenta)	changes a property of a selected object and all other objects with the same style in the current drawing
Auxiliary (Gray)	does not change any property of any object



You can change the color of these grips on the AEC Editor tab in the Options dialog which is accessed from the application menu. For more information, see Changing the AEC Editor Settings on page 140.

Using the CTRL Key with Grips

Some object grips have multiple functions. For example, a face grip on a free form mass element has these possible grip modes:

- Move ortho
- Move
- Move plane
- Pull ortho
- Pull
- Push ortho

When a grip has multiple modes, this information is displayed in the grip tip. To switch between the different grip modes, use the *CTRL* key.

1. Select the object.
2. Pause the cursor over the grip, to see what grip modes are available.

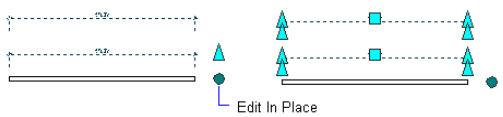
   The first mode listed is the mode that will be started when you select the grip without using the *CTRL* key.
3. Select the grip.
4. Press *CTRL* to switch to the next editing mode.

NOTE You need to press the *CTRL* key only once, and then release it. This switches the grip to the next editing mode. After releasing the *CTRL* key, you can start editing the grip. Do not keep pressing *CTRL* while editing the grip.

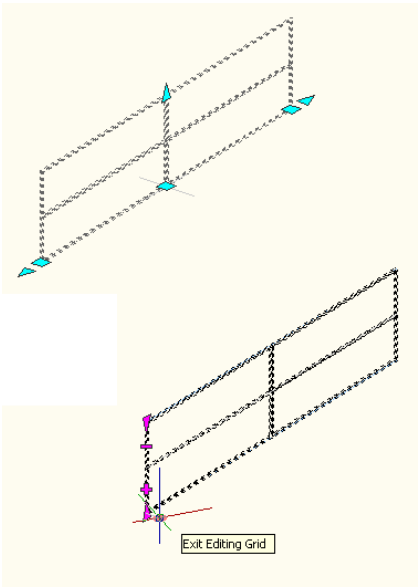
Trigger Grips

Selecting a trigger grip immediately performs an action on an object, as opposed to a normal drag grip, which you must drag to change a dimension property. You can use trigger grips to set discrete properties of an object, such as the swing direction of a door or the justification of a wall. You can also use trigger grips to change the grip-edit mode of an object. For example, selecting the Edit Grid grip in a curtain wall opens an edit in place session for the curtain wall grid. Selecting the Edit In Place grip in an AEC dimension activates additional grips for the individual dimension chains, text strings, and extension lines. A trigger grip typically displays with a circle or an arrow.

AEC dimension before and after activating edit-in-place grip



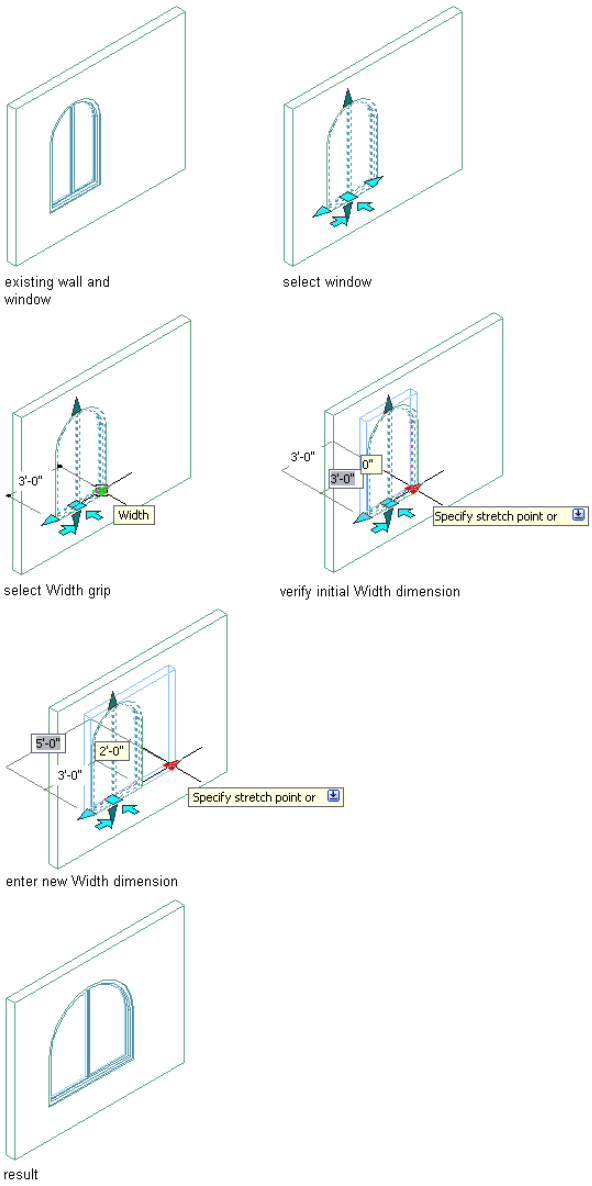
In some cases, such as with the AEC Dimension edit-in-place grip, the grip-edit mode is exited when the object is no longer selected. In other cases, you must click the grip again to exit the grip-edit mode.



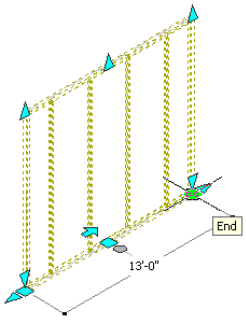
Dynamic Dimensions

When you use grips to change the dimension or angle of an object, temporary dimension objects show you the changes you are making. Use Dynamic Input to enter a precise value instead of moving a grip. This is active by default, and selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. Click (Dynamic Input) on the application status bar to toggle this off. For more information, see “Use Dynamic Input” in AutoCAD Help.

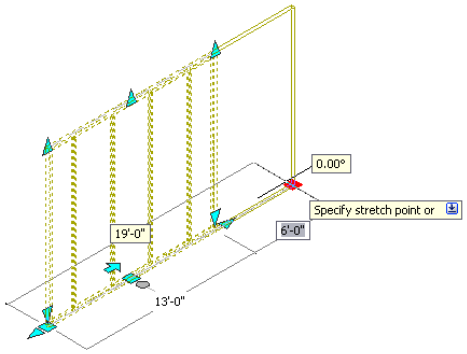
Using dynamic dimensions to change window width



These dynamic dimensions give you instant feedback about your changes. You can also use the dynamic dimensions to enter new dimension values directly on screen.



select curtain wall End grip



enter new dimension value

Three types of dynamic dimensions display on grips:

- Focal dimensions, which display highlighted in a white rectangular box. If you type a value while a dynamic dimension is focused, the edit box is displayed at the dimension text location.
- Editable dimensions, which display based on the drafting settings you specify. If you press *TAB* while a dynamic dimension is focused, the dimension focus shifts forward to the next editable dimension. You can continue pressing *TAB* to cycle forward through all editable dimensions, or press *SHIFT+TAB* to cycle backward through all editable dimensions.
- Non-editable dimensions, which display in black text. These dimensions typically display the current value of a property that you can modify with a grip.

You can apply different settings, such as the color of the dynamic dimension text box, on the Dynamic Input tab in the Drafting Settings dialog box. For more information, see "Use Dynamic Input" in AutoCAD Help.

You can select the color of grips and the dynamic dimension linetype on the AEC Editor tab in Options. For more information, see Changing the AEC Editor Settings on page 140.

NOTE When a dimension edit box is displayed, pressing *ENTER* sets the value of the property that you are editing and ends the grip operation. Pressing *TAB* sets the value, changes the focused dimension, and continues the same grip-editing operation.

NOTE When one or more editable dimensions are displayed, you can always press *TAB* to a state where no dimension has focus, during which you can use normal entry on the command line. You can always reach this non-focused state by pressing *SHIFT+TAB* immediately after selecting a grip.

To enter dynamic dimensions

1 Select the grip representing the dimension you want to change.

For example, to change the length of a curtain wall, select one of its Lengthen grips.

2 Enter the new value on screen.

Grip Constraints

When you select and drag a grip, its final position might not be the same as the current cursor position, which might be constrained. For example, for the Lengthen grip on a linear wall, the cursor position is projected to the nearest point on the wall. Whenever the constrained position of a grip differs from the current cursor position, dotted lines or arcs display between the cursor and the grip to indicate how the grip was constrained.

A square-shaped grip typically indicates that the cursor movement is constrained to a plane. An isosceles triangle-shaped grip indicates that the cursor movement is constrained to a line or curve.

Temporary Grip Coordinate Systems

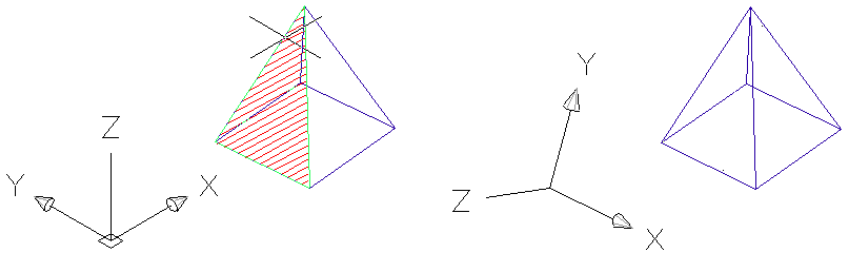
When you drag a grip, the current cursor position is typically projected to the *XY* plane of the current User Coordinate System (UCS). Some grip-editing operations are not possible in the current coordinate system. For example, if the current UCS is in plan, you cannot change the height of a wall while in an isometric view. For this reason, some grips have their own coordinate system that is temporarily set while the grip is active. Once the grip-editing operation is complete, the UCS is set back to its previous state. To identify whether a grip is setting a temporary coordinate system, set the UCSICON system variable to On on the command line, and display the icon at the origin.

Aligning the UCS to an Object Face

Use this procedure to align the currently active UCS to the face of an object.

You can align the UCS to the face of an AEC object or to the face of an AutoCAD solid. For detailed information about the UCS, see "Use Coordinates and Coordinate Systems" in AutoCAD Help. For more information about working with objects in a temporary section, elevation, or plan view with the UCS correctly aligned, see Editing Objects in Temporary Views on page 748.

Aligning the UCS to a pyramid face



1 Click View tab ➤ Coordinates panel ➤ Face .

2 Select an object face to align to the UCS.

You can select the face of an AEC object or an AutoCAD solid here. When you move the cursor over a face, it is highlighted with a temporary hatch.

3 Select the UCS origin point on the selected face.

4 Enter a rotation value for the new UCS.

The UCS is aligned to the object face.

Matching Object Properties

AutoCAD users are likely to be familiar with the Match Properties command (MATCHPROP), which allows you to quickly copy properties such as layer, color, and linetype from one AutoCAD entity and apply them to another. Beginning with the 2009 releases of AutoCAD Architecture and AutoCAD MEP, you can also use this command to match style and object display properties between AEC objects of the same type (for example, 2 different sizes of door) or between AutoCAD MEP objects of the same type. For AEC objects of different types (for example, a door and a window) you can use the command to match basic AutoCAD properties. Likewise, you can match basic AutoCAD properties between an AutoCAD entity and an AEC object.

When you match properties between style-based AEC objects, both the style properties and the display properties of the selected source object are applied to one or more selected destination objects. For non-style-based objects, only display properties are matched. In either case, the display properties are applied to all display representations of the destination object.

Object Types for Which Both Style and Display Properties Are Matched	Object Types for Which Only Display Properties Are Matched
2D Section	3D Grid
AEC Dimension	Ceiling Grid
AEC Polygon	Column Grid
Curtain Wall	Elevation Label
Curtain Wall Unit	Layout Curve
Display Theme	Layout Grid
Door	Opening Roof
Door Window Assembly	
Mask Block	
Mass Element	
Multi-View Block	
Railing	
Roof Slab	
Schedule Table	
Slab	
Space	
Stair	
Structural Members	
Wall	
Window	
Zone	

Overrides

When you use the Match Properties command, any style or object overrides in effect for the source object are applied to all display representations of the destination object. Overrides currently in effect for the destination object will be removed if they conflict with corresponding settings for the source object. If you want to change a setting for a particular display property in a particular display representation, the recommended method is to use the Display tab of the Properties palette. For more information, see Using the Properties Palette to Change Display Properties on page 514.

To run the Match Properties command:

1 Click Home tab ➤ Modify panel ➤ Match Properties .
The cursor changes to a paintbrush symbol.

2 Select the source object whose properties you want to copy.

3 Select one or more destination objects to which you want to apply the properties of the source object.

   Source object properties are applied to each destination object as it is selected.

4 When finished selecting destination objects, press ENTER.

Styles and Support Files

Styles are contained in Styles drawings from which you select a style to add to your drawing. This ensures smaller templates and a clearer structure of your drawings. The following table shows the location of the Styles drawings and other support files.

Files	Location
Plotter Configurations	*C:\ProgramData\Autodesk\ACA 2010\enu\Plotters*
Plot Styles	*C:\ProgramData\Autodesk\ACA 2010\enu\Plotters\Plot Styles*
DesignCenter Content	*C:\ProgramData\Autodesk\ACA 2010\enu\AEC Content*
Details	*C:\ProgramData\Autodesk\ACA 2010\enu\Details*
Layer Standards drawing	*C:\ProgramData\Autodesk\ACA 2010\enu\Layers*
Styles drawings	*C:\ProgramData\Autodesk\ACA 2010\enu\Styles*
Material Definitions	*C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>\Material Definitions.dwg*
Schedule Tables	*C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>\Schedule Tables.dwg*
Drawing templates	*C:\ProgramData\Autodesk\ACA 2010\enu\Template*
Area Evaluation templates	*C:\ProgramData\Autodesk\ACA 2010\enu\Template\Evaluation Templates*
Sample Tool Palette Catalogs	*C:\Program Files\AutoCAD Architecture 2010\Sample\Sample Palette Catalog (Imperial/Metric)*
Stock Tool Catalog	*C:\Program Files\AutoCAD Architecture 2010\Catalogs\StockToolCatalog*
Structural Member Catalog	*C:\Program Files\AutoCAD Architecture 2010\Catalogs\Structural*
Sample Drawing Management Project	*C:\My Documents\Autodesk\My Projects\Sample Project 2010*
Default User Workspace Catalog	*C:\Documents and Settings\<Username>\Application Data\Autodesk\ACA 2010\enu\Support\WorkspaceCatalog (Imperial/Metric)*

Integration of AutoCAD Architecture and AutoCAD

AutoCAD Architecture is integrated with the AutoCAD design platform. The commands and features of both applications are blended within the user interface. There are some differences between working in a pure

AutoCAD environment and accessing AutoCAD commands from within AutoCAD Architecture. These differences are listed in this section.

AutoCAD Tools

- The Properties palette is not invoked when AutoCAD tools are used to add objects to a drawing.
- AutoCAD tools do not have the same tool properties as AutoCAD Architecture tools; for example, the layer key.
- AutoCAD Hatch tools and Block tools cannot have a user-defined tool image.
- The tool properties of AutoCAD tools cannot be applied to an existing AutoCAD object in the drawing.

AutoCAD Tool Palettes

- When working in AutoCAD, you cannot create and link AutoCAD tool palettes from the Content Browser.
- AutoCAD tool palettes do not support palette properties.

Other Differences

- **Properties Palette:** When working in AutoCAD, you cannot set the Properties palette to be transparent.
- **Revision clouds:** The Revision cloud feature in AutoCAD is not identical to the Revision cloud feature in AutoCAD Architecture. Revision clouds in AutoCAD Architecture have additional scaling and layer key functionality, as well as the option of adding a Delta symbol.
- **Units:** Running the **UNITS** command from the command line opens the AutoCAD Architecture Drawing Setup dialog. If you want to open the AutoCAD Units dialog, enter **ddunits** on the command line.

WARNING To change the drawing setup of AutoCAD Architecture, you must use the Drawing Setup command of AutoCAD Architecture. If you change the units in the AutoCAD Units dialog, AutoCAD Architecture drawing units are not affected.

Content Browser 3

The Content Browser lets you store, share, and exchange AutoCAD Architecture content, tools, and tool palettes. The Content Browser runs independently of the software, allowing you to exchange tools and tool palettes with other Autodesk applications.

Content Browser Overview

The Content Browser is a library of tool catalogs containing tools, tool palettes, and tool packages. You can publish catalogs so that multiple users have access to standard tools for projects.

Tool Catalogs and Websites

AutoCAD Architecture 2010 tools and content are shared in the Content Browser using tool catalogs and websites. A tool catalog can contain one or more of the following items:

- Tools: For example, you might select a tool to create a customized wall used throughout a building project.
- Tool palettes: These contain tools used to support a particular workflow or task. For example, a tool palette may contain a set of annotation tools used in a project, or a set of tools to draw each type of door used in a project. A tool palette is treated as a single object.
- Tool packages: These are collections of tools that users can select and use. For example, a tool package may contain a set of productivity tools and utilities.

A single copy of a tool catalog can be shared among users on your local area network. If tools in the catalog are updated, you have immediate access to the latest version of the tools.

Websites containing AutoCAD Architecture tools, and content that you can download using i-drop® technology, can also function as tool catalogs.

Several tool catalogs are provided with AutoCAD Architecture, and you can create additional catalogs of your own.

Catalog Libraries

Tool catalogs are organized into catalog libraries, and each AutoCAD Architecture user has a personal catalog library.

Tool catalog data is not stored in the catalog library. Rather, the catalog library contains pointers to the physical tool catalogs. It is like the card catalog in a real library—it tells you where to find a book, but it does not contain the book itself.

You can sort the catalogs in the library by Last Used, Publisher, Title, or Type. You can filter the list of catalogs by Type.

You cannot create additional catalog libraries, but you can open the personal catalog library of another user if you are authorized to do so.

Tool Catalogs Supplied with AutoCAD Architecture

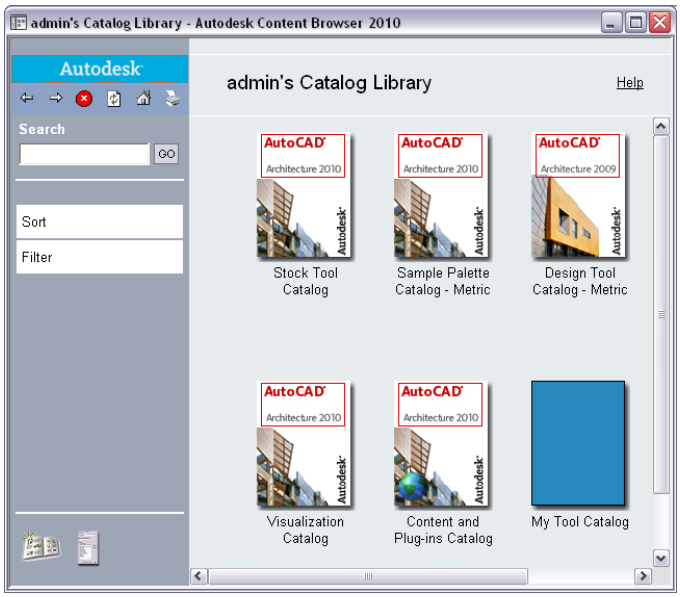
The following tool catalogs are supplied with your personal catalog library:

Catalog Name	Contents
Design Tool Catalog - Imperial	Content tools in imperial units for design and documentation of multi-view blocks and symbols.
Design Tool Catalog - Metric	Content tools in metric units for design and documentation of multi-view blocks and symbols.
Documentation Tool Catalog - Imperial	Content tools in imperial units for annotation and documentation.
Documentation Tool Catalog - Metric	Content tools in metric units for annotation and documentation.
My Tool Catalog	An empty tool catalog provided so that you can create your own tool set.
Visualization Catalog	A tool catalog containing render materials, lights, cameras and visual styles.
Sample Palette Catalog - Imperial	A sampling of tools in imperial units for objects such as doors, walls, and windows.
Sample Palette Catalog - Metric	A sampling of tools in metric units for objects such as doors, walls, and windows.
Stock Tool Catalog	A catalog that contains the standard stock tools in AutoCAD Architecture.

You cannot add or remove items from the Autodesk-supplied tool catalogs, but you can create your own tool catalogs. You can also copy other tool catalogs and website links into your catalog library using the Publish catalog feature.

Exploring the Content Browser

➤ Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .



The Content Browser window usually is divided into two panes (web pages displayed in the Content Browser occupy the entire window). Tool catalogs and their contents are displayed in the right pane. When you start the Content Browser, your personal catalog library, named *<user_name>'s Catalog Library*, displays in the right pane. The left pane is used for navigation, searching for tools, sorting catalogs, and filtering catalog display. The buttons at the top of the left pane work much like the equivalent controls in a web browser.

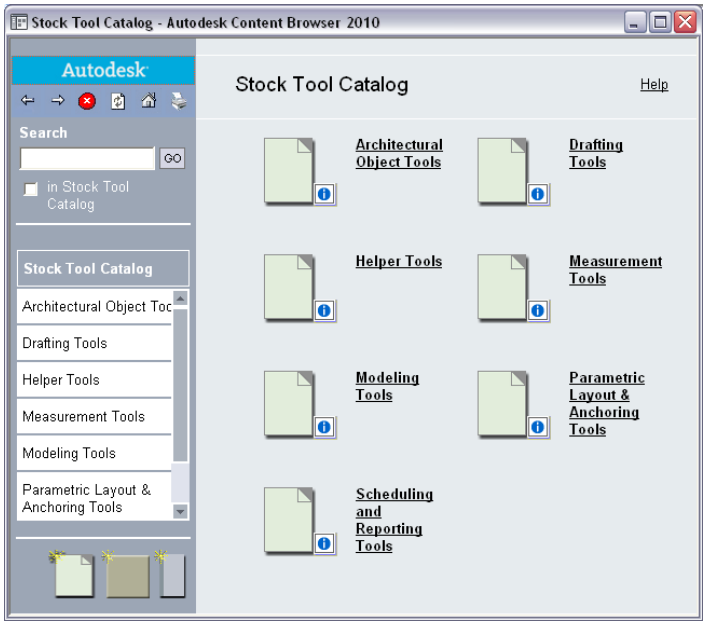
Click to display the top level of the catalog library in the right pane. This view is either all the catalogs in the library, or a group of catalogs filtered by type.

You can have more than one instance of the Content Browser open at a time. To open an additional Content Browser window, press *CTRL+N*. For more information, see Working with Multiple Content Browser Windows on page 126.

Viewing a Tool Catalog

To view a tool catalog, click the catalog in the catalog library. For example, click the Stock Tool catalog to display a window like the following illustration:

View of the Stock Tool catalog



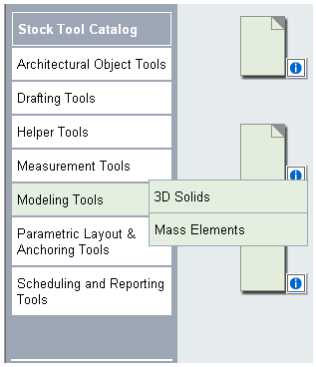
When you open the Stock Tool catalog, a cover page describing the catalog is displayed in the right pane. If no cover page is defined for a tool catalog, items contained in the tool catalog are displayed in the right pane. For information about specifying a cover page, see Editing Tool Catalog Properties on page 111.

To continue past the cover page to the contents of the tool catalog, click the catalog name in the left pane of the Content Browser window.

The contents of a tool catalog can be organized into categories. When a tool catalog is open in the right pane, any categories are listed in the left pane. For example, the Stock Tool catalog is organized into the categories shown in the previous illustration.

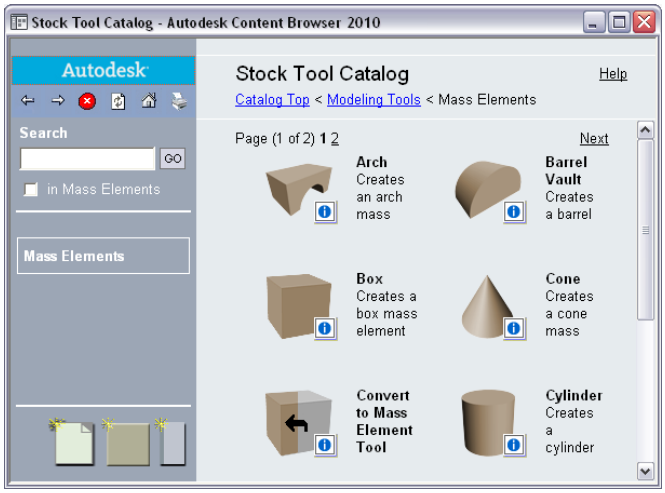
Categories can be subdivided into one or more levels. If subcategories exist, a list of subcategories appears when you move the pointer over the category name in the left pane. For example, in the Stock Tool catalog, move the pointer over Modeling Tools to see the Mass Element Tools and 3D Solids subcategories.

Displaying subcategories in a category



To open a category or subcategory, click it. For example, click Mass Element Tools to display the following window:

Mass Element Tools category of the Stock Tool catalog



Associated with each item in the tool catalog is the following i-drop® icon: .

You click the i-drop icon to drag a tool or other tool catalog item into the AutoCAD Architecture 2010 workspace or into another catalog, tool palette, or tool package.

You can modify the contents and properties of a tool catalog if you are authorized to do so, unless the catalog is read-only. Read-only tool catalogs are identified in the Content Browser title bar when you open the catalog.

A tool catalog category may contain more items than can fit on a page. If multiple pages are needed, navigation controls appear at the top and bottom of each page. The Mass Element Tools category shown earlier requires two pages to display its contents. You can specify the page to be displayed by clicking the page number or by clicking Next or Prev. (Note that these controls appear at the bottom of the page too.) You can also change the number of items that display on a Content Browser page.

Specifying the Number of Rows on a Content Browser Page

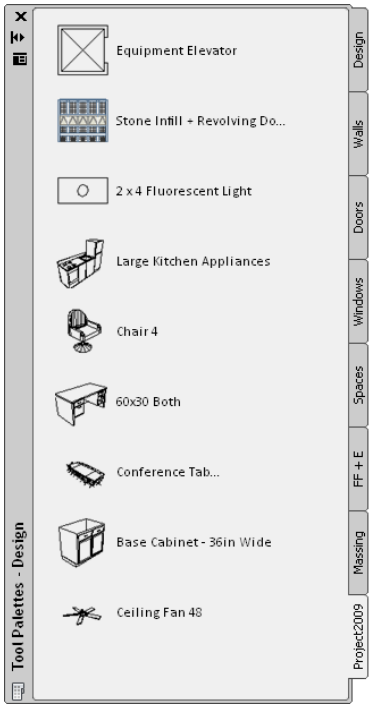
Use this procedure to specify the number of rows that display on a Content Browser page.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Click to display the catalog library.
3. Click to display the Content Browser Preferences dialog box.
4. In the Content Browser Preferences dialog box, enter the number of rows to be displayed on each page. You can specify up to 100 rows, and you must specify at least 5.
5. Click OK.

Using the Items in a Tool Catalog

To use a tool catalog item in AutoCAD Architecture 2010, drag the item into the software's workspace. Dragging a tool palette into the workspace adds the tool palette to the default tool palette set.

AutoCAD Architecture 2010 tool palette set, with added tool palette



Once added to the tool palette set, the palette remains a part of the set and is available each time you start AutoCAD Architecture.

You can drag a tool directly into the drawing area from the Content Browser. For example, with the Mass Element Tools category open in the Stock Tool Catalog, drag the Arch tool into the drawing area with the i-drop® icon to begin adding an Arch mass element to your drawing.

If you use a tool frequently, you will save time if you add the tool to a palette in the tool palette set, where you can access it without using the Content Browser.

Managing Your Catalog Library

You manage your catalog library by adding and deleting tool catalogs and website links and by setting catalog properties as needed. You can create a new catalog or customize existing ones to meet your needs. You can reorganize tool catalogs by moving and copying items among them.

Creating a New Tool Catalog

Use this procedure to create a new tool catalog in your catalog library.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to create a catalog.

4 In the Add Catalog dialog box, select Create a new catalog.

5 Enter a name for your tool catalog.

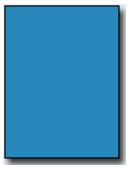
Tool catalog names can include spaces and can contain any characters except the following:\ / : * ? " < > |

NOTE The full path name of the catalog file cannot exceed 255 characters, so be careful about using long catalog names.

The name you assign is used for both the file containing the catalog definition and the folder containing the catalog's contents. The name is also used in the title identifying the tool catalog in the catalog library. You can change the title displayed in the catalog library without affecting the file and folder name. For information about changing the title, see Editing Tool Catalog Properties on page 111.

6 Identify the folder in which to store your tool catalog:

If you want to…	Then…
store the tool catalog in the default location	click OK.
store the tool catalog in a different location	click Browse, select the folder in which to store the catalog, and then click OK.

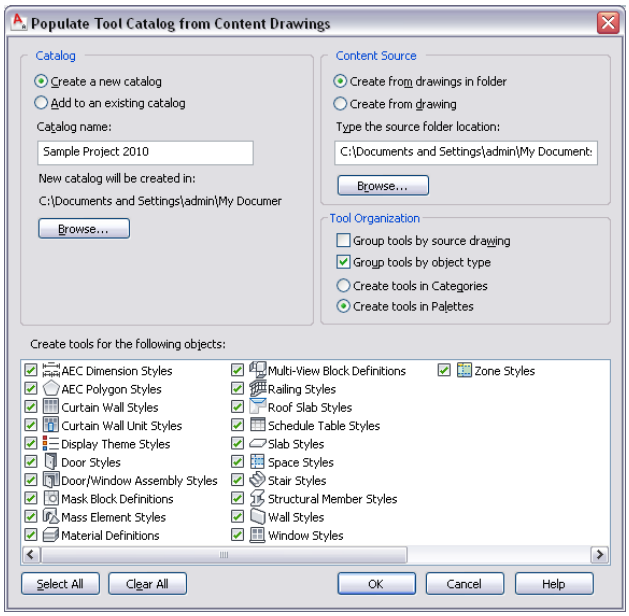
The tool catalog is displayed in the catalog library with the following default graphic image:  . For information about changing the graphic image and other tool catalog properties, see Editing Tool Catalog Properties on page 111.

Creating a Tool Catalog from Content Drawings

Use this procedure to create a new tool catalog based on existing standards from the styles in one or more drawings. You specify the styles from which tools will be created and whether the new tools are organized in categories or palettes. Note that Content Browser does not have to be open to create a tool catalog.

WARNING Converting large numbers of tools can slow down your computer considerably. Depending on your processor and amount of RAM, the conversion process can take a long time and the application may appear to be non-responsive. To avoid this, do not convert more than 3000 tools in one Tool Catalog Generator session. Instead, break up the source drawings, and use multiple instances of Tool Catalog Generator to achieve the conversion.

1 Click Manage tab ➤ Customization panel ➤ ➤ Generate Tool Catalog .



2 Under Catalog, select Create New Catalog.

3 Enter a name for the new catalog.

4 Click Browse to define the location of the catalog.

By default, a new catalog is saved in *C:\My Documents*.

5 Under Content Source, specify whether you want the new catalog to be created from multiple drawings in a folder or from a single drawing. Then, enter the path for the folder or drawing.

NOTE When you specify a folder as the catalog source, any nested folders are included in the new tool catalog.

6 Under Tool Organization, specify how you want the tools organized in the new catalog.

- To organize the new tools by their source drawing, select Group tools by source drawing. This option is well suited for a tool catalog that is generated from a number of styles drawings. The resulting tools could be placed in categories or palettes named “Wall Styles - Concrete (Imperial)”, “Wall Styles - Brick (Imperial),” etc.
- To organize the new tools by their object type, select Group tools by object type. This option is well suited if you want to merge styles from various drawings into palettes or categories. The resulting tools will be placed in categories or palettes named “Walls”, “Doors,” etc.

  NOTE If both options are enabled, the catalog is first grouped by the drawings and then by the object type, generating categories from the drawings, and palettes from the object types. This is implemented because palettes cannot be nested. In this case the radio buttons for categories and palettes are disabled, and the Create tools in palettes option is selected for the catalog.

  NOTE If neither of the two options is enabled, all new tools will be generated in the top category of the catalog.

- To organize the new tools in categories, select Create Tools in Categories.

If you select Group tools by source drawing, a category will be created for each source drawing. If you select Group tools by object type, a category will be created for each object type.

- To organize the new tools in palettes, select Create Tools in Palettes.
  If you have selected to group tools by their source drawing, then for each source drawing a palette will be created. If you have selected to group tools by their object type, then for each object type a palette will be created.

7 Under Create tools for the following objects, select the object styles you want to appear as tools in the new catalog.

By default, all available style types are selected. Use the Select All and Clear All buttons as necessary.

8 Click OK.

A progress bar in the application status bar informs you of the progress of the catalog generation. This can take a few moments for a large catalog.

NOTE Each category and each palette is created in its own ATC file. The category and palette ATC files are stored in the Palettes or Categories subfolders within the folder where the new catalog is created.

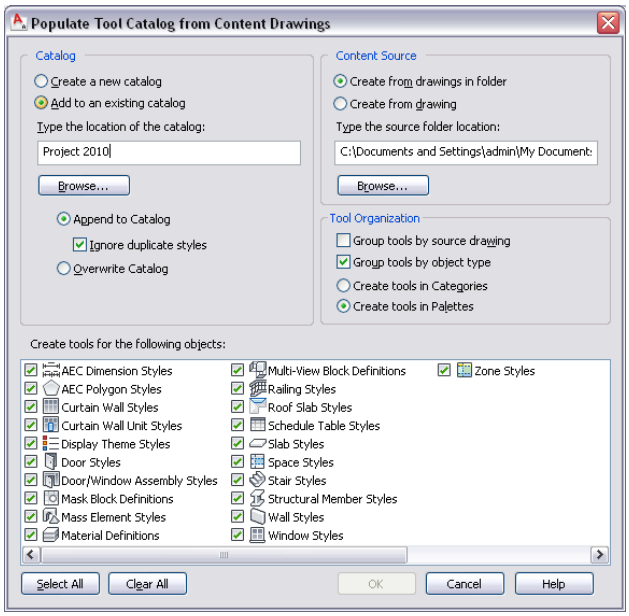
After creating a new catalog, you can add it to your Content Browser library, as described in Adding an Existing Tool Catalog to Your Catalog Library on page 107.

Adding Tools from Content Drawings to a Tool Catalog

Use this procedure to add tools from one or more drawings to an existing catalog.

WARNING Converting large numbers of tools can slow down your computer considerably. Depending on your processor and amount of RAM, the conversion process can take a long time and the application may appear to be non-responsive. To avoid this, do not convert more than 3000 tools in one Tool Catalog Generator session. Instead, break up the source drawings, and use multiple instances of Tool Catalog Generator to achieve the conversion.

1 Click Manage tab ➤ Customization panel ➤ ➤ Generate Tool Catalog .



2 Under Catalog, select Add to an existing catalog.

3 Enter the name and the path of the catalog.

4 Click Append to Catalog and select Ignore Duplicate Styles if you want existing styles from being overwritten by styles with the same name and file path from the appended drawing.

If you clear Ignore Duplicate Styles, existing styles are overwritten with styles from the appended drawing if they have the same name and file path.

5 If you want to overwrite the existing catalog, click Overwrite Catalog.

This deletes the whole catalog and replaces it with the palettes, categories, and tools from the source drawing(s).

WARNING You should use that option with great caution, as it will delete the complete existing catalog. If you just want to overwrite tools with their up-to-date versions from a content drawing, select Append to Catalog instead, and verify that Ignore Duplicate Styles is cleared.

6 Under Content Source, select a project standards drawing or standards folder to use as source for the new tools.

If you want to…	Then…
add tools from multiple drawings in a folder	select Create from drawings in folder, and then enter the path and folder name under Type the source location.
add tools from a single drawing	select Create from drawing, and then enter the path and drawing name under Type the source drawing.

7 Under Tool Organization, specify how the tools should be organized in the catalog.

- To organize the resulting tools by their source drawing, select Group tools by source drawing. This option is well suited for a tool catalog that is generated from a number of styles drawings. The resulting tools could be placed in categories or palettes named “Wall Styles - Concrete (Imperial),” “Wall Styles - CMU (Imperial),” etc.
- To organize the resulting tools by their object type, select Group tools by object type.

This option is well suited if you want to merge styles from various drawings into a new catalog. The resulting tools will be placed in categories or palettes named "Walls," Doors," etc.

NOTE If both options are enabled, then the tools are first grouped by the drawings and then by the object type, generating categories from the drawings, and palettes from the object types. This is implemented because palettes cannot be nested. In this case the radio buttons below are disabled and the Create tools in palettes option is selected for the tools.

NOTE If neither of the two options are enabled, all new tools will be generated in the top category of the catalog.

- To organize the new tools in categories, select Create Tools in Categories.
  If you have selected to group tools by their source drawing, then for each source drawing a category will be created. If you have selected to group tools by their object type, then for each object type a category will be created.
- To organize the new tools in palettes, select Create Tools in Palettes.
  If you have selected to group tools by their source drawing, then for each source drawing a palette will be created. If you have selected to group tools by their object type, then for each object type a palette will be created.

8 Under Create tools for the following objects, select which object styles should appear as tools in the catalog.

By default, all available style types are selected. Use the Select All and Clear All buttons as needed to make your selections.

9 Click OK.

A progress bar in the application status bar indicates the progress of the tool generation. When a large number of tools are being added, the process can take a few moments.

NOTE Each category and each palette is created in its own ATC file. The category and palette ATC files are stored in the Palettes or Categories subfolders in the folder in which the new catalog is created.

Adding an Existing Tool Catalog to Your Catalog Library

Use this procedure to add an existing tool catalog to your catalog library.

Adding a tool catalog to a catalog library does not physically move or copy any files. Instead, a pointer to the catalog's location is added to the catalog library. If you add a tool catalog that resides on another computer, and then a tool in that catalog is updated, you always reference the latest version of the tool in the catalog library.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to create a catalog.

4 In the Add Catalog dialog box, select Add an existing catalog or website.

5 Enter the location of the tool catalog you want to add, or click Browse and select a catalog.

Tool catalog files typically have the extension *.atc*.

6 Click OK.

NOTE Alternatively, you can drag and drop an ATC file from Windows Explorer to the Content Browser library pane.

Creating a Catalog Install File

Use this procedure to create a registry file that adds catalogs to other users' Content Browser libraries.

When you add a catalog in Content Browser, it is automatically added to your Content Browser library (CBL). However, as a CAD manager, you might also want to automatically install new catalogs into other user's libraries. In that case, you can either add a pointer to a catalog in an existing registry file, or create a new registry file that adds that catalog to the user's library.

Creating a catalog install file

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Select the catalog that you want to add to a registry file.

When you add a catalog to a registry file, make sure that the network location of the catalog and all its affiliated files can be accessed by all users to whom you want the catalog distributed.

3 Shift-Rightclick the catalog.

4 Click Convert to Registry File.

If you want to…	Then…
create a new registry file for the catalog	browse to the desired folder location, enter a name for the registry file, and click Open. In that case, a new registry file (REG) is created, containing the registry information for the selected catalog.
enter the catalog into an existing registry file	browse for the registry file, select it and click Open. In that case, an entry containing the registry information for the selected catalog is appended to the registry file.

NOTE When you select an existing registry file, the file is not overwritten, as in standard Windows Save dialogs; the catalog entry is simply added to the registry file. If you want to overwrite an existing registry file, you need to delete it from Windows Explorer, and then create a new one of the same name.

Entering a catalog in a users' library

5 To enter the catalog reference into the local registry, and thereby into the user's catalog library (CBL), run the new registry file.

6 Either place the generated REG file on a generally accessible network folder, or copy it to the local user machine where the catalog should be entered.

7 Double-click the REG file on the user's computer.

8 Click Yes when asked whether you want to add the information into the local registry.

The catalog is entered into the users' registry and catalog library.

Publishing Tool Catalogs

The Publish Catalog feature helps you make tool catalogs available for use by multiple users on a network. You can move and copy catalogs or make them available from their current location. The feature handles dependent file paths during the publish catalog operation.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Right-click the tool catalog you want to publish, and click Publish *<catalog_name>*.
3. In the Publish Tool Catalog - Step 1 of 4 dialog box, do one of the following:

If you want to…	Then…
move the catalog to a new location when publishing it	click Move it to a new location.
copy the catalog to a different location	click Copy to another location.
publish the catalog from its current location	click Leave it in its current location.

4. Click Next.

   If you are moving or copying the catalog, you are prompted to specify the destination location.

5. In the Publish Tool Catalog - Step 2 of 4 dialog box, specify the destination for the tool catalog.

   You can enter a path, or click [...] to navigate to the destination location. You can specify an existing location or create a new folder.

6. Click Next.
7. In the Publish Tool Catalog - Step 3 of 4 dialog box, specify the location for any dependent files.

   You can enter a path, or click [...] to navigate to the destination location. You can specify an existing location or create a new folder.

   Dependent files contain information referenced by the tools; for example, style information. If you select the option Automatically move (or copy) tool dependent files into the above folder to be referenced by the publish catalog, the feature attempts to copy all of the dependent files referenced in the catalog to the dependent file location you specify. If you do not select this option, you must verify that the files are already present in the dependent location. If you select the option Report invalid catalog references, the feature generates a report of any dependent files it cannot locate.

8. To have the publish catalog feature move (or copy) dependent files, click Automatically move (or copy) tool dependent files into the above folder to be referenced by the publish catalog.
9. Click Report invalid catalog references to generate an HTML file containing any dependent files that were not found, and then click Next.
10. In the Publish Tool Catalog - Step 4 of 4 dialog box, do one of the following:

If users will…	Then…
access the catalog directly from the network location you specify	Click Directly from the location provided.
access the catalog from an alternate or aliased location	Click From an *http://* site or mapped drive, and enter the location name.

11. To make the catalog read-only, select Set items in catalog to be read-only.
12. To prevent catalog items from refreshing when they are dropped in the workspace, select Set items in catalog to not be refreshable when drag/dropped into the workspace, and click Finish.

Individual users can specify the location of dependent files, such as styles for tools, on the AEC Content tab in the Options dialog box. The variable %AECCONTENT_DIR% is used for tool-dependent file references. This variable is updated to use the path specified. For example, <Style href="%AECCONTENT_DIR%\<*DoorStyles\DoorStyles.dwg*"/>. For more information, see Changing the AEC Content Settings on page 142.

Adding a Website to Your Catalog Library

Use this procedure to add a website link to your catalog library. Links are useful for websites containing AutoCAD Architecture 2010 tools and content that you can download using i-drop® technology.

You can also add a website link by dragging the URL from the Address bar of Internet Explorer into the Content Browser window.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to create a catalog.

4 In the Add Catalog dialog box, select Add an existing catalog or website.

5 Enter the location of the website to link:

If you want to…	Then…
link to a website on the Internet or on an intranet	enter the URL of the website, including the *http://* prefix. **TIP** Here is the easiest way to specify a URL: 1. Open a web browser, such as Internet Explorer. 2. Open the web page you want to link to. 3. Copy the URL from your browser's address bar. 4. Paste the URL into the Add Catalog dialog box.
link to a web page in an HTML file on your computer or on your network	enter the file name, or click Browse and select the file you want to link to.

6 Click OK.

The link to the website is represented in the catalog library by a default graphic image, which you can change. For information about changing this image and other Tool Catalog properties, see Editing Tool Catalog Properties on page 111.

Opening Web Pages in the Content Browser

Use this procedure to open a web page through a website link in your catalog library.

TIP If you have any problem viewing a web page in the Content Browser window, try opening the page in Internet Explorer.

- Move your pointer over the website link you want to open, and do one of the following:

If you want to…	Then…
view the web page in the Content Browser window	click the link.
view the web page in a new Content Browser window	right-click the link, and click Open in New Window.
view the web page in a new Internet Explorer window	right-click the link, and click Open With Internet Explorer.

Editing Tool Catalog Properties

Use this procedure to view and modify the properties of a tool catalog. If you have write access to the tool catalog, you can select a different source file or target, and you can change the cover page.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Right-click the desired tool catalog, and click Properties.

3 Edit the properties:

If you want to…	Then…
change the graphic image that represents the tool catalog in the catalog library	click the image in the Properties dialog box, and then select a graphic file to use. You can use a BMP, JPEG, PNG, or TIFF file for your graphic. The graphic image is displayed at 90 × 120 pixels. If you specify an image of a different size, the image is scaled to fit. **NOTE** The graphic file you select is copied into the tool catalog's image folder.
change the title displayed beneath the tool catalog's graphic image in the catalog library	enter a new title. You can also right-click the catalog and click Rename <*catalog_name*>.
change the descriptive text that displays when you move the pointer over the tool catalog's graphic image	enter a new description.
change the tool catalog file or website	enter the new file in File or Target, or click Browse to select a tool catalog file.
change or specify the HTML file that displays when the tool catalog is opened	enter the new HTML file in Cover Page, or click Browse to select a cover page.
change the publisher of the tool catalog	enter a new publisher name.
change the type designation for the catalog	select a type from the Type list. For information on assigning types to catalogs, see Creating Catalog Types on page 112.
define that tools and palettes from this catalog should be automatically linked to the Content Browser when	select Link items when added to workspace. For information on linking tools to the Content Browser,

If you want to…	Then…
dropped onto the tool palettes set of AutoCAD Architecture 2010	see Using Tool Catalog Items in AutoCAD Architecture on page 122 and Working with Tools from a Central Location on page 78.
define that tools and palettes from this catalog should not retain a link to the Content Browser when dropped onto the tool palettes set of AutoCAD Architecture 2010	clear Link items when added to workspace. Inserting tools without retaining a link to Content Browser would be the right choice if you want to make changes to a tool in AutoCAD Architecture that should not overwritten by the tool properties in Content Browser; also, unlinked tools create a better general performance in AutoCAD Architecture 2010.

4 Click OK.

Creating Catalog Types

Use this procedure to create catalog types. You can assign a type property to a catalog and then sort and filter your catalogs by type.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to display the Content Browser Preferences dialog box.

4 In the Catalog Types area, under New Catalog Type, enter the name of the type you want to create.

5 Click OK.

6 The new type is added to the list of available types. You can now assign this type to catalogs by editing their properties. Once the type is assigned to a catalog, you can sort or filter the display of catalogs in the Library View by this type.

7 To remove a type, click the type name and click Remove.

NOTE The Type catalog property is cleared for any catalogs associated with this type.

Sorting Catalogs in the Library View

Use this procedure to sort the display of catalogs by last-used date, publisher, title, or type.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 With the catalog library open in the right pane of the Content Browser, position the pointer over Sort in the left pane.

4 From the list of available sort options, click the method you want to use to sort catalogs in the library.

If you want to…	Then…
sort chronologically by when you last used each catalog	click By Last Used.
sort alphabetically by the publisher name of each catalog, and then by title	click By Publisher. If the catalog does not have a publisher property, the catalog appears at the bottom of the display.
sort alphabetically by catalog title	click By Title.
sort by catalog type	click By Type. If the catalog does not have a type assigned, the catalog appears at the bottom of the display.

Filtering Catalogs in the Library View

Use this procedure to filter the display of catalogs in the Library View.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 With the catalog library open in the right pane of the Content Browser, position the pointer over Filter in the left pane.

4 From the list of available types, click the type of catalog you want to view.

To display all the catalogs in the library, click All Catalogs.

NOTE To filter catalogs by Type, you must assign a type to each catalog in the library. For more information, see Creating Catalog Types on page 112.

Removing a Tool Catalog or Website Link

Use this procedure to remove a tool catalog or website link from your catalog library.

When you remove a tool catalog or website link, only a pointer to the item is removed; no files or web pages are physically deleted.

1 With the catalog library open in the right pane of the Content Browser, right-click the tool catalog or website link to delete, and click Remove *<catalog_name>* from Library.

2 When prompted, click Yes to confirm deletion, or click No to cancel deletion.

Opening a Different Catalog Library

Use this procedure to open a catalog library other than your personal catalog library, or to reopen your personal catalog library.

A catalog library is stored in a file having the extension *.cbl*. The default file name for your personal catalog library is *ContentBrowserLibrary.cbl*; it is stored in the folder *C:\My Documents\Autodesk\My Content Browser Library\ACA 2010*.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the current open catalog library.

3 Right-click the catalog library name, and click Open New Library.

4 In the Open dialog box, select the catalog library that you want to open.

Renaming a Catalog Library

Use this procedure to rename the currently open catalog library. The name change affects the title of the catalog library displayed in the Content Browser, but no files are renamed.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to display the Content Browser Preferences dialog box.

4 Under Library Name, enter the new library name.

5 Click OK.

Searching for Items in a Tool Catalog

You can use the Search feature to help you find a particular tool. You can search across multiple catalogs or search a particular tool catalog, tool palette, or tool package. For example, if you are looking for a tool to help you create a 3D desk, you could search on the keywords *3D desk*. The search applies to all the catalogs currently displayed (filtered). Narrow the search by filtering the catalog display.

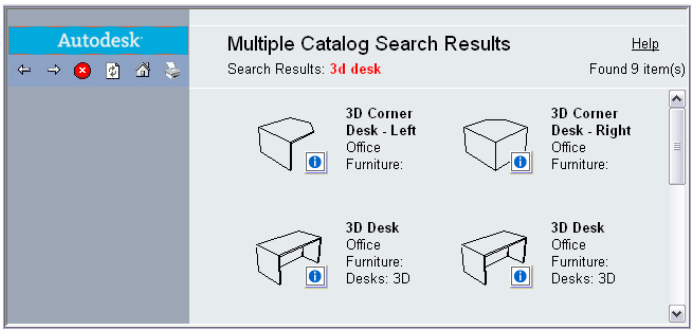
The Search feature looks at the text in the following properties of tool catalog items for the keywords you specify:

- Name
- Description
- Keywords

The Search tool is only as helpful as the tool names and descriptions that you assign. A tool name should indicate the tool's function, and the description should indicate the tool's use.

If you enter a search term containing more than one word, the Search feature looks for items containing both words. You can also join multiple search words with AND, &, or +. To retrieve items containing any of the search words, enter OR or | between search terms. To exclude a word from the search, precede the word with !. Use * as a wild-card string and ? as a wild-card character. Search is not case sensitive by default. To use a particular case in a search, surround the word in quotes.

Search results are displayed in the right pane of the Content Browser window. The following illustration shows the results of a search on the term *3D desk* in the Content catalogs group:



The search term and the number of items found are listed on the line below the tool catalog name. If multiple pages are returned, you can specify the page to display by clicking the page number or by clicking Next or Prev.

Performing a Search

Use this procedure to search across multiple catalogs or to search all or part of a tool catalog.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Filter the library to display the catalogs you want to search:

If you want to…	Then…
search for tools across multiple catalogs	display the catalog library and then filter the display to include the catalogs you want to search.
search for tools only within a specific catalog	open the tool catalog you want to search.
search for tools only within a specific category and its subcategories	open the category you want to search, and select the box labeled *in <category name>*.
search for tools only on a specific tool palette	open the tool palette you want to search, and select the box labeled *in <palette name>*.
search for tools anywhere in the open catalog	leave the box under the search term clear.

3 Enter the terms to search for under Search.

4 Click GO.

Items that match your search criteria are displayed in the right pane of the Content Browser. To go to the catalog containing an item, click that item. To view the source catalog of an item, right-click the item.

5 To perform another search, click the button located near the top of the left pane.

Adding Content to a Tool Catalog

Tool catalogs can contain tools, tool palettes, and tool packages, which may be organized into categories.

Categorizing the Items in a Tool Catalog

You can define categories and subcategories in a tool catalog to organize a large number of items. For example, the Stock Tool catalog contains dozens of tools. If these tools were not grouped into categories, you would have to scroll through page after page to find a particular tool. To make it easier to find tools, the Stock Tool catalog is organized into categories and subcategories, as shown in the following diagram:

Category Name	Contents
Architectural Object Tools	■ Wall, Curtain Wall, and Curtain Wall Unit ■ Opening, Door, Window, and Door/Window Assembly ■ Roof, Roof Slab and Slab ■ Ceiling Grid ■ Stair, Stair Tower, and Railing ■ Space and Space Boundary ■ Structural Members and Column Grid
Drafting Tools	■ AEC Dimensions ■ Callouts and Title Mark ■ Text, Leaders, Keynotes, Legend ■ Masking Block ■ Hatching and Gradient ■ Chamfer and Fillet ■ Shrink Wrap Tool ■ Welding Symbols
Helper Tools	■ AEC Entity Reference ■ AEC Polygon ■ Camera ■ Horizontal and Vertical Design Sections ■ Hidden Line Removal Tool and Napkin Sketch
Measurement Tools	■ Area, Distance, and Point ID
Modeling Tools	**Mass Element Tools:** ■ Box, Arch, Pyramid, Extrusion, and so on ■ Mass Group ■ Convert to Mass Elements **3D Solids Tools:** ■ 3D Solid Box, Cylinder, Convert to 3D Solids
Parametric Layout and Anchoring Tools	■ Layout Curve ■ Layout Grid (2D and 3D) ■ Object Anchor, Node Anchor, Cell Anchor, Volume Anchor

Category Name	Contents
Scheduling and Reporting Tools	■ Space Evaluation ■ Display Theme ■ Tag Tool ■ Schedule Table ■ Property Data Browse and Renumber Tools

About Tool Palettes

A tool palette is a collection of tools used to support a task. For example, a palette might contain tools to create the different types of doors (single-hinged, double-hinged, revolving, and so on) used in a building project. Storing a tool palette in a tool catalog makes the palette available to multiple users.

The date and time at which the tool palette was created and last modified are identified in the Tool Palette Properties dialog box. To view the dialog box, right-click the tool palette, and click Properties. For information about other tool palette properties, see Adding a Tool Palette to a Tool Catalog on page 118.

About Tool Packages

A tool package is a group of tools stored together for distribution. For example, a package might contain a set of productivity tools and utilities.

The date and time at which the tool package was created and last modified are identified in the Tool Package Properties dialog box. To view the dialog box, right-click the tool package, and click Properties. For information about other tool package properties, see Adding a Tool Package to a Tool Catalog on page 118.

Customizing Tools

You customize a tool by copying it to a palette in the AutoCAD Architecture 2010 tool palette set, modifying the tool's properties, and then copying it back to its original location in the tool catalog.

Defining Categories in a Tool Catalog

Use this procedure to define categories and subcategories in a tool catalog.

Categories are listed in the left pane of the Content Browser, below the name of the open tool catalog.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog in which to define categories.

3 Select the location for the new category:

If the tool catalog…	Then…
already has one or more categories defined and you want to add a subcategory	in the left pane of the Content Browser, navigate to the desired category, and click the category name.
is not currently divided into categories and is open to a cover page	in the left pane of the Content Browser, click the catalog name.
is not currently divided into categories and the content page is displayed	do nothing; this is where you define your first category.

4 In the right pane of the Content Browser window, right-click a blank area, and click Add Category.

5 Enter a name for the category, and click OK.

6 To define additional categories and subcategories, continue from step 2.

Adding a Tool Palette to a Tool Catalog

Use this procedure to add a tool palette to a tool catalog. You must have write access to the tool catalog in order to add a palette.

You can also drag a tool palette from the AutoCAD Architecture 2010 workspace into a tool catalog. Click the tab of the tool palette to drag it.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog in which to add the tool palette.

To add the palette to a specific category in the catalog, open that category.

If no graphics appear at the bottom of the left pane, the tool catalog is read-only, and you cannot add a tool palette.

3 Click in the left pane of the Content Browser.

4 In the Tool Palette Properties dialog box, enter a name for the tool palette, and enter any other desired properties:

If you want to…	Then…
add a description to be displayed in the tool catalog and queried in catalog search operations	enter a description.
define terms that will be found during a search of the tool catalog	enter the terms for keywords.
identify the publisher of the tool palette	enter a publisher.

Adding a Tool Package to a Tool Catalog

Use this procedure to add a tool package to a tool catalog. You must have write access to the tool catalog in order to add a package.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog in which to add the tool package.

To add the package to a specific category in the catalog, open that category.

3 Click in the left pane of the Content Browser.

4 In the Package Properties dialog box, enter a name for the tool package, and enter any other desired properties:

If you want to…	Then…
add a description to be displayed in the tool catalog and queried in catalog search operations	enter a description.
define terms that will be found during a search of the tool package	enter the terms for keywords.

If you want to…	Then…
identify the publisher of the tool package	enter a publisher.

If the tool catalog is read-only, the Package Properties dialog box is displayed, but you cannot enter anything in it.

Adding Tools to a Tool Catalog

Use this procedure to add a tool to a tool catalog or to a tool palette or tool package stored in a catalog. You must have write access to the tool catalog in order to add a tool to it.

You can also drag a tool from a tool palette in the AutoCAD Architecture 2010 workspace to a tool catalog in the Content Browser.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Open the tool catalog in which to add a tool.

   If you are adding the tool to a specific category in the catalog or to a palette or package in a specific category, open that category.
3. Double click the image to open the palette or package if you are adding the tool to a tool palette or tool package.
4. In the AutoCAD Architecture 2010 workspace, open the tool palette that contains the tool to add to the tool catalog.
5. Right-click the tool, and click Copy.
6. In the right pane of the Content Browser window, right-click in a blank area, and click Paste.

NOTE If there is no Paste option on the shortcut menu, then the pointer is probably positioned over a tool, even though the space may appear to be blank. Move the pointer and try again.

Copying and Moving Tool Palettes and Tool Packages

Use this procedure to copy or move tool palettes or tool packages between tool catalogs or between categories in the same catalog. To copy an item, you must have write access to the catalog you are copying to. To move an item, you must have write access to both the catalog you are copying from and the catalog you are copying to.

You can also open multiple Content Browser windows and drag tool palettes and tool packages from one window to another. For information about using multiple windows to copy and move items, see Dragging Catalog Items Between Content Browser Windows on page 127.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Open the tool catalog containing the tool palette or tool package to copy or move. If the item is located in a specific category of the catalog, open that category.
3. Right-click the item, and select an action:

If you want to…	Then…
add a copy of the tool palette or tool package in another location	click Copy.
move the tool palette or tool package to another location, deleting it from its original location	click Cut.

4 Select the item's destination:

If the destination is…	Then…
a category within the current tool catalog	click that category in the left pane of the Content Browser window.
another tool catalog	click to return to the catalog library, and then click the tool catalog.
a category in another tool catalog	click to return to the catalog library, click the tool catalog you are copying to, and then select its category in the left pane of the Content Browser window.

5 In the right pane of the Content Browser window, right-click in a blank area, and click Paste.

NOTE If there is no Paste option on the shortcut menu, then the pointer is probably positioned over a catalog item, even though the space may appear to be blank. Move the pointer and try again.

Copying and Moving Tools

Use this procedure to copy or move tools between tool palettes, tool packages, or tool catalogs.

You can also open multiple Content Browser windows and drag items from one window to another. For information about using multiple windows to copy and move items, see Working with Multiple Content Browser Windows on page 126.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog containing the tool to copy or move.

3 Open the item containing the tool to copy or move:

If the tool is in…	Then…
a category of the tool catalog	open the category.
a tool palette in the tool catalog	open the category for that tool palette, if necessary, and then click the tool palette.
a tool package in the tool catalog	open the category for that tool package, if necessary, and then click the tool package.

4 Right-click the tool, and select an action:

If you want to…	Then…
add a copy of the tool in another location	click Copy.
move the tool to another location, deleting it from its original location	click Cut.

5 If the destination of the tool is in a different tool catalog, click to return to the catalog library, and then click the tool catalog to open it.

6 Open the destination of the tool:

If the destination is…	Then…
a category of the tool catalog	open the category.
a tool palette in the tool catalog	open the category for that tool palette, if necessary, and then click the tool palette.
a tool package in the tool catalog	open the category for that tool package, if necessary, and then click the tool package.

7 In the right pane of the Content Browser window, right-click in a blank area, and click Paste.

NOTE If there is no Paste option on the shortcut menu, then the pointer is probably positioned over a catalog item, even though the space may appear to be blank. Move the pointer and try again.

Customizing a Tool

Use this procedure to modify a tool that is stored in a tool catalog.

When you begin this procedure, both the AutoCAD Architecture tool palette set and the Content Browser window should be visible, so that you can drag items between them.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog that contains the tool to customize. If the tool is located in a specific category of the catalog, open that category.

3 Move the pointer over the i-drop® icon next to the tool you want, so that the pointer image changes to an eyedropper ( ).

4 Click the eyedropper and drag it to a palette in the tool palette set.

If the tool palette does not accept the tool, it might be because the palette is set to allow updates only from a linked tool palette in a tool catalog. To check this, right-click on the palette, click Properties, and look at the Refresh from setting. If Refresh from is selected, the palette is linked to a palette in a tool catalog. To break the link, clear Refresh from. For more information about linked tool palettes, see Using the Items in a Tool Catalog on page 101.

5 Right-click the copy of the tool in the tool palette set, and click Properties.

6 In the Tool Properties worksheet, clear Refresh from.

If Refresh from is selected, the tool is linked to its source in the tool catalog and can be updated only from the source tool.

7 Make any property changes, and then click OK.

8 Drag the tool from the tool palette set back to its original location in the Content Browser.

TIP Right-click the title bar of the Autodesk Content Browser, and select Always on Top before dragging the tool to the Content Browser.

9 When prompted to confirm catalog item replacement, click Yes.

Deleting Tool Catalog Items

Use this procedure to delete a tool palette, tool package, or tool in a tool catalog. You must have write access to the tool catalog in order to delete items.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Open the tool catalog containing the item to delete. If the item is located in a specific category of the catalog, open the category.
3. Right-click the item, and click Delete.
4. When prompted, click Yes to delete the item, or click No to cancel deletion.

Using Tool Catalog Items

Tools from catalogs can be used immediately in the drawing area or stored in a palette in the tool palette set. You can add a catalog tool palette or tools in a tool package to the tool palette set.

TIP To keep the Content Browser window in view while other applications are active, right-click the title bar of the Autodesk Content Browser, and select Always on Top.

Linked and Unlinked Tool Catalog Items

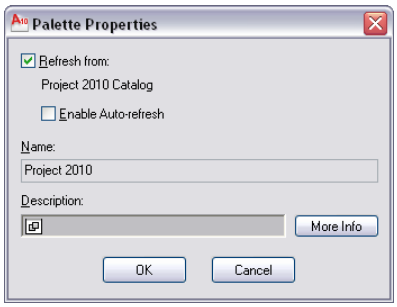
When you copy a tool or tool palette from the Content Browser to the tool palette set, you can choose whether the copy retains its association with the original. Linking the copy to the original means that, if you copy the item back to its original location, the Content Browser assumes you are updating the original item. This is the default behavior. If you change the original, you can update a linked copy using a single mouse click. To make working easier for you, you can set a whole tool catalog to be linked or unlinked. When a tool catalog is linked, all tools and palettes contained in it are dropped into the AutoCAD Architecture palettes set as linked items by default. When a tool catalog has been set to unlinked, all items in it are dropped as unlinked.

An unlinked copy of a tool or tool palette is treated as a new item, with no relationship to the original item. If you copy an unlinked item back to its original location in a tool catalog, the Content Browser simply adds it to the catalog; you end up with two copies of that item with the same name.

Any time you copy an item from the Stock Tool catalog to the tool palette set, the item is treated as unlinked.

You can tell whether an item in the tool palette set is linked by right-clicking the item and clicking Properties. If Refresh from is activated and a source is listed, as shown below, the item is linked.

Refresh from property of a linked palette



If you select Enable Auto-Refresh, each time you start the software, any linked tool palettes will be updated to reflect any changes made to the tool palette and its contents in the tool catalog.

Using a Tool in the AutoCAD Architecture Workspace

Use this procedure to use a tool from a tool catalog in the AutoCAD Architecture 2010 workspace. You can also copy tools stored in a tool package to a tool palette in the tool palette set.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog containing the tool you want to use. If the tool is located in a specific category of the catalog, open that category.

3 Move the pointer over the i-drop® icon next to the tool, so that the pointer image changes to an eyedropper ( ).

To select multiple tools to copy, press and hold *CTRL* while clicking each tool; then position the eyedropper over any of the selected tools. You can also select all the tools in the current category by right-clicking and clicking Select All.

4 Drag the eyedropper according to the desired action:

If you want to…	Then…
use the tool immediately	click the eyedropper and drag it into the drawing area.
store a linked copy of the tool on a tool palette in the tool palette set	click the eyedropper and drag it to a tool palette in the tool palette set. **NOTE** A linked copy will only be created when the tool catalog has been set to linked. If the catalog has been set to non-linked, any tool from that catalog will be inserted as non-linked tool onto the AutoCAD Architecture tool palettes set. For more information about linking tool catalogs see Editing Tool Catalog Properties on page 111.
create an unlinked copy of the tool on a tool palette in the tool palette set	press and hold *alt*. Then click the eyedropper, and drag it to a tool palette in the tool palette set. **NOTE** If the tool catalog containing the tool has been set to unlinked, you do not need to hold down *alt* while dragging the tool. It will be inserted as unlinked in any case.

NOTE If a tool palette does not accept a tool, it might be because the palette is set to allow updates only from a linked tool palette in a tool catalog. To check this, right-click on the palette, click Properties, and look at the Refresh from setting. If Refresh from is selected, the palette is linked to a palette in a tool catalog. To break the link, clear Refresh from.

Copying a Tool Palette to the AutoCAD Architecture Workspace

Use this procedure to store a copy of a tool palette in the tool palette set.

You can create a linked or unlinked copy of the tool palette. A linked copy remains connected to the original in the tool catalog, so that you can easily update the copy with any changes made to the original. An unlinked

copy is treated as a new tool palette, with no relationship to the original. For more information about linked and unlinked tool palettes, see Using the Items in a Tool Catalog on page 101.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog containing the tool palette to copy to the tool palette set. If the palette is located in a specific category of the catalog, open that category.

3 Move the pointer over the i-drop® icon next to the tool palette, so that the pointer image changes to an eyedropper ( ).

To copy multiple tool palettes, press and hold *CTRL* while clicking each palette; then position the eyedropper over any of the selected palettes.

4 Drag the eyedropper according to the desired action:

If you want to…	Then…
store a linked copy of the tool palette in the tool palette set	click the eyedropper and drag it to a tool palette in the tool palette set. **NOTE** A linked palette will only be created when the tool catalog has been set to linked. If the catalog has been set to non-linked, any palette from that catalog will be inserted as non-linked tool palette onto the AutoCAD Architecture tool palettes set. For more information about linking tool catalogs see Editing Tool Catalog Properties on page 111.
create an unlinked copy of the tool palette in the tool palette set	press and hold *alt*. Then click the eyedropper, and drag it to a tool palette in the tool palette set. **NOTE** If the tool catalog containing the palette has been set to unlinked, you do not need to hold down *alt* while dragging the palette. It will be inserted as unlinked in any case.

Copying a Tool Package to the AutoCAD Architecture Workspace

Use this procedure to copy a tool package to a palette in the tool palette set.

You can create linked or unlinked copies of the tools in the package. A linked copy remains connected to the original in the tool catalog, so that you can easily update the copy with any changes made to the original. An unlinked copy is treated as a new tool, with no relationship to the original. For more information about linked and unlinked tools, see Using the Items in a Tool Catalog on page 101.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Open the tool catalog containing the tool package to copy into the tool palette set. If the package is located in a specific category of the catalog, open that category.

3 Move the pointer over the i-drop® icon next to the tool package, so that the pointer image changes to an eyedropper ( ).

To copy multiple tool packages, press and hold *CTRL* while clicking each package; then position the eyedropper over any of the selected packages.

4 Drag the eyedropper according to the desired action:

If you want to…	Then…
store linked copies of the package's tools in the tool palette set	click the eyedropper and drag it to a tool palette in the tool palette set. **NOTE** Linked tools will only be created when the tool catalog has been set to linked. If the catalog has been set to non-linked, any tool in that package will be inserted as non-linked tool package onto the AutoCAD Architecture tool palettes set. For more information about linking tool catalogs see Editing Tool Catalog Properties on page 111.
create unlinked copies of the package's tools in the tool palette set	press and hold *alt*. Then click the eyedropper, and drag it to a tool palette in the tool palette set. **NOTE** If the tool catalog containing the package has been set to unlinked, you do not need to hold down *alt* while dragging the tool. It will be inserted as unlinked in any case.

Refreshing Linked Tools

Use this procedure to update a linked tool with the contents of its source copy in a tool catalog.

- In the tool palette set, right-click the tool you want to refresh, and click Refresh Tool.
  If Refresh Tool is not listed on the shortcut menu, click Properties. Then, in the Tool Properties worksheet, select Refresh from.

Refreshing Linked Tool Palettes

Use this procedure to update a linked tool palette with the contents of its source copy in a tool catalog.

- In the tool palette set, right-click the tool palette you want to refresh, and click Refresh Palette.
  If Refresh Palette is not listed on the shortcut menu, click Properties. Then, in the Tool Palette Properties worksheet, select Refresh from.

Specifying Refresh Options for Linked Tool Palettes

Use this procedure to determine whether a linked tool palette and its tools are refreshed from the tool catalog when you start AutoCAD Architecture 2010.

1 In the tool palette set, right-click the desired tool palette, and click Properties.

2 Select an Auto-refresh option:

If you want…	Then…
the tool palette and all its tools to automatically refresh when you start AutoCAD Architecture 2010	select Enable Auto-refresh. **NOTE** Refresh from must also be selected in order to enable Auto-refresh.
no automatic refreshing of the tool palette	clear Enable Auto-refresh.

3 Click OK.

Working with Multiple Content Browser Windows

You can open more than one copy of the Content Browser and you can move or copy items by dragging them between the windows. You can copy tool palettes, tool packages, and tools; you cannot copy tool catalogs between Content Browser windows. Only one catalog library can be open at any time.

When you drag tool catalog items between Content Browser windows, the following rules apply:

- If a different catalog is open in each Content Browser window, dragging an item copies it to the new location and leaves the original item in place.
- If the same catalog is open in both Content Browser windows, dragging items from one window to the other moves the item (for example, from one category to another), removing the original item.

If you have the same tool catalog open in multiple windows, and you add an item to the catalog, the tool catalog display is updated in all open Content Browser windows.

Opening Additional Content Browser Windows

You can open a new instance of the Content Browser by pressing *CTRL+N* in the Content Browser. You can also open a specific tool catalog, tool palette, or tool package in a new Content Browser window.

Closing Content Browser Windows

Closing one Content Browser window has no effect on other Content Browser windows. You can close all open Content Browser windows at once by right-clicking in the title bar of any window and selecting Close All Windows.

Opening a Tool Catalog in a New Content Browser Window

Use one of the following procedures to open a tool catalog in a new Content Browser window or display an open catalog in a new Content Browser window.

- With the catalog library displayed in the right pane of the Content Browser window, right-click the catalog to open, and click Open in New Window.
- If a tool catalog is already open in the right pane of the Content Browser window, right-click in a blank area of the catalog, and click New Window.
  You can open a specific category of the tool catalog in a new Content Browser window by opening the category.

Opening Catalog Items in a New Content Browser Window

Use this procedure to open a tool palette or tool package in a new Content Browser window.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2 Open the catalog containing the desired tool palette or tool package. If the item is located in a specific category of the catalog, open that category.
3 Right-click the tool palette or tool package, and click Open in New Window.

Dragging Catalog Items Between Content Browser Windows

Use this procedure to send tools, tool palettes, or tool packages from one catalog location to another by dragging them between two Content Browser windows. Moving an item removes it from its original location, while copying an item retains the original.

NOTE You must have write access to the original catalog before you can move it.

1 Open two Content Browser windows.
2 In the first Content Browser window, display the catalog item that you want to move or copy.
3 In the second Content Browser window, open the catalog, category, tool palette, or tool package to send the item to (only tools can be sent to palettes and packages).
4 In the first Content Browser window, move the pointer over the i-drop icon associated with the item to be moved, so that the pointer image changes to an eyedropper ( ).

If you want to…	Then…
move an item to another location in the same catalog	right-click and drag the item to its destination catalog or category in the second Content Browser window, and click Copy Here.
copy an item to another location in the same catalog	press *CTRL;* then and drag the item to its destination catalog or category in the second Content Browser window.
move an item to a different catalog	press *CTRL;* then click and drag the item to its destination catalog or category in the second Content Browser window.
copy an item to a different catalog	click and drag the item to its destination catalog or category in the second Content Browser window.
move a tool to a tool palette or tool package in the same catalog	click and drag the item to its destination palette or package in the second Content Browser window.
copy a tool to a tool palette or tool package in the same catalog	press *CTRL;* then click and drag the item to its destination palette or package in the second Content Browser window.

If you want to…	Then…
move a tool to a tool palette or tool package in a different catalog	press *CTRL;* then click and drag the item to its destination palette or package in the second Content Browser window.
copy a tool to a tool palette or tool package in a different catalog	click and drag the item to its destination palette or package in the second Content Browser window.

Starting the Content Browser from a Windows Command Prompt

Use this procedure to open the Content Browser from a Windows command prompt, even if AutoCAD Architecture 2010 is not currently open.

1. Click Start (Windows) menu ➤ Command Prompt.

   The location of the Command Prompt application varies from one version of Windows to another. It is most likely to be found either in Programs or on the Accessories menu within Programs.

2. At the command prompt, specify the AutoCAD Architecture program folder as the current directory.
3. Enter the command *aeccb*, followed optionally by the path to the tool catalog you want the Content Browser to open. For example:

   aeccb "c:\my documents\autodesk\my content browser library\mycatalog\mycatalog.atc"

Creating and Saving Drawings

4

Drawings have common properties that you can specify when you create a new drawing. You can specify:

- the template on which to base the drawing, or create a drawing that is not based on any template.
- units, scale, layer standard, layer key style, and default display properties.
- options that control drawing performance and behavior.

You also have a number of options for saving files to use with other applications. These options are useful if you work with vendors and consultants who do not use AutoCAD Architecture.

About Templates

The templates included in the software are drawing files with predefined settings. Predefined settings include drawing units, drawing scales, and annotation plot sizes. You can use these templates to create new drawings without going through any additional setup.

Templates are installed in *C:\ProgramData\Autodesk\ACA 2010\enu\Template*.

NOTE The Template folder is marked as hidden in Windows by default. To display hidden folders, enable that option on the View tab of the Folder Options command in Windows Explorer.

Templates also contain predefined display configurations. Display configurations allow you to produce different architectural displays, such as floor plans, reflected plans, elevations, 3D models, or schematic displays. For more information, see Display System on page 513. If you are working with a project, as described in Drawing Management on page 199, you can assign display configurations directly to the project as a project standard. For more information, see Configuring Project Standards on page 393.

If you are a new user of the software, it is recommended that you use a template to create your drawings. You always have the option to modify a template or create your own template after you become more familiar with the software.

You can modify a template to conform to your office standards by changing the settings and then saving it as a new template, or you can import settings from another template into the current drawing, and then saving the current drawing as a template. For more information about creating your own template, see “Use a Template File to Start a Drawing” in AutoCAD Help. For more information about importing display settings

to a custom template, see Using Display Settings in Multiple Drawings on page 550 and Creating and Editing Display Configurations on page 535.

Creating a Drawing from a Template

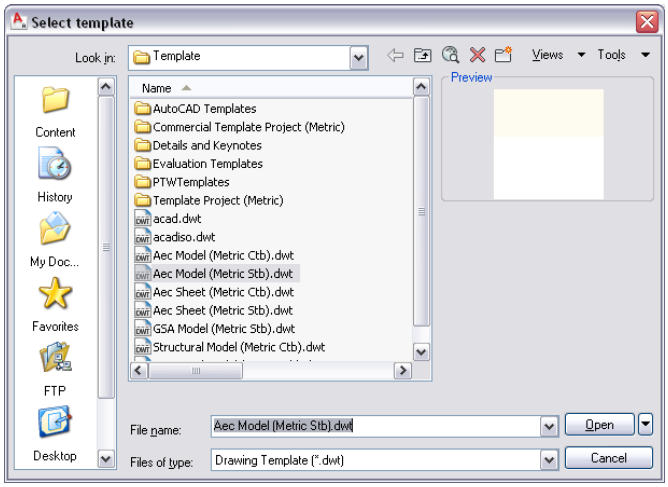
Use this procedure to create a drawing from a template. The drawing templates provided with the software are located in *C:\ProgramData\Autodesk\ACA 2010\enu\Template*. Template files have the extension dwt.

NOTE To create a drawing that you want to include in a project, see Workflow for a Project Environment on page 199.

1 Click ➤ New ➤ Drawing.

NOTE Be sure to choose the New command from the application menu to select a template. The icon on the Quick Access toolbar is a shortcut to the "QNew" command which creates a new drawing based upon a default template file. You can configure the default template file used for QNew in the Options dialog. For more information, see "QNEW Command" in AutoCAD Help.

2 Select the template you want to use, or click Tools ➤ Find, and navigate to the template you want to use.



3 Click Open.

To view or change the default drawing settings for units, scale, layers, and display, see Setting Up a Drawing on page 132.

Creating a Drawing Without a Template

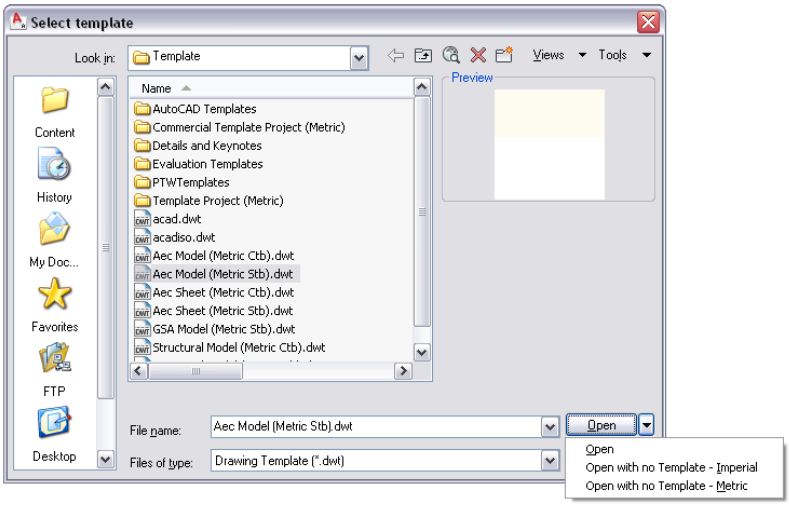
Use this procedure to create a drawing that is not based on a template. Drawings that are not based on templates contain no customized or predefined settings, such as display configurations or architectural units. Drawings without a template use the settings specified in the Drawing Setup dialog box.

If you are a new user use one of the templates provided to create drawings until you are comfortable working with display configurations and other settings. After you are more familiar with the program, you can create your own templates and customize your drawing settings. For more information, see Creating a Drawing from a Template on page 130.

NOTE To create a drawing to include in a project, see Workflow for a Project Environment on page 199.

1 Click ➤ New ➤ Drawing.

2 Click the arrow next to Open.



3 Select Open with no Template - Imperial to begin a drawing in imperial units, or select Open with no Template - Metric to begin a drawing in metric units.

For more information, see Setting Up a Drawing on page 132.

Opening Legacy Drawings

Keep the following points in mind when you open drawings from earlier releases:

- To upgrade a drawing from an earlier release to the current release, open the legacy drawing and then save the drawing. When you open a drawing from a previous release in a newer one, a task dialog appears prompting you to do so. If the drawing references other legacy drawings, open and save those externally referenced (xref) drawings to upgrade them to the current release.
- If you try to edit an external reference drawing within a legacy drawing, you are prompted to update the external reference drawing to the current release. It is recommended that you use the same version for your external references and host drawings.
- If you open a legacy drawing in the Style Manager, the drawing is marked as read-only; you can copy styles from that drawing to drawings in newer current versions. If you copy styles from the current version to legacy drawing, you have to save the legacy drawing under a new name and in the current release file format.
- Open and save a legacy drawing in the current version if you want to be able to edit it in DesignCenter®.

IMPORTANT Any time you combine a drawing from a previous version with a drawing from the current version, you should first open the previous version drawing and save it. For example, before inserting a drawing as a block or attaching it as an xref, open the drawing and save it to promote all the objects to the current version.

Saving a Drawing to a Previous Release File Format

When you save a drawing to a previous release file format, not all objects and properties will be supported. You can do one of the following:

- Save the drawing to the current release format: All objects and properties will be saved correctly, but the drawing may become incompatible with earlier releases.
- Save the drawing as AutoCAD-only objects. For more information, see Exporting a Drawing to AutoCAD on page 147.
  To view AutoCAD objects in a previous release, verify that the latest Object Enabler is installed, as available on *http://www.autodesk.com\enablers*.
- Save the drawing to a previous version with Proxy Graphics. If you open the drawing in the previous version, you can view AEC objects as Proxy Graphics, but cannot edit them. For more information, see Generating Proxy Graphics on page 147.

Setting Up a Drawing

When you create a drawing from a template, the drawing setup options are predefined. You can use these settings or customize them as needed. For example, you may want to use different drawing scales for different drawings.

When you create a drawing without a template, settings such as layer standards and layer key styles are imported into the drawing. For more information, see Creating a Drawing Without a Template on page 130.

You can specify the drawing units, drawing scale, and layer options as the default settings for any drawing that you start, with or without a template. If you save the settings specified as the default, they override settings in the template.

If you are unfamiliar with the display system or layer management, you may want to read more in Display System on page 513 and Managing Drawing Layers on page 466 before specifying the layering and display options.

Specifying the Drawing Units

Use this procedure to specify the drawing units in a new or existing drawing. If you change the drawing units, you can specify whether existing objects in the drawing are scaled to the new units or retain their original size. You can also specify whether objects inserted from a drawing that uses different units are scaled to the units in the current drawing, or retain their original size.

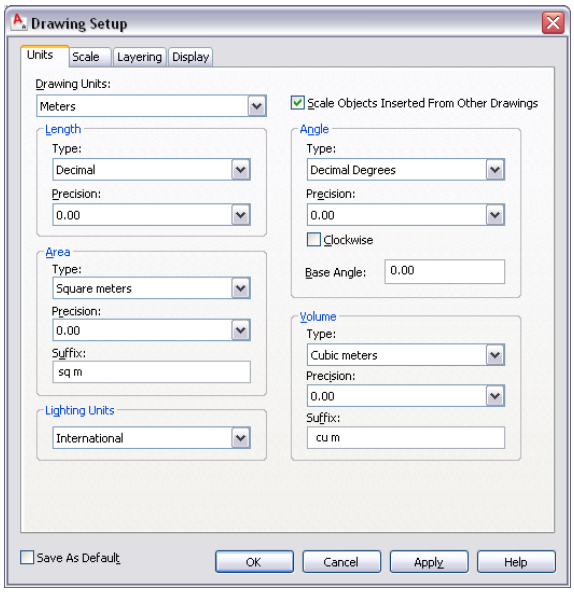
You can specify the unit type and precision for linear, angular, area, and volume units. The precision values specify only the number of decimal places displayed in the interface. They do not determine the number of decimal places used in the software to make calculations.

When you change the drawing units, the default options under Area and Volume change to reflect the new drawing units. The drawing scale options on the Scale tab also change to reflect the new drawing units.

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Units tab.

Specifying default units options for the current drawing



3 Under Drawing Units, select the desired units.

Various imperial and metric units are available. The units that you select determine the unit of measurement that each unit in your drawing represents. For example, if you select Inches, each drawing unit equals one inch.

4 To scale objects that you insert into the current drawing from drawings with different drawing units, select Scale Objects Inserted from Other Drawings.

Clear this option to insert objects at their original size without scaling. For example, if an item that is one inch long were inserted into a drawing set to millimeters, this setting would scale the item to 25.4 mm in length when enabled. With this setting disabled, it would remain one unit long, (which would now be only one millimeter rather than one inch).

5 Under Length, select a unit type and desired precision.

6 Under Angle, select an angle type and desired precision.

If you want to measure angles clockwise instead of counterclockwise, select Clockwise.

7 Under Base Angle, enter a value for the default 0 angle direction. The default is 0 degrees (East) and a counter-clockwise direction.

Imported survey drawings may include drafting instructions where changing the base angle might be desirable to properly orient the data.

The following values match these directions:

Value	Direction
0	East
90	North
180	West
270	South

8 Under Area, select an area type and precision.

If you do not want to use the default suffix that is displayed for the drawing units that you specify, enter a new suffix.

9 Under Volume, select a volume type and precision.

If you do not want to use the default suffix that is displayed for the drawing units that you specify, enter a new suffix.

10 Under Lighting Units, select a lighting unit type.

11 Save the units settings:

If you want to…	Then…
save the units settings as default settings for new drawings that you start from scratch or from templates that do not contain drawing setup information	select Save as Default. Settings on the Scale and Layering tabs are also saved as default settings.
save the units settings only for the current drawing	clear Save as Default, and then click Apply.

NOTE You can save one default drawing units set per unit type with the Save as Default option. Define a set of imperial drawing units defaults, and click Save as Default. Then, define a set of metric default units, and click Save as Default again. When you start a drawing without a template with imperial units, the imperial default settings will be used. When you start a drawing without a template with metric units, the metric default settings will be used. If you start a new drawing with a template, the settings saved within that template file will be used regardless of the saved default settings.

12 Click OK.

You are prompted to specify whether existing objects in the current drawing should be scaled for the new units.

13 Specify scaling of existing Model Space and Paper Space objects:

If you want to…	Then…
scale all existing objects in the drawing to reflect the new units	select Rescale modelspace and paperspace objects.
scale objects in Model Space to reflect the new units	select Rescale only modelspace objects.
leave all objects at their current scale	select Don't rescale any existing objects.

Creating Annotation Scales and Assigning them to Display Configurations

In the Scale tab, you can do the following things:

- Display the available annotation scales
- Create new annotation scales
- Assign an annotation scale to a display configuration.

NOTE You cannot set the annotation scale used for this drawing here. For information on setting the scale, see Specifying Annotation Scale on page 2413.

The annotation scale determines how many drawing units in the drawing represent one inch (for imperial drawings) or one millimeter (for metric drawings) in the plotted drawing. A drawing scale of 1/8″=1′-0″ (or 1:96 - eight eighths per inch times 12 inches per foot) in a drawing that has inches as default drawing units

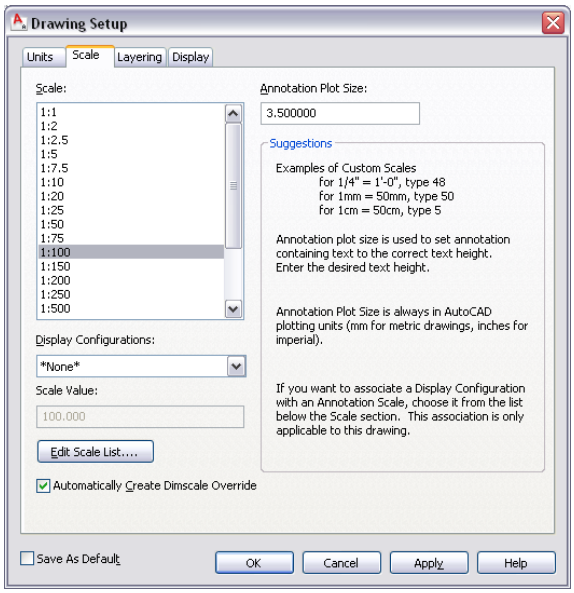
means that 8 feet in the drawing are represented by 1 inch on the plotted out plan. Likewise, if a drawing has a scale of 1:200 and a drawing unit of millimeters, then 200 millimeters in the drawing will be represented by one millimeter on the plotted out plan.

Annotation plot size, multiplied by the scale factor, determines the height of plotted annotation text. Scale-dependent objects in a drawing are scaled automatically upon insertion to reflect the units that are specified in a drawing. Any content that you create can be built to take advantage of these settings and is thus scaled appropriately.

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Scale tab.

Specifying default scale options for the current drawing



3 Under Scale, the available annotation scales are displayed.

NOTE The scale values in the list reflect the current drawing units. To change the drawing units, see Specifying the Drawing Units on page 132.

4 To assign an annotation scale to a specific display configuration, first select the desired annotation scale from the Scale list, and then select the display configuration to associate it with from the Display Configurations list.

Under Scale value, the currently used annotation scale for this display configuration is displayed.

5 To edit an existing scale or add a new scale, click Edit Scale List.

- To edit an existing scale, select it, and click Edit.
- To add a new scale, click Add, and enter a display name and scale values.
- To rearrange the order of the scale entries, use the Move up and Move down buttons.

6 Click OK.

7 Select Automatically Create Dimscale Override, if you want to make the dimension scale match your drawing scale.

The override applies a scale factor to the dimension style properties.

NOTE AEC dimensions added with tools are not affected by the dimension scale override because an AEC dimension style depends on which display representation is active. For more, see AEC Dimensions on page 2217.

If you clear Automatically Create Dimscale Override, the software is prevented from automatically applying an override to the current dimension scale style in the drawing.

8 Enter a value for Annotation Plot Size.

The annotation plot size is always measured in millimeters for metric drawings and in inches for imperial drawings. Annotation plot size, multiplied by the drawing scale factor, determines the height of plotted annotation text.

9 Save the scale settings:

If you want to…	Then…
save the scale settings as default settings for new drawings that you start from scratch or from templates that do not contain drawing setup information	select Save as Default. Settings on the Units and Layering tabs are also saved as default settings.
save the scale settings only for the current drawing	clear Save as Default, and then click Apply.

NOTE You can save one default drawing scale set per unit type with the Save as Default option. Define a set of imperial drawing scale defaults, and click Save as Default. Next, define a set of metric scale defaults, and click Save as Default again. When you start a drawing without a template with imperial units, the imperial default scale will be used. When you start a drawing without a template with metric units, the metric default scale will be used. If you start a new drawing with a template, the settings saved within that template file will be used regardless of the saved default settings.

10 Click OK.

If you also changed the drawing units, you are prompted to specify whether existing objects in the current drawing should be scaled for the new units. For more information, see Specifying the Drawing Units on page 132.

Specifying a Layer Standard and a Layer Key Style

Use this procedure to specify the layer standard and layer key style to determine the layers on which objects are placed in a drawing. You can specify the layer key style to use in the current drawing. You can also specify a layer standard and a layer key style to be imported when you set up a new drawing.

There are a number of layer standards and layer key styles in AecLayerStd.dwg, located in *C:\ProgramData\Autodesk\ACA 2010\enu\Layers*.

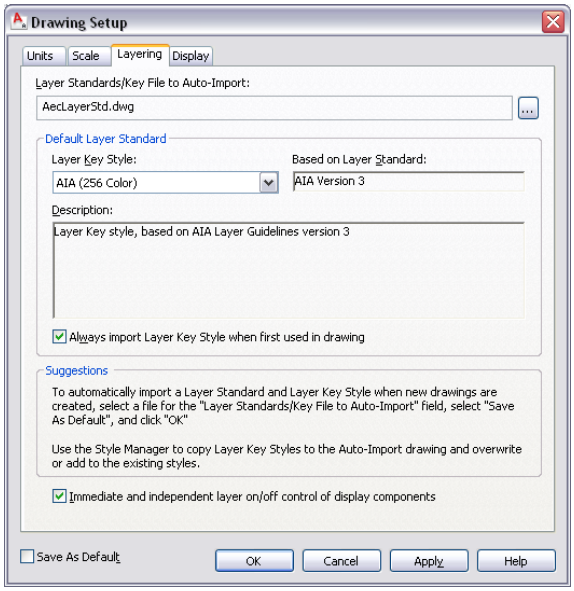
By default, AecLayerStd.dwg (located in the Layers folder mentioned above) is loaded automatically. This file contains layer standards and layer key styles.

NOTE If you are unfamiliar with layer keying, you may want to read the overview of layer keying before specifying layering options. For more information, see Working with Layer Keys on page 492.

1 Do any of the following:

- Click Home tab ➤ Layers panel ➤ ➤ Select Layer Standard .
- Click ➤ Utilities ➤ Drawing Setup, and click the Layering tab.

2 Specifying default layering options for the current drawing



3 Under Layer Standards/Key File to Auto-Import, enter the name of the layer standards drawing (DWG or DWT) you want to use.

You can click ... to navigate to a file.

4 Under Default Layer Standard, select the layer key style that you want to use in your drawing.

5 To re-import the layer key style from the layer standard you specified at the start of each drawing session, select Always import Layer Key Style when first used in drawing.

Selecting this option has the effect of checking the current drawing to see if the selected layer key style exists. If it does exist, the date and time stored on it are compared with the external file. If the external layer key style drawing is newer, then it re-imports the layer key style and standard. This action occurs each time the drawing file is opened; therefore, to force a re-import of the layer key style, you must close and reopen the drawing.

6 Define the on/off behavior of secondary components within an object.

You can place different components of an AEC object on different layers. This is accomplished with the object's display properties. For example, the current layer key style might place a wall on the layer named A-Wall, while the wall's material definitions place its internal boundaries on the layer named A-Wall-Comp. Turning off the layer A-Wall would typically make the entire wall (including its internal boundaries) invisible, even though those components were assigned to a different layer. Selecting Immediate and independent layer on/off control of display components allows the internal boundary components on A-Wall-Comp to remain visible, even though the primary object's layer (A-Wall in this case) is off. This behavior can be desirable in some plan representations.

NOTE Freezing the primary object's layer (A-Wall in this case) makes the entire wall, including its internal boundaries, invisible regardless of the value of this setting. This setting applies only to the Off layer state.

If you want to…	Then…
turn off secondary object components on different layers when the main component layer is turned off	clear Immediate and independent layer on/off control of display components.

If you want to…	Then…
turn on and off secondary object components independently of the main object component layer settings	select Immediate and independent layer on/off control of display components.

7 **IMPORTANT** If you select Save as Default, the layer key style you select is the default layer key style for all new drawings created without a template or from templates that do not have different default layer key standards assigned.

Save the layer settings:

If you want to…	Then…
save the layers settings as default settings for all new drawings that you start without a template or from templates that do not contain drawing setup information	select Save as Default, and click OK. Settings on the Units and Scale tabs are also saved as default settings.
save the layer settings only for the current drawing	clear Save as Default, click Apply, and then click OK.

If you also changed the drawing units, you are prompted to specify whether existing objects in the current drawing should be scaled for the new units. For more information, see Specifying the Drawing Units on page 132.

Specifying the Default Display Representations

Use this procedure to specify the default display representations of AEC objects. You can also specify the default display configuration for the Model tab and new viewports. In addition, you can specify whether the drawing uses its own display configurations or those of a host drawing when the drawing is referenced as an overlay xref.

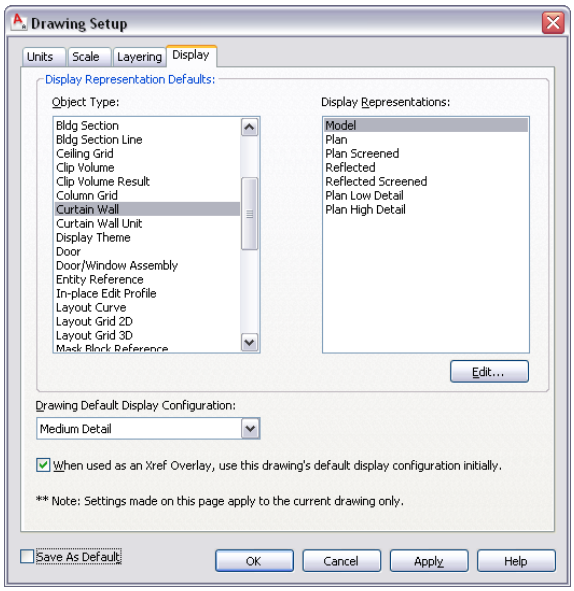
You may find it easier to select and modify display representations using the Display Manager. For more information about the display system, see Display System on page 513. For more information about using the Display Manager, see The Display Manager on page 528.

NOTE Changes you make on the Display tab apply only to the current drawing. New drawings are not affected. Save as Default has no effect on this tab.

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Display tab.

Specifying default display options for the current drawing



3 To make changes to a display representation for an object type, select it, and click Edit.

For general information about display representations, see Display Representations on page 520. For information about the display properties of an object type, see the chapter about the relevant object. For example, for information about wall display properties, see Specifying the Display Properties of a Wall Style on page 860.

4 Select a display configuration for Default Display Configuration.

The display configuration is applied to the Model tab and new viewports in paper space layouts.

5 To use the display configurations in the current drawing when the drawing is referenced as an overlay xref in a host drawing, select When used as an Xref Overlay, use this drawing's default display configuration initially.

Clear this option if you want objects in the current drawing to use the display configurations of the host drawing when the current drawing is an overlay xref.

For information about overlaying xrefs in drawings, see "Reference Other Drawing Files (Xrefs)" in AutoCAD Help.

6 Click OK.

If you also changed the drawing units, you are prompted to specify whether existing objects in the current drawing should be scaled for the new units. For more information, see Specifying the Drawing Units on page 132.

Specifying AEC Options

There are several tabs in the AutoCAD Options dialog box where you can select specific AEC options. You can use these settings to specify default values for some architectural objects, to specify the location and type of content files, and to control performance while you are working in architectural drawings.

Changing the AEC Editor Settings

Use this procedure to specify settings to control the following aspects of the software:

- the display of diagnostic messages and solution tips
- the placement of dialog boxes and viewers on the screen
- whether objects retain their layer, color, and linetype when you export them to an AutoCAD or DXF file

To improve drawing performance, you can limit the snap points provided by certain display representations, and decrease the layer loading time of the Layer Manager.

You can also specify settings for grip colors, and specify whether dynamic dimensions appear when you select and move grips to change the geometry of an object.

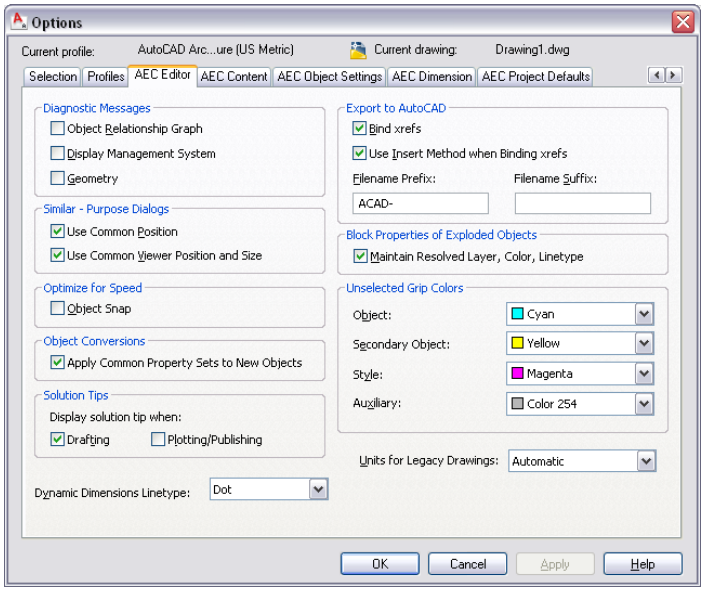
The AEC Editor settings that you specify are saved in the Windows® registry.

1 Click ➤ Options.

You can also display the Options dialog box by right-clicking in the command line area, and clicking Options.

2 Click the AEC Editor tab.

Specifying default AEC Editor options for the current drawing



3 Under Diagnostic Messages, select options for displaying diagnostic messages on the command line:

If you want to…	Then…
display data about the relationship between objects in the drawing	select Object Relationship Graph.
display Display System errors	select Display Management System.
display object geometry-specific data	select Geometry.

All diagnostic messages are off by default.

4 Under Similar-Purpose Dialogs, select options for the default position of dialog boxes and viewers:

If you want to…	Then…
use a common position on the screen for similar dialog boxes	select Use Common Position. Some dialog boxes, such as those containing style properties, are always displayed in the center of the screen, regardless of this setting.
use a common position for similar-purpose viewers	select Use Common Viewer Position and Size. Some viewers are not controlled by this setting.

5 Under Optimize for Speed, select Object Snap to limit certain display representations to respond only to the Node and Insert object snaps.

This setting affects stair, railing, space boundary, multi-view block, masking block, slice, and clip volume result (building section) objects.

6 Under Object Conversions, choose Apply Common Property Sets to New Objects if you wish to have common property sets automatically applied to new objects when applying tool properties.

When you apply the properties of a tool to an object in the drawing, the result can often be a new object. For instance, when you apply the tool properties of a door to an existing window, a new door object is created in place of the existing window. With this setting enabled, any property sets that were assigned to the existing window will automatically be preserved and applied to the new door provided that the property set definitions in question applies to both types of objects (in this case, both doors and windows are selected on the property set's applies to tab).

7 Under Solution Tips, specify whether you want solution tips to be displayed during the listed activities. Drafting is selected by default. Plotting/Publishing is cleared by default. For more information, see Solution Tips on page 49.

8 Under Dynamic Dimensions Linetype, select either Continuous or Dot.

The dimensions identify the current value of the dimension being edited, such as the length of a wall, the difference between the current value and the new dimension based on the position of the grip, and the total value. For example, when you select and move a Lengthen grip on a wall, the dimensions shown are the current length, the difference between the current length and the length based on where you moved the grip, and the total new length of the wall.

The dynamic dimensions will display in either continuous or dot linetype based on your selection.

9 Under Export to AutoCAD, select Use Insert Method when Binding xrefs if you want all objects from an xref drawing referenced in the file you export to be incorporated into the host drawing.

If you select this option, the names of the xref drawings are discarded when the exported drawing is created. In addition, their layers and styles are incorporated into the host drawing. For example, all exploded walls, regardless of their source (host or xref) are located on the same layer.

Clear Use Insert Method when Binding xrefs if you want to retain the xref identities, such as layer names, when you export a file to AutoCAD or to a DXF file. For example, the blocks that define walls in the host drawing are located on A-Wall in the exploded drawing. Walls in an attached xref drawing are located on a layer whose name is created from the drawing name and the layer name, such as Drawing1$0$A-Wall.

10 Enter a prefix or a suffix to be added to the drawing file name when the drawing is exported to an AutoCAD drawing or to a DXF file.

11 Under Block Properties of Exploded Objects, select Maintain Resolved Layer, Color, Linetype to maintain the layer, color, and linetype of AEC objects when you explode them.

When you explode an AEC object, you create several primitive objects grouped in a block definition. If this option is selected, any objects whose component layer, color, and linetype properties are set to ByBlock take the layer, color, and linetype of the parent object. If this option is cleared, when you explode an object, properties that are ByBlock remain ByBlock. Clear this option if you want to explode the block definition even further.

12 Under Unselected Grip Colors, select the colors you want to use for each type of grip.

13 To specify the units of measure for AutoCAD drawings when they are opened in the software, select Metric or Imperial for Units for Legacy Drawings.

This option enables the software to ignore the value for the AutoCAD MEASUREMENT variable to ensure that the software respects the correct units when an AutoCAD drawing is opened in the software. Select Automatic if you want AutoCAD drawings to use the units that are current in the software.

14 Click OK.

Changing the AEC Content Settings

Use this procedure to specify the location of the content files accessed by the Custom View in AutoCAD DesignCenter, to choose between imperial and metric content, and to specify whether the Edit Property Data dialog box is displayed when you insert schedule tags. You can also specify the location of dependent files, such as styles for tools.

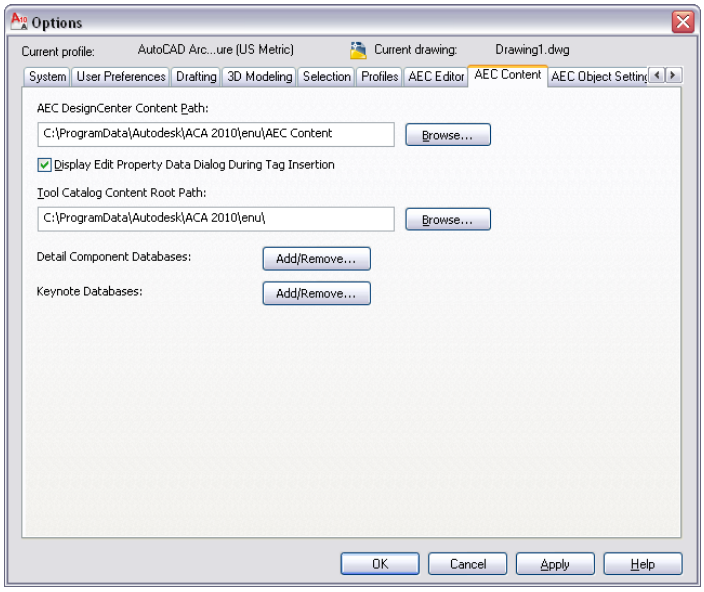
The AEC Content settings that you specify are saved in the Windows® registry.

1 Click ➤ Options.

You can also display the Options dialog box by right-clicking in the command line area, and clicking Options.

2 Click the AEC Content tab.

Specifying default AEC Content options for the current drawing



3 Under AEC DesignCenter Content Path, edit the path and location of your content files, or click Browse to locate content files.

4 To display the Edit Property Data dialog box when you insert a schedule tag in the drawing, select Display Edit Property Data Dialog During Tag Insertion.

When this option is chosen, a worksheet will display after each tag is placed, allowing you to edit property set values. If you clear this option, no worksheet will appear during tagging.

5 Under Tool Catalog Content Root Path, edit the path and location of your style drawings, or click Browse to locate files.

The variable, %AECCONTENT_DIR%, used for tool-dependent file references, is updated to use the path you specify. For example, <Style href="*%AECCONTENT_DIR%\Door Styles\DoorStyles.dwg*"/>.

6 Click Add/Remove next to Detail Component Databases to add or remove additional Detail Component Databases.

7 Click Add/Remove next to Keynote Databases to add or remove additional Keynote Databases.

8 Click OK.

Specifying AEC Object Settings

Refer to the following topics to specify AEC options for walls, stairs, spaces, and the display of curved objects:

- Wall Parameters on page 814
- Specifying AEC Options for Stairs on page 1367
- Setting Up Adjacency Relations between Space Surfaces on page 2017
- Specifying the Display Resolution of Objects with Facets on page 143

Specifying the Display Resolution of Objects with Facets

Use this procedure to specify the facet deviation and the maximum number of facets that can be used to display a curved object, such as a Cylinder mass element or a curved wall. The values you specify apply to the current drawing.

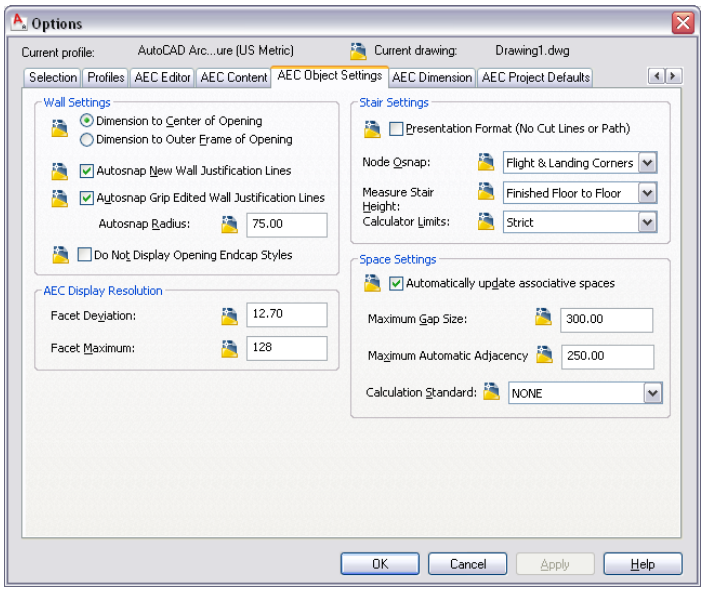
The number you specify for facet deviation defines the maximum distance from the chord to the arc, the chord being an edge that is created from faceting the curve to the true mathematical arc. The facet deviation must be greater than zero (0). It has no upper limit.

1 Click ➤ Options.

You can also display the Options dialog box by right-clicking in the command line area, and clicking Options.

2 Click the AEC Object Settings tab.

Specifying default AEC Object Settings options for the current drawing



3 Under AEC Display Resolution, enter a value for Facet Deviation.

The default value is 1/2" for drawings created from imperial templates and 12.7 mm for drawings created from metric templates. The value you enter is stored in the AecFacetDev variable.

4 Enter the maximum number of facets that can be used to draw curved objects.

You can enter a value between 100 and 10,000. The value you enter is stored in the AecFacetMax variable.

The default value is 128 for new drawings.

5 Click OK.

Changing the AEC Project Defaults

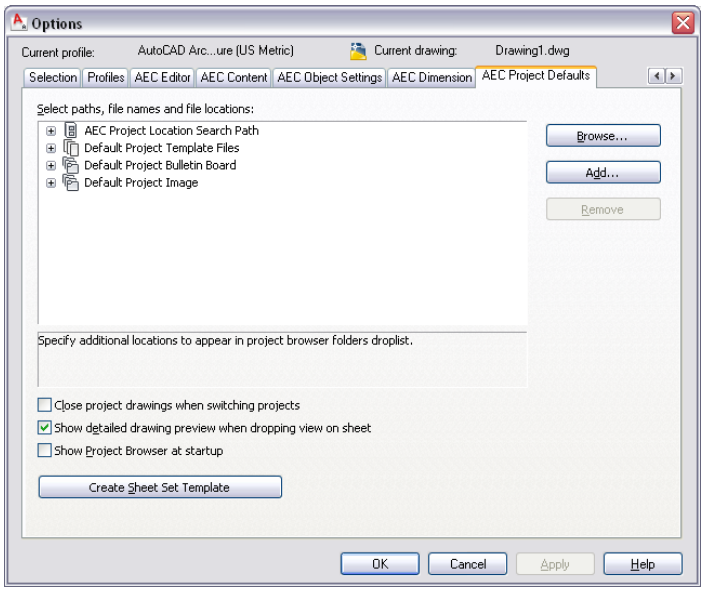
Use this procedure to specify the default folders in which the software searches for projects, palettes, templates, and other project files. These settings are used to create new projects without using a template. If a new project is created from a template project, the settings of the template project are used instead.

1 Click ➤ Options.

You can also display the Options dialog box by right-clicking in the command line area, and clicking Options.

2 Click the AEC Project Defaults tab.

Specifying default AEC Project Defaults options for the current drawing



3 Expand a category, and select a path.

4 Change, add, or remove a path:

If you want to…	Then…
change the current path	select the path, and click Browse. Navigate to the new path, and click OK.
add a path to the list of paths	select the category, and click Add. Specify the new path, and click OK. If Add is unavailable, you can specify only one path for this category.
remove a path	select the path, and click Remove. If Remove is unavailable, you can edit the path but you cannot delete it.

5 Select Show Project Browser at startup if you want the Project Browser to open when you open the software.

6 To launch the Create Sheet Set wizard, click the Create Sheet Set Template.

This will launch a wizard to assist you in creating your own Sheet Set Template to use for your projects.

7 Click OK.

Sharing Drawings with AutoCAD Users

There are 2 methods for making drawings available to users who are working with AutoCAD:

- Working with Proxy Graphics
- Exporting drawings to AutoCAD DWG or DXF

The method you choose depends on the software the others are using, on how exactly the drawing must match the original drawing, and on the particular views the other users require.

Turning on Proxy Graphics

When you turn on proxy graphics in a drawing, users who do not have AutoCAD Architecture but do have another AutoCAD-based product (AutoCAD 2000 or newer), can view and plot AEC objects and design data.

Exporting to AutoCAD Drawings and DXF Files

You can export drawings created with the software to AutoCAD drawings for the following versions:

- AutoCAD 2007
- AutoCAD 2004 (including 2005 and 2006)
- AutoCAD 2000 (including 2000i and 2002)
- AutoCAD R14

You can also export a drawing to a drawing interchange format (DXF) file. A DXF file is a text or binary file that contains drawing information that can be read by other CAD systems. For more information about DXF files, see "DXF Files" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

You can export drawings to the following DXF formats:

- AutoCAD 2007 DXF
- AutoCAD 2004 DXF (including 2005 and 2006)
- AutoCAD 2000 DXF (including 2000i and 2002)
- AutoCAD Release 12 DXF

Exporting a drawing to an AutoCAD drawing or to a DXF file creates a separate drawing in which all AEC objects, such as walls, doors, windows, and roofs, are exploded to AutoCAD primitive objects, such as lines, arcs, and 3D faces. The resulting AutoCAD objects cannot be restored to AutoCAD Architecture objects. Export AutoCAD Architecture drawings to DXF instead of saving them as DXF files.

NOTE You can open DXF files generated in earlier versions of the software if the files do not contain any AEC objects. DXF files that contain AEC objects cannot be imported into the software.

Comparing Methods of Sharing Drawings

The following table lists the features of the various methods of sharing drawings with AutoCAD users:

Use Case	Proxy Graphics	Object Enabler	Export to AutoCAD (DWG or DXF)
Use of AEC objects in other AutoCAD-based applications	View, plot AEC objects and design data; no manipulation of objects	View, plot, copy, manipulate AEC objects and design data	View, plot, manipulate exploded AEC objects
Status of AEC objects in other applications	AEC objects are displayed as proxy graphics with no intelligence	AEC objects are maintained as intelligent objects	No AEC objects
Multiple representations of objects in different viewports	No	Yes	Separate exploded copies are generated

Use Case	Proxy Graphics	Object Enabler	Export to AutoCAD (DWG or DXF)
AEC objects still exist when reopened in the software	Yes	Yes	No
Drawings used in a previous version	Yes	No	Yes

Generating Proxy Graphics

Use this procedure to create proxy graphics in a drawing to be made available to users who do not have the software.

Proxy graphics store the last-viewed image of AEC objects, which lets users view your drawing without modifying the original objects. Proxy graphics store only the display representation for the currently active viewport.

NOTE Depending on its complexity and density, a drawing saved with proxy graphics turned on can become extremely large and can slow drawing performance. It is recommended that you make a copy of the drawing before turning proxy graphics on if you want to share the drawing with other users.

1. Arrange the view for which you want to create proxy graphics.
2. At the command line, enter **proxygraphics**.
3. Enter **1**.
4. Save the drawing.
5. To turn off proxy graphics, enter **proxygraphics**, and then enter **0**.

Exporting a Drawing to AutoCAD

Use this procedure to export a drawing created in the software to AutoCAD. This process creates a new AutoCAD drawing with all AEC objects exploded. The original drawing is not affected.

Depending on the size and complexity of the original drawing, the resulting AutoCAD drawing may contain a large number of primitive objects, which can affect drawing performance.

NOTE When you export a drawing to an AutoCAD drawing, all AEC objects are exploded to AutoCAD primitive objects. Reopening the file in the software does not restore these primitive objects to AEC objects.

WARNING If you export a drawing that has Mviews to AutoCAD R14, only the layout active at the time of exporting will be preserved in AutoCAD R14. Any non-rectangular (polygonal or object) Mviews are converted to rectangular Mviews.

1. Choose whether to export a single representation of the AEC objects or all visible representations.

If you want to…	Then…
export the currently active representation of the AEC objects in the drawing	activate the Model tab. Only those representations in the currently active view will be generated.

If you want to…	Then…
export all representations of the AEC objects in the drawing	activate any layout tab. The representations for all layouts will be generated. **TIP** This will usually result in duplicate graphics on the Model tab, which makes the drawing less useful.

For example, when creating a drawing for a consultant to use as an xref-attached background, you should display a top view in the active Model tab viewport. When creating a drawing to be used to produce a rendering, you should display an isometric view in the active Model tab viewport.

To create a drawing that includes the exact graphics used in all layout tab viewports, activate any layout tab. These drawings can be sent to a printing service, for example, to make plots without the need for AutoCAD Architecture or the Object Enabler.

2 Press F2 to display the command window.

3 On the command line, enter **-ExportToAutocad**.

A list with the currently active export settings from the AEC Editor options page is displayed:

- File Format
- Bind Xrefs
- Bind Type
- Filename prefix
- Filename suffix

4 Alternatively, enter **AecToAcad** on the command line.

For more information, see "ExportToAutoCAD" in AutoCAD Help.

5 To change the AutoCAD file format to which the drawing should be exported, enter **F** (Format) and press *ENTER*.

The following AutoCAD file format versions are available:

- AutoCAD 2007
- AutoCAD 2004 (including 2005 and 2006)
- AutoCAD 2000 (including 2000i and 2002)
- AutoCAD R14

6 To specify whether to bind xrefs when exporting a drawing, enter **B** (Bind Xrefs), press *ENTER*, and select **Y** (Yes) or **N** (No).

NOTE If you want to retain visual fidelity in the exported drawing, selecting Yes is recommended. Visual fidelity can be affected by exporting individual drawings and binding them later, because when opened individually the xref may appear differently than it does in the host drawing.

7 To select the desired bind type for xrefs when exporting the drawing, enter **T** (bind Type), and choose one of the following:

If you want to…	Then…
discard the names of the xref drawings and incorporate their layers and styles into the host drawing when the exported drawing is created	enter **I** (Insert). In this case, for example, all exploded walls, regardless of their source (host or xref) are located on the same layer.
retain the xref identities when binding xrefs, such as layer names, when exporting the drawings	enter **B** (Bind). In this case, for example, the blocks that define walls in the host drawing are located on A-Wall in the exploded drawing. Walls in an attached xref drawing are located on a layer whose name is created from the drawing name and the layer name, such as Drawing1$0$A-Wall.

IMPORTANT If you want to export drawings with multiple xrefs in them, the bind option is recommended. If xref layers have the same name, but different visibility settings, then the layers will be merged when using the insert option, and use the settings of the first layer found. This can lead to unexpected results in the exported drawings, for example with objects disappearing from the drawing. The bind option will retain the layers and their settings and thereby ensure that visibility settings stay identical to the source drawing.

8 To specify whether the object properties in the exported AutoCAD drawing should be maintained, enter M (Maintain) and press *ENTER*:

- If you want the object properties to be resolved and be directly assigned to the exploded objects, enter **Y** (Yes).
- If you want objects to remain in blocks and have their properties set ByLayer and ByBlock, enter **N** (No).

9 To select a prefix or suffix for the drawing name, enter P (Prefix) or S (Suffix), press *ENTER*, and type in the desired prefix or suffix.

10 To enter a name for the exported AutoCAD drawing and start the export, press *ENTER*, and type in a file name.

TIP You can also start an export to AutoCAD by clicking ➤ Export ➤ AutoCAD, and then selecting the desired export format. In that case, the export settings defined on the AEC Editor tab of the Options dialog are used for exporting. For more information, see Changing the AEC Editor Settings on page 140.

IMPORTANT The **-AecExportToAutoCAD** command has been added to the Object Enabler in the software, enabling you to export a drawing to an AutoCAD format from within AutoCAD or other AutoCAD based vertical applications.

Exporting a Drawing to a DXF File

Use this procedure to export a drawing created in AutoCAD Architecture to a drawing interchange format (DXF) file. A DXF file is a text file that contains drawing information that can be read by other CAD systems. For more information about DXF files, see “DXF Files” in AutoCAD Help.

You can export drawings to the following DXF formats:

- AutoCAD 2007
- AutoCAD 2004 DXF (including 2005 and 2006)
- AutoCAD 2000 DXF (including 2000i and 2002)
- AutoCAD Release 12 DXF

Exporting AutoCAD Architecture drawings to a DXF format provides more consistent results than saving drawings as DXF files. Exporting creates a new DXF file with all AEC objects exploded. The original drawing is not affected.

Depending on the size and complexity of the original drawing, the resulting AutoCAD drawing may contain a large number of primitive objects, which can affect drawing performance.

NOTE When you export a drawing to a DXF file, all AEC objects are exploded to AutoCAD primitive objects. Reopening the file in the software does not restore these primitive objects to AEC objects.

1 Click ➤ Export ➤ AutoCAD.

2 Select the DXF format you want to use.

3 Enter a file name, and specify a path, if necessary.

The default file name includes any prefix or suffix that you specified on the AEC Editor tab of the Options dialog box. For more information, see Changing the AEC Editor Settings on page 140.

4 Click Save.

Interoperability with Other Applications

5

AutoCAD Architecture 2010 is compatible with other Autodesk software applications (such as Autodesk® Land Desktop and Autodesk® DWF™ Viewer) as well as applications that are IFC certified. Interoperability features expand the usability of AutoCAD Architecture. For example, you can import LandXML data and use the topographical information to site your building appropriately.

Importing and Exporting IFC Files

Based on established, international standards for common objects in the building industry, the Industry Foundation Classes (IFC) file format provides an interoperability solution between different software applications. Using IFC reduces the loss of information when files are transmitted.

AutoCAD Architecture is IFC-certified for importing and exporting version 2x3 IFC files. IFC files from versions 2x2 and 2x can also be imported if the data is compatible with 2x3 and is consistent with implementation agreements as defined for the IFC 2x3 coordination view. For more detailed information, go to *http://www.iai-international.org* and search for IfcWiki Web resource.

IFC certification enhances your ability to share project information across disciplines and technical applications over the life of the project. Using the IFC format, you can export these drawings to other IFC-certified applications that could not otherwise open a DWG file. For example, building models drawn in AutoCAD Architecture are saved to a DWG file format. You can export the drawing using the IFC format. Likewise, you can import an IFC file to create and work in a DWG that was originally created in a format other than DWG.

Visual fidelity for three-dimensional (3D) objects is maintained in model views. This means that dimensions are maintained for 3D objects exported to IFC. Objects must be dimensionally accurate in the single IFC model because it is shared by diverse applications.

For information about other methods of sharing drawings with external users, see Sharing Drawings with AutoCAD Users on page 145.

General Information for Exporting Drawing Files to IFC

Only a currently active drawing can be exported to IFC. The export process generates 2 files:

- An IFC file that contains information specified for project number and name, file path, and external references (xrefs).
- A LOG file that contains data about information (objects and geographic location) in the drawing. This file is stored in the same location as the IFC file.

The current display configuration for the drawing being exported is what defines the graphical information and geometry for the IFC file. Objects that would typically display in the current display configuration are exported regardless of whether their layers are frozen or turned off. For more information, see Display Representations on page 520.

You can export a property set as an IfcElementQuantity if an object with a property set definition has a suffix of IfcElementQuantity. The property set definition must also include at least one property name with a value, such as IfcQuantityArea, IfcQuantityCount, or IfcQuantityLength. This information displays on the Extended Data tab of the Properties palette. For more information, see Property Sets and Property Set Definitions on page 2458.

You can use the IfcBaseProperty property set to specify the name and object type for each IFC entity exported. This information is also preserved in the same property set when importing an IFC file.

Spaces and their boundaries must be set to Associative if you want to export space boundary information. When there is a virtual boundary—a boundary between spaces or a space with nothing in it—draw a line along the expected boundary, and set Bound spaces as Yes. This space will be exported as a Virtual space boundary in IFC. For more information, see Making a Space Associative or Non-Associative on page 1936.

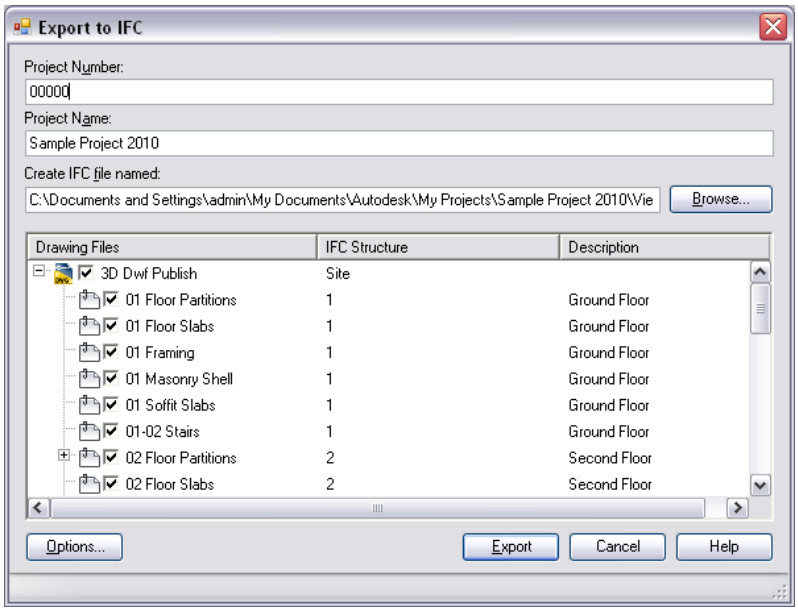
A value must be specified in the Geographic Location dialog if you want to export to true North. For more information, see View the Geographic Location Information in the AutoCAD Help.

AutoCAD Architecture Project Drawings

When you export a drawing file from an AutoCAD Architecture project folder, the drawing file is mapped to (Ifc)Site by default. The (Ifc)Site drawing may contain building objects and site geometry as well as xrefs.

Identifying information displays by default in the project, including project number, project name, and level assignments of xrefs, when you select a project drawing for export.

You control which xrefs in the project file are exported and how they display in the IFC file by either accepting the default level assignments or by specifying a different label. All drawings that are assigned to the same IFC Structure are exported into an IfcBuildingStorey in the IFC file.For more information about working with AutoCAD Architecture projects, see Concepts of Drawing Management on page 200.



Exporting a Drawing from an AutoCAD Architecture Project

Use this procedure to export a project drawing as an IFC file. Select the drawing from the Constructs, Views, or Sheets tab of Project Navigator.

Xrefs contained in the drawing being exported are listed in the tree view below the drawing name. If they were unloaded in the drawing, they are shaded in the Export to IFC dialog. For more information, see Before You Begin: External References on page 207.

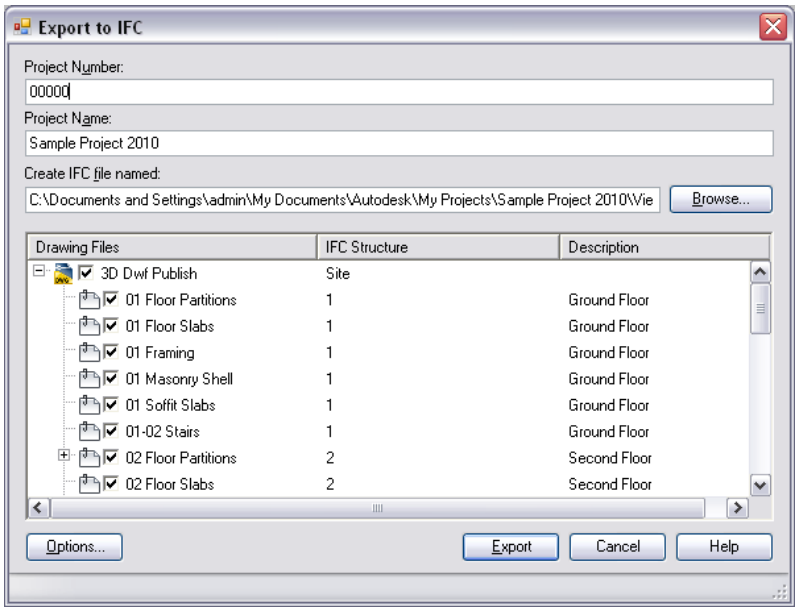
If the drawings were assigned to levels as part of the AutoCAD Architecture project, a corresponding label is displayed by default under IFC Structure. Otherwise, they are mapped to Level 1 by default.

If there are objects you want to classify as a different type of object for export, the drawing with the classified objects must have been previously saved. For more information, see Classifying AEC Objects for Export on page 161.

1 On the Constructs, Views, or Sheets tab in Project Navigator, open the drawing that you want to export as an IFC file.

2 Click ➤ Export ➤ IFC (Industry Foundation Classes).

Alternatively, on the command line, enter -IfcExport, and select export options.



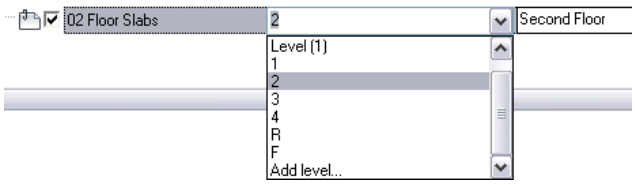
3 In the Export to IFC dialog, the project number and project name display by default. Modify these if necessary.

4 If you want to change the default value for Create IFC File Named, enter a new name; or click Browse, navigate to the file, and select it.

5 Under Drawing Files, select the drawing files to be exported.

If you select an xref at the top level, all xrefs nested within this drawing are selected as well. Expand the top level, and select xrefs individually if necessary.

6 If you want to change the labels for the drawing files selected, click the label in the IFC Structure column, and select a different level from the drop-down list, or enter text in the field.



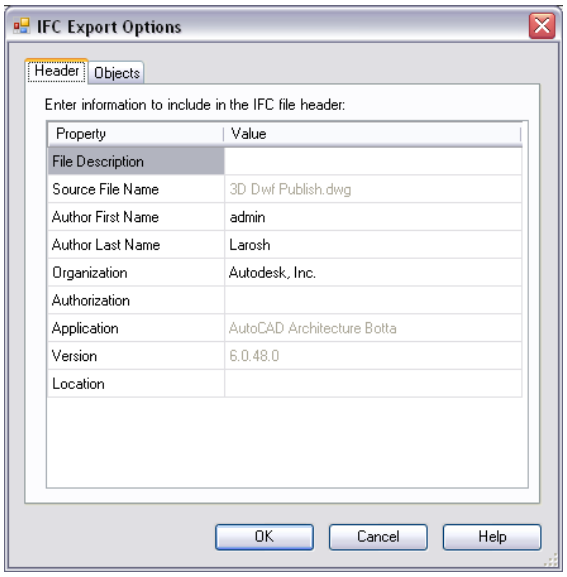
If you want xrefs to display as a distinct level within the IFC file, specify different identifying labels under IFC Structure. You can specify the same identifier, such as Level (1), for multiple xrefs to combine the objects within those xrefs into one IfcBuildingStorey.

7 Enter a description of the file for export.

You can select multiple drawing files and change all labels or descriptions at the same time.

Specify Export Options

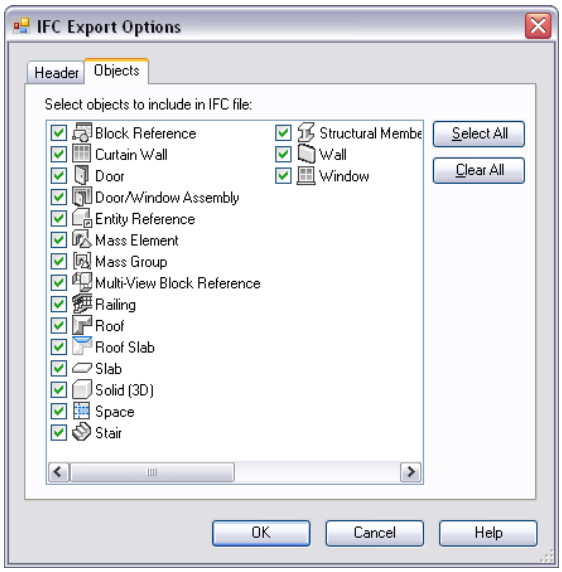
8 Click Options, and click the Header tab.



The name of the drawing active on your screen displays on the Header tab of the IFC Export Options dialog. You can add information about the drawing file to be exported, such as a description of the drawing, the author and company name, authorization data, and the geographic location of the building. For example, you could enter the description of a structural drawing as Structure for Commercial Building 152 on the Header tab. This information displays in the header of the IFC file when the file is viewed.

Other data is exported with the drawing by default and includes the name of the source drawing file and the name and version of the application in which it was created.

9 Enter information to include, then click the Objects tab.



You can select or exclude objects for export with the drawing file. When the IFC file is viewed, the only objects included will be those that you selected. For example, you could select Slab and Structural Member and exclude all other objects from exporting.

When you specify export options for your objects, the following constraints apply:

- The classification of an object takes precedence over the object type. For example, if you classify a mass element as a ramp and then export the drawing without Mass Element selected on the Objects tab, the newly-classified mass element is not included in the export process.
- Any change you make to either tab in the IFC Export Options dialog, become the new default settings.
- For selected objects to be exported, their display representations must be active in the current display configuration.

10 Select objects to include, and click OK.

11 Click Export.

Exporting Standalone Drawings

Drawings created outside of an AutoCAD Architecture project can be exported to an IFC file with or without xrefs.

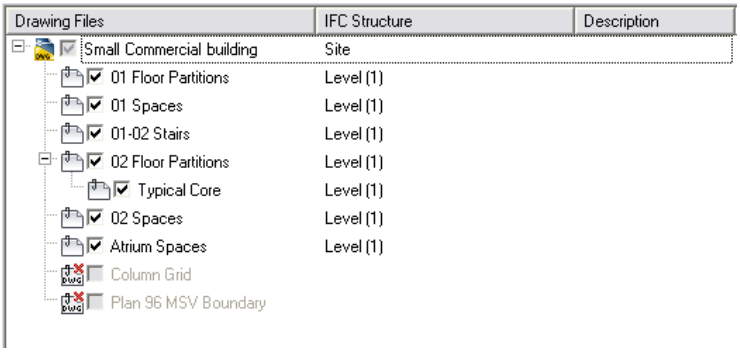
- If you are exporting a drawing file that contains xrefs, the host drawing file is mapped to (Ifc)Site by default. The (Ifc)Site file may contain building objects and site geometry as well as xrefs.
- If you are exporting a drawing that does not contain any xrefs, all of the objects in the drawing are contained in (Ifc)Building. The IFC file will not contain an IfcSite or an IfcBuildingStorey. Without IfcSite, geographic location information, such as longitude and latitude, cannot be exported. This information is tracked in the LOG file. For more information, see General Information for Exporting Drawing Files to IFC on page 152.

Exporting a Drawing with External References

Use this procedure to export a drawing as an IFC file and include selected xrefs. The drawing for export must be active on your drawing screen. It is mapped to (Ifc)Site by default.

If there are objects you want to classify as a different type of object for export, the drawing with the classified objects must have been previously saved. For more information, see Classifying AEC Objects for Export on page 161.

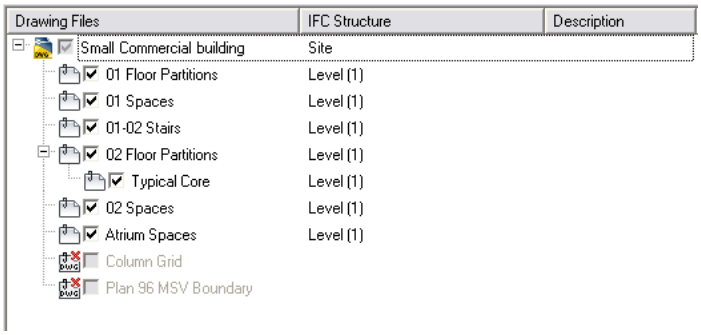
Xrefs contained in this drawing are listed in the tree view below the drawing name, and are mapped to Level (1) by default. If the xrefs are missing in the drawing, they are unavailable in the Export to IFC dialog. The icon next to the file name indicates if the xref is unloaded in the host drawing.



1 Open the drawing that you want to export as an IFC file.

2 Click ➤ Export ➤ IFC (Industry Foundation Classes).

Alternatively, on the command line, enter -IfcExport, and select export options.



3 In the Export to IFC dialog, for Project Number, enter a project number for the drawing.

4 The name of the drawing being exported displays for Project Name by default. Modify this, if necessary.

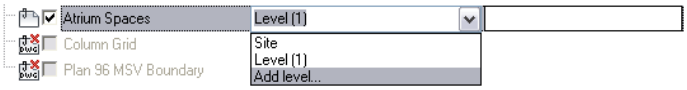
5 To change the default value for Create IFC File Named, click Browse, navigate to the desired file, and select it.

6 Under Drawing Files, select the drawing files to be exported.

If you select an xref at the top level, all xrefs nested within this drawing are selected as well. Expand the top level, and select xrefs individually if necessary.

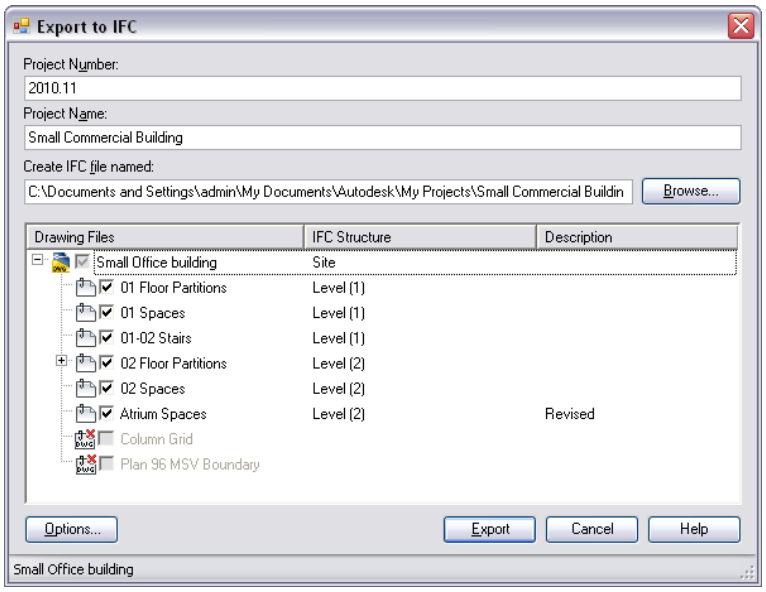
7 To change the label in the IFC Structure column, select or add a different level from the drop-down list, or enter text in the field.

If you want xrefs to display as a distinct level within the IFC file, specify different identifying labels. You can specify the same identifier, such as Level (1), for multiple xrefs to combine the objects within those xrefs into one IfcBuildingStorey.



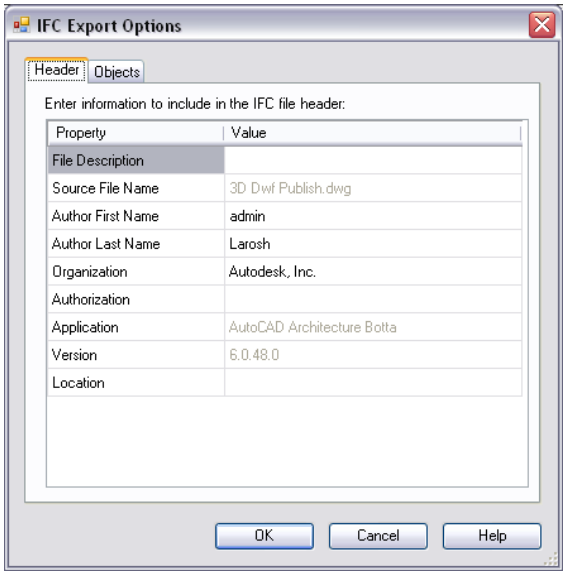
8 Enter a description of the file for export.

You can select multiple drawing files and change all labels or descriptions at the same time.



Specify Export Options

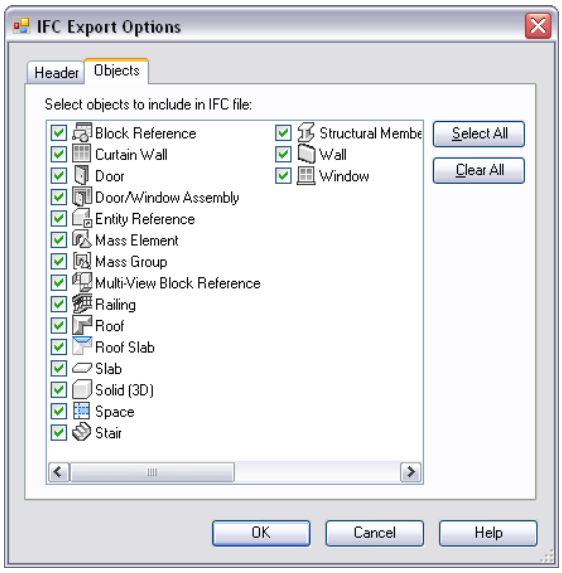
9 Click Options, and click the Header tab.



The name of the drawing active on your screen displays on the Header tab of the IFC Export Options dialog. You can add information about the drawing file to be exported, such as a description of the drawing, the author and company name, authorization data, and the geographic location of the building. For example, you could enter the description of a structural drawing as Structure for Commercial Building 152 on the Header tab. This information displays in the header of the IFC file when the file is viewed.

Other data is exported with the drawing by default and includes the name of the source drawing file and the name and version of the application in which it was created.

10 Enter information, then click the Objects tab.



You can select or exclude objects for export with the drawing file. When the IFC file is viewed, the only objects included will be those that you selected. For example, you could select Slab and Structural Member and exclude all other objects from exporting.

When you specify export options for your objects, the following constraints apply:

- The classification of an object takes precedence over the object type. For example, if you classify a mass element as a ramp and then export the drawing without Mass Element selected on the Objects tab, the newly-classified mass element is not included in the export process.
- Any change you make to either tab in the IFC Export Options dialog, become the new default settings.
- For selected objects to be exported, their display representations must be active in the current display configuration.

11 Select the objects for export, and click OK.

12 Click Export.

Exporting a Drawing Without External References

Use this procedure to export a drawing as an IFC file when the drawing does not contain xrefs. The drawing for export must be active on your drawing screen. It is mapped to (Ifc)Building by default.

If there are objects you want to classify as a different type of object for export, the drawing with the classified objects must have been previously saved. For more information, see Classifying AEC Objects for Export on page 161.

1 Open the drawing that you want to export as an IFC file.

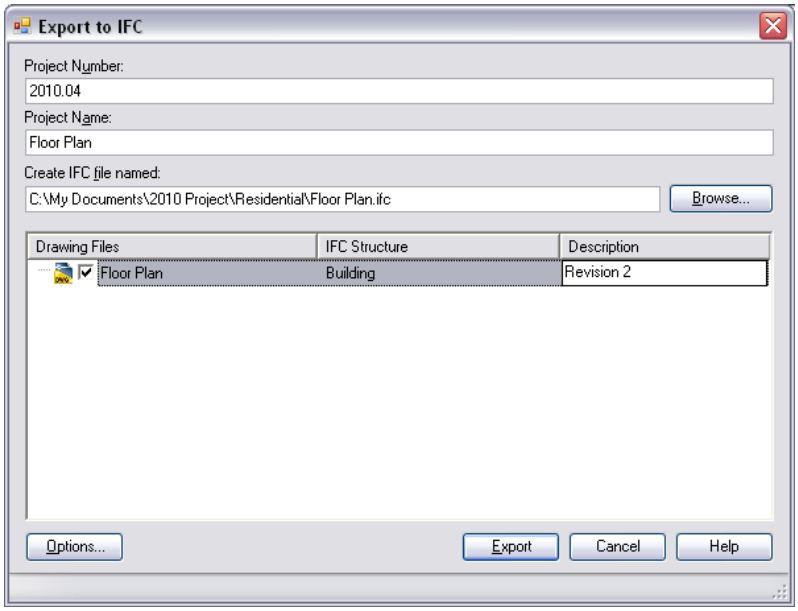
2 Click ➤ Export ➤ IFC (Industry Foundation Classes).

Alternatively, on the command line, enter -IfcExport, and select export options.

3 In the Export to IFC dialog, for Project Number, enter a project number for the drawing.

4 The name of the drawing being exported displays for Project Name by default. Modify this, if necessary.

5 If you want to change the default value of where the IFC file is exported, click Browse, navigate to the desired file, and select it.

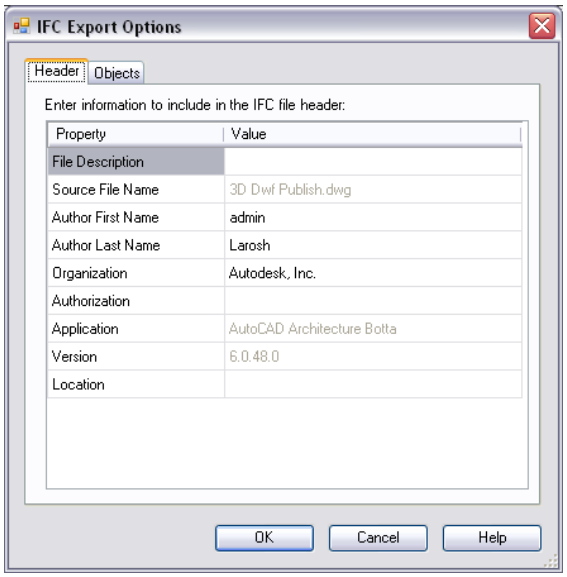


6 Enter a description of the file for export.

You can select multiple drawing files and change all labels or descriptions at the same time.

Specify Export Options

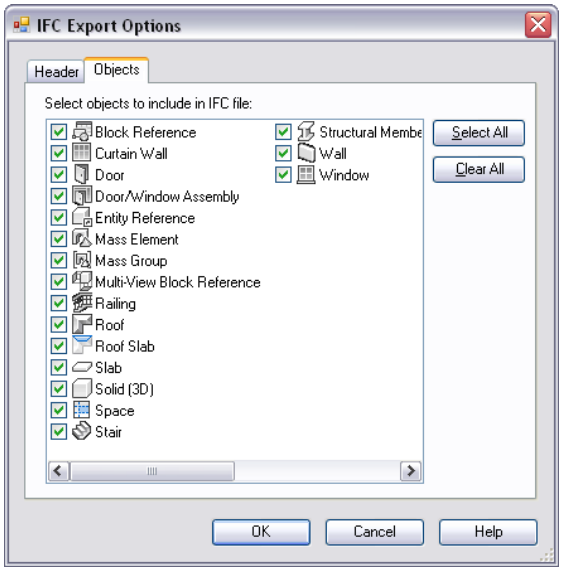
7 Click Options, and click the Header tab.



The name of the drawing active on your screen displays on the Header tab of the IFC Export Options dialog. You can add information about the drawing file to be exported, such as a description of the drawing, the author and company name, authorization data, and the geographic location of the building. For example, you could enter the description of a structural drawing as Structure for Commercial Building 152 on the Header tab. This information displays in the header of the IFC file when the file is viewed.

Other data is exported with the drawing by default and includes the name of the source drawing file and the name and version of the application in which it was created.

8 Enter information, and click the Objects tab.



You can select or exclude objects for export with the drawing file. When the IFC file is viewed, the only objects included will be those that you selected. For example, you could select Slab and Structural Member and exclude all other objects from exporting.

When you specify export options for your objects, the following constraints apply:

- The classification of an object takes precedence over the object type. For example, if you classify a mass element as a ramp and then export the drawing without Mass Element selected on the Objects tab, the newly-classified mass element is not included in the export process.
- Any change you make to either tab in the IFC Export Options dialog, become the new default settings.
- For selected objects to be exported, their display representations must be active in the current display configuration.

9 Select the objects for export, and click OK.

10 Click Export.

Classifying AEC Objects for Export

Using classification definitions allows you to assign three-dimensional AEC objects as different object types. This is helpful if you want to export the object in your drawing as something different for the IFC file. For example, you can draw a mass element, and classify it as a specific object type. For more information about assigning classifications to objects, see Classification Definitions on page 2540.

A folder of classifications that can be used for objects at export is available in the software and can be found in Documents and Settings\All Users\Application Data\Autodesk\ACD-A 2010\enu\Styles.

Use this procedure to classify an AEC 3D object to display as something different in the IFC file.

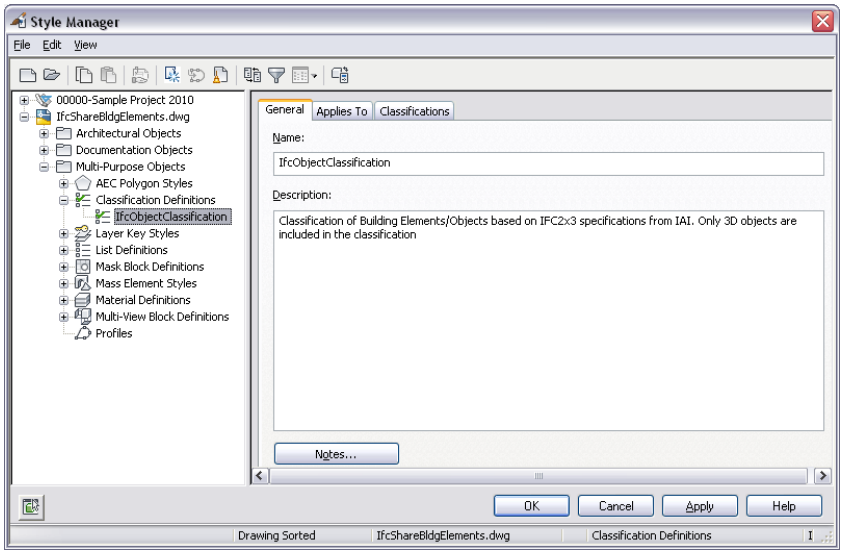
1 Open the drawing that contains the objects you want to classify for export.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 In Style Manager, click (open drawing).

4 In the Open drawing dialog, navigate to *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\IfcProductExtension.dwg* (or *IfcShareBldgElements.dwg*), and click Open.

5 In the Style Manager, expand the IFC drawing file, expand Multi-Purpose Objects, and expand Classification Definitions.



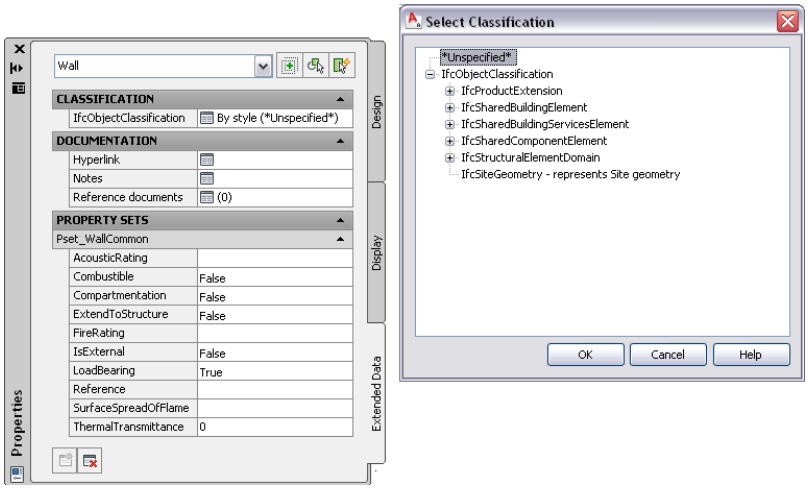
6 Right-click Classification Definitions, and click Copy.

7 Select the drawing into which to add the IFC classifications (the drawing opened in step 1), right-click, and click Paste.

8 Click OK to close Style Manager.

9 In the drawing area, select the objects to classify, open the Properties palette, and click the Extended Data tab.

10 Click next to IFCObjectClassification.



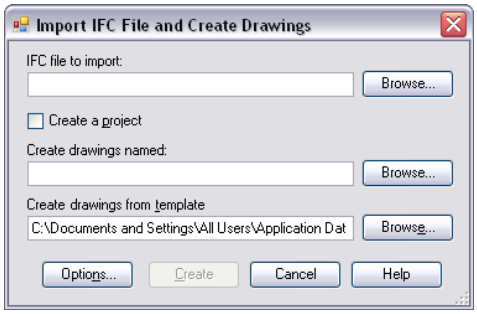
11 In the Select Classification dialog, select the classification, and click OK.

12 Save your drawing before continuing to export it to an IFC file. For more information, see General Information for Exporting Drawing Files to IFC on page 152.

IMPORTANT Save this drawing file with the classifications before exporting the file as either the host drawing or an xref.

How IFC Files Are Imported

When you import an IFC file, drawing files are created that correspond to each part of the IFC project structure. The files are xrefed together into a main host file that represents the entire IFC file. The import process also creates a LOG file which contains object and geographic location information. This file is stored in the same location as the imported IFC file. IFC files can be imported into an AutoCAD Architecture project or as standalone drawings.



You may need to turn on some display components of objects (such as surfaces of spaces) for them to display after you import an IFC file. For more information, see Display Representations on page 520.

When you import an IFC file, you specify a name for the drawing that is being created from the IFC file. This drawing contains xrefs only. For example, importing an IFC file and naming it Small Office Building, creates a DWG file called Small Office Building.dwg, which contains all of the xrefs that correspond to each part of the project structure contained in the IFC file. During the import process, the following occurs:

- A site drawing is created with field information if it existed in the IFC file. If the IfcSite file does not have a name assigned, a site drawing file is created with –Site appended. If there is an IfcSite name specified in the IFC file, a default drawing is created with the name of Site.dwg. The geographic location is imported by default if the IfcSite file contained the latitude and longitude of the site. (The geographic information for a drawing with multiple xrefs is determined by the host drawing.) You can see this information in the Geographic Location dialog. For more information, see View the Geographic Location Information in the AutoCAD Help.
- The import process applies a name to the project or drawing file:

If the IFC file is imported as…	Then…
an AutoCAD Architecture project	the IfcBuilding name is used with the name of the project. (Note that AutoCAD Architecture uses the project name (that you specified in the Export to IFC dialog) as the IfcBuilding name. This is noticeable if you are importing an IFC file that originated in AutoCAD Architecture.)
standalone drawings	the drawing is created with the original project name appended. Using the Small Office Building example, the drawing name would be Small Office Building-Commercial Project.dwg because Commercial Project was the IfcBuilding name in the IFC file.

- A drawing is created for each IfcBuildingStorey contained in the IFC file. The files are created using the drawing name with the name of the IfcStorey appended. These files are referenced into the project file.

- Objects in files with colors specified as 0, 0, 0 or 255, 255, 255 display with the AutoCAD Color Index (ACI) 7 assigned by default.

Architectural Objects and IFC

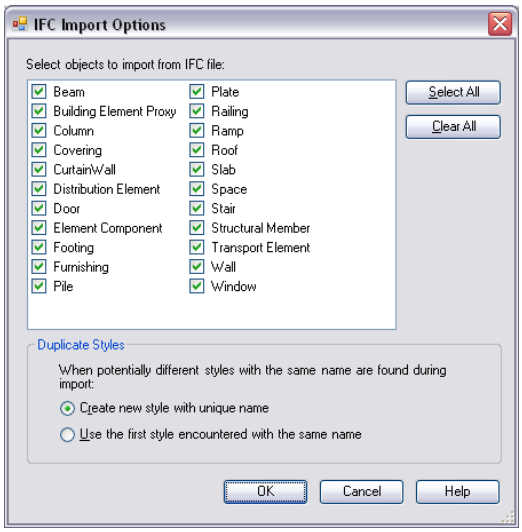
As shown in the following table, most common building objects imported from an IFC file are created as the corresponding AutoCAD Architecture objects in the resulting drawing file. However, in the case of an IFC object with complex geometry that does not directly correspond to the components of its AutoCAD Architecture counterpart, a custom display block is created in the model display representation. Therefore, 3D geometry in the Model display representation may not always correspond exactly to the Plan display representation. For more information, see Display Representations on page 520.

When you import an…	AutoCAD Architecture creates a…
IfcBeam	Beam
IfcColumn	Column
IfcCurtainWall	Curtain wall
IfcDoor	Door
IfcElementAssembly	Multi-view block
IfcOpening	Opening
IfcMember	Brace
IfcRailing	Multi-view block
IfcRamp	Multi-view block
IfcRoof (object with geometry)	Multi-view block
IfcSlab	Slab
IfcSlab (object with predefined type of Roof or an aggregate of slabs such as a gabled roof)	Roof slab
IfcSpace	Space
IfcStair	Multi-view block
IfcWall	Wall
IfcWallStandardCase (an upright wall with uniform thickness)	Wall
IfcWindow	Window
IfcBuildingElementProxy (for example, IFC objects that represent furniture)	Multi-view block

When you import all other IFC objects with a 3D geometric representation (for example, IFC objects that represent pipes or ducts), AutoCAD Architecture creates a multi-view block.

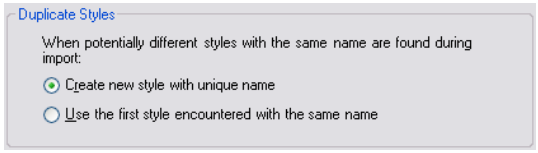
Options for Importing AEC Objects

When you import an IFC file, you can specify objects to import. For example, if you want to create a drawing file that displays only the curtain walls from the IFC file, you can clear all other objects listed in the IFC Import Options dialog. When the drawing is viewed, the only objects included will be those that you selected.



Style names stored in the IFC file display on the Properties palette and in Style Manager. If there are no specific style names in the IFC file, style names are created incrementally, such as IFCSTYLE(0).

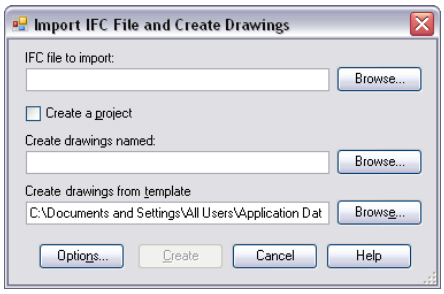
You can specify how and when styles are created if there are multiple styles with the same name in the IFC file. They can either display incrementally with a number suffix or display with the name first encountered, regardless of whether the styles are the same, during the import.



Importing an IFC File

Use this procedure to import an IFC file. When you select an IFC file to import, you specify whether to create the drawings in an AutoCAD Architecture project or as a set of standalone drawings.

1 Click ➤ Open ➤ IFC (Industry Foundation Classes).



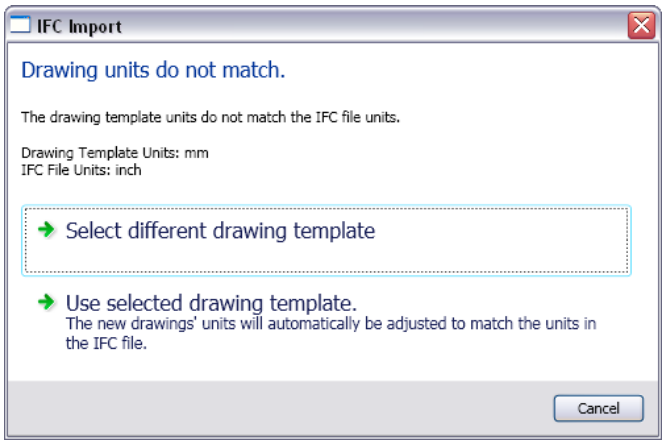
2 In the Import IFC File and Create Drawings dialog, click Browse for IFC file to import, navigate to the desired IFC file, and select it.

3 Specify if the imported file is to be part of a project:

If you want to…	Then…
import the file and create a project and project drawings	select Create a project, and enter a folder name for Create project under folder; or click Browse, navigate to the desired folder, and select it. The drawings are imported with the structure of an AutoCAD Architecture project. For more information, see Concepts of Drawing Management on page 200.
import the file as standalone drawings	enter a drawing name for Create drawings named; or click Browse, navigate to the desired file, and select it. Unless you specify otherwise, the drawing is created at the same location as the IFC file.

4 If you want to change the default value for Create Drawings from Template, click Browse, navigate to the desired DWT file, and select it.

If the template (DWT file) you select does not have the same units as the IFC file being imported, you are given the choice to continue with that template or select a different template. If you choose to continue with the selected template, the units in the IFC file will override the units in the template file.



NOTE The template you select becomes the new default template.

5 Click Options to specify import options, then click OK:

If you want to…	Then…
change the default value of importing all objects to selecting specific objects to import	under Select objects to import from IFC file, check the objects to import or clear objects to omit. Click Select All and Clear All to assist with the selection. For more information, see Options for Importing AEC Objects on page 165.
have a new style name created to correspond with each instance of the style name in the IFC file	select Create new style with unique name. For more information, see Options for Importing AEC Objects on page 165. If multiple occurrences of the same style name exist, a number displays incrementally at the end of the name.

If you want to…	Then…
use the first instance of the style name for all objects	select Use the first style encountered with the same name. For more information, see Options for Importing AEC Objects on page 165.

6 Click Create:

If you…	Then…
specified Create project drawings when you imported the IFC file	the Project Navigator opens on your drawing screen. Use Project Navigator to browse the project drawings created at import. For more information, see Workflow for a Project Environment on page 199.
created standalone drawings and want to view the top-level drawing	click Yes.
created drawings outside of an AutoCAD Architecture project and want to view a different drawing	click No.

If there is a component of an object that does not display after you import an IFC file, open the display representation for the object, and on the Layer/Color/Linetype tab, turn on the display component by selecting the light bulb icon under Visible. For more information, see Display Representations on page 520.

IMPORTANT If AutoCAD Architecture runs out of memory during import, a message displays on the command line, and the import process fails. Continuing to use AutoCAD Architecture under these conditions may affect subsequent work. The correct procedure is to close and then restart the application. You can then retry the import after:

- Closing all other applications.
- Limiting the objects for import in the IFC Import Options dialog.
- Switching to a 64-bit system.

Importing Building Components from Autodesk Inventor

AutoCAD Architecture 2010 can import data from Autodesk Inventor. This capability allows designers of manufactured mechanical building system components and architectural elements to export digital design geometry without the loss of data. This data can then be imported by architects designing buildings and mechanical systems with AutoCAD Architecture.

Previously, exporting a building component from Inventor incurred some loss of information when the data was imported into AutoCAD Architecture. Such information loss may be necessary to protect the intellectual property of the designer of the manufactured item, or to reduce the complexity and size of the data being passed to the architectural or engineering model. To achieve the desired level of information in the exported data, Inventor now employs a custom data reduction of the architectural or engineering model.

Export Requirements in Autodesk Inventor

In order for a building component to be correctly imported into AutoCAD Architecture, it must be prepared for export in Autodesk Inventor, and be saved as a Bulding Component Autodesk Exchange file (*.adsk). For more information, consult the Inventor User Guide.

Import Format

When you import an Inventor building component into AutoCAD Architecture, you can choose whether the component is imported as a multi-view block or a block.

Changing the UCS During Import

When importing building components from Inventor into AutoCAD Architecture, you can change the original UCS. For example, a building component could have been designed in Inventor using a coordinate system with the X and Z axes as the horizontal ground plane axes and the Y axis as the vertical axis. When importing into AutoCAD Architecture however, a different coordinate system with the X and Y axes as the horizontal ground plane axes and the Z axis as the vertical axis is needed, in order to avoid importing the component lying on its back. In this case, the UCS can be changed during the import of the part.

Re-Importing Components

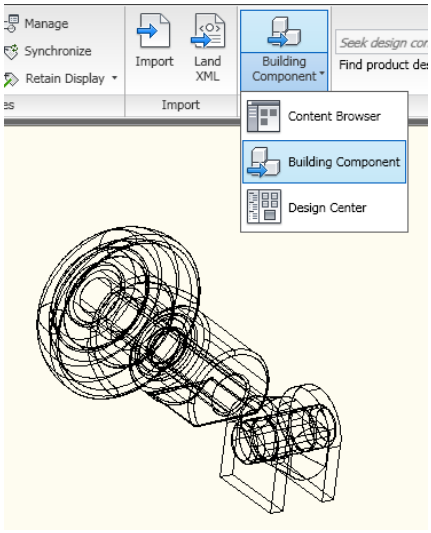
If a building component has been imported into AutoCAD Architecture, and then a change is made to the original file, then on re-import you can choose whether the existing multi-view block or block is overwritten with the updated component, or whether the new version should be imported as a new block or multi-view block.

Importing a Building Component into AutoCAD Architecture

Use this procedure to import an Inventor building component into AutoCAD Architecture.

1 Click Insert tab ➤ Content panel ➤ Content Browser drop-down ➤ Building Component .

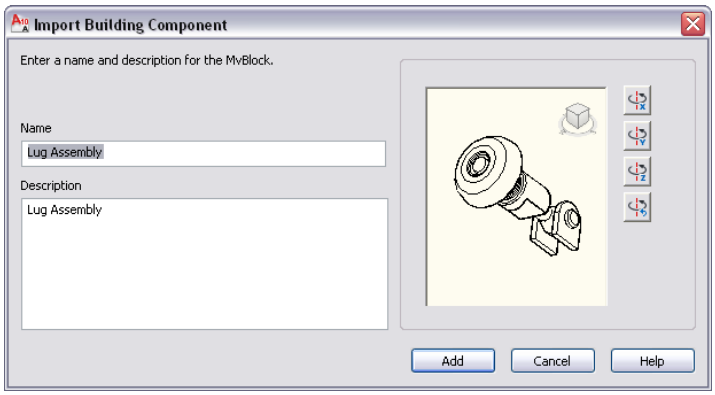
Inserting an Inventor component as a multi-view block



2 In the Import Building Component dialog, select the Autodesk Exchange Format file (*.adsk) that you want to import.

3 Select if you want to import the component as a block or a multi-view block.

This opens the Import dialog where you can specify a name, description, and change the orientation of the block or multi-view block during insertion.



4 When inserting a single block, the image in the viewer will be the block that is inserted, i.e front, top, etc. Any axonometric view will insert the 3D block.

If necessary, use the ViewCube in the preview window to display the component in the desired view.

5 Use the Rotate buttons to rotate the model around its X, Y, or Z axis when inserted into the drawing.

6 Do one of the following:

- If you are inserting a multi-view block, click Add. Then specify the insertion point in the drawing.
- If you are inserting a block, click either Insert (to insert the block reference), or Insert All (to insert the block reference plus separate graphical representations of all the view directions). This is recommended if you want to build a block library and add the block to that. Then, specify the insertion point, the X and Y scale, and the rotation.

Depending on whether the component was inserted as a block or multi-view block, you have different options for editing it in AutoCAD Architecture. For information on multi-view blocks, see Multi-View Blocks on page 1881. For information on blocks, see “Create and Use Blocks (Symbols)” in the AutoCAD Online help.

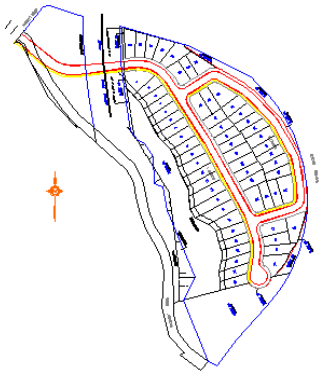
Importing LandXML

LandXML data can be imported and converted to objects. LandXML is the standard XML data format for civil engineering and survey data used in the land development and transportation industries. LandXML provides a data format suitable for long-term data archiving and offers a standard format for electronic design submission.

With LandXML, building professionals can extend the downstream value of their data from design to construction, and for scheduling and maintenance by using a format that can be read by many applications.

LandXML files are based on the LandXML schema, an XML schema definition for civil and survey data.

Residential area layout from Autodesk® Land Desktop



NOTE For more information about LandXML, visit *http://www.landxml.org*.

You cannot convert AutoCAD Architecture objects to LandXML data or export DWG files to the LandXML format.

Schema Version

To import LandXML files, create them with the LandXML schema version 1.1. Note that LandXML files created with earlier versions of LandXML (for example version 0.88) cannot be imported. You can download the latest version of the LandXML schema from *http://www.landxml.org*.

Supported Data Types

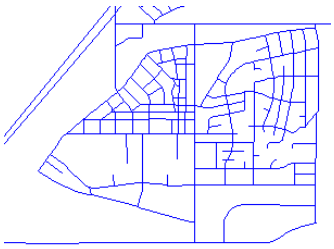
AutoCAD Architecture can read and convert the following LandXML data types:

- Parcels
- COGO points
- Surfaces

Parcels

Parcels are two-dimensional shapes created from closed lines, arcs, and polylines. When a parcel is imported, the parcel name and the lines (segments) and curves (arcs) that make up the parcel boundary are used for the conversion.

Parcels in a street layout from Autodesk® Land Desktop



You can convert parcels to spaces or polylines. When you convert parcels to spaces, you can define a space style that is applied to the spaces generated from the parcels, and the parcel name is used as the space name. When the parcel is converted to a polyline, the parcel name is lost.

Parcel data in LandXML

```
<Parcel name="444" area="12846.9020">
    <Center>325.15651476 409.45999549</Center>
    <CoordGeom>
        <Line>
            <Start>304.67904916 281.77993878</Start>
            <End>401.62704976 468.02002165</End>
        </Line>
        <Line>
            <Start>401.62704976 468.02002165</Start>
            <End>269.16344536 478.58002603</End>
        </Line>
        <Line>
            <Start>269.16344536 478.58002603</Start>
            <End>304.67904916 281.77993878</End>
        </Line>
    </CoordGeom>
</Parcel>
```

COGO (Coordinate Geometry) Points

You can import LandXML COGO (Coordinate Geometry) points and convert them to AutoCAD points.

Civil engineers create COGO points to locate crucial surveying locations. A COGO point can be a project benchmark point - a common datum that the entire civil team works off and from which all critical dimensions are located.

NOTE A LandXML file usually contains a large number of COGO points. In most cases, you need only a small set to work within the drawing. You do not need to import all COGO points, only those that have a special meaning for the drawing.

COGO points are the foundation for any civil engineering or surveying project. In Land Desktop, you can use description keys to place points in the drawing with symbols on specific layers. When importing a LandXML file you can map selected points to the appropriate layer.

When a COGO point is imported it is defined by its coordinates in the form of "northing easting" or "northing easting elevation."

For example, a COGO point could be represented as: *<CgPOINT NAME="1" DESC="MYPOINT">248.04605951 359.53997314 1.000000</CgPOINT>*.

COGO points on a map

NOTE Autodesk Land Desktop uses two coordinate systems for locating points: X,Y and northing/easting. When you start a new project, these values all default to 0 so that the Y coordinate is the same as the northing, and the X coordinate is the same as the easting. Unless you change that in Land Desktop before exporting a drawing to LandXML, the exported northing value will be identical to Y and the exported easting value will be identical to X.

Surfaces

In most surveying and civil engineering operations, you gather information about elevations to generate surface contours that represent a model of the ground surface. The surfaces in LandXML are made up of many faces which are either TINs (Triangular Irregulated Networks) or quadrilaterals. Points or contours are usually a primary part of the original surface information and are supplemented with break lines and boundaries. You can create a surface in LandXML, and then import it. It is converted to a Free Form mass element.

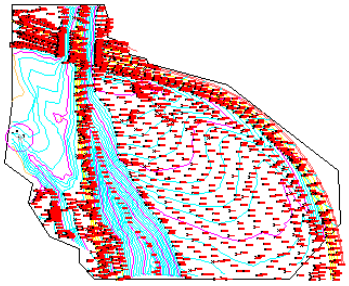
In the following cases, importing surfaces can create errors or fail altogether:

- Surfaces with vertical faces

- Surfaces with tiny gaps between the individual faces
- Surfaces with very narrow faces

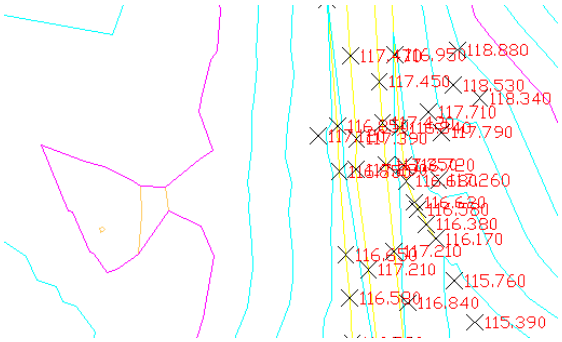
If the import fails, an error message is displayed on the command line, such as “Failed to create mass element from terrain.”

Surface model in Autodesk® Land Desktop



A surface model is usually a complex structure with many defining points and faces. When you convert a surface model to a Free Form mass element, the points and faces are merged into one composite mass element body.

Surface model detail



A Free Form mass element contains a large number of grips. Displaying all grips can slow down the performance and be unnecessary for using the mass element. There are two ways to control the display of grips on mass elements:

- By default, the grips on a Free Form mass element are only displayed if their number does not exceed 2000 grips per element.
- You can turn off the display of grips in the drawing altogether if you click ➤ Options, then click the Selection tab, and under Grips, clear Enable Grips.

A surface in the LandXML Schema contains information about the surface name, type, 2D and 3D area, and the maximum and minimum elevations. It also contains information about each of the points and faces that comprise the surface. The surface information is merged into one composite mass element body, which can have thousands of faces. Applying a surface hatch or texture map to a complex mass element can be quite time-consuming.

Surface data in LandXML

```
<Surfaces>
    <Surface name="Area1" desc="Area1">
        <Definition surfType="TIN" area2DSurf="73335.0380" area3DSurf="188927.3561"
            elevMax="127.6600" elevMin="0.0000">
            <Pnts>
                <P id="1">4838972.630000 315816.970000 116.4700</P>
                <P id="2">4838971.920000 315797.470000 117.6300</P>
                <P id="3">4838965.720000 315798.350000 117.5900</P>
                <P id="4">4838968.400000 315818.170000 116.4000</P>
                ...
            </Pnts>
            <Faces>
                <F>534 214 533</F>
                <F>88 2 3</F>
                <F>256 255 240</F>
                ...
            </Faces>
        </Definition>
    </Surface>
</Surfaces>
```

File Validation

When you import a LandXML file, the file is automatically validated before it is imported and opened. The LandXML file has to conform to the LandXML 1.1 schema definition to be used.

Importing LandXML Data

Use this procedure to import LandXML data.

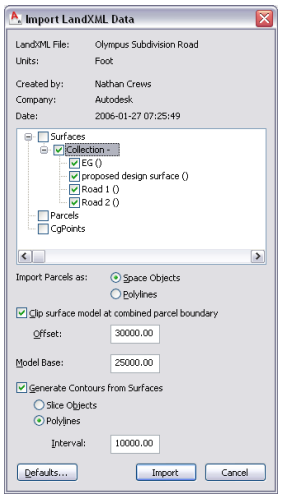
When you import a LandXML file, you can select different object types to import. For a complete list, see Supported Data Types on page 170. Depending on the object type, you can define additional conversion parameters. For example, if you want to import LandXML parcels, you can choose to convert them to space objects or standard polylines.

NOTE A LandXML file contains information about the drawing units in which it is measured. When you import a LandXML file into a drawing with different units, the LandXML data is converted to the units in the current DWG. When a LandXML file based on meter units is imported into a drawing based on millimeters, the resulting coordinates may exceed the range in which accurate calculations can be made.

1. Click Insert tab ➤ Import panel ➤ Land XML.
2. Select a LandXML file to import, and click Open.

   NOTE If you have selected an invalid LandXML file, an XML file not based on the LandXML Schema, or an XML file based on a LandXML Schema version earlier than 1.1, you receive an error message and cannot import the file. Select another file that conforms to the LandXML 1.1 schema, or update the existing file accordingly.

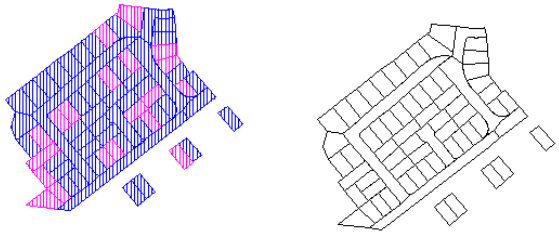
3. Select the import options.



If you want to…	Then…
import surfaces from the LandXML file	select Surfaces. This selects all surfaces from the imported file. To import only individual surfaces, expand Surfaces, expand Collection, and then select the surfaces you want to import.
import parcels from the LandXML file	select Parcels. This selects all parcels from the imported file. To import only individual parcels, expand Parcels, expand Collection, and then select the parcels you want to import.
import COGO points from the LandXML file	select CgPoints. This selects all COGO from the imported file. To import only individual points, expand CgPoints, expand Collection, and then select the points you want to import.

4 If you are importing parcels, indicate the form to which you want them converted by selecting either Space Objects or Polylines.

Parcels converted to spaces (left) and polylines (right)



5 If you want to clip the surface model using the boolean union of all parcels as the model boundary, select Clip Surface Model at Combined Parcel Boundary.

If this check box is selected, you can also enter an offset from the boundary.

6 Enter a value for Model Base.

This creates an extrusion of the surface outer boundary from the value you enter starting at the lowest surface point.

7 If you want to generate contours from the surface data you are importing, select Generate Contours from Surfaces.

NOTE If you want to see the actual surfaces of the converted mass element, such as a TIN model, you can display the mass element without Gouraud shading.

8 Indicate how you want the contours to be created by selecting either Polylines or Slice Objects.

9 Enter an interval value for the vertical spacing of the contours.

NOTE Because slice objects shade their entire area, they can interfere with the appearance of the surface itself in shaded or hidden line views.

10 Click Import.

Selecting Layer Keys for LandXML Data

Use this procedure to set a default layer key for the different types of LandXML data being imported. You can set layer keys individually for COGO points, parcels, surfaces, and contour lines.

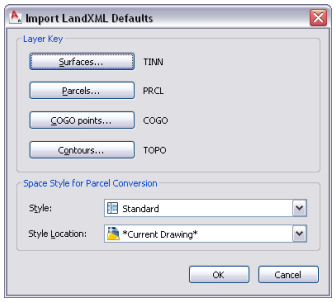
If you do not define specific layer keys for your LandXML data, the imported data is placed on the default layer keys specified for LandXML data, TINN (Surfaces), PRCL (Parcels), COGO (COGO Points), and TOPO (Contours).

You can also define a specific space style for parcels that are imported as spaces.

1 Click Insert tab ➤ Import panel ➤ Land XML.

2 Select a LandXML file to import, and click Open.

3 Click Defaults.



4 Select a layer key default for the imported objects.

If you want to…	Then…
select a layer key default for imported surfaces	click Surfaces.
select a layer key default for imported parcels	click Parcels.
select a layer key default for imported COGO points	click COGO points.
select a layer key default for imported contours	click Contours.

5 Select a layer key, and click OK.

6 If you want to import LandXML parcels as spaces, select a space style and a style location if necessary.

7 Click OK.

8 Import your LandXML data as described in Importing LandXML Data on page 173.

Publishing Drawing Files to Autodesk MapGuide

You can publish objects and property set data to the Autodesk MapGuide® product suite.

The MapGuide product suite provides the tools to create, publish, and display maps, drawings, designs, schematics, facilities management plans, and associated attribute data over the Internet, an intranet, or an extranet with the services of a web server and a web browser.

You can find a number of sample MapGuide projects under *http://data.mapguide.com/SampleApps/fm/default.htm*.

Prerequisites

To publish graphic objects and property set data to MapGuide, the MapGuide SDF Component Toolkit must be installed on your computer.

The MapGuide SDF Component Toolkit is a development library that allows developers to read, write, and modify point, line, and polygon data within SDF files. SDF files are the native Spatial Data File format of MapGuide, created from stand-alone applications or CGI applications.

You can download the Autodesk MapGuide SDF Component Toolkit from *http://www.autodesk.com*.

Published Data Types

You can publish the following data types from a drawing to MapGuide.

- Graphic data: All graphic objects can be exported to MapGuide in an SDF (Spatial Data File) file. Areas and spaces are converted to polygons in the appropriate SDF files. All other graphic objects are converted to polylines.
- Property set data: Property set data attached to an exported object is exported to a Microsoft® Access Database consisting of a series of tables representing the individual property sets. Each object record within a table is assigned a unique object key matching the corresponding object key in the SDF file in order to associate the record in the database with the appropriate SDF geometry.
- Blocks and MVBlocks: Blocks and MVBlocks are exported as SDF files and point databases. Since the blocks and MVBlocks are exported in SDF format as well, the point databases provide an option for users to use symbols rather than the SDF geometry to represent Blocks and MVBlocks in MapGuide. There is a point geometry SDF format, but since AutoCAD Architecture does not work with geospatial coordinate systems, a table in an external database presents a better data source for point-related data.
  The Publish To MapGuide command does not create bitmap files (BMP) or Windows Metafiles (WMF) representing the geometry of blocks or MVBlocks. If you want to generate WMFs, you need to use either the AutoCAD® *WmfOut* command or the MapGuide SDF Loader.

  The SDF Loader is a utility used to create Spatial Data Files (SDF) and their accompanying Spatial Index Files (SIF) from a variety of GIS data formats.

  You can download the SDF Loader utility from *http://www.autodesk.com*.
- External references: objects and property set data from external references are exported as if they actually resided in the host drawing.

  NOTE The external reference name prefix of the layer name is removed when exporting data to MapGuide. This means that objects of the same type that are on the same layer in separate externally referenced files are placed in the same SDF files.

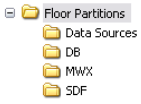
Generating a MWX File

The Publish To MapGuide feature creates, in addition to the data types listed in Published Data Types on page 176, a default map file (MWX file) that combines the exported data in a MapGuide® project. The map contains one layer for each generated SDF file. Each layer is visible and selectable.

An Overview of the Published Data Structure

When you publish data to MapGuide®, a data structure is created that facilitates the incorporation of the data into an MWX project. The exported files are placed in a series of folders representing the relevant portions of an MWX project folder hierarchy. If the following folders do not already exist below the folder you select for exporting your data, they are created and the appropriate files placed in each folder.

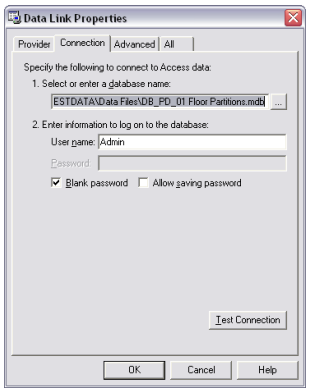
Directory structure of exported data



The following files are contained in the individual folders:

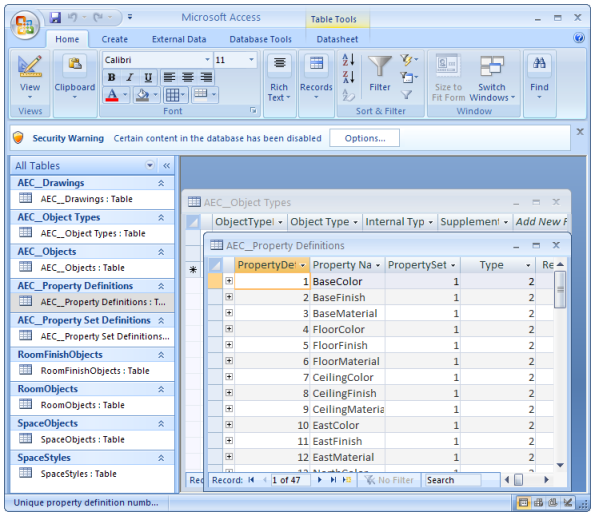
- Data Sources folder: In the Data Sources folder, you can find the data links to the MDB database and the SDF directory. The Publish To MapGuide options allow you to place the Data Sources in an alternate location.

  Data link to exported database



- DB: The DB folder contains the Microsoft® Access Database created on export.

Exported database file



- MWX: the MWX folder contains the MapGuide project file combining the exported spatial and non-spatial data. To view and edit the exported data in MapGuide, you open the MWX file.
- SDF: The SDF folder contains the exported SDF (Spatial Data File) and SIF (Spatial Index File) files from the graphic objects.

An Overview of the Database Structure

When you publish data to MapGuide®, a Microsoft® Access Database (MDB) is created that contains information about the exported graphic objects and property set data.

Exported database file

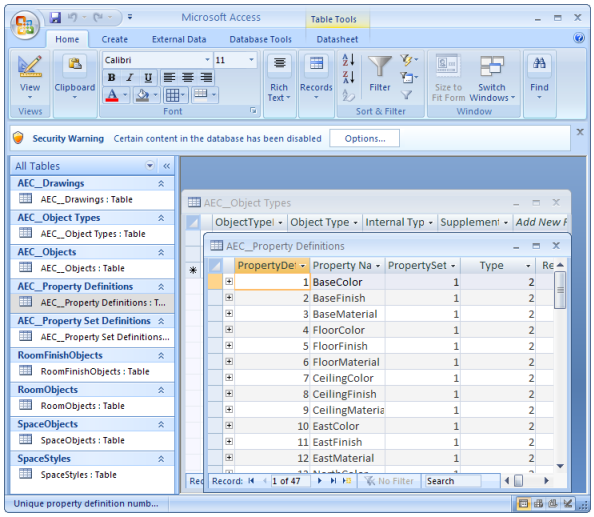


Table Name	Content
ADT_Drawings	This table lists information about the drawing from which the data is exported. Information includes file name, path, date of last modification, and the units of the drawing.

Table Name	Content
ADT_Object Types	This table provides a listing of the object types and object styles contained in the exported data. Each type and style is assigned an ID, which is later used to identify individual objects in the ADT_Objects table.
ADT_Objects	This table lists all individual objects contained in the exported data.
ADT_Property Set Definitions	This table provides a listing of the property set definitions contained in the exported data. Each property set definition is assigned an ID, which is later used to identify individual properties.
ADT_Property Definitions	This table lists all properties contained in the exported data. To identify individual properties, use the PropertySetId from the ADT_Property Set Definitions table.
<Objects>	For each object type that has property data attached directly to one or more of its objects, a table is created that contains the objects and their associated property data. For example, if an exported drawing contains a number of doors with attached properties for frame depth and frame width, a DoorObjects table is created that lists all of these doors and their frame depths and frame widths.
<Object>Styles	For each object type that has property data attached via an object style, a table is created that contains the objects and the property data derived from their styles. For example, if an exported drawing contains a number of doors with a style controlling the louver height and louver width, a DoorStyles table is created that lists all doors of that style with their louver heights and louver widths.

NOTE For a detailed view and description of the individual tables, select a table in Microsoft® Access, right-click, and click Design View.

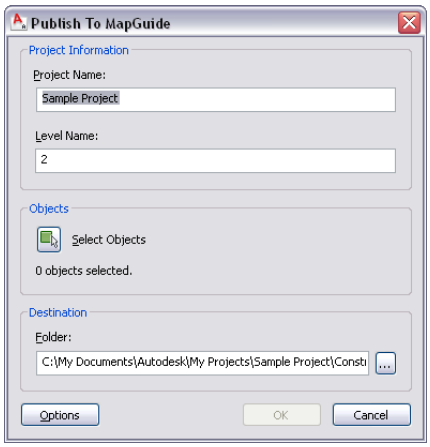
When you export data to an MDB, make sure that your property set definitions names, property definition names, and layer names meet the following naming criteria.

- Names must not exceed 64 characters. Longer names will be truncated after 64 characters.
- Names must not contain the following special characters: period (.), exclamation mark (!), accent ague (`), and brackets ([]).

Publishing Data to Autodesk MapGuide

Use this procedure to publish data to MapGuide®.

1 Click ➤ Publish ➤ To Map Guide.



If the drawing from which you want to publish objects is part of a building project, the project name and level assignment of the drawing display in the Publish to MapGuide dialog.

If the drawing is not part of a building project, the name of the drawing and "Level 1" display by default. You can change these entries.

NOTE The project name that you enter here is not used as the name of the source MapGuide project folder and project files. The name of the project source folder and project files is created from the name of the drawing.

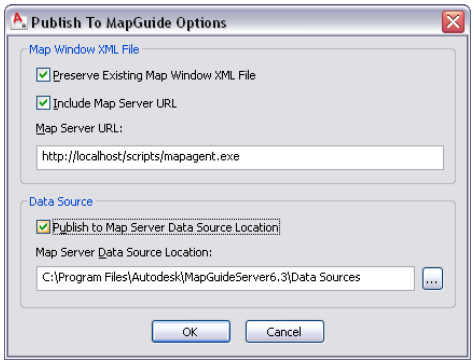
2 Under Objects, click .

3 Select the objects you want to publish, and press *ENTER*.

4 Under Folder, select the location for the project files.

For a detailed description of the files and folders generated on export, see An Overview of the Published Data Structure on page 177.

5 Click Options.



6 Specify additional export options:

If you want to...	Then...
preserve the existing Map Window XML file	select Preserve Existing Map Window XML file. This option will prevent an existing MWX file in this location from being overwritten. This will allow users to preserve any changes they made to the MWX file (secondary data source table selections, layer properties, or themes) when updating or re-publishing the underlying data or geometry.

If you want to...	Then...
include an URL to a Map Server	select Include a Map Server URL, and enter a server address.
publish your data to a Map Server data location	select Publish to Map Server Data Source Location, and browse for a location.

For more information about Map Server data locations, see the online Autodesk MapGuide® User's Guide.

7 Click OK twice.

Depending on your selection set, the export may take extra time. A progress bar shows you the state of the export.

Exporting Property Set Data to an MDB

Use this procedure to export property set data in a drawing to a Microsoft® Access Database (MDB).

1 Click ➤ Export ➤ Property Data.

2 Select the objects that contain the property data that you want to export.

3 Press *ENTER*.

4 In the Export Property Data dialog, enter a path and a name for the exported MDB.

5 Click Save.

The property set data of the objects you selected is exported to a Microsoft® Access database.

Publishing Drawings to DWF and DWFx

The Design Web Format™ (DWF™) is an Autodesk® method of publishing design data to a file that can be posted on the Internet or on an intranet. You can view DWF files with a web browser, like Microsoft® Internet Explorer, or with the free downloadable Autodesk® Design Review, from where you can also plot the file. You can send a published DWF file as an e-mail attachment, share it using a project collaboration site such as Autodesk® Buzzsaw®, or you can post it to a company website.

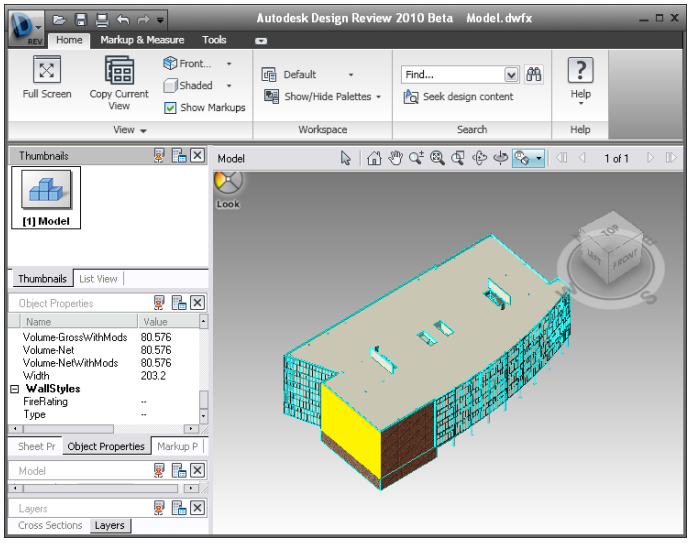
DWFx is the next version of the DWF file format. The DWFx file format is a blend of DWF and the Microsoft XPS (XML Paper Specification) format.

You can publish your DWG files as 2D or 3D model with the included property set data to DWF or DWFx. When these files are viewed with Autodesk® Design Review, users can select components that represent objects and display the object information on the Object Properties palette.

For more information about property set data, see Property Set Definitions on page 2510.

TIP To view published DWF or DWFx files, you need to install Autodesk Design Review. You can download the latest version of Autodesk Design Review from *http://www.autodesk.com*.

DWFx file published to Autodesk Design Review



Workflow for Publishing Drawings to DWF or DWFx

Watch the movie

Review the steps

Prepare a drawing for publishing

Select a 2D or 3D view of the building with the correct display on page 182.
If you are working in a structured AutoCAD Architecture project, select a sheet on page 340 or a sheet set from the Project Navigator.

Include specific information about objects in the drawing

Attach additional property set data on page 188 if desired.

Publish the drawing

Publish the 2D or 3D on page 189 drawing.

Conditions and Limitations to Publishing Drawings to 3D DWF or DWFx

When publishing a drawing to 3D DWF or DWFx, the following conditions apply:

- Most types of hatches (patterns, solid, graphics) are published.
- The 3D DWF or 3D DWFx file uses the display configuration that is active in the DWG file during publishing.

NOTE When you publish 3D objects to DWF or DWFx, only the display set used for 3D views of the drawing is published. For 3D views, this is usually a Model display set, for example Model Medium Detail, Model High Detail, or Model Low Detail. You can view the objects in Top view in Design Review; however, this is only a Top view of the Model display, and not a Plan view. Objects with no display representation in the Model display set are not displayed in the published DWF or DWFx. Objects that typically are not displayed in Model views are tags, annotations, dimensions, and 2D Plan symbols. If you want these to display in the DWF or DWFx, you can either activate them for the Model display set, or generate a 2D DWF or 2D DWFx file. For more information about the display system, see Display System on page 513.

- If Render materials are enabled, the transparency is translated to the DWF or DWFx file. For more information, see Materials on page 577.
- Live Section objects are published.
- Property set data attached to objects or styles is published to DWF or DWFx.

The following limitations apply:

- Infinite lines, like construction lines (xlines) and rays, are not published.
- Text fonts in the DWG file are all converted to Arial. Text formatting like Bold, Italic, and Underline are not currently supported.
- Clip Planes and Xref Clipping are not supported.
- OLE objects as well as inserted images are not supported.
- Linetypes and lineweights are currently not supported.
- Hyperlinks are not published (but are visible for non-AEC objects.)

Exporting Property Set Data to a DWF or DWFx File

You can export different types of property set data to a DWF or DWFx file.

Automatic Property Set Data

Each object in AutoCAD Architecture has a set of automatic properties attached to it. For example, every wall has a width, length, and height. Automatic properties are a subgroup of all property set data that can be attached to an object (or object style) with a property set definition.

You can automatically export all automatic properties of an object to a DWF or DWFx file. Automatically exporting all automatic properties has the advantage that you do not need to set up property set definitions for individual objects; it does not allow you however to select which properties to export and which to ignore.

For information on how to export automatic property set data, see Publishing a 3D DWF or 3D DWFx File with Automatic Property Set Data on page 186.

User-Defined Property Set Data

User-defined property set data is data from a property set definition that you have created and attached to an object or object style. Property set data can include automatic object properties, like height and width of a wall, but also manually defined data such as fire ratings or manufacturing information, project information, and more.

When publishing user-defined property set data, you specify which property set definitions to include and which to exclude. For example, some property sets in your drawing can contain confidential information, which you do not want to expose to others. In other cases, the recipient of a published file might need only

very specific property set information about one aspect of the drawing, and does not want to search for that information among a large amount of unrelated information.

When publishing user-defined property set data, you must attach property set definitions to the objects in your drawing, and select a PPL (Published Properties List) file that contains these property sets. For example, you attach the property set definition DoorObjects to a number of doors in your drawing. Then, you add the DoorObjects property set definition to your PPL file. When you publish the drawing to DWF or DWFx, the property set data from these doors is published. In the same PPL file, you add the WindowObjects property set definition. However, you do not attach the WindowObjects property set definition to any windows in your drawing. When you publish the drawing to DWF or DWFx, no property set data from the WindowObjects property set definition is published.

In order to publish user-defined property set data to a DWF or DWFx file, you need to perform the following high-level steps:

1. Create property set definitions for objects and apply them to an object or an object style.

   For more information, see Property Set Definitions on page 2510.

2. Define in the PPL file (Published Properties List) which property set definitions from your drawing should be exported.

   For more information, see Creating a New Published Property List (PPL) on page 192.

3. Publish the drawing to DWF or DWFx, as described in Publishing a 3D DWF or 3D DWFx file with User-Defined Property Set Data on page 188 and Publishing a 2D or 3D DWF or DWFx File with Property Set Data on page 189.

Publishing Property Set Data from External References

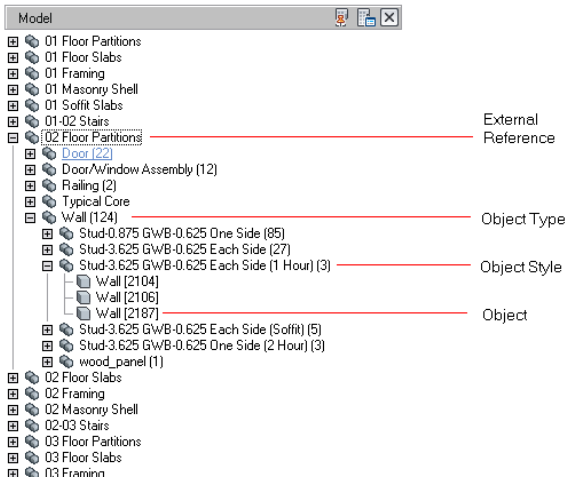
Property set data works across external references, and you can publish data from an external reference to a DWF or DWFx file. To make sure that data from the external reference is published correctly, make sure that the following conditions are met:

- The data structure of property sets coming from an external reference must be identical to the structure of any corresponding property sets in the host drawing. For example, if an external reference has a property set definition called Doors that reports Height, Width, and Door Number, the host drawing cannot have a property set definition called Doors that reports Fire Rating, Leaf Width, and Glass thickness.
- The same property data format must be applied to property set definitions from external references and corresponding property set definitions in the host drawing. For example, if an external reference property set definition called Doors specifies architectural units with 1/4 inch precision, the host drawing cannot have a property set definition called Doors that specifies architectural units with 1/16 inch precision. If the property data formats differ, the format of the host drawing is used for the external reference.

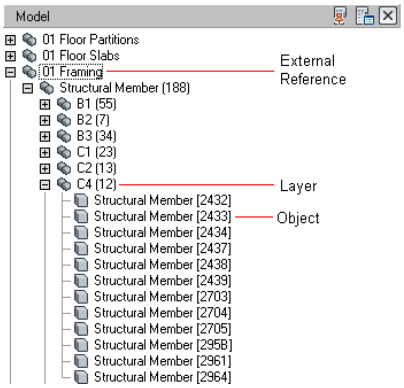
Property Set Data Structure

As shown in the following examples, you can specify how property data is organized when exporting property set data from a DWG file to a DWF, DWFx, or PDF file. This capability can be helpful when exporting large drawings with many object properties.

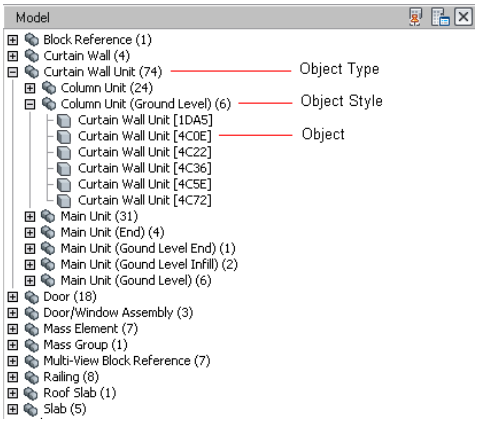
- Grouping property set data by external reference first, and then by object type and object style:



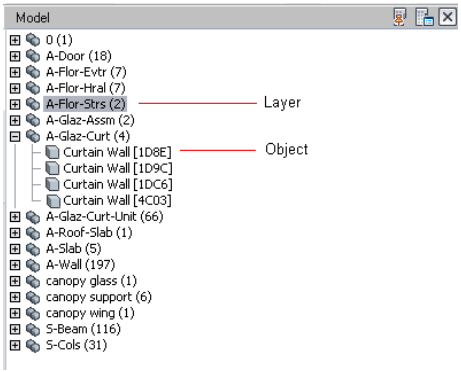
- Grouping property set data by external reference first, and then by layer:



- Grouping property set data by object type first, and then object style:



- Grouping property set data by object layer:



For information on setting the data structure, see Publishing a 3D DWF or 3D DWFx File with Automatic Property Set Data on page 186 and Publishing a 3D DWF or 3D DWFx file with User-Defined Property Set Data on page 188.

Publishing a 3D DWF or 3D DWFx File with Automatic Property Set Data

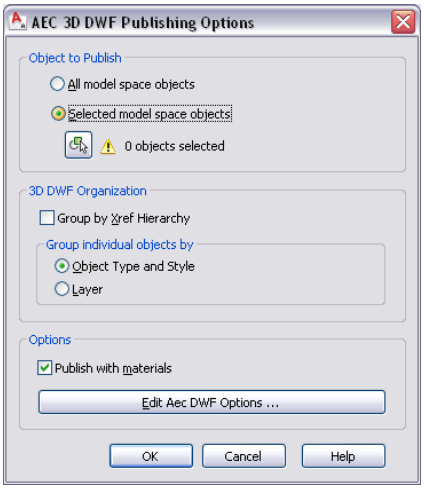
NOTE This instruction lets you create a single 3D DWF or 3D DWFx file of the model you are working on with automatic property set data. If you want to create multiple DWF or DWFx files for different sheets with automatic property set data, see Publishing a 2D or 3D DWF or DWFx File with Property Set Data on page 189.

1 Do one of the following:

- Click Export ➤ 3D DWF.
- Enter **3ddwf** on the command line.

2 In the Export 3D DWF dialog, select 3D DWF or 3D DWFx for Files of type. (By default 3D DWFx is selected.)

3 Click Tools menu ➤ Options.



4 Under Objects to Publish, select either the whole model or click Selected Model space objects, and pick objects in the drawing to include in the exported DWF or DWFx file.

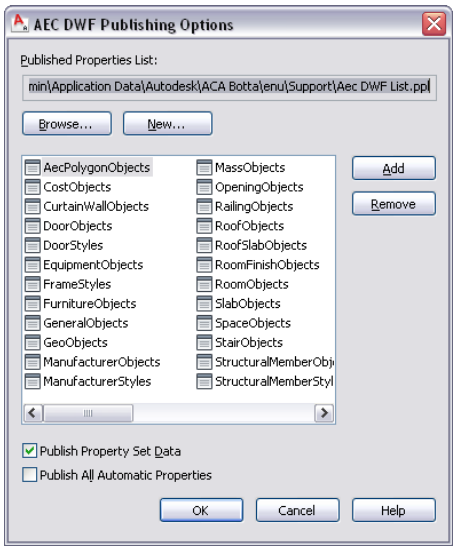
5 Under 3D DWF Organization select in which order xrefs and objects will be displayed in the exported file.

If you want to…	Then…
group the objects by their external reference, and then by their object type and style	check Group by Xref Hierarchy. Under Group individual objects by, select Object Type and Style.
group the objects by their external reference, and then by their layer	check Group by Xref Hierarchy. Under Group individual objects by, select Layer.
group the objects by their type and style	uncheck Group by Xref Hierarchy. Under Group individual objects by, select Object Type and Style.
group the objects by their layer	uncheck Group by Xref Hierarchy. Under Group individual objects by, select Layer.

For example illustrations, see Property Set Data Structure on page 184.

6 Select Publish with materials in order to include the material definitions from the DWG file in the DWF or DWFx file.

7 Click Edit AEC DWF Options.



8 In the AEC DWF Publishing Options dialog, click Publish All Automatic Properties.

This will publish all automatic properties associated with the objects you have selected for exporting to the DWF or DWFx file.

9 If you want to publish user-defined property set data, see Publishing a 3D DWF or 3D DWFx file with User-Defined Property Set Data on page 188.

10 Click OK, and then Save.

By default, the automatic property data exported will be listed under a property group called Aec+<object type>. For example, if you export the automatic properties of a door, they will be listed under AecDoor. If you are exporting additional user-defined property set definitions and one of them already uses the name Aec+<object type>, the automatic properties will be listed in a property group called Aec+<object type> (2). In the door example that would mean that if you are exporting a user-defined property set definition named AecDoor, then the automatic door properties will be listed under AecDoor (2).

If an object property is both an automatic property and is also included in a property set definition, it will be listed both under the automatic properties and under the property set definition it is part of in the DWF or DWFx file.

Publishing a 3D DWF or 3D DWFx file with User-Defined Property Set Data

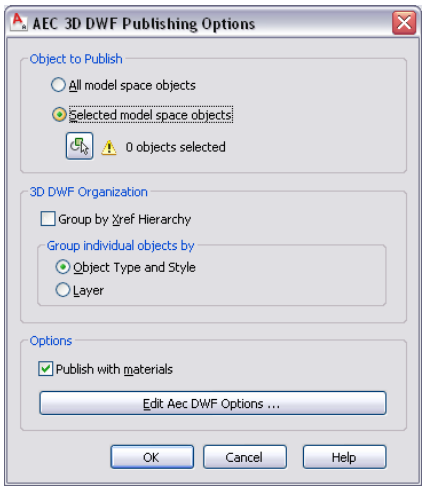
NOTE This instruction lets you create a single DWF or DWFx file of the model you are working on with user-defined property set data. If you want to create multiple DWF or DWFx files for different sheets with user-defined property set data, see Publishing a 2D or 3D DWF or DWFx File with Property Set Data on page 189.

1 Do one of the following:

- Click Export ➤ 3D DWF.
- Enter **3ddwf** on the command line.

2 In the Export 3D DWG dialog, select 3D DWF or 3D DWFx for file format. (By default, 3D DWFx is selected.)

3 Click Tools menu ➤ Options.



4 Under Objects to Publish, select either to publish the whole model or click Selected Model space objects, and pick objects in the drawing to include in the exported DWF or DWFx file.

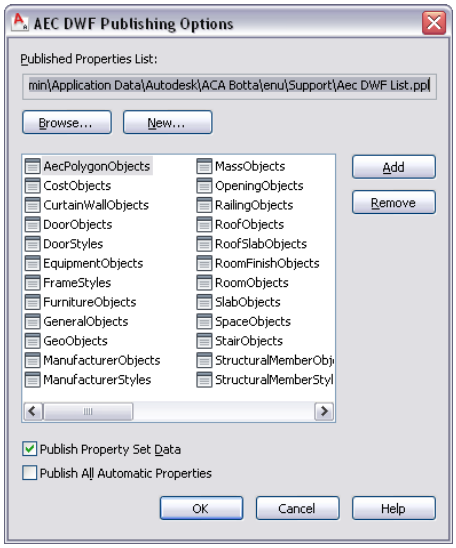
5 Under 3D DWF Organization select in which order xrefs and objects will be displayed in the exported file.

If you want to…	Then…
group the objects by their external reference, and then by their object type and style	check Group by Xref Hierarchy. Under Group individual objects by, select Object Type and Style.
group the objects by their external reference, and then by their layer	check Group by Xref Hierarchy. Under Group individual objects by, select Layer.
group the objects by their type and style	uncheck Group by Xref Hierarchy. Under Group individual objects by, select Object Type and Style.
group the objects by their layer	uncheck Group by Xref Hierarchy. Under Group individual objects by, select Layer.

For example illustrations, see Property Set Data Structure on page 184.

6 Select Publish with materials in order to include the material definitions from the DWG file in the DWF or DWFx file.

7 Click Edit AEC DWF Options.



8 Verify that Publish Property Set Data is selected.

9 To add a property set definition to the exported DWF or DWFx file, click Add.

In the Add Property Sets dialog, by default the currently active drawing and the property set definitions in it are displayed.

10 To select one of the listed property set definitions, check its mark and click OK.

11 To select property set definitions from another drawing file, click Browse, and navigate to the desired drawing. Then, proceed to add property set definitions as described above.

12 Click OK.

13 To remove a property set definition from the exported DWF or DWFx file, select it, and click Remove.

14 To create a new PPL file, click New, and follow the instructions in Creating a New Published Property List (PPL) on page 192.

15 To select a different PPL file, click Browse and select a new file.

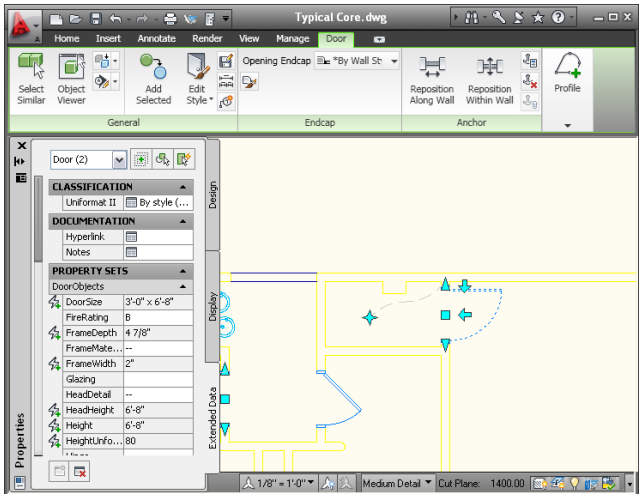
16 Click OK twice, and then click Save.

When the export is finished, you are asked whether you want to view the DWF or DWFx file. Click Yes to open the exported file in Autodesk Design Review.

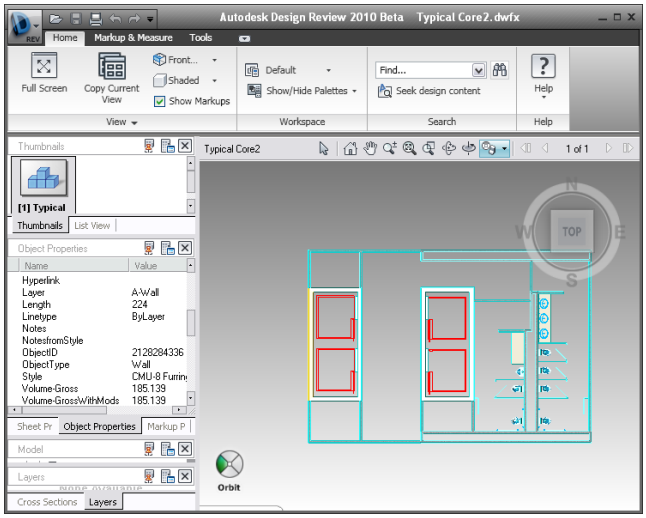
Publishing a 2D or 3D DWF or DWFx File with Property Set Data

When you create a DWF or DWFx file with the Publish dialog, you can create both 2D and 3D DWF or DWFx files. You can also create multiple DWF or DWFx files for individual sheets in your drawing. If you export property set data, the property set data will be displayed in each DWF or DWFx file.

DWG file with property set data



DWFx file with property set data



1 Click Publish.

NOTE If you want to publish sheets from a project, see Publishing Sheet Sets on page 340.

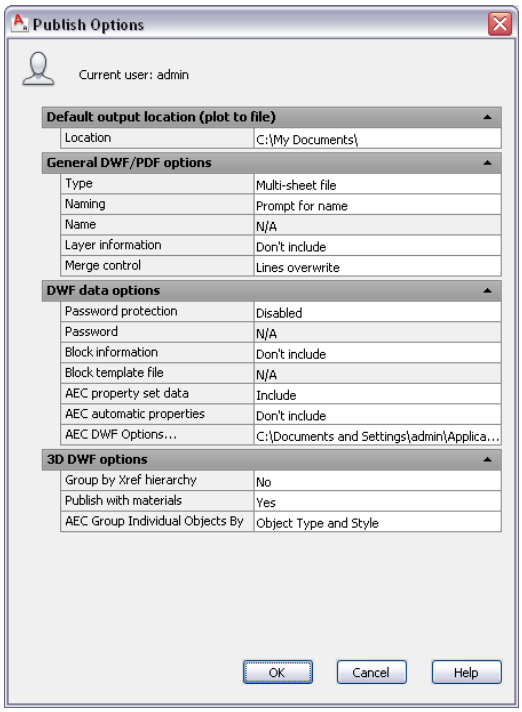
2 Under Page Setup, select if you want to publish a 2D or 3D DWF or DWFx file:

- To publish a 2D DWF or DWFx file, select a 2D page setup, or select <Default: None>.
- To publish a 3D DWF or 3D DWFx file, select <3D DWF>.
  If the <3D DWF> option is not available, no valid 3D display configuration has been set for the drawing.

3 Under Publish to, select DWF format.

4 Depending on whether you want to create DWF or DWFx, select the appropriate option below DWF Format.

5 Click Publish Options.



6 Specify the general DWF options as described in Publish Options Dialog Box in the AutoCAD Help.

7 If you want to publish user-defined property set data, select Include for AEC property set data.

8 If you want to publish all automatic properties of the objects in the drawing, select Include for AEC automatic properties.

NOTE Automatic properties can be published instead of or in addition to user-defined property set data.

9 In order to add or remove user-defined property sets for the exported DWF or DWFx file, click the Browse button under AEC DWF Options.

10 If you are creating a 3D DWF or 3D DWFx file, define the organization of published AEC objects in Autodesk Design Review:

If you want to...	Then...
group the objects by their external reference, and then by their object type and style	select Object Type and Style for AEC Group Individual Objects by. Then, select Yes for Group by Xref Hierarchy.
group the objects by their external reference, and then by their layer	select Layer for AEC Group Individual Objects by. Then, select Yes for Group by Xref Hierarchy.
group the objects by their type and style	select Object Type and Style for AEC Group Individual Objects by. Then, select No for Group by Xref Hierarchy.
group the objects by their layer	select Layer for AEC Group Individual Objects by. Then, select No for Group by Xref Hierarchy.

For example illustrations, see Property Set Data Structure on page 184.

11 If you are creating a 2D DWF or 2D DWFx file, select a sorting option under AEC Group Individual objects by.

12 Click OK.

13 Click Publish.

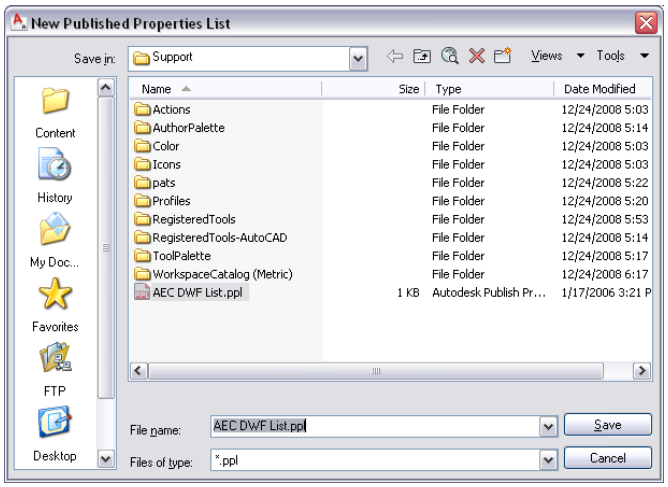
The publishing process is initiated and notifies you when it is finished.

Creating a New Published Property List (PPL)

Use this procedure to create a new, Published Property List (PPL). The Published Property List specifies which property set definitions in a DWG file will be exported to DWF or DWFx, provided the property set definition has been added to objects or styles in the drawing.

1 Click ➤ Publish ➤ AEC DWF Publishing Options.

2 Click New.



3 Browse for the folder in which you want to save the new PPL file, and enter a name for the new PPL file.

4 Click Save.

The new PPL file is opened in the AEC DWF Publishing Options dialog. By default it does not contain any property set definitions.

5 Click Add.

By default the currently active drawing and all property set definitions in it are displayed.

6 If you want to add property set definitions from another drawing, click Browse to navigate to the desired file.

7 Select all property set definitions that should be included in the new PPL either by selecting their check marks or by using the Select All button.

8 If the PPL is complete, click OK.

9 If you want to add more property set definitions to it, click Add again, and repeat step 6 - 7.

10 Click OK twice.

Publishing Drawings to PDF

The Adobe® Portable Document Format (PDF) facilitates exchanging drawing sets electronically. An electronic drawing set is the digital equivalent of a set of plotted drawings.

PDF files can be easily distributed for viewing and plotting using the free, downloadable Adobe® Acrobat software. You can send a published PDF file as an e-mail attachment, share it using a project collaboration site such as Autodesk® Buzzsaw®, or post it to a company website.

Like DWF files, PDF files are generated in a vector-based format conducive to maintaining precision. Drawings that are converted to PDF can be easily distributed for viewing and printing in Adobe Reader, versions 7 or later, available from the Adobe website.

Unlike DWF or DGN files, multi-page PDF files are attached one page at a time (as opposed to one sheet at a time for DWF files or one model at a time for DGN files). Also, hypertext links from PDF files are converted to straight text, and digital signatures are not supported. For information about publishing a PDF file, see Publish Drawings in the AutoCAD Help.

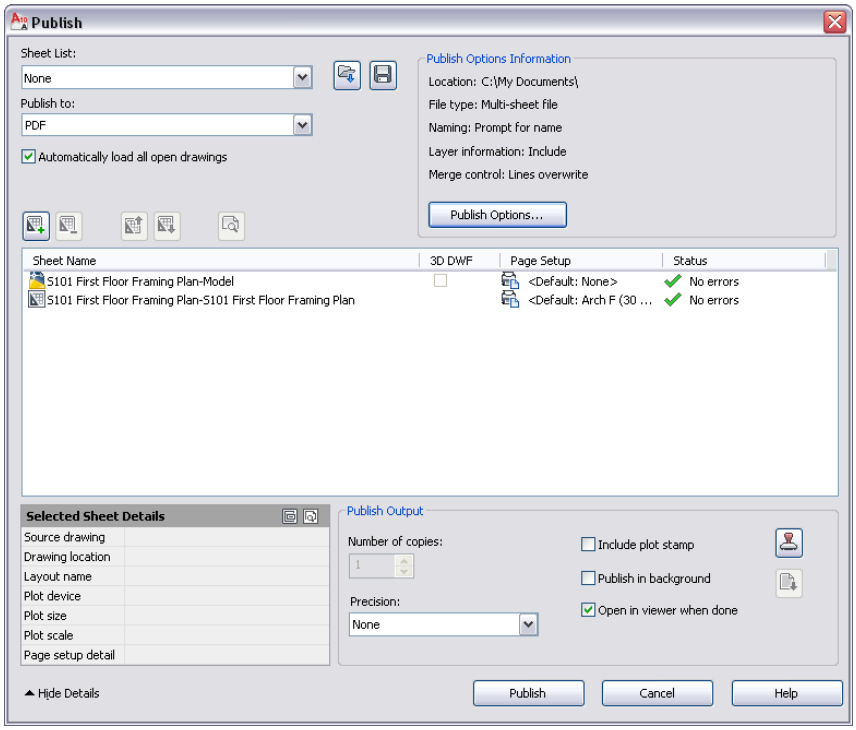
Publishing to PDF

You can specify that drawings are automatically published to PDF format (or DWF or DWFx) whenever they are saved or closed. The auto-publish settings also let you specify whether to include models, layouts, or both and whether to publish a multi-sheet or single-sheet file. (For more information, see Auto Publish Options Dialog Box in the AutoCAD Help.) The following topics explain how to publish or export to PDF on demand using settings you specify at the time.

Publish to PDF

Use this procedure to publish PDF files based on options you select.

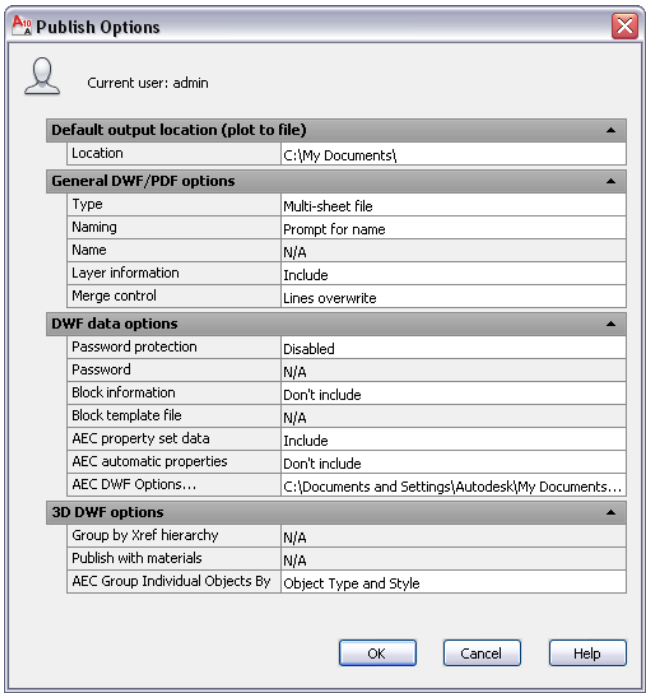
1 Click ➤ Publish.



2 For Publish to, in the Publish dialog, select PDF.

3 Specify other information for the PDF file as desired. For more information, see Publish Dialog Box in AutoCAD Help.

4 Click Publish Options if you want to change your settings, make the changes, and click OK.

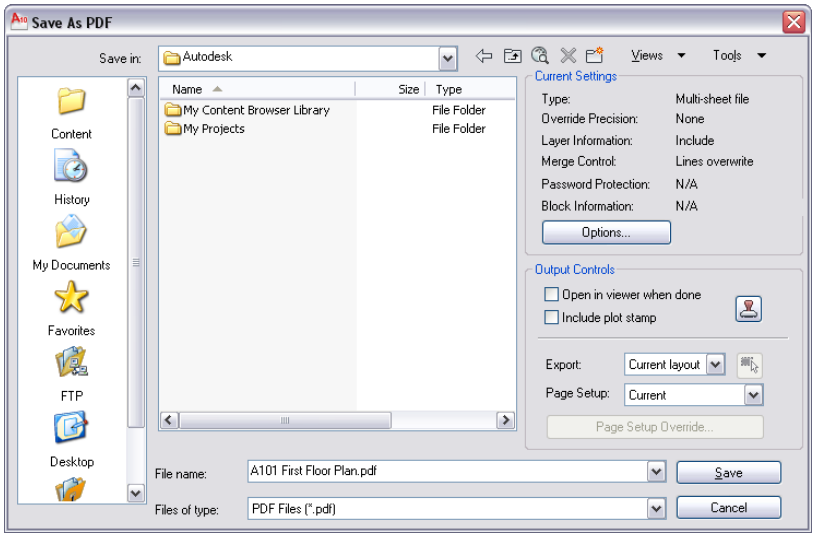


5 In the Publish dialog, click Publish.

Export to PDF

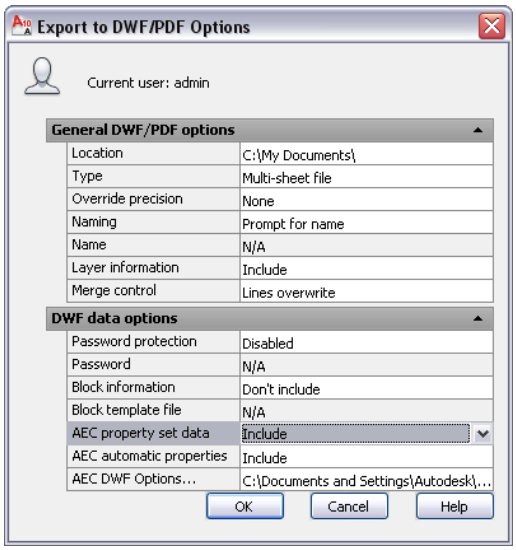
Use this procedure to create a PDF file.

6 Click ➤ Export ➤ PDF.



7 Specify information for the PDF file as desired. For more information, see Save as PDF Dialog Box in AutoCAD Help.

8 Click Options if you want to change your settings, make the changes, and click OK. For more information, see Export to DWF/PDF Options Palette in AutoCAD Help.



9 In the Save As PDF dialog, click Save.

Exporting Property Set Data to a PDF File

You can export both automatic and user-specified property set data to a PDF file.

Automatic Property Set Data

Each object in AutoCAD Architecture has a set of automatic properties attached to it. For example, every wall has width, length, and height properties. Automatic properties are a subgroup of property set data that can be attached to an object (or object style) with a property set definition.

If you automatically export all automatic properties of an object to a PDF file, you do not have to set up property set definitions for individual objects; but you cannot select which properties to export and which to ignore.

For information on how to export automatic property set data, see Publishing a PDF File with Automatic Property Set Data on page 196.

User-Defined Property Set Data

User-defined property set data is data from a property set definition that you have created and attached to an object or object style. Property set data can include automatic object properties, like height and width of a wall, but also manually defined data such as fire ratings or manufacturing information, project information, and more.

When publishing user-defined property set data, you specify which property set definitions to include and which to exclude. For example, some property sets in your drawing might contain information you want to keep confidential. In other cases, the recipient of a published file might need only specific property set information about one aspect of the drawing, and does not want to search for that information among a large amount of unrelated information.

When publishing user-defined property set data, you must attach property set definitions to the objects in your drawing, and select a PPL (Published Properties List) file that contains these property sets. For example,

you attach the property set definition DoorObjects to a number of doors in your drawing. Then, you add the DoorObjects property set definition to your PPL file. When you publish the drawing to PDF, the property set data from these doors is published. In the same PPL file, you add the WindowObjects property set definition. However, you do not attach the WindowObjects property set definition to any windows in your drawing. When you publish the drawing to PDF, no property set data from the WindowObjects property set definition is published.

To publish user-defined property set data to a PDF file, you need to perform the following high-level steps:

1. Create property set definitions for objects and apply them to an object or an object style.
   For more information, see Property Set Definitions on page 2510.
2. Specify in the PPL file (Published Properties List) which property set definitions from your drawing should be exported.
   For more information, see Creating a New Published Property List (PPL) on page 192.
3. Publish the drawing to PDF, as described in Publishing to PDF on page 193.

Publishing Property Set Data from External References

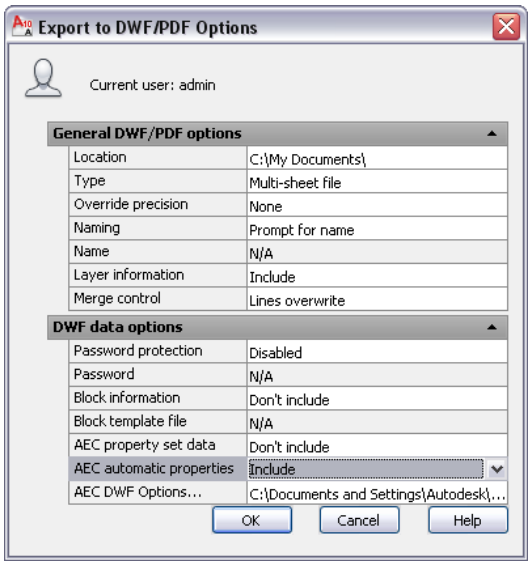
Property set data works across external references, and you can publish data from an external reference to a PDF file. To make sure that data from the external reference is published correctly, make sure that the following conditions are met:

- The data structure of property sets coming from an external reference must be identical to the structure of any corresponding property sets in the host drawing. For example, if an external reference has a property set definition called Doors that reports Height, Width, and Door Number, the host drawing cannot have a property set definition called Doors that reports Fire Rating, Leaf Width, and Glass thickness. For more information, see Property Set Data Structure on page 184.
- The same property data format must be applied to property set definitions from external references and corresponding property set definitions in the host drawing. For example, if an external reference property set definition called Doors specifies architectural units with 1/4 inch precision, the host drawing cannot have a property set definition called Doors that specifies architectural units with 1/16 inch precision. If the property data formats differ, the format of the host drawing is used for the external reference.

Publishing a PDF File with Automatic Property Set Data

Use this procedure to include automatic property data in your PDF. If you want to publish sheets from a project, see Publishing Sheet Sets on page 340.

1. Do either of the following:
   - Click Export ➤ DWF/PDF Options.
   - Enter **exportsettings** and select Options on the command line.
2. In the Export to DWF/PDF Options dialog, under DWF data options for AEC automatic properties, select Include, and click OK.



All automatic properties associated with the objects you have selected for exporting are published to the PDF file. For more information, see Export to DWF/PDF Options Palette in AutoCAD Help.

By default, the automatic property data exported will be listed under a property group called Aec+<object type>. For example, if you export the automatic properties of a door, they will be listed under AecDoor. If you are exporting additional user-defined property set definitions and one of them already uses the name Aec+<object type>, the automatic properties will be listed in a property group called Aec+<object type> (2). In the door example that would mean that if you are exporting a user-defined property set definition named AecDoor, then the automatic door properties will be listed under AecDoor (2).

If an object property is both an automatic property and is also included in a property set definition, it will be listed both under the automatic properties and under the property set definition it is part of in the PDF file.

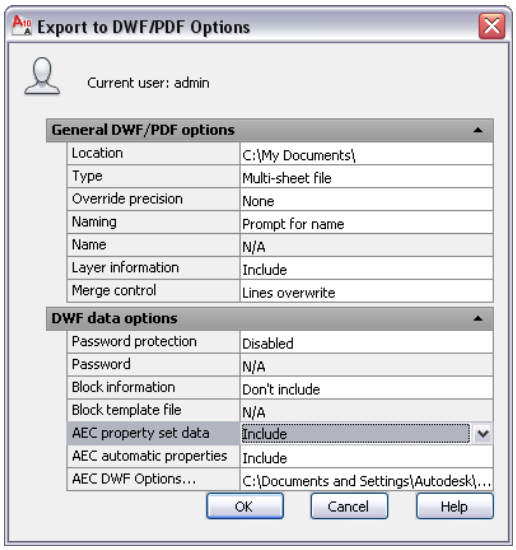
Publishing a PDF with All Property Set Data

Use this procedure to include automatic and user-defined property set data in your PDF. If you want to publish sheets from a project, see Publishing Sheet Sets on page 340.

1 Do either of the following:

- Click port ➤ DWF/PDF Options.
- Enter **exportsettings** and select Options on the command line.

2 In the Export to DWF/PDF Options dialog, under DWF data options for AEC property set data, select Include, and click OK. For more information, see Export to DWF/PDF Options Palette in AutoCAD Help.


Export to DWF/PDF Options
Current user: admin
General DWF/PDF options
Location
C:\My Documents\
Type
Multi-sheet file
Override precision
None
Naming
Prompt for name
Name
N/A
Layer information
Include
Merge control
Lines overwrite
DWF data options
Password protection
Disabled
Password
N/A
Block information
Don't include
Block template file
N/A
AEC property set data
Include
AEC automatic properties
Include
AEC DWF Options...
C:\Documents and Settings\Autodesk\...
OK
Cancel
Help

Drawing Management

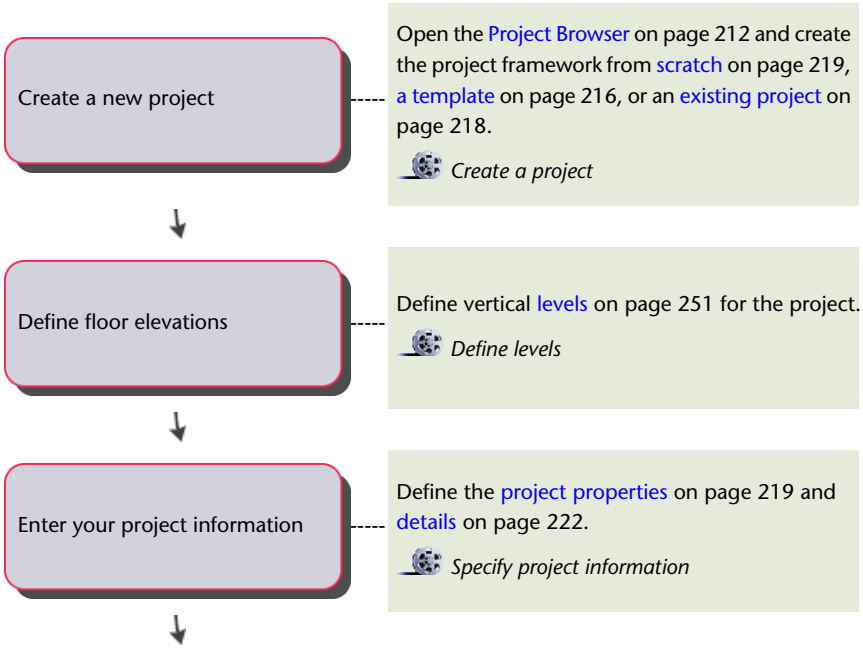
6

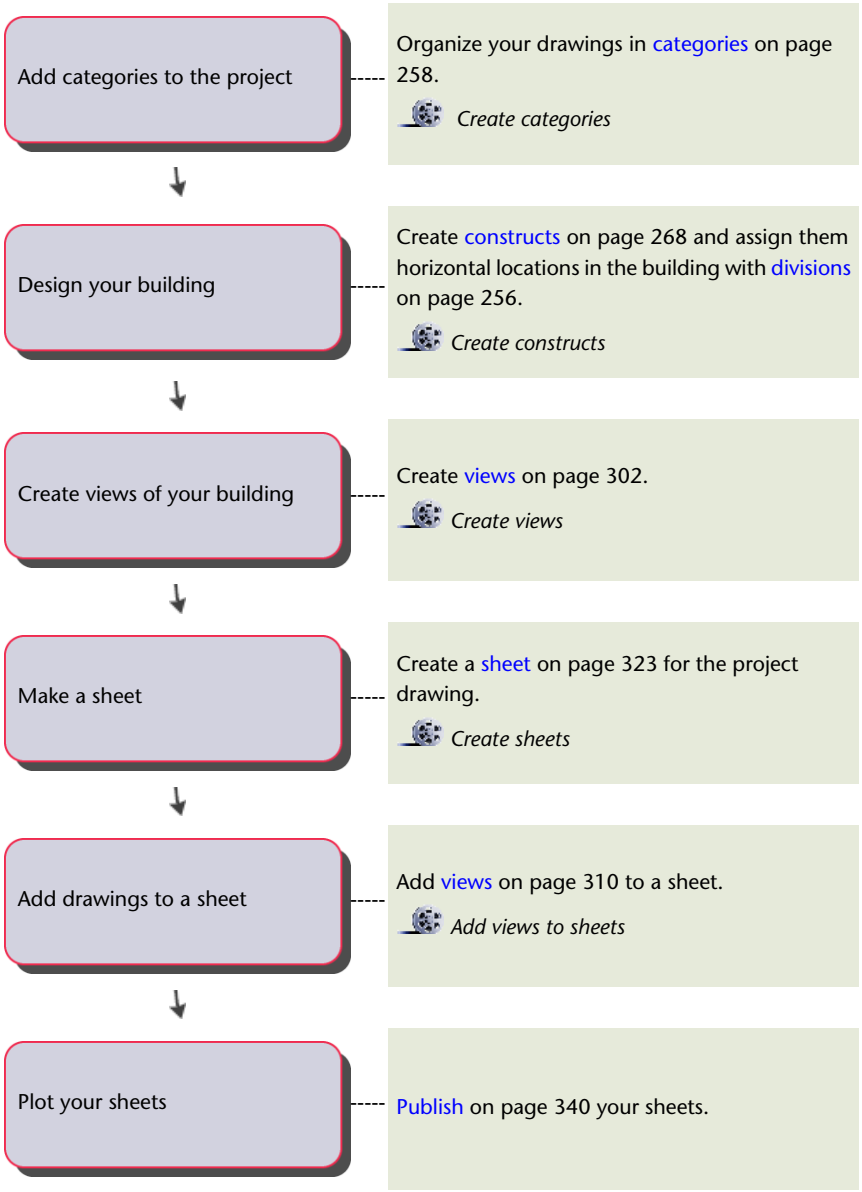
The Drawing Management feature formalizes and automates the processes relating to building model design and documentation. The feature provides automated tools that aid you in the management, viewing, and construction of your building.

When you manage your project files with this feature, you have consistency throughout all aspects of the project. Everyone on your design team has a centralized project environment for accessing the most current documents, from project templates to sections and elevations.

Workflow for a Project Environment

Creating a set of construction documents with the Drawing Management feature in AutoCAD Architecture is more efficient than creating standalone drawings and compiling them afterwards.





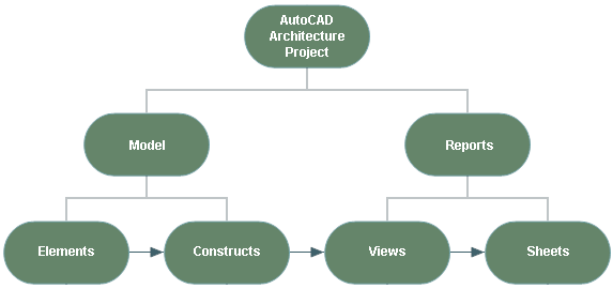
Concepts of Drawing Management

The Drawing Management feature of AutoCAD Architecture lets you create large building projects distributed among many drawing files. The following sections describe the key concepts of this feature.

Project

At the highest level, building models are organized conceptually into projects. A project is composed of 2 parts: the building model and the reports generated from the model. The building model is composed of

constructs and elements, while reports consist of views and sheets. Within a project, constructs are referenced into views, and views are referenced into sheets.



Constructs

A construct describes one unique portion of a building and is assigned to a specific level and division within the project. Spanning constructs, like curtain walls, can be assigned to multiple levels and divisions.

For example, the first level of your building project may consist of an exterior shell construct, a first-level core construct, and a first-level interior partitions construct.

A construct can contain drawing objects like walls and doors, external references to elements, or a combination of both. For example, a first-level core construct can contain the core walls directly drawn into the construct and an elevator element inserted as an external reference.

You can create and modify constructs within the current project. You can also import drawings and convert them or add them to constructs. You can import constructs into the project physically or by creating a link.

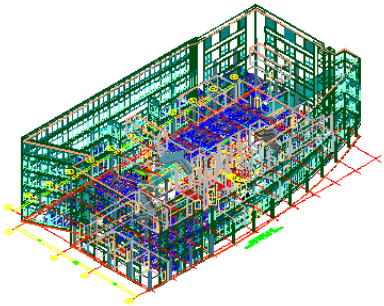
Constructs are referenced into views. For more information, see Constructs on page 265.

Views

After the structure of the building is defined, and constructs are assigned to levels and divisions, you can generate reports (views and sheets) from the building model. A view automatically references a number of constructs to present a specific view of the building project. To create a view drawing, you first decide what portion of the building you wish to look at and the type of view to generate. You could, for example, create a first-floor reflected ceiling plan or a second-floor framing plan.

You could also create a composite view of all floors in the building as shown:

3D view of entire building view



View drawings automatically reference the appropriate constructs according to their location within the building. For example, to create a floor plan of the west wing of the second floor, you would create a view that references all constructs assigned to the second floor and the west wing. This would also include a curtain wall spanning the first through fifth floors. You can reference additional constructs that you want to see in the view even though they do not lie on that floor, such as a building outline.

In a view drawing you can also add data like annotation, dimensions, and schedules. Whether to create the annotation in a view drawing or on a sheet is a decision you make based on your workflow and individual needs.

Three different types of view drawings, each with its own template and identified by a different icon, can be used as organizational tools.

- General view drawing
- Detail view drawing
- Section/Elevation view drawing

Views are referenced into sheets. For more information on the view system in AutoCAD Architecture, see Views on page 297.

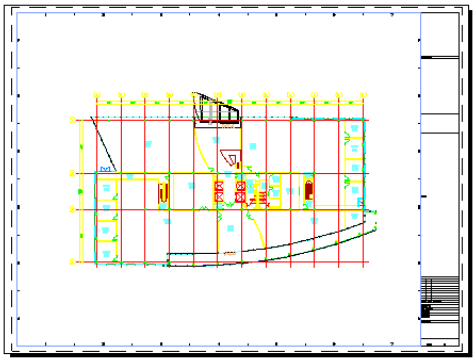
Sheets

Sheets are used to plot drawings of your building project.

The sheet system in AutoCAD Architecture consists of the following components:

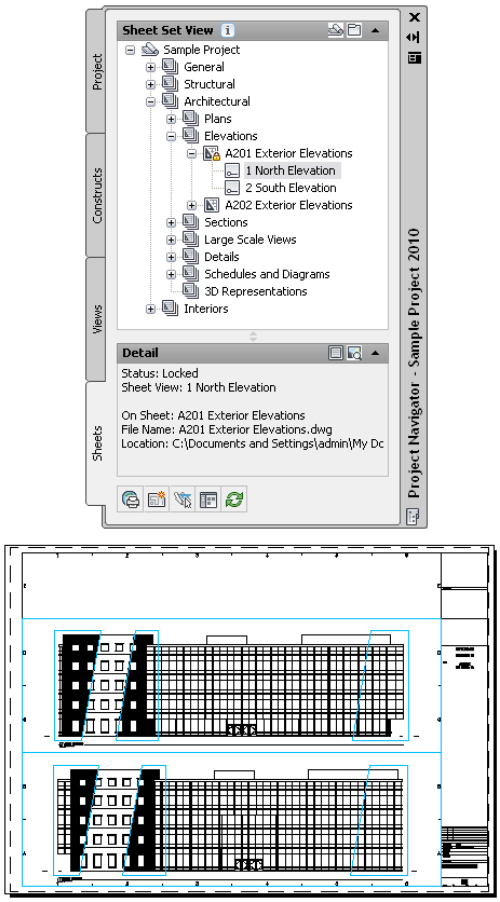
- Sheet: A sheet is a paper space layout that has been registered as a sheet. A sheet can contain one or more sheet views. For more information, see "Work with Model Space and Paper Space" in AutoCAD Help.

  Sheet with building plan sheet view



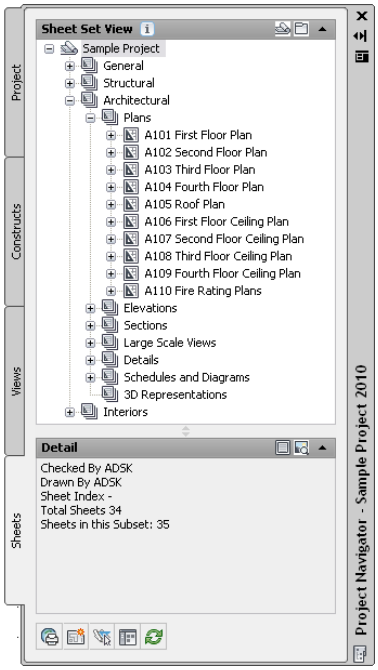
- Sheet views: A sheet view is a paper space viewport created by dragging a model space view from a view drawing in the Drawing Explorer onto a sheet.

Sheet view created from model space view



- Sheet set: A sheet set is a named and ordered collection of sheets. Sheet sets are similar to the physical set of bound sheets that are the primary communication medium for a typical building project. Sheet sets are tailored for efficient output of printed or electronic documents through the Publish command.

Sheet set for AutoCAD Architecture project



Each project in AutoCAD Architecture has a simple project sheet set, which contains all sheets for the project.

- Sheet drawing: A sheet drawing is a DWG file containing one or more sheets.

Sheet set, sheets, sheet views, sheet drawings, and model space views are listed on the Sheets and Views tabs of the Project Navigator.

Although it is recommended to place annotation in a view, you can add annotation like tags, dimensions, and schedule tables to a sheet. For more information, see Sheets on page 321.

Project Standards

There is a Project Standards feature in AutoCAD Architecture. Project standards provide a mechanism to establish, maintain, and synchronize styles and display settings across an AutoCAD Architecture project. Within a project, you can specify standard styles, display settings, and AutoCAD standards that are used across all project drawings. Standard styles and display settings are defined in standards drawings associated with the project. The project is synchronized with these standards throughout the project life cycle. For more information, see Project Standards on page 387.

Project Tool Palettes and Content Browser Library

In addition to standards drawings, you can also set up project-specific tool palettes and a Content Browser library for a project. A user-definable root path for tool content ensures that the tools always reference the correct content drawing for their definition.

External Reference Management

External references allow your source files to be distributed over many different locations on your computer or on a network. You can assign schedule tables, annotation tags, and dimensions to external references easily. Different people can work simultaneously on the same project.

You specify whether reference paths are full external or relative external paths.

For more information on external references, see “Reference Other Drawing Files (Xrefs)” in AutoCAD Help.

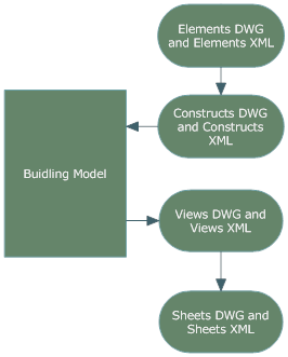
For more information on annotating external references in a project, see Workflow for Annotating a Project on page 352.

Mapped Drives

AutoCAD Architecture supports mapped drives within a project environment. You can map the same identifying drive letter on different servers with the same project structure. If you use mapped drives within an AutoCAD Architecture project, you are not prompted to repath each time you open the project drawing files from different servers. For more information, see Working with Design Teams Located Remotely on page 212.

XML Structure

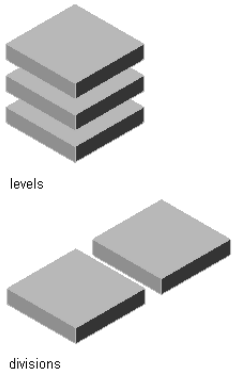
A AutoCAD Architecture project has an underlying XML structure. For each drawing file you create—for example, a floor drawing or a structural drawing—an accompanying XML file is created. The XML file contains project-relevant information, such as level and division information. You can reuse any drawing file created within a project outside the project as well, because the drawing file itself does not contain project-relevant information.



Levels and Divisions

The project provides a framework of levels (floors) and divisions (wings) that specify where in the building project constructs are located. By default, a new project consists of one level and one division. You can add levels and divisions throughout the lifetime of a project. The matrix of levels and divisions provide the framework to help uniquely identify the building components. For example, you could have a construct in your building assigned to First Floor—West Wing.

Levels and divisions schematic



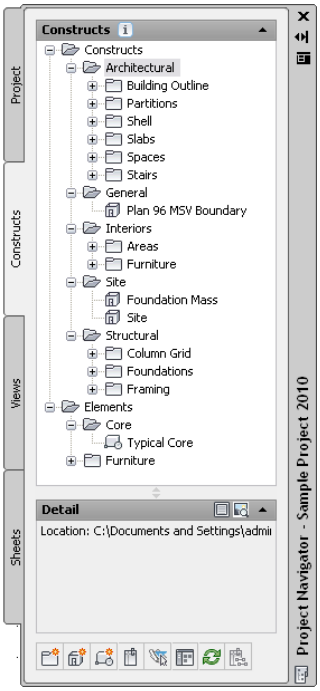
Building objects, such as curtain walls and elevator shafts, can span multiple levels and divisions. You can use a spanning construct for these types of building objects.

For more information, see Levels on page 250 and Divisions on page 256.

Categories

To help organize the building, components of the building project—constructs, views, and sheets—can be categorized. You can use categories like shell, core, and interior partitions. Categorizing a construct lets you filter that construct when generating views.

Construct categories in the Project Navigator



For more information, see Categories on page 258.

The Project Structure

When you create a new project, AutoCAD Architecture automatically creates a project environment to connect the individual files into one project. This environment has 3 main components:

The Project (APJ) File

The project (APJ) file contains:

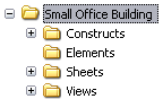
- the project name and number
- information about levels and divisions
- settings for drawing templates, project details, project standards, project palettes, and the method of linking xrefs

You also configure standards styles, display settings, and AutoCAD standards here. For more information, see Working with Project Properties on page 219. An existing APJ file can serve as the template for a new project. For more information, see Creating a New Project Based on a Template (Copying a Project) on page 216.

NOTE The APJ file is a well-formed XML document. You can open and modify it using an XML editor.

The Default Category Structure

When you create a new project, the following default category structure is created:



These categories are empty unless you created the new project from an existing project with drawing files.

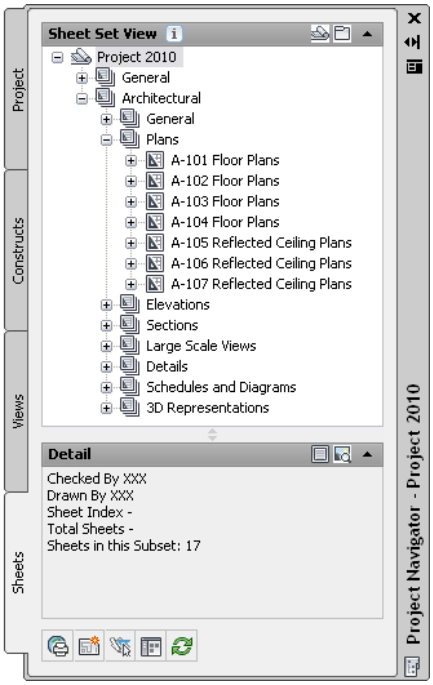
These top-level categories can be redirected to point to other folders. Each top folder must use a unique folder, and they cannot be an ascendant or descendant of each other in the tree structure. You can create subcategories in each of them. For more information, see Categories on page 258.

The Project Sheet Set

In AutoCAD Architecture, project sheets are collected in sheet sets or a project. A sheet set allows you to have common publishing setups across a number of sheets.

When you create a new project, a unique sheet set is created for this project. The project sheet set is displayed on the Sheets tab of the Project Navigator.

Project sheet set in AutoCAD Architecture Project Navigator



Only one sheet set can be associated with a project. You cannot change the sheet set for an existing project, but you can change its properties. For more information, see Setting the Properties of the Project Sheet Set on page 325.

Before You Begin: External References

The Drawing Management feature uses external references (xrefs) as a means to create a project and maintain it. Elements are referenced into constructs, constructs are referenced into views, and views are referenced into sheets. The mechanism of referencing is identical to the regular AutoCAD External References Management feature. However, the background methods employed have additional features.

Xrefs that are created in drawing management can automatically make use of project data, while those that are created manually through the xref palette or command line cannot. For example, a construct that is placed on a specific level will use that level's elevation data (as defined by the project) to control the Z-axis insertion point when being xrefed into a view.

If you are working in a project environment, the best practice for referencing project drawings into other project drawings is to use the Project Navigator rather than the standard AutoCAD Xref Manager. The AutoCAD Xref Manager cannot differentiate between project drawings and non-project drawings. If you reference a non-project file into a project file by mistake, you cannot use the full Drawing Management functionality on that file.

Whenever you define a project drawing on the Project Navigator, an accompanying XML file is created. The XML file is vital for the project. Under no circumstances should you delete it (unless you are deleting the entire project). That XML file contains:

- information about level and division assignments
- viewport and content information appropriate for the type of drawing

Keep these considerations in mind when working with a project:

- Do not delete any XML files generated by the Drawing Management feature. They are vital for the project.
- Use the Project Navigator to create, modify and reference project files within the project. If you want to use existing non-project files in a project, convert them to project files first. For more information, see Converting a Drawing to an Element on page 287 and Converting a Drawing to a Construct on page 271.
- Drawing Management supports the use of relative paths for external references. In the project setup, you can decide whether to use full paths or relative paths. Working with relative xref paths makes moving the project and transmitting it easier and reduces the need to repath the project. For more information on relative and full paths, see “Set Paths to Referenced Drawings” in AutoCAD Help.

NOTE Changing full xref paths to relative xref paths or relative paths to full paths in an existing project will change existing paths. An exception is if the xref path points to a location that is outside the project folders or is otherwise not supported by relative paths. For information on adding project location search paths, see Specifying the Default Project Options on page 210.

Before You Begin: Working in a Network Environment

When you are working on a large project, the project may be hosted on a network server and accessed by multiple users simultaneously. For a seamless workflow, keep these points in mind:

- **Keep the project tree current:** When multiple users are working on a project simultaneously, it is possible that one user’s view of the project will not reflect changes made by another user.
  For example, user 1 might be adding/moving/deleting constructs in a project at the same time that user 2 is annotating sheets. User 2 is not notified that the coworker has removed some constructs from the project. If user 2 tries to open a removed construct from the Project Navigator on his machine, an error message results.

  To prevent this situation, refresh the Project Navigator by clicking (Refresh Project) so that all items are updated to reflect the current project status. For more information, see Refreshing the Project Navigator on page 351.
- **Icons reflect the status of drawings:** A lock symbol is automatically appended to the drawing icon if the drawing is in use. When you hold the cursor over the drawing name, a tooltip displays information about the drawing file.

- **Access restrictions on the network server:** You can limit other users' ability to edit and delete project files by using network permissions. You can limit the Delete rights for the entire project, so that users cannot delete files from the project or move files around within the project. You might consider limiting Delete rights to the top project folder (containing the APJ file) while allowing deletions in the subfolders.
- **Mapped drives:** The Drawing Management feature supports working with mapped drives. You can place the project APJ file or project drawings on a mapped drive and mirror the server information for users in multiple locations. For more information, see Working with Design Teams Located Remotely on page 212.

Project Support Files

A project can be associated with multiple support files. Normally these files are used to provide standards that ensure consistency across the project, or across multiple projects. Some support files are mandatory, while others are optional.

NOTE You can find all project-related templates under *C:\ProgramData\Autodesk\ACA 2010\enu\Template*.

The following support files can be used in an AutoCAD Architecture project:

- Project template (optional)
- Drawing templates (mandatory)
- Sheet set template (mandatory)
- Project standards drawings (optional)
- Project tool palette group (optional)
- Project Content Browser library (optional)
- Project structure templates (optional)

These support files are described below.

Project Template

A project template is an existing project that can be used as a template when creating a new project. When you create a project based on a template project, all drawing files, settings, and support files of the new project are taken from the template project. Alternatively, you can use only the structure and the support files of a project as the basis for the new project. For more information, see Creating a New Project Based on a Template (Copying a Project) on page 216 and Creating a New Project with the Structure of an Existing Project on page 218.

Drawing Templates

When you create a new project, you can define default templates for new elements, constructs, and model views created in the project. For more information, see Creating and Saving Drawings on page 129. Sheet templates are defined in the project sheet set template.

The Project Sheet Set Template

Each project has a unique sheet set that collects and organizes the sheets in a project when the project is created. The sheet set is created from a template in which the user defines the sheet set structure, the default sheet template, and page setup overrides. When you create a project based on a template project, the sheet set of that project is used as a sheet set template. When you create a new project without using a template, the default sheet set template defined in Specifying the Default Project Options on page 210 is used.

You cannot change the sheet set template after creating a project. You can, however, change the properties of the sheet set in the project.

By default, following sheet set templates are shipped with the software:

- Aec Sheet Set (Imperial ctb).dst
- Aec Sheet Set (Imperial stb).dst
- Aec Sheet Set (Metric ctb).dst
- Aec Sheet Set (Metric stb).dst

Project Standards Drawings

You can define project-specific drawings that contain standard styles and display settings, as well as AutoCAD standards for a project. For more information, see Specifying Project Standards on page 224.

Project Tool Palette Group

You can define a tool palette group to be used in the project. If your project is not based on a template that includes a project-specific tool palette group, you can define one as described under Setting up Standard Tools in a Project on page 403.

Project Content Browser Library

You can define a project-specific Content Browser library that opens by default when you start Content Browser from within Project Navigator. The project library contains standard tools and palettes for the project. For more information, see Setting up Standard Tools in a Project on page 403.

Specifying the Default Project Options

Use this procedure to set the default options for your AutoCAD Architecture projects. The following options can be specified for projects:

- Location search paths
- Template files for constructs, elements, views and sheet sets
- Project bulletin board
- Project image

NOTE When you create a new project based on a template project, the default templates, bulletin board, and project image of the template project are used in the new project. If the new project is not based on a template project, the settings defined in the project defaults are used.

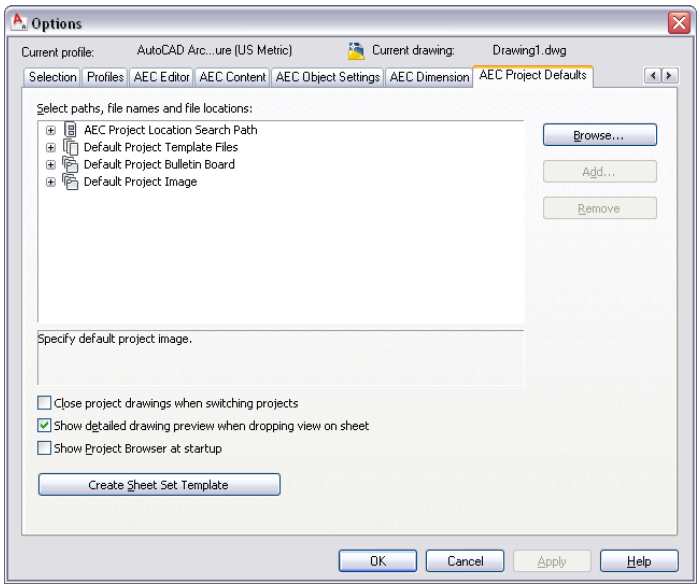
In addition, you can specify settings that affect your workspace when:

- Starting the application
- Switching between projects
- Dragging and dropping a view onto a sheet

To specify project defaults:

1 Click ➤ Options.

2 Click the AEC Project Defaults tab.



3 Expand AEC Project Location Search Path:

The paths also display in the Project Browser drop-down list (above the list of projects), providing shortcuts to folders containing projects.

If you want to…	Then…
change an existing project location search path	click the path you want to change, and click Browse. In the Browse for Folder dialog, select the new search path, and click OK.
add a search path	click Add. In the Browse for Folder dialog, select the additional search path, and click OK.
remove a search path	click Remove.

4 Expand Default Project Template Files.

5 To change any of the default templates, the bulletin board, or the image, expand the category, select the existing file, and click Browse. Then in the Select File dialog, select the new file, and click Open.

6 Specify how your workspace displays:

If you want to…	Then…
close all drawing files that are open in your current project when you change to a different project	select Close project drawings when switching projects. This setting is only in effect if the option of Always perform selected action in the Project Browser-Close Project Files dialog is also selected. For more information, see Closing All Project Files on page 231.
improve performance by displaying only the model space view name within the frame of the view when dropping it on a sheet	clear Show detailed drawing preview when dropping view on sheet.
specify that the Project Browser opens every time you open AutoCAD Architecture	select Show Project Browser at startup.

7 To create a new sheet set template, click Create Sheet Set Template, and see Creating a Sheet Set Template on page 341.

8 Click OK.

Working with Design Teams Located Remotely

The best practice for working with members of a remote team is to set up the structure for a project on a dedicated drive of a central network server. If you must mirror a server drive, communicate the location to remote teams so they can assign the same drive letter. When remote locations use the same mapped drive, the extended team can work on the project without being prompted to repath the project when it is set current.

If you want to specify mapped drives for an existing project, organize the full project on the specific drive first. Then use Project Browser to browse for the project using the mapped drive letter.

Opening a Project From a Mapped Drive

Use this procedure to open a project located on a mapped drive. You must already have the project structure defined on that drive.

1 On the Quick Access toolbar, click Project Browser .

2 In the Project Files dialog, browse to the mapped drive (indicated by letter) on which your project is located, and click Open.

3 To set this project current, select the APJ file, and click Open.

4 Click Close on the Project Browser.

The Project Browser

The Project Browser is where you perform high-level project-related tasks, such as creating a new project, selecting the currently active project, and setting project properties.

Opening the Project Browser

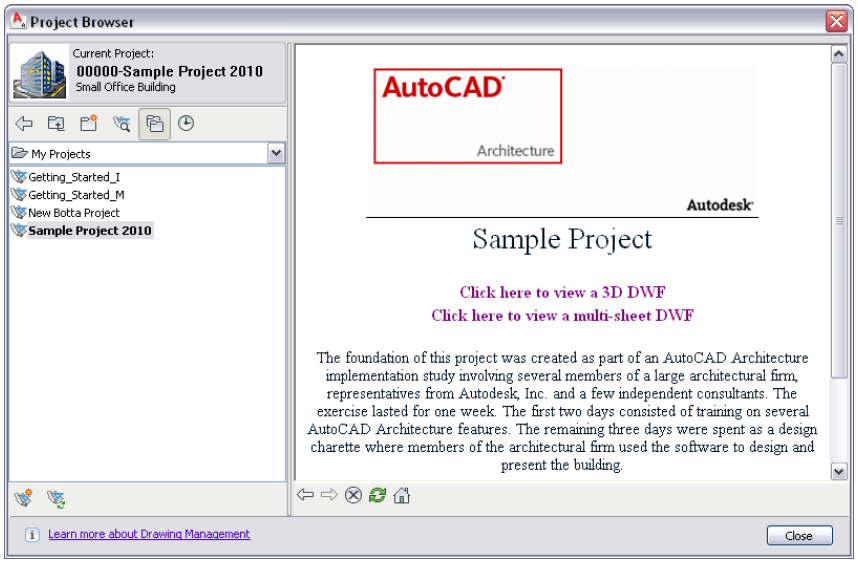
Use this procedure to open the Project Browser.

- Click ➤ Open ➤ Project.
- On the Quick Access toolbar, click Project Browser .
- On the command line, enter **AecProjectBrowser**.

Using the Project Browser

In the Project Browser, you create new projects, configure the project settings and project standards, add detail information, and select the current project. When you set a project current, either from the context menu or by double-clicking the file name, the project is migrated to a format compatible with the current version of AutoCAD Architecture. If you also repath the project, all project drawings are migrated as well,

and you will be unable to open the project in any older version of the software. For more information, see Repath the Project on page 350.



Project Browser

On the left side of the Project Browser, you select the current project, create new projects, browse existing projects, and view the project history. On the context menu, you can also edit project properties, close a project, copy the project structure, eTransmit a project, and archive a project. All information you enter here pertains to the project as a whole. On the right side of the Project Browser, an embedded Internet Explorer allows you to browse your project home page.

NOTE The projects you create in the Project Browser display as files and folders in Windows Explorer. As a general rule, you should not perform any file operations on a project file there, except in those cases where a procedure explicitly states that you should. Changes in Windows Explorer are not always updated correctly in the Project Browser or Project Navigator, and you could get an inconsistent view of your project data. Any changes you make to the project within the Project Browser are managed and coordinated by AutoCAD Architecture. Changes made outside the software might not be correctly coordinated and processed.

The Project Header

The currently selected project is displayed in the upper-left area of the Project Browser. The header contains the project name, project number, a user-selected bitmap representing the project, and an optional short project description. You enter this information when you create a new project or edit properties of an existing project.

Project header

The Project Navigation Bar

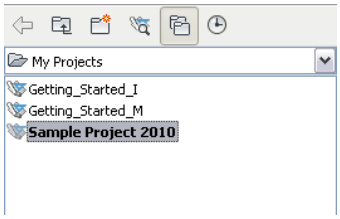
Below the project header, toolbar buttons help you to navigate in your folder structure.

Button	Description
	Returns you to the previously displayed folder.
	Displays the folder one level above the currently displayed folder.
	Takes you to the Project File Navigator, where you can browse for project (APJ) files.
	Lets you create a new folder in the specified location.
	Displays the projects in the folder selected in the list below. For detailed information, see The Project Selector on page 214.
	Displays a historic list of projects sorted by various criteria. For detailed information, see The Project Selector on page 214.

The Project Selector

The project selector on the left side of the Project Browser displays the projects you have created in AutoCAD Architecture.

Project selector



You have 2 main options for displaying projects:

Displaying Projects by Folder Structure

You can display the projects on your computer or network based on the Windows Explorer folder structure. When you navigate to a folder, all projects and subfolders contained in that folder are displayed.

1. On the Quick Access toolbar, click Project Browser .
2. In the project navigation bar, click .
   The project selector displays the folder structure of your computer. The contents of the currently selected folder are displayed in the project selector. Project files are displayed with the project icon . The current project is displayed in bold letters.
3. To switch to another folder, select it in the drop-down list.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

4 To navigate to the parent folder of the current folder, click .

Displaying Projects by History

In the project selector, you can display projects based on their history.

1 On the Quick Access toolbar, click Project Browser .

2 In the project navigation bar, click .

3 Select the option by which you want to sort projects.

- If you select Most Recently Used, the last eight projects you have made current are displayed in descending order in the project selector.
- If you select By Date, a list of project dates is displayed, sorted by current day, current week, and previous weeks.
- If you select By Project, a list of project names is displayed, sorted alphabetically.
- If you select By Location, a list of folders containing project files is displayed, in alphabetical order. If you double-click a folder, the projects contained in it are displayed.

Project files are displayed with the project icon . The current project is displayed in bold letters.

4 If you want to remove a project from the history, select the project, right-click, and click Remove from History List. Click Yes in the subsequent message box.

NOTE You cannot remove the current project from the history list.

5 If you want to remove the complete history list except for the current project, select a project, right-click, and click Reset History list. Click Yes in the subsequent message box.

The Embedded Internet Explorer View

A project can connect to a bulletin board HTML page. You could do this, for example, to provide a link to your company's home page or a project web site. The HTML page is displayed in the right pane of the Project Browser. At the bottom of the page, there is a standard Internet Explorer navigation bar with buttons for Back, Forward, Stop, Refresh and Project Home.

Setting a Project Current

Use this procedure to set a project to be the current project.

To work within the project environment, you must define the current project. Only one project can be current at a time, and all project operations you perform, such as adding constructs and elements or changing levels and divisions, are done within the current project.

When you select a project as the current one, its project header and default HTML bulletin board are displayed in the Project Browser, and the name appears on the Project Navigator palette.

NOTE If your Project Browser does not yet contain any projects, see Creating a New Project on page 216.

1. On the Quick Access toolbar, click Project Browser .
2. In the project selector, select a project.

   Projects are displayed with a project icon .
3. Right-click, and click Set Project Current.

   NOTE Alternatively, you can double-click the project.

   The selected project is loaded in AutoCAD Architecture, and you can work with it until you close it or select another one.
4. In the Project Browser, click Close to begin working on the Project Navigator palette.

If you working on the same project in more than one session of the same version of AutoCAD Architecture, and you make changes in one session, you can automatically refresh the project in the other session(s) by opening the Project Browser there.

Creating a New Project

There are 3 options for creating a new project. You can copy an existing project and all its settings; you can create a project with the folder structure and support files of an existing project; or you can create a new project from scratch, with no predefined files and settings.

Creating a New Project Based on a Template (Copying a Project)

Use this procedure to create a project using an existing project as a template.

This is the quickest and easiest way to create a project with predefined settings and support files. When you use this method, the following files and structures are copied to the new project:

- All project DWG files and XML files
- Project standards files
- AutoCAD standards files
- Project standards synchronization settings
- Sheet set template
- Project details
- Drawing templates
- Keynote and detail component databases
- Project tool palette group
- Tool content root path
- Project Content Browser library

NOTE Project standards files, the project tool palette group, and the project Content Browser library are copied to the new project only if they are located within the original project folder. Standard components located outside the project folder will be referenced by the new project, but not copied to it.

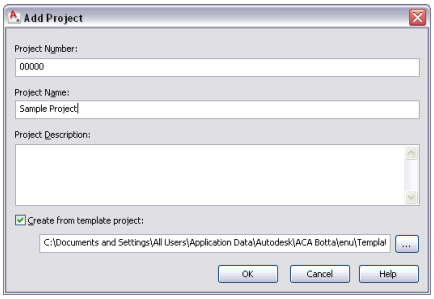
Creating a new project based on a template will copy all files that are in the project folder. If you want only the support files and structure of the project to be copied, but not its drawing files, see Creating a New Project with the Structure of an Existing Project on page 218.

If you redirected a project folder (elements, constructs, views, or sheets) to a folder that is not beneath the root project folder (location of the APJ file), the project cannot be used as a template project. For more information, see Specifying the Location of Top-Level Categories on page 262.

1 On the Quick Access toolbar, click Project Browser .

2 Right-click on an existing project or folder in the project selector, and click New Project.

Alternatively, you can click in the toolbar below the project selector.



3 In the Add Project dialog, enter a number for the new project.

Each project needs a unique identification number. You can use numerals, alphabetic characters, or a combination, such as 100A. The project number appears in the project header.

The number you assign here can be used as a prefix for all drawings you create in the project. You can also use the number as a property for a title block. For more information, see Project Schedule Properties on page 356.

4 Enter a name for the new project.

5 Under Project Description, if desired, enter a description brief enough to be displayed in the project header.

Details about the project can be entered on a separate worksheet. For information, see Adding Detailed Information to Project Properties on page 222.

6 Select Create from template project.

7 Enter the path and name of an existing APJ file, or click to navigate to an APJ file.

8 Click OK.

NOTE You cannot specify all support files and paths directly when creating a new project; you can only define name, number, description, and project template. The remaining settings can only be defined after the project has been created. If you create the project based on a template, the settings of the template are used for the initial setting. To define the project settings, see Working with Project Properties on page 219.

Creating a New Project with the Structure of an Existing Project

Use this procedure to create a new project that is based on the structure and support files of an existing project. However, if you redirected any categories in the project on which you want to base your new project, it cannot be used as a template. For more information, see Specifying the Location of Top-Level Categories on page 262.

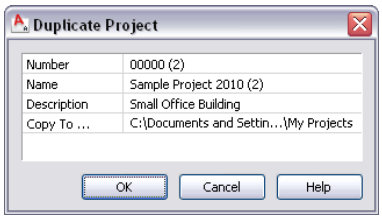
When you use this method, the following files and settings are copied to the new project:

- Project standards files
- AutoCAD standards files
- Project standards synchronization settings
- Sheet set template
- Project details
- Drawing templates
- Keynote and detail component databases
- Project tool palette group
- Tool content root path
- Project Content Browser library

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, locate the folder in which the project of which you want to copy the structure and support files is located.

3 Select the project, right-click, and click Copy Project Structure.



4 In the Duplicate Project dialog, enter a number for the new project.

Each project needs a unique identification number. You can use numerals, alphabetic characters, or a combination, such as 100A. The project number appears in the project header.

The number you assign here can be used as a prefix for all drawings you create in the project. You can also use the number as a property for a title block. For more information, see Project Schedule Properties on page 356.

5 Enter a name for the new project.

6 Under Description, if desired, enter a description brief enough to be displayed in the project header.

Details about the project can be entered on a separate worksheet. For information, see Adding Detailed Information to Project Properties on page 222.

7 Under Copy to, select a folder in which you want to save the copied project.

8 Click OK.

Creating a New Project Without Using a Template

Use this procedure to create a new project that is not based on a template but uses the drawing templates, sheet set template, and project bulletin board specified in the AEC Project Defaults, as described in program default options on page 210. Note that you still need to define project details and project standards.

1 On the Quick Access toolbar, click Project Browser .

2 Right-click on an existing project or folder in the project selector, and click New Project.

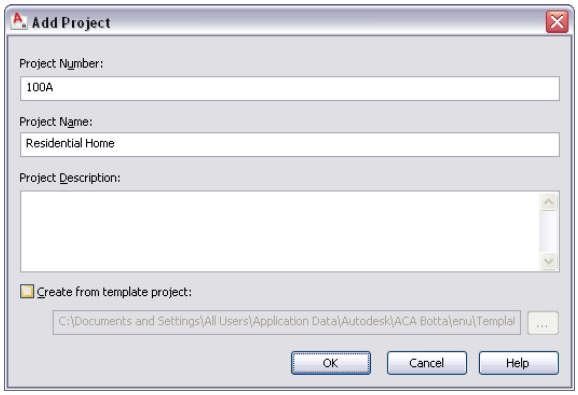
Alternatively, you can click in the toolbar below the project selector.

3 In the Add Project dialog, enter a number for the new project.

Each project needs a unique identification number. You can use numerals, alphabetic characters, or a combination, such as 100A. The project number appears in the project header.

The number you assign here can be used as a prefix for all drawings you create in the project. You can also use the number as a property for a title block. For more information, see Project Schedule Properties on page 356.

4 Enter a name for the new project.



5 Under Project Description, if desired, enter a description brief enough to be displayed in the project header.

Details about the project can be entered on a separate worksheet. For information, see Adding Detailed Information to Project Properties on page 222.

6 Verify that Create from template project is not selected.

7 Click OK.

NOTE You cannot specify all support files and paths directly when creating a new project; you can only define name, number, description, and project template. The remaining properties are defined after the project has been created. If you create the project based on a template, the properties of the template are used for the initial setting. If you create a project without using a template, the properties will initially be empty or are defined by the AEC default project options. To define the project properties, see Working with Project Properties on page 219.

Working with Project Properties

When you have created a new project, the following properties may be defined or can be changed:

- Project bulletin board

- Project image
- Relative or full paths for external references
- Synchronization of view drawing layer settings with sheet views
- Project tool palette file location
- Project tool palette storage type
- Project tool content root path
- Project Content Browser library
- Drawing templates for elements, constructs and views
- Project details
- Project detail component databases and keynote databases
- Project standards settings

When you have created a project based on a template project, these settings are initially taken from that project. You can change them, if necessary.

NOTE The project sheet set template is defined during the creation of the project; either it is the sheet set used in the template project, or, if you have chosen to create a new project without using a template, it is the default project sheet set template defined in Specifying the Default Project Options on page 210.

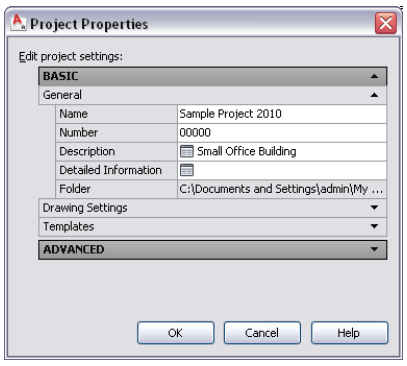
Specifying Basic Project Properties

Use this procedure to define or change basic properties for a project. Basic properties are divided into 3 categories:

- General
- Drawing Settings
- Templates

1. On the Quick Access toolbar, click Project Browser .
2. In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

   The Project Properties dialog is displayed.



3 Under General define or change the following properties as needed.

Property	Description
Name	The project name is defined when you create the project. If you change the name here, only the name displayed in Project Browser and Project Navigator is changed; the APJ file and the project folder in Windows Explorer retain the original name. The recommended procedure for renaming project is described in Renaming a Project on page 230.
Number	The project number is defined when you create the project. You can enter a new number here. **NOTE** Under Drawing Settings, you can specify that the project number is added as a prefix to each project drawing created in the project. If you change the project number during the project life cycle, the existing file names will be changed and repathed.
Description	To add a description or change the current one, click , enter the desired text, and click OK.
Detailed Information	To attach user-defined information to a project, such as project data and site description, click . For more information see, Adding Detailed Information to Project Properties on page 222.
Folder	This path is read only and identifies where the project is located.

4 Under Basic, expand Drawing Settings, and define or change the following properties as needed:

Property	Description
Use Relative Xref Paths	Select Yes to have external references within the project attached using relative paths whenever possible. This makes it easier to move or electronically transmit a project. After the progress bar indicates the project files have been renamed, you are given the option to repath the project now or repath the project later. Changing full xref paths to relative xref paths or relative paths to full paths for existing xref paths will change existing paths accordingly. An exception to this behavior is if the xref path points to a location outside the project folders or otherwise not supported by relative paths.
Match Sheet View Layers to View	Select Yes to use the view drawing layer settings in any sheet views generated from the view drawing or one of its model space views. The settings are updated in the sheet view when they change in the view drawing. For more information, see Synchronizing View Drawing Layers with Sheet View Layers on page 317.

Property	Description
Prefix Filenames with Project Number	Select Yes to have the project number prefixed to the file names of drawing files created within this project. If you select No, no prefix is added to drawing files created within this project. **NOTE** When you add or change the prefix setting in an existing project, extended file names are changed and repathed. Filename prefixes do not display in the Drawing Explorer.

5 Under Basic, expand Templates, and define or change the following properties as needed:

Property	Description
Use Common Model/View Templates	Specify whether you want to base your elements, constructs, and view drawings on a single common template or define separate DWT files as templates for each drawing type. For an overview of the drawing types, see Concepts of Drawing Management on page 200. If the value of Use Common Model/View Templates is Yes, the Common Model/View Template property specifies the location of the common template for elements constructs, and view drawings. To change this value, click , select a different drawing template, and click Open.
Element Template Construct Template General View Template Section/Elevation View Templates Detail View Template	If the value of Use Common Model/View Templates is No, these properties specify the location of the default template file. To change any of these values, click , select a different drawing template, and click Open.
Sheet Template	Specifies the location of the default template file for creating new sheets. To change this value, click , select a different drawing template, and click Open. If the sheet set is locked for the project, this property is read only.

6 Click OK to return to the Project Browser.

Adding Detailed Information to Project Properties

Use this procedure to add detail information to a project.

Project details are user-defined information items that can be attached to a project. Details might include contact information about contractors, legal representatives, or others. You can also use project details to track changes and improvements to the project.

You can create detail categories such as Financial Data which might contain detail items such as Loan Amount or Grant Amount. The details worksheet lets you create an information model that meets your needs.

If you create a project based on a project template, you can use the project detail categories and items from an existing project, For more information, see Creating a New Project on page 216. If you create a new project without a template, no project details exist.

NOTE Detailed information is saved in the project APJ file in XML format. You can open the project APJ file in an XML editor in order to edit the detail information.

Project details are not only used in the project APJ file, but are also displayed as manual properties in the schedule data of a project. You can use the details to create schedule tables for your project or build title blocks for sheets. For more information, see Project Schedule Properties on page 356.

1 On the Quick Access toolbar, click Project Browser .

2 Select the project to which you want to add details, right-click, and click Project Properties.

3 If necessary, expand Basic ➤ General and for Detailed Information click .

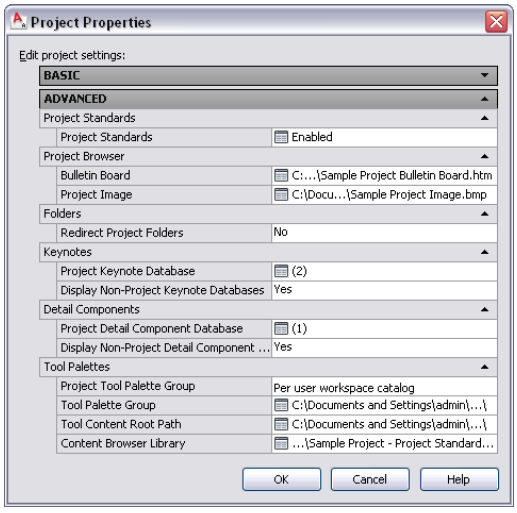
4 Add or modify project details as needed:

If you want to…	Then…
add or edit the value of the detail item	enter the information in the right column of the appropriate detail row.
add a detail category	click , enter a name for the new detail category, and click OK.
add a detail item within a detail category	select the category, click , enter a name for the new detail, and press *ENTER*.
remove a detail item	select the detail item, and click .
remove a detail category	first delete all detail items in the detail category; then select the category, and click .

5 When you are finished editing, click OK twice.

Advanced Project Properties

You can define or modify advanced project properties such as standards, images, keynotes, detail components, and tool palettes.



Specifying Project Standards

Use this procedure to configure project standards. The Project Standards feature is disabled by default and lets you establish, maintain and synchronize standards across all drawings in an AutoCAD Architecture project. Project standards include standard styles, display settings, and AutoCAD standards that are used across all project drawings. Standard styles and display settings are specified in one or more standards drawings associated with the project. Project drawings can then be synchronized with these standards throughout the project life cycle, either automatically, or on demand.

The AutoCAD Architecture Project Standards feature integrates the AutoCAD Standards checker, allowing you to set up one or more DWS files for AutoCAD components. AutoCAD components that can be included in a standards check are:

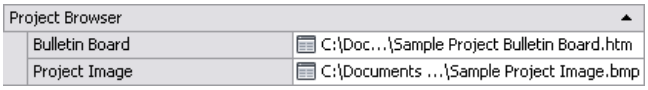
- AutoCAD dimension styles
- AutoCAD layers
- Text styles
- Linetypes

In the Configure AEC Project Standards dialog, you define which drawings to use as the source for standard styles and display settings, which drawings to use as the source for AutoCAD layers, dimension styles, text styles, and layers, and how to synchronize the standards in the project. For detailed information about configuring project standards, see Project Standards on page 387.

Specifying Project Browser and Bulletin Board Images

Use this procedure to specify a BMP image for the project header and an HTML file for the project bulletin board. You can specify that the HTML file points to your company home page or a project web site. The current project header and default HTML bulletin board display in the Project Browser.

1. On the Quick Access toolbar, click Project Browser .
2. In the project selector, select the project for which to define the settings, right-click, and click Project Properties.
3. Under Advanced, define or change the Project Browser project properties as needed.



4. For Bulletin Board, click , select the HTML page to display in the Project Browser, and click Open.

   The page selected is displayed in the right side of the Project Browser in an embedded Internet Explorer.

5. For Project Image, click , select the bitmap file to display in the project header, and click Open.

   TIP Due to the relatively small size of the header (64x64 pixels), a simple image with clear contrasts creates the best effect.

6. Click OK to return to the Project Browser.

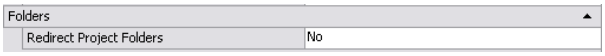
Specifying Locations for the Project Folders

Use this procedure to change the location of the project folders. Ideally, the project folders will not be redirected and will be located under your project folder as Elements, Constructs, Views, and Sheets. If you change the location of the project folders, you will need to repath. For more information, see Specifying the Location of Top-Level Categories on page 262.

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

3 Under Advanced, define or change the Folders project properties as needed.



Property	Description
Redirect Project Folders	Specify whether you want to redirect your elements, constructs, views, and sheets folders to a different location. If the value of Redirect Project Folders is No, the default folder location for the project is used. For more information, see Specifying the Default Project Options on page 210.
Elements Folder Constructs Folder Views Folder Sheets Folder	If the value of Redirect Project Folders is Yes, these properties specify the location of the project folders. To change any of these values, click the value, click Browse, select a different folder location, and click OK.

4 Click OK to return to the Project Browser.

NOTE Folders must be unique and not ancestors or descendants of the project folder.

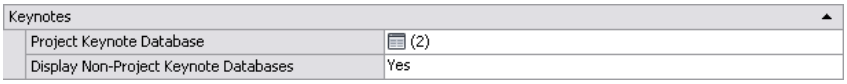
Specifying the Keynote Databases for a Project

To ensure the compliance with a specific keynoting standard, for example the CSI standard, you can use the following procedure to specify the relevant keynote databases for a project. For more information, see Annotation and Keynoting Tools on page 2353.

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

3 Under Advanced, define or change the Keynotes project properties as needed.



4 For Project Keynote Database, click . (The number of databases associated with the current project is noted.)

5 In the Add/Remove Keynote Databases dialog, click Add to add a keynote database to the project.

6 To remove a database from the list of databases available in the project, select the database, and click Remove.

7 Click OK.

8 For Display Non-Project Keynote Databases, specify whether all keynote databases included on the AEC Content tab in the Options dialog display in addition to keynote databases specified for the project.

9 Click OK to return to the Project Browser.

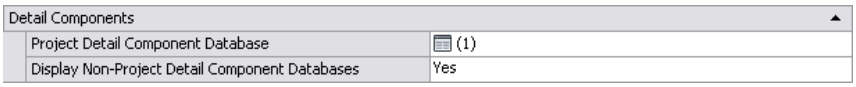
Specifying the Project Detail Component Databases for a Project

Use this procedure to specify the relevant detail component databases for the project. For more information, see Detail Components on page 2313.

1 On the Quick Access toolbar, click Project Browser .

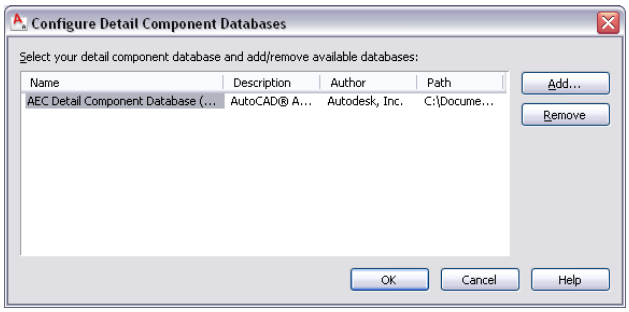
2 In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

3 Under Advanced, define or change the Detail Components project properties as needed.



4 For Project Detail Component Database, click . (The number of databases associated with the current project is noted.)

5 In the Configure Detail Component Databases dialog, click Add to add a detail component database to the project.



NOTE Only correctly structured detail component databases can be added here; if you try to add a database with a different structure, you receive an error message.

6 To remove a database from the list of databases available in the project, select the database and click Remove.

7 Click OK.

8 For Display Non-Project Detail Component Databases, specify whether all detail component databases included on the AEC Content tab in the Options dialog display in addition to detail component databases specified for the project.

9 Click OK to return to the Project Browser.

Adding a Project Content Browser Library and Tool Palette Group

You can define a project tool palette group and specify a Content Browser library to be associated with the project. Then, each time the Content Browser opens from the Project Navigator palette, the project library is displayed.

Project Tool Palette Group

Each project may have a specific tool palette group (ATC files) associated with it. Depending on how you created the project, the tool palette group can be created and displayed in different ways.

For a new project, the project tool palette group is empty by default, unless the project settings point to an existing palette group.

Tool Content Root Path

Setting a tool content root path can help you keep your tools consistent if the project or the standards drawings are moved during the project life cycle.

When tools on the project tool palettes point to the tool content root path specified in the project settings, the content root path is created as a variable (%AECPROJECT_DIR%) in the XML definition of the tool. When the tool content root path in the project settings is changed, the path of the tools is changed accordingly.

For example, if all project tools point to content stored under *<Project Root Folder>\Standards\Content\Content 1*, you can move the content to *<Project Root Folder>\Standards\Content\Content 2*, adjust the tool content root path in the project setup accordingly, and all tools will now point correctly to *<Project Root Folder>\Standards\Content\Content 2*.

Another example is if a user creates an eTransmit package of the project and its tool content files in order to work offline. When the eTransmit package is unpacked on the local computer, the tool content root path can be redirected to a different drive, and all content remains valid.

Later, when the drawings the user modified offline are copied back to the main project on the P server, the content root path will automatically change back to *P:\ <Project Root Folder>\Standards\Content\Content*, because this is the path of the original APJ file.

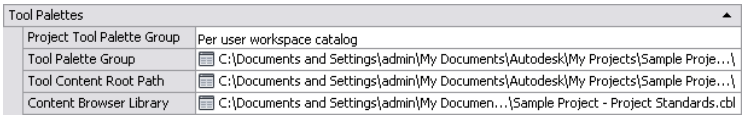
Project Content Browser Library

For a large project, the CAD manager may want to set up a Content Browser library on a shared network volume, so that all project users have quick access to standard tools. When the Content Browser opens from the Project Navigator palette, the library associated with the project will automatically open.

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

The Project Properties dialog is displayed.



3 Under Tool Palettes, specify the location for the project tool palette group. You can select a local folder or a network folder.

If you do not specify a location, the following default behavior is automatically selected based on how you created your project:

Project Type	Tool Palette Group File Location	Project Tool Palette Group
Legacy project from Architectural Desktop 2005/2006	pointing to new empty ATC file under *\<ProjectName\>\Standards\ WorkspaceToolPalettes\ <ProjectName>.atc*	Created, but not displayed. To display the tool palette group in the tool palettes set and add tools to it, see Displaying the Project Tool Palette Group on page 411 and Building the Tool Palette Group on page 413.
New project not based on a template	pointing to new empty ATC file under *\<ProjectName\>\Standards\ WorkspaceToolPalettes\ <ProjectName>.atc*	Created, but not displayed. To display the tool palette group in the tool palettes set and add tools to it, see Displaying the Project Tool Palette Group on page 411 and Building the Tool Palette Group on page 413.
New project based on default AutoCAD Architecture template project	pointing to new ATC file under *\<ProjectName\>\Standards\ WorkspaceToolPalettes\ <ProjectName>.atc*. By default, one empty tool palette is already inserted.	Created and displayed with empty default tool palette. To add tools and palettes, see Building the Tool Palette Group on page 413.
New project based on user-defined existing template project	If the tool palette group of the template project is located within the template project folder, it will be copied with all contained palettes to the corresponding folder of the new project. The tool palette file location of the new project will point to the copied tool palette group. If the tool palette group of the template project is located outside the template project folder, the tool palette file location of the new project will point to the same location, sharing the tool palette group with the template project.	Displayed as either copied tool palette group or referenced tool palette group

4 For Project Tool Palette Group, select Shared Workspace Catalog, Per User Workspace Catalog, or None.

If you select Shared Workspace Catalog, the path selected for Tool Palette Group is added to your project profile (AWS), and the tool catalog is accessed from the specified location. If you select Per User Workspace Catalog, a folder is created under *C:\My Documents\Autodesk\My Projects\<project name>* and the tool palettes are copied to that folder. If you select None, the project tool palette group is disabled for this project, and the other properties under Tool Palettes do not display.

5 For Tool Content Root Path, you can specify a root path for the tools used in the project tool palette group. When tools on project palettes are created with the tool content root path specified in the project setup, the content root path is created as a variable (%AECPROJECT_DIR%). When the tool content root path in the project setup is changed, and the referenced style drawings are moved to the new location, the path of the project tools is changed accordingly.

NOTE When a project is repathed, and the content root path is within the project folder, it will be repathed accordingly.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

6 For Content Browser Library, select the default Content Browser Library (CBL) to be displayed when the Content Browser is opened from the Project Navigator.

7 Click OK to return to the Project Browser.

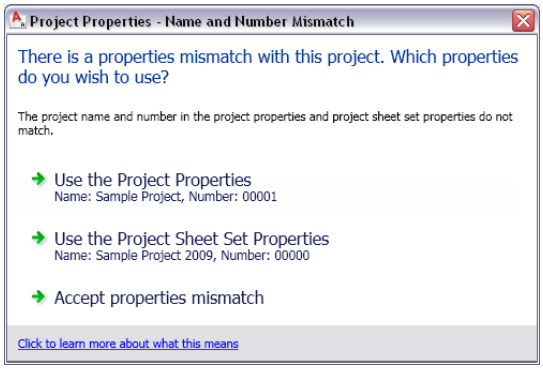
Consolidating Inconsistent Project and Sheet Set Information

If the project name and project number you have entered in the sheet set properties (Creating a Sheet Set Template on page 341) differ from the project name and number when you created the project (Creating a New Project on page 216), then the project information is inconsistent and needs to be consolidated. When you edit the properties of an inconsistent project, you are prompted to consolidate the project information.

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, select the project for which to define the settings, right-click, and click Project Properties.

If the project name and number of the project and the sheet set template do not match, a message is displayed:



Under Use the Project Properties, the name and number from the project properties are displayed. Under Use the Project Sheet Set Properties, the different project name and number from the sheet set is displayed.

If you want to…	Then…
consolidate the project information under the project name and number	select Use the Project Properties. The name and number of the sheet set are overwritten with the project name and number.
consolidate the project information under the project sheet set name and number	select Use the Project Sheet Set Properties. The project name and number are overwritten with the project sheet set name and number.
continue to use different names for the project and the project sheet set	select Accept properties mismatch.

Moving a Project

Use this procedure to move a project with all its associated files to a different file location.

When you move a project, all internal paths between the project files are automatically updated, so that all relationships between drawings are kept current.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

NOTE Do not use Windows Explorer to move a project file to a different location. This might result in inconsistent project data.

1. Verify that the project is closed. For more information, see Closing All Project Files on page 231.
2. On the Quick Access toolbar, click Project Browser .
3. Select the project you want to move, right-click, and click Move Project.
4. Select the location to which you want to move the project.
5. Click OK.

   The project and all its files and folders are moved to the new location.

Renaming a Project

Use this procedure to rename an existing project.

Renaming the project renames the following project files:

- Rename the project display name in Project Browser and Project Navigator
- Rename the APJ file
- Rename the top project folder

When you rename a project, all internal paths between the project files are automatically updated, so that all relationships between drawings are kept current.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

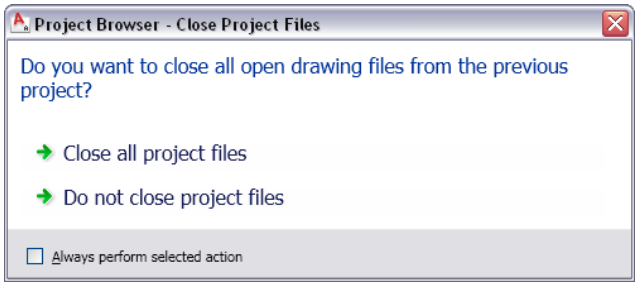
NOTE Do not use Windows Explorer to rename a project file. This might result in inconsistent project data.

1. Verify that the project is closed. For more information, see Closing All Project Files on page 231.
2. On the Quick Access toolbar, click Project Browser .
3. In the project selector, select the project you want to rename, right-click, and click Rename Project.
4. Enter the new name, and click OK.

Closing All Project Files

Use one of the following methods to close all drawing files in the current project.

- Click ➤ Close ➤ All Project Drawings.
  This option closes all of the project drawings but leaves the project current and the Project Navigator displayed.
- On the Project Navigator palette, right-click below the file tree, and click Close All Project Files.
  This option closes all of the project drawings but leaves the project current and the Project Navigator displayed.
- On the Project tab of the Project Navigator palette, click , then specify your preferences in the Project Browser - Close Project Files dialog.



If you want to…	Then…
always close all project files, close the Project Navigator, and exit the project environment when you click	select Always perform selected action, and then click Close all project files.
always close the Project Navigator and exit the project environment but leave all project files open, when you click	select Always perform selected action, and then click Do not close project files. This option lets you work on the files outside the project environment so that you do not accidentally make changes to the project.
close all project files, close the Project Navigator, and exit the project environment for this instance	click Close all project files.
close the Project Navigator and exit the project environment but leave all project files open for this instance	click Do not close project files. This option lets you work on the files outside the project environment so that you do not accidentally make changes to the project.

NOTE When you select Always perform selected action, the Close project drawings when switching projects option on the AEC Project Defaults tab of the Options dialog is also selected. See Specifying the Default Project Options on page 210. Note also that the Project Browser - Close Project Files dialog becomes a hidden message. It will not display when you click until you turn it back on as explained under Hidden Message Settings Dialog Box in AutoCAD Help.

Electronically Transmitting a Project

Use this procedure to create an electronic file set package for a project or to package files so they can be archived.

The electronic package can include the following:

- All project drawing (DWG) files, including external references
- All project XML files
- The project (APJ) file
- All project templates
- The project sheet set (DST) file
- AutoCAD font map
- AutoCAD plot style tables

If you want to eTransmit a project, it is recommended that it uses relative xref paths. You can determine whether a project uses full xref paths or relative xref paths in the project setup. For more information, see Creating a New Project on page 216 and Before You Begin: External References on page 207.

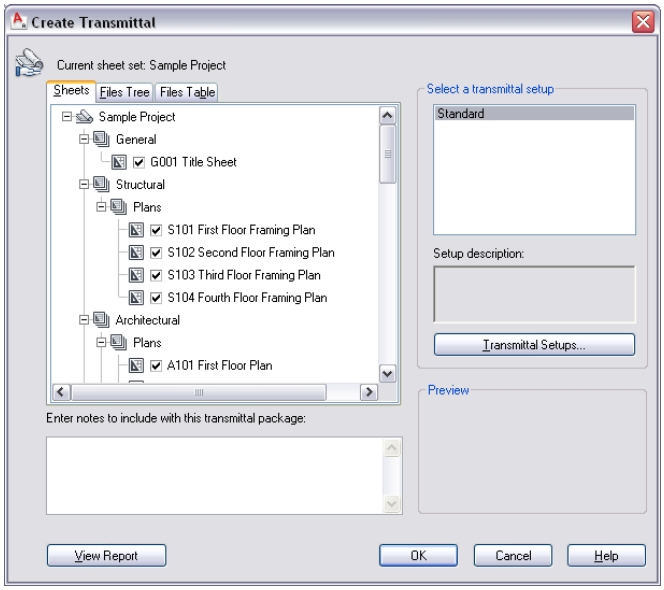
For more information about creating packages for electronic transmissions, see Package a Set of Files for Internet Transmission in AutoCAD Help.

1 On the Quick Access toolbar, click Project Browser .

2 In the project selector, select the project from which you want to create an electronic package.

3 Right-click, and click eTransmit.

The Create Transmittal dialog is displayed. For more information, see Package a Set of Files for Internet Transmission in AutoCAD Help.

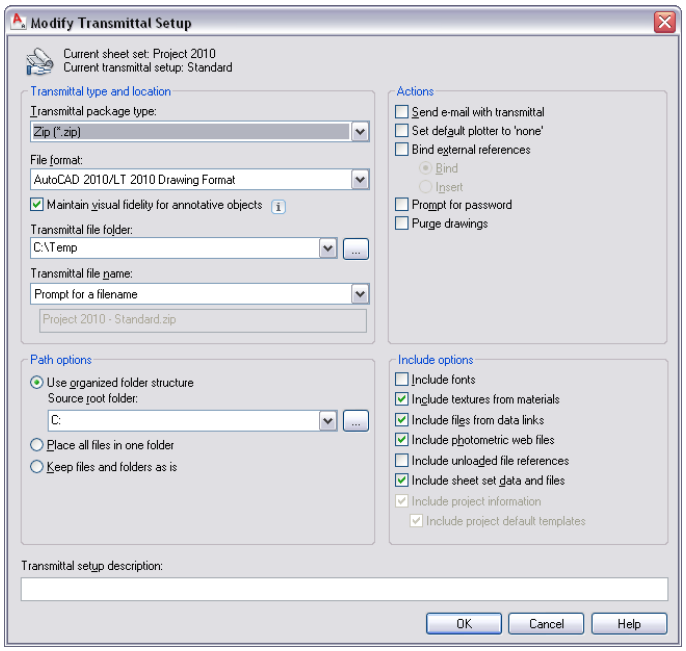


4 Select the components to include in the electronic package.

5 Select the transmittal setup for the package, and click Transmittal Setups.

6 In the Transmittal Setups dialog, click Modify.

The Modify Transmittal Setup dialog is displayed.



7 Under Transmittal package type, select the package type in which to export your project.

For more information, see Modify Transmittal Setup Dialog Box in AutoCAD Help.

8 Under File Format, select the format in which to export the drawing files. If you want to export the project drawings with their AEC objects:

- intact (such as walls and doors), select the AutoCAD <version> Drawing Format.
- exploded (such as 3D faces and hatches), select the AutoCAD <version> Drawing Format with Exploded AEC Objects.

9 Under Transmittal file folder, select the folder in which to place the package.

For example, if you selected ZIP as the transmittal package type and C:\MyTransfer as the transmittal folder, the ZIP file containing your project will be placed under C:\MyTransfer\MyProject.zip.

10 Under Transmittal file name, specify the method for naming the transmittal package:

If you want to…	Then…
display a standard file selection dialog where you can enter the name of the transmittal package	select Prompt for a file name.
use a logical default file name and, if the file name already exists, overwrite the existing file name	select Overwrite if necessary.
use a logical default file name and, if the file name already exists, add a number to the end of the file name	select Increment file name if necessary.

11 Select the transmittal options:

If you want to…	Then…
duplicate the folder structure for the files being transmitted and make the root folder the top-level folder within the hierarchical folder tree	select Use organized folder structure. For more information, see Modify Transmittal Setup Dialog Box in AutoCAD Help. **NOTE** This option is not available if you are saving a transmittal package to an Internet location.
unpack all files to a single, specified target folder when the transmittal package is installed	select Place all files in one folder. **WARNING** Do not select this option when electronically transmitting project information. When you place all files in one folder the project structure will be flattened.
preserve the folder structure of all files in the transmittal package	select Keep files and folders as is. **NOTE** This option is not available if you are saving a transmittal package to an Internet location.

If you are transmitting a project, the following project-related information is always included in the transmittal package:

- Project (APJ) file
- XML files
- Project template files

12 Specify actions for the transmittal. For more information, see Modify Transmittal Setup Dialog Box in AutoCAD Help.

13 Identify options to include with the transmittal:

If you want to include…	Then…
the associated font files (TXT and SHX) with the transmittal package	select Include fonts. **NOTE** Because TrueType fonts are proprietary, they are not included with the transmittal package. If any required TrueType fonts are not present on the computer to which the transmittal package is copied, the font specified by the FONTALT system variable is substituted.
textures of materials with the transmittal package	select Include textures from materials that are attached to objects or faces.
external files referenced by a data link to the transmittal package	select include files from data links.
photometric web files that are associated with web lights in the drawing	select Include photometric web files.
the sheet set data and files (DST) in the transmittal package	select Include sheet set data and files.

14 Enter a description for the transmittal setup, and click OK.

This description is displayed in the Create Transmittal dialog box below the list of transmittal file setups. You can select any transmittal setup in the list to display its description.

15 Click Close, and then click OK to start the electronic transmittal.

Deleting a Project

Deleting a project is a system administrator task. Therefore, you do not perform it from within the Project Browser but from Windows Explorer.

Deleting the project folder deletes all DWG files, XML files, and the APJ file. Before you do this, make sure that you really do not need any of these files anymore. If you do not work on a project any longer but still want to save the DWG files in it, it is often sufficient to just remove the project context, as described in Removing the Project Context on page 235.

NOTE Before you delete a project, make sure that is not the current project in AutoCAD Architecture.

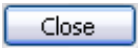
1 In Windows Explorer, navigate to the folder of the project you want to delete.

2 Delete the project folder.

Closing the Project Browser

Closing the Project Browser leads you to the next phase, where you are working on the actual building project, creating and editing elements, constructs, building views, and sheets. In this phase, you work mainly with the Project Navigator. For more information, see The Project Navigator on page 237.

Close the Project Browser with one of these buttons:

Button	Description
	Right-click in the AutoCAD Architecture dialog header, and click Close.
	Click the Close button in the lower-right corner of the Project Browser.
	Click the Windows Close button in the upper-right corner of the Project Browser.

Removing the Project Context

Use this procedure to remove all project-related information from the drawing files of a project. This may be desirable if you want to hand over the files to a contractor who does not work with the latest version of AutoCAD Architecture, or if the project no longer exists but you do not want to delete the drawing files.

Much of the project-related information associated with a drawing file does not reside in the drawing file itself, but in the accompanying XML file. This means that you can use all your project files at any time in a non-project-related drawing context. However, if you want to work permanently without the project context, it is recommended that you clean your file set of the unused project files.

Project-related information resides in the following files:

- The APJ file, which contains the general, high-level project data like name, number, project details, and project standards.

- The XML files, each of which stores the project information for an individual drawing file.

If you delete the APJ file and the XML files, the remaining drawing files no longer have connections to a project. They are regular AutoCAD Architecture drawing files and can be copied, edited, and deleted like any other drawing file.

The drawing files can contain standard styles and display settings, if standards have been set up for the project. When the XML and APJ files are deleted, any standard styles and display settings are no longer synchronized in the now standalone drawings.

NOTE Once the project context has been removed, there is no simple way to recreate it. if you have removed the project, and want to re-build a project around the remaining drawing files, build the project from scratch, and import the drawing files into it.

To remove project-related information

1. In Windows Explorer, navigate to the folder containing the project.
2. In the project folder, delete the APJ file. For example, if you have a project named Office Building, delete the file named Office Building.apj.
3. Open the Elements, Constructs, Sheets, and Views folders, and delete the XML files associated with your drawing files.

   For example, if your Constructs folder contains First Floor Construct.dwg, select and delete the file named First Floor Construct.xml.
4. Repeat the previous step for each drawing file.

NOTE If you reorganize files into a different file structure, you may have to manually reset broken external reference paths in the drawings.

Opening a Project from Windows Explorer

You can open AutoCAD Architecture with a specific project set current by double-clicking the project APJ file in Windows® Explorer. If there is an AutoCAD Architecture session already open, the new project will become the active project within the same session. Based on the setting you specify, you are given the option to close all open drawing files from the previous project. For more information, see Closing All Project Files on page 231.

When you install AutoCAD Architecture 2010, and the APJ files extension has not previously been associated with another application, such as an XML editor, the file association between the APJ file extension and AutoCAD Architecture is automatically created. If you had previously associated the APJ file extension with another application, and want to change that association to AutoCAD Architecture, use the following steps:

1. On the Windows Start menu, click Settings ➤ Control Panel.
2. Double-click Folder Options.
3. Click the File Types tab.
4. Under Registered File Types, scroll to the APJ extension, and select it.

   In the Details section, the default application for opening APJ files is listed. If the value of Opens with is AECLAUNCHCURRENTPROJECT.EXE, click OK. If not, click Restore, or click Change, select AutoCAD Architecture in the Open With dialog, and click OK.

To open AutoCAD Architecture from an APJ file, use the following steps:

1. In Windows Explorer, navigate to the project APJ file you want to open.

APJ files have a specific icon in Windows Explorer.

2 Double-click the APJ file.

AutoCAD Architecture will be opened with the double-clicked project set as the current project.

The Project Navigator

After you have selected a project in the Project Browser, you open the Project Navigator to create and edit the actual building and documentation data. Here you create elements, constructs, model views, detail views, section views, and sheets, connecting them with one another.

NOTE Although project files and categories you create on the Project Navigator palette are shown as files and folders in Windows Explorer, you should not move, copy, delete, or rename project files from there. Such changes are not updated on the Project Navigator palette, and you could get an inconsistent view of your project data. Any changes you make to the project on the Project Navigator palette are managed and coordinated by the software. Also note that any changes you make on the Project Navigator palette (such as renaming, deleting, or changing the file's properties) cannot be undone using the AutoCAD Undo command.

Opening the Project Navigator

The Project Navigator is opened by default after closing the Project Browser. If you have manually closed it and want to redisplay it, use any of the following methods:

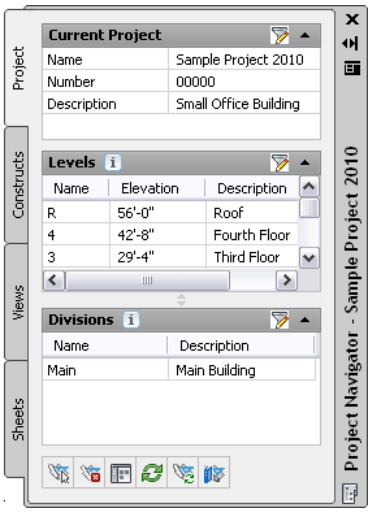
- On the Quick Access toolbar, click Project Navigator .
- On the command line, enter **AecProjectNavigator**.

The Tabs of the Project Navigator

The Project Navigator has 4 tabs on which you can enter project data. The tabs correspond to the main phases of project creation: general project information (levels and divisions), creating building data (constructs and elements), and creating building documentation (views and sheets).

The Project Tab

The Project tab of the Project Navigator palette is where you enter information pertaining to the entire project.

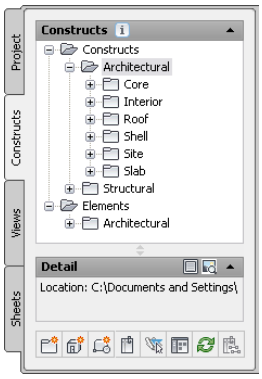


On the Project tab, you can do the following:

- Change project properties. For more information, see Working with Project Properties on page 219.
- Add, modify, and delete levels. For more information, see Levels on page 250.
- Add, modify, and delete divisions. For more information, see Divisions on page 256.
- Launch the Project Browser. For more information, see Opening the Project Browser on page 212.
- Launch the Content Browser to access the project library. For more information, see Displaying the Project Content Browser Library on page 250.
- Close the current project. For more information, see Closing All Project Files on page 231.
- Refresh the project. For more information, see Refreshing the Project Navigator on page 351.
- Synchronize the project with project standard styles and display setting. For more information, see Synchronizing a Project with AEC Standards on page 422.
- Enable and configure project standards. For more information, see Configuring Project Standards on page 393.

The Constructs Tab

The Constructs tab of the Project Navigator palette is where you add the basic building objects for your project. For information about commands available on the context menu, see The Drawing Explorer Context Menu on page 244.

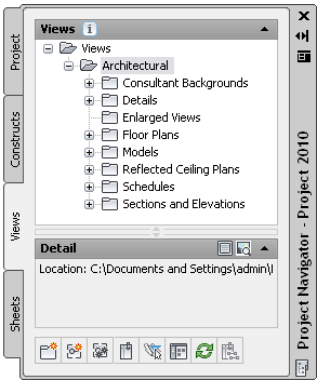


On the Constructs tab, you can do the following:

- Add, modify, and delete constructs and elements within the project. For more information, see Constructs on page 265 and Elements in the Building Project on page 283.
- Open and close existing element and construct drawings. For more information, see Opening and Closing a Construct on page 273 and Opening and Closing an Element on page 290.
- Create categories for constructs and elements. For more information, see Categories on page 258.
- Reference elements into constructs. For more information, see Attaching an Element as an External Reference to a Construct on page 275 and Overlaying an Element as an External Reference to a Construct on page 276.
- Launch the Content Browser to access the project library. For more information, see Displaying the Project Content Browser Library on page 250.

The Views Tab

The Views tab of the Project Navigator palette is where you create individual views of your building data. Views contain constructs and are the primary location for adding annotation like notes, tags, and dimensions within the project. After you have created a view drawing, you can create model space views in it. For information about commands available on the context menu, see The Drawing Explorer Context Menu on page 244.



On the Views tab, you can do the following:

- Add, modify, and delete general views, detail views, and section/elevation views. For more information, see Creating a Model Space View Drawing from a Callout on page 308.
- Add, modify, and delete model space views. For more information, see Creating a Model Space View on page 313.
- Open and close view drawings. For more information, see Opening and Closing a View Drawing on page 308.
- Change the contents of view drawings. For more information, see Changing the Properties of a View Drawing on page 309.
- Create categories for view drawings. For more information, see Categories on page 258.
- Launch the Content Browser to access the project library. For more information, see Displaying the Project Content Browser Library on page 250.

The Sheets Tab

The Sheets tab of the Project Navigator palette is where you create and organize sheets for your project. Sheets reference views and are used for plotting drawings.

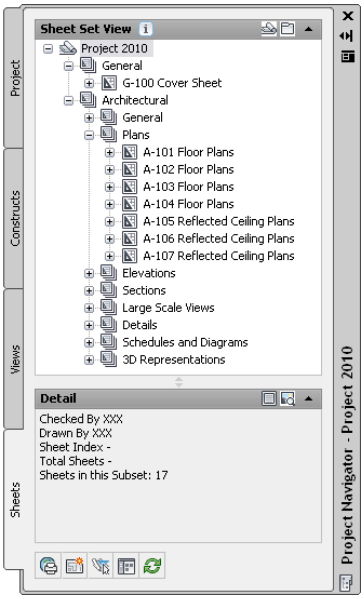
The Sheets tab is also where you manage the project sheet set, performing tasks such as creating a table of contents, managing page setups, or publishing to a plotter, a PDF, a DWF, or a DWFx file. For information about commands available on the context menu, see The Drawing Explorer Context Menu on page 244.

The buttons at the top of the Sheets tab let you view sheet information in either of the following ways: Click the Sheet Set View button to see the sheet set view.

- Sheet Set View
- Explorer View

Sheet Set View

The Sheet Set View is a tree view of the project sheet set in which you have access to all publishing capabilities.

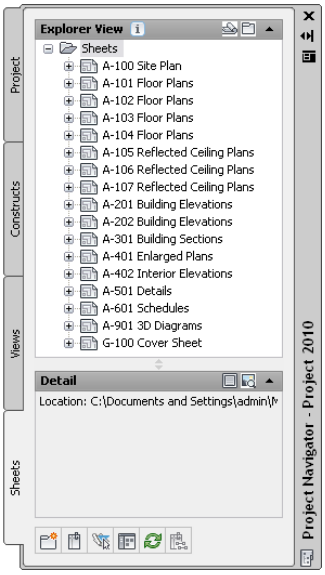


In the Sheet Set view, you can do the following:

- Add, modify, and delete sheets in the project. For more information, see Creating a Sheet on page 323.
- Create sheet subsets that define the logical structure of the sheet set. For more information, see Creating a Sheet Subset on page 327.
- Open and close sheet views. For more information, see Opening a Sheet View on page 332.
- Assign numbers to sheet views. For more information, see Numbering Sheet Views on page 332.
- Insert a table of contents. For more information, see Inserting a Sheet List on page 335.
- Electronically transmit the sheet set or a sheet subset. For more information, see Electronically Transmitting Sheets and Sheet Sets on page 338.
- Archive the sheet set or a sheet subset. For more information, see Publishing Sheet Sets on page 340.
- Publish the sheet set or a sheet subset to a plotter, a PDF, a DWF file, a DWFx file, or to an alternate page setup. For more information, see Publishing Sheet Sets on page 340.
- Create sheet selections for specific tasks. For more information, see Creating a Sheet Selection on page 337.
- Manage page and publishing options. For more information, see Publishing Sheet Sets on page 340.
- Launch the Content Browser to access the project library. For more information, see Displaying the Project Content Browser Library on page 250.

Explorer View

The Explorer View is a view of the folder structure and sheet drawings in the project.



In the Explorer View, you can do the following:

- Open, close, and delete sheet drawings. For more information, see Deleting a Sheet Drawing on page 331.
- Create categories for sheet drawings. For more information, see Categories on page 258.
- Launch the Content Browser to access the project library. For more information, see Displaying the Project Content Browser Library on page 250.

Using the Project Navigator

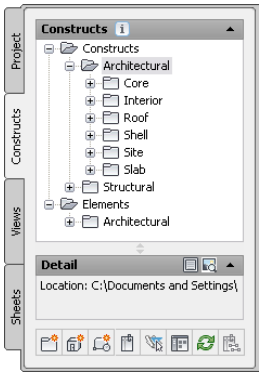
The Project Navigator is the main point from which you work with the project.

The Drawing Explorer

The Drawing Explorer is a tree view common to the Constructs, View, and Sheets tabs of the Project Navigator. This is where the drawing files are organized. Each tab of the Project Navigator except the Project tab has a Drawing Explorer tree where the associated project drawing files—elements, constructs, views, and sheets—are displayed.

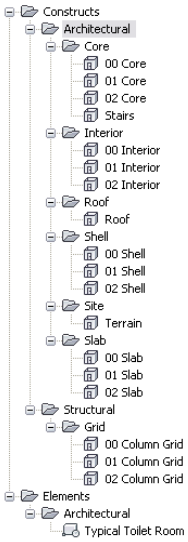
- The Constructs tab organizes constructs and elements in the project.
- The View tab organizes view drawings, as well as their associated model space views.
- The Sheets tab organizes sheet drawings, sheets, sheet views and the sheet set.

Drawing Explorer



Drawing files belonging to a project are displayed on their respective tabs in the Drawing Explorer tree view, which lists the drawings in their category (folder). You can drag and drop, or copy and paste drawing files in the Drawing Explorer.

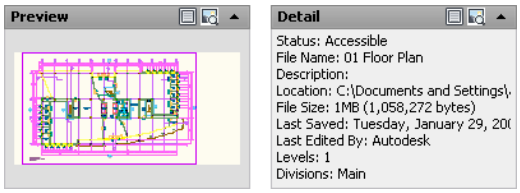
Drawing Explorer of Constructs tab fully expanded



The Preview and Detail Panes

Below the Drawing Explorer on the Project Navigator palette is the Preview or Detail pane. You display this pane by right-clicking at the bottom of the Project Navigator palette and selecting Preview/Details Pane from the Tooltip Style menu. For more information, see Drawing Explorer Tooltips on page 247.

With Preview/Details Pane selected, you can switch modes by clicking (Preview) to display a preview or by clicking (Detail) to display a description of the drawing file selected.



The Drawing Explorer Context Menu

When you right-click a drawing file in the Drawing Explorer of the Project Navigator palette, a context menu displays. The commands on the context menu can vary slightly based on the type and status of the file selected:

Command	Description
Open	Opens the selected drawing file within AutoCAD Architecture. Unavailable if the drawing file is in use or has a read-only attribute.
Bring to Front	Returns focus to the selected file if it is already open in the current drawing session.
Open read-only	Opens the selected file in read-only mode and displays it in the drawing area. If the drawing file is already open for write in the current session, clicking Open read-only opens a copy and brings that drawing file to the front.
Close	Closes the selected drawing file. For more information, see Closing All Project Files on page 231.
External References	Opens the External References dialog that lists all external references in the selected file and lets you unload, reload, and detach them from a context menu. For more information, see Displaying External References of a Construct on page 277, Displaying External References of a View Drawing on page 306, or Displaying External References of a Sheet Drawing on page 333.
New ➤ Category	Creates a new category for the file type selected: for example, an element category or a construct category. For more information, see Categories on page 258.
New ➤ Element Construct View Dwg (General, Section/Elevation, Detail) Model Space View Sheet	Creates a new project file of the specified type. For a description of these file types, see Concepts of Drawing Management on page 200.
Save Current Dwg as Element Construct View (General, Section/Elevation, Detail)	Converts pre-existing and non-project drawings into project file drawings. **NOTE** The legacy file must be open to run this command.
Xref Attach	Attaches the selected drawing as an external reference (xref) to the currently active drawing. **NOTE** The xref must be closed when you attach it.

Command	Description
Xref Overlay	Overlays the selected drawing as an external reference to the currently active drawing. **NOTE** The xref must be closed when you overlay it.
Insert as Block	Inserts the selected drawing as a block into the active drawing. **NOTE** The drawing being inserted as a block must be closed when you insert it.
Cut	Cuts the selected file from the Drawing Explorer. Use this command together with Paste to relocate drawing files within the Drawing Explorer. **NOTE** You cannot cut a file that is open.
Copy	Copies the selected file. Use this command together with Paste to copy a file to a different location.
Copy Construct to Levels	Creates a new copy of the construct drawing for each level you specify.
Attach Element to Constructs	References the selected element into one or multiple constructs you specify.
Paste	Pastes a cut or copied file to a new file location that you specify with the Drawing Explorer. After pasting a file in a different location, you are prompted to repath the project to update the file information.
Delete	Deletes the selected file. **NOTE** You cannot delete a file that is currently open.
Rename	Renames the selected file. **NOTE** You cannot rename a file that is open. After you rename a file, you are prompted to repath the project to update the file information.
Repath File	Opens the Project Repath Queue dialog in which you can view the repath queue and repath or delete pending file paths. Unavailable if there are no files in the queue. For more information, see Working with Design Teams Located Remotely on page 212. **WARNING** Selecting Repath migrates your drawings to the current version format. This means that you will be unable to open these drawings in any older version. For more information, see Repath the Project on page 350.
eTransmit	Creates an eTransmit package from the selected file, including all external references.

Command	Description
Properties	Opens the properties of the selected project drawing file. Depending on the file type, the properties can differ. A construct, for example, has settings for level and division assignment; a view has a list of constructs assigned to it. For detailed information on file properties, see the appropriate sections for the individual file types.

The Project Navigator Toolbar

As the following table shows, the buttons on the toolbar at the bottom of the Project Navigator vary according to which tab is active. Some of the same functions are also available on the context menu for the tab:

Button	Description	Tab Location
Project Browser	Launches the Project Browser	All
Close Current Project	Closes all project files of the current project. For more information, see Closing All Project Files on page 231	Project
Content Browser	Launches the Content Browser. If a project library has been set for the project, it is displayed in the Content Browser.	All
Refresh Project	Refreshes the project information in the Drawing Explorer to reflect any changes made. **NOTE** Refreshing the project frequently is especially important when you are working with a project on a network server.	All
Synchronize Projects	Synchronizes a project with its project standards, if they have been established. For more information, see Synchronizing a Project with the Standards on page 418.	Project
Configure Project Standards	Opens the Configure AEC Project Standards dialog in which you can set up or modify standards for the current project. For more information, see Configuring Project Standards on page 393.	Project
Add Category	Adds a new category for elements, constructs, views, or sheets. You can nest categories and create an organizational tree.	Constructs, Views, Sheets
Add Element	Creates a new element.	Constructs
Add Construct	Creates a new construct.	Constructs
Show External References	Opens the External References dialog that lists all external references in the selected file and lets you unload, reload, and detach them from a context menu.For more information, see Displaying External References of a	Constructs, Views, Sheets

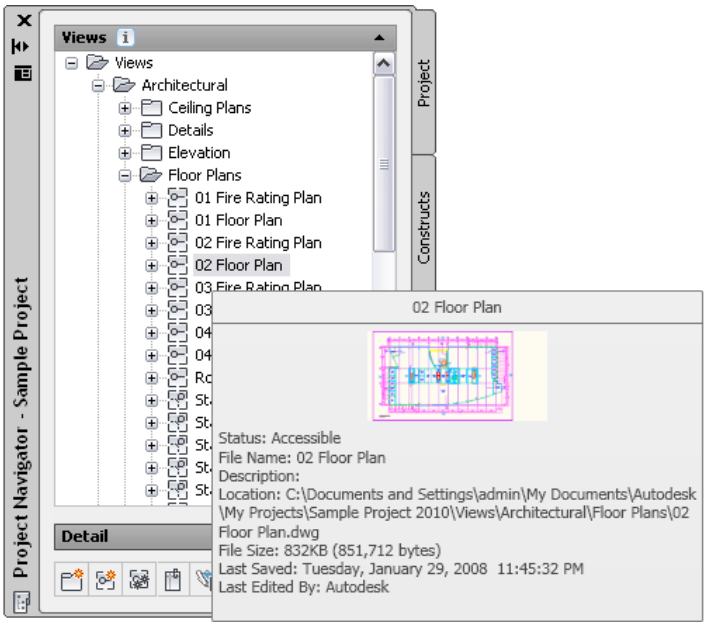
Button	Description	Tab Location
	Construct on page 277, Displaying External References of a View Drawing on page 306, or Displaying External References of a Sheet Drawing on page 333.	
Repath Xref	Opens the Project Repath Queue dialog in which you can view the repath queue and then update the modified xref paths. Unavailable if there are no files in the queue. **WARNING** Selecting Repath migrates your drawings to the current version format. This means that you will be unable to open these drawings in any older version. For more information, see Repath the Project on page 350.	Constructs, Views, Sheets
Add View	Creates a new view.	Views
Regenerate View	Reloads all of the xrefs needed to generate the selected view after you have edited xrefs in the view, added new references, or changed the view properties.	Views
Add Sheet	Creates a new sheet drawing.	Sheets
Publish	Publishes the sheet set to the plotter, DWF, DWFx, or PDF that you specify.	Sheets

Drawing Explorer Tooltips

To specify the content of the tooltip that displays when you move the cursor over an item in the Drawing Explorer, right-click an open area on the toolbar and select one of the following options:

If you want to…	Then…
display the Preview or Detail pane at the bottom of the Project Navigator palette	select Preview/Details Pane.
close the Project Navigator palette	select Close.
display only the file name	select Tooltip Style, and then click Name.
display the name and an image of the content	select Tooltip Style, click Preview, and then click Small, Medium, or Large.
display details, such as the status, location, and who currently has the file open (if applicable)	select Tooltip Style, and then click Details.

If you want to…	Then…
display an image and details	select Tooltip Style, click Preview & Details, and then click Small, Medium, or Large.



Drag and Drop on the Project Navigator Palette

You can drag and drop files on a Project Navigator tab, from the tab to the drawing area, or to and from Windows Explorer. Afterwards, you are prompted to repath the project to update the file information.

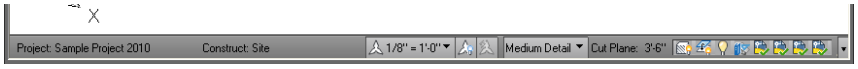
The following drag and drop operations are supported:

- Dragging elements, constructs, views, and sheets from one category in the Drawing Explorer to another.
- Dragging elements, constructs, views, and sheets from the Drawing Explorer into the AutoCAD Architecture drawing area.
- Dragging and dropping objects from an open drawing in the drawing area onto an element or construct in the Drawing Explorer.
- Dragging drawing files from Windows Explorer to the Project Navigator; the drop location determines the file type. For example, a file dragged to a construct category becomes a construct.

The Drawing Status Bar

When you are working with a drawing in a project, the drawing status bar displays the name of the current project, the name of the project file, and the project file type. When you open a drawing that does not belong to a project, no project information is displayed.

Drawing status bar



Displaying the Project Tool Palette Group

Use this procedure to display the project tool palette group in the tool palettes set.

Depending on the setting of the tool palette file location (as described in Adding a Project Content Browser Library and Tool Palette Group on page 227), the project tool palette group can be displayed automatically after you set a project current and close Project Browser, or it can be empty and not be displayed on the tool palettes set. The project tool palette group is displayed automatically when it contains at least one palette.

Project tool palette groups that are not automatically displayed will not display in the following cases:

- A new project that is not based on a template, and does not point to an existing tool palette group
- A legacy project that is not manually redirected to an existing tool palette group
- A project that is based on a template project where the Project Tool Palette Group storage type is set to None.
- A project that is based on a template project without project tool palettes

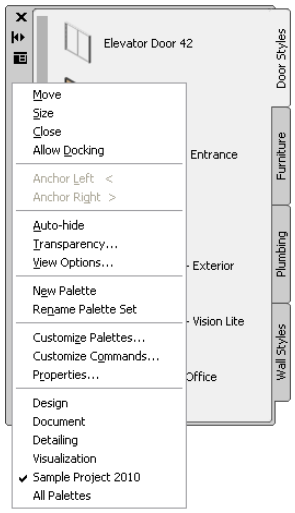
If an empty tool palette group is created for a project, it is not displayed in the tool palettes set after the project is set current. To display it, add at least one tool palette.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

2 In the title bar of the tool palettes set, click .

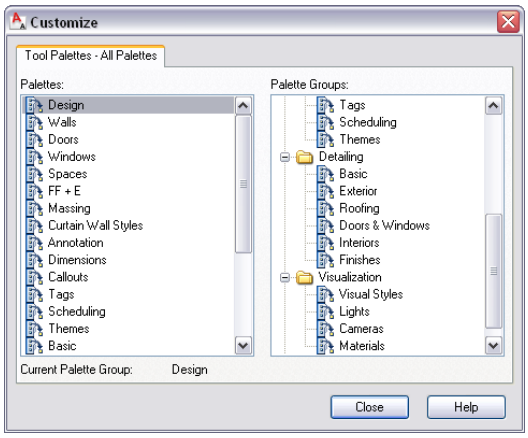
- If the project tool palette group contains at least one palette, it is displayed in the list of available tool palette groups and can be selected.

Selecting the project tool palette group



- If the tool palette group of the current project is empty, it is not displayed.

3 To add a new palette to the empty tool palette group so it will display the project tool palette group, click , and click Customize Palettes.



On the left, all available palettes are listed. On the right, all palette groups are listed. The empty project tool palette group is listed there.

4 Right-click in the palettes list on the left, and click New Palette.

5 Enter a name for the new palette.

6 Select the palette, and drag it on the project palette group on the right.

7 Click Close, and click again.

The project tool palette group is listed under the available palette groups and can be selected and displayed.

Displaying the Project Content Browser Library

You can start the Content Browser directly from the Project Navigator, and display a project-specific Content Browser Library.

If you are working with project standards, the project library should contain tools referencing project standard styles. If you are not using project standards, the project library should contain the tools you need in this project.

For information on building a Content Browser library for a project, see Setting up Standard Tools in a Project on page 403.

1 Set the project current, as described in Setting a Project Current on page 215, and close the Project Browser.

2 On the Quick Access toolbar, click Project Navigator .

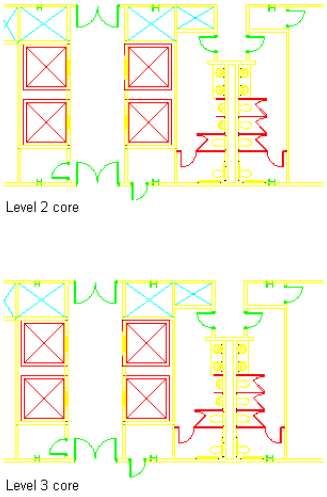
3 On the Project Navigator palette toolbar, click .

The Content Browser is opened with the project library displayed.

Levels

Buildings are segmented into levels (or floors) in the vertical plane. When you create a project, you determine the number of levels, their floor-to-floor height, and their floor elevation. When you add or remove levels, the project is updated with the new level information.

Plan view of identical building core levels



Level Defaults

By default, the first level is present in each new project. It has a floor elevation of zero and represents the ground floor. You can change the elevation value for the first level, which is then used as the default elevation for each new level you insert.

NOTE The unit in which the level height is displayed is dependent on the drawing defaults of the active drawing.

Copying Levels with Constructs

You can quickly and easily duplicate floors with identical plans. After creating one level and assigning the floor plan constructs to it—for example, a layout of apartments on the first floor—you can easily create new levels, which have copies of the first level's constructs assigned to them. You can edit and rename these constructs later on the Constructs tab.

TIP If you duplicate floor plans in this way, a construct is created for each new level. If you edit the floor plan later, for example, to add an extra door, edit each level and construct individually. If your floor plans are going to be absolutely identical, you can avoid this task. Create an element containing the floor plan, and reference it into the first construct. Then copy the constructs to the levels. Each of the copied constructs have the same reference, and you can change them quickly by changing the referenced element once.

For information on creating constructs and assigning them to levels, see Creating a New Construct on page 268.

For information on creating elements and referencing them into constructs, see Creating an Element on page 285, and Attaching an Element as an External Reference to a Construct on page 275.

Creating a New Level

Use this procedure to add levels to a building.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Levels, click .

3 If you want each new level to take its floor elevation from the height of the level below, click Auto-Adjust Elevation.

4 Add a level using one of the following methods:

If you want to…	Then…
add a level above the current level	click . The default floor-to-floor height of the new level is identical to the level below. If you have selected Auto-Adjust Elevation, the level's floor elevation starts on top of the previous level. **NOTE** Alternatively, you can select the level above which you want to add a level, right-click, and click Add Level Above.
add a level below the current level	select the level below which you want to add a level, right-click, and click Add Level Below. **NOTE** If you add a level below the ground floor and you have selected Auto-Adjust Elevation, the elevation of the new level is a negative height.

NOTE If you add a level between existing levels and you have selected Auto-Adjust Elevation, the elevations of all levels above or below the new level are automatically adjusted.

5 If necessary, edit the properties of the new level:

If you want to…	Then…
change the name of the level	click the name, and enter a new one. Note that you cannot give the same name to 2 different levels—the name is the unique identifier of the level when assigning constructs.
change the base elevation of the level	enter a new value. If you have selected Auto-Adjust Elevation, the base elevation fits with the elevation and floor height of the level below, and you won't need to make changes here. **NOTE** The base elevation of a level determines where the level starts on the horizontal plane. Usually, the base elevation of a level is determined by the floor-to-floor height of the level below.
change the floor-to-floor height of the level	enter a new value. If you add levels above this level and you selected Auto-Adjust Elevation, they use the floor height of this level is used as the base elevation.
change the ID of the level	enter a new ID. The ID can be used in schedule tables. For more information on scheduling a project, see Workflow for Annotating a Project on page 352.
add a description to the level	enter a description for the level.

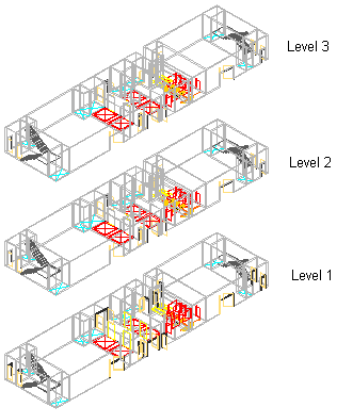
6 When you are finished adding levels to the project, click OK.

7 Click Yes in the subsequent dialog to update the changed level information throughout the project.

Copying a Level with Assigned Constructs

Use this procedure to copy an existing level and all its assigned constructs within the building.

3D view of copied levels with assigned constructs



When you create a new level, it is empty and has no constructs assigned. After you have assigned constructs to the level, as described in Creating a New Construct on page 268, you can copy that level and its constructs within the building. For example, perhaps you have created a first-floor level and assigned 3 apartment constructs to it. To create a second-floor level with exactly the same layout, you can copy and paste the first level with its apartment constructs and rename it “Second Floor.”

1 Create a level and assign constructs to it.

   For more information, see Creating a New Construct on page 268.

2 On the Quick Access toolbar, click Project Navigator .

3 Click the Project tab, and under Levels, click .

4 Select the name of the level you want to copy, right-click, and click Copy Level and Contents.

5 Click the level above or below the one on which you want to place the copied level, right-click, and click Paste Level Above or Paste Level Below.

6 Rename the pasted level accordingly: for example, Second Level.

7 If necessary, edit the description and the ID.

8 Click OK.

9 Click Yes in the subsequent dialog to update the changed level information throughout the project.

10 Click the Constructs tab.

11 Locate the Constructs category.

   The constructs that were created by copying the level and constructs are below the original construct. For example, if you copied the first-floor-level with a construct named First Floor—Left Apartment, you now have 2 constructs: First Floor—Left Apartment and First Floor—Left Apartment (2).

12 If necessary, rename the copied construct with an appropriate name: for example, Second Floor—Left Apartment.

13 To update the Drawing Explorer, click .

Changing the Properties of a Level

Use this procedure to change the properties of a level.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Levels, click .

3 Change the level information as needed:

If you want to…	Then…
change the name of the level	click the name, and enter a new one. Alternatively, you can select the name, right-click, and click Rename Level.
change the elevation of a level	click the floor elevation, and change it. **NOTE** If you have selected Auto-Adjust Elevation, the levels above and below the level are changed accordingly. To prevent this, clear Auto-Adjust Elevation before making changes to the elevation.
change the floor-to-floor height of a level	click the floor-to-floor height, and change it. **NOTE** If you have selected Auto-Adjust Elevation, the levels above and below the level are changed accordingly. To prevent this, clear Auto-Adjust Elevation before making changes to the elevation.
change the ID of a level	click the ID, and change it.
change the description of a level	click the description, and change it.

4 Click OK.

5 Click Yes in the subsequent dialog to update the changed level information throughout the project.

Deleting a Level

Use this procedure to delete a level from a building.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Levels, click .

3 Click the name of the level to delete.

4 Delete the level using either of the following methods:

- Right-click, and click Delete Level.
- In the Levels dialog, click .

5 Click OK.

6 Click Yes in the subsequent dialog to update the changed level information throughout the project.

NOTE Constructs assigned to the deleted level are not deleted.

Changing Levels: Interactions with the Project

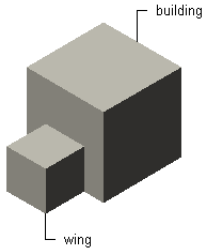
Changes made to one part of a project frequently influence other parts of the project. The following information describes the changes you can make to a level and the effects of the changes on other parts of the building project:

- **Adding new levels:** When you add a new level to a project, you must assign constructs. You also need views and sheets to represent that level.
  For more information, see Constructs on page 265, Views on page 297, and Sheets on page 321.
- **Changing the level name:** When you change the name of a level, the constructs assigned to it are automatically updated to reference the new name. For example, if you change the name of a level from 1 to First Floor, the constructs assigned to that level are automatically updated to be assigned to First Floor.
- **Changing the level ID:** Level IDs can be used in schedule tables. If you change the information here, the information in your schedule table changes.
- **Changing the floor-to-floor height of a level:** When you change the floor-to-floor height of a level and you have selected Auto-Adjust Elevation, all levels above the changed level are adjusted. The multi-level view regenerates to adjust for the change in height. For example, if you change the height of the first floor from 3 meters to 4 meters, the elevation of the second level changes from 3 meters to 4 meters. If you have chosen not to auto-adjust levels, you need to update all other levels manually to avoid gaps or overlapping levels. In any case, make sure that the objects in the assigned constructs retain the correct height for the level after changing it. That way, you avoid displaying 4 meter walls in a 3 meter level.
- **Changing the floor elevation of a level:** If you are changing the elevation of a level, the elevation above the level is adjusted. The floor-to-floor height of the level below the selected level is also changed, and the multi-level view regenerates to adjust for the change in elevation. For example, if you change the elevation of the second floor from 2.5 meters to 2.6 meters, the floor-to-floor height of the first floor below it is changed from 2.5 meters to 2.6 meters. Also, the floor elevation of all levels above the second level will be increased by 0.1 meter.
- **Deleting a level:** When you delete a level, constructs assigned to that level are not deleted with it. They remain in the project, but they are “orphaned,” that is, they have lost their level. You can choose what to do with them:
  - Delete them, because the level on which they are placed no longer exists.
  - Assign them to a different level within the project.
- When you delete a level that has been used for a view, the view is not deleted from the project. If you update the view, however, it is missing this level. You can choose among these actions:
  - Delete the view, because the level it was displaying no longer exists.
  - Create a new selection set for the view.
    For more information, see Views on page 297.

Divisions

Divisions segment the building in the horizontal plane. A division might be a wing of a building. By default, each new project in AutoCAD Architecture has one division. You can add divisions, change their properties, and delete them.

Building and wing schematic



In most projects, you work with only one horizontal division.

Creating a New Division

Use this procedure to add divisions to a project.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Divisions, click .

3 Add a division using either of the following methods:

- Right-click in the list, and click Add Division.
- In the Divisions dialog, click .

4 If necessary, edit the division settings:

If you want to…	Then…
change the name of the division	click the name, and enter a new one. Alternatively, you can select the name, right-click, and click Rename Division. **NOTE** You cannot give the same name to 2 divisions; the name is the unique identifier of the division when assigning constructs to it.
change the ID of the division	enter a new ID. The ID can be used for schedule tables. For more information on scheduling a project, see Workflow for Annotating a Project on page 352.
add a description to the division	enter a description, and press *ENTER*.

NOTE The division names are displayed in the order of their creation.

5 When you have finished adding new divisions to the project, click OK.

Changing a Division

Use this procedure to change the properties of a division.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Divisions, click .

3 Change the division information as needed:

If you want to…	Then…
change the name of the division	click the name, and change it.
change the ID of the division	click the ID, and change it. The ID can be used in schedule tables.
change the description of the division	click the description, and change it.

4 Click OK.

Deleting a Division

Use this procedure to delete a division from the building project.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Divisions, click .

3 Click the name of the division to delete.

4 Delete the division using either of the following methods:

- Right-click, and click Delete Division.
- Click .

5 Click OK.

6 Click Yes in the subsequent dialog to update the changed division information throughout the project.

Changing Divisions: Interactions with the Project

Changes made to one part of a project frequently influence other parts of the project. The following information describes the changes you can make to a division, and the effects of the changes on other parts of the building project:

- **Adding new divisions:** When you add divisions to a project, you must assign constructs. You also need views and sheets to represent that division. For example, you might create a view named South Wing and a sheet Plan—South Wing.
  For more information, see Creating a New View Drawing on page 302.
- **Changing the division name:** When you change the name of a division, the constructs assigned to it are updated with the new name. For example, if you change the name of a division from SW to South Wing, the constructs assigned to that division are updated to be assigned to South Wing.
- **Changing the division ID:** Division IDs can be used in schedule tables. If you change the information here, the information in your schedule table changes.

- **Deleting a division:** When you delete a division, constructs assigned to that division are not deleted with it. They are considered orphaned and have lost their division. You can choose among the following actions:
  - Delete the constructs because the division in which they were placed no longer exists.
  - Assign them to a different division within the project.

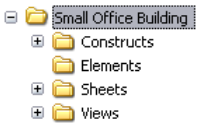
  When you delete a division that has been used for a view, the view is not deleted from the project. If you update the view, however, the deleted division is missing. You can choose among the following actions:
  - Delete the view because the division it was displaying no longer exists.
  - Create a new selection set for the view.

Categories

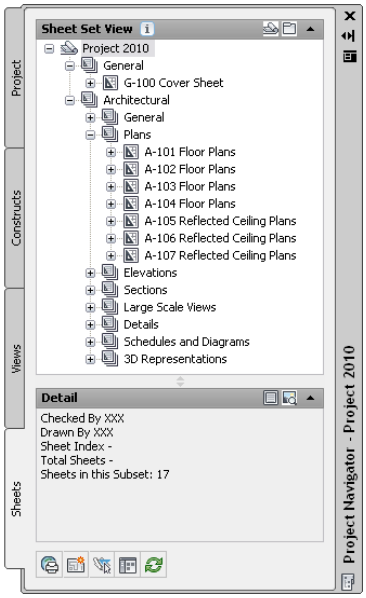
The basic categories are represented by folders in the Drawing Explorer within the project structure that help you organize your project files according to disciplines, drawing types, or aspects of your workflows.

The Basic Project Categories

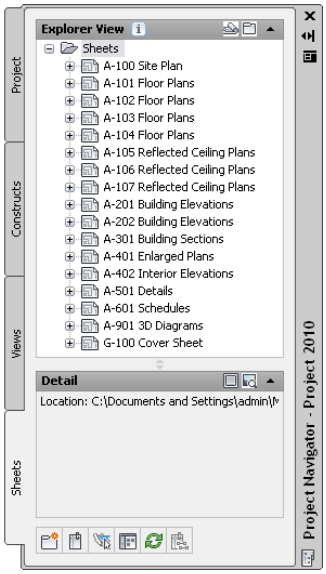
For every building project in AutoCAD Architecture, the following basic category structure is displayed on the Project tab of the Project Navigator palette:



- **<ProjectName>:** This is the top node in the project, represented by a folder with the project name.
- **Constructs:** This is the default category for constructs in the project. When you create a construct, it is saved into the Constructs category or one of its subcategories. For more information, see Constructs on page 265.
- **Elements:** This is the default category for elements in the project. When you create an element, it is saved into the Elements category or one of its subcategories. For more information, see Elements in the Building Project on page 283.
- **Views:** This is the default category for view drawings in the project. When you create a view drawing, it is saved into the Views category or one of its subcategories. For more information, see Views on page 297. If you create model space views within a view drawing, they are placed under the view drawing in the same category as the view drawing itself.
- **Sheets:** Sheets in the project can be viewed in 2 ways: the Sheet Set View and the Explorer View. The following image is a Sheet Set View.



The following image is an Explorer View.



Sheets are organized in sheet subsets in the Sheet Set View. Sheet subsets are a logical structure rather than a physical one. The sheet folder category does not need to be identical to the sheet subset in which the sheet is placed, however, to avoid confusion, it is recommended that you have parallel structures in the sheet set and the sheet categories.

You can rearrange sheets into different subsets within the Sheet Set View, but that will not change their physical location in the category or folder. Likewise, when you remove a sheet from a sheet subset in the Sheet Set View, only the reference of the sheet to the subset is removed; the layout itself and its containing sheet drawing are not deleted from the Sheets folder or subfolder. For more information, see Sheets on page 321.

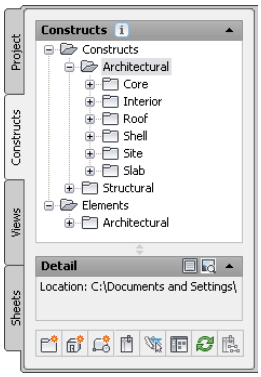
In the Explorer View, sheet drawings are placed in folder categories. When you create sheets or sheet views within a sheet drawing, they are placed in the sheet drawing.

User-Defined Categories

Within the main category structure which is fixed, you can create subcategories and subcategory trees. Subcategories usually represent aspects of your workflow. You might set up subcategories by discipline, by view type (such as working, presentation, section, and rendering), by sheet type (such as floor plan, ceiling plan, elevation), or by any other system that you find helpful.

NOTE You cannot mix basic category types. For example, you cannot create a construct subcategory within the Views category or an element subcategory within the Sheets category.

Your Constructs tab might look like this:



The Benefits of Categories

Categories offer optimal organization and transparency. Even small building projects contain a large number of individual drawings that are difficult to track. Putting them into descriptive categories helps you quickly find the correct files.

Categories help you to assemble views. When you create views of your building data, you can use categories as selection or filter criteria. For example, for a complete view of framing constructs in your building, you could set up a view that references a Framing subcategory, thereby referencing all drawing files from that category. If you add more framing construction to the Framing category later, the view is updated to include the appropriate constructs. For more information, see Creating a View Drawing: Selecting the Constructs on page 304.

Methods of Creating Categories

You can create categories on the Project Navigator palette or in Windows Explorer as described in the topics that follow.

Creating a Category in the Drawing Explorer

Use this procedure to create a new category in the Drawing Explorer.

1 On the Quick Access toolbar, click Project Navigator .

2 Navigate to the tab for the category type you want to create.

3 If you want to create a sheet category, click the Sheets tab, and click (Explorer View).

4 To create a category under an existing category, click the existing category in the tree, and create a new subcategory using either of the following methods:

- Right-click, and click New ➤ Category.
- Click on the toolbar at the bottom of the tab.

5 Enter a name for the category, and press *ENTER*.

You can now add project files to the new category.

Creating a Category from Windows Explorer

Use this procedure to create a new category in your project by dragging a folder from Windows Explorer into the Drawing Explorer of the Project Navigator palette. This adds a folder and its contents to your project.

1 On the Quick Access toolbar, click Project Navigator .

2 Navigate to the tab for the category type you want to create.

3 If you want to create a sheet category, click the Sheets tab, and click (Explorer View).

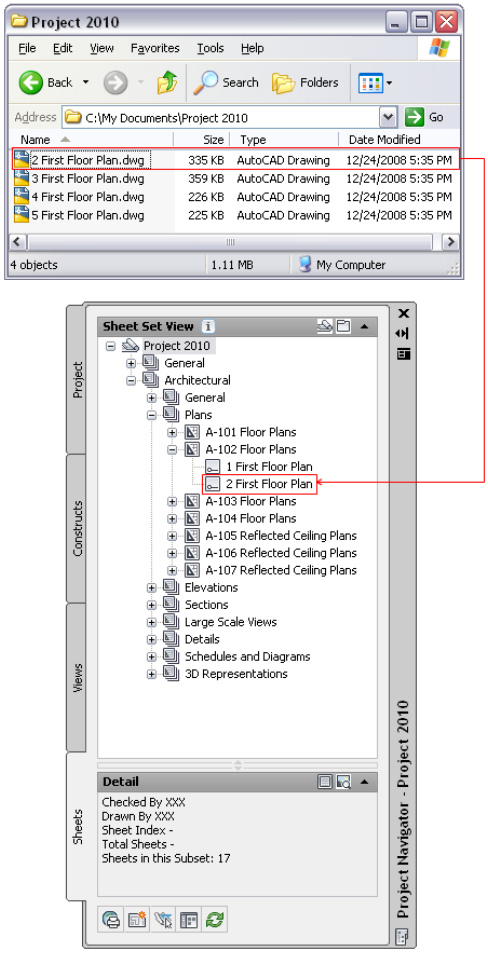
4 Start Windows Explorer and position it next to the Project Navigator.

5 Select the folder in Windows Explorer from which you want to create a category.

6 Place the folder in the Drawing Explorer of the selected tab of the Project Navigator:

If you want to…	Then…
move the folder out of its current location	drag the folder to the desired location.
copy the folder from its current location	CTRL-drag the folder to the desired location

Dragging a folder from Windows Explorer to Project Navigator



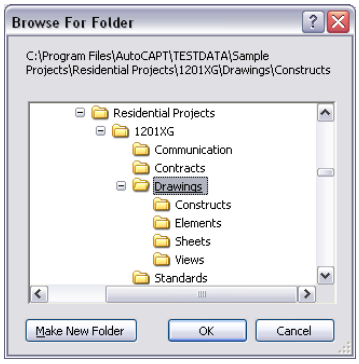
NOTE If the folder you are dragging onto the Project Navigator palette contains drawing (DWG) files, you are prompted to add each one as a project file. For example, if you drag a folder into the Elements category in the Drawing Explorer, the Add Element dialog displays prompting you to add each DWG file within that folder as an element. For detailed information on converting existing drawing files into project files, see, Converting a Drawing to a Construct on page 271 and Converting a Drawing to an Element on page 287.

For more information on updating files, see Repath the Project on page 350.

Specifying the Location of Top-Level Categories

When you want to specify an alternate location for the top-level category folders (Constructs, Elements, Views, and Sheets), the best practice is to start with a new project. Organize the project structure in Windows Explorer first, with the categories located in the same root folder as the APJ file. For example, you could structure your project with Constructs, Elements, Views, and Sheets under a category called Drawings. For more information, see Creating a New Project on page 216.

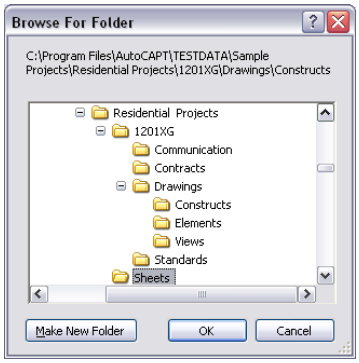
Top-level categories within project structure



These top categories can be directed to point to unique folders, but they cannot be an ascendant or descendant of each other in the tree structure. When you want to change the location of a category in an existing project, create the new category in Windows Explorer, and move the files from the old category into the new category in Windows Explorer first before you redirect the category.

NOTE If you locate top-level category folders outside the project folder, the project cannot be used as a template for new projects.

Top-level category located outside the project folder



Redirecting Top-Level Categories

Use this procedure when you want to change the location of the top-level categories in your project after you have created new category folders in Windows Explorer. You can redirect the path of Constructs, Elements, Views, and Sheets.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Project tab, and under Current Project, click .

3 In the Project Properties dialog, expand Advanced, and under Folders for Redirect Project Folders, select Yes.

4 Click for the category you wish to redirect, and browse to the location for the new folder.

5 Select the new folder, and click OK.

Paths for files within the category are redirected to the new location.

Changing the Subcategory of a Project File

By default each drawing file you create within a project is assigned to one of the top-level, predefined categories—Elements, Constructs, Views, or Sheets. After you have created a more detailed category system for your project, you can move drawing files into the subcategories.

Creating a File in a Subcategory

Use this procedure to create a project file within a subcategory.

1 On the Quick Access toolbar, click Project Navigator .
2 Navigate to the tab for the file type you want to create.
3 If you want to create a file in a sheet category, click the Sheets tab, and click (Explorer View).
4 Locate the subcategory in which you want to create a project file.
5 Select the subcategory, right-click, and click New ➤ Element/Construct/ General View Dwg/Section/Elevation/Detail/Sheet.

NOTE Alternatively, you can use the Add button at the bottom of the tab.

6 Specify the properties of the new file.

For more information on specifying new project files, see the appropriate sections for the individual file types.

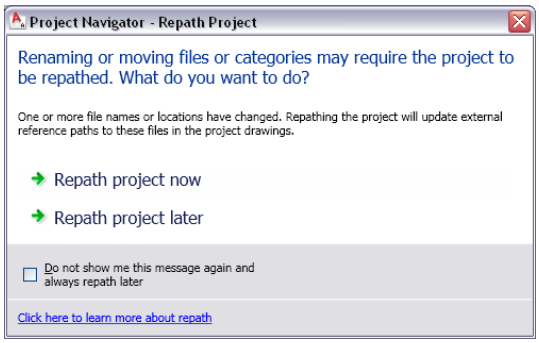
Changing the Category of an Existing File

Use this procedure to change the category of an existing file.

1 On the Quick Access toolbar, click Project Navigator .
2 Navigate to the tab for the category type you want to change.
3 If you want to change a sheet category, click the Sheets tab, and click (Explorer View).
4 Locate the project file you want to move to another category.
5 Change the file category using any of the following methods:

- Select the file, right-click, and click Properties. In the Modify dialog, change the file category, and click OK.
- Select the file, and drag it into another subcategory.
- Select the file, right-click, and click Cut. Select the destination category, right-click, and click Paste.

The Project Navigator - Repath Project dialog displays.



6 Update your files to display the changes to your project:

If you want to…	Then…
update all project files at this time	click Repath project now.
update all project files at another time	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and display in the Project Repath Queue dialog the next time you open it.

7 Alternatively, click to repath all files in the project at any time.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

Deleting a Category

Use this procedure to delete unneeded categories from a project.

If you delete a category that contains drawings, the drawings are deleted with the category.

NOTE Deleting a category from Windows Explorer may result in inconsistent project data.

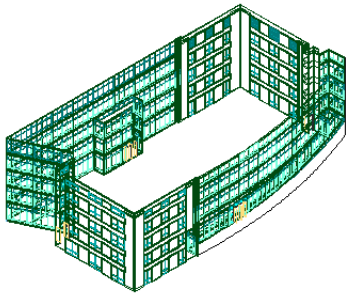
1 On the Quick Access toolbar, click Project Navigator .
2 Navigate to the tab for the category type you want to delete.
3 If you want to delete a sheet category, click the Sheets tab, and click (Explorer View).
4 Select the category you want to delete, right-click, and click Delete.
5 Click Yes in the subsequent dialog.

Constructs

Constructs are the main building blocks (or base drawing files) of the building model. A construct represents one unique portion of a building, such as a building core, an apartment, or an entire floor.

You assign a construct to a level and a division within the project. For example, you could assign an architectural construct named Interior Partitions—First Floor/South Wing to the first level and the south wing division of the building. You could also assign the structural construct Framing—First Floor/South Wing to the first level and south wing division, but it has a different purpose. Constructs can span more than one level, a requirement for objects such as curtain walls.

3D view of spanning curtain wall construct



Construct Files

A construct is a drawing (DWG) file. As opposed to non-project related drawing files, an additional XML file with the same name is created. The accompanying XML file contains information to connect the construct to the project.

NOTE The XML file is created and updated automatically. You do not need to edit it, but be careful not to accidentally delete it in Windows Explorer.

Copying Constructs to Levels

In multi-story buildings, levels may have identical floor plans. You can create the constructs for one level and copy them to the other levels in one quick step. For detailed information, see Copying Constructs to Levels on page 270.

Converting Legacy Drawings to Constructs

You can convert an existing drawing file into a construct within a project. You specify the subcategory into which to move or copy the source drawing.

When you convert a legacy drawing file into a construct:

- The drawing file is either moved, copied, or connected through a link to the project category you specify.
- You assign a level and a division to the construct.
- If necessary, you give the construct a different name, and add a description to it.

For detailed information, see Converting a Drawing to a Construct on page 271.

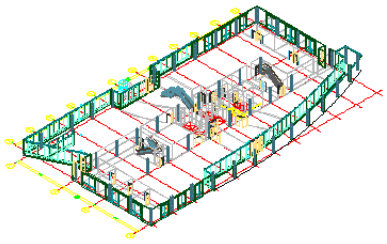
Constructs and Views

You use constructs to create views of a project. You could create a view named First Floor, which displays the following constructs:

- Interior Partitions—First Floor/South Wing
- Framing—First Floor/South Wing
- Ceiling—First Floor/South Wing
- Spanning Front Curtain Wall

This view would contain all objects in the South wing of the first floor. You select the constructs to include in the view when you identify view properties. You can add or remove constructs from views.

3D view of building first floor

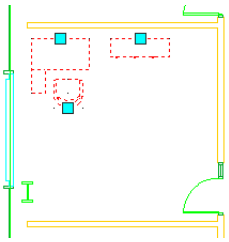


When To Start with Constructs

You start creating constructs when you want to assemble the basic objects of your building project into base files.

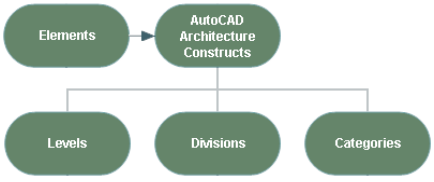
Typically, you begin a project by creating constructs. Adding optional elements often comes later in the process. For example, perhaps you know how many offices you need on a floor before you know the exact furniture layout of the offices. Therefore, you would first create the construct for the office walls and doors, First Floor—Office Space. Later, you could create elements for desk/chair combinations or generic printer/copier layouts and reference them into the construct with the office walls and doors.

Plan view of construct with highlighted furniture elements



The Role of Constructs in the Building Project

Constructs are the main building blocks or base files of the building model. A construct can contain referenced elements and building objects, such as walls, roofs, and doors. It can also contain more abstract information, like structural grids, building outlines, and footpaths. After creating constructs, you can create different views of your building data. A view might contain the framing constructs for floors 1–4, the foundation construct, and the column grid construct. Or, a view of the first floor might include the partition walls of the first floor, the framing of the first floor, and the shell components of the building.



The Content of Constructs

There are 3 different types of content you can place in a construct:

- **Drawing objects:** You can draw an entire floor, apartment layout, a frame drawing, or a ceiling grid as a construct. Also, spanning objects like curtain walls or elevator shafts are usually created directly as constructs.
- **Element references:** You can display repeating components within the construct, such as desk/chair combinations, bathroom layouts, or stairs. For more information, see Referencing Elements into Constructs on page 274, and Referencing an Element into Multiple Constructs on page 276.
- **A combination of drawing objects and element references:** If you have a floor with different office types, but repeating furniture elements, you could draw the office walls directly in the construct but reference the furniture as elements.

You should not, as a general rule, reference constructs into constructs. A construct has a defined level and division assignment. If a construct were to be referenced into another construct, it may have 2 contradicting level and division assignments. However, there are situations where the necessity to do this can occur. For example, when you are checking the correct vertical alignment of a ceiling in the building, you could view a ceiling construct with an overlaid floor plan construct in it. Or, you might want to display alternating versions of a 2 car garage and a 3 car garage within a plan construct. If you encounter a situation where you would need to do this, there are several options that can serve as a work-around:

- Overlay the construct onto the other construct.
- Convert the first construct to an element, as described in Converting a Construct to an Element on page 281, and then reference it into the other construct.

  WARNING Do not attach property set data to an overlaid construct from within the host construct. This data is not carried forward into views. Attach the property data locally in the overlaid construct.

- Create a view into which you reference both constructs. For more information, see Creating a New View Drawing on page 302.

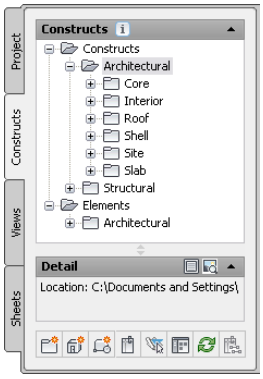
Which of these options is best for you largely depends on your workflow and the results you want to achieve.

Creating a New Construct

Use this procedure to create a new construct within a project.

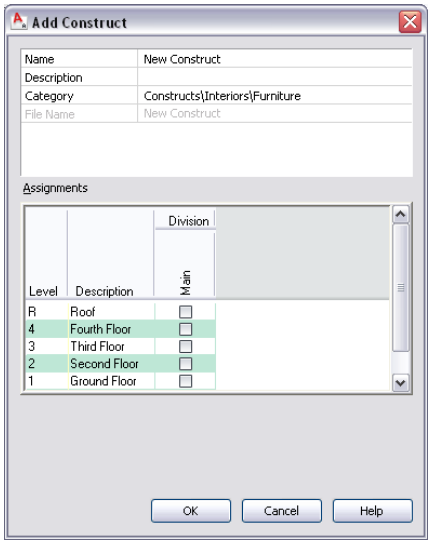
1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the Constructs category or subcategory where you want to add the new construct.



3 Open the Add Construct dialog using one of the following methods:

- Right-click the category in which to place the new construct, and click New ➤ Construct.
- On the toolbar at the bottom of the Constructs tab, click . (You then specify the category in the dialog.)



4 Define the construct properties:

If you want to…	Then…
name the new construct	enter a name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the construct	click the setting for Description, enter a description of the construct, and click OK.
change the category of the construct	select a category from the Category list. By default, the category you chose in step 3 is suggested.

If you want to…	Then…
select a different template file	click , and browse for a new template. The software uses the default template set for constructs in the project.
assign the construct to a level and a division	select the correct level and division in the assignments table. Select the desired level row and the division column, and check the appropriate box. **NOTE** You should check only one level and division. Multiple levels and divisions create spanning constructs.

5 If you want to work in this construct immediately, select Open in drawing editor.

For information about other methods of opening constructs, see Opening and Closing a Construct on page 273.

6 Click OK.

7 Edit the construct as necessary:

- Add objects to the construct.
- Reference elements into the construct.
  For information on adding content to constructs, see The Content of Constructs on page 268.

8 Close the construct using either of the following methods:

- Right-click the construct in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

9 Click Yes to save the changes in the drawing, if necessary.

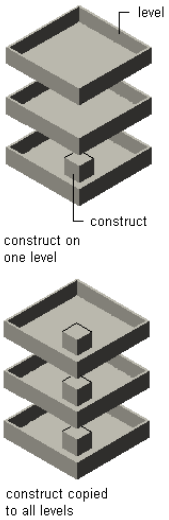
10 To update the tree view in the Drawing Explorer, click .

Copying Constructs to Levels

Use this procedure to copy a construct to multiple levels.

Copying constructs to levels is an easy way to fill multi-story buildings with content. You draw the construct for the first level, and then create a copy of that construct for each level you select.

Copying constructs to all levels schematic



1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, select the construct to copy to multiple levels, right-click, and click Copy Construct to Levels.

3 Select the levels on which to create a copy of the construct.

NOTE The level on which the original construct is situated is selected by default. You cannot clear the selection here.

4 Click OK.

A new construct is created for each level selected. The level number is appended in brackets after the construct name.

NOTE To rename a copied construct, select it in the Drawing Explorer, right-click, and click Rename.

Converting a Drawing to a Construct

You may have drawing files in AutoCAD Architecture that you want to convert into constructs. When you convert a drawing into a construct:

- The drawing file is either moved, copied, or connected via a link to the project category you specify.
- You assign a level and a division to the construct.
- If necessary, you give the construct a different name, and add a description to it.

There are 2 ways to convert a drawing file into a construct: you can open the drawing file in AutoCAD Architecture and save it as a construct, or you can drag a drawing file from Windows Explorer to the Project Navigator.

Converting Drawing Files by Saving as a Construct

Use this procedure to convert a drawing file to a construct by opening the file in AutoCAD Architecture and then saving it as a construct.

1 Click ➤ Open ➤ Drawing.

2 In the Select File dialog, select the file, and click Open.

3 On the Quick Access toolbar, click Project Navigator .

4 On the Constructs tab, locate the Constructs category or any of its subcategories.

5 Right-click, and click Save Current Dwg as Construct.

6 Define the construct properties:

If you want to…	Then…
change the name of the drawing file	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the construct	click the setting for Description, enter a description of the construct, and click OK.
change the category of the construct	select one from the Category list. By default, the category you chose in step 4 is suggested.
assign the construct to a level and a division	select the correct level and division in the assignments table. Select the desired level row and the division column, and check the appropriate box. **NOTE** You should check only one level and division. Multiple levels and divisions create spanning constructs.

7 Click OK.

Converting Drawing Files Using Windows Explorer

Use this procedure to convert drawing files to constructs by dragging and dropping them from Windows Explorer.

Windows Explorer offers 3 different modes of conversion:

- Converting a file to a construct and moving it into a project folder
- Copying a file, and converting the copy to a construct in a project folder
- Converting a file to a construct and creating a link to its original location

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Constructs tab.

3 Start Windows Explorer, and position it next to the Project Navigator.

4 In Windows Explorer, open the folder that contains the drawing file.

5 Place the drawing in the Constructs category or one of its subcategories:

If you want to…	Then…
move the drawing into the selected category, and convert it to a construct	drag the drawing into the desired location in the Drawing Explorer.
move a copy of the drawing into the selected category, and convert it to a construct	CTRL-drag the drawing into the desired location in the Drawing Explorer.
create a link to the drawing in its original location, and convert it to a construct	ALT-drag the drawing into the desired location in the Drawing Explorer.

NOTE You can also drag an entire folder into the project. The folder is converted into a category, and all drawings within it are converted to constructs. For instructions on converting legacy folders to categories, see Creating a Category from Windows Explorer on page 261.

6 Define the construct properties:

If you want to…	Then…
change the name of the drawing file	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the construct	click the setting for Description, enter a description of the construct, and click OK.
change the category of the construct	select from the Category list. By default, the category you chose in step 5 is suggested.
assign the construct to a level and a division	select the correct level and division in the assignments table. Select the desired level row and the division column, and check the appropriate box. **NOTE** Unless you are defining a spanning construct, you should check only one level and division. Multiple levels and divisions create spanning constructs.

7 Click OK.

Opening and Closing a Construct

Use this procedure to open and close a construct. For information about additional commands available on the context menu, see The Drawing Explorer Context Menu on page 244.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the Constructs category or the subcategory that contains the construct to open.

3 Open the construct using either of the following methods:

- Select the construct, right-click, and click Open.
- Double-click the construct.

The construct is opened in the drawing area of AutoCAD Architecture.

When you open a construct, the status line in the AutoCAD Architecture drawing area displays the name of the associated project.

4 Close the construct using either of the following methods:

- Right-click the construct in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

5 Click Yes to save the changes in the drawing, if necessary.

Dragging Objects into a Construct

Use this procedure to drag and drop objects from the drawing screen into a construct.

When you create a new construct, you have several choices for adding content to it. You can draw objects within the construct, you can reference elements into a construct, or you can drag and drop objects from other drawing files into a construct.

1 Open the drawing that contains the objects you want to drag and drop into the construct.

The drawing containing the objects is not required to be a part of a project.

2 On the Quick Access toolbar, click Project Navigator .

3 On the Constructs tab, locate the Construct to which you want to add objects from another drawing file.

4 In the open drawing file, select the objects you want to drag and drop into the construct.

5 Move or copy the objects into the construct.

If you want to…	Then…
move the objects from the open drawing to the construct	drag them from the drawing onto the desired construct in the Drawing Explorer.
copy the objects from the open drawing to the construct	CTRL-drag them from the drawing onto the desired construct in the Drawing Explorer.

NOTE You can also drop objects on the category to create a new construct containing the objects.

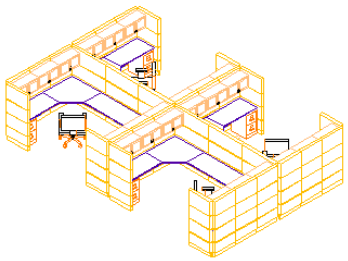
Referencing Elements into Constructs

There are several ways to reference an element into a construct:

If you want to…	Then…
create a link from the element to the construct	attach an element as an external reference. Any changes to the referenced element are displayed in the construct when

If you want to…	Then…
	it is opened or refreshed. For more information, see Attaching an Element as an External Reference to a Construct on page 275.
create a link from the element to the construct	overlay an element as an external reference. An overlaid reference is not included when the construct is attached or overlaid as a reference to a view. For more information, see Overlaying an Element as an External Reference to a Construct on page 276.
cut off the link between the element and the construct	insert an element as a block reference. The inserted element is converted to a block and is not updated when the reference element is changed. You can, however, edit the block in the construct. For more information, see Inserting an Element as a Block into a Construct on page 276.

3D view of cubicle element referenced 4 times into office space construct



Attaching an Element as an External Reference to a Construct

Use this procedure to attach an element as an external reference to a construct.

For detailed information on attaching external references to drawings, see “Reference Other Drawing Files (Xrefs)” in AutoCAD Help.

1. On the Quick Access toolbar, click Project Navigator .
2. On the Constructs tab, select the element to reference.
3. Reference the element into a construct using one of the following methods:
   - With a construct open in your drawing area, drag the element into the open construct drawing.
   - With a construct open in your drawing area, right-click the element, and click Xref Attach.
   - Right-click, click Attach Element To Constructs, and in the Attach Element to Construct dialog, select the constructs into which to reference the element, and click OK.

   The element is attached as an external reference to the construct at 0, 0, 0.

NOTE If you cannot see the element, it may be inserted at 0, 0, 0. Use the AutoCAD Zoom Extents command to display it.

Overlaying an Element as an External Reference to a Construct

Use this procedure to overlay an element as an external reference to a construct.

For detailed information on overlaying external references to drawings, see "Reference Other Drawing Files (Xrefs)" in AutoCAD Help.

1. On the Quick Access toolbar, click Project Navigator .
2. On the Constructs tab, locate the construct into which to reference an element, right-click, and click Open.
3. On the Project Navigator palette, locate the element to overlay.
4. Select the element, right-click, and click Xref Overlay.

   The element is inserted as an external reference into the construct.

NOTE If you cannot see the element, it may be inserted at 0, 0, 0. Use the AutoCAD Zoom Extents command to display it.

Inserting an Element as a Block into a Construct

Use this procedure to insert an element as a block into a construct.

For detailed information on blocks, see "Create and Use Blocks (Symbols)" in AutoCAD Help.

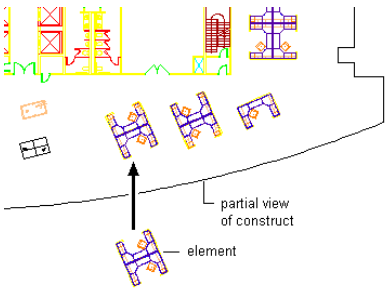
1. On the Quick Access toolbar, click Project Navigator .
2. On the Constructs tab, locate the construct into which to reference an element as a block, right-click, and click Open.
3. On the Project Navigator palette, locate the element to insert as a block.
4. Select the element, right-click, and click Insert as Block.
5. Specify the Insert options—such as insertion point, scale and rotation angle—and click OK.

Referencing an Element into Multiple Constructs

Use this procedure to reference an element into multiple constructs.

This procedure is useful for updating a number of similar floor constructs in a building.

Referencing an element into a construct



1. On the Quick Access toolbar, click Project Navigator .
2. On the Constructs tab, locate the element to reference into multiple constructs, right-click, and click Attach Element to Constructs.
3. Check the boxes of the constructs into which to reference the element.

NOTE As a shortcut, you can select an entire category for referencing.

4 Define the referencing method:

If you want to…	Then…
attach the element as an external reference	select the construct, right-click, and click Set to Attach. **NOTE** If the Set to Attach command is unavailable, the element is already set to attach.
overlay the element as an external reference	select the construct, right-click, and click Set to Overlay. **NOTE** If the Set to Overlay command is unavailable, the element is already set to overlay.

5 Repeat steps 5-6 for each construct the element should be attached to.

6 Click OK.

Elements are attached at 0, 0, 0.

Displaying External References of a Construct

Use this procedure to display a list of xrefs attached to a construct and to access the functions available for each xref.

1 On the Quick Access toolbar, click Project Navigator .

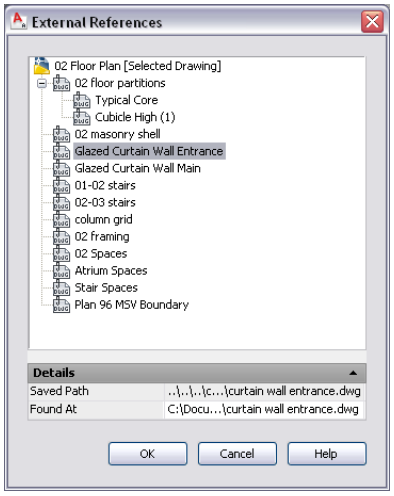
2 Click the Constructs tab.

3 In the Drawing Explorer, locate the construct for which to display external references, and select it.

4 Display the external references using either of the following methods:

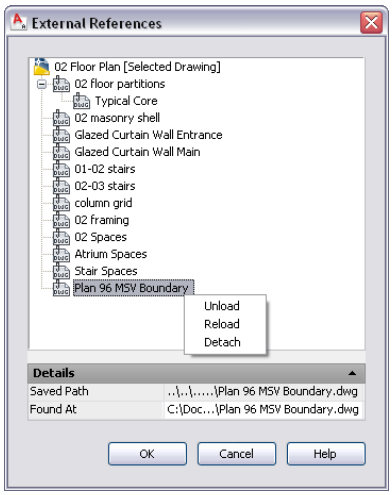
- Right-click, and click External References.
- On the toolbar at the bottom of the Constructs tab, click .

The External References dialog displays a list of xrefs in the construct.

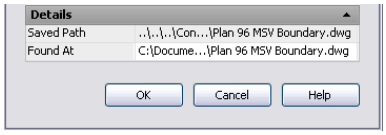


5 Expand or collapse the list by clicking individual items, and right-click to change the status of the xref, if necessary.

From the context menu you can unload, reload, or detach the attached xref. For more information, see Reference Other Drawing Files in AutoCAD Help.



6 View the details of the xref:



- Saved Path displays the saved path, if any, that is used to locate the xref. This path can be a full (absolute) path or a relative (partially specified) path.
- Found At displays the path where the xref was found. If no path was saved for the xref, or if the xref is no longer located at the specified path, the program searches for the xref and displays the location here.

7 Click OK to close the dialog.

NOTE You can also display external references by opening the construct in the AutoCAD Architecture drawing area, and using the AutoCAD Xref Manager. For more information, see "Reference Other Drawing Files (Xrefs)" in AutoCAD Help.

Changing the Properties of a Construct

Use this procedure to change the properties of a construct.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the Constructs category or the subcategory that contains the construct you want to change, right-click, and click Properties.

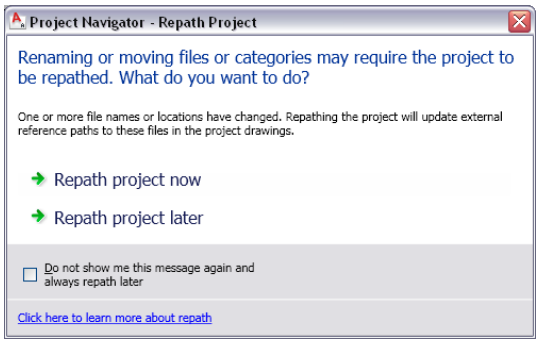
3 Change the construct properties:

If you want to…	Then…
change the name of the drawing file	enter a name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is dis-

If you want to…	Then…
	played under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the construct	click the setting for Description, enter a description of the construct, and click OK.
change the category of the construct	select one from the Category list. By default, the category you chose in step 3 is suggested.
assign the construct to a different level and a division	select the correct combination of both in the assignments table. Select the desired level row and division column, and check the appropriate box. **NOTE** Unless you are defining a spanning construct, you should check only one level and division. Multiple levels and divisions create spanning constructs.

4 Click OK.

The Project Navigator - Repath Project dialog displays if you changed the name or category of the construct.



5 Update your files to display the changes to your project:

If you want to…	Then…
update all project files at this time	click Repath project now.
update all project files at another time	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and display in the Project Repath Queue dialog the next time you open it.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

For more information on updating files, see Repath the Project on page 350.

Electronically Transmitting a Construct

Use this procedure to electronically transmit a construct drawing.

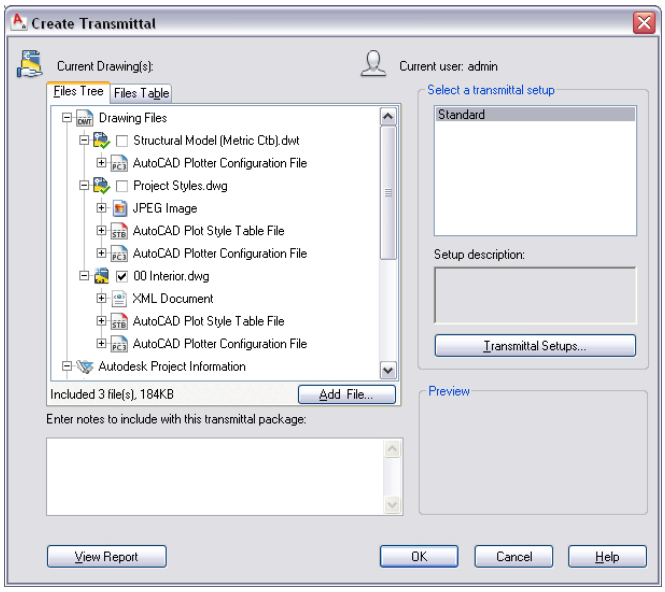
Electronically transmitting a drawing means that you package the drawing for delivery in electronic form. Drawing files in the transmittal package include all related dependent files such as external references and font files.

For more information about electronic transmittal, see "Package a Set of Files for Internet Transmission" in AutoCAD Help.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the Constructs category or the subcategory that contains the construct to transmit, right-click, and click eTransmit.

The Create Transmittal dialog is displayed.



3 In either the Files tree tab or the File Table tab, select the components to be included in the electronic package.

The Files Tree tab displays the included files sorted by type. The Files Table tab displays all files in a list view. You can sort the list by name, path, type, version, size, and date.

4 To include project information, double-click the setup under Select a transmittal setup, and in the Modify Transmittal Setup dialog, select Include project information under Include options.

For detailed information about packaging project information for an electronic transmittal, see Electronically Transmitting a Project on page 232

5 Click OK to start the electronic transmittal.

Deleting a Construct

Use this procedure to delete a construct.

For information on the consequences of deleting constructs, see Changing Constructs: Interactions with the Project on page 282.

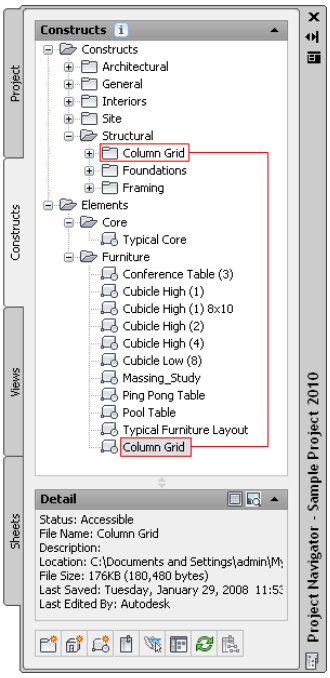
The construct must be closed in order to delete it.

NOTE Do not delete a construct from Windows Explorer. This might result in inconsistent project data.

1 On the Quick Access toolbar, click Project Navigator .
2 On the Constructs tab, locate the construct to delete, right-click, and click Delete.
3 Click Yes in the subsequent message box.

Converting a Construct to an Element

Use this procedure to convert a construct to an element.



You may create a construct, and then realize that this is actually a repeating element. For example, you might create a column grid and then decide to use it on another floor. You can easily convert the construct to an element and reference it into multiple constructs.

NOTE When you convert a construct to an element, the level and division information is lost. Should you later convert the element back to a construct, you must reassign to a level and division.

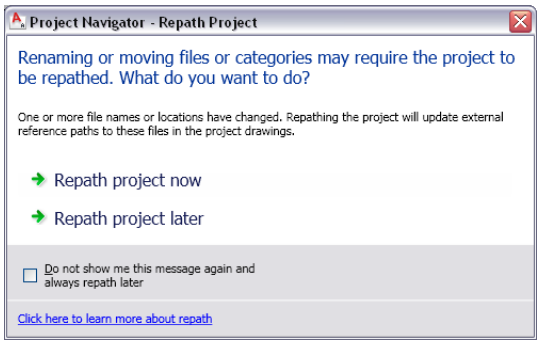
NOTE Do not drag a construct into the Elements folder within Windows Explorer. This will result in inconsistent project data.

1 On the Quick Access toolbar, click Project Navigator .
2 On the Constructs tab, locate the construct to convert to an element, and drag it into the Elements category or one of its subcategories.

NOTE If you want to convert the element back to a construct, drag the element to the Constructs category.

3 Specify the element properties, as described in Creating an Element on page 285.

The Project Navigator - Repath Project dialog displays.



4 Update your project files:

If you want to…	Then…
update all project files now	click Repath project now.
update all project files later	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and display in the Project Repath Queue dialog the next time you open it.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

For more information on updating files, see Repath the Project on page 350.

Changing Constructs: Interactions with the Project

Changes made to one part of a project frequently influence other parts of the project. The following information describes the changes you can make to a construct and the effects of the changes on other parts of the building project:

- **Adding a new construct:** When you add new constructs to a project, you must fill them with drawing objects or referenced elements. Also, you must create views in which to display them. For more information, see Creating a New View Drawing on page 302.
- **Changing the construct name and category (location):** Constructs are referenced into views. Therefore, any name and location changes to a construct need to be updated throughout the project. To update any xref paths to the construct, repath the project, as described in Repath the Project on page 350.

  WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

- **Changing the level and division of a construct:** If you change the level and division you may need to regenerate views. For more information, see Regenerating the View Drawings in a Project on page 310.

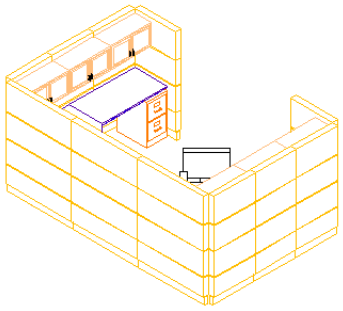
- **Deleting a construct:** If you delete a construct you may need to regenerate views. For detailed information on deleting constructs, see Deleting a Construct on page 280. For detailed information on views, see Views on page 297.

Elements in the Building Project

An element is a generic building block for multiple use. For example, you can create an element for a repeating design object like a desk/chair combination to place in a number of cubicles. You can also create an element for a typical bathroom layout and reference it multiple times into one or more constructs. Because you can annotate individual instances of an external reference, you can use the same element and annotate it differently in different locations.

Elements

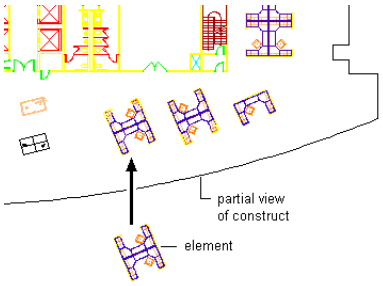
3D view of cubicle element



You can place the same element in different levels and divisions. If you create a bathroom layout as an element, you can use it on the second floor of the west wing as well as on the first floor of the east wing. To place the element on a specific floor and wing, you reference it into a construct. For example, you could create an element named Generic Bathroom Layout and reference it into constructs named First Floor—Left Apartment, First Floor—Middle Apartment, First Floor—Right Apartment, and so on.

For more information, see Elements in the Building Project on page 283.

Element repeated in construct



For information on scheduling repeating elements, see Attaching Property Sets to Objects from External References on page 358.

Element Files

An element is a drawing (DWG) file. As opposed to non-project drawing files, an additional XML file with the same name is created. The accompanying XML file contains information to connect the drawing file to the project.

NOTE The XML file is created and updated automatically. You do not need to edit it, but be careful not to accidentally delete it in Windows Explorer.

Converting Drawings to Elements

You can convert a drawing file into an element within a project. You specify the subcategory into which to move or copy the source drawing.

When you convert a legacy drawing file into an element:

- The drawing file is moved, copied, or linked to the project category you specify.
- You can assign a different name and add a description to the file.

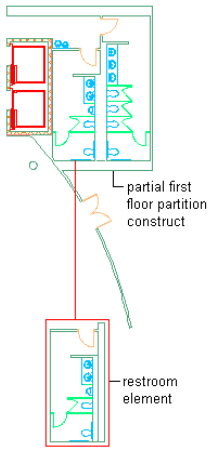
Element Templates

When you create a project, you specify a default template for new elements. For more information about project templates, see Project Support Files on page 209.

Constructs and Elements

An element is a generic building block for multiple use. If you create a bathroom layout as an element, you can use it on the second floor of the west wing just as well as on the first floor of the east wing. To place the element on a specific floor and wing, reference it into a construct. For example, you could create an element named Generic Bathroom Layout and reference it into constructs named First Floor, Second Floor, and Third Floor.

Referencing an element into a construct



Referencing Elements to Multiple Constructs

In multi-story buildings, levels may have identical elements. You can create an element once, and then reference it into multiple constructs in one single, convenient step. For detailed information, see Referencing an Element into Multiple Constructs on page 276.

When to Start with Elements

You would start creating elements when you can identify generic building blocks in your project.

Elements can be small units like a desk/chair combination or large units like an entire apartment layout or a generic furniture layout. You can also define an element that uses other elements as external references in its content. A generic building core element, for example, could contain references for bathroom elements or staircase elements. You can nest elements that are external references multiple levels deep.

Keep in mind these points when creating elements:

- An element must be referenced into a construct before it can be used for views.
- An element can be referenced directly into a sheet. This might be done for title blocks or the documentation of a detail on the sheet.
- An element can be uniquely scheduled.
- An element is re-usable.

Processing Elements in the Building Project

After you have created and modified some elements in your project, decide how to use them in the project. The following list describes typical uses for elements and where to find additional information:

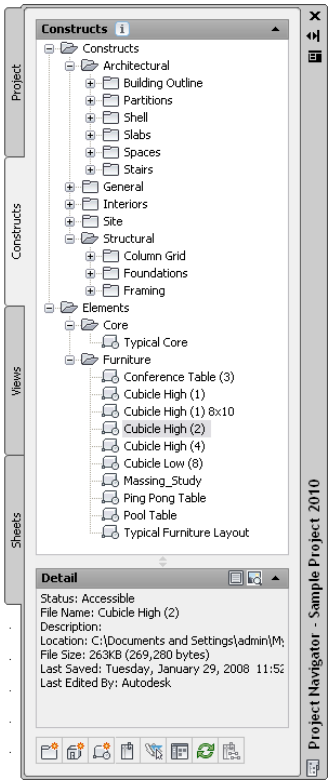
Use	Further Information
reference an element into a construct	This is the most frequent use case for an element. A generic element, like a bathroom layout, is referenced into a specific construct, like a floor plan. For more information, see Referencing Elements into Constructs on page 274 and Referencing an Element into Multiple Constructs on page 276.
reference an element into another element	For example, if you want to have different elements for single cubicles—a 4-cubicle group, you could create an element for one cubicle, and reference that 4 times into the 4-cubicle group element. For more information, see Referencing an Element into Another Element on page 293.
reference an element into a sheet	You can directly reference an element into a sheet. This can be useful for title block elements.

Creating an Element

Use this procedure to create an element.

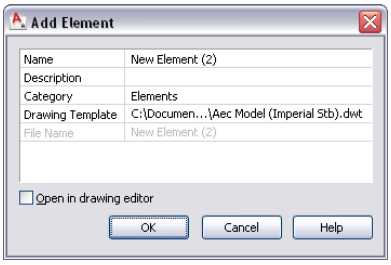
1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the Elements category or subcategory where you want to add the new element.



3 Open the Add Element dialog using one of the following methods:

- Right-click the category in which to place the new element, and click New ➤ Element.
- In the toolbar at the bottom of the Constructs tab, click . (You then specify the category in the dialog.)



4 Define the element properties:

If you want to...	Then...
name the new element	enter a name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.

If you want to…	Then…
add a description for the element	click the setting for Description, enter a description of the element, and click OK.
change the category of the element	select a category from the Category list. By default, the category you chose in step 3 is suggested.
select a different template file	click , and browse for a new template. By default, the default template for elements set in the project is used.

5 If you want to work in this element immediately, select Open in drawing editor.

For information about other methods of opening elements if you do not select this option, see Opening and Closing an Element on page 290.

6 Click OK.

7 Edit the element as necessary:

- Add objects to the element.
- Reference other elements into the element.
  For more information, see Referencing an Element into Another Element on page 293.

8 Close the element using either of the following methods:

- Right-click the element in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

9 Click Yes to save the changes in the drawing if necessary.

Converting a Drawing to an Element

You may have drawing files in AutoCAD Architecture that you want to convert into elements. When you convert a drawing file into an element:

- The drawing file is either moved, copied, or connected via a link to the element category you specify.
- If necessary, a different name is given to the file and a description is added to it.

There are 2 ways to convert a drawing file into an element: you can open the drawing file in AutoCAD Architecture and save it as an element, or you can drag a drawing file from Windows Explorer to the Project Navigator.

Converting Drawing Files by Opening and Saving as an Element

Use this procedure to convert a drawing file to an element by opening it in AutoCAD Architecture and then saving it as an element.

1 Click ➤ Open ➤ Drawing.

2 On the Quick Access toolbar, click Project Navigator .

3 On the Constructs tab, locate the Elements category, right-click, and click Save Current Dwg as Element.

4 Define the element properties:

If you want to…	Then…
change the name of the drawing file	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the element	click the setting for Description, enter a description of the element, and click OK.
change the category of the element	select one from the Category list. By default, the category you chose in step 4 is suggested.

5 Click OK.

6 Close the element using either of the following methods:

- Right-click the element in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

7 Click Yes to save the changes in the drawing, if necessary.

Converting Drawing Files from Windows Explorer

Use this procedure to convert drawing files to elements by dragging and dropping them from Windows Explorer.

Windows Explorer offers 3 different modes of conversion:

- Converting a file to an element and moving it into a project folder
- Copying a file, and converting the copy to the element in a project folder
- Converting a file to an element and creating a link to its original location

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Constructs tab.

3 Start Windows Explorer, and position it next to the Project Navigator.

4 In Windows Explorer, open the folder that contains the drawing.

5 Drag and drop the drawing in the Elements category or one of its subcategories:

If you want to…	Then…
move the drawing into the selected category, and convert it to an element	drag the drawing into the desired location in the Drawing Explorer.

If you want to…	Then…
move a copy of the drawing into the selected category, and convert it to an element	CTRL-drag the drawing into the desired location in the Drawing Explorer.
create a link to the drawing in its original location, and convert it to an element	ALT-drag the drawing into the desired location in the Drawing Explorer.

NOTE You can also drag an entire folder into the project. The folder is converted into a category, and all drawings within are converted to elements. For instructions on converting folders to categories, see Creating a Category from Windows Explorer on page 261.

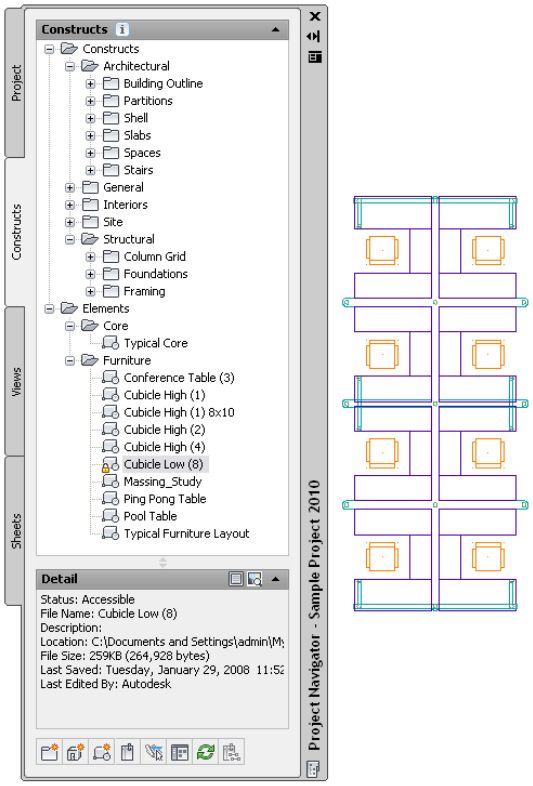
6 Define the element properties:

If you want to…	Then…
change the name of the drawing file	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the element	click the setting for Description, enter a description of the element, and click OK.
change the category of the element	select one from the Category list. By default, the category you chose in step 5 is suggested.

7 Click OK.

Opening and Closing an Element

Use this procedure to open and close an element. For information about additional commands available on the context menu, see The Drawing Explorer Context Menu on page 244.



When you open an element, the status line in the AutoCAD Architecture drawing area displays the name of the associated project.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the element you want to open.

3 Open the element using either of the following methods:

- Select the element, right-click, and click Open.
- Double-click the element.

The element is opened in the drawing area of AutoCAD Architecture. You can now edit it.

4 Close the element using either of the following methods:

- Right-click the element in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

5 Click Yes to save the changes in the drawing, if necessary.

6 To update the preview of the element in the Drawing Explorer, click .

Dragging Objects into an Element

Use this procedure to drag and drop objects into an element.

When you create a new element, you may choose to add content to it in several ways. You can draw objects within the element, you can reference one element into another, or you can drag and drop objects from other drawing files into an element.

1 Open the drawing that contains the objects you want to drag and drop into an element.

NOTE The drawing containing the objects is not required to be a part of a project.

2 On the Quick Access toolbar, click Project Navigator .

3 On the Constructs tab, locate the element to which you want to add objects from another drawing file.

4 In the open drawing file, select the objects you want to drag and drop into the element.

5 Move or copy the objects into the element:

If you want to…	Then…
move the objects from the open drawing to the element	drag the objects from the drawing onto the desired element in the Drawing Explorer.
copy the objects from the open drawing to the element	CTRL-drag the objects from the drawing onto the desired element in the Drawing Explorer.

NOTE You can also drag the objects from the drawing onto a category in the Drawing Explorer to create an element.

Changing the Properties of an Element

Use this procedure to change the properties of an element.

1 On the Quick Access toolbar, click Project Navigator .

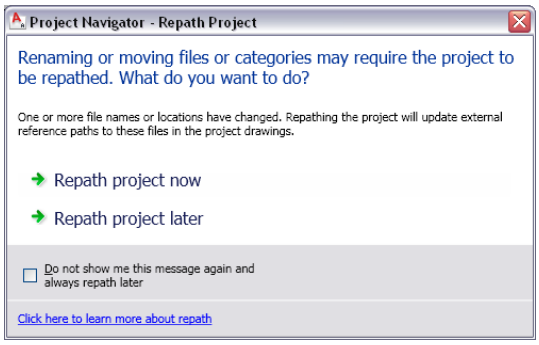
2 On the Constructs tab, locate the element you want to change, right-click, and click Properties.

3 Change the element properties:

If you want to…	Then…
change the name of the element	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
change the description of the element	click the setting for Description, change the description of the element, and click OK.
change the category of the element	select one from the Category list. Changing the category of an element means changing its location in the project.

4 Click OK.

The Project Navigator - Repath Project dialog displays.



5 Update your project files:

If you want to…	Then…
update all project files now	click Repath project now.
update all project files later	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and display in the Project Repath Queue dialog the next time you open it.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

Electronically Transmitting an Element

Use this procedure to electronically transmit an element drawing.

Electronically transmitting a drawing means that you package the drawing for delivery in electronic form. Drawing files in the transmittal package include all related dependent files such as external references and font files.

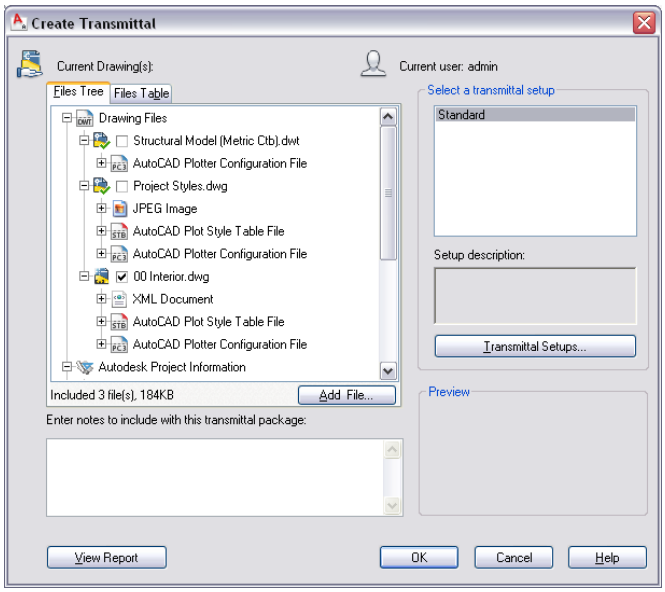
For more information about electronic transmittal, see “Package a Set of Files for Internet Transmission” in AutoCAD Help.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the element to transmit.

3 Select the element, right-click, and click eTransmit.

The Create Transmittal dialog is displayed.



4 On either the Files tree tab or the File Table tab, select the components to be included in the electronic package.

The Files Tree tab displays the included files sorted by type. The Files Table tab displays all files in a list view. You can sort the list by name, path, type, version, size, and date.

For detailed information about packaging project information for an electronic transmittal, see Electronically Transmitting a Project on page 232.

5 Click OK to start the electronic transmittal.

Deleting an Element

Use this procedure to delete an element.

The element must be closed in order to delete it.

NOTE Do not delete an element from Windows Explorer. This might result in inconsistent project data.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Constructs tab, locate the element to delete.

3 Select the element, right-click, and click Delete.

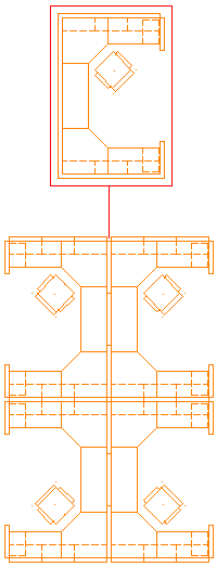
4 Click Yes in the subsequent message box.

Referencing an Element into Another Element

Use this procedure to reference an element into another element.

NOTE When you are working in a project environment, make sure that all files you are using belong to this project. Drawing files that do not belong to a project do not give access to the full functionality of Drawing Management. To reference a non-project drawing file into the project, convert the file into an element, and then reference it.

Cubicle element referenced 4 times into cubicle group



1 On the Quick Access toolbar, click Project Navigator .

2 Click the Constructs tab.

3 In the Drawing Explorer, locate and open the element into which you want to reference another element.

4 On the Project Navigator palette, locate the element to reference into the open element.

5 Reference the element into the open element using one of the following methods:

If you want to…	Then…
attach the element as an external reference to the open element	select the element in the Drawing Explorer, right-click, and click Xref Attach, or select the element in the Drawing Explorer, and drag it into the open element in the AutoCAD Architecture drawing area. When you attach an element as an external reference, you create a link from the referenced element to the current element; any changes to the referenced element are displayed in the current element when it is opened or refreshed.
overlay the element as an external reference on the open element	select the element in the Drawing Explorer, right-click, and click Xref Overlay. When you overlay an external reference, you also create a link from the referenced element to the current element. Unlike an attached reference, an overlaid reference is not included when the element is itself attached or overlaid as a reference to another element or construct.
insert the element as a block into the open element	select the element in the Drawing Explorer, right-click, and click Insert as Block. When you insert an element as a block reference into another element, the link between the referenced element and the current element is cut off. The inserted element is converted to a block and does not up-

If you want to…	Then…
	date when the reference element is changed. You can, however, edit the block in the current element.

6 If necessary, edit the external reference in the open element.

For more information on external references, see "Attach External References" in AutoCAD Help.

For more information on blocks, see "Create and Insert Symbols (Blocks)" in AutoCAD Help.

Displaying External References Attached to an Element

Use this procedure to display a list of xrefs attached to an element and to access the functions available for each xref.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Constructs tab.

3 In the Drawing Explorer, locate the element for which to display xrefs.

4 Select the element.

5 Display the xrefs using either of the following methods:

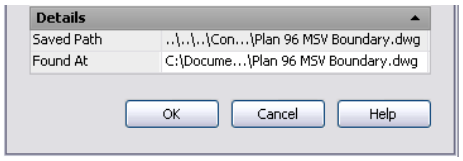
- Right-click, and click External References.
- On the toolbar at the bottom of the Constructs tab, click .

The External References dialog displays a list of xrefs in the element.

6 Expand or collapse the list by clicking individual items, and right-click to change the status of the xref, if necessary.

From the context menu, you can unload, reload, or detach the attached xref. For more information, see Reference Other Drawing Files in AutoCAD Help.

7 View the details of the xref:



- Saved Path displays the saved path, if any, that is used to locate the xref. This path can be a full (absolute) path or a relative (partially specified) path.
- Found At displays the path where the xref was found. If no path was saved for the xref, or if the xref is no longer located at the specified path, the program searches for the xref and displays the location here.

8 Click OK to close the dialog.

NOTE You can also display external references by opening the element in the AutoCAD Architecture drawing area and using the AutoCAD Xref Manager. For more information, see Reference Other Drawing Files in AutoCAD Help.

Converting an Element to a Construct

Use this procedure to convert an element to a construct.

If you create an element and realize later that you do not need this drawing as a repeating element, you can convert it into a construct.

NOTE Do not drag an element to the Constructs folder within Windows Explorer. This will result in inconsistent project data.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Constructs tab.

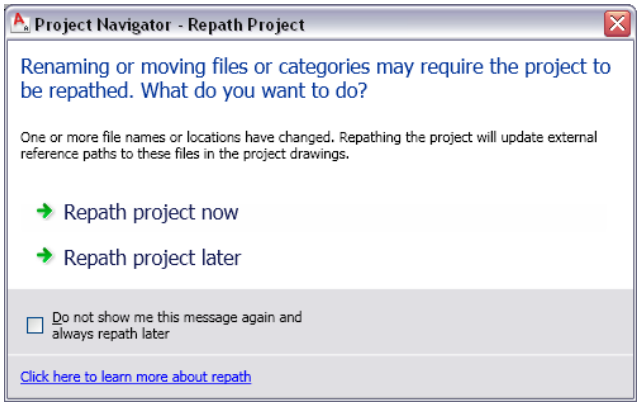
3 In the Drawing Explorer, locate the element to convert into a construct.

4 Select the element, and drag it into the Constructs category or one of its subcategories.

5 Specify the construct properties, as described in Creating a New Construct on page 268.

6 Click OK.

The Project Navigator - Repath Project dialog displays.



7 Update your project files:

If you want to…	Then…
update all project files now	click Repath project now.
update all project files later	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and display in the Project Repath Queue dialog the next time you open it.

NOTE If you want to convert the construct back to an element, drag it back to the Elements category.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

Changing Elements: Interactions with the Project

Changes made to one part of a project frequently influence other parts of the project. The following information describes the changes you can make to an element, and the effects of the changes on other parts of the building project.

- **Adding new elements:** When you add new elements to a project, you may reference them into other elements, constructs, or sheets.
- **Changing the element name and category (location):** Elements are used as external references in other files. When you change the name and the location of an element, external reference paths to it no longer correct. To update the project, repath it, as described in Repath the Project on page 350.

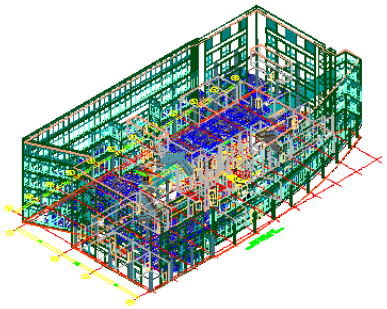
  WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

- **Deleting an element:** When you delete an element that has been referenced into another element or into a construct or a sheet, that drawing now has missing references. If a construct with deleted elements has been referenced into a view, and the view is updated, it also has missing references. Therefore, before deleting an element, check to see if it is still used elsewhere.
  For detailed information on deleting elements, see Deleting an Element on page 293.

Views

After the structure of the building project is defined, and constructs are assigned to levels and divisions, you can start to create view drawings. A view drawing references a number of constructs to present a specific view of the building project. To create a view drawing, you first decide which portion of the building you wish to look at and which type of view to generate. You could, for example, create a first-floor reflected ceiling plan or a second-floor framing plan, or create a composite view of all floors in the building. View drawings automatically reference the appropriate constructs according to their level/division assignments within the building. For example, to create a floor plan of the west wing of the second floor, you would create a view that references all constructs assigned to the second floor and the west wing. This would also include a curtain wall spanning the first through fifth floors.

3D view of entire building view



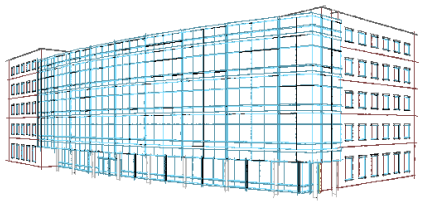
In a view drawing you also add data like annotation, dimensions, and schedule tables.

Types of View Drawings

There are 3 different types of view drawings in the Drawing Management feature:

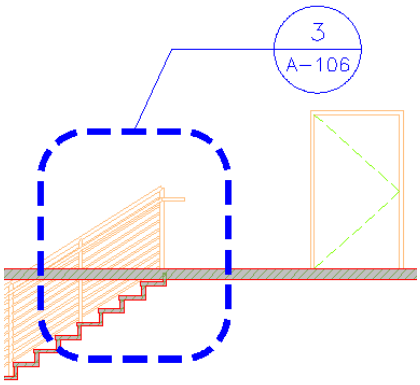
- **General view drawing**: A general view drawing contains referenced constructs from the project, representing a specific view on the building model. General view drawings are based on the general view template defined in the project settings.
  You can reference a view drawing in a sheet. When you reference the view drawing into a sheet, a sheet view is created that contains the view drawing reference.

  Perspective view of building

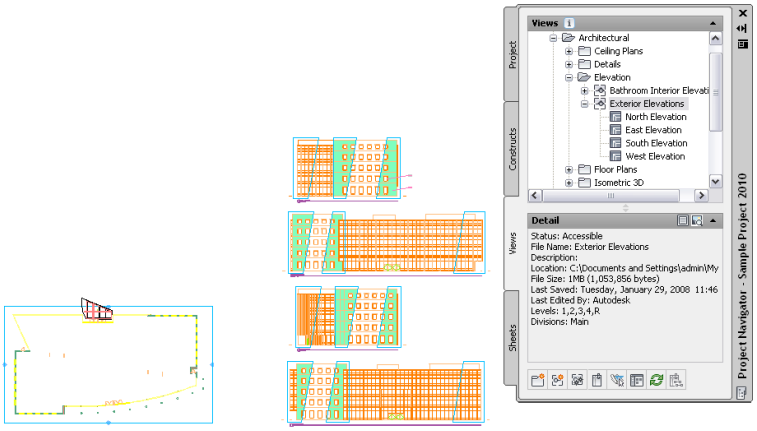
- **Detail view drawing**: A detail view drawing contains one or more model space views that show a defined portion of the detail drawing in the level of detail you specify. A model space view containing a detail can be associated with a callout. Detail view drawings are based on the detail view template defined in the project settings.

  Detail view in callout

- **Section/Elevation view drawing**: A section/elevation view drawing contains one or more model space views, each showing a defined portion of the section/elevation view drawing. A model space view containing a section or elevation can be associated with a callout. Section/Elevation view drawings are based on the section/elevation view template defined in the project settings.

Elevation view drawing with 4 model space views



When you reference a view drawing into a sheet, a sheet view is created that contains the view drawing reference.

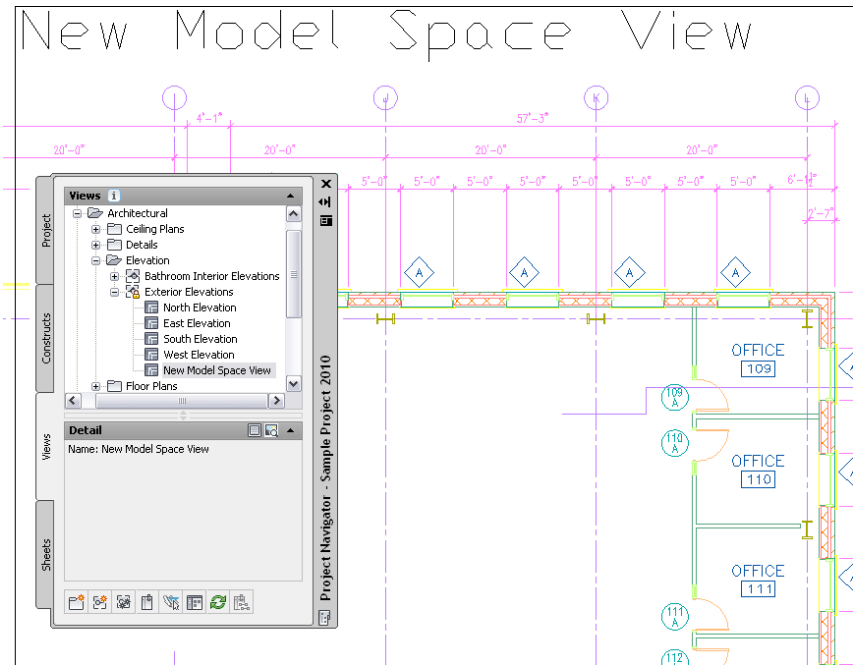
Model Space Views

A model space view is a portion of a view drawing that may be displayed in its own paper space viewport on a sheet. Model space views are an evolution of the Named Views concept of AutoCAD. Unlike Named Views, a model space view has a defined boundary. When a model space view is placed onto a sheet, a sheet view is created. A view drawing can contain any number of model space views.

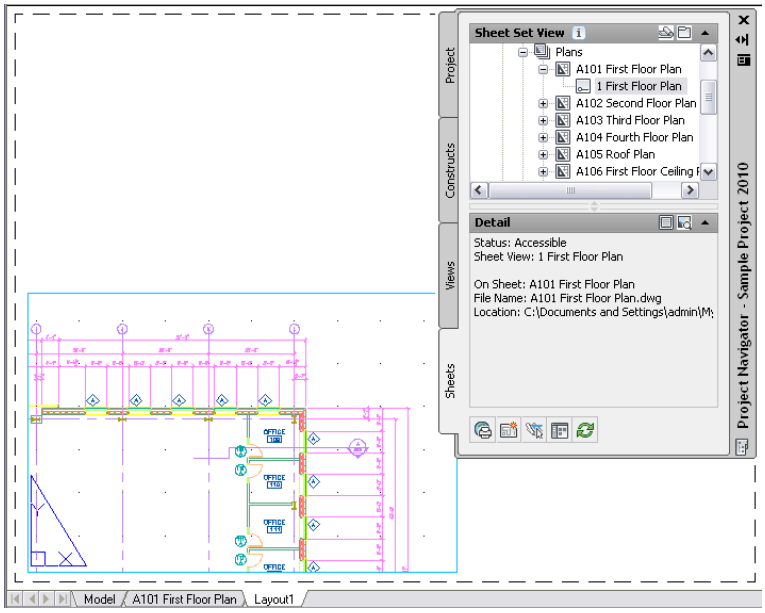
Sheet Views

A sheet view is a paper space viewport on the sheet that is created when you drag a view drawing or model space view from the Project Navigator palette onto a sheet.

Model space view of plan area



Sheet view placed on sheet



Sheet views can have viewport-specific layer overrides. When a view drawing or a model space view is referenced into a sheet view, these overrides will be retained, unless the project has been set up to synchronize views with sheets. In that case the layer settings of the view drawing will be reset in the sheet view when the sheet is opened, plotted, or published. For more information, see Synchronizing View Drawing Layers with Sheet View Layers on page 317.

For more information on viewport-specific layer overrides, see “Override Layer Properties in Viewports” in the AutoCAD help.

Views and Constructs

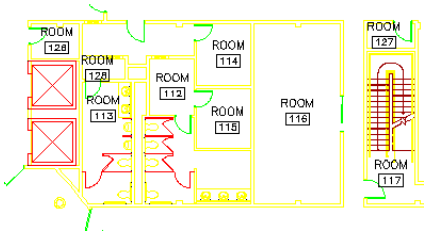
You create a view drawing by selecting constructs from the Project Navigator palette and referencing them into the view drawing. When you are creating multi-level views, each construct is referenced at its relative level height, with the lowest level inserted at Z = 0. For more information, see Creating a New View Drawing on page 302.

3D view of copied building core constructs at each building level

Views and Annotation

You can add annotation, dimensions, and schedule tables in a view drawing or on a sheet, depending on your specific workflow and needs. For more information on annotating a project, see Workflow for Annotating a Project on page 352.

View drawing with annotation tags



Updating View Drawings

A view drawing can include either individual constructs or entire construct categories. For example, if you select the Architectural—First Floor construct category, all constructs within this category at the appropriate level or division are included in the view drawing. If you add constructs to that category later, the view drawing is automatically regenerated to include the new constructs as applicable. Using categories helps you keep your view drawings current throughout the project.

View Templates

When you create a project, you set a default template for new view drawings. There are separate templates for general view drawings, detail view drawings, and section/elevation view drawings.

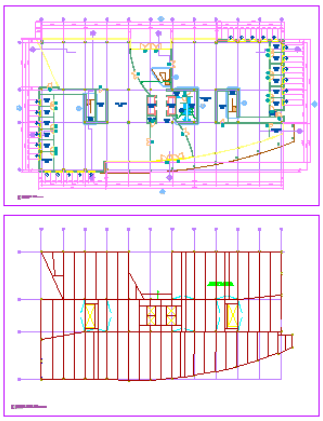
The default view template should be saved so that it will create a drawing that opens to the Model tab. When you create a new view drawing, all constructs that you assign to it will be referenced into the view drawing. If the template does not open with model space active, the building will be referenced into paper space.

For more information about project templates, see Project Support Files on page 209.

When to Start with Views

Typically, you create view drawings and model space views after you have defined levels, divisions, and the basic constructs. For example, you could create the following series of views for individual floors: First Floor Plan, Second Floor Plan, Basement Plan, Roof Plan. You could also create a series of views based on plan type, such as: Plan View, Model View, Reflected View. Another approach could be by function; for example: Walls, Framing, Furniture. Only constructs can be referenced into a view drawing. To see elements in a view, they must be referenced by a construct.

First floor plan (top) and framing plan (bottom)

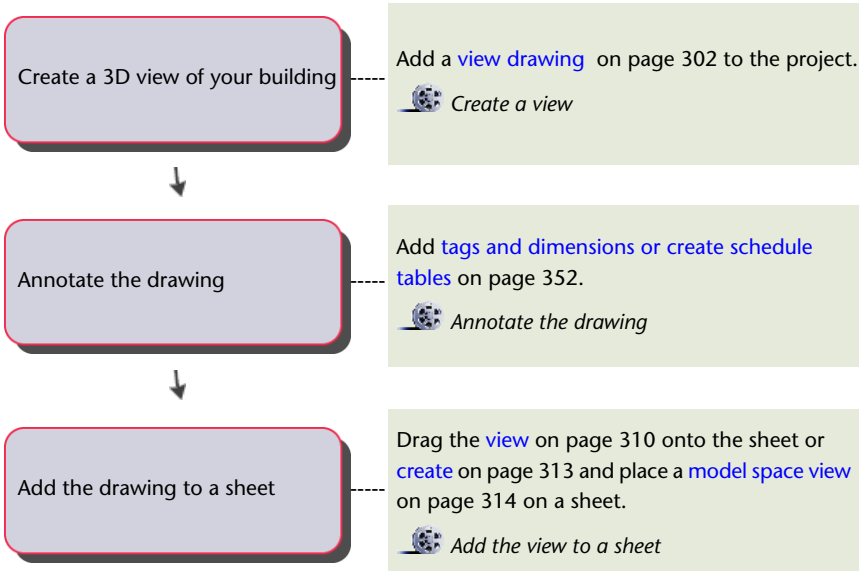


Working in a view, you add tags, dimension the building objects, and create a schedule table. Tags and schedule tables may contain a number of project properties, such as level and division assignments. For detailed information on annotating a project, see Workflow for Annotating a Project on page 352.

After you have assembled a view drawing, you can create model space views in it. These model space views are later placed on sheets, creating sheet views.

Workflow to Create View Drawings

A view is a composite of constructs from your project.



Creating a New View Drawing

A wizard leads you through the steps for creating a view drawing as described in the topics that follow.

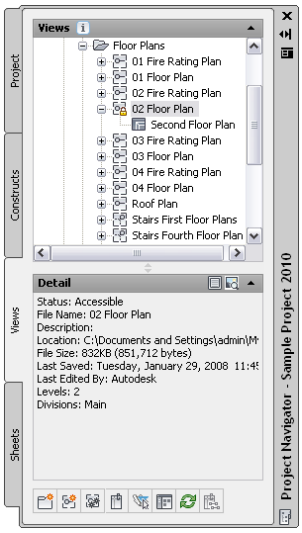
NOTE View drawings are containers for constructs. Typically, you create a view drawing after you add the necessary constructs to the project. However, you can also create an empty view drawing first, and reference constructs into it later.

Creating a View Drawing: Defining General Properties

Use this procedure to specify the name, description, category, and template file for a new view drawing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab, and locate the Views category or subcategory where you want to add the new view drawing.



3 Add a new view drawing to the project using either of the following methods:

- Right-click the category in which to place the new view drawing, click New View Dwg, and click the view type (General, Section/Elevation, or Detail).
- On the toolbar at the bottom of the Views tab, click , and in the Add View dialog, click the view type (General, Section/Elevation, or Detail).

4 In the Add <View Type> View dialog, define the General properties for the view:

If you want to…	Then…
name the new view drawing	enter a name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220.
enter a description for the view drawing	click the value for Description, enter a description of the view, and click OK.
change the category of the view drawing	click the value for Category, and select a category from the list. The category you chose in step 3 is recommended.
select a different template file	click , and browse for a new template. The default template for view drawings set in the project is recommended.

5 Click Next, and continue with assigning levels and divisions. For more information, see Creating a View Drawing: Assigning Levels and Divisions on page 304.

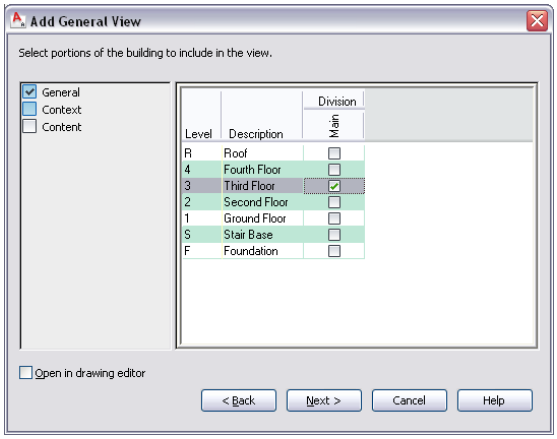
Creating a View Drawing: Assigning Levels and Divisions

Use this procedure to select portions of the building to include in the view by assigning levels and divisions. You can choose multiple levels and divisions for a view drawing; for example, to create a view of the entire building. This provides the context for the view drawing.

When you select one or more levels as a view context, all constructs that belong to the selected levels are referenced into the view drawing. The lowest level in the view is inserted at an elevation of 0' - 0". A spanning element would be referenced at the elevation of the lowest level to which it is assigned.

The levels and divisions you choose for the context serve as a preselection for selecting the constructs. For example, if you choose the first level and the south wing as the view context, all constructs belonging to that level and wing are selected as content in the next step by default. You can exclude constructs if you wish, but preselection saves time and effort.

1 Define the general properties of the view drawing, as described in Creating a View Drawing: Defining General Properties on page 303.



2 In the Add <View Type> View dialog, select the levels and divisions to include in the view drawing.

3 When you finish defining levels and divisions, click Next, and proceed to defining the view content. For more information, see Creating a View Drawing: Selecting the Constructs on page 304.

Creating a View Drawing: Selecting the Constructs

Use this procedure to select constructs to be referenced in the view drawing—the content. By default, each construct is attached as an external reference. For detailed information on attaching and overlaying external references, see “Reference Other Drawing Files” in AutoCAD Help.

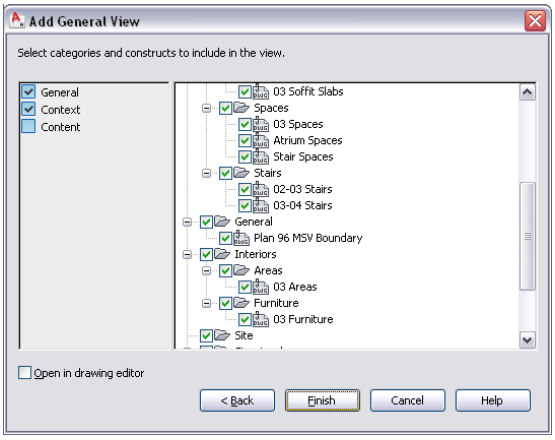
Selecting constructs is the key to creating a view drawing. The view drawing consists mainly of referenced constructs.

There are several ways to make the selection of constructs easier:

- **Preselect levels and divisions:** Depending on the level and division you selected previously as the context, all constructs at that level and division are already checked.

- **Work with categories:** When you select a category, all constructs within that category are selected. When you add constructs to the category later, they are included in the view drawing.

1 Define the general properties and the context of the view drawing, as described in Creating a View Drawing: Defining General Properties on page 303 and Creating a View Drawing: Assigning Levels and Divisions on page 304.



2 Create the selection set of constructs for the view drawing:

If you want to…	Then…
select an entire category to include in the view drawing	select the category. All constructs in the category are selected automatically. When you add constructs to the category later, they are included in the view drawing.
select a construct to include in the view drawing	expand the categories as needed, and select the construct.
exclude a category from the view drawing	clear the category's box. All constructs in the category are cleared automatically.
exclude a construct from the view drawing	clear the construct.

3 Determine the referencing mode of the constructs in the view drawing:

If you want to…	Then…
attach the construct to the view drawing	select the construct, right-click, and click Set All to Attach. **NOTE** Attaching an external reference is the default insertion method for views. When the Set All to Attach command is unavailable, the construct has already been attached.
overlay the construct on the view drawing	select the construct, right-click, and click Set All to Overlay. **NOTE** When the Set All to Overlay command is unavailable, the construct has already been overlaid.

4 If you want to work in this view drawing immediately, select Open in drawing editor.

For information about other methods of opening views, see Opening and Closing a View Drawing on page 308.

5 Click Finish.

Displaying External References of a View Drawing

Use this procedure to display a list of xrefs attached to a view drawing and to access the functions available for each xref.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

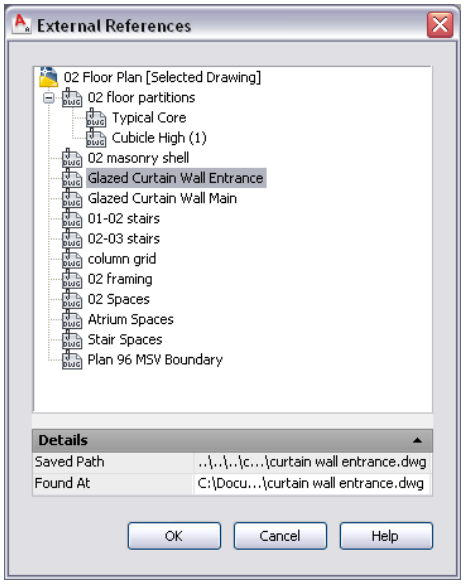
3 In the Drawing Explorer, locate the view drawing for which to display external references.

4 Select the view drawing.

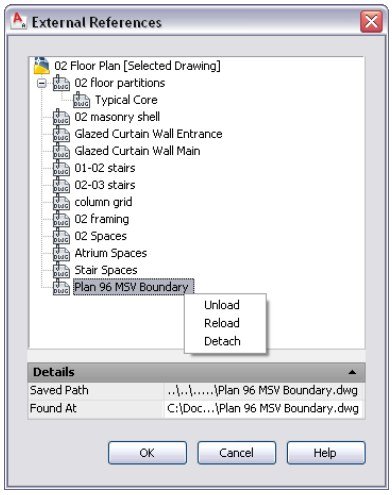
5 Display the xrefs using either of the following methods:

- Right-click, and click External References.
- On the toolbar at the bottom of the Views tab, click .

The External References dialog displays a list of xrefs in the view.

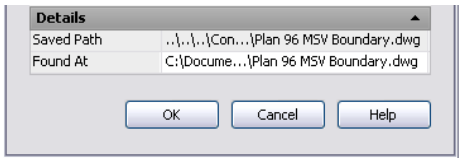


6 Expand or collapse the list by clicking individual items, and right-click to change the status of the xref, if necessary.



You can unload, reload, or detach the attached xref. For more information, see Reference Other Drawing Files in AutoCAD Help.

7 In the External References dialog, view the details of the xref:



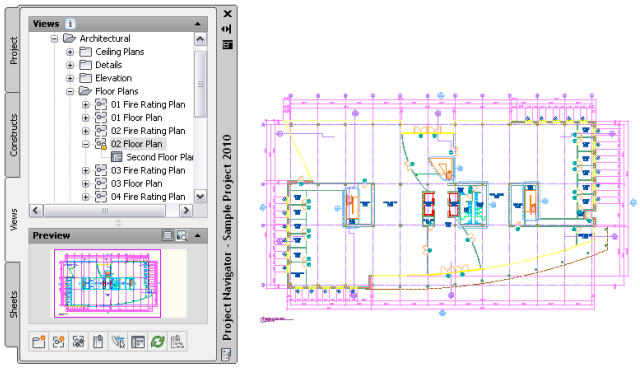
- Saved Path displays the saved path, if any, that is used to locate the xref. This path can be a full (absolute) path or a relative (partially specified) path.
- Found At displays the path where the xref was found. If no path was saved for the xref or if the xref is no longer located at the specified path, the program searches for the xref and displays the location here.

8 Click OK to close the dialog.

NOTE You can also display external references by opening the view drawing and using the AutoCAD Xref Manager. For more information, see "Overview of Referenced Drawings (Xrefs)" in AutoCAD Help.

Opening and Closing a View Drawing

Use this procedure to open and close a view drawing.



1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 In the Drawing Explorer, locate the view drawing you want to open.

4 Open the view drawing using one of the following methods:

- Select the view drawing, right-click, and click Open. (For information about additional commands available on the context menu, see The Drawing Explorer Context Menu on page 244.)
- Double-click the view drawing.

The view drawing opens in the drawing area of AutoCAD Architecture.

5 Close the view drawing using one of the following methods:

- Right-click the view drawing in the Drawing Explorer on the Project Navigator, and click Close.
- Click ➤ Close ➤ Current Drawing.

6 Click Yes to save the changes in the drawing, if desired.

Creating a Model Space View Drawing from a Callout

In most cases, when you need a model space view containing a detail or a section/elevation, you will create it by using a callout tool. This method lets you specify whether the resulting model space view is placed in the view drawing you have created it from, in a different drawing, or in a new view drawing. For more information, see Callouts on page 2419.

NOTE You can still associate a callout symbol with the view later if you do not use a callout tool to create the model space view. For more information, see Working with Callouts on page 2419.

On the Views tab of the Project Navigator palette, general, detail, and section/elevation view drawings are distinguished by different symbols:

View Drawing Type	Symbol
General view drawing	
Detail view drawing	
Section/Elevation view drawing	

For more information, see Creating a New View Drawing on page 302.

Changing the Properties of a View Drawing

Use this procedure to change the general, context, or content properties of a view drawing.

If you change the name or the location (general properties) of constructs included in the view drawing, repath the project.

If you change the level or division assignment (context properties) of constructs included in the view drawing, reload the external references in the drawing. For information, see Regenerating the View Drawings in a Project on page 310.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 In the Drawing Explorer, select the view drawing, right-click, and click Properties.

4 In the left pane of the Modify <View Type> View dialog, click the General category, and change the general view properties as needed:

If you want to…	Then…
change the name of the view drawing	enter a new name. If the project number is used as a prefix for project file names, you do not need to enter the prefix here. The complete name with prefix is displayed under File Name. For more information on prefixes, see Specifying Basic Project Properties on page 220. Changing the name prompts you to repath the project. For more information, see Repath the Project on page 350.
change the description of the view drawing	click the setting for Description, change the description of the view drawing, and click OK.
change the category of the view drawing	select one from the Category list. Changing the category prompts you to repath the project. For more information, see Repath the Project on page 350

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

5 In the left pane of the Modify <View Type> View dialog, click the Context category, and change the levels and divisions to include in the view drawing as needed.

6 In the left pane of the Modify <View Type> View dialog, click the Content category, and change the selected constructs for the view drawing as needed:

If you want to…	Then…
add a construct or category to the view drawing	select the construct or category.
remove a construct or category from the view drawing	select the construct or category.
change the referencing mode of a construct	right-click the construct, and select one of the following commands: ■ To attach a previously overlaid construct to a view, click Set All to Attach. ■ To overlay a previously attached construct to a view, click Set All to Overlay. **NOTE** If one of these commands is unavailable, its mode is already selected.

7 Click OK.

Regenerating the View Drawings in a Project

Use this procedure to regenerate view drawings in the project when the content, levels, or divisions have changed. When you regenerate a view drawing, the external references used to generate it are attached, detached, or reloaded as needed.

1 On the Project Navigator palette, click the Views tab.

2 On the toolbar at the bottom of the tab, click the button.

All view drawings in the project are updated with the changed constructs.

Placing a View Drawing onto a Sheet

When a view drawing is dragged onto a sheet to create a sheet view, the model space settings (the viewport scale, layer settings, and display configuration) of the view drawing are used in the sheet view.

NOTE For information about placing a model space view, instead of a whole view drawing, onto a sheet, see Placing a Model Space View onto a Sheet on page 314.

When generating a model space view or a new view drawing from a callout tool, you define the drawing scale to be used. This scale is also used in any sheet views generated from the view.

Layer changes (including xref dependent layer changes) from the view drawing can be displayed and updated in the sheet view, if the project has been set up to synchronize sheets with views, as described in Synchronizing View Drawing Layers with Sheet View Layers on page 317.

If a project has been set up to synchronize view drawing layers with sheet view layers, viewport layer overrides in sheet views will be overwritten by the layer configuration of the view drawing when the external references are loaded or reloaded. If not, layers and xrefed layers in the sheet view will behave as normal.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Sheets tab, click (Sheet Set View) on the title bar.

3 In the Sheet Set view, locate the sheet into which you want to reference the view drawing.

4 Open the sheet using one of the following methods:

- Select the sheet, right-click, and click Open.
- Double-click the sheet.

The drawing containing the sheet opens in the drawing area. The sheet you selected is the active layout.

5 On the Project Navigator palette, click the Views tab.

6 Select the view drawing you want to place on the sheet, and drag it from the Drawing Explorer to the drawing area of the sheet.

TIP While inserting the view drawing on a sheet, you can change the scale of the resulting sheet view by right-clicking and selecting a different scale before defining the insertion point. After creating the sheet view, you can change its scale on the Properties palette.

NOTE Sheet views are inserted with their own layer key. By default, the sheet view layer is G-Anno-Nplt.

Electronically Transmitting a View Drawing

Use this procedure to electronically transmit a view drawing.

Electronically transmitting a drawing means that you package the drawing for delivery in electronic form. Drawing files in the transmittal package automatically include all related dependent files, such as external references and font files.

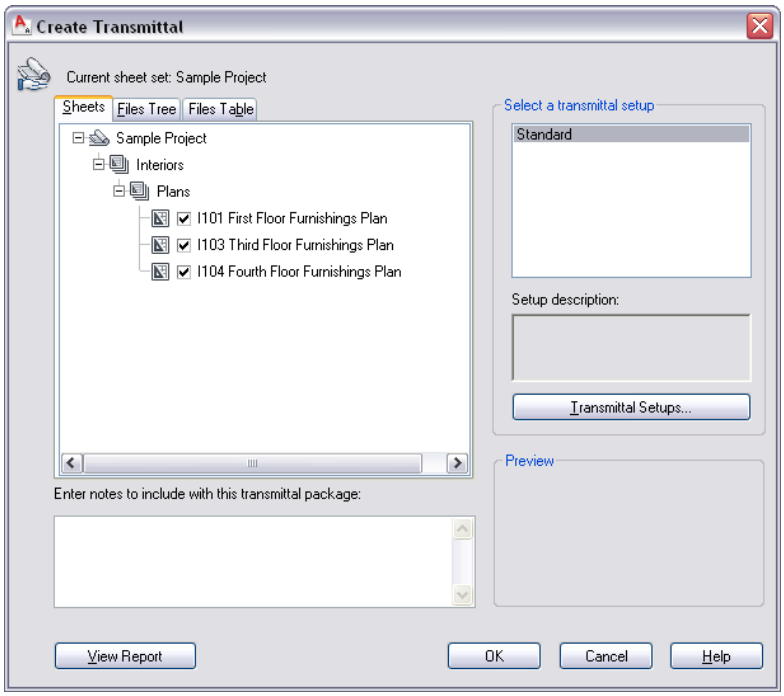
NOTE If the view contains multiple model space views, you are prompted to drop each in succession.

For more information about electronic transmittal, see “Package a Set of Files for Internet Transmission” in AutoCAD Help.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing you want to transmit, right-click, and click eTransmit.



4 In either the Files tree tab or the File Table tab, select the components to be included in the electronic package.

The Files Tree tab displays the included files sorted by type. The Files Table tab displays all files in a list view. You can sort the list by name, path, type, version, size, and date.

5 To include project information, double-click the setup under Select a transmittal setup, and in the Modify Transmittal Setup dialog, select Include project information under Include options.

For detailed information about packaging project information for an electronic transmittal, see Electronically Transmitting a Project on page 232.

6 Click OK to start the electronic transmittal.

Deleting a View Drawing

Use this procedure to delete a view drawing.

For information on the consequences of deleting view drawings, see Changing Views: Interactions with the Project on page 321.

The view drawing must be closed in order to delete it.

NOTE Do not delete a view drawing from Windows Explorer. This might result in inconsistent project data.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 In the Drawing Explorer, select the view drawing, right-click, and click Delete.

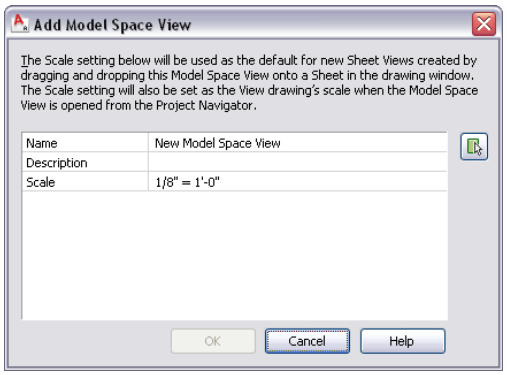
4 Click Yes in the subsequent message box.

Creating a Model Space View

A model space view is a named view that represents a view definition in model space. You can create multiple model space views in a view drawing, each with its own name, description, layer settings, and drawing scale.

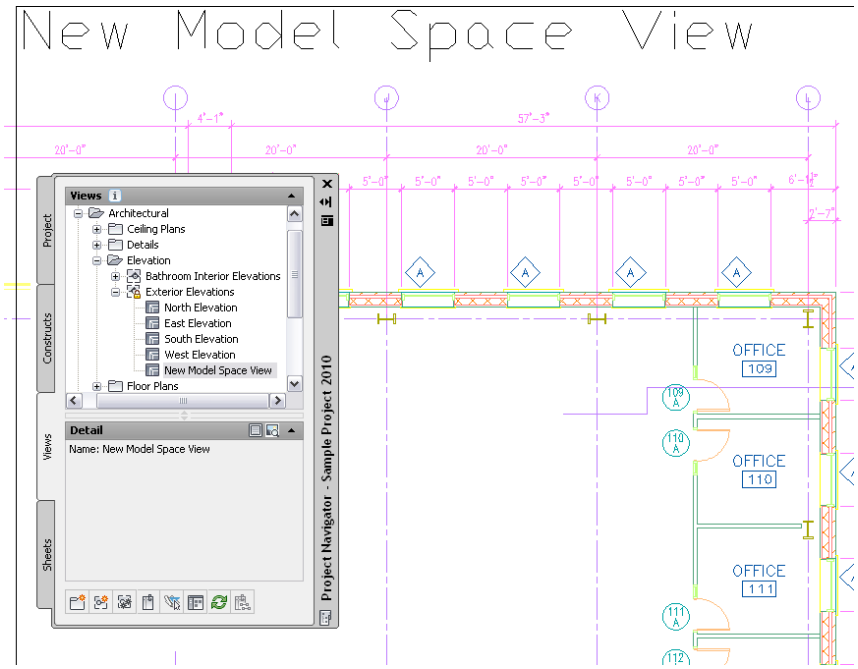
When a model space view is placed onto a sheet, its own viewport scale, layer settings, and the display configuration of the view drawing are used in the sheet view created. The view direction, however, defaults to plan.

You can associate an AutoCAD layer snapshot with a model space view. If you then place the model space view on a sheet, the AutoCAD layer snapshot determines the On/Off and Freeze/Thaw settings of the model space layers. The layer settings from the layer snapshot will only be used if the project has not been set up to synchronize view drawing layers with sheet view layers. If that synchronization has been set up, the layer settings from the view drawing's model space are used, and any attached layer snapshots on the model space view are ignored.



Defining a model space view

Displaying a model space view

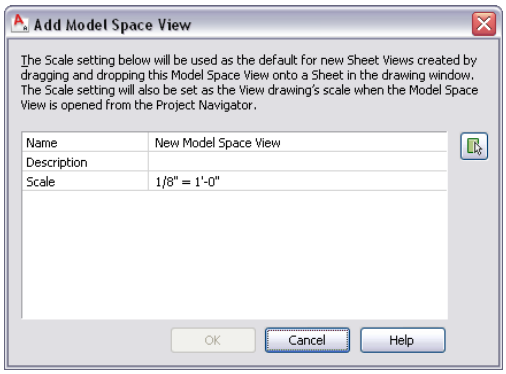


To create a model space view within a view drawing

1 On the Quick Access toolbar, click Project Navigator .

2 On the Views tab, select the view drawing in which you want to create a model space view, right-click, and click Open.

3 Select the view drawing again, right-click, and click New Model Space View.



4 In the Add Model Space View dialog, enter a name for the new model space view.

5 Define the settings for the new model space view:

If you want to…	Then…
enter a description for the model space view	click the setting for Description and add a description of the model space view.
change the scale of the model space view	select a scale from the list of those used in the current view drawing.

6 Click to define the boundaries of the new model space view.

7 Specify the first boundary point of the desired view area.

8 Specify the second boundary point of the desired view area.

9 Click OK.

The new model space view is listed under the view drawing from which it was created.

10 To associate an AutoCAD layer snapshot with the new model space view, select the model space view in the Drawing Explorer, right-click, and click Save Layer State.

11 Open the model space view using either of the following methods:

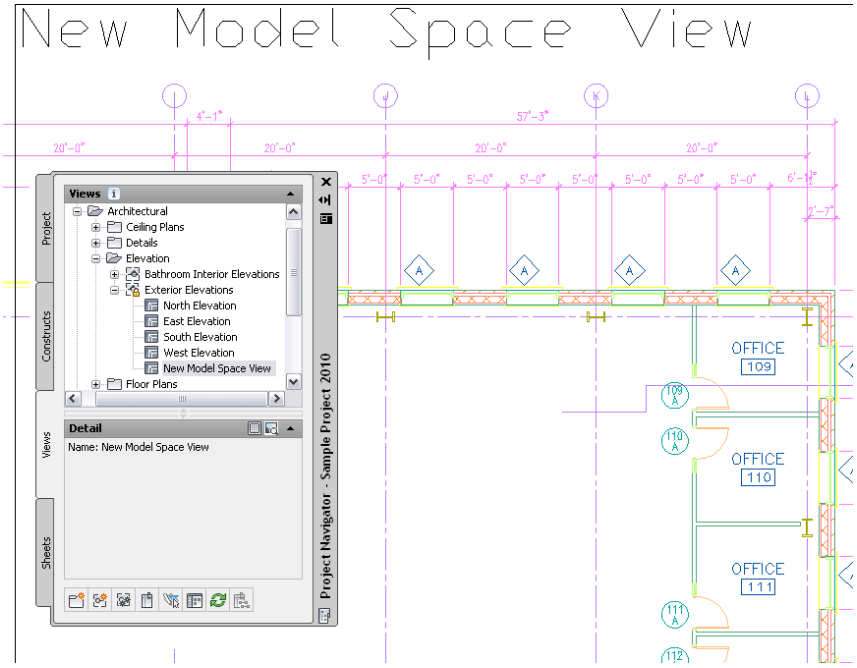
- double-click it in the Drawing Explorer.
- select the model space view in the Drawing Explorer, right-click, and click Open.

Placing a Model Space View onto a Sheet

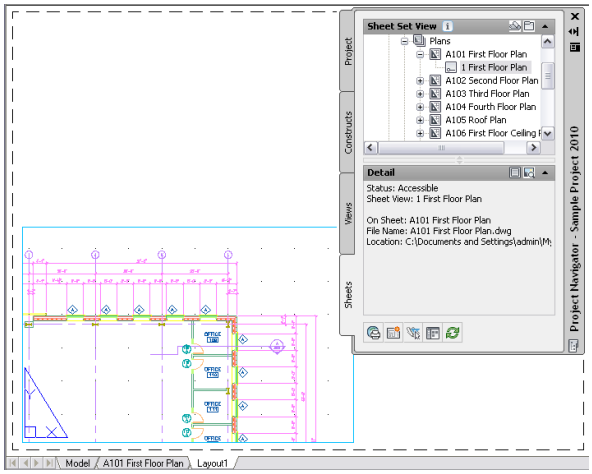
Use this procedure to place a model space view onto a sheet, creating a sheet view. A sheet can contain any number of sheet views.

When a model space view is placed on a sheet, it retains its own drawing scale and layer settings but uses the display configuration of the view drawing. The view direction of the sheet view is determined by the sheet.

Model space view of plan detail



Sheet view placed on sheet



1 On the Quick Access toolbar, click Project Navigator .

2 On the Sheets tab, click (Sheet Set View) on the title bar.

3 In the Sheet Set view, locate the sheet into which you want to reference the model space view, and open it using one of the following methods:

- Select the sheet, right-click, and click Open.
- Double-click the sheet.

The drawing containing the sheet opens in the drawing area with the selected sheet as the active layout.

4 On the Project Navigator palette, click the Views tab.

5 Use one of the following methods to place the desired model space view on the sheet:

- Select the model space view, right-click, and click Place on Sheet. Then, specify an insertion point on the sheet.
- Select the model space view, and drag it from the Project Navigator to the drawing area of the sheet.

You can disable image previews to improve performance while dragging a view from the Project Navigator palette. For more information, see Drawing Explorer Tooltips on page 247.

You can change the scale of the resulting sheet view by right-clicking and selecting a different scale before defining the insertion point. After creating the sheet view, you can change its scale on the Properties palette.

NOTE Sheet views are inserted with their own layer key. By default, the sheet view layer is G-Anno-Nplt.

Changing the Properties of a Model Space View

Use this procedure to change the properties of a model space view.

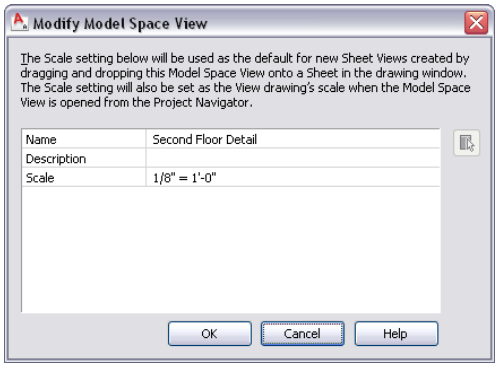
NOTE If you change the properties of a model space view, instances of that view that have been placed as sheet views on a sheet are not updated. Only new instances of the model space view will have the new settings. For example, if a model space view named West Stairs is defined with a scale of 1/8" = 1'-0", it is placed with that scale on a sheet. If the scale is later changed to 1/4" = 1'-0", the new scale is not updated on existing sheet views, but will be used for new sheet views.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 In the Drawing Explorer, select the view drawing that contains the model space view you want to change, and expand it.

NOTE To change the name, description, or scale of a model space view, the associated view drawing does not need to be open. To change the model space boundaries, the associated view drawing must be open.



4 Right-click, click Properties, and change the properties of the model space view as needed:

If you want to…	Then…
change the name of the model space view	enter a new name.

If you want to…	Then…
change the description for the model space view	click the setting for Description and change it.
change the scale of the model space view	select a new scale from the list.

5 To change the model space boundary, click , and redefine the boundaries on screen.

6 Click OK.

Deleting Model Space Views

Use this procedure to delete a model space view.

When you delete a model space view, it is only deleted from the view drawing; existing sheet views based on a deleted model space view remain in their respective sheets.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing that contains the model space view you want to delete, and expand it.

4 Select the model space view to delete, right-click, and click Delete.

NOTE You can also delete model space views by the click View tab ➤ Appearance panel ➤ Views drop-down ➤ View Manager, and deleting the model space view.

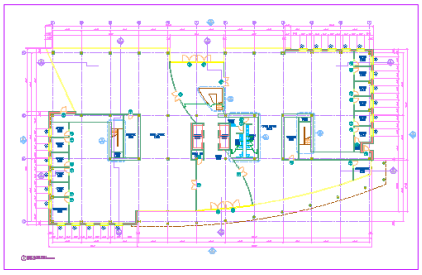
Synchronizing View Drawing Layers with Sheet View Layers

You can set up your project so that the sheet view layer settings are updated from the layer settings in the model space of the view drawing.

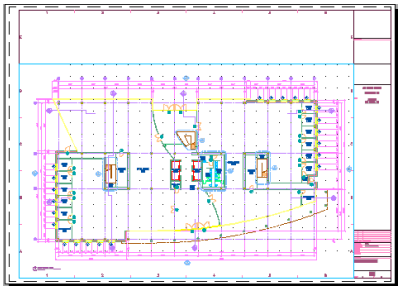
The synchronized layer settings include:

- the layer states (on/off, thawed/frozen).
- the layer properties (layer, color, linetype, plotstyle) of layers native to the view drawing.
- the layers in external references attached to the view drawing through constructs and elements.

View drawing with xref dependent layer changes



Sheet view with layer settings from view



Before you can use the layer settings of the view drawing in a sheet view, the following conditions must be met:

- In the Project Properties dialog, the setting for synchronizing view drawing layers with sheet view layers must be activated. For more information, see Configuring an Existing Project to Synchronize View Drawing Layers with Sheet View Layers on page 320.
- In both the view drawing and the sheet drawing, the VISRETAIN variable should be set to 1.
- The VPLAYEROVERRIDESMODE variable for the AutoCAD session must be set to 1.
- The project in which the view drawing and the sheet drawing reside must be the currently active project. If you open the sheet drawing outside of Project Navigator while its project is not current, the synchronization will not take place. The layer settings from the last successful synchronization will remain in effect.
- The layer synchronization takes place only if the view drawing and sheet drawing are located within the project context. If either the view drawing or the sheet drawing have been disconnected from the project, the standard AutoCAD VISRETAIN behavior controls how the externally referenced layer settings resolve. If you register both files back into the project, you can synchronize the view and sheet layers again.
- If you have set the project to synchronize view drawing layers with sheet view layers after you created sheet views, close and reopen the existing sheet views, or reload their xrefs to perform the synchronization.
- If you have set a legacy project from a previous version of the software to synchronize view drawing layers with sheet view layers, you may need to manually link the sheet views to the view drawing. If the sheet views need to be linked, they will display a warning icon in the Drawing Explorer. In that case, follow the instruction in Linking a Legacy View Drawing to a Sheet View on page 320 to link the sheet view to the view drawing.

Synchronization of view drawing layers with sheet view layers occurs in the following instances:

- Loading or reloading external references
- Background plotting and publishing of the sheet

When a project is set to synchronize view drawing layers with sheet view layers, the following behaviors will differ from standard AutoCAD behavior:

- If a layer is off or frozen in the model space of the view drawing, it will be frozen in synchronized sheet views.
- Plotting or publishing output will include synchronized sheet views except when you are foreground plotting the active sheet; in this case, the current display settings in the sheet view will be used. In all other cases, the output may display the updated, synchronized layer settings, even though the open sheet view remains out of synch.
- Synchronization of layer settings will never occur during electronic transmission of a sheet.

If you copy or cut and paste a sheet view, the new copies will not be linked to the original source view. To create multiple sheet views of a model space view, drag the model space view to the sheet again. This creates a new sheet view with the same model space view content.

When you drag a view drawing with multiple model space views onto a sheet, the sheet view layers will be synchronized with the view drawing after all sheet views are created.

When the project is set to synchronize view drawing layers with sheet view layers, any AutoCAD layer snapshots that are attached to model space views will be ignored. If the project is not set to synchronize view drawing layers with sheet view layers, then the layer snapshot settings will be retained. However, any layer that did not exist when the AutoCAD layer snapshot was created will be frozen in the sheet view, regardless of whether it is frozen or thawed in the view drawing. The new layer will also be listed as an unreconciled layer in Layer Manager. For more information, see New Layer Notification on page 483.

Display Configurations in Sheet Views

When a project is set to synchronize view drawing layers with sheet view layers, changes to the display configuration of the view drawing will not be updated in the sheet view. The display configuration initially used in the sheet view will be the same configuration that was active when the view drawing or model space view was first referenced into the sheet drawing, unless changed in the sheet view. Use one of the following methods to update the display configuration of the view drawing in a sheet view:

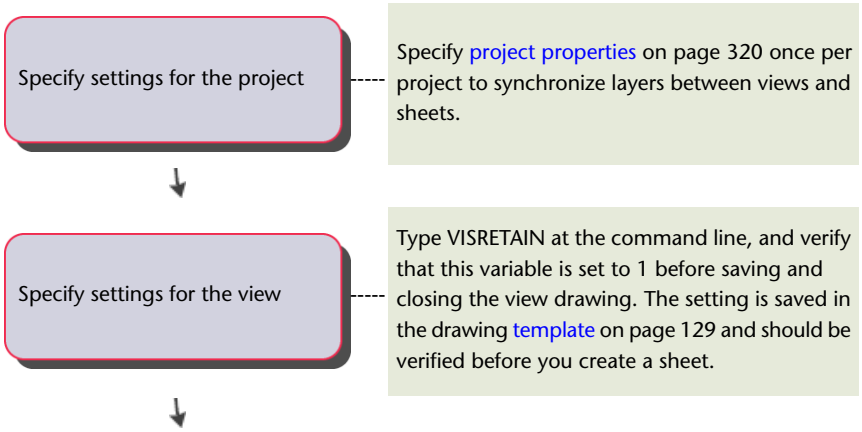
- Edit the sheet view directly by double-clicking it and changing the display configuration in the sheet view.
- Create a new sheet drawing, and reference the view drawing that has the desired display configuration.

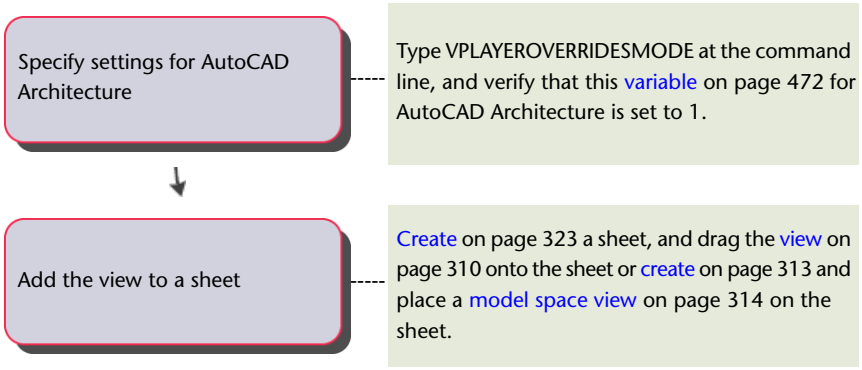
Viewport Layer Overrides in Sheet Views

Sheet views created in AutoCAD Architecture allow for layer overrides in paper space viewports. (For more information, see Overriding Layer Properties in Layout Viewports on page 472.) If the project has been set to synchronize view drawing layers with sheet view layers, any viewport-specific overrides in the sheet view will be overwritten when the view drawing xrefs are reloaded in the sheet view. Otherwise, sheet view specific overrides behave as normal viewport layer overrides. In this case, the xref-dependent layer changes from the view will be marked as viewport overrides in the sheet.

Workflow to Synchronize View and Sheet Layers

After you set up your project so that the sheet view layer settings are updated from the layer settings in the model space of the view drawing, these settings do not have to be synchronized again.





Linking a Legacy View Drawing to a Sheet View

In order to synchronize the view drawing layers with the sheet view layers, the sheet view and view drawing must be linked. In legacy projects created with a previous version of the software, where a view drawing without model space views was placed on a sheet, this information does not exist and must be added by linking the sheet view to the view drawing.

When this happens, the sheet view icon on the sheet set tree displays a warning icon ( ). The sheet view must be linked to the view drawing to establish the link and allow synchronization.

NOTE In other cases where the link between a sheet view and its associated view drawing is broken, no warning icon will be displayed. In these cases, the sheet view must be recreated in the sheet by dragging the model space view or view drawing onto the sheet again. This creates a new sheet view with the correct connection. The connection between sheet view and view drawing or model space view can be broken by: renaming of the view drawing, renaming of the model space view, copying and pasting a sheet viewport, or creating a viewport by using the MVIEW command.

1. On the Quick Access toolbar, click Project Navigator .
2. On the Sheets tab, open the sheet containing the sheet view to be linked.
3. Select the desired sheet view, and drag it onto a view drawing on the Views tab.

   The sheet view node will be updated when you expand the containing sheet node, when you click Refresh on the Project Navigator palette, or when the linking is complete.

Configuring an Existing Project to Synchronize View Drawing Layers with Sheet View Layers

At any time during a project, you can activate synchronization of view drawing layers with sheet view layers. Selecting this option does not update existing sheet views instantly; the update occurs the next time they are opened or their external references are reloaded.

1. At the bottom of the Project Navigator palette, click .
2. In the Project Browser, select the currently active project, right-click, and click Project Properties.
3. Under the Basic category, expand Drawing Settings.
4. For Match Sheet View Layers to View, select Yes.
5. Click OK to close the Project Properties dialog, and click Close to close Project Browser.

New sheet views you create will use the layer settings of the associated view drawing. Existing sheet views will be synchronized the next time they are opened or have their xrefs are reloaded.

Changing Views: Interactions with the Project

Changes made to one part of a project frequently influence other parts of the project. Listed below are the effects of some of the common changes you can make to a view.

- **Adding a new view drawing:** When you create a new view drawing, all or most of the referenced constructs should be present. For easy selection of constructs, place them in categories.
- **Changing the view name and category (location):** A view drawing has a number of constructs referenced into it, and the view drawing itself can be referenced into a sheet. Therefore, any name and location changes to a view drawing need to be updated throughout the project. To update the path, repath the project as described in Repath the Project on page 350.
- **Changing the content of a view drawing:** Any changes made to the content of a view are also made to the sheets that reference that view. If you have created model space views and sheet views from the view drawings, they will be updated to reflect the changed content of the view drawing.
- **Deleting a view drawing:** If you delete a view drawing that has been referenced into a sheet, that sheet now has missing references. Check to see if the view is still used in a sheet before deleting it. If you delete a view drawing, all model space views associated with that view are deleted also. Any sheet views that reference these views will have missing references.
- **Changing a model space view:** Changes made to the boundaries or scale of an existing model space view are not updated in existing sheet views derived from this view. To change the sheet view, delete it and re-create it from the updated model space view. If the content of a model space view changes due to changes in the view drawing, these changes will be updated in the sheet view.
- **Deleting a model space view:** When you delete a model space view, all sheet views created from it remain intact. For definition, sheet views need only the building model in the view drawing.

Sheets

Sheets are used to plot view drawings of your building project. The sheet system in AutoCAD Architecture consists of these components:

- Sheet: A sheet is a paper space layout that has been registered as a sheet. A sheet can contain one or more views.
- Sheet views: A sheet view is a paper space viewport created by dragging and dropping a model space view from the Project Navigator onto a sheet.
- Sheet sets: A sheet set is a collection of sheets. Within the sheet set, sheets are organized in sheet subsets.
- Sheet drawing: A sheet drawing is a drawing file containing one or more sheets.

Sheets, sheet subsets, sheet views, and sheet drawings are listed on the Sheets tabs of the Project Navigator.

Sheets and Sheet Drawings

The National CAD Standard (NCS) mandates that sheets should be stored in individual drawings, each with one sheet layout. The drawing name should be the sheet number in its sheet set. The AutoCAD Architecture Project Navigator follows this standard, so that each new sheet is placed in a new sheet drawing. You can, however, create multiple sheets in one sheet drawing, if necessary. For more information, see Importing the Current Layout as a Sheet on page 330.

Sheets and Annotation

Although it is recommended that annotation be placed in a view, you can add annotation, dimensions, and schedule tables in a view or a sheet, depending on your specific workflow and needs. Scheduling in AutoCAD Architecture makes it easy to add annotation in both views and sheets. For more information on annotating a project, see Workflow for Annotating a Project on page 352.

Sheet Drawing Files

A sheet drawing is a DWG file. As opposed to other non-project drawing files, an XML file with the same name is created when you create a sheet drawing. The accompanying XML file contains information to connect the drawing file with the project.

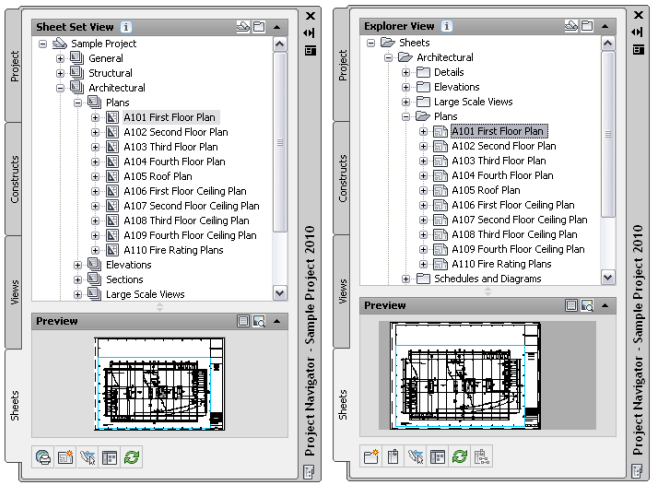
NOTE The XML file is created and updated automatically. You do not need to edit it but be careful not to accidentally delete it in Windows Explorer.

Sheets and sheet views are contained within sheet drawings. There are no corresponding XML files for individual sheets or sheet views.

Sheet Categories and Subsets

Sheets are organized in 2 different methods. In the Explorer View, sheet drawings are placed in category folders. When you create sheets or sheet views within a sheet drawing, they are placed in the host sheet drawing.

Sheet tab with Sheet Set View of project (left) and Explorer View (right)



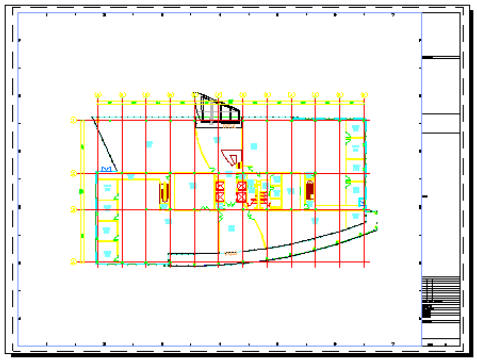
In the Sheet Set view, sheets are organized in sheet subsets. Sheet subsets are a logical structure rather than a physical one. This means that the sheet and subset organization may not reflect the drawing file organization on disk. You can logically rearrange sheets into a different subset within the Sheet Set View, but that will not change their physical location in the category or folder. The sheet category folder does not need to be identical to the sheet subset in which the sheet is placed. However, to avoid confusion, it is recommended to have parallel structures in the sheet set and the sheet categories. When you remove a sheet from a sheet subset in the Sheet Set view, only the reference to the sheet in the subset is removed; the layout itself and its containing sheet drawing are not deleted from the Sheets folder or subfolder. For more information, see Sheets on page 321.

When to Start with Sheets

Sheets are the final output of a building design. You create sheets after you have created constructs for all parts of the building model, along with the necessary model views, detail views, and section/elevation views. You then drag the views onto the sheets to create sheet views.

Designing a building is an iterative process. You will revisit planning stages and make changes to constructs, elements, and views. These changes are reflected in sheets.

Sheet with building plan



Keep these points in mind when creating sheets:

- The content of a sheet depends on the views that are referenced into it and the constructs referenced into the views.
- The viewport settings of a sheet view are defined in the model space view placed on the sheet from a view drawing. For more information, see Creating a Model Space View on page 313.
- A sheet contains all plotting-specific settings and title blocks.

Creating a Sheet

Use this procedure to create a new sheet. Each new sheet is created in a new sheet drawing.

1 On the Quick Access toolbar, click Project Navigator .

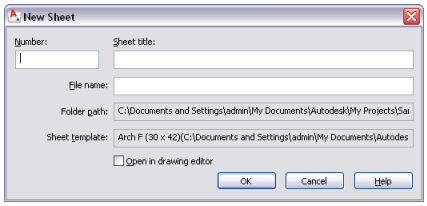
2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Add a new sheet to the project using one of the following methods:

- Right-click the subset in which to place the new sheet, and click New ➤ Sheet.
- In the toolbar at the bottom of the Sheets tab, click .

4 If you selected to be prompted for a template each time you create a new sheet, you are prompted now for a sheet template. Select a drawing template and a layout from a DWT, DWG or DWS file as a sheet template, and click OK.

If you selected not to be prompted for a sheet template when creating new sheets, the default template defined in the project sheet set or the sheet subset is used.



5 Define the sheet properties:

If you want to…	Then…
number the new sheet	enter a number. If you selected a project prefix in the project settings, the prefix is placed in front of the sheet number in the file name. For more information, see Specifying Basic Project Properties on page 220.
enter a title for the sheet	enter text under Sheet title. Commas, ampersands, and semicolons are allowed in sheet titles. The sheet title is used in these locations: ■ As the display name of the sheet in the Drawing Explorer. ■ As the display name of the sheet in a sheet list. ■ As the sheet layout name in the sheet drawing.
enter a file name for the sheet	enter one under File name.
change the folder in which the sheet is saved	The folder path defined in Project Properties is displayed. This field is read only. For information about changing the Folder path, see Specifying Basic Project Properties on page 220.
select a new sheet template	enter a template path.

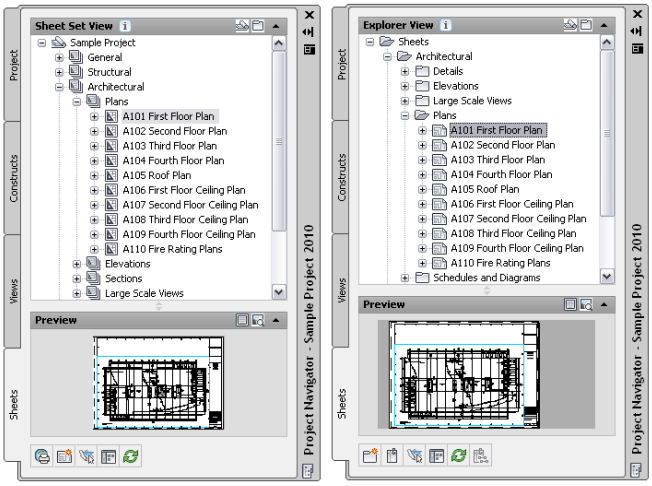
NOTE If the settings for the storage folder and the sheet set template are read only, these settings are defined in the sheet subset. To change them, you must change the properties of the sheet subset.

6 Click OK.

You can access the new sheet from 2 locations:

- In the Sheet Set view, the new sheet is displayed under the sheet subset in which you created it.
- In the Explorer View, the sheet drawing and the sheet are displayed under the folder category in which you saved the sheet.

Sheet Set View on project (left) and Explorer View (right)



By default, these have the same organization, but depending on your project setup, these 2 locations can have different names and structures.

Setting the Properties of the Project Sheet Set

Use this procedure to set the properties of the project sheet set.

The properties of the project sheet set are initially defined by the sheet set template you assigned in Creating a New Project on page 216. However, you can change the settings for an individual project.

NOTE A number of settings apply only to sheet sets referenced in the AutoCAD Sheet Set Manager. For a sheet set that will be used in an AutoCAD Architecture project, most settings come from the project, and not from the sheet set template.

The following settings are ignored when you use a sheet set template in an AutoCAD Architecture project:

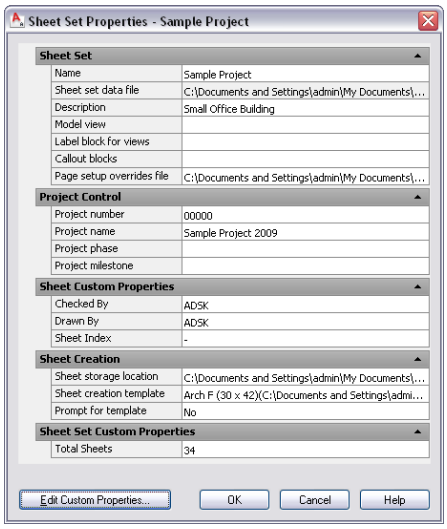
- Sheet set data file: The DST file is always stored in the root folder of the project.
- Model view: Model view drawing locations are not tracked in AutoCAD Architecture sheet sets. They are automatically taken from the project views.
- Label block for views: Label blocks are not recommended in an AutoCAD Architecture project. Use callout tools instead. For more information, see Callout Tools on page 2421.
- Callout blocks: Callout blocks are not recommended in an AutoCAD Architecture project. Use callout tools instead. For more information, see Callout Tools on page 2421.
- Sheet storage location: The sheets in a project are always stored in the Sheets folder of the project, or in one of its subfolders.

NOTE If you enter a project name and project number under Project Control that differs from the project name and number you have entered in Creating a New Project on page 216, you will get a message when editing the sheet set properties, and be prompted to consolidate the information.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the root node of the sheet set, right-click, and click Properties.



4 Expand Sheet Set.

5 To define page setup overrides in the project, click the setting for Page setup override files.

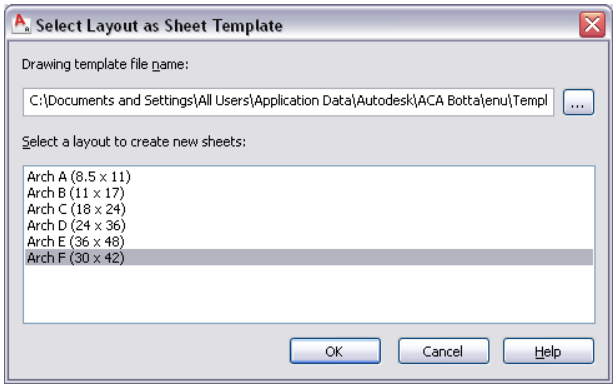
6 In the Select Template dialog, select a drawing template (DWT) file.

NOTE Select a template that contains named paper space layouts, and make sure that their plot areas have been set to Layout. Otherwise, you cannot use them as page setup overrides.

7 Expand Sheet Creation.

In this category, you define settings for the sheets you create within the sheet set.

8 To define a default template for new sheets, click the setting for Sheet creation template.



9 Click to browse for a drawing (DWG) or template (DWT) file, and click Open.

10 Select the default layout you want to use to create new sheets. Then, click OK.

11 Specify if you want to be prompted for the sheet template each time you create a new sheet:

If you want to…	Then…
be prompted for a sheet template each time you create a new sheet	select Yes.
always use the default sheet template	select No.

12 To add, edit, or delete custom properties, click Edit Custom properties.

For information about Custom Properties, see "Include Information with Sheets and Sheet Sets" in AutoCAD Help.

NOTE When working in an AutoCAD Architecture project, you can also use the project properties. For more information, see Adding Detailed Information to Project Properties on page 222.

13 Click OK.

If you have entered a project name and project number in the sheet set properties that differs from the project number and name defined in Creating a New Project on page 216, a message appears informing you of the mismatch. For information about consolidating the inconsistent name and number, see Consolidating Inconsistent Project and Sheet Set Information on page 229.

Creating a Sheet Subset

Use this procedure to create a new sheet subset. You create sheet subsets in the Sheet Set view of the Sheets tab.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet subset under which you want to create a new subset, right-click, and click New ➤ Subset.

4 Define the properties of the new subset:

If you want to…	Then…
change the name of the sheet subset	enter a new name.
set a different default directory for new sheets created in this subset	under Store new sheet DWG files in, click . Then, select a folder into which new sheets should be placed, and click Open.
set a different default template for new sheets created in this subset	under Sheet creation template for subset, click . Then, use the default or select a DWG or DWT file, and select a layout of the file.
be prompted for a template each time you create a new sheet in this subset	select Prompt for template.

5 Click OK.

Setting the Properties of a Sheet Subset

Use this procedure to set the properties of a sheet subset.

A sheet subset is a logical grouping of sheets and subsets. Subsets help you organize your sheet by allowing you to create sheet subsets for plan sheets, detail sheets, elevation sheets, or other grouping criteria.

You can set the following parameters for a sheet subset:

- The default template for new sheets created in this subset
- Whether to be prompted for a sheet template each time you create a new sheet

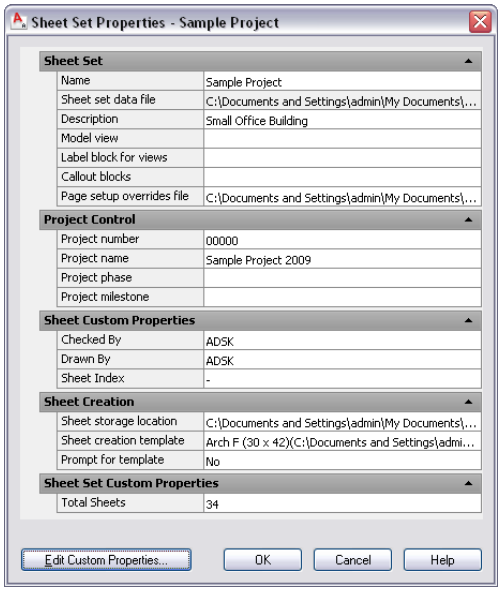
These parameters are set in sheet set properties., but you can override them for individual subsets. This would be useful if you want to use different sheet templates for plan sheets and detail sheets.

If you have no sheet subsets in your sheet set yet, see Creating a Sheet Subset on page 327.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet subset for which to change properties, right-click, and click Properties.



4 Change the properties of the sheet subset:

If you want to…	Then…
change the name of the sheet subset	enter a new name.
set a different default directory for new sheets created in this subset	under Store new sheet DWG files in, click . Then, select a folder into which new sheets should be placed, and click Open.
set a different default template for new sheets created in this subset	under Sheet creation template for subset, click . Then, select a DWG or DWT file, and select a layout of the file as the default sheet template.
be prompted for a template each time you create a new sheet in this subset	select Prompt for template.

5 Click OK.

Removing a Sheet Subset

Use this procedure to remove a sheet subset from the project sheet set. When you delete a sheet subset, no sheets or sheet drawings are deleted.

You can remove a sheet subset only if it contains no sheets.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet subset you want to delete, right-click, and click Delete.

Importing Sheets into the Sheet Set

Use this procedure to import a sheet into the project sheet set.

When you import a layout as a sheet, the layout and its associated sheet drawing are physically not moved from their original location. For example, if you import a layout from the drawing C:\Additional Drawings\Example.dwg into the project sheet subset Architectural, the selected sheet is displayed under the Architectural subset; the Example.dwg file, however, is not moved into the Sheets folder of the project. This drawing remains in its original location under C:\Additional Drawings\Example.dwg.

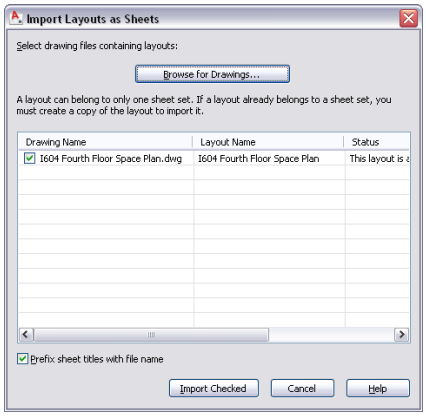
If you switch to the Explorer View, the imported sheet drawing is listed if the drawing is located outside the folder. It is marked with a special icon .

A sheet can belong to only one sheet set. You cannot import a sheet that is already part of another sheet set.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet subset into which to import the sheet, right-click, and click Import Layout as Sheet.



4 Click Browse for Drawings.

5 Browse for the drawing file containing the sheet you want to import, and click Open.

6 Select the sheet layout to import.

NOTE You can select multiple layouts here.

7 If you want the sheet name to be prefixed with the sheet drawing's file name, select Prefix sheet titles with file name.

8 Click OK.

NOTE To import a layout that is currently open and displayed on the drawing screen, select the subset in which it should be displayed, right-click, and click Import Current Layout as Sheet.

Importing the Current Layout as a Sheet

Use this procedure to import the current layout as a sheet in the sheet set.

In some cases, you might have sheet drawings that do not conform to the NCS standard, and contain more than one sheet. When you create a sheet in the Drawing Explorer of AutoCAD Architecture, only the first sheet in the sheet drawing is registered. To register other sheets as well, you may import them while the sheet drawing is open and the layout is displayed.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Explorer View) in the title bar.

3 Locate the sheet drawing that has additional layouts you want to register as a set.

4 Double-click the sheet drawing.

5 On the drawing screen, click the layout you want to import to make it current.

6 On the Project Navigator palette, click .

7 Navigate to the sheet subset in which the additional sheet should be placed, right-click, and click Import Current Layout as Sheet.

The sheet is added to the sheet subset. When you change to the Sheet Set view, and expand the sheet drawing containing the sheet, you can see that the additional sheet is now listed under the sheet drawing.

Opening and Closing a Sheet

Use this procedure to open and close a sheet. For information about additional commands available on the context menu, see The Drawing Explorer Context Menu on page 244.

When you open a sheet, the sheet drawing containing the sheet opens with the correct sheet (layout) displayed.

1 On the Quick Access toolbar, click Project Navigator .

2 On the Sheets tab, click (Sheet Set View) in the title bar.

NOTE You can also open a sheet from the Explorer View of the Sheets tab.

3 Locate the sheet you want to open.

4 Open the sheet using one of the following methods:

- Select the sheet, right-click, and click Open.
- Double-click the sheet.

The drawing containing the sheet opens in the drawing area of AutoCAD Architecture. You can now edit it. To close the sheet, you must close the sheet drawing.

5 Close the sheet drawing using one of the following methods:

- Right-click it in the Drawing Explorer, and click Close.
- Click ➤ Close ➤ Current Drawing.

6 Click Yes to save the changes in the drawing, if necessary.

7 To update the preview of the sheet in the Drawing Explorer, click (Refresh Project).

Changing the Properties of a Sheet

Use this procedure to change the properties of a sheet.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet for which you want to change properties, right-click, and click Properties.

4 Change the sheet properties as necessary.

For more information, see "Include Information with Sheets and Sheet Sets" in AutoCAD Help.

5 Click OK.

Removing a Sheet

When you remove a sheet from the sheet set, the sheet drawing and its companion XML file are deleted unless other sheets exist in the sheet drawing. If other sheets exist in the sheet drawing, or the sheet drawing is located outside of the sheet folder, then only the reference to the sheet is removed. When only the reference is removed, the sheet drawing is still physically saved on disc.

You must be in the Sheet Set view on the Sheets tab of the Project Navigator to remove sheets.

Removing a sheet from the sheet set has the following consequences:

- The sheet cannot be selected for a sheet selection.
- The sheet will not be included in new sheet lists.
- The sheet will not be included in electronic packages of the sheet set.
- The sheet will not be included in archive packages of the sheet set.
- The sheet will not be included when you publish the sheet set to a plotter, PDF, DWF, or a DWFx file.

To remove a sheet from the sheet set:

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet you want to remove from the sheet set, right-click, and click Delete.

4 In the Confirm Sheet Delete dialog, click Yes.

Deleting a Sheet Drawing

You must delete sheet drawings from the project using the Explorer View on the Sheets tab of the Project Navigator. When you delete a sheet drawing, all sheet layouts in the sheet drawing are deleted from this project.

To delete a sheet drawing from the project:

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Explorer View) in the title bar.

3 Select the sheet drawing you want to delete, right-click, and click Delete.

4 In the Confirm Sheet Delete dialog, click Yes.

Creating a Sheet View

Use this procedure to create a sheet view on a sheet.

A sheet view is a paper space viewport on a sheet that is created when a model space view or view drawing from the Project Navigator is dragged and dropped onto a sheet. For information on model space views, see Creating a Model Space View on page 313.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 In the Sheet Set view, locate the sheet on which you want to place a new sheet view.

4 Open the sheet using one of the following methods:

- Select the sheet, right-click, and click Open.
- Double-click the sheet.

The sheet opens in the drawing area of AutoCAD Architecture. The sheet you have selected is the active layout.

5 On the Project Navigator palette, click the Views tab.

6 Select the model space view, right-click, and click Place on Sheet. Then, select an insertion point on the sheet.

Alternatively, drag the model space view from the Project Navigator and drop it onto a sheet.

NOTE Sheet views are inserted with their own layer key. The layer key used for sheet views is G-Anno-Nplt.

Opening a Sheet View

Use this procedure to open a sheet view.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet containing the sheet view you want to open, and expand it.

4 Select the sheet view, right-click, and click Open.

Numbering Sheet Views

Use this procedure to number sheet views in a sheet set.

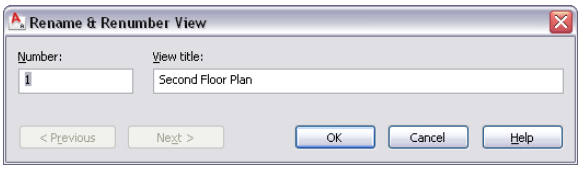
The number assigned to a sheet view is displayed as a prefix to the sheet set view name on the Project Navigator.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet that contains the sheet view you want to number, and expand it.

4 Select the sheet view, right-click, and click Rename and Renumber.



5 Enter a number for the sheet view.

6 If necessary, rename the sheet view.

7 Click Next to display the information for the next sheet view in the sheet.

8 When you finish changing the numbering of sheet views, click OK.

Deleting a Sheet View

Use this procedure to delete a sheet view from a sheet.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet containing the sheet view you want to delete, and expand it.

4 Select the sheet view, right-click, and click Open.

The sheet view opens in the drawing area.

5 Select the sheet view in the drawing area, and press *DELETE*.

NOTE The view xref is still attached in model space. To also detach the view from the sheet, right-click the sheet in the Drawing Explorer, and click External References. In the External References dialog, select the view, right-click, and click Detach.

Displaying External References of a Sheet Drawing

Use this procedure to display the external references of a sheet drawing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Explorer View) in the title bar.

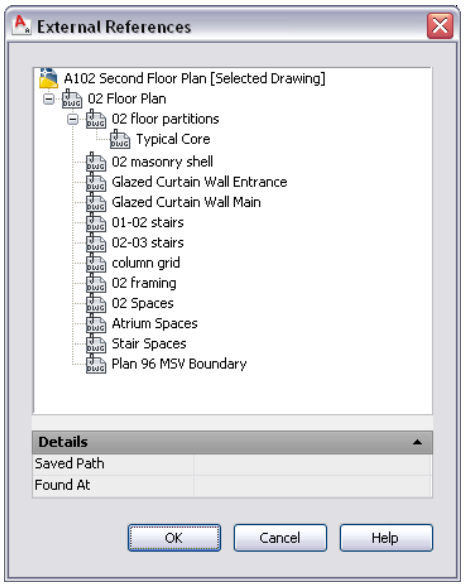
3 In the Drawing Explorer, locate the sheet drawing for which to display external references.

4 Select the sheet drawing.

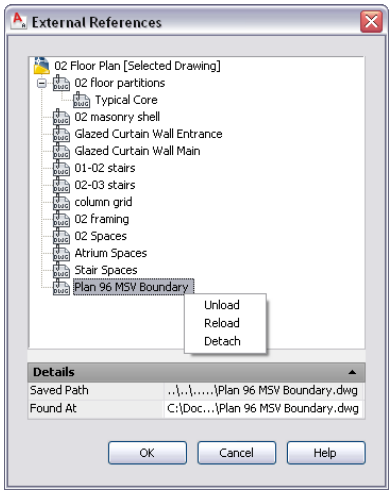
5 Display the xrefs using either of the following methods:

- Right-click, and click External References.
- On the toolbar at the bottom of the Sheets tab, click .

The External References dialog displays a list of xrefs in the sheet.

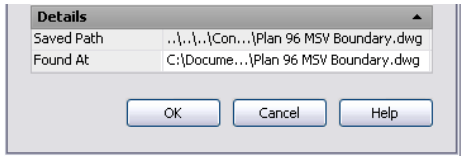


6 Expand or collapse the list by clicking individual items, and right-click to change the status of the xref, if necessary.



From the context menu, you can unload, reload, or detach the attached xref. For more information, see Reference Other Drawing Files in AutoCAD Help.

7 On the External References dialog, view the details of the xref.



- Saved Path displays the saved path, if any, that is used to locate the xref. This path can be a full (absolute) path or a relative (partially specified) path.
- Found At displays the path where the xref was found. If no path was saved for the xref or if the xref is no longer located at the specified path, the program searches for the xref and displays the location her.

8 Click OK to close the dialog.

NOTE You can also display external references by opening the sheet drawing and using the AutoCAD Xref Manager. For more information, see "Reference Other Drawing Files (Xrefs)" in AutoCAD Help.

Inserting a Sheet List

Use this procedure to insert a sheet list on a sheet.

A sheet list is a table of contents for the sheets in a project. Normally, you place it on the cover sheet of your sheet set; however, you can place it on any sheet.

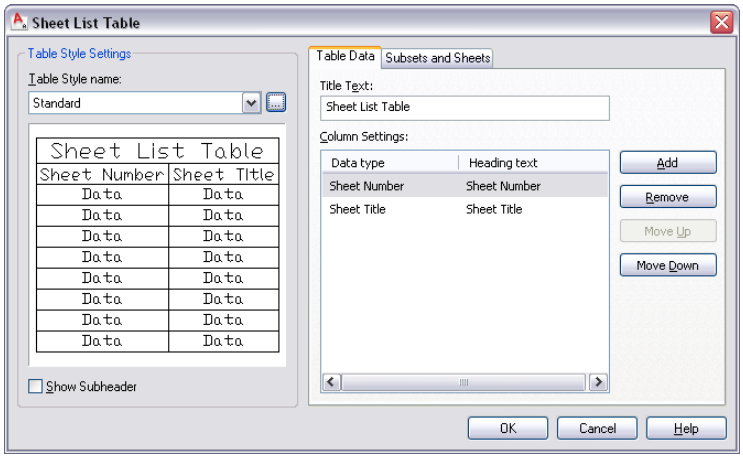
The sheet list is inserted as a table.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Open the sheet on which you want to place the sheet list.

4 Select the sheet set, sheet, or subset, right-click, and click Insert Sheet List Table.



5 On the Table Data tab, select the table style for the sheet list under Table Style name.

To create a new table style, click . For information on creating table styles, see "Work with Table Styles" in AutoCAD Help.

6 Enter the title of the sheet set under Title Text.

7 Under Column Settings, define the information to include in the sheet list.

Columns for sheet number and sheet title have already been defined; however, you can delete them.

If you want to…	Then…
add a column to the sheet list	click Add. Then, click the Data Type entry, and select the data you want to display in the list. You can choose subject, author, keywords, and more. To change the heading text for the entry, click the heading text and enter new text.
remove a column from the sheet list	select the column in the list, and click Remove.

If you want to…	Then…
rearrange a column in the sheet list	select the column in the list, and click Move Up or Move Down. The top entry in the list will be placed as the far left column in the sheet list. The next-lower entry will be placed next to the left column, and so on. **NOTE** You can see a preview of the sheet list in the viewer on the left.

8 Click the Subsets and Sheets tab, and select the sheets to include or select the subset if you want each sheet in that subset to be included in the table.

When a subset is selected, any sheets added to that subset in the future are also added to the sheet list table.

9 Click OK.

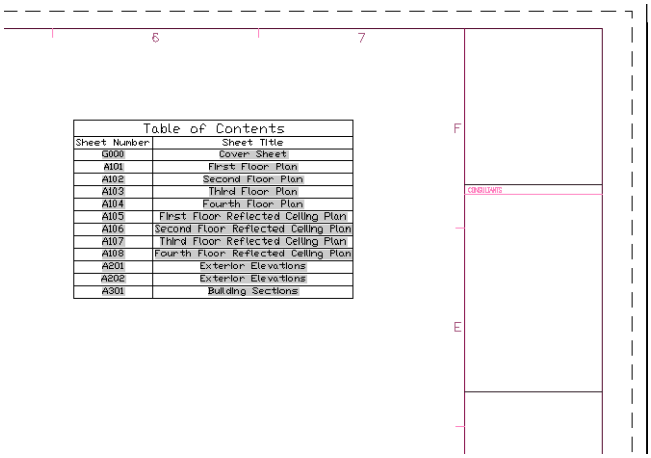
NOTE The sheet list is generated from the sheets contained in the sheet set. If you make manual changes to the sheet list after placing it on a sheet, these changes will be overwritten when you update the sheet list, as described in Updating the Sheet List on page 337.

10 Specify an insertion point for the sheet list on the current sheet.

The sheet list is placed on the sheet.

The sheet title and sheet number entries are hyperlinked to the files containing these sheets. If you CTRL-click the sheet title or sheet number, it will open the associated drawing file.

Sheet list table on cover sheet



Changing the Sheet List Properties

Use this procedure to change the properties of a sheet list.

NOTE Changing the properties of a sheet list includes changing the table style, the number and arrangement of columns displayed, and the sheet list title. If you change the actual sheets in your list (for example if you rename sheets, add, or delete sheets), update the sheet list, as described in Updating the Sheet List on page 337.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Open the sheet that contains the sheet list.

4 Select the sheet list in the drawing, right-click, and click Edit Sheet List Table Settings.

5 Change the properties of the sheet list, as described in Inserting a Sheet List on page 335.

Updating the Sheet List

Use this procedure to update a sheet list.

If you add, remove, or rename sheets, update the sheet list when you change the sheet set; for example, if you add, remove, or rename sheets.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Open the sheet that contains the sheet list.

4 Select the sheet list in the drawing, right-click, and click Update Sheet List Table.

Refreshing the Sheet Set

Use this procedure to refresh the sheet set.

Refreshing a sheet set includes opening all sheets in the set, updating them with any changes that have occurred (for example, changed external references), saving them, and closing them. You cannot refresh sheets, if any of the following conditions are true:

- The associated sheet drawing is already open.
- The sheet drawing or its folder are set to read-only.
- The associated sheet drawing has been deleted.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the sheet set root node, right-click, and click Resave All Sheets.

Resaving the sheet set can take a moment or two. A progress bar displays how long it will take. When the sheet set has been saved, you are notified by a message. If there were problems saving one or more sheets, they are listed. You can also view details in a log file located in the root directory of the project folder.

Creating a Sheet Selection

Use this procedure to create a sheet selection.

If you regularly work with a specific group of sheets in the project sheet set, you can create a named selection of those sheets. You define the sheet selection by choosing its name in the Sheet Set view of the Project Navigator.

You could use a sheet selection as a selection set for electronic transmissions or publishing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 SHIFT-click or CTRL-click to select the sheets to include in the sheet selection.

4 When you finish selecting sheets, right-click, and click Save Sheet Selection.

5 Enter a name for the sheet selection, and click OK.

Activating a Sheet Selection

Use this procedure to activate a sheet selection.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the project sheet set root node, right-click, and click Sheet Selections.

4 Make your selection from the Sheet Selections submenu.

Removing a Sheet Selection

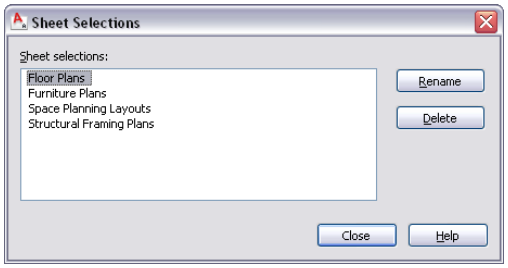
Use this procedure to delete a sheet selection.

NOTE Deleting a sheet selection does not delete any sheets included in that selection.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Sheets tab, and click (Sheet Set View) in the title bar.

3 Select the project sheet set root node, right-click, and click Sheet Selections ➤ Manage.



4 Select the sheet selection you want to delete, and click Delete.

5 Click OK.

Electronically Transmitting Sheets and Sheet Sets

Use this procedure to electronically transmit a sheet, a sheet subset or the project sheet set.

Electronically transmitting a file set means that you package the file set for delivering in electronic form. Drawing files in the transmittal package include all related dependent files, such as external references and font files.

You can select different components of the project sheet set for electronic transmittal:

- The complete project sheet set: This includes all sheets in the project sheet set.
- A sheet subset: This includes all sheets from a specified sheet subset.
- A sheet: This includes the sheet.

For more information about electronic transmittal, see “Package a Set of Files for Internet Transmission” in AutoCAD Help.

1 On the Quick Access toolbar, click Project Navigator .

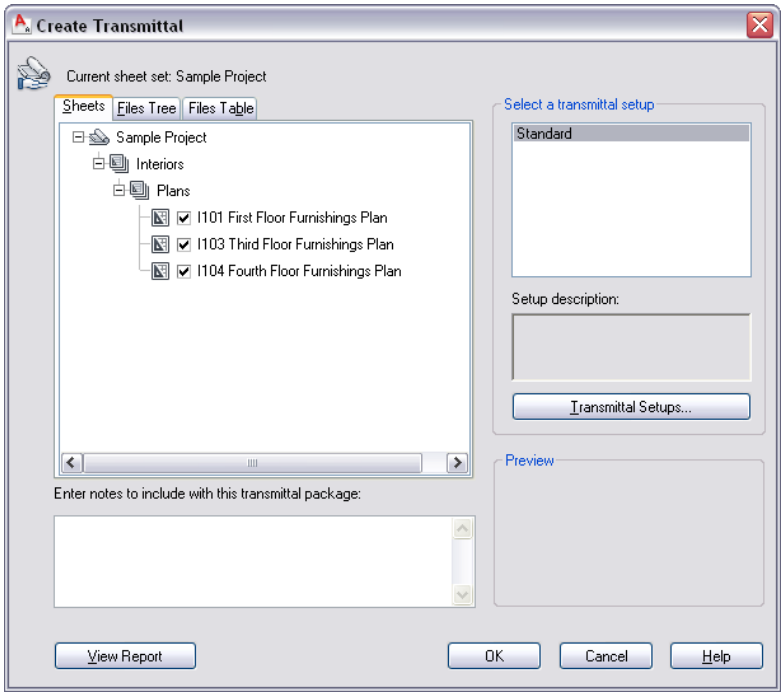
2 On the Sheets tab, click (Sheet Set View) on the title bar.

3 Select the component you want to transmit electronically:

If you want to…	Then…
transmit the complete project sheet set	select the project sheet set.
transmit a sheet subset	select the desired subset.
transmit a sheet	select the desired sheet.

4 Right-click, and click eTransmit.

The Create Transmittal dialog is displayed.



5 In either the Files tree tab or the File Table tab, select the components to be included in the electronic package.

The Files Tree tab displays the included files sorted by type. The Files Table tab displays all files in a list view. You can sort the list by name, path, type, version, size, and date.

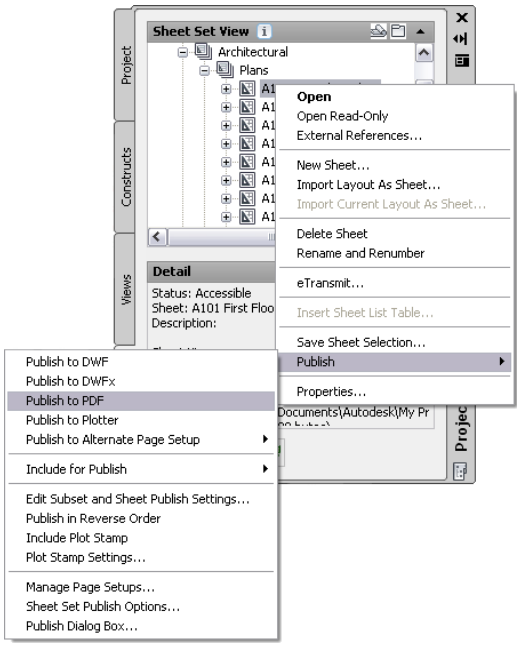
6 To include project information, double-click the setup under Select a transmittal setup, and in the Modify Transmittal Setup dialog, select Include project information under Include options.

For detailed information about packaging project information for an electronic transmittal, see Electronically Transmitting a Project on page 232.

7 Click OK to start the electronic transmittal.

Publishing Sheet Sets

In the Sheet Set view, you can publish sheets to a plotter, a PDF, a DWF file, or a DWFx file. You can assign plot stamps to the sheet set, publish sheets to an alternate page setup, and specify PDF, DWF, and DWFx publishing settings.



You publish from the following components:

- An individual sheet.
- A sheet subset. For information about creating sheet subsets, see Creating a Sheet Subset on page 327.
- A sheet selection. For information about creating sheet subsets, see Creating a Sheet Selection on page 337.
- The project sheet set.

For detailed information about plotting and publishing, see the following topics in AutoCAD Help:

- Publish Drawings
- Publish, Transmit, and Archive Sheet Sets
- Overview of Page Setup Settings
- Set Options for Plotted Objects and Plot Stamp Dialog Box

Changing Sheets: Interactions with the Project

Changes made to one part of a project frequently influence other parts of the project. The following information describes the changes you can make to a sheet and the effects of the changes on other parts of the building project:

NOTE Because the sheet is the last stage of the project, it has fewer interactions with the project than the other components do. For example, deleting a sheet has no influence on other drawings, like views or constructs.

- Adding a new sheet: Normally, a sheet is created to reference a specific view. For example, if you create a view called First Floor Plan, create a sheet that contains this view.
- Changing the sheet name and subset: A sheet has one or more views referenced into it. Therefore, any name and location changes to a sheet need to be updated throughout the project. To update the path, repath the project as described in Repath the Project on page 350.

  WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format. For more information, see Repath the Project on page 350.

- For detailed information on deleting views, see Deleting a View Drawing on page 312.

Creating a Sheet Set Template

When you create a new project, a project sheet set is automatically created. The project sheet set controls the settings relevant to sheets and the sheet set, such as page setups, the sheet template, and sheet subsets. The sheet set is based either on the sheet set template that you define in the project default options, or, if you base a new project on a project template, on the sheet set of this project template.

The easiest way to create a new sheet set template is to base it on an existing sheet set. You can also base your new sheet set template on existing drawing files, allowing you to add existing sheet layouts to the template.

NOTE A number of settings apply only to sheet sets referenced in the AutoCAD Sheet Set Manager. For a sheet set that will be used in an AutoCAD Architecture project, most settings come from the project, and not from the sheet set template. For more information, see Adding Detailed Information to Project Properties on page 222 and Working with Project Properties on page 219.

These fields on the Sheet Set Properties dialog are ignored when you use a sheet set template in an AutoCAD Architecture project for the following reasons:

- Sheet set data file: The sheet set file (DST) is always stored in the root folder of the project.
- Model view: Model view drawing locations are not tracked in AutoCAD Architecture sheet sets. They are automatically taken from the project views.
- Label block for views: Label blocks are not recommended in AutoCAD Architecture projects. Use callout tools instead. For more information, see Working with Callouts on page 2419.
- Callout blocks: Callout blocks are not recommended in AutoCAD Architecture projects. Use callout tools instead. For more information, see Callout Tools on page 2421.
- Sheet storage location: The sheets in a project are always stored in the Sheets folder of the project, or in one of its subfolders.

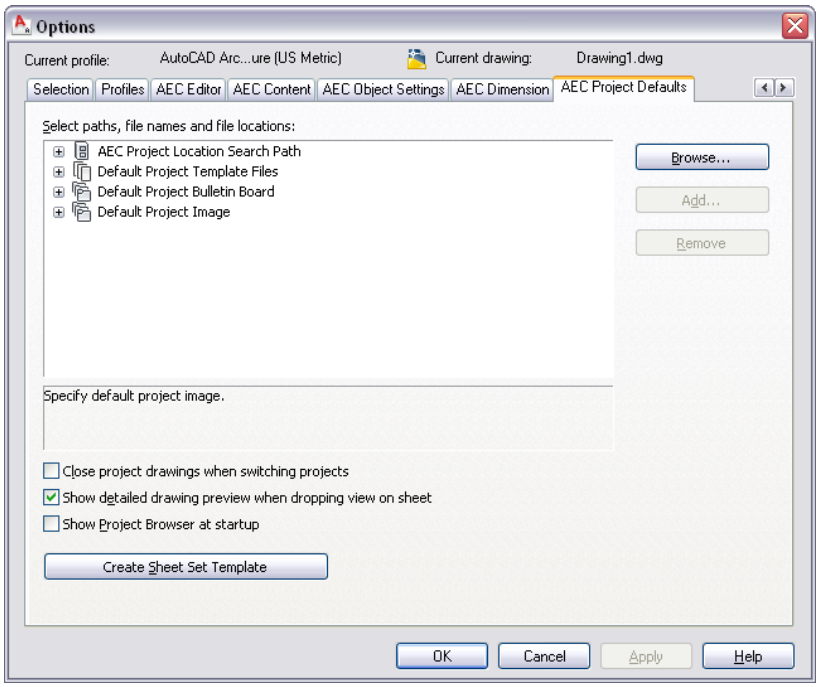
Creating a Sheet Set Template

Use this procedure to create a sheet set template based on a sheet set in an existing project. Settings applied here are overridden if you redirect top-level categories on the Project Property dialog in the project in which

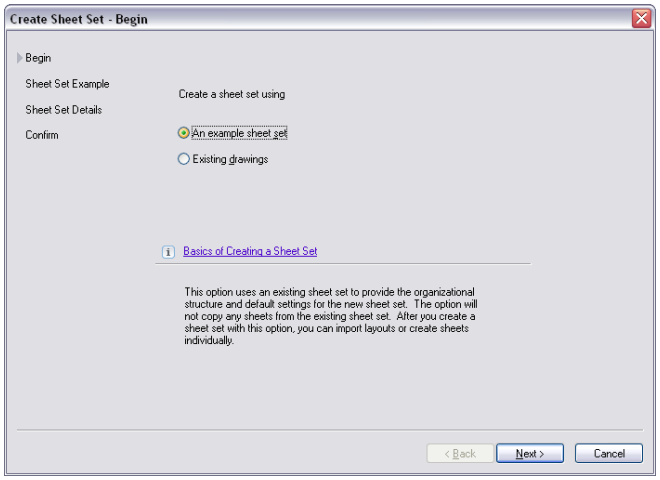
the sheet set is located. For more information, see Specifying the Location of Top-Level Categories on page 262.

1 Click ➤ Options.

2 Click the AEC Project Defaults tab, and click Create Sheet Set Template.



The Create Sheet Set wizard is displayed. It will help you create a new sheet set template.

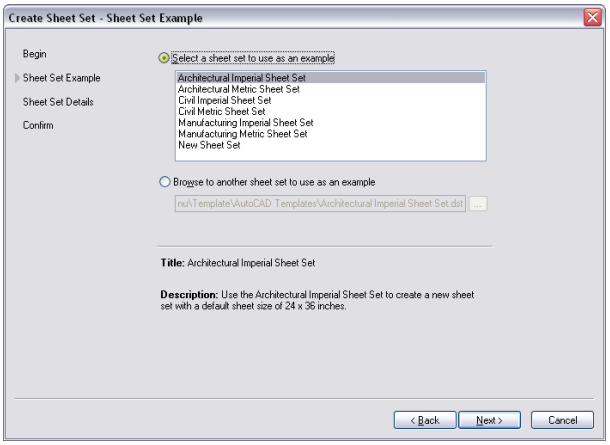


3 In the Create Sheet Set - Begin dialog, under Create a sheet set using, select An example sheet set, and click Next.

4 In the Create Sheet Set - Sheet Set Example dialog, select a sheet set to use as an example:

If you want to...	Then...
use a sample sheet set from the list	click Select a sheet set to use as an example, select a sheet set from the list, and then click Next.

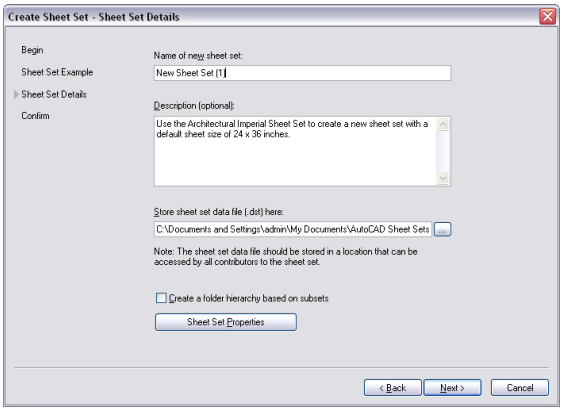
If you want to…	Then…
use a sheet set not listed	click Browse to another sheet set to use as an example, and click … . In the Browse for Sheet Set dialog, select a sheet set (DST) file, click Open, and then click Next.



5 In the Create Sheet Set - Sheet Set Details dialog, enter a name for the new sheet set template.

6 Enter a description for the new sheet set template.

7 Select the folder location in which to save the new sheet set template.

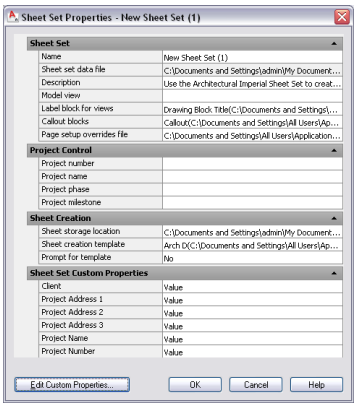


NOTE The location of a sheet set template (DST file) does not define the location of project sheet sets created from that template. A project sheet set is always stored in the root folder of the associated project.

If you are creating a sheet set template for an AutoCAD Architecture project, selecting Create a folder hierarchy based on subsets will have no impact because sheet subsets in the Drawing Explorer will have corresponding folders associated to them automatically. If you are creating a sheet set template for an AutoCAD sheet set, you can select this option. This will create a new subfolder in the sheet set every time you create a new sheet subset in the Sheet Set Manager.

8 To define the properties of the new sheet set template, click Sheet Set Properties.

The Sheet Set Properties dialog is displayed.



It is not necessary to complete the following fields when you use the sheet set template for an AutoCAD Architecture project:

Field	Reason
Sheet set data file	The DST file is always stored in the root folder of the project.
Model view	Model view drawing locations are not tracked in AutoCAD Architecture sheet sets. They are automatically taken from the project views. In an AutoCAD sheet set, this field displays the paths and names of folders that contain drawings used by the sheet set.
Label block for views	These are stored in the view templates.
Callout blocks	These are located on the Tools palette.
Name, Number, Phase, Milestone under Project Control	You associate project information with the project file (APJ), instead of the project sheet set, when you are working in an AutoCAD Architecture project. For information on associating information with a project, see Creating a New Project on page 216 and Working with Project Properties on page 219. **NOTE** If you enter a project name and project number under Project Control in the Sheet Sets Properties dialog that differs from the project name and number you enter in Creating a New Project on page 216, you will get an error message when editing the project, and be prompted to consolidate the information. Therefore, it is strongly recommended to leave the Project Control fields in the sheet set template empty.
Sheet storage location	The sheets in a project are always stored in the Sheets folder of the project, or in one of its subfolders.

9 In the Sheet Set Properties dialog, under Sheet Set, click the setting for Page setup overrides file to define overrides for the project.

10 In the Select Template dialog, select a drawing template (DWT) file, and click Open.

NOTE Select a template that contains named paper space layouts, and make sure that their plot areas have been set to Layout. Otherwise, you cannot use them as page setup overrides.

None of the other settings under Sheet Set are applied when using the sheet set template for an AutoCAD Architecture project.

11 Under Sheet Creation, you define settings for the sheets you create within the sheet set.

12 To define a default layout for new sheets, click the setting for Sheet creation template.

13 In the Select Layout as Sheet Template, click ... to browse for a drawing (DWG) or template (DWT) file, and click Open.

14 In the Select Drawing dialog, select the default layout to use to create new sheets, and click OK.

15 Specify if you want to be prompted for the sheet template each time you create a new sheet:

If you want to…	Then…
be prompted for a sheet template each time you create a new sheet	select Yes for Prompt for Template.
always use the specified template	select No for Prompt for Template.

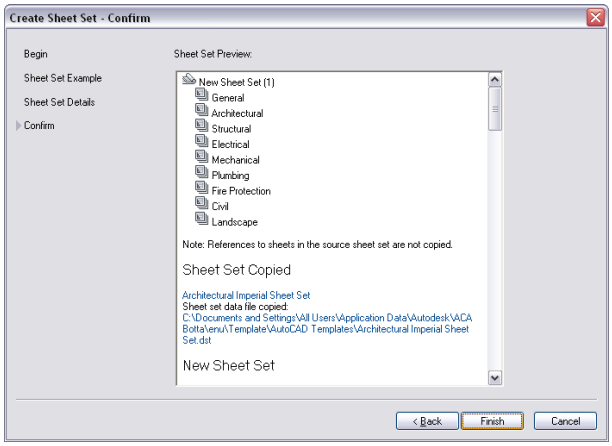
16 To add, edit, or delete custom properties, click Edit Custom properties.

For information about Custom Properties, see "Include Information with Sheets and Sheet Sets" in AutoCAD Help.

NOTE When working in an AutoCAD Architecture project, normally you do not use custom properties. In most cases, you use the project details in the Project Browser. For more information, see Adding Detailed Information to Project Properties on page 222.

17 Click OK to close the Sheet Set Properties dialog. Then, click Next.

The Create Sheet Set - Confirm dialog displays.



18 Verify that all settings for the new sheet set are correct:

If you want to…	Then…
make changes to one or more settings	click Back.
finish creating the sheet set template	click Finish.

NOTE You can edit a project sheet set in the Sheet Set view of the Project Navigator, as described in Setting the Properties of the Project Sheet Set on page 325. You can edit a project sheet set template in the Sheet Set Manager of AutoCAD, as described in "Create and Manage a Sheet Set" in AutoCAD Help.

Creating a Template from Existing Drawings

Use this procedure to create a sheet set template that contains layouts from one or more existing drawings. You can also select options to prefix the sheet titles with the file name and create subsets based on the folder structure. Settings applied here are overridden if you redirect top-level categories in the Project Properties dialog in the project in which the sheet set is located. For more information, see Specifying the Location of Top-Level Categories on page 262.

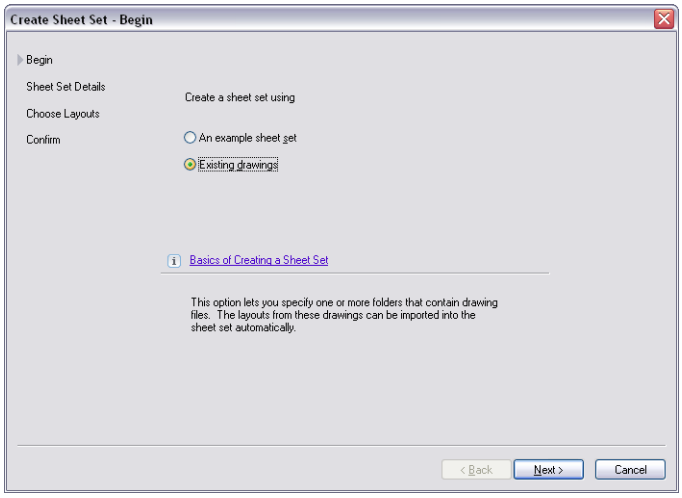
1 Click ➤ Options.

2 Click the AEC Project Defaults tab, and click Create Sheet Set Template.

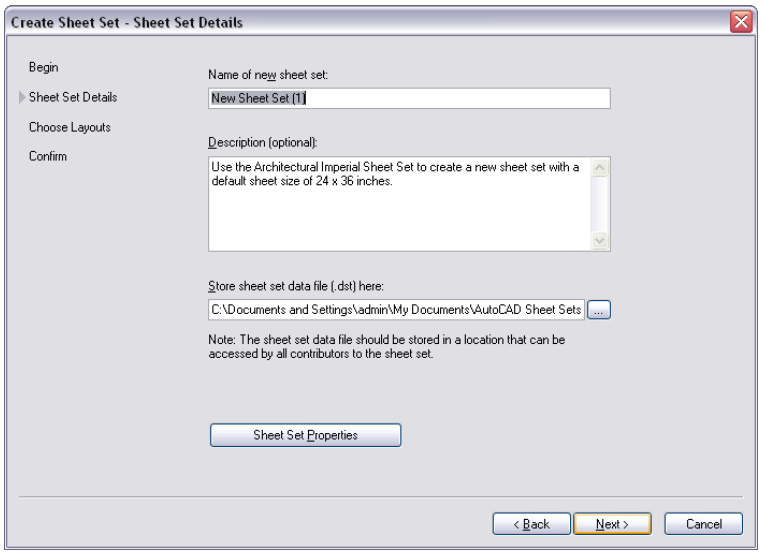
The Create Sheet Set wizard is displayed. It will help you create a new sheet set template.

3 Under Sheet Set Template, click Create.

The sheet set wizard is displayed. It will help you to create a new sheet set template.



4 Under Create a sheet set using, select Existing drawings, and then click Next.



5 In the Create Sheet Set - Sheet Set Details, enter a name for the new sheet set.

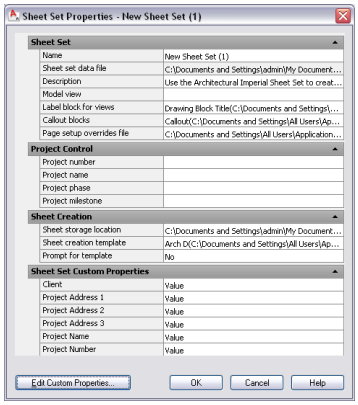
6 Enter a description for the new sheet set.

7 Select the folder location where the new sheet set template should be saved.

NOTE The location of a sheet set template (DST file) does not define the location of project sheet sets created from that template. A project sheet set is always stored in the root folder of the associated project.

8 To define the properties of the new sheet set template, click Sheet Set Properties.

The Sheet Set Properties dialog is displayed.



It is not necessary to complete the following fields when you use the sheet set template for an AutoCAD Architecture project:

Field	Reason
Sheet set data file	The DST file is always stored in the root folder of the project.
Model view	Model view drawing locations are not tracked in AutoCAD Architecture sheet sets. They are automatically taken from the project views. In an AutoCAD sheet set, this field displays the paths and names of folders that contain drawings used by the sheet set.

Field	Reason
Label block for views	These are stored in the view templates.
Callout blocks	These are located on the Tools palette.
Name, Number, Phase, Milestone under Project Control	You associate project information with the project file (APJ), instead of the project sheet set, when you are working in an AutoCAD Architecture project. For information on associating information with a project, see Creating a New Project on page 216 and Working with Project Properties on page 219. **NOTE** If you enter a project name and project number under Project Control in the Sheet Sets Properties dialog that differs from the project name and number you enter in Creating a New Project on page 216, you will get an error message when editing the project, and be prompted to consolidate the information. Therefore, it is strongly recommended to leave the Project Control fields in the sheet set template empty.
Sheet storage location	The sheets in a project are always stored in the Sheets folder of the project, or in one of its subfolders.

9 In the Sheet Set Properties dialog, under Sheet Set, click the setting for Page setup overrides file to define overrides for the project.

10 In the Select Template dialog, select a drawing template (DWT) file, and click Open.

NOTE Select a template that contains named paper space layouts, and make sure that their plot areas have been set to Layout. Otherwise, you cannot use them as page setup overrides.

None of the other settings under Sheet Set are applied when using the sheet set template for an AutoCAD Architecture project.

11 Under Sheet Creation, you define settings for the sheets you create within the sheet set.

12 To define a default layout for new sheets, click the setting for Sheet creation template.

13 In the Select Layout as Sheet Template, click to browse for a drawing (DWG) or template (DWT) file, and click Open.

14 In the Select Drawing dialog, select the default layout to use to create new sheets, and click OK.

15 Select the default layout you want to use to create new sheets. Then, click OK.

16 Specify if you want to be prompted for the sheet template each time you create a new sheet:

If you want to…	Then…
be prompted for a sheet template each time you create a new sheet	select Yes for Prompt for Template.
always use the specified template	select No for Prompt for Template.

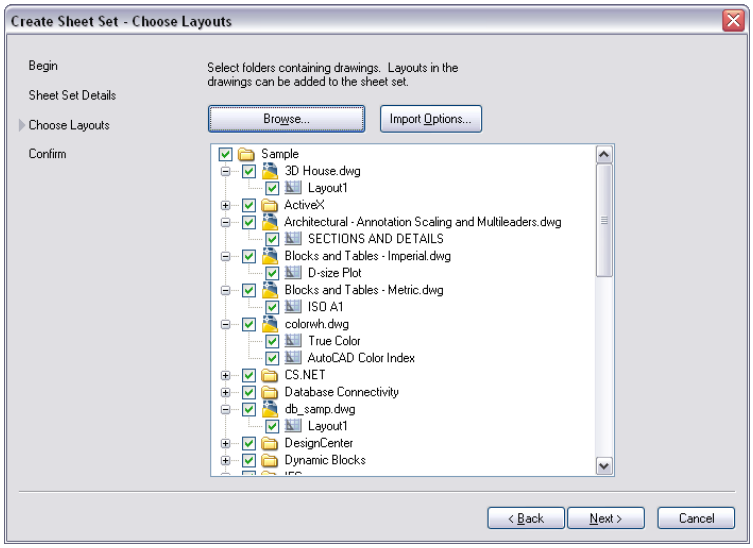
17 To add, edit, or delete custom properties, click Edit Custom properties.

For information about Custom Properties, see “Include Information with Sheets and Sheet Sets” in AutoCAD Help.

NOTE When working in an AutoCAD Architecture project, normally you do not use custom properties. In most cases, you use the project details in the Project Browser. For more information, see Adding Detailed Information to Project Properties on page 222.

18 Click OK to close the Sheet Set Properties dialog. Then, click Next.

The Create Sheet Set - Choose Layouts dialog is displayed.



In the Create Sheet Set - Choose Layouts dialog, you can select layouts from existing drawings and add them to the sheet set template as sheets. For example, you could do this to convert legacy sheets to project sheets.

19 To select one or more drawings from which to copy layouts to the sheet set template, click Browse.

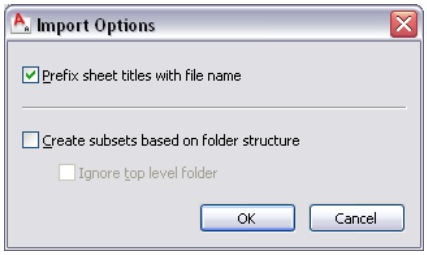
20 In the Browse for Folder dialog, select the folder containing the drawings, and click OK.

21 Expand the folder and drawing name, and select the layouts to be included in the sheet set template.

22 To remove a drawing or folder, select it, right-click, and click Remove.

23 Repeat this step for drawings in other folders, if necessary.

24 To prefix sheet titles with the file name or create subsets of sheet sets based on the folder structure, click Import Options, select the options, and click OK.



25 Click Next.

26 Verify that all settings for the new sheet set are correct:

If you want to...	Then...
make changes to one or more settings	click Back.

If you want to…	Then…
finish creating the sheet set template	click Finish.

NOTE You can edit a project sheet set in the Sheet Set Explorer of the Project Navigator, as described in Setting the Properties of the Project Sheet Set on page 325. You can edit a project sheet set in the Sheet Set Manager of AutoCAD, as described in "Create and Manage a Sheet Set " in AutoCAD Help.

Repath the Project

Use this procedure to update the external reference paths within the project after making changes to the names or locations of elements, constructs, or views. For example, if you move a project file into another category, or rename it, you must update the file that references the changed drawing to reflect that change on the Project Navigator palette.

WARNING When you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format.

A repath is necessary after you make any of the following changes in the project:

- Move the project to a different location
- Move a project file to a different category
- Rename a project file
- Move a subcategory from one category to another

In addition to updating the project files, repathing will also update the paths of the following files:

- Paths to support files, folders, and templates stored within the project setup, such as drawing templates, tool content root path, or project standards drawings.
- Paths to images referenced in project drawings
- Paths for schedules referencing external drawings within project drawings

When you zip a project and send it to another user who unpacks the project to a different location on another computer, the project will be updated in its new location when it is set current for the first time on the new computer. For example, if your project resides in C:\Project1\, and the user you are sending it to unpacks it to D:\Project1, the path information is updated when the new user sets the project current in AutoCAD Architecture. However, this will update only if all project paths were correct and current when you zipped them. If, for example, you have moved the project to another location on your computer before zipping it, and not repathed it before zipping, the repathing on the new user's machine will not work correctly. Before you zip and send a project, you must make sure that all external reference paths in the project are valid.

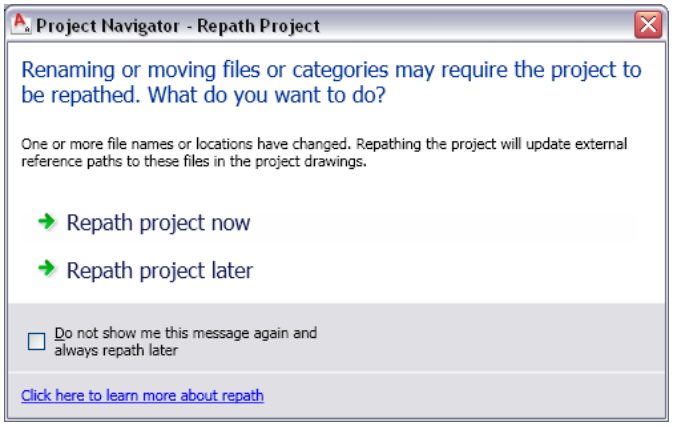
You have the choice of repathing:

- A single project file
- All files in a category
- All files in the project

1 On the Quick Access toolbar, click Project Navigator .

2 Change the name or the location of a project file or project folder in the Drawing Explorer.

The Project Navigator - Repath Project dialog displays.



3 Specify when you want the repathing to be done:

If you want to…	Then…
update all project files now	click Repath project now.
update all project files later	click Repath project later. If you close the project before repathing, the drawing files remain in a queue for update and will display in the Project Repath Queue dialog the next time you open it. The repath queue is shared by all users working on a project and it is saved from session to session.

4 Alternatively, click to update all files in the project at any time.

Refreshing the Project Navigator

Use this procedure to refresh the project view on the Project Navigator palette.

When multiple people are working on the same project simultaneously, the situation can occur that one person's Drawing Explorer view on the Project Navigator palette becomes out of sync with the changes of another.

For example, user 1 is adding/moving/deleting constructs of a project. At the same time, user 2 is annotating sheets. User 2 is not automatically notified that user 1 has removed some constructs from the project. If user 2 tries to open a removed construct from the Project Navigator on their machine, an error message results.

To prevent this situation, refresh the Project Navigator by clicking (Refresh Project) so that all items are updated to reflect the current project status.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the tab for which you want to refresh the file tree.

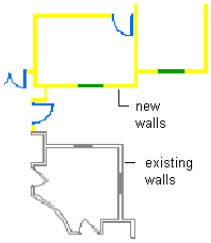
3 Click .

NOTE It is recommended that you do this frequently during a project session when multiple people are working on the same project.

Object Display in External References

When you reference a project drawing into another project drawing—a construct into a view or a view into a sheet—the referenced drawing uses the display settings of the host drawing (the drawing into which it is referenced).

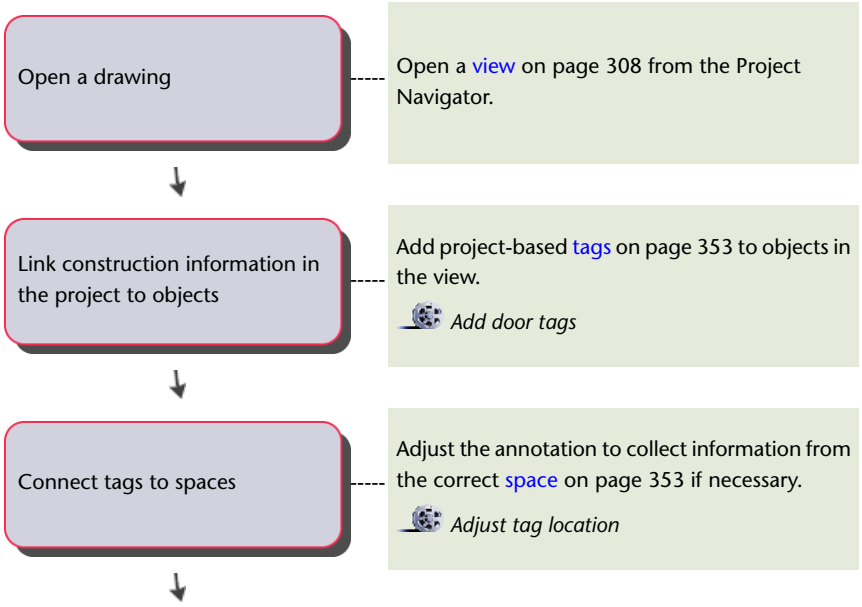
In some cases, however, you might want to change the display of an external reference for a specific view. For example, you may want to display a new walls construct with its regular display configuration, and an existing wall construct as a light gray background image, as displayed in a different display configuration.

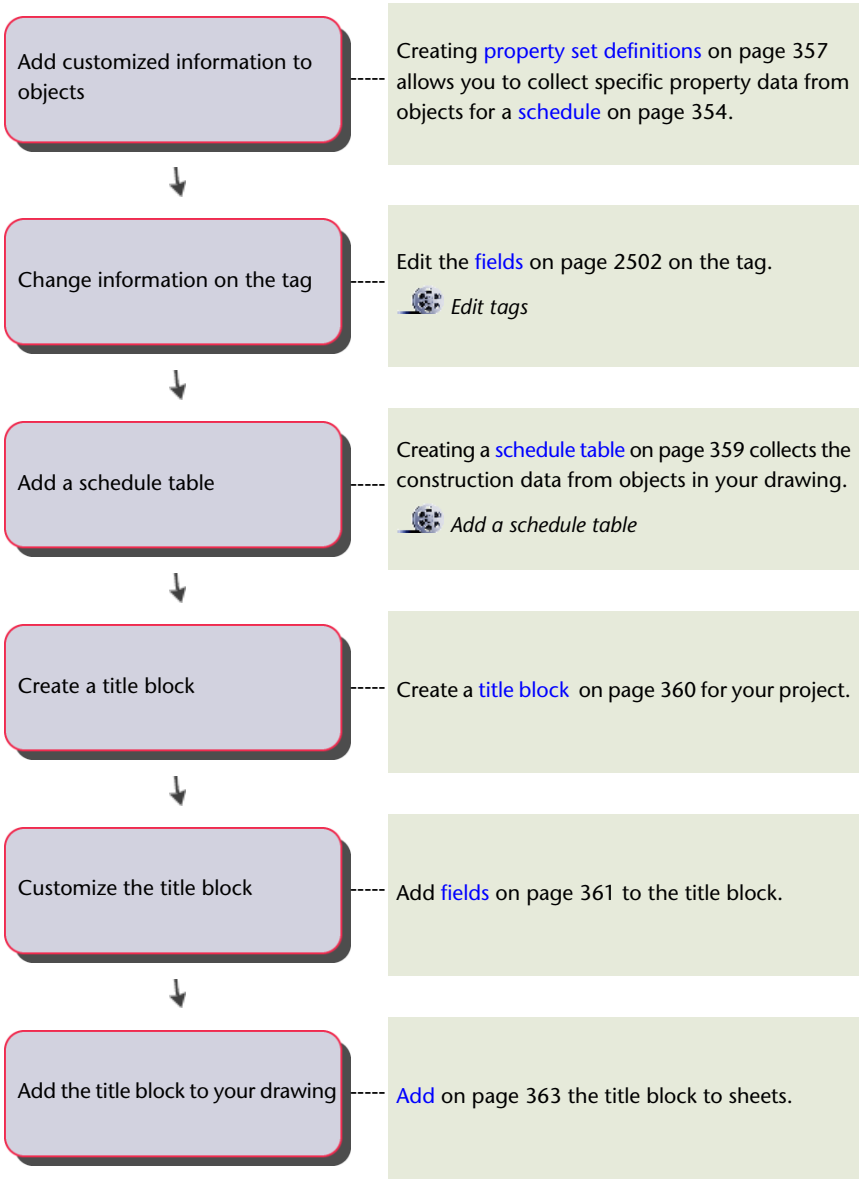


To do this, you could define in a construct a display configuration called Existing Walls and assign a light gray color to it. When you reference the construct into a view during the first phase of the project, you use the regular display configuration for new walls. When you reference that construct into a view in a later phase, you can assign the Existing Walls display configuration. For more information, see Specifying the Display Configurations Used in Xref Overlays on page 544.

Workflow for Annotating a Project

The most appropriate place to add annotation is in a view drawing.





Generating Spaces

Before you start creating annotation for the building objects, you might need to create spaces and space property information from your project. Spaces and space schedule properties help you report information on the rooms of a building, such as room numbers, room finishes, or physical information like net and gross areas, perimeters, and calculation modifiers. You can easily create spaces from walls and other building objects. For more information, see Generating Associative Spaces on page 1915, Converting Objects, Profiles, and Polylines to Non-Associative Spaces on page 1945, and Basic Schedules on page 2461.

Tagging in a Project

Use this procedure to tag objects in a project drawing.

One of the most frequent uses of annotation in a project is tagging the individual objects. It is recommended that you tag objects in view drawings. You can create project-specific tags that display project information

or use the default project-based schedule tags that are in the Document tool palettes. The difference between a standard schedule tag and a project-based schedule tag is that a project-based schedule tag recognizes the level in the project in which the object is located. When you want this additional information captured, use a project-based schedule tag. For more information, see Adding Tags Using Schedule Tag Tools on page 2466.

For more information, see Project Schedule Properties on page 356, Creating a Property Set Definition with Project Property Definitions on page 357, and Workflow for Creating Title Blocks on page 360.

1. Open the view drawing in which to add your tags.
2. Open the tool palette that contains the tag you want to use, and select the tool.

   Predefined project tag tools are located in the Documentation Catalog in the Content Browser. You can add these tools to any tool palette.
3. Select the object to which to attach the tag.

   NOTE You can select an object within an external reference.
4. Specify the location of the tag.
5. If prompted, enter property set data for the object in the Edit Property Set Data dialog, and click OK.

   For information about preventing the worksheet from displaying each time you add a tag, see Turning Off the Edit Property Set Data Worksheet on page 2467.

   If property set data is not yet attached to the object, you can attach an appropriate property set from the current drawing or the Schedule Tables.dwg file in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>*. For more information about property sets, see Property Set Definitions on page 2510.
6. Enter m, press ENTER, and select multiple objects to tag.
7. Alternatively, press ENTER, and add schedule tags one at a time.

Property Set Data and Schedule Tables in Projects

Schedules are tables that list specific information about selected objects in your building model. You can create different types of schedules by attaching property set data to objects and object styles, and then extracting and displaying the data in a schedule table.

For detailed information on property sets and schedule tables, see Schedules and Display Themes on page 2455.

You can schedule each instance of each external reference individually. For example, if you have an element that contains a typical door, you can reference that door element five times into a construct. When you create a door schedule in the construct, all five instances of the door element are scheduled independently and can have unique data.

When you work in a non-project environment, you typically attach property data to objects directly in the drawing. When you use the Drawing Management feature, you work extensively with external references and often tag objects in xrefs.

- **Attach property set data to objects in external references:** You can, for example, reference a construct into a view, and attach property sets in the view to the objects from the referenced construct. Attaching property sets to external references works for any nested levels, but it is recommended that you attach data while in a view drawing.
- **Attach different property sets to individual instances of an external reference within a host drawing:** You can reference the same door multiple times into the same host drawing and attach different property

sets to each instance of the door. That way, you can reference the same typical element multiple times in a building and schedule each one differently.

- **Access property sets from the source element or construct drawing as well as property sets from views or sheets:** You can create a property set with properties in the element drawing and another property set in the sheet and schedule both in the sheet.

Example: Numbering a Door in a Project

The following example shows how you can define property data that combines object properties with project properties. The example uses space information to show how you could use project and formula property definitions. The following diagram shows how a space number can be built up from information on the space and in the project.

Value	Property Set Definition	Property Definition	Description
2	Space	LevelNumber	A project property definition, getting the Level ID for the object for the current project
01	Space	BaseNumber	A manual auto-incrementing property definition
201	Space	RoomNumber	A formula property definition, with the formula [LevelNumber][BaseNumber]

Creating Property Sets and Schedule Tables in a Project

Work with property set data and schedules as follows:

1. Create property set definitions and schedule table styles that contain the necessary project information.

   For more information, see Project Schedule Properties on page 356 and Creating a Property Set Definition with Project Property Definitions on page 357.

   You can create property set definitions and schedule table styles at different locations in the project environment:

   - In the AutoCAD Architecture Schedule Tables.dwg file
   - In your own, user-defined property set definitions drawing
   - In the drawing template
   - In the drawing

   NOTE To attach a property set definition to an external reference, import it into the object drawing. This is done automatically when you drag a tag from DesignCenter into the drawing.

   NOTE The drawing that contains your property set definitions does not need to be a part of your project. You can import and use property set definitions from any drawing file accessible to you.

   There are a number of guidelines that can help you decide in which property set definition to put property definitions:

   - Non-manual property definitions—that is, Automatic, Formula, Classification, Material, and Project Property Definitions—can in many cases be defined in property set definitions that are applied to styles. If a property set definition is to be applied to objects that do not have styles, it does not matter where the property definition is defined.

- Manual property definitions containing data that does not change for each instance of a style should be defined in property set definitions that are applied to styles.
- Manual property definitions containing data that does change for each instance of a style should be defined in property set definitions that are applied to objects.

2 Attach the property set definition to an object or style in a project drawing.

You can attach a property set to an object at various stages of the project. You can attach property set data to an external reference and also override existing property sets from the external reference in the host drawing. For example, you can attach a property set definition to a door in an element and then override that property set with an extended one when referencing that door into a construct. You could also create an element without property sets, reference it into a construct and a view, and attach a property set there.

NOTE Overriding property set definitions works only for those property sets attached to objects. Property sets attached to styles cannot be overridden when referenced into another drawing.

For more information, see Attaching Property Set Data to Objects on page 2502 and Attaching Property Sets to Objects from External References on page 358.

The following guidelines help you to select the correct location for attaching property sets to objects within a project:

- Property set definitions that are applied to styles must be attached to styles in the drawing containing the style.
- Property set definitions that are applied to objects and that contain data that does not change for each instance of the object that is externally referenced should be attached to the object itself in the externally referenced drawing.
- Property Set Definitions that are applied to objects and that contain data that does change for each instance of the object that is externally referenced should be overridden at the external reference, typically at the project construct level.

These guidelines are recommendations. The location of property data also depends on the processes and workflow you have established in your work environment.

3 Open the project drawing in which to place the schedule table.

4 If necessary, attach property sets to objects to be scheduled from external references, or override property sets for those objects on the external references that contain them.

For more information, see Attaching Property Sets to Objects from External References on page 358.

5 Create schedule tables in the drawing.

For more information, see Creating a Schedule Table in a Project on page 359.

Project Schedule Properties

A project property definition can be defined in a property set definition so that an object has access to information about the project in which it is currently located.

These project properties are available:

Property	Description
Name	Name of the project
Description	Description of the project

Property	Description
Number	Number of the project
Location	File location of the project on the hard disk or network drive
Number of Levels	Total number of levels in your project
Level ID	ID of the level the object is on
Level Elevation	Elevation of the level the object is on
Level Height	Height of the level the object is on
Number of Divisions	Total number of divisions in your project
Division ID	ID of the division the object is in
Sheet Name	Name of the sheet drawing that contains the object
Sheet Description	Description of the sheet drawing that contains the object
Details of the project: Project Data, Proposed Improvements, Site Legal Description, Owner's Data, Site Information Sources, Public Services, Financial Data, and Method of Handling	Properties for all project details created in Adding Detailed Information to Project Properties on page 222.

For general information on creating property set definitions, see Creating a Property Set Definition on page 2521.

Creating a Property Set Definition with Project Property Definitions

Use this procedure to create a property set definition containing project property definitions.

For a list of available project properties, see Project Schedule Properties on page 356.

For general information on creating property set definitions, see Creating a Property Set Definition on page 2521.

NOTE A property set definition can contain different types of property definitions such as automatic properties, project properties, formulas, and classifications.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and click Property Set Definitions.
3. Right-click, and click New.
4. Enter a name for the new property set definition press *ENTER*.
5. Click the Applies to tab, and define if the property set definition should be applied to objects or to object styles.
6. Select the entities or styles to which the property set definition should apply.

   Typically, you would attach project information to objects such as spaces, walls, doors, windows, and curtain walls.
7. Click the Definition tab.

8 Click .

The general project properties are listed. If you have created project details, as described in Project Schedule Properties on page 356, they are listed too and can be selected for the property set definition.

9 Select a project property.

10 Enter a name, and click OK.

11 Repeat steps 8-10 for each project property you want to add to the property set definition.

12 If necessary, add other properties to the definition.

13 Click OK twice.

Attaching Property Sets to Objects from External References

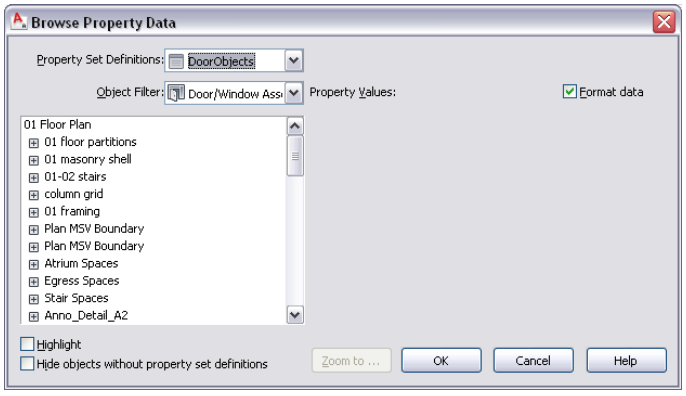
Use this procedure to attach property sets to objects in external references.

This topic explains the following procedures:

- Attaching property sets to objects from external references.
- Attaching different property sets to different instances of the same external reference. For example, you can reference the same floor plans onto multiple levels and schedule each level differently.

1 Reference a project drawing, such as an element or a construct, into another project drawing, such as a view or a plotting sheet.

2 Open the Scheduling tool palette, and select the Browse Property Data tool.



3 Under Property Set Definitions, select the property set definition from the host drawing with which you want to work.

4 Expand the desired external reference in the tree, until you can see the desired object.

5 Attach property set data to objects:

If you want to…	Then…
attach a property set from the host drawing to an object in an external reference	If no property set definition with the same name has been attached to the object, the row of boxes immediately next to it is empty. Select the box to check it. A property set is attached directly to the object. It is displayed on the right side, and can be edited.
override a property set from an external reference with a property set from the host drawing	If a property set with the same name has been attached at a lower level to the external reference, a

If you want to…	Then…
	read-only box is displayed at the appropriate level. Select the box at that level next to the object. The property set is attached to the external reference at the selected level as an override for the object. If a property set definition with the same name as that selected above exists in the external reference, it uses it, otherwise the property set definition in the host drawing is copied to the external reference. The property set is displayed on the right and is editable.
attach different property sets to different instances of an external reference	Expand the desired instance of the external reference in the tree. Select the box next to the object instance. To attach a different property set to another instance, select a different property set definition, expand a different instance of the external reference, and attach the property set to it.
remove a property set from the host drawing for an external reference	clear the box at the appropriate level next to the desired object.

6 If necessary, decrease the number of objects displayed in the tree:

If you want to…	Then…
show only one type of object in the tree	select the appropriate object under Object Filter.
show only those objects that already have the selected property set attached on some level	clear Hide Objects without Property Set Definitions.

7 If you are not sure whether you selected the correct object from the external reference, click Highlight to mark the object in the drawing area.

8 To display the correct object in the drawing area, click Zoom to.

9 If necessary, edit the property set data on the right.

10 To display properties with the correct data format style from the property set definition, select Format Data.

11 Click OK.

Creating a Schedule Table in a Project

Use this procedure to create a schedule table that contains property data from an external drawing such as a project drawing.

Schedule tables can contain information from external references and block references, which typically must exist in the same drawing as the schedule table. Schedule tables now optionally specify an external drawing, which is scheduled as if it were an external reference in the same drawing as the table. The advantage to this is that the graphics of the external drawing do not need to be generated in order to fill out the data in the table.

For general information on adding schedule tables, see Schedules on page 2455.

TIP To ensure that the Properties palette is displayed before you select a tool, right-click in the drawing area, and click Properties.

1 Open the sheet to contain the schedule table.

2 Open the tool palette that you want to use, and select a Schedule Table tool.

If necessary, scroll to display the tool that you want to use.

3 On the Properties palette, expand Basic, and expand General.

4 Select a style.

5 Instead of selecting objects in the drawing, press *ENTER*.

6 Specify the insertion point of the schedule table.

7 Specify the size of the schedule table.

A schedule table with no rows is inserted into the drawing.

8 Select the empty table, right-click, and click Properties.

9 On the Properties palette, expand Advanced, and expand External Source.

10 For Schedule External Drawing, select Yes.

The External Drawing settings are displayed, with a list containing all drawings in the Views directory of the current project. Each drawing should correspond to a view defined in the project. If no project is active, the list contains all drawings in the last directory browsed.

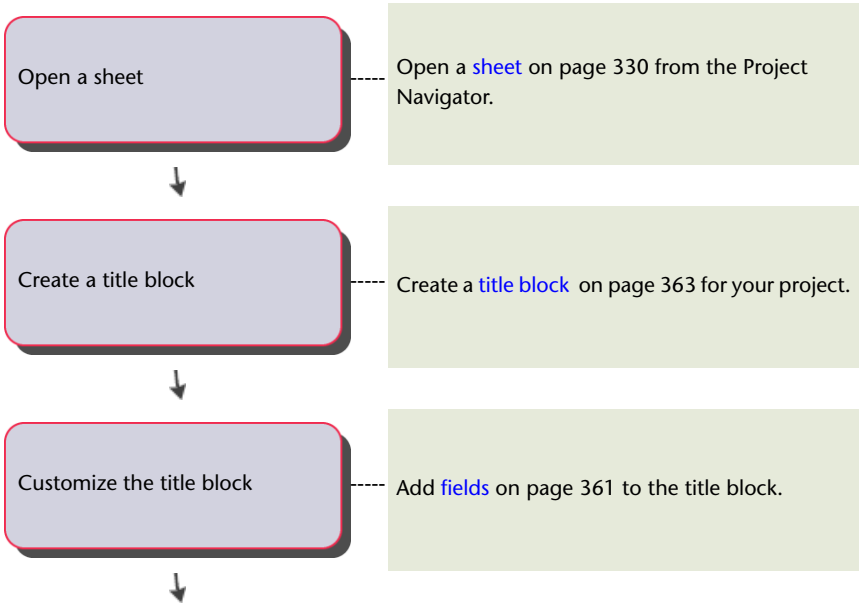
11 Select the view you want to schedule.

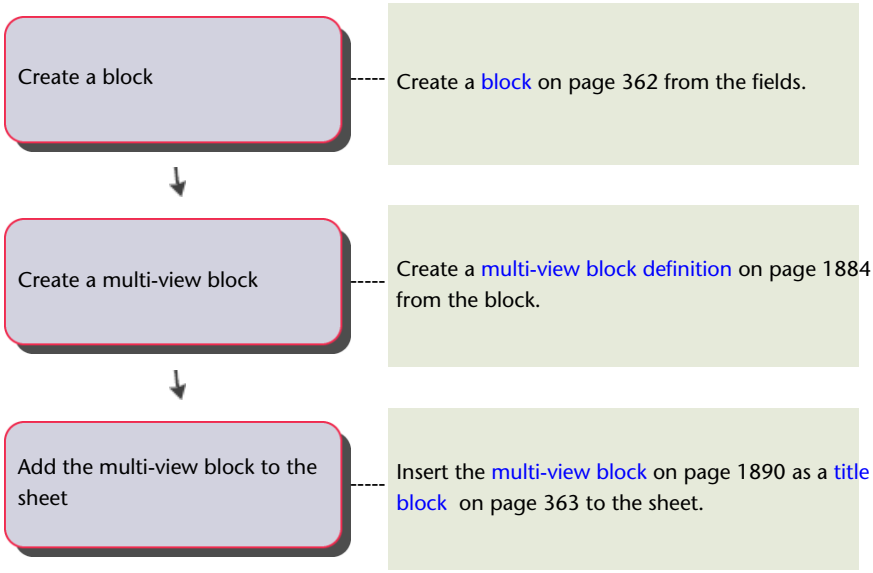
NOTE The setting for External Drawing Name is displayed only if you have selected Yes for Schedule External Drawing.

If the desired external view drawing is not displayed in the list, select Browse and find it.

Workflow for Creating Title Blocks

You can create title blocks that display information specific to the sheet set or the project. When the information changes, it is updated in the title block. A title block can be a multi-view block or a block with fields that include project information from project attributes.



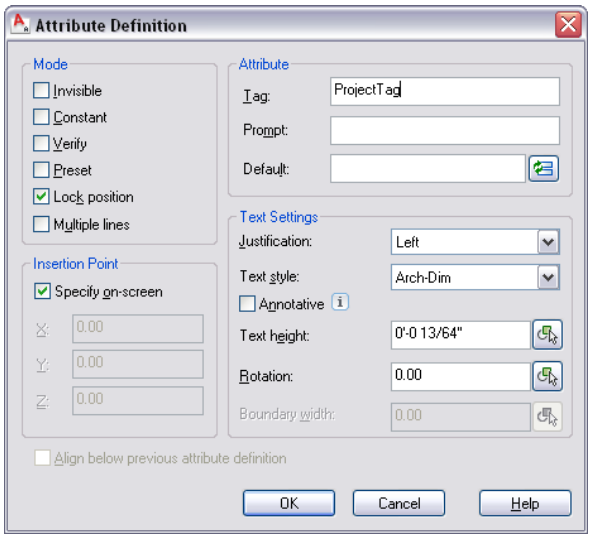


A title block would typically be placed in a sheet template or a sheet drawing. If it is in a sheet template, you can use it for all sheet drawings based on that template.

Adding Project Attributes

Use this procedure to create project attributes for a title block in the drawing.

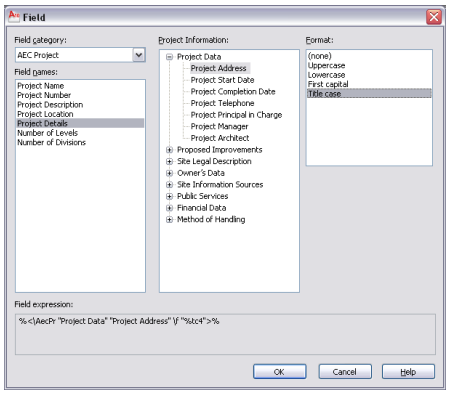
1 Click Insert tab ➤ Attributes panel ➤ Define Attributes .



2 In the Attribute Definition dialog, enter a name for Tag.

3 Click for Default.

The Field dialog is displayed.



4 In the Field dialog, select the field category you want to display in the title block.

For example, if you want to display details of the project, select AEC Project for Field category, and then select Project Details for Field names.

5 Select the text format for Format, and click OK.

6 Click OK to add the attribute.

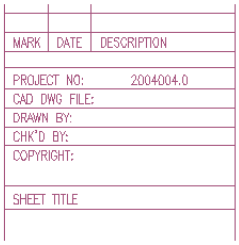
For more information, see Attach Data to Blocks (Block Attributes) in AutoCAD Help.

7 Repeat steps 1–5 to add additional attributes to the project title block.

8 Complete the attribute block with lines and borders.

The result is a number of attributes and graphic elements in your drawing. Your attribute block might look like this:

title block detail with attributes displayed



title block detail with project number data

Creating a Project Block

Use this procedure to create a block that contains the project attributes you want to display in a project title block. For information about adding attributes, see Adding Project Attributes on page 361.

1 Click Insert tab ➤ Block panel ➤ Create Block .

2 In the Block Definition dialog, enter a name for the block.

3 Click Select Objects, and select the attributes and additional graphics to include in the title block.

4 For Block unit, select Unitless.

5 Continue creating the block as described in Create Blocks Within a Drawing in AutoCAD Help.

Creating a Multi-View Block for a Title Block

Use this procedure to create a multi-view block that contains the blocks you want to display in the project title block. For information about creating blocks, see Create Blocks Within a Drawing in AutoCAD Help.

For detailed information about multi-view blocks, see Creating Multi-View Block Definitions on page 1882.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects.

3 Right-click Multi-View Block Definitions, and click New.

4 Enter a name for the new multi-view block definition, and press *ENTER*.

5 Select the new multi-view block definition, right-click, and select Edit.

6 Click the View Blocks tab.

7 Select a display representation for the title block.

Typically, you would display a title block in plan views and reflected views.

8 Click Add.

9 Select the block you defined in Creating a Project Block on page 362, and click OK.

10 Select the view directions for the block.

11 Repeat steps 6–10 for each display representation in which you want the title block to display.

12 Click OK twice.

Creating a Tool for a Title Block

Use this procedure to create a tool for inserting the title block in a drawing. It is assumed you have already defined the multi-view block, as described under Creating a Multi-View Block for a Title Block on page 363.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.

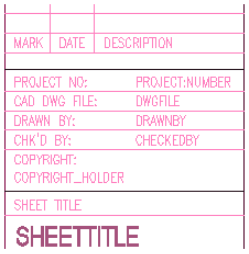
3 Locate the multi-view block definition you want to make into a tool, and drag it to the tool palette.

4 Click OK to close the Style Manager.

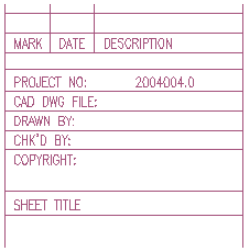
Inserting the Title Block in a Sheet

Use this procedure to insert a title block into a drawing using a tool you have created. See Creating a Tool for a Title Block on page 363.

Viewing title block attributes and data



title block detail with attributes displayed



title block detail with project number data

1 On the Quick Access toolbar, click Project Navigator .

2 On the Sheets tab, open the sheet on which you want to place the title block.

3 Open the tool palette that contains the title block tool you want to use.

4 Specify the insertion point for the title block.

5 If necessary, specify the scale and rotation of the title block.

6 Press *ENTER*.

Dimensioning a Project

Use this procedure to dimension objects in a project drawing.

In the documentation phase of a project, you create detailed dimensions of objects. AEC dimensions can be attached to objects in a drawing or to objects in an external reference. You can dimension objects in source drawings like elements or constructs, or you can dimension them in higher-level drawings like views or sheets.

For detailed information, see AEC Dimensions on page 2217.

1 Open the project drawing in which to add a dimension.

This may not be the drawing in which the object to be dimensioned is located. It may be a drawing that references the object. For more information, see Associative Dimensions in External References on page 2227.

2 Open the tool palette that you want to use, and select an AEC dimension tool.

If necessary, scroll to display the tool that you want to use.

3 On the Properties palette, expand Basic, and expand General.

4 Select a style.

5 In the drawing area, select the objects to dimension.

6 Press *ENTER*.

7 Specify the position of the new dimension:

If you want to…	Then…
insert the dimension group parallel to or perpendicular to the dimensioned object	drag the cursor in the desired direction, and click in the drawing at the desired insertion point. **NOTE** If your selection set contains objects with different directions, the direction of the first selected object defines the parallel and perpendicular directions.
insert the dimension group at a specified rotation	enter **r** (Rotation) on the command line, and press *ENTER*. Then, enter a rotation angle either by clicking in the drawing or by entering one on the command line. Press *ENTER*, and click in the drawing at the desired insertion point. **NOTE** If your selection set contains objects with different directions, the rotation is calculated with reference to the first selected object.
insert the dimension group aligned parallel to an object other than the dimensioned object	enter **a** (Align) on the command line, and press *ENTER*. Then, select the object to which to align the dimension group. Press *ENTER*, and click in the drawing at the desired insertion point. **NOTE** The direction of the dimension group is dependent on the rotation of the chosen object. The drawing direction of the object has no influence on the dimension group direction.

Working with Cut Planes in a Project

You can set a global cut plane for each display configuration in a drawing, and individual cut planes for objects like walls, curtain walls, and wall openings. For more information, see Viewing Display Configurations on page 530.

The Global Cut Plane

You can set a cut plane for a display configuration in a drawing. All objects included in that display configuration are cut at the height defined in the display configuration, unless they have an object-specific cut plane override. Each display configuration can have a different cut plane. For more information, see Object-Specific Cut Planes on page 373 and Global Cut Planes on page 367.

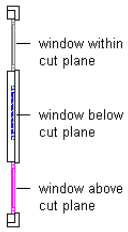
The Object-Specific Cut Plane

A number of objects can override the cut plane settings in the display configuration and use their own cut planes: for example, walls, curtain walls, and stairs. For more information, see Object-Specific Cut Planes on page 373.

Cut Plane Display Range

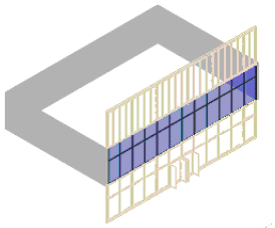
A cut plane is set to a specific height, for example, 1.4 meters. Objects above or below that level are by default not displayed in a plan view. You can, however, define a display range above and below the cut plane. Object components inside that range are displayed too. This would be useful if you want to display a window that lies above or below the cut plane but that should be included in the display.

Viewing plan view window cut plane options



You also use a display range to define clipped views, such as the model view of a second floor. In that case, the display range defines which levels to display and which levels to hide.

Clipped 3D view of second floor



For more information, see Creating a Clipped Model View on page 371.

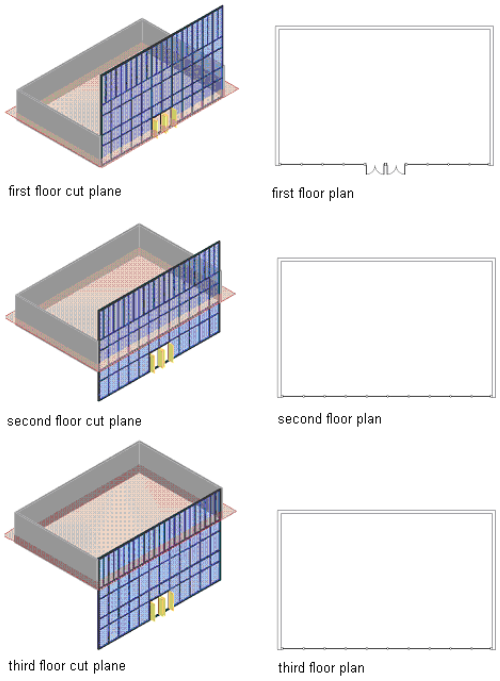
Cut Planes and Levels

Levels are represented separately by one or more files and are assembled in a view or sheet to represent the entire building.

You set the cut plane individually for each level of a building. You create a drawing file—a construct or a view—that represents the level, and assign a cut plane to a display configuration within the drawing.

The following images illustrate a curtain wall that spans 3 levels. The images on the left indicate the cut plane for the associated level drawing. The plans to the right show how the curtain wall would be displayed in plan view at each level. Notice the different appearance of the doors and mullions on the various floor plans.

Specifying 3 cut plane levels



Global Cut Planes

The global cut plane cuts all objects in a drawing at the same height. It is defined separately for each of the display configurations that can be applied to a drawing, so you can have, for example, one cut plane height for a regular plan view and another cut plane height for a Reflected view.

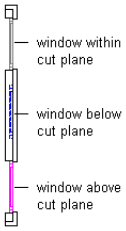
The global cut plane is used on all objects that do not have an object-specific cut plane override. For more information, see Object-Specific Cut Planes on page 373.

Global Cut Plane Display Range

When you set a cut plane for a display configuration, you also set a display range above and below the cut plane. This is the range in which objects, even when they do not intersect the cut plane, are displayed. For example, if you set the cut plane to 1.4 meters and define the visible range above the cut plane at 2 meters and the visible range below the cut plane at 1 meter, then your objects are cut at 1.4 meters. Objects that lie between 1.4 meters and 2 meters as well as objects that lie between 1.4 meters and 1 meter are also displayed, but with different display for above and below the cut plane. Objects that lie outside the range—for example, a window that is inserted at 0.8 meter—are not displayed at all.

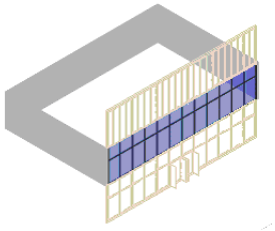
NOTE The values for the display range are calculated relative to the WCS, not relative to the global cut plane height.

Plan view of window cut planes



You also use a display range to define clipped views, such as the model view of a second floor. In that case, the display range defines which levels to display and which levels to hide.

Clipped 3D view of second level



For more information, see Creating a Clipped Model View on page 371.

Display Properties for the Cut Plane Display Range

Many objects have display components that you can set for display above and below the cut plane. For example, an object below the cut plane can be displayed with dashed lines and a different color. If you want to work with the display range, set the appropriate display components accordingly.

NOTE The Above and Below Cut Plane display components display in some plan-type display representations, such as Plan, Plan High Detail, Plan Low Detail, Plan Screened, Reflected, and Reflected Screened, as well as in user-defined display representations that are based on any of these display representations.

The following objects have display components for above and below the cut plane:

Object	Components that can be set for above and below cut plane
Curtain Walls/Curtain Wall Units	Curtain Wall/Curtain Wall Unit body
Doors	Frame/Panel/Stop/Swing/Threshold
Door/Window Assemblies	Door/Window Assembly body
Mass Elements	Mass Element body
Railings	Guard Rail/Hand Rail/Bottom Rail/Post
Slabs/Roof Slabs	Slab Body/Slab Outline
Stairs	Stringer/Stringer Facets/Riser/Riser Numbers/ Nosing/Path Outline
Structural Members	Beam/Brace/Column body

Object	Components that can be set for above and below cut plane
Walls	Wall Body
Windows	Glass/Frame/Sash/Sill

For more information on setting display properties for individual objects, see the appropriate procedures for the objects.

Setting the Global Cut Plane and the Display Range

Use this procedure to set the cut plane and the visible display range for a display configuration. For information on the display system, see Display Configurations on page 525.

NOTE The values you enter for the Above and Below ranges are the absolute height values calculated from the WCS origin. They are not relative to the cut plane. For example, if you have set the global cut plane to 1.4 meters, set the visible range above the cut plane to a value higher than 1.4 meters; otherwise, you get an invalid display range.

1 Access the global cut plane controls using one of the following methods.

If you want to…	Then…
define the global cut plane height for the current display configuration	click the value for Cut Plane on the drawing window status bar. **NOTE** Specify a cut plane that falls within the display range, or change the value of the display range to include the cut plane height.
define the global cut plane height for any display configuration	click Manage tab ➤ Style & Display panel ➤ Display Manager .Then, select a display configuration in the left pane, and click the Cut Plane tab.

2 Define the cut plane and the visible ranges above and below the cut plane:

If you want to…	Then…
define the global cut plane height for the display configuration	enter the appropriate value for Cut Height.
define the visible range above the cut plane	enter the appropriate value for Display Above Range. **NOTE** The value you enter here is calculated from the WCS origin and is not relative to the cut height.
define the visible range below the cut plane	enter the appropriate value for Display Below Range. **NOTE** The value you enter here is calculated from the WCS origin, and is not relative to the cut height.

You must specify a cut plane that falls within the display range, or adjust the value of the display range to include the cut plane height.

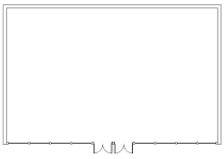
3 Click OK.

Displaying the Cut Plane for a Specific Level

Use this procedure to display the cut plane for a specific level in a project.

Usually, you want to display the cut plane of the current level. However, in some cases, you might want to display a different level. For example, you may want to see how a curtain wall that spans several levels in a project will display at each level.

Specifying different cut planes results



result using first floor cut plane

result using second floor cut plane

1 On the Project Navigator, open a construct with a curtain wall.

2 If necessary, switch to a plan view.

3 Access the cut plane controls using one of the following methods.

If you want to…	Then…
define the cut plane height for the current display configuration	click the value for Cut Plane on the drawing window status bar.
define the cut plane height for any display configuration	click Manage tab ➤ Style & Display panel ➤ Display Manager . Then, select a display configuration in the left pane, and click the Cut Plane tab.

4 Click Calculate.

This button is only available when the drawing is part of a project. It uses the level information you entered in Creating a New Level on page 251.

5 In the Cut Plane Worksheet, select the level whose plan view you want to display in the current drawing.

For example, if you have created a view of the first floor but want to display the plan view of the second floor, select 2.

6 Select the cut plane height of the selected level.

For example, to display the second level at a cut height of 1.4 meters, enter 1.4 here.

7 Click OK.

The display range is adapted to display the height of the selected level.

For example, perhaps you have a 3-story building with a floor height of 2.75 meters for each floor. You have created a view of the first floor but want to display the second floor in it at a cut height of 1.4 meters. In the Cut Plane dialog, you enter 2 for level, and 1.4 for Cut Plane Height Above Level. When you click OK, the display range of the view now spans the second level. The following values are entered into the Cut Plane Tab of the display configuration:

Field Name	Value	Comment
Display Below Range	2.75 meters	This is where the second level starts.
Cut Height	4.15 meters (2.75 meters + 1.4 meters)	To display a cut height of 1.4 meters, add 1.4 meters to the start of the second level at 2.75 meters.
Display Above Range	5.5 meters	The second level starts at 2.75 meters, and has a base height of 2.75 meters. This results in an overall height of 5.5 meters.

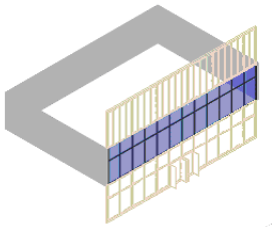
8 Click OK.

Creating a Clipped Model View

Use this procedure to create a clipped Model view of a building level.

If a level is crossed by a spanning element like a curtain wall or an elevator shaft, you want to display only those parts of the spanning element that actually lie on that level. You can create a clipped Model view that displays only those objects and object ranges within the user-defined display range.

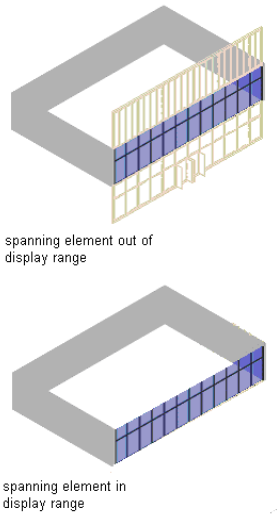
Clipped Model view



Some display settings for a clipped Model view are influenced by the materials assigned to the clipped objects:

- Display of object ranges outside the display range: You can display the parts of a spanning element that are outside the display range of the level. In some cases, you might want to display those parts of the object in a lighter color and thinner lineweight to imply the complete shape of the object.

3D view of spanning element in and out of display range



How those parts are displayed is set in the Sectioned Body component of the object's materials. For information on setting the display of the Sectioned Body component, see Sectioned Body and Sectioned Boundary on page 589 and Defining the Layer, Color and Linetype of a Material Definition on page 600.

- Display of a section hatch and a section boundary where the display range cuts the spanning object: You might choose such a display to highlight the cut line.
  How the section hatch and boundary are displayed is defined in the Section Hatch component of the materials for the object. For information on setting the display of these components, see Section Hatch Material Component on page 588Sectioned Body and Sectioned Boundary on page 589, and Defining the Layer, Color and Linetype of a Material Definition on page 600.

1. Create a view containing the desired level.
   For more information, see Creating a New View Drawing on page 302.
2. If necessary, switch to a Model view: for example, SW Isometric.
3. Click Manage tab ➤ Style & Display panel ➤ Display Manager .
4. Expand Configurations.
5. Select the current display configuration.
   It is displayed in bold text.
6. Click the Cut Plane tab.
7. Set the Above and Below display ranges to be identical to the level height.
   For example, if your level is 2.75 meters high, set Display Below Range to 0.0 meters and Display Above Range to 2.75 meters.

   NOTE For a clipped model view, it is not important how you set the cut plane, as the cut plane is displayed only in plan views. Either keep the original value, or enter any value within the display range: for example, 1.4 meters.

8. Expand Sets.
9. Select the current display set (displayed in bold text).
10. Click the Display Options tab.

11 Define the display of the clipped model view:

If you want to…	Then…
display the objects in the display range defined in step 7 with their regular display settings, and the objects outside of the display range as Sectioned Body	select Section AEC Objects by Display Range defined in Display Configuration.
show a section hatch and a section boundary where spanning objects are cut by the display range	select Show Materials where Display Range Intersects AEC Objects.
hide all parts of spanning objects outside of the display range	select Hide Sectioned Body Component.
suppress the surface hatch of objects within the display range	select Hide Surface Hatching.

12 Click OK.

Object-Specific Cut Planes

Many objects in AutoCAD Architecture have individual settings for cut planes that can override the cut plane setting of the display configuration. Object-specific cut planes are useful when you have objects of different heights in your plan view. This happens frequently when you are working with a window high in a wall.

NOTE The cut plane you specify must fall within the display range, or you can adjust the value of the display range to include the cut plane height.

An object-specific cut plane takes precedence over the global cut plane in the display configuration. For more information on the global cut plane, see Global Cut Planes on page 367.

Example: Overriding the Cut Plane for a Wall

The object-specific cut plane is a part of the display properties of an object. You can set it for an individual object, an object style, or as the system default.

For detailed information on display properties, see Display Representations on page 520and Creating a Display Representation for an Object on page 538.

TIP If you want to create a clipped model view, as described in Creating a Clipped Model View on page 371, or want to display the cut plane of a different level, as described in Displaying the Cut Plane for a Specific Level on page 370, make sure to turn off the object specific-cut plane of the included objects. The object-specific cut plane overrides the global cut plane, and so you might get unexpected display results.

The following is an example of how to set a cut plane for a wall style. The detailed steps for other objects may vary slightly. For more information, see the individual object chapters.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and then expand Wall Styles.
3 Select the wall style for which you want to set an individual cut plane, and click the Display Properties tab.
4 Select a Plan or Reflected display representation.
5 Click the Edit button.
6 Click the Cut Plane tab.

7 Select Override Display Configuration Cut Plane.

8 For Cut Plane Height, enter the desired cut plane.

9 Click OK 3 times.

Example: Using the Cut Plane of the Anchoring Object

Whether an anchored object uses the cut plane of its host object or the cut plane of the display configuration is set in the display properties of the object. You can define this for an individual object, an object style, or as the system default.

For detailed information about display properties, see Display Representations on page 520and Creating a Display Representation for an Object on page 538.

The following example demonstrates how to set an anchored window to use the cut plane of the wall to which it is anchored. The detailed steps for other objects may vary slightly. For more information, see the individual object chapters.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and then expand Window Styles.

3 Select the window style for which you want to set the cut plane when anchored, and click the Display Properties tab.

4 Select a Plan or Reflected display representation.

5 Click the Edit button.

6 Click the Other tab.

7 Select Respect Cut Plane of Container Object When Anchored.

NOTE You should use this setting as the default. Even when the cut plane of the anchoring object does not differ from the global cut plane, this setting ensures a correct display of the anchored object in plan views.

8 Click OK 3 times.

Object-Specific Cut Plane Overrides

The following objects can have an object-specific cut plane:

- Curtain Walls
- Curtain Wall Units
- Door/Window Assembly
- Mass Elements
- Roof Slabs
- Slabs
- Stairs
- Walls

Cut Planes from the Anchoring Object

Objects like windows or doors usually are anchored into walls, curtain walls, and window assemblies. Normally, you want those anchored objects to have the same cut plane height as the object into which they are anchored. However, because the cut plane of the anchoring object can be set by either the display configuration or by the object itself, specify in the anchored object whether it should use the cut plane of the display configuration or of the object to which it is anchored.

The following objects can derive their own cut plane from the cut plane of the object to which they are anchored:

- Curtain Wall Units
- Doors
- Door/Window Assemblies
- Windows

Manual Cut Planes

You can define any number of manual cut planes for a wall or a curtain wall. Manual cut planes are only displayed when they are inside the display range.

For information on setting the manual cut plane, see:

- Specifying the Cut Plane Display of a Curtain Wall on page 1008
- Specifying the Cut Plane Display of a Wall Style on page 862
- Specifying the Cut Plane Display of a Curtain Wall on page 1008
- Specifying the Cut Plane Display of a Curtain Wall Unit on page 1091
- Specifying the Cut Plane Display of a Door and Window Assembly on page 1181

Drawing Management Commands

You can run certain Drawing Management commands from the command line. These commands are also available as toolbar buttons or context menu commands. In some cases, for example when creating LISP routines, you might want to initiate them via the command line.

Command Line: Opening the Project Browser

Use this procedure to open the Project Browser from the command line.

- On the command line, enter **AecProjectBrowser**.
  The Project Browser is displayed.

NOTE Alternatively, you can click the button on the Projects tab of the Project Navigator.

Command Line: Opening the Project Navigator

Use this procedure to open the Project Navigator palette from the command line.

- On the command line, enter **AecProjectNavigator**.
  The Project Navigator palette is displayed.

NOTE Alternatively, you can click on the Quick Access toolbar.

Command Line: Refreshing the Project

Use this procedure to refresh the project on the Project Navigator palette from the command line.

- On the command line, enter **AecRefreshProject**.
  The Project Navigator Palette is displayed, and all tabs are refreshed to display the current project state.

NOTE Alternatively, you can click the button on each of the Project Navigator tabs.

Command Line: Regenerating Views

Use this procedure to regenerate all views in the current project from the command line. When you regenerate a view, you reload all of the external references used to generate the view.

- On the command line, enter **AecRegenerateProjectViews**.
  All views in the current project are regenerated.

NOTE Alternatively, you can click the button on the Views tab of the Project Navigator.

Command Line: Selecting a New Project Environment

Use this procedure to select a new project environment from the command line.

NOTE You can select only existing projects from the command line. To create a new project environment, go to the Project Browser and create a new project as described in Setting a Project Current on page 215.

1. On the command line, enter **AecSetCurrentProject**, and press *ENTER*.
2. Enter the project you want to set current on the command line.

NOTE Alternatively, you can click on the Projects tab of the Project Navigator, and set the new project current in the Project Browser.

Command Line: Closing the Project Navigator

Use this procedure to close the Project Navigator from the command line.

- On the command line, enter **AecCloseProjectNavigator**.
  The Project Navigator Palette is closed.

Frequently Asked Questions about Drawing Management

This topic contains questions and answers that can help you to achieve the results you need when working with Drawing Management.

What do I have to consider when working with the XML files in the project?

The project data of a building model is contained in the APJ file, which contains information about the overall project, and in the XML files accompanying each DWG file. Both file types are well-formed XML. In most cases, you should not try to edit these files manually in an XML editor, as you might inadvertently corrupt the file. To make changes to your project, use the Project Browser and Project Navigator commands instead.

NOTE Do not delete any XML files generated by the Drawing Management feature. They are vital to the project.

I have added a lot of project details in the Project Browser. Can I export these to another application?

Yes. The project details you enter in the Project Browser are stored in the project's APJ file, which is a well-formed XML file. If you want to export these details, create a copy of the APJ file, and export it to any XML application or database. If you want to use the project detail categories and items in another project, use the existing APJ file as the template for the new project.

What should I do if my APJ file has been accidentally deleted or corrupted?

Deleting or corrupting the project's APJ files has no influence on the DWG files and XML files contained in the project. In the Project Browser, the project will not display anymore. To recreate the project with a new APJ file, go to the Project Browser, and create a new project of the same name in the same folder location as the previous APJ file. For instructions, see Creating a New Project on page 216. Then, go to the Project Navigator, and drag-and-drop the Elements, Constructs, Views, and Sheets folders of the project from Windows Explorer into the corresponding tabs of the Project Navigator. This re-inserts the files into the project.

What should I do if an XML file has been accidentally deleted or corrupted?

Each DWG file within a project has an accompanying XML file that contains the project-specific information. If the accompanying XML file is accidentally deleted or corrupted, the DWG file is no longer recognized as part of the project and will not display in the Drawing Explorer. To insert it into the project again, convert the DWG file into a project file. For instructions, see Converting a Drawing to a Construct on page 271and Converting a Drawing to an Element on page 287.

Can I limit other users access to the project files?

You can limit other users ability to edit and delete project files by using the network permissions. You can limit the Delete rights for the entire project, so that users are not able to delete files from the project or move files around within the project. You might also consider just limiting the delete rights to the top project folder (containing the APJ file) and allow deleting in the subfolders.

How much additional file space will the project files need?

Working with a project does not require large additional amounts of file space on your computer or network folder. The XML files are less than 10K, most of them around 1-3K. The APJ file is slightly bigger, but in most cases will not exceed 10K either.

How can I best archive a project?

With AutoCAD Architecture, you can electronically transmit and archive a project. For more information, see Electronically Transmitting a Project on page 232.

Alternatively, you can copy and paste a project in Windows Explorer. All of the project files are contained in a folder structure within the top project folder, which also contains the APJ file. Just take the top project folder and move or copy it to the desired archive location on a folder, a CD, or streamer tape.

How would I best place Addenda, Alternates, or As-Builts within the project?

How you organize these items would largely depend on your internal processes and workflow. One solution would be to draw the alternates as regular constructs and then create special views for them.

If you want to present completely different plans/elevations to represent Alternates, you could use divisions to represent them; when generating the view, you just need to include the appropriate division into the view.

In some cases you might also consider copying the project and putting the Alternates into the copied project. For instructions, see Creating a New Project Based on a Template (Copying a Project) on page 216. If you copy a project, however, you have 2 different file sets to maintain; the copied project does not retain any links to the original one.

How do I define the physical locations of constructs and elements in the building?

The location of the objects in a project file when referenced into another project file depends on the location in the original file. By default, project files are referenced at 0,0,0. When generating a view, the lowest level included in this view is placed at a Z axis of 0.

When referencing a project file into another project file, are basepoints other than 0,0,0 respected?

Yes. When referencing elements into constructs, and constructs into views, they are inserted at 0,0,0. A base point (INSBASE) other than 0,0,0 within the constructs and elements is respected.

Can I override the basepoints of project files when referencing them in other project files?

No. This is standard AutoCAD behavior.

Can I lock constructs and elements in their position to avoid accidentally moving them?

Yes. If you want to lock an element or construct within the building model, lock the layer the element or construct has been inserted on.

Is there an easy way to copy an element to multiple constructs at once?

Yes. Select the element in the Drawing Explorer, right-click, and click Attach Element to Constructs. For detailed instructions, see Referencing an Element into Multiple Constructs on page 276.

Is there an easy way to copy a construct to multiple levels at once?

Yes. There are 2 methods of achieving this, which are described in Copying a Level with Assigned Constructs on page 253 and Copying Constructs to Levels on page 270.

How do I move constructs from one level to another?

To move a construct to a different level, change its level assignment. Select the construct, right-click, and click Properties in the context menu. Then, choose a different level in the Assignments matrix. For detailed instructions, see Changing the Properties of a Construct on page 278.

Will wall cleanups work across walls from different divisions?

Yes. Walls do cleanup across external references, such as divisions. You just need to make sure that the wall baselines are at the same elevation.

Will AEC dimensions work with objects from external references?

Yes. AEC dimensions are capable of dimensioning objects from external references, even when they are nested. For detailed information, see Dimensioning a Project on page 364.

Will schedule tags and property sets work with objects from external references?

Yes. Schedule tags and property set definitions are capable of annotating objects from external references, even when they are nested. For detailed information, see Tagging in a Project on page 353 and Property Set Data and Schedule Tables in Projects on page 354.

Is the Project Navigator MDI compliant?

No. During a session of AutoCAD Architecture, only one project can be opened at a time. You can open files from different projects with the regular Open file command in the Application menu. You do not, however, see the associated project on the Project Navigator palette.

Appendix 1: Template Projects

A template project is an AutoCAD Architecture project that is used as the starting point for a new project. The files and folder structure of the existing project are used for the new project and are copied to the location you specify. You can access template projects when creating a new project in Project Browser.

Once chosen, the template project is copied to the new location (selected in the Project Browser window before clicking the New Project icon) and then automatically repathed. A template project provides the equivalent benefits that DWT files provide for individual drawing files. Template projects help to speed project setup and ensure office standards and consistency.

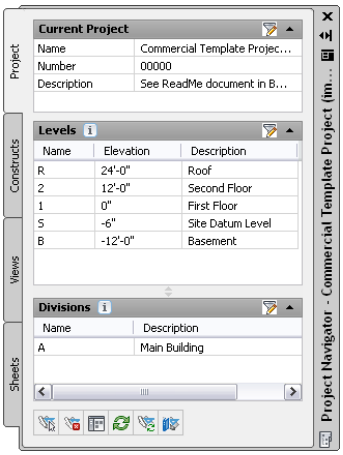
Using the Commercial Template Project as template for a new project

1. On the Quick Access toolbar, click Project Browser .
2. In the Project Browser window, navigate to the location where you want to create the new project, and click .
3. Enter the project name and number, and then click Create from template project.
4. Navigate to the following project: *C:\ProgramData\Autodesk\ACA 2010\enu\Template\Commercial Template Project (Imperial)\Commercial Template Project (Imperial).apj*. This includes United States-based constructs.

   Alternatively, you can select the metric version.
5. Click OK and wait until the project has finished repathing.

Levels and Divisions

The Commercial Template Project includes 5 basic levels to get you started. For detailed information, see Creating a New Level on page 251.



If you are using divisions to divide the project laterally, set those up right away.

Project File Naming

Below is a summary of potential file names based on the recommendations of the US National CAD Standard as adapted to the Project Navigator and suggestions made here. For complete information and to purchase a copy of NCS visit: *http://www.nationalcadstandard.org/*.

An NCS Model file name is composed of a Discipline, plus a drawing type Code, followed by an enumeration (which typically corresponds to the floor number), though not always. (Elevations, for instance, would just be numbered sequentially in any logical order.)

For example:

- A-FP01 = Architectural First Floor Plan
- A-EL01 = Architectural Elevations (first group of elevations; there could be others named 02, 03, etc.) The hyphen is used between discipline and code, but not between code and number.

NCS Recommends the following codes for Model files. Use these designations for View file names:

- FP = Floor Plan
- SP = Site Plan
- DP = Demolition Plan
- QP = eQuipment Plan
- XP = eXisting Plan
- EL = ELevation
- SC = SeCtion
- DT = DeTail
- SH = ScHedules
- 3D = isometrics/3D
- DG = DiaGrams

Technically, FP would be used for any type of plan and each would simply be enumerated. So, the first floor plan might be: A-FP01, while the first floor ceiling plan might be: A-FP02. However, A-FP02 for a ceiling plan on the first floor is confusing to most people and it is highly likely you would run out of codes with only 2 digits. Therefore, the following abbreviations are used almost universally by most firms:

- CP = reflected Ceiling Plan
- RP = fuRniture Plan
- EP = Enlarged Plan

While A-3D01 would technically be correct for the name of a composite model, the following is recommended:

- CM = Composite Model

So the file would be named A-CM01. (You could also use A-CM00 for the first composite model in a set. It is not that critical with which number you start.)

NCS knows nothing about constructs. Since their names indicate drawing type and function, they are best suited to use as View file names. Consider descriptive names for Constructs such as:

- 01 Walls
- 01 Shell and Core
- 01 Floor
- 01 Floor Plate (not Plan)
- Stair (for spanning Stairs)
- 00 Stair (alternative for stairs)
- Roof
- 01 Slab

For sheets, the NCS system is fine. They recommend the number of the sheet, which typically includes the discipline code as well. The number is in 2 parts: the first digit is a code indicating drawing type, and the remaining 2 are an enumeration.

- 1 = Plans (Horizontal Views)
- 2 = Elevations (Vertical Views)
- 3 = Sections (Sectional Views)
- 4 = Large Scale Views (Plans, Sections & Elevations that are not Details)
- 5 = Details
- 6 = Schedules and Diagrams
- 7 = User Defined
- 8 = User Defined
- 9 = 3D Representations (Isometrics, Perspectives and Photographs)

Examples:

- A-101 - (Architectural First Floor Plan)

- A-102 - (Architectural Second Floor Plan)
- A-103 - (Architectural First Floor Reflected Ceiling Plan)
- A-201 - (Architectural Building Elevations)
- A-301 - (Architectural Building Sections)

Constructs Included in the Commercial Template Project

All constructs included in the Commercial Template Project are suggestions of typical commercial project organization. Feel free to modify the arrangement to suit your specific project needs and add or delete files as needed. Some files may contain geometry; these are placeholders that are meant to be erased by project team members prior to beginning work. Simply erase the geometry, and draw actual project geometry in its place. For example, the Typical Toilet Room element file contains a rectangle, and many files include a Live Area Guide block insertion.

General Considerations for all Constructs

Typically there will be at least one construct for each level and/or division (if used). However, there will often be many more than that. Project and team member requirements will be a determining factor in shaping the exact quantity and makeup of the constructs on a per-project basis. Some projects will have many constructs per floor, while others might have only one per floor. Below is a brief description of each construct included in this Commercial Template Project. Feel free to add or delete them as required to meet your specific project and team needs. You can also make modifications to the Commercial Template Project and save it as a custom template project for use in later projects.

Terrain Construct

This construct is intended for a simple terrain model of the project's site conditions. The Terrain construct is referenced in the Site Plan, Composite Model, Section and Elevation View files.

Shell Construct

Several shell constructs have been included into the Commercial Template Project: one for each floor of the building. These constructs are intended for the exterior enclosure of the building. The various shell constructs are referenced in the Floor Plans, Composite Model, Section and Elevation View files.

Core Construct

This construct is intended for objects that are part of the building core (like walls, doors, etc.), excluding the stairs and possibly the toilet rooms. The stairs should be drawn in the separate stairs construct. Toilet rooms, if the layout is the same on all levels, can be drawn here and copied to each level. Otherwise, they can be created as an element file like the Typical Toilet Room element file (included in this Commercial Template Project), and then dragged into the Core construct file.

If you do not wish to have a separate core construct, core geometry can be drawn in either the Shell or Interior construct files instead. If you do this, delete the core construct(s) from the project.

The various Core constructs are referenced in the Floor Plans, Composite Model and Section View files.

Slab Construct

This construct is intended for slab objects and other objects that should display in sections and models but should not display in plans. The various slab constructs are referenced in the Composite Model and Section View files.

Interior Construct

This construct is intended for all geometry that is placed within the exterior shell of the building. This includes all partitions, doors, etc. on the interior of each floor. You can include space objects, ceiling grids, furniture and equipment in this construct as well. Or, if you wish, you can separate these other objects into their own spaces and grids and furniture constructs.

The various Interior constructs are referenced in the Floor Plans, Composite Model and Section View files.

Stairs Construct

This spanning construct is intended to contain the complete flight of stairs from the lowest level to the roof (if applicable). You can create separate constructs for each stair tower, or a single Stairs construct that contains all stairs for the entire project. If you view the properties of the construct on the Project Navigator palette, you will note that all levels are checked. This makes it spanning. To work with this construct, draw a single run of stairs at the lowest level, and add railings and any slabs needed for landings. Then use the Stair Tower Generate tool (on the Design Palette - Design Tool Palette Group) to copy the stairs, railings and slabs (if desired) to the upper levels. For more information, see Stair Tower Generator on page 1502.

To make the multi-story stair display correctly in view files, use the Medium Detail Intermediate Level display configuration as an external reference (xref) display override when referencing the stair into a view. Select the Medium Detail Intermediate Level display configuration for the intermediate levels, and the Medium Detail Top Level display configuration for the top level stair reference. For more information, see Object Display in External References on page 352

The Stairs construct is referenced in the Floor Plans, Composite Model and Section View files.

Roof Construct

This construct is intended for the roof of the building. You can create a separate roof construct for each discrete portion of the roof (lower roofs, wings, towers, etc.) or you can create all roofs in this file at their appropriate Z-heights relative to the roof level elevation. Parapets and other roof features can be included here or in other constructs as appropriate.

The roof construct is referenced in the Roof Plan, Composite Model, Elevation and Section View files.

Column Grid Construct

This construct is intended for structural column grids and their columns. Include column grids, columns, column grid bubbles and dimensions in this file. This file has been included in a Structural folder.

The various column grid constructs are referenced in the Floor Plans, Composite Model and Section View files.

The Element File Included in the Commercial Template Project

Elements are meant for typical conditions in the project and also are useful for miscellaneous project resources whose external referencing (xref) behavior you wish to control manually (not appearing automatically in views or sheets).

Typical Toilet Room Element

This element is intended for creating toilet room layouts that will occur more than once in the project. Rather than draw the same layout several times, or copy and paste it, only to have to redraw when changes occur, use an element to centralize edits to a single source file.

This element file contains a simple rectangle on a non-plotting layer as a way to alert you to its presence in the preconfigured files. Open this element and delete this rectangle and replace it with your actual toilet room geometry at the start of a project. The Typical Toilet Room Element is referenced into the various core constructs.

Views Included in the Template Project

A collection of starter views is included in this Template Project.

Consultant Backgrounds

This folder contains floor plan views that have been saved with the Screened display configuration active. For consultants that use AutoCAD Architecture or AutoCAD MEP, simply save and send these files. For consultants using AutoCAD, change the display configuration to Plan Only and then use the Save as AutoCAD command on the Application menu to save a non-AutoCAD Architecture version of the file. For more information, see Exporting a Drawing to AutoCAD on page 147.

Detail Views

The only view in this folder simply provides a layout grid divided into a detail grid module. Draw details in this file on the detail grid. Create a new view for details at a different scale.

Enlarged Views

This folder is for interior elevations and enlarged plan views. Use the callout tools on the Callouts tab of the Tool Palettes to create such views. For more information see Callout Tools in AutoCAD Architecture on page 2421.

Floor Plan Views

Floor plan views are included here. Basic titlemarks, elevation, and section markers are included in these files. You can use these, modify them, or erase and add them again as required.

3D Model Views

Composite Model views gather all the constructs together for visualization and/or coordination. Two are provided here, one of the entire model and another of just the shell constructs.

Reflected Ceiling Plan Views

Reflected ceiling plan views are included here. Basic titlemarks and elevation and section markers are included in these files.

Schedule Views

A composite Model is included in the Commercial Template Project for use in generating schedule tables. This view file is referenced directly by the schedule objects in the schedule sheet file included in the project (Sheet A601–Schedules). Reload external references and then update the schedule table periodically throughout the project to see the latest data. For more information, see Updating a Schedule Manually on page 2464.

Elevation and Section Views

These files are generated using the callout tools. They include 2D section/elevation objects of the overall building. Four elevations and 2 sections are included. As you add geometry to your constructs, you can move and resize the section and elevation lines as appropriate to capture the complete design and then refresh the sections and elevations. The constructs listed in this document are already included in the section and elevation objects' selection set. If you add new files, you will need to regenerate the section or elevation. For more information, see Updating a 2D or 3D Section on page 2153 and Updating a 2D or 3D Elevation on page 2200.

Sheets Included in the Template Project

Several basic sheets have been included in this Template Project. Some of the sheets already include viewports, such as the floor plans. Others are empty sheets ready to place views on. Drag a view file or named model space view within a View file from Project Navigator and drop it on the sheet. For more information, see Placing a Model Space View onto a Sheet on page 314 and Creating a Sheet View on page 332.

Sheets are organized in a sheet set and subsets. The list of sheets includes the following:

General	G-100, Cover Sheet
Architectural: General	A-100, Site Plan
Architectural: Plans	A-101, Floor Plans A-102, Floor Plans A-103,Floor Plans A-104, Floor Plans
Architectural: Elevations	A-201, Building Elevations A-202, Building Elevations
Architectural: Sections	A-301, Building Sections
Architectural: Large Scale Views	A-401, Enlarged Plans A-402, Interior Elevations
Architectural: Details	A-501, Details
Architectural: Schedules and Diagrams	A-601, Schedules
Architectural: 3D Representations	A-901, 3D Diagrams

Project Standards

Project Standards are a tool that allows project files to have their object styles and display settings synchronized to one or more Standards drawing files. The Template Project has been set up to only be synchronized with the standards when the user manually starts a synchronization. For more information, see Setting up Synchronization of AEC Standards on page 399.

In the project's Standards\Content folder, a file named Project Styles.dwg is included. Some sample styles have been included in this file. Tools in the Project's Tool Palette reference the styles in this file. The project is set to synchronize all types of styles to this drawing except layer key styles. The default AECLayerStd.dwg file has been set as a second Standards drawing to synchronize layer key styles.

In the Standards\Template folder, 2 additional drawing template files (DWT) have also been provided: one for constructs, elements and views and the other for sheets. The project is configured to synchronize display settings from the Model DWT file in this folder. All styles in the project have been versioned and synchronized to these files.

Project Standards

7

The Project Standards feature lets you establish, maintain and synchronize standards across all drawings in an AutoCAD Architecture project. Project standards include standard styles, display settings, and AutoCAD standards that are used across all project drawings. Standard styles and display settings are specified in one or more standards drawings associated with the project. Project drawings can then be synchronized with these standards throughout the project lifecycle, either automatically, or on demand. In addition, you can designate tool palettes and a Content Browser library that are associated with the project.

Project Standards Terminology

project drawing A drawing file belonging to an AutoCAD Architecture project. A drawing must be part of a project to access and be synchronized with project standards.

standards drawing A file (DWG, DWT, DWS) that contains standard styles and display settings associated with the project. Standards drawings can be placed in a folder within the project folder, if they contain project-specific standards, or outside the project folder if they contain department-specific or company-wide standards.

Standards drawings can be included in e-transmit and archiving packages.

standard style or display setting A style or display setting that has been defined as a standard for a certain project. To be defined as a standard style or display setting, it needs to be contained in a standards drawing. Standard style types and display settings include the following:

- object styles (for example, wall styles, door styles, and so on)
- property set definitions
- property data formats
- schedule table styles
- classification definitions
- display theme styles
- layer key styles
- mask block definitions
- material definitions
- multi-view block definitions

- profile definitions
- display properties
- display sets
- display configurations

Not standardized style or display setting A style or display setting in a project drawing for which no corresponding object can be found in the project standards drawings.

version The process of recording changes to project standard styles and display settings. Standard styles and display settings should be versioned when they are changed in a standards drawing. When a new version is created, the next synchronization recognizes the style or display setting as changed and lets you update the project drawing accordingly.

Nonstandard version of a standard style or display setting Standard styles and display settings in a project are versioned when they are changed either in a project drawing or a project standards drawing. A version of a standard style could for example have the date of July 14, 2006. The previous version could be a week earlier from July 7, 2006.

When the synchronization detects a version of the style or display setting in a project drawing that has a version date not found in the project standards drawing (for example, a version dated July 12, 2006), this version is labeled a "nonstandard version" of a project standard style or display setting.

older version of a standard style or display setting When the synchronization in the above example detects a version of the style or display setting dated July 7, 2006 in the project drawing, this is labeled as an "older version", because the version exists in the project standards drawing, but has been updated by a newer one from July 14, 2006.

synchronization The process of checking a drawing or project against its associated standards to identify and remove version discrepancies between the standards and the project. Synchronization can be set up to run invisibly in the background, run automatically with user prompting, or can be manually initiated by the user.

project tool palette group A project tool palette group is associated automatically with the project. It can be referenced from a shared location or be copied to each user's computer.

project tools Project tools are tools in the project tool palettes set for the project. In order to ensure that the current style definition is always used, project-specific tools should point directly to the styles within a standards drawing.

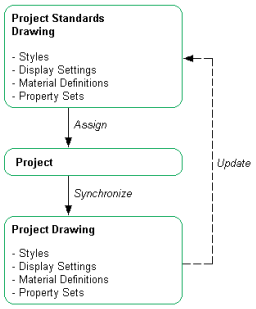
standards drawing location When standards drawings, catalogs, and libraries are located within the project folder, they are treated as project-specific. For example, if the project is used as a template for a new project, all files from the standards folder are copied to the new project, to enable changing and overwriting them in the new project. Standards files that are located outside the project folder are not copied when creating a new project; they are only referenced from their original location in both the existing and the new project. This would be appropriate for files containing company standards that should not be changed from project to project.

Project Standards Overview

Standard styles and display settings for a project are specified and stored in one or more standards drawings that are associated with the project. This allows you to organize your standards drawings in various ways. For example, you could have one standards drawing for styles, another for display settings, and a third for AutoCAD components such as layers, dimension styles, text styles, and linetypes. Or you could place all your wall styles in one standards drawing and all of your property set definitions and data format styles into another.

Project standards can be accessed from a variety of AutoCAD file formats. They can be saved in one or more drawing files (DWG), drawing templates (DWT), or AutoCAD standards drawings (DWS). Each of these file types can be associated with a project as standards drawings.

The project can be compared to the project standards at any time during the project lifecycle, and if version discrepancies between the standards and the project drawings are detected, be synchronized with the standards. In addition, the standards can be updated from the project drawings if necessary.



AEC Standards

AEC standards for a project include all items from Style Manager and Display Manager. AEC standard objects are included in the synchronization and can be updated from a project drawing.

They include these items:

- object styles (for example, wall styles, door styles, and so on)
- property set definitions
- property data formats
- schedule table styles
- classification definitions
- display theme styles
- layer key styles
- mask block definitions
- material definitions
- multi-view block definitions
- profile definitions
- display properties
- display sets
- display configurations

Standard Scheduling Information

Project standards enable you to define and distribute a set of property set definitions, property data formats, schedule table styles, and object tags across a project. Property set definitions, property data formats, and schedule table styles are created and accessed through Style Manager. Schedule tags are accessed through the project tool palettes.

Standard Material Definitions

Material definitions can be defined and distributed across the project. Materials are an integral part of object styles, and should be contained in the same standards drawing as the object styles that reference them.

Layer Key Styles

Layer key styles can be defined in a project standards drawing, and distributed across the project. Layer standards, however, are not set in the project standards. If you want to associate a layer standard with a project, you need to associate it with the drawing templates used for elements, constructs, views, and sheets.

Profiles

Profile definitions for a project are specified in one or more project standards drawings. Profiles can be used by many objects, for example mass element shapes or window styles.

Classification Definitions

A project may have a set of classification definitions in one or more standards drawings. Classifications are used as a reporting and display tool for building objects. Classifications are attached to object styles. If you want to use a classification in a project standard style, the classification needs to be stored in the same standards drawing as the object style to which it is referenced.

Display Settings

You can define standard display representations, display sets, and display configurations for a project. This will ensure consistent display of drawing objects in the project. Only one display standards drawing can be set for a project.

AutoCAD Standards

The Project Standards feature integrates the AutoCAD Standards checker, allowing the user to set up one or more DWS files for AutoCAD components. AutoCAD components that can be included in a standards check are:

- AutoCAD dimension styles
- AutoCAD layers
- Text styles
- Linetypes

When you set up AutoCAD standards, a CHX batch checker file is created for the project. The CHX file contains all project drawings as drawings to be checked, and all specified DWS files as drawings to check against. You can run this batch file for checking the whole project, or check individual project drawings manually. For more information, see Synchronizing a Project with AutoCAD Standards on page 430 and Synchronizing a Project Drawing with AutoCAD Standards on page 430.

Standard Tools

Standard styles can be organized and accessed through tools. You can define project tool palettes and a project library in Content Browser for quick and easy access. For detailed information, see Setting up Standard Tools in a Project on page 403.

Project Tool Palette Group

You can define a project tool palette group containing standard project styles. You can choose between defining a shared tool palette group on a network location, or a copy of the project tool palette group on the local users' machines.

Standard Content Browser Library

An icon now appears on the Project Navigator Palette to launch the Content Browser. You can set a custom Content Browser library that is opened by default when Content Browser is started from the Project Navigator. With the possibility of creating tool catalogs from existing drawings, as described in Creating a Project Standards Tool Catalog on page 405, it is now easy to create standard tools and catalogs for a project.

Synchronizing the Project

During the lifecycle of a project, project standards can change. For example, the hatching associated with a wall component can change its pattern, or a property set definition can have added properties. In cases such as these, the project must be synchronized with the modified standards. You can configure the project standards so that project drawings are automatically checked against the standards when opened, and automatically updated with the new edits. You can also manually start a synchronization for a project drawing or on the complete project at any time or you can configure standards for manual synchronization regardless of the overall project synchronization settings.

Process Overview: Using Standards in a Project

Setting up and using standards in a project entails the following actions:

1. Create standard styles, display settings, and AutoCAD components in one or more standards drawings.

   Standards drawings can be drawing files (DWG), drawing templates (DWT), or AutoCAD standard files (DWS).

   Optionally, you can create different project standards files for different styles, display settings, and AutoCAD components.

2. If desired, create a tool catalog that uses the styles from the standards drawings for their tool definitions.
3. Optionally, you can create a Content Browser library that should be used throughout the project.
4. Associate the standards drawings with the project.
5. If there are multiple standards drawings for styles, define which style type should be controlled by which standards drawing.
6. Set up the desired synchronization behavior of the project.

   You can choose between different synchronization modes, depending on your project workflows. For example, you can specify that a project drawing is synchronized with the standards when it is opened, or you can specify that synchronization happens only manually.

7. Add standard styles and display settings to your project drawings by one of these methods:
   - Use tools from the standard palettes.
   - Use tools from the standard Content Browser library.
   - Copy styles and display settings from the standards drawings through Style Manager and Display Manager.
8. Synchronize project drawings with the project standards. Project drawings can be synchronized automatically on opening, or manually by the user.

9 Update any inconsistent objects.

Using Project Standards

Project standards help ensure consistency across a project.

The following workflows demonstrate how to use standards in a project:

- The user opens a project drawing, and the styles and display settings are synchronized with the associated project standards. Depending on the standard settings, the user can either be prompted to update out-of-synch objects, or they can be automatically updated by the software.
- The CAD manager makes changes to a style in a standards drawing, applies a version to the change, and saves and closes the standards drawing. The next time a project drawing is opened it can be synchronized with the changed style, making it match the version in the standards file.
- A user receives a project drawing from another user or a subcontractor, and performs a standards audit on it to determine if there are any not standardized styles or display settings, or if any of them are out-of-date. The user can decide whether to update out-of-date styles and display settings, or ignore them.
- The CAD manager sets up a default Content Browser library for the project. When a user starts Content Browser from the current project in Project Navigator, the project library is displayed. The user can then drag standard tools into a project drawing.
- To create a standard tool catalog based on an existing project, the CAD manager opens the AEC Tool Catalog Generator, browses to the project, and creates a tool catalog from the project drawings. He adds the new catalog to a Content Browser library and connects that library to a project. From there, the tools can be used either directly in the project or be used to build up a project-specific tool palette group.
- To transmit the project to an external subcontractor, the CAD manager creates an e-transmit package containing all project drawing files, standards drawings, and standard catalogs, as well as the standard Content Browser library. The subcontractor unzips the package to access these standard objects for use on the subcontracted design work.
- The CAD manager wants to create a hierarchical structure for standards. Some standards are specific to the project, whereas others are specific to a customer or general company standards. By placing different standards drawings in different locations, some can be copied and overwritten for a specific project, whereas others are referenced from a central location and are read-only.

Prerequisites for Working with Project Standards

The following points need to be taken into consideration to work efficiently with the project standards feature:

- Project standards can be used only with projects. A drawing must be part of a project to be synchronized with project standards. Project standards cannot be applied to standalone drawings. You can copy standard styles and display settings into standalone drawings, but they will not be synchronized when the standards change.
- Project standards can be distributed among multiple standards drawings, if desired. However, there can be only one drawing that is designated for the display settings in a project.
- Project standards can be stored in DWG, DWT, and DWS files.
- AutoCAD standards for layers, text styles, linetypes, and AutoCAD dimension styles must be placed in DWS files.

- Demand loading needs to be enabled for working with project standards. The XLOADCTL system variable must be set to 2 (default value).

Setting up Standards in a Project

You can define one or more files to use as the source for standard styles and display settings. You can also specify options for synchronizing the styles and display settings with the standards. Additionally, you can set up DWS files for AutoCAD layers, dimension styles, text styles, and linetypes.

Creating a New Project with Predefined Standards

The quickest and easiest way to create a new project that already has standards associated with it, is to use an existing project with standards as a template. When you use an existing project as a template, the following files and structures are copied to the new project:

- All project DWG files and XML files
- AEC standards files
- AutoCAD standards files
- Project standards synchronization settings
- Sheet set template
- Project details
- Drawing template paths
- Keynote and detail component database paths
- Project tool palette group
- Tool content root path
- Project Content Browser library

NOTE Project standards files, tool palettes, and the project Content Browser library are copied to the new project only if they are located within the original project folder. Standard components located outside the project folder will be referenced by the new project, but not copied to it.

For information about creating a project with predefined standards, see Creating a New Project Based on a Template (Copying a Project) on page 216.

When you create a new project based on a template, all files that are in the project folder, will be copied, including the project drawings (DWG) and their associated XML files. If you want to copy only the standards files and support files, as well as the structure of the project, you need to create a project with a copied structure, as described in Creating a New Project with the Structure of an Existing Project on page 218.

Configuring Project Standards

After setting up a project, you can configure the project standards. If you have created a project based on a template, the initial project standard settings come from the template. If you have not used a template, the settings are undefined or default settings.

Project standard settings include the following:

- Standard styles
- Standard display settings
- Synchronization settings
- AutoCAD standards (layers, dimension styles, text styles and linetypes)

NOTE To set up project standards, you must have one or more project standards drawings available. If you have created a new project based on a project with standards, the standards drawings of the original project are copied to the new project and are automatically associated with the new project. If you have created a new project not based on a template, or based on a project without standards, you first need to define one or more standards drawings. For more information, see Creating a New Project Standards Drawing on page 433.

Setting up Standard Styles and Display Settings

Use this procedure to set up standard styles and display settings for a project.

NOTE Standard styles include object styles, definitions, profiles, materials, property set definitions, and classifications.

To set up standard styles and display settings, you define one or more project standards drawings that contain the standards for styles and display settings. These drawings can be DWG, DWT, or DWS files and are added in the configuration dialog.

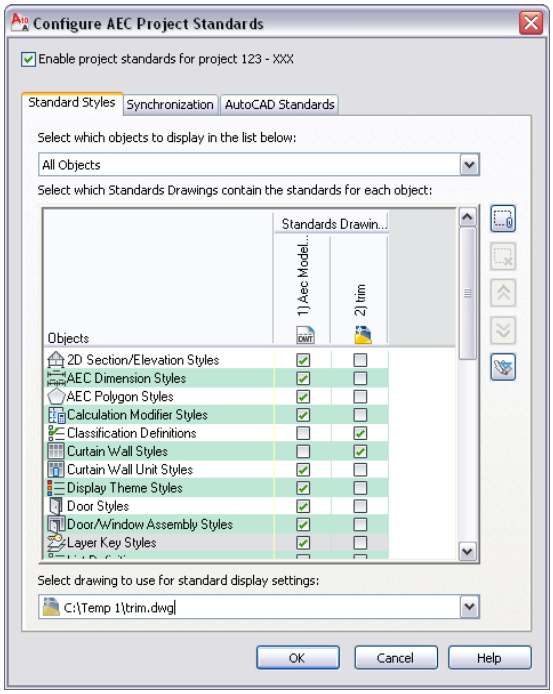
Standard files are marked by icons next to their name in the configuration setup.

Icon	Description
	Standards drawing (DWG)
	Standards template (DWT)
	AutoCAD Standards file (DWS)
	Missing standards file

Synchronization Order

If you have multiple standards drawings associated with a specific style type, then during synchronization the occurrence of the style in the first standards drawing is used as the style with which the style in the project drawing is synchronized. Further drawings containing the same standard style are ignored.

Order of standards drawings

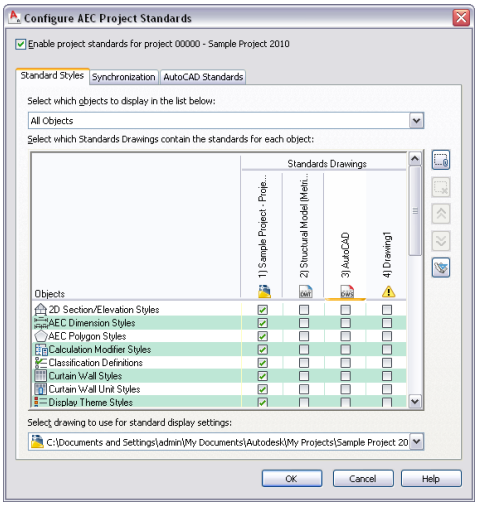


1 Click ➤ Open ➤ Project.

NOTE To access the standards configuration of the current project only, click Manage tab ➤ Project Standards panel ➤ Configure .

2 Select the project for which you want to configure standards, right-click, and click Project Properties.

3 Expand Advanced and click Project Standards .



4 To add a new standards drawing for styles, click .

5 In the Select Standards Drawing dialog box, select a DWG, DWT, or DWS file that contains standard styles, and click Open.

If you do not yet have standards drawings, see Creating a New Project Standards Drawing on page 433.

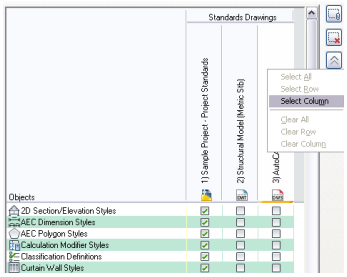
The new styles drawing is appended to the Standards Drawings list. The order of the columns, from left to right, defines the search order and precedence during synchronization. To change the order of the drawings, select the drawing name in the column header, and click to move the drawing up in the drawing order, and click to move the drawing down in the drawing order.

After you have added styles drawings to the project standards setup, you need to define for which style types each drawing should be the standard. To do this, you associate each style type with a standards drawing. The style types are listed under Objects in the Standard Styles tab. You can find all style types from Style Manager here.

6 To display only style types of one style category, select the category under Select which objects to display in the list below. If you want to see all style categories, select All Objects.

7 To define that a specific style type should be controlled by a specific standards drawing, click the style type's check box in the appropriate drawing column.

TIP If you want to select one drawing for all style types, right-click in the header, and click Select Column.



If a style type has not been associated with a standards drawing, these styles are not controlled by the standards. For example, if the standards drawing "Standard Styles 1.dwg" has not been associated with the Wall Styles type, then even if wall styles from this standards drawing exist in a project drawing, they will be interpreted as "not standardized" by the synchronization.

If you select multiple standards drawings for one style type, then during synchronization, each drawing is searched for that style type in the order of the drawings. This means that you can distribute standard styles for a style type among different drawings. For example, you could store your concrete wall styles in the standards drawing "Wall Styles - Concrete (Imperial)", and your brick wall styles in the drawing "Wall Styles - Brick (Imperial)".

NOTE If two standards drawings contain a style of the same name and type, the style in the first standards drawing will be used for synchronization. Further instances of that style will be ignored. The order of standards drawings is determined by their position from left to right in the table. To re-order the drawings, use the Up and Down buttons.

8 To remove a standard styles drawing from the project, click on its name in the Standards Drawings list, and click .

Removing a standards drawing from the list only removes the reference of this drawing to the project. The drawing is not deleted from the file system.

Next, you need to define a standards drawings for the display settings in the project. You can assign only one standards drawing for display settings. The standard display settings drawing can be one already assigned as a styles standards drawing.

9 Under Select drawing to use for standard display settings, select a file. If necessary, select Browse to browse for a file.

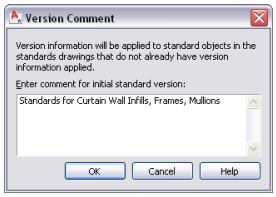
NOTE If you are using a display standards drawing that is different from the styles standards drawing, or if you have multiple styles standards drawings, you need to make sure that the styles standard drawings are in synch with the display standards drawing. For more information, see Synchronizing Project Standards with Each Other on page 445.

10 Click the Synchronization tab.

If you have added a standards drawing to the project, and the drawing is located in the project folder, the drawing will automatically have initial version information added to all styles and display settings. If the new standards drawing is located outside the project folder, and has not yet been versioned, you need to version it as described in Versioning a Project Standards Drawing on page 443. For more information about versioning, see Versioning Standards on page 435.

11 If necessary, enter a universal comment to all versioned styles and display settings.

For instance, you might want to add a comment to indicate what has changed in the style as of this version.



12 Click OK.

NOTE If some of the standards drawings have been set to read-only, they cannot be automatically versioned. In this case, they need to be versioned manually by a user with read-write access.

Synchronization Options

When a project uses standards, it needs to be synchronized with the standards in regular intervals to make sure the standards are observed. During synchronization with its standards, the styles and display settings in the project or project drawing are compared with the project standards, to find version discrepancies between them, and fix them.

You can set different synchronization options. Before deciding on settings, you should review your desired workflow to find the optimal choice. Keep in mind that the option you select will be in effect for all users of the project.

Automatic Synchronization

If you select automatic synchronization, the following behavior is defined for the synchronization:

- Project drawings are compared with the project standards when they are opened.
- In case of version discrepancies between a project drawing and the project standards, the styles and display settings in the project drawing are overwritten by the styles and display settings from the project standards without prompting. The user cannot prevent the update.

- No notification of not standardized styles and display settings in the project drawing is displayed during the automatic synchronization. If not standardized styles and display settings exist, they are ignored.

  TIP To display not standardized styles and display settings, you can audit the drawing, as described in Auditing a Project or a Drawing on page 431.

- When users make changes to a standard style or display setting in a project drawing, they will not be prompted to upload the styles or display settings to the projects standards drawings accordingly. Unless a user uploads the changed objects to the standards drawing manually, they will not be copied into the standards drawing.

Semi-Automatic Synchronization

If you select semi-automatic synchronization, the following behavior is defined for the synchronization:

- Project drawings are compared with the project standards when they are opened.
- In case of version discrepancies between a project drawing and the project standards, a notification dialog is displayed where the user can decide whether the styles and display settings in the project drawings should be overwritten with the standards. The user has the option to ignore inconsistent styles and display settings.
- Not standardized styles and display settings in the project drawing are displayed in a list.
- When users make changes to a standard style or display setting in a project drawing, they will be prompted to upload the styles or display settings to the projects standards drawings.

Manual Synchronization

If you select manual synchronization, the following behavior is defined for the synchronization:

- Project drawings are *not* compared and synchronized with the project standards when opening the project drawing. To perform a synchronization, the user needs to manually initiate it. For more information, see Synchronizing a Project with the Standards on page 418.
- In case of version discrepancies between a project drawing and the project standards, a notification dialog is displayed where the user can decide whether the styles and display settings in the project drawings should be overwritten with the project standards. The user has the option to ignore inconsistent standard styles or display settings.
- Not standardized styles and display settings in the project drawing are displayed in a list.
- When users make changes to a standard style or display setting in a project drawing, they will *not* be prompted to upload the changes to the projects standards. Unless a user uploads the changed standards in the standards drawing manually, they will not be copied into the standards drawing.

The synchronization settings are valid for all users of the project. So the synchronization method selected should reflect the workflow needs of the majority of users. For example, if you want all users to be in synch with all project standards at all times, you should choose automatic synchronization. If you want greater transparency and user control, you could choose semi-automatic or manual synchronization.

If you have selected automatic synchronization, the synchronization of project drawings will run “invisible” in the background. On opening, each drawing will automatically be synchronized with the standards without notification to the user. If you have selected semi-automatic or manual synchronization, you have more control and information about the synchronization process; you can display lists of not standardized styles and display settings, nonstandard versions, or older versions, and individually decide if you want to update or ignore them.

Setting up Synchronization of AEC Standards

Use this procedure to set up the synchronization options for the AEC standards in a project.

NOTE The synchronization settings you define are relevant only for the synchronization of the AEC standard styles and display settings in a project, as specified in Setting up Standard Styles and Display Settings on page 394. They do not affect the synchronization of AutoCAD standards in a project, as defined in Setting up AutoCAD Standards on page 400. For more information about synchronization, see Synchronizing a Project with the Standards on page 418.

NOTE The settings in this dialog box control only how project drawings are synchronized with project standards drawings. They do not specify how project standards drawings are synchronized with each other. For information on synchronizing project standards drawings, see Synchronizing Project Standards with Each Other on page 445.

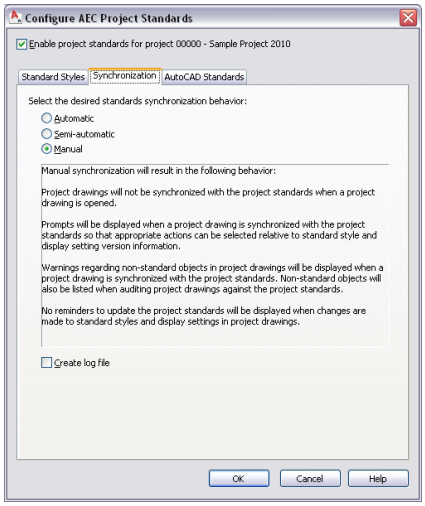
1 Click ➤ Open ➤ Project.

NOTE To access the standards configuration of the current project only, click Manage tab ➤ Project Standards panel ➤ Configure .

2 Select the project for which you want to configure standards, right-click, and click Project Properties.

3 Expand Advanced and click Project Standards .

4 Click the Synchronization tab.



5 Select the synchronization method for your project.

For information about the available methods, see Synchronization Options on page 397.

6 To create a log file of the synchronization, select Create log file.

When the log file is created, you can choose between a report in XML or HTML format. The log file contains information about the drawings synchronized, the standards drawings used, and the changes made to standard styles and display settings in the course of synchronization.

7 Click OK or click the AutoCAD Standards tab.

Setting up AutoCAD Standards

Use this procedure to set up AutoCAD standards for the project.

AutoCAD standards include AutoCAD layers, AutoCAD dimension styles, text styles, and linetypes, and are contained in DWS files. You cannot define different DWS files for different components; for example, you cannot define one DWS file for dimension styles, and another one for linetypes. Each setting from each DWS file is processed. If there is conflicting information in different DWS files, then the first one in the list is used. If necessary, you can change the order of the DWS files to change the precedence. For more information, see "Define Standards" in AutoCAD Help.

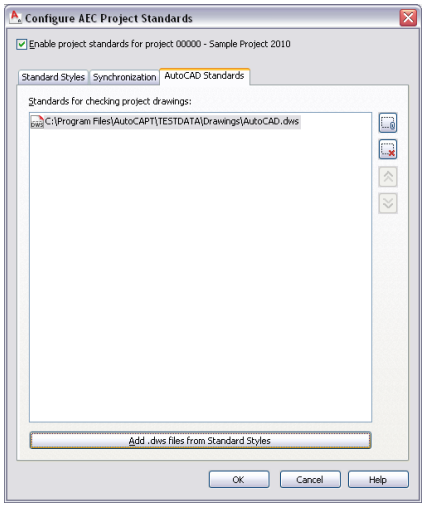
When you set up AutoCAD standards, a CHX batch checker file with the same name as the project file is created in the project folder. The CHX file contains all project drawings as drawings to be checked, and all specified DWS files as drawings to check against. You can run this batch file for checking the whole project, or check individual project drawings manually. For more information, see Synchronizing a Project with AutoCAD Standards on page 430 and Synchronizing a Project Drawing with AutoCAD Standards on page 430.

1 Click ➤ Open ➤ Project.

2 Select the project for which you want to set up AutoCAD standards, right-click, and click Project Properties.

3 Expand Advanced and click Project Standards .

4 Click the AutoCAD Standards tab.



5 To add a new DWS file, click .

By default, the new DWS file is appended to the end of the list. That means that will be processed last, and settings from higher listed DWS files will take precedence.

6 To change the order of the DWS files in the list, use the Up and Down buttons.

7 To remove a DWS file from the list, click on its name in the list, and click .

Removing a DWS file from the list only removes the reference of this file to the project. The file is not deleted from the file system.

8 If you have set up DWS files as AEC standards drawings in Setting up Standard Styles and Display Settings on page 394, you can re-use them for the AutoCAD standards by clicking Add .dws files

from Standard Styles. This will copy the AEC standards files to the AutoCAD Standards tab, and use them as AutoCAD standard files in the project.

Copying Project Standards from Another Project

Use this procedure to copy the project standard settings from an existing project.

Copying the project standards copies the following standards settings:

- Copy or reference the style and display standards drawings to the new project
- Copy or reference AutoCAD standards drawings to the new project
- Duplicate the association of standards drawings to style types in the new project
- Duplicate the synchronization settings in the new project

When you copy the standards of an existing project to a new project, standards drawings can be either referenced from their original location in the new project, or be copied to the new project.

- If the project standards drawings of the copied project are located within the original project folder, then the drawings are copied to the new project. You would do this if you wanted to have a separate set of project standards drawings for each project you create. That way, you can make project-specific changes for each set of project standards.
- If the standards drawings of the copied project are outside the original project folder, they will not be copied to the new project, but will be referenced from their original location. You could do this if your project standards are not specific to one project, but are rather department-specific or company-wide standards. If you make changes to a project standards drawing referenced by several projects, all projects will be able to be synchronized with the changes.

1 Click ➤ Open ➤ Project.

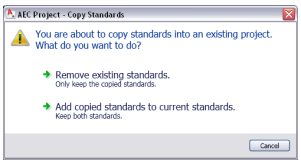
2 Select the project for which you want to set up AutoCAD standards, right-click, and click Project Properties.

3 Expand Advanced and click Project Standards .

4 Click the Standard Styles tab.

5 Click .

6 In the Select Project dialog box, select the project file (APJ) from which you want to copy project standards, and then click Open.



7 Select the copy settings.

If you want to…	Then…
overwrite the existing project standards with the copied project standards	click Remove existing settings.

If you want to…	Then…
add the project standards from the selected project to any existing project standards	click Append copied settings to existing settings. Existing settings that are inconsistent with the copied settings will be replaced with the copied settings.

8 Click OK twice.

Enabling Project Standards for a Project

After defining the standards for a project, you need to enable them to make them active within the project.

While you are still working on setting up the standards for a project, you might not want the standards to be activated in the project right away, as standards styles might still be added, removed, or changed. Once the setup is complete, however, you must enable the standards for the project.

1 Click ➤ Open ➤ Project.

2 Select the project for which you want to enable AutoCAD standards, right-click, and click Project Properties.

3 Expand Advanced and click Project Standards .

4 Select Enable project standards for project <Project Name>.

5 Click OK twice.

The selected synchronization behavior (automatic, semi-automatic, or manual) is now activated.

NOTE Enabling the standards in a project does not mean that standard styles and display settings are copied to project drawings. To add standard styles and display settings to project drawings, see Adding Standards to a Project Drawing on page 414.

Generating a Project Standards Setup Report

Use this procedure to create an HTML or XML report that lists the project's standard drawings, and standard styles and display settings, along with their version history.

1 Verify that the project for which you want to create a standards setup report is set as the current project.

For information on setting a project current, see Setting a Project Current on page 215.

2 Click Manage tab ➤ Project Standards panel ➤ ➤ Setup Report .

3 In the Save Setup Report dialog box, select a file name, location, and format for the generated report.

4 Click Save.

The report is saved in the specified location and can be displayed with a Web Browser or XML editor.

Setting up Standard Tools in a Project

Every project has a project tool palette group associated with it. If you are using project standards, the tools should point to standard styles from a project standards drawing. To make working with project tools easier, a project-specific library can be created in Content Browser.

Setting up standard tool palettes is usually a task for a CAD manager or project owner. Depending on the requirements of the project, different steps can be taken to achieve the desired results. The main considerations for creating the project tool palettes are the following:

Per User Workspace Catalog and Shared Workspace Catalog

The CAD manager can decide whether to create a group of tools and palettes that are shared by all users of a project and accessed from a single location, or to define a project catalog and Content Browser library, and maybe create a starter set of palettes for copying to individual users' computers. For more information, see Before You Begin: Working in a Network Environment on page 208.

AutoCAD Architecture loads the tool palettes found in the paths specified in the Files tab of the Options dialog box. Projects allow you to specify an additional location path for a tool palettes file that contains project-specific tool palettes. This path is appended to the current profile when the project is made current, and removed when the project is closed or when another project is set current.

Projects support two workflows for working with project palettes:

Per user workspace catalog: This the recommended option. Use the Per user workspace catalog option in conjunction with project tool catalogs in Content Browser. In this mode, users can access the tools and tool palettes they need for the job from tool catalogs in Content Browser on a per-user basis. By utilizing the refresh/linking behavior of Content Browser, you can make changes to the original tools and tool palettes in project catalogs, and your team can refresh their tools and palettes to get the latest versions. Thus, each user's workspace is maintained by the application uniquely, but linked palettes allow for global updates.

You can optionally provide your project team with a starter set of tool palettes, including the initial layout and tool ordering. To do this, you would create the project palettes in your own workspace, and then use Windows Explorer to copy the files to the location specified for the tool palette file location in the project properties. For detailed instructions, see the workflow examples below.

Shared workspace catalog: This option is recommended if you wish to mandate a set collection of project tool palettes for everyone on the project. In this case you do not want users going to Content Browser to customize project tools or tool palettes. To create a shared workspace, you specify a shared network location and assign it to the tool palette file location of the project. As this path will be appended to every project team member's profile when the project is set current, the path should be read-only. Otherwise changes made by one user would affect every user, and the last change would be the final form of the tool.

NOTE If you make changes to the shared tool palettes, they are not copied to disk until you close the project to close AutoCAD Architecture. Similarly, other users will not see your updates until the next time the project is set current or AutoCAD Architecture is closed and re-opened with the project still current.

Using Content Browser or Style Manager

You can create standard catalogs in Content Browser and define a standard Content Browser library for a project. You can use the catalog and library to drag tools and palettes to the workspace or to the project tool palettes. This would likely be the case if you set up the project using the Per user workspace catalog option. If you do not want to give users access to a Content Browser library with standard tools, do not set a library for the project. In that case, you need to build the project tool palettes from standard styles in Style Manager. You would typically do this if you are using the Shared workspace catalog option.

Using Linked or Unlinked Tools

When you build your project palettes from a project catalog in Content Browser, you can either link the palettes and tools from Content Browser, or create an unlinked copy in the project palettes. If you want to be able to make frequent updates in Content Browser, linking tools and palettes is recommended.

Following are two suggested workflows for setting up standard tools. The first one is based on a per user workspace catalog, giving more freedom to the individual users of the project. The second one is based on a shared workspace catalog, and puts greater emphasis on adhering to a given structure.

Workflow 1: Using a Per User Workspace Catalog

1. Create standard styles in standards drawings and associate them with the project. For more information, see Creating a New Project Standards Drawing on page 433 and Setting up Standard Styles and Display Settings on page 394.
2. Create one or more tool catalogs from the standards drawings. For more information, see Creating a Tool Catalog for a Project on page 405.
3. Create a project library in Content Browser, and add the standard catalogs. For more information, see Adding a Project Catalog to a Content Browser Library on page 408.

   TIP By default, tool catalogs are set to be linking. This makes it easier to update them once they have been copied to the workspace tool palettes.

4. Define the tool palette file location for the project. For more information, see Adding a Project Library and Tool Palette Group on page 409.

   TIP If you are using one of the project templates provide with the software, the tool palette file location is by default set to *\<Project Folder>\WorkspaceToolPalettes*.

5. For Tool palette storage type, select Per user workspace catalog.
6. Associate the Content Browser library you have created with the project. For more information, see Adding a Project Library and Tool Palette Group on page 409.
7. Build up the project tool palette group. For more information, see Building the Tool Palette Group on page 413.
8. If you want your project users to start out with the same tools you have in your workspace, copy the palettes to the location specified in the tool palette file location path. For more information, see Copying the Project Tool Palettes to the Tool Palette File Location on page 414.
9. If you want your project users to have the same palette groupings, icon size, and ordering as you have, copy the project profile (AWS) to the location specified in the tool palette file location path. That way, new project users will have the profile installed in their Documents and Settings folder. For more information, see Adding the Project Profile to the Tool Palette File Location on page 414.

Workflow 2: Using a Shared Workspace Catalog

1. Create standard styles in standards drawings and associate them with the project. For more information, see Creating a New Project Standards Drawing on page 433 and Setting up Standard Styles and Display Settings on page 394.
2. Define the tool palette file location for the project. For more information, see Adding a Project Library and Tool Palette Group on page 409.

   TIP If you are working with a shared workspace catalog, it is highly recommended that you point the tool palette file location to a read-only folder.

3 For Tool palette storage type, select Shared workspace catalog.

4 Build up the project tool palette group. For more information, see Building the Tool Palette Group on page 413.

5 If you want your project users to have the same palette groupings, icon size, and ordering as you have, copy the project profile (AWS) to the location specified in the tool palette file location path. That way, new project users will have the profile installed in their Documents and Settings folder. For more information, see Adding the Project Profile to the Tool Palette File Location on page 414.

Creating a Tool Catalog for a Project

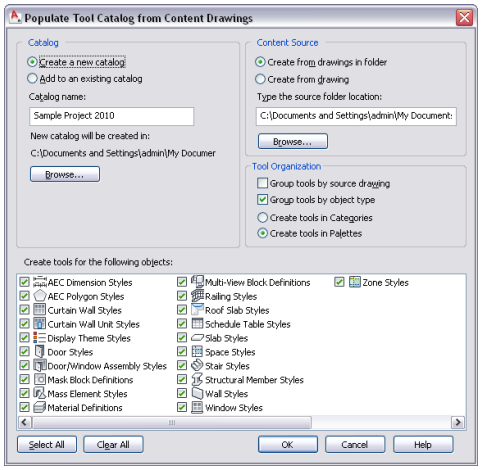
A tool catalog for a project should contain tools from project standards drawings. The easiest way to generate a tool catalog from standards drawings is to either create a new tool catalog based on one or more project standards drawings, or to add tools from a project standards drawing to an existing tool catalog.

The tool catalog can then be added to the Content Browser library that is associated with the project. This makes it easy to use the tools either in the drawing or add them to the project tool palettes.

Creating a Project Standards Tool Catalog

Use this procedure to create a new tool catalog based on existing standards drawings. You specify the styles from which tools will be created and whether the new tools are organized in categories or palettes.

1 Click Manage tab ➤ Customization panel ➤ ➤ Generate Tool Catalog .



2 Under Catalog, select Create a new catalog.

3 Enter a name for the new catalog.

4 Click Browse to define the location of the catalog.

5 Under Content Source, specify whether you want the new catalog to be created from multiple drawings in a folder or from a single drawing. Then, enter the path for the folder or drawing.

NOTE When you specify a folder as the catalog source, any nested folders are included in the new tool catalog.

6 Specify how you want the tools organized in the new catalog:

- To organize the new tools by their source drawing, select Group tools by source drawing.

This option is well suited for a tool catalog that is generated from a number of styles drawings. The resulting tools could be placed in categories or palettes named “Wall Styles - Concrete (Imperial)”, “Wall Styles - Brick (Imperial),” and so on.

- To organize the new tools by their object type, select Group tools by object type.
  This option is well suited if you want to merge styles from various drawings into palettes or categories. The resulting tools will be placed in categories or palettes named “Walls”, “Doors,” and so on.

NOTE If both options are enabled, the catalog is first grouped by the drawings and then by the object type, generating categories from the drawings, and palettes from the object types. This is implemented because palettes cannot be nested. In this case the radio buttons for categories and palettes are disabled, and the Create tools in palettes option is selected for the catalog.

NOTE If neither of the two options is enabled, all new tools will be generated in the top category of the catalog.

- To organize the new tools in categories, select Create Tools in Categories.
  If you selected Group tools by source drawing, a category will be created for each source drawing. If you selected Group tools by object type, a category will be created for each object type.
- To organize the new tools in palettes, select Create Tools in Palettes.
  If you selected Group tools by source drawing, a palette will be created for each source drawing. If you selected Group tools by object type, a palette will be created for each object type.

7 Under Create tools for the following objects, select the object styles you want to appear as tools in the new catalog.

By default, all available style types are selected. Use the Select All and Clear All buttons as necessary.

8 Click OK.

A progress bar in the application status bar informs you of the progress of the catalog generation. This can take a few moments for a large catalog.

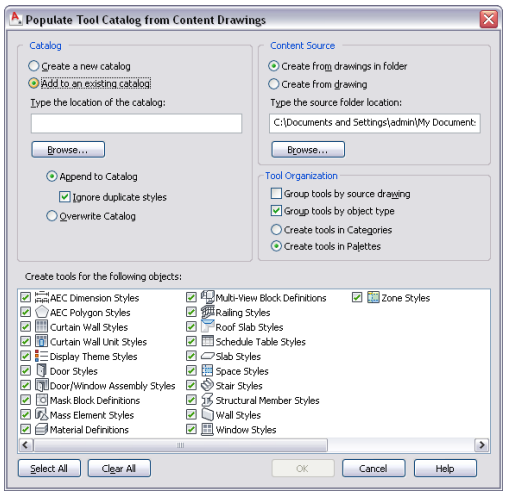
NOTE Each category and each palette is created in its own ATC file. The category and palette ATC files are stored in the Palettes or Categories subfolders within the folder where the new catalog is created.

For information about associating a tool catalog to a project library, see Adding a Project Catalog to a Content Browser Library on page 408.

Adding Standard Tools to a Tool Catalog

Use this procedure to add project standard tools to an existing tool catalog.

1 Click Manage tab ➤ Customization panel ➤ ➤ Generate Tool Catalog .



2 Under Catalog, select Add to an existing catalog.

3 Enter the name and the path of the catalog.

4 Click Append to Catalog and select Ignore Duplicate Styles if you want to prevent existing styles from being overwritten by styles with the same name and file path from the appended drawing.

If you clear Ignore Duplicate Styles, existing styles are overwritten with styles from the appended drawing if they have the same name and file path.

5 If you want to overwrite the existing catalog, click Overwrite Catalog.

This deletes the whole catalog and replaces it with the palettes, categories, and tools from the source drawing(s).

WARNING You should use that option with great caution, as it will delete the complete existing catalog. If you just want to overwrite tools with their up-to-date versions from a content drawing, select Append to Catalog instead, and verify that Ignore Duplicate Styles is cleared.

6 Under Content Source, select a project standards drawing or standards folder to use as source for the new tools.

If you want to…	Then…
add tools from multiple drawings in a folder	select Create from drawings in folder, and then enter the path and folder name under Type the source folder location.
add tools from a single drawing	select Create from drawing, and then enter the path and drawing name under Type the source drawing.

7 Specify how the tools should be ordered in the catalog.

- To order the resulting tools by their source drawing, select Group tools by source drawing. This option is well suited for a tool catalog that is generated from a number of styles drawings. The resulting tools could be placed in categories or palettes named “Wall Styles - Concrete (Imperial)”, “Wall Styles - CMU (Imperial)” and so on.
- To order the resulting tools by their object type, select Group tools by object type. This option is well suited if you want to merge styles from various drawings into the catalog. The resulting tools will be placed in categories or palettes named after the style type, for example “Walls”, “Doors,” and so on.

NOTE If both options are enabled, then the tools are first grouped by the drawings and then by the object type, generating categories from the drawings, and palettes from the object types. This is implemented because palettes cannot be nested. In this case the radio buttons below are disabled and the Create tools in palettes option is selected for the tools.

NOTE If neither of the two options are enabled, all new tools will be generated in the top category of the catalog.

- To place the new tools in categories, select Create Tools in Categories.
  If you selected to group tools by their source drawing, then for each source drawing a category will be created. If you selected to group tools by their object type, then for each object type a category will be created.
- To place the new tools in palettes, select Create Tools in Palettes.
  If you selected to group tools by their source drawing, then for each source drawing a palette will be created. If you selected to group tools by their object type, then for each object type a palette will be created.

8 Under Create tools for the following objects, select which object styles should appear as tools in the catalog.

By default, all available style types are selected. Use the Select All and Clear All buttons as needed to make your selections.

9 Click OK.

A progress bar in the application status bar indicates the progress of the tool generation. When a large number of tools are being added, the process can take a few moments.

NOTE Each category and each palette is created in its own ATC file. The category and palette ATC files are stored in the Palettes or Categories subfolders in the folder in which the new catalog is created.

For information about associating a tool catalog to a project library, see Adding a Project Catalog to a Content Browser Library on page 408.

Adding a Project Catalog to a Content Browser Library

Tool catalogs are placed in catalog libraries. If you have created a tool catalog with standard tools, you need to add it to a catalog library. A Content Browser library can be set up on a shared network volume to be accessed by all project users. The CAD manager or project owner can point the project to that Content Browser library to have quick access to standard tools. For more information, see Adding a Project Library and Tool Palette Group on page 409.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Click to display the catalog library.

3 Click to create a catalog.

4 In the Add Catalog dialog box, select Add an existing catalog or website.

5 Enter the location of the standards tool catalog created in Creating a Project Standards Tool Catalog on page 405, or click Browse a to navigate to the catalog.

6 Click OK.

NOTE Alternatively, you can drag and drop an ATC file from Windows Explorer to the Content Browser library pane.

Adding a Project Library and Tool Palette Group

If you have created a project library in Content Browser, you can associate it to a project. When you open the Content Browser from Project Navigator, the project library is automatically displayed.

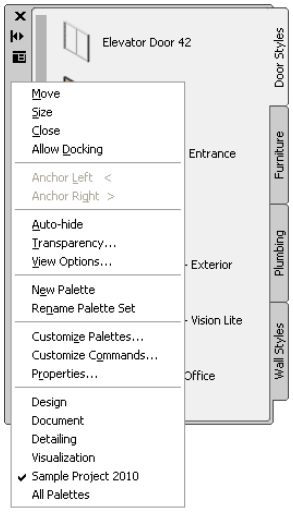
The project library can be used to drag tools in project drawings, or to fill the project tool palettes with standard tools.

Project Tool Palette Group

Each project has a specific tool palette group (ATC) associated with it. Depending on how you created the project, the tool palette group can be created and displayed in different ways.

For a new project, the project tool palette group is by default empty, unless the project settings are pointing to an existing palette group.

Selecting the project tool palette group



Tool Content Root Path

Setting a tool content root path can help you keep your tools consistent with standards if the project or the standards drawings are moved during the project lifecycle.

When tools on the project tool palettes point to the tool content root path specified in the project settings, the content root path is created as a variable (%AECPROJECT_DIR%) in the XML definition of the tool. When the tool content root path in the project settings is changed, the path of the tools is changed accordingly.

For example, if all project tools point to content stored under *<Project Root Folder>\Standards\Content\Content 1*, you can move the content to *<Project Root Folder>\Standards\Content\Content 2*, adjust the tool content root path in the project setup accordingly, and all tools will now point correctly to *<Project Root Folder>\Standards\Content\Content 2*.

Another use case for changing the tool content root path would be if a user wants to work offline, and for that purpose creates an e-transmit package of the project and its tool content files. When the e-transmit package is unpacked on the local computer, the path to the content files will have changes. If it was *P:\ <Project Root Folder>\Standards\Content\Content*, it could now be *C:\ <Project Root*

Folder>*Standards**Content**Content*. If the tool content root path is redirected to the user's C drive, and all content will remain valid.

Later, when the drawings the user modified offline are copied back to the main project on the P server, the content root path will automatically change back to *P:*\ <*Project Root Folder*>*Standards**Content**Content*, as this is the path in the main APJ file.

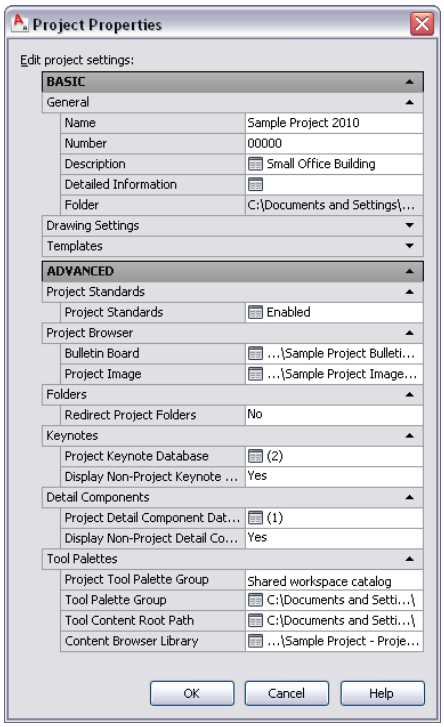
Project Library

A Content Browser library can be set up on a shared network volume to be accessed by all project users. The CAD manager or project owner can associate the library with the project to have quick access to standard tools. This can be especially useful on a large project. For more information, see Before You Begin: Working in a Network Environment on page 208.

When Content Browser is opened from the Project Navigator, it will automatically open the library associated with the project.

1 Click ➤ Open ➤ Project.

2 Select the project for which you want to specify the tool palette group and the Content Browser library, right-click, and click Project Properties.



3 Under Tool Palette Group, specify the location of the project tool palette group. You can select a local folder or a network folder here.

If you do not explicitly set a location here, the following default behavior is selected depending on how you created your project:

Project Type	Tool Palette File Location	Project Tool Palette Group
Legacy project from Autodesk Architectural Desktop 2005	pointing to new empty ATC file under \<*ProjectName*>*Standards*\ *WorkspaceToolPalettes*\ <*ProjectName*>.*atc*	Created, but not displayed. To display the tool palette group in the tool palettes set and add tools to it, see Displaying the Project Tool Palette Group

Project Type	Tool Palette File Location	Project Tool Palette Group
		on page 411 and Building the Tool Palette Group on page 413.
New project not based on a template	pointing to new empty ATC file under *\<ProjectName>\Standards\ WorkspaceToolPalettes\ <ProjectName>.atc*	Created, but not displayed. To display the tool palette group in the tool palettes set and add tools to it, see Displaying the Project Tool Palette Group on page 411 and Building the Tool Palette Group on page 413.
New project based on default AutoCAD Architecture template project	pointing to new ATC file under *\<ProjectName>\Standards\ WorkspaceToolPalettes\ <ProjectName>.atc*. By default, one empty tool palette is already inserted in ATC.	Created and displayed with empty default tool palette. To add tools and palettes, see Building the Tool Palette Group on page 413.
New project based on user-defined existing template project	If the tool palette group of the template project is located within the template project folder, it will be copied with all contained palettes to the corresponding folder of the new project. The tool palette file location of the new project will point to the copied tool palette group. If the tool palette group of the template project is located outside the template project folder, the tool palette file location of the new project will point to the same location, sharing the tool palette group with the template project.	Displayed as either copied tool palette group or referenced tool palette group

4 For Project Tool Palette Group, select Shared Workspace Catalog or Per User Workspace Catalog.

If you select Shared Workspace Catalog, the path selected under Tool Palette File Location is added to the user's project profile (AWS), and the tool catalog is used from the specified location. If you select Per User Workspace Catalog, a folder is created under *\\Documents and Settings\<User Name>* and the tool palettes are copied to that folder.

5 Under Tool Content Root Path, you can set a root path for the tools used in the project tool palette group. When tools on project palettes are created with the tool content root path specified in the project setup, the content root path is created as a variable (%AECPROJECT_DIR%). When the tool content root path in the project setup is changed, and the referenced style drawings are moved to the new location, the path of the project tools is changed accordingly.

NOTE When a project is re-pathed, and the content root path is within the project folder, then it will be re-pathed accordingly.

6 Under Content Browser Library, select the default Content Browser library (CBL) to be displayed when opening Content Browser from the Project Navigator.

7 Click OK.

Displaying the Project Tool Palette Group

Use this procedure to display the project tool palette group in the tool palettes set.

Depending on the setting of the tool palette file location in Adding a Project Content Browser Library and Tool Palette Group on page 227, the project tool palette group can be displayed automatically after setting a project current and closing Project Browser, or it can be empty and not be displayed on the tool palettes set. The project tool palette group is displayed automatically when it contains at least one palette.

Tool palette groups that are not automatically displayed can appear in the following cases:

- A new project that is not based on a template, and does not point to an existing tool palette group
- A legacy project from Autodesk Architectural Desktop 2005 that is not manually re-pointed to an existing tool palette group
- A project that is based on a template project without project tool palettes

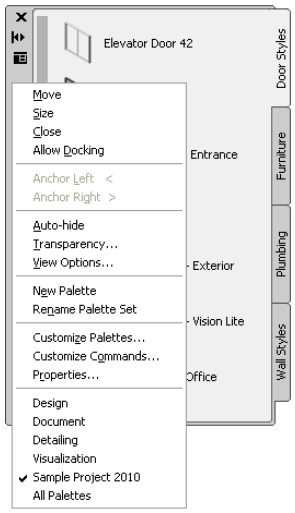
If an empty tool palette group is created for a project, it is not displayed in the tool palettes set after the project is set current. To display it, you need to add at least one tool palette to it.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools.

2 In the title bar of the tool palettes set, click .

- If the project tool palette group contains at least one palette, it is displayed in the list of available tool palette groups, and can be selected.

Selecting the project tool palette group



- If the tool palette group of the current project is empty, it is not displayed.

3 To display the project tool palette group, click , and click Customize.

On the left, all available palettes are listed. On the right, all palette groups are listed. The empty project tool palette group is listed there.

4 Right-click in the palettes list on the left, and click New Palette.

5 Enter a name for the new palette.

6 Select the palette, and drag it on the project palette group on the right.

7 Click Close, and click again.

The project tool palette group is listed under the available palette groups and can be selected.

Building the Tool Palette Group

When a new project is created, its associated tool palette group is empty, unless the new project is explicitly pointing to an existing tool palette group. You can add and remove palettes, add, remove, and rearrange tools to suit the needs of the current project.

TIP To make sure that the changes you make here are distributed to all project collaborators, you should define the tool palette storage type as a shared workspace catalog.

IMPORTANT All new palettes you add to the tool palettes set while a project is current are added to the current project's tool palette group. This happens regardless of whether the project tool palette group is active or not. In order to add new palettes to the global tool palettes associated with your user profile, you must first close any project that is current.

You can add standard tools to the project palette group in these ways:

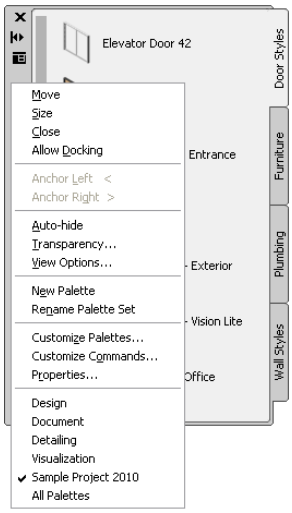
- Add standard tools from the project library
- Add standard tools from the from standards drawings in Style Manager

1 Set the desired project current.

2 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools.

3 In the title bar of the tool palettes set, click , and then select the project tool palette group.

Selecting the project palette group



4 Add and rename palettes as necessary.

For detailed information, see Creating a New Tool Palette on page 61.

5 To add standard tools from the project library, click in the Project Navigator toolbar.

The Content Browser is opened with the project library displayed.

6 Drag tools or palettes from the project library to the project palette group.

7 To add standard tools from the standards drawings, open a project drawing, and click Manage tab ➤ Style & Display panel ➤ Style Manager .

The project standards drawings are displayed under the project node. You can drag-and-drop styles from the Style Manager to the project palettes.

The next time you open the project, the new palettes and tools will be present in the project tool palettes.

Copying the Project Tool Palettes to the Tool Palette File Location

If you are working with a per user workspace catalog, you can create a starter set of palettes and tools for the project users by copying your palettes to the project tool palette file location. The first time a user opens the project, the tool palettes from the tool palette file location will be copied to the local users' machines.

1. Set up project standards tools as described in Adding a Project Library and Tool Palette Group on page 409 and Building the Tool Palette Group on page 413.
2. Close AutoCAD Architecture.
3. In Windows Explorer, navigate to *C:\Documents and Settings\<username>\Application Data\Autodesk\ACA 2010\enu\Support\Profiles\ProjectCatalogs*.
4. Select the project catalog folder.

   If you have just closed AutoCAD Architecture, the current project folder is the one with the latest date. In addition, the folder is named with the project GUID, which you can also find in the project APJ file.
5. Copy the project catalog folder and paste it to the folder specified as the tool palette file location for the project.

Adding the Project Profile to the Tool Palette File Location

After setting up the project tool palette group, the CAD manager or project owner needs to ensure that new users of the project will all have an identical set of tools and palettes when they are working with the project. To do this, the project profile needs to be copied to the folder specified as the tool palette file location.

1. Set up project standards tools as described in Adding a Project Library and Tool Palette Group on page 409 and Building the Tool Palette Group on page 413.
2. Close AutoCAD Architecture.
3. In Windows Explorer, navigate to *C:\Documents and Settings\<username>\Application Data\Autodesk\ACA 2010\enu\Support\Profiles\ProjectProfiles*.
4. Select the project AWS file.

   If you have just closed AutoCAD Architecture, the current project profile is the one with the latest date. In addition, the AWS contains the project GUID which you can also find in the project APJ file.
5. Copy the project AWS file and paste it to the folder specified as the tool palette file location of the project.

Adding Standards to a Project Drawing

If you set up standards for a new project, or add new drawings to an existing project, standard styles and display settings do not yet exist in these drawings and need to copied there.

If you have configured project standard tools as described in Setting up Standard Tools in a Project on page 403, you can drag-and-drop them from the project library or the project standards palettes to project drawings.

If you want to use standard styles and display settings in a project drawing without using tools, you need to copy them through Style Manager and Display Manager.

WARNING Project standard styles and display settings can be used only in project drawings. You can copy standard styles and display settings into standalone drawings as well; however, they will not be synchronized or versioned and maintain no link to the project standards.

There are different methods of copying standard styles and display settings to a drawing:

- Project tool palettes can be defined, as described in Building the Tool Palette Group on page 413. If the tools reference styles from standards drawings, the associated standard style is copied to the project drawing when the tool is executed.
- A Content Browser library for the project can be defined, as described in Adding a Project Library and Tool Palette Group on page 409. You can drag-and-drop tools from Content Browser to a project drawing.
- Standards drawings are displayed in the Style Manager and Display Manager under the project node. You can drag-and-drop styles and display settings into a project drawing from a project standards drawing.

Project Tool Palette Group

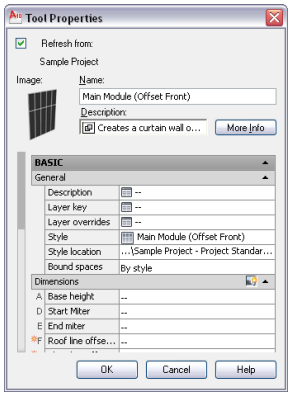
When you create a project, a project palette group is associated with it. The project palette group is displayed in the tool palettes set when the project is set current. For information about creating a project tool palette group, see Setting up Standard Tools in a Project on page 403.

Adding Standard Styles from the Project Tool Palettes

If you want to copy a standard style from a project palette into the current drawing, you can either insert the tool into the drawing, or import the associated style from the tool palette into the drawing.

1 Right-click the tool, and click Properties.

Verifying the style location



Under Style location, the associated style drawing is listed.

2 Verify that the tool points to a project standards drawing.

3 Click OK.

4 To add the standard style into the drawing, do one of the following:

- Select the tool, right-click, and click Import <Style Name> <Object> Style. For example, if you want to add the wall style CMU-190 into the drawing, click Import CMU-190 Wall Style.
- Click the tool to execute its function which will automatically use the referenced style.

Both of these options add the style to the drawing.

Adding Standard Styles from Content Browser

The CAD manager can set up a library in Content Browser that contains standard tools. Standard tools can be dragged from Content Browser directly to a drawing or to a tool palette.

For information about associating a library for a project, see Adding a Project Library and Tool Palette Group on page 409.

1 Set the project current, as described in Setting a Project Current on page 215, and close the Project Browser.

2 Click View tab ➤ Palettes panel ➤ Project Navigator .

3 In the Project Navigator toolbar, click .

The Content Browser is opened with the project library displayed.

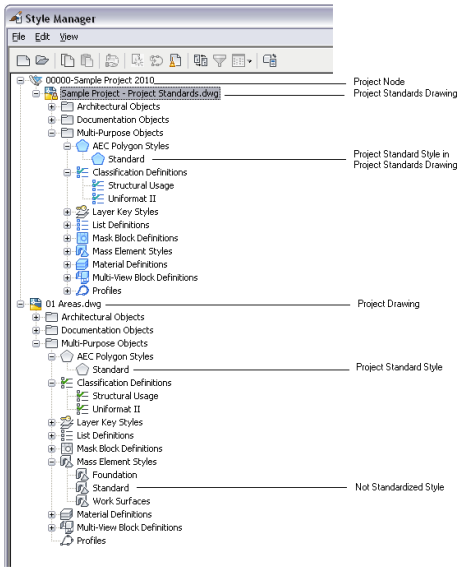
4 Select a standard tool by its eyedropper tool, and drag it either to the drawing area of AutoCAD Architecture, or to one of the tool palettes.

NOTE Be sure to hold down the mouse button until the eyedropper appears to "fill up" before dragging it to the drawing or tool palette.

Adding Standard Styles from Style Manager

You can add standard styles to project drawings in Style Manager. When standards drawings are specified in the project standards configuration, they are displayed in Style Manager when you open a project drawing. Styles can be dragged from the project node to the project drawing node here.

Standard styles in Style Manager



1 Open the project drawing to which you want to add standard styles.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The standards drawings specified in the standards configuration are listed under the project node.

3 Expand the node for the project standards drawing containing the style you want to add, and expand subnodes as necessary to locate the style.

4 Drag the style from the project standards drawing node to the project drawing node in the tree view.

The standard style is copied to the project drawing node.

NOTE For the synchronization of the standard style to work, the style needs to come from a standards drawing that has been selected as a standards drawing for this style type in the configuration setup. For example, if the standards drawing "Wall Styles.dwg" has been configured as the standard for wall styles, and the standards drawing "Door Styles.dwg" has been configured as the standards drawing for door styles, you should not copy any wall styles from the "Door Styles.dwg" to the project drawing. Because that drawing has not been defined as the standards drawing for wall styles, the copied styles will display as not standardized in the synchronization. For information on configuring standards drawings, see Setting up Standard Styles and Display Settings on page 394.

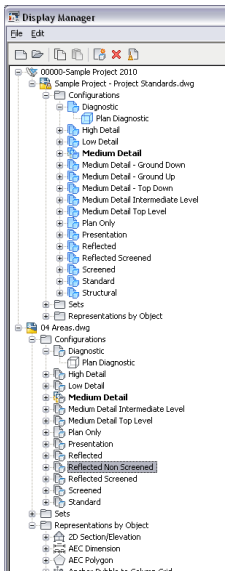
5 Click OK.

You can also drag styles from a project standards drawing into a drawing that is not part of the current project. If the drawing is not part of any project, no synchronization will happen to that style in the future. If the drawing is part of a different project, the style will display as not standardized in future synchronizations of that project, unless that project references the same standards drawing from which the style was dragged.

Adding Standard Display Settings from Display Manager

You can add standard display settings to project drawings in the Display Manager. When a standard display drawing is specified in the project standards configuration, it is displayed in Display Manager under the project node. From there, display configurations, display sets, and display representations can be dragged to the project drawing nodes.

Adding standard display settings from Display Manager



1 Open the project drawing to which you want to add standard display settings.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

The drawing that has been defined as display standards drawings in the project standards configuration is listed under the project node.

3 Expand the standards drawing node and navigate to the desired type nodes for Configurations, Sets, and Representations by object.

4 Drag the component to the project drawing node in the tree view.

5 Click OK.

Synchronizing a Project with the Standards

When a project or project drawing is synchronized with its standards, the styles and display settings in it are compared with the project standards to find version discrepancies between them, and fix them.

Synchronization can become necessary in these cases:

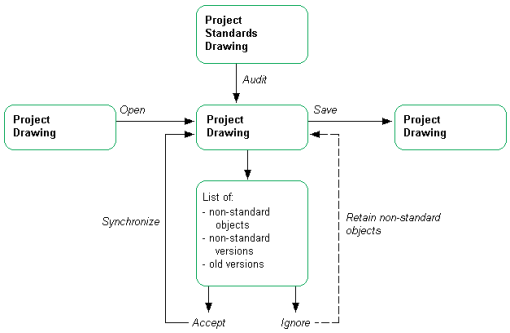
- A style or display setting in a project drawing has changed and needs to be updated with the correct version from the project standards.
- A style or display setting in the project standards has changed and needs to be updated in the project drawings.
- Not standardized styles and display settings have been introduced in a project drawing.

Depending on the synchronization settings specified in Setting up Synchronization of AEC Standards on page 399, outdated standards in the project drawings are either automatically updated with the latest version from the project standards drawings, or you are presented with a list of objects that need to be updated. You can select individual objects to update, while ignoring others. If you select to update a style with the associated standard, the selected style is copied from the project standards drawing into the project drawing, overwriting the existing style definition.

NOTE Automatic synchronization of standard styles and display settings does not happen during background plot/publish.

WARNING You should always synchronize the display settings in your project. Version discrepancies between the display settings in the project drawings can result in objects in project drawings not being displayed consistently. You also need to make sure to synchronize all project standards drawings with the current standard display settings, as described in Synchronizing Project Standards with Each Other on page 445, to ensure consistent display in the standards drawings.

Synchronizing a project with standards



Versioning Styles and Display Settings

To determine whether a standard style or display setting in a project drawing is identical to the corresponding object in the project standards drawing, styles and display settings in a project are versioned. The version information includes a unique GUID (Global Unique Identifier), the date and time of the last modification, the windows login name of who last modified the object, and an optional comment.

A new version of a standard style or display setting in a project drawing is created each time the style or display setting is changed in Style Manager or Display Manager, and saved.

In a project standards drawing, a new version of a standard style or display setting must be manually created after the style or display setting has been changed in Style Manager or Display Manager. For information about versioning standard styles and display settings, see Versioning Standards on page 435. In project standards drawings, a version history is also stored. The version history will be used to determine if styles or display settings in project drawings are identical to the version in the project standards drawing, or newer or older versions.

An older version of a style or display setting in a project drawing is a version that exists in the project standards drawing, but is not the latest version. A newer version of a style or display setting in a project drawing is a style or display setting that exists in the project standards drawing, but has no corresponding version in its version history.

A special case occurs if a standard style or display setting in a standards drawing has no version information. This can happen if the version information has been purged, as described in Purging the Version Information from a Project Standards Drawing on page 444. In this case, the standard style or display setting still participates in the synchronization and is considered the "latest version" when comparing with versions of the object in project drawings. No attempt is made during synchronization to automatically create a version GUID or history list. If you want to add version information to the standard style or display setting, you need to manually version the object as described in Updating Standard Objects in a Project Standards Drawing on page 438.

Synchronization Conditions

Two styles or display settings are considered identical if the following are identical:

- Object type (e.g. wall style, display set)
- Name
- Version GUID

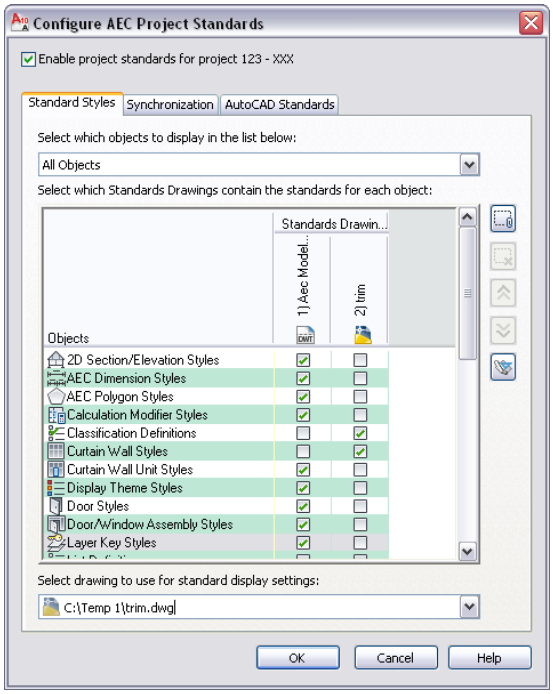
If the synchronization process finds a style or display setting in a project drawing that has the same type, name, and version GUID as the corresponding style or display setting in the project standards, it concludes that the style or display setting is up-to-date with the project standards. In that case, no change is necessary.

NOTE A synchronization does not perform a property-by-property comparison between the versions. The reason for this is that such a comparison would slow down the software considerably, and that the GUID, date and time stamp in the version information provides sufficient information to identify changes.

Synchronization Order

If you have multiple standards drawings containing the same standard styles associated with a specific style type, then the instance of the style in the first standards drawing is used as the style to which the style in the project drawing is synchronized. The first standards drawing is the one listed on the left in the standards configuration table. Further drawings containing the same standard style are ignored.

Order of standards drawings



NOTE The order of the synchronization is observed in all cases, even if a later project standards drawing contains a newer version of a standard style than the one contained in the preceding standards drawing.

Dependent Styles

Some styles have dependent styles or definitions used to create them. This could be, for example, door and window styles that are used within window assembly or curtain wall styles. In a case like that, it is recommended that all dependent styles and definitions are placed in the same standards drawing.

Synchronization Granularity

You can synchronize different parts of a project. You can synchronize a complete project, an individual project drawing, or an individual style or display setting.

Synchronizing only one drawing or style will take considerably less time, and may often be sufficient.

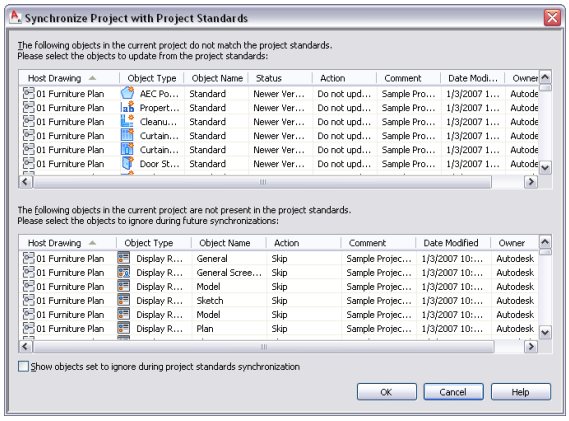
Synchronizing AutoCAD Standards

Synchronizing the AutoCAD standards (DWS) of a project is a separate process from synchronizing the AEC standards of a project. While you can set the AEC standards in a project to be automatically synchronized every time a drawing is opened, synchronization of the AutoCAD standards has to be initiated manually by the user. When AutoCAD standards are set up in a project, a CHX file is automatically created containing the project drawings and the associated AutoCAD project standards drawings. The batch standards checker can be used to open the project's CHX file and batch check the entire project.

Synchronization Status

When you synchronize a project or a drawing with its AEC project standards, the styles and display settings in the project drawings are compared with the versions in the standards drawings. If the version of the style or display setting in the project drawing is not identical to the version in the standards drawing, you can choose from several possible actions regarding the style or display setting.

Synchronization dialog



Status	Description	Action
Current standard version	The style or display setting in the project drawing is identical to the version in the project standards drawing.	No action required. The object is in synch with the standard.
Older version of standard style or display setting	The style or display setting in a project drawing is an older version than the style in the project standards drawing. **NOTE** The version GUID is used to determine which version is more current.	You can choose from these actions: ■ Update from Standard: this copies the version from the project standards drawing to the project drawing. The object in the project drawing is overwritten. ■ Do not Update: The style or display setting is skipped for this synchronization. The next time the drawing is synchronized, it will display as inconsistent with the standards again. ■ Ignore: The style or display settings is skipped now and for future synchronizations. **NOTE** If you choose this option, you may choose to display ignored objects during each synchronization.
Nonstandard (Newer) Version of standard style or display setting	The style or display setting in the project drawing is a version not found in the project standards drawing's version history.	
Not standardized style or display setting	The style or display setting in the project drawing is not present in the project standards drawings.	■ Skip: The not standardized object is skipped for this synchronization. The next time the project is synchronized, it will display as not standardized again. ■ Ignore: The not standardized object is skipped now and for future synchronizations. **NOTE** If you choose this option, you may choose to display ignored objects during each synchronization.

Synchronizing a Project with AEC Standards

When you have set up AEC project standards and enabled them, you can synchronize the project with the standards.

For information about setting up AEC standards, see Setting up Standard Styles and Display Settings on page 394.

Synchronizing a project will synchronize all drawings contained within. Depending on your system setup and project size, this might take some time. Also, project drawings that are open during the synchronization might not be correctly synchronized because they will not be able to be saved after the synchronization. In that case, the drawings need to be closed, and the synchronization repeated.

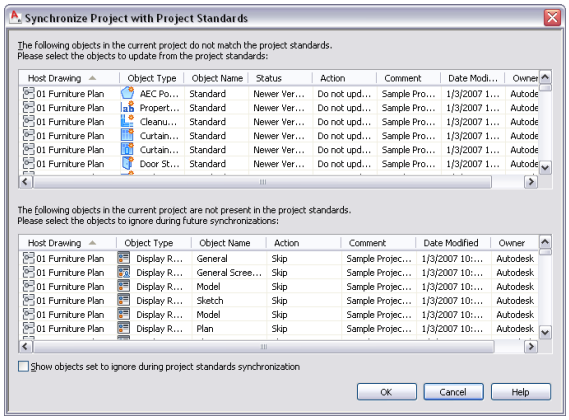
NOTE Synchronizing a project will not synchronize the project standards drawings with each other, even if they are located within the project folder. To synchronize project standards drawings with each other, see Synchronizing Project Standards with Each Other on page 445.

1 Verify that the project you want to synchronize is the current project.

For information about setting a project current, see Setting a Project Current on page 215.

2 Click Manage tab ➤ Project Standards panel ➤ Synchronize Project .

Synchronizing a project with AEC standards



The synchronization dialog is displayed with two lists. The top list shows styles and display settings that are either older versions of standard styles or display settings, or nonstandard (newer) versions. The bottom list shows a list of not standardized styles and display settings. For a definition of terms, see Project Standards Terminology on page 387.

3 To synchronize a style or display setting that is either an older version or a nonstandard (newer) version, select Update from Standards from the Action drop-down list.

4 To skip over a style or display setting that is either an older version or a nonstandard (newer) version, select Do not Update from the Action drop-down list.

In this case, the nonstandard version remains in the project drawing for now, and is not updated with the standard. The next time the drawing is synchronized, the style or display setting will be listed again as inconsistent with the standard.

5 To ignore a style or display setting that is inconsistent with the standard, select Ignore from the Action drop-down list.

In this case, the inconsistent object will not be listed again in future synchronizations, except if you select Show objects set to ignore during project standards synchronization, or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

WARNING You should use the Ignore option only in clearly defined exception cases where you are sure that a style or display setting does not need to conform to the project standards.

6 To skip over a not standardized style or display setting, select Skip from the Action drop-down list.

The next time the drawing is synchronized, the style or display setting will be listed again as not standardized.

NOTE You cannot promote not standardized styles and display settings to standard ones here. To do this, you need to add the not standardized style to the project standards, as described in Adding Standard Objects from a Project Drawing to a Project Standards Drawing on page 441.

7 To ignore a not standardized style or display setting, select Ignore from the Action drop-down list.

In this case, the not standardized object will not be listed again in future synchronizations, except if you select Show objects set to ignore during project standards synchronization, or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

8 Click OK.

Synchronization Exceptions

When you synchronize a complete project, drawings that are currently opened by another user or are read-only will be excluded from the synchronization. Before the synchronization of the project is started, the program runs an internal check to see if there are drawings that cannot be synchronized at the time. If such drawings are found, the Synchronization Warning worksheet is displayed.

NOTE If a project drawing is opened by the same user who is trying to synchronize the project, no error warning is displayed. The program will detect that the drawing is open and will be able to make the synchronization changes to the open drawing.

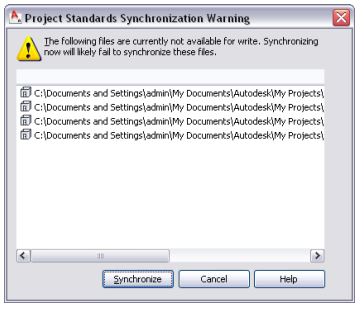
If you get a warning message like this, you can either wait until all project drawings are available to you, or you can synchronize the project now, accepting that there are drawings that cannot be included.

1 Verify that the project you want to synchronize is the current project.

For information on setting a project current, see Setting a Project Current on page 215.

2 Click Manage tab ➤ Project Standards panel ➤ Synchronize Project .

If there are project drawings that are currently unavailable for synchronization, you will receive the following warning message:



3 Click Synchronize to synchronize all project drawings *not* listed in the warning worksheet.

4 When the Synchronization dialog is opened, follow the instructions in Synchronizing a Project with AEC Standards on page 422.

Synchronizing a Project Drawing with AEC Standards

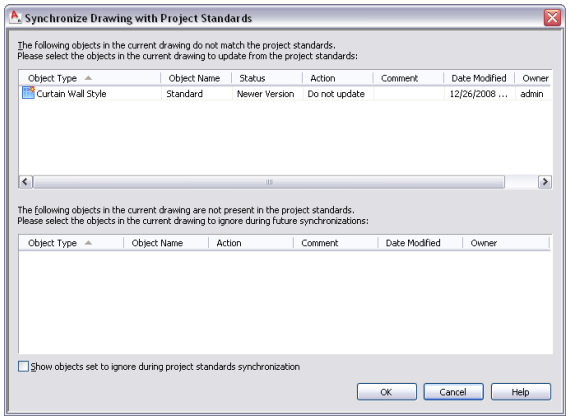
Use this procedure to synchronize a project drawing with the AEC project standards.

NOTE If you have selected automatic or semi-automatic synchronization in your standards configuration, the synchronization is automatically started every time you open the project drawing. For information on setting the synchronization mode, see Synchronization Options on page 397.

1 Open the project drawing you want to synchronize.

2 Click Manage tab ➤ Project Standards panel ➤ Synchronize DWG .

Synchronizing a project drawing with AEC standards



Two lists are displayed. The top list shows styles and display settings that have corresponding styles or display settings in the project standards, but are either an older version of a standard style or display setting, or a nonstandard (newer) version. The bottom list shows a list of styles and display settings that do not have corresponding styles or display settings in the standards (not standardized styles and display settings). For a definition of the terms, see Project Standards Terminology on page 387.

3 To synchronize a style or display setting that is either an older version or a nonstandard (newer) version, select Update from Standards from the Action drop-down list.

4 To skip over a style or display setting that is either an older version or a nonstandard (newer) version, select Do not Update from the Action drop-down list.

In this case, the nonstandard version remains in the project drawing for now, and is not updated with the standard version. The next time the drawing is synchronized, the style or display settings will be listed again as older version or nonstandard version.

5 To ignore a style or display setting that is either an older version or a nonstandard version, select Ignore from the Action drop-down list.

In this case, the nonstandard version will not be listed again in future synchronizations, except if you select Show objects set to ignore during project standards synchronization, or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

You should use the Ignore option only in clearly defined exception cases where you are sure that a style or display setting does not need to conform to the project standards.

6 To skip over a not standardized style or display setting, select Skip from the Action drop-down list.

The next time the drawing is synchronized, the style or display setting will be listed again as not standardized.

NOTE You cannot promote not standardized styles and display settings to standard ones here. To do this, you need to add the not standardized style to the project standards, as described in Adding Standard Objects from a Project Drawing to a Project Standards Drawing on page 441.

7 To ignore a not standardized style or display setting, select Ignore from the Action drop-down list.

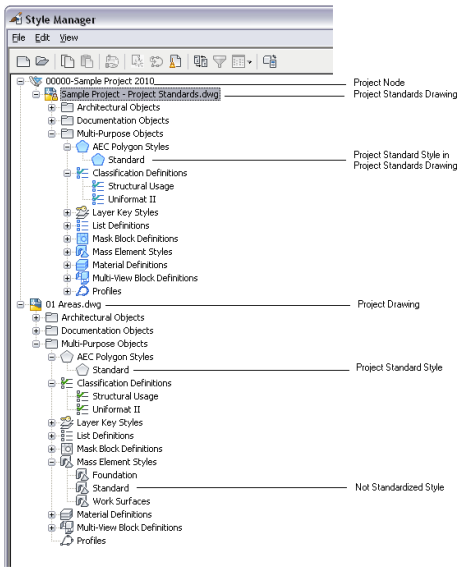
In this case, the not standardized object will not be listed again in future synchronizations, except if you select Show objects set to ignore during project standards synchronization, or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

8 Click OK.

Synchronizing Selected Styles and Display Settings with AEC Standards

You can synchronize individual styles and display settings in Style Manager and Display Manager. You could do this if you have accidentally changed a style in the project drawing, and want to restore the correct version from the project standards. Synchronizing an individual style or display setting will take less time than synchronizing a drawing or the project.

Standard styles in Style Manager



This process only synchronizes styles and display settings in a project drawing with the standards. It does not synchronize styles and display settings in different standards drawings with each other. For information on synchronizing standards drawings among themselves, see Synchronizing Project Standards with Each Other on page 445.

Standard Icons

Standard styles and display settings are displayed in Style Manager and Display Manager. Depending on their status with regards to the project standards, there are a number of different icons to differentiate them.

Icon	Description
	Standard style or display setting When a blue icon appears on a style or display setting in a project drawing or project standards drawing, the style or display setting is a standard one and is in synch with the standard. No update or synchronization is necessary.
	Standard style or display setting that is outdated When this icon appears on a style or display setting in a project drawing, the style or display setting is a standard one, but is out of date. This means that the corresponding style or display setting in the project standards drawing has a newer GUID than the one in the project drawing. To update the style or display setting in the project drawing, see Synchronizing Individual Styles with AEC Standards on page 428 and Synchronizing Individual Display Settings with AEC Standards on page 428.
	Standard style or display setting that has a non-standard (newer) version When this icon appears on a style or display setting in a project drawing, the object is a standard object, but has a version GUID that cannot be found in the project standards. If you encounter this icon, you can either overwrite the non-standard version with the current version from the standards drawing, as described in Synchronizing Individual Styles with AEC Standards on page 428 and Synchronizing Individual Display Settings with AEC Standards on page 428, or you can update the standards with the version from the project drawing, as described in Updating Standard Objects in a Project Standards Drawing from a Project Drawing on page 440.
	Standard style or display setting that is excluded from synchronization When this icon appears on a style or display setting, the object is excluded from synchronization. For more information, see Excluding Styles and Display Settings from Synchronization on page 429.
	Standard style or display setting that has no version information When this icon appears on a style or display setting in a project standards drawing, the style or display setting has no version information. Version information can be deleted, as described in Purging the Version Information from a Project Standards Drawing on page 444. To add version information to a style or display setting, see Updating Standard Objects in a Project Standards Drawing on page 438.
	Standard style or display setting that has been changed, but not versioned When this icon appears on a style or display setting in a project standards drawing, the object has been modified, but not versioned yet. In order for the changes to be included in the synchronization, the object must be versioned, as described in Updating Standard Objects in a Project Standards Drawing on page 438. This icon appears only in project standards drawings. Changes in project drawings are versioned automatically when you click Apply or OK in Style Manager or Display Manager.
	Not standardized style or display setting When a gray icon appears on a style or display setting in a project drawing, this object has no equivalent in the project standards, or (in the case of styles) the equivalent style in the project standards has not been associated with that style type in the project standards configuration. When this icon appears on a style in a project standards drawing, the style type it belongs to has not been associated with the corresponding standard style type in the project configuration setup. For example, if the Wall style type in the standards configuration has been associated with the Standards Drawing “Wall Styles 1.dwg” then the wall styles in “Wall Styles 1.dwg” will be displayed

Icon	Description
	as standard styles in the Style Manager. The wall styles in "Wall Styles 2.dwg" will be displayed as not standardized styles.

Overview: Styles in Project Drawings

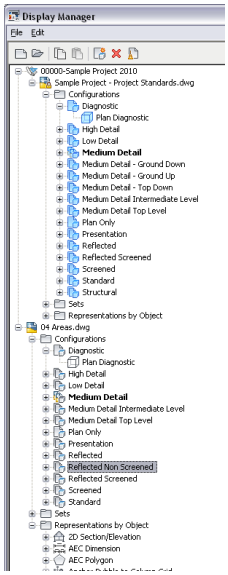
You can synchronize individual styles in a project drawing.

- All styles in a project drawing
- Style Categories: You can synchronize all styles contained in a style category. For example, you can synchronize all styles contained in Documentation Objects, if you have made changes to property set definitions, table styles, and data formats.
- Style types: You can synchronize all styles belonging to a style type. For example, you can synchronize all wall styles or all door styles.
- Styles: You can synchronize individual styles. You could do this if you have made a single change to a standard style, and do not want to start a complete synchronization of the drawing.

Overview: Display Settings in Project Drawings

You can synchronize individual components of the display system in a project drawing.

Display Manager tree



- All display settings in a project drawing: You can synchronize all display settings in a project drawing. This includes display configurations, display sets, and display representations.
- Display configurations: You can synchronize either an individual display configuration or all display configurations in the drawing.

  NOTE A change to the cut plane is not a versionable change. If you change the cut plane, and synchronize the display configuration with the project standards, the changed cut plane will not be overwritten with the project standard.

- Display Sets: You can either synchronize an individual display set or all display sets in the drawing,

NOTE Changes to the Live Section settings are not a versionable change. If you change the Live Section settings, and synchronize the display set with the project standards, the changed Live Section settings will not be overwritten with the project standard.

- Display representations: You can either synchronize an individual display representation, all display representations of an object type, or all display representations in the drawing.

Synchronizing Individual Styles with AEC Standards

Use this procedure to synchronize styles in a project drawing.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. In the Style Manager tree, navigate to the style, style type, or style category you want to synchronize.
3. Select the object in the tree, right-click, and click Synchronize with Project Standards.
4. In the Synchronize Drawing with Project Standards dialog box, select Update from Standard from the Action drop-down list for each object that should be synchronized.
5. Click OK.

Synchronizing Individual Display Settings with AEC Standards

Use this procedure to synchronize display settings in a project drawing.

NOTE Display settings should always be synchronized with the latest standard settings. Out-of-synch display settings in a project can cause objects to be displayed inconsistently.

1. Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2. In the Display Manager tree, navigate to the object you want to synchronize.
   You can synchronize the following objects:
   - All display settings in a drawing
   - all display configurations
   - single display configuration
   - all display sets
   - single display set
   - all display representations
   - all display representations of an object type
   - a single display representation on an object type
3. Select the object in the tree, right-click, and click Synchronize with Project Standards.
4. In the Synchronize Drawing with Project Standards dialog box, select Update from Standard from the Action drop-down list for each object that should be synchronized.
5. Click OK.

Excluding Styles and Display Settings from Synchronization

Use this procedure to specify individual styles and display settings that you want to be ignored during synchronization.

Specified styles and display settings will not be overwritten with standards during automatic synchronization and will not be displayed as version mismatches during semi-automatic or manual synchronization, unless you select the Show objects set to ignore during project standards synchronization check box in the Synchronization dialog box.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

2 Navigate to the style or display setting to be excluded, right-click, and click Ignore During Synchronization.

Note that the Ignore During Synchronization option now has a check mark next to it. If you click the option again, the check mark disappears and the selected style or display setting is removed from the list of components to be ignored.

Generating a Synchronization Report

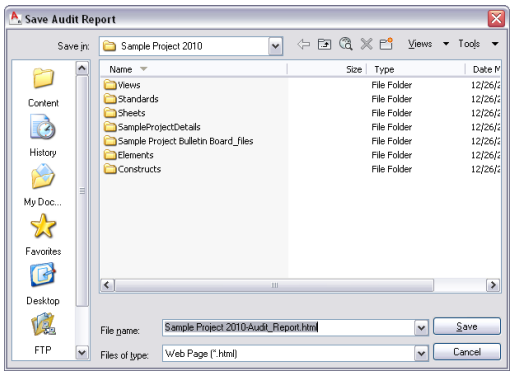
When you synchronize a project or a project drawing, you can save a synchronization report in HTML or XML format.

You can define in the project setup whether a synchronization report should be generated when synchronizing a project.

1 Verify that the creation of synchronization log files has been activated in the project configuration, as described in Setting up Synchronization of AEC Standards on page 399.

2 Synchronize a project or a drawing with its standards, as described in Synchronizing a Project with AEC Standards on page 422 or Synchronizing a Project Drawing with AEC Standards on page 424.

When the synchronization is finished, the Save Project Standards Report dialog box is displayed.



3 Select a file location and enter a name for the synchronization report.

4 Click Save.

The report is saved as an HTML or XML document in the specified location. You can open it with a Web Browser or an XML editor.

The report offers you various ways to display synchronization results; for example, you can view the synchronization results by drawing, by standard objects, or by problems encountered.

Synchronizing a Project with AutoCAD Standards

Use this procedure to synchronize a project with its AutoCAD standards. For information on defining AutoCAD standards for a project, see Setting up AutoCAD Standards on page 400.

When you set up AutoCAD standards for a project, a CHX batch checker file with the project name is created in the project folder. The CHX file contains a list of all project drawings as drawings to be checked, and a list of all specified AutoCAD standards files (DWS) as files to check against. If you want to synchronize a whole project against the AutoCAD standards, you need to run this batch file using the AutoCAD Batch Standards Checker.

The AutoCAD Batch Standards Checker runs independently from AutoCAD Architecture.

Before you start the AutoCAD Batch Standards Checker, you should update the project CHX file to make sure the CHX contains the current list of AutoCAD standard files and project files.

1 Verify that the project you want to check is the current project.

   For information on setting a project current, see Setting a Project Current on page 215.

2 Click Manage tab ➤ CAD Standards panel ➤ Batch Checker.

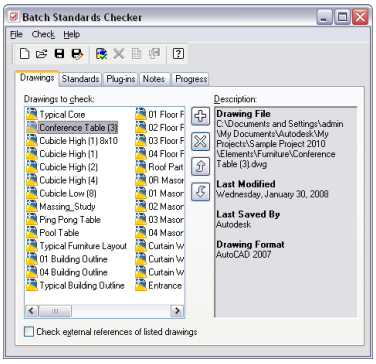
   A progress bar indicates the progress of the CHX update.

3 Click Start (Windows) menu ➤ All Programs (or Programs) ➤ Autodesk ➤ AutoCAD Architecture 2010 ➤ Batch Standards Checker.

4 Click File menu ➤ Open Check File.

5 In the File Open dialog box, select the project CHX file.

Batch Standards Checker



6 Click Check menu ➤ Start Check.

   For more information about AutoCAD standards, see “Maintain Standards in Drawings” in AutoCAD help.

Synchronizing a Project Drawing with AutoCAD Standards

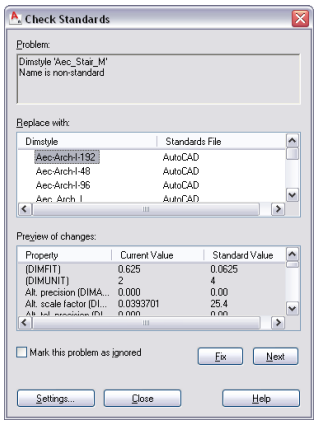
Use this procedure to synchronize a project drawing with its associated AutoCAD standards. AutoCAD standards include AutoCAD layer settings, AutoCAD dimension styles, linetypes, and text styles.

1 Open the drawing you want to synchronize with AutoCAD standards.

2 Click Manage tab ➤ Project Standards panel ➤ Update .

   A progress bar indicates the progress of the CHX update.

3 Click Manage tab ➤ CAD Standards panel ➤ Check.



Under Problem, the first AutoCAD dimension style, text style, layer, or linetype style that is inconsistent with the AutoCAD standards of the project is listed.

4 To synchronize the component with the project standards, select one of the styles listed under Replace with, and click Fix.

5 To retain the not standardized component in the drawing, click Mark this Problem as ignored.

6 Click Next to display the next not standardized component.

When all problem components have been processed, a message displays with a summary of the problems.

7 Click OK, and then click Close.

Auditing a Project or a Drawing

When a project or a drawing is audited, the styles and display settings in the project drawing are compared with those of the project standards, and any out-of-synch standards will be reported.

Out-of-synch standards can appear in these cases:

- A style or display setting in a project drawing has changed and needs to be updated with the correct version from the project standards.
- A style or display setting in the project standards has changed and needs to be updated in the project drawings.
- Not standardized styles and display settings have been introduced in a project drawing.

You could for example run an audit on drawings that come from contractors, or from other outside sources. Before you synchronize the drawings with the project standards, you first want to look at what actually is different between the drawings and the standards. For information on synchronizing standards, see Synchronizing a Project Drawing with AEC Standards on page 424.

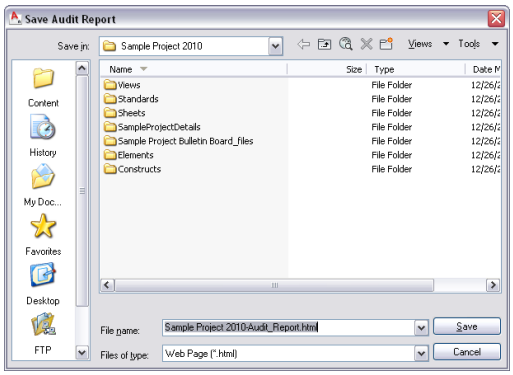
NOTE A drawing needs to be part of a project to be audited against project standards. You cannot audit standalone drawings. If a drawing had been outsourced, it needs to be copied back into the project before it can be audited. For more information, see Converting a Drawing to a Construct on page 271.

The result of the audit is placed in an HTML or XML audit report.

1 To create an audit report for the project click Manage tab ➤ Project Standards panel ➤ Audit Report .

2 To create an audit report for the project drawing click Manage tab ➤ Project Standards panel ➤ Audit Project Drawing .

When the audit is finished, the Save Project Standards Report dialog box is displayed.



3 Select a file location and enter a name for the synchronization report.

4 Click Save.

The report is saved as an HTML or XML document in the specified location. You can open it with a Web Browser or an XML editor.

The report offers you various ways to display audit results; for example, you can view the audit results by drawing, by standard objects, or by problems encountered.

Showing Display Overrides in Project Drawings

To keep project drawings synchronized, it is important to control the properties and display properties of building objects by style, to be able to update the objects when the project standards change. Introducing object-level overrides makes it impossible for the overridden objects to be updated through the synchronization process when project standards change.

Use this procedure to detect object-level overrides on style-based objects in the current drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Show Display Overrides.

NOTE Alternatively, enter **AecShowDisplayOverrides** on the command line.

2 On the command line, enter a display option:

If you want to…	Then…
highlight the overridden objects in the drawing area.	enter **O** (byObject).
display a list of overridden objects in the AutoCAD command window	enter **S** (byStyle)
highlight the objects and display a list in the AutoCAD command window	enter **B** (Both).

3 Remove any object-level overrides.

Editing Project Drawings Outside the Project

You need to work on a project drawing outside of a project in any of the following cases:

- A drawing is edited by an outside contractor.
- A user wants to work on a drawing offline without access to the project.
- A drawing has been created outside the project and is integrated into the project later.

When you are working with a project drawing outside of a project, you can use the drawing's standard styles and display settings, but they cannot be updated with changes that are made to the project standards during that time. So it is important to synchronize the drawing after it has been re-integrated into the project.

If you have made changes to standard styles and display settings in the project drawing during working outside the project, a new version of the styles and display settings is created automatically to track the changes when synchronizing the drawing with the project standards. You can select to either overwrite the new version with the current version from the project standards, or you can update the project standards with the version from the project drawing. For more information, see Synchronizing a Project Drawing with AEC Standards on page 424 and Updating Standard Objects in a Project Standards Drawing from a Project Drawing on page 440.

Creating a New Project Standards Drawing

Project standards drawings are assigned to a project, but are not project drawings like elements, constructs, views, and sheets. The styles and display settings in project drawings are compared with the standards and updated as necessary during the synchronization process.

To create a project standards drawing, you need to create a drawing file or a drawing template containing styles and display settings that should be used in the project.

For example, you can create one drawing that contains the standard wall styles, and another one that contains the standard door styles, or mask block definitions.

Project standard files can be of the file format DWG, DWT, or DWS. If you select the DWS format for your standards drawings, you can simultaneously use them as your AutoCAD standards drawings.

A project standards drawing is a regular drawing file. The definition of the drawing as a project standards drawing is created when the drawing is added as a project standards drawing to the standards configuration of a project, as described in Setting up Standard Styles and Display Settings on page 394.

Styles vs. Display Settings

You can assign multiple standards drawings for project styles. During synchronization, project drawings are compared against the project standards drawings in the order you establish in the project standards configuration. If a style is located in multiple standards drawings, the first instance in the search order is used as the standard.

For display settings, you can assign only a single standards drawing. It must contain all standard display settings for the project. Note, however, that the same standards drawing can be used for both styles and display settings.

File Location of Project Standards Drawings

You can choose two different options for storing project standards drawings:

Project Folder

If the project standards drawings are located within the project, they are treated as project specific. Typically, drawings containing project-specific standards are stored inside the project folder. For example, if you create styles for only one building project, you would place them in a project-specific standards drawing within the project folder. Placing standards drawings under the project folder has the following implications:

- When you use the project as a template for a new project, the project standards drawings are copied to the new project, and repathed to their new location.
- If you copy the standards of the project to another project, the project standards drawings are copied to that project.
- If you synchronize project standards drawings with each other, only standards drawings within the project will be included in the synchronization. For more information, see Synchronizing Project Standards with Each Other on page 445.
- The standards drawings are included in e-transmit and archiving packages created of the project.

You would place your standards drawings within the project if you want to keep the standards drawings specific to that project. You can copy the standards drawings to a new project, but any changes you make to one set of the standards drawings will not be propagated to the other one.

A Folder Outside the Project

If project standards drawings are located outside the project, they are referenced from that location. You would do this typically for standards that are not specific to a project, but rather to the department or the company. In that case, copying the standards to individual projects would create a risk of version discrepancies being introduced in the multiple copies. Also, a change made to a company-wide standards file would not be automatically propagated to all projects using that standards file. Placing a standards drawing outside the project has the following implications:

- When you use the project as a template for a new project, the project standards drawings are not copied to the new project. They are referenced from their original location.
- If you copy the standards of the project to another project, the project standards drawings are referenced from their original location in the other project.
- If you synchronize project standards drawings with each other, standards drawings outside the project will not be included in the synchronization. For more information, see Synchronizing Project Standards with Each Other on page 445.
- The standards drawings outside the project folder are not included in e-transmit and archiving packages created of the project. For more information, see Electronically Transmitting a Project on page 232.

1 Open a new drawing file.

2 Add the standard styles and display settings you need in this project.

For more information, see Style Manager on page 565, Display System on page 513, and the relevant object chapters.

3 Save the drawing as DWG, DWT, or DWS format.

If you want to…	Then…
make the standards drawing specific to a project	save it within the project folder. **NOTE** You can create subfolders for standards drawings.

If you want to…	Then…
make the standards drawing available for general use within the company or team	save it outside the project folder.

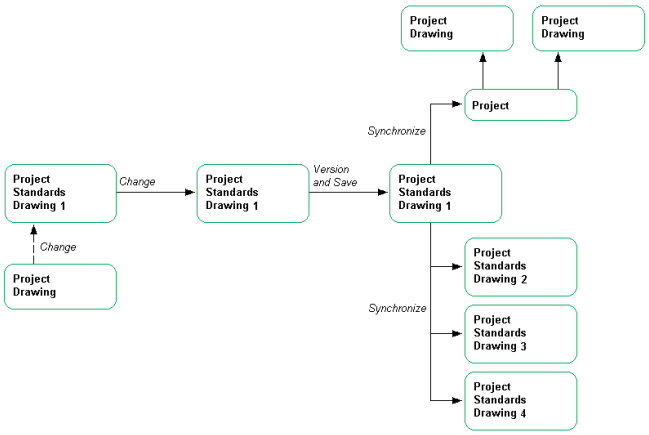
4 Associate the standards drawing with a project, as described in Setting up Standard Styles and Display Settings on page 394.

Updating Project Standards Drawings

When a standard style or display setting changes during the lifecycle of a project, it needs to be versioned, saved, and then updated in the project drawings and the other project standards drawings.

A standard component can be either changed directly in the standards drawing, or be updated from a project drawing. For more information, see Updating Standard Objects in a Project Standards Drawing on page 438 and Updating Standard Objects in a Project Standards Drawing from a Project Drawing on page 440.

Updating AEC project standards drawings



Process Overview: Updating AEC Standards in a Project

When a change is made to an AEC project standard, the following high-level steps need to be performed throughout the project:

1 Make a change to a standard style or display setting in a project standards drawing.

2 Version the changed style or display setting in Style Manager or Display Manager, and save or close the standards drawing. For more information, see Versioning Standards on page 435.

3 Synchronize the project, individual project drawings, or individual styles or display settings with the changed standard. For more information, see Synchronizing a Project with the Standards on page 418.

4 It is recommended that you synchronize all other project standards drawings with the change. For more information, see Synchronizing Project Standards with Each Other on page 445.

Versioning Standards

Styles and display settings in project standards drawings and project drawings have a version. The version is used to determine whether a style or display setting needs to be synchronized. The version information includes a unique GUID (Global Unique Identifier), the date and time of the last modification, the Windows login name of the user who last modified the object, and an optional comment.

Version Comparison

When a project is audited or synchronized with its standards, the comparison of the versions determines whether styles and display settings in the project are identical, older, or newer than the project standard.

Styles or display settings are considered identical to the project standards if the following are identical:

- Object type (such as Wall style or display set)
- Name
- Version GUID

For determining whether a style in a project drawing is identical to a project standard style, the GUIDs of both are compared. The GUID is a unique string that is newly created for each version of a standard object. In the project standards drawing, a list of previous GUIDs is kept as a version history to enable comparison with objects in a project drawing.

If the synchronization process finds a style or display setting in a project drawing that has the same type, name, and version GUID as the corresponding style or display setting in the project standards drawing, it concludes that the style or display setting is a standard one, and in synch with the object in the project standards drawing. In that case, no change is necessary.

If the comparison finds that the GUID in the project drawing does not match the GUID of the style in the project standards drawing, but matches a previous GUID from the standard style version list, it labels the style in the project drawing an "older version of a standard style."

If the comparison finds a style or display setting that matches a standard object in name and object type, but has a GUID not appearing in the version history of the standard style or display setting, the style or display setting in the project drawing is labeled "nonstandard (newer) version of standard object."

NOTE Synchronization does not perform a property-by-property comparison between the versions. The reason for this is that such a comparison would slow down the software considerably, and that the GUID, date and time stamp in the version information provides sufficient information to identify changes.

Creating Versions

A new version of a standard style or display setting in a project drawing is created automatically each time the style or display setting is changed in Style Manager or Display Manager.

A new version of a standard style or display setting in a project standards drawing must be created manually when the style or display setting is changed in Style Manager or Display Manager. In project standards drawings, a version history for each standard style and display setting is also stored. The version history is used during synchronization to determine if styles or display settings in project drawings match the versions in the project standards drawing, or are newer or older versions.

Versioning Exceptions for Display Settings in Project Standards Drawings

There are a few cases where modifications to the display settings will not be automatically versioned, as this will in most use cases not be a desirable effect. Some settings will routinely vary from the standards drawing, so these settings will not be included in the automatic versioning process.

- Display Configuration: Cut Plane
- Display Set: Surface Hatch on/off
- Display Set: Live Section on/off
- Wall display: wall graph toggle on/off

Version History

Standard styles and display settings in project standards drawings contain a version history for changes made to them during the project. You cannot roll back to a previous version of a standard object. The version history is only used to determine the current state of standard styles and display settings.

Change Types in Project Standards Drawings

Different types of changes you can make to project standards require different actions to be applied throughout the project.

Change Type	Actions required
Modifying a standard style or display setting	■ Version style or display setting ■ Save project standards drawing ■ Synchronize project drawings ■ Synchronize other project standards drawings (optional)
Renaming a standard style or display setting	■ Rename style or display setting ■ Save project standards drawing ■ Copy style or display setting to project drawings ■ Assign style or display settings in project drawing ■ Remove older name version from project drawings **NOTE** Renaming a style is not considered a modification to the style and cannot be synchronized.
Adding a new standard style or display setting	■ Create new style or display setting ■ Save project standards drawing ■ Copy style or display setting to project drawings ■ Copy style or display setting to other project standards drawings (optional)
Deleting a standard style or display setting	■ Verify that the style or display setting is not needed anymore in the project ■ Delete style or display setting ■ Save project standards drawing ■ Remove style or display setting from project drawings

Modifying a standard style or display setting: When you make a modification to a standard style or display setting (except for renaming), you need to synchronize the project drawings that use the style or display setting. If the standard style or display setting is used in other project standards drawings, they need to be synchronized, too.

Renaming a standard style or display setting: Renaming a style or display setting is similar to creating a new style. The previous version history of the renamed style remains. If you want to use the renamed object in a project drawing or in another project standards drawing, you need to copy it there. Any instances of the older name in a project drawing or a project standards drawing should be deleted.

Adding a new standard style or display setting: If you have added a new standard style or display setting to a standards drawing and want to use the style in a project drawing or in another project standards drawing, you need to copy it through Style Manager and Display Manager or through tool palettes to these drawings. For information on copying styles and display settings to project drawings, see Adding Standards to a Project Drawing on page 414. Once it has been copied, the new style or display setting will be included in future synchronizations.

Deleting a standard style or display setting: When you remove a standard style or display setting from a standards drawing, instances of that style in project drawings will be identified as not standardized in subsequent synchronizations. The not standardized instances should be removed from these drawings, as well.

NOTE Standard styles and display settings can only be deleted in their standards drawings. The synchronization does not delete unused standard styles or display settings.

Updating Standard Objects in a Project Standards Drawing

You can change a standard style or display setting in a project standards drawing. When a change has been made, you must version it and then synchronize the project with the change.

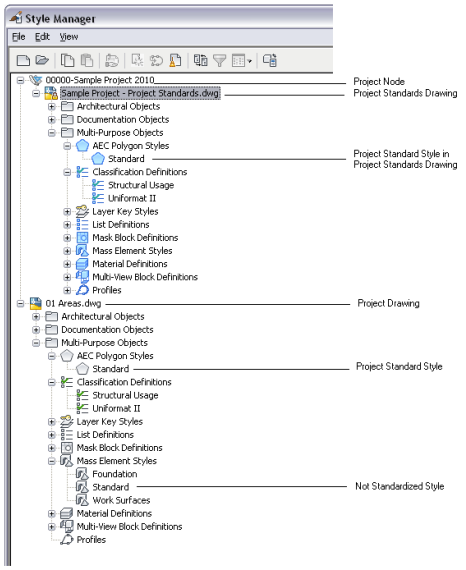
When you change a standard style or display setting directly in the standards drawing, you do not need to version every single change. Many changes may be necessary to create a standard style or display setting in its final form; to create a version for every intermediate stage would slow down the process. unnecessarily.

You can make multiple changes, save and close the drawing, reopen it, and then version the style or display setting when it is ready for propagating in the project. As long as the changes are saved to the project standards drawing, no edits will be lost, even without versioning in between.

WARNING As long as your changes are saved, but not versioned, any synchronizations taking place during that time will not recognize the styles and display settings as changed, since the object comparison is performed on the version GUID, and not the actual object properties. As a consequence, changed but unversioned styles and display settings in the project standards will not be updated in the project drawings. To have the changes synchronized with the project, you need to version the styles or display settings first.

To make changes to a project standards drawing, you must have write access to the drawing. If a standards drawing is read-only, it is marked with a Lock icon ( ) in Style Manager or Display Manager. You can make changes to that drawing, but you cannot save them. If you need to make changes to a locked drawing, contact the drawing owner or CAD manager.

Standards drawings and standard styles under the project node



Changing a standard style or display setting

1 Open a project standards drawing.

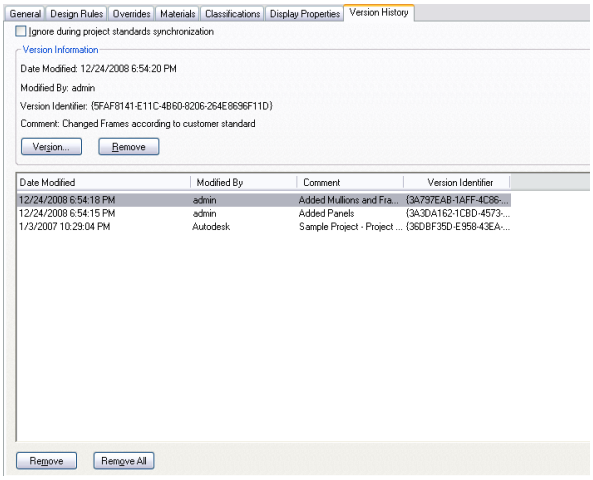
2 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

TIP All standards drawings are listed under the project node in Style Manager and Display Manager.

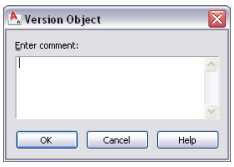
3 Select the style or display setting you want to edit, and make your changes.

Versioning changed styles and display settings

4 Click the Version History tab of the changed style or display setting.



5 Click Version.

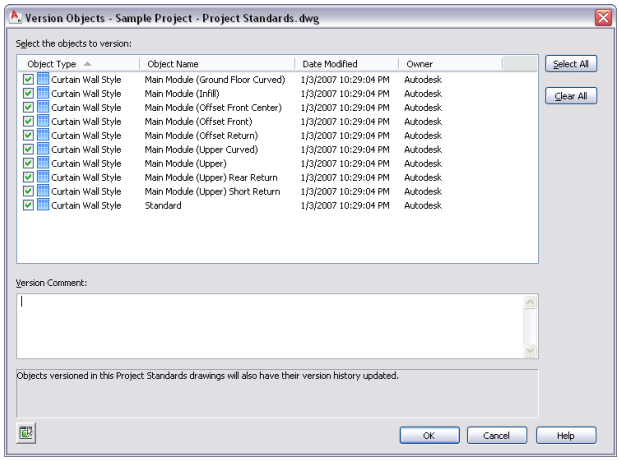


6 If necessary, enter a comment for the new version.

7 Click OK.

The new version is appended to the Version History tab.

8 To version multiple styles or display settings in a project standards drawing, select a group of objects and version them:



9 Select the styles or display settings that should be versioned.

10 If desired, enter a comment.

The comment will be applied to all objects selected for versioning.

11 Click OK.

NOTE To version all styles and display settings in a drawing, click Manage tab ➤ Project Standards panel ➤ ➤ Apply Versioning To Current Drawing.

Updating Standard Objects in a Project Standards Drawing from a Project Drawing

You can change a standard style or display setting in a project standards drawing by overwriting it with the corresponding style or display setting from a project drawing. When you have updated the project standard from a project drawing, the project needs to be synchronized to use the updated styles and display settings. For information, see Synchronizing a Project with the Standards on page 418.

NOTE Before you change a project standard from a project drawing, you should verify that this is the correct procedure. Once the project standard has been changed, the style or display setting will be updated in all project drawings during the next project synchronization, if automatic synchronization is selected.

To make changes to a standards drawing, you must have write access to the drawing. If a standards drawing is read-only, it is marked with a Lock icon ( ) in Style Manager or Display Manager. You can make changes to that drawing, but you cannot save them. If you need to make changes to a locked drawing, contact the drawing owner or CAD manager.

1 Open a project drawing from Project Navigator.

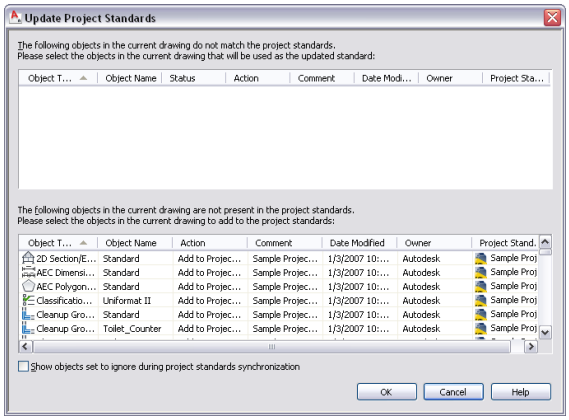
2 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

3 Expand the node of the project drawing, and select the standard style or display setting with which you want to update the project standards.

NOTE A standard style or display setting in a project drawing is marked with a blue icon. If a style or display setting is displayed with a gray icon, it is not a standard style or display setting. In that case, you can add it to the project standards, as described in Adding Standard Objects from a Project Drawing to a Project Standards Drawing on page 441.

4 Right-click, and click Update Standards from Drawing.

NOTE You can select multiple objects here.



The selected style or display setting is listed in the top panel.

5 To update the project standards from a style or display setting in the project drawing, select Update Project Standards from the Action drop-down list of the style or display setting.

6 To not update the project standards from a style or display setting in the project drawing, select Do not Update Project Standards from the Action drop-down list of the style or display setting.

In this case, the version in the project standards is not overwritten with the version in the project drawing. During the next synchronization of the project drawing, the style or display setting will be displayed as out of synch with the project standards.

7 To ignore the out of synch version of the style or display setting, select Ignore from the Action drop-down list.

In this case, the style or display setting will not be displayed in future updates, except when you select Show objects set to ignore during project standards synchronization or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

8 Click OK.

9 In Style Manager or Display Manager, click OK or Apply.

10 Click Yes to save the updated project standards drawing.

Adding Standard Objects from a Project Drawing to a Project Standards Drawing

You can add not standardized styles or display settings from the current project drawing to the project standards. You can do this, for example, if you have created a complex style in a project drawing and want to include that in your standards.

If you want to add a style to the project standards in this way, in addition to copying the style to the standards drawing you need to verify that the style type in question has been selected for that standards drawing in the project configuration. Otherwise, it will not be used as a standard. For example, if you copy a wall style from a project drawing to the standards drawing “Standards 1.dwg,” you need to make sure that in the

project configuration the Wall Style type has been checked for “Standards 1.dwg.” For more information, see Setting up Standard Styles and Display Settings on page 394.

After copying a style or display setting to the project standards, you need to synchronize the project to use the new standard object.

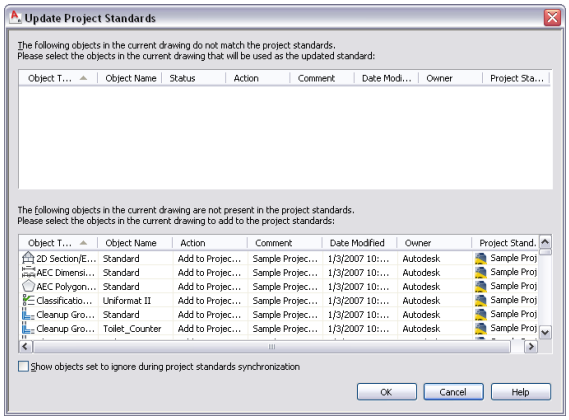
1 Open a project drawing from Project Navigator.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

3 Add a new style or display setting to the current project drawing.

4 Select the new style or display setting, right-click, and click Update Standards from Drawing.

NOTE You can select multiple items here.



The new style or display setting is listed in the lower panel, which displays styles and display settings in the project drawing that do not exist in the project standards.

5 To add the style or display setting to a project standards drawing, and thereby make it a standard style or display setting, select Add to Project Standards in the Action drop-down list.

NOTE If you are adding a display setting to the project standards, it is added to the display standards drawing. If you are adding a style to the project standards, it is added to the first project standards drawing in the search order that has been associated with that style type in the project standards configuration, as described in Setting up Standard Styles and Display Settings on page 394.

6 To skip over the not standardized style or display setting select Skip from the Action drop-down list.

In this case, the not standardized object remains in the project drawing, and is not entered in the standards.

7 To ignore the style or display setting, select Ignore from the Action drop-down list.

In this case, the not standardized object will not be listed again in future updates, except if you select Show objects set to ignore during project standards synchronization or remove the Ignore flag from the style or display setting in Style Manager or Display Manager, as described in Excluding Styles and Display Settings from Synchronization on page 429.

8 Click OK.

9 In Style Manager or Display Manager, click OK or Apply.

10 Click Yes to save the updated project standards drawing.

Editing the Version History of a Standard Object

Each style and display setting in a project standards drawing has a version history. The version history displays the unique version identifier (GUID), date and time of the modification, user name and any additional comments entered by the user.

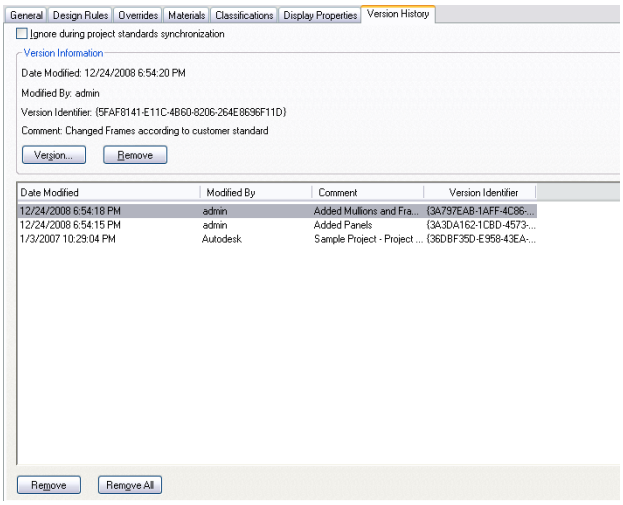
You can edit the history by selectively removing individual versions, or removing all versions.

1 Open a project standards drawing.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

3 Select the standard style from the project standards node of the tree.

4 Click the Version History tab.



5 To add a new version, click Version, and enter the versioning information.

6 To remove an existing version, select the version from the Version History list, and click Remove.

To remove all versions in one step, click Remove All.

7 If you want the style or display setting to be ignored during synchronization of standards, select Ignore during project standards synchronization.

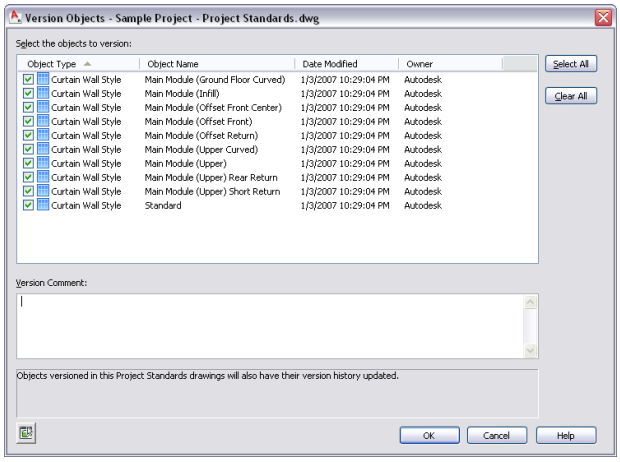
8 Click OK.

Versioning a Project Standards Drawing

You can version all styles and display settings in a project standards drawing in a one step.

1 Open a project standards drawing.

2 Click Manage tab ➤ Project Standards panel ➤ ➤ Apply Versioning To Current Drawing.



3 Select the styles or display settings that should be versioned.

4 If desired, enter a comment.

The comment will be applied to all objects selected for versioning.

5 Click OK.

Purging the Version History from a Project Standards Drawing

You can remove the version history from all standard styles and display settings in a project standards drawing with one command. Purging the version history will remove all versions except the current one from the standard styles and display settings. You can do that to avoid cluttering your styles and display settings.

When you purge the version history, no version GUID except for the current one remains. That means that the synchronization can no longer distinguish between an older version of a standard style and a non standard version of a style. Each style in a project drawing that does not have the current GUID of the corresponding standard style, will be labeled a "non-standard," or newer version.

1 Verify that the project with which the project standards drawing is associated is the current project.

2 Open the Project Standards drawing from which you want to purge the version history.

NOTE Project standards drawings do not appear on the Project Navigator. You need to open them by clicking ➤ Open ➤ Drawing.

3 On the command line, enter **AecClearVersionHistory**.

The version history is removed from all standard styles and display settings in the drawing.

Purging the Version Information from a Project Standards Drawing

You can remove the version information from all standard styles and display settings in a project standards drawing. When you remove the version information, the version history and the current version information is deleted.

When you run a synchronization, the standard style or display setting still participates in the synchronization and is considered the latest version when comparing with versions of the object in project drawings. No

attempt is made during synchronization to automatically create a version GUID or history list. If you want to add version information to the standard style or display setting, you need to manually version the object as described in Updating Standard Objects in a Project Standards Drawing on page 438.

1 Verify that the project with which the project standards drawing is associated is set current.

2 Open the project standards drawing from which you want to remove the version information.

NOTE Project standards drawings do not appear on the Project Navigator. You need to open them by clicking ➤ Open ➤ Drawing.

3 On the command line, enter **AecPurgeVersion**.

The version information is removed from all standard styles and display settings in the drawing.

NOTE To re-add a version to all styles or display settings in the drawing, open Style Manager or Display Manager, select the drawing in the tree, right-click, and click Version Drawing.

Synchronizing Project Standards with Each Other

Project standard styles and display settings can be distributed among multiple standards drawings, and depend on each other. For example, the styles in a styles drawing should use the display settings from the standard display drawing. If display changes are introduced in a standard styles drawing, and not synchronized with the standard display drawing, styles can display inconsistently across the project. Therefore, you should synchronize project standards drawings with each other when changes have been made to individual standards drawings.

You can synchronize project standards drawings among themselves either from the project standards node in Style Manager and Display Manager, or from the CAD Manager menu.

When project standards drawings are synchronized among themselves, the following criteria are used to determine how the objects are updated:

- Standards drawing type: The display settings in the Standards display drawing update the display settings in all standard styles drawings.
- Assigned style types: When a drawing has been associated with a style type in the standards configuration setup, the styles in this drawing will update all other standards drawings that may contain standard styles of that type. For example, if the standards drawing “Door Styles.dwg” has been associated with the Door style type, the styles in that drawing will overwrite any existing door standard styles in all of the other standards drawings. Note that in most cases, you will not place standard styles anywhere but in the designated standards drawing for that style type.
- Search order: When more than one standards drawings in the standards configuration setup have been associated with a style type, the first standards drawing in the search order will update all other drawings associated with that style type.

Synchronizing project standards drawings among themselves is an automatic synchronization process, where no user interaction is possible. That means that no styles or display settings can be excluded from the synchronization process.

1 Verify that the project of which you want to synchronize the standards is the current project.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager or Display Manager .

3 Select the project node in the tree view, right-click, and click Synchronize Project Standards Drawings.

4 When the synchronization is finished, click OK to exit Style Manager or Display Manager.

NOTE Alternatively, you can click Manage tab ➤ Project Standards panel ➤ ➤ Synchronize Project Standards .

Editing Project Standards Drawings Outside the Project

You can edit project standards drawings outside the current project. This could happen, if you need to work offline, without access to the project, or if you want to work on a project standards drawing that is not part of the current project.

The following high-level steps are necessary to edit a project standards drawing outside of a project:

1 If necessary, copy the project standards drawing to an offline location outside the project.

2 Open the project standards drawing, and open Style Manager or Display Manager.

3 Edit the styles or display settings as necessary.

NOTE If the style or display setting you are editing already has a version history within the project, the version history is displayed in Style Manager or Display Manager.

4 Upon closing Style Manager or Display Manager, you are prompted to version changed styles or display settings. Version them just like you would within the project.

5 Save and close the project standards drawing.

6 If necessary, copy the project standards drawing back to the project.

7 Set the project current, and start a synchronization to propagate the changed styles and display settings to the project.

Scripting Project Standards Commands

Commands can help you automate the standards in your project by scripting your workflows and processes. The following commands are available for the project standards feature:

Command	Description
AecProjectStandards	Launches the Configure AEC Project Standards dialog box for the current project. For more information, see Configuring Project Standards on page 393.
AecSynchronizeProjectDrawing	Synchronizes the current drawing with the project standards. **TIP** To run this command without user interaction, make sure the automatic synchronization option is selected, as described in Setting up Synchronization of AEC Standards on page 399.
AecSynchronizeProject	Synchronizes the current project with the project standards. **TIP** To run this command without user interaction, make sure the automatic synchronization option is selected, as described in Setting up Synchronization of AEC Standards on page 399.
AecAuditProjectDrawing	Audits the current drawing against the project standards. For more information, see Auditing a Project or a Drawing on page 431

Command	Description
AecAuditProject	Audits the current project against the project standards. For more information, see Auditing a Project or a Drawing on page 431
AecShowObjectDisplayOverrides	Identifies objects in the current drawing that have their display properties overridden at the object level. For more information, see Showing Display Overrides in Project Drawings on page 432.
AecVersionModifiedObjects	Versions all modified styles and display settings in the current drawing. For more information, see Updating Standard Objects in a Project Standards Drawing on page 438. **NOTE** This command works only with project standards drawings.
AecProjectStandardsSetupReport	Generates a tracking report for the project standards setup. For more information, see Generating a Project Standards Setup Report on page 402.
AecUpdateStandards	Updates the project standards with the styles and display settings from the current drawing. For more information, see Updating Standard Objects in a Project Standards Drawing from a Project Drawing on page 440.
AecPurgeVersion	Purges the version information from all styles and display settings in the current drawing. For more information, see Purging the Version Information from a Project Standards Drawing on page 444. **NOTE** This command works only with project standards drawings.
AecClearVersionHistory	Purges the version history from all styles and display settings in the current drawing, except for the current version. For more information, see Purging the Version History from a Project Standards Drawing on page 444. **NOTE** This command works only with project standards drawings.
AecSynchronizeStandards	Synchronizes the project standards drawings of the current project among themselves. For more information, see Synchronizing Project Standards with Each Other on page 445.
AecUpdateProjectCADStandards	Updates the project's CAD Standards Batch Standards Checker CHX file. It also updates the CAD Standards file associations with each drawing in the current project.

NOTE The commands for the Drawing Management feature can also be useful for creating scripts for project standards. For more information, see Drawing Management Commands on page 375.

Drawing Compare

8

An efficient review of drawings and revisions is key as you move through the design, development, and construction phases of a project. The Drawing Compare feature makes it easier and faster to compare versions of drawings visually and review proposed changes. In addition to AutoCAD Architecture, Drawing Compare also allows you to compare drawings from AutoCAD®, Revit MEP, Revit Architecture, and Revit Structure.

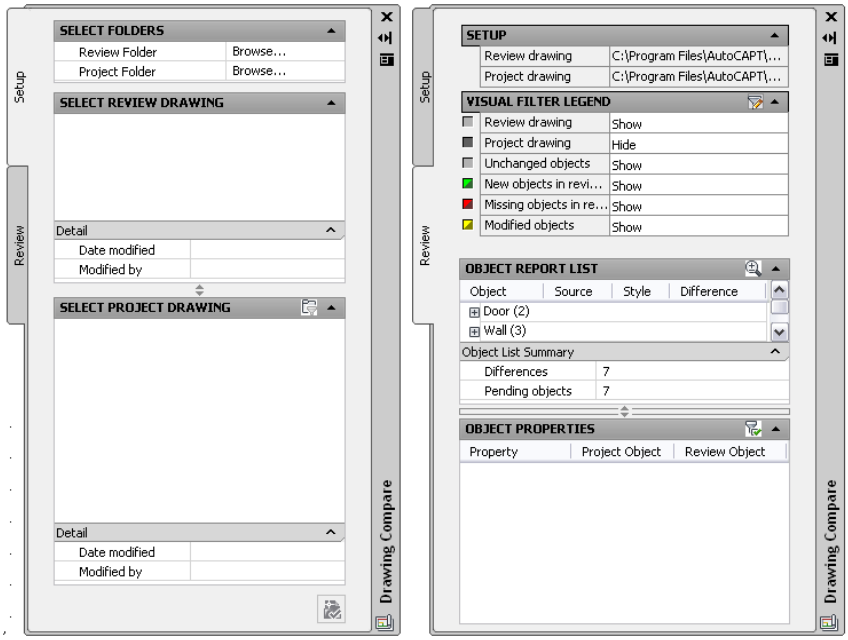
Overview of Drawing Compare

A typical project requires multiple reviews as you produce drawings and add supplemental information. Drawing Compare compares review drawings to project drawings. The original drawings are the project drawings. The drawings that are revised and ready for evaluation are the review drawings.

The comparison process is like how drawings were compared when they were received on tracing paper or Mylar sheets and then overlaid on the original project drawings. Drawing Compare displays informational data about the objects in your drawing as well as displaying the graphical changes on the drawing screen.

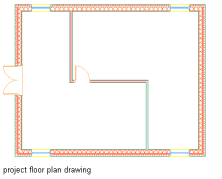
You select the review drawings and compare each to its corresponding project drawing on the Setup tab of the Drawing Compare palette. After the comparison, you view the results on the Review tab of the Drawing Compare palette and in the drawing area.

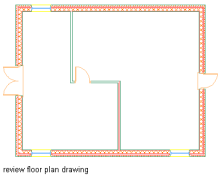
Drawing Compare identifies objects that have been modified, added, or removed in the review drawings. Based on the status of the objects (modified, new, or missing), colors are assigned, and a list of the changes is generated.



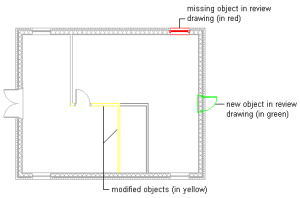
Drawing Compare palette

In the following example, a simple floor plan was modified to show what information Drawing Compare displays during a comparison session. The review drawing shows that changes to the project drawing include moving the lower vertical interior wall segment to the left (resulting in a shorter horizontal interior wall segment), adding an exterior door to the right exterior wall segment, and removing a window from the upper exterior wall segment.

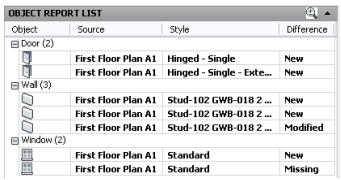




When the drawings are compared, color-coded changes are displayed, based on the type of change.



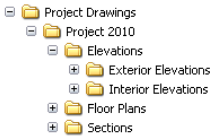
Information about changes is also displayed in the Object Report List on the Review tab.



File Organization for Drawing Compare

AutoCAD Architecture projects (the drawing management feature) provide automated tools to aid in the management, viewing, and construction of a building. Although it is not necessary for your drawings to be in a structured project, Drawing Compare works best when they are. When you are working in a project environment, Drawing Compare recognizes the Autodesk Project Information (APJ) file that identifies the collection of drawing files as being organized in a project. For more information about managing drawings in projects, see Workflow for a Project Environment on page 199. Different people on the team can access, share, and redirect project and review drawings in top-level folders in a project setting. For more information, see Working with Design Teams Located Remotely on page 212.

If you are not working with a structured project in AutoCAD Architecture, organize original drawings in project folders, and organize the revised drawings for review in review folders. The project drawings must all be contained within the same top-level folder to provide the correct context to perform the comparison. You specify these source folders for both Project and Review folders when you start Drawing Compare. Your drawings may be loosely organized as plans, elevations, and sections and look like this:



General Guidelines for Comparing Drawings

Drawing Compare only works in model space. If a drawing selected for comparison was saved in paper space, Drawing Compare automatically switches to the model tab. Because the content of sheets is exclusive to paper space, Drawing Compare does not display sheets in the list of project drawings in the Select Project Drawing pane.

Drawing Compare creates a snapshot of current drawing conditions. If you make changes, such as modifying project entities or changing the annotation scale while the review process is active, the results of the changes do not display until you run a new comparison.

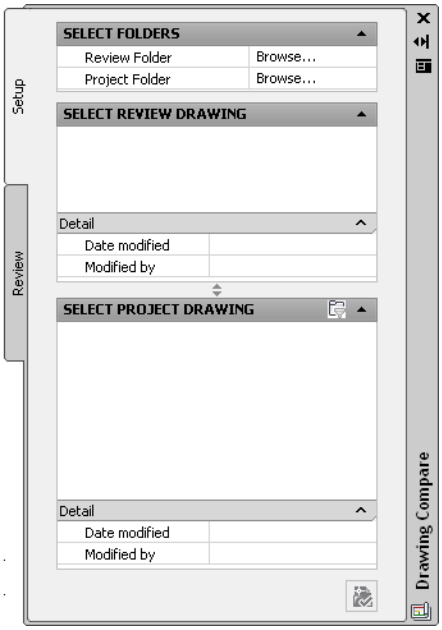
During a Drawing Compare session, the drawing open on your screen is the project drawing with a screened image of the review drawing overlaid. Any changes you make are made in the project drawing. You can save changes you make to this project drawing, but you cannot merge review drawings with project drawings or modify review drawings.

Drawing Compare is not an integration tool. After the Drawing Compare process is complete and differences between the drawings are compiled, review drawings are not automatically integrated into your project. You are responsible for manually integrating and copying review drawings and all of their associated files (xref and image files, for example) to their appropriate locations.

IMPORTANT The data collected from the comparison is not saved. When you exit Drawing Compare, the results of the comparison are discarded.

Starting a Drawing Compare Session

The Setup tab of the Drawing Compare palette is where you specify the context in which drawings are matched and analyzed. Under Select Folders, the review folder contains updated or revised drawings, and the project folder contains the original version of the drawing files. All the project drawings must be contained within the same top-level folder to provide the correct context. For more information, see File Organization for Drawing Compare on page 451.



The matching and analyzing process looks at each review drawing to verify whether it is a modified version of a project drawing. If so, the 2 drawing files are matched. For more information, see General Guidelines for Comparing Drawings on page 451.

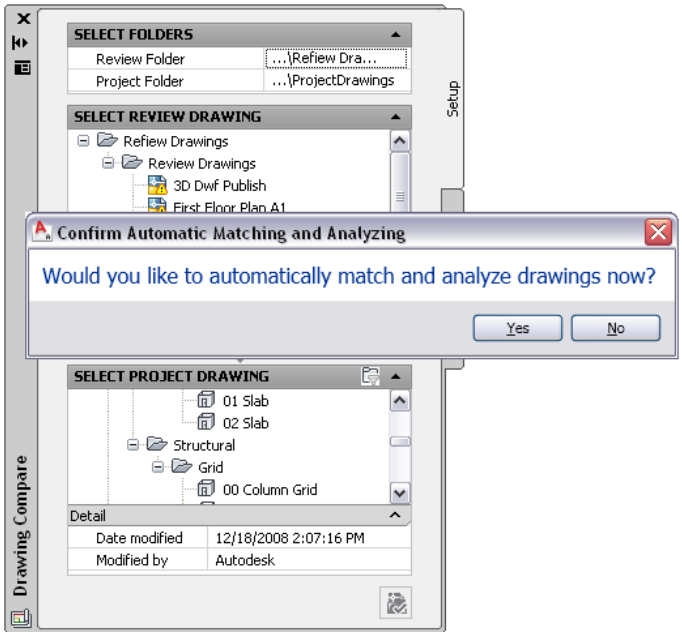
1 Click ➤ Utilities ➤ Drawing Compare.

2 On the Setup tab, for Review Folder, click Browse , navigate to the folder containing project drawings, and select it.

Drawing files in this folder are displayed alphabetically in the Select Review Drawing pane. These files include host drawings and any drawings nested within them as external references (xrefs).

3 For Project Folder, click Browse , navigate to the folder containing project drawings, and select it.

The Confirm Automatic Matching and Analyzing dialog displays.



NOTE The automatic matching and analyzing option is strongly recommended for most use cases. Match drawings manually only when a review drawing has been renamed, or if you want to compare a smaller set of drawings.

4 Match review drawings to project drawings.

If you want to…	Then…
let Drawing Compare automatically match all the review drawings against all of the project drawings in these folders	click Yes. The Automatically Matching and Analyzing Drawings progress bar displays. The software matches drawings by file name.
select a different project folder for Project Folder before automatically matching	click No, and under Select Folders, browse to the folder that contains project drawings for Project Folder. Click Yes when the Confirm Automatic Matching and Analyzing dialog displays.

You can also selectively match drawings:

If you want to…	Then…
select specific drawings/folder for automatic matching	click No, and in the Select Review Drawing pane, right-click the drawings or drawing folder to be matched, and select Automatically Match.
match drawings manually	click No, and in the Select Review Drawing pane, select a drawing, and drag it onto a drawing in the Select Project Drawing pane. When you manually match drawings with different names, a relationship is established between the drawings. This affects what displays when you use the filter mode for the Project folder.

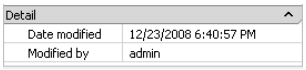
If you want to…	Then…
exclude specific drawings from matching	click No. In the Select Review Drawing pane, right-click the drawings or drawing folder to be excluded, and clear Include in Comparison. **NOTE** If you choose to exclude drawings from a comparison, objects in excluded drawings will appear as unmodified after the comparison. This allows you to focus on a smaller, more manageable set of modifications. A file excluded from a comparison will act as if it, and all its xrefs, are exact copies of the originals. Objects in excluded files (or xrefed by excluded files) will appear as unmodified. You should exclude files that you do not want to include in a comparison.

NOTE Architectural Desktop R14 drawings or earlier versions may not match automatically, but they can still be compared. You can either update the older drawings by saving them in the 2007 format, or you can match them manually.

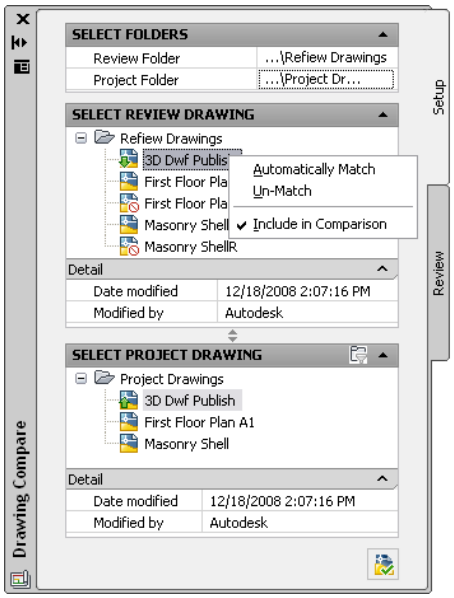
After project and review drawings have been matched, icons next to the drawing name indicate status of the drawings as follows:

Icon	Description
	No match attempted yet. This is the initial state of all review drawings.
	A review drawing is matched but is not selected.
	A review drawing that is matched and selected.
	A project drawing for which a matched review drawing is selected.
	No match for a review drawing is found.
	A review drawing that was specifically excluded from comparison by the user.

The date the selected drawing file was modified and the name of the person who made the modifications displays when you select a drawing from the review or project folder.



5 If desired, the drawings in the Review folder can be reset from matched to unmatched. This undoes an incorrect or inadvertent match, removing the match relationship.



- You can un-match all review drawings at once by selecting the top-level folder in the Select Review Drawing pane, right-clicking, and clicking Un-Match All.
- You can un-match a single review drawing by selecting the drawing, right-clicking, and clicking Un-Match.

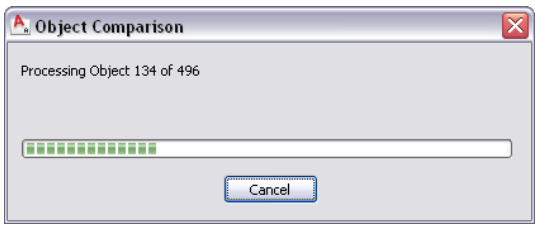
6 If you want to set up a filter for results, select any drawing in the Select Review Drawing pane, and click on the Select Project Drawing title bar.

With the filter on, drawings in the project folder are filtered to display only those drawings that were matched to the drawing selected in the review folder and any project drawings into which the selected review drawing is xrefed. When you turn the filter mode off, all of the drawings in the project folder are listed.

7 Begin a comparison using one of the following methods.

- Select a review drawing from the Select Review Drawing pane, select a project drawing from the Select Project Drawing pane, right-click, and click Begin comparison from this drawing.
- Select a review drawing from the Select Review Drawing pane, select a project drawing from the Select Project Drawing pane, then click (Start Drawing Comparison) at the bottom of the tab.
- Select a review drawing from the Select Review Drawing pane, double-click the project drawing from the Select Project Drawing pane.

The Object Comparison progress bar displays the number of objects being compared as they are processed. For results to be generated, always allow the Drawing Compare process to finish. For more information, see Reviewing the Results of a Drawing Compare Session on page 456.

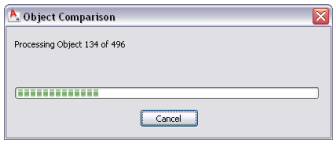


IMPORTANT Although you can use the AutoCAD Undo command while working in a drawing, you cannot use it to undo any actions specific to Drawing Compare.

After the comparison is complete, the Review tab of the Drawing Compare palette displays along with a separate Drawing Compare panel. For more information, see Reviewing the Results of a Drawing Compare Session on page 456.

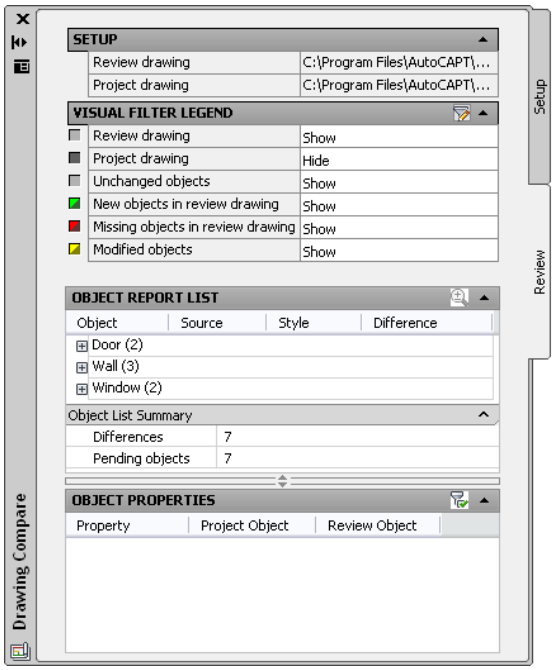
Reviewing the Results of a Drawing Compare Session

After you begin a comparison between a review drawing and a project drawing (see Starting a Drawing Compare Session on page 452), the Object Comparison progress indicator displays as shown.



When all objects in the drawings have been compared, the following events occur:

- The Review tab of the Drawing Compare palette becomes active. This tab has a legend for the colors used in the drawing area and lists all objects for which differences were found. Select an object in the list to view a comparative list of its properties in both drawings (and optionally zoom in on the object in the drawing area).



- Comparison results are shown graphically in the drawing area, with review drawing geometry overlaid on the project drawing. Objects for which differences were found display in color according to the Visual Filter Legend on the Review tab. For more information, see Creating a Visual Filter on page 460.

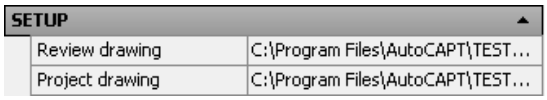
- The Drawing Compare panel displays on the Home tab, providing a set of tools for reviewing comparison results.

Icon	Description
	Ends a Drawing Compare session. There is no Undo option for exiting Drawing Compare, and the compiled data is not saved. There is no way to recapture the information you were reviewing without beginning a new comparison.
	Plots a Drawing Compare session. You can publish the current comparison results (based on the current display system, layers, and filter settings) of the review drawing to 2D DWF or plot with foreground plotting. For more information, see Publishing Drawings to DWF and DWFx on page 181 and "Plot and Publish Drawings" in AutoCAD Help. **NOTE** Foreground plotting is used by default; background plotting is disabled when the plot button is selected. If you choose to plot or publish using background plotting, your comparison results will not be plotted, and you will lose the themed results.
	Selects the previous or next object in the Object Report List, and zooms in on the object in the drawing area if the Zoom to option is activated.
	Selects an object in the drawing area and highlights it in the Object Report List.
	Activates/deactivates the Zoom to option. Activate this option to move forward and back through objects in the Object Report List.
	Hides/displays the Drawing Compare palette. You can minimize the Drawing Compare palette and use the Drawing Compare panel on the Home tab of the ribbon to navigate when viewing objects. Expand the palette when necessary to review information about objects and properties.

Using the Review Tab

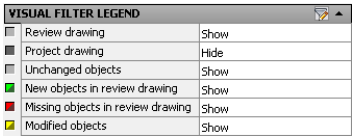
The Review tab of the Drawing Compare palette lets you review the results of a Drawing Compare session on an object-by-object basis. It also provides a mechanism for filtering the display in the drawing area to show/hide certain categories of objects or an entire drawing. The tab includes the following sections.

- **Setup:** This section displays the full paths for the review and project drawings that are being compared. If multiple comparisons are active, this information updates as you switch between drawings.

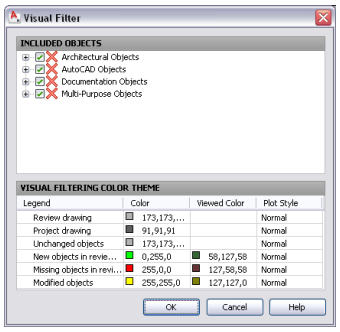


- **Visual Filter Legend:** The Visual Filter Legend identifies the colors used to indicate different categories of drawings and objects. You can switch the Hide/Show settings to control what will be visible in the drawing area. The icons for new, missing, and modified objects show 2 colors: the color in the upper-left corner of the icon is used for objects that have not been viewed; the color at the lower right is used for objects that have been viewed.
  When you start a Drawing Compare session, the last used filter from the previous session is still in effect. To change the colors or plot styles for any of the categories in the legend, click the Edit Visual Filter icon

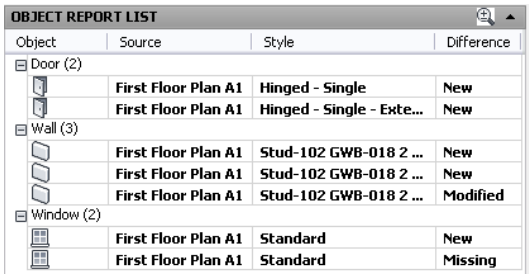
( ) on the Visual Filter Legend title bar to open the Visual Filter dialog. For more information, see Creating a Visual Filter on page 460.



- **Visual Filter:** The Visual Filter dialog displays after you click the Edit Visual Filter icon ( ) on the Visual Filter Legend title bar. It allows you to specify filters that affect how objects display during your Drawing Compare session.
  Select which objects will be compared under Included Objects. For example, you can set up a visual filter to include only modified windows to be included in the comparison. All other objects would display as unchanged. Under Visual Filtering Color Theme, you can adjust the color schemes and assign plot styles to different groups of objects, such as all modified windows. The Color column lists the colors for pending objects before they are selected. The Viewed Color column lists the colors for objects after they are selected. For more information, see Creating a Visual Filter on page 460.



- **Object Report List:** Objects that changed in the selected review drawing are listed alphabetically by categories, such as Circle, Door, Multi-View Block, and Polyline. All the information is in bold text initially, indicating objects as pending (not yet viewed). After an object is viewed, the associated information displays as normal text.

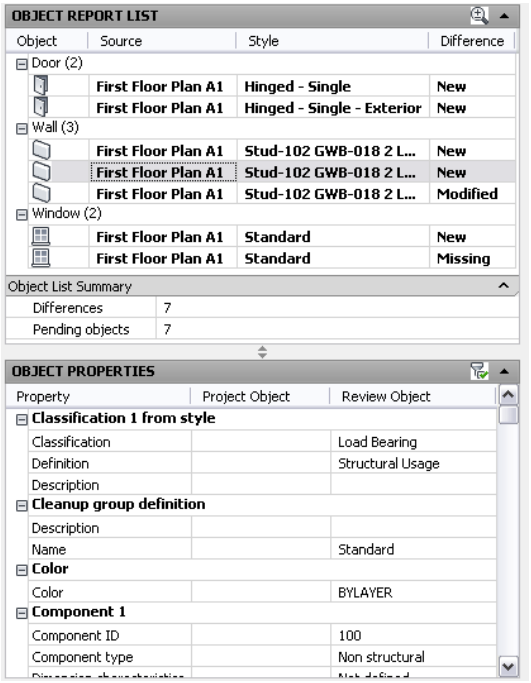


Select objects from the list to reset their status to pending or to viewed. Use the *SHIFT* key to select multiple objects and the *CTRL* key to select objects one at a time, right-clicking, and clicking Reset to pending or Mark as viewed. Resetting the objects changes the text style on the Object Report List and updates values in the Object List Summary.

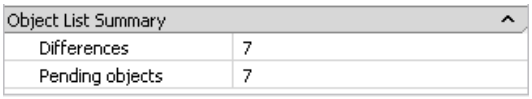
The option to zoom in on an object turns on and off when you click the Activate/Deactivate Zoom to icon ( ) on the Object Report List title bar or on the Drawing Compare panel. The software zooms into an object automatically after you select it in the Object Report List when this option is turned on.

When you select changed objects in the drawing area, the object is highlighted in the Object Report List. When you hold the cursor over new or modified objects in the drawing, a lock icon indicates that these objects cannot be changed.

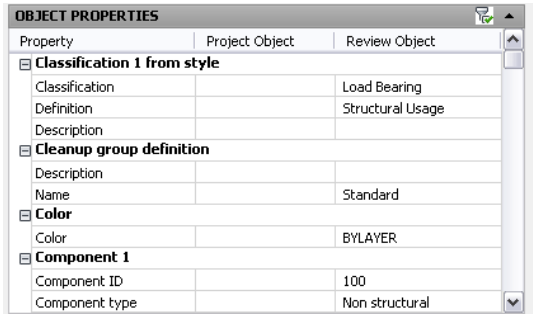
The Object Report List works hand-in-hand with the Object List Summary and the Object Properties. When you select an object from the Report List, the number of Pending objects changes, and the properties of the object display under Object Properties.



- **Object List Summary:** This summary displays the total number of objects changed and the total number of objects waiting to be viewed. In the following example, a total of 209 objects changed in the review drawing in some way, and 7 of these were reviewed, leaving 202 objects still pending; that is, not yet selected in the Object Report List. As you change the status of objects in the Object Report List, the number of Pending objects decreases or increases accordingly.



- **Object Properties:** This option is on by default and displays properties that have changed for the object that is selected in the Object Report List. If you want to view all properties of the selected object, click the Display properties for reviewed objects icon ( ) on the Object Properties title bar to turn it off. If the object is missing, data is listed in the Project Object column only. If the object is new, data is listed in the Review Object column only. For modified objects, both project and review properties display.



Creating a Visual Filter

Use this procedure when you want to create a filter that controls which objects display and how they display during a review session. The changes you make on the worksheet are applied to the drawing and the Visual Filter Legend after you click OK.

1 On the Review tab, click the Edit Visual Filter button ( ).

2 On the Visual Filter dialog, in the Included Objects pane, select or clear the objects as needed to specify which ones will display.

TIP The context menu includes options to Clear All or Select All objects.

3 Specify settings for the visual filtering color theme:

If you want to…	Then click the
change the primary color of object groups pending review	under Color to display the Select Color dialog box, select the primary color to appear on the icon, and click OK.
change the secondary color of object groups after they are selected and viewed	under Viewed Color to display the Select Color dialog box, select the secondary color to appear on the icon, and click OK.
select a plot style	under Plot Style to display the Select Plot Style dialog box, select the plot style for the object group, and click OK. **NOTE** No options are listed for drawings that use the CTB plot style. If the STB style is used, you can change the color and pen thickness for this group of objects. For more information about plot styles, see "Change Plot Style Settings" in AutoCAD Help.

4 Click OK.

Drawing Compare Commands

You can run certain Drawing Compare commands from the command line.

- To open the Drawing Compare palette, enter **DwgCompare** at the command line.
- To open the Visual Filter dialog (when the Review tab is current), enter **VisualFilter**.

Frequently Asked Questions about Drawing Compare

Question: When I copy an object from a project drawing to a review drawing and then start a Drawing Compare session, I would expect that the copied object would be identified as unchanged. However, the copied object is identified as new and missing. Why is this?

Answer: Drawing Compare uses object handles to match objects in review drawings to objects in the project drawings. When an object is copied from one drawing to another, it is assigned a new object handle and is identified as a new version of the object. This results in the object being identified as missing in the project drawing and new in the review drawing.

Question: When I run a Drawing Compare session, objects that I know have been altered are not identified as modified. What causes this situation?

Answer: Check the Visual Filter worksheet and verify that the objects in question are not excluded from the Drawing Compare review. In the Included Objects section, expand each list of objects and select the appropriate objects for inclusion in the Drawing Compare review if necessary. If the properties that have been modified are annotation scale-dependent, they may not have been modified at the current annotation scale.

Drawing Compare uses the current model space annotation scale from the project drawing when comparing drawings. Annotative entities that do not support the current scale are still compared, but properties that can vary by scale representation will be identified as "Missing scale representation." Properties that never vary by scale representation are always identified with their actual values. For any specific annotative entity, Drawing Compare will compare all its non-annotative properties as well as those scale-specific properties that are associated with the current annotation scale.

Non-annotative entities will always appear at the same size and rotation and will have the same property values regardless of the current annotation scale.

Question: I expect the Drawing Compare feature to zoom to each object that I select in the Object Report List, but this is not happening. Why?

Answer: The following reasons may apply:

- You may have clicked the Zoom to button and toggled off the option.
- You may be in the middle of a command. Click the Zoom to button again to toggle the option on, or end the command that you started to return to your Drawing Compare session.
- The selected object is not currently visible because of layer or display system settings. A message displays on the command line when a non-visible object is selected from the Object Report List.

Question: My Drawing Comparison results identify xrefs that are new and missing, but I expect these xrefs to be identified as unchanged or modified. Why is this?

Answer: Drawing Compare uses object handles to match objects in review drawings to objects in the project drawings. If the xref has been detached, then reattached, the xref is assigned a different object handle and is identified as a new version of the xref. This results in the xref being identified as new in the review drawing and missing in the project drawing.

Question: After drawings from review and project folders are matched automatically, some of the drawings are still identified as unmatched even though these drawings in question share the same name. How can this be?

Answer: The drawing names may be the same, but the individual drawing internal IDs are different. This can occur, for example, when a drawing is W-blocked into a new drawing. Different drawing internal IDs are also assigned to AutoCAD Architecture or Revit Architecture drawings when they are exported to AutoCAD.

NOTE Using the Save or Save As commands does not alter a drawing's internal ID.

Question: Why is my Select Project Drawing list empty after I select a project folder?

Answer: This occurs when the Project Drawing filter is toggled on and either no review drawing has been selected or the selected review drawing is not matched with a project drawing.

Question: Why do I not see the drawings that have been recently added to the project or review folder?

Answer: Folder contents are not automatically updated when drawings are added or removed. To update folder contents after they have been changed, reselect the appropriate folder.

Question: I see an external block reference identified in the Object Report List as new, modified, or missing, yet this external block reference does not appear graphically with any color assigned by the Visual Filter settings. What causes this problem?

Answer: External block references cannot have Visual Filter settings assigned to them. This is to ensure that the modifications to underlying objects within the external block reference are assigned colors according to the Visual Filter settings.

Question: Objects that have had their display settings modified are not identified in the Object Report List as modified. Why is this?

Answer: The Drawing Compare process does not review display settings for objects. Only the property and style settings of objects are reviewed.

Question: When comparing drawings exported from Revit Architecture or Revit Structure, I notice that a simple modification that I made to an object in these drawings results in numerous differences in associated objects. Why?

Answer: Each Revit object may be exported as separate objects, each of which may show up as a separate modification.

Question: Why do I have to always manually match drawings exported from Revit Architecture?

Answer: A new internal drawing ID is automatically assigned to each drawing file exported from Revit Architecture.

Layer Management

9

Enhanced layer management helps you to create, view, and modify the numerous and diverse elements of architectural plans. Use the Layer Properties Manager in AutoCAD Architecture to effectively organize and manage conceptual groupings in a drawing.

Layer Management

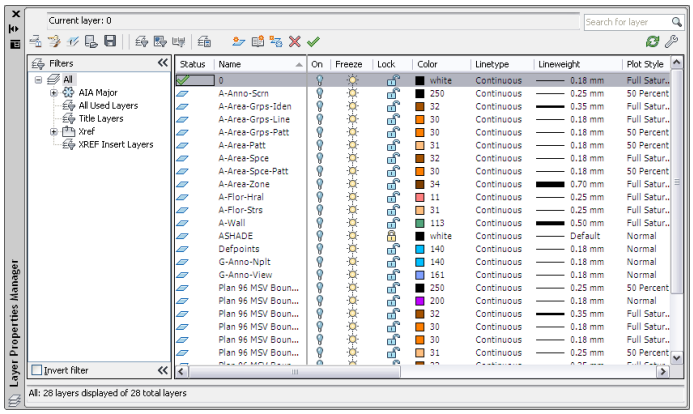
Layer Properties Manager

The Layer Properties Manager helps you organize, sort, and group layers, and allows you to work with layer standards, layer key styles, layer filters, layer overrides, and saved layer states.

In the Layer Properties Manager you can perform all activities related to layers:

- Create, rename, and delete layers
- Set and change layer properties
- Make a layer current
- Work with layer standards and layer key styles
- Create layer groups and layer filters
- Create layer overrides for layout viewports
- Get notified about new layers in the drawing and its xrefs
- Save and restore layer states

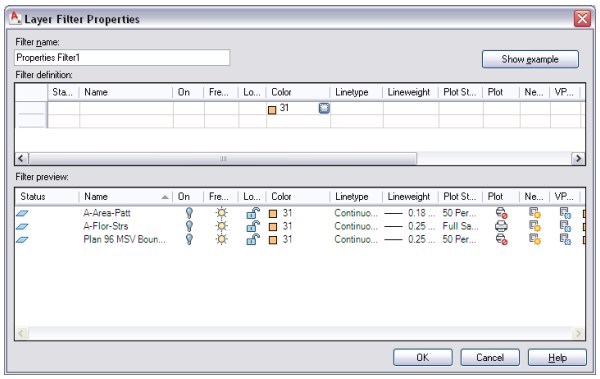
When you display the Layer Properties Manager, all the layers in the current drawing are displayed in the All layer group. If there are any external reference files linked to the drawing, the layers are listed in a separate layer group, listed by referenced drawing.



Layer Filters

You can create layer filters to manage large sets of layers. The Layer Properties Manager allows you to create three types of layer filters: group filters, property filters, and layer standards filters. Property filters group layers based on layer properties and states, like for example visibility or color. Group filters contain any layers that you put in them. Standards filters contain layers associated with a specified layer standards category.

Creating a layer properties filter

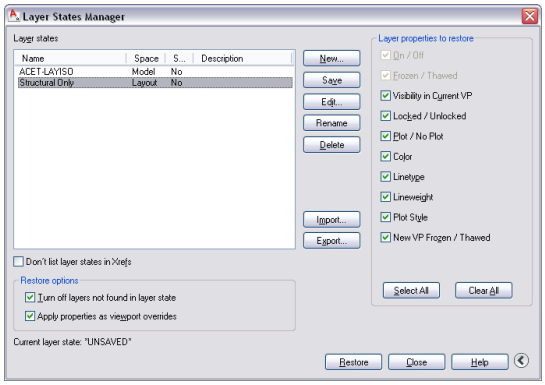


Layer States

You can save the current layer settings in a drawing as a layer state and restore this layer configuration later. Saving layer states is convenient if you need to return to particular settings for all layers during different stages in completing a drawing or for plotting.

Layer settings include layer states, such as on or locked, and layer properties, such as color or linetype. In a saved layer state, you can choose which layer states and layer properties you want to restore later. For example, you can choose to restore only the Frozen/Thawed setting of the layers in a drawing, ignoring all other settings. When you restore that named layer state, all settings remain as they are currently set except whether each layer is frozen or thawed.

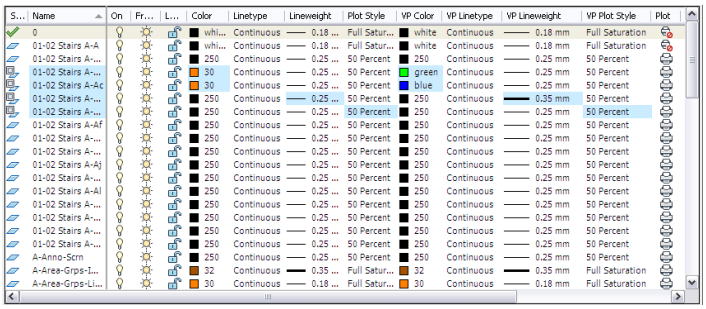
Restoring a saved layer state



Viewport Layer Overrides

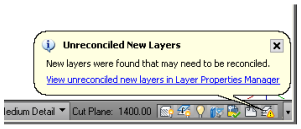
You can now apply overrides for color, linetype, lineweight, and plot style to layers in individual layout viewports. This is an efficient way to display objects with different property settings in individual viewports without changing their ByLayer or ByBlock properties. Because layer property overrides do not change the layer's global properties, you can have objects display differently in various viewports without having to create duplicate geometry or use xrefs that have different layer settings. When the Layer Properties Manager is accessed from a layout tab, 4 additional columns for viewport-specific layer property overrides are displayed for VP Color, VP Lineweight, VP Linetype, and VP Plot Style.

Overriding layer properties for a viewport



New Layer Notification

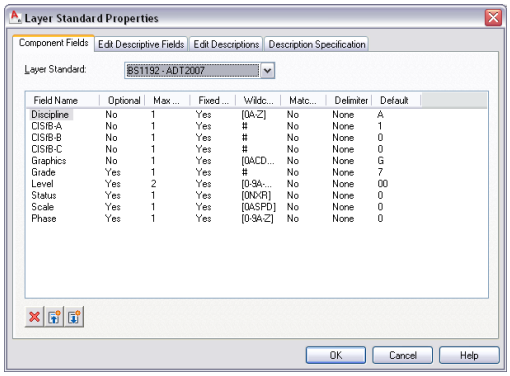
You can be notified when new layers are added to the current drawing or one of its attached xrefs before certain tasks, such as plotting, saving, or restoring a layer state. This way you can avoid potential problems such as plotting objects that were added to the drawing by the addition of a new layer. You can control when a drawing is evaluated for new layers, if at all. You can specify which commands, such as SAVE or PLOT, trigger the software to check the layer list and alert you of new layers. This can be limited to new layers that have been added to attached xrefs or include layers in the current drawing and attached xrefs.



Layer Standards

Layer standards establish naming conventions for layers in your drawings. A layer standard contains a set of rules that determines the structure of the layer names in a drawing. When you install the software, you can select from a number of layer standards that you can use. You can change or edit each of the layer standards later, if needed.

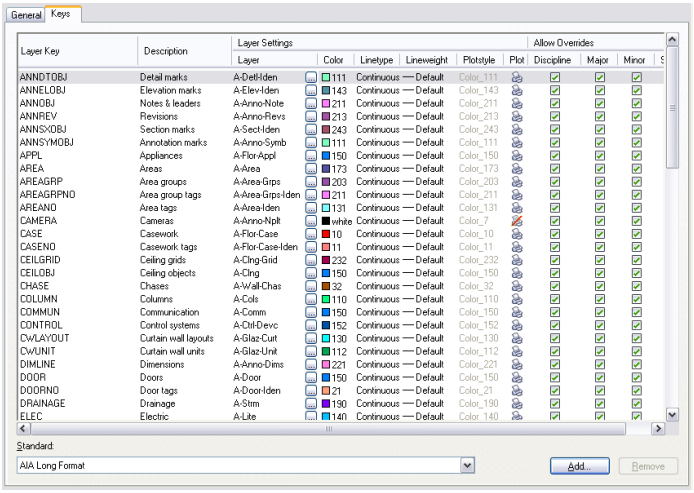
Defining a layer standard



Layer Keys and Layer Key Styles

Each layer standard has a corresponding layer key style. The layer keys in the layer key style assign objects to predefined layers with names that conform to the layer standard. When you add an object, the object is automatically drawn on the layer assigned to it in the current layer key style. This process is called *layer keying*.

Viewing a layer key style



You can change any part of the layer name structure using layer key overrides within the layer key style. You can override the layer names for all the layer keys in a layer key style, or you can override individual layer key styles.

Managing Drawing Layers

The Layer Properties Manager helps you organize, sort, and group layers, as well as save and coordinate layer states. You can also use layer standards with the Layer Properties Manager to better name the layers in multiple drawings.

When you open the Layer Properties Manager, all the layers in the current drawing are displayed in the right pane. You can work with individual layers to:

- Create, rename, and delete layers
- Change layer properties
- Make a layer current

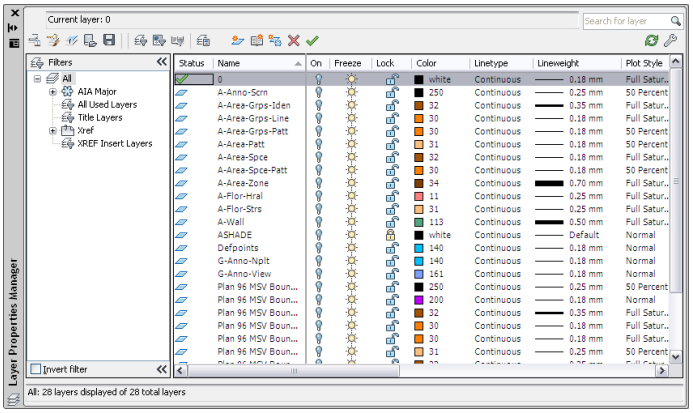
- Add and remove viewport layer overrides
- Get notified of new layers and reconcile them in the drawing
- Filter and group layers

NOTE Additional AutoCAD layer functionalities are available on the Home tab ➤ Layers panel. For more information about AutoCAD layer functionalities, see "Work with Layers" in the AutoCAD help.

Opening the Layer Properties Manager

Use this procedure to open the Layer Properties Manager. When you open the Layer Properties Manager, all the layers in the current drawing are displayed in the right pane while the layer groups are displayed in the left pane.

➤ Click Home tab ➤ Layers panel ➤ Layer Properties .



Making a Layer Current

Use this procedure to make a specific layer the current layer in the drawing. You must select an individual layer to make current. You cannot make multiple layers or layer groups current.

When you make a layer current, new objects you create are drawn on that layer, unless they have their own layer assignment. For example, if you make **A-Wall** the current layer, any lines, polylines, and other linework objects without layer assignment will be drawn on that layer until you select another layer to be current.

NOTE AutoCAD Architecture objects have their own layer assignment through layer key styles and layer standard, so they are not affected by the current layer setting.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the right pane, double-click the layer that you want to make current.

You can also select the layer that you want to make current and click .

The selected layer is now the current layer and is marked with a green check in the Layer Properties Manager. The layer name is displayed next to Current Layer: at the top of the Layer Properties Manager.

Creating a Layer with a Layer Standard

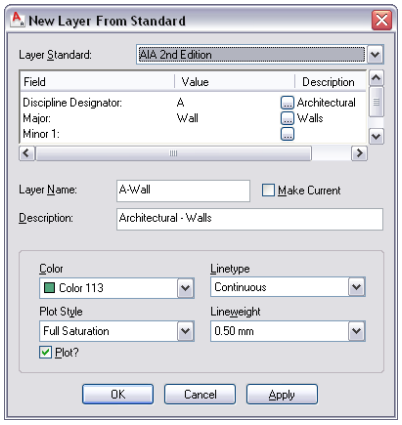
Use this procedure to create a layer that conforms to the layer standard selected for the drawing. Layer standards define the naming of new layers according to the structure defined in the standard. AutoCAD Architecture creates layers as needed according to the current layer standard. For example, when you add a wall to a drawing, the software creates the necessary wall layers if they do not yet exist.

Layer standards can be based on architectural standards like AIA or BS1192, or they can be user-defined and represent a company or other standard. AutoCAD Architecture ships with a number of predefined layer standards and matching layer key styles.

For information on selecting a layer standard and layer key style for a drawing, see Specifying a Layer Standard and a Layer Key Style on page 136. For information about creating your own layer standard, see Creating a Layer Standard on page 507.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .



3 Select the layer standard that you want to use for Layer Standard.

4 Specify the layer standard information.

Depending on the layer standard you are using, different fields are available here.

To select a value for one of the available fields, click the [...] button, and select one of the values.

You can also enter a new value, provided you follow the parameters specified for the layer standard components.

When you are finished, the Layer Name and Description fields display the combination of values you have selected. If you have, for example, created a new layer for storage shelves according to the BS1192 layer standard, it is named *A746G*.

NOTE If the name of the new layer is the same as an existing layer in the current layer key style, the properties of the new layer are automatically updated with the properties of the existing layer.

5 Select Make Current if you want to make the new layer the current immediately.

6 Select a color for the layer from the list.

If the desired color is not available on the list, select Select Color, and select a color from the Color Picker.

7 Select a linetype.

If the desired linetype is not available on the list, select Other, and select a linetype from the Select Linetype dialog box.

8 Select a lineweight.

9 Select a Plot Style.

Clear Plot if you do not want the new layer to be plotted.

10 Click OK.

Creating a Nonstandard Layer

Use this procedure to create a nonstandard layer. A nonstandard layer is a layer that does not need to conform to the layer standard. You might want to use nonstandard layers for elements like architect's comments or construction lines, blocks you do not want to insert on their original layer, or walls that you want to display partially.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select Non Standard for Layer Standard.

4 Enter a name for the new layer.

5 Select Make Current if you want to make the layer the current layer.

6 Enter a description for the new layer.

7 Select a color for the layer from the list.

If the desired color is not available on the list, select Select Color, and select a color from the Color Picker.

8 Select a linetype.

If the desired linetype is not available on the list, select Other, and select a linetype from the Select Linetype dialog box.

9 Select a lineweight.

10 Select a Plot Style.

Clear Plot if you do not want the new layer to be plotted.

11 When you finish specifying the properties of the layer, click OK.

Renaming a Layer

Use this procedure to specify a new name for a layer.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Select the layer that you want to rename, and click the layer name.

3 Enter a new name for the layer, and press *ENTER*.

Deleting a Layer

Use this procedure to delete a layer from a drawing.

Keep the following points in mind when you delete layers:

- If you try to delete a layer that still has objects on it, you receive an error message. To delete this layer, you must first erase all objects on it in the drawing.
- If the layer you try to delete is the current layer, you receive an error message. To delete this layer, make another layer current and then delete the layer.
- Some layers may be assigned to the components of another object, or even to other object styles. These layers cannot be deleted.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. Right-click the layer that you want to delete, and click Delete Layer.

   Alternatively, you can select the layer that you want to delete and click .

Changing the Layer Standard of a Layer

Use this procedure to assign a specific layer to a different layer standard.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. Right-click the layer that you want to change, and click Change Layer Standard.
3. Select the layer standard that you want to use for Layer Standard.

   The layer you selected is now assigned to the specified layer standard.

NOTE If a layer standard is unavailable on the shortcut menu, the layer that you selected is not valid for that standard.

Defining the Properties of a Layer

A layer has a number of states and properties that define its display and behavior in the drawing.

A state is a condition of a layer that can have one of two values, like On/Off or Freeze/Thaw. The following layer states can be set in the Layer Properties Manager:

Icon	Layer state value	Description
	On	Objects on the layer are displayed, plotted, and regenerated and hide other objects when you use HIDE.
	Off	Objects on the layer are not displayed and not plotted but do hide other objects when you use HIDE. The drawing is not regenerated when you turn the layer on.
	Thawed	Objects on the layer are displayed and plotted and hide other objects when you use HIDE.
	Frozen	Objects on the layer are not displayed and not plotted but do hide other objects when you use HIDE. The drawing is regenerated when you thaw the layer.

Icon	Layer state value	Description
	Unlocked	Objects on the layer can be modified.
	Locked	Objects on the layer cannot be modified. You can still apply object snaps to objects on a locked layer and perform other operations that do not modify those objects.
	Plot	The selected layer is plotted.
	Non Plot	The selected layer is not plotted. If you turn off plotting for a layer, the objects on that layer are still displayed. Layers that are off or frozen are not plotted, regardless of the Plot/Non Plot setting.
	New Viewport Thawed	Thaws the selected layer in new layout viewports.
	New Viewport Freeze (New VP Freeze)	Freezes selected layers in new layout viewports. For example, freezing the DIMENSIONS layer in all new viewports restricts the display of dimensions on that layer in any newly created layout viewports but does not affect the DIMENSIONS layer in existing viewports. If you later create a viewport that requires dimensions, you can override the default setting by changing the Current Viewport Freeze/Thaw setting.
	Current Viewport Thawed	Thaws the selected layer in the current layout viewport.
	Current Viewport Freeze (VP Freeze)	Freezes selected layers in the current layout viewport. You can freeze or thaw layers in the current viewport without affecting layer visibility in other viewports. Current Viewport Freeze is an override to the Thaw setting in the overall drawing. You can freeze a layer in the current viewport if it is thawed in the drawing, but you cannot thaw a layer in the current viewport if it is frozen or off in the drawing. A layer is not visible when it is set to Off or Frozen in the drawing.

Layer properties are settings that can have a list of different values for a display characteristic. The following properties can be set for a layer in the Layer Properties Manager:

- Color: Changes the color of objects on the layer. Clicking the color name displays the Select Color dialog box.
- Linetype: Changes the linetype of objects on the layer. Clicking the linetype name displays the Select Linetype dialog box.
- Lineweight: Changes the lineweight of objects on the layer. Clicking the lineweight name displays the Lineweight dialog box.
- Plot style: If you are working with color-dependent plot styles (PSTYLEPOLICY = 1), you cannot change the plot style associated with a layer. Clicking the plot style displays the Select Plot Style dialog box.
- Description: You can add a description to the layer. if your layers are created with a layer standard, the description is filled in automatically. In that case, it is recommended to not overwrite it.

NOTE You can override layer properties for individual viewports. For more information, see Overriding Layer Properties in Layout Viewports on page 472.

Changing the Visibility of Object Subcomponents

You can place different components of an AEC object on different layers. This is accomplished via the object's display properties. For example, the current layer key style might place a wall on the layer named *A-Wall*, while the wall's material definitions might place its internal boundaries on the layer named *A-Wall-Comp*. Turning off the layer *A-Wall* would typically make the entire wall (including its internal boundaries) invisible, even though those components were assigned to a different layer. You can define that the subcomponents of an object remain visible, even though the primary object's layer (*A-Wall* in this case) is turned off. For information on setting this option, see Specifying a Layer Standard and a Layer Key Style on page 136.

NOTE Freezing the primary object's layer would make the entire object including its internal subcomponents invisible regardless of the value of this setting. You must turn the layer off if you want subcomponents to be visible without the main component.

To change the properties of a layer

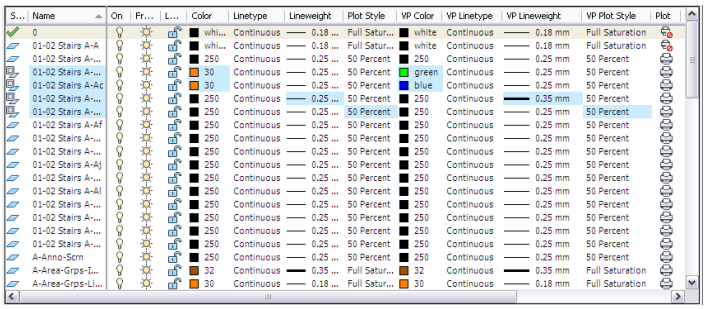
1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. To change one of the layer states On/Off, Freeze/Thaw, Lock/Unlock, Plot/Non Plot, Current Viewport Freeze/Thaw, or New Viewport Freeze/Thaw, click the layer state icon for the state to switch its value.
3. To change one of the layer properties Color, Linetype, Lineweight, Plot Style, or Description, click the current setting for the property. Then, use the subsequent dialog box to select a different value.

NOTE You can also access these many of these settings directly from the Layer drop-down on Home tab ➤ Layers panel.

Overriding Layer Properties in Layout Viewports

You can now apply overrides for color, linetype, lineweight, and plot style to layers in individual layout viewports. This is an efficient way to display objects with different property settings in individual viewports without changing their ByLayer or ByBlock properties. Because layer property overrides do not change the layer's global properties, you can have objects display differently in various viewports without having to create duplicate geometry or use xrefs that have different layer settings. When the Layer Properties Manager is accessed from a layout tab, 4 additional columns for viewport-specific layer property overrides are displayed for VP Color, VP Lineweight, VP Linetype, and VP Plot Style (available only in named-plot style drawings; PSTYLEMODE=1.)

Viewport layer overrides in Layer Properties Manager



If you want to temporarily not display or plot property overrides, set VPLAYEROVERRIDESMODE to 0. Objects will display and plot with their global layer properties. Property overrides can still be set even when VPLAYEROVERRIDESMODE is set to 0.

NOTE Property overrides that are on xref layers are not retained when VISRETAIN system variable is set to 0.

Layer Property Overrides in Previous Releases

When a drawing containing layer overrides is opened in a previous release of the software, overrides are not visible and the layer displays its global properties. The override settings are retained however when the drawing is saved in a previous release, and are visible again when the drawing is re-opened in the current release.

If a viewport containing layer overrides is deleted when the drawing is opened in a previous release, the override settings are not retained and are not available when the drawing is re-opened in the current release.

When VISRETAIN is set to 0 when the drawing is opened in a previous release, viewport overrides in xref layers are not retained.

To override layer properties in a layout viewport

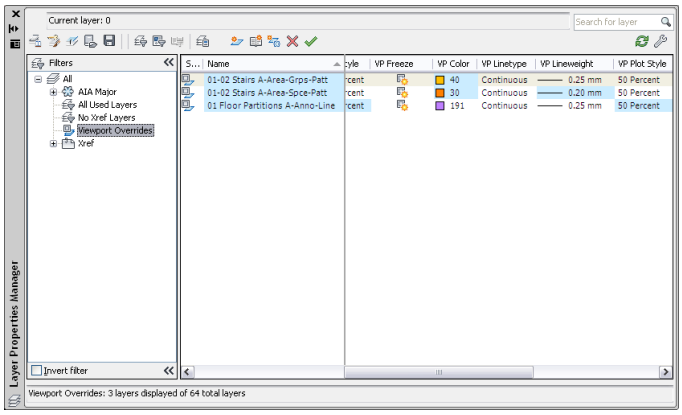
1. Make the layout viewport active for which you want to create viewport layer overrides.
2. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
3. Scroll until you have the viewport overrides columns visible in the Layer Properties Manager.
   The following viewport overrides are available for layout viewports:
   - VP Color
   - VP Linetype
   - VP Lineweight
   - VP Plot Style
4. Click the desired setting to change the property value.
   A layer value that is overridden in the viewport is marked by a different background color (light blue by default) on the override property, the global property, and the layer name.

Identifying Viewport Layer Overrides

There are a number of ways to identify layers containing overrides.

In the Layer Properties Manager:

- A background color displays for each override and for each corresponding global property setting. By default, it is set to light blue, but you can change that to another color. For information on changing the background color, see “Override Layer Properties in Viewports” in the AutoCAD help.
- A different icon ( ) displays in the Status column of the layer.
- A tooltip displays property override information when the cursor is placed over the Status icon for the layer containing overrides.
- A predefined filter named Viewport Overrides is displayed in the tree view where all layers with viewport overrides are listed.



In the drawing workspace:

- On the command line, enter VPLAYEROVERRIDES to check if the current viewport contains layer property overrides. When VPLAYEROVERRIDES is equal to 1, the viewport contains overrides.

Removing Viewport Layer Overrides

You can remove layer overrides from layout viewports.

There are different options to make removing viewport overrides efficient and intuitive:

- You can remove overrides in the active viewport only, or for all viewports.
- You can remove overrides for selected layers only, or for all layers.
- You can remove individual overrides from a selected layer.

To remove a single override from a selected layer

1. Make the layout viewport active that has viewport layer override you want to remove.
2. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
3. In the list of layers, right-click the overridden setting you want to remove (for information about identifying overrides, see Identifying Viewport Layer Overrides on page 473), and click Remove Viewport Overrides for.

   Depending on the setting you have right-clicked, a submenu displays for the setting:

   - Color
   - Linetype
   - Lineweight
   - Plot Style

4. Click the desired submenu, and click one of these commands:
   - In Current Viewport only: This will remove the override from the selected layer in the current viewport only. For example if you have clicked Remove Viewport Overrides for ➤ Color ➤ In Current Viewport only, then only the overridden color in the currently active viewport for the selected layer will be reset to the global color.

- In All Viewports: This will remove the selected override from the selected layer in all layout viewports. For example if you have clicked Remove Viewport Overrides for ➤ Color ➤ In All Viewports, then any color overrides for the selected layer in any layout viewport in the drawing will be reset to the global color.

To remove all overrides from a selected layer

5 Make the layout viewport active in which you want to remove all viewport overrides from a layer.

6 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

7 In the list of layers, right-click the layer name or status icon from which you want to remove all overrides, and click Remove Viewport Overrides for ➤ Selected Layers.

8 Click one of these two commands:

- In Current Viewport only: This will remove all overrides from the selected layer in the current viewport only.
- In All Viewports: This will remove all overrides from the selected layer in all layout viewports, and reset them to their global properties.

To remove all overrides from all overridden layers

9 Make the layout viewport active in which you want to remove all viewport layer overrides.

10 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

11 In the list of layers, right-click any layer name or status icon, and click Remove Viewport Overrides for ➤ All Layers.

12 Click one of these two commands:

- In Current Viewport only: This will remove all overrides from all layers in the current viewport only.
- In All Viewports: This will remove all overrides from all layers in all layout viewports, and reset them to their global properties.

Working with Layer Groups

With the Layer Properties Manager, you can create different layer groups to produce working views and backgrounds from large building data sets. Layer groups help you work more efficiently in drawings that have many layers. You can change the settings of a layer group to apply the changes to all layers in the group at one time. For example, you can lock a layer group to lock all the layers in the filter.

Types of Layer Groups

There are five types of layer groups:

Type	Description
All	Is always present and lists all the layers and other layer groups in the drawing.
Xref	Lists any layers in external reference files linked with the current drawing. This group is automatically created when you xref a drawing into the current drawing.

Type	Description
group filters	Contain layers that you have assigned to them.
property filters	Contain layers based on a filter that you specify. You can base filters on layer names and other layer properties.
layer standards filters	Contain layers associated with a specified standards category.

Rules for Layer Groups

The following group rules apply when you are creating and working with layer groups:

- You can list a layer in more than one layer group.
- Multiple listings of the same layer must always have identical property settings. For example, a layer that is a member of two groups cannot be a different color in each group.
- You cannot list a layer twice in a group.
- You can delete layer groups without affecting the layers in the group.
- Changing one of the properties of a layer group changes that property for all the layers in that group, except where the change would be invalid. For example, it is not possible to freeze the current layer.
- Layer group names need not be unique.
- There is no naming convention for layer groups. Group names can include spaces, non-alphanumeric characters, and both uppercase and lowercase letters.
- Xref layer groups cannot contain other filter groups.

Managing Layer Groups

You can add and subtract layers from layer groups. You can change the standard AutoCAD properties for the layers in groups, rename layer groups, delete layer groups, and change the filters in filter groups.

Types of Layer Filters

With the Layer Properties Manager, you can create three types of layer filters: group filters, property filters, and layer standards filters.

Group filters can contain any layers in the current drawing. You can manually add layers to, and remove layers from, group filters by dragging layers within the Layer Properties Manager into the group filter or by selecting an object in the drawing on the layer that you want to add to the group filter.

Group filters are considered static because they are not automatically updated. They include only the layers that were assigned when the group was created. You can manually add layers to, and remove layers from, group filters.

Property filters contain layers that meet filter criteria that you specify for the group. Filter criteria can select layers according to layer states (on/off, frozen/thawed, locked/unlocked), properties, or names. For example, you can create a property filter that includes all of the red layers in the current drawing.

Property groups are considered dynamic because they are automatically updated when you change the properties of layers that are part of the group. Property filters are also updated when you add or modify layers that meet the criteria specified in the filter. You cannot manually add layers to, or remove layers from property filters.

The layer groups named Xrefs and All are created automatically.

Creating a Group Filter

Use this procedure to create a group filter. Group filters can contain any layers currently listed in the Layer Properties Manager. You can manually add layers to, and remove layers from, group filters by dragging layers within the Layer Properties Manager into the group filter or by selecting an object in the drawing on the layer that you want to add to the group filter.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and select New Group Filter, or click in the Layer Properties Manager.

3 Enter a name for the new group filter, and press *ENTER*.

4 Edit the new group filter:

If you want to…	Then…
add layers to the group filter	see Adding Layers to Layer Groups on page 481.
specify properties for the group filter	see Changing the Properties of a Layer Group on page 482.

Creating a Property Filter

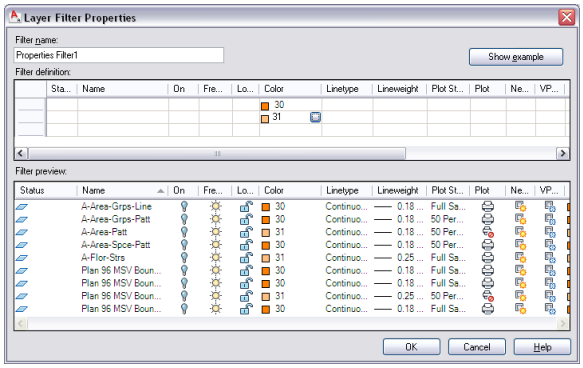
A property filter contains layers that meet filter criteria that you specify for the group. Filter criteria can include layers according to layer states (on/off, frozen/thawed, locked/unlocked), properties, or names. For example, you can create a property filter that includes all of the red layers in the current drawing.

Creating Property Filters

Use this procedure to create property filters. You can specify more than one filter for a group. For example, you can filter by both layer name and status in order to group all frozen walls layers.

You can also specify more than one set of criteria for a property filter. For example, you can create a filter that will include all frozen red layers and all frozen blue layers. Boolean AND/OR logic is applied to the filter definitions to determine which layers to include. A layer must meet all the criteria in a single row in order to be included in the filter. Continuing with the example, a layer must be frozen *and* red to be in the filter. Multiple rows offer alternative criteria. In the example below, a layer must be overridden with the color 30 *or* it must be overridden with the color 31.

Example of a property filter with multiple criteria



1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and select New Property Filter, or click in the Layer Properties Manager.

3 Enter a name for Filter Name.

4 Specify the filter criteria:

If you want to…	Then…
filter layers by visibility state	see Specifying a Filter for Layer State on page 478.
filter layers by layer color	see Specifying a Filter for Layer Color on page 479.
filter layers by layer linetype	see Specifying a Filter for Layer Linetype or Lineweight on page 479.
filter layers by wildcard characters	see Specifying a Filter for Layer Name on page 480.

5 Once a row of criteria is configured, you can copy or delete the row:

If you want to…	Then…
copy a row of criteria	right-click in the row you want to copy, and select Duplicate Row.
delete a row	right-click in the row, and select Delete Row.

6 Click OK.

Specifying a Filter for Layer State

Use this procedure to specify a filter that includes layers based on the following layer states:

- In use/not in use
- On/off
- Frozen/thawed
- Locked/unlocked

A layer must meet all the specified filter criteria to be included. For example, if you select Off and Frozen for the filter, a layer that is turned off but is not frozen will not be included.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and select New Property Filter.

3 Enter a name for Filter Name.

4 Specify the In use/not in use layer criteria for the filter:

If you want to…	Then…
include all the layers in the drawing that are in use	click in the Status field, and select .

If you want to…	Then…
include all the layers in the drawing that are not in use	click in the Status field, and select .

5 Specify the On/Off layer state criteria for the filter:

If you want to…	Then…
include all the layers in the drawing that are turned on	click in the On field, and select .
include all the layers in the drawing that are turned off	click in the On field, and select .

6 Specify the Freeze/Thaw layer state criteria for the filter:

If you want to…	Then…
include all the layers in the drawing that are thawed	click in the Freeze field, and select .
include all the layers in the drawing that are frozen	click in the Freeze field, and select .

7 Specify the Locked/Unlocked layer state criteria for the filter:

If you want to…	Then…
include all the layers in the drawing that are unlocked	click in the Lock field, and select .
include all the layers in the drawing that are locked	select Locked. .

8 Click OK.

Specifying a Filter for Layer Color

Use this procedure to specify a filter that includes layers based on layer colors.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and click New Property Filter.

3 Enter a name for Filter Name.

4 Under Filter definition, click the Color field.

5 Click the [...] button.

6 Select a color from the Select Color dialog box.

7 Click OK.

Specifying a Filter for Layer Linetype or Lineweight

Use this procedure to specify a filter that includes layers based on linetype or lineweight.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and click New Property Filter.

3 Enter a name for Filter Name.

4 Specify the filter criteria for linetypes or lineweights:

If you want to…	then…
specify a linetype to include in the filter	click in the Linetype field, and click the [...] button. Select a linetype from the Select Linetype dialog box.
specify a lineweight to include in the filter	click in the Lineweight field, and click the [...] button. Select a lineweight from the Lineweight dialog box.

5 Click OK.

Specifying a Filter for Layer Name

Use this procedure to specify a filter that includes layers based on wildcard strings in a layer name. The wildcard string is not case sensitive.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 In the left pane of the Layer Properties Manager, select a layer group, right-click, and click New Property Filter.

3 Enter a name for Filter Name.

4 Under Filter definitions, click the Name field.

5 Specify the wildcard filter criteria:

If you want to…	Then…
include all layers that start with a particular string	enter a wildcard string and an asterisk (*) for Name. Example: *wall**
include all layers that end with a particular string	enter an asterisk (*) and the wildcard string for Name. Example: **view*
include all layers where a particular string can occur anywhere within the layer name	enter an asterisk (*), the wildcard string, then another (*) for Name. Example: **anno**

For more information about working with wildcards, see “Filter Selection Sets” in AutoCAD help.

6 Click OK.

Creating a Layer Standards Filter

A layer standards filter contains layers that are associated with a particular category of a standard. For example, if you create a layer standards filter for the AIA 2nd Edition standard, and you specify the Major category as the one to include in the filter, you create a filter that contains all of the drawing annotation layers.

Creating Layer Standards Filters

Use this procedure to create standards filters. You can specify more than one standard category for a filter.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. In the left pane of the Layer Properties Manager, select a layer group that you want to create the new group under, right-click, and select New Standards Filter, or click in the Layer Properties Manager.
3. Enter a name for Filter Names.
4. Select a standard for Layering Standard.
5. The categories in the Available Category(s) column will differ depending on the standard being used. Select a category to include in the filter, and click the Add >> button to move it to the Selected Category(s) column.

   You can include multiple categories in one standards filter. All layers associated with the Selected Category(s) will be included in the filter.
6. Click OK.

Adding Layers to Layer Groups

Use this procedure to add layers to a layer group. You can manually add layers to a group filter. You can either drag them from the list of layers in the right pane of the Layer Properties Manager to the group in the left pane or add the layer to the group by selecting an object in the current drawing that is on the layer that you want to add.

You can also replace all layers in an existing group by selecting objects in the current drawing that are on the layers that you want to use as replacements for the existing layers.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. Add layers to a layer group:

If you want to…	Then…
add layers to a layer group by dragging	in the left pane of the Layer Properties Manager, select the All layer group. In the right pane of the Layer Properties Manager, drag a layer to the user layer group or static filter group in the left pane.
add layers to a layer group by selecting drawing objects	select the layer group, right-click, and click Select Layers ➤ Add. In the current drawing, select an object on each layer that you want to add to the group. Press *ENTER* to return to the Layer Properties Manager.
replace layers from groups by selecting drawing objects	select the layer group whose layers you want to replace, right-click, and click Select Layers ➤ Replace. Select an object on each layer that you want to replace the layers in the group. Press *ENTER* to return to the Layer Properties Manager.

3. Click OK.

Changing the Properties of a Layer Group

Use this procedure to change the properties of all layers in a layer group. If a layer is in more than one group, the changes apply to that layer in all groups in which it is included. For example, if you freeze a group that includes the layer A-Wall, that layer is frozen in any other group in which A-Wall appears.

NOTE Because you cannot freeze the current layer, you do not have the option to freeze a group in the active viewport if the current layer is included in the group. You also cannot freeze the active viewport on the Model layout tab.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click the layer group whose properties you want to change, and specify properties:

If you want to…	Then…
specify whether the group is locked	right-click, select Lock, and select Lock or Unlock Off.
specify whether the group is frozen	right-click, select Visibility, and select Thawed or Frozen.
specify the visibility of the group	right-click, select Visibility, and select On or Off.
freeze all layers in the drawing except those in the selected layer group	right-click, select Isolate Group, and select All Viewports or Active Viewport Only.

Renaming and Deleting Layer Groups

Use this procedure to rename or delete layer groups. The layer group is deleted from the Layer Properties Manager, but the layers listed in the group are not deleted.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Rename or delete a layer group:

If you want to…	Then…
rename the layer group	right-click the layer group, and click Rename. Enter a new name, and press *ENTER*.
delete the layer group	right-click the layer group, and click Delete.

Converting a Property Filter to a Group Filter

Use this procedure to convert property filters to group filters. Note that dynamic property filters are converted to static group filters. You manually add, replace, and delete layers from group filters.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 On the left pane, select the property filter you want to convert.

3 Right-click, and select Convert to Group Filter.

New Layer Notification

You can be notified when new layers are added to the drawing before certain tasks, such as plotting, saving, or restoring a layer state. It is important to be aware of new layers that have been added to a drawing or to an attached xref without your knowledge. You can avoid potential problems such as plotting objects that were added to the drawing by the addition of a new layer.

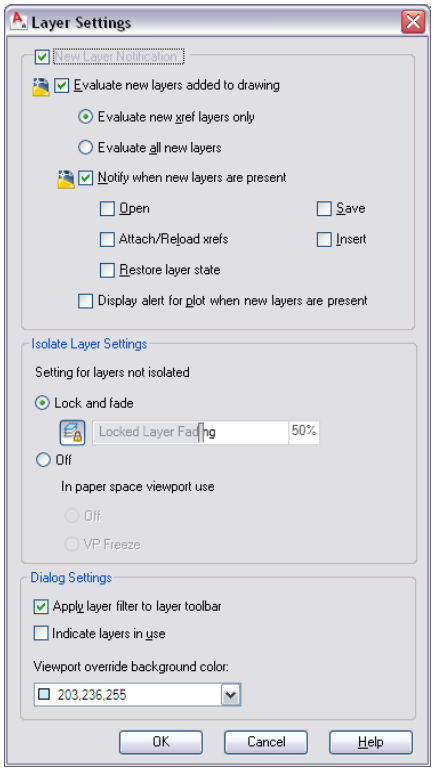
You can control when a drawing is evaluated for new layers, if at all. You can specify which commands, such as SAVE or PLOT, trigger the program to check the layer list and alert you of new layers. This can include new layers that have been added to attached xrefs.

Setting up the Notification for New Layers

Use this procedure to be notified when new layers are introduced into the drawing or any xrefs referenced to it.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click (Settings).



3 To set up the new layers notification in the drawing, select Evaluate new layers added to the drawing.

4 Determine if you want to be notified only of new layers added to xrefed drawings, or of new layers in xrefed drawings and in the current drawing:

To be notified only of new layers in xref drawings, click Evaluate new xref layers only.

To be notified of new layers in xref drawings and in the current drawing, click Evaluate all new layers.

5 Click Notify when new layers are present to define the actions that should trigger an evaluation for new layers. Each time one of the specified actions is performed in the drawing, a comparison is made between the last time a specified action was performed (the layer baseline) and the present time. If new layers have been added in the meantime, the new layers notification is displayed.

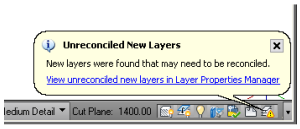
In new drawings, the layer baseline is created when the drawing is saved or plotted for the first time. For example, when layers are added to a new drawing, and then it is saved, the layer baseline is created. Layers that have been added since the drawing was saved are considered new unreconciled layers.

- Open: Checks for new layers on opening the drawing.
- Attach/Reload Xrefs: Checks for new layers when an xref is attached or reloaded.
- Restore Layer state: Checks for new layers when you restore a saved layer state. For more information, see Working with Layer States on page 485.
- Save: Checks for new layers when the drawing is saved.
- Insert: Checks for new layers when a block is inserted.

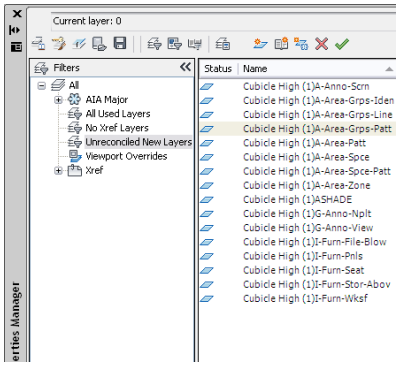
6 Click Display alert for plot when new layers are present to check for new layers when plotting a drawing.

Identifying New Layers in the Drawing

When notification is turned on, a New Layer Notification bubble displays on the status bar every time one of the specified actions is performed, and new layers are detected in the process. You can choose to view the new layers by clicking the View Unreconciled New Layers link.



When you click the link, the Layer Properties Manager opens, and the Unreconciled New Layers filter is automatically selected. All new layers that have been added to the drawing or attached xrefs are displayed in the list view.



You can turn off layer notification but still have the layer list evaluated for new layers. Although the notification bubble does not display, you can still check for new layers by right-clicking the alert icon ( ) on the status bar.

Reconciling New Layers in the Drawing

Unreconciled layers are layers that have been added to the drawing or to attached xrefs since the layer list was last evaluated. The layer list is checked for new layers when one of the commands selected in Setting up the Notification for New Layers on page 483 is used.

To reconcile a layer in the drawing you have to manually select it and mark it as reconciled.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. In the tree view on the left, select the Unreconciled Layers group.

   All layers that have been added to the drawing or its xrefs since the last user-specified action (for example reloading an xref), are listed.
3. To reconcile a new layer, select the layer name or status, right-click, and click Reconcile Layer.

   This will add the layer to the layer baseline and not display it as new anymore in the drawing.

Working with Layer States

NOTE In AutoCAD Architecture 2010 the Layer Snapshot functionality is discontinued in favor of the Layer State functionality. Existing layer snapshots (LAY) files are automatically converted to layer states (LAS) when the Layer States Manager is invoked in a legacy drawing with layer snapshots. The layer snapshot is deleted after the conversion.

You can save the current layer settings in a drawing as a saved layer state and restore them later. Saving layer states is convenient if you need to return to particular settings for all layers during different stages in completing a drawing or for plotting.

For example, a facilities manager might save a layer state of individual floor plans and furniture, cable, and HVAC layouts to separate this information from a complete building layout.

Layer settings you can save and restore include layer states, such as on or locked, and layer properties, such as color or linetype. You can choose which layer states and layer properties you want to restore later.

You can modify the properties of a saved layer state. All layer properties other than the layer name can be edited. You can also add new layers to a layer state if new layers were added since the later state was saved.

NOTE To be notified when new layers are added to the drawing, see Setting up the Notification for New Layers on page 483.

Layer States in Xrefs

When an xref containing saved layer states is inserted in the host drawing, the xref layer states are listed by name and can be viewed in the Layer States Manager. Although they can be restored, they cannot be edited. Xref layer states are identifiable because the layer state name is preceded by the xref drawing's name and separated by a double underscore symbol. (Example: Xref Name__Layer State Name.) When the xref is bound to the host drawing, layer states are identifiable by 0 that displays between the xref name and layer state name. (Example: Xref Name0Layer State Name.)

Layer states from nested xrefs are also included. Layer states from xrefs are removed from the host drawing when the xref is detached or unloaded.

Creating a Saved Layer State

You can save any set of currently existing layers and their properties as a layer state, with the purpose of either restoring that layer state later in the current drawing or exporting it to another drawing and restore it there.

The following lists the layer states and properties that are saved in a layer state:

Saving a Layer State in Model Space:

- Layer name
- On/Off
- Freeze/Thaw
- Lock/Unlock
- Color
- Linetype
- Lineweight
- Plot style

IMPORTANT When a layer state is saved from the model space, the global layer properties for color, linetype, lineweight, and plot style are saved in the layer state. When the layer state is restored to the model space, the global layer properties will be restored as the global layer properties of the drawing. If the layer state is restored to a layout viewport, you can choose if the settings from the saved layer state are restored either as the global layer properties for the drawing, or as viewport overrides for that specific viewport.

- Plot/Non Plot
- New VP Freeze

Saving a Layer State in a Layout Viewport:

- Layer name
- On/Off
- Freeze/Thaw
- Lock
- Color
- Linetype
- Lineweight
- Plot style

IMPORTANT When a layer state is saved from a layout viewport, and the viewport has overrides for color, linetype, lineweight, or plot style, the override settings are saved as the viewport properties. When the layer state is restored to a layout viewport, you can choose if the settings from the saved layer state are restored either as the global layer properties for the drawing, or as viewport overrides for that specific viewport. When the layer state is restored to the model space of a drawing, the saved layer settings will be restored as global layer properties to the model space.

- Plot/Non Plot
- New VP Freeze

1 Verify that you are in the viewport - either model space or a layout - which you want to save as a layer state.

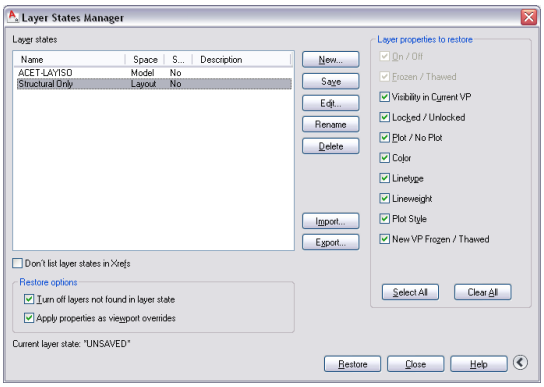
2 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

3 Verify that all layers have the desired states and properties you want to save in a layer state. If necessary, make adjustments.

4 Click to open the Layer States Manager.

NOTE Alternatively, you can click Home tab ➤ Layers panel ➤ Layer States drop-down ➤ New Layer State.

Saving a layer state



5 Click New, and enter a name and description for the layer state. Then, click OK.

The current settings in Layer Properties Manager are saved in the layer state.

When a layer state has been created, the following information about the layer state is displayed in the Layer States Manager:

- Name: name of the layer state.
- Space: displays whether the layer state has been saved from the model space or from a layout viewport.
- Same as DWG: If the layer configuration in the drawing is identical to the one saved in the layer state, it is listed as Yes. Otherwise, it is No. Typically, the layer state should be identical to the drawing layer configuration when it is created and when it just has been restored.

  NOTE The layer state will also be reported to be Same as DWG=Yes if the drawing contains new layers not in the layer state, but these layers are turned off in the drawing.

- Description: optional description of the layer state.

TIP To view the saved layer state settings, click Edit.

6 To define which layer settings should be restored when later restoring the layer state, click , and select the appropriate properties under Layer properties to restore.

NOTE Selecting settings to restore has no influence over which settings are saved. All settings listed in the Edit window are saved; but you can control which of these settings to restore.

You cannot change the settings for On/Off and Freeze/Thaw if you are restoring a layer state to a layout viewport. When a layer state is restored to a layout viewport, the layers in it will be On and Thawed.

You cannot change the setting for Visibility in Current VP if you are restoring a layer state to the model space. In model space, you can only control the global visibility of the layer.

7 Click Save.

8 If new layers have been added to the drawing since the layer state was saved, and you have not added these layers to the layer state you can turn them off in the drawing when restoring the layer state. To do so, click Turn off layers not found in layer state.

9 If you want to restore the saved layer state to a layout viewport, determine if the saved layer properties for color, linetype, lineweight, and plot style should be restored to the viewport as global layer properties or as viewport overrides:

Select Apply properties as viewport overrides if you want to restore the saved layer state properties as viewport overrides.

Clear Apply properties as viewport overrides if you want to restore the saved layer state properties as global layer properties.

NOTE If you restore a saved layer state to the model space, the saved properties are always restored as global layer properties.

Editing a Saved Layer State

When a layer state is saved, it uses the current viewport layer settings. You can make changes to the saved layer state.

Changes to a saved layer state can be these 3 change types:

- adding layers that have been added to the drawing since the layer state was saved
- removing layers from the layer state
- modifying layer settings

1 Do any of the following to open Layer States Manager:

- Click Home tab ➤ Layers panel ➤ Layer States drop-down ➤ Manage Layer State.
- Open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties , and then click .

2 Select the layer state that you want to edit, and click Edit.

3 Edit the selected layer state:

If you want to…	Then…
add layers from the drawing to the layer state	click , select the layer that you want to add, and click OK.

If you want to…	Then…
delete a layer from the layer state	select the layer that you want to delete, and click .
edit the settings of the individual layers in the layer state	click the appropriate state or property icon and make the desired change. This affects only the layer state. The layers in the drawing are not affected until you restore the layer state.

4 Click OK, and then click Close to close the Layer States Manager.

Restoring a Layer State

You can restore a saved layer state in a drawing. When you restore a layer state, you can specify which of the saved settings you want to restore. The layer settings you have not selected remain unchanged in the drawing. For example, if you select only the Color property to be restored from the layer state, then the linetype, lineweight, and plot style of the drawing remain unchanged, even if they are different in the layer state than in the drawing. If the drawing contains layers that were added since the layer state was saved, those layers are not deleted when restoring the layer state. You can, however, select to turn them off when restoring a layer state that does not have these layers. For more information, see Creating a Saved Layer State on page 486.

When restoring a layer state, the layer that was current when the layer state was saved is made current. If that layer no longer exists, the current layer does not change.

IMPORTANT When you save a layer state in the current drawing and then delete any layers in the drawing that are in the layer state, these layers are deleted from the layer state without notification. To retain layers in a layer state that are deleted in the drawing, you must export the layer state before deleting the layers in the drawing. Later, you can re-import the exported LAS file and restore the deleted layers.

Restore Options for Different Viewports

In most cases it is recommended to restore layer states that have been saved from a layout viewport to a layout viewport and layer states that have been saved from the model space to the model space of the drawing. If you want to restore layer states between different workspaces, note the following behaviors:

When a layer state is saved from the model space, the global layer properties for color, linetype, lineweight, and plot style are saved to the state. When the layer state is later restored to the model space, the global layer properties will be restored as the global layer properties of the drawing. If the layer state is restored to a layout viewport, you can choose if the settings from the saved layer state are restored either as the global layer properties for the drawing, or as viewport overrides for that specific viewport.

NOTE Layers that were turned off or frozen in model space are set to VP Freeze in the Layer Properties Manager if they are restored to a layout viewport.

When a layer state is saved from a layout viewport, and the viewport has overrides for color, linetype, lineweight, or plot style, the override settings are saved as the viewport properties. When the layer state is later restored to the model space of a drawing, the saved layer settings will be restored as global layer properties to the model space. If the layer state is later restored to a layout viewport, you can choose if the settings from the saved layer state are restored either as the global layer properties for the drawing, or as viewport overrides for that specific viewport.

1 Verify that the viewport in which you want to restore a saved layer state is active.

2 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

3 Click to open the Layer States Manager.

4 Select the saved layer state to restore.

If the setting for Same as DWG is set to Yes, the layer configuration in the drawing is already identical to the one saved in the layer state, or the drawing contains new layers not in the layer state, but these layers are turned off in the drawing. In this case, the layer state will also be reported to be Same as DWG.

5 Expand the Layer States Manager by clicking .

6 To define which layer settings should be restored, select the appropriate properties under Layer properties to restore.

You cannot change the settings for On/Off and Freeze/Thaw if you are restoring a layer state to a layout viewport. When a layer state is restored to a layout viewport, the layers in it will be On and Thawed.

You cannot change the setting for Visibility in Current VP if you are restoring a layer state to the model space. In model space, you can only control the global visibility of the layer.

7 Click Save.

8 If new layers have been added to the drawing since the layer state was saved, and you have not added these layers to the layer state, you can turn them off in the drawing when restoring the layer state. To do so, click Turn off layers not found in layer state.

9 If you want to restore the saved layer state to a layout viewport, determine if the saved layer properties for color, linetype, lineweight, and plot style should be restored to the viewport as global layer properties or as viewport overrides:

Select Apply properties as viewport overrides if you want to restore the saved layer state properties as viewport overrides.

Clear Apply properties as viewport overrides if you want to restore the saved layer state properties as global layer properties.

NOTE If you restore a saved layer state to the model space, the saved properties are always restored as global layer properties.

10 Click Restore.

Deleting a Layer State

When you delete a saved layer state, you do not delete the layers from the drawing. You delete only the layer state.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click to open the Layer States Manager.

3 Select the saved layer state to delete.

4 Click Delete, and click Yes in the subsequent dialog.

5 Click Close.

Importing Layer States to the Current Drawing

You can import layer states that are saved in drawing files (DWG, DWS, and DWT) or directly in a layer state (LAS) file.

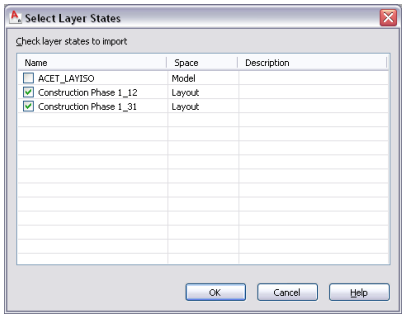
If the layer state is imported from a drawing that contains layers not present in the current drawing, these layers are imported into the current drawing.

If the layer state is imported from a drawing and it contains a layer property, such as a linetype or plot style that is not loaded or available in the current drawing, that property is automatically imported from the source drawing.

If the layer state is imported from a LAS file, and it contains linetype or plot style properties that do not exist in the current drawing, that property cannot be restored.

When importing a layer state that is a duplicate of a layer state in the current drawing, you can choose to overwrite the existing layer state or not import it.

1. If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .
2. Click to open the Layer States Manager.
3. Click Import.
4. In the Import layer state dialog box, select the file format of the file from which you want to import a layer state:
   - DWG: Imports layer states from a drawing file
   - DWS: Imports layer states from a drawing standards file
   - DWT: imports layer states from a drawing template
   - LAS: Imports a saved and exported layer state directly
5. Select the desired file, and click Open.
6. If you have selected a DWG, DWS, or DWT file with multiple saved layer states, select the desired state in the Select Layer States dialog, and click OK.



7. If you have selected a LAS file, you are prompted upon successful import whether you want to immediately restore the layer state in the current drawing. Click Yes to restore or No to import without restoring.

Exporting a Layer State from the Current Drawing

You can export a saved layer state from the current drawing. Saved layer states are saved as LAS files and can be imported into drawing files.

When you export a layer state, all layers and their settings are saved in an external file and can be re-imported into a drawing. Exporting a layer state is useful for saving layer configurations you need across multiple drawings.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click to open the Layer States Manager.

3 Select the layer state you want to export, and click Export.

4 In the Export Layer State dialog, select a name and location for the LAS file, and click Save.

5 Click Close.

Working with Layer Keys

A layer key maps an object that you draw to a defined layer. Layer keys also specify the default properties of each layer.

Layer Keys and Layer Keying

When you create an object, the layer key that is associated with the object automatically places that object on the layer to which it is mapped. Using layer keys to automatically place objects on predefined layers is called *layer keying*. Usually, you key objects to layers that conform to a layer standard. Each layer standard names layers according to a set of rules that you can modify. For more information, see Creating and Editing Layer Standards on page 502.

Layer Key Styles

You can create different sets of layer keys, called layer key styles, that you can use to place objects on defined layers in your drawings. Each layer key style contains a set of layer keys. Both the AIA and BS1192 layer key styles contain layer keys and layer properties, including layer name, description, color, linetype, lineweight, plot style, and plot settings for all of the AEC objects. You can import the AIA and BS1192 layer standards and layer key styles that are provided with AutoCAD Architecture 2010 from the *AecLayerStd.dwg* in the *C:\ProgramData\Autodesk\ACA 2010\enu\Layers* folder. You can modify these styles, if needed, or create new layer key styles. You can also create layer key styles from LY files.

Properties of Layer Key Styles

You can add and remove layer keys from layer key styles. Default layer keys cannot be removed. The properties of any layer in an existing layer key style can also be edited. You can change the layer name, description, color, linetype, lineweight, plot style, and plot settings for the layer that each layer key maps to. If the layer key style is based on a layer standard, you can use overrides on all or some of the layer keys within the layer key style. For more information about overrides, see Layer Key Overrides on page 500.

NOTE The default Standard layer key style is not based on a layer standard. It contains the default set of layer keys.

LY Files and Layer Key Styles

If you have LY files from S8 or Release 1 of Architectural Desktop that you want to use, you can create a new layer key style from an LY file. For more information see Creating a Layer Key Style from an LY File on page 498.

Overrides to Layer Key Styles

Whether you create an original layer key style or one from an existing LY file, if you want to use overrides, you must base the layer key style on a layer standard in the current drawing. If you create a nonstandard

layer key style, the Overrides On/Off command is unavailable. If you copy a layer key style, you can use layer key overrides only if the layer key style that you copied is based on a layer standard. For more information about using layer key overrides, see Layer Key Overrides on page 500.

Managing Layer Key Styles

To create, edit, copy, or purge layer key styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture, where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager on page 565.

Default Layer Keys

AutoCAD Architecture uses the following default layer keys when you create AEC objects.

Default layer keys for creating AEC objects

Layer Key	Description
ANNDTOBJ	Detail marks
ANNELKEY	Elevation marks
ANNELOBJ	Elevation objects
ANNMASK	AutoCAD Architecture masking objects
ANNMATCH	Match lines
ANNOBJ	Notes, leaders, etc.
ANNREV	Revisions
ANNSXKEY	Section marks
ANNSXOBJ	Section lines
ANNSYMOBJ	Annotation marks
APPL	Appliances
CAMERA	Cameras
CASE	Casework
CASENO	Casework tags
CEILGRID	Ceiling grids
CEILOBJ	Ceiling objects
CHASE	Chases
COGO	Control points
COLUMN	Columns

Default layer keys for creating AEC objects	
COMMUN	Communication
CONTROL	Control systems
CWLAYOUT	Curtain walls
CWUNIT	Curtain wall units
DIMLINE	Dimensions
DIMMAN	Dimensions (AutoCAD points)
DOOR	Doors
DOORNO	Door tags
DRAINAGE	Drainage
ELEC	Electric
ELECNO	Electrical tags
ELEV	Elevations
ELEVAT	Elevators
ELEVHIDE	Elevations (2D)
EQUIP	Equipment
EQUIPNO	Equipment tags
FINCEIL	Ceiling tags
FINE	Details - fine lines
FINFLOOR	Finish tags
FIRE	Fire system equipment
FURN	Furniture
FURNNO	Furniture tags
GRIDBUB	Plan grid bubbles
GRIDLINE	Column grids
HATCH	Details - hatching
HIDDEN	Hidden lines
LAYGRID	Layout grids

Default layer keys for creating AEC objects	
LIGHTCLG	Ceiling lighting
LIGHTW	Wall lighting
MASSELEM	Massing elements
MASSGRPS	Massing groups
MASSSLCE	Massing slices
MED	Details - medium lines
OPENING	Wall openings
PEOPLE	People
PFIXT	Plumbing fixtures
PLANTS	Plants - outdoor
PLANTSI	Plants - indoor
POLYGON	AEC Polygons
POWER	Electrical power
PRCL	Property
PRK-SYM	Parking symbols
ROOF	Rooflines
ROOFSLAB	Roof slabs
ROOMNO	Room tags
SCHEDOBJ	Schedule tables
SEATNO	Seating tags
SECT	Miscellaneous sections
SECTHIDE	Sections (2D)
SITE	Site
SLAB	Slabs
SPACENO	Space tags
SPACEOBJ	Space objects
STAIR	Stairs

Default layer keys for creating AEC objects	
STAIRH	Stair handrails
STRUCTBEAM	Structural beams
STRUCTBEAMIDEN	Structural beam tags
STRUCTBRACE	Structural braces
STRUCTBRACEIDEN	Structural brace tags
STRUCTCOLS	Structural columns
STRUCTCOLSIDEN	Structural column tags
SWITCH	Electrical switches
THIN	Details - thin lines
TINN	Triangulated irregular network
TITSCALE	Graphical Scales
TITTEXT	Border and title block
TITTEXT-DWG	Drawing title text
TOILACC	Architectural specialties
TOILNO	Toilet tags
TOPO	Topography
UTIL	Site utilities
VEHICLES	Vehicles
VIEWPORT	Sheet View viewports
WALL	Walls
WALLFIRE	Fire wall patterning
WALLNO	Wall tags
WIDE	Details - wide lines
WIND	Windows
WINDASSEM	Window assemblies
WINDNO	Window tags
XLINE	Construction line

Default layer keys for creating AEC objects	
ZONE	Zones
ZONENO	Zone tags

Default Layer Key Values

The following default values are assigned to new layer keys.

Default values for layer keys	
Layer name	Same as layer key name. Assigned to appropriate layer root name.
Description	Blank
Color	7 (white/black)
Linetype	Continuous
Lineweight	Default
Plot style	Normal
Plot	Yes

Creating a Layer Key Style

Use this procedure to create a layer key style. You can create a layer key style by using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

If you want to use layer key overrides, you must base the layer key style you create on a layer standard in the current drawing. If you create a nonstandard layer key style, you cannot attach layer key overrides to that layer key style.

1 Click Home tab ➤ Layers panel ➤ ➤ Layer Key Styles . Alternatively, in the Layer Properties Manager palette, click .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Create a new layer key style:

If you want to…	Then…
create a style with default properties	right-click Layer Key Styles, and click New.
create a style from an existing style	right-click the layer key style you want to copy, and click Copy. Right-click Layer Key Styles, and click Paste.

3 Right-click the new layer key style and click Rename.

4 Enter a name for the new layer key style, and press *ENTER*.

5 Edit the new layer key style:

If you want to…	Then…
specify properties for layer keys	see Editing Layer Key Styles on page 498.
add notes and files to the style	see Attaching Notes and Files to a Layer Key Style on page 500.

6 When you finish specifying the properties of the layer key style, click OK.

Creating a Layer Key Style from an LY File

Use this procedure to create a new layer key style from an existing LY file from S8 or Release 1 of Architectural Desktop. If the LY file that you are using does not contain the default layer keys required by the software, they are added to the new layer key style by default and mapped to default layers based on the key name. For example, the layer key ANNOBJ maps to the layer ANNOBJ.

If you want to use layer key overrides, you must base the new layer key style on a layer standard. If you create a nonstandard layer key style, you cannot attach layer key overrides to that layer key style. When you create an original layer key style from an existing LY file, you can choose which sections of the LY file you want to include in your layer key style.

You must first import an existing LY file.

1 On the command line, enter **-AECLYImport**.
2 Enter the file name to import, or enter **?** and browse for a file.
3 Select a file, and click Open.
4 Enter the name for the new layer key style.
5 Select the sections of the LY file you want to include in the new layer key style.
6 Click OK.

A new layer key style is created. It is not associated with a layer standard until you assign the new layer key style to a layer standard. For more information about changing style properties, see Editing Layer Key Styles on page 498.

Editing Layer Key Styles

Use this procedure to edit a layer key style.

- You can change the layer standard that a layer key style is based on, or you can specify a layer standard for a nonstandard layer key style.
- You can add layer keys to the layer key style.
- You can remove any layer keys except the default layer keys.
- You can edit the layer properties of the layers to which the layer keys map.
- You can specify whether layer key overrides can be used with the layer key style.

1 Click Home tab ➤ Layers panel ➤ ➤ Layer Key Styles . Alternatively, you can click in the Layer Properties Manager.
The Style Manager is displayed with the current drawing expanded in the tree view.
2 Select the layer key style that you want to change.

3 Click the Keys tab.

4 Specify the layer standard:

If you want to…	Then…
specify a different layer standard on which to base the layer key style	select a new layer standard for Standard.
specify that the layer key style is not based on a layer standard	select Non Standard for Standard.

NOTE You can base more than one layer key style on the same layer standard so that each layer key style can be used with different color, linetype, and override settings.

5 To add a new layer key, click Add.

New keys are added with default values.

6 To delete a layer key, select a layer key, and click Remove.

You cannot delete the default layer keys.

TIP To change the properties of more than one layer key at a time, hold down *CTRL* and select the additional layer keys.

7 Select a layer key, and specify the layer key properties:

If you want to…	Then…
modify the description for a layer key	double-click the text that you want to change for Description, and enter new text.
modify the layer name	under Layer, click the [...] button. Specify the appropriate values for layer fields, and click OK.
modify the color for a layer key	under Color, click the current value. Select a new color, and click OK.
modify the linetype for a layer key	under Linetype, click the current value. Select a new linetype, and click OK.
modify the lineweight for a layer key	under Lineweight, click the current value. Select a new lineweight, and click OK.
specify whether a layer key will plot	under Plot, click the printer icon to turn plotting on or off.
specify whether to allow layer field overrides	under Allow Overrides, clear the options for which overrides are not allowed. **TIP** When you first add a new layer key by default the name generated for the layer is not yet based on the layer standard used. This is why the layer overrides are inactive. Modify first the layer name associated to the key by clicking the [...] button. Once the name is based on the layer standard, you can allow overrides to the standard.

8 Click OK.

Attaching Notes and Files to a Layer Key Style

Use this procedure to enter notes and attach reference files to a layer key style. You can also edit notes and edit or detach reference files from a layer key style.

1 Click Home tab ➤ Layers panel ➤ ➤ Layer Key Styles . Alternatively, you can click in the Layer Properties Manager.

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Select the layer key style that you want to change.

3 Click the General tab.

4 To add a description to the layer key style, enter it for Description.

5 Click Notes.

6 To add a note, click the Notes tab, and enter the note.

7 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK two times.

Layer Key Overrides

A layer key override enables you to change the default layer names specified by one or more layer keys. The structure of layer names is determined by the descriptive fields in the layer standard definition. You can allow overrides on all the layer keys within a layer key style, or you can select individual layer keys that you want to override. You can override all descriptive fields that make up the layer name, or you can specify which descriptive fields to override. You can apply overrides to any layer keys in a layer key style that is based on a layer standard.

For example, in the AIA 2nd Edition layer standard definition, the Discipline Designator field assigns a description and the Major field assigns a name by default. By using layer key overrides, you can change the values specified in these fields and add values in the unused fields, Minor Code and Status.

The information that you enter to create layer key overrides must conform to the field width and value types specified by the layer standard definition. For example, you cannot specify a four-letter override in the Discipline Designator field in the AIA 2nd Edition Layer Standard, because the maximum width for the Discipline Designator field as specified in the AIA layer standard definition is 1. To modify the descriptive fields, you must edit the layer standard definition. For more information, see Creating and Editing Layer Standards on page 502.

After you add overrides to a layer key style, you can turn the overrides on and off in your current drawing. When the layer key overrides are on, objects that you create are placed on layers defined by the layer standard

definitions and overridden with the values that you specify. When the layer key overrides are off, objects that you create are placed on the layers defined only by the layer keys. You can start using the layer key overrides immediately after you specify them, or you can use the Overrides On/Off command to switch them on later.

Layer key overrides do not change the layer assignments of existing objects. Only objects added after an override is enabled are affected by the override.

Specifying Layer Key Overrides

Use this procedure to specify layer key overrides. The layer key overrides that you specify apply only to the layer keys that have any or all descriptive field overrides selected in the Layer Key Properties dialog box. For more information, see Editing Layer Key Styles on page 498.

To specify layer key overrides, you must have a layer key style that is based on a layer standard. If you base your layer key standard on a nonstandard style, you cannot specify layer key overrides.

If you do not have all overrides enabled in the Layer Key Overrides dialog box, objects that you draw after you exit the dialog box are placed on the layer defined by the layer standard. You can use the Overrides On/Off command to turn on the layer overrides later.

NOTE Individual layer keys that do not allow overrides as specified in the Layer Key Properties dialog box are not overridden when you select Enable All Overrides.

1. Click Home tab ➤ Layers panel ➤ ➤ Layer Key Overrides . Alternatively, in the Layer Properties Manager palette, click .
2. Under Current Layer Key Style, select the layer key style that you want to override.

   The layer standard that the layer key style is based on is displayed under Based on Standard and is not editable.
3. Enter values for Override or click the [...] button to specify values to override the information in the descriptive fields.

   The fields in this dialog box depend on the layer standard your layer key style is based on. For example, if you are using the AIA 2nd Edition layer standard, you can enter override values for the Discipline Designator, Major, Minor 1, Minor 2, and Status descriptive fields.
4. To begin using the layer overrides immediately, select Enable All Overrides.
5. Click OK.

   If you turned on the layer key overrides, any objects that you create now use the layer key overrides according to the override values that you have specified and whether you allowed overrides for the layer keys in the layer key style. If you did not turn on the layer key overrides, objects that you create are placed on layers defined by the layer standard.

Turning Layer Key Overrides On and Off

You can use the Overrides On/Off command to turn layer key overrides on and off for the current layer key style in your drawing. This command is available only if your current layer key style is based on a layer standard and if you have specified layer key overrides. If the layer key overrides are on in the current drawing, a check mark is displayed next to the command name on the menu.

- At the command prompt, enter **AecToggleLKeyOverridesMnu**.

If you turned the layer key overrides on, objects that you create are placed on layers defined by the layer standard definitions and are overridden with the values that you specified. If you turned the layer key overrides off, objects that you create are placed on layers defined by the layer standard.

Remapping Objects to Different Layers

Use this procedure to change the layer an object is drawn on by remapping it from the current layer key to a different layer key.

1 Click Home tab ➤ Layers panel ➤ ▾ ➤ Remap Object Layers .
2 Select the object or objects that you want to change, and press *ENTER*.
3 To view the list of available layer keys, enter **?**.
4 Press *F2* to view the list of layer keys.
5 Select the layer key that you want to map the object to, right-click, and click Paste To CmdLine.
6 Press *F2* to close the text window, and press *ENTER*.

The object is mapped to a different layer in your drawing, respecting any current layer key overrides.

Restoring Objects to Default Layer Key Layers

Use this procedure to restore the default layer key assignment to an object after you remap the object to a different layer by assigning it to a different layer key.

1 Click Home tab ➤ Layers panel ➤ ▾ ➤ Remap Object Layers .
2 Select the object or objects that you want to change, and press *ENTER*.
3 Enter **o** (byObject).

   This applies the layer assigned to the default layer key of each object in the selection set, respecting any current layer key overrides.

4 Press *ENTER*.

Creating and Editing Layer Standards

A layer standard contains predefined layer names and a set of rules that determines the names of new layers that you create using that layer standard. You can use layer standards to establish individual, project, or office layering conventions that provide consistent and informative layer names. AutoCAD Architecture provides a number of layer standards that you can use in drawings. You can also create your own layer standards by customizing an existing layer standard.

How Layer Standards Determine Layer Name

When you create a new layer using a layer standard, the layer name has a number of parts separated by delimiters (for example, hyphens). Each part of the layer name is determined by rules specified in a corresponding field of the layer standard.

For example, the AIA 2nd Edition layer standard includes five fields that form each new layer name: Discipline Designator, Major, Minor 1, Minor 2, and Status. Each field is separated by a hyphen (?) delimiter, as in the following example:

(Discipline Designator) - (Major) - (Minor 1) - (Minor 2) - (Status)

A layer in your drawing with a Discipline value of “A,” a Major value of “Wall,” a Minor 1 value of “Full,” a Minor 2 value of “Abov” and a Status value of “D,” to denote a demolition layer, would be named A-WALL-FULL-ABOV-D.

You can edit the layer standard definition to change these rules. For more information, see Editing Component Fields on page 508.

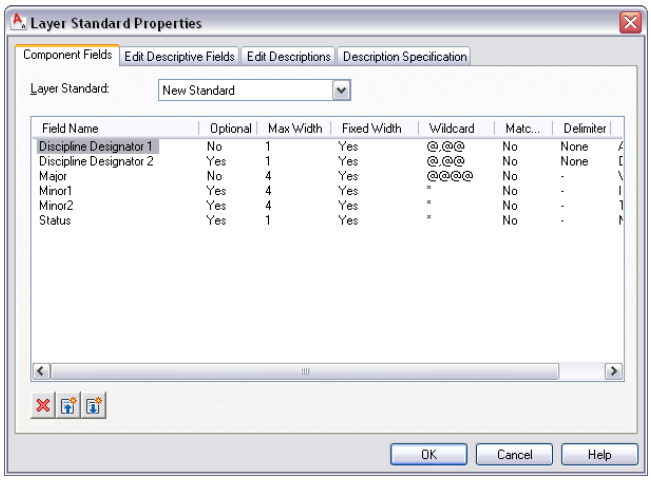
You can override the information in each field to change the way a layer standard creates a layer name by specifying layer key overrides. For more information, see Layer Key Overrides on page 500.

Layer Standards Included with the Layer Properties Manager

AutoCAD Architecture provides industry-standard layering conventions including: AIA 2nd Edition, BS1192 Descriptive, and BS1192 - AUG Version 2. Additional international layer conventions are also provided including: DIN 276, ISYBAU Long Format, ISYBAU Short Format, and STLB. Each layer standard contains specific information organized in fields. You can specify how the information appears in each field by changing the values in the layer standard fields. For more information, see Editing Component Fields on page 508.

Component Fields in Layer Standards

Each layer standard defines the number of component fields that make up a layer name and specifies the rules for the content allowed in each field. If you create or edit a layer standard, you access the layer standard properties to edit the component fields.



Component Field Descriptions

Each layer standard contains the following component fields.

Value	Description
Field Name	Identifies the field. Field names should be as consistent as possible across layering systems to aid in translation.
Optional	When Yes, allows the field to be omitted from the end of the layer name. Optional layer fields cannot precede a required layer field unless the match option is Yes so that the fields can be identified according to a match against specific descriptions.

Value	Description
Max Width	Represents the maximum width in characters that can be used.
Fixed Width	When Yes, prevents a field from being shortened from the max width setting.
Wildcard	An AutoCAD wildcard pattern that the field must match.
Match Description	When Yes, recognizes the field only if it exactly matches a description. You can omit fields from the middle of layer names. For example, an AIA layer may be made up of <discipline> <major> <minor>, or <discipline> <major> <status>, or <discipline> <major> <minor> <status>, as the <minor> field may not precede the <status> field and can be determined only by matching the field value against valid <minor> field descriptions. **NOTE** When omitting fields from layer names, verify that the omitted field Match Description property is No. This ensures that the layer name specified can be created.
Delimiter	Specifies the character used to separate fields with no fixed width. Delimiters are often also used in fixed-width fields for clarity.
Default	A predefined value for those field names that are not optional within the layer.

For more information about the content of specific layer standards, see AIA Long Format Layer Standard on page 504 and Editing Component Fields on page 508.

AIA Long Format Layer Standard

The AIA Long Format Standard contains the following fields:

Field Name	Description
Discipline Designator	Shows divisions of manageable sections. For example, A for architectural, M for mechanical. This field is required.
Major	Designates assemblies or construction systems such as walls and doors. This field is required.
Minor 1	Further differentiates major groups into minor groups such as full-height walls and partial-height walls. This field is optional and user-defined.
Minor 2	Additional information, like title or unit information.
Status	Differentiates phases of work. For example, New indicates new, Demo indicates to be demolished. This field is optional.

The following table lists the rules for the AIA Long Format Layer Standard:

AIA Long Format							
Field	**Optional**	**Width**	**Fixed**	**Wildcard**	**Match**	**Delimiter**	**Default**
Discipline Designator	No	1	Yes	"@"	No	None	A
Major	No	4	Yes	"@@@@"	No	"-"	Wall
Minor	Yes	4	No	"*"	No	"-"	
Status	Yes	4	No	"*"	No	"-"	

BS1192 - AUG Version 2 Layer Standard

The BS1192 - AUG Version 2 layer standard contains the following fields:

Field	Description
Discipline	Identifies the author of the layer by using a single character. For example, A for architect, S for structural engineer. This field is required.
Category	Identifies the building element by using three digits and uses CISfB as a common referencing system. For example, 210 for wall, 315 for door. This field is required.
Graphics	Indicates information that is associated with the category by using a single character. For example, D for dimension, G for graphics, T for text. This field is required.
Grade	Expresses as a single digit the recommended line thickness, where 1 is the thinnest and 9 is the thickest. This field applies mostly when using text where ISO standard pen thicknesses correlate with ISO standard text heights. For example, text that is 2.5mm high that is drawn with a 0.25mm pen is given a pen grade of 2. This field is required.
Level	Differentiates viewing planes in plan, section, or elevation view by using a two-digit alphanumeric character. For example, 01 would be Level/Floor 1, EA the elevation, and SA Section A. This field is optional.
Status	Indicates the state of work by using a single character. For example, N indicates new, R indicates to be removed. This field is optional.
Scale	Indicates the level of detail to be shown by using a single character. For example, P indicates a planning level, D indicates a detail. This field is optional.
Phase/Time	Indicates phasing or alternatives by using a single character.

Field	Description
User	Specifies the user. It is not a fixed width field but is separated from the rest of the layer name with an underscore. For example, A210G701_WALL_L1. This field is optional.

The following table lists the rules for the BS1192 - AUG Version 2 Layer Standard:

BS1192 - AUG Version 2

Field		Optional	Width	Fixed	Wildcard	Match	Delimiter	Default
Discipline		No	1	Yes	[0A-Z]	No	None	A
CSIfB	CISfB-A	No	1	Yes	#	No	None	1
	CISfB-B	No	1	Yes	#	No	None	0
	CISfB-C	No	1	Yes	#	No	None	0
Graphics		No	1	Yes	[0ACDGHTZ]	No	None	G
Grade		No	1	Yes	#	No	None	7
Level		Yes	2	Yes	[0-9A-Z][0-9A-Z]	No	None	00
Status		Yes	1	Yes	[0NXR]	No	None	0
Scale		Yes	1	Yes	[0ASPD]	No	None	0
Phase		Yes	1	Yes	[0-9A-Z]	No	None	0

BS1192 - Descriptive Layer Standard

The BS1192 - Descriptive layer standard contains the following fields:

Field Name	Description
Discipline	Identifies the author of the layer by using a single character. For example, A for architect, S for structural engineer. This field is required.
Element	Identifies the building element by using a descriptive name for it. For example, possible choices for this field are “Equipment” or “Room.” This field is required.
Graphics	Indicates information that is associated with the category by using a single character. For example, D for dimension, G for graphics, T for text. This field is required.

Field Name	Description
Level	Differentiates viewing planes in plan, section, or elevation view by using a two-digit alphanumeric character. For example, 01 would be Level/Floor 1, EA the elevation, and SA Section A. This field is optional.
Status	Indicates the state of work by using a single character. For example, N indicates new, R indicates to be removed. This field is optional.
Scale	Indicates the level of detail to be shown by using a single character. For example, P indicates a planning level, D indicates a detail. This field is optional.
Phase	Indicates phasing or alternatives by using a single character.
User	Specifies the user. It is not a fixed width field but is separated from the rest of the layer name with an underscore. For example, A210G701_WALL_L1. This field is optional.

The following table lists the rules for the BS1192 - Descriptive Layer Standard:

BS1192 - Descriptive

Field	Optional	Width	Fixed	Wildcard	Match	Delimiter	Default
Discipline	No	1	Yes	[0A-Z]	No	None	A
Element	No	15	No	*	No	-	Wall
Graphics	No	1	Yes	[0ACDGHTZ]	No	-	G
Level	Yes	2	Yes	[0-9A-Z][0-9A-Z]	No	None	00
Status	Yes	1	Yes	[0NXR]	No	None	0
Scale	Yes	1	Yes	[0ASPD]	No	None	0
Phase	Yes	1	Yes	[0-9A-Z]	No	None	0

Creating a Layer Standard

Use this procedure to create a layer standard, with default settings or based on an existing standard, that specifies naming conventions for layers in drawings.

If your drawing does not contain a layer standard, you can import a layer standard from another drawing or an AutoCAD Architecture template. For more information, see Importing Layer Standards on page 511.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Click New.

4 To base the new layer standard on an existing standard, select Based On, and select a standard.

5 Enter a name for the new layer standard, and click OK.

6 Edit the new layer standard:

If you want to…	Then…
specify component fields of the layer standard	see Editing Component Fields on page 508.
specify descriptive fields of the layer standard	see Editing Descriptive Fields on page 509.
specify the descriptions for the layer standard	see Editing Descriptions on page 509.
specify the descriptive specifications of the layer standard	see Editing Description Specifications on page 510.

7 Click OK.

Editing Component Fields

Use this procedure to specify how you want to set up the fields within the layer standard that determine the different parts of the layer names created with that standard. You can add and delete fields here.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select the layer standard that you want to edit, and click Edit.

4 Click the Component Fields tab.

5 Modify the component fields:

If you want to…	Then…
delete a component field	select the field, and click .
add a component field above an existing field	select the field, click , and enter a name for the new component field.
add a component field below an existing field	select the field, click , and enter a name for the new component field.
edit a field name	double-click the name of the field, and enter a new name over the existing name.
change the values of individual components of the fields	select the values that you want to change, and select a new value. For more information, see Component Field Descriptions on page 503.

6 Click OK two times.

Editing Descriptive Fields

Use this procedure to add a description that is applied to each component field in the layer name. You can add a single description to a group of layer name component fields.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select the layer standard that you want to edit, and click Edit.

4 Click the Edit Descriptive Fields tab.

5 Modify the descriptive fields:

If you want to…	Then…
delete a descriptive field	select the field, and click .
add a descriptive field above an existing field	select the field, click , and enter a name for the new descriptive field.
add a descriptive field below an existing field	select the field, click , and enter a name for the new descriptive field.
edit a field name	double-click the name of the field, and enter a new name over the existing name.
delete a component from a descriptive field	select the component, and click Delete.

6 Click OK two times.

Editing Descriptions

Use this procedure to map longer or different descriptions to the component fields of the layer name.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select the layer standard that you want to edit, and click Edit.

4 Click the Edit Descriptions tab.

5 Modify the descriptions:

If you want to…	Then…
delete a description	select the field description, and click .
edit a description	select the field description, click . Make changes to the description, and click OK.

If you want to…	Then…
add a field with a value and a description	click . Enter a value and a description for the field, and click OK. To add multiple fields, click Apply after each individual field, and click OK to finish.

6 Click OK two times.

Editing Description Specifications

Use this procedure to specify how all the fields in the layer standard determine the layer description that is displayed in the Layer Properties Manager. You can change the field that is used in the description and the order of the fields, and you can add text to the beginning of the layer description.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select the layer standard that you want to edit, and click Edit.

4 Click the Description Specification tab.

5 Specify how the fields determine the layer description:

If you want to…	Then…
delete a layer standard field	select the field, and click .
add a field above an existing field	select the field, click , and enter a name for the new field.
add a field below an existing field	select the field, click , and enter a name for the new field.
edit text	double-click the text for Prior Text, and enter a new name.
change a field value	select the current value for Field, and click a new value.

6 Click OK two times.

Purging Layer Standards

Use this procedure to remove standards that are not in use.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Select the layer standards that you want to purge, and click Purge.

4 Click OK.

NOTE To purge all layer standards and layer key styles in a drawing, enter **AecPurgeLayerStyles**. This is beneficial to use when creating custom templates or when importing new layer standards and layer key styles.

Importing Layer Standards

Use this procedure to import layer standards from other drawings or from the *AecLayerStd.dwg* drawing in *C:\ProgramData\Autodesk\ACA 2010\enu\Layers* folder.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Click Import/Export.

4 Click Open.

5 Select the drawing with the layer standards that you want to import, and click Open.

All the layer standards in the drawing are displayed in the External File list.

6 Under External File, select the layer standard that you want to import, and click Import.

You can select more than one layer standard in a list by holding down *CTRL* while you select the additional layer standards.

If you import a layer standard that already exists in the target drawing, a message is displayed asking if you wish to overwrite the existing layer standard. Click Yes to overwrite the existing layer standard, or click No to cancel.

7 Click OK.

The layer standards that you imported are displayed in the Layer Standards dialog box.

Exporting Layer Standards

Use this procedure to export layer standards from the current drawing to a new drawing or to an existing drawing.

1 If necessary, open the Layer Properties Manager by clicking Home tab ➤ Layers panel ➤ Layer Properties .

2 Click .

3 Click Import/Export.

4 Export the layer standards:

If you want to…	Then…
export layer standards to a new drawing	click New, enter a name for the new drawing, and click Save.
export layer standards to an existing drawing	click Open, select a drawing, and click Open.

5 Select the layer standards that you want to export, and click Export.

You can select more than one item in a list by holding down *CTRL* while you select the additional items. If you export a layer standard that already exists in the target drawing, a message is displayed asking if you wish to overwrite the existing layer standard. Click Yes to overwrite the existing layer standard, or click No to cancel.

6 Click OK two times.

Appendix: LISP Changes for Layer Snapshots and Layer States

NOTE In AutoCAD Architecture 2010 the Layer Snapshot functionality is discontinued in favor of the Layer State functionality. Existing layer snapshots (LAY) files are automatically converted to layer states (LAS) when the Layer States Manager is invoked in a legacy drawing with layer snapshots. The layer snapshot is deleted after the conversion.

If you have accessed layer snapshots via LISP routines in the past, these LISP functions are the equivalents of the discontinued layer snapshot functions and must be exchanged in your scripts:

Defunct Layer Snapshot Function	New Layer States Function
AecLayerAddToSnapshot	layerstate-addlayers
AecLayerExportSnapshot	layerstate-export
AecLayerGetSnapshot	layerstate-getlayers
AecLayerImportSnapshot	layerstate-import
AecLayerRestoreSnapshot	layerstate-retore

For more information about these functions, see the AutoLISP Reference in the AutoCAD Help.

Display System

10

The display system in AutoCAD Architecture controls how AEC objects are presented in a designated viewport. By specifying the display configuration in a viewport and the direction from which to view the objects, you can produce different architectural representations. The display system lets you produce floor plans, reflected plans, elevations, 3D models, or schematic displays without redrawing objects.

Introduction to the Display System

The display system in AutoCAD Architecture is designed so that you only have to draw an architectural object once. The appearance of that object then changes automatically to meet the display requirements of different types of drawings, view directions, or levels of detail.

Display Properties and Display Components

The view-dependent display of objects in AutoCAD Architecture is made possible by a hierarchical system of display settings that specify display properties (visibility, layer, color, linetype, and so on) for individual display components of all the different types of architectural objects under all the different viewing scenarios.

For example, a door object has 5 display components by default: Door Panel, Frame, Stop, Swing, and Glass. (Many display components correspond directly to the physical components of the object, but some, like Swing, do not.) For each of these display components, the drawing default settings specify the relevant display properties as appropriate for the drawing type. In the case of doors, the default settings specify that the Swing component is visible in plan and elevation views, but not in 3D views.

Overrides

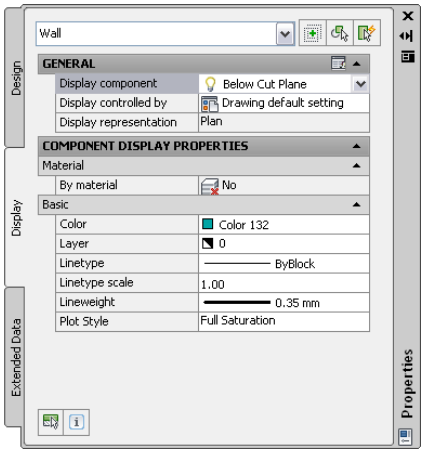
The drawing default settings for a particular type of object apply to all such objects in the drawing, except those for which an override is in effect. For example, you can change a setting for all doors of a particular style (a style override) or for an individual door (an object override).

Establishing and Modifying Default Display Settings

If you are a CAD manager, you will want to fully understand the Display System Structure on page 519 and The Display Manager on page 528 topics so that you can modify and organize default settings as necessary to implement your own display standards. But any user can quickly change the appearance of an object in a particular view by modifying values on the Display tab of the Properties palette.

NOTE To hide the Display Tab (or show it if it is currently hidden), enter the following command at the command line: AecChangeDisplayTabStatus.

Display tab when display component is selected



To change the display using this tab, you select an object display component (like a hatch or a boundary), and then select or enter a new value for the display property you want to change (such as color, visibility, or lineweight). The results are immediately visible in the drawing area for the current display representation and can be applied to other display representations that use the same component. You can also apply style or object overrides by changing the value of Display controlled by. For detailed instructions, see Using the Properties Palette to Change Display Properties on page 514.

Using the Properties Palette to Change Display Properties

You can use the Display tab of the Properties palette to change the display property settings for a selected object in the current display representation. You can change settings for properties that apply to the object as a whole (such as Cut plane height), as well as settings for the object's individual display components (such as Color, Layer, and Linetype for a hatch component).

You can also specify whether your changes will apply to:

- all objects of the selected type (drawing default)
- all objects of the same style as the one to which the component belongs (a style override)
- only the selected object (an object override)

You can also apply your changes to other display representations that use the same display component to draw the selected object.

NOTE To hide the Display Tab (or show it if it is currently hidden), enter the following command at the command line: AecChangeDisplayTabStatus.

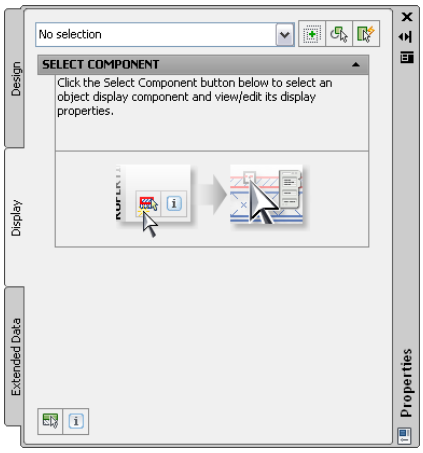
---

1 If necessary, open the Properties palette using any of the following methods:

- Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .
- Press *CTRL*+1.
- Select an object in the drawing, right-click, and click Properties.
- Double-click an object in the drawing.

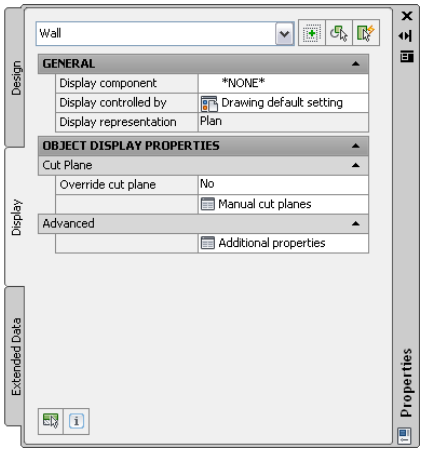
2 On the Properties palette, click the Display tab.

Display tab with no object selected



3 Select an object in the drawing area. Note that the current display representation is identified under the General category on the Display tab

Display tab with one object selected



4 Under the General category, for Display controlled by, select the level at which you want your changes applied, as described in the following table

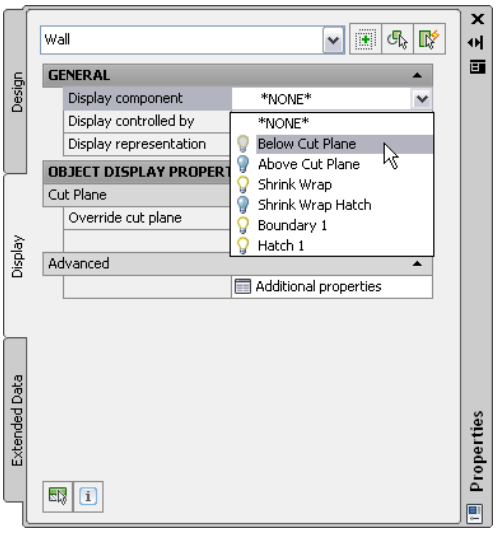
If the value of Display controlled by is …	Then your changes will apply to …
Drawing default setting	all objects of the same type for which no overrides are in effect (for example, all doors in the drawing).
<object type>Style:<style name> (for example: Door Style: Hinged - Single)	all objects with the specified style for which no object overrides are in effect. This is called a style override; it takes precedence over the drawing default setting.
This object	the selected object only. This is called an object override; it takes precedence over either the drawing default setting or the style.

5 Do one of the following:

If you want to …	Then …
change one or more display property settings for a particular object display component (or change the visibility setting for multiple components)	proceed to step 6.
view or modify display properties that apply to the entire object at the level currently specified by the value of Display controlled by	for Display component, select *NONE*, then under the Object Display Properties category, change the value or click the worksheet button for whichever property or set of properties you want to modify. The properties shown under this category depend on the type of object selected. For detailed information about modifying display properties for a specific object type, see the relevant Help topic, such as Walls or Doors. Each of these object topics contains subtopics for each category of display property. For example, for instructions on changing settings on the Other tab for a wall object, see Specifying the Display of Other Characteristics of a Wall on page 811.

6 To change one or more display property settings for a particular object display component, first use one of the following methods to select it:

- If an object is already selected, under the General category on the Display tab, select a component from the Display component drop-down list.

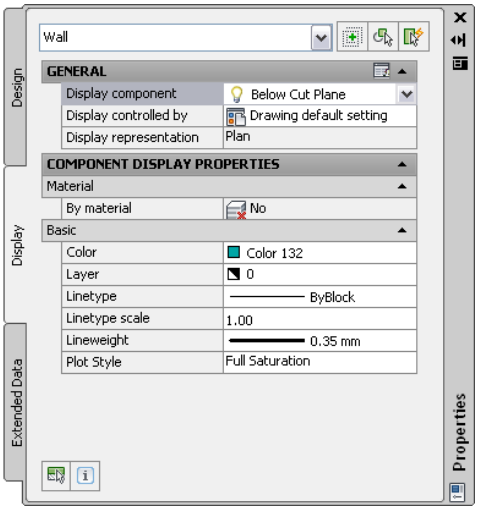


The color of the light bulb icon preceding each component name indicates whether the component is visible (yellow) or not (blue) in the current display representation. When the list is open, you can click one or more of these icons to change the visibility setting for the associated component(s). Your changes take effect in the drawing when you close the drop-down list by clicking a component name, pressing *Enter*, or clicking anywhere outside the list. Pressing *Esc* closes the list and cancels any visibility setting changes you have made while the list was open.

TIP A hatch may obscure other components, which can be selected inadvertently when you click on the hatch in the drawing area.Therefore, the drop-down list is the preferred method for selecting solid hatch components. Note also that the drop-down list contains only components whose appearance is controlled by the display system. Clicking in the drawing area may result in the selection of an object or component whose display cannot be modified through the Display tab (such as MV blocks, custom blocks, AutoCAD objects, and other entities). In such cases, an error message will identify why the selection is invalid.

- If no object is selected, at the bottom of the Display tab, click , and then click the display component in the drawing area.
- Regardless of whether an object is selected, you can right-click in the drawing area, click Select Component, and then click the display component you want to modify.

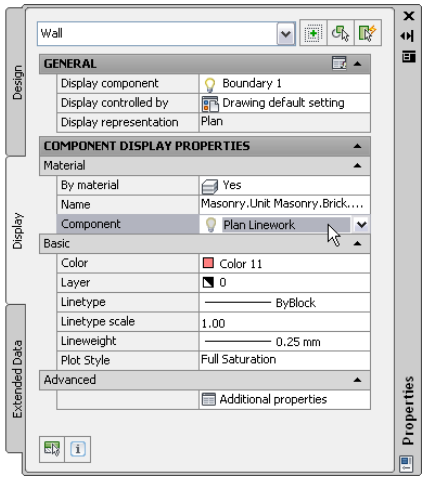
Display tab with object display component selected



NOTE The property settings shown on the Display tab for a selected component are specific to the display system. In most cases these settings will not be the same as the settings (either default or override) for associated layers in the Layer Properties Manager.

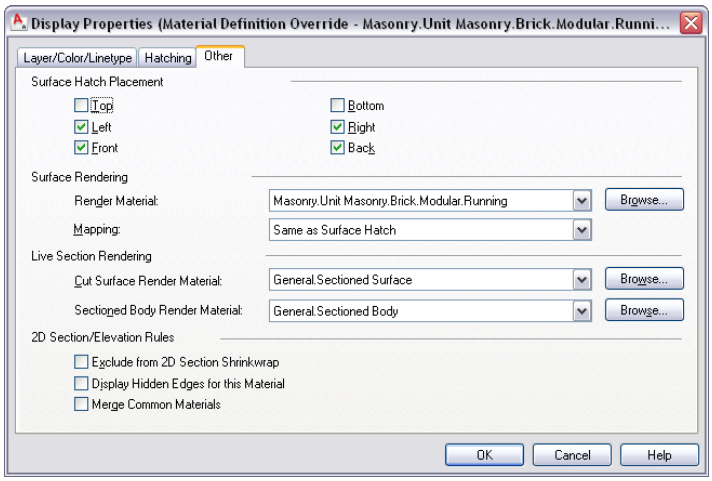
7 Enter or select a new value for any display properties you want to change. The results of your changes are immediately visible in the drawing area. Note that the properties shown on the Display tab vary depending on the object and component selected. Most are self-explanatory. For detailed information about modifying display properties for a specific object type, see the relevant Help topic, such as Walls or Doors. Each of these object topics contains subtopics for the applicable categories of display properties. For example, the Walls topic includes separate subtopics for Specifying the Layer, Color, and Linetype of a Wall on page 808 and Specifying the Hatching for Components of a Wall on page 808.

NOTE If the value of By Material is Yes, then your changes will apply to all objects with display components controlled by the material definition identified by the Name property, regardless of the value of Display controlled by. This is called a material definition override. When By material is Yes, you can access the drop-down list of material display components and change their visibility settings using the same technique described for display components in the previous step.



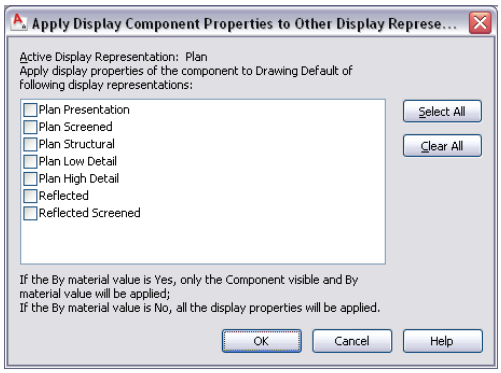
In this case, the Display tab also includes an Advanced category under which the Additional Properties worksheet button accesses a dialog where you can view and modify display properties associated with the material definition, such as surface hatch placement and surface rendering, as shown below. For detailed instructions, see Creating and Editing Material Definitions on page 599.

Other tab for material definition override



8 If you want to apply your changes to other display representations at the same level indicated by the Display controlled by value, click the worksheet button on the title bar of the General category. (Note that the worksheet button is available only when a display component is selected, and the worksheet lists only those display representations that can be applied to that component.)

Worksheet for applying changes to other display representations



9 On the worksheet, select the display representations to which you want your changes to apply, and click OK.

NOTE If the value of By material is Yes, only that setting and the Component visible setting will be applied to the selected display representations. If the value of By material is No, all of the display property settings for the component will be applied to the selected display representations.

Display System Structure

You use the display system to manage display properties and view assignments for objects in your project. You can also create new groupings for display purposes.

Elements of the Display System

The display system has 3 major elements:

- A display representation, which controls how an individual object, such as a door or a wall, is displayed
- A display set, which is a group of display representations of objects
- A display configuration, which is a collection of display sets assigned to particular view directions

These 3 elements are hierarchical: each display configuration contains a number of display sets, and each display set contains a number of display representations. To use a display configuration, you assign it to a viewport. The objects in the viewport then use the display properties specified in the display configuration.

Predefined Display Configurations in Templates

You use different display configurations for different tasks, such as sketching and plotting. You also use different display configurations for different types of drawings, such as floor plans, 3D models, and elevations.

AutoCAD Architecture includes templates with predefined display configurations applied to viewports. These configurations are created for typical architectural tasks and drawing types. You can use the configurations and viewports supplied by the templates, or you can modify the display system settings to suit your office standards. If you want to create your own display configurations, you can start a drawing from scratch or from a template that does not contain predefined display configurations.

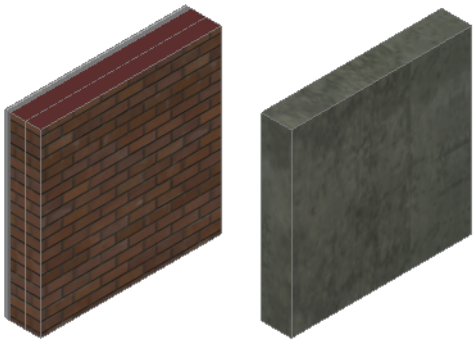
Materials and the Display System

A material definition is a group of settings for the display properties of a real-world material, such as glass, brick, or wood. The settings define how the components assigned to the material appear in every view.

The materials feature works with the display system to simplify the process of customizing the display of drawings. Rather than specifying individual properties, you can control the display of objects according to the materials assigned to the physical components of the objects.

For example, you can assign brick as the material for all walls whose components consist of this material. The display properties of the bricks are customized to look like a typical brick wall. By assigning the material to walls, you avoid the need to customize the display properties for each wall that uses brick material. In addition, if the materials change during the project, you can reassign components to the new material.

Wall components with assigned brick and concrete materials



Sample styles in AutoCAD Architecture catalogs contain predefined materials assigned to their components. Use these materials in your drawings, customize them, or create your own materials. For more information, see Creating and Editing Material Definitions on page 599.

Display Settings in External References

You cannot change a display setting in an external reference while refediting it from its host drawing. You can open Display Manager and make changes, but they will not be saved when the external reference is saved and closed in the host drawing. To make changes to display settings in external references, you need to open the external reference drawing directly, make the changes there, and save it. The external reference should then be reloaded to update the changes

Display Representations

A display representation defines how the components that make up an object are drawn. In traditional CAD and manual drafting, a single object, such as a door, is typically drawn multiple times in different drawings. In these drawings, each instance of a door is a separate collection of linework. In AutoCAD Architecture, you can create an object that changes the way it draws itself depending on the display representation used to represent that object.

Display Components of AEC Objects

Most AEC objects are made up of individual components. For example, a door has the following components: door panel, frame, stop, swing, glass, and threshold. A door may also have muntins.

Each component of an object has both physical and graphical properties that help to determine the display representation of that object.

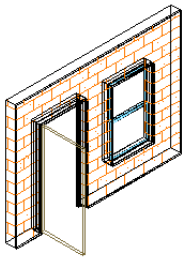
- The physical properties of an object control width, height, shape, and location of the object in the drawing.
- The graphical properties control visibility (on/off), layer, color, and linetype.

You typically decide the physical properties of an object when you create it. For example, you specify the size of a door and its location in a wall. You control the graphical properties of an object in its display representation. You can define multiple display representations for the same object.

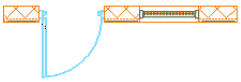
Display Representations and View Directions

A display representation is not dependent on view direction, although it usually is designed with a specific view in mind.

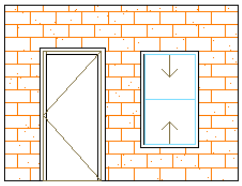
Objects displayed from different view directions that use different display representations



Model display representations for wall, door, and window shown in 3D from an isometric view direction



Plan display representations for wall, door, and window shown in 2D from a plan view direction



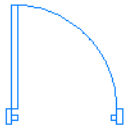
Elevation display representations for wall, door, and window shown in 2D from a front view direction

Why Most Objects Have Multiple Display Representations

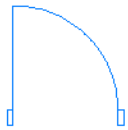
All objects have predefined display representations. Most objects have Plan, Model, and Reflected display representations, because these are the most common design situations. Some objects, such as cameras and reference AEC objects, have only a General representation, because the display of these objects does not change in different views.

A single object can be drawn in various ways, depending on the needs of different drawing types. For example, the Plan display representation draws the door panel, frame, stop, and swing components. The Nominal display representation draws the door panel, frame, and swing components. Although both representations draw the door panel, each draws it differently. The Plan representation draws a door panel as a rectangle, while the Nominal representation draws it as a single line.

Door shown in the Plan and Nominal display representations



door in Plan display representation showing frame, panel, swing, and stop



door in Nominal display representation showing frame, panel, and swing

The Plan display representation is appropriate for two-dimensional (2D) views when components are to be displayed from a plan (Top) view. The Nominal display representation is appropriate for 2D views when a limited amount of detail is needed in plan view. For example, display configurations intended for plotting at small scales, where details of objects might be obscured, often use the Nominal display representation.

Default Display Representations

The display representations available for an object and the names of those representations are based on the ways that you might need to view the object. Display representations can include different components of an object or additional display options.

For example, the display properties of stairs in the Plan display representation include settings for break marks and other stair symbols. Break marks appear only in 2D Top view drawings, so other display representations, such as Model and Elevation, do not contain settings for break marks. Similarly, objects that never display break marks do not have settings for them in their Plan display representations.

Plan display representation for stairs includes options for break marks

zigzag break mark

curved break mark

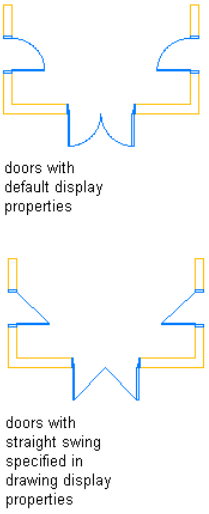
Customizing the Display of an Object

If you do not use materials to control display, you customize the appearance of an object by changing its display properties for the display representation. For example, you can turn off the door swing in the Plan display representation; specify whether the swing is straight or an arc; specify the percent open; or change the layer, color, and linetype of the swing.

To change the display of an object, you specify how changes are applied to the instances of the object in the drawing. You do this by specifying the source of the display properties for the selected display representation.

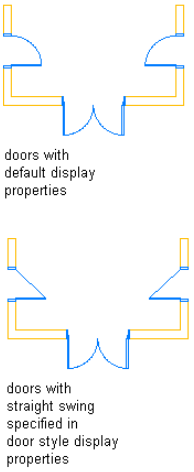
- To apply the changes to the default display properties of the object, you customize the drawing default settings. The changes affect all instances of the object in the drawing.

  Drawing default display properties affect all instances of an object

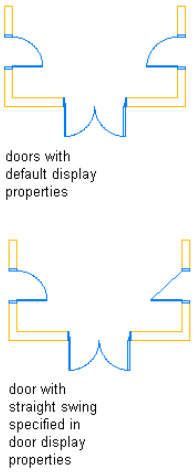
- To apply the changes to all instances of the object that have the same style, you override the drawing default settings with the display properties of the object style.

  Changes to the display properties of a style affect all objects of that style

- To apply the changes only to the selected object, you override the drawing default settings or style display properties with the display properties of the object.

Display properties of an object apply only to that object



Objects use the default display properties unless the properties are overridden by the display properties of an object style or an individual object. Generally, you customize the display properties of object styles so that the appearance of different types of the same object is consistent throughout a drawing. You may need to override the display properties of the style for an individual object in order to achieve certain results.

Display Sets

Display sets are collections of object display representations. A display set determines which objects are visible, and how the objects, such as wall assemblies that include doors and windows, are displayed in different views.

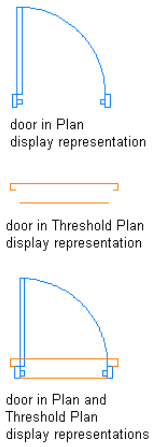
Display Representations Included in a Display Set

A display set usually contains display representations that are appropriate for specific tasks or drawing types. For example, the Reflected display set contains display representations for objects typically included in a reflected ceiling plan. This display set uses the Reflected display representation for most of these objects, but uses the Plan display representation for other objects, such as structural members, that appear the same in plan and reflected views.

A display set can contain more than one display representation for an object. For example, a display set for plotting a floor plan might include the Plan and Threshold Plan display representations for doors.

- The Plan display representation contains components for the door panel, frame, stop, and swing.
- The Threshold Plan display representation contains components for the inner and outer thresholds of the door.

Plan and Threshold Plan display representations used alone and together to display a door



If a display set contains no display representations for an object, the object is not displayed when that display set is used. For example, a display set for a reflected ceiling plan does not need representations for railings, which typically are not shown in these drawings.

Display Sets and View Direction

A display set is not dependent on view direction, although it usually is designed with a specific view in mind. For example, a Reflected display set is intended to be used to display objects from the Top view direction in a reflected ceiling plan.

Similarly, a Plan display set might contain Plan display representations for a number of objects intended for two-dimensional (2D) top views. A three-dimensional (3D) model display set might contain the Model display representation for a number of objects. The display representations included in a display set depend on what representations are available for each object, and whether objects need to be drawn differently from different view directions.

Default Display Sets

Drawings based on templates provided with AutoCAD Architecture contain display sets for many purposes. All drawings, even those that are not created from templates, contain the following default display sets: Elevation, Model, Model High Detail, Model Low Detail, Plan, Plan High Detail, Plan Low Detail, and Reflected. These display sets contain display representations for each object based on the most common design situations.

Display Configurations

A display configuration is a collection of display sets assigned to view directions.

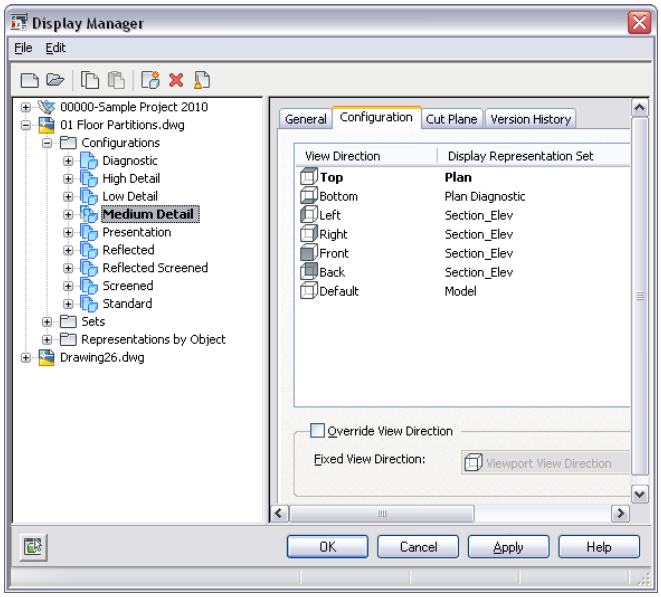
Display Configurations, Viewports, and Templates

A display configuration typically is created for a specific design task or drawing type. To use a display configuration, you assign it to a viewport. Drawings based on templates provided with AutoCAD Architecture contain layout tabs with viewports to which appropriate display configurations are assigned. You can use the configuration assigned to a viewport, assign a different one, or customize the configuration.

Display Sets Assigned to View Directions

You can identify the display set assigned to each view direction using the Display Manager. The Display Manager is a utility for managing elements of the display system. The following illustration shows a drawing with two display configurations, Medium Detail and Standard.

Sample display configurations in the Display Manager



In the Display Manager, the active viewport in the drawing (in bold type) is assigned the Medium Detail display configuration. In the left pane, the display sets used are listed below the configuration name. An icon next to each display set indicates the view direction to which the display set is applied. The Configuration tab in the right pane shows the view direction to which each display set is mapped. In this example, the current view direction in the drawing is Top, which uses the Plan display set. Objects in the active viewport are shown using the display representations in the Plan display set.

If the view direction in the active viewport is changed to Front, the objects are shown using the display representations in the Section_Elev display set. This is also true when the view direction in the active viewport is changed to Right, Left, or Back.

The display set assigned to the Default view direction is used when any view direction other than the six orthogonal views is selected, or when a view direction is not assigned a display set. If the view direction of the active viewport is changed to Bottom, objects are shown using the display set assigned to the Default view direction—the Model display set.

For more information about the Display Manager, see The Display Manager on page 528.

Displaying Objects in a Viewport

The display configuration, the current viewport, and the object interact in the following manner to determine what is shown in a viewport:

- The active viewport has a current view direction and a current display configuration. For example, the view direction is Top, and the display configuration is Medium Detail.
- The display configuration has one or more display sets and uses the display set that is assigned to the current view direction. For example, in the Medium Detail display configuration, the Plan display set is assigned to the Top view.

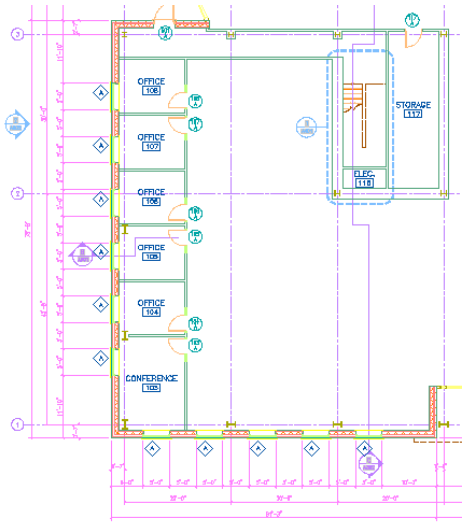
- The display set has associated display representations and it selects the representation(s) associated with the object that needs to be shown. For example, in the Plan display set, doors, windows, and walls use their Plan display representations.
- The object is shown in the active viewport using the appropriate display representation(s) and display properties.

Examples of View Directions That Use Different Display Sets

A display configuration assigns display sets to specific view directions. When a view direction is selected, the display representations in the display set determine how each object is displayed in the viewport.

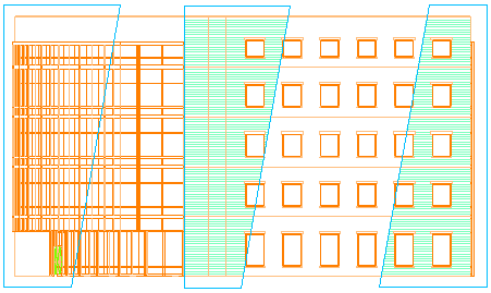
For example, the following illustration shows a viewport assigned the Plot display configuration and the Top view direction. In this illustration, the objects are shown with a Plan display representation.

Objects from Top view using a display set for plan views



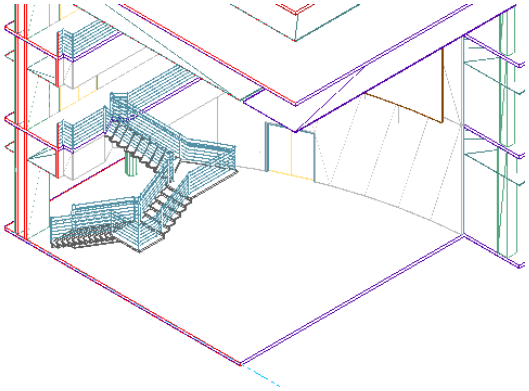
If the Front view direction is selected in this viewport, the same objects are displayed with an Elevation display representation.

Objects from Front view using a display set for elevation views



If the SW Isometric view direction is selected, the same objects are displayed with a three-dimensional (3D) representation.

Objects from SW isometric view using a display set for model views



Default Display Configuration

The display configurations in a drawing depend on the template used to create the drawing. A drawing that is not created from a template contains the Standard display configuration, which includes the Plan and Model display sets.

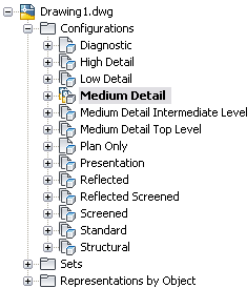
The Display Manager

The Display Manager is the central location of display system information for your drawing in AutoCAD Architecture. You use the Display Manager to create and modify display configurations, display sets, and display representations. You can also assign a display configuration to a viewport and view how objects are displayed in different representations. You can resize the Display Manager window and the left and right panes as needed to view display information.

Left Pane of the Display Manager

The left pane of the Display Manager organizes the display information for your drawings in a hierarchical tree view. You can add, purge, rename, copy, and send display system components in the tree view. As you select items in the left pane, the right pane is updated appropriately.

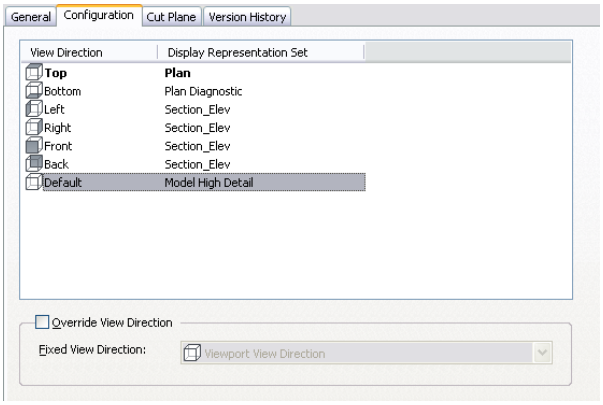
Left pane showing a tree view of display configurations and their components



Right Pane of the Display Manager

The information displayed in the right pane of the Display Manager depends on what you select in the left pane. You can view the display sets and mapped view directions associated with each display configuration. You can view the display representations of different objects and access the default graphical display properties of objects in your drawings. You can also preview how an object is displayed.

Right pane showing details of a selected display configuration

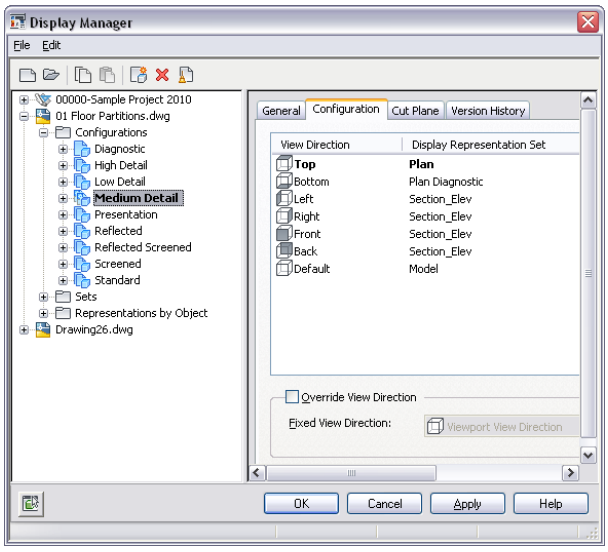


View Direction Icons in the Display Manager

The icons used with display sets and view directions identify how a display set is used in a configuration. When you expand a display configuration, the display sets used in it are shown. The icon next to each display set indicates the view direction to which it is applied in the display configuration.

In the following example, the Model display set is applied to the default view direction. The right pane shows that the Section_Elev display set is applied to the front, back, left, and right view directions. The Plan display set is applied to the top view direction. In the right pane, icons correspond to the six orthogonal view directions and the default view direction.

Using icons to identify view directions to which display sets are applied



Opening the Display Manager

Use this procedure to open the Display Manager.

1. Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2. Move and resize the Display Manager or resize the left and right panes as needed to view display information.

Viewing Display Configurations

Use this procedure to view the display configurations available in the current drawing. The display configurations depend on the template used to create the drawing. A drawing not created from a template contains the Standard display configuration, which includes the Model and Plan display sets.

The following icons can be assigned to a display configuration:

Icon	Description
	Multiple view display configuration
	Fixed view display configuration
	Multiple view display configuration (drawing default)
	Fixed view display configuration (drawing default)
	Default display set used in the display configuration. This set is used for all views that are not otherwise connected to a display set.
	Display set used for the top view of the display configuration.
	Display set used for the bottom view of the display configuration.
	Display set used for the left side view of the display configuration.
	Display set used for the right side view of the display configuration.
	Display set used for the front view of the display configuration.
	Display set used for the back view of the display configuration.
	Display set used for the multiple views of the display configuration, but not as the default display set.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Configurations, and select a configuration.

3 Click the Configuration tab.

The left pane lists the display sets included in the configuration. The right pane lists the display sets assigned to each view direction. If a display set is not listed next to a view direction, the display set for the Default view direction is used when that view direction is selected. The Default view direction is also used for any view directions other than the six orthogonal views.

4 Click the Cut Plane tab.

The Cut Plane tab contains settings for the height of the cut plane and the height above and below the cut plane that are included in views when you assign this display configuration.

If you are working with a project, you can also calculate the cut plane based on the level heights from the project. For more information, see Global Cut Planes on page 367.

5 If you are working with a project and use project standards, you can use the Version History tab to modify the version history of the display configuration.

For more information, see Project Standards on page 387.

6 Click OK.

Viewing Display Sets

Use this procedure to view the display sets in the current drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

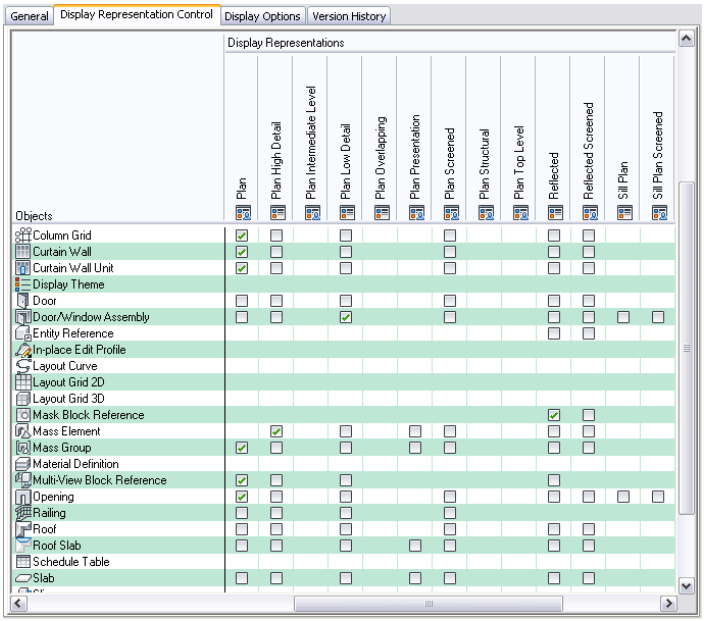
2 Expand Sets, and select a display set.

The icons next to the display set names in the left pane indicate whether a display set is used in a display configuration within the current drawing. The icon with a green check mark indicates that a display set is assigned. The icon with a green dot indicates that a display set is a standard set. Although standard sets can be renamed, they cannot be deleted.

3 Click the Display Representation Control tab.

The right pane contains a matrix that lists each object and display representation. A check mark under a display representation indicates that the display set uses this representation to show the corresponding object. For example, in the Model display set, most objects use the Model display representations.

Display representations selected for each object in the Model display set



Display sets can have different icons depending on their function in the drawing:

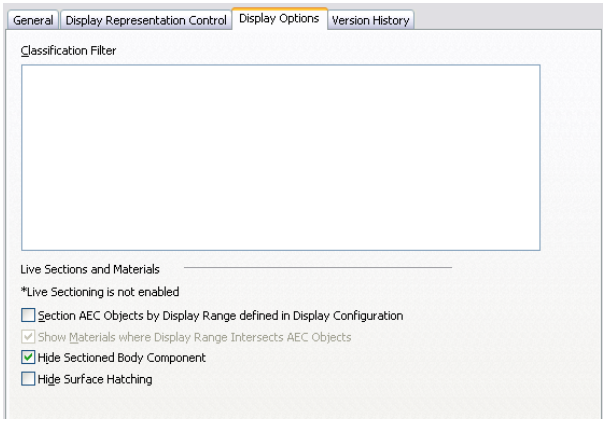
Icon	Description
	The display set is a standard display set and cannot be deleted.

Icon	Description
	The display set is currently used in a display configuration in the drawing.
	The display set is a standard display set and is currently used in a display configuration in the drawing.
	The display set is neither a standard display set nor is it used in a display configuration in the drawing.

4 Click the Display Options tab.

Settings on this tab enable you to filter objects by their classification. In addition, you can specify settings that affect how materials are displayed when you generate a live section view of a building model.

Display options specified for a selected display set



5 If you are working with a project and use project standards, you can use the Version History tab to modify the version history of the display set.

For more information, see Project Standards on page 387.

6 Click OK.

Viewing Display Representations

Use this procedure to view the display representations in the current drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

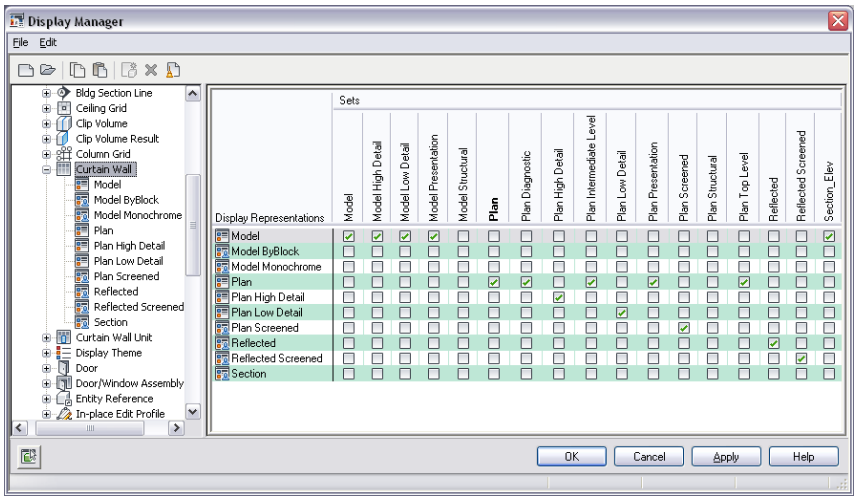
2 Expand Representations by Object, and select an object.

Display representations can have different icons depending on their function in the drawing:

Icon	Description
	Standard display representation with properties that the user can set.
	User-defined display representation with properties the user can set.
	Display representation without user-definable properties.

In the right pane, rows list the display representations that exist for that object, and columns list display sets. A check mark under a display set indicates that the display representation is used in that display set. A display representation can be used in multiple display sets.

Curtain wall display representations used in display sets



The icon next to the display representation name indicates whether it is a predefined display representation ( ) or custom display representation ( ).

3 Click OK.

Viewing an Object in a Display Representation

Use this procedure to see how an object appears in different display representations and view directions.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Click .

3 Reposition the Floating Viewer and the Display Manager so that both are visible.

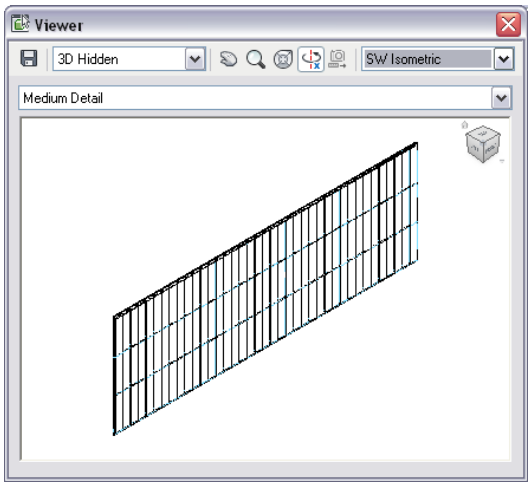
4 Expand Representations by Object, and select an object.

5 In the right pane, select a display representation.

NOTE Overrides to the default display representation, made in the display properties of an object style or an individual object, do not show in the Display Manager.

The Floating Viewer displays the object in the display representation.

Floating Viewer displaying a curtain wall



6 Use the controls in the Floating Viewer to view the object from different view directions and with hidden lines removed or with shading.

7 Repeat steps 4 and 5 to view objects in various display representations.

8 Click to close the viewer.

Viewing the Display Representation of an Object in a Display Set

Use this procedure to see how an object appears in the display representation used object in a selected display set.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Click .

3 Reposition the Floating Viewer and the Display Manager so that both are visible.

4 Expand Sets, and select a display set.

5 Click the Display Representation Control tab.

6 Select an object.

NOTE Overrides to the default display representation, made in the display properties of an object style or an individual object, do not show in the Display Manager.

The Floating Viewer displays the object in the display representation selected for it in the display set.

7 Use the controls in the Floating Viewer to view the object from different view directions and with hidden lines and shading.

8 Repeat steps 6 and 7 to view other objects in the display representation used in the display set.

9 Select another display set, and repeat steps 6 and 7 to view objects as they appear in that display set.

10 Click to close the viewer.

11 Click OK.

Accessing the Default Display Properties of an Object

Use this procedure to access and view the default display properties of a display representation of an object. Default display properties apply to all instances of the object in the drawing unless the properties are overridden by the object style or an individual object.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Representations by Object.

3 Expand an object, and select a display representation.

The right pane of the Display Manager shows the default display properties of the object for the selected display representation.

NOTE Overrides to the default display representation, made in the display properties of an object style or an individual object, do not appear in the default display properties in the Display Manager.

4 Click OK.

Creating and Editing Display Configurations

A display configuration is a collection of display sets that controls the representation of objects viewed from different directions in a drawing. You apply a display configuration to the viewport in which you want the objects to appear. You can also select a display configuration to use as the default for model space and new viewports.

Drawings based on templates provided with AutoCAD Architecture contain display configurations for common tasks and drawing types. You can modify them and their display sets and display representations to meet your needs. You can also copy these elements of the display system to use as the basis for custom display configurations.

Process Overview: Creating a Display Configuration

AutoCAD Architecture templates provide display configurations for common design, drafting, and production tasks. You can also create custom display configurations.

The process of creating a display configuration has the following steps:

1 Create a display configuration with default properties.

2 Create display sets to associate with different view directions.

Although you can assign display sets to any view direction, you usually create them with specific view directions in mind. For example, you may want to create display sets for plan, elevation, and model views of a building model. You can add more display representations to the display sets later.

3 Create or modify display representations for each object you want to display.

You create a new display representation by duplicating an existing display representation for an object. Use a display representation that is similar to the one you want to create so that you have fewer settings to modify. Although you can use display representations in any view direction, you usually create them with specific view directions in mind.

4 Assign new, modified, or existing display representations to display sets.

A display set can include any display representation that you specify. Objects can use more than one representation in a display set. Remember that you need to include at least one display representation for every object that is to appear in a viewport.

5 Assign display sets to view directions in the display configuration.

   You add display sets to a display configuration by assigning them to any of the six orthogonal view directions or to the Default view direction. The display set assigned to the Default view direction is used if no display set is assigned to a view direction.

6 Assign the display configuration to a viewport.

   The display configuration becomes active when you assign it to a viewport. You can assign a display configuration to multiple viewports. You can also export display configurations to other drawings.

Tips for Working with Display Configurations, Sets, and Representations

This topic provides suggestions for working effectively with display configurations and their elements.

- Templates provided with AutoCAD Architecture and the drawings based on those templates contain display configurations for common design, drafting, and production tasks and various drawing types. If your drawing does not contain these display configurations, you can import them. For more information, see Display Configurations on page 525.
  Templates and the drawings based on them contain layout tabs with display configurations assigned to viewports for specific tasks. Examine your building model in these different layouts to see if objects are displayed as you want them to appear.
- Before creating or modifying display configurations, review the predefined configurations to see if they meet your needs or if you can readily adapt them for your project.
- When possible, use a predefined display configuration as the basis for configurations you create. Starting with a display configuration that is similar to what you need helps you to work efficiently. You can modify only the settings that need to change, rather than creating everything from scratch.
- When you modify a display representation, the changes affect every display set and display configuration that use that representation. To apply changes more selectively, create a new display representation for the object and assign it to the display sets in which the changes are to appear.
- Similarly, when you modify a display set, the changes appear in every display configuration that uses the display set. And if you modify a display configuration, the changes appear in every viewport to which the configuration is assigned. To apply the changes more selectively, create custom display sets and configurations.
- Remember that changes made to display representations through the Display Manager apply only to the default display properties of objects. Changes to the display properties of object styles and individual objects override the default display properties. In addition, if the default display properties assign a material to object components, the display properties of the material determine the appearance of the object.

Creating a Display Configuration

Use this procedure to create a display configuration. You can create a display configuration using standard default properties or by creating a duplicate of an existing configuration.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Configurations.

3 Create a display configuration:

If you want to …	Then …
create a display configuration with default properties (containing no display sets)	click Configurations, and click New .
create a display configuration from an existing display configuration	click the display configuration you want to copy, and click New .

4 Enter a name for the new display configuration, and press *ENTER*.

5 Specify the display sets and display representations to use in this display configuration:

If you want to …	Then …
create a display set for this configuration	see Creating a Display Set on page 537.
create display representations to use in this display configuration	see Creating a Display Representation for an Object on page 538 and Assigning a Display Representation to a Display Set on page 539.
assign display sets to view directions	see Assigning a Display Set to a View Direction on page 542.

6 Click OK.

Creating a Display Set

Use this procedure to create a display set. You can create a display set using standard default properties or by creating a duplicate of an existing display set.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Sets.

3 Create a display set:

If you want to …	Then …
create a display set with default properties (containing no display representations)	click Sets, and click New .
create a display set from an existing display set	click the display set you want to copy, and click New .

4 Enter the name for the new display set, and press *ENTER*.

5 Specify the display representations to use in this display set:

If you want to …	Then …
create display representations to use in this display set	see Creating a Display Representation for an Object on page 538.
assign display representations to this display set	see Assigning a Display Representation to a Display Set on page 539.

If you want to …	Then …
add this display set to a display configuration	see Assigning a Display Set to a View Direction on page 542.
use this display set as one of the default display sets	see Specifying a Display Set as a Default Display Set on page 543.

6 Click OK.

Creating a Display Representation for an Object

Use this procedure to create a display representation for a selected object. You create a display representation by duplicating an existing one for the object.

Each object has one or more display representations, depending on whether the object needs to change in different views. Select an existing representation that is similar to the one you want to create. That way, the display properties are available for you to customize in the new representation.

For example, to create a display representation for stairs and use a custom break mark, duplicate a plan display representation for stairs that contains settings for the break mark.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Representations by Object.

3 In the left pane of the Display Manager, select the object for which to create the new display representation.

4 In the right pane, right-click the display representation to duplicate, and click Duplicate.

5 Enter a name for the new display representation, and press *ENTER*.

The new display representation has the display properties of the representation you duplicated.

The display representation created in the right pane is not listed in the Representations by Object directory in the left pane until you close and reopen the Display Manager.

6 Double-click the new display representation to edit its properties.

For more information about editing display properties, see Editing a Display Representation on page 538.

7 Assign the display representation to the display sets in which they will be used.

For more information, see Assigning a Display Representation to a Display Set on page 539.

8 Click OK.

You can click Apply instead of OK to save the changes and continue working in the Display Manager.

Editing a Display Representation

Use this procedure to change the following default display properties of a display representation:

- Visibility (on or off), and whether the display of a component is controlled by its material assignment
- Layer, color, linetype, and lineweight
- Display properties that are specific to the object and the display representation, such as the stair line and break mark in plan display representations of stairs

By default, the layer of object components is layer 0. The default color and linetype are ByBlock. With these defaults, the object components inherit the color and linetype properties of the "parent" object. For example, when the color and linetype of the door frame component are ByBlock, the door frame has the color and linetype of the door object. Object components cannot exist outside their parent object as can typical AutoCAD block objects.

Changes made to a display representation apply to every display set and display configuration that use the display representation. To apply changes more selectively, create a display representation based on the representation you want to modify. You can then change the display properties of the new representation and assign it to specific display sets. For more information about creating display representations, see Creating a Display Representation for an Object on page 538.

NOTE Changes you made to a display representation using this procedure apply only to the default display properties for the object. Changes to the display properties of object styles or of individual objects override the default display properties.

1. Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2. Expand Representations by Object.
3. Expand the object that contains the display representation you want to edit.
4. Select the display representation to edit.

   The display properties you can edit depend on the object and the display representation that you select. For example, a wall in a model representation displays only the Layer/Color/Linetype tab; a wall in a plan representation displays two additional tabs to specify display properties for hatching and cut plane components.
5. Click the Layer/Color/Linetype tab to change the AutoCAD properties, including visibility of the object components and whether their display is controlled by the material assignment.
6. If applicable, click tabs such as Hatching or Other to change object-specific display properties.

   For more information about object-specific display properties, see the procedures for specifying display properties of an object style in the Help topic for each object. For example, to specify the display properties of wall styles, see Specifying the Display Properties of a Wall Style on page 860.
7. When you finish editing display properties, click OK.

Assigning a Display Representation to a Display Set

Use this procedure to add or remove display representations in a display set. Changes made to a display set affect every display configuration that uses the display set.

Keep the following points in mind when you add or remove display representations in a display set:

- A display set can use more than one display representation for an object. For example, some display sets for plan views include both Plan and Threshold Plan display representations for doors.
- To use a display representation for an object other than the current one, be sure to clear the current display representation after selecting the new one. Otherwise, the display set uses the display properties of both display representations.
- If no display representation is selected for an object, the object does not appear when the display set is active in a viewport.
- If no check box appears under a display representation for an object, the object does not have the display representation. For example, objects such as layout curves and layout grids have only one display representation.

- You can compare two display sets to view the differences in display representation assignments. For more information, see Comparing Display Representations Between Display Sets on page 541.

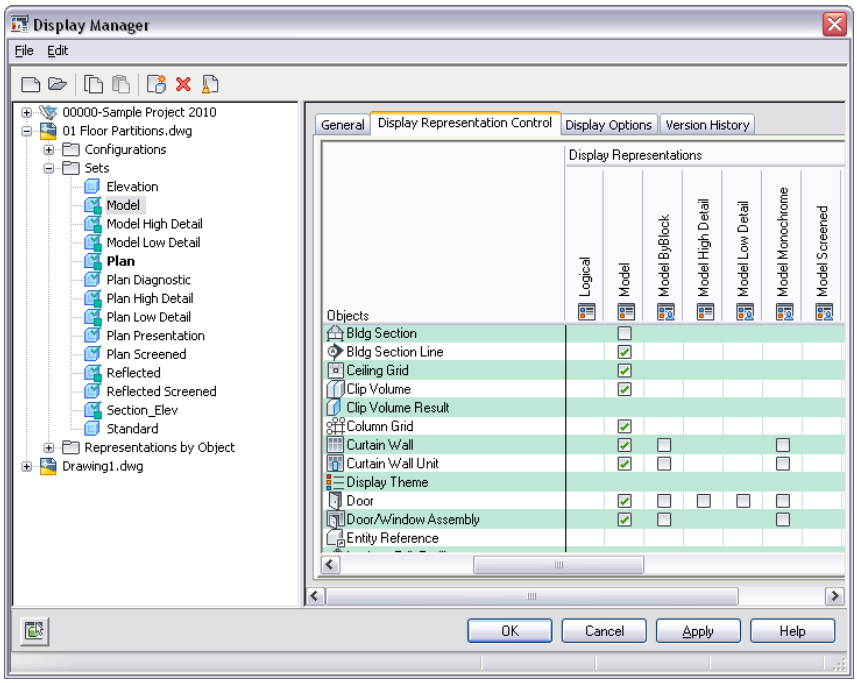
1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Sets.

3 Select the display set you want to edit.

4 Click the Display Representation Control tab.

Editing a display set



5 In the right pane, add or remove display representations:

If you want to …	Then …
add a display representation for an object to the display set	scroll through the list to find the object. Select a display representation to use. If no check box appears under a display representation, the object does not have the display representation.
remove a display representation for an object in the display set	scroll through the list to find the object. Clear the display representation you want to remove.
use the same display representation for all objects in the display set	right-click the name of the display representation, and click Select All. Be sure to clear any other display representations for the objects in this display set.
remove an object from a display set	scroll through the list to find the object. Right-click the object name, and click Clear All.
add all display representations to all objects in the display set	right-click in the Objects heading area, and click Select All Display Representations.
clear all display representations from all objects in the display set	right-click in the Objects heading area, and click Clear All Display Representations.

NOTE You can use these steps to assign display representations from the Representation by Objects directory. Expand *Representations by Object* in the left pane, select an object, and add or remove display representation assignments.

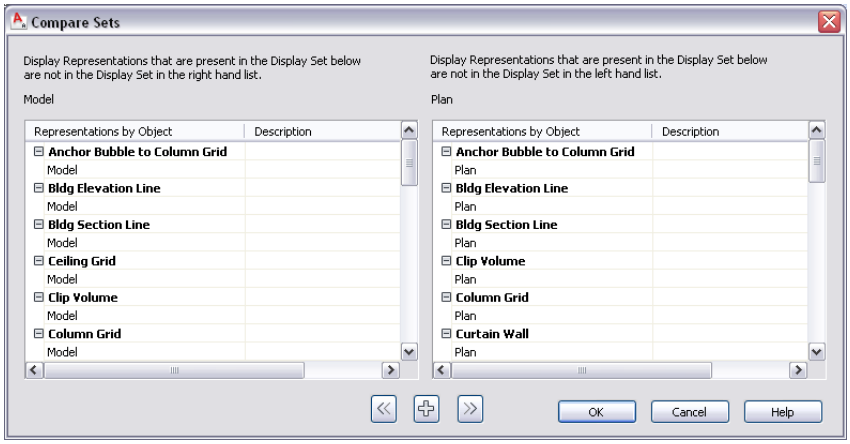
6 Click OK.

Comparing Display Representations Between Display Sets

Use this procedure to view the differences in display representation assignments between two display sets.

The Compare Sets dialog box displays two lists. Each list contains display representations that are assigned to that particular display set, but are not assigned to the display set in the adjacent column.

Comparing display sets to view different display representation assignments



You can use the Compare Sets dialog box to assign one or more display representations to either display set.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Click Sets.

3 In the right pane, hold down the CTRL key and select the two display sets you want to compare.

4 Right-click one of the selected display set names, and click Compare Sets.

NOTE The Compare Sets command is available only when two display set names are selected. You cannot compare more than two display sets at a time.

5 Each list shows the display representation assignments that are different from the other display set.

6 To assign display representations:

If you want to …	Then …
assign a display representation on the left side to the display set on the right side	select the display representation name under the display set on the left side, and click .
assign a display representation on the right side to the display set on the left side	select the display representation name under the display set on the right side, and click .

If you want to …	Then …
assign all display representations to the other display set so both sets have identical assignments	Click .

7 Click OK twice.

Assigning a Display Set to a View Direction

Use this procedure to specify the display set assigned to each view direction in a display configuration.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Configurations.

3 Select the display configuration you want to edit.

4 Click the Configuration tab.

5 Under Display Representation Set, select the appropriate display set for each view direction.

The display set becomes active when the view direction is selected in the viewport in which the display configuration is assigned. The display set assigned to Default is used for view directions to which you do not assign a display set and for the four isometric views.

6 Click OK.

To see the results of your changes, you must assign the display configuration to a viewport. For more information, see Assigning a Display Configuration to a Viewport on page 542.

Assigning a Display Configuration to a Viewport

Use this procedure to assign a display configuration to a viewport. You can specify a display configuration for a viewport, model space, or tiled viewport at any time during the design process.

NOTE You can also assign a display configuration to the current viewport in the Display Manager. Right-click the display configuration, and click Set To Current Viewport.

1 Select the viewport for which you want to assign a display configuration.

2 In the drawing status area, select the setting for Display Configuration.

Displaying the configurations you can assign to the current viewport

3 Select the display configuration that you want to use.

4 If necessary, click View tab ➤ Appearance panel ➤ Regenerate drop-down ➤ Regenerate Drawing And Viewports to update the display to show the new display configuration.

NOTE Alternatively, you can enter **rea** (Regenerate All) at the command prompt.

Specifying a Display Set as a Default Display Set

Use this procedure to change the display sets defined as default display sets. For more information about default display sets, also known as standard sets, see Display Sets on page 524.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

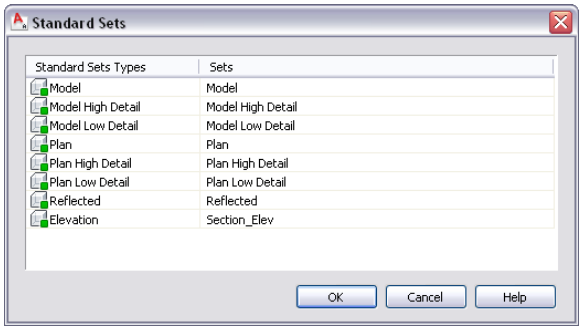
2 Right-click Sets, and click Standard Sets Adjustment.

The Standard Sets Types column lists the default display sets for the drawing. The Sets column lists the display set specified for each default display set.

3 Locate the standard set you want to change, and click its display set name in the Sets column.

4 Select the display set name to use for the standard set type.

Specifying a display set for the Model standard set type



5 Click OK twice.

Specifying the Default Display Configuration

Use this procedure to specify the default display configuration applied to new viewports, model space, or tiled viewports in the current drawing. Existing viewports with assigned display configurations are not affected.

NOTE You can also assign the default display configuration in the Display Manager. Right-click the display configuration, and click Set as Drawing Default.

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Display tab.

3 Under Drawing Default Display Configuration, select the display configuration to apply to new viewports, or when the TILEMODE system variable is set to 1.

4 Click OK.

5 If necessary, click View tab ➤ Appearance panel ➤ Regenerate drop-down ➤ Regenerate Drawing And Viewports to update the display to show the new display configuration.

NOTE Alternatively, you can enter **rea** (Regenerate All) at the command prompt.

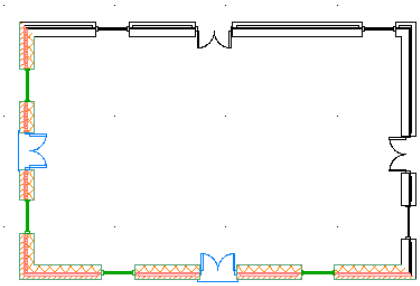
Specifying the Display Configurations Used in Xref Overlays

Use this procedure to specify whether the objects in an xref drawing are to use the display configurations in the xref when the drawing is referenced as an overlay by the host drawing.

By default, objects in both overlay and attached xref drawings use the display configurations assigned in the host drawing. This procedure describes how to specify that an xref overlay use only its own display configurations and not those in the host drawing. If you do not turn on this option, objects in the xref drawing can use their own display configurations or those of the host drawing. Xref drawings that are referenced as attachments can use either group of display configurations. For more information, see Changing the Display Configuration Used in Xref Drawings on page 545.

In the following example, the objects in the xref drawing inserted as an overlay use the Screened display configuration (north and east walls, doors, and windows). The host drawing uses the Medium Detail display configuration (south and west walls, doors, and windows).

An xref overlay that does not use the active display configuration in the host drawing



1 Open the drawing that you want to reference in another drawing.

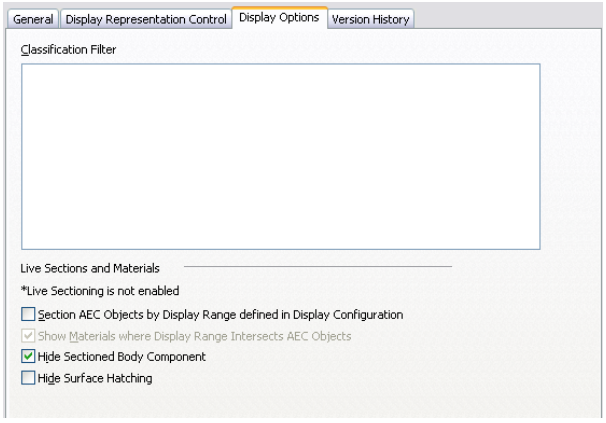
2 Click ➤ Utilities ➤ Drawing Setup.

3 Click the Display tab.

4 Under Drawing Default Display Configuration, select When used as an Xref Overlay, use this drawing's default display configuration initially.

Clear this option if you want the xref drawing to use either its own display configurations or the display configurations in the host drawing.

Specifying that objects use display configurations only from the current drawing



5 Click OK.

Changing the Display Configuration Used in Xref Drawings

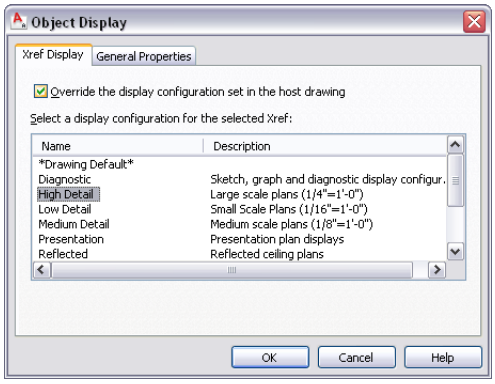
Use this procedure to change the display configuration of an xref drawing that is referenced as either an attachment or an overlay in a host drawing.

NOTE If you specified that the drawing should always use its own display configurations when inserted as an xref overlay, you cannot change the display configuration used to display the xref objects in the host drawing. For more information, see Specifying the Display Configurations Used in Xref Overlays on page 544.

1. Open the host drawing that contains the xref drawing for which to specify a different display configuration.
2. Select the xref drawing you want to change, right-click, and click Edit Object Display.
3. Click the Xref Display tab.

   If the settings on the tab are unavailable, you cannot change the display configuration used for this xref overlay.
4. Select Override the display configuration set in the host drawing.
5. Select the display configuration that you want to use.

   Selecting a display configuration from those in the xref drawing



   The list of display configurations are those available in the xref drawing. Select Drawing Default if you want to use the default display configuration specified in the host drawing.
6. Click OK.
7. If necessary, click View tab ➤ Appearance panel ➤ Regenerate drop-down ➤ Regenerate Drawing And Viewports to update the display to show the new display configuration.

NOTE Alternatively, you can enter **rea** (Regenerate All) at the command prompt.

Displaying Objects by Classification

Use this procedure to hide or show objects in a display set based on the classification of the objects. For example, if you classify objects by construction status (new, existing, or demo), you can exclude objects with the demo classification from the display. When the display is used in the drawing, those objects do not appear.

Objects filtered from the display are not removed from the drawing. Their display is turned off only in viewports using the display set in which they are filtered. You can change the filter to display them again. Because the objects still exist in the drawing, the display of other objects does not change. For example, if you filter doors from a floor plan, the walls in which they are placed are still cut in the space occupied by the doors.

For more information about defining classifications and assigning them to object styles, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Sets.

3 Select the display set you want to edit.

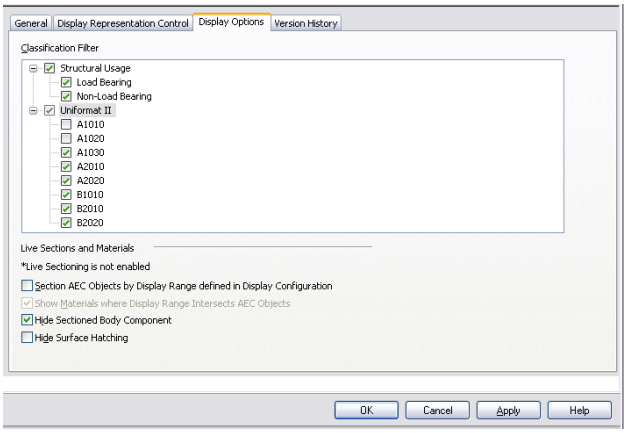
4 Click the Display Options tab.

The classification filter lists all classifications in the current drawing. All classifications are selected by default.

5 To hide objects of a specified classification, clear the check box under Classification Filter.

For example, to hide all doors and walls classified as A1010 and A1020, clear the check boxes for A1010 and A1020 under Uniformat II.

Hiding objects based on their classification



To redisplay objects in a classification that were hidden, select the classification.

6 Click OK.

Specifying Settings for Live Sections and Materials

Use this procedure to specify how live sections and materials are displayed when the selected display set is active in a viewport and a live section view of the building model is enabled. These settings let you refine the appearance of a section. For example, you can remove surface hatching that may obscure details in the section.

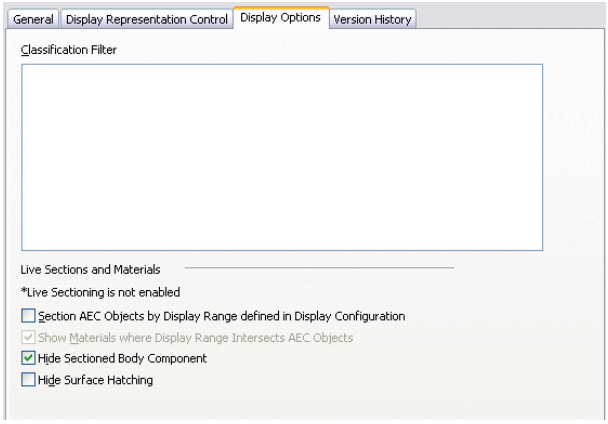
For more information about materials, see Materials on page 577. For more information about live sections, see Creating and Editing a Live Section View on page 2140.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Sets.

3 Select the display set you want to change, and click the Display Options tab.

Specifying display options for live sections and materials



4 Under Live Sections and Materials, specify display settings:

If you want to …	Then …
use the display range of the display configuration to determine the vertical extents of a live section view	select Section AEC Objects by Display Range defined in Display Configuration. If you want to graphically indicate where objects in the model extend below the display range, select Show Materials where Display Range Intersects AEC Objects. **WARNING** You should clear this setting for Plan display sets. If this setting is selected, any 2D sections inserted in Plan view will not be displayed.
remove the display of the portion of sectioned objects beyond the bounding box of the live section	select Hide Sectioned Body Component.
remove surface hatching on sectioned objects	select Hide Surface Hatching.

5 Click OK.

Managing Display Configurations

The Display Manager is a utility for managing display configurations, display sets, and display representations: renaming them or deleting them, copying them between drawings, emailing them to other users, and purging unused elements from drawings.

Renaming a Display Configuration or a Display Set

Use this procedure to rename a display configuration or a display set. You cannot rename the Standard display configuration.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Select a display configuration or a display set:

If you want to …	Then …
rename a display configuration	expand Configurations, right-click the display configuration, and click Rename.
rename a display set	expand Sets, right-click the display set, and click Rename.

3 Enter the new name, and press *ENTER*.

4 Click OK.

Renaming a Display Representation

Use this procedure to rename a display representation. You can rename any display representation that you create as well as some that are provided in AutoCAD Architecture templates. You cannot rename predefined display representations.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Representations by Object.

3 Select the object for which to rename a display representation.

4 In the right pane, right-click the display representation to rename, and click Rename.

If Rename is unavailable on the context menu, the display representation is predefined. Predefined display representations have this icon next to their names.

5 Enter the new name, and press *ENTER*.

6 Click OK.

Deleting a Display Configuration or a Display Set

Use this procedure to delete a display configuration or a display set.

Keep the following points in mind when you delete display configurations or display sets:

- You cannot delete the display configuration assigned to the current viewport.
- You cannot delete predefined display configurations, indicated by a red check mark to the left of the configuration name.
- You cannot delete a display set used in a display configuration, nor can you delete the Standard display configuration.

NOTE Deleting a display configuration does not delete the display sets and display representations used in it. Deleting a display set does not delete the display representations used in it. For more information, see Deleting a Display Representation on page 549.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Select a display configuration or a display set:

If you want to …	Then …
delete a display configuration	expand Configurations, click the display configuration, and click Delete .

If you want to …	Then …
delete a display set	expand Sets, click the display set, and click Delete .

3 Click OK.

Deleting a Display Representation

Use this procedure to delete a display representation that is not assigned to a display set. You can delete display representations that you create as well as some that are provided in AutoCAD Architecture templates.

User-defined display representations have this icon next to their names. You cannot delete predefined display representations. Predefined display representations have this icon next to their names.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Representations by Object.

3 Select the object for which to delete a display representation.

4 To remove the display representation from all display sets, right-click the display representation, and click Clear All.

5 Right-click the display representation to delete, and click Delete.

You will receive an error message if you try to delete a predefined display representation or one that is assigned to a display set.

The name of the display representation deleted in the right pane is listed in the Representations by Object directory in the left pane until you close and reopen the Display Manager.

6 Click OK.

Adding Notes and Reference Files to a Display Configuration or a Display Set

Use this procedure to enter notes and attach reference files to a display configuration or a display set. You can also edit notes and edit or detach reference files.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Select a display configuration or a display set:

If you want to …	Then …
add notes or files to a display configuration	expand Configurations, and select the display configuration.
add notes or files to a display set	expand Sets, and select the display set.

3 Click the General tab.

4 To add a description to the display configuration, enter it for Description.

5 Click Notes.

6 To add a note, click the Notes tab, and enter the note.

7 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.

If you want to …	Then …
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Using Display Settings in Multiple Drawings

You can use your display configurations, display sets, and display representations in multiple drawings.

You can copy display configurations, display sets, and display representations between drawings. When you copy a display configuration, the display system also copies any display sets and display representations included in the selected configuration that do not exist in the destination drawing. Similarly, if you copy a display set, the display system copies any display representations that do not exist in the destination drawing.

If a display set or a display representation with the same name exists in the destination drawing, it is not overwritten with the new display information. To transfer the new information, rename the existing display set or representation in the destination drawing before copying display configurations or display sets.

For example, you might want to copy a display set named New Reflected, which contains a display representation for doors named Reflected Screened. The current drawing also contains a display representation for doors named Reflected Screened. You must rename the Reflected Screened display representation in the current drawing before copying the new display set and its display representations.

Emailing Display Configurations

If your system has email, you can email display configurations to other users from the Display Manager. You can send the entire display system in your drawing to another user of AutoCAD Architecture. The Display Manager copies the display system information to a new drawing, and attaches the drawing to a new email message created using your email program. Users of AutoCAD Architecture who receive your display system by email can import it into their drawings, open the attached drawing file, and export your display system to their drawings; or they can use the attached drawing file as a template for new drawings. For further information about importing and exporting display systems, see Sending Display Configurations to Other Users on page 551.

Copying Display Settings Between Drawings

Use this procedure to copy display configurations, display sets, and display representations from the current drawing to another drawing. You can copy display settings between existing drawings. You can also copy them from an existing drawing to a new drawing.

NOTE You can also drag and drop display configurations, display sets, and display representations between drawings.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 In the Display Manager, open the drawing into which you want to copy the display representation, display set, or display configuration, if necessary:

If you want to…	Then…
copy the display configuration, display set, or display representation to a drawing that is not open in the Display Manager	in the Display Manager, click File ➤ Open, select the drawing you want, and click Open.
copy the display configuration, display set, or display representation to a new drawing	in the Display Manager, click File ➤ New drawing, enter a name for the drawing, and click Save.

3 Expand the Configurations, Sets, or Representations by Object folder.

4 Select the display configurations, display sets, or display representations that you want to copy:

If you want to…	Then…
copy an individual display configuration, display set, or display representation	right-click the display configuration, display set, or display representation, and click Copy.
copy all display configurations, display sets, or display representations	right-click the Configurations, Sets, or Display Representations folder, and click Copy.

5 In Display Manager, right-click the drawing into which you want to paste the display settings, and click Paste.

The display configurations, display sets, or display representations are pasted into the selected drawing. If the drawing already contains a setting with the same name, the duplicate name is displayed in the Import/Export - Duplicate Names Found dialog box.

6 Resolve duplicate names, if prompted:

If you want to…	Then…
prevent the Display Manager from overwriting the existing display configuration, display set, or display representation with the new item of the same name	select Leave Existing, and click OK.
replace the existing display configuration, display set, or display representation with the new item	select Overwrite Existing, and click OK.
keep the existing display configuration, display set, or display representation and add the new item with a different name	select Rename to Unique, and click OK. The Display Manager appends a number to the name of the new setting. Right-click a setting, and click Rename to change the name.

7 Click OK.

Sending Display Configurations to Other Users

Use this procedure to email all the display configurations and their elements in a drawing to other users of AutoCAD Architecture. The software creates a new drawing that contains only the display information from the current drawing and attaches the drawing to an email message. Objects, layers, and other drawing content and settings are not included in the new drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Right-click the drawing name, and click Send.

An email message with the subject "AutoCAD Architecture Display System," is created using your email program. A drawing file containing the display information is attached to the message.

If email is not available on your system, the Send option is not available.

3 Complete and send the message in your email program.

4 Click OK.

Purging a Display Configuration

Use this procedure to purge unused display configurations from a drawing.

You cannot purge a display configuration assigned to a viewport or model space, or predefined display configurations such as Standard.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Click Configurations, and click Purge .

All display configurations that you can purge are selected in the Purge Display Configurations dialog box.

3 Clear any display configurations that you do not want to purge, and click OK twice.

Purging a Display Set

Use this procedure to purge unused display sets from a drawing.

You cannot purge a display set assigned to a display configuration, or predefined display sets such as Standard, Model, or Plan.

TIP To find out if a display set is assigned to any display configurations, select Configurations in the left pane. The right pane lists each display configuration and the display sets it uses.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Click Sets, and click Purge .

All display sets that you can purge are selected in the Purge Display Sets dialog box.

3 Clear any display sets that you do not want to purge, and click OK twice.

Purging a Display Representation

Use this procedure to purge unused display representations from a drawing. You cannot purge a display representation assigned to a display set, or predefined display representations such as Model or General.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Representations by Object.

3 Select the display representations to purge:

If you want to …	Then …
purge unused display representations for a specific object	click the object name, and click Purge .

If you want to …	Then …
purge all unused display representations in the drawing	click Representations by Object, and click Purge .

All display representations that you can purge are selected in the Purge Display Representations dialog box.

4 Clear any display representations that you do not want to purge, and click OK twice.

Working with Standard Display Settings

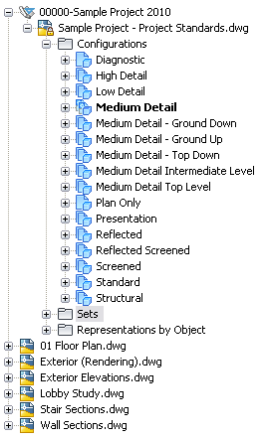
The Project Standards feature provides a mechanism for users to establish, maintain and synchronize display settings across an AutoCAD Architecture project. Within a project, you can define standard display settings that are used across all project drawings.

For more information about projects and project standards, see Drawing Management on page 199 and Project Standards on page 387.

Standard display settings are organized in a standards drawing that is assigned to the project. Once a group of display settings have been defined as project standard settings, and introduced in the project drawings, they have a link to the standards and can be synchronized with them. With the same link, display settings from a project drawing can update the standard display settings, too.

Standard display settings can be accessed, edited, synchronized, copied, and updated in Display Manager.

Standard settings in Display Manager



Standard Icons

Standard display settings are displayed in Display Manager. Depending on their status with regards to the project standards, there are a number of different icons to differentiate them.

Icon	Description
	Standard display setting When a light blue icon appears on a display setting in a project drawing or project standards drawing, the display setting is a standard setting and is in synch with the standard. No update or synchronization is necessary.
	Standard display setting that is outdated When this icon appears on a display setting in a project drawing, the display setting is a standard setting, but is out of date. This means that the corresponding display setting in the project standards drawing has a newer GUID than the one in the project drawing. To update the display setting in

Icon	Description
	the project drawing, see Synchronizing Individual Display Settings with AEC Standards on page 428.
	Standard display setting that has a non-standard (newer) version When this icon appears on a display setting in a project drawing, the setting is a standard setting, but has a version GUID that cannot be found in the project standards. If you encounter this icon, you can either overwrite the non-standard version with the current version from the standards drawing, as described in Synchronizing Individual Display Settings with AEC Standards on page 428, or you can update the standards with the version from the project drawing, as described in Updating Standard Display Settings in the Project Standards Drawing from a Project Drawing on page 557.
	Standard display setting that is excluded from synchronization When this icon appears on a display setting, the setting is excluded from synchronization. For more information, see Excluding Display Settings from Synchronization on page 555.
	Standard display setting that has no version information When this icon appears on a display setting in a project standards drawing, the display setting has no version information. Version information can be deleted, as described in Purging the Version Information from a Project Standards Drawing on page 444. To add version information to a display setting, see Updating Standard Display Settings in a Project Standards Drawing on page 555.
	Standard display setting that has been changed, but not versioned When this icon appears on a display setting in a project standards drawing, the setting has been modified, but not versioned yet. In order for the changes to be included in the synchronization, the setting must be versioned, as described in Updating Standard Display Settings in a Project Standards Drawing on page 555. This icon appears only in project standards drawings. Changes in project drawings are versioned automatically when you click Apply or OK in Display Manager.
	Non-standardized display setting When a dark blue icon appears on a display setting in a project drawing, this setting has no equivalent in the project standards.

Synchronizing Individual Display Settings with AEC Standards

Use this procedure to synchronize display settings in a project drawing with the project standards.

1 Open a project drawing.

For more information about projects and project standards, see Drawing Management on page 199 and Project Standards on page 387.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

3 In the Display Manager tree, navigate to the display setting you want to synchronize.

You can synchronize the following items:

- display configurations
- display sets
- display representations

4 Select the item in the tree, right-click, and select Synchronize with Project Standards.

5 In the Synchronize Drawing with Project Standards dialog box, select the items to synchronize, as described in Synchronizing a Project Drawing with AEC Standards on page 424.

6 Click OK to start the synchronization process.

Excluding Display Settings from Synchronization

Use this procedure to specify individual display settings that you want to be ignored during synchronization.

Specified display settings will not be overwritten with standards during automatic synchronization and will not be displayed as version mismatches during semi-automatic or manual synchronization, unless you select the Show objects set to ignore during project standards synchronization check box in the Synchronization dialog box.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Navigate to the display configuration, display set, or display representation to be excluded, right-click, and click Ignore During Synchronization.

Note that the Ignore During Synchronization option now has a check mark next to it. If you click the option again, the check mark disappears and the selected display setting is removed from the list of components to be ignored.

Updating Standard Display Settings in a Project Standards Drawing

Use this procedure to change and version a standard display setting in the project standards display drawing.

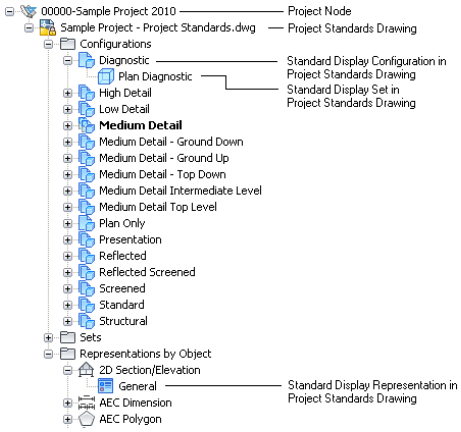
Display settings in the project standards display drawing and in the project drawings are versioned. The version is used to determine whether a display setting needs to be updated during synchronization. The version information includes the GUID (Global Unique Identifier), the date and time of the last modification, the windows login name of who last modified the item, and an optional comment.

When you change a standard display setting in the open standards drawing, you are not automatically prompted to version the change.You can make multiple changes, save and close the drawing, reopen it, and then version the display setting when its is ready for propagating in the project. As long as the changes are saved to the project standards drawing, no edits will be lost, even without versioning in between.

NOTE When you make changes to the display standards drawing, you need to update the standard styles drawings with the new setting as described in Synchronizing Project Standards with Each Other on page 561. Otherwise, inconsistent display of objects might occur.

As long as your changes are saved, but not versioned, any synchronizations taking place during that time will not recognize the display settings as changed, since the object comparison is performed on the version GUID, and not the actual object properties. As a consequence, changed but unversioned display settings in the project standards will not be updated in the project drawings. To have the changes synchronized with the project, you need to version the display settings first.

Project standards in Display Manager



Updating a standard display setting

1 Open the standards display drawing of the current project.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

TIP The standard display drawings in Display Manager are listed under the project node ( ). If no project node is displayed, the current drawing is not part of a project.

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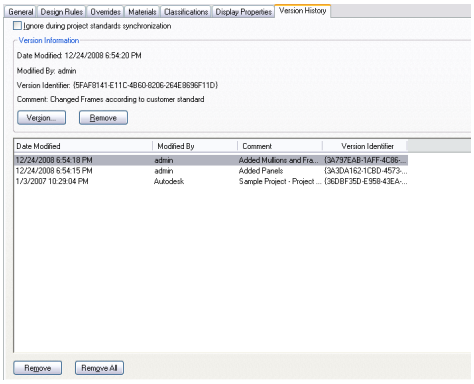
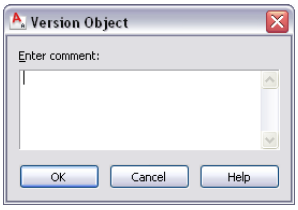
3 Select the display setting you want to edit, and make your changes.

4 Click the Version History tab of the changed display setting.



5 Click Version.

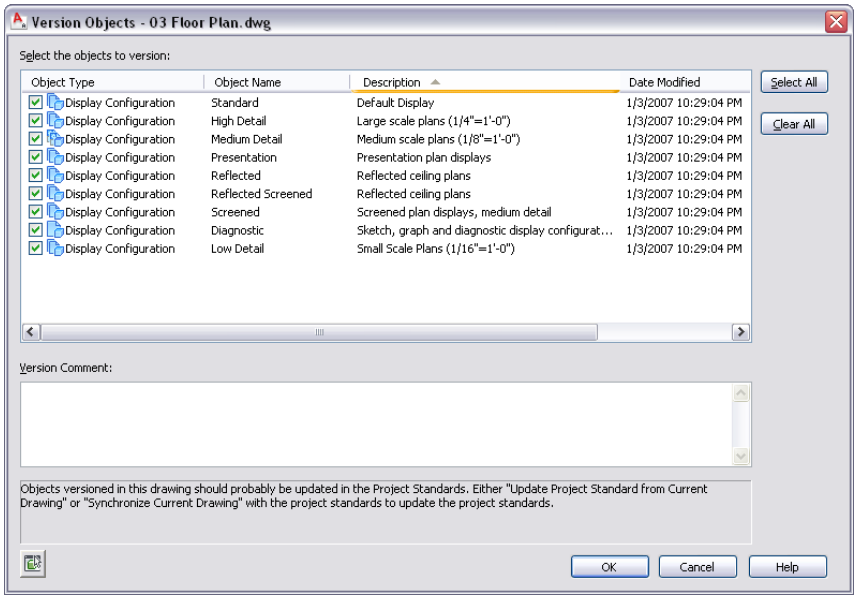


6 If necessary, enter a comment for the new version.

7 Click OK.

The new version is appended to the Version History tab.

8 To version multiple display settings in a project standards drawing, select a group of settings and version them:



9 Select the display settings that should be versioned.

10 If desired, enter a comment.

The comment will be applied to all objects selected for versioning.

11 Click OK.

Updating Standard Display Settings in the Project Standards Drawing from a Project Drawing

You can change a standard display setting in the project standards display drawing by overwriting it with the corresponding display setting from a project drawing. When you have updated a project standard display setting from a project drawing, the project needs to be synchronized to use the updated display setting. For information, see Synchronizing a Project with the Standards on page 418.

NOTE When you make changes to the display standards drawing, you need to update the standard style drawings with the new setting as described in Synchronizing Project Standards with Each Other on page 561. Otherwise, inconsistent display of objects might occur.

1 Open a project drawing.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

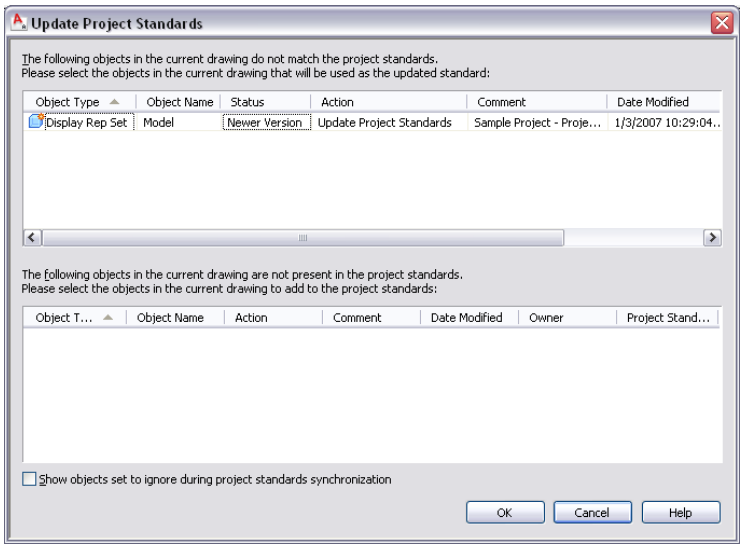
3 Expand the node of the project drawing, and select the standard display setting with which you want to update the project standards.

NOTE A standard display setting in a project drawing can be recognized by a blue icon.

4 Right-click, and click Update Standards from Drawing.

NOTE Alternatively, click Manage tab ➤ Project Standards panel ➤ ➤ Update Standards From Drawing .

NOTE You can also select to update multiple display settings here.



The selected display setting is listed in the top panel.

5 To update the project standards from the project drawing, select Update Project Standards from the Action drop-down list of the display settings.

6 To not update the project standards from the display setting in the project drawing, select Do not Update Project Standards from the Action drop-down list of the display settings.

In this case, the version in the project standards drawing is not overwritten with the version in the project drawing. During the next synchronization of the project drawing, the display setting will be displayed as out of synch with the project standards.

7 To ignore the out of synch version of the display setting, select Ignore from the Action drop-down list.

In this case, the item will not be displayed in future updates, except when you select Show objects set to ignore during project standards synchronization or remove the Ignore flag from the display setting in Display Manager, as described in Excluding Display Settings from Synchronization on page 555.

8 Click OK.

9 In Display Manager, click OK or Apply.

10 Click Yes to save the updated project standards drawing.

Adding Standard Display Settings from a Project Drawing to a Project Standards Drawing

You can add non-standardized display settings from the current project drawing to the project standards. You can do this, for example, if you have created a complex display configuration in a project drawing and want to include that into your standards.

After copying a display setting to the project standards, you need to synchronize the project to use the new standard setting.

1 Open a project drawing from Project Navigator.

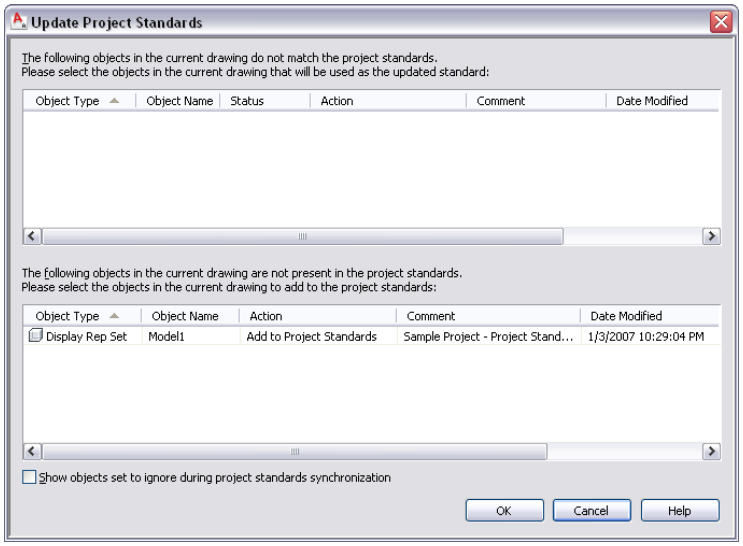
2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

3 Add a new display setting to the current project drawing.

4 Select the new setting, right-click, and click Update Standards from Drawing.

NOTE Alternatively, click Manage tab ➤ Project Standards panel ➤ ➤ Update Standards From Drawing .

NOTE You can select multiple display settings here.



The new setting is listed in the lower panel, which lists styles and display settings in the project drawing that do not exist in the project standards.

5 To add the display setting to a project standards drawing, and thereby make it a standard setting, select Add to Project Standards in the Action drop-down list.

6 To skip over the non-standardized display setting, select Skip from the Action drop-down list.

In this case, the non-standardized display setting remains in the project drawing, and is not entered in the standards.

7 To ignore the display setting, select Ignore from the Action drop-down list.

In this case, the non-standardized display setting will not be listed again in future updates, except if you select Show objects set to ignore during project standards synchronization or remove the Ignore flag from the display setting in Display Manager, as described in Excluding Display Settings from Synchronization on page 555.

8 Click OK.

9 In Display Manager, click OK or Apply.

10 Click Yes to save the updated project standards drawing.

Editing the Version History of a Standard Display Setting

Each display setting in a project standards drawing has a version history. The version history displays the unique version identifier, date and time of the modification, user name and any additional comments entered by the user.

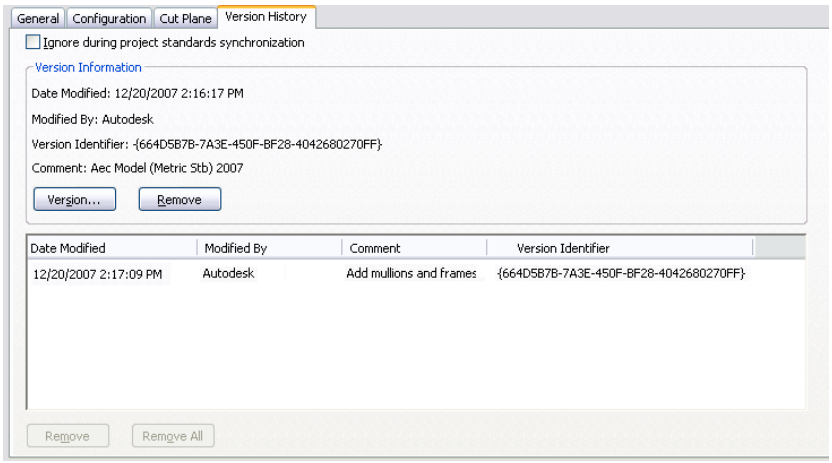
You can edit the history by selectively removing individual versions, or removing all versions. You cannot remove the current version.

1 Open a project standards drawing.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

3 Select a standard display setting from the project node.

4 Click the Version History tab.



5 To add a new version, click Version, and enter the versioning information.

6 To remove an existing version, select the version from the Version History list, and click Remove.

To remove all versions in one step, click Remove All.

7 If you want the display setting to be ignored during synchronization of standards, select Ignore during project standards synchronization.

8 Click OK.

Purging the Version History from a Project Standards Drawing

You can remove the version history from all standard styles and display settings in a project standards drawing with one command. Purging the version history will remove all versions except the current one from the standard styles and display settings. You can do that to avoid cluttering your styles and display settings.

When you purge the version history, no version GUID except for the current one remains. That means that the synchronization can no longer separate between an older version of a standard display setting and a non standard version of a standard display setting. Each display setting in a project drawing that does not have the current GUID of the corresponding standard display setting, will be labeled a “non-standard”, or newer version.

1 Open the project standards drawing.

2 On the command line, enter **AecClearVersionHistory**.

The version history is removed from all standard styles and display settings in the drawing.

Purging the Version Information from a Project Standards Drawing

You can remove the version information from all standard styles and display settings in a project standards drawing. When you remove the version information, the version history and the current version information is deleted.

When you run a synchronization, the standard style or display setting still participates in the synchronization and is considered the "latest version" when comparing with versions of the object in project drawings. No attempt is made during synchronization to automatically create a version GUID or history list. If you want to add version information to the standard style or display setting, you need to manually version the object as described in Updating Standard Objects in a Project Standards Drawing on page 438.

1 Open the project standards drawing from which you want to remove the version information.

2 On the command line, enter **AecPurgeVersion**.

The version information is removed from all standard styles and display settings in the drawing.

Synchronizing Project Standards with Each Other

Project standard styles and display settings can be distributed among multiple standards drawings, and depend on each other. For example, the styles in a styles drawing should use the display settings from the standard display drawing. If display changes are introduced in a standard styles drawing, and not synchronized with the standard display drawing, styles can display inconsistently across the project. Therefore, you should synchronize project standards drawings with each other when changes have been made to individual standards drawings.

You can synchronize project standards drawings with each other either from the project node in Display Manager or from the Manage tab on the ribbon.

When project standards drawings are synchronized with each other, the following criteria are used to determine how the components are updated:

- Standards drawing type: The display settings in the standard display drawing update the display settings in all standard styles drawings.
- Assigned style types: When a drawing has in the standards configuration setup been associated to a style type, the styles in this drawing will update all other standards drawings that may contain standard styles of that type. For example, if the standards drawing "Door Styles.dwg" has been associated with the Door style type, the styles in that drawing will overwrite any existing door standard styles in all of the other standards drawings. Note that in most cases, you will not place standard styles anywhere but in the designated standards drawing for that style type.
- Search order: When more than one standards drawings in the standards configuration setup have been associated to a style type, the first standards drawing in the search order will update all other drawings associated to that style type.

Synchronizing project standards drawings with each other is an automatic synchronization process, where no user interaction is possible. That means that no styles or display settings can be excluded from the synchronization process.

1 Verify that the project of which you want to synchronize the standards is the current project.

2 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

3 Select the Project Standards node in the tree view, right-click, and click Synchronize Project Standards Drawings.

4 When the synchronization is finished, click OK to exit Display Manager.

NOTE Alternatively, you can click Manage tab ➤ Project Standards panel ➤ ➤ Synchronize Project Standards .

Troubleshooting the Display System

If you have problems displaying objects in your drawing, use the following troubleshooting suggestions.

Object Not Displayed in a Viewport

Why isn't my object displayed?
When AEC objects in your model do not display correctly in a viewport, the following actions might help to solve the problem.

- In the drawing status area, verify the name of the selected display configuration. Select a different display configuration, and see if the problem is resolved.
- In the Display Manager, find out what display set is being used in the display configuration assigned to the viewport in question. The name of the current display configuration is highlighted. The name of the current display set is also highlighted.
- In the detailed view of the display sets in the Display Manager, make sure that a display representation for the object is selected in that display set.
- Is the object hidden because objects of its classification are filtered in the current display set? On the Display Options tab, verify that objects are not hidden.
- If a display representation is selected in the current display set, look at the display properties of the display representation. Are the display components turned off? Are components on layers turned off?
- Is the display of components controlled by the material assigned (is ByMaterial selected in the display properties)? If so, look at the display properties of the material assigned to object components to determine the settings.
- Is the object drawn on a layer that is turned off?

Viewport Not Updating Properly

Why isn't my viewport updating?
Under certain circumstances, such as when you switch view directions in shade modes other than 2D wireframe, the display is not restored correctly.

In such cases, click View tab ➤ Appearance panel ➤ Regenerate drop-down ➤ Regenerate Model, and either select the problem AEC object or press *ENTER* to select all the AEC objects. This forces the display system to regenerate all the current display representations.

NOTE Alternatively, enter **objrelupdate** on the command line.

Objects Copied from Another Drawing Display Differently

I dragged objects to another drawing. Why do they look different now?
Objects dragged or copied from one drawing to another use the display properties of the display configuration assigned to the viewport in the destination drawing. The display configuration in the original drawing is not copied with the objects.

Verifying the Existence of Objects Not Displayed in a Drawing

Is there a quick way to verify that an object exists in a drawing but is not displayed?
Enter DisplayDxfName on the command line to label each object in the drawing with its name. Labels appear even for objects that are not displayed. For example, if you created a display set that did not include a display

representation for doors, and you then assigned the display set to a display configuration used in the current viewport, doors would not be displayed in that viewport. An object can also exist in a drawing and not be displayed if the object was filtered by its classification in the current display set.

DisplayDxfName can help you determine whether the objects are simply not displayed or if they are not present.

1 At the command line, enter **displaydxfname**.

2 Enter **y** (Yes).

3 Click View tab ➤ Appearance panel ➤ Regenerate drop-down ➤ Regenerate Drawing And Viewports.

NOTE Alternatively, enter **rea** on the command prompt.

Displaying the names of objects, including those that are not shown

4 To turn off object names, enter **displaydxfname**.

5 Enter **n** (No).

Object Linetype Displayed Incorrectly

Why doesn't the linetype for my object display the way I expect?

The linetype scale for components of AEC objects works with the AutoCAD linetype scale specified in the LTSCALE variable to control the linetype of AEC objects. The default value for linetype scale of all components of AEC objects is 1.0. This value is multiplied by the current value for LTSCALE to produce the linetype scale of object components.

For example, if the LTSCALE value is 48.0, and the linetype scale in the display properties of an object is 1.0 for an object component, then the linetype scale of the component is 48.0. If you change the linetype scale in the display properties to 2.0, the linetype scale of the component is effectively 96, or 2.0 x 48.

Style Manager

11

The Style Manager is an AutoCAD Architecture utility that provides a central location for working with the styles that determine the function and appearance of objects in your drawing.

What Are Styles?

Styles are sets of parameters that determine the function and appearance of objects in AutoCAD Architecture drawings. For example, a door style specifies a door's type (single or double, bi-fold or hinged) and shape (rectangular or arched), as well as its default frame dimensions, standard sizes, materials, and display properties.

Each object in a drawing is an instance of a particular style. You use the same style for all objects that are to have the same characteristics. For example, you might use one door style for all office doors in a building and another for all fire doors.

Generally a style is applied to an object through the tool you use to create the object. After the object is created, you can apply a different style to it or edit the style, either in the Style Manager or in a dialog accessed from the object's context menu. When you edit a style, the changes apply to all instances of that style in your drawing, making this an efficient way of modifying a large number of objects at once.

AutoCAD Architecture uses styles to define objects in 3 different categories:

- Architectural objects, such as walls, doors, and windows
- Documentation objects, such as 2D sections/elevations, dimensions, and schedule tables
- Multi-purpose objects, such as layer keys, mass elements, and material definitions

Where Are Styles Located?

For most architectural, documentation, or multi-purpose objects, there is a default standard style, which you can access and customize through the Style Manager. The default tool palettes also provide tools representing many specific styles. For example, the Doors tool palette includes tools for creating door objects of the Bifold - Double style, the Bifold - Single style, the Cased Opening style, and so on. As soon as you use one of these tools to add an object to your drawing, the associated style is added to the list of styles for that drawing in the Style Manager, where you can view and edit the properties that define the style.

Additional predefined styles are provided in the Stock Tools catalogs accessible through the Content Browser. All styles are defined in Styles drawings located in the *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial or Metric* folder.

For more information about specifying the location of files at installation, see "Install AutoCAD Architecture 2010" in the *AutoCAD Architecture 2010 Installation Guide*.

Styles in External References

You cannot change an object style in an external reference while refediting it from its host drawing. You can open Style Manager and make changes, but they will not be saved when the external reference is saved and closed in the host drawing. To make changes to styles in external references, you need to open the external reference drawing directly, make the changes there, and save it. The external reference should then be reloaded to update the changes.

Style Manager Overview

The Style Manager is an AutoCAD Architecture utility that provides a central location where you can view and work with the styles that determine the appearance and function of objects in drawings.

You can also manage layer key styles, schedule data formats, and definitions for cleanup groups, mask blocks, multi-view blocks, profiles, and property sets.

The Style Manager allows you to readily create or customize styles and share them with other users. In the Style Manager, you can perform the following tasks:

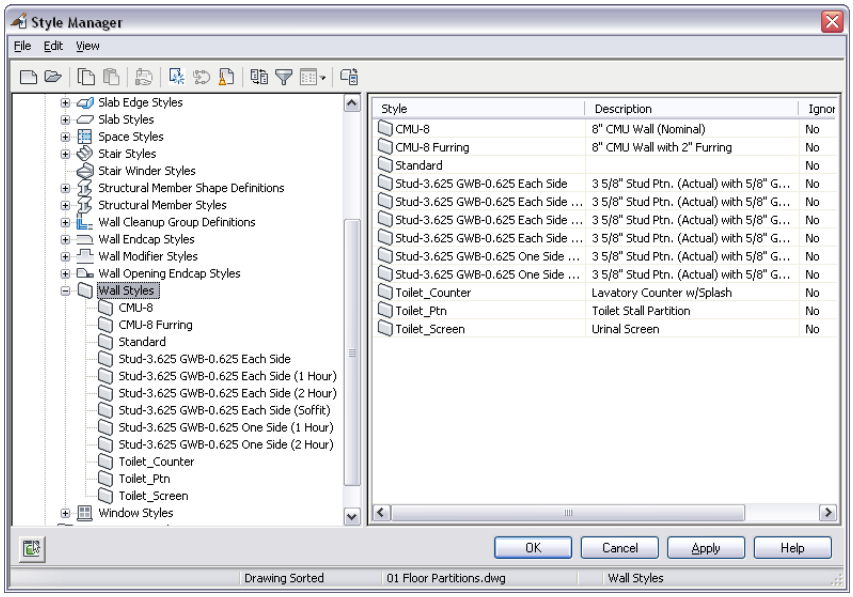
- Access styles from open drawings and intranet sites
- Drag styles onto a palette to create tools
- Set up new drawings and templates by copying styles from other drawings or templates
- Sort and view the styles in your drawings and templates by drawing or by style type
- Preview an object with a selected style
- Create and edit styles
- Delete unused styles from drawings and templates
- Send styles to other AutoCAD Architecture users by email

Opening the Style Manager

To open the Style Manager, click Manage tab ➤ Style & Display panel ➤ Style Manager .

You can also access the Style Manager by right-clicking any style-based object tool on a tool palette and clicking <object type> Styles.

The Style Manager



The Style Manager is split into 2 resizable panes and has a menu bar, a toolbar, and a status bar. When you open the Style Manager, all drawings and templates that are open in the current session are displayed in the tree view in the left pane.

Left Pane of the Style Manager

The left pane of the Style Manager displays the styles in all open drawings and templates in a hierarchical tree view that you can navigate by expanding and collapsing the different levels in the tree. By default, styles in the tree view are sorted by the drawing that contains them, but you can also sort them by style type. The tree view is always displayed in the left pane, regardless of how you sort the styles.

Styles are organized into 3 categories: Architectural Objects, such as Door Styles; Documentation Objects, such as Schedule Table Styles; and Multi-Purpose Objects, such as Layer Key Styles. Within each category, styles are listed alphabetically. To filter the tree view so that only styles of one style type are displayed, select a style type, and on the Style Manager toolbar, click . To redisplay all styles, click again.

NOTE If drawings or templates are read-only, their read-only status is indicated by a lock on the folder next to the drawing in the tree view and also by a lock icon on the status bar.

Right Pane of the Style Manager

The style information displayed in the right pane depends on what you select in the tree view in the left pane. For example, when the tree view is sorted by drawing, and a style category is selected, the right pane lists the style types in the category. If a style type is selected, the right pane lists the styles within the type. If an individual style is selected, the right pane displays a series of tabs on which you can edit the properties of the style and preview how an object will display using that style. When the tree view is sorted by style, you can select a style type to view the distribution of the styles within that type across all drawings and templates that are open in the Style Manager.

Style Manager Menu Bar and Toolbar

The top of the Style Manager includes a menu bar and a toolbar for quick access the menu commands. Pause the mouse over a toolbar icon to display a tooltip describing the associated command.

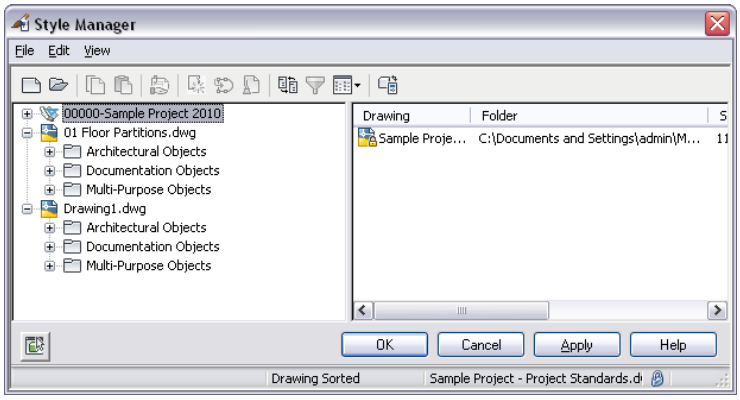
Status Bar

The status bar at the bottom of the Style Manager indicates how styles are sorted in the tree view (by drawing or by style), the name of the drawing, and the currently selected style type and style.

Sorting Styles in the Style Manager

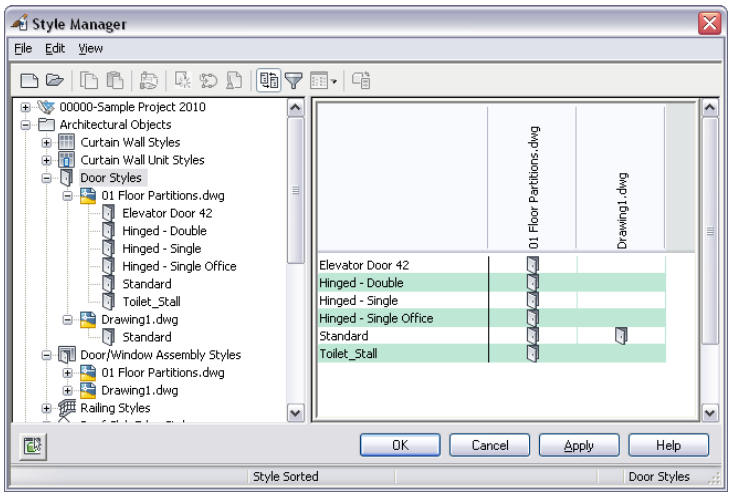
Use this procedure to change the way styles are sorted in the Style Manager. By default, the names of open drawings and templates are displayed in the tree view in the left pane. When you expand a drawing in the tree view, the individual styles within the drawing are grouped into 3 categories: Architectural Objects, Documentation Objects, and Multi-Purpose Objects. If you expand a category, the individual styles are listed alphabetically by style type.

Styles sorted by drawing



To see the styles available in each drawing for a particular style type, such as door styles, you can sort by style. Styles are then grouped by category, and organized by type and then by drawing.

Styles sorted by style type



The status bar at the bottom of the Style Manager indicates whether the styles are sorted by drawing or by style type.

To switch how styles are sorted in the Style Manager

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

By default, styles are sorted by drawing.

2 On the toolbar of the Style Manager, click to sort styles by style type.

Alternatively, on the menu bar of the Style Manager, click View menu ➤ Explore ➤ By Style.

3 If you want to view the styles available in a drawing, expand a category, a style type, and then the drawing.

4 To restore the by-drawing sort order, click again.

Creating a Style from the Style Manager

If you want to create a new style or definition for a particular type of object, you can start with the default style properties for that object type, or you can copy an existing style that has most of the properties you want. In either case you then edit the style properties as needed to specify the desired object characteristics.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager displays with all open drawings listed in the tree view and the current drawing expanded.

2 Expand the object category (Architectural, Documentation, or Multi-Purpose) and object type for which you want to create a style.

3 Choose a method:

If you want to…	Then…
create a style with default properties	right-click the style type, and click New.
create a style from an existing style	expand the style type, right-click the style you want to copy, and click Copy. Right-click, and click Paste.

4 On the General tab, enter a name and description for the new style.

5 Click other tabs as needed to view and edit the properties.

For detailed information about specifying the properties of a style for a particular object, see the Help topics associated with that object type.

6 When you finish specifying the properties of the style, click OK.

The new style will be listed if you open the Style Manager again while the drawing remains open, but it is not saved until you save the drawing.

After you have created a style, you can drag it from the Style Manager onto a tool palette to create a tool. For more information, see Creating a Tool from a Style on page 570.

Creating a Style from an Object

Use this procedure to create a new style for an object by copying and modifying its current style. This method lets you change style properties for the selected object without affecting other objects that use the same style. The new style can then be assigned to other objects as needed. This functionality can save you time if you need to create many styles, or if you need to create templates or styles draw

1 In the drawing area, select an object with the style you want to copy.

2 Click <Object> tab ➤ General panel ➤ Save As .

3 On the General tab of the <object type> Style Properties dialog, enter a name for the new style, or accept the default, which is the original style name suffixed with an incremental number in parentheses.

4 Change other properties of the new style as desired.

For more information about changing the properties of an object style, refer to the appropriate section in the Help. For example, for information about wall styles, see Wall Styles on page 847.

5 Click OK.

The new style has been assigned to the object. You can access the new style in the Style Manager under the appropriate object style type.

Creating a Tool from a Style

Use this procedure to create a tool from a style. You can create tools from the following styles and definitions: AEC polygon, curtain wall, curtain wall unit, door, door/window assembly, mask block, mass elements, multi-view block, railing, roof slab, schedule table, slab, space, stair, structural member, wall, window, zone template, and zone.

You can create object tools by dragging a style from the Style Manager to a tool palette. When you drag a style onto a tool palette, a reference is created that associates the tool to the style. The reference location can be the current drawing, another drawing, or a remote location. If you edit the style in the Style Manager, the tool automatically uses the updated style.

If an existing tool references a style from another drawing, the style is not added to the current drawing until you add an object of that style to the drawing. The reference location is used only if the current drawing has been saved.

For detailed information about creating and customizing tools, see Tools on page 67.

1 Open the tool palette on which you want to create a tool.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Locate the style you want to copy, and drag it to the tool palette.

The default tool name is the name of the referenced style.

The image that identifies the new tool uses the view direction last used in the Properties palette for the selected object type.

4 Click OK.

Renaming a Style

Use this procedure to change the name of a style in an open drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 In the tree view of the Style Manager, right-click the style you want to rename, and click Rename.

3 On the General tab, enter a new name for the style.

4 Click OK.

The new name will display if you open the Style Manager again while the drawing remains open, but it is not saved until you save the drawing.

Copying Styles Between Drawings

Use this procedure to copy styles or definitions from the current drawing to another drawing. You can copy styles and definitions between existing drawings. You can also copy them from an existing drawing to a new drawing.

If a style references other styles, those styles are also copied to the other drawing. For example, if you copy a wall style into a new drawing, the wall endcap style used in the wall style is also copied to the new drawing.

NOTE You can also drag and drop styles and style types between drawings.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager displays with all open drawings listed in the tree view and the current drawing expanded.

2 If the drawing to which you want to copy the style is not listed, open it or create a new drawing:

If you want to…	Then…
copy the style to a drawing that is not open in the Style Manager	in the Style Manager, click File ➤ Open Drawing, select the drawing you want, and click Open.
copy the style to a new drawing	in the Style Manager, click File ➤ New drawing, enter a name for the drawing, and click Save.

3 Expand a category, and expand a style type.

4 Select the styles or definitions that you want to copy:

If you want to…	Then…
copy an individual style or definition	right-click the style or definition, and click Copy.
copy all styles or definitions of a selected type, such as all wall styles	right-click the style or definition type, and click Copy. If your styles are sorted by style type, right-click the drawing name under the selected style or definition type, and click Copy.

5 Right-click the drawing into which you want to copy the style(s), and click Paste.

The styles or definitions are pasted into the selected drawing. If the drawing already contains a style with the same name, the duplicate name is displayed in the Import/Export - Duplicate Names Found dialog.

6 Resolve duplicate style names, if prompted:

If you want to…	Then…
prevent the Style Manager from overwriting the existing style with the new style of the same name	select Leave Existing, and click OK.
replace the existing style with the new style	select Overwrite Existing, and click OK.
keep the existing style and add the new style with a different name	select Rename to Unique, and click OK. The Style Manager appends a number to the name of the new style. Right-click a style, and click Rename to change a style name.

7 Click OK.

Sending Styles to Other Users

Use this procedure to email styles or definitions to other users of AutoCAD Architecture. The software creates a new drawing that contains only the style information from the current drawing and attaches the drawing to an email message. If email is not available on your system, the Send option is not available.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand a category.

3 Select the styles or definitions you want to send:

If you want to…	Then…
send an individual style or definition	right-click the style or definition, and click Send.
send all styles or definitions of a selected type, such as all wall styles	right-click the style or definition type, and click Send. If your styles are sorted by style type, right-click the drawing name under the selected style or definition type, and click Send.
send all styles or definitions in the drawing (styles must be sorted by drawing)	right-click the drawing name, and click Send.

A new email message with the subject AutoCAD Architecture Styles is created using your email program. A drawing file containing the styles and definitions you selected is added to the message as a file attachment.

4 Complete and send the message in your email program.

5 Click OK.

Purging Styles

Use this procedure to remove unused styles and definitions from a drawing. You can purge any styles that are not applied to an object in the drawing and not used in another style. You can purge either a single unused style or definition or all those within a selected type. For example, you can purge all unused wall styles.

Referenced styles or definitions are not purged when you purge the style that uses them. For example, if you purge a wall style, the wall endcap style and cleanup group definition used in the wall style are not purged.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed, with the current drawing expanded in the tree view.

NOTE You can also purge a selected style or style type by pressing *DELETE*.

2 Expand a category, and expand a style type.

3 Purge styles or definitions:

If you want to…	Then…
purge one unused style or definition	right-click the style or definition you want to remove, and click Purge.
purge all unused styles or definitions of a selected type	right-click the style or definition type, and click Purge. When prompted, verify that the styles you want to purge are selected, and click OK.

If a style or definition you selected to purge remains in the list after purging, the style or definition is currently applied to an object or is used in another style. For example, you cannot purge a wall endcap style that is used in a wall style or that is applied to an individual wall.

4 Click OK.

Working with Drawings and Templates in the Style Manager

When you first open the Style Manager, any drawings or templates that are open in AutoCAD Architecture are displayed in the tree view. You can also open other drawings or templates and create new drawings or templates within the Style Manager.

Opening Drawings in the Style Manager

When you create a new drawing or template in the Style Manager, or open an existing one, that drawing or template is open for use only within the Style Manager, and not in your drawing session. You need to exit the Style Manager before you can open the drawing or template in the drawing session.

Determining the Status of a Drawing

To determine whether a drawing or template is open in the software or only within the Style Manager, look at the icon next to the drawing or template in the tree view.

Drawing icon	Drawing status
	Drawing is open in the software and in the Style Manager.
	Drawing is open only in the Style Manager.
	Drawing is locked.

A drawing may be locked in the Style Manager for any of the following reasons:

- The drawing is read-only.
- The drawing was created in a previous version of the software.
- The drawing is referenced into a drawing that is currently open.
- The drawing is open in another application.
- The drawing file is locked on a network.

To view a tooltip stating the reason for the lock, select the drawing in the tree view, and pause the cursor over the lock icon on the Style Manager status bar .

TIP You can save your styles in a read-only source drawing and copy them to other drawings as necessary.

Closing Drawings in the Style Manager

Any drawings and templates that you create or open in the Style Manager are listed in the tree view every time you open the Style Manager until you close them from within the Style Manager.

Starting a New Drawing or Template in the Style Manager

Use this procedure to start a new drawing or template in the Style Manager. The new drawing or template does not contain any styles and is open for use in the Style Manager only. It is not open in the AutoCAD Architecture session. You can open the new drawing or template in the software after you exit the Style Manager.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. On the Style Manager menu bar, click File ➤ New Drawing, or on the Style Manager toolbar, click .
3. In the New Drawing dialog, for File Name, enter the new drawing name.
4. For Files of Type, select Drawing (*.dwg) to create a drawing, or select Drawing Template (*.dwt) to create a template.
5. Click Save.
6. Click OK.

Opening a Drawing or Template in the Style Manager

Use this procedure to open a drawing or template in the Style Manager. The drawing or template will be open only within the Style Manager; that is, it will not be open in the AutoCAD Architecture drawing session. You can open the drawing in the software after you exit the Style Manager.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. In the Style Manager, click File ➤ Open Drawing, or on the Style Manager toolbar, click .
3. Select one or more files, and click Open.
4. Click OK.

Dragging a Drawing into the Style Manager

Use this procedure to open a drawing or template in the Style Manager by dragging it from Microsoft® Windows® Explorer. The drawing or template will be open only within the Style Manager; that is, it will not be open in the AutoCAD Architecture session. You can open the drawing in the software after you exit the Style Manager.

1. In the Style Manager, sort the styles by drawing.
2. Start Microsoft Windows Explorer.
3. In Windows Explorer, select the drawing or template that you want to open in the Style Manager.
4. Drag the drawing into the tree view in the Style Manager.
5. Click OK.

Closing Drawings and Templates in the Style Manager

Use this procedure to close a drawing or template that is open only in the Style Manager. If a drawing is open in the AutoCAD Architecture session, you cannot close it in the Style Manager.

1. In the Style Manager, sort the styles by drawing.
2. Select the drawing or template that you want to close.
3. In the Style Manager, click File ➤ Close.

4 Click OK.

Materials

12

A material in AutoCAD Architecture corresponds to a specific finish material in a building model, such as brick, concrete, or glass. Materials are useful for illustrating plans, sections, elevations, and renderings in the design process. Materials also provide a way to manage the display properties of object styles.

Materials

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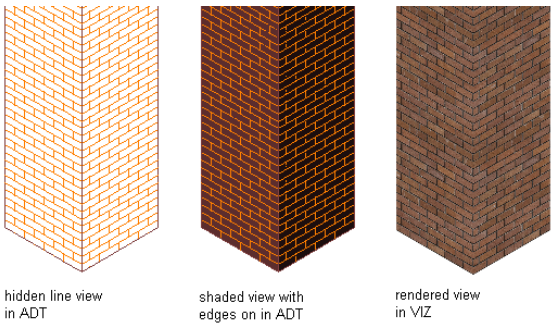
Viewing a building model corner showing materials



Simplifying the Design Process

Using materials makes displaying objects more realistic. You define the display of a material, such as brick or glass, only once in the drawing or the drawing template, and then assign it to the component of an object where you want the material to display. For example, you can define a material “Glass” and then assign it to any number of windows, glass door insets or cubicle walls. You typically assign materials to components in the style of an object, such as the brick in a wall style. Then, whenever you add a wall of that style to your drawing, the brick of that wall displays consistently.

Defining materials in an object style can provide control for the display of objects across the whole project. When the characteristics of a material change, you change them just once in the material definition and all objects that use that material are updated. With the material tool you can apply a material to a single instance of the object.

Visual Styles and Render Materials

You can take advantage of Visual Styles, Rendering Materials, Lights, and Cameras in AutoCAD Architecture. In Content Browser, a Visualization catalog lets you access a number of predefined tools for lights, rendering materials, cameras, and visual styles. For more information about these visualization features, see "Create Realistic Images and Graphics" in the AutoCAD help.

Predefined Materials

AutoCAD Architecture provides a number of predefined material definitions for common design purposes, making it easy for you to start with new drawings. You can use these predefined material definitions "as is" or modify them to fit your designs. You can also create your own material definitions. Object styles provided with the software already have material definitions assigned to them.

Surface Hatching

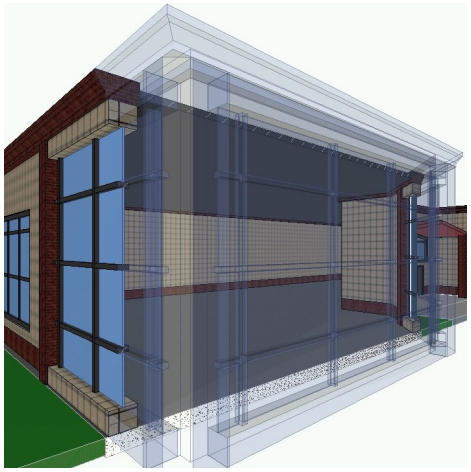
Materials provide the ability to assign surface hatches to objects. Surface hatches can be displayed in model, section and elevation views. You can control the placement and orientation of the hatch for each object face.

Section Hatching

Materials are helpful to clearly illustrate sections and elevations. The section hatch is specified independently of the surface hatch. Special material components allow a realistic or schematic display of rendered live section views, section cuts, and section bodies.

For more information about live section views, see Creating and Editing a Live Section View on page 2140.

Rendered live section view with transparent outside material



Material Tool

You create a material tool from a material definition. You can then use this tool in the same way that you would use any other tool in your project. For more information about working with tools, see Tools on page 67. This is the most efficient method of applying a material definition to an object or the component of an object. For more information, see Creating a Material Tool from a Material Definition in Style Manager on page 582.

Objects That Support Materials

Objects to which you assign materials are typically three-dimensional (3D) objects. Two-dimensional (2D) objects, such as areas, grids, or AEC polygons, are more like symbolic representations and drawing aids than actual building objects.

Not all components of an object can take on a material definition. For example, a door swing is a symbolic graphic, therefore, it does not support a material assignment. The appearance of a door swing is specified in the display properties of a door style. The door frame, however, is a physical part of the door, and a material definition can be assigned to it.

Object	Components that support materials
Curtain Walls/Curtain Wall Units	infills, frames, mullions
Doors	frames, panels, stops, insets, muntins
Door/Window Assemblies	infills, frames, mullions
Mass Elements	mass element body
Mass Groups	mass group body
Railings	guardrails, handrails, bottom rails, posts, balusters
Roof	roof body
Slabs/Roof Slabs	slab body, slab edge, fascias slab, edge soffits
Space Boundaries	interior boundary, exterior boundary
Spaces	floor, ceiling
Stairs	tread, riser, landing
Structural Members	beam, brace, column body
Walls	wall body, wall shrinkwrap, wall components
Windows	glass, frames, sashes, muntins

Assigning Materials to Objects and Object Styles

The most efficient way to use materials is to apply them to a style. Any object of that style inherits those definitions or the relevant properties. As you add new objects of a style to your project, each will have the same materials assigned to them.

You can also assign materials directly to an object. You may want to do so in these cases:

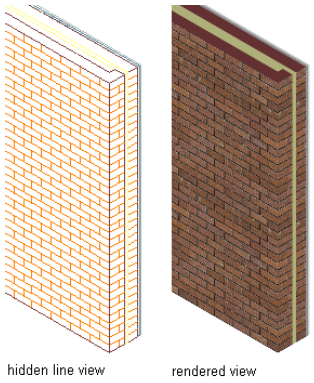
- You want to override the existing material for a specific object.
- The object in question does not support styles, but does support materials. (This is the case for AEC polygons.)

Examples of Material Assignments

Assigning a material to components of an object will change how the object displays in plan, isometric, section, and elevation views.

For example, if you want to draw a brick exterior wall, you can assign a material that displays a brick surface hatch in model view and a realistic brick display for a rendered view.

Brick wall in hidden line and rendered views



If there are special insulation components in a wall, you can assign a light, half-transparent material to them. For sectioning the wall, you can assign a specific section hatch pattern or fill that differs from the regular brick surface hatch.

Section fill material in a rendering

In another example, you can assign materials to the floor and ceiling components of a space such as a carpet material to the floor and tile to the ceiling.

Working with Material Tools

You can apply materials to objects in 2 different ways:

- Assign material definitions to individual components of an object through the display properties of its style. For more information, see Process Overview: Creating and Assigning Materials on page 599.
- Use a material tool to apply a material definition directly to an object component in the drawing. For more information, see Using the Material Tool to Add Materials to Objects on page 581.

- Apply a render material from an AEC material definition to an AutoCAD object. For more information, see Creating a Material Tool from a Render Material in the Content Browser on page 583.

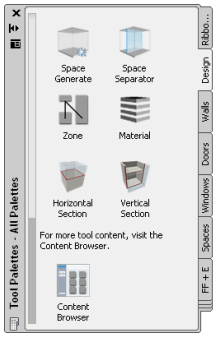
The Design tool palette includes the default Material tool, which references the Material Definitions file and allows you to apply any of those material definitions. Many of these material definitions can also be applied through material-specific tools located on the Materials tool palette in the Visualization palette group.

You can also create custom material tools from other existing tools, from material definitions in Style Manager, or from render materials in the Content Browser. For more information, see Creating Custom Material Tools on page 582.

Using the Material Tool to Add Materials to Objects

Use this procedure to configure the default Material tool and use it to apply an existing material definition to a component of an AEC object in a drawing. By default, the tool applies the Standard material definition, but you can modify the tool properties to specify any of the materials defined in the Material Definitions (Imperial).dwg or Material Definitions (Metric).dwg files.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Design Tools .

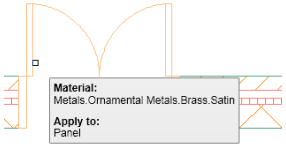


2 On the Design palette, do one of the following:

If you want to…	Then…
apply the Standard material definition	click the Material tool.
select a different material definition	right-click the Material tool, and click Properties. Expand Basic ➤ General, click the value for Definition name, and select the desired definition. Then click OK, and click the Material tool.

TIP A number of prefabricated material tools are available on the Materials palette in the Visualization palette group.

The cursor symbol changes to a small square. As you move it over an object component, the component highlights and a tooltip identifies the component and the material to be applied to it.



If a component does not support materials in the current view direction, does not support materials at all, or is in an xref, the tooltip informs you the material cannot be applied, and the cursor changes to a slashed red circle until you move it off that component.

NOTE For information about which objects can have materials assigned, see Objects That Support Materials on page 579.

3 Move the cursor over the object in the drawing until the desired component is identified in the tool tip, and then click to apply the material.

4 If you want the material to be applied to this component in all objects of this style, press *ENTER*. If you want it applied only to this component in the current object, enter **O**, and press *ENTER*. (Applying the material to the style is the default option for the first use of the tool on any component; if you choose to apply the material only to the current object, that becomes the default option, and you would need to enter **S** to apply the material to the style the next time you use the tool on that component. In other words, whichever option you choose becomes the default for the next use of the tool.)

NOTE For non-style based objects, such as a roof, the material definition (or the render material part of it in the case of an AutoCAD object) is applied to the object as soon as you click. You are not prompted about applying the material to the style, and you do not have to press *ENTER*.

Creating Custom Material Tools

In addition to using the standard Material tool on the Design tools palette, or the material-specific tools on the Materials tools palette in the Visualization tool palette group, you can create your own material tools in a number of ways, as explained in the following topics.

Creating a Material Tool from a Material Definition in Style Manager

You can create a new material tool from a material definition in Style Manager.

NOTE You can create a material tool from Style Manager only if the drawing containing the material definition has been previously saved.

1 Create a material definition as described in Creating and Editing Material Definitions on page 599

2 Make the tool palette active on which you want to place the new material tool.

3 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

4 Expand Multi-Purpose Objects, and expand Material Definitions.

5 Select the material definition that you have created, and drag it from Style Manager to the active tool palette.

6 Close Style Manager.

The material definition has been added as a material tool to the tool palette. You can use it to apply the material to objects, as described in Using the Material Tool to Add Materials to Objects on page 581.

NOTE The material tool uses the material definition you selected in Style Manager. The style location of the material tool is the drawing containing the definition. This means that when using this material tool you have access to all material definitions contained in the drawing.

Copying a Material Tool on a Tool Palette

You can create a new material tool by copying and pasting an existing tool on a tool palette.

1. Select a material tool from one of these locations on the tool palettes set:
   - the Design tool palette (contains the default material tool)
   - the Materials tool palette (in the Visualization tool palette group)
   - user-defined palettes and tools
2. Select the material tool, right-click, and click Copy.
3. If you want to paste it onto a different palette, make the palette active.
4. On the palette, right-click, and click Paste.
5. Select the tool, right-click, and click Properties.
6. To change the associated material definition, select a different definition under Definition Name.
7. To select a different source drawing, click Browse under Style Location.
8. In the Select a location File dialog box, select a source drawing, and click Open.
9. Select a material definition from the selected source file.
10. To update the material tool icon with the new material, select the icon under Image in the top left corner, right-click, and click Refresh Image.
11. Click OK.

Creating a Material Tool from a Render Material in the Content Browser

You can create a material tool by dragging a render material from Content Browser to AutoCAD Architecture.

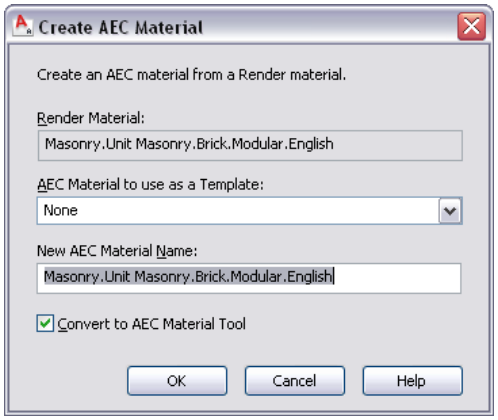
Creating a new material tool in a drawing entails the creation of a new material definition in Style Manager. The material definition is used to create the material tool, but can also be used for different purposes in the drawing, like using the material definition to create object styles.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. Open the Visualization catalog and navigate to the Render Material category. Then, select the material you require.
3. Move the pointer over the i-drop® icon next to the tool so that the pointer image changes to an eyedropper ( ).
4. Click and hold the i-drop® icon until it is full.
5. Use one of the following options to copy the render material to AutoCAD Architecture:
   - Drag the material from Content Browser into an AutoCAD Architecture drawing.
     If you drag a render material from Content Browser directly into an AutoCAD Architecture drawing, an AutoCAD Architecture material definition is created from it. You cannot directly create an AutoCAD Architecture material tool this way. The new material definition is listed

in Style Manager, where you can create a material tool from it, as described in Creating a Material Tool from a Material Definition in Style Manager on page 582.

- Drag the material from Content Browser onto an AutoCAD Architecture palette.
  If you drag a render material to an AutoCAD Architecture palette, a "temporary" material tool is created.

6 If you have dragged the render material directly into an drawing, the Create AEC Material worksheet is displayed.



- For AEC Material to use as a Template, select an existing material definition that contains the parameters you want to use.

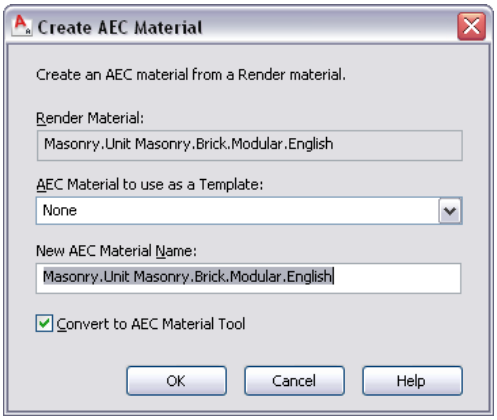
  NOTE The material definition you select as template will define all initial material settings except for the rendering material. These include the layer, color, and linetype settings, hatching, surface hatch assignments, and the behavior of the material when used in a section.

- Enter a name for the new material definition.
- Click OK.

The option to automatically create a material tool from the new material definition is grayed out. To create a material tool, see Creating a Material Tool from a Material Definition in Style Manager on page 582.

7 If you have dragged the render material onto an AutoCAD Architecture palette, finish the creation of the AEC Material tool.

- Select the temporary icon on the tool palette.



- In the Create AEC Material Worksheet, select an existing material definition for AEC Material to use as a Template.

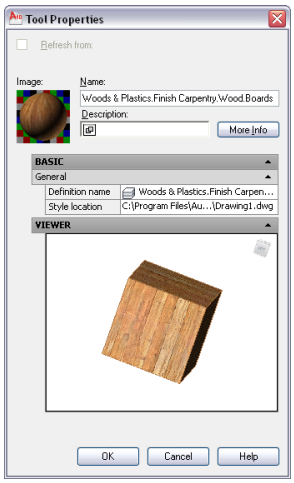
  NOTE The material definition you select as template will define all initial material settings except for the rending material. These include the layer, color, and linetype settings, hatching, surface hatch assignments, and the behavior of the material when used in a section.

- Enter a name for the new material definition.
- Verify that Convert to AEC Material tool is selected.
- Click OK.
  A notification message appears, reminding you to save the drawing after dismissing the notification so that the material tool is saved with the current drawing.

8 If you have created a material tool by dragging a render material to a tool palette, update the tool image to display the AutoCAD Architecture material tool icon.

9 Select the material tool on the palette, right-click, and click Properties.

You can see that the icon preview is different from the Viewer preview.



10 Select the icon preview under Image, right-click, and click Refresh Image. Then, click OK.

The material tool is now represented on the palette by the AutoCAD Architecture cube icon with correct material display.

Material Components and Display Properties

Each material definition has the following display components that determine the appearance of object components to which a material has been assigned:

- Linework
- Plan Hatch 3D Body
- Surface Hatch
- Section Hatch
- Sectioned Body and Boundary

After you have specified display components of an object to be By Material, then you can no longer change the display component properties of that object.

The material components correspond to groups of object display properties or to display property types. For example, the material Linework component determines the appearance of linework components in 2D plan views, such as wall shrinkwraps, mass element boundaries or door frames. Surface Hatch determines the appearance of all surface hatching on objects in model and elevation views.

When you specify that the component of an object is displayed by material, the component uses the display properties of the associated material, instead of the display properties of the object. Only object components that correspond to a physical component of the object can be assigned material definitions. For more information, see Objects That Support Materials on page 579.

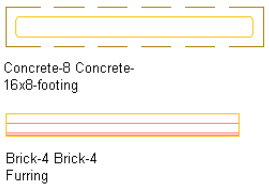
Material definitions cannot be assigned to a custom display block, but objects that are within custom display blocks may have material definitions assigned.

For a detailed list of object components mapped to material components, see the Help topics for the objects.

Linework Material Component

The Linework component is used for object components representing linework in 2D plan and elevation views, such as wall boundaries, door frames, or mass element boundaries.

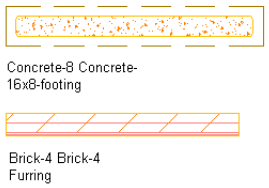
Viewing wall plan view linework material components



Plan Hatch Material Component

The Plan Hatch component is used for hatching display components in plan views, such as wall component hatches, mass element hatches, and slab hatches.

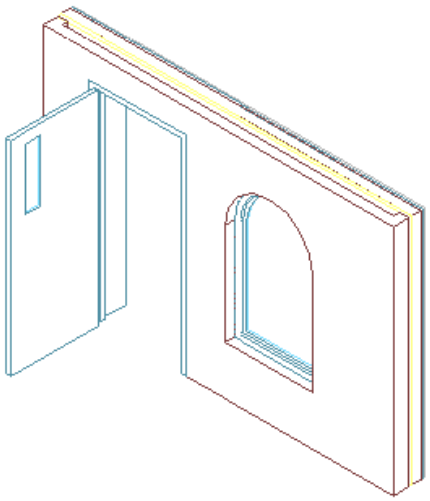
Viewing wall plan view hatching material components



3D Body Material Component

The Body component is used for object components representing linework in 3D model views, such as wall bodies, mass element boundaries, door frames, and window frames.

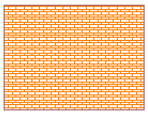
Viewing 3D body material components



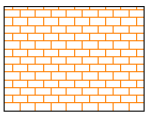
Surface Hatch Material Component

The Surface Hatch component is used for hatching display components in 3D model views, sections, and elevations. Section hatching is used on the cut face of a sectioned object or component.

Viewing surface hatching material on a wall elevation



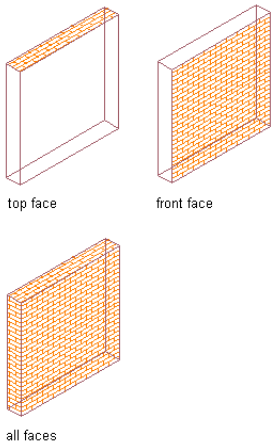
brick surface hatching



CMU surface hatching

You can specify the faces of an object that display the surface hatch within the material definition. For example, you can specify that the hatch be on only the front and left side of the object.

Specifying wall face surface hatching assignments

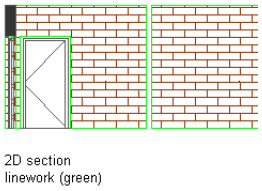


For more information about surface hatch faces, see Specifying the Surface Hatch Pattern of a Material Definition on page 602.

2D Section/Elevation Linework

The 2D Section/Elevation Linework component is used specifically for 2D building sections or building elevations. All linework in a 2D section/elevation can be controlled by this component. For more information about using material definitions in elevations, see Surface Hatch Linework in Elevations on page 2208.

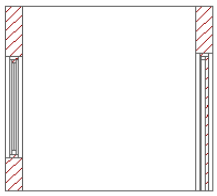
Viewing 2D elevation linework on a wall



Section Hatch Material Component

The Section Hatch component is used specifically for building sections. It is used for hatches on object faces cut by a section line. Section hatches can be applied to 2D sections, 3D sections, and live section views. For more information about using material definitions with sections, see Section Hatch Linework on page 2163.

Viewing a 2D wall section with section hatch



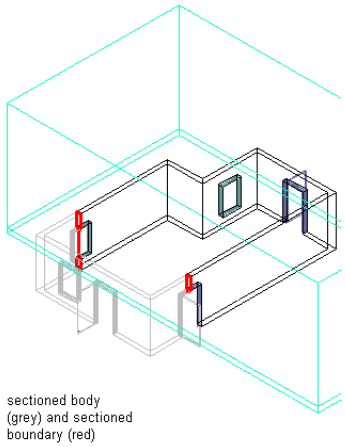
Sectioned Body and Sectioned Boundary

The Sectioned Body and Sectioned Boundary components display only in live section views. Live section views are special section views of a 3D building model. The building objects are not converted into a section object but are retained as individual objects in the section. They keep their properties and display components and may be edited in the section. The display of the views exterior to the live section is changed to be Sectioned Body. This display can be semi-transparent or hidden.

Material Component	Description
Sectioned Body	the objects or object parts outside the section
Sectioned Boundary	the outline of the cut line created by the section

For detailed information about live section views, see Creating and Editing a Live Section View on page 2140.

Live section view with sectioned body (gray) and sectioned boundary (red)



Displaying Materials in a Drawing

Use this procedure to turn on material definitions in a display representation if they are assigned to objects but are not displayed in the drawing. For more information, see Display System Structure on page 519.

1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Configurations.

The current display configuration is marked in bold.

3 Expand the current display configuration.

4 Select a display set in the current display configuration.

5 Click the Display Representation Control tab.

6 Scroll to Material Definition and select a display representation.

By default, material definitions have only a General display representation. If this is the only available display representation listed, select it. If you created another display representation for material definitions, you can select that representation instead.

NOTE Make sure that you select only one display representation for material definitions in each display set. You should also verify that the component's object layer is turned on.

7 Repeat steps 4–6 to select a display representation for material definitions in the other display sets in the current configuration.

8 Click OK.

The material assignments you made now display in the drawing.

Working with Surface Hatches

Surface hatches are hatch patterns on three-dimensional (3D) objects that display in 3D model views and elevation views.

Each 3D object has a number of faces: Top, Bottom, Left, Right, Front, and Back. You can decide whether an object should carry a surface hatch. For example, if you view a wall in 3D view, you might want to hatch only the side facing you to avoid cluttering the drawing.

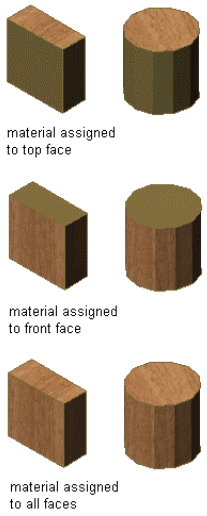
The faces of an object that carry the surface hatch are specified in the material definition. All objects with that material definition assigned show the same surface hatch assignment, unless you create an individual surface hatch override.

Defining the faces on a regular object, such as a wall, slab, or box-shaped mass element, is intuitive. Front, Back, Left, Right, Top and Bottom are clearly defined faces that can easily be assigned material definitions. However, defining the direction in which each face lies can be more complex for different, irregularly shaped objects, such as curved objects, extrusion objects, or Free Form objects resulting from Boolean operations.

For information about changing the surface hatch assignments of a material definition, see Specifying the Surface Hatch Pattern of a Material Definition on page 602.

For information about surface hatch overrides, see Overriding the Surface Hatch on Individual Objects on page 593.

Specifying object face material assignments

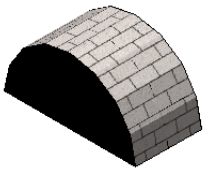


Surface Hatches on Curved Surfaces

Curved surfaces do not have all the view directions you can specify in the material definition. It is important to know that the faces are designated on curved surfaces to understand how surface hatching is applied when these objects are assigned material definitions.

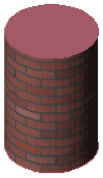
An object with a vertically curved surface, such as a Barrel Vault mass element, has no front and back faces, as nothing could delineate them. The curved surface of the Barrel Vault mass element is considered to be the top face of the object.

Barrel vault mass element with material assigned to top face



An object with a horizontally curved surface, such as a Cylinder mass element, has no left and right sides, as nothing can delineate them. The curved surface is considered to be the front face.

Cylinder mass element with material assigned to front face



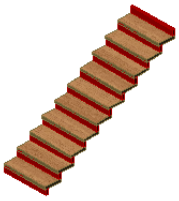
An object that has only one curved surface, such as a Sphere mass element, has only a front face.

Sphere mass element with material assigned to front face

Surface Hatches on Multiple Faces

Irregular and complex objects can have multiple faces in one view direction. If necessary, you can override the surface hatch on all faces with the same view direction, or on individual faces. For information about overriding individual faces, see Overriding the Surface Hatch on Individual Objects on page 593.

Stair with material assigned to treads



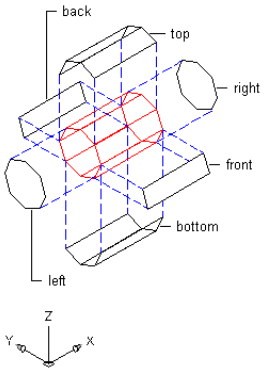
Surface Hatches on Extrusions

The surface hatch placement on objects created from an extruded profile depends on two factors:

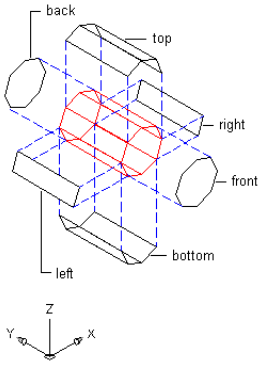
- the view directions assigned to the individual edges of the profile
- the direction of the extrusion

The desired extrusion direction depends on the object you want to extrude from the profile. A rail, for example, is extruded in the *X* direction. A railing post is extruded in the *Z* direction. Custom door and window shapes are extruded in the *Y* direction.

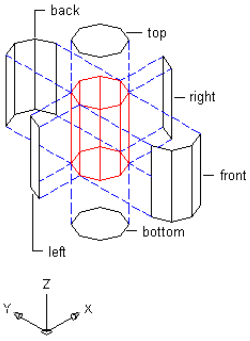
Face assignments from edges extruded in the X direction



Face assignments from edges extruded in the Y direction



Face assignments from edges extruded in the Z direction



Specifying Faces on Extrusions

Use this procedure to specify the faces on object components created from extruding a profile. These objects and components include extruded mass elements, wall body modifiers, custom railing components, and other components extruded from a profile.

When you create a profile, all the edges are marked for extrusion in the *Z* direction. These edge positions are calculated based upon the quadrant in which the midpoint of the edge lies. You can change the view direction of edges and the extrusion direction in the profile definition.

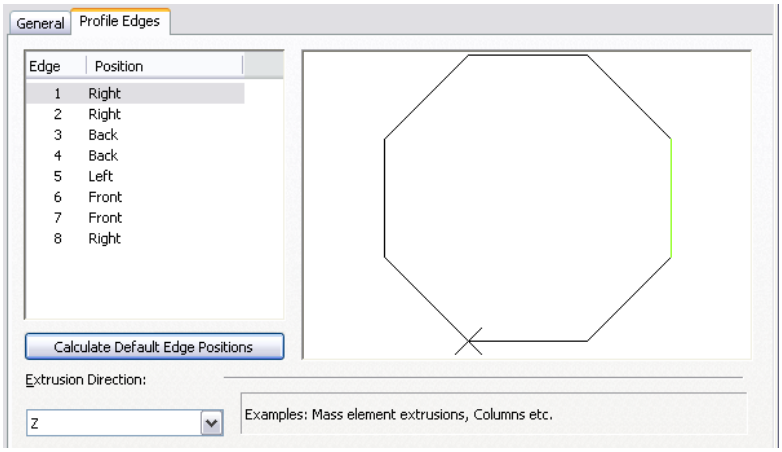
Determine the direction of the profile edges before creating objects from the profile. For example, if you created a profile for a custom railing baluster and specified the direction of the individual edges, any baluster added to the railing based on that profile has those assignments. If you later change the edge view direction in the profile, existing balusters do not change accordingly.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Profiles.

3 Select the profile for the extrusion.

4 Click the Profile Edges tab.



5 Select an extrusion direction.

6 For each edge, select a position that corresponds to the view direction you want to assign to the face created from that edge.

The edge positions that are available depend on the extrusion direction you selected.

7 Click OK.

Surface Hatches on Free Form Mass Elements

Free Form mass elements are created when you perform a Boolean operation on a standard mass element by adding, subtracting or intersecting another mass element. The resulting mass element can be irregularly shaped. For more information, see Mass Elements and Mass Groups on page 657.

When a mass element is converted into a Free Form mass element, all previous material assignments of the source mass elements are lost. The new mass element reverts to the Standard material definition. You can assign another definition to the new mass element.

Overriding the Surface Hatch on Individual Objects

The surface hatch specified for a material determines the display of objects that are assigned the material in elevation and model views, as well as the appearance in rendered views. The material definition specifies which faces of objects—Top, Bottom, Left, Right, Front, Back—display a surface hatch.

However, in some instances, you may want to override the surface hatch for a selected face of an object. For example, you may want to turn off the surface hatch where it could obscure small details of an object when the drawing is plotted.

Override Operations

You can change the surface hatches for faces of individual objects in the following ways:

- hide the surface hatch
- change the rotation of the surface hatch
- change the vertical and horizontal offsets of the surface hatch

You can also specify whether the changes are applied only to the selected face or to all faces of the object with the same direction—for example, to all front faces.

Multiple Surface Hatch Overrides

You don't need to create separate overrides for individual changes; you can create one surface hatch override that is both rotated and offset. In most cases, this is the preferred method of working. However, in some cases, you need to assign more than one override. For example, suppose you want to rotate the surface hatch of all front faces of a column, and you want to offset one individual front face. You first add an override for the rotation and select All Front Faces. Then you add an override for the offset in which you select Only Selected Front Face.

Hiding a Surface Hatch

Use this procedure to hide the surface hatch on an object face.

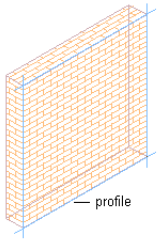
To add an override to a surface hatch, an object needs to have a surface hatch material assigned to it. A surface hatch on an object can come from an assigned material or from the display properties of the object or object style.

If a surface hatch comes from the display properties of the object instead of from the material assignment, you cannot override it on individual faces. You receive an error message upon selecting the object face.

1. Select the object for which you want to hide an individual surface hatch, then click <Object> tab ➤ Surface Hatch panel ➤ Add Override .
2. Select the object face where you want to hide the surface hatch.

   A profile surrounds the selected face.

   Profile defining a face of a wall



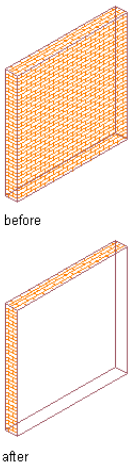
3. Specify where the override applies:

If you want to…	Then…
override only the selected face of the object	select Only Selected <Direction> Face for Faces. For example, to apply a surface hatch override only to the selected Front face of a wall, select Only Selected Front Face.

If you want to…	Then…
override all faces of the object in the same view direction	select All <Direction> Faces for Faces. For example, to apply a surface hatch override to all Top faces of a selected column, select All Top Faces.

4 Select Hide Surface Hatching.

Surface hatch hidden on the front face of a wall



5 Click OK.

Displaying a Hidden Surface Hatch

Use this procedure to display a previously hidden surface hatch.

An object must have a surface hatch material assigned to it in order to add an override to a surface hatch. A surface hatch on an object can come from an assigned material or from the display properties of the object or object style.

If a surface hatch comes from the display properties of the object instead of from the material assignment, you cannot override it on individual faces. You receive an error message upon selecting the object face.

1 Select the object for which you want to redisplay a hidden individual surface hatch, and click <Object> tab ➤ Surface Hatch panel ➤ Edit Override .

2 Select the profile around the hidden surface hatch.

3 Click Edit In Place tab ➤ Profile panel ➤ Edit Hatch Override .

4 Under Overrides, clear Hide Surface Hatching.

5 Click OK.

6 Click (Finish) on the Edits panel to save the changes.

Specifying the Rotation of a Surface Hatch

Use this procedure to specify the rotation of a surface hatch.

1 Select the object for which you want to rotate an individual surface hatch, and click <Object> tab ➤ Surface Hatch panel ➤ Add Override .

2 Select the object face where you want to change the rotation.

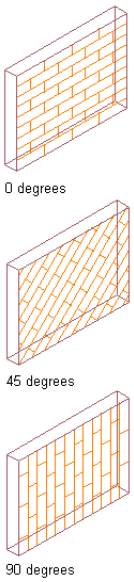
A profile surrounds the selected face.

3 Specify where the override applies:

If you want to…	Then…
override only the selected face of the object	select Only Selected <Direction> Face for Faces. For example, to apply a surface hatch override only to the selected Front face of a wall, select Only Selected Front Face.
override all faces of the object in the same view direction	select All <Direction> Faces for Faces. For example, to apply a surface hatch override to all Top faces of a selected column, select All Top Faces.

4 Specify the rotation of the surface hatch.

Specifying surface hatch rotation angles



5 Click OK.

Specifying the Horizontal and Vertical Offset of a Surface Hatch

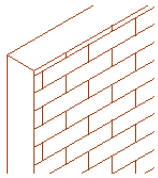
Use this procedure to specify the horizontal and vertical offset of a surface hatch.

An object must have a surface hatch material assigned to it in order to add an override to a surface hatch. A surface hatch on an object can come from an assigned material or from the display properties of the object or object style.

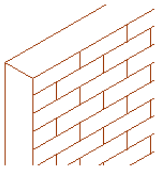
If a surface hatch comes from the display properties of the object instead of from the material assignment, you cannot override it on individual faces. You receive an error message upon selecting the object face.

Changing the offsets of a surface hatch lets you adjust the hatch pattern on individual faces to align with the face edges or to improve the appearance of the hatch.

Specifying surface hatching offset and alignment



standard wall surface hatch



wall surface hatch offset to align with wall edge

1 Select the object for which you want to change the hatch pattern offset, and click <Object> tab ➤ Surface Hatch panel ➤ Add Override .

2 Select the object face where you want to change the hatch pattern offset.

A profile surrounds the selected face.

3 Specify where the overrides applies:

If you want to…	Then…
override only the selected face of the object	select Only Selected <Direction> Face for Faces. For example, to apply a surface hatch override only to the selected Front face of a wall, select Only Selected Front Face.
override all faces of the object in the same view direction	select All <Direction> Faces for Faces. For example, to apply a surface hatch override to all Top faces of a selected column, select All Top Faces.

4 Specify the horizontal and vertical offsets of the surface hatch.

5 Click OK.

Editing Surface Hatch Overrides

Use this procedure to edit a surface hatch override that you applied to an object.

1 Select the object that has a surface override you want to change, and click the <Object> tab ➤ Surface Hatch panel ➤ Edit Override .

2 Select the profile of the face you want to edit.

If you have multiple surface hatch overrides on one object face, be sure to select the override you want to change.

3 Click Edit In Place tab ➤ Profile panel ➤ Edit Hatch Override .

4 Edit the surface hatch override:

If you want to…	Then…
hide a surface hatch	select Hide Surface Hatching.
re-display a hidden surface hatch	clear Hide Surface Hatching.
change the rotation of the surface hatch	enter a value for Rotation, or click and specify the rotation on screen.
change the offset of the surface hatch	enter a value for X Offset or Y Offset, or click and specify the offset on screen.

5 Click OK.

6 Click (Finish) on the Edits panel to save the changes.

Displaying a List of Materials

Use this procedure to create a list of material definitions and corresponding volumes for the objects that you select. The list includes all material definitions used in the selected objects as well as the total volume of each material definition. You can use the information for preliminary cost estimates.

1 On the command line, enter **materiallist**.

2 Select the objects you want to include in the list, and press *ENTER*.

3 Press *F2*.

The material definitions list is displayed in the AutoCAD® text window.

NOTE You can also select the list of material definitions, and then press *CTRL+C* to copy it, and *CTRL+V* to paste it into Microsoft® Word.

Displaying a Material Query

Use this procedure to obtain volume information for a selected material definition. The results of the query include the total volume for all objects with a selected material definition. For example, if you have two brick walls within your selection set, and each has a volume of 8.85 m3, the overall volume of brick objects is listed as 17.7 m3. You can use that information for preliminary cost estimates.

1 On the command line, enter **materialquery**.

2 Select the objects you want to include in the query, and press *ENTER*.

3 Select the material definition you want to query.

For example, if you want to query for bricks, select Brick from the list.

4 Click OK.

All objects assigned the selected material definition are highlighted in the drawing.

5 Press *F2*.

The volume for the selected material definition is displayed in the AutoCAD® text window.

Process Overview: Creating and Assigning Materials

AutoCAD Architecture offers a number of predefined building material definitions in the drawing templates. You can also create your own custom material definitions. All material definitions used in a project are listed under Material Definitions in the Style Manager.

The material definitions are listed in alphabetical order. Devising a naming convention for your material definitions allows you to locate them quickly. For example, you might create glazing definitions named "glass.interior.clear,""glass.exterior.tinted," and "glass.exterior.clear." These would appear in the following order under Material Definitions:

- glass.exterior.clear
- glass.exterior.tinted
- glass.interior.clear

The following steps describe the process of creating a material definition and assigning it to an object or object style:

1. Create a material definition for each material needed and specify the display properties of these definitions.

   For example, create a brick material definition that shows a dark red surface hatch, matching dark red linework components, an appropriate section hatch, and a brick rendering material. Or, create a glass material definition that has light blue linework, a transparent surface, and a light blue rendering material.

   For more information, see Creating and Editing Material Definitions on page 599.

2. In object styles, assign a material definition to represent each component.

   For example, in a window style, assign a wood material definition to the frame and the muntins and a glass material definition to the window glass. Or, if you are working with a wall style, assign a brick material definition to the wall body and an insulation material to insulation components.

3. Make sure that the corresponding display properties of the object or object style are in all display representations specified as By Material.

4. For object components that do not use material definitions, specify the display properties in each display representation.

   For example, if you want the graphic representation of a door swing to match the dark brown door frame, open the display properties of the door style, and change the color of the door swing to a dark brown. Perform this step for each display representation in which the door swing appears.

   When you create objects from these styles, their components are displayed as follows:

   - If you have selected By Material in the Display Properties, then the object components that have material definitions assigned show the display properties you specified in the material definition.
   - Object components that have no material definitions assigned show the display properties you specified in the object style.

Creating and Editing Material Definitions

Material definitions are created, edited, copied, or purged in Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. Material definitions contain settings for the hatching, scale, and color of materials, plus rendering materials. You can find predefined material definitions in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>\Material Definitions.dwg*. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Material Definition

Use this procedure to create a definition for the material you wish to use.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Create a material definition:

If you want to…	Then…
create a new definition with default properties	right-click Material Definitions, and click New.
create a new definition from an existing definition	right-click the material definition you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new material definition, and press *ENTER*.

5 Edit the properties of your new definition:

If you want to…	Then…
enter a description of the material definition	click General. Enter a description of the material definition.
change the layer/color/linetype properties	see Defining the Layer, Color and Linetype of a Material Definition on page 600.
change the hatching patterns	see Specifying the Plan and Section Hatch Patterns of a Material Definition on page 601.
assign surface hatching to individual object faces	see Specifying the Surface Hatch Pattern of a Material Definition on page 602.
assign surface and live section rendering materials	see Assigning Render Materials on page 604.
exclude components from 2D shrinkwrap	see Excluding a Material Definition from 2D Section Shrinkwrap on page 606.
add notes, files, or documents to the definition	see Attaching Notes and Files to a Material Definition on page 608.

6 When you finish changing the material definition properties, click OK.

Defining the Layer, Color and Linetype of a Material Definition

Use this procedure to define the layer, color, and linetype of the material components. For detailed descriptions of the individual material components, see Material Components and Display Properties on page 585.

NOTE If you turn off a display component in the material definition, object components assigned that material definition do not display in the drawing. For example, if you turn off the Linework component in a material definition, and assign that definition to a door frame component, the door frame does not display in plan views.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Select the material definition you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and verify that Style Override is checked.

The display representation in bold is the current display representation.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK.

Specifying the Plan and Section Hatch Patterns of a Material Definition

Use this procedure to change the patterns for the Plan, Hatch, and Section Hatch components of a material definition. For detailed descriptions of individual hatch components, see Material Components and Display Properties on page 585.

For more information about specifying surface hatch patterns, see Specifying the Surface Hatch Pattern of a Material Definition on page 602.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Select the material definition you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and verify that Style Override is checked.

The display representation in bold is the current display representation.

6 If necessary, click .

7 Click the Hatching tab.

8 Select Plan Hatch or Section Hatch, and click the setting for Pattern.

9 Select the hatching for the component:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the location where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.

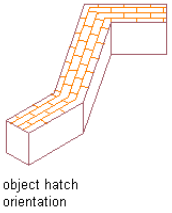
11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

Specifying surface hatching orientation

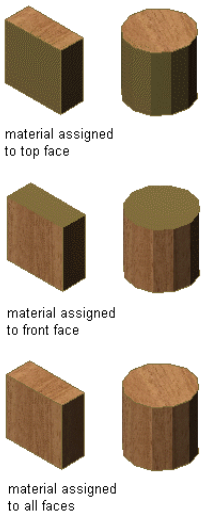


14 Click OK.

Specifying the Surface Hatch Pattern of a Material Definition

Use this procedure to specify the pattern used for the surface hatch.

Specifying material assignment by object face



NOTE After you assign a material definition to an object, you can edit the surface hatches for the individual faces of the object. For more information about editing surface hatches, see Overriding the Surface Hatch on Individual Objects on page 593.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Select the material definition you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and verify that Style Override is checked.

The display representation in bold is the current display representation.

6 If necessary, click .

7 Click the Hatching tab.

8 Select Surface Hatch, and click the setting for Pattern.

9 Select the hatching for the component:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the location where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.

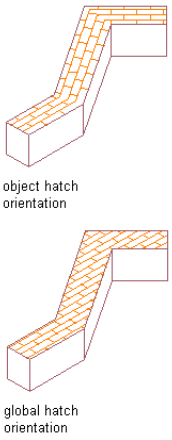
11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

Specifying surface hatch orientation



14 Click the Other tab.

15 For Surface Hatch Placement, select the object faces on which the surface hatching is displayed.

16 Click OK.

Assigning Render Materials

Use this procedure to assign materials for rendering object surfaces.

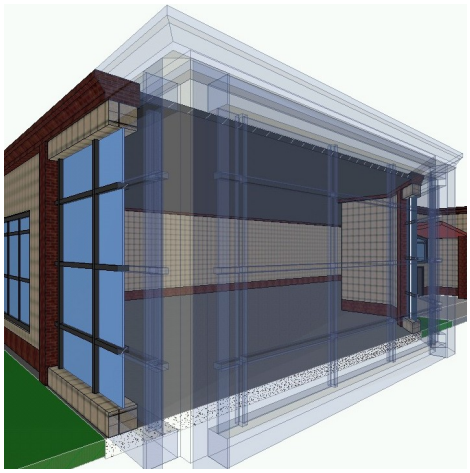
In shaded view and rendered views, objects may display rendering materials instead of the hatch patterns that are displayed in 2D wireframe and hidden line views. The following types of rendering materials are available:

Render Material Type	Description
Surface Rendering Material	Any object face that has surface hatching applied displays the hatching in the AutoCAD renderer
Live Section Rendering Material	All faces cut by a live section line display the live section rendering material when rendered with the AutoCAD renderer
Live Section Sectioned Boundary Rendering Material	All objects and object parts outside the live section line display the sectioned boundary material when rendered with the AutoCAD® renderer

You can assign rendering materials to two different types of component:

- Object surfaces: All object surfaces that have a surface hatch applied to them can also have a rendering material assigned. If you want to assign a rendering material to an object surface, make sure that the Surface Hatch component in the material definition is turned on.
- Live section views: The Sectioned Body component of a live section view as well as the live section cut plane can have special rendering materials assigned. If you want to assign rendering materials to a live section view, make sure that the Sectioned Body component in the material definition is turned on.

Rendered live section view with transparent outside component



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Select the material definition you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and verify that Style Override is checked.
The display representation in bold is the current display representation.

6 If necessary, click .

7 Click the Other tab.

8 Select rendering materials for the individual material components:

If you want to…	Then…
assign a rendering material to object surfaces	select a material for Render Material. Then select a mapping type for Mapping: ■ If you select Same as Surface Hatch, only those surfaces selected under Surface Hatch Placement are rendered. ■ If you select Face Mapping, all surfaces are rendered and any hatch alignment overrides are ignored.
assign a rendering material to the cut plane of a live section view	select a material for Cut Surface Render Material.
assign a rendering material to the body component outside the live section line	select a material for Sectioned Body Render Material.

If you don't find the correct rendering material or if you want to see a preview of the material, click the Browse button and browse for the desired material.

9 Select a new rendering material, if necessary.

10 Click OK.

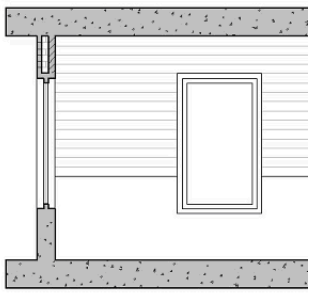
Excluding a Material Definition from 2D Section Shrinkwrap

Use this procedure to exclude components with a specific material definition assigned to them from the shrinkwrap of a 2D section.

When you create a 2D section, you can display a section component named Shrinkwrap. The shrinkwrap is the union of all object faces cut by the section line, merged into one component with one hatch pattern. This is a view frequently used for a 2D section.

By default, all components that are assigned material definitions are included in the shrinkwrap. However, you may want to exclude certain material definitions, such as glass, from the shrinkwrap.

2D section shrinkwrap with glass excluded (left)



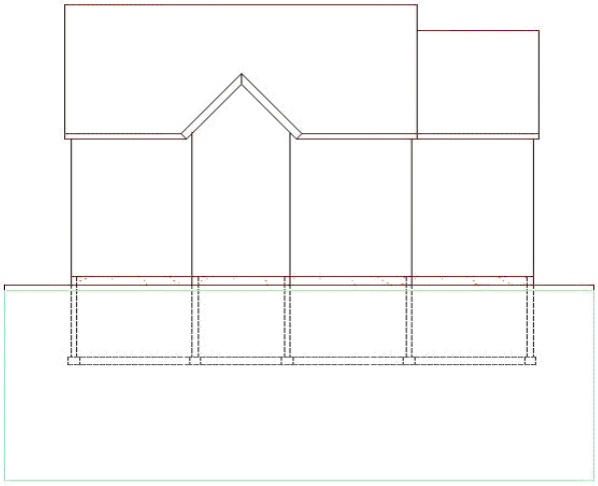
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Multi-Purpose Objects, and expand Material Definitions.
3. Select the material definition you want to change.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
   The display representation in bold is the current display representation.
6. If necessary, click .
7. Click the Other tab.
8. Select Exclude from 2D Section Shrinkwrap.
9. Click OK.

Controlling the Display of Hidden Lines by Material

Use this procedure to control whether hidden lines of a material should be displayed in a section or elevation.

You could do this, for example, if you want to display concrete walls and footings that are hidden by the ground and by other walls. Another frequent use could be to display structural members that are located behind walls.

Displaying hidden foundation walls



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.

3 Select the material definition you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.
The display representation in bold is the current display representation.

6 If necessary, click .

7 Click the Other tab.

8 Under 2D Section/Elevation Rules, select Display Hidden Edges for this Material.

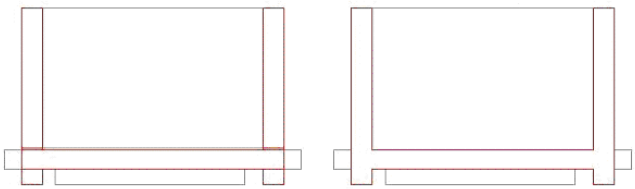
9 Click OK.

Merging Material Definitions in a 2D Section/Elevation

Use this procedure to merge material definitions when creating a 2D section/elevation.

Sometimes a single object in real-life is modeled with different objects in AutoCAD Architecture. An example is concrete foundations, which are modeled from slabs and walls. These objects should appear as one foundation object in sections and elevations. The new option to merge common material definitions facilitates this result. When a 2D section/elevation is created, all objects of that material definition are combined into a single object. Edges between coplanar faces are removed.

Walls and slabs merged (right)



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Material Definitions.
3 Select the material definition you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
The display representation in bold is the current display representation.
6 If necessary, click .
7 Click the Other tab.
8 Under 2D Section/Elevation Rules, select Merge Common Materials.
9 Click OK.

Attaching Notes and Files to a Material Definition

Use this procedure to enter notes and attach reference files to a material definition. You can also edit notes and edit or detach reference files from a material definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.
2 Expand Multi-Purpose Objects, and expand Material Definitions.
3 Select the material definition you want to change.
4 Click the General tab.
5 To add a description to the material definition, enter it for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Content Creation Guidelines

13

In this guide the term content refers generically to various types of elements that you can create to customize your installation of AutoCAD Architecture. These elements can be style-based or symbol-based and include items such as plot style tables, layers, layer key styles, layer standards, and drawing template files. While there are many ways in which you can create and structure your custom content, there are several standards and conventions (both documented and de-facto) that you can follow to make your custom tools more efficient and more portable between different environments and organizations. This document is not step-by-step guide for creating custom content; instead it focuses on identifying the relevant standards, conventions and best practices.

General Content Standards and Conventions

It is important to understand the various types of content, where they are stored and how they are made accessible to users. AutoCAD Architecture includes support for various CAD standards. Understanding how these are applied will assist you in creating your own customized content that works with the existing standards and conventions.

Content Types

AutoCAD Architecture content takes several forms and can be stored in a variety of locations.

- **Drawing templates:** The drawing template file is perhaps the most critical of content items in AutoCAD Architecture. In addition to standard AutoCAD items such as layers and dimension styles, the templates contain critical drawing and display settings. All AutoCAD Architecture model and sheet drawings should start with a template. Drawing templates are usually stored in the folder established in the AutoCAD Options dialog for template file storage. Additionally you can specify a default template to be used whenever the QNEW command is invoked. Finally, a default plot sheet template is usually specified as one of the sheet set properties for an AutoCAD Architecture project.
- **Styles:** Most AutoCAD Architecture objects, whether they are geometric objects or documentation objects, are based on styles. Any successful AutoCAD Architecture implementation will most likely consist of several custom styles and definitions. Most styles should be stored in one or more style library drawings, in a location that is accessible by all users. Usually, styles can be easily accessed by users from a tool on a palette or in a tool catalog.

NOTE Although some styles may be stored in the drawing template, this should be kept to a minimum and limited to those styles and definitions that are required for other content in the template.

- **Design and General Documentation Symbols:** These are best stored as AEC Content, which is created using the Create AEC Content wizard. Palette-based tools can also access these symbols.

NOTE Some symbol-based content, such as multi-view blocks used for column grid bubbles, can be stored in the drawing template. As with styles, however, this should be kept to a minimum. Once a symbol is stored as AEC Content, you can access it through Design Center™.

- **Callout Symbols:** These are special symbols that use attributes with field values to automate drawing coordination when you are placing keys for elevations, sections and details. The blocks that define callouts are stored in a library drawing and are accessed through palette-based tools.
- **Schedule Tags:** Based on multi-view block definitions, schedule tags capture and display property set data for objects in a drawing. Like callout symbols, schedule tags are stored in a library drawing and accessed from a palette-based tool.
- **Layer Key Styles:** While they can be stored in the drawing template, it is better to keep layer key styles in a central library drawing. When setting up a drawing, you can specify that a particular layer key style automatically loads each time a drawing is opened. This way if a layer key style is updated, a drawing that is already in progress will always be using the latest version.
- **Layer Standards:** Defined in the Layer Manager, layer standards are stored in the same library drawing as the layer key style with which they are associated. When the layer key style is imported into a drawing, the layer standard on which it is based will import also.
- **Display Configurations:** Default display configurations are stored in the drawing template.

TIP Most content types have associated naming conventions that are documented in this guide. As a global convention, it is acceptable to prefix any name with a company or organization name to differentiate your custom content from the default content supplied with AutoCAD Architecture.

National CAD Standard Compliance

The National CAD Standard version 3.1 is a consensus standard compiled from three existing standards and guidelines by NIBS (The National Institute of Building Sciences). These consist of the AIA Layer Guidelines version 3.0, the CSI Uniform Drawing System (UDS) and the Tri-Services Plotting Guidelines. The National CAD Standard v. 3.1 is supported where possible in AutoCAD Architecture through the use of pre-configured Layer Standards, Layer Key Styles, plot style tables and annotation tools. While it is not required that custom content be compliant, when creating new content for use in the United States you should take this support into account.

The Imperial templates provided with AutoCAD Architecture are pre-configured to load the AIA Version 3 Layer Key Style by default. This is based on the AIA Version 3 Layer Standard, which is in turn compliant with the AIA Layer Guidelines version 3.0.

The AIA v3 Layer Key Style includes line weights and linetypes that are in accordance with the Uniform Drawing System, and the colors that it specifies are compliant with the Tri-Services plotting guidelines. Additionally, the drawing default display representations for all objects in the template files have been configured to adhere to the Tri-Services Guidelines and Uniform Drawing System recommendations by assigning appropriate colors, linetypes, line weights and plot styles to all display components.

There are twelve templates that are provided with the AutoCAD Architecture sold in the United States, and each one is pre-configured to use a specific plot style table:

Template File Name	Description	Default Plot Style Table
AEC Model (Imperial Ctb).dwt	Used for model drawings with imperial (architectural) units and set up for color-based plotting.	AIA Standard.ctb
AEC Model (Imperial Stb).dwt	Used for model drawings with imperial (architectural) units and set up for named plot styles.	AEC Standard.stb
AEC Sheet (Imperial Ctb).dwt	Used for plot sheet drawings with imperial (architectural) units and set up for color-based plotting.	AIA Standard.ctb
AEC Sheet (Imperial Stb).dwt	Used for plot sheet drawings with imperial (architectural) units and set up for named plot styles.	AEC Standard.stb
AEC Model (Metric Ctb).dwt	Used for model drawings with metric (decimal) units and set up for color-based plotting.	AIA Standard.ctb
AEC Model (Metric Stb).dwt	Used for model drawings with metric (decimal) units and set up for named plot styles	AEC Standard.stb
AEC Sheet (Metric Ctb).dwt	Used for plot sheet drawings with metric (decimal) units and set up for color-based plotting.	AIA Standard.ctb
AEC Sheet (Metric Stb).dwt	Used for plot sheet drawings with metric (decimal) units and set up for named plot styles.	AEC Standard.stb
Structural (Imperial Ctb).dwt	Used for structural model drawings with imperial (architectural) units and set up for color-based plotting.	AIA Standard.ctb
Structural (Imperial Stb).dwt	Used for structural model drawings with imperial (architectural) units and set up for color-based plotting.	AEC Standard.stb
Structural (Metric Ctb).dwt	Used for structural model drawings with metric (decimal) units and set up for color-based plotting.	AIA Standard.ctb
Structural (Metric Stb).dwt	Used for structural model drawings with metric (decimal) units and set up for named plot styles.	AEC Standard.stb

NOTE By default the software is configured to use the *AEC Model (Imperial Stb).dwt* for model drawings and the *AEC Sheet (Imperial Stb).dwt* for plot sheet drawings.

In addition to the default plot style tables assigned to the imperial and metric templates, there are several additional optional tables provided. Many of these are for use with older legacy templates and drawing files:

Plot Style Table	Description
AEC Standard.stb	Default plot style for templates using named plot styles. This table uses generic names for plot styles and passes line weight control to the layer and object properties. All objects plot black.
AIA Standard.ctb	Default plot style for templates set up for color-based plotting. This table maps each color to an explicit line weight according to the Tri-Services guidelines.
AIA Standard Color.ctb	Optional plot style for templates using color-based plotting. All colors are mapped to explicit line weights according to the Tri-Services guidelines. Colors are controlled by the objects and layers.
AEC Standard Color.stb	Optional plot style for templates using named plot styles. This table uses the same names for plot styles as the AEC Standard.stb plot style table, but objects will plot according to their AutoCAD color.
AIA Standard.stb	Legacy plot style for older templates using named plot styles. This table includes plot styles named according to line weight definitions specified in the Uniform Drawing System.
AIA LWT by Object.ctb	Legacy plot style for older templates using color-based plotting. All colors are mapped to black and line weight control is by layer and object properties.
AIA LWT by Object.stb	Legacy plot style for older templates using named plot styles. All line weight control is by layer and object properties.
AIA Standard Color.stb	Legacy plot style for older templates using named plot styles. Plot styles assign line weight explicitly. Colors are controlled by objects and layers.
AIA Color LWT by Object.ctb	Legacy plot style for older templates using color-based plotting. Color and line weight control is by layer and object properties.
AIA Color LWT by Object.stb	Legacy plot style for older templates using named plot styles. All plot styles assign color and line weight according to object and layer assignments.

Legacy named plot style tables have seemingly redundant plot style names that correspond to UDS line weight names. Many of these tables use the same plot settings for multiple plot styles. This was done to allow for consistency in naming when switching between plot styles. With the newer *AEC Standard.stb* plot style tables, this complex plot style naming has been abandoned in favor of a much more simplified system. Both the *AEC Standard.stb* and the *AEC Standard Color.stb* plot style tables use the same plot style names,

however the former will plot all objects black while the latter will plot all objects according to their AutoCAD color. Aside from color vs. monochrome, the plot styles determine saturation:

- **Normal:** Default plot style. Because this plot style is not editable, it is typically not used in the AutoCAD Architecture layer key styles or display settings.
- **Full Saturation:** Objects assigned this plot style will plot either 100 percent black or 100 percent color, depending upon which plot style table is used.
- **50 Percent:** Objects assigned this plot style will plot with a 50 percent screen.
- **25 Percent:** Objects assigned this plot style will plot with a 25 percent screen.
- **Invisible Ink:** This is a unique plot style. Regardless of whether the *AEC Standard.stb* or *AEC Standard Color.stb* plot style table is being used, objects on this plot style will plot cyan, to simulate the effect of a blue lead pencil from manual drafting days, which will not typically come through when reproduced on a monochrome copy machine or standard blueline machine.

The Uniform Drawing System also specifies formatting for symbology and annotation. This is supported in AutoCAD Architecture through the content provided in the Documentation Tool Catalogs and in the drawing templates themselves.

NOTE For more information on NIBS or to purchase a copy of the National CAD Standard documentation you can visit their web site at *http://www.nibs.org/*

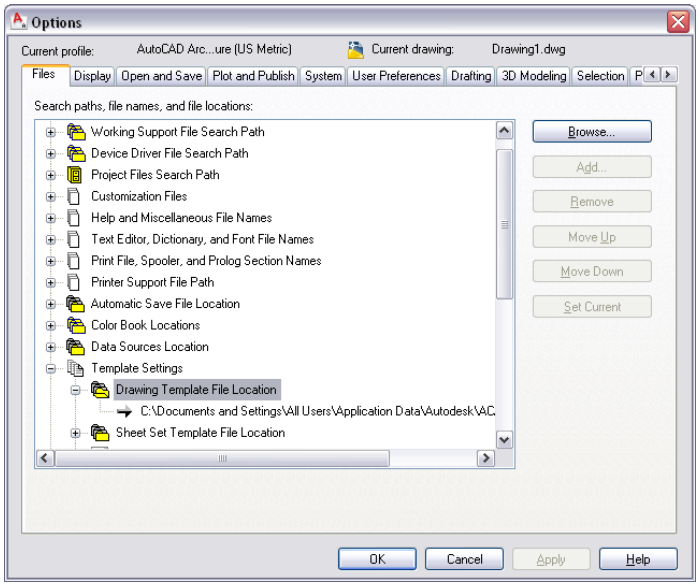
Content Resources

To create and distribute content effectively, it is important to have an understanding of where different types of content are best stored, and the possibilities each one of them provide towards a cohesive, well-managed system of templates, styles, symbols and tools. Careful attention should be paid to ease of user access, centralized storage and automation.

Template Drawings

There are a variety of things that should be kept in the template, however care should be taken to keeping it as “lean” as possible. Before storing content in a template you should consider other options, choosing to store it in the template only after confirming that it is the best possible location. Normally, the template itself should be stored in the location that is specified in the Options dialog under Template Settings.

Setting the template file location in the "Options" dialog box.



Items that should be included in the template file:

- **Layer definitions:** Pre-defined layers should be kept to a minimum. Most layers are created when needed by the layer key style that is loaded into a drawing. Only include pre-defined layers for those other objects and settings that must be in the template before a Layer Key Style is loaded or any objects created.
- **Text styles:** Include text style definitions to be used for standard notes and dimensions.
- **Title blocks, layouts and page setups:** These should be created in templates intended for use as plot sheet templates. Templates that are intended to be used for sheet sets, especially, should have page setups saved within them to serve as overrides when publishing a sheet set.
- **Multi-view blocks:** Normally these should be stored as AEC Content or tags, however if you want to use a custom column grid bubble block instead of the default grid bubble, you should store it in the template.

  NOTE Custom blocks do not scale correctly if you copy objects to which they are attached (such as doors with door hardware) and paste them in a drawing that has drawing units specified differently.

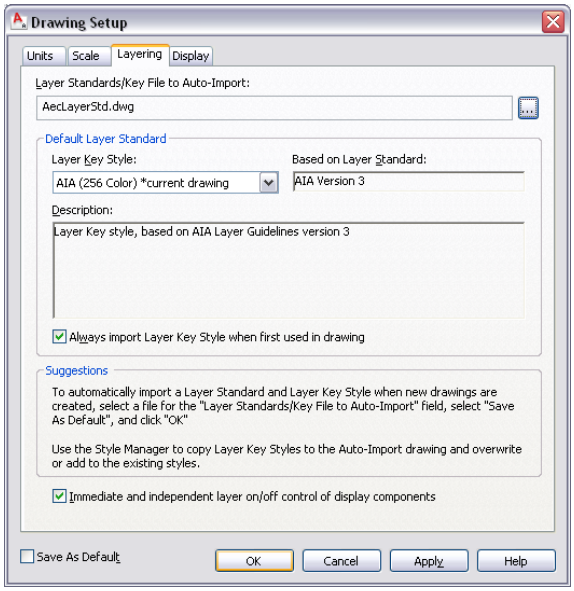
- **Classification definitions:** Those classification definitions that you use frequently are best stored in your drawing template, so that they are readily available when you need to classify either a style or an individual object.

Items that should not be included in the template file:

- **Most styles:** These should be kept in a style library drawing, with an associated palette-based tool that allows users to import the styles into the current quickly and easily on demand. Storing the styles in a style library and providing tool access to them keeps your drawings from becoming unnecessarily bloated due to unused styles in the drawing database.
- **Symbol-based content:** These items are typically more effectively stored as AEC content or in the case of callouts and schedule tags, a library drawing. Again, palette-based tools provide quick and easy access to them on an as-needed basis.
- **Dimension styles:** AEC dimensions and the standard AutoCAD dimension styles upon which they depend for their display do not need to be stored in the template. Instead, you can store these in the same way as other style-based content; in a style library drawing, and provide access to them through palette-based tools.

- **Layer key styles and layer standards:** While these can be stored in the template, it is better to keep them in a library drawing and use the Drawing Setup dialog to make sure that the most current layer key style is automatically imported into a new drawing and any drawings that are already in progress upon opening. This ensures that you are always working with the most up-to-date version.

The layer settings in the Drawing Setup dialog. Note that a layer key style is set to auto-import and that Save as Default is checked. This will ensure that even if you start a drawing without a template, the correct layer key style will be loaded. Note also that Always import Layer Key Style when first used in drawing is checked. This is a drawing-based setting and should be set in the template. This will ensure that the most current layer key style will also be used in drawings that are already in progress.



Style Library Drawings

Most style-based content should be kept in a centrally located library drawing, accessible to all users. In most cases, the styles contained in this file can be imported by selecting a tool on a palette. If you anticipate a large quantity of custom styles, you may wish to break your library drawings up by type to keep them more manageable.

General Guidelines for Style Library Drawings:

- Start with a valid template drawing that includes all of your display configurations and correct units. This will allow you to edit or review styles in the library in the context in which they will be used.
- If you are storing your style library on a mapped drive make sure that the drive is mapped identically on every user's computer. AutoCAD Architecture supports UNC (Universal Naming Convention) pathing. If you are confident that your server names will not be changing you may want to consider using this method of pathing to your style libraries to avoid drive mapping problems.
- If you need to restrict users' ability to make changes to the style library, you can store it in a read-only folder. They will still be able to use the styles that it contains without any problems.

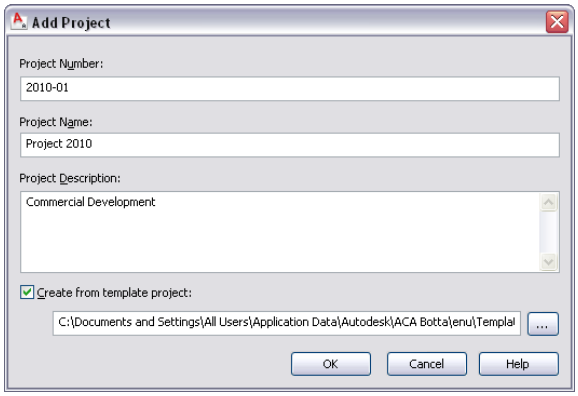
Template Projects

A well-planned template project can help you automate office standards and simplify the process of beginning and setting up a new project. Depending upon the type of work you do, your template project may be very

complete or it may just form the basic framework for a project. If your work consists of unique designs and your building types vary, you may find that the most efficient template project is minimal in structure. On the other hand, if you work with a typical building type, or if you work with prototypical buildings you might find that a more complete template project that includes more information concerning specific project structure is more effective.

Creating a template project is not the same as simply copying and renaming an existing project. In order to properly call for a template, you must specify it at the time that you create your new project.

Specifying the template project from the Add Project dialog. This is the only time this can be done. When the new project is created, settings and files from the specified template project will be copied to the new project.



Template Drawings

AutoCAD Architecture projects have, as a project property, template file specifications that determine the drawing templates to use for constructs, elements and views. These template settings are independent from the template settings established in the Options dialog. These templates should be in a location accessible to all users.

Project Details

Accessible from the Project Properties dialog, the detailed information worksheet contains information that can be linked to title blocks via fields or embedded in MTEXT or block attributes. This data is completely user-defined. Include data that is common to all of your projects in the project details of the template project.

Sheet Sets

All AutoCAD Architecture projects include an AutoCAD sheet set (.dst) file. When you use a project as a template, its sheet set file gets copied over to your new project along with all of the other project files and folders, and it is renamed to match your new project. The sheet set file contains a variety of critical information that can be pre-configured as part of your overall project template.

Items that can be modified in the sheet set file as part of the template project:

- **Default sheet template file:** This should be a sheet that has layouts defined in it to represent all of your standard plot configurations. It should also contain each layout saved as a page setup for use as overrides when publishing.
- **Subset structure:** You can add and delete subsets to conform to your office's standard sheet set layout and structure.
- **Sheets:** You can create sheets in advance to further automate the sheet set structure.
- **Sheet set custom properties:** You can define standard properties (data fields) that can be linked to your title block MTEXT or attribute fields.

NOTE If you define custom properties that are to be linked to a title block, you may want to consider providing a default value of "----" so that it will be obvious later on (if you have fields without values), and it will be easy to edit them.

Items that you should NOT include in a sheet set file for AutoCAD Architecture

- **Resource drawing locations:** In AutoCAD Architecture your view drawings automatically become your resource drawings. This setting should remain blank in the sheet set properties for an AutoCAD Architecture project.
- **Label block for views:** This is taken care of by the Title Mark tool on the AutoCAD Architecture tool palettes. These can also be customized to suit office standards. Leave this setting blank.
- **Callout blocks:** As with title marks, these are taken care of by the various callout tools on the AutoCAD Architecture tool palettes and can be customized to suit office standards. This setting should remain blank.

Project Standards

All settings established in the Configure AEC Project Standards dialog will copy with the template project to become part of the new project. Standards files that are unique to the project, in other words, standards files that reflect project standards that may be supplemental to or override office standards, should be placed in the Standards folder of the template project. These files will be copied and their paths updated in the new project.

As with style library drawings, if you are including a non-project based file in your standards files, you need to decide whether to use mapped drives or UNC file pathing. If you are using mapped drive letters, they must be mapped identically on all users' workstations. If you choose UNC, you need to be sure that the server path will be remaining the same for the foreseeable future.

Project Tool Catalogs and Palettes

In addition to office standard custom tool catalogs, each project has its own Content Browser library, with its own associated project tool catalogs. These can be configured in the template project as well. There are a few simple guidelines that you should follow when creating project tool catalogs.

- Create your new catalog from the project library view in the Content Browser. The project library can be accessed from the Content Browser button at the bottom of Project Navigator.
- If you create new catalogs in the project library, you should place them in the Standards/Tool Catalogs folder of your template project.

IMPORTANT In order for project catalogs to properly copy when the template project is selected, you must start your template project from one of the templates provided with AutoCAD Architecture. Remember also that even though the project catalog is copied from the template project, the tools within the catalog are unchanged; their paths remain the same as they are in the template.

Project Structure

If you work with a building type that is fairly consistent from one project to another, or a prototypical building type, you may find it advantageous to pre-define some aspects of the project structure itself. None of this is absolutely necessary, and the level to which you choose to pre-define these items is completely optional.

Project Structure Items That Can be Established in the Template Project

- **Levels and Divisions**

- **Constructs and Elements:** In addition to defining categories and sub-categories, any actual construct or element drawings will be copied to the new project from the template project.
- **Views:** If you've created constructs and elements as part of your template project structure, you can also create view drawings that reference the constructs.

NOTE AutoCAD Architecture provides you with the choice to use relative xref paths, which are on by default in the project properties. If you choose not to use relative paths and you create constructs, elements, and views as part of your template project, when a new project is created, the these items will be repathed automatically according to the new project's path.

Tool Catalogs

The tool catalog is one of the most critical components of any office's custom content collection. It is the central repository for all tool-based content, which can and should include tools that provide access to styles, AEC content, callouts, schedule tags, and other miscellaneous annotation items. Because it is central to an effective content distribution and management system, you should spend time planning its location, organization, and structure. You should also take steps to protect the contents of the tool catalog from unauthorized or inadvertent modifications.

If users are going to manually load the catalog into their content browser library, pathing is not critical; it simply needs to be placed in a location that all users can browse to. If you choose to automate the loading of the palette by creating a catalog install file, you need to ensure that the network location of the catalog file is accessed in the same way by all users. As with other types of network-based content, carefully consider the advantages and disadvantages of both mapped network drives and UNC pathing.

If you need to control the ability of users to make modifications to the tool catalog, you can store it in a read-only folder. Users will still be able to access the catalog to use the tools, however only those people with permission to write to that location will actually be able to make changes to it.

Display Control

The AutoCAD Architecture display control system is flexible and powerful and is drawing-based. Therefore, your default display settings should be established in your template drawing. The templates that come with AutoCAD Architecture already have much of the work involved in setting up a display system done for you. While they may require some adjustments to conform to your office or project standards, you should, in most cases, start with the default templates and make modifications to the existing settings rather than try to create a display system from scratch.

Display Hierarchy and By Material Display Control

Display control of individual objects can occur at three levels: drawing default, style overrides, and object overrides. When you define an object style you should only apply style overrides when absolutely necessary. Frequently, you can use material assignments to control the display of linework and hatching components of objects. For this reason, many objects have By Material set as a drawing default for their display representations.

Display Control Customization

Like most aspects of AutoCAD Architecture, the display system can be customized. There are a few things that you should keep in mind before doing so, however.

Best Practices for Customizing the Display System

- Start with one of the default templates. Creating a display system from scratch can be laborious and time-consuming. It is better to start with a template that is relatively close to what you need and make modifications to it.
- Modify existing display configurations and display sets before creating new ones.
- Do not create new display representations for objects unless you absolutely have to. Many times you can find an existing display representation that you are not using that you can modify to suite your needs. Remember that every display representation that you create is one that you have to manage.

NOTE Remember that display control is drawing-specific. Changes that you intend to be part of your office standard should be made in the drawing template. You can use the Display Manager to copy display configurations, display sets, and display representations between drawings.

IMPORTANT If you create a new display configuration that uses an existing display representation that has been modified, you must remember to copy both the display configuration and the modified display representation to your template. When you copy the display configuration to the template the associated display representations and display sets will only be copied with it if they do not already exist in the template. When you manually copy a display set or a display representation into a template that already contains display sets and representations with the same name, you will be prompted to overwrite the existing definitions.

Level of Detail

Level of detail should always be a consideration when creating new content objects and new display representations. By default there are three display configurations that address level of detail provided in the AutoCAD Architecture template drawings.

Display Configuration	Design Scale [Metric Units in Brackets]
High Detail	1/4″=1′-0″ [1:50]or greater
Medium Detail	1/8″=1′-0″ [1:100]
Low Detail	1/16″=1′-0″ [1:200] or smaller

NOTE You may decide that the default display configurations are not appropriate for your preferred graphic standards. You can create additional display configurations and modify the existing ones to accommodate your own standards.

Architectural objects frequently include hatch pattern parameters as part of their display control. You should make sure that the hatch pattern scale and type is appropriate for the level of detail a given display representation is meant to address. Also remember to address hatch pattern scale and type in your material definitions, as it is a best practice to assign material definitions to style-based components. Hatch patterns that represent annotation standards (diagonal lines that represent brick in plan, for example), should be scaled appropriately for your level of detail. Hatch patterns that represent geometry (bricks in elevation, for example), should be given a scale of 1 unit.

Style-Based Content

Style-based content in AutoCAD Architecture is classified under one of three general groups.

- **Architectural Objects:** Traditional architectural object geometry.
- **Documentation Objects:** Any style-based object that is specifically and uniquely used for annotation and documentation purposes.

- **Multi-Purpose Objects:** Any style-based object that could be used to help define either a documentation object style or an architectural object style.

Many styles can be used to create style-based tools on a palette. Others are used as nested styles or substyles. All styles and definitions can be edited in the Style Manager and stored in a central style library drawing.

TIP You can assign a pre-defined keynote from your keynote database to any style that you create on the General tab of the style definition.

Architectural Objects

When referring to styles, the term architectural object refers to any object style that will result in the creation of a specific type of architectural geometry, such as a wall, door, stair, roof slab, etc. It also refers to sub-styles that are related to those object types, such as wall endcaps and slab edge styles.

Walls

Walls are more complex objects and affected by a variety of styles and substyles. When a wall style that references a specific substyle is imported into a drawing, it will import all necessary substyles with it.

Wall Styles

Naming Conventions

You should provide as much information about the wall structure in the name itself as practical. This makes it easier to discriminate between wall styles in a long list without having to refer to the wall style description. The first component listed is the major structural component. The last component listed is usually a finish component.

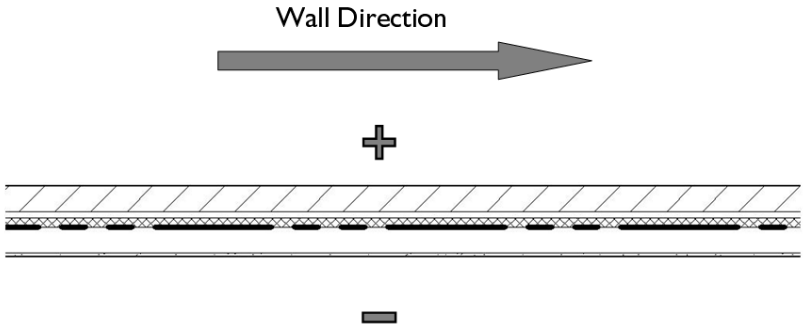
<Component name>-<Size in decimal units> <Component name>-<Size in decimal units>...

Example Wall Style Names:

Wall Style Description	Example Name
Wall structure: 5/8" gypboard interior finish, 3 1/2" wood stud, 1/2" sheathing, 1" air gap and 3 5/8" brick veneer.	**Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625**
Wall structure: 5/8" Gypboard interior finish on both sides of a 3 1/2" wood stud.	**Stud-3.5 GWB-0.625 Both Sides**
Wall structure: 5/8" Gypboard interior finish on both sides of a variable width wood stud.	**Stud-X GWB-0.625 Both Sides**

Best practices for wall styles

- Walls are directional and should be considered as having an exterior and interior side. The exterior, or positive side of the wall, is at the top of a wall running left to right. Wall components should be defined so that the index order is from exterior to interior. The component furthest to the exterior side of the wall should have an index assignment of 1, while the most interior component will have the highest index assignment.



- When specifying the edge offset of a component, the value should always be to the most interior edge of the component.
- The width of components is always a positive value.
- Wall priorities should be standardized and based on the existing AutoCAD Architecture convention, which is documented in the AutoCAD Architecture User Guide.
- Materials should be assigned to all wall components.
- Plan display of wall components should normally be set to observe the drawing default settings. Best practice is to assign materials to wall components and set their linework and hatch pattern parameters to By Material in the plan display settings.

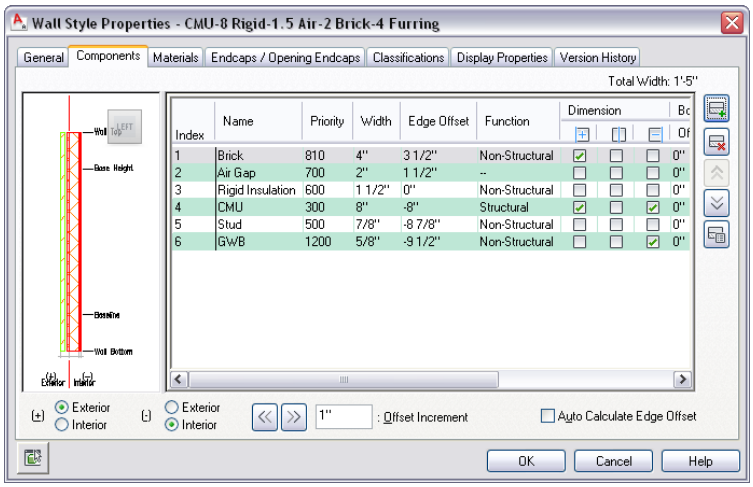
  NOTE Prior to the introduction of material definitions in Architectural Desktop 2004 it was common and recommended practice to assign wall style components to nested layers and set their color, line type, line weight, and plot style settings to BYLAYER. While this is still technically valid in AutoCAD Architecture 2010, it is not recommended except for a very few exceptions (such as the Plan Screened display representation, which is frequently used to export plan displays to consultants using AutoCAD, who desire the items to be on a prescribed layer and assigned colors appropriate for background drawings).

- Model display of wall components should be set to the drawing defaults to allow for material assignments to control the color and hatching of walls when viewed in non-orthogonal views.
- Wall styles should be classified. This allows for more flexible scheduling and tagging in the future, as well as more display control options.

  NOTE The Uniformat II classification definition is supplied in the *Uniformat II Classifications (1997 ed).dwg* file located in the *AEC Content\Styles* path. This classification definition is fairly comprehensive and in many cases serves well in classifying all types of AutoCAD Architecture object styles according to a uniform standard.

- Walls that have one or more obvious internal dimension points (such as the outside of a structural component) should have those specified in the wall style Components tab under the Dimensions column. This allows for more accurate application of AEC dimensions.
- Wall components should be assigned a “Structural” or “Non-Structural” designation under the “Type” column in the “Components” tab, again to allow for more effective use of AEC dimensions.
- Walls should have an interior and exterior side specified as part of the wall style definition to ensure more accurate AEC Dimensioning.

To ensure accurate dimensioning with AEC dimensions, the wall in the following image has had its components assigned to either "Structural" or "Non-Structural" types. Dimension points and the exterior/interior sides of the wall are also specified.



Wall Endcap Styles

Wall endcap styles are intended to be used with specific wall styles. They can be used to define actual end conditions as well as opening conditions as part of a Wall Opening Endcap Style.

Naming Conventions:

Wall endcap styles should be named according to the wall style to which they apply, with an indication of the condition they are meant to address:

<Associated wall styles> (<End condition><Index>)

Example Wall Endcap Style Names:

Wall Endcap Style Description	Example Name
For wall style *Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625* to define the first end condition.	**Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625 (End1)**
For wall style *Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625* to define a possible second end condition.	**Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625 (End2)**
or wall style *Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625* to define a jamb condition.	**Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625 (Jamb1)**

Best Practices for Wall Endcaps:

- Endcaps are drawn for each component. Components for which there is no endcap defined will terminate as soon as another component's endcap is encountered. For that reason, you need to draw a complete endcap for each component except for those that are intended to terminate at the location on the wall where the endcap is applied.
- Endcaps are applied perpendicular to the direction of the wall. The endpoints of each endcap are normally drawn so that an imaginary line connecting them would be perpendicular to the wall edges, except in the case where an endcap is intentionally skewed.
- It is typically not recommended to define endcaps for walls with variable width components. As a component's width is changed, its associated endcap will adjust to accommodate the change in width, however the endcap will maintain its proportions, causing distortions to occur to the end effect.

Wall Opening Endcap Styles

Wall Opening Endcap Styles apply to door, window, opening and door/window assemblies that are inserted into a wall. They consist of a collection of wall endcap styles that are applied to the head, jamb and sill conditions of the opening.

Wall Opening Endcap Style Naming Conventions:

The naming convention for a wall opening endcap style is similar to that for a wall endcap style:

<Associated wall style> (Opening<Index>)

Example Wall Opening Endcap Style Names:

Wall Opening Endcap Style Description	Example Name
Wall opening endcap style for a wall style named *Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625.*	**Stud-3.5 Brick-3.625 Sheathing-0.5 Air-1 GWB-0.625 (Opening1)**

Wall Cleanup Group Definitions

Wall Cleanup Group definitions should allow objects anchored to walls in other cleanup groups to be moved or copied to walls of the current cleanup group unless there is a compelling reason to not allow it. Cleanup between host and xref drawings should be turned on by default unless performance issues arise. There are no naming conventions for wall cleanup group definitions.

Wall Modifier Styles

Wall modifiers are typically best created "on the fly" by first creating a 2D polyline and converting it to a wall modifier. During the process you are prompted for a name to assign to a new modifier style, which is created from your geometry. Modifier styles define minimal information about the shape of the modifier itself. There are no current conventions for naming or application of wall modifier styles.

NOTE Wall modifiers can vary widely in shape and size from one instance to the next, even if they belong to the same style. To ensure that the modifier you wish to apply to a wall represents the shape that you want, first draw a 2D polyline and then convert the polyline to a wall modifier. You will be prompted for a new wall modifier style name during the process; each converted polyline must define a different modifier style. For these reasons, you may find it more effective in many cases to use *body modifiers* instead, which are not style-based.

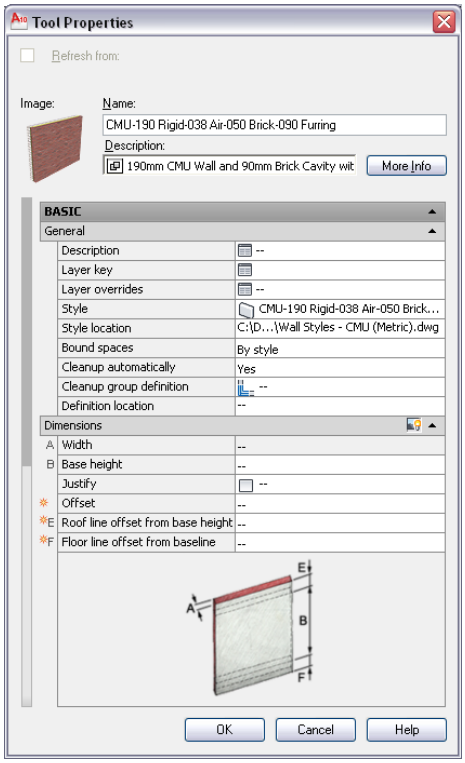
Palette-Based Wall Tools

The only wall-based style that can be assigned to a palette-based tool is the wall style itself. However when the wall style is used, any substyles that it uses, such as wall endcap styles and wall opening endcap styles, will be imported with it automatically. Additionally there are some tool properties that you may want to consider setting as defaults before saving the tool to a catalog:

- **Justification:** In the case of exterior walls, the baseline is usually defined at a critical dimensional location within the wall structure. In these cases it is a good idea to pre-set the justification property of the tool to "Baseline".
- **Cleanup Group Definition:** If you have defined a wall that should not clean up with other walls that are not of the same type, you can pre-set the cleanup group definition that it is inserted with.

  IMPORTANT To pre-set the wall cleanup group definition, you must first specify the library drawing in which the cleanup group definition exists, then define the cleanup group to use. Even if the cleanup group already exists in the current drawing, it will not be used unless you specify the definition location.

Wall tool pre-sets to establish the default cleanup group definition and the justification.



Doors and Windows

Doors and windows comprise three primary AutoCAD Architecture object styles: doors, windows and door/window assemblies.

Door Styles

Naming Conventions:

As with wall styles, the name for a door style should provide as much information about the door as possible. The format is:

<Door Operation> - <Door Type> - <Optional Door Shape> <Optional Case Type>...

NOTE Doors with no shape specified are assumed to be rectangular.

Example Door Style Names:

Door Style Description	Example Name
A single hinge, flush rectangular door.	**Hinged - Single**
A single hinge, flush rectangular door, explicitly for exterior use.	**Hinged - Single - Exterior**
A double hinge, paneled arched door.	**Hinged - Double -Arched - Paneled**
A single overhead door, paneled, for exterior use.	**Overhead - Single - Paneled - Exterior**

Door Style Description	Example Name
A single hinge, full glazed door, for use in a door/window assembly.	**Hinged - Single - Full Glazed - Assy**

IMPORTANT It is important to indicate those doors that are intended explicitly for assemblies. They will frequently have conditions defined that will not look correct when inserted into a wall independently from the assembly for which they were defined.

Best Practices for Door Styles:

- All door components should have materials assigned to them.
- Door styles should be classified for more control with scheduling and display control. As with walls, the Uniformat II Classification definition contains a ready-made list of classifications, including basic door classifications.
- In the "Model display representations of doors components should follow "By Material" settings.
- In the "Elevation" display representations components should be assigned colors with the display rules of your *2D Section/Elevation styles* in mind. Using colors that are coordinated with those styles can be used to automate linework properties in section and elevation objects.

Window Styles

Naming Conventions:

The naming convention for window styles is similar to that for doors, however is a bit more relaxed with more items becoming optional:

<Optional Window Operation> - <Window Type> - <Optional Window Shape> <Optional Case Type>...

NOTE Windows with no window shape specified are assumed to be rectangular. Windows with no operation specified are assumed to be fixed.

Example Window Style Names:

Window Style Description	Example Name
A rectangular Picture Window.	**Picture**
An arched double casement window.	**Casement - Double - Archtop**
An awning window, to be used explicitly in a door/window assembly.	**Awning - Assy**

IMPORTANT It is important to indicate those windows that are intended explicitly for assemblies. They will frequently have conditions defined that will not look correct when inserted into a wall independently from the assembly for which they were defined.

Best Practices for Window Styles:

- All window components should have materials assigned to them.
- Window styles should be classified for more control with scheduling and display control. As with walls, the Uniformat II Classification definition contains a ready-made list of classifications, including basic window classifications.
- In the Model display representations of window components should follow "By Material" settings.

- In the "Elevation" display representations components should be assigned colors with the display rules of your *2D Section/Elevation styles* in mind. Using colors that are coordinated with those styles can be used to automate linework properties in section and elevation objects.

Door/Window Assembly Styles

Naming Conventions:

The naming convention for door/window assemblies should reflect as much as possible the infill elements that they include, any cell adjustment parameters and where appropriate, the general position of infills in the assembly. In addition, if certain infills have a fixed size, it is helpful to indicate these as well. Different infill types are separated with a "+" symbol. These are loose guidelines at best; the very flexibility of door/window assembly styles and virtually unlimited combination of infills and grids makes it impossible to develop a fixed naming convention that will apply to all conditions:

<Infill Type> <Optional Infill Size> <Optional Infill Position> <Optional Cell Adjustment Parameter> + <Next Infill Type>....<Optional Door/Window Assembly Shape>

NOTE Door/Window Assemblies with no shape specified are assumed to be rectangular. In the case of a very complex door/window assembly, you may choose to omit some of the less prominent infill types and parameters, choosing instead to include them in a more complete style description.

Example Door/Window Assembly Style Names:

Door/Window Assembly Style Description	Example Name
An arched assembly with 4' windows and a two foot tall arched transoms, centered, with both side cells configured to grow as the assembly width is changed until the 4' size can be accommodated	**Windows4-0 Ctr Grow + Transom 2-0 Ctr Arched**
Hinged double door with variable width sidelights on each side and a transom.	**Hinged Double 6-0x6-8 + Sidelights + Transom**
A hinged single door on the right side with a single sidelight and a transom.	**Hinged Single 3-9x6-8 Right + Sidelight + Transom**

Best Practices for Door/Window Assembly Styles:

- All assembly components should have materials assigned to them.
- Door/Window Assembly styles should be classified for more control with scheduling and display control. This is especially important with assemblies that are explicitly intended to be included in a window or door schedule as a mulled unit.

  NOTE In cases where an assembly includes a door or window infill and the assembly is to be included in a door or window schedule, you can choose not to classify the door or window infill. This will help you to make sure that the infill is not included in the schedule as a separate item from the assembly of which is a part.

- The Model display representations of assembly components should follow "By Material" settings.
- The "Elevation" display representations components should be assigned colors with the display rules of your *2D Section/Elevation styles* in mind. Using colors that are coordinated with those styles can be used to automate linework properties in section and elevation objects.
- Naming of assembly components: In order to minimize confusion when editing door/window assembly styles, you should be descriptive and consistent when naming the components of the style. In general, each name should end with the type of assembly element it refers to. For example, an infill name might

be “Entry Door Infill.” In particular, care should be taken to name grids and the divisions they are based on. A grid using a division named “Sidelight Vertical Division” should be named “Sidelight Vertical Grid.”

Curtain Walls

Curtain walls comprise two primary AutoCAD Architecture objects: Curtain wall styles and curtain wall unit styles. Curtain walls can also use door, window and door/window assembly styles as infills.

Curtain Wall Styles

Naming Conventions:

As with other style types, the naming for curtain walls should be as descriptive as possible, but because curtain walls can be even more varied and complex in their structure than door/window assemblies, you should not expect to fully describe the details of the style in the name:

<Major Element (Descriptive) + <Major Element (Descriptive)>...

Example Curtain Wall Style Names:

Curtain Wall Style Definition	Example Name
A curtain wall whose first floor cell assignment consists of wide mullions meant to simulate wall panels, with a 4’ x 4’ pattern of standard window mullions and glazing panels above.	**Mass Base + 4x4 Grid Above**
First floor with stone panels, revolving doors and glazing above in variable pattern (perhaps with nested assemblies or curtain wall unit styles as infills).	**Stone Base + Revolving Doors + Variable Grid Above**

Best Practices for Curtain Wall Styles:

- All curtain wall components should have materials assigned to them.
- The “Model display representations of curtain wall components should follow “By Material” settings.
- The “Elevation” display representations components should be assigned colors with the display rules of your 2D Section/Elevation styles in mind. Using colors that are coordinated with those styles can be used to automate linework properties in section and elevation objects.
- Naming of curtain wall components: In order to minimize confusion when editing curtain wall styles, you should be descriptive and consistent when naming the components of the style. In general, each name should end with the type of curtain wall element it refers to. For example, an infill name might be “Stone Panel Infill.” In particular, care should be taken to name grids and the divisions they are based on. A grid using a division named “First Floor Vertical Division” should be named “First Floor Vertical Grid.”

Curtain Wall Unit Styles

Naming Conventions:

Curtain wall units, while similar in many respects to door/window assemblies and curtain walls, are limited to simple panel infill definitions. The naming conventions are similar to those for curtain walls, but you can also include indicators of cell adjustment parameters as well:

<Major Element (Descriptive) + <Major Element (Descriptive)>...<Optional Cell Adjustment Parameter)

Example Curtain Wall Unit Style Names:

Curtain Wall Unit Style Definition	Example Name
A curtain wall unit with 2 x 2 glazing panels:	**2 x 2 Glazing**
A curtain wall unit with 4' wide glazing panels, mullions coming to a point at the top, with the side cells set to grow until a new 4' panel can be added:	**Glazing 4-0 Grow + Pointed Mullions**

Best Practices for Curtain Wall Unit Styles:

- All curtain wall Unit components should have materials assigned to them.
- Unless a curtain wall unit is to be scheduled as a separate item, you should not classify curtain wall unit styles.
- The Model display representations of curtain wall unit components should follow "By Material" settings.
- The "Elevation" display representations components should be assigned colors with the display rules of your *2D Section/Elevation styles* in mind. Using colors that are coordinated with those styles can be used to automate linework properties in section and elevation objects.
- Naming of curtain wall unit components: In order to minimize confusion when editing curtain wall styles, you should be descriptive and consistent when naming the components of the style. In general, each name should end with the type of curtain wall element it refers to. For example, an infill name might be "Stone Panel Infill." In particular, care should be taken to name grids and the divisions they are based on. A grid using a division named "First Floor Vertical Division" should be named "First Floor Vertical Grid."

Roofs and Slabs

Roof slab styles can contain more than one component, similar to wall styles; many of the conventions are therefore the same or similar. Roof slabs can also use roof slab edge styles.

Roof Slab Styles

Naming Convention:

Roof slab styles, like wall styles, include multiple components. The name should indicate the structure of the roof and the dimensions of the major components (minor components such as roofing felt can have the dimension omitted). The first component listed should be the major structural component. The last component should be the finish component (if any):

<Component name>-<Size in decimal units> + <Component name>-<Size in decimal units>...

Example Roof Slab Style Names:

Roof Slab Style Definition	Example Name
Roof Structure: 2x8 Rafter, roofing felt, asphalt shingles.	**Rafter-7.25 + Shingles**

Best Practices for Roof Slab Styles:

- Materials should be assigned to all roof slab components.
- Roof slabs should be defined with the baseline at the bottom of the major structural component.
- The index order of roof slab components should be indexed from top to bottom, with the top component having index 1.
- Thicknesses of components should always be positive. The thickness offset from the baseline should always be to the bottom edge of the component.
- You should consider classifying all roof slab styles to allow for more display control options.

Roof Slab Edge Styles

Roof slab edge styles are fairly simple and can contain a maximum of only two components: the fascia and the soffit. Unlike wall endcaps, roof slab edge styles are not applied to individual roof slab components, but to the roof slab as a whole.

Naming Conventions:

Roof slab edge styles should be named according to the fascia and/or soffit condition they define:

<Optional nominal fascia size> <Optional fascia> + <Optional nominal soffit size> <Optional soffit> - <Optional default edge cut condition> - <Optional edge overhang>

Example Roof Slab Edge Style Names:

Roof Slab Edge Style Description	Example Name
1x4 Fascia, no soffit, plumb cut, no overhang.	**1x4 Fascia - Plumb**
1x8 Fascia, 5/8" soffit, plumb cut, 1' overhang.	**1x8 Fascia + 5-8 Soffit - Plumb - Overhang 12**
4x4 Cant strip edge style (for built-up roof).	**4x4 Cant**

Best Practices for Roof Slab Edge Styles:

- When creating the profiles for the edge, draw them for the right side of the roof when drawn in section.
- Exercise discretion when turning on "Auto-Adjust to Edge Height". While this will cause the fascia to adjust to a variable width component in a roof slab as it changes thickness, the adjustment is proportional. The fascia will adjust both vertically and horizontally. The same consideration should be taken into account when turning on the option to adjust the soffit to the overhang depth.

NOTE Roof slab edge styles can not be applied as a part of the roof slab style definition; instead you can apply them as a palette-based tool property. Many of the roof slab styles included in the sample content files that ship with AutoCAD Architecture indicate in their names a specific roof slab edge style and when a tool is created from those styles, the slab style is already assigned to the tool properties. These styles originated in an earlier version of the software in which default roof slab edge styles could be assigned to a roof slab style. This capability was removed from the User Interface of the roof slab style editor, however the style properties were left in those sample styles.

Slab Styles

Naming Convention:

Slab styles, like wall styles, include multiple components. The name should indicate the structure of the slab and the dimensions of the major components (minor components such as vapor barriers, linoleum floor finishes, etc., can have the dimension omitted). The first component listed should be the major structural component. The last component should be the finish component (if any):

<Component name>-<Size in decimal units> + <Component name>-<Size in decimal units>...

Example Slab Style Names:

Slab Style Description	Example Name
Slab Structure: 6" Concrete, ceramic tile flooring.	**Concrete-6 + Tile-Ceramic**

Best Practices for Slab Styles:

- Materials should be assigned to all slab components.
- Slabs should be defined with the baseline at the bottom of the major structural component.
- The index order of slab components should be indexed from top to bottom, with the top component having index 1.
- Thicknesses of components should always be positive. The thickness offset from the baseline should always be to the bottom edge of the component.
- You should consider classifying all slab styles to allow for more display control options.

Slab Edge Styles

Slab edge styles are fairly simple and can contain a maximum of only two components: termed "fascia" and "soffit". As with roof slab edge styles, slab edge styles are not applied to individual slab components, but to the slab as a whole.

Naming Conventions:

Slab edge styles should be named according to the fascia and/or soffit condition they define:

<Optional fascia size> <Optional fascia> + <Optional nominal soffit size> <Optional soffit> - <Optional default edge cut condition> - <Optional edge overhang>

Example Slab Edge Style Names:

Slab Edge Style Description	Example Name
6" Curb.	**Curb**
36" x 18" grade beam with brick lug.	**36x18 Grade Beam + Brick Lug**

Best Practices for Slab Edge Styles:

- When creating the profiles for the edge, draw them for the right side of the slab when drawn in section.
- Exercise discretion when turning on "Auto-Adjust to Edge Height". While this will cause the fascia to adjust to a variable width component in a slab as it changes thickness, the adjustment is proportional. The fascia will adjust both vertically and horizontally. The same consideration should be taken into account when turning on the option to adjust the soffit to the overhang depth.

NOTE Slab edge styles can not be applied as a part of the slab style definition; instead you can apply them as a palette-based tool property. Many of the slab styles included in the sample content files that ship with AutoCAD Architecture indicate in their names a specific slab edge style and when a tool is created from those styles, the slab style is already assigned to the tool properties. These styles originated in an earlier version of the software in which default slab edge styles could be assigned to a slab style. This capability was removed from the User Interface of the slab style editor, however the style properties were left in those sample styles.

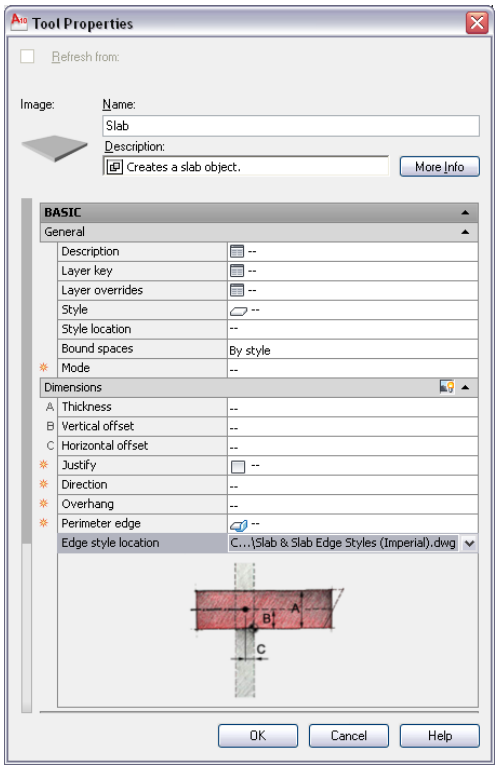
Palette-Based Roof Slab and Slab Tools

To apply a slab edge or roof slab edge style at the time of creation, you can specify them as default properties of a palette-based tool along with other properties:

- You may want to consider “Top”, “Bottom” or “Baseline” justification, depending upon the type of slab and its intended purpose.
- The Vertical Offset can be set to pre-determine an elevation for the slab.
- You can establish an edge style as a default.

IMPORTANT To pre-set the edge style, you must first specify the library drawing in which the edge style exists, then define the edge style to use. Even if the edge style already exists in the current drawing, it will not be used unless you specify the style location.

Slab tool properties, with a slab edge style set as the default.



Stairs and Railings

Stairs can be created using a parametric object or from a 2D sketch. In both cases, the resulting object will be based on a stair style definition.

Stair Styles

There are no naming conventions for stair styles. In general the name should simply indicate the overall purpose or stair type and possibly include the primary structure, material or construction of the stair.

Example Stair Style Names:

Stair Style Description	Example Name
Steel stairs with a housed stringer.	**Steel - Housed**
Stair style configured to act as a concrete ramp with stringers configured to act as curbs.	**Ramp - Concrete + Curb**

Best Practices for Stair Styles:

- Consider carefully the ramifications, pro and con, of allowing the landing extension settings and stair component settings to vary amongst stairs of the same style. Turning these options off makes them "hard coded" to the style. Turning them on makes them merely defaults to be applied during the creation of a stair, but able to be overridden.
- When a style is assigned to a custom stair created from linework, the stringer offsets specified in the style definition will be calculated from the lines that you select for the stringer locations.
- Landing extensions that are defined in the stair style will be ignored when creating a custom stair from linework.

Stair Winder Styles

Winder styles can be applied to stairs with the "Turn type" set to either "1/4 Turn" or 1/2 Turn.

Stair Winder Styles Naming Conventions:

The stair style name should indicate the Winder type, followed by specifics as to any tread or riser controls:

<Winder type> - <Optional control parameter>...

Example Stair Winder Style Names:

Stair Winder Style Description	Example Name
Manual winder type, "Use Riser Line" toggled on under "Settings".	**Manual - Riser**
Single Point winder type, "Adjust Winder Turn" checked on under "Tread Settings in Turn Area", with 2 treads per turn.	**Single Point - 2 Tread**

Best Practices for Stair Winder Styles:

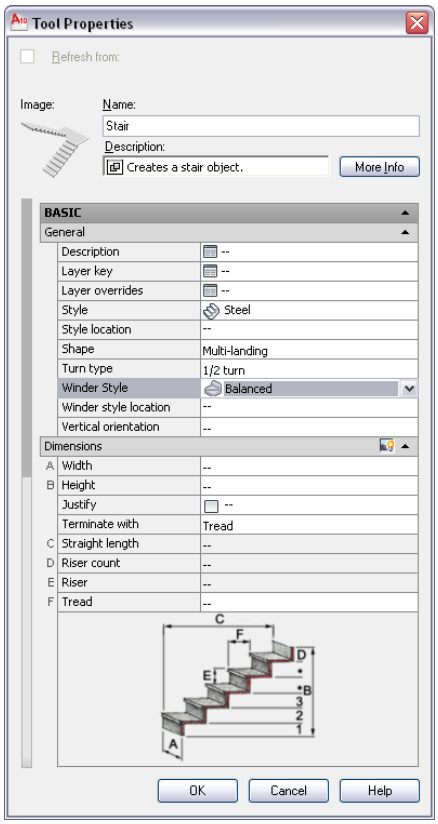
- Before defining a new stair winder style, check the existing style content library files. Most of the typical winder conditions have already been defined.
- When using the single point type, it is important to clear "Use Riser Line" if the turn point will be on the edge or corner of the stair. Otherwise, the treads will overlap and the stair will be defective.

Palette-Based Stair Tools

When creating a tool for a stair style you may want to consider the following optional pre-sets:

- Stair shape: although many properties of a stair can be changed after the stair has been placed, the stair shape can only be set at the time of creation. You may want to consider having the stair shape (multi-landing, U-shaped, spiral or straight) be a default setting for your stair tools.
- Turn type: you can specify either landings or turns. This is also a setting that cannot be changed after the stair has been placed.
- Winder style and winder style location: If you specify a turn as the turn type, you can set the winder style to use on the turn. If you specify the winder style, you can also specify a different drawing from which to import the winder style.
- Stair termination: You can pre-determine whether the stair should end with a riser, tread or landing. This setting can be changed after the stair has been placed as well.

The stair tool properties



Railing Styles

Railing style names should be as descriptive as possible, listing the major components of the railing.

Railing Styles Naming Conventions:

<Rail type> - <Rail Shape> + <Additional component> + <Additional component>...

Example Railing Style Names:

Railing Style Description	Example Name
Guardrail, circular with a handrail and rod balusters.	**Guardrail - Pipe + Handrail + Rod Balusters**

Railing Style Description	Example Name
Guardrail, circular with a handrail and returns:	**Guardrail - Pipe _+ Handrail + Return**

NOTE If a custom display block applied as a style-level display override defines a component, such as a return, it should be listed as an additional component in the railing style name.

Spaces

Spaces have a multitude of uses, spanning the conceptual design through construction documents phases of a project. Among other things, spaces can begin to define the layout of a building's internal rooms and areas. They can also define rooms and areas for scheduling purposes and for area calculations and evaluations. They can also contain information valuable to users of AutoCAD MEP who need to process the geometry for analysis.

Space Styles

Space style names should be indicative of the type of room or area that the space style is meant to address.

Space Style Naming Conventions:

<Room/Area use> - <Optional relative size> - <Optional building type>

Example Space Style Names:

Space Style Description	Example Name
Large commercial kitchen.	**Kitchen - Large - Commercial**
Dining room for a restaurant.	**Dining_Room - Restaurant**
Residential Bedroom.	**Bedroom**
Bedroom for a hotel suite.	**Bedroom - Hotel**

Best Practices for Space Styles:

- Spaces can have a "Name" property assigned. These are derived from a *List Definition*. The List Definition should be assigned to the style so that you have a valid list of names to select from when establishing the space object's properties.
- Space styles should have materials assigned to their "Floor" and "Ceiling" components.
- Because space styles can work in conjunction with *Zone Definitions* you may want to store them in the same library file to make it easier to make changes later.

Structural Members

Structural Member Shape Definitions

Structural Member Shape Definitions should be named according to the structural member style(s) for which they are intended to be a part of. For example, if you are defining a steel bar joist member style and you've

defined a structural member shape definition on which you plan to base the bottom chord component of the joist, you would name it simply “Steel Joist Bottom Chord”.

Structural Member Styles

Structural members should be named according to the specific structural object type that they are to represent, including dimensional information.

Structural Member Style Naming Conventions:

<Structural member type> <Size>

NOTE Frequently standard structural shape designations include the size of the member. In these cases, the structural name can simply be the structural designation.

Example Structural Member Style Names:

Structural Member Style Description	Example Name
Wide flange steel shape (W8x40).	**W8x40**
10” K Series Bar Joist.	**Bar Joist 10K1**
Decorative square tapered square column (specific use).	**Decorative Square Column - Tapered 12”-8”**
10” Plywood Web Wood Joist.	**Plywood Web Joist - 10**

NOTE Naming conventions for structural member styles are not fixed. In the case of structural member styles defined as a result of the Structural Member Catalog, it is acceptable and more efficient in many cases to use the default name that is provided by the catalog. As an example the “Plywood Web Joist - 10” style name listed above would be “10in Plywood Web Wood Joist”.

Best Practices for Structural Member Styles:

- When naming a structural member style, consider whether it can be used for more than one purpose. For example, wide flange shapes can be used for either columns, bracing or beams. In the case of such an element, you should not indicate a specific use in the member style name.
- When defining custom display blocks for the Model display of structural member styles, you should use other structural members to define the blocks where possible, in lieu of mass elements. An example of this is seen in the example Bar Joist styles that are provided with AutoCAD Architecture. The custom display blocks that define the webbing are made from a structural member style called “Steel Joist Webbing”.
- Materials should be assigned to structural member style components.

Documentation Objects

AutoCAD Architecture documentation objects are object types that are explicitly for use as annotation tools. Rather than define 3D geometry, they define data structures and 2D annotation graphics.

NOTE Since documentation objects do not define geometry, it is not necessary to classify their styles for scheduling purposes, however you may want to consider it if you need more display control than that provided by the normal display set controls.

Sections and Elevations

2D sections and elevations define the 2D representation of orthogonal views of a 3D building model. They are not geometric objects in and of themselves, but are more of a "report" of the model.

2D Section/Elevation Styles

The purpose of a 2D Section/Elevation style is to automate the display characteristics of linework in the section/elevation object.

IMPORTANT It is important to have a standardized display system established before creating custom 2D Section/Elevation styles. The Design Rules of a Section/Elevation style are wholly dependent upon the colors assigned to objects in the display representation used by the section/elevation object. By default, this is usually an object's "Model" or "Elevation" display representation. To find out which specific display representation is used by section/elevations for each object type, you can refer to Display Manager and review the Display Representation Control for the "Section_Elev" display set, or whatever other display set is specified as part of the section/elevation's properties.

2D Section/Elevation Style Naming Conventions:

<2D Section purpose or use> - <Optional scale>

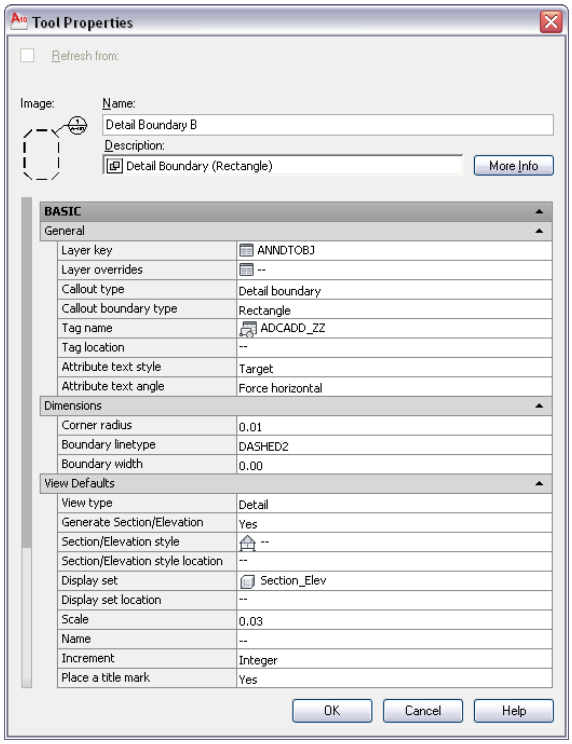
Example 2D Section/Elevation Style Names:

2D Section/Elevation Style Description	Example Name
A section/elevation style to be used for elevations and sections plotted at 1/4"=1'-0".	**Bldg Section-Elevation - 48**
A section/elevation style for use as a background for a detail view.	**Detail Background**

Best Practices for 2D Section/Elevation Styles

- If you define custom components and design rules in your section/elevation style, you should always include a description. The description for the design rules should explain what action each rule takes in the display properties of the style. For example, you might have a display component named "Swing Lines". The component description would be simply "Door and Window swing lines". The design rule accompanying the component might have a description of "Make window and door swings a fine line weight and dashed".
- For a section/elevation style intended to be used as a detail background, you should place all display components on a no-plot layer.
- Section/elevation styles cannot, by themselves, be made into a palette-based tool. Instead you refer to them in a callout tool's properties. You can specify the library file containing the section/elevation style, and the specific section/elevation style to be used with the callout.

Callout tool properties including the 2D Section/Elevation Style to use, the style library from which to import the style, the default scale and display set to use.



Dimensions

In addition to traditional AutoCAD dimensioning, AutoCAD Architecture provides more intelligent and automated AEC Dimension objects. Thoughtful creation of AEC Dimension Styles can greatly improve productivity during the construction documents phase of a project. Another benefit of AEC Dimension styles is that as AEC objects, they can be controlled with the AutoCAD Architecture Display System, and can be scale-dependent; the same AEC Dimension can be used for any number of scales in the drawing.

AEC Dimension Styles

AEC Dimension Style Naming Conventions:

<Maximum number of chains> - <Optional unique purpose>

Example AEC Dimension Style Names:

AEC Dimension Style Description	Example Name
Dimension style with maximum 3 chains, for use in normal construction documents dimensioning.	**3 Chain**
Dimension style with maximum 2 chains, to display metric units in a drawing configured for imperial units.	**2 Chain - Alternate Metric**

Best Practices for AEC Dimension Styles:

- Make your dimension styles scale dependent where possible, by using different AutoCAD dimension styles with different settings for "Overall Scale". By changing display configurations, you can use a different display representation for dimension styles that adjusts to different scales and detail levels.
- It is not necessary to store AEC Dimension styles, or the AutoCAD dimension styles on which they are dependent upon for display in the template drawing. Instead you can use the tool properties to import them as needed from a style library. Necessary AutoCAD dimension styles will also be imported.
- If you have configured the "Dimension" and "Type" parameters of your wall style components, you can and should take advantage of this in the AEC Dimension's "Content" settings for the "Wall Width" dimension parameters by specifying "From Style" or "Structural from Style".

Schedules and Property Sets

Schedules, property set definitions, property data format styles and display themes are all tightly interrelated. Because of that, you should take the time to plan out carefully your system of property data usage.

Property Set Definitions

In addition to defining data fields for schedules, property set definitions can also be used to create "smart" object tags and can be used to override display settings for objects. Because of their myriad uses, you should plan them carefully. Of utmost importance, you need to carefully consider what specific object type(s) your property set definition will apply to and whether or not it will be style-based or object-based.

NOTE Because Property Set Definitions, Property Data Format Styles, Schedule Table Styles and Display Theme Styles are so inter-dependent you may want to consider storing them in the same style library to make it easier to make modifications later on.

Property Set Definition Naming Conventions:

<Object type><Optional additional description><Attachment (style or object>

Example Property Set Definition Names:

Property Set Definition Description	Example Name
Property set definition for doors, object-based.	**DoorObjects**
Property set definition for window frame information, attached to window styles.	**WindowFrameStyles**

Best Practices for Property Set Definitions:

- Do not include spaces in property set definition names or property names. In the event that you want to have a property displayed in an object tag, it will need to be referenced by an AutoCAD attribute definition by name when the "Define Schedule Tag" tool is used. Attribute definition tags cannot include spaces.
- When a property is selected for use in a schedule table column, the property's description is the default column header. While this can easily be overridden at any time, if you keep it in mind when you are defining your properties you can streamline the task of creating schedule tables somewhat.
- If you have legacy property set definitions for anchored objects that include formula-based properties that extract information based on the host object's properties, you should consider replacing them with the "Anchor Property" in AutoCAD Architecture. An example of this would be a door's fire-rating property where you want to make sure it is set to match the fire-rating of the wall it is anchored to.

- Take advantage of AutoCAD Architecture's new ability to hide properties. This is useful if you have a property that is not actually directly edited by a user. By disabling its visibility you can minimize confusion when viewing and editing properties in the "Extended Data" tab of the object properties palette.
- If you have classified your object styles, consider strongly using classifications to further filter the object and style types that your property sets apply to. This is much more reliable than using layer filters.

Property Data Formats

Property Data Formats control the appearance and character/numeric formatting of property set values when they appear in a schedule table.

Property Data Format Naming Conventions:

Naming conventions for property data formats is fairly relaxed and descriptive:

<Data type/purpose> - <Optional description>

Example Property Data Format Names:

Property Data Format Description	Example Name
Property data format to display the area of an object.	**Area**
Property data format to display a numerical value as a length to 1/16" precision.	**Length - Short 1-16**

NOTE In cases of numerical values formatted for a specific precision, you can choose to leave the actual precision value out of the data format style name, however you should indicate it in the description.

Best Practices for Data Format Styles:

- Before creating a new data format style, check to make sure there isn't already an existing one that you can re-use. There are a large number of pre-configured data format styles in the existing "Schedule Tables (Imperial).dwg" or "Schedule Tables (Metric).dwg" files in your AutoCAD Architecture content folder.

Schedule Table Styles

Schedule Table Style Naming Conventions:

<Object type> Schedule <Optional additional qualifier>

Example Schedule Table Style Names:

Schedule Table Style Description	Example Name
Door schedule, using standard door number property (not project-based).	**Door Schedule**
Door schedule, using project-based door number.	**Door Schedule Project Based**

Best Practices for Schedule Table Styles:

- If you have classified your object styles, consider strongly using classifications to further filter the object and style types that your schedule applies to. This is much more reliable than using layer filters.
- Pay special attention to the "Applies to" property of your schedule table style. It must match exactly the "Applies to" property of any property set definitions whose properties you intend to use for schedule table columns.

Display Theme Styles

Aside from making sure that your style names are descriptive, there are no conventions or standards for Display Theme Styles.

Zones

Zones allow you to group your spaces together for use in area calculation schemas and presentations (showing spaces color-coded by department, for example). Additionally, engineers who are using AutoCAD MEP can use zones to perform complex analysis calculations and reporting.

Zone Styles

Beyond being as descriptive as possible there are no naming conventions for Zone Styles.

Best Practices for Zone Styles:

- If you are using Zone Templates to automate the organization of your zones, then you *must* store the zone styles in the same drawing as the zone template styles.
- You may want to use a style-level display override for your zone styles for presentation displays to control hatching and color.

NOTE In addition to using style display overrides to control the display of zones, you might also consider using a Display Theme Style configured to display Spaces based on a property value.

Calculation Modifier Styles

Calculation Modifier Style Naming Conventions:

<Calculation description> <Purpose>

Example Calculation Modifier Style Names:

Calculation Modifier Style Description	Example Name
Modifier to add ten percent to a calculated area to account for a commons factor add on in a commercial office building.	**10 Percent Commons Factor**

Zone Template Styles

Zone Templates allow you to automate the organization of your zones into a tree structure. Aside from being as descriptive as reasonably possible there are no naming conventions.

Best Practices for Zone Template Styles:

- When it is appropriate to do so, don't forget to attach a calculation modifier style to the styles that you include in your zone template. This can further automate the process of zone organization.
- Zone template styles *must* be stored in the same drawing as the zone styles that they include. They also must be stored in the same drawing as any calculation modifiers that they use.

IMPORTANT Related zone styles, zone template styles and calculation modifier styles must exist in the same drawing. For this reason, you should consider storing all zone styles, zone template styles and calculation modifier styles in the same library drawing. In addition, you should store list definitions in the library drawings containing the zone styles, space styles and property set definitions that they are intended to be used with.

Multi-Purpose Objects

Object styles found under the "Multi-Purpose Objects" category are usually "helper" objects that are used to help define or enhance other object styles, or symbol objects, such as masking blocks or multi-view blocks.

AEC Polygons

AEC Polygons are useful in defining infills for curtain walls and curtain wall units, defining 2-dimensional areas and other annotation tasks. For example, they are also used on the "Cut Line" tool found on the "Annotation" tool palette.

AEC Polygon Naming Conventions:

AEC Polygon naming format will depend upon what their purpose is. An AEC Polygon style meant to define a curtain wall infill, for example, will have a much more rigid naming convention than one meant to merely define an area:

<AEC Polygon purpose> - <Optional description>

Example AEC Polygon Style Names:

AEC Polygon Style Description	Example Name
AEC Polygon style to serve as banding in a stone infill with a revolving door in a curtain wall.	**Stone Infill + Revolving Doors - Stone Infill Dark Band**

Classification Definitions

Classifications are a way of further defining a more generic object type. For example, wall styles can be used to define objects that aren't walls, such as cabinetry, countertops, soffits, etc. By classifying objects, you can control whether or not they are scheduled or displayed with other similar object types.

Classification Definition Naming Conventions:

Classification definitions are merely a list. Frequently this list is based on some other documented list or data structure. In other cases they may pertain to a specific object type and qualities about that object type. The naming format can vary depending upon these conditions.

Classification Definition Purpose	Naming Convention
Classification definitions based on an existing list or data structure.	*<Data structure name or description>*
Classification definitions for a specific object type and purpose.	*<Object type> <Purpose>*

Example Classification Definition Names:

Classification Definition Description	Example Name
Classification definition, applying to all object types, based on the Uniformat II structure.	**Uniformat II**
Classification definition for doors, windows and assemblies, to classify	**Doors-Windows Phase**

Classification Definition Description	Example Name
based on construction phase.	

NOTE The second example above is exactly that, an example. In reality, a classification definition to classify objects based on phasing might better be defined to apply to all object types.

Best Practices for Classification Definitions:

- While it is possible to classify objects on a "per instance" basis, it is better in most cases to classify object styles. All object styles that define geometry (anything that would be considered an "Architectural Object" rather than a "Documentation Object") should be classified.
- Be careful not to be too restrictive when specifying the "Applies to:" parameter for a classification definition. In many cases you may find that your classification definition, depending upon what is actually included in its list of classifications, might apply best for several different object types, if not all of them.
- If you have a long classification definition you may want to consider arranging the classifications in a hierarchical manner. For example, if you were developing a classification definition to encompass the MasterSpec II format, you might have at the top level the major division numbers, then have the sections within those divisions defined within each one at a lower level.
- Store commonly used classifications in your template drawings, especially those that might be used to classify individual objects.

Layer Key Styles

Layer Key Styles are the heart of an automated layer standard. There are several pre-defined Layer Key Styles provided with AutoCAD Architecture that are based on existing widely accepted industry standards. You can also define your own Layer Key Style.

Layer Key Style Naming Conventions:

<Optional company name or other unique identifier> <Optional standard name> <Optional descriptive element>

Example Layer Key Style Names:

Layer Key Style Description	Example Name
Layer Key Style based on the British BS1192 standard.	**BS1192**
Layer Key Style based on the AIA Layer Guidelines version 3, with provisions for deviation from Tri-Services plotting guidelines (using named plot styles).	**AIA v3**
Layer Key Style created by "Company X" for use with their internal layer standard, which is specifically used on medical projects.	**Company X Health Care**

Best Practices for Layer Key Styles:

- Base your Layer Key Style on a structured AutoCAD Architecture*Layer Standard*, which defines the actual layer naming format for your layers. Layer keys that are not based on a Layer Standard cannot take advantage of layer key overrides.

- Since Layer Key Styles define the color, line weight, line type and plot style for each layer they define, they should work in conjunction with your display system. Before defining your own Layer Key Style, you should have a display system in effect that has been tested and you should be very familiar with it.
- Remember that several existing Layer Key Styles are already provided with AutoCAD Architecture. You may want to start with these instead of creating a new one from scratch, modifying and adding layer keys as necessary to suit your needs.
- Don't forget to specify, as part of your drawing settings the Layer Standard and Layer Key Style to automatically load in any new drawing. Additionally you should specify that the Layer Key Style be reloaded in any existing drawings if the "master" Layer Key Style in the library drawing has been edited recently. (Refer to "Template Drawings" under the "Content Resources" section of this chapter).

List Definitions

There are no naming or "Best Practices" tips for List Definitions.

NOTE Store list definitions in the library drawings containing the zone styles, space styles and property set definitions that they are intended to be used with.

Mask Block Definitions

Mask blocks are symbol-based style definitions that consist of a shape definition to serve as a masking object along with optional additional graphics.

NOTE Mask blocks only affect AEC Objects and cannot mask generic AutoCAD objects such as lines, arcs, circles, etc.

Mask Block Definition Naming Conventions:

Because Mask Block Definitions are symbolic objects, naming conventions are similar to those used for standard block definitions. Since mask block definitions are best stored as AEC Content, you may also want the name to indicate the category of AEC Content in which the mask block definition belongs:

Descriptive field>_<Optional descriptive field>_...<Optional size indication>

Example Mask Block Definition Names:

Mask Block Definition Description	Example Name
2'x2' fluorescent lighting fixture for use in an imperial Architectural project.	**I_Elec_Lighting_Fluor_2x2**
Custom conference table created by/for "Company X" for use in imperial projects.	**Company X_I_Furn_Table_Conf**

Best Practices for Mask Block Definitions:

- When creating geometry to serve as additional graphics for the mask block definition, create it on the layer "0" with color, line weight, line type and plot style set to "BYBLOCK", unless you have a specific reason to override any of these values with an explicit value.

  NOTE Only the objects selected as "Additional Graphics" can be assigned a unique property for color, line weight, line type and plot style prior to being defined as a mask block. The objects that make up the masking shape will ignore any of those overrides once made part of a mask block definition, following the assignments given to their display representations instead.

- Store mask blocks as AEC Content. This way they can be easily accessed through the Design Center. Additionally, a palette-based tool can be used to allow users to find them without navigating the AEC Content folder structure.

Mass Element Styles

Unlike many other types of AutoCAD Architecture object types, mass elements do not have to exist on a specific mass element style to be effectively used. Many mass elements can be created on the style "Standard" with no adverse effects whatsoever. However you can define mass element styles to predefine material assignments, classification assignments and display representation overrides.

Mass Element Style Naming Conventions:

Mass - <Optional classification assignment> - <Material assignment>

NOTE Classification and material assignments can be abbreviated in the mass element style name.

Example Mass Element Style Names:

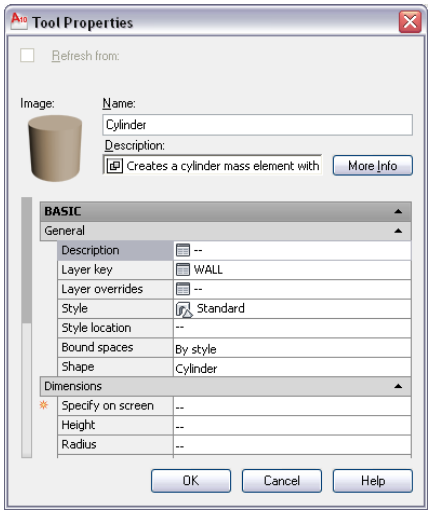
Mass Element Style Description	Example Name
Mass element for use as a decorative column and classified as "B2010 - Exterior Walls" from the "Uniformat II" classification definition and assigned a material of "Finishes.Plaster and Gypsum Board.Plaster.Stucco.Fine.Brown".	**Mass - Exterior Wall - Brown Stucco**
Unclassified mass element for non-specific use assigned a material of "Finishes.Flooring.Tile.Marble.Deep Green".	**Mass - Deep Green Marble Tile**

Best Practices for Mass Element Styles:

- Use tools and tool palettes to provide access to your mass element styles. You can accomplish several things with a tool referencing a mass element style:
  1. You can create a tool that pre-assigns a specific mass shape as well as a mass style to a mass element.
  2. You can create a tool that pre-assigns a mass style but leaves the shape undefined. This is useful for assigning a mass style to an existing object with the "Assign Tool Properties To..." right-click tool menu option without changing its shape.
  3. Mass elements by default are created on a generic "MASSELEM" layer key, since they do not, by definition, define a specific type of architectural object. By using a tool, you can override this and place them on a key that is more appropriate for the object type that they are to represent.

Tool properties for a mass element style tool. Note that the name of the tool has been changed to be more descriptive. Additionally, since the mass element that this tool creates is meant to define a decorative column classified as an exterior wall, the tool's creator has decided to put the mass element on the layer defined by the "WALL" key in the current layer key style. In the example the mass element shape has also been

pre-defined to be a cylinder, again, since it is meant to define a specific object type, not just a particular material assignment.



Material Definitions

Material Definitions are integral to the display system in AutoCAD Architecture and are a powerful tool to use with style and object definitions to automate displays in plan, section and elevation. Additionally, you can use a "Material" automatic property definition to tie material assignments (and the properties of those materials) into a schedule table of objects that have the materials assigned to them.

Material Definition Naming Conventions:

<General material category>.<Additional descriptive field>.<Optional additional descriptive field>...<Optional color>

Example Material Definition Names:

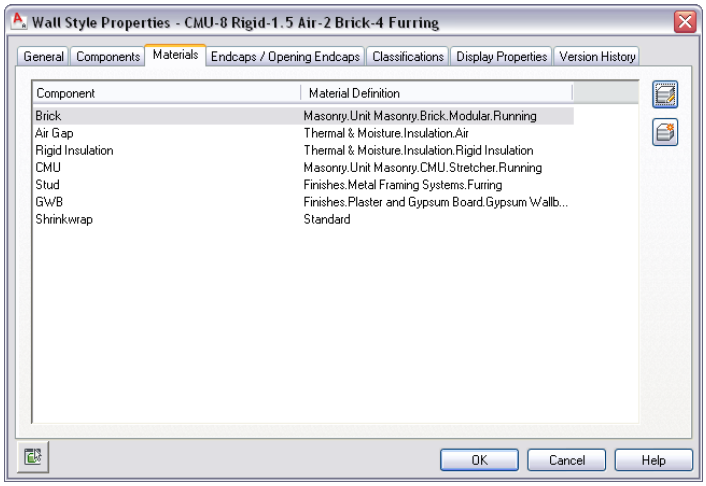
Material Definition Description	Example Name
Cast in place concrete, exposed aggregate, medium texture.	**Concrete.Cast-in-Place.Exposed Aggregate.Medium**
Dark green marble flooring tile.	**Finishes.Flooring.Tile.Marble.Deep Green**

Best Practices for Material Definitions:

- Take every step to standardize your materials. You may want to consider storing your main material library drawing as a read-only file, accessible to only a few authorized people in your office to ensure that standard material definitions do not get inadvertently modified.
- Take advantage of Project Standards to make sure your project drawings are consistent with your office and project standard materials.
- Avoid using the "Edit Material" or "New Material" buttons on the "Materials" tab of your style editor. While these may seem like efficient ways of editing and creating new materials "on the fly", they can be dangerous, as they make it easy to accidentally edit a material that has been applied to a multitude of different object styles, having an unintended and potentially drastic effect on the graphic quality of your drawing, as well as creating a material that deviates from your standard material definitions.

  The "Edit Material" and "New Material" buttons available in the style editor. These may seem like efficient and handy ways of creating materials on the fly, but their use

should be discouraged as they make it easy to accidentally create non-standard materials.



- Assign commonly used standard materials to palette-based tools so that users can access them quickly and easily without having to browse for your material library file in Style Manager.
- Material Definitions are essentially nothing more than a collection of display representations. *Therefore, every material definition you create should have style overrides placed on every display representation.*
- When defining and editing materials, keep level of detail in mind, especially when you are defining hatch patterns and hatch pattern scale. In the default template drawings there are three display representations for material definitions that are meant to address scale dependency. You can, of course, create additional display configurations and associated display representations for additional scale dependency. The existing display representations for scale dependency are:

Display Configuration	Material Display Representation
General HIgh Detail	High Detail
General Medium Detail	Medium Detail
General Low Detail	Low Detail

- When editing a material definition's "General Screened" or "General Reflected Screened" you should assign the components to a layer that has a color or plot style assigned to it that will plot screened with color and line type set to "BYLAYER". These display representations are meant for use with consultants who need a screened background drawing. You can set one of the screened display configurations current and export your AutoCAD Architecture drawing to an AutoCAD format. By assigning the components to screened layers you provide your consultants and collaborators the ability to control their display via traditional AutoCAD layer control.

NOTE By default, the screened display representations in the Imperial and Metric templates for use in the United States assign material display components to the layer "A-Anno-Scrn" in accordance with the AIA layering guidelines.

IMPORTANT If you want to use material definitions to control the display of object components in a 2D Section/Elevation object on the cut line you must first set the "Defining Line" component in the 2D Section/Elevation's "General" display representation to "By Material". Next, edit the material definitions being used in the section and set the "2D Section/Elevation Linework" component to the color, line type, line weight and plot style you would like to see in the Section/Elevation. You will also need to make sure the setting "Maintain layer, color, linetype properties form the Display Set used during generation" is toggled off.

Multi-View Block Definitions

Multi-View Block Definitions can be used for both geometric symbols and annotation symbols (primarily chases and column grid bubbles).

Multi-View Block Naming Conventions

Geometry-defining Multi-View Blocks.	*<Optional system of measure>_<General object category>_<Specific object type>_<Optional descriptive field>_<Optional descriptive field>*
Annotation-defining Multi-View Blocks.	*<Optional system of measure>_<Annotation purpose/type>_<Optional descriptive field>*

Example Multi-View Block Definition Names:

Multi-View Block Definition Description	Example Name
Multi-View Block Definition for a queen size bed for use in an imperial project.	**I_Furn_Bed_Queen**
Multi-View Block Definition for a wall-mounted flush WC for use in a metric project.	**M_Plumb_WC_Flush - Wall**
Multi-View Block Definition for a Chase.	**Chase**
Multi-View Block Definition for a column grid bubble, with a square bubble.	**I_ColGrid_Bubble_Square**

Block definitions for view block components of Multi-View blocks should also be named consistently and appropriately.

View Block Naming Conventions:

View Blocks for Geometry-defining Multi-View Blocks.	*<Optional system of measure>_<General object category>_<Specific object type>_<Optional descriptive field>_<View direction indicator>*
View Blocks for Annotation-defining Multi-View Blocks.	*<Optional system of measure>_<Annotation purpose/type>_<Qualifier ("2D", "Scale-Dependent", etc.)>*

Example View Block Names:

View Block Description	Example Names
2D plan view for a queen size bed multi-view block.	**I_Furn_Bed_Queen_P**
2D front view for a queen size bed multi-view block.	**I_Furn_Bed_Queen_F**
3D model for a queen size bed multi-view block.	**I_Furn_Bed_Queen_M**

View Block Description	Example Names
2D grid bubble block with attribute for grid bubble multi-view block.	**I_GridBubble_2D**

Best Practices for Multi-View Block Definitions:

- Limit the use of multi-view blocks for annotation purposes to grid bubbles, chases, and schedule tags. To define a multi-view block for use as a schedule tag, use the Create Tag tool, accessed by clicking Annotate tab ➤ Scheduling panel ➤ ➤ Create Tag .
- There are two possible display representations by default for multi-view blocks. Typically, "General" is used for most plan views. If you need to define a scale-dependent multi-view block, you can use "Plan" instead, along with "Plan High Detail" and "Plan Low Detail," and any other display representations you might create for different scale plan views. In these cases do *not* use the "General" display representation.
- Use the Create AEC Content Wizard to store your multi-view block definitions, rather than store them in the template. The only exception to this is a custom column grid bubble multi-view block definition.

Profiles

Profiles are general purpose 2D definitions that assist in defining geometry that is included in other styles. For example, a 2D shape can be converted to a profile to define a handrail shape. The profile is then extruded the length of the railing whose style the profile is used in to define the handrail.

Profile Definition Naming Conventions:

<Profile purpose>_<Descriptive field>_<Optional additional descriptive field>_<Optional size indication>

Example Profile Definition Names:

Profile Definition Description	Example Name
Profile to define a handrail grip for a railing style	**HR_Grip**
Profile to define a glazed door panel.	**Door (SingleHinge)_Glazed**
Profile to define a 1x4 base for a wall sweep definition.	**WallBase_1x4**
Profile to define a 2x10 fascia for a roof slab edge style.	**Fascia_2x10**

Symbol & Tool-Based Content

The terms "Symbols" and "Tools" in the context of this chapter refer mainly to delivery mechanisms for the various types of content that is external to the drawing template: styles, multi-view blocks, masking blocks, and command-based content.

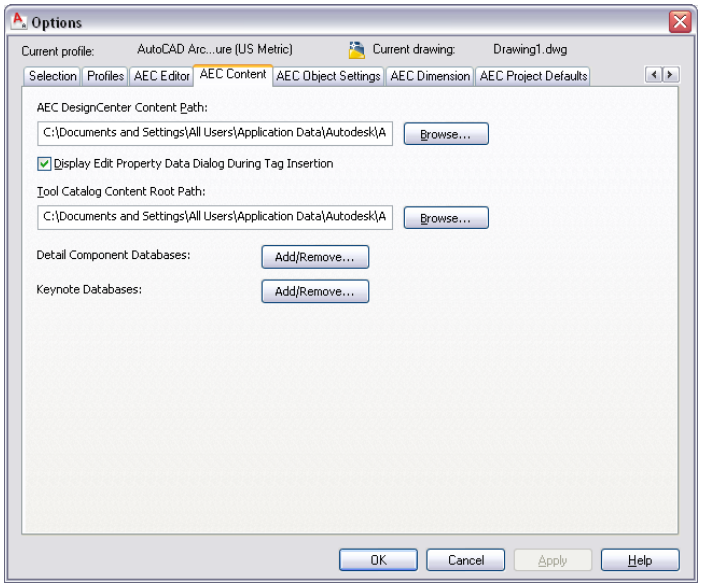
AEC Content

Any symbol-based content with the exception of leaders, callouts and title marks should be created using the AEC Content Wizard and stored as AEC Content so that it can be made accessible either through the "AEC Content" tab in Design Center or through a palette-based tool.

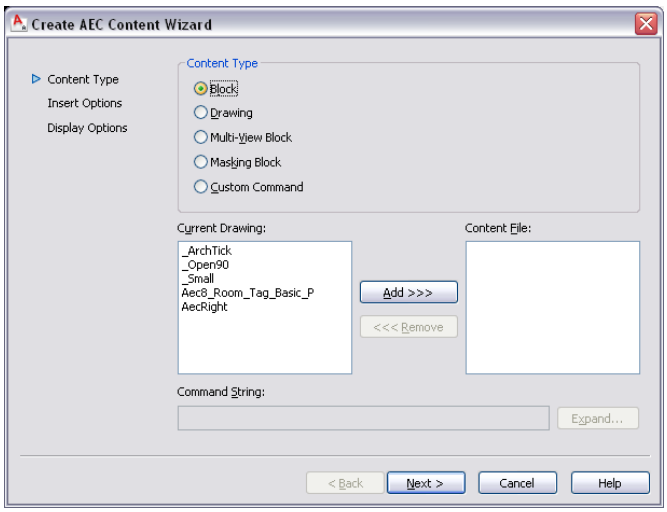
NOTE Custom blocks do not scale correctly if you copy objects to which they are attached (such as doors with door hardware) and paste them in a drawing that has drawing units specified differently.

Best Practices for AEC Content:

- Store your custom AEC Content files in a folder that is separate from the default “Imperial” and “Metric” folders. The path to your AEC Content can be accessed in the OPTIONS dialog box in the “AEC Content” tab. You can create as many subfolders as you like in the location indicated as the “AEC Design Center Content Path”. They will be accessible from the “AEC Content” tab in the AutoCAD Design Center, and will act like any other type of AEC Content.

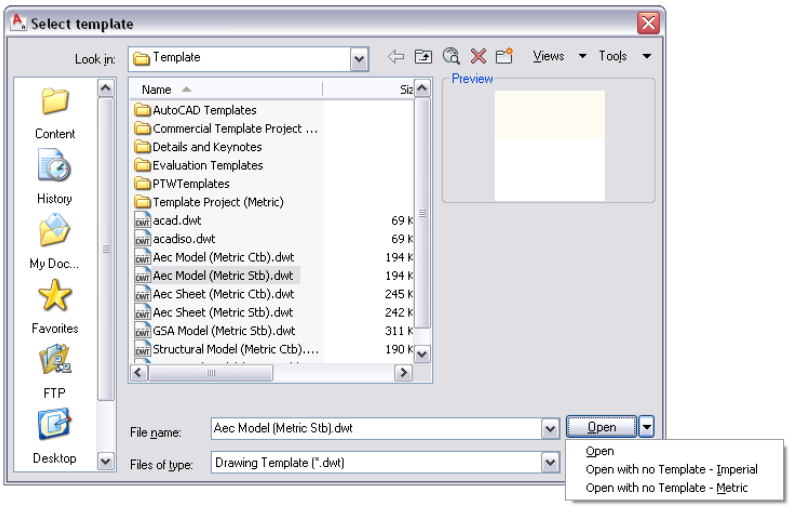


- If you have existing 2D and 3D AutoCAD blocks, you can convert them directly to AEC Content using the AEC Content Wizard and choosing “Block” as the content type.



- When creating AEC Content, remember that the resulting file is a new drawing that takes its content and other settings from the drawing in which you are running the AEC Content Wizard. With this in mind, there are some critical steps you should take before launching the Wizard:

  1. Start in a clean drawing. Instead of using the QNEW command, which loads a template, use the NEW command and choose "Open with No Template - Imperial" from the "Open" drop down list.



IMPORTANT Make sure you have set your drawing setup parameters to automatically load your layer key style into any new drawing. This is critical in order to assign your content to a layer key.

  2. Make sure your drawing window background color is set to white. The resulting content file will have an associated icon with it. The icon background color will be the same color as your AutoCAD drawing window background.

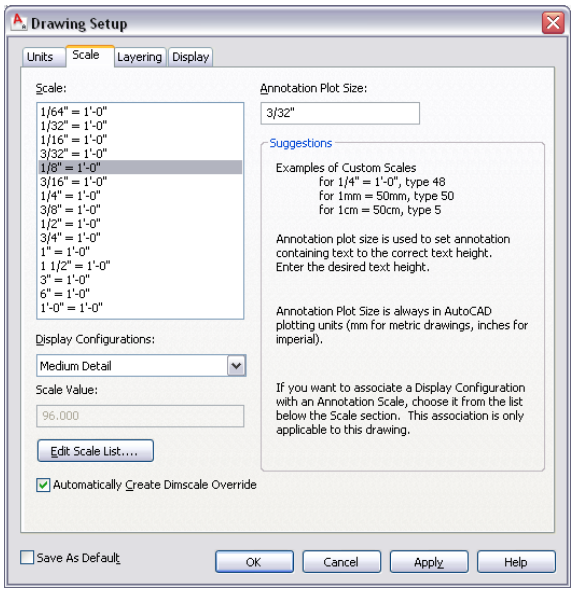
  3. Make sure you have all of the items necessary for your content in the current drawing. In the case of a multi-view block that you may have defined in another drawing, if you simply copy that block into the current drawing, all necessary view blocks will import with it.

  4. Create the graphics for your content file's Design Center icon.

IMPORTANT Remember that the Design Center icon is nothing more than a thumbnail. Keep the graphics simple. The default Design Center icon will be created from *all* geometry that exists in the drawing window at the time you save the content file.

- Always assign a layer key to your AEC Content file.
- Always provide a description for the AEC Content file.
- When saving the AEC Content file, make sure you save it to a folder underneath the AEC Content path setting in your OPTIONS dialog box. This is not done by default. You should select the "Browse" button next to the file name field in the AEC Content Wizard to make sure your file is being saved in the right location.
- Most design content files, since they define actual architectural geometry, should be made up of blocks, multi-view blocks and mask blocks.
- Documentation content files, regardless of whether they are based on blocks or multi-view blocks have the additional requirement that they be inserted at a scale relative to your anticipated plot scale, and taking into account the "Annotation Plot Size" setting in the drawing setup dialog box. As a baseline, you can use one AutoCAD unit (either an inch or a millimeter, depending upon whether your working

in imperial or metric units). Anything in the content file that is one unit in size will be the annotation plot size when plotted at the drawing scale specified at the time it was inserted. Items that are not meant to be plotted at the annotation plot size can be sized proportionally.



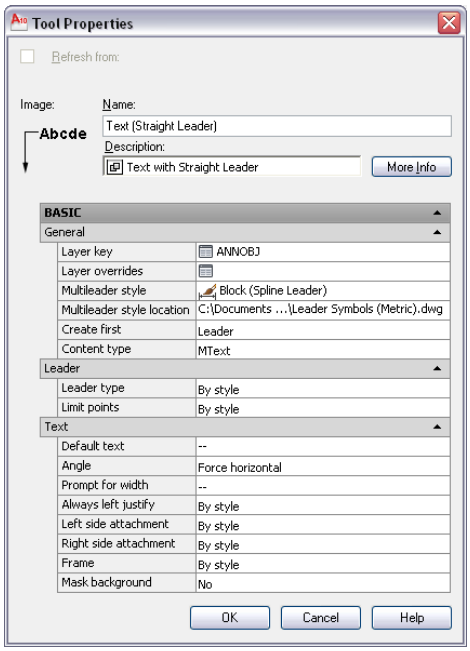
Palette-Based and Miscellaneous Annotation Tool Content

Palette-based tools, combined with tool catalogs, offer an effective means of distributing and standardizing content, as well as automating insertion and creation parameters.

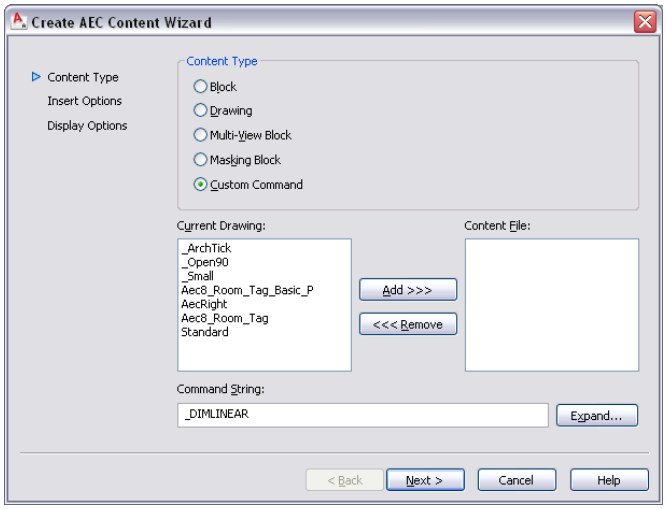
General Best Practices for Palette-Based Tools

- All annotation content should be created to take advantage of the annotation plot size.
- Tools should normally be saved in a catalog. That way, if the palette on which they exist in the user's workspace gets inadvertently deleted, the tool can be restored from the original palette.
- When creating palette based tools, make it a habit to look for automation opportunities. With the exception of tools for AEC content, there are a variety of properties that can be pre-configured to further automate and standardize object creation.
- If you have a need for callouts that use different graphic qualities, you can limit the number of actual tools that you create by taking advantage of dynamic blocks. The disadvantage to doing this, however, is that you may lose some standardization, as the same callout tool could have multiple bubbles in the same drawing by simply changing the view state parameter of the callouts after they've been inserted.
- Store schedule tags in the same file as your schedules and property set definitions. While this is not technically necessary in order for them to work properly, it makes editing them easier.
- Text and labels in schedule tags should be MTEXT objects. MTEXT that links to a property definition will automatically be converted to a properly formatted attribute definition.

- Carefully consider the tool properties for leaders. There are several pre-sets that can make creating a simple leader much less time consuming and more standardized.

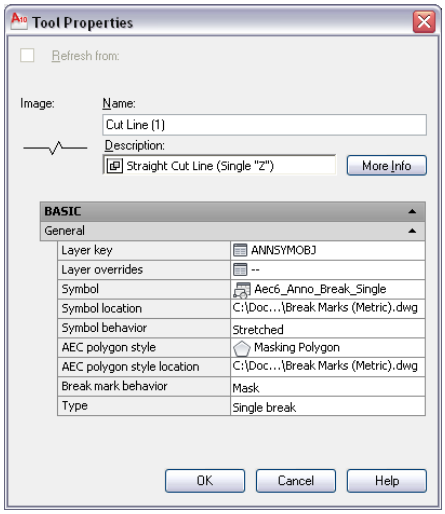


- If you create tools for standard AutoCAD dimensions, use the AEC Content Wizard to do so. That way you can use the Custom Command option and use layer keys to make sure that the dimensions go to the correct layer.



- Break line tools should have supporting elements stored in the same drawing as the break line symbol. As with other multi-component tools, such as schedule tags, it makes them easier to modify in the future.

All of the properties for break marks are set in the tool properties, including whether or not the break mark masks or trims objects.



- Title blocks should be stored in a sheet template drawing rather than as a separate drawing.
- Use MTEXT objects instead of attribute definitions in your title blocks. When you include fields in an MTEXT object, it will word-wrap where necessary.

TIP The title blocks that are provided in the AutoCAD Architecture sheet templates are NCS compliant. You may want to consider beginning with them and making modifications to suit if you are planning to comply with that standard.

Conceptual Design

Creating Conceptual Models

14

A conceptual model, which represents the idea for a building design, comprises a variety of building blocks. In AutoCAD Architecture, the building blocks include mass elements, mass groups, spaces, and slices. Combined, they produce a three-dimensional (3D) model.

Mass Elements and Mass Groups

Mass elements are primitive parametric objects that have specific shapes, such as arch, box, cylinder, and gable. They function as the building blocks of conceptual design (also schematic design) in AutoCAD Architecture. You can create preliminary studies, or mass models, by grouping mass elements together in mass groups.

Mass Groups and Mass Models

When you create a mass group, you can combine the shapes of mass elements in the mass group by adding, subtracting, and intersecting them in a specific order. The resulting complex shape of the mass group forms your conceptual building design, or mass model. The mass model defines the basic structure and proportion of a building model.

Developing Mass Models

As you continue developing your mass model, you can combine mass elements into mass groups and create complex building shapes by adding, subtracting, and intersecting the mass elements.

You can change mass elements in the mass group as necessary to reflect the building design. You can edit individual mass elements that are attached to a mass group to further refine the building model. You can also nest mass groups within other mass groups. For more information, see Creating a Mass Group on page 700.

Using the Model Explorer

You can use the Model Explorer to create your entire mass model, or you can create your mass model in the current drawing. You can also modify your mass model or change the relationships of mass elements in the Model Explorer. In addition to a graphics area that displays the mass model, the Model Explorer has a tree view in which you can drag and drop mass elements and mass groups to arrange and view the building blocks of your model in a hierarchical structure. For more information, see Using the Model Explorer to Create Mass Models on page 715.

When creating massing studies, you can create mass groups with any AutoCAD three-dimensional (3D) object, including AutoCAD ACIS solids. These can be combined with mass elements in the Model Explorer to allow more complex studies of potential designs. However, only objects that have volume affect the appearance of the mass group. For example, a polyline, even with thickness, does not contribute to the mass group.

Continuing Building Design from a Mass Model

The mass model that you create is a refinement of your original idea that you carry into the next phase of the project, where you can slice floorplates from the mass model. You can convert the floorplates to space boundaries to start space planning, or you can convert them to polylines and then to walls to begin your building design.

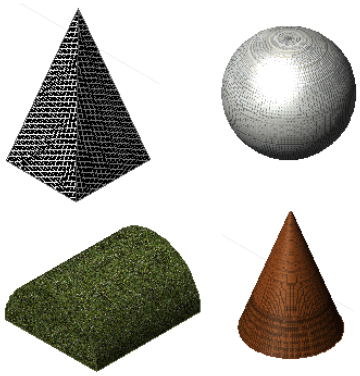
Display Configurations and Layouts for Mass Modeling

Drawings created from templates provided with AutoCAD Architecture contain display configurations and layouts that enable you to work effectively with mass elements and mass groups. For example, a layout has two viewports: one is assigned a display configuration that displays only mass groups and the other is assigned a display configuration that displays only mass elements.

Materials in Mass Elements

In AutoCAD Architecture, you can assign materials to a mass element. These materials are displayed in wireframe and working shade views, or when rendered. Materials have specific settings for individual components of a mass element, such as linework or surface hatches.

Mass elements with assigned materials in rendered view



AutoCAD Architecture provides predefined materials for all common design purposes. These materials contain settings for roof slabs. You can use these predefined materials, or modify them to your special designs. You can also create your own materials from scratch.

For more information, see Using Materials for Mass Elements and Mass Groups on page 712.

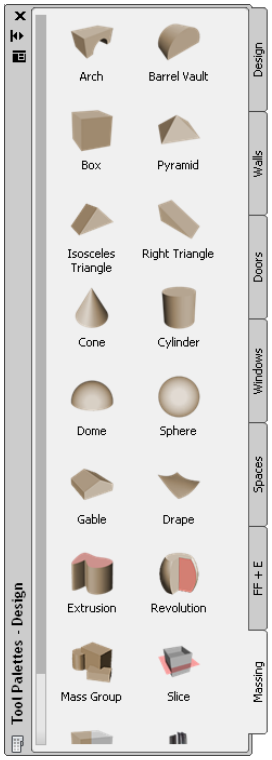
Other Uses of Mass Elements and Mass Groups

You can use mass elements and mass groups to create 3D body pieces of the building model. For example, you can apply them to walls as 3D body modifiers.

Using Massing Tools to Create Mass Elements

Tools provided with AutoCAD Architecture let you quickly place mass elements by selecting a massing tool with a specific style and other predefined properties. You can use the tool with its default settings, or you can change any properties that are not controlled by the style. You can also use massing tools to create new mass elements by applying tool properties to existing 3D solids.

Tool palette containing massing tools



The default tool palettes in the workspace contain massing tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain massing tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog
- My Tool catalog

For more information on accessing tools in these catalogs, see Content Browser on page 97.

Custom palettes created by your CAD manager or other users may also contain massing tools with mass element styles and properties that are customized for your projects or office standards.

Creating a Mass Element

Use this procedure to add a new mass element that has the properties specified in a selected massing tool. To specify settings when you add a mass element, see Creating a Mass Element with User-Specified Settings on page 660.

Shapes of Mass Elements

To create mass elements, you start with basic shapes and manipulate them for the desired result. The twelve basic mass element shapes are Arch, Barrel Vault, Box, Pyramid, Isosceles Triangle, Right Triangle, Cone, Cylinder, Dome, Sphere, Gable, and Drape. You can also create custom mass elements by extruding and revolving profiles and by creating free form mass elements.

You can modify a mass element based on its shape. For example, you can specify the width, depth, and height of a Box mass element, and the radius and height of a Cylinder mass element. For more information, see Editing Mass Elements on page 670.

Specifying the Size of Mass Elements

You can graphically specify size parameters of mass elements.

- A rectangular mass element is any element that has four lines at its base, such as an Arch, Barrel Vault, Box, Gable, Pyramid, Isosceles Triangle, or Right Triangle. You can graphically specify the width, depth, and height of rectangular mass elements.
- When you create a circular mass element, you graphically specify all the valid size parameters. Circular mass elements are Cone, Cylinder, Dome, and Sphere.

Some parameters are fixed during input; for example, the radius of an arch is one quarter of the width, and the rise of a gable is half the height. These parameters can be edited after the mass elements are placed in the drawing.

1. Open the tool palette that you want to use, and select a massing tool.

   Alternatively, you can click Home tab ➤ Build panel, and select a mass element there.

2. Specify the insertion point of the mass element.

   You can move or hide the Properties palette to expose more of the drawing area.

3. Specify the next point.

   This point can be the second corner (for a rectangular mass element), or the radius (for a circular mass element).

4. Specify the height, if prompted.
5. Specify the rotation of the mass element.
6. Continue adding mass elements, and press *ENTER*.

Creating a Mass Element with User-Specified Settings

Use this procedure to add a mass element with settings that you specify.

1. Open the tool palette that you want to use, and select a massing tool.

   Alternatively, you can click Home tab ➤ Build panel, and select a mass element there.

2. On the Properties palette, expand Basic, and expand General.
3. Select a style.
4. Under Bound Spaces, define if this mass element can be used as a bounding object for associative spaces.

   You can select three options here:

   - Yes: this mass element can be used as bounding object for associative spaces.
   - No: this mass element cannot be used as bounding object for associative spaces.
   - By style: this mass element will use the bounding settings from the mass element style.

   NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

5. Select a shape.
6. Specify the mass group to which to attach the mass element.
7. Expand Dimensions.

   The options that display under Dimensions depend on the shape you selected for the mass element.

8 Specify the dimensions of the mass element:

If you want to…	Then…
specify the width of the mass element in its relative *X* direction	enter a value for Width.
specify the depth of the mass element in its relative *Y* direction	enter a value for Depth.
specify the height of the mass element in its relative *Z* direction	enter a value for Height.
specify the radius of the mass element	enter a value for Radius.
specify the rise of the mass element	enter a value for Rise.

9 In the drawing area, specify the insertion point of the mass element.

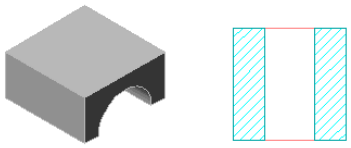
You can move or hide the Properties palette to expose more of the drawing area.

10 Continue adding mass elements, and press *ENTER*.

Creating an Arch Mass Element

Use this procedure to dynamically create an Arch mass element. The insertion point of an Arch mass element is at the centroid of its bottom face.

Arch mass element in 3D and plan views



1 On the Massing tool palette, select the Arch tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Arch .

2 Specify the first corner of the Arch.

3 Drag the cursor and specify the second corner of the Arch.

4 Drag the cursor and specify the height of the Arch.

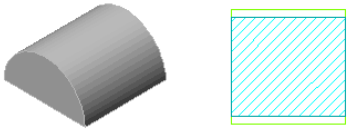
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Arch mass elements, and press *ENTER*.

Creating a Barrel Vault Mass Element

Use this procedure to create a Barrel Vault mass element. The insertion point of the Barrel Vault mass element is at the centroid of its bottom face.

Barrel Vault mass element in 3D and plan views



1 On the Massing tool palette, select the Barrel Vault tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Barrel Vault .

2 Specify the first corner of the Barrel Vault.

3 Drag the cursor and specify the second corner of the Barrel Vault.

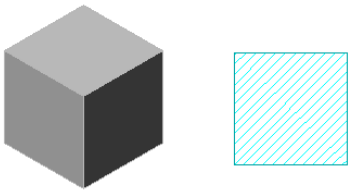
4 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

5 Continue adding Barrel Vault mass elements, and press *ENTER*.

Creating a Box Mass Element

Use this procedure to create a Box mass element. The insertion point of the Box mass element is at the centroid of its bottom face.

Box mass element in 3D and plan views



1 On the Massing tool palette, select the Box tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Box .

2 Specify the first corner of the Box.

3 Drag the cursor and specify the second corner of the Box.

4 Drag the cursor and specify the height of the Box.

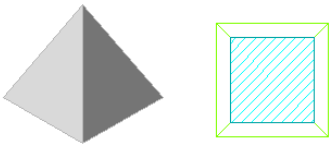
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Box mass elements, and press *ENTER*.

Creating a Pyramid Mass Element

Use this procedure to create a Pyramid mass element. The insertion point of a Pyramid mass element is at the centroid of its bottom face.

Pyramid mass element in 3D and plan views



1 On the Massing tool palette, select the Pyramid tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Pyramid .

2 Specify the first corner of the Pyramid.

3 Drag the cursor and specify the second corner of the Pyramid.

4 Drag the cursor and specify the height of the Pyramid.

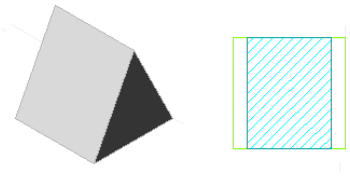
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Pyramid mass elements, and press *ENTER*.

Creating an Isosceles Triangle Mass Element

Use this procedure to create an Isosceles Triangle mass element. The insertion point of an Isosceles Triangle mass element is at the centroid of its bottom face.

Isosceles Triangle mass element in 3D and plan views



1 On the Massing tool palette, select the Isosceles Triangle tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Isosceles Triangle .

2 Specify the first corner of the Isosceles Triangle.

3 Drag the cursor and specify the second corner of the Isosceles Triangle.

4 Drag the cursor and specify the height of the Isosceles Triangle.

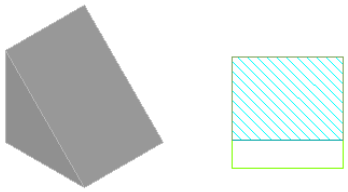
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Isosceles Triangle mass elements, and press *ENTER*.

Creating a Right Triangle Mass Element

Use this procedure to create a Right Triangle mass element. The insertion point of a Right Triangle mass element is at the centroid of its bottom face.

Right Triangle mass element in 3D and plan views



1 On the Massing tool palette, select the Right Triangle tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Right Triangle .

2 Specify the first corner of the Right Triangle.

3 Drag the cursor and specify the second corner of the Right Triangle.

4 Drag the cursor and specify the height of the Right Triangle.

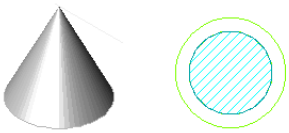
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Right Triangle mass elements, and press *ENTER*.

Creating a Cone Mass Element

Use this procedure to create a Cone mass element. The insertion point of the Cone mass element is at the centroid of its bottom face.

Cone mass element in 3D and plan views



1 On the Massing tool palette, select the Cone tool.

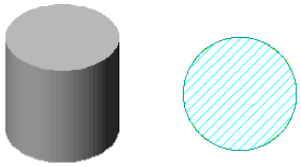
   Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Cone .

2 Specify the insertion point of the Cone.
3 Drag the cursor and specify the radius of the Cone.
4 Drag the cursor and specify the height of the Cone.
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.
6 Continue adding Cone mass elements, and press *ENTER*.

Creating a Cylinder Mass Element

Use this procedure to create a Cylinder mass element. The insertion point of the Cylinder mass element is at the centroid of its bottom face.

Cylinder mass element in 3D and plan views



1 On the Massing tool palette, select the Cylinder tool.

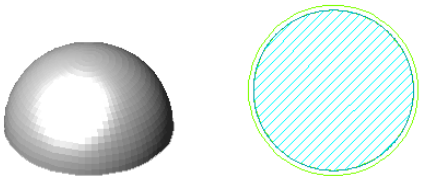
   Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Cylinder .

2 Specify the insertion point of the Cylinder.
3 Drag the cursor and specify the radius of the Cylinder.
4 Drag the cursor and specify the height of the Cylinder.
5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.
6 Continue adding Cylinder mass elements, and press *ENTER*.

Creating a Dome Mass Element

Use this procedure to create a Dome mass element. The insertion point of the Dome mass element is at the centroid of its bottom face.

Dome mass element in 3D and plan views



1 On the Massing tool palette, select the Dome tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Dome .

2 Specify the insertion point of the Dome.

3 Drag the cursor and specify the radius of the Dome.

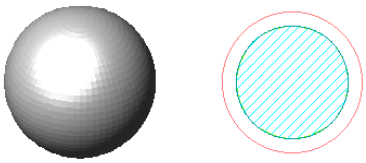
4 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

5 Continue adding Dome mass elements, and press *ENTER*.

Creating a Sphere Mass Element

Use this procedure to create a Sphere mass element. The insertion point of a Sphere mass element is at its centroid.

Sphere mass element in 3D and plan views



1 On the Massing tool palette, select the Sphere tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Sphere.

2 Specify the insertion point of the Sphere.

3 Drag the cursor and specify the radius of the Sphere.

4 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

5 Continue adding Sphere mass elements, and press *ENTER*.

Creating a Gable Mass Element

Use this procedure to create a Gable mass element. The insertion point of a Gable mass element is at the centroid of its bottom face.

Gable mass element in 3D and plan views

1 On the Massing tool palette, select the Gable tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Gable .

2 Specify the first corner of the Gable.

3 Drag the cursor and specify the second corner of the Gable.

4 Drag the cursor and specify the height of the Gable.

5 Enter a rotation angle, or press *ENTER* to accept the default angle of 0.

6 Continue adding Gable mass elements, and press *ENTER*.

Creating a Drape Mass Element

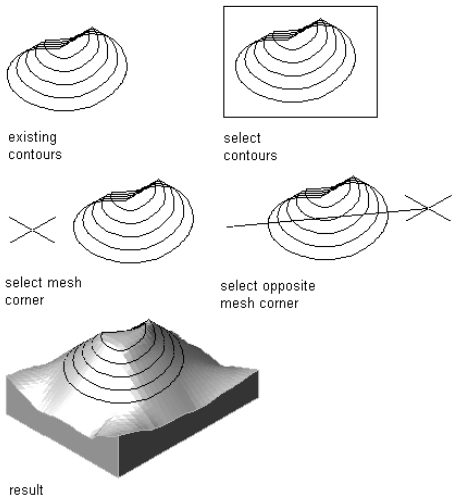
Use this procedure to create a Drape mass element. A drape is useful when you are working with a conceptual model of a building site. You can create polylines and AEC Polygons at different elevations to represent topographic lines, and then drape a mass element over the polylines to show the contours of the site.

For the generated terrain surface, you can choose between a regular mesh with user-defined mesh density and mass element size, and a non-regular mesh defined by the input contour curves and points (Delaunay triangulation).

For a non-regular mesh, you can select either a rectangular mesh of user-specified size (the topography will be extrapolated from your input if the selected rectangular region is larger than the area covered by the contour curves and points), or a non-rectangular mesh whose surface size and shape are determined by the area of the input contour curves and points.

NOTE AutoCAD Architecture uses the Autodesk Civil 3D technology to define the terrain surface; however, the extrapolation of the terrain is used in AutoCAD Architecture only.

Creating a Drape mass element



1 On the Massing tool palette, select the Drape tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Box drop-down ➤ Drape .

2 Select the polylines or AEC Polygons to represent contours, and press *ENTER*.

3 Specify whether the source contours should be deleted after creating the drape mass element, and press *ENTER*.

4 Specify which mesh type you want to generate.

If you want…	Then…
a surface with user-defined mesh density and mass element size (non-triangulated surface)	enter **y** (Yes) for Generate Regular Mesh [Yes/No].
a surface defined from the input contours and points (Delaunay triangulation)	enter **n** (No) for Generate Regular Mesh [Yes/No].

5 If you are generating a regular mesh, complete the following steps:

- Specify the first corner point of the mesh.
- Specify the opposite corner point of the mesh.

- Specify the mesh subdivisions in the X-direction.
- Specify the mesh subdivisions in the Y-direction.
- Enter the base thickness of the resulting mass element.

6 If you are generating a non-regular mesh, specify whether you want it to be rectangular or non-rectangular:

If you want…	Then…
a rectangular mesh	enter **y** (Yes) for Generate Rectangular Mesh [Yes/No].
a non-rectangular mesh	enter **n** (No) for Generate Rectangular Mesh [Yes/No].

7 If you are generating a non-regular, rectangular mesh, complete the following steps:
- Specify the first corner point of the mesh.
- Specify the opposite corner point of the mesh.
- Enter the base thickness of the resulting mass element.

NOTE If the selected mesh area extends beyond the selected contours, the topography of the resulting mass element is extrapolated from the input values.

8 If you are generating a non-regular, non-rectangular mesh, enter the base thickness for the resulting mass element, and press *ENTER*.

Creating Profiles for Extrusion and Revolution Mass Elements

Use this procedure to define a profile from a polyline to create either of the following mass elements:

- Extrusion, in which the shape of the two-dimensional (2D) profile is projected to create a 3D mass element
- Revolution, in which the 2D profile is revolved around its *X* axis to create a 3D mass element

You can draw more than one polyline within the outermost polyline to create voids in the resulting mass element. Polylines cannot intersect or overlap.

1 Draw one or more closed polylines in the shape you want to extrude or revolve.

2 Select the polyline, right-click, and click Convert To ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the mass element.

4 Press *ENTER* to specify a new profile definition.

5 Enter a name for the profile, and click OK.

You can now use the profile as an Extrusion or Revolution mass element. For more information, see Creating a Mass Element by Extruding a Profile on page 667 or Creating a Mass Element by Revolving a Profile on page 668.

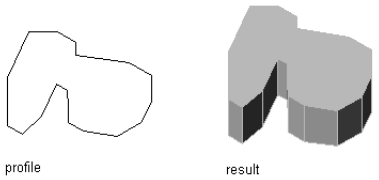
Creating a Mass Element by Extruding a Profile

Use this procedure to create a custom-shaped mass element by using a profile as the basis of its shape. The extrusion projects the shape of the profile to create the mass element.

The width and depth of the Extrusion mass element are based on the original width and depth of the profile. You can specify different width and depth values, if necessary.

The insertion point is at the centroid of the bottom face of the Extrusion mass element.

Creating an Extrusion mass element from a profile



1 Create the profile to use as the basis of the mass element.

   For more information, see Creating Profiles for Extrusion and Revolution Mass Elements on page 667.

2 On the Massing tool palette, select the Extrusion tool.

3 On the Properties palette, expand Basic and expand General.

4 Select the profile you created in step 1 for Profile.

5 Specify the insertion point in the drawing.

6 Specify the height of the Extrusion mass element.

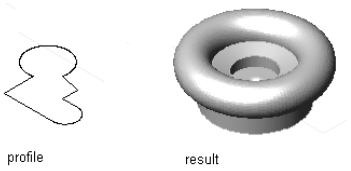
7 Specify a rotation angle, or press *ENTER* for a rotation angle of zero degrees.

8 Press *ENTER*.

Creating a Mass Element by Revolving a Profile

Use this procedure to create a mass element by defining a profile as the basis of its shape, and then revolving the profile about an axis. The axis of revolution is along the *X* axis of the profile as it is drawn. The insertion point is at the centroid of the bottom face of the Revolution mass element.

Creating a Revolution mass element from a profile



1 Create a profile to use as the basis of the mass element.

   For more information, see Creating Profiles for Extrusion and Revolution Mass Elements on page 667.

2 On the Massing tool palette, select the Revolution tool.

3 On the Properties palette, expand Basic and expand General.

4 Select the profile you created in step 1 for Profile.

5 Specify the insertion point in the drawing.

6 Specify a rotation angle, or press *ENTER* for a rotation angle of zero degrees.

7 Press *ENTER*.

Creating a Mass Element from a 3D Solid

Use this procedure to create a Free Form mass element from an AutoCAD ACIS solid that has the properties of the mass element tool you select. You can edit these properties after creating the mass element.

The resulting Free Form mass element is a faceted approximation of the 3D solid. The smoothness of curved edges is controlled by the FACETDEV variable. This variable specifies the number of facets to display on curved AEC objects. For more information, see Specifying the Display Resolution of Objects with Facets on page 143.

1. Open the tool palette that you want to use.

   If necessary, scroll to display the tool that you want to use.
2. Right-click a mass element tool, and click Apply Tool Properties to ➤ 3D Solid.
3. Select the 3D solids to convert.
4. When prompted to erase the original geometry, press *ENTER* to keep the 3D solid, or enter **y** (Yes) to erase it.
5. Enter **n** (Name) to give a description to the mass element, and press *ENTER*.
6. Enter a name, and press *ENTER* twice.
7. Edit the properties of the mass element in the Properties palette, if needed.

NOTE Due to the topological structure of the free form mass element, its facet deviation cannot be changed. The FACETDEV command will have no effect on an existing free form mass element.

Creating a Mass Element Tool

Use this procedure to create a mass element tool and add it to a tool palette. You may want to create your own tools if you frequently place multiple mass elements of specific styles that have the same properties.

1. Open the tool palette on which you want to create a tool.
2. Create the tool:

If you want to…	Then…
create a tool from a mass element in the drawing	select the object, and drag it to the tool palette.
create a tool from a mass element style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another palette	right-click the tool, and click Copy. Open the other palette, and click Paste.
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3. Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 On the Properties palette, expand Basic, and expand General.

7 Click the setting for Description, enter a description of the mass element created from this tool, and click OK.

8 Specify a layer key and any layer overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select a mass element style.

10 Select the drawing file containing the style used for this mass element.

11 Under Bound Spaces, define if this mass element tool can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this mass element tool can be used as bounding object for associative spaces.
- No: this mass element tool cannot be used as bounding object for associative spaces.
- By style: this mass element tool will use the bounding settings from the mass element style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

12 Select a shape.

13 Expand Dimensions.

The options that display under Dimensions depend on the mass element tool you copied to create the new tool.

14 Specify the dimensions of the mass element:

If you want to…	Then…
specify the width of the mass element in its relative *X* direction	enter a value for Width.
specify the depth of the mass element in its relative *Y* direction	enter a value for Depth.
specify the height of the mass element in its relative *Z* direction	enter a value for Height.
specify the radius of the mass element	enter a value for Radius.
specify the rise of the mass element	enter a value for Rise.

15 Click OK.

Editing Mass Elements

After you create mass elements, you can edit and reposition them to generate the form of your building mass model.

You can use grips to manipulate mass elements. The grip editing features available depend upon the shape of the selected mass element. Because mass elements are parametric, each shape has a specific behavior when you modify it. For example, if you select and drag the corner grip point of a Box mass element, the width and depth of the mass element are modified.

AutoCAD Architecture offers several methods for editing mass elements:

- You can directly edit mass elements using grips for dimensions and other physical characteristics.
- You can change mass element settings on the Properties palette.
- You can select editing commands from the shortcut menu for a selected mass element.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see "Use Dynamic Input" in AutoCAD Help.

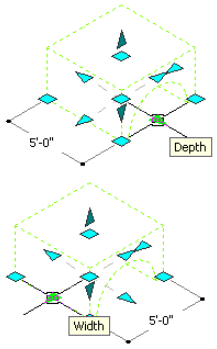
Using Grips to Edit Mass Elements

Use the following procedures to edit mass elements using grips.

Editing Mass Element Dimensions

1. Select the mass element.
2. Select the grip for the dimension you want to change.

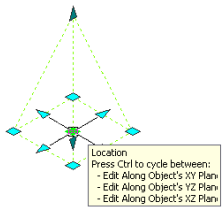
Viewing mass element grips and dimensions



3. Move the grip until the dimension value you want is displayed, and click once; or enter a value.

Changing the Location or Position of a Mass Element

1. Select the mass element.
2. Select the Location grip.

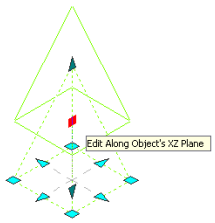


In model view, the Location grip has three edit modes: Edit Along Object's XY Plane, Edit Along Object's YZ Plane, and Edit Along Object's XZ Plane. Press *CTRL* to cycle among modes until you are in the desired mode. The default edit mode is along the *XY* plane. In plan view, the Location grip is restricted to movement in one plane.

3. Move the mass element to the desired location, and click; or enter a value, and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the mass element along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the mass element is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the mass element is constrained to the *Y* dimension direction.



4 Right-click, and click Deselect All to turn off grips.

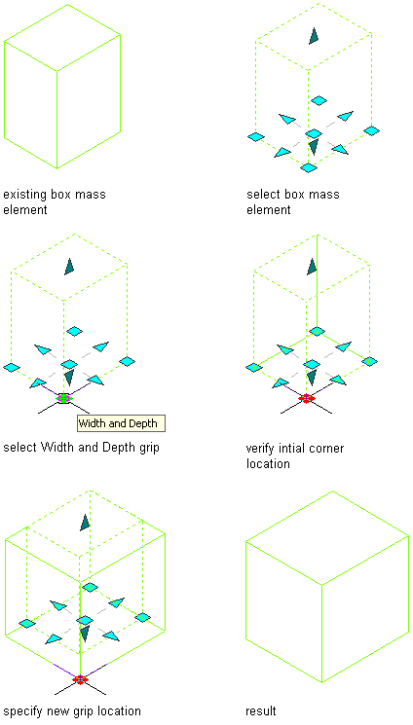
Changing the Area of a Rectangular Mass Element

Use this procedure to change the area of a rectangular mass element using grips. A rectangular mass element is any element that has four lines at its base, such as an Arch, Barrel Vault, Box, Gable, Pyramid, Isosceles Triangle, or Right Triangle.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change mass element area dimensions on the Properties palette.

Editing a Box mass element with its corner grip



Using Corner grips to change area

1 Select the rectangular mass element to display its grips.

2 Click a corner (Width and Depth) grip, and move it to the new location, or enter a value and press *ENTER*.

The location of the opposite corner remains fixed while you move the mass element corner.

If you want to enter a specific value for the second direction in the Width and Depth edit mode, press *TAB* to cycle to the second direction value.

Changing the Edge of an Extrusion Mass Element

Use this procedure to change the area of an extrusion mass element using the Edge grip.

The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the mass element and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added as necessary.

Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well.

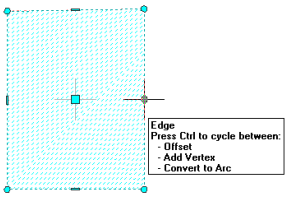
Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the mass element area dimensions on the Properties palette.

1 Select the extrusion mass element.

2 Select an Edge grip.



3 Specify the new edge location:

If you want to…	Then…
offset the edge	move the edge to the desired location and click; or enter a value and press *ENTER*.
add a vertex and create an edge	press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click; or enter a value and press *ENTER*.
change the selected edge to an arc	press *CTRL* twice to switch to the Convert to Arc edit mode. Stretch the midpoint to the desired location and click; or enter a value and press *ENTER*.

You can press *CTRL* to toggle among the edit modes.

4 Right-click, and click Deselect All to turn off grips.

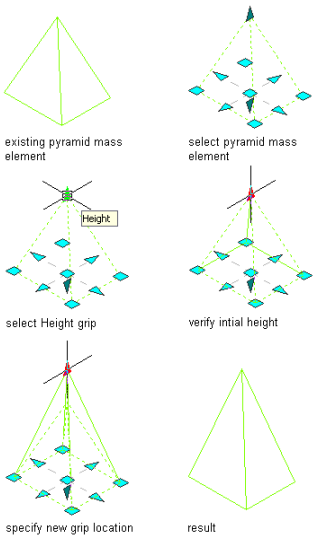
Changing the Height of a Mass Element

Use this procedure to change the height of a mass element using grips.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the mass element height on the Properties palette.

Editing a Pyramid mass element with its Height grip



1. Switch to a 3D view.
2. Select the mass element to display its grips.
3. Click the Height grip at the top of the mass element, and move it to the new location. The height of the mass element changes as you move the grip.

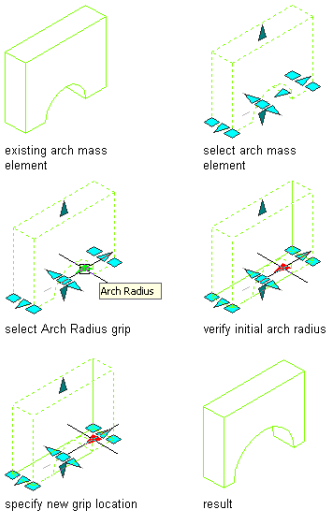
Changing the Arch Radius of an Arch Mass Element

Use this procedure to change the radius of the arch within an Arch mass element using grips.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the arch radius on the Properties palette.

Editing an Arch mass element with its Arch Radius grip



1 Select the Arch mass element to display its grips.
2 Click the Arch Radius grip, and move it to the new location.
The radius of the arch changes as you move the grip.

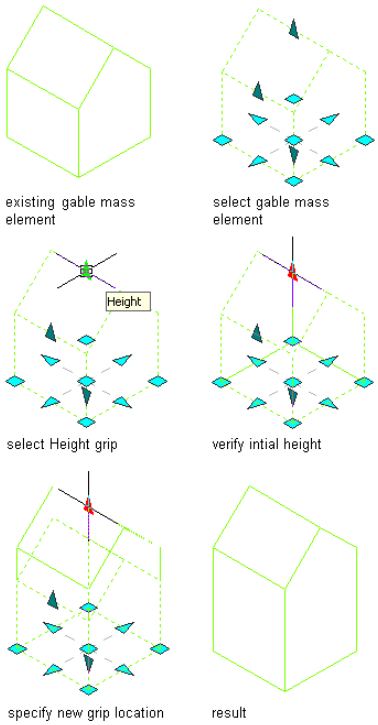
Changing the Roof Height of a Gable Mass Element

Use this procedure to change the roof height of a Gable mass element using grips.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the Gable roof height on the Properties palette.

Editing a Gable mass element with its Height grip



1 Switch to a 3D view.

2 Select the Gable mass element to display its grips.

3 Click the Height grip at the midpoint of the roof ridgeline.

4 Move the grip to change the height of the roof.

The height of the roof ridgeline and the walls change as you move the grip, leaving the roof slope and gable configuration unchanged.

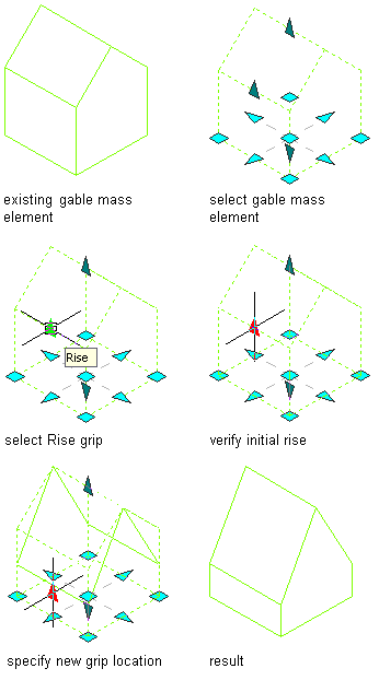
Changing the Rise of a Gable Mass Element

Use this procedure to change the wall height of a Gable mass element using grips.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the gable rise on the Properties palette.

Editing a Gable mass element with its Rise grip



1 Switch to a 3D view.

2 Select the Gable mass element to display its grips.

3 Click the Rise grip at the top of the wall.

4 Move the grip to change the height of the wall.

The height of the wall changes as you move the grip, while the roof ridgeline position remains fixed. This changes the roof slope and gable configuration.

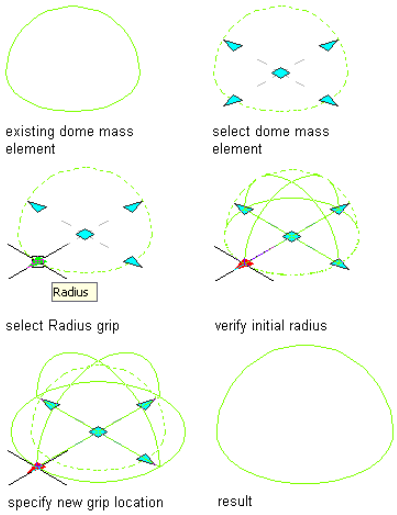
Changing the Radius of a Circular Mass Element

Use this procedure to change the radius of a circular mass element using grips. Circular mass elements include Cones, Cylinders, Domes, Doric Columns, Spheres, and Revolutions.

For more information about mass element grips, see Using Grips to Edit Mass Elements on page 671.

You can also change the mass element radius on the Properties palette.

Editing a Dome mass element with its Radius grip



1 Select the circular mass element to display its grips.

2 Click the Radius grip on the mass element.

You can select any one of the radius grips on the same circle to change the size.

3 Move the grip in or out.

The mass element becomes larger or smaller depending on the direction you move the grip.

Changing the Shape, Size, and Mass Group of a Mass Element

Use this procedure to change one mass element into another, add it to a mass group, and change its size.

1 Double-click a mass element.

2 On the Properties palette, expand Basic, and expand General.

3 Select a new basic shape for Shape.

4 To attach the mass element to a mass group, select a mass group for Attached to.

5 Expand Dimensions.

6 Enter new dimension values for the mass element.

NOTE When you change the size of a mass element, the center point remains constant and the change is applied to both sides of the element.

Editing the Profile of a Mass Element

Use this procedure to edit the geometry of a mass element.

NOTE If you want to replace the geometry of the mass element with newly drawn polylines, ellipses, or circles, draw them before you start this procedure.

1 Select the mass element that you want to change, right-click, and click Edit Profile In Place.

2 If prompted that the profile is not drawn to size, click Yes.

A temporary profile is created for you to edit the geometry of the mask block.

3 **NOTE** After you perform an editing task from the context menu, you may need to select the profile again to perform another editing task. If you do not see the editing commands that you expect on the context menu, select the profile, and right-click to display the context menu.

Edit the profile:

If you want to…	Then…
change the shape of the perimeter of the profile or its rings	select the profile, and use edge or vertex grips to adjust the shape. The Edge grip has two edit modes: Stretch and Move. The default mode is Stretch, and the direction of the stretch depends on the orientation of edges connected to the selected edge. For example, if the edges at both ends of the selected edge are parallel, the grip edit mode is Stretch (Parallel) and the stretch direction is limited to the direction of the parallel edges. If the connected edges are not parallel, the grip edit mode is Stretch (Offset) and the stretch direction is perpendicular to the direction of the selected edge. The Move edit mode allows an unconstrained move of the selected edge.
add vertices to the profile	select the profile, right-click, and click Add Vertex. Select a point for each new vertex, and press *ENTER*.
remove vertices from the profile	select the profile, right-click, and click Remove Vertex. Select each vertex to remove, and press *ENTER*.
replace an existing ring of the profile with new geometry	select the profile, right-click, and click Replace Ring. Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
add a ring to the profile	select the profile, right-click, and click Add Ring. Select the geometry to define the ring. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
remove a ring from the profile	select the profile, right-click, and click Remove Ring. Select the ring to remove, and press *ENTER*.

4 Save or discard the changes:

If you want to…	Then…
restore the mass element to its original shape	right-click and click Discard All Changes
save the changes to the current mass element	right-click, and click Save Changes. The mass element uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.

Combining Mass Elements Using Boolean Operations

Use this procedure to combine mass elements using Boolean operations.

1 Select the mass element to which you want to join another mass element.

2 Selected the desired Boolean operation:

If you want to…	Then…
combine the total volume of two or more mass elements into a composite object	click Mass Element tab ➤ Modify panel ➤ Boolean drop-down ➤ Union .
remove the common area of one mass element from another	click Mass Element tab ➤ Modify panel ➤ Boolean drop-down ➤ Subtract .
remove non-overlapping portions and create a composite solid from the common volume	click Mass Element tab ➤ Modify panel ➤ Boolean drop-down ➤ Intersect .

3 Select the objects you want to combine, and press *ENTER*.

4 Enter **y** (Yes) to erase the original geometry, or enter **n** (No) to keep the original geometry in the drawing.

NOTE A boolean operation creates a free form mass element. Due to the topological structure of the free form mass element, its facet deviation cannot be changed. The FACETDEV command will have no effect on an existing free form mass element.

Dividing a Mass Element

Use this procedure to divide a mass element. The divide plane you specify splits the original mass element into two separate mass elements.

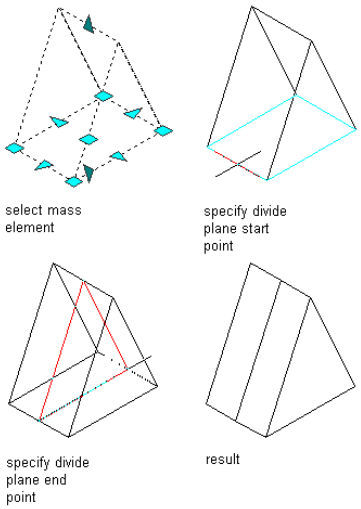
1 Select the mass element you want to divide.

2 Click Mass Element tab ➤ Modify panel ➤ Split By Plane .

3 Specify the divide plane start point.

4 Specify the divide plane endpoint.

Dividing a mass element



The original mass element is split along the divide plane, creating two mass elements.

NOTE Dividing a mass element creates free form mass elements. Due to the topological structure of the free form mass element, its facet deviation cannot be changed. The FACETDEV command will have no effect on an existing free form mass element.

Trimming a Mass Element

Use this procedure to trim a mass element. The divide plane you specify acts as the trim line, and you specify which side of the mass element to remove.

1 Select the mass element you want to trim.

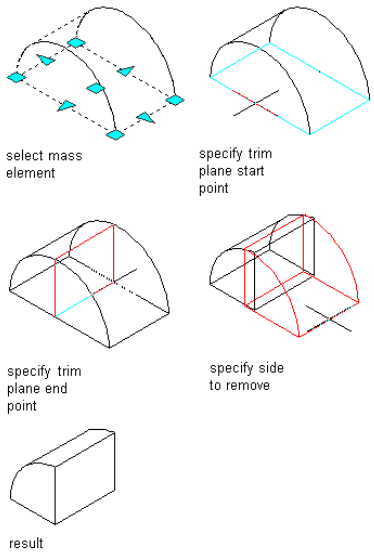
2 Click Mass Element tab ➤ Modify panel ➤ Trim By Plane .

3 Specify the divide plane start point.

4 Specify the divide plane endpoint.

5 Select the side of the mass element to remove.

Trimming a mass element



NOTE Trimming a mass element creates a free form mass element. Due to the topological structure of the free form mass element, its facet deviation cannot be changed. The FACETDEV command will have no effect on an existing free form mass element.

Converting a Mass Element to a Free Form Mass Element

Use this procedure to convert mass elements to Free Form mass elements.

1 Double-click the mass element to convert.

2 On the Properties palette, expand Basic, and expand General.

3 Select Freeform for Shape.

4 Press *ESC*, or right-click and click Deselect All to exit the editing session.

NOTE Due to the topological structure of the free form mass element, its facet deviation cannot be changed. The FACETDEV command will have no effect on an existing free form mass element.

Converting a Mass Element to a 3D Solid

Use this procedure to convert mass elements to 3D solids. Most objects create 2D geometry in plan view; therefore, select a 3D view first for best results.

1 Select the mass element to convert.

2 Click Mass Element tab ➤ Convert To panel ➤ Convert To 3D Solid .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass element, or enter **y** (Yes) to erase it.

Converting a Mass Element to a Wall

Use this procedure to convert mass elements to walls.

1 Select the mass element to convert.

2 Click Mass Element tab ➤ Convert To panel ➤ Wall .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass element, or enter **y** (Yes) to erase it.

4 Specify a point to start the baseline.

5 Specify a point to end the baseline.

The Wall Styles worksheet displays the wall styles that exist in your current drawing.

6 Select a wall style and click OK.

Converting a Mass Element to a Slab or Roof Slab

Use this procedure to convert mass elements to slabs or roof slabs.

1 Select the mass element to convert.

2 Click Mass Element tab ➤ Convert To panel ➤ Roof Slab .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass element, or enter **y** (Yes) to erase it.

The Slab Styles or Roof Slab Styles worksheet displays the slab or roof slab styles that exist in your current drawing.

4 Select a style and click OK.

Converting a Mass Element to a Space

Use this procedure to convert mass elements to spaces. Depending on whether the converted mass element shape is an extrusion- type shape (box, cylinder, extrusion) or a non-extrusion-type shape (pyramid, gable, freeform, etc.), either an extruded 3D space or a 3D freeform space is generated by the conversion.

1 Select the mass element to convert.

2 Click Mass Element tab ➤ Convert To panel ➤ Space .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass element, or enter **y** (Yes) to erase it.

Converting an Object to a Mass Element

Use this procedure to convert objects to Free Form mass elements. The resulting Free Form mass element is a faceted approximation of the object. The smoothness of curved edges is controlled by the FACETDEV variable.

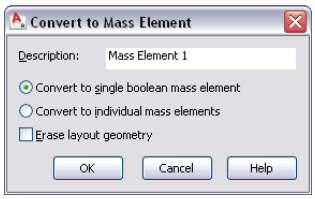
This variable specifies the number of facets to display on curved AEC objects. For more information, see Specifying the Display Resolution of Objects with Facets on page 143.

1 Open a tool palette that has the Convert to Mass Element tool and select the tool.

Alternatively, you can click Home tab ➤ Modify panel ➤ ➤ Convert To Mass Element .

2 Select the object(s) that you want to convert to a Free Form mass element, and press *ENTER*.

The Convert to Mass Element worksheet opens.



3 Enter text for Description.

4 To convert all of the selected objects into one mass element, select Convert to single boolean mass element.

5 Alternatively, to convert the objects within your selection to separate mass elements, select Convert to individual mass elements.

6 To erase the original geometry of the objects, select Erase layout geometry.

7 Click OK.

Dividing the Face of a Mass Element

Use this procedure to divide the face of a mass element. In order for the face to split, the mass element is converted to a Free Form mass element.

1 Select the mass element whose face you want to divide.

2 Click Mass Element tab ➤ Modify panel ➤ Split Face .

3 Select the first point on the face.

4 Select the second point on the same face, and press *ENTER*.

The original mass element is converted to a Free Form mass element, and the selected face is divided along the line you specified.

Joining the Faces of a Mass Element

Use this procedure to join previously split faces of a mass element. After the faces are joined, the mass element is converted to its original shape.

1 Select the mass element whose faces you want to join.

2 Click Mass Element tab ➤ Modify panel ➤ Join Faces .

3 Select the edge of the coplanar faces, and press *ENTER*.

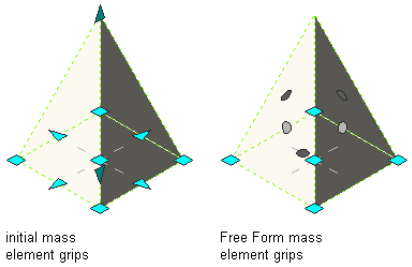
The mass element is converted to its original shape, and the selected faces are joined into a single face.

Editing the Faces of a Free Form Mass Element

Use this procedure to edit individual faces of a Free Form mass element. You must convert the mass element to a Free Form mass element in order to edit its faces.

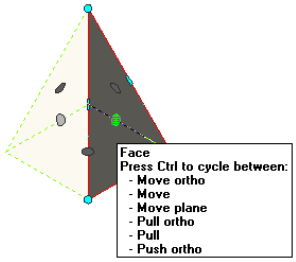
The following illustration shows how Initial and Free Form mass element grips are displayed.

Initial and Free Form mass element grips



When you select a Free Form mass element Face grip, the following tooltip is displayed.

Free Form mass element Face grip tool tip



You have six choices while editing a face of a Free Form mass element. A tooltip displays to indicate which option is current.

If you want to…	Then…	Tooltip Displayed
move the face orthogonally while stretching adjacent faces	click and drag the Face grip to the new Face location.	Move face orthogonally, stretch adjacent faces
move the face freely while stretching adjacent faces	click and hold the Face grip, press *CTRL* once, and specify the new Face location.	Move face freely, stretch adjacent faces
move the face orthogonally while maintaining the planes of adjacent faces	click and hold the Face grip, press *CTRL* twice, and specify the new Face location.	Move face plane, maintain plane of adjacent faces
pull the face orthogonally while adding adjacent faces	click and hold the Face grip, press *CTRL* three times, and specify the new Face location.	Pull face orthogonally, add adjacent faces
pull the face freely while adding adjacent faces	click and hold the Face grip, press *CTRL* four times, and specify the new Face location.	Pull face freely, add adjacent faces

If you want to…	Then…	Tooltip Displayed
pull or push the face orthogonally while either adding adjacent faces or creating a hole	click and hold the Face grip, press *CTRL* five times, and specify the new Face location.	Push face orthogonally, add adjacent faces, possibly create a hole

As you cycle through the options by pressing *CTRL*, the tooltip advances sequentially to indicate the current option. Pressing *CTRL* more than five times returns you to the first option, allowing you to continue cycling through the edit choices.

The cursor is constrained when you choose an orthogonal option and unconstrained when you choose a free option.

Moving a Mass Element Face Orthogonally While Stretching Adjacent Faces

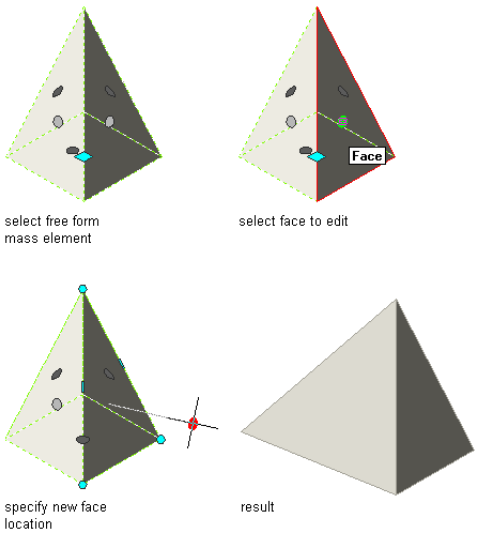
1. Select the mass element you want to edit.
2. On the Properties palette, expand Basic, and expand General.
3. Select Freeform for Shape.

   The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.
4. Select the Face grip for the face of the mass element to edit.

   Depending on the original shape of the mass element, Edge and Vertex grips are displayed.
5. Click and drag the Face grip to specify the new location.
6. Press *ESC*, or right-click and click Deselect All to exit the editing session.

NOTE You cannot pull the mass element face at such an angle, either horizontally or vertically, that the adjacent faces become non-planar. If this distorted condition occurs, the mass element face automatically returns to its original position and an error message is displayed on the command line.

Moving a mass element orthogonally while stretching adjacent faces



The face of the Free Form mass element is moved orthogonally and its geometry remains unchanged, while its adjacent faces are stretched and tilted.

Moving a Mass Element Face Freely While Stretching Adjacent Faces

1. Select the mass element you want to edit.

2 On the Properties palette, expand Basic, and expand General.

3 Select Freeform for Shape.

The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.

4 Select the Face grip for the face of the mass element to edit.

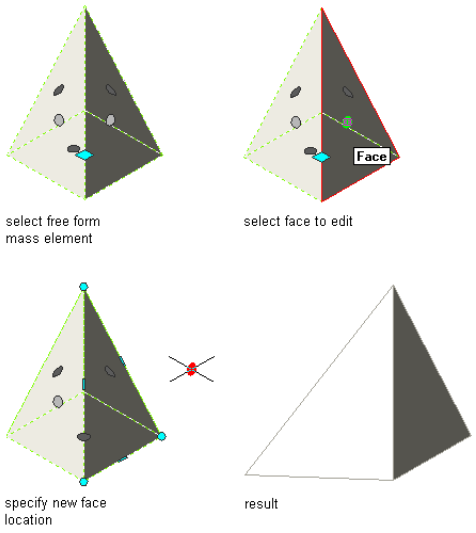
Depending on the original shape of the mass element, Edge and Vertex grips are displayed.

5 Click and hold the Face grip, press *CTRL* once, and specify the new location.

6 Press *ESC*; or right-click, and click Deselect All to exit the editing session.

NOTE You cannot pull the mass element face at such an angle, either horizontally or vertically, that the adjacent faces become non-planar. If this distorted condition occurs, the mass element face automatically returns to its original position and an error message is displayed on the command line.

Moving a mass element freely while stretching adjacent faces



The face of the Free Form mass element is moved freely and its geometry remains unchanged, while its adjacent faces are stretched and tilted.

NOTE The location of the current UCS is temporarily moved to coincide with the original position of the Face grip that you select when you are working with this option. Only the UCS origin is changed, not its orientation.

Moving a Mass Element Face Orthogonally While Maintaining the Planes of Adjacent Faces

1 Select the mass element you want to edit.

2 On the Properties palette, expand Basic, and expand General.

3 Select Freeform for Shape.

The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.

4 Select the Face grip for the face of the mass element to edit.

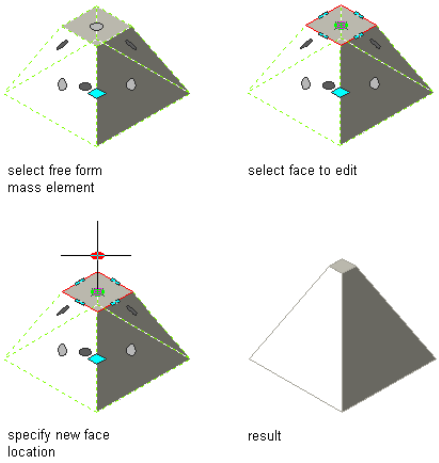
Depending on the original shape of the mass element, Edge and Vertex grips are displayed.

5 Click and hold the Face grip, press *CTRL* twice, and specify the new location.

6 Press *ESC*, or right-click and click Deselect All to exit the editing session.

NOTE You cannot pull the mass element face at such an angle, either horizontally or vertically, that the adjacent faces become non-planar. If this distorted condition occurs, the mass element face automatically returns to its original position and an error message is displayed on the command line.

Moving a mass element face orthogonally while maintaining the planes of adjacent faces



The face of the Free Form mass element is moved orthogonally and its geometry is changed, while the planes of its adjacent faces are maintained.

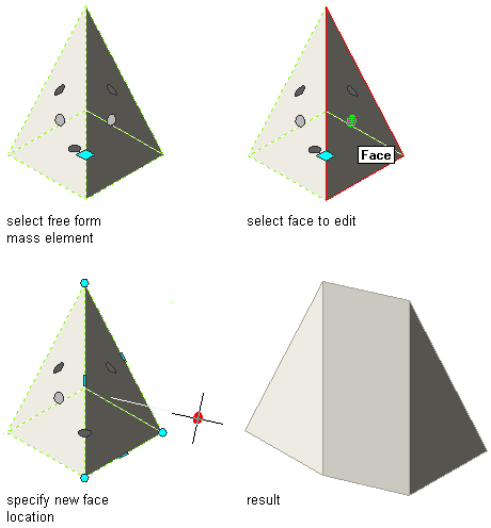
Pulling a Mass Element Face Orthogonally While Adding Adjacent Faces

1. Select the mass element you want to edit.
2. On the Properties palette, expand Basic, and expand General.
3. Select Freeform for Shape.

   The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.
4. Select the Face grip for the face of the mass element to edit.

   Depending on the original shape of the mass element, Edge and Vertex grips are displayed.
5. Click and hold the Face grip, press *CTRL* three times, and specify the new location.
6. Press *ESC*, or right-click and click Deselect All to exit the editing session.

Pulling a mass element face orthogonally while adding adjacent faces



The face of the Free Form mass element is moved orthogonally and its geometry remains unchanged, while adjacent faces between the original geometry and the moved face are added.

Pulling a Mass Element Face Freely While Adding Adjacent Faces

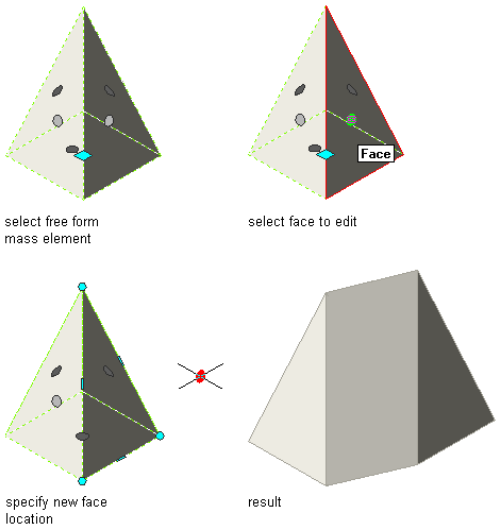
1. Select the mass element you want to edit.
2. On the Properties palette, expand Basic, and expand General.
3. Select Freeform for Shape.

   The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.
4. Select the Face grip for the face of the mass element to edit.

   Depending on the original shape of the mass element, Edge and Vertex grips are displayed.
5. Click and hold the Face grip, press *CTRL* four times, and specify the new location.
6. Press *ESC*, or right-click and click Deselect All to exit the editing session.

NOTE You cannot pull the mass element face at such an angle, either horizontally or vertically, that the adjacent faces become non-planar. If this distorted condition occurs, the mass element face automatically returns to its original position and an error message is displayed on the command line.

Pulling a mass element face freely while adding adjacent faces



The face of the Free Form mass element is moved freely and its geometry remains unchanged, while adjacent faces between the original geometry and the moved face are added.

NOTE The location of the current UCS is temporarily moved to coincide with the original position of the Face grip that you select when you are working with this option. Only the UCS origin is changed, not its orientation.

Pushing or Pulling a Mass Element Face Orthogonally While either Adding Adjacent Faces or Creating a Hole

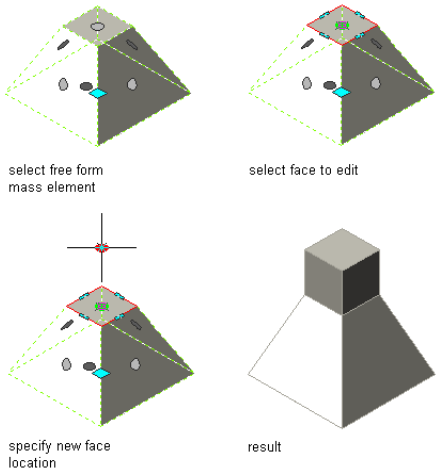
1. Select the mass element you want to edit.
2. On the Properties palette, expand Basic, and expand General.
3. Select Freeform for Shape.

   The mass element is in in-place edit mode. Each face of the Free Form mass element is available to edit in this mode.
4. Select the Face grip for the face of the mass element to edit.

   Depending on the original shape of the mass element, Edge and Vertex grips are displayed.
5. Click and hold the Face grip, press *CTRL* five times, and specify the new location.

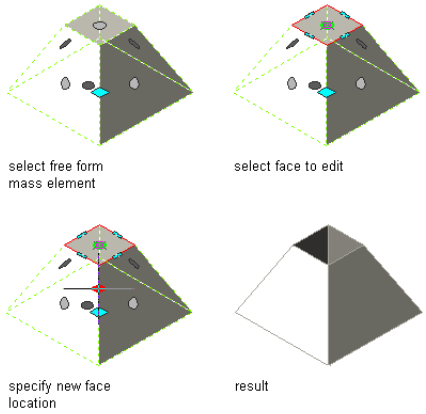
   Push into the mass element to create a hole, or pull out of the mass element to add adjacent faces.
6. Press *ESC*, or right-click and click Deselect All to exit the editing session.

Pulling a mass element face orthogonally while adding adjacent faces



The face of the Free Form mass element is pulled orthogonally and its geometry remains unchanged, while adding adjacent faces between the original geometry and the moved face.

Pushing a mass element face orthogonally to create a hole



The face of the Free Form mass element is pushed orthogonally and its geometry remains unchanged, while creating a hole in the mass element.

Assigning Materials to a Mass Element

Use this procedure to assign materials to the individual components of a mass element.

1. Select the mass element to which you want to assign materials, right-click, and click Edit Object Display.
2. To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation where you want the changes to appear, and click .
3. Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.
4. Click the Materials tab.

The Component column displays all components of the mass element that can be assigned a material. Components that are only symbolical graphics, like the bounding box, are not listed because they cannot have a material assignment.

The Material Definition column displays the currently assigned materials. If no previous material assignments were made, the default material is Standard.

5 Select the component you want to change, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

6 Click OK twice.

Specifying the Display Properties of a Mass Element

Use this procedure to change the following display properties of the components of a mass element:

- Visibility (component is on or off)
- By Material (material assigned to the component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE If a material assignment determines the properties of a mass element display component, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Assigning Materials to a Mass Element on page 690.

1 Select the mass element you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current one.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab.

6 Select the component to change, and select a different setting for the property.

7 Click OK twice.

Specifying the Hatching of a Mass Element

Use this procedure to specify the hatching of components of an individual mass element. Hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

NOTE If a material assignment determines the hatching properties of a mass element display component, you can change the hatching by clearing By Material or by overriding the material assignment with a different material. For more information, see Assigning Materials to a Mass Element on page 690.

1 Select the mass element you want to change, right-click, and click Edit Object Display.
2 Click the Display Properties tab.
3 Select the display representation where you want the changes to appear, and select Object Override.

   The display representation in bold is the current one.

4 If necessary, click .
5 Click the Hatching tab.
6 Select a display component, and click the setting for Pattern.
7 Select the hatching for the display component:

If you want to select…	Then…
a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
single hatching	select User-defined for Type, and clear Double Hatch.
double hatching	select User-defined for Type, and select Double Hatch.
solid fill	select Solid Fill for Type.

8 Click OK.
9 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.
10 Click Angle, and enter the angle for the selected pattern.
11 Click Orientation, and specify how the hatching is oriented:

If you want to orient…	Then…
the hatching to the object, regardless of the object rotation	select Object.
the hatching to the World Coordinate System	select Global.

12 Click OK twice.

Changing the Location of a Mass Element

Use this procedure to relocate a mass element by changing the coordinate values of its insertion point. The mass element also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the mass element are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the mass element by aligning its normal with another axis. You can also rotate the mass element on its plane by changing the rotation angle.

For more information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1 Select the mass element you want to change.

2 On the Properties palette, expand Basic, and expand Location.

3 Select Additional information.

4 Specify the location of the mass element:

If you want to…	Then…
relocate the mass element	enter new coordinate values under Insertion Point.
locate the mass element on the *XY* plane	make the normal of the mass element parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the mass element on the *YZ* plane	make the normal of the mass element parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the mass element on the *XZ* plane	make the normal of the mass element parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the mass element	enter a new value for Rotation Angle.

5 Click OK twice.

Specifying the Cut Plane Display of a Mass Element

Use this procedure to specify the properties of one or more cut planes for a mass element. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the mass element you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all mass elements in the drawing, select Drawing default setting. To apply changes to all mass elements of this style, select Mass Element Style:<style name>. For more information on styles, see Mass Element Styles on page 694.

5 If necessary, expand Object Display Properties ➤ Cut Plane.

6 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

7 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)

You can also access and modify these same cut plane settings through the mass element's context menu, as follows

1 Select the mass element, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Other tab, and then change the settings as needed.

6 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Mass Element

Use this procedure to attach hyperlinks, notes, or files to a mass element. You can also edit hyperlinks and notes, and edit or detach reference files from a mass element.

1 Select the mass element to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, and select a file. Click open, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Mass Element Styles

A mass element style is a collection of settings for variables associated with a mass element. Depending on the scope of the drawing, you could create different mass element styles to represent different types of mass elements.

Properties Controlled by Mass Element Styles

The mass element style determines the properties of mass elements you create. When you edit the display properties of a mass element style, those changes are applied to existing mass elements of that style throughout the current drawing.

Creating Mass Element Styles

Typically, you create mass element styles that represent the basic building blocks of the drawing. When you name a mass element style, mass elements are grouped and can generate reports based on the first part of the mass element style name.

Editing Mass Element Styles

The changes you make to a mass element style take effect the next time you use that style. Mass elements already created with that style are not updated unless you change the display properties of the mass element style.

Managing Mass Element Styles

When you create, import, export, or edit styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Mass Element Style

Use this procedure to create a mass element style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Mass Element Styles.

3 Create a mass element style:

If you want to…	Then…
create a style with default properties	right-click Mass Element Styles, and click New.
create a style from an existing style	right-click the mass element style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new mass element style, and press *ENTER*.

5 Edit the new mass element style:

If you want to…	Then…
specify materials for mass element components	see Assigning Materials to a Mass Element Style on page 696.
specify the display properties of the style	see Specifying the Display Properties of a Mass Element Style on page 697.
specify hatching for components of the style	see Specifying the Hatching for Components of a Mass Element Style on page 698.
add notes and files to the style	see Attaching Notes and Files to a Mass Element Style on page 699.

6 When you finish specifying the properties of the mass element style, click OK.

Specifying the Materials of a Mass Element Style

A mass element consists of a number of components whose display properties can be determined by the materials assigned to each component.

You assign one material to each physical component of the mass element. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the mass element style, instead of using material display properties, you can turn off the material assignments in the display properties of the style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three-dimensional (3D) model views and in elevations.

Mass Element Materials and Display Components

The following table lists mass element components and the material components that determine them in specific views.

Mass Element Component	Material Component
Plan, Plan High Detail, Plan Low Detail, Plan Presentation, Plan Screened	
Above Cut Plane	Plan Linework
Below Cut Plane	Plan Linework
Hatch	Plan Hatch
Cut Plane	No Material
Model	
Entity	3D Body
Bounding Box	No Material
Reflected, Reflected Screened	
Entity	3D Body
Bounding Box	No Material
Hatch	Plan Hatch

Assigning Materials to a Mass Element Style

Use this procedure to assign materials to the individual components of a mass element style. The component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the mass element. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, the hatch is a physical component. The cut plane is a symbolic component.

NOTE If a material assignment does not determine the display properties of a mass element component, you can change the display properties of the mass element style as described in Specifying the Display Properties of a Mass Element Style on page 697.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Multi-Purpose Objects, and expand Mass Element Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.
11. Click OK.

Specifying the Display Properties of a Mass Element Style

Use this procedure to change the following display properties of the display components of a mass element style:

- Visibility (component is on or off)
- By Material (material assigned to the component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

To change these display properties for an individual mass element, see Specifying the Display Properties of a Mass Element on page 691.

NOTE If a material assignment determines the display properties of components in the mass element style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Assigning Materials to a Mass Element Style on page 696.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Mass Element Styles.
3 Select the mass element style you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 Click the Layer/Color/Linetype tab.
7 Select the component to change, and select a different setting for the property.
8 Click OK.

Specifying the Hatching for Components of a Mass Element Style

Use this procedure to specify the hatching of components of a mass element style. Mass element hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Multi-Purpose Objects, and expand Mass Element Styles.
3 Select the mass element style to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override. The display representation in bold is the current one.
6 Click the Hatching tab.
7 Select a display component, and click the setting for Pattern.
8 Select the hatching for the display component:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

9 Click OK.
10 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.
11 Click Angle, and enter the angle for the selected pattern.
12 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

13 Click OK.

Defining a Mass Element Style as Bounding for Associative Spaces

Use this procedure to define a mass element style that can bound associative spaces.

When a mass element style is set as bounding, by default all mass element that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the mass element style in an individual mass element, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Multi-Purpose Objects, and expand Mass Element Styles.
3 Select a mass element style.
4 Click the General tab.
5 Select the check box for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Mass Element Style

Use this procedure to enter notes and attach reference files to a mass element style. You can also edit notes and edit or detach reference files from a mass element style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Multi-Purpose Objects, and expand Mass Element Styles.
3 Select the mass element style you want to change.
4 Click the General tab.
5 To add a description to the mass element style, enter it for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

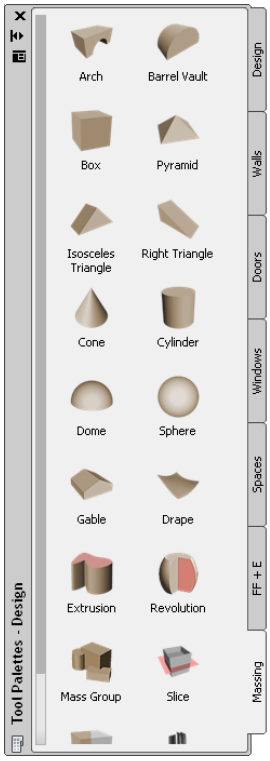
If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Using Massing Tools to Create Mass Groups

Tools provided with AutoCAD Architecture let you quickly place mass groups by selecting a tool from the Massing tool palette. The mass group tool has predefined properties. You can use the default settings of the tool, or you can change settings for the mass group properties.

Tool palette containing mass group tools



The default tool palettes in the workspace contain sample mass group tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain mass group tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog

For more information on accessing tools in these catalogs, see Content Browser on page 97.

Custom palettes created by your CAD manager or other users may also contain mass group tools with mass group properties that are customized for your projects or office standards.

Creating a Mass Group

Use this procedure to add a new mass group that has the properties specified in a selected mass group tool.

A mass group is a display object that allows you to visualize and manipulate combinations of mass elements. After you create mass elements, you can combine their shapes through Boolean operations (addition, subtraction, and intersection) in a mass group. The resulting complex shape of the mass group represents your mass model.

Mass Groups and Mass Group Markers

You use a mass group tool to attach mass elements, other AEC objects, or AutoCAD objects to a mass group, which you place in a convenient area of your drawing. The mass elements and other objects that you attach form the body of the mass group. The mass group is created on a different layer than the mass elements that form it.

A mass group marker is displayed in the drawing if you create a mass group and then detach all mass elements from it, or if you release the anchor of objects attached to the group. If you attach elements to the group, or if you anchor attached objects to the group, the mass group marker is no longer displayed.

Using Boolean Operations to Create a Mass Group

You can combine the shapes of mass elements in the mass group—adding, subtracting, and intersecting them in a specific order.

- An additive operation combines the total volume of two or more solids or two or more regions into a composite object.
- A subtractive operation removes the common area of one set of solids from another.
- An intersection removes non-overlapping portions and creates a composite solid from the common volume.

You can attach any closed, solid shape to a mass group. For example, a line has no solid properties and cannot be added to the shape of the mass group. However, an AutoCAD 3D solid does contribute to the final shape.

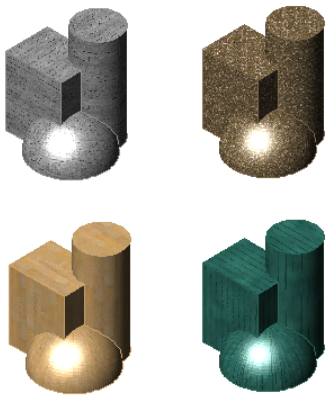
You can also create and work with mass groups in the Model Explorer. For more information, see Using the Model Explorer to Create Mass Models on page 715.

To further refine the building model, you can edit individual mass elements that are attached to a mass group.

Materials in Mass Groups

In AutoCAD Architecture, you can assign materials to a mass group. These materials are displayed in wireframe or rendered views. Materials have specific settings for individual components of a mass group.

Mass groups with assigned materials in rendered view



AutoCAD Architecture provides predefined materials for common design purposes, which contain settings for mass groups. You can use these predefined materials, or modify them to your special designs. You can also create your own materials.

For more information, see Using Materials for Mass Elements and Mass Groups on page 712.

1 Open the tool palette that you want to use, and select a mass group tool.

If necessary, scroll to display the tool that you want to use.

2 Select the elements to attach to the group, and press *ENTER*.

3 Specify the insertion point of the mass group.

You can move or hide the Properties palette to expose more of the drawing area.

Assigning Materials to a Mass Group

Use this procedure to assign materials to the individual components of a mass group.

1 Select the mass group to which you want to assign materials, right-click, and click Edit Object Display.

2 To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation where you want the changes to appear, and click

3 Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.

4 Click the Materials tab.

The Component column displays all components of the mass group that can be assigned a material. Components that are only symbolical graphics, like the bounding box, are not listed because they cannot have a material assignment.

The Material Definition column displays the currently assigned materials. If no previous material assignments have been made, the default material is Standard.

5 Select the component you want to change, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

6 Click OK twice.

Changing the Size of the Mass Group Marker

Use this procedure to change the size of the mass group marker by editing its display properties.

1 Double-click the mass group you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all mass groups in the drawing, select Drawing default setting.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 Click the value for Marker size, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)

You can also access and modify the marker size property through the mass group's context menu, as follows

1 Select the mass group, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Other tab, and then change the size as needed.

6 Click OK twice.

Adding a New Mass Element to a Mass Group

Use this procedure to add a new mass element to a mass group after you have placed a mass group in the drawing.

1 Select an existing mass group or mass group marker.

2 Click Mass Group tab ➤ Modify panel ➤ Add New Element.

3 On the Properties palette, select a shape for the mass element.

4 Select Add, Subtract, or Intersect for Operation.

5 Specify an insertion point in the drawing.

6 Specify additional parameters for the mass element.

Depending on the shape of the mass element, you need to specify a second corner, the radius, or the height.

7 Specify a rotation angle, and press *ENTER*.

The newly created mass element is now part of the selected mass group.

Attaching an Existing Mass Element to a Group

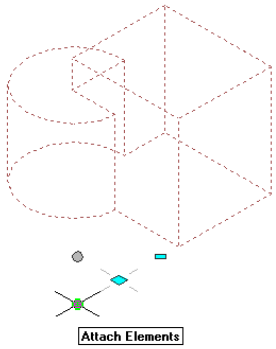
Use this procedure to add existing mass elements to a mass group. When an element is attached to a mass group, the element display is turned off and the group display is turned on.

While it is possible to attach any number of objects to a single mass group, performance improves if this group is subdivided into a series of nested groups. Your design is also more manageable if a group is broken into logical divisions. In addition, if one of the subgroups fails to display as expected, it is easier to track down the problem. In most cases, you can adjust the order of the objects in the group to get the correct appearance.

1 Select the mass group.

2 Select the Attach Elements grip.

Alternatively, you can click Mass Group tab ➤ Modify panel ➤ Attach Elements .



3 Select one or more mass elements to attach to the mass group, and press *ENTER*.

Detaching a Mass Element from a Group

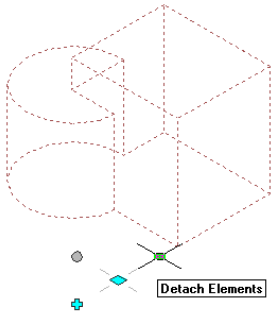
Use this procedure to detach a mass element from a mass group. After you have defined a mass group and added mass elements to it, you may decide that one or more elements do not fit your model. You can detach these from the mass group and use them elsewhere or delete them.

When an element is detached from a mass group, the element display is turned on because it is an individual entity and is no longer part of the group.

1 Select the mass group.

2 Select the Detach Elements grip.

Alternatively, you can click Mass Group tab ➤ Modify panel ➤ Detach Elements .



3 Select one or more mass elements to detach from the mass group.

If there is only one element attached to the mass group, you are not prompted to select elements. The single element is detached without further input.

4 Press *ENTER*.

Using Boolean Operations for Mass Groups

You can change a mass group by using boolean operations on the mass elements contained within.

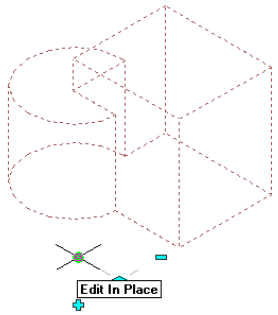
Making a Mass Element Additive

Use this procedure to change the operation of a mass element. All objects are additive when they are created. When two mass elements are grouped together, they form one mass containing both objects.

1 Select the mass group that contains the mass element you want to change.

2 Select the Edit In Place grip.

Alternatively, you can click Mass Group tab ➤ Modify panel ➤ Edit In Place .



3 Select the mass element you want to make additive.

4 Click Edit in Place tab ➤ Modify panel ➤ Mass Group Operation drop-down ➤ Additive .

5 Click Edit in Place tab ➤ Edits panel ➤ Finish .

This saves the changes to the mass element and ends the in-place edit session.

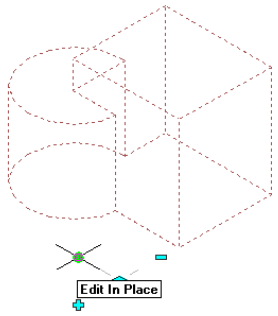
Making a Mass Element Subtractive

Use this procedure to change the operation of a mass element. When a mass element in a group operates by subtraction, the mass element subtracts its mass where it overlaps another object.

1 Select the mass group that contains the mass element you want to change.

2 Select the Edit In Place grip.

Alternatively, you can click Mass Group tab ➤ Modify panel ➤ Edit In Place .



3 Select the mass element you want to make subtractive.

4 Click Edit in Place tab ➤ Modify panel ➤ Mass Group Operation drop-down ➤ Subtractive .

5 On the Properties palette, expand Basic, and expand General.

6 Select Subtract for Operation.

7 Click Edit in Place tab ➤ Edits panel ➤ Finish .

This saves the changes to the mass element and ends the in-place edit session.

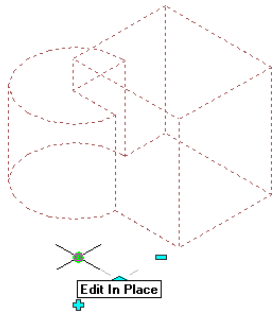
Creating an Intersection from Mass Elements

Use this procedure to create a new mass shape using the intersection of two mass elements.

1 Select the mass group that contains the mass element you want to change.

2 Select the Edit In Place grip.

Alternatively, you can click Mass Group tab ➤ Modify panel ➤ Edit In Place .



3 Select the mass element you want to make intersecting.

4 Click Edit in Place tab ➤ Modify panel ➤ Mass Group Operation drop-down ➤ Intersect .

5 On the Properties palette, expand Basic, and expand General.

6 Select Intersect for Operation.

7 Click Edit in Place tab ➤ Edits panel ➤ Finish .

This saves the changes to the mass element and ends the in-place edit session.

Creating a Nested Mass Group

Use this procedure to attach a mass group to another mass group. This action nests the current mass group within the mass group that you select.

You may find it easier to nest mass groups using the Model Explorer. For more information, see Moving a Mass Element or Group from One Mass Group to Another on page 724.

1 Select the mass group that you want to nest within another mass group.

2 On the Properties palette, expand Basic, and expand General.

3 Click the mass group where you want to nest the current mass group for Attached to.

4 Specify Add, Subtract, or Intersect for Operation.

This option determines how the mass group is nested within the mass group you selected.

Removing a Nested Mass Group from a Mass Group

Use this procedure to remove a mass group from a mass group in which the first mass group is nested. The mass group you remove remains in the drawing.

1 Select the mass group you want to remove.

2 On the Properties palette, expand Basic, and expand General.

3 Select None for Group.

4 Right-click, and click Deselect All to turn off grips.

Changing the Location of a Mass Group Using Grips

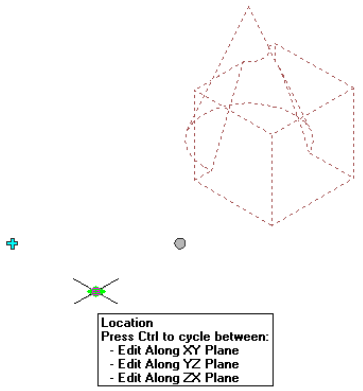
Use this procedure to relocate a mass group using the Location grip. In Model view, the Location grip has three edit modes: Edit Along XY Plane, Edit Along YZ Plane, and Edit Along ZX Plane. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

If the mass elements that are attached to the mass group are anchored, they move when you move the Location grip. If the anchor of objects has been released, only the mass group marker moves when you move the Location grip. For more information, see Working with Mass Group Anchors on page 708.

You can also change the location of a mass group using the Properties palette.

1 Select the mass group you want to change.

2 Select the Location grip.

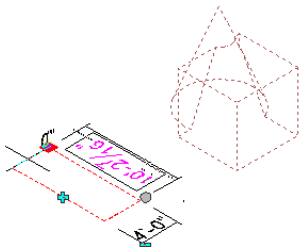


3 Move the mass group to the desired location, and click once; or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the mass group along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the mass group is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X*

dimension is locked at that value, and movement of the mass group is constrained to the *Y* dimension direction.



4 Right-click, and click Deselect All to turn off grips.

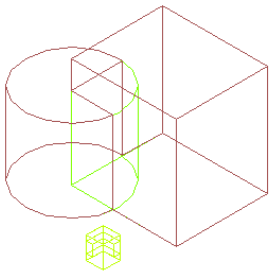
Working with Mass Group Anchors

Use these procedures to release anchors of objects attached to a mass group, or anchor elements to a mass group.

Releasing object anchors from a mass group

1 Select the mass group with objects anchored to it.

2 Click Mass Group tab ➤ Modify panel ➤ Release Anchor .



All anchors are released, and the mass group marker is displayed. The display of attached elements is turned on.

Anchoring objects to a mass group

1 Select the mass group or the mass group marker that has no objects anchored to it.

The mass group must have mass elements attached to it in order to anchor them to the group.

2 Right-click, and click Anchor Attached Objects.

All objects are anchored to the mass group, and the mass group marker is no longer displayed. The display of attached elements is turned off.

Working with Mass Groups

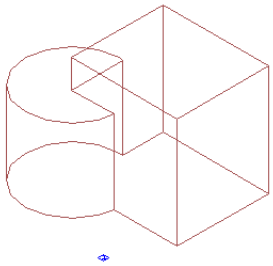
Use these procedures to place an entity reference of a mass group in a drawing, or to reposition the insertion point of a mass group.

You can place a mass group in the drawing multiple times for modeling. Using an entity reference helps to simplify the modeling process.

You can adjust the insertion point of a mass group by selecting a new location and a new rotation.

Placing an entity reference of a mass group

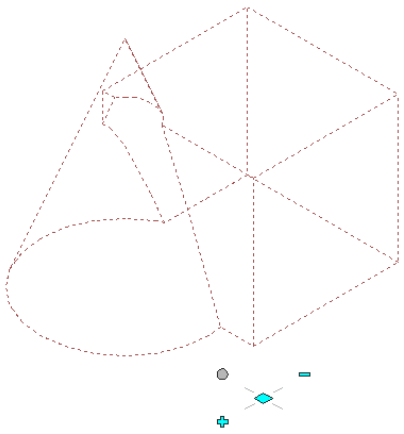
1. Select a mass group.
2. Click Mass Group tab ➤ Modify panel ➤ Place Reference .
3. Move the cursor to the desired location for the entity reference, and click once to place the reference in the drawing.
4. Specify the rotation angle, and press *ENTER*.



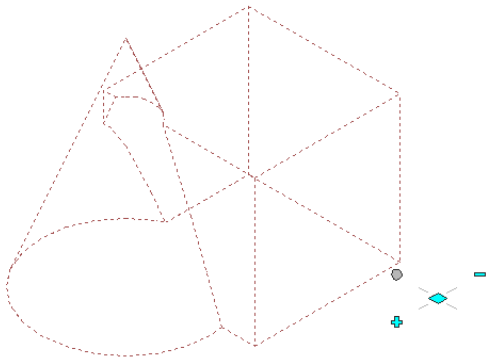
An entity reference of the selected mass group is placed in the drawing, as specified. The entity reference is distinguished from the mass group by its location marker.

Repositioning the insertion point of a mass group

1. Select a mass group.



2. Click Mass Group tab ➤ Modify panel ➤ Reposition Insertion Point .
3. Specify the new insertion point.
4. Enter a rotation angle, and press *ENTER*; or move the cursor, and click to specify the rotation.



If the mass group has an entity reference connected to it, repositioning the insertion point of the mass group affects the rotation of the entity reference.

Specifying the Cut Plane Display of a Mass Group

Use this procedure to specify the properties of one or more cut planes for a mass group. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1. Double-click the mass group you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

NOTE To apply your changes to all mass groups in the drawing, select Drawing default setting.

5. If necessary, expand Object Display Properties ➤ Cut Plane.
6. For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.
7. If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)

You can also access and modify these same cut plane settings through the mass group's context menu, as follows

1. Select the mass group, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
3. Select the display representation where you want the changes to appear, and select Object Override.

   The display representation in bold is the current display representation.

4. If necessary, click .
5. In the Display Properties dialog, click the Other tab, and then change the settings as needed.
6. Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Mass Group

Use this procedure to attach hyperlinks, notes, or files to a mass group. You can also edit hyperlinks and notes, and edit or detach reference files from a mass group.

1. Double-click the mass group to which you want to attach information.
2. On the Properties palette, click the Extended Data tab.
3. To add a hyperlink, click the setting for Hyperlink, and specify the link.
4. To add a note, click next to Notes, enter text, and click OK.
5. To attach, detach, or edit a reference file, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6. Click OK twice.

Creating a Mass Group Tool

Use this procedure to create a mass group tool and add it to a tool palette. You may want to create your own mass group tools if you are placing multiple mass groups with the same mass group properties.

1. Open the tool palette where you want to create a tool.
2. Create the tool:

If you want to…	Then…
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	right-click the tool, and click Copy. Open the other palette, and click Paste.
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3. Right-click the new tool, and click Properties.
4. Enter a name for the tool.
5. Click the setting for Description, enter a description of the tool, and click OK.
6. To add keywords to the tool, click More Info.
7. Enter the keywords, and click OK twice.

Using Materials for Mass Elements and Mass Groups

Using materials simplifies defining the display of objects. You define the display of a material, such as brick or glass, only once in the drawing or the drawing template, and then assign it to any object component or object style. For example, you can define a material "Glass" and assign it to any number of windows, glass door insets, or cubicle walls.

Using a common set of materials provides centralized control across the display of objects in a drawing or throughout the whole project. When the particulars of a material change, you change them just once in the material definition, and all objects are updated.

For more information, see Materials on page 577.

Rendered building with different materials

Predefined Materials

AutoCAD Architecture provides predefined materials for common design purposes. You can use these predefined materials, or modify them to your special designs. You can also create your own materials.

Surface Hatching

Surface hatches can display in both model views and section/elevation views. Placement and orientation of the hatch can be precisely controlled and specified for each object face individually.

For detailed information about surface hatches, see Working with Surface Hatches on page 590.

Mass Element and Mass Group Display Components and Materials

A mass element or a mass group consists of a number of display components that can be determined by materials.

Workflow

You assign one material to each display component of the mass element or mass group. For example, you assign a dark wood material to the mass element body and a light brown material to the mass element hatch. When you assign a material to a mass group, the display properties of the attached mass elements are overridden with the mass group settings.

If you want to use the display properties of the mass element instead of the material display properties, you can deactivate the material assignments in the display properties of the mass element.

Display Representations

The display properties of an object are specified for each display representation individually. Mass elements and mass groups have display representations for plan, model, reflected, and sketch views. You can create

new display representations for mass elements and mass groups by copying an existing representation. For example, you can create a new display representation "Plan 1:25" to create a plan view optimized for display in a view scaled to 1:25. This new display representation has the same display components as the one from which it was copied. The copied components will be influenced by the same material components as the original components.

Material Component Assignments

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in Plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their descriptions, see Material Components and Display Properties on page 585.

The following table lists mass element components and the material components that determine them.

Mass Element Component	Material Component
Plan High Detail, Plan Low Detail, Plan Presentation, Plan Screened	
Hatch	Plan Hatch
Cut Plane	No Material
Model	
Entity	3D Body
Bounding Box	No Material
Reflected, Reflected Screened, Sketch	
Entity	Plan Linework
Bounding Box	No Material
Hatch	Plan Hatch

The following table lists mass group components and the material components that determine them.

Mass Group Component	Material Component
Plan High Detail, Plan Low Detail	
Marker	No Material
Cut Plane	No Material
Hatch	No Material
Plan, Plan Presentation, Plan Screened	
Entity	Plan Linework
Marker	No Material

Mass Group Component	Material Component
Model	
Entity	3D Body
Marker	No Material
Reflected, Reflected Screened	
Entity	Plan Linework
Marker	No Material

Process Overview: Creating and Applying a Material for a Mass Element or Mass Group

If you create a material, you can apply it to all types of objects that support materials. For example, a concrete material could be used for a wall and for a structural element. Mass elements and mass groups are often used for columns, elevator shafts, or chimneys. If you want to create a material to use only for mass elements or mass groups, you should name it accordingly. For example, if the materials have specific names, such as "Mass Element - Concrete Column" or "Mass Group - Cable Shaft," you can simplify the organization of your material definitions.

1 Create a new material definition or edit an existing material definition.

For more information, see Creating and Editing Material Definitions on page 599.

2 In the material definition, define the settings that affect the display of materials in mass elements and mass groups:

If you want to…	Then…
display a surface hatch for a mass element or a mass group in 3D model views	turn on the Surface Hatch component, and specify its display properties. For more information, see Defining the Layer, Color and Linetype of a Material Definition on page 600 and Specifying the Surface Hatch Pattern of a Material Definition on page 602.
display a section hatch for a mass element or mass group in a 2D section, 3D section, or live section	turn on the Section Hatch component, and specify its display properties. For more information, see Defining the Layer, Color and Linetype of a Material Definition on page 600 and Specifying the Plan and Section Hatch Patterns of a Material Definition on page 601.
display the sectioned boundary and sectioned body of a mass element or mass group in a live section	turn on the Sectioned Boundary and Sectioned Body components, and specify their display properties. For more information, see Defining the Layer, Color and Linetype of a Material Definition on page 600.
add special rendering materials for mass elements or mass groups in live sections	select rendering materials. For more information, see Assigning Render Materials on page 604.
exclude mass element or mass group components from a 2D section shrinkwrap hatch	specify this setting in the material definition. For more information, see Excluding a Material Definition from 2D Section Shrinkwrap on page 606.

3 Turn on the assigned materials in the individual display representations, and then assign materials to the mass elements and mass groups in your building model.

For more information about assigning materials to mass elements, see Assigning Materials to a Mass Element on page 690.

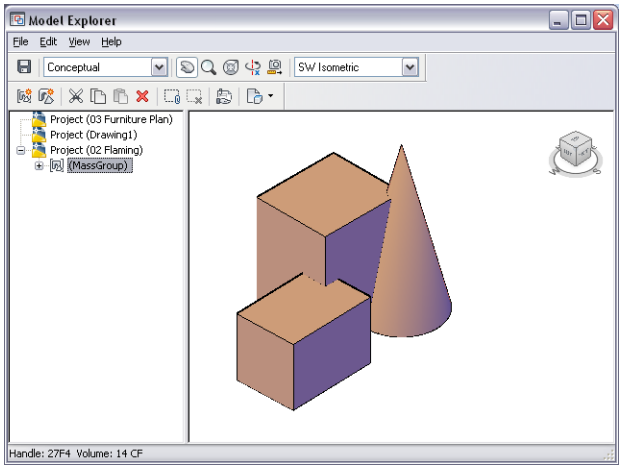
For information about assigning materials to mass groups, see Assigning Materials to a Mass Group on page 702.

Using the Model Explorer to Create Mass Models

The Model Explorer is a window in which you create, view, and manipulate mass elements and mass groups. You can create your entire conceptual model by using the Model Explorer. The main window is similar to the 3D orbit view. You can attach objects and mass elements to mass groups and view them in the Model Explorer. You can simultaneously view the conceptual and the hierarchical structure of mass groups and mass elements that make up the model.

The Model Explorer is divided into three areas: the tree view in the left pane, the graphics area in the right pane, and the menu bar and toolbar across the top.

Viewing a mass group in the Model Explorer



Left Pane of the Model Explorer

The tree view lists all open drawings as Projects. Any mass groups are displayed under their associated drawing in the tree view. If you expand a mass group, the mass elements attached to it are displayed. One of the following icons is displayed next to each mass element in the mass group, indicating which Boolean operation is used to combine mass elements:

Icon	Boolean Operation Used
	If both squares are yellow, the operation is additive.
	If the top portion of the two squares is yellow, the operation is subtractive.
	If the middle of squares is yellow, the operation is intersection.

An additive operation in the Model Explorer combines the total volume of two or more solids or two or more regions into a composite object. A subtractive operation removes the common area of one set of solids

from another. An intersection removes non-overlapping portions and creates a composite solid from the common volume.

The order of objects and mass elements in the tree view dictates the outcome of the group when mass elements are combined. You can drag and drop the mass elements within the mass group to change the order in which they are combined.

You can also drag and drop mass groups to nest them within other mass groups. For example, if you are modeling a building with multiple wings, each wing can be a mass group containing multiple mass elements. You can then add these groups to a mass group of the entire building.

Right Pane of the Model Explorer

The right pane of the Model Explorer displays a graphical view of the mass elements or mass groups that you select in the left pane.

Model Explorer Menu Bar and Toolbar

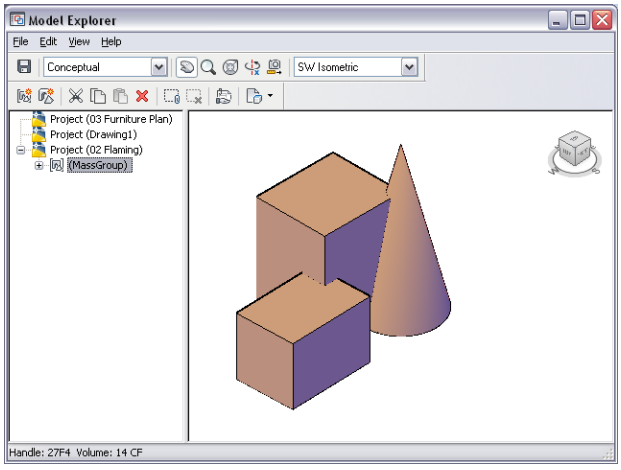
The top of the Model Explorer includes a menu bar and toolbar that allow you to access menu commands. If you position your pointing device over a toolbar icon, a tooltip displays an explanation of the icon. For more information, see Using Toolbar Commands in the Model Explorer on page 720.

If you turn off the Model Explorer toolbars using commands on the View menu, the tree view and viewer are blank the next time you display the Model Explorer. Click any pull-down menu heading to restore the proper display.

Displaying the Model Explorer

Use this procedure to open the Model Explorer. Any mass groups in the current drawing are displayed in the right pane. The tree view in the left pane lists the mass groups in open drawings.

Viewing a mass group in the Model Explorer



1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 You can move, resize, or close the Model Explorer:

If you want to…	Then…
move the Model Explorer	drag the Model Explorer title bar to the desired location.

If you want to…	Then…
resize the Model Explorer	click the edge of the Model Explorer and drag to the desired size.
close the Model Explorer	click the "X" in the upper right corner of the Model Explorer.

Defining the View in the Model Explorer

The Model Explorer lets you display mass groups in different view directions, display configurations, and visual styles. You can also define parallel or perspective views.

1 Select a visual style from the drop-down menu on the top left:

- **3D Hidden:** Displays the objects using 3D wireframe representation and hides lines representing back faces.
- **3D Wireframe:** Displays the objects using lines and curves to represent the boundaries.
- **Conceptual:** Shades the objects and smooths the edges between polygon faces. Shading uses a transition between cool and warm colors. The effect is less realistic, but it can make the details of the model easier to see.
- **Realistic:** Shades the objects and smooths the edges between polygon faces. Materials that you have attached to the objects are displayed.

Alternatively, right-click in the preview area, click Visual Style, and select the desired style.

2 Click the button to select a display configuration.

Display configurations are collections of object display representations, determining which objects are visible, and how the objects are displayed per view. For more information, see Display Configurations on page 525.

3 Select a view direction from the drop-down menu on the top right.

Alternatively, right-click in the preview area, click Preset Views, and select the desired view direction.

4 Select the projection type of the mass groups in the preview:

- To select a parallel projection, right-click in the preview area, and click Projection ➤ Parallel.
- To select a perspective projection, right-click in the preview area, and click Projection ➤ Perspective.

Navigating the View in the Model Explorer

In the Model Explorer, you have a number of options for navigating through the model view.

1 Use these basic navigation tools as needed:

- To move the view in the drawing area, click (Pan Realtime.) Alternatively, right-click in the preview area, and click Pan.

2 To zoom in and out of the drawing area, click (Zoom Realtime.)

Alternatively, right-click in the preview area, and click Zoom. For further Zoom options, right-click in the drawing area, click More, and select the desired Zoom option.

3 To orbit the model in 3D, click (Constrained 3D Orbit.)

Alternatively, right-click in the preview drawing area, and click Orbit.

4 To move closer to or farther away from the model, click (Adjust Distance.)

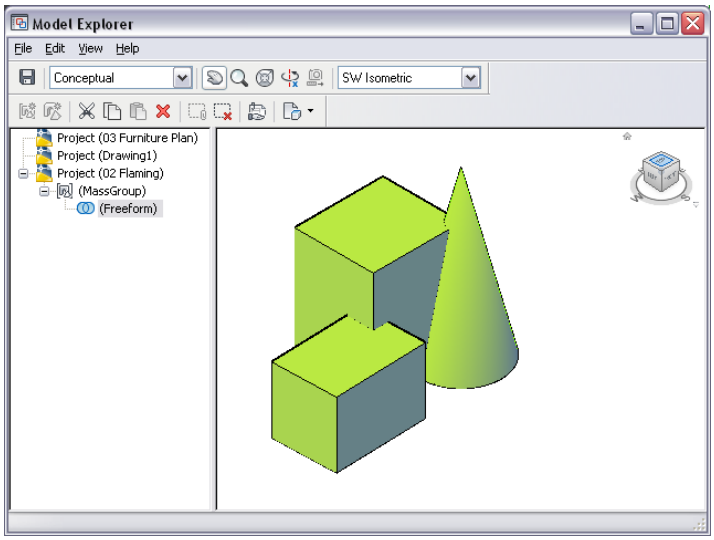
This command works only when you are in perspective projection.

Alternatively, right-click in the preview drawing area, and click More ➤ Adjust Distance.

Navigating the View with the ViewCube

The ViewCube is a 3D navigation tool that appears when the 3D graphics system is enabled and allows you to switch between standard and isometric views.

In Model Explorer the ViewCube is always visible. When you position the cursor over the ViewCube, it becomes active. You can switch to one of the available preset views, roll the current view, or change to the Home view of the model.

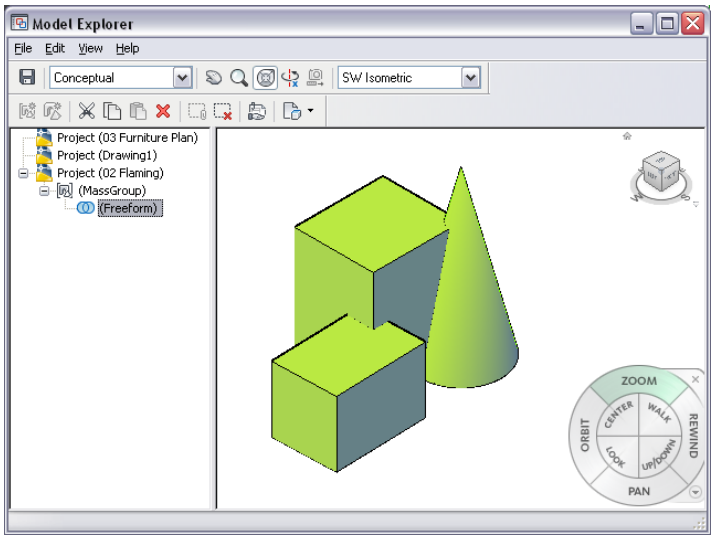


For detailed information about the ViewCube, see “ViewCube” in the AutoCAD Help.

Navigating the View with SteeringWheels

SteeringWheels are tracking menus that are divided into different sections known as wedges. Each wedge on a wheel represents a single navigation tool. You can pan, zoom, or manipulate the current view of a model in different ways.

SteeringWheels can save you time and clicks by combining many of the common navigation tools into a single interface. Wheels are specific to the context that a model is being viewed in.



1 Click the button.

Alternatively, you can right-click in the preview area, and click Steering Wheel.

2 To close the SteeringWheel, right-click, and click Close Wheel, or click the button again.

For detailed information, see “SteeringWheels” in the AutoCAD Help.

Viewing Objects on a Nonvisible Layer

Use this procedure to change the settings in the Model Explorer to view all objects, regardless of the visibility of the layer on which they reside. Any object on a layer that is frozen or turned off is not displayed initially.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 On the Model Explorer View menu, click Show All Layers.

The check mark on the menu next to Show All Layers indicates that all objects are displayed in the Model Explorer.

Maintaining Zoom Percentage and Position of an Object

Use this procedure to select an object in the Model Explorer tree view. The zoom percentage and location of the object are maintained. This is useful when you want to examine how the object relates to the rest of the drawing.

In the Model Explorer, you can specify to display the selected object only, and display it at maximum size.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 On the Model Explorer View menu, click Auto Zoom Extents.

4 Select the object to view from the tree view.

The Model Explorer graphics window displays only the selected object, zoomed to fit the window.

Using Toolbar Commands in the Model Explorer

The following toolbar commands allow you to work with mass elements and mass groups in the Model Explorer:

Icon	
	New Grouping: Creates a new mass group in the drawing.
	New Element: Creates a new mass element in the drawing.
	Cut: Cuts the selected item in the tree view to the Clipboard.
	Copy: Copies the selected item from the tree view to the Clipboard.
	Paste: Pastes the item on the Clipboard into the tree view at the selected location.
	Delete Item: Deletes an item from the tree view and from the drawing.
	Attach Items: Attaches existing mass elements or objects to the selected mass group. Select one or more elements or objects in the drawing. This option is available only when a mass group is selected in the tree view.
	Detach Items: Detaches the selected mass elements or objects from the mass group. This option is available only when a mass group is selected in the tree view.
	Properties: Opens the properties dialog box for the selected mass element, object, or mass group.
	Display Configuration: Changes the display configuration of the objects in the Model Explorer. You select a display configuration from the list.

Creating a Mass Element with the Model Explorer

Use this procedure to create a mass element in the Model Explorer. For detailed information about specifying the shape and dimensions of a mass element, see Creating a Mass Element on page 659.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select the level at which to create the mass element.

If you select the drawing name, the new mass element is created at the next hierarchical level. If you select a mass group name with a drawing, the new mass element is attached to the selected mass group.

4 On the Model Explorer File menu, click Create Element, or click .

5 On the command line, specify a shape.

6 Specify the insertion point for the mass element.

Depending on the shape you specified, you need to specify a second corner, the radius, or the height.

7 Specify the rotation angle.

8 Press *ENTER*.

Creating a Mass Group

Use this procedure to create a mass group in the Model Explorer.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select the level at which you want to create the mass group.

If you select the drawing name, the new mass group is created at the next hierarchical level. If you select a mass group name with a drawing, the new mass group is nested within the existing mass group.

4 On the Model Explorer File menu, click Create Group, or click .

5 Specify a location for the mass marker.

The location does not represent the location of mass elements added to the marker. Therefore, you can locate the mass marker in any convenient area.

6 Specify the rotation angle.

The new mass group is added to the project tree in the Model Explorer.

Attaching a Mass Element to a Mass Group

Use this procedure to attach existing mass elements to the group after a mass group is created.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select a mass group, right-click, and click Attach Elements.

4 Select the mass elements to add to the group, and press *ENTER*.

Attaching Objects to a Mass Group

Use this procedure to attach objects such as doors, walls, and curtain walls to the group after a mass group is created.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

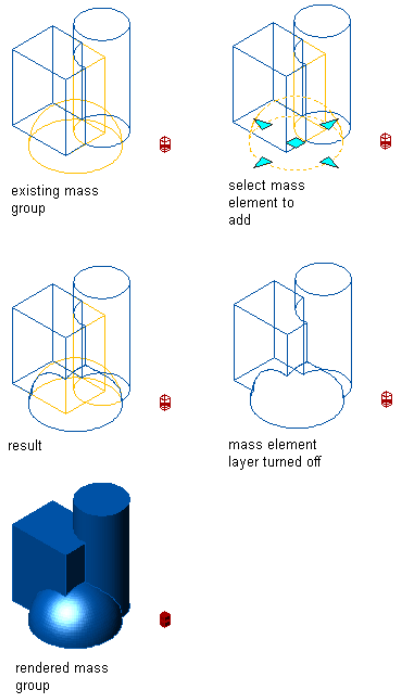
3 In the left pane, select a mass group, right-click, and click Attach Elements.

4 Select the objects to add to the group, and press *ENTER*.

Changing a Mass Element Operation to Additive

Use this procedure to change a mass element operation to additive. Mass elements are additive when you create them. After a mass element is added to a mass group, its operation can be changed to produce different results.

Adding a mass element to a mass group



1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select a mass element, right-click, and click Operation ➤ Additive.

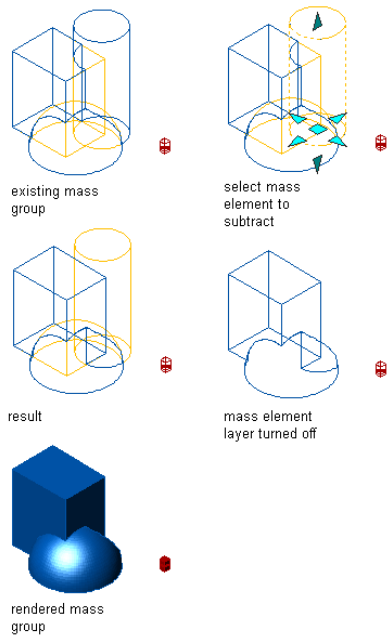
4 In the left pane, click Project to update the display.

The display changes to indicate the new operation property of the mass element.

Changing a Mass Element Operation to Subtractive

Use this procedure to change a mass element operation to subtractive. Mass elements are additive when you create them. After a mass element is added to a mass group, its operation can be changed to produce different results. If the mass element is subtractive, its shape is removed from the mass group.

Subtracting a mass element from a mass group



1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select a mass element, right-click, and select Operation ➤ Subtractive.

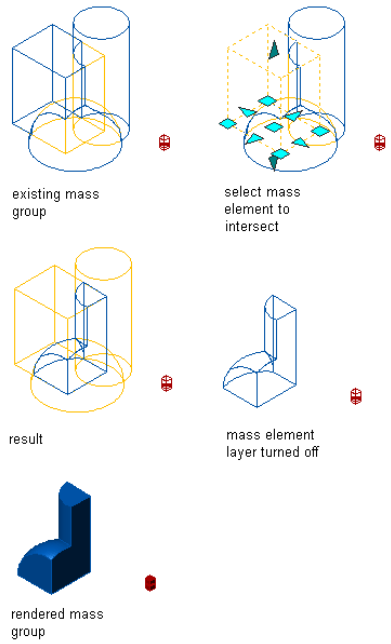
4 In the left pane, click Project to update the display.

The display changes to indicate the new subtractive operation of the mass element.

Changing a Mass Element Operation to Intersection

Use this procedure to change a mass element operation to intersection. Mass elements are additive when you create them. After a mass element is added to a mass group, its operation can be changed to produce different results. The intersect operation creates a shape that is defined by the overlap where the mass element intersects with another mass element.

Creating an intersection mass group from mass elements



1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select a mass element, right-click, and select Operation ➤ Intersect.

4 In the left pane, click Project to update the display.

The display changes to indicate the new intersection operation of the mass element.

Specifying the Order of Mass Elements

Use this procedure to specify the order of mass elements. The operation (additive, subtractive, intersection) of each mass element in a mass group is based on the hierarchy of mass elements in the project tree. You can drag and drop mass elements within mass groups in the project tree. By default, mass elements are listed in the left pane of the Model Explorer in the order they are created in the Model Explorer or selected for the mass group.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 Select the mass element you want to move, and drag it to the target location in the project tree.

Moving a Mass Element or Group from One Mass Group to Another

Use this procedure to move a mass element or a mass group from one mass group to another in the Model Explorer project tree.

1 Select a mass group.

2 Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

3 In the left pane, select the mass element or mass group you want to move, and drag it to another mass group.

When you move a mass group within another mass group, it is known as a nested mass group.

Creating Slice Floorplates from a Conceptual Model

A slice can be thought of as a representation of a theoretical floor level. Slice floorplates provide a way to translate the 3D geometry of a mass group into something that can be used to generate the individual floors of a building. Slices can be converted to space boundaries or polylines, and then to walls.

Slices and Mass Models

Like mass groups, slices are chosen and manipulated by an associated marker, the slice marker. When you attach mass groups to the slice marker, the slice marker creates the perimeter geometry of the building, known as a floorplate. Anytime you change the mass groups attached to the slice marker, the floorplate is updated.

If you attach mass elements instead of mass groups to the slice, the operational aspects (additive, subtractive, and intersection) of the mass elements are not recognized by the slice. To have these aspects recorded by the slice, attach the mass group. For more information about additive, subtractive, and intersection operations, see Creating a Mass Group on page 721.

From Slice Floorplate to Walls

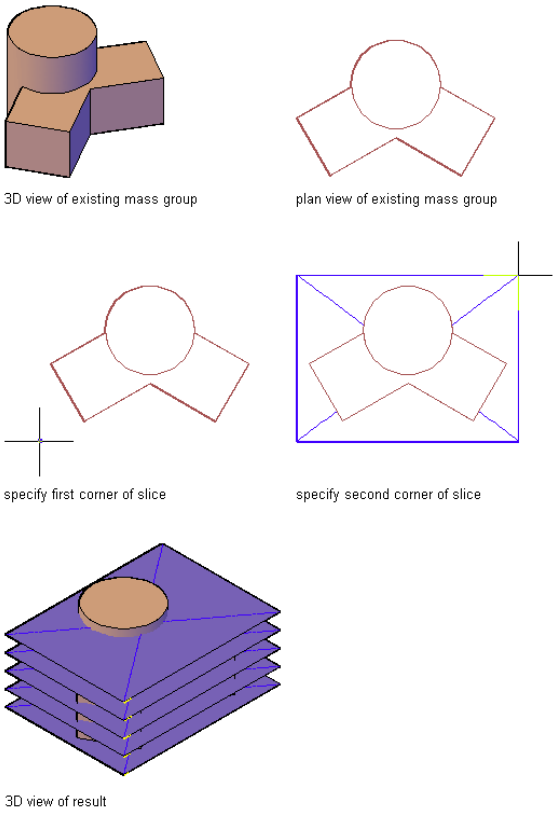
After you create floorplates, you can convert slices to space boundaries or polylines, and then generate walls. You cannot create walls directly from a slice. The slice is simply a way to mark each floor level of the mass group.

Generating a Slice

Use this procedure to generate a slice. The slice object is defined by a small crossed box. Like the mass group marker, the slice marker can be located in a convenient place in your drawing. For more information about the mass group marker, see Creating a Mass Group on page 721.

You can create multiple slices at regular height intervals. A slice marker is created for each slice.

Generating slice objects



1 Open the tool palette that you want to use, and select a slice tool.
If necessary, scroll to display the tool that you want to use.

2 Specify the number of slices you want to create.

3 Specify the lower-left and upper-right corners for the slice marker.

TIP Keep the slice marker small so as not to clutter your drawing.

4 Specify a rotation for the slice marker.

5 Enter the starting height of the slice.

6 Enter the distance between slices, and press *ENTER*.

7 Press *ENTER*.

Specifying the Slice Elevation

Use this procedure to change the elevation of a slice.

1 Select the slice marker.

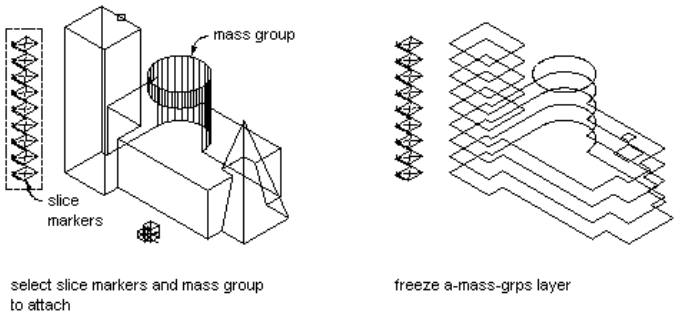
2 Click Slice tab ➤ Modify panel ➤ Set Elevation .

3 Enter a new slice elevation.
If multiple slices were created together, only the elevation of the selected slice changes. The distance between slices remains constant.

Attaching Objects to a Slice

Use this procedure to attach mass elements or mass groups to a slice to create the building floorplate. You can freeze the layer(s) containing the mass elements and mass groups to display only the slices.

Attaching a mass group to slice objects



1 Select the slice marker.

2 Click Slice tab ➤ Modify panel ➤ Attach Objects .

3 Select the mass elements or mass groups you want to include in the slice.

4 Press *ENTER*.

Detaching Objects from a Slice

Use this procedure to detach mass elements or mass groups from a slice to change a floorplate.

1 Select the slice marker.

2 Click Slice tab ➤ Modify panel ➤ Detach Objects .

3 Select the mass elements or mass groups you want to remove from the slice.

4 Press *ENTER*.

Converting a Slice to a Polyline

Use this procedure to convert a slice to a polyline after objects have been attached to a slice marker. You can then convert polylines to spaces, walls, or profiles.

- Select the slice marker.
- Click Slice tab ➤ Modify panel ➤ Convert To Polyline .
  The outlines of the objects attached to the slice marker are converted to polylines.

Changing the Location of a Slice

Use this procedure to relocate a slice by changing the coordinate values of its insertion point. The slice also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the slice are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the slice by aligning its normal with another axis. You can also rotate the slice on its plane by changing the rotation angle.

For more information about the WCS and the UCS, see “Use Coordinates and Coordinate Systems” in AutoCAD Help.

1 Double-click the slice you want to modify.

2 On the Properties palette, expand Basic, and expand Location.

3 Click Additional information.

4 Specify the location of the slice:

If you want to…	Then…
relocate the slice	enter new coordinate values under Insertion Point.
locate the slice on the *XY* plane	make the normal of the slice parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the slice on the *YZ* plane	make the normal of the slice parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the slice on the *XZ* plane	make the normal of the slice parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the slice	enter a new value for Rotation Angle.

5 Click OK.

Attaching Hyperlinks, Notes, or Files to a Slice

Use this procedure to attach hyperlinks, notes, or files to a slice. You can also edit hyperlinks and notes, and edit or detach reference files from a slice.

1 Double-click the slice to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 To add a note, click the setting for Notes, and enter the note.

5 Click OK.

6 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

7 Click OK.

Quick Slice

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The Quick Slice tool lets you “slice” through one or more objects in a drawing and extract a polyline outline that you can use to create profile shapes.

Quick Slice

The Quick Slice tool lets you “slice” through one or more three-dimensional (3D) objects in a drawing (including mass groups, AutoCAD® blocks, and external references) and extract a polyline outline that can be used to produce a profile shape, such as a roof truss. If you have a 3D model of stairs in your drawing, you can use the Quick Slice tool to create a polyline outline of the stair object in a section view, instead of using a section tool. For more information about section views, see Sections on page 2123.

Unlike the Horizontal Section, Vertical Section, and Slice tools, which produce multiple polyline segments, the Quick Slice tool produces a single polyline. When you slice through the selected object(s), any overlapping parts of the outline are combined in a boolean operation and converted into a polyline that is inserted on the current layer. The Quick Slice tool also differs from the Slice tool in that it does not create a slice marker. For more information about the Slice tool, see Generating a Slice on page 725.

Creating a Quick Slice

Use this procedure to extract a polyline outline of a “slice” through one or more 3D objects.

1 Click Home tab ➤ Section & Elevation panel ➤ ➤ Quick Slice .

NOTE The Quick Slice tool is also provided with the Helper Tools in the Stock Tool Catalog. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 Select the object(s) that you want to slice through, and press *ENTER*.

3 Specify a starting point for the slice plane.

4 Specify a second point to complete a slice plane through the object(s) and generate the polyline outline.

You can now select the polyline outline and view it using the Object Viewer.

Object Viewer

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The Object Viewer lets you preview objects in your drawing with different visual styles, view directions, and display configurations without changing the display of the drawing area.

Object Viewer

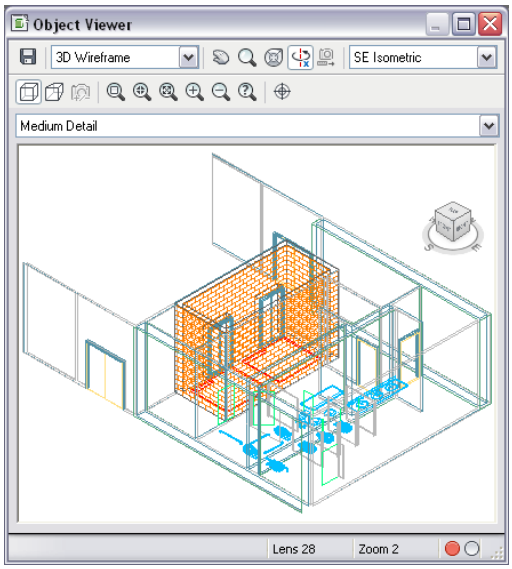
The Object Viewer lets you preview objects in your drawing with different visual styles, view directions, and display configurations without changing the display of the drawing area.

The Object Viewer can be started from different locations in the software. Depending on where the Object viewer is located the viewing and navigation options can vary. For example, if you use Object Viewer to preview an object from the drawing area, a compass is displayed. If you use the object viewer to preview a style in Style Manager, the compass is not displayed, since the style is not an object located in WCS or UCS.

Previewing Objects from the Drawing Area

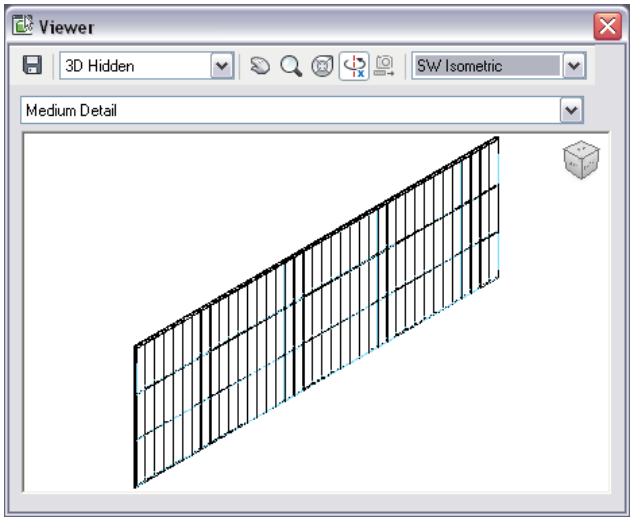
You can select one or more objects in the drawing area, and preview them in the Object Viewer.

1. Select the objects in the drawing area for which you want to see a preview.
2. Click <Object> tab ➤ General panel ➤ Object Viewer .



Previewing Object Styles in the Style Manager

You can preview the effects of a style that you are creating in the Object Viewer (Floating Viewer) provided with Style Manager.



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Select the style you want to preview.
3. Click the (Floating Viewer) button at the bottom left of Style Manager.

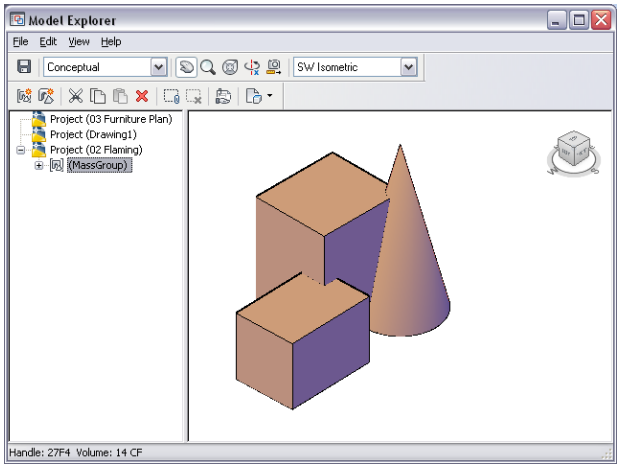
   Alternatively, you can click the button (Inline Edit Toggle) to display the Object Viewer embedded inside Style Manager.

Previewing Mass Models in Model Explorer

The Model Explorer is a window in which you create, view, and manipulate mass elements and mass groups. The Model Explorer uses the Object Viewer to let you preview the mass element and mass group operations you perform.

For more information about Model Explorer, see Using the Model Explorer to Create Mass Models on page 715.

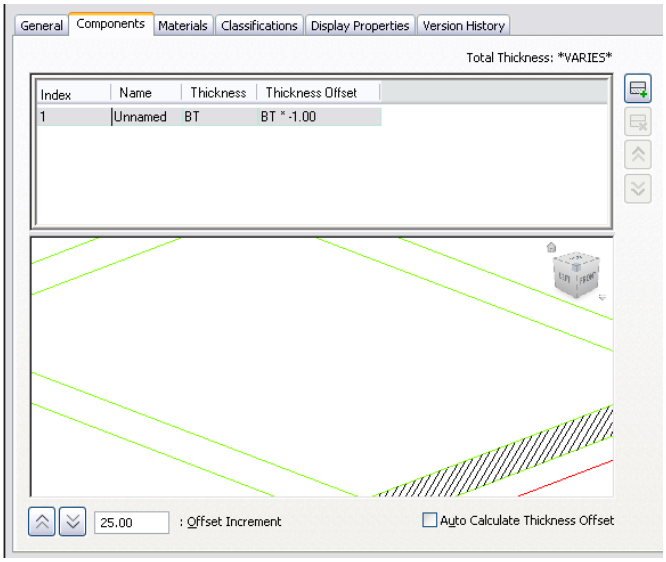
1. Select a mass group.
2. Click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .



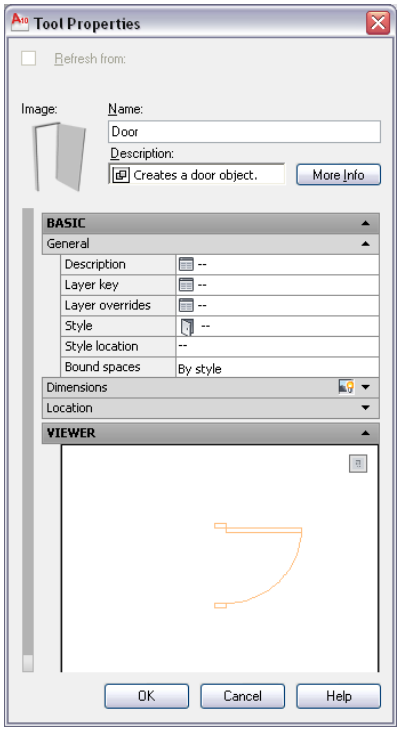
Embedded Object Viewers

A number of dialogs have embedded object viewers in order to let you preview components of a style, a definition, or a tool. See below for a couple of examples of embedded Object Viewers.

Embedded Object Viewer in Roof Slab style tab



Embedded Object Viewer in tool properties



Defining the View in the Object Viewer

The Object Viewer lets you display selected objects, styles, or tools in different view directions, display configurations, and visual styles. You can also define parallel or perspective views.

1 Open the Object Viewer from one of these locations:

- Select an object in the drawing area, and click <Object> tab ➤ General panel ➤ Object Viewer .
- Click Manage tab ➤ Style & Display panel ➤ Style Manager , and click the button. Alternatively, you can click the button (Inline Edit Toggle) to display the Object Viewer embedded inside Style Manager.
- Select a mass group, and click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

2 Select a visual style from the drop-down menu on the top left:

- **3D Hidden:** Displays the objects using 3D wireframe representation and hides lines representing back faces.
- **3D Wireframe:** Displays the objects using lines and curves to represent the boundaries.
- **Conceptual:** Shades the objects and smooths the edges between polygon faces. Shading uses a transition between cool and warm colors. The effect is less realistic, but it can make the details of the model easier to see.
- **Realistic:** Shades the objects and smooths the edges between polygon faces. Materials that you have attached to the objects are displayed.

Alternatively, right-click in the preview area, click Visual Style, and select the desired style.

3 Select a display configuration from the drop-down list below the Visual Styles drop-down list.

Display configurations are collections of object display representations, determining which objects are visible, and how the objects are displayed per view. For more information, see Display Configurations on page 525.

NOTE Display configurations are not available in some embedded Object Viewers.

4 Select a view direction from the drop-down menu on the top right.

Alternatively, right-click in the preview area, click Preset Views, and select the desired view direction.

5 Select the projection type of the objects in the preview:

- Click to display the objects in a parallel projection.
- Click to display the objects in a perspective projection. Perspective views require a distance between a theoretical camera and target point. in order to change the lens length of the camera, click and enter the desired value.

Alternatively, right-click in the preview area, click Projection, and select the desired view projection.

NOTE In embedded Object Viewers, only the context menu options of these commands are available.

Navigating the View in the Object Viewer

In the Object Viewer, you have a number of options for navigating through the model view.

1 Open the Object Viewer from one of these locations:

- Select an object in the drawing area, and click <Object> tab ➤ General panel ➤ Object Viewer .
- Click Manage tab ➤ Style & Display panel ➤ Style Manager , and click the button.

  Alternatively, you can click the button (Inline Edit Toggle) to display the Object Viewer embedded inside Style Manager.
- Select a mass group, and click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

2 Use these basic navigation tools as needed:

- To move the view in the drawing area, click (Pan Realtime.)
  Alternatively, right-click in the preview area, and click Pan.

3 To zoom in and out of the drawing area, click (Zoom Realtime.)

Alternatively, right-click in the preview area, and click Zoom. For further Zoom options, right-click in the drawing area, click More, and select the desired Zoom option.

4 To orbit the objects in 3D, click (Constrained 3D Orbit.)

Alternatively, right-click in the preview drawing area, and click Orbit.

5 To move closer to or farther away from the object, click (Adjust Distance.)

This command works only when you are in perspective projection.

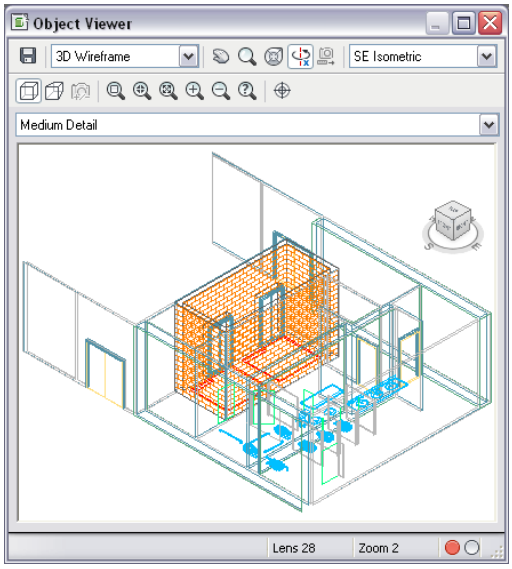
Alternatively, right-click in the preview drawing area, and click More ➤ Adjust Distance.

NOTE In embedded Object Viewers, only the context menu option is available for all commands.

Navigating the View with the ViewCube

The ViewCube is a 3D navigation tool that appears when the 3D graphics system is enabled and allows you to switch between standard and isometric views.

In Object Viewers, the ViewCube is always visible. When you position the cursor over the ViewCube, it becomes active. You can switch to one of the available preset views, roll the current view, or change to the Home view of the model.



NOTE When you access the ViewCube from Style Manager or from an embedded Object Viewer, no UCS option and no compass are available.

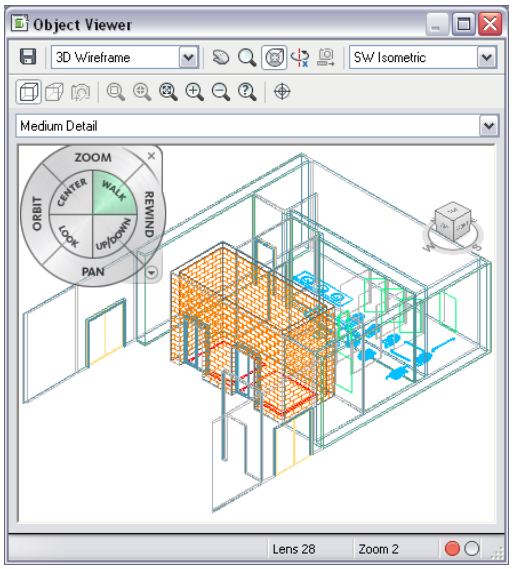
For detailed information about the ViewCube, see "ViewCube" in the AutoCAD Help.

Navigating the View with SteeringWheels

SteeringWheels are tracking menus that are divided into different sections known as wedges. Each wedge on a wheel represents a single navigation tool. You can pan, zoom, or manipulate the current view of a model in different ways.

SteeringWheels can save you time and clicks by combining many of the common navigation tools into a single interface. Wheels are specific to the context that a model is being viewed in.

NOTE SteeringWheels are not available in embedded Object Viewers.



1 Open the Object Viewer from one of these locations:

- Select an object in the drawing area, and click <Object> tab ➤ General panel ➤ Object Viewer .
- Click Manage tab ➤ Style & Display panel ➤ Style Manager , and click the button. Alternatively, you can click the button (Inline Edit Toggle) to display the Object Viewer embedded inside Style Manager.
- Select a mass group, and click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

2 Click the button.
Alternatively, you can right-click in the preview area, and click Steering Wheel.

3 To close the SteeringWheel, right-click, and click Close Wheel, or click the button again.
For detailed information, see “SteeringWheels” in the AutoCAD Help.

Setting the View Direction of the Object Viewer to the Drawing Area

You can set the view direction you have specified in the Object Viewer back to the drawing area.

NOTE This command is available only for the Object Viewer when it is started from an object in the drawing area.

1 Select an object in the drawing area, and click <Object> tab ➤ General panel ➤ Object Viewer .

2 Change the view direction as desired.

3 Click .
Alternatively, you can right-click in the preview area, and click Set View.

Saving a Preview Image from the Object Viewer

You can save the view in the Object Viewer to a graphic file. File formats supported are PNG, JPEG, BMP, and TIFF.

1 Open the Object Viewer from one of these locations:

- Select an object in the drawing area, and click <Object> tab ➤ General panel ➤ Object Viewer .
- Click Manage tab ➤ Style & Display panel ➤ Style Manager , and click the button.

  Alternatively, you can click the button (Inline Edit Toggle) to display the Object Viewer embedded inside Style Manager.
- Select a mass group, and click Mass Group tab ➤ Modify panel ➤ Show Model Explorer .

2 Click .

Alternatively, you can right-click in the preview area, and click Save Image.

NOTE In embedded Object Viewers, only the context menu option is available.

3 In the Save Image File dialog, enter a file name and select a file format. Then, click Save.

Napkin Sketch

17

Use Napkin Sketch to create freehand sketch geometry from objects in a drawing. You can create a napkin sketch to reflect ambiguity in a work-in-progress design or to present a more artistically pleasing version of a drawing. You can also generate a napkin sketch of a portion of a drawing and designate it as still in the design stage.

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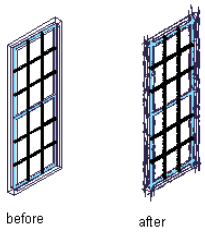
You can create a napkin sketch from an entire drawing or from a portion of a drawing. You can select both AutoCAD® and AEC objects to include in your napkin sketch.

How Objects Appear in a Napkin Sketch

When you generate a napkin sketch, random bumpy line segments are created along objects that you select to include in your sketch. The bumpy lines are short segments that emulate the freehand strokes of a traditional sketch. Lines where segments cross each other are extended in the napkin sketch.

Generating a napkin sketch



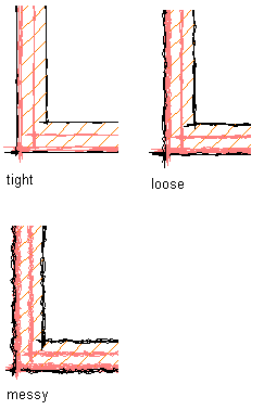
Line Formats for Napkin Sketches

When you generate the napkin sketch, you choose from three line formats that control the appearance of the sketch:

- **Tight line format:** Traces the selected geometry once to create the appearance of a more accurate sketch.
- **Loose line format:** Traces the selected geometry twice. (This is the default setting.)

- **Messy line format:** Traces the selected geometry three times.

Line format options



Each pass at tracing the geometry adds more artistic flare to the sketch.

Managing Napkin Sketches

When you create a napkin sketch, the geometry is packaged in a named block and placed on top of the original objects in model space. This means that you can move the original drawing and the sketch drawing independently of each other. You can also edit the napkin sketch as you do with other referenced blocks. Each sketch segment retains the layer and color of the geometry from which it is generated.

Depending on the line format you select for the napkin sketch, up to three complex polylines are generated for each selected object in your drawing. This can significantly increase the drawing size. To keep your drawing size as small as possible, cut and paste your napkin sketches into new drawings.

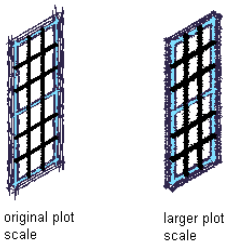
When you are working with three-dimensional (3D) drawings or complex models, first create a hidden line projection, two-dimensional (2D) section, or 2D elevation object. Unless your drawing is very simple, generating the napkin sketch from these 2D objects saves linework and time.

When you are working with external references, double-click on the napkin sketch and edit it like any other block. For more information about editing external references, see “Edit Referenced Drawings” in the AutoCAD Help.

Napkin Sketch and Intended Plot Scale

You can specify the intended plot scale to control the size of the sketch segments and extensions. Select a larger scale to increase the size of the sketch segments and extensions in the final sketch.

Specifying a plot scale



Creating a Napkin Sketch

Use this procedure to produce a napkin sketch in a plan, isometric, or elevation view. When you are working with three-dimensional (3D) drawings, unless your drawing is very simple, generate the napkin sketch from a two-dimensional (2D) hidden line projection, section, or elevation. For more information, see Creating a Hidden Line Projection on page 2215, Sections on page 2123, and Working With Elevations on page 2171.

1. Open a tool palette that contains a napkin sketch tool.

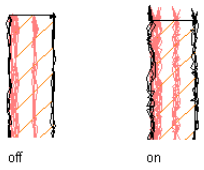
   A napkin sketch tool is located with the Helper Tools in the Stock Tool catalog. For more information, see Content Browser Overview on page 97.

2. Select a napkin sketch tool.
3. Select the objects to include in the napkin sketch, and press *ENTER*.
4. Enter a name for the block created of the napkin sketch.
5. Specify a line format for generating the napkin sketch geometry:

If you want to…	Then…
trace over objects once to create the appearance of a more accurate sketch	select Tight.
trace over objects twice to create a looser sketch	select Loose.
trace over objects three times to create a very loose sketch	select Messy.

6. Clear Extend Sketch Lines At Corners if you do not want the extended lines to appear on the napkin sketch.

   Extending sketch lines at corners



7. Under Intended Plot Scale, select the scale at which you intend to plot the sketch, or select Other and enter a custom scale.
8. Click OK.

   The napkin sketch geometry is generated and placed as a block reference over the drawing objects that you selected. Use the Move command to relocate the sketch block reference in the drawing, or cut and paste it into a new drawing.

Editing a Napkin Sketch

Use this procedure to edit the block reference generated when you create a napkin sketch. For more information about editing external references, see "Edit Selected Objects in Referenced Drawings and Blocks" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1. Select the napkin sketch that you want to edit, right-click, and click Edit Block in-place.

The Reference Edit dialog box opens. For more information, see "Reference Edit Dialog Box" in AutoCAD Help.

2 Select the reference to edit, if necessary.

3 Specify how nested objects in the napkin sketch are selected:

If you want to…	Then…
make changes to the sketch lines or any component of the object from which the sketch was drawn	select Automatically select all nested objects.
work with specific nested objects within a napkin sketch, such as a hatch pattern	select Prompt to select nested objects.

4 Specify lock settings for the napkin sketch:

If you want to…	Then…
allow changes to be made to objects other than those selected as your working set	select the Settings tab, and clear Lock objects not in working set.
prevent changes from being made to objects other than those selected as your working set	select the Settings tab, and select Lock objects not in working set.

For information about the Settings tab, see "Reference Edit Dialog Box" in AutoCAD Help.

5 Click OK.

The block reference that represents the napkin sketch is highlighted in your drawing.

6 Make changes to the block reference as you would to any drawing object.

7 Click Insert tab ➤ Edit Reference panel ➤ Save.

8 Click OK.

Designing with Architectural Objects

General Object Tools

18

The following topics describe commands that are common for most object types.

The General Panel

The General panel on each object's contextual tabs contains commands that are common for most object types.

Selecting Similar Objects

You can select all objects in a drawing that have the same object type, style, and layer as one or more preselected objects. If the objects selected are of different types, the selection is based on shared properties.

For example, you can select all walls in the drawing that use the CMU-Rigid style and are placed on the A-Walls layer.

NOTE Block references are selected based on their layer and block definition. Style-based objects are selected on their style.

1 Select the object on which to base the preselection criteria.

2 Click <Object> tab ➤ General panel ➤ Select Similar .

All objects that match the type, style, and layer of the object are added to the selection set. You can now make changes to the selection set, for example on the Properties palette.

The Object Viewer

The Object Viewer lets you preview objects in your drawing with different visual styles, view directions, and display configurations without changing the display of the drawing area.

1 Select the object you want to display in Object Viewer.

2 Click <Object> tab ➤ General panel ➤ Object Viewer .

For more information, see Object Viewer on page 731.

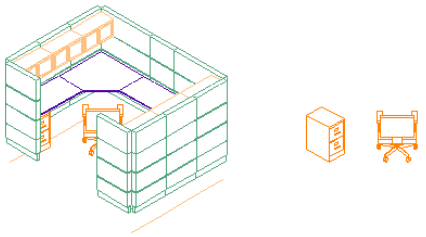
Isolating and Hiding Objects

You can create a temporary drawing view where only selected (isolated) objects appear. When you are finished, you can dismiss the view, or save the drawing in that view.

There are 2 basic ways of creating a view with only selected objects:

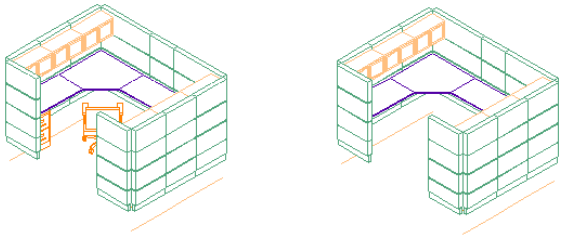
- Select the objects to display: you can select (isolate) objects and display only those

  Isolate chair and cabinet



- Hide objects: you can hide those objects that you do not want included in the current view

  Hiding chair and cabinet



Isolating Objects

You can select (isolate) objects and create a temporary view that includes only these objects.

1 Select the objects that you want to display, for example a wall.

2 Click <Object> tab ➤ General panel ➤ Isolate Objects drop-down ➤ Isolate Objects .

3 **TIP** You can also use the icon in the drawing window status to isolate objects. A red icon ( ) means that there are already objects isolated.

4 If you need to refine the selection set, select the desired objects, and click <Object> tab ➤ General panel ➤ Isolate Objects drop-down ➤ Isolate Objects again.

When you end the object isolation, as described in Ending the Object Isolation View in a Drawing on page 747, all objects are redisplayed.

Hiding Objects

You can temporarily hide objects in the drawing.

1 Select the objects that you want to hide.

2 Click <Object> tab ➤ General panel ➤ Isolate Objects drop-down ➤ Hide Objects .

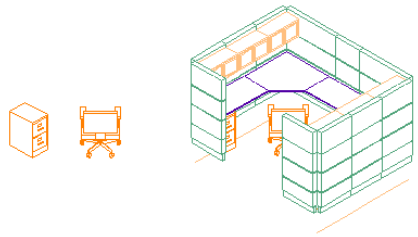
3 **TIP** You can also use the icon in the drawing window status to hide objects. A red icon ( ) means that there are already objects hidden.

4 If you need to refine the selection set, select the desired objects, and click <Object> tab ➤ General panel ➤ Isolate Objects drop-down ➤ Hide Objects again.

Ending the Object Isolation View in a Drawing

To redisplay all objects in the drawing, the object isolation view must be dismissed.

Restoring all objects in a drawing



1 Select any object in the current view.

2 Click <Object> tab ➤ General panel ➤ Isolate Objects drop-down ➤ End Isolation .

TIP You can also use the icon in the drawing window status to end the object isolation view.

Saving Isolated Objects

You can save a drawing in which object isolation is currently active. The next time you open the drawing, it displays with the isolation settings you defined.

For example, you could save a specific view setting to distribute the file to a contractor who needs to see only a specific part of the drawing. You could also save a specific view setting in a drawing that is used as an external reference within another drawing.

1 Isolate and hide objects as needed. (See Isolating Objects on page 746 and Hiding Objects on page 746).

2 Save the drawing with the current isolation setting.

NOTE If you want to distribute a drawing with isolated objects, make sure that you and the recipient of the drawing are working with the same version of AutoCAD Architecture. A recipient who is working with an earlier version of the software, plain AutoCAD, or Object Enabler is not able to display the hidden objects. In this case, end the object isolation before saving and distributing the drawing.

Isolating Objects in External References

When working in drawings with external references, note the following points:

- You can isolate an external reference within a host drawing as a whole by selecting it and isolating at as described in Isolating Objects on page 746.
- You can isolate individual objects within an external reference by opening the external reference, isolating and hiding objects as needed, saving the external reference drawing, and then reloading the external reference.
- You cannot isolate or hide objects in an external reference while editing it with REFEDIT in the host drawing. You need to use XOPEN and save the desired Hide/Isolate settings within the external reference.
- You cannot redisplay hidden objects in an external reference while editing it with REFEDIT in the host drawing. You need to use XOPEN and save the desired Hide/Isolate settings within the external reference.

Editing Objects in Temporary Views

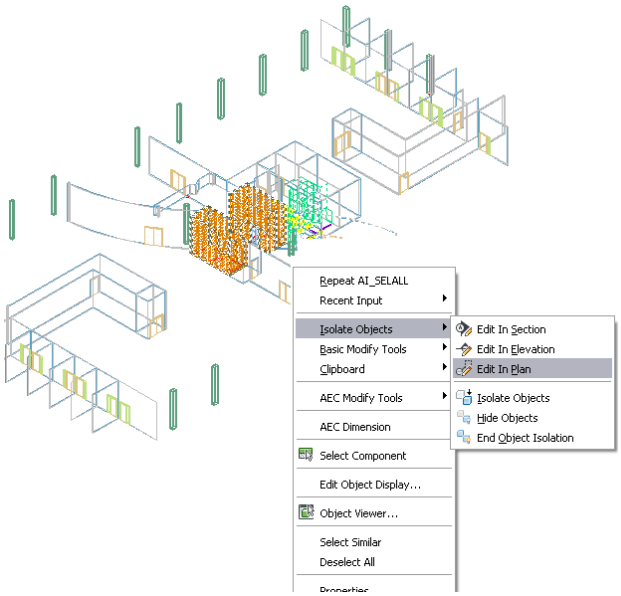
You can specify a selection of objects in a drawing and view and edit them in a temporary section, elevation, or plan view. The UCS will be aligned to the temporary view while you are editing it.

For example, if you are working in a design with an angled wall and want to add a body modifier in an elevation view, you can switch to a temporary elevation, add the detail, and exit the elevation. You are returned to your working view, and you must save any modifications at this point. You could also use to look at the endcaps of a wall opening in a temporary section view or add a section line through objects at an angle.

The following high-level steps are necessary to view and edit an object in a temporary view:

- Select objects
- Generate temporary section, elevation, or plan view
- (Optional) Edit objects in view
- Dismiss temporary view
- (Optional) Save changes to objects

Selecting objects for temporary view



Editing Objects in a Temporary Section View

You can select objects to view and edit in a temporary section view. The section view is not persisted after the edits are finished.

1 Select the objects you want to view in a section view.

2 Click <Object> tab ➤ General panel ➤ Edit In View drop-down ➤ Edit In Section .

3 Specify the first and second points for the section line or press *ENTER* to change the UCS.

4 Specify the extent of the section.

5 Modify the objects in the section view.

6 Click on the Edit in View toolbar to exit the temporary section.

7 Save the changes to your drawing.

Editing Objects in a Temporary Elevation View

You can select objects to view and edit in a temporary elevation view. The elevation view is not persisted after the edits are finished.

1 Select the objects you want to view in an elevation view.

2 Click <Object> tab ➤ General panel ➤ Edit In View drop-down ➤ Edit In Elevation .

3 Select linework, the face of an object, or a reference point for the view direction.

4 Specify the extents of the elevation.

5 Modify the objects in the elevation view.

6 Click on the Edit in View toolbar to exit the temporary elevation.

7 Save the changes to your drawing.

Editing Objects in a Temporary Plan View

You can select objects to view and edit in a temporary plan view. The plan view is not persisted after the edits are finished.

1 Select the objects you want to view in a temporary plan view.

2 Click <Object> tab ➤ General panel ➤ Edit In View drop-down ➤ Edit In Plan .

3 Select linework, the face of an object, or a reference point for the view direction.

4 Modify the objects in the plan view.

5 Click on the Edit in View toolbar to exit the temporary plan.

6 Save the changes to your drawing.

Adding Objects of the Same Type as the Selected Object

When you have an object in the drawing, you can select it and create new objects of the same type based on the selection. This saves you the time needed for navigating to the tools palette,and re-selecting the correct tool.

1 Select the object of which you want more instances.

2 Click <Object> tab ➤ General panel ➤ Add Selected .

3 Proceed to create new objects of the same type.

Editing Object Styles

When you have selected an object the contextual tab gives you access to editing the style of the object.

Editing the style of the selected object

1 Select the object.

2 Click <Object> tab ➤ General panel ➤ Edit Style.
The style properties of the selected object are displayed. You can edit them as necessary.

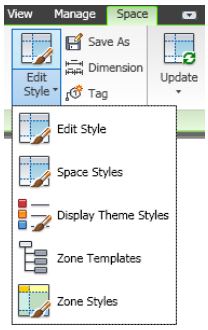
The ribbon also lets you access other styles of the same type.

Editing other styles of the same type

1 Select the object.

2 Click <Object> tab ➤ General panel ➤ Edit Style drop-down ➤ <Object> Styles.
This opens Style Manager with only styles for that object type displayed, for example, only wall styles or door styles. You can edit them as necessary.

Depending on the object you have selected, you may be able to access not only styles for that object, but also styles of objects that act as supporting objects. For example, when you have selected a space, you can access space styles, zone styles, zone templates, and display theme styles.



Accessing supporting style types from the ribbon

1. Select the object.
2. Click <Object> tab ➤ General panel ➤ Edit Style drop-down, and select the desired style type.

Copying and Assigning an Object Style

The General panel of the contextual tab of an object lets you create a copy of the currently used style and assign that to the object.

1. Select the object for which you want to create a new style.
2. Click <Object> tab ➤ General panel ➤ Save As .
   For more information, see Creating a Style from an Object on page 569.

Dimensioning an Object

From the contextual tab of an object, you can add an AEC dimension to the object.

1. Select the object you want to dimension.
2. Click <Object> tab ➤ General panel ➤ Dimension .

For more information, see AEC Dimensions on page 2217.

Tagging an Object

For some objects, you can add a tag from their contextual tab.

NOTE More tags are available under Annotate tab ➤ Scheduling panel, on the Tags tool palette, and in Content Browser.

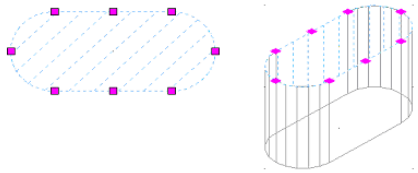
1. Select the object you want to tag.
2. Click <Object> tab ➤ General panel ➤ Tag .
   For more information about tagging objects, see Schedule Tags on page 2465.

Editing Object Components In Place

Edit in place is a special editing mode where polyline- or profile based object components can be edited directly on screen, while other editing capabilities in the drawing are limited. For example when you are in edit-in place mode, you can change a wall endcap, but you cannot save and close the drawing. Upon exiting the edit-in-place mode you can choose if the changes should be discarded, overwrite the existing component definition, or be saved as a new definition.

When you enter the edit-in-place mode, a temporary profile is drawn around the object or component being edited.

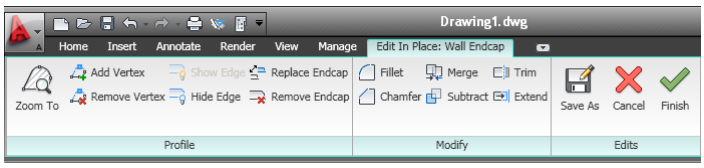
In-place edit profile of extruded mass element



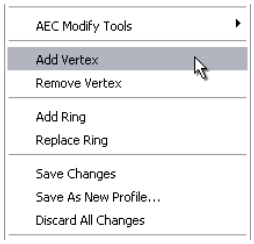
The edit-in-place mode is characterized by the following user interface changes:

- On the ribbon, the contextual Edit in Place tab for the selected component is displayed.

  Edit in Place tab for Wall Endcaps



- Right-clicking an editable object component displays a context menu that has commands for editing the component, and for exiting the edit in place mode.



- Editable object components are displayed with a different color and hatching. You can change the display of the components by changing the color, lineweight, and hatching. For more information, see Changing the Display of Object Components in Edit-in-Place Mode on page 756.
- A number of commands, like closing or saving the drawing are deactivated while the edit-in-place mode is active. In order to access them, you must exit the edit-in-place mode first.

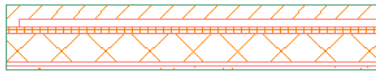
Sometimes, multiple edit-in-place entities are created in a single session. This is the case for walls that have multiple sweeps or modifiers, or for roof slabs and slabs that have both a fascia and a soffit profile. You can make changes to all of them during the session. When you exit the edit-in-place mode, all of the changes are either saved or discarded.

Editing Polyline-based Components in Place

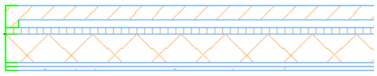
The following objects in AutoCAD Architecture can have custom components based on polylines:

- Walls: wall endcaps and opening endcaps
- Wall/curtain walls: roof and floor lines
- Walls: plan modifiers

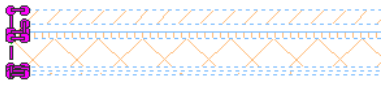
Polyline-based components of an object can be edited in place. During the edit-in-place session, the selected polyline is isolated for editing so that you can perform changes on its shape, such as grip-editing or adding and removing vertex points.



Wall with multiple endcaps



Edit in Place session active



Endcaps selected in In Place Edit

You can modify the polyline-based components of a wall either in two-dimensional (2D) plan views or in three-dimensional (3D) model views.

When you edit a component in a 3D view, the UCS is aligned to the component, so that you can easily add or remove vertices and grip-edit the component.

The commands for editing polyline-based objects vary, depending on the component type. For example, a wall endcap has commands for adding and removing vertices and hiding and replacing endcap components; a wall roof line or floor line has commands for adding gables and steps and projecting the roof and floor lines to a polyline. For instructions on how to assign and edit a polyline-based object component in place, see the following locations:

- Working with Wall Endcaps and Opening Endcaps on page 891
- Working with Wall Modifiers on page 831
- Editing the Roof Line or the Floor Line of a Wall on page 801
- Editing the Roof Line or the Floor Line of a Curtain Wall on page 1013

Editing Profile-based Object Components in Place

You can edit profile-based objects and object components in place. You can change the shape of the profile, add and remove rings and, for some profiles, move the insertion point.

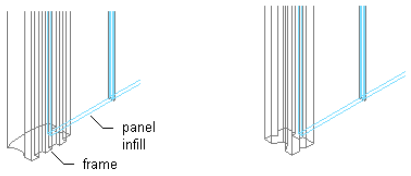
The following objects are either profile-based or can have profile-based components that can be edited in place:

- extruded mass elements

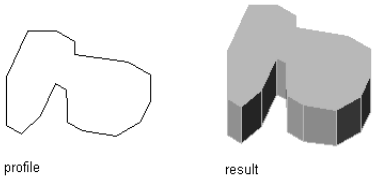
- revolution mass elements
- slab and roof slab edges (fascia and soffits)
- door frames
- window frames
- opening frames
- door/window muntins
- railing guardrails, handrails, bottom rails, and posts
- curtain wall/curtain wall unit frames and mullions
- door/window assembly frames and mullions
- wall sweeps

NOTE The edit-in-place feature for the objects in the list is available only if one or more components of the object are based on profiles.

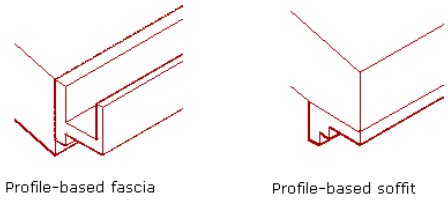
Example 1: profile based curtain wall frames



Example 2: mass element extruded from a profile



Example 3: profile-based roof slab fascia and soffit



For instructions for editing profiles in place, see Editing a Profile In Place on page 1859.

Editing in Place: Special Cases

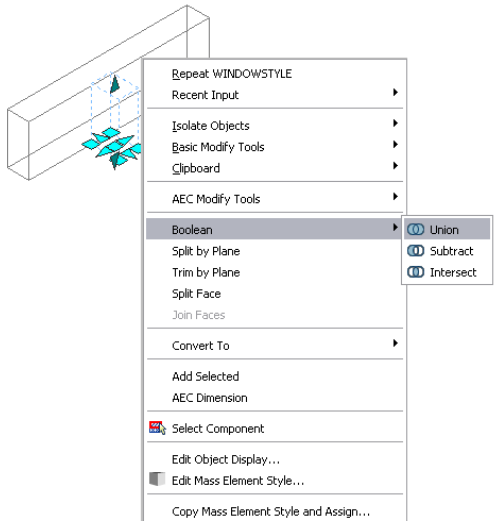
There are a number of special cases where you can use the edit-in-place mode.

3D Wall Body Modifiers

You can add a 3D modifier to a wall body, and then edit it in place. Body modifiers use the 3-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to, subtract from, or completely replace one component in a wall.

While you edit the body modifier in place, you can change the modifier shape with grips and use Boolean commands to add or remove other objects from the body modifier.

Editing a body modifier in place

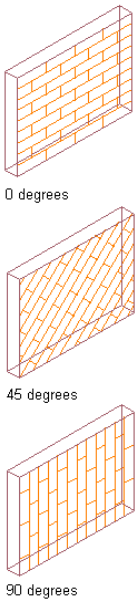


For instructions on adding and editing a body modifier, see Working with Body Modifiers on page 839.

Editing Material Hatches in Place

You can make changes to the surface hatch of an object with the edit-in-place mode, if the surface hatch is coming from a material. Unlike the other edit-in-place modes, you do not change the shape of an object but the display of the hatch on a specific object face.

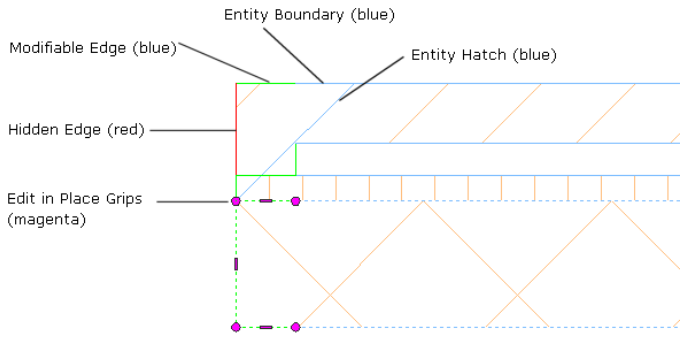
Changing the hatch rotation with in-place editing



For detailed instructions, see Overriding the Surface Hatch on Individual Objects on page 593.

Changing the Display of Object Components in Edit-in-Place Mode

When you enter the edit-in-place session, a temporary profile is created that allows you to edit a polyline or profile-based component of an object. That profile has different sub-components of which you can change the display.



Changing the edge and boundary properties

1. Enter an edit-in-place session, as described in Editing a Profile In Place on page 1859, Working with Body Modifiers on page 839 and Overriding the Surface Hatch on Individual Objects on page 593.
2. Select the temporary profile, right-click, and click Edit Object Display.
3. Depending on whether the display changes should be valid for all edit-in-place profiles in the drawing, or only the selected profile, choose one of these options:
   - To make display changes globally in the drawing for all profiles, verify that Drawing Default is selected for Display Property source, and that the Object override checkbox is not selected.
   - To make changes only to the currently selected profile, select the Object Override checkbox.
4. Click .
5. On the Layer/Color/Linetype tab, change the properties of the following components:
   - Entity: this component controls the display of the object on which you edit a component in place. For example, if you edit a wall endcap in place, this display component controls the wall boundary.
   - Hatch: this display component controls the layer/color/linetype properties of the hatch of the temporary profile. This is independent on any hatches assigned to the object itself, and will be displayed only in edit-in-place mode. By default this component is turned off.
   - Modifiable edge: this display component controls the display of the active edges of the profile that can be modified.
   - Hidden Edge: controls the display of object edges that are hidden from view. When you hide an edge, and exit the edit-in-place mode, it will not be displayed. When you are in the edit-in-place mode it is displayed as a red line.

Changing the color of edit in place grips

1. Click ➤ Options.

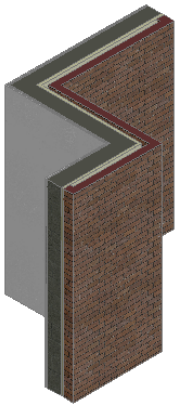
2 Click the AEC Editor tab.

3 Under Unselected Grip Colors, change the color for Style to the desired color.

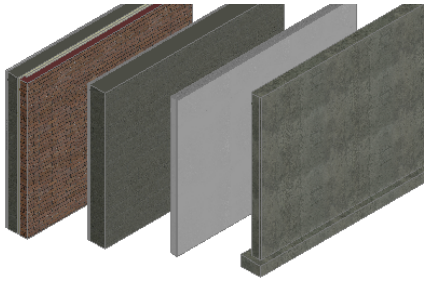
Walls

19

A wall is an AEC object that represents the real-world features of an interior or exterior wall. The wall object contains all the geometry needed to represent a wall in 2-dimensional (2D) and 3-dimensional (3D) views.



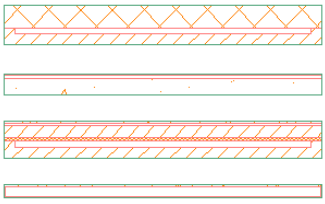
Walls are the basic components of any building plan. You can create very simple wall types that rely on standard settings, and add them on the fly. You can also create complex walls with different components, materials, and 2D and 3D endcaps assigned, have detailed cleanup information, and contain interferences with other objects like mass elements.



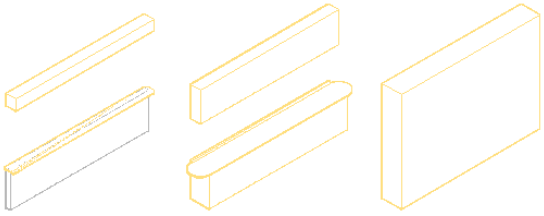
A wall has one or more components, which are the materials used to construct the wall. Some components include brick, CMU, concrete, studs, air gaps, and insulation. The components of walls can also have modifiers, which change the shape of the component or its surface.

Wall styles control the appearance of wall objects. Using wall styles, you can specify components, endcaps, materials, and other characteristics to create new types of walls, such as concrete walls, masonry walls, and brick cavity walls. Catalogs

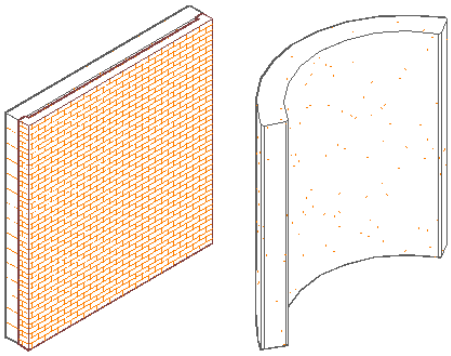
provided with AutoCAD Architecture include sample wall styles for common wall types, such as concrete walls with footings or furring, CMU and brick cavity walls, and various stud partition walls.



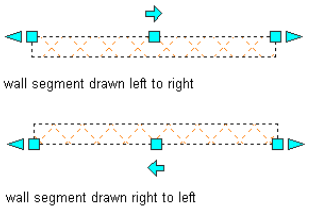
You can also work with casework wall styles that include counters, base units, and upper units.



When you add a wall to a drawing, you select a wall tool and then specify the points that define each wall segment. A wall can have both straight and curved segments.

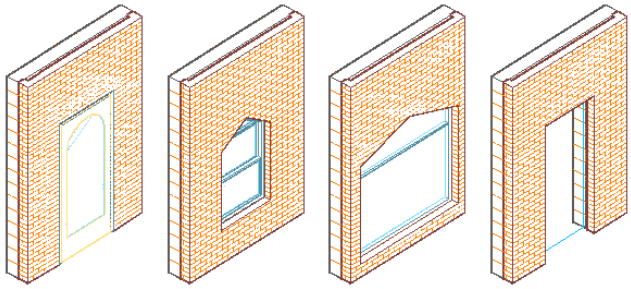


Wall direction is significant for some modifications to walls. Sample wall styles provided with AutoCAD Architecture were created with the intent that you place perimeter walls in clockwise fashion. After placing a wall, you can determine the wall direction by selecting the wall. The wall direction grip indicates the wall direction. You can also reverse the direction of a wall.

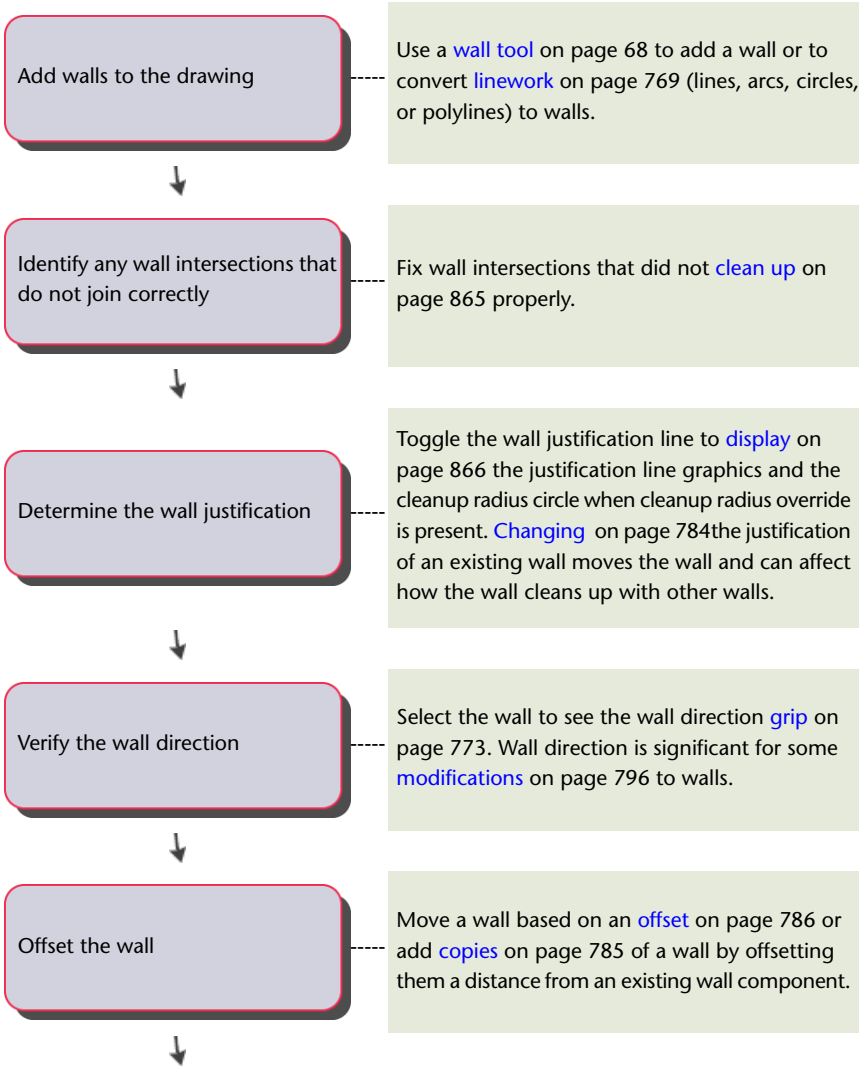


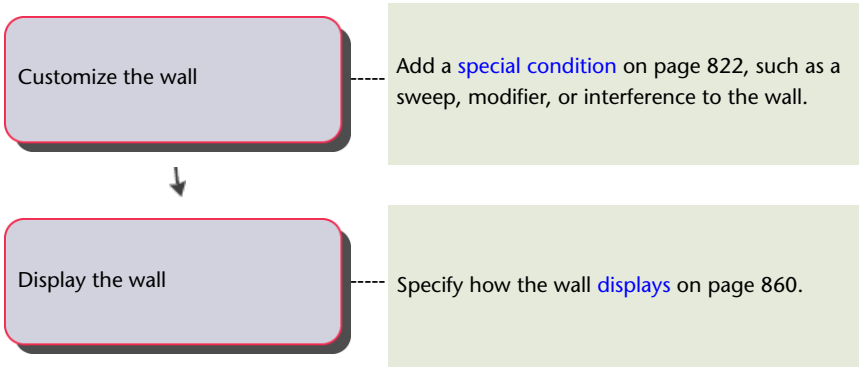
When you add doors, windows, door/window assemblies, and openings to a wall, the wall automatically adjusts to accommodate the object and adds endcaps where needed. By default, these objects are anchored to the wall and remain

with the wall if you move it. If you remove an object from a wall, the wall repairs itself in the space where the object was located.



Workflow for Adding Walls





Drawing Walls

Draw straight or arc wall segments, change the orientation or justification of a wall segment while you are drawing it, or reposition a wall segment based on an offset from a wall component.

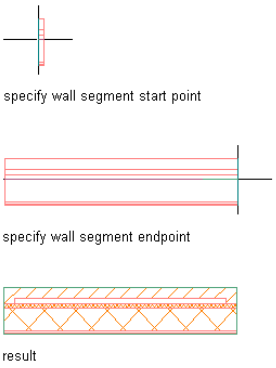
To Draw a Straight Wall Segment

1 Select a wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

2 Specify the wall segment start point.

3 Specify the wall segment endpoint.



To Draw an Arc Wall Segment

1 Select a wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

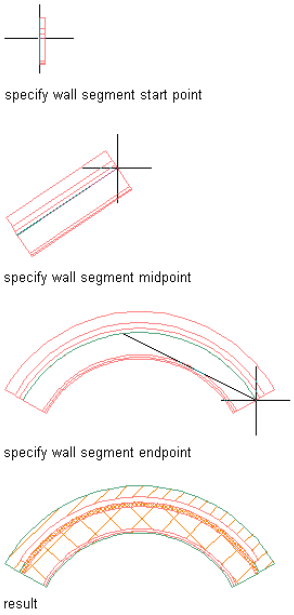
2 Specify the wall segment start point.

3 On the command line, enter **A** for Arc.

4 Specify the wall segment midpoint.

NOTE If you have Dynamic Input activated on the application window status bar (DYN), you can use dynamic dimensions to specify the wall length and angle. After clicking the start point of the wall, dynamic input fields for wall length and wall angle appear around the wall preview. Enter values as desired, and use the TAB key to switch between input fields.

5 Specify the wall segment endpoint.



To Change the Wall Orientation

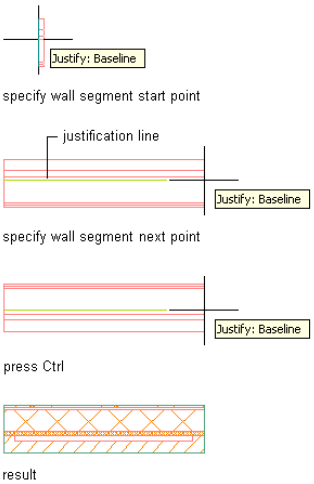
1 Select a wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

2 Specify the wall segment start point.

3 Press *CTRL* to flip the wall segment orientation.

4 Specify the wall segment endpoint.



To Change the Wall Justification

You can either enter **J** on the command line to initiate switching the justification, or you can press *CTRL* to cycle between the justification options.

1 Select a wall tool.

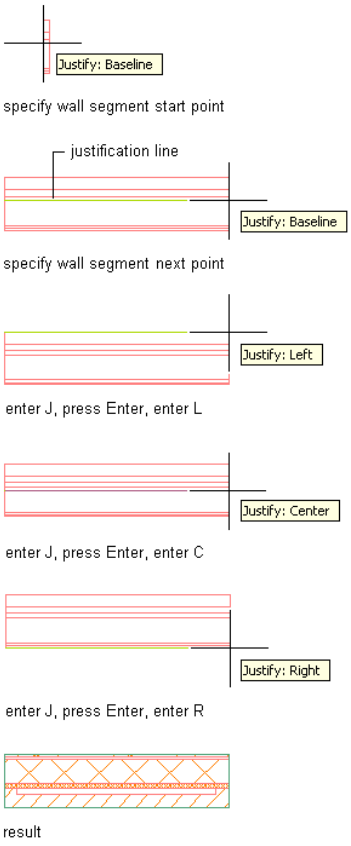
NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

2 Specify the wall segment start point.

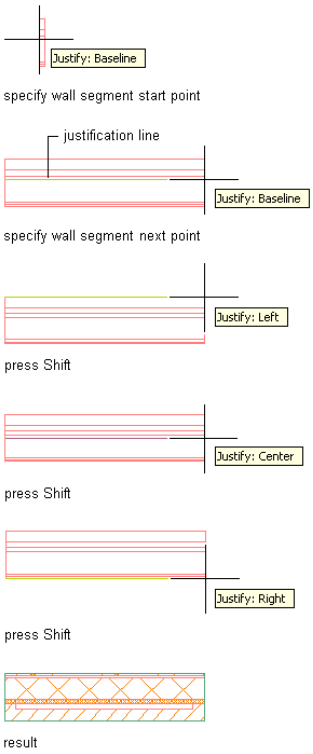
3 On the command line, enter **J** for Justification, then do the following:

If you want to switch the justification to...	Then, on the command line...
Left	...enter **J**, then enter **L**.
Center	...enter **J**, then enter **C**
Right	...enter **J**, then enter **R**
Baseline	...enter **J**, then enter **B**

4 Specify the wall segment endpoint.



You can also press *SHIFT* to cycle between the justification options.



To Reposition a Wall Segment

Reposition a wall segment while you are drawing it by specifying an offset based on a wall component's face or center, or the overall center of the wall. When you specify the offset option and move your cursor over the wall segment, assistant lines with a tooltip display to indicate which part of the particular wall component is selected. A solid line indicates a component face, a dashed line indicates a component center, and a center line indicates the overall center of the wall.

Reposition a wall segment as you are drawing it to align a particular wall component with a specific point or guideline. For example, you may wish to align the outside face of a wall's brick veneer with a column grid line or align the inside face of a wall's structural CMU with a column.

You can also pick any point inside or outside of the wall to specify as an offset point for repositioning the wall. You can enter a value in the dynamic dimension box, or on the Properties palette, under Dimensions, enter a value for Offset, and the wall will move the offset distance entered in the direction from your cursor location to the current justification line.

1 Select a wall tool.

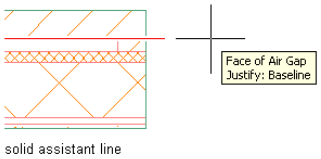
NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

2 Specify the wall segment start point.

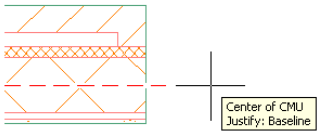
NOTE You may need to switch the wall segment orientation or justification at this point to properly position it before specifying an offset distance.

3 On the command line, enter **O** for Offset, or right-click and click Offset.

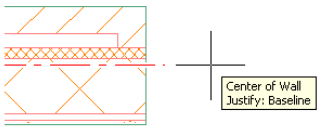
As you move your cursor, assistant lines are displayed with tooltips.



solid assistant line



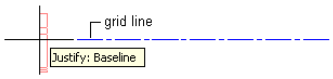
dashed assistant line



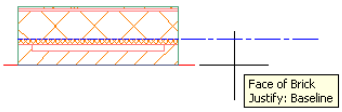
center assistant line

4 Click to select the wall component to offset from or specify a point outside the wall segment. The justification line shifts to accommodate the specified offset distance.

5 Specify the wall segment endpoint.

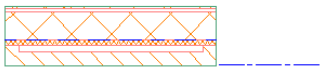


specify wall segment start point



specify wall component to offset from

specify wall segment endpoint



result

To Specify Wall Properties

Use wall properties to specify whether the walls you draw will be bounding objects for associative spaces, the cleanup parameters, and dimensions.

1 Select a wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

2 Specify the wall segment start point.

3 On the Properties palette, expand Basic, and expand General.

4 Select a wall style.

5 Under Bound Spaces, define if this wall can be used as a bounding object for associative spaces.

You can select 3 options here:

- Yes: this wall can be used as bounding object for associative spaces.
- No: this wall cannot be used as bounding object for associative spaces.
- By style: this wall will use the bounding settings from the wall style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

6 Select Yes for Cleanup Automatically if you want the wall to clean up with other walls, and select a cleanup group.

7 Expand Dimensions.

8 Specify wall dimensions:

If you want to …	Then …
specify the thickness of the wall	enter a value for Width. If Width is not available, the wall style you selected determines the width of the wall.
specify the height of the wall from the floor to the ceiling	enter a value for Base height.
specify the length of the wall from the start and end-points	enter a value for Length.

9 Specify the wall justification, which places the wall in relation to the points you specify and the direction in which you draw the wall:

If you want to …	Then …
specify points that define the left side of the wall	select Left for Justify.
specify points that define the right side of the wall	select Right for Justify.
specify points that define the center line of the wall	select Center for Justify.
select points that define the baseline of the wall	select Baseline for Justify.

10 Specify offsets:

If you want to …	Then …
offset the location of the wall from the points you specify	enter a value for Baseline offset.
offset the roof line from the specified base height	enter a value for Roof line offset from base height.
offset the floor line from the baseline	enter a value for Floor line offset from baseline.

11 Continue adding wall segments.

You can enter **u** (Undo) to undo any point except the start point.

12 Specify the endpoint of the wall:

If you want to …	Then …
close the wall by drawing 2 wall segments that meet the start point at a right angle	enter **or** (Ortho Close), and then specify a point in the direction you want the wall to close. The wall segment is extended until it meets a wall segment perpendicular to the first wall segment.
close the wall by adding a wall segment from the previous point to the start point of the wall	enter **c** (Close).
complete the wall segment at a point that you specify	specify the endpoint of the wall, and press *ENTER*.

For more information about Ortho Close and Close, see Using Ortho Close and Close with Walls on page 915.

To Draw a Wall Segment From a Wall Justification Line

Use this procedure to draw a new wall segment using any of the Object Snap modes on an existing wall segment justification line. Start by specifying which Osnaps you want to be active. For example, you may want to start a new wall segment from the midpoint of an existing wall segment.

Once you start to add the new wall segment, the justification line is automatically displayed on the existing wall segment, whether or not its display was turned on. If you move your cursor off of the existing wall segment, the justification line will disappear. Selecting a point near the middle of the wall segment will display the Midpoint Osnap on the justification line. Click to specify this point as the new wall segment start point, and then specify the wall segment endpoint.

1 On the command line, enter **dsettings**, and then click the Object Snap tab.

2 Under General, select the object snap modes that you want to be active.

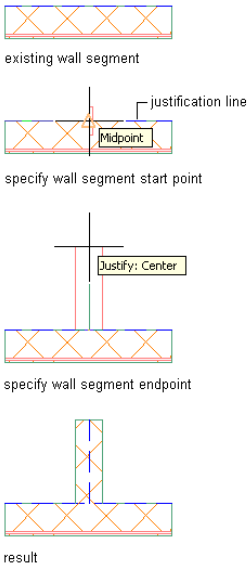
3 Under AutoCAD Architecture, select Allow general object snap settings to act upon wall justification line.

4 Select a wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Wall .

5 On the existing wall segment, click the object snap on the justification line from which you want to start the new wall segment.

6 Specify the new wall segment endpoint.



Creating Walls from Linework and 3D Objects

Use this procedure to convert any of the following objects to walls:

- Lines
- Arcs
- Circles
- Polylines

For example, you can create line diagrams or sketches of walls using lines, arcs, circles, and polylines to create the building exterior and rooms, and convert these objects to walls. You can edit the wall properties after creating the wall.

You can also convert 3D objects, such as mass elements into walls.

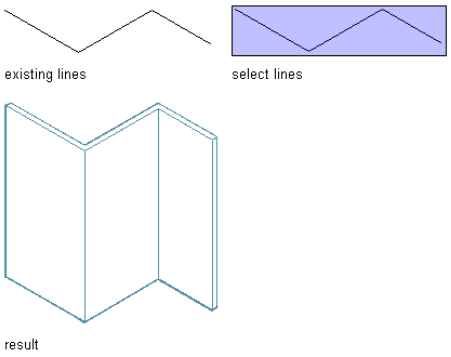
To Convert a Line into a Wall

1 Right-click a wall tool, and click Apply Tool Properties to ➤ Linework.

2 Select the line to convert, and press *ENTER*.

3 When prompted to erase the original geometry, press *ENTER* to retain the linework, or enter **y** (Yes) to erase it.

4 Edit the properties of the new walls in the Properties palette, if necessary.



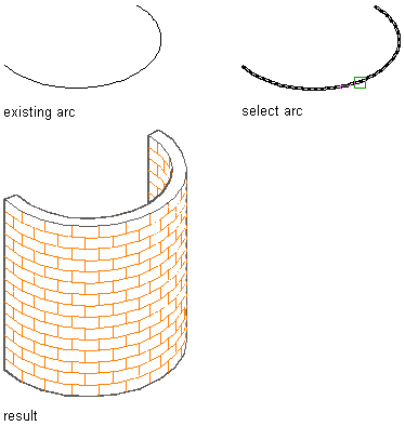
To Convert an Arc into a Wall

1 Right-click a wall tool, and click Apply Tool Properties to ➤ Linework.

2 Select the arc to convert, and press *ENTER*.

3 When prompted to erase the original geometry, press *ENTER* to retain the linework, or enter **y** (Yes) to erase it.

4 Edit the properties of the new walls in the Properties palette, if necessary.



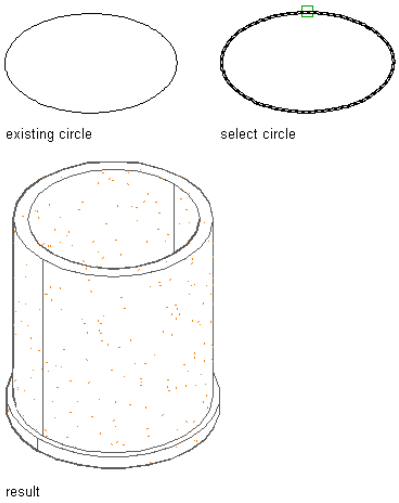
To Convert a Circle into a Wall

1 Right-click a wall tool, and click Apply Tool Properties to ➤ Linework.

2 Select the circle to convert, and press *ENTER*.

3 When prompted to erase the original geometry, press *ENTER* to retain the linework, or enter **y** (Yes) to erase it.

4 Edit the properties of the new walls in the Properties palette, if necessary.



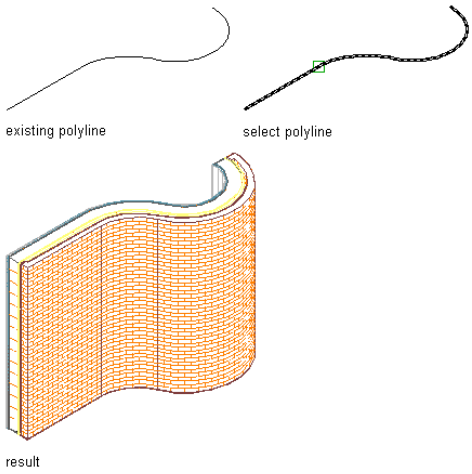
To Convert a Polyline into a Wall

1 Right-click a wall tool, and click Apply Tool Properties to ➤ Linework.

2 Select the polyline to convert, and press *ENTER*.

3 When prompted to erase the original geometry, press *ENTER* to retain the linework, or enter **y** (Yes) to erase it.

4 Edit the properties of the new walls in the Properties palette, if necessary.



To Convert a 3D Object into a Wall

Convert a 3D object, such as a mass element or an AutoCAD ACIS solid, into a single-component wall.

1 Select the object you want to convert to a wall.

2 Click Mass Element tab ➤ Convert To panel ➤ Wall .

3 Enter **y** (Yes) to erase the original object, or enter **n** (No) to retain the object.

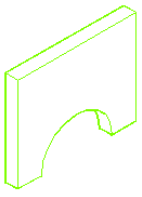
4 Specify the baseline of the wall:

If you want to …	Then …
specify the baseline of the wall by specifying the start point and the endpoint of the wall	specify the start point, and then specify the endpoint when prompted.
specify the baseline of the wall from an existing line or arc in the drawing	enter **p** (Pick), and select the line or the arc you want to define for the baseline.

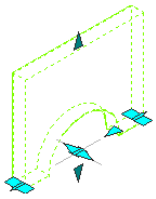
NOTE Specifying a baseline away from the object you are converting to a wall affects the insertion of anchored objects, such as doors, windows, and openings. Anchored objects are inserted in a wall relative to the baseline of the wall.

5 Select a wall style.

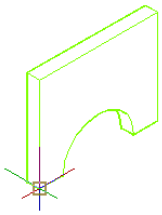
The wall style you select must be a single-component style.



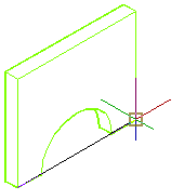
existing mass element



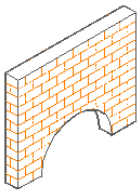
select mass element



specify baseline start point



specify baseline endpoint



result

Editing Walls

After placing walls, you can change its style, location, size, shape, basic geometry, and override the component priorities and the endcap styles of the wall. You can also move a wall, merge or join walls, reverse the direction of a wall and change the shape of the roof line and the floor line of a wall. In addition, you can modify walls using other objects as interference conditions or body modifiers.

Depending on the type of editing you want to perform, various methods may be available:

- After selecting a wall, you can click any non-grip point along the perimeter and drag the entire object to a new location. You can also move the object by clicking a grip, pressing the Space bar, and then moving the object to the new location and clicking again.

- You can drag the grips that are displayed on a selected wall to reorient it, resize it, or change other physical characteristics.
- For grip edits where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. (This feature is activated by default; you can toggle it on and off by clicking DYN on the application status bar. For more information, see Dynamic Dimensions on page 90.)
- You can apply the properties of a wall tool to an existing wall or the properties of a curtain wall tool, slab tool, or roof slab tool to an existing wall.
- You can change settings on the Properties palette.
- You can use editing commands from the object's context menu.

Using Grips to Edit Walls

Various types of editing grips are displayed for a selected wall object. You can drag these grips as needed to reposition or resize the object, or you can enter precise distance or angle values using the Dynamic Input feature. When you select a grip that has multiple functions, you can cycle among them by pressing *CTRL*. For more information, see Dynamic Dimensions on page 90.

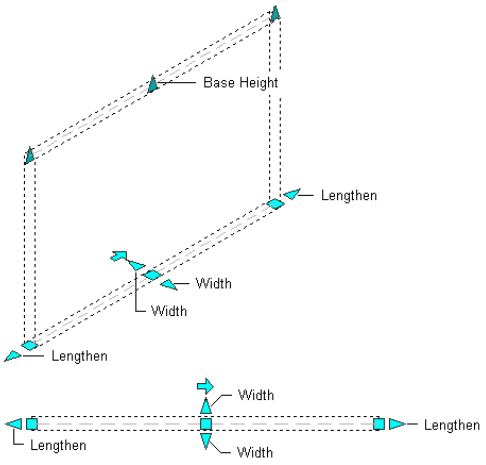
Grip	Description	Animation
(Lengthen)	Lets you change the length of a straight wall segment	*Changing the Straight Wall Length with Grips Animation*
(Base Height)	Lets you change the base height of a straight wall segment	*Changing the Straight Wall Base Height with Grips Animation*
(Width)	Lets you change the width while maintaining the baseline of a straight wall segment	*Changing the Straight Wall Width while maintaining the Baseline with Grips Animation*
(Width)	Lets you change the width while maintaining the opposite face of a straight wall segment	*Changing the Straight Wall Width while maintaining the Opposite Face with Grips Animation*
(Base Height)	Lets you change the base height of an arc wall segment	*Changing the Arc Wall Base Height with Grips Animation*
(2nd Point)	Lets you change the 2nd Point of an arc wall segment.	*Changing the Arc Wall 2nd Point with Grips Animation*
(Curve Radius)	Lets you change the curve radius of an arc wall segment.	*Changing the Arc Wall Curve Radius with Grips Animation*
(End Angle)	Lets you change the end angle of an arc wall segment.	*Changing the Arc Wall End Angle with Grips Animation*
(Reverse Direction)	Lets you reverse the direction of an arc wall segment.	*Reversing the Arc Wall Direction with Grips Animation*

Grip	Description	Animation
(Reverse Direction)	Lets you reverse the direction while maintaining the baseline of an arc wall segment.	*Reversing the Arc Wall Direction while Maintaining the Baseline with Grips Animation*

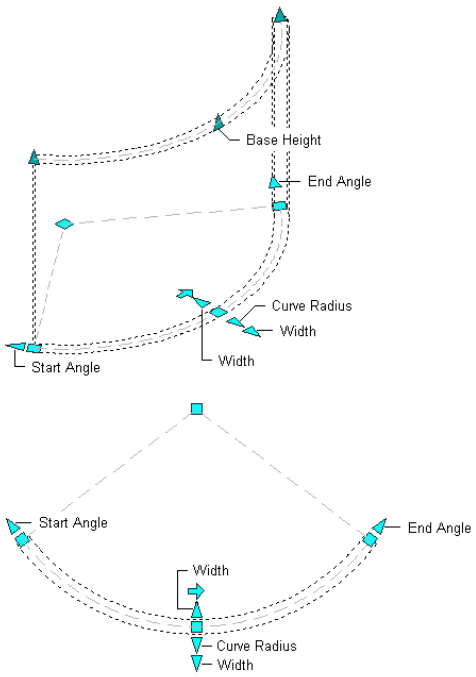
Viewing Wall Grips

The types of editing grips available for a selected wall depend on the view direction and the wall style. Lengthen, Start, Location, Reverse Direction, Width, and End grips are displayed in both plan and 3D isometric views. Base Height grips are available only in 3D isometric views. Curve 2nd Point, Width, and Curve Radius grips are displayed in both 2D and 3D views for curved walls. Wall styles that have a fixed width do not display Width grips, while wall styles that have a variable width do.

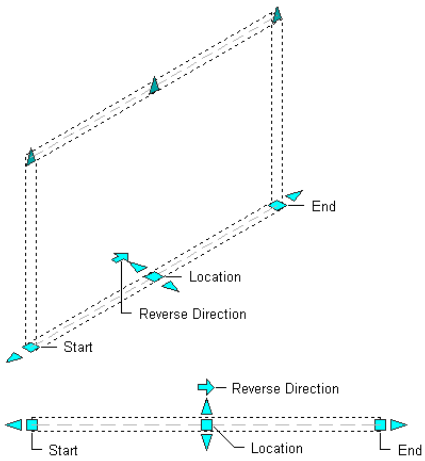
The following illustration shows the Lengthen, Width, and Base Height grips that appear for a straight wall segment in 3D and 2D views.



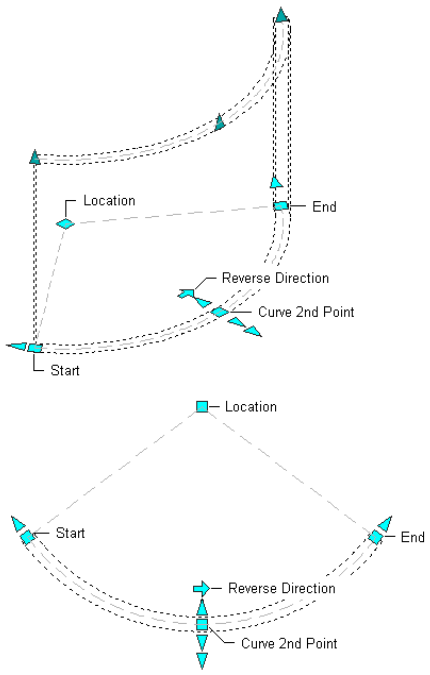
The following illustration shows the Start Angle, End Angle, Width, Curve Radius, and Base Height grips that appear for a curved wall segment in 3D and 2D views.



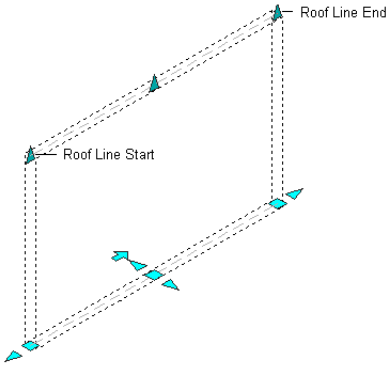
The following illustration shows the Start, End, Reverse Direction, and Location grips that appear for a straight wall segment in 3D and 2D views.



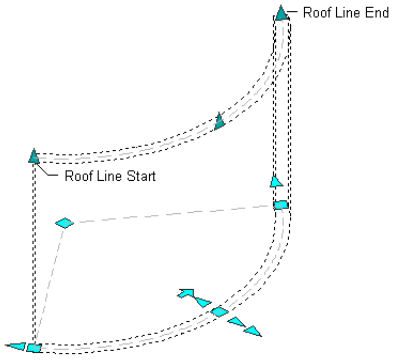
The following illustration shows the Start, End, Reverse Direction, Curve 2nd Point, and Location grips that appear for a curved wall segment in 3D and 2D views.



The following illustration shows the Roof Start Line and Roof End Line grips that appear for a straight wall segment in 3D and 2D views.



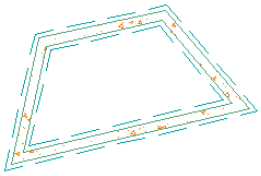
The following illustration shows the Roof Start Line and Roof End Line grips that appear for a curved wall segment in 3D and 2D views.



Changing the Location of a Wall

Use this procedure to relocate a wall by using the Location grip. There are 2 cases to consider when working with the location grip: parallel wall segments and non-parallel wall segments.

parallel walls



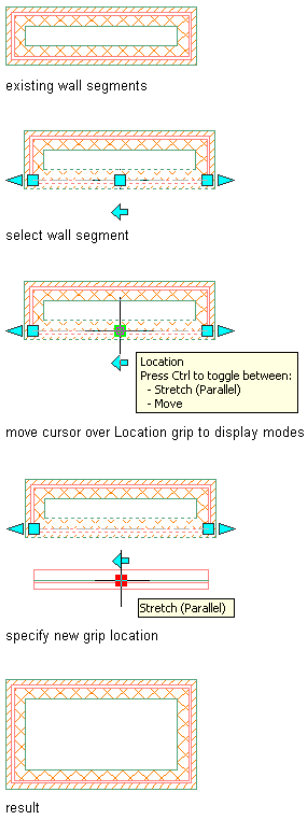
non-parallel walls

When you are working with connected walls that are parallel, the Location grip has 2 edit modes: Stretch (Parallel) and Move. The default mode is Stretch (Parallel), and the direction of the stretch depends on the orientation of walls connected to the selected wall. For example, if the walls at both ends of the selected wall are parallel to each other, with the Stretch (Parallel) mode, the move direction is limited to the direction of the parallel walls.

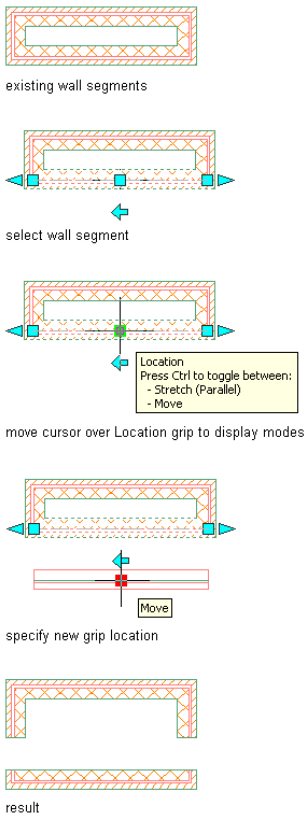
When you are working with a stand-alone wall segment or connected walls that are not parallel, the Location grip has 2 edit modes: Stretch (Offset) and Move. In this case, the default mode is Stretch (Offset) and the stretch direction is perpendicular to the direction of the selected wall.

In both cases, the Move location mode allows an unconstrained move of the selected wall without maintaining adjacent wall connections. You can also move a wall by changing its coordinates on the Properties palette.

The following illustration shows how to use the Location grip in Stretch (Parallel) mode to move a connected parallel wall segment and maintain adjacent wall connections.



The following illustration shows how to use the Location grip in Move mode to move a parallel wall segment without maintaining adjacent wall connections.



1 Select the wall you want to relocate.

2 Select the Location grip.

The Stretch (Parallel) location mode is the default, or you can press *CTRL* to toggle to the Move location mode.

3 Move the wall to the desired location and click once, or enter a distance value and press *ENTER*.

When you use the Stretch (Parallel) location mode, wall connections are maintained if the connecting walls use a zero cleanup circle radius. The connected walls are trimmed, extended, and reversed as necessary to maintain connections and the cleanup circle radius. Using the Move location mode results in disconnected walls.

4 Press *ESC*, or right-click, and click Deselect All to deselect the wall and turn off all grips.

Changing the Shape of a Wall

Use this procedure to change a straight wall to a curved wall, or to change a curved wall to a straight wall. When you change a straight wall to a curved wall, the software adds a Curve 2nd Point grip at the midpoint of the of the wall segment. You can then use the grip to change the shape of the arc. For more information about curved walls, see About Curved Walls on page 916.

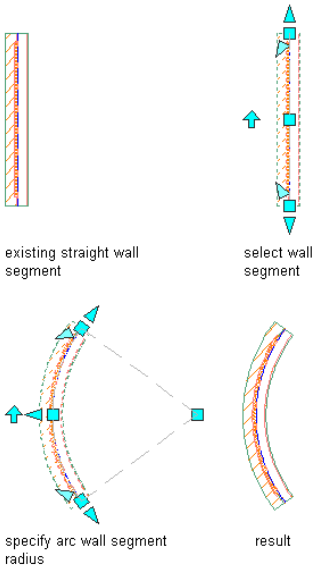
When you change a curved wall to a straight wall, the software creates a straight segment between the start and endpoints of the curve. You can use grips to adjust the length and location of the wall.

1 Select the walls you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand General.

3 Select Arc or Line for Segment type.

4 Select the Curve 2nd Point grip, and move it to adjust the radius for a curved wall.



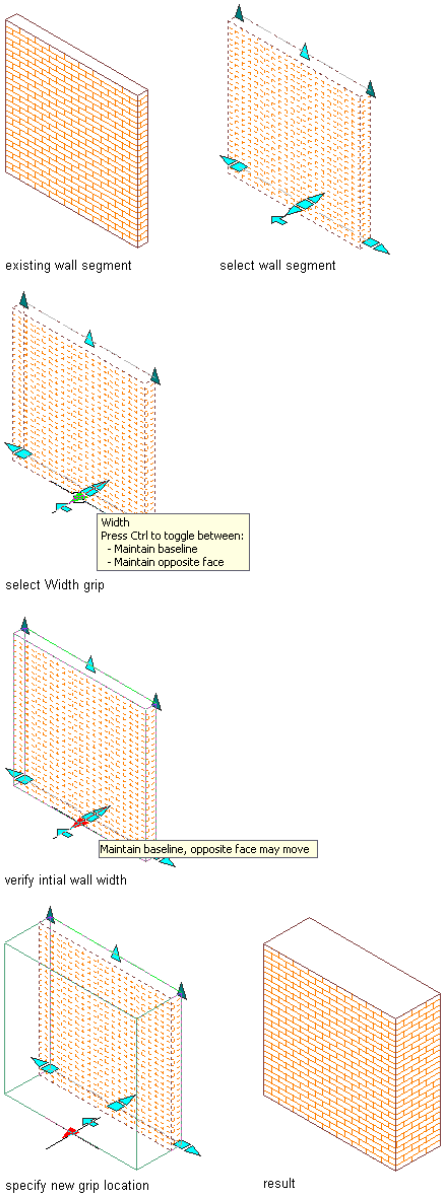
To Change the Wall Width with Grips while Maintaining the Wall Baseline

If the wall width is defined in the wall style applied to the wall, you cannot change the thickness of an individual wall.

1 Select the wall.

2 Select a Width grip, move the grip until the width value you want is displayed, and click once.

After selecting a grip, you can also enter a precise value to increase or decrease the width of the wall. For more information, see Dynamic Dimensions on page 90.

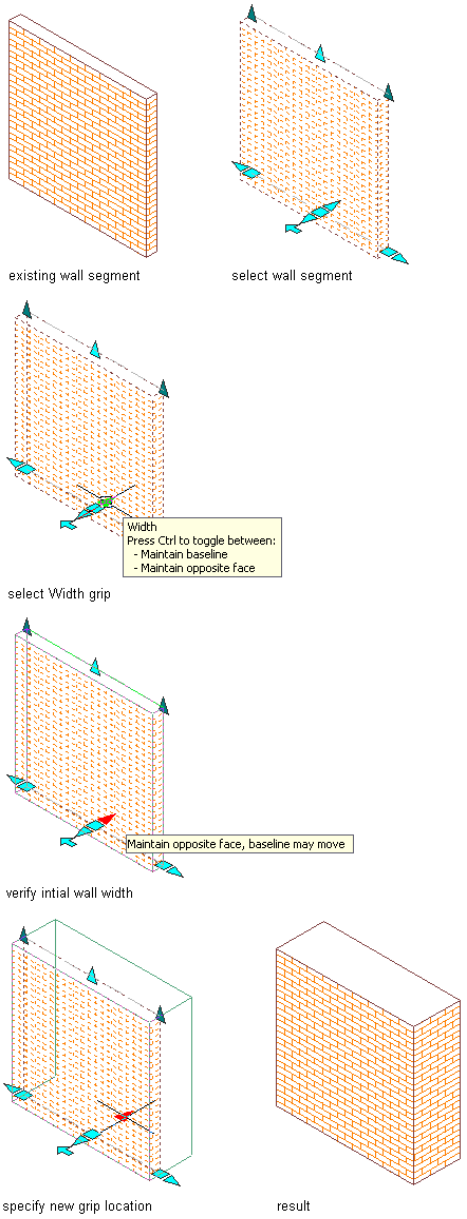


To Change the Wall Width with Grips while Maintaining the Opposite Face of the Wall

You can also change the wall width on the Properties palette. If the wall width is defined in the wall style applied to the wall, you cannot change the thickness of an individual wall.

1. Select the wall.
2. Select a Width grip and press *CTRL* to maintain the position of the opposite face of the wall when you change the wall width.
3. Move the grip until the width value you want is displayed, and click once.

After selecting a grip, you can also enter a precise value to increase or decrease the width of the wall. For more information, see Dynamic Dimensions on page 90.

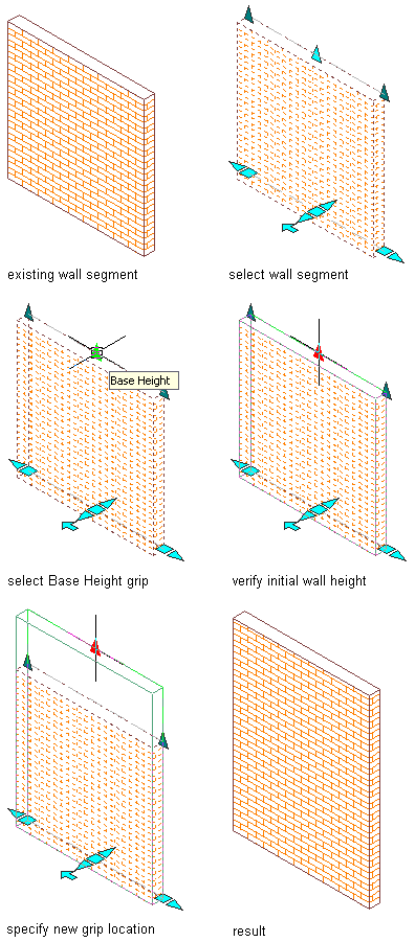


To Change the Wall Base Height with Grips

The base height is the height of the wall from floor to ceiling. You can also change the base height on the Properties palette.

1. Select the wall.
2. Select the Base Height grip, move the grip until the height value you want is displayed, and click once.

After selecting the grip, you can also enter a precise value to increase or decrease the base height of the wall.

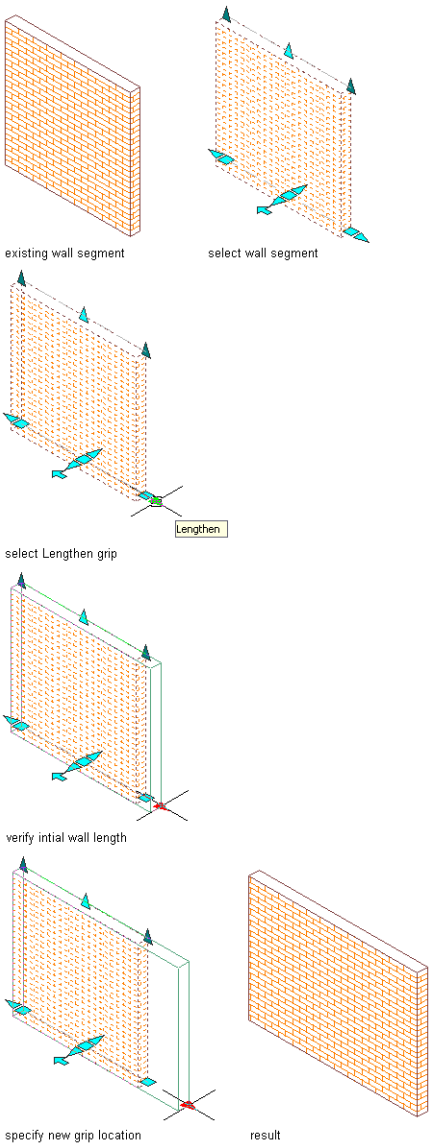


To Change the Wall Length with Grips

You can also change the length on the Properties palette.

1. Select the wall.
2. Select a Lengthen grip, move the grip until the length value you want is displayed, and click once.

After selecting the grip, you can also enter a precise value to increase or decrease the length of the wall.



To Change Wall Justification with Grips

Justification determines the location of the wall in relation to the direction in which the wall was drawn and the points used to draw the wall. Changing the justification of an existing wall moves the wall and can affect how the wall cleans up with other walls. You can also change the justification on the Properties palette.

Changing the Wall Justification

1 Select the wall.

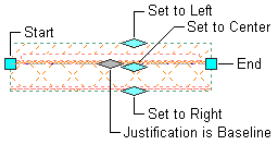
2 Click Wall tab ➤ Cleanup panel ➤ ➤ Edit Justification .

Six grips appear, with four indicating the justification options: Left Right, Center, and Baseline. The gray grip identifies the current justification. Start and End grips for the wall segment are also displayed.

3 Select the grip that corresponds to the justification you want.

In the following illustration, the Baseline justification is current, as indicated by the gray grip.

Wall justification grips



Offsetting New Walls from Existing Walls

Use this procedure to add copies of an existing wall that are offset from a component of the wall at a distance that you specify.

This offset command allows you to copy walls by offsetting them a clear distance from the face or center of a specific wall component, such as the stud or the wall finish.

1 Select the wall you want to copy.

2 Click Wall tab ➤ Modify panel ➤ Offset drop-down ➤ Copy .

3 Specify the location of the offset point:

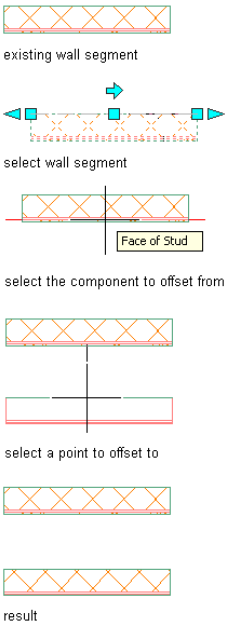
If you want to …	Then …
offset the wall from the face of a wall component	move the cursor over the wall until the face of the component you want is highlighted with a red line, and click once.
offset the wall from the center of a wall component	press *CTRL*, and move the cursor over the wall until the center of the component you want is highlighted. Click once.

4 Specify the offset distance.

5 Continue adding walls, each new wall offset from the face or center of the wall you added before it.

You can specify a different offset distance each time you add another wall.

Offset copying a wall segment from an existing wall segment component



6 Press *ENTER*.

Repositioning a Wall

Use this procedure to move a wall by offsetting the wall from the center or face of a wall component to a point or distance that you specify.

1 Select the wall you want to move.

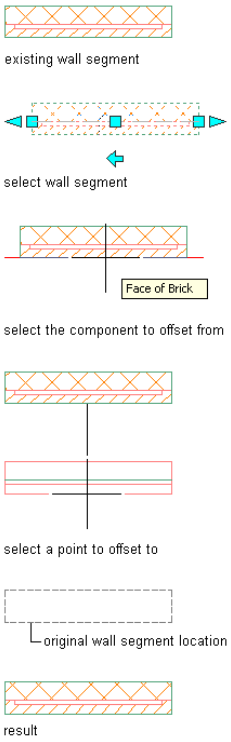
2 Click Wall tab ➤ Modify panel ➤ Offset drop-down ➤ Move .

3 Specify the location of the offset point:

If you want to …	Then …
offset the wall from the face of a wall component	move the cursor over the wall until the face of the component you want is highlighted with a red line, and click once.
offset the wall from the center of a wall component	press *CTRL*, and move the cursor over the wall until the center of the component you want is highlighted. Click once.

4 Specify the distance from the component face or center to its new position.

Offset moving a wall segment from its existing wall segment component



Adjusting the Position of Wall

Use this procedure to adjust the position of a wall by aligning or offsetting the center or face of a wall component from a reference point that you specify. For example, you can adjust the placement of a stud partition wall by defining the distance from stud to stud on center.

1 Select the wall you want to move.

2 Click Wall tab ➤ Modify panel ➤ Offset drop-down ➤ Set From .

3 Specify the location of the offset point:

If you want to …	Then …
offset the wall from the face of a wall component	move the cursor over the wall until the face of the component you want is highlighted with a red line, and click once.
offset the wall from the center of a wall component	press *CTRL*, and move the cursor over the wall until the center of the component you want is highlighted. Click once.

4 Specify the reference point to which you want to measure.

For example, if you want to move a wall so that its exterior face is aligned with the exterior face of another wall, specify a point on the face of the other wall.

5 Specify the new distance from the wall component face or center to the reference point.

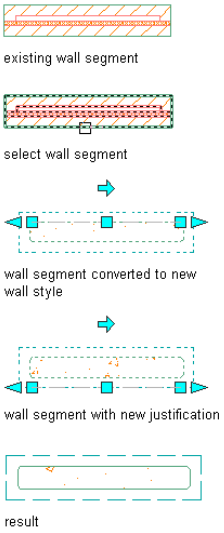
Enter **0** (zero) to align the selected wall with the reference point.

Applying Tool Properties to an Existing Wall

Use this procedure to modify one or more walls by applying the properties of a wall tool. The properties include the wall style and any other settings specified in the tool you select.

1. Open the tool palette that contains the wall tool you want to use.
   (You may have to scroll to display the desired tool.)
2. Right-click the tool, and click Apply Tool Properties to ➤ Wall.
3. Select the walls to be modified, and press *ENTER*.
4. Edit the properties of the modified walls in the Properties palette, if necessary.

Applying a different wall tool and new property to an existing wall segment

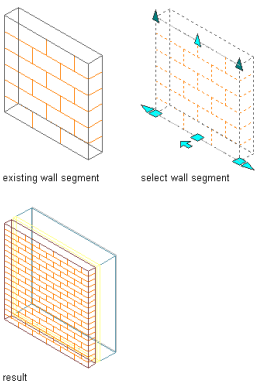


Changing the Style of a Wall

Use this procedure to select a different wall style for one or more walls.

1. Select the walls to change, and double-click one of them.
2. Expand Basic, and expand General.
3. Select a different style.

Changing the style of a wall segment



Changing the Location of a Wall

Use this procedure to relocate a wall by changing the coordinate values of its insertion point. The wall also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the wall are parallel to the XY plane, its normal is parallel to the Z axis. You can change the orientation of the wall by aligning its normal with another axis. You can also rotate the wall on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1 Double-click the wall you want to change.

2 In the Properties palette, expand Basic, and expand Location.

3 Select Additional information.

4 Specify the location of the wall:

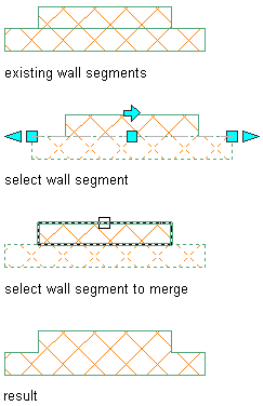
If you want to …	Then …
relocate the wall	enter new coordinate values under Insertion Point.
locate the wall on the XY plane	make the normal of the wall parallel to the Z axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the wall on the YZ plane	make the normal of the wall parallel to the X axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the wall on the XZ plane	make the normal of the wall parallel to the Y axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the wall	enter a new value for Rotation Angle.

5 Click OK.

Merging Walls

Use this procedure to merge the profile of selected walls. This does not provide automatic wall cleanup, but merging walls is useful in tight situations that involve short wall segments.

Merging wall segments



1 Select a wall to merge.

2 Click Wall tab ➤ Cleanup panel ➤ ▾ ➤ Add Wall Merge Condition .

3 Select other walls to merge with the first wall, and press *ENTER*.

TIP To identify merged walls, turn on the Graph display representation. Select a wall, right-click, and click Cleanups ➤ Toggle Wall Graph Display. Select the wall to which you added merge conditions. An arc connects the original wall to each wall it is merged with.

Removing Individual Merge Conditions

Use this procedure to selectively remove merge conditions from a wall.

1 Select a wall.

2 Click Wall tab ➤ Cleanup panel ➤ Justification Display .

3 Select the wall that was selected first when the walls were merged.

An arc connects the wall to each wall merged with it.

4 Select the Remove Wall Merge Condition grip for the wall you want to remove from the original wall.

The arc and grip are removed to indicate that a merge condition with the wall no longer exists.

Removing All Merged Walls

Use this procedure to remove all merged wall conditions from a group of merged walls.

TIP To identify merged walls, turn on the Diagnostic display representation. Select a wall and click Wall tab ➤ Cleanup panel ➤ Justification Display . Select the wall to which you added merge conditions. An arc connects the original wall to each wall it is merged with.

1 Select the wall that was selected first when the walls were merged.

2 Click Wall tab ➤ Cleanup panel ➤ ➤ Remove All Wall Merge Conditions .

If a message at the command line indicates that no merge conditions were removed, the wall you selected was not the first wall when the merge condition was created. You can press *ENTER* to repeat the command, and then select a different wall.

Joining Walls

Use this procedure to combine the baselines of 2 walls to create one wall segment. Walls that you join must meet the following requirements:

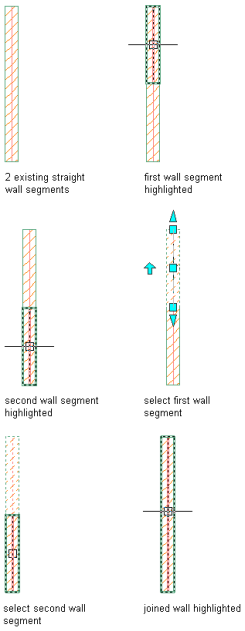
- Linear walls must have colinear baselines and be touching at one endpoint.
- Arc walls must have the same center, radius, and be touching at one end.
- Walls must have the same style and width.
- Walls must belong the same cleanup group.

Joining walls also transfers all sub-objects and anchored objects from one wall to the other. Sub-objects include roofline, floorline, anchors, wall modifiers, wall style overrides, and interference conditions. Anchored objects include doors, windows, and openings anchored to the walls.

NOTE Certain colinear wall segments may appear to be already joined. However, if they were drawn as 2 segments, they are actually separate segments and can be highlighted as separate segments.

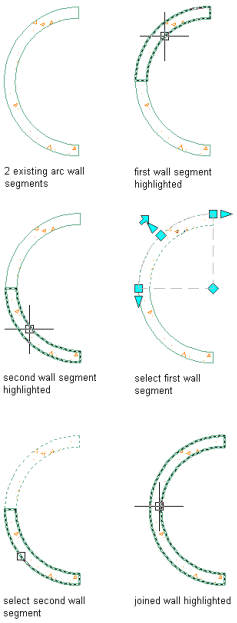
The following illustration shows joining 2 straight wall segments after first highlighting each separate segment.

Joining 2 straight wall segments



The following illustration shows joining 2 curved wall segments after first highlighting each separate segment.

Joining 2 curved wall segments



1 Select the first wall.

2 Click Wall tab ➤ Cleanup panel ➤ ▾ ➤ Join .

3 Select the second wall.

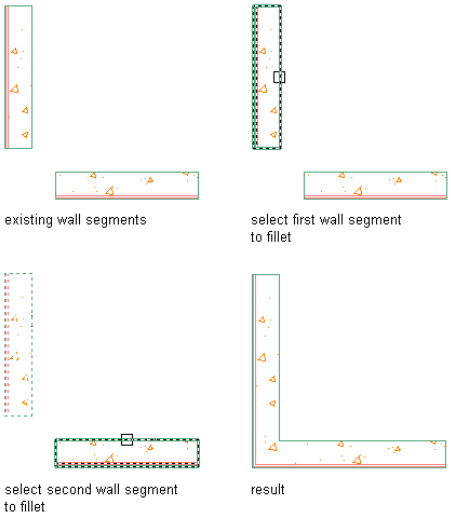
Filleting Walls

Use this procedure to fillet 2 walls. Filleting walls creates a curved wall segment with a specified radius that is tangent to the baselines of the selected walls.

If you specify zero for the fillet radius, the walls are trimmed or extended until they intersect, but no curved wall segment is created. Using a radius of zero allows you to force odd-angled walls to meet. If you select parallel wall segments, the fillet radius is ignored, and a curved wall segment is created that is tangent to the baselines of the selected walls.

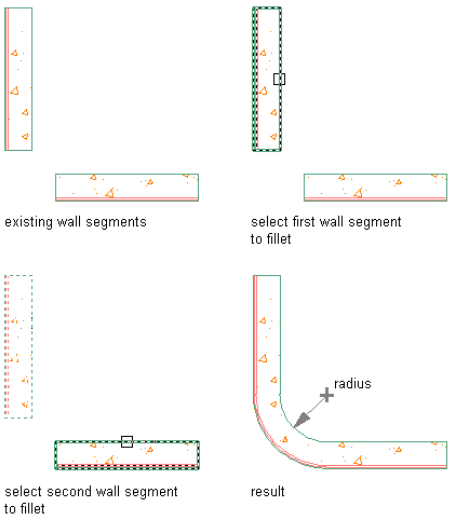
The following illustration shows how to fillet two wall segments with a zero radius.

Filleting wall segments with a zero radius



The following illustration shows how to fillet two wall segments with a specified radius.

Filleting wall segments with a specified radius



Trim mode options allow you to specify whether the walls are trimmed or extended to the new segment (trim option) or whether their endpoints remain unchanged (no trim option). If you select no trim, the fillet radius must be greater than zero.

Before filleting walls, ensure that the following conditions exist:

- The walls have the same style and baseline justification.
- The fillet radius is not a negative value.

Solution tip icons may display when you fillet the walls if these conditions are not met.

1. Open a tool palette that contains the Fillet tool.

   The Fillet tool is located with the Drafting Tools in the Stock Tool Catalog in the Content Browser. You can add this tool to any tool palette, and then use the tool to fillet walls and other objects.

2. Select the Fillet tool.
3. Verify trim mode and radius settings:

If you want to …	Then …
trim or extend wall segments to meet each other or to meet the endpoints of the resulting curved wall segment	enter **t** (Trim), and then enter **t** (Trim).
keep the endpoints of the wall segments in their original locations and fit the curved wall segment between them	enter **t** (Trim), and then enter **n** (No trim).
specify a new fillet radius	enter **r** (Radius), and then enter a value for the radius. Enter 0 for the radius if you want the wall segments to meet each other without creating a curved wall segment.
fillet multiple walls	enter **m** (Multiple).

4. Select the first wall.
5. Select the second wall.

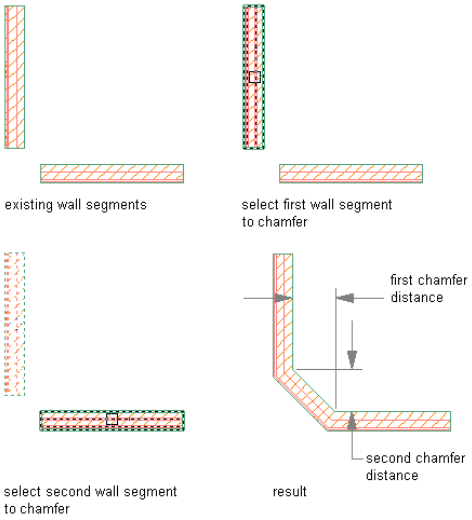
Chamfering Walls

Use this procedure to chamfer 2 walls. Chamfering walls creates a new wall segment between 2 walls that are not parallel. Chamfering is useful when you are working with unique wall angles or architectural details.

You can chamfer walls by specifying distance or angle:

- Using the distance option, you specify the length that each wall should be trimmed or extended until it meets the new wall segment or the other wall. If both chamfer distances are zero, the walls are extended until they intersect, but a new wall segment is not created.

Chamfering wall segments using the distance option



- Using the angle option, you specify the length of the chamfer and the angle it forms with the first wall.

Trim mode options allow you to specify whether the walls are trimmed or extended to the new wall segment (trim option) or whether their endpoints remain unchanged (no trim option). If you select no trim, chamfer distances must be greater than zero.

Before chamfering walls, ensure that the walls have the same style and baseline justification. Solution tip icons may display when you chamfer the walls if these settings are not the same for each wall.

1. Open a tool palette that contains the Chamfer tool.

   The Chamfer tool is located with the Drafting Tools in the Stock Tool Catalog in the Content Browser. You can add this tool to any tool palette, and then use the tool to chamfer walls and other objects.

2. Select the Chamfer tool.
3. Specify default settings for chamfering walls:

If you want to …	Then …
trim or extend wall segments to meet each other or to meet the endpoints of the new wall segment	enter **t** (Trim), and then enter **t** (Trim).
keep the endpoints of the wall segments in their original locations and fit the new wall segment between them	enter **t** (Trim), and then enter **n** (No trim).
specify the default length and angle values for the angle option	enter **a** (Angle). Enter the distance from the endpoint to the point on the wall where you want the chamfer to begin. Enter the angle of the chamfer.
specify the default distances for the distance option	enter **d** (Distance). Enter values for Distance 1 and Distance 2. Enter 0 for both distances if you want the walls to meet without creating a new wall segment.
specify the distance option as the default option for chamfering walls	enter **e** (Method), and then enter **d** (Distance).

If you want to …	Then …
specify the angle option as the default option for chamfering walls	enter **e** (Method), and then enter **a** (Angle).
chamfer multiple walls	enter **m** (Multiple).

4 Select the first wall.

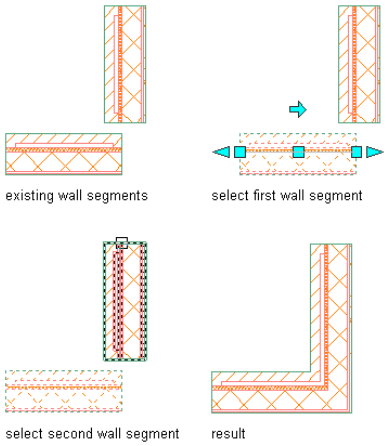
5 Select the second wall.

Trimming Walls at L and T Intersections

Use this procedure to trim or extend walls so that they meet and clean up at L-shaped or T-shaped intersections. If walls do not belong to the same cleanup group, they are trimmed but do not clean up with each other.

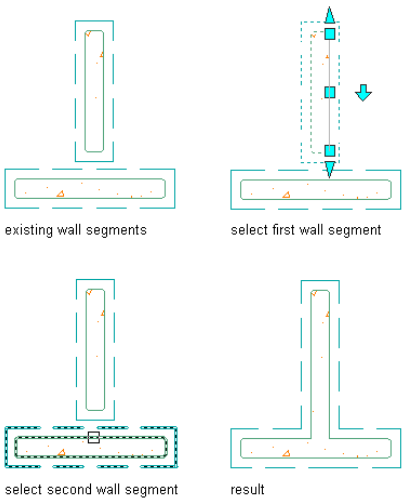
When you create an L-shaped intersection, the wall endpoints that are closest to each other extend or trim so that their wall justification lines meet exactly.

Creating an L-shaped wall intersection



When you create a T-shaped intersection, the walls you select are extended or trimmed to a boundary wall that you specify.

Creating a T-shaped wall intersection



➤ Select the cleanup method you want to use:

If you want to …	Then …
create an L-shaped intersection between 2 walls	select the walls, and click Wall tab ➤ Cleanup panel ➤ L Cleanup .
create a T-shaped intersection between 2 walls	select the walls to be extended or trimmed to a boundary wall, and Click Wall tab ➤ Cleanup panel ➤ T Cleanup . Select the boundary wall.

Reversing the Direction of a Wall

Use this procedure to change the direction in which a wall is drawn by reversing the start point and the endpoint of the wall. Walls are drawn from the first specified point to the last point. Some commands and properties are affected by that order. For example, you can add wall modifiers to the left or right side of a wall. Left and right sides are west and east, respectively, when a wall is drawn from south to north, regardless of how the wall is displayed in the current view.

There are 2 different ways to reverse the wall direction. When you reverse a wall in place, the wall position in the drawing does not change; only the wall direction changes, and the wall baseline is switched in the drawing but not in relation to the wall components. This method of reversing walls is common when you create walls from scratch and do not want to change their physical position in the drawing.

When you reverse the wall baseline, the wall position in the drawing changes, but the baseline position in the drawing remains the same. You would use this method when creating walls from polylines or spaces; in this case the baseline position can be important geometry that you do not want to change.

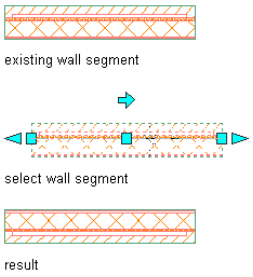
To determine the direction in which a wall was drawn, select the wall. The Reverse Direction grip shows the orientation of the wall. For more information about wall grips, see Using Grips to Edit Walls on page 773.

To reverse the wall direction in place:

1 Select the wall.

2 Click Wall tab ➤ Modify panel ➤ Reverse drop-down ➤ WallReverse .
The outside faces of the wall remain in place, and the baseline shifts, if necessary.

Reversing a wall segment in place

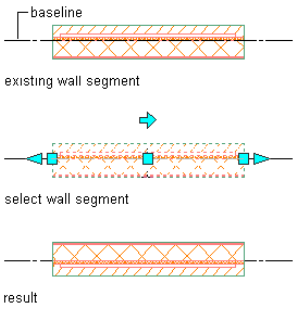


To reverse the wall baseline:

1 Select the wall.

2 Click Wall tab ➤ Modify panel ➤ Reverse drop-down ➤ WallReverseBaseline .
The baseline remains in place, and the wall shifts, if necessary.

Reversing a wall segment about its baseline



Using AutoCAD Commands to Edit Walls

You can use the following standard AutoCAD commands to edit walls:

- BREAK
- EXTEND
- TRIM

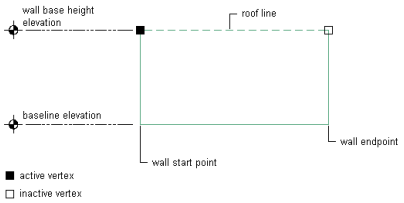
For more information about these commands, see AutoCAD Help.

Changing the Roof Line and the Floor Line of a Wall

You can modify the roof and floor lines of a wall to create a non-rectangular wall.

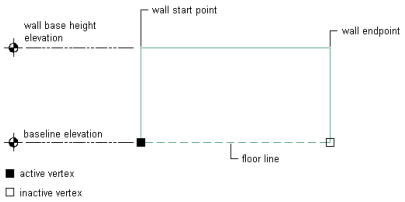
- You edit vertex locations on the roof line to create steps, gables, and other roof conditions.

Modifying the roof line of a wall



- You edit vertex locations on the floor lines to create steps and other floor conditions.

Modifying the floor line of a wall



You can also create non-rectangular roof and floor conditions by projecting to polylines.

AutoCAD Architecture offers multiple methods of editing roof lines and floor lines. You may want to begin by graphically creating a custom roof line or floor line condition. You can then fine-tune that condition by specifying precise values in the Roof/Floor Line worksheet on the Properties palette.

Offsetting or Projecting the Roof Line of a Wall

Use this procedure to change the height or the shape of the roof line of a wall:

- Offset the roof line from the current height of the wall.
- Project the roof line of the wall to a polyline.
- Project the roof line of the wall to another object, such as a roof or stairs.

You can also create a polyline that represents the current roof line of the selected walls. You can then use this polyline to change the roof line of other walls.

NOTE To project the roof line to a polyline, draw the polyline first in elevation view. For best results, the polyline should be parallel to the wall. The polyline does not need to be in the same plane as the wall.

1 Select a wall,

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Modify Roof Line .

3 Change the roof line of the wall:

If you want to …	Then …
offset the roof line from the current height of the wall	enter **o** (Offset), and enter an offset distance. Enter a negative value to project the roof line below the current wall height.
project the roof line to a polyline	enter **p** (Project), and select the polyline.
project the roof line to another object, such as a roof or stairs	enter **a** (Auto-project), and select the object to project to. When projecting to stairs, make sure that the

If you want to …	Then …
	bottom riser or the stringer does not create a zero-height segment of wall.
generate a polyline of the current roof line	enter **g** (Generate), and select the walls for the polyline to be created from.
remove any changes to the roof line	enter **r** (Reset), and select the walls to change.

4 Press *ENTER*.

Offsetting or Projecting the Floor Line of the Wall

Use this procedure to change the height or the shape of the floor line of a wall:

- Offset the floor line from the current baseline of the wall.
- Project the floor line of the wall to a polyline.
- Project the floor line of the wall to another object, such as a floor slab or stairs.

You can also create a polyline that represents the current floor line of the selected walls. You can then use this polyline to change the floor line of other walls.

NOTE To project the floor line to a polyline, draw the polyline first in elevation view. For best results, the polyline should be parallel to the wall. The polyline does not need to be in the same plane as the wall.

1 Select a wall.

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Modify Floor Line .

3 Change the floor line of the wall:

If you want to …	Then …
offset the floor line from the current base line of the wall	enter **o** (Offset), and enter an offset distance. Enter a negative value to project the floor line below the current wall base line.
project the floor line to a polyline	enter **p** (Project), and select the polyline.
project the floor line to another object, such as a slab or stairs	enter **a** (Auto-project), and select the object to project to. When projecting to stairs, make sure that the bottom riser or the stringer does not create a zero-height segment of wall.
generate a polyline of the current floor line	enter **g** (Generate), and select the walls for the polyline to be created from.
remove any changes to the floor line	enter **r** (Reset), and select the walls to change.

4 Press *ENTER*.

Adding a Gable to the Roof Line of a Wall

Use this procedure to add a gable to the roof line of a wall. You can also add a gable on the Roof/Floor Line worksheet on the Properties palette.

NOTE This option is available only if the roof line has not been edited. After the roof line changes, you cannot add a gable using this option. To add a gable to a roof line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Wall on page 804.

1 Select the wall.

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .

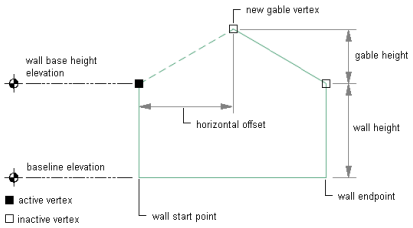
A temporary profile is created for you to edit the geometry of the Roof line.

3 Click Edit In Place tab ➤ Profile panel ➤ Add Gable .

If Add Gable is not available, the roof line was previously edited.

4 Select the roof line.

Modifying a wall roof line by adding a gable



A third vertex is added to the roof line halfway between the 2 ends of the roof line and 8'-0" up from the roof line.

5 Continue editing the roof line or the floor line, if needed.

For more information, see Editing the Roof Line or the Floor Line of a Wall on page 801.

6 Save or discard the changes:

If you want to …	Then …
restore the roof line to its previous shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the roof line	click Edit In Place tab ➤ Edits panel ➤ Finish .

Adding a Step to the Roof Line or Floor Line of a Wall

Use this procedure to add a step to the roof line or the floor line of a wall. You can also add a step on the Roof/Floor Line worksheet on the Properties palette.

NOTE This option is available only when the roof line or the floor line has not been edited. After the line has been changed, you cannot automatically add a step using this option. To add a step to a roof line or a floor line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Wall on page 804.

1 Select the wall.

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .

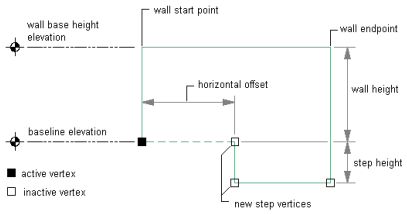
A temporary profile is created for you to edit the geometry of the roof line or the floor line.

3 Click Edit In Place tab ➤ Profile panel ➤ Add Step .

If Add Step is not available, the roof line or the floor line was previously edited.

4 Select the roof line or the floor line.

Modifying a wall floor line by adding a step



A third vertex is added to the line halfway between the 2 ends of the line and 4'-0" from the line. A step is created from the selected vertex to the second vertex.

5 Continue editing the roof line or the floor line, if needed.

For more information, see Editing the Roof Line or the Floor Line of a Wall on page 801.

6 Save or discard the changes:

If you want to …	Then …
restore the roof line or the floor line to its previous shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the roof line or the floor line	click Edit In Place tab ➤ Edits panel ➤ Finish .

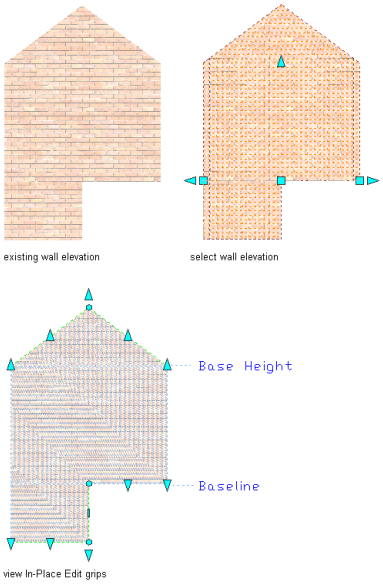
Editing the Roof Line or the Floor Line of a Wall

Use this procedure to edit the geometry of the roof line or the floor line of a wall:

- Add, modify, or remove gables.
- Add, modify, or remove steps.
- Project the roof line or the floor line to a polyline or to other objects, such as roofs, roof slabs, slabs, and stairs.
- Create custom roof line or floor line conditions by adding and adjusting vertices and edges.
- Reverse the roof line or the floor line of the wall without reversing the wall itself.
- Remove all changes to the roof line or the floor line of a wall.

You can also edit the roof line and the floor line on the Roof/Floor Line worksheet on the Properties palette. For more information, see Changing Vertices in the Roof Line or Floor Line of a Wall on page 804.

Viewing Edit In Place Wall Elevation Grips

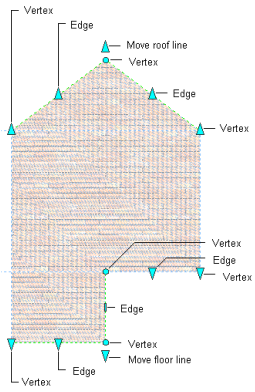


NOTE If you want to project the roof line or the floor line to a polyline, draw the polyline before you start this procedure.

1 Select the wall that has the roof line or floor line you want to change.

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .
A temporary profile is created for you to edit the geometry of the roof line and floor line.

Wall Elevation Edit In Place Grips



3 **NOTE** After you perform an editing task, you may need to select the profile again to perform another editing task.

Edit the profile:

If you want to …	Then …
add a gable to the roof line or the floor line	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Gable . Select the roof line or the floor line.

If you want to …	Then …
add a step to the roof line or the floor line	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Step . Select the roof line or the floor line.
change the shape of the roof line or the floor line	select the profile, and use Move Roof Line, Move Floor Line, Vertex, and Edge grips to adjust the shape.
add vertices to the roof line or the floor line	select the profile, right-click, and click Add Vertex. Select a point for each new vertex, and press *ENTER*.
remove vertices from the roof line or the floor line	select the profile, right-click, and click Remove Vertex. Select each vertex to remove, and press *ENTER*.
project the roof line or the floor line to a polyline	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Project To Polyline . Select the roof line or the floor line, and select the polyline. Press *ENTER* to keep the geometry, or enter **y** (Yes) to erase it.
project the roof line or the floor line to another object, such as a stair or a roof	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Auto Project . Select the roof line or the floor line, and select the object.
reverse the roof line or the floor line	select the profile, and click Edit in Place tab ➤ Profile panel ➤ Reverse . Select the roof line or the floor line.
restore the roof line to the base height of the wall, or restore the floor line to the baseline of the wall	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove . Select the roof line or the floor line.

NOTE To add a gable or a step to a roof line or a floor line that has been edited, first use the Remove tool to remove an existing roof line or floor line condition.

4 Save or discard the changes:

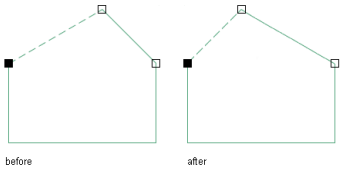
If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit In Place tab ➤ Edits panel ➤ Finish . The wall uses the edited profile to define its geometry.

Reversing the Roof Line or Floor Line of a Wall

Use this procedure to reverse the conditions applied to the roof line or the floor line of a wall. Reversing the roof line or the floor line does not reverse the start point and endpoint of the wall.

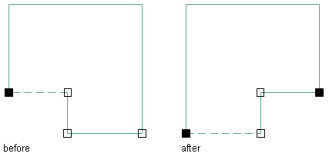
The following illustration shows reversing the roof line of a wall.

Reversing the roof line of a wall



The following illustration shows reversing the floor line of a wall.

Reversing the floor line of a wall



1 Select the wall that has the roof line or floor line you want to change.

2 Click Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .
A temporary profile is created for you to edit the geometry of the roof line or the floor line.

3 Select the profile.

4 Click Edit in Place tab ➤ Profile panel ➤ Reverse .

5 Select the roof line or the floor line.
The selected line is reversed; the condition is applied to the opposite end of the line.

6 Save or discard the changes:

If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit In Place tab ➤ Edits panel ➤ Finish . The wall uses the edited profile to define its geometry.

Changing Vertices in the Roof Line or Floor Line of a Wall

Use this procedure to perform the following tasks on the Roof/Floor Line worksheet on the Properties palette:

- Add, move, or remove vertices in the roof line or the floor line of a wall.
- Add gables or steps to a roof line or steps to a floor line that was previously edited by adding vertices that define these conditions.

You can also edit the roof line and the floor line graphically. For more information, see Editing the Roof Line or the Floor Line of a Wall on page 801.

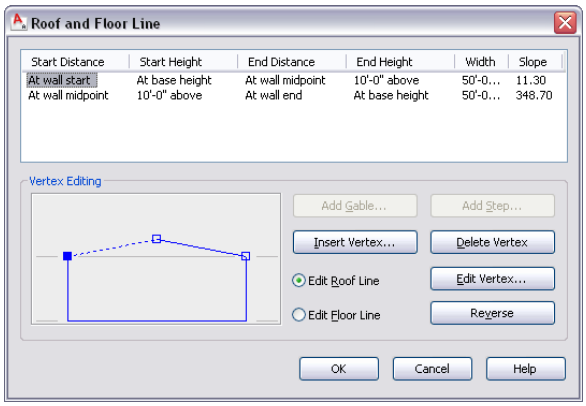
1 Double-click the wall you want to change.

2 Expand Advanced, and expand Worksheets.

3 Select Roof/Floor Line.

4 Select Edit Roof Line, or select Edit Floor Line.

Changing the vertices of a roof line



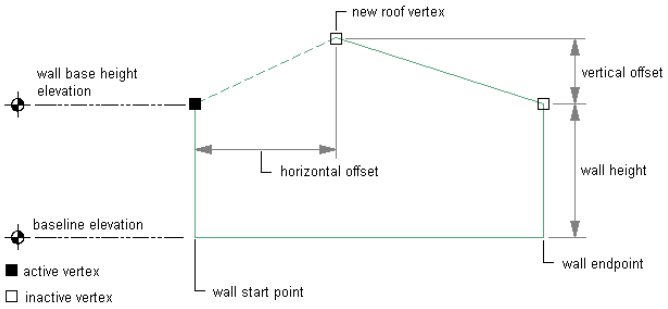
The active vertex in the illustration changes when you select a different line to edit. Any changes you make to the wall are reflected in the illustration.

5 To add a vertex, click Insert Vertex. Specify the horizontal offset and vertical offset for the new vertex and each offset distance, and click OK.

For more information about specifying the location of a vertex, see Specifying Offsets for Roof Line and Floor Line Vertices on page 916.

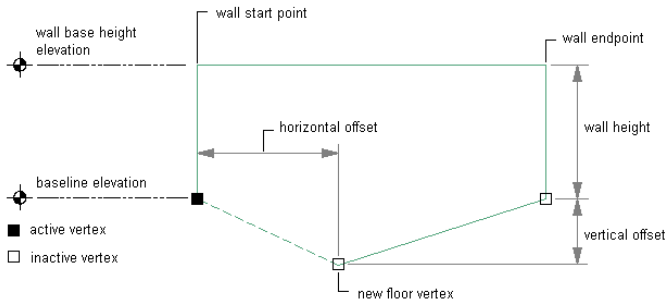
The following illustration shows modifying the roof line of a wall by adding a vertex.

Modifying a roof line of a wall by adding a vertex



The following illustration shows modifying the floor line of a wall by adding a vertex.

Modifying a floor line of a wall by adding a vertex



6 To move a vertex, select the vertex from the table or the illustration, and click Edit Vertex. Specify the horizontal offset and vertical offset for the new vertex and each offset distance, and click OK.

For more information about specifying the location of a vertex, see Specifying Offsets for Roof Line and Floor Line Vertices on page 916.

7 To delete a vertex, select a vertex, and click Delete Vertex.

The selected vertex is deleted, and the line automatically connects the 2 adjacent vertices.

8 To reverse the roof line or the floor line, click Reverse.

9 Click OK.

Specifying the Materials of Individual Walls

Use this procedure to select a different material for components of an individual wall.

To change the materials assigned to all walls of the same wall style, see Specifying the Materials of a Wall Style on page 858.

NOTE If a material assignment does not determine the display properties of a wall component, you can change the properties of the display component as described in Changing the Display Properties of Individual Walls on page 807.

---

1 Select the wall you want to change, right-click, and click Edit Object Display.

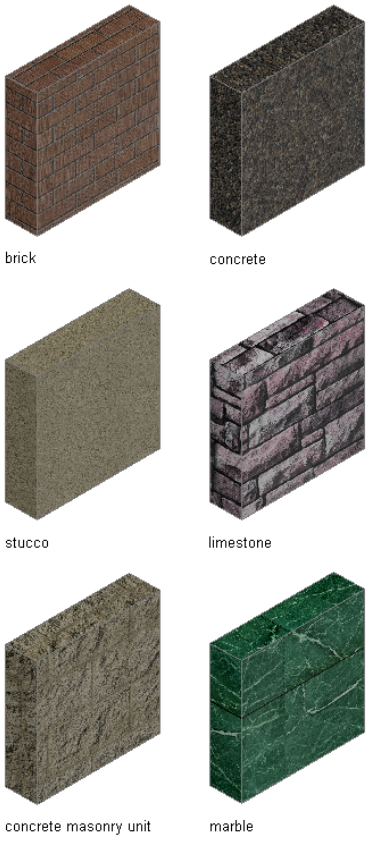
2 To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation where you want the changes to appear, and click .

3 Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.

4 Click the Materials tab.

5 Select the component you want to change, and select a different material definition.

Wall segments with assigned materials in realistic visual style



You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog, any changes you make to the material definition apply to all objects that are assigned the material.

6 Click OK.

Changing the Display Properties of Individual Walls

In most cases, you want the appearance of walls that belong to the same style to be consistent throughout a drawing. To achieve this, you specify the material assigned to each wall component, or you specify the display properties for each wall style. However, in certain instances, you may need to override a display property for an individual wall to achieve a specific result. All the display properties that you can specify in wall styles are available for individual walls:

- Whether the display properties of wall components are determined by material assignments
- The layer, color, and linetype of the display components of the wall
- The hatching used with each component
- The cut plane height and the display of components relative to the cut plane
- Other specific wall display information, such as whether complex endcaps are displayed and whether the wall is cut around door and window frames

When you change the display properties of an individual wall, the changes apply only to that wall. Other walls of the same style are not affected. To change the display properties of all walls of a specific wall style, see Wall Styles on page 847.

Specifying the Layer, Color, and Linetype of a Wall

Use this procedure to change the following display properties of the components of an individual wall:

- Visibility (component is on or off)
- By material (a material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

To change these display properties for all walls of the same wall style, see Specifying the Display Properties of a Wall Style on page 860.

NOTE If a material assignment determines the properties of a wall display component, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Materials of Individual Walls on page 806.

1 Select the wall you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab.

6 Select the component to change, and select a different setting for the property.

7 Click OK twice.

Specifying the Hatching for Components of a Wall

Use this procedure to specify the hatching of the components of an individual wall. Wall hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

To change the hatching for all walls of the same wall style, see Specifying the Hatching for Components of a Wall Style on page 861.

NOTE If a material assignment determines the hatching properties of a wall component, you can change the hatching of the component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Materials of Individual Walls on page 806.

1 Select the wall you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Hatching tab.

6 Select a component, and click the setting for Pattern.

7 Select the hatching for the component:

If you want to …	Then …
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

8 Click OK.

9 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

10 Click Angle, and enter the angle for the selected pattern.

11 Click Orientation, and specify how the hatching is oriented:

If you want to …	Then …
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

12 Click OK twice.

Specifying the Cut Plane Display of a Wall

Use this procedure to specify the properties of one or more cut planes for an individual wall. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

To better visualize the elements of a wall in plan view, you can create cut planes. The main cut plane is where the shrinkwrap and hatching are applied. The plan display shows the components and objects in the wall as they are displayed at the height of each cut plane.

1. Double-click the wall you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

> **NOTE** To apply your changes to all walls in the drawing, select Drawing default setting. To apply changes to all walls of this style, select Wall Style:<style name>. For more information on styles, see Wall Styles on page 847.

5. If necessary, expand Object Display Properties ➤ Cut Plane.
6. For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.
7. If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object.
8. To specify whether to display object components both above and below the cut plane, or to define additional cut planes for the wall, click Manual cut planes.
9. On the Manual Cut Planes worksheet, do either or both of the following:

   - To display object components above and below the cut plane, verify that Automatically Choose Above and Below Cut Plane Heights is selected.
   - To specifically define a cut plane, select Manual Above and Below Cut Plane Heights, click Add, and enter the height of the new cut plane.

If you add a cut plane …	Then …
at a height that is lower than the value for Cut Plane Height	objects are displayed using the Layer/Color/Linetype properties specified for the Below Cut Plane component of the object.
at a height that is higher than the value for Cut Plane Height	objects are displayed using the Layer/Color/Linetype properties specified for the Above Cut Plane component of the object.

   You can click Remove to delete a cut plane that you added.

You can also access and modify these same cut plane settings through the wall's context menu, as follows:

1. Select the wall you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
3. Select the display representation where you want the changes to appear, and select Object Override.

   The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.

6 Click OK twice.

Specifying the Display of Endcaps in Model Views

Use this procedure to specify whether to display endcaps of openings in a selected wall in a display representation used for model views.

1 Double-click the wall.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all walls in the drawing, select Drawing default setting. To apply changes to all walls of this style, select Wall Style:<style name>. For more information on styles, see Wall Styles on page 847.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced.

7 For Display opening endcaps, select Yes or No.

Specifying the Display of Other Characteristics of a Wall

Use this procedure to specify display properties for an individual wall that apply only in display representations such as Plan, that are used in the Top view (plan view) of a drawing. These properties include whether to display complex endcaps, to show door and window frames, or to show the miter of specific wall components.

1 Double-click the wall you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all walls in the drawing, select Drawing default setting. To apply changes to all walls of this style, select Wall Style:<style name>. For more information on styles, see Wall Styles on page 847.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced.

7 Click Additional properties.

8 Specify individual display property settings as needed:

If you want to …	Then …
display the component lines within the wall above the cut plane (for example, through a window or door in the wall)	select Display Inner Lines Above. Clear this option if you do not want to display these lines.
display the component lines within the wall below the cut plane (for example, through a window or door in the wall)	select Display Inner Lines Below. Clear this option if you do not want to display these lines.

If you want to …	Then …
turn off lines above a window, door, or opening at the cut plane	select Hide Lines Below Openings Above Cut Plane. Clear this option if you want to display the lines.
turn off lines beneath a window or an opening at the cut plane	select Hide Lines Below Openings at Cut Plane. Clear this option if you want to display the lines.
display complex endcaps	select Display Endcaps. Clear this option to display complex endcaps as a single line.
display door openings cutting the wall at the outer edge of the door frame	select Cut Door Frames. Clear this option if you want door openings to cut the wall at the inside of the door frame.
display window openings cutting the wall at the outer edge of the window frame	select Cut Window Frames. Clear this option if you want window openings to cut the wall at the inside of the window frame.
draw wall components by their priority number to control the display of a component over another component	select Component Draw Order by Priority. Clear this option if you want to draw the components in the order that they were created.
perform a slice of the actual 3-dimensional (3D) model at each cut plane to obtain more accurate views of walls with sweeps or body modifiers	select Do True Cut. Clear this option if the wall does not have sweeps or body modifiers, or if they do not change along the height of the wall.
display miter lines at wall corners for selected wall components	Under Draw Miter for Components, select each component whose miter lines you want to display.

9 Click OK.

You can also access and modify these same additional settings through the wall's context menu, as follows

1 Select the wall you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .
5 In the Display Properties dialog, click the Other tab, and then change the settings as needed.
6 Click OK twice.

Attaching Notes and Files to a Wall

Use this procedure to enter notes and attach reference files to a wall. You can also edit notes and edit or detach reference files from a wall.

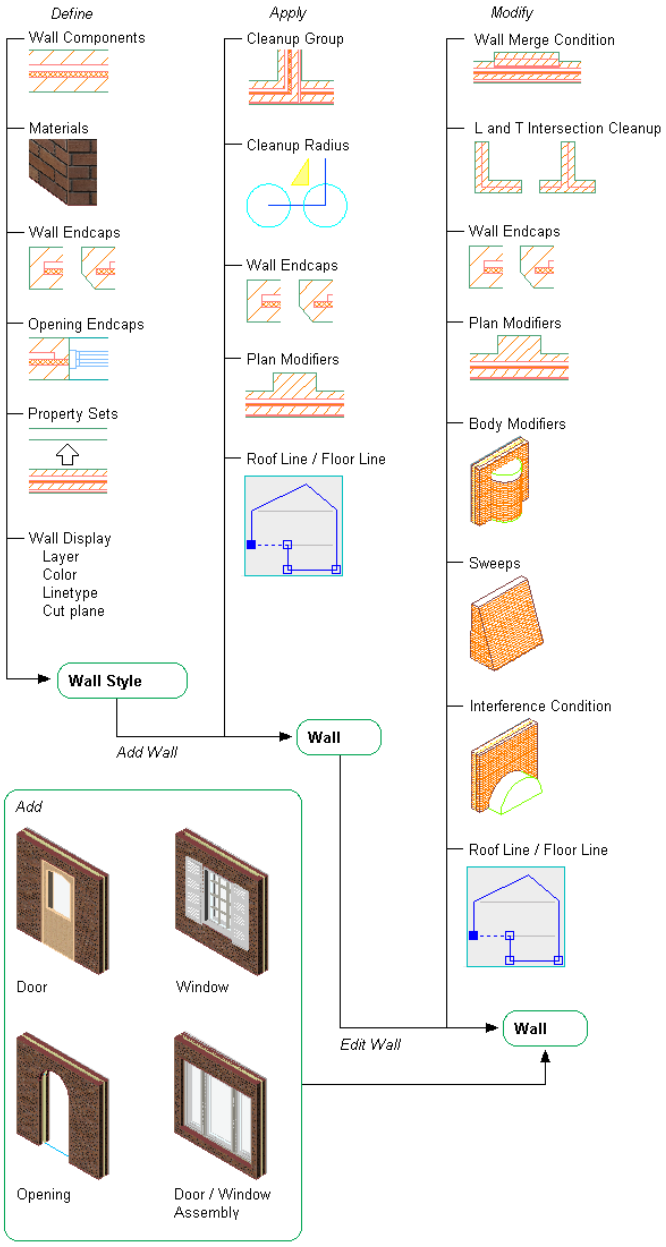
1 Double-click the wall.
2 On the Properties palette, click the Extended Data tab.
3 Click the setting for Notes.
4 Enter the note, and click OK.

5 Click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click , select a file, and click OK.
edit the description of a reference file	select the file, and click the description. Edit the description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK twice.

Wall Parameters

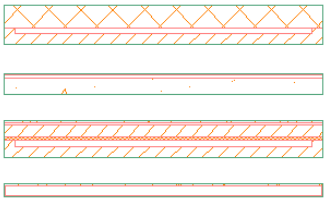


Wall Styles

Many characteristics of a wall are determined by the wall style used. You can create simple wall styles that have a more symbolic display, or you can create detailed walls styles with a representational display, containing many elements the real wall will have. These settings are defined in the wall style:

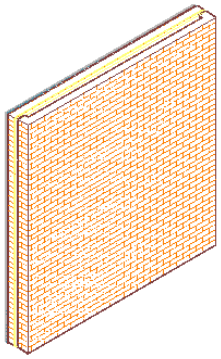
- **Property Set data**: If you want to tag a wall in a drawing, or include it in a schedule table, you need to attach property set data to the wall or the wall style. Property data attached to a wall style typically contains automatic properties, like the wall height or the wall width, or manual properties that are identical for all walls of that style, like for example the fire rating. For more information, see Adding Property Set Data to a Wall Style on page 849.

- **Wall Components**: In a wall style, you can define wall components.



For more information, see Specifying the Components of a Wall Style on page 849

- **Materials**: In a wall style, you can define materials for the 2D and 3D display of walls, as well as for the rendering display of the wall.



To use a material in a wall style, it needs to be defined first in Style Manager. For information about assigning a material to a wall style, see Specifying the Materials of a Wall Style on page 858.

For information about defining Materials, see Creating and Editing Material Definitions on page 599.

- **Specifying Wall Display**: the visual appearance of a wall is defined in the wall style. Define the layer, color, linetype settings of the individual wall components, hatching, and the cut plane display of the wall in plan views. The display settings defined in the wall style can be overridden for an individual wall. For more information, see Specifying the Display Properties of a Wall Style on page 860
- **Specifying Default Wall Settings**: access the Options dialog and specify the defaults for dimensioning walls and for wall cleanup. The cleanup settings apply only to new walls.
- **Using Wall Tools**: Tools provided with AutoCAD Architecture let you quickly place walls by selecting a wall tool with a specific wall style and other predefined properties. You can also use wall tools to convert linework to walls and to apply the settings of a wall tool to existing walls.
  You can also access Stock Tool, Sample palette, and Design Tool catalogs. When you place walls using wall tools, you can use the default settings of the tool, or you can change settings for any wall properties that are not controlled by the style.

Wall Endcaps and Opening Endcaps

Work with wall and opening endcaps to create endcap conditions:

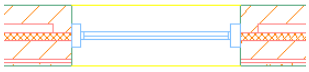
- **Modifying Wall Endcaps with Edit in Place Grips**: You can use Edit in Place grips to modify wall endcaps and create the wall endcap conditions that you want. Vertex and Edge grips are displayed for all wall components at the wall endcap that you specify. For more information, see Using Edit in Place to Modify Wall Endcaps on page 892.
- **Creating Wall Endcaps Using Calculate Automatically**: You can use the Calculate Automatically feature with appropriate polyline linework to create wall endcaps. Calculate Automatically will add boundary segments to complete an endcap configuration if the initial polyline is drawn with regard to location

and orientation of the particular wall component. For more information, see Creating Wall Endcaps Using Calculate Automatically on page 906.

- **Creating Wall Endcaps Using AEC Modify Tools**: You can use AEC Modify Tools to manipulate wall components to create appropriate wall endcap configurations. Use Trim, Extend, Subtract, and Merge tools as necessary to do this. You can modify single wall components or you can modify all components at your wall endcap or opening at once. In each case, you will be using the Edit in Place feature as you modify the wall components to create your wall endcap condition. For more information, see Using Edit in Place to Modify Wall Endcaps on page 892.
- **Specifying Wall Endcaps by Style**: In the wall style, you can define endcaps for the wall start and end. The standard endcap style is a straight line. If you need different endcaps, you need to create a wall endcap style, and then assign it to the wall style. For more information, see Applying a Wall Endcap Style to a Wall Style on page 910 and Working with Wall Endcaps and Opening Endcaps on page 891.

NOTE You can override the wall endcap style on individual walls in the drawing.

- **Specifying Opening Endcaps by Style**: In the wall style, you define the endcaps for any doors, windows, and openings inserted in the wall. By default the opening endcaps are 4 straight lines for the jamb start and end, and the sill and head of the opening.



For more information, see Working with Wall Endcaps and Opening Endcaps on page 891.

Creating a Wall Tool

Use this procedure to create a wall tool and add it to a tool palette. You may want to create your own tools if you are placing multiple walls of specific styles that have the same properties.

For example, you are creating an office floor plan with partition walls for cubicles. Although all partition walls use the same wall style in your floor plan, the walls in administrative areas are lower than the walls in office areas. To work efficiently, you can create a wall tool for each wall height, and select the appropriate tool to place the walls with the correct height in each area of the floor plan.

You can use any of the following methods to create a wall tool:

- Drag a wall that has the properties you want to a tool palette.
- Drag a wall style from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Copy an existing wall tool, and then customize the properties of the new tool.
- Drag a wall tool from a tool catalog in the Content Browser, and then customize the properties of the tool.

1 Open the tool palette on which you want to create a tool.

2 Create the tool:

If you want to …	Then …
create a tool from a wall in the drawing	select the wall, and drag it to the tool palette. **TIP** Drag the wall by a point on its perimeter, not by one of its grips.

If you want to …	Then …
create a tool from a wall style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, click Copy, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog in the Content Browser	open the tool catalog in the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Enter a description of the tool.

8 If you do not want to use the default layer key, select a layer key.

9 If you want to override the default layer names, select a layer override.

10 Select a wall style.

11 For Style location, select the drawing file containing the style to be used for this tool, or select Browse and use a standard file selection dialog box to select the file.

12 Under Bound spaces, define if this wall tool can be used as a bounding object for associative spaces.

You can select 3 options here:

- Yes: this wall tool can be used as bounding object for associative spaces.
- No: this wall tool cannot be used as bounding object for associative spaces.
- By style: this wall tool will use the bounding settings from the wall style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

13 Select Yes for Cleanup automatically if you want the wall to clean up with other walls, and select a cleanup group.

14 For Definition location, select Browse, and use a standard file selection dialog box to select the Cleanup group definition to be used for this tool.

15 Expand Dimensions.

16 Specify wall dimensions:

If you want to …	Then …
specify the thickness of the wall	enter a value for Width. If Width is not available, the wall style you selected determines the width of the wall.
specify the height of the wall from the floor to the ceiling	enter a value for Base height.

17 Specify the wall justification, which places the wall in relation to the points you specify and the direction in which you draw the wall:

If you want to …	Then …
specify points that define the left side of the wall	select Left for Justify.
specify points that define the right side of the wall	select Right for Justify.
specify points that define the center line of the wall	select Center for Justify.
specify points that define the baseline of the wall	select Baseline for Justify.

18 Specify offsets:

If you want to …	Then …
offset the location of the wall from the points you specify	enter a value for Baseline offset, or pick the offset point.
offset the roof line from the specified base height	enter a value for Roof line offset from base height.
offset the floor line from the baseline	enter a value for Floor line offset from baseline.

19 On the Properties palette, expand Advanced.

20 Expand Cleanups, and specify cleanup options:

If you want to …	Then …
specify the line that the Diagnostic display representation uses for the wall justification line	select Wall Justification Line, or select Wall Center Line.
specify a radial distance from the endpoint of a wall in which other walls will be connected	enter a value for Cleanup radius override.

21 Click OK.

Troubleshooting Walls

This section provides solutions for problems you may encounter when working with walls.

Legacy Walls Do not Display in Isometric Views

In some cases walls in a drawing that come from a previous version of AutoCAD Architecture do not display in isometric views. The reason for this can be number of decimal places in the wall base height. If you encounter this situation, try the following:

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Units tab.

3 Under Area, for Precision, select the maximum 8 decimals.

4 Close the Drawing Setup dialog.

5 Select the wall in the drawing, and edit its Base Height value in the Properties palette to display the correct value.

The wall should now display in an isometric view.

Troubleshooting Wall Cleanups

Wall Cleanup can be complex, especially for multi-component walls. For a list of issues that can come up and how to solve them, see Troubleshooting Wall Cleanups on page 873.

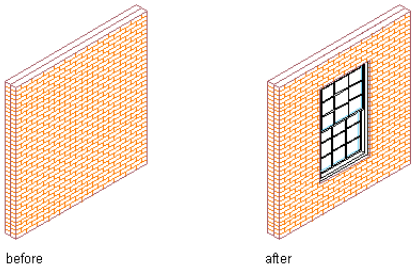
Adding Objects to Walls

When you add doors, windows, window assemblies, and openings to a wall, the wall automatically adjusts to accommodate the object and adds endcaps where needed. By default, these objects are anchored to the wall. The objects remain with the wall if you move it. If you remove an object from a wall, the wall repairs itself in the space where the object was located. You can control how the objects are anchored to the start or the end of a wall, within the wall width, and vertically.

Adding a Window to a Wall

Use this procedure to place one or more windows in a wall.

Inserting a window in a wall



1 Select a wall.

2 Click Home tab ➤ Build panel ➤ Window .

3 Specify the settings for the window.

For more information about adding windows, see Creating a Window with User-Specified Settings on page 1278.

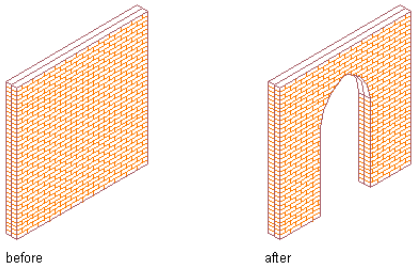
4 Specify an insertion point along the wall.

5 Continue to place windows in the wall, and press *ENTER*.

Adding an Opening to a Wall

Use this procedure to place one or more openings in a wall.

Inserting an opening in a wall



1 Select a wall.

2 Click Home tab ➤ Build panel ➤ Door drop-down ➤ Opening .

3 Specify the settings for the opening.

For more information about adding openings, see Creating an Opening with User-Specified Settings on page 1337.

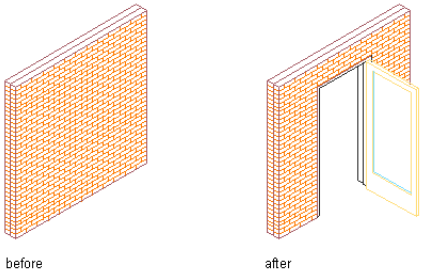
4 Specify an insertion point along the wall.

5 Continue to place openings in the wall, and press *ENTER*.

Adding a Door to a Wall

Use this procedure to place one or more doors in a wall.

Inserting a door in a wall



1 Select a wall.

2 Click Home tab ➤ Build panel ➤ Door drop-down ➤ Door .

3 Specify the settings for the door.

For more information about adding doors, see Creating a Door on page 1218.

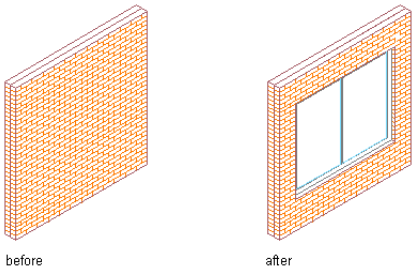
4 Specify an insertion point along the wall.

5 Continue to place doors in the wall, and press *ENTER*.

Adding a Door/Window Assembly to a Wall

Use this procedure to place one or more door/window assemblies in a wall.

Inserting a door/window assembly in a wall



1 Select a wall.

2 Click Home tab ➤ Build panel ➤ Door drop-down ➤ Door/Window Assembly .

3 Specify the settings for the door/window assembly.

4 Specify an insertion point along the wall.

5 Continue to place door/window assemblies in the wall, and press *ENTER*.

Removing Windows, Openings, Doors, or Door/Window Assemblies from a Wall

Select the objects you want remove from the wall, and press *DELETE*. The wall repairs itself where the objects were located.

Anchoring an Object to a Wall

Use this procedure to move objects to a different wall by anchoring the objects.

An anchored object is constrained by the wall. You can move the object along the wall, but the object does not move from the wall unless you detach the object. Objects anchored to walls follow connected wall segments.

The center of the bottom face of the object is anchored to the insertion point on the bottom face of the wall, which is midway in the wall width.

NOTE By default, doors, openings, windows, and window assemblies are anchored to the walls these objects are added to.

1 Select the object to attach to the wall, and do one of the following:

If the selected object is …	Then …
a window	click Window tab ➤ Anchor panel ➤ Set
an opening	click Opening tab ➤ Anchor panel ➤ Set
a door	click Door tab ➤ Anchor panel ➤ Set
a door/window assembly	click Door/Window Assembly tab ➤ Anchor panel ➤ Set

2 Select the wall to attach the object to.

Detaching Objects from a Wall

Use this procedure to detach an object that is anchored to a wall. When you detach an object, the object is no longer constrained by the wall and can be moved off the wall.

1 Select the object to release from the wall.

2 Do one of the following:

If the selected object is …	Then …
a window	click Window tab ➤ Anchor panel ➤ Release .
an opening	click Opening tab ➤ Anchor panel ➤ Release .
a door	click Door tab ➤ Anchor panel ➤ Release .
a door/window assembly	click Door/Window Assembly tab ➤ Anchor panel ➤ Release .

The object remains in place but is no longer constrained to the wall. The wall no longer cleans up around the object.

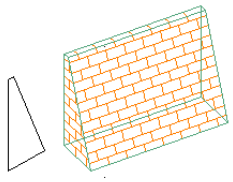
Creating Special Conditions and Customized Wall Surfaces

Wall sweeps, wall (plan) modifiers, body modifiers, and interference conditions are features that you can use to create special conditions, such as chases, and to customize wall surfaces.

Wall Sweeps Created from Profiles

A wall sweep is a wall or a wall component whose shape is extruded horizontally from a profile that was created from a closed polyline. The profile "sweeps" along the length of the wall to define the shape of the wall or the wall component.

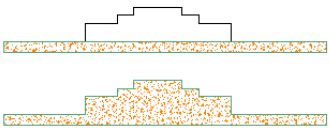
Profile and resulting wall sweep



Wall (Plan) Modifiers Created from Polylines

Wall modifiers use the 2-dimensional (2D) geometry of an open polyline to customize the shape of a wall or a wall component. To use wall modifiers, you draw a polyline in the shape you need and create a wall modifier style from the polyline. You can then add wall modifiers of that style to any wall.

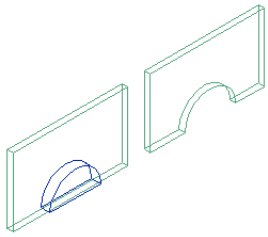
Polyline and resulting wall modifier



Body Modifiers Created from 3D Objects

Body modifiers use the 3-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to, subtract from, or completely replace one component in a wall. If the wall has only one component, the body modifier applies to the entire wall. If the wall has multiple components, the modifier applies only to the component that you specify.

Barrel Vault mass element and resulting body modifier subtracted from a wall



Interference Conditions Created from 3D Objects

Interference conditions use the geometry of 3D objects to create custom openings or cutouts in walls. You can specify how the interference condition is applied to the wall: added to the wall, subtracted to the wall, or ignored.

Interference conditions apply to all wall components that the interfering object touches. The wall stops at the interference condition. The way in which you apply the interference condition to the wall determines how the shrinkwrapping of the wall is affected by the condition in plan view. In model views, the interference condition is always subtractive, regardless of the shrinkwrapping option you selected.

When you edit the object that acts as the interference condition, the wall changes to accommodate the changes to the geometry of the object. For example, you can move the interfering object to change its location on the wall.

A Cylinder mass element added as an additive interference condition

Working with Wall Sweeps

A wall sweep is a wall or a wall component whose shape is extruded horizontally from a profile that was created from a closed polyline. The profile “sweeps” along the length of the wall to define the shape of the wall.

The height and the width of the polyline you use to create the profile define the height and the width of the wall component.The profile is not scaled when swept on the wall. The insertion point of the profile becomes the lower-left corner of the wall component.

After you create wall sweeps, you can miter wall sweeps that meet at a corner. You can also change how the sweep is applied to the wall:

- You can edit the geometry that defines a sweep.
- You can assign a sweep profile to a different wall component.
- You can adjust the miter angles at each end of a wall that has a sweep profile.
- You can remove a sweep profile from a wall or a wall component.

Creating a Profile for a Wall Sweep

Use this procedure to create a profile from a closed polyline. You can then sweep the profile along the length of a wall or a wall component to create a wall with a custom shape.

The height and the width of the polyline you use to create the profile define the height and the width of the wall component. The profile is not scaled when swept on the wall. The insertion point of the profile becomes the lower-left corner of the wall component.

You can also define the shape of a wall sweep as you add it to a wall, using the Start from Scratch option. You may find that option easier to use because you can define the shape in place on the wall. You may want to separately create a profile as described in this procedure if the shape is highly complex or contains many arcs.

1 Draw a closed polyline of the shape needed for the resulting wall component.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Specify the insertion point of the profile.

The point you specify becomes the lower-left corner of the wall component.

4 Press *ENTER*.

5 Enter a name for the profile, and click OK.

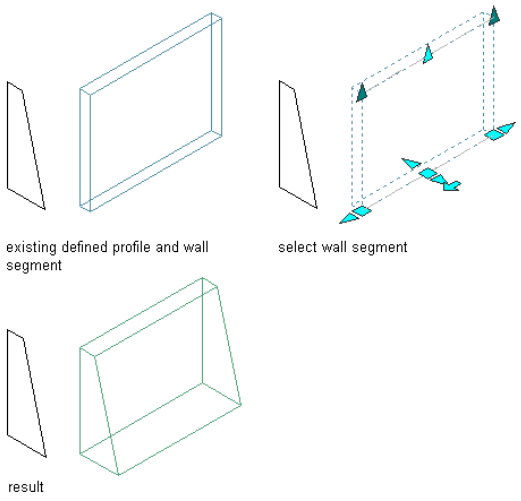
You can now use the profile as a wall sweep to replace a wall component. For more information, see Adding a Sweep to a Wall on page 824.

Adding a Sweep to a Wall

Use this procedure to create a custom wall or a wall component by defining its shape from a profile.

You can create the profile as you add it to a wall. However, if the shape you need is elaborate and has curved segments, you may find it easier to create the profile from a polyline first. You can then add the profile to the wall. For more information, see Creating a Profile for a Wall Sweep on page 824.

Adding a sweep profile to a wall



1 Select the walls to sweep.

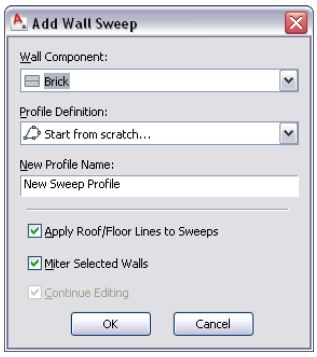
2 Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Add .

3 Select the component to which to apply the sweep.

4 Select the profile to use for the sweep.

If you want to define the sweep after you apply it to the component, select Start from scratch, and enter a name for the profile.

Specifying settings for a wall sweep



5 Specify how the sweep is applied to the wall:

If you want to …	Then …
apply existing roof line or floor line conditions to the sweep	select Apply Roof/Floor Lines to Sweeps.
use the geometry of the sweep to define the roof line and the floor line	clear Apply Roof/Floor Lines to Sweeps.
miter the intersection of the wall containing the sweep and other walls	select Miter Selected Walls.
prevent mitering the intersection of the wall containing the sweep and other walls	clear Miter Selected Walls. You can miter the walls later, if needed. You can also adjust the miter angles.
change the geometry of the sweep when it is applied to the wall	select Continue Editing. For more information about editing the profile, see Editing the Geometry of a Wall Sweep on page 825.
use the existing geometry of the profile to define the sweep	clear Continue Editing.

6 Click OK.

TIP To create additional walls with the same sweep condition, select the wall with the sweep, and click Wall tab ➤ General panel ➤ Add Selected .

Editing the Geometry of a Wall Sweep

Use this procedure to change the shape of a wall component that was defined with a wall sweep. You can select a different profile to change the appearance of the sweep, or you can edit the current profile.

If you want to remove a wall sweep, apply the sweep to a different wall component, or change how the sweep cleans up with intersecting walls, see Managing Wall Sweeps on page 830.

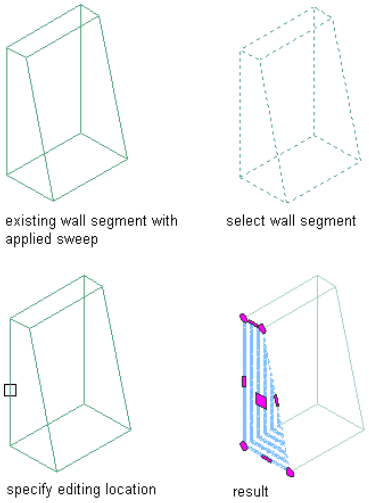
Use this procedure to display wall sweep edit in-place grips

1 Select the wall that has the sweep you want to change.

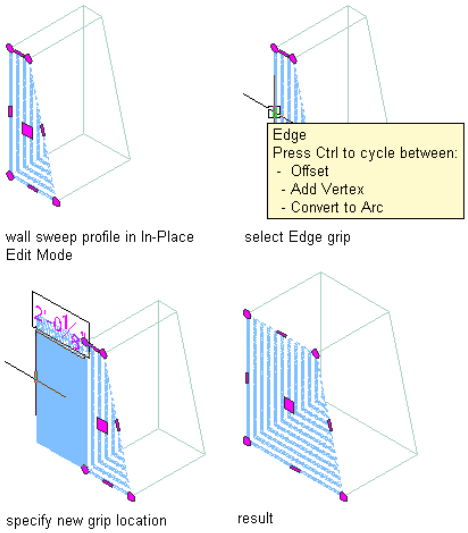
2 Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Edit Profile In Place .

3 Select a location on the wall where the shape of the sweep will be convenient to edit.
A temporary profile is created for you to edit the geometry of the sweep.

Viewing Wall Sweep Edit In Place Grips



Offsetting an edit in-place wall sweep profile edge



Use this procedure to offset an edit in-place wall sweep profile edge

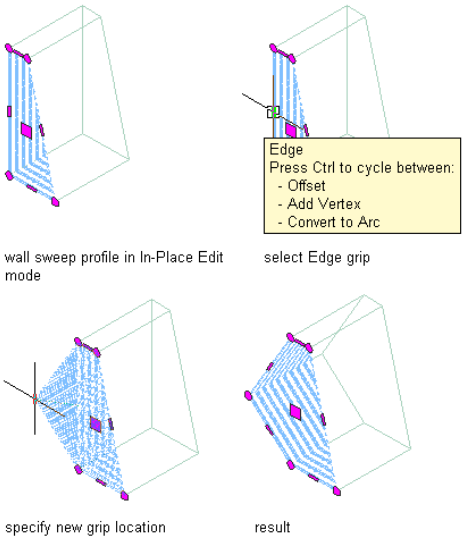
1 Select the wall that has the sweep you want to change.

2 Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Edit Profile In Place .

3 Select a location on the wall where the shape of the sweep will be convenient to edit.
A temporary profile is created for you to edit the geometry of the sweep.

4 Select the Edge grip and specify a new grip location.
The wall sweep profile now has an offset edge.

Adding a vertex to an edit in-place wall sweep profile edge



Use this procedure to add a vertex to an edit in-place wall sweep profile edge

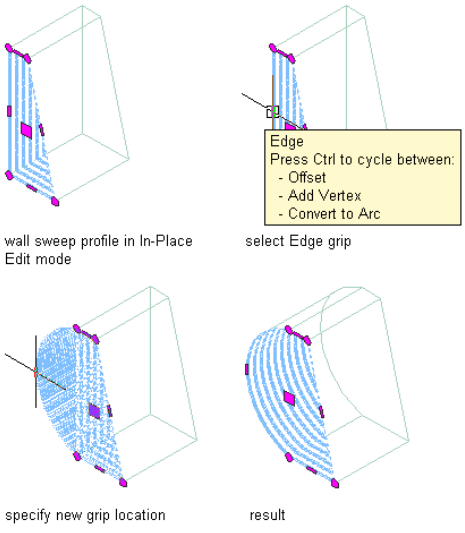
1 Select the wall that has the sweep you want to change.

2 Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Edit Profile In Place .

3 Select a location on the wall where the shape of the sweep will be convenient to edit.
A temporary profile is created for you to edit the geometry of the sweep.

4 Select the Edge grip, press *CTRL* and specify a new grip location.
The wall sweep profile now has a new edge vertex.

Converting an edit in-place wall sweep profile edge to an arc



Use this procedure to convert an edit in-place wall sweep profile edge to an arc

1 Select the wall that has the sweep you want to change.

2 Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Edit Profile In Place .

3 Select a location on the wall where the shape of the sweep will be convenient to edit.

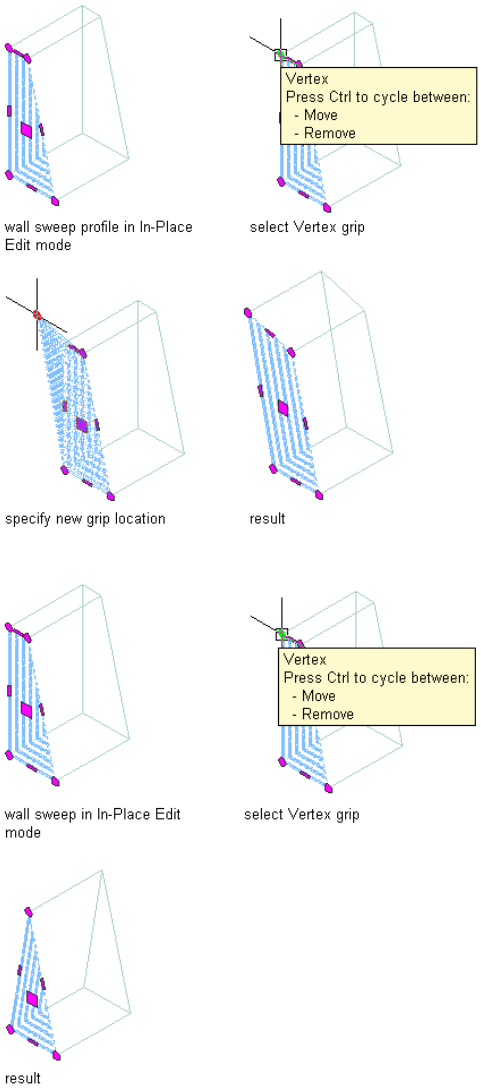
A temporary profile is created for you to edit the geometry of the sweep.

4 Select the Edge grip, press *CTRL* twice, and specify a new grip location.

The wall sweep profile edge is now an arc.

1 **NOTE** After you perform an editing task, you may need to select the profile again to perform another editing task.

Moving an edit in-place wall sweep vertex



Edit the profile:

If you want to …	Then …
change the location of the sweep	select the Insertion Point grip, and move it to the desired position.

If you want to …	Then …
change the shape of the perimeter of the profile or its rings	select the profile, and use grips to adjust the shape. The Edge grip has 3 edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.
add vertices to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
remove vertices from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click.
replace an existing ring of the profile with new geometry	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
add a ring to the profile to subtract an area from the profile	draw the linework in place on the temporary profile. Select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Ring . Select the geometry to define the ring. Press *ENTER* to keep the geometry, or enter **y** (Yes) to erase it.
remove a ring from the profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Select the ring to remove, and press *ENTER*. This option does not appear if the profile has only one ring.

2 Save or discard the changes:

If you want to …	Then …
restore the sweep to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current profile	click Edit In Place tab ➤ Edits panel ➤ Finish .The sweep uses the edited profile to define its geometry.

If you want to …	Then …
	Any other objects or styles that use this profile are also updated with the edited geometry.
save the changes to a new profile	click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new profile, and click OK. The sweep uses the new profile to define its geometry. Other styles or objects that use the original profile are not affected.

Mitering Walls with Sweeps

Use this procedure to miter intersecting walls whose shape is defined by a wall sweep.

NOTE If you miter the end of walls, no endcaps are drawn.

1. Select a wall with a sweep that you want to miter.
2. Click Wall tab ➤ Modify panel ➤ Sweep drop-down ➤ Miter .
3. Select the second wall.

   To adjust the angles of the mitered walls, see Managing Wall Sweeps on page 830.

Managing Wall Sweeps

Use this procedure to edit or remove a wall sweep from an individual wall. You can change the component the sweep is applied to. You can also change the miter angles at each end of the sweep and the offsets in the wall.

1. Double-click the wall you want to change.
2. On the Properties palette, expand Advanced, and expand Worksheets.
3. Select the setting for Sweeps.
4. Select a wall sweep, and change its settings:

If you want to …	Then …
change the profile used to define the geometry of the sweep	select a different profile for Profile.
apply the sweep to a different wall component	select a different component for Component.
change the miter angles at each end of the wall	enter different values for Start Miter and End Miter.
offset the sweep within the wall	enter a value for Offset Within.
vertically offset the sweep	enter a value for Offset Vertical.
delete the sweep from the wall component	click .

5. Click OK.

Working with Wall Modifiers

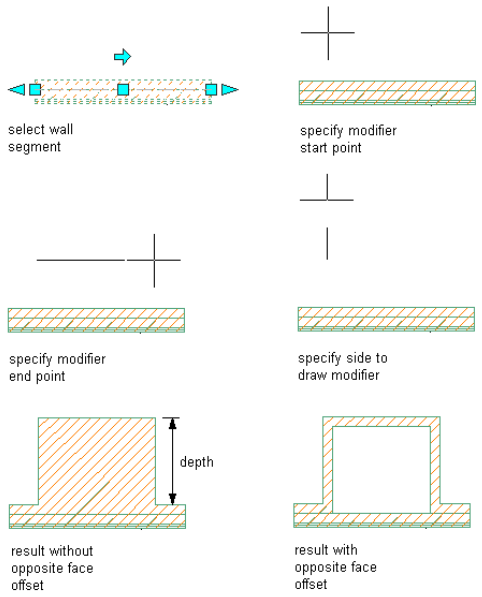
Wall modifiers (also called plan modifiers) use the 2-dimensional (2D) geometry of an open polyline to customize the shape of a wall or a wall component. To use wall modifiers, you draw a polyline in the shape you need and create a wall modifier style from the polyline. You can then add wall modifiers of that style to any wall. A wall can have more than one wall modifier attached to it.

Placing a Wall Modifier on a Wall

You specify the placement of a wall modifier, including its vertical and horizontal position and its depth. The wall modifier can be added at the drawn size of the polyline or scaled to a specific size. The wall modifier is then extruded vertically along the wall surface.

You can add the wall modifier to one or both sides of the wall. When you select the face, you can also offset the wall modifier from the opposite face to create a bump-out, such as for pipe chases or interior columns.

Applying wall modifiers to a wall



Editing a Wall Modifier

After placing a wall modifier, you can adjust its placement, or assign the modifier to a different wall component. You can also edit the geometry of the wall modifier, and save the changes to the current wall modifier style or to a new style.

Display Properties and Materials for Wall Modifiers

Wall modifiers take on the material assignment and the display properties of the wall component they are assigned to. This allows you to use the same wall modifier on different types of walls.

Wall Modifier Styles

You save the geometry of a wall modifier as a wall modifier style. You can create the style when you add the wall modifier to a wall. You can also create a wall modifier first and then apply it to walls as needed.

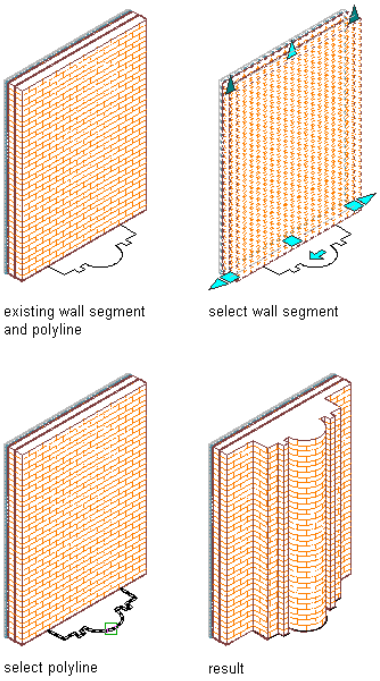
To create, edit, copy, or purge wall modifier styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture to work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Converting a Polyline to a Wall Modifier

Use this procedure to create a wall modifier from an open polyline. You can draw the polyline in the location for the wall modifier, or you can project the modifier you create to the wall. The polyline cannot be closed.

The wall modifier you create is added to the selected wall and is also saved as a wall modifier style that you can apply to other walls.

Converting a polyline to a wall modifier



1 Draw the polyline in the shape of the wall modifier.

2 Select a wall to which you want to apply a wall modifier.

3 Click Wall tab ➤ Modify panel ➤ Plan Modifiers drop-down ➤ Convert Polyline To Wall Modifiers .

4 Select the polyline.

5 Enter **y** (Yes) to erase the selected polyline, or enter **n** (No) to keep the polyline in the drawing.

6 Enter a name for the wall modifier style created from the polyline, and click OK.

7 Select the wall component to which the wall modifier applies.

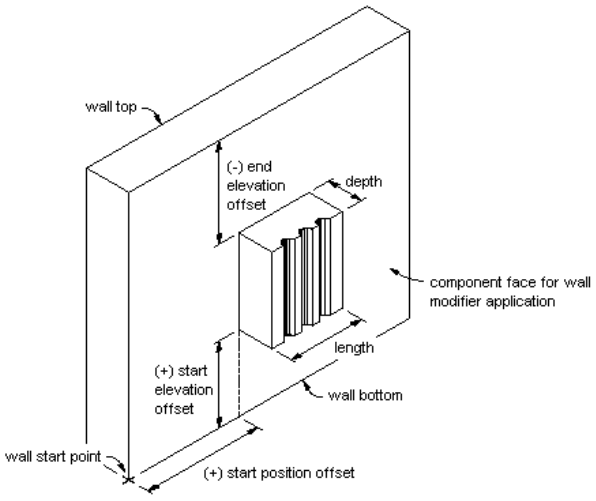
8 To offset the opposite face of the selected component in the shape of the wall modifier, select Offset Opposite Face.

9 Specify the vertical position of the modifier on the wall component:

If you want to …	Then …
specify the beginning height of the wall modifier	enter a value for Start Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.
specifying the ending height of the wall modifier	enter a value for End Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.

Enter a negative offset value to specify a location toward the ground.

Placing a wall modifier offset from the wall start point, the wall bottom, and the wall top

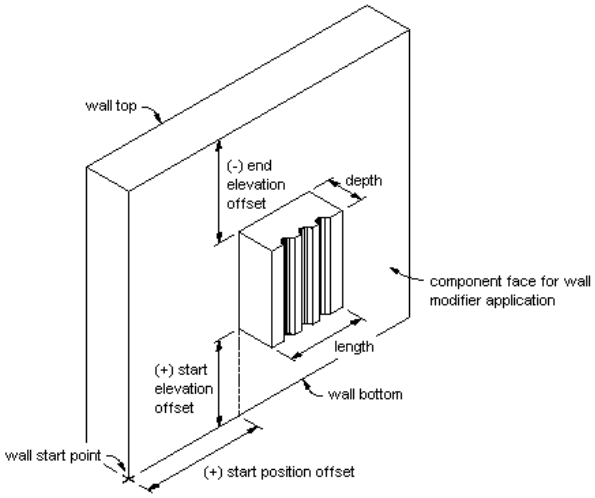


10 Click OK.

Adding an Existing Wall Modifier to a Wall

Use this procedure to add a wall modifier of an existing wall modifier style to a wall. You can apply the modifier to one or both sides of the wall or the component. The left and right sides of the wall are determined from the start and endpoints of the wall.

Placing a wall modifier offset from the wall start point, the wall bottom, and the wall top



1 Select the wall to which you want to apply a wall modifier

2 Click Wall tab ➤ Modify panel ➤ Plan Modifiers drop-down ➤ Add .

3 Select the start point for the wall modifier.

After you select the first point, a temporary line is displayed to show you the length of the modifier.

4 Select the endpoint for the modifier.

5 Select the side of the wall to draw the modifier.

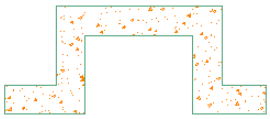
6 Enter the depth for the wall modifier.

7 Select the wall modifier style.

8 Select the name of the component to apply the modifier to.

9 To offset the opposite face of the selected component in the shape of the wall modifier, select Offset Opposite Face.

Offsetting a wall modifier from the opposite face of a wall component



10 Specify the vertical position of the modifier on the wall component:

If you want to …	Then …
specify the beginning height of the wall modifier	enter a value for Start Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.
specifying the ending height of the wall modifier	enter a value for End Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.

Enter a negative offset value to specify a location toward the ground.

11 Click OK.

After you add a wall modifier, you can edit its geometry or adjust its placement.

Editing the Geometry of a Wall Modifier

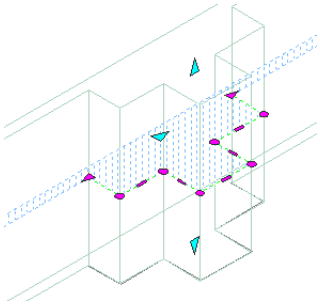
Use this procedure to edit the geometry of a wall modifier that is applied to a wall. You can edit the vertices and edges of the wall modifier or replace the geometry with that of another polyline. You can save the changes to the current wall modifier style or to a new style.

To move a wall modifier horizontally or change the vertical offsets of a wall modifier, see Changing the Horizontal and Vertical Offsets of a Wall Modifier on page 836.

1 Select the wall that has the wall modifier you want to change.

2 Click Wall tab ➤ Modify panel ➤ Plan Modifiers drop-down ➤ Edit Profile In Place .

3 If prompted that the modifier is not drawn to size, click Yes.



A temporary profile is created for you to edit the geometry of the wall modifier. If the wall contains multiple wall modifiers, a profile is created for each wall modifier.

4 NOTE After you perform an editing task, you may need to select a profile again to perform another editing task.

Edit the profile:

If you want to …	Then …
change the shape of the perimeter of the profile	select the profile, and use grips to adjust the shape.
hide one or more edges of the profile (plan view only)	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Hide Edge . Select the edges you want to hide, and press *ENTER*.
display an edge that you hid	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Show Edge . Select the edges you want to show, and press *ENTER*.
add vertices to the profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Vertex . Select a point for each new vertex, and press *ENTER*.
remove vertices from the profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Select each vertex to remove, and press *ENTER*.
replace a profile with new geometry	select the profile, and click Click Edit In Place tab ➤ Profile panel ➤ Replace Modifier . Select the modifier to replace, and select a polyline to define the new geometry. Press *ENTER* to keep the polyline in the drawing, or enter **y** (Yes) to erase it. The start and endpoints of the new polyline must be the same as those for the original wall modifier.
remove a wall modifier	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Modifier . If the wall has multiple wall modifiers, select the wall modifier to remove, and press *ENTER*.

5 Save or discard the changes:

If you want to …	Then …
restore the wall modifier to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current wall modifier style	click Edit In Place tab ➤ Edits panel ➤ Finish .The wall modifier and the wall modifier style use the edited profile to define its geometry. Any other walls that use this wall modifier style are also updated with the edited geometry.

If you want to …	Then …
save the changes to a new wall modifier style	click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new wall modifier, and click OK. The wall modifier uses the new style to define its geometry. Other walls that use the original style are not affected.

Changing the Horizontal and Vertical Offsets of a Wall Modifier

Use this procedure to change the horizontal position of a wall modifier applied to a wall, or to change its vertical position on a wall.

1 Select the wall that has the wall modifier you want to change.

2 Click Wall tab ➤ Modify panel ➤ Plan Modifiers drop-down ➤ Edit Profile In Place .

3 If prompted that the modifier is not drawn to size, click Yes.

A temporary profile is created for you to edit the geometry of the wall modifier. If the wall contains multiple wall modifiers, a profile is created for each wall modifier.

NOTE After you perform an editing task, you may need to select a profile again to perform another editing task.

4 Change the placement of the wall modifier:

If you want to …	Then …
move the wall modifier horizontally along the wall	select the Move grip, and move the grip to reposition the wall modifier. After you select the grip, you can also enter a value to move the wall modifier a specified distance.
position the wall modifier relative to the top of the wall	select an isometric view. Select the Offset from top of wall grip, and move the grip to reposition the wall modifier. After you select the grip, you can also enter a value to move the wall modifier a specified distance from the top of the wall.
position the wall modifier relative to the bottom of the wall	select an isometric view. Select the Offset from bottom of wall grip, and move the grip to reposition the wall modifier. After you select the grip, you can also enter a value to move the wall modifier a specified distance from the bottom of the wall.

5 If necessary, continue editing the wall modifier as described in Editing the Geometry of a Wall Modifier on page 834.

6 Save or discard the changes:

If you want to …	Then …
restore the wall modifier to its original position	click Edit In Place tab ➤ Edits panel ➤ Cancel .

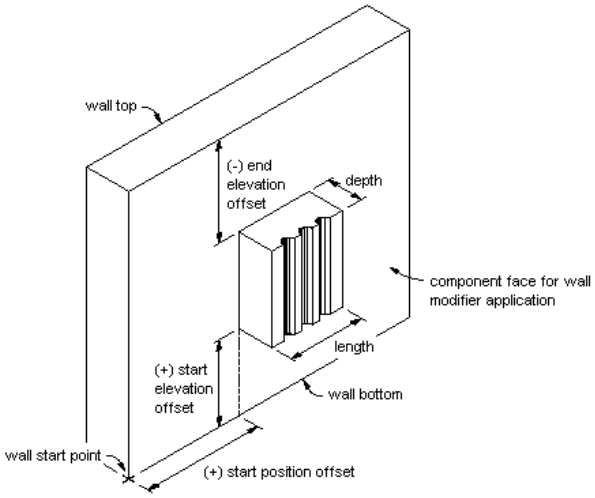
If you want to …	Then …
save the changes to the current wall modifier style	click Edit In Place tab ➤ Edits panel ➤ Finish The wall modifier and the wall modifier style use the edited profile to define its geometry. Any other walls that use this wall modifier style are also updated with the edited geometry.
save the changes to a new wall modifier style	click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new wall modifier style, and click OK. The wall modifier uses the new style to define its geometry. Other walls that use the original style are not affected.

Adjusting the Placement of a Wall Modifier

Use this procedure to adjust the placement of a wall modifier that you added to a wall. You can also add or remove wall modifiers using this procedure. You can also graphically adjust the placement of a wall modifier. For more information, see Changing the Horizontal and Vertical Offsets of a Wall Modifier on page 836.

To edit the shape of a wall modifier, see Editing the Geometry of a Wall Modifier on page 834.

Placing a wall modifier offset from the wall start point, the wall bottom, and the wall top



1. Double-click the wall that has the modifier you want to change.
2. On the Properties palette, expand Advanced, and expand Worksheets.
3. Select the setting for Plan Modifiers.
4. Under Style, select the wall modifier you want to change.
5. If needed, select a different modifier style or component name, and specify which sides to apply the modifier to.
6. Enter a value for Start Position Offset and specify whether the offset occurs from the wall start point, the wall endpoint, or the midpoint of the wall.

   These settings specify the start point of the modifier along the length of the wall. You can enter a negative value to specify an offset in the reverse wall direction.

7 Edit the vertical position of the modifier on the wall component:

If you want to …	Then …
specify the beginning height of the wall modifier	enter a value for Start Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.
specifying the ending height of the wall modifier	enter a value for End Elevation Offset, and specify whether the offset occurs from the wall top, the wall base height, the wall baseline, or the wall bottom.

Enter a negative offset value to specify a location toward the ground.

8 Edit settings to control the size and placement of the modifier:

If you want to …	Then …
place the modifier at the size it was defined in the modifier style	select Use Drawn Size.
specify the length and the depth of the modifier on the wall	clear Use Drawn Size, and enter values for Length and Depth.
mirror the modifier in the X direction	select Mirror X.
mirror the modifier in the Y direction	select Mirror Y.
measure the modifier to the center of the wall	select Measure to Center.

9 To remove a modifier, select the modifier, and click .

10 Click OK.

Removing Wall Modifiers

Use this procedure to remove a wall modifier from an individual wall or a wall component.

NOTE If you offset the modifier to the opposite face of the wall or the wall component when you applied the modifier, you must remove the wall modifier from each face.

1 Select the wall that has the wall modifier you want to remove.

2 Click Wall tab ➤ Modify panel ➤ Plan Modifiers drop-down ➤ Remove .

3 Select the modifier.

4 Enter **y** (Yes) to create a polyline in the shape of the modifier, or enter **n** if you do not want to create a polyline.

Creating a Wall Modifier Style

Use this procedure to create a wall modifier style from a polyline. The shape of the polyline defines the shape of the wall modifier. After you create the style, you can add it to a wall or a component of a wall. To create a wall modifier style and apply it to a wall at the same time, see Converting a Polyline to a Wall Modifier on page 832.

To edit a wall modifier style, add the wall modifier to a wall, and then edit the geometry of the wall modifier. For more information, see Adding an Existing Wall Modifier to a Wall on page 833 and Editing the Geometry of a Wall Modifier on page 834.

1 Draw an open polyline in the shape you want to use for the wall modifier.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects.

4 Right-click Wall Modifier Styles, and click New.

5 Enter a name for the new style.

6 Right-click the new style, and click Set From.

7 Select the polyline.

8 Click OK.

Attaching Notes or Files to a Wall Modifier Style

Use this procedure to enter notes and attach reference files to a wall modifier style. You can also edit notes and edit or detach reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Modifier Styles.

3 Select the wall modifier style that you want to change.

4 Click the General tab.

5 To add a description to the style, enter it for Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Working with Body Modifiers

Body modifiers use the 3-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to, subtract from, or completely replace one component in a wall. If the wall has only one component, the body modifier applies to the entire wall. If the wall has multiple components, the modifier applies only to the component that you specify.

If you add the body modifier to a wall component, or use a body modifier to replace the component, the body modifier uses the material assignment and display properties of the wall component.

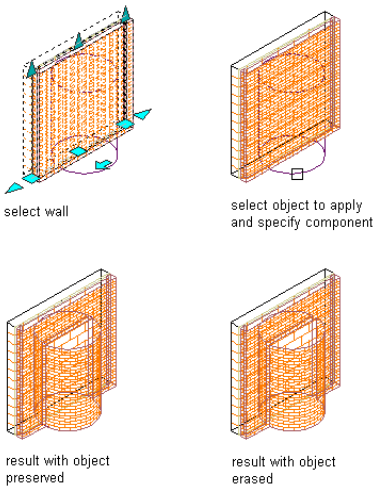
After you create a body modifier from an object, you can delete the original object. However, if you have created a complex object, such as a mass group comprising many mass elements, you may want to retain the object in the drawing until you are sure you have the results you want for the wall.

Adding a Body Modifier to a Wall

Use this procedure to create a body modifier and add it to a wall. You can apply the modifier to a single-component wall, or to a component in a multi-component wall.

You can create a 3-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

Adding a body modifier to a wall component



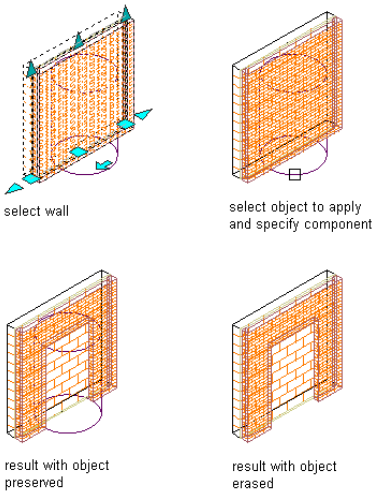
1. Place the object in the location where you want to add the body modifier to the wall.
2. Select the wall to which you want to add the body modifier.
3. Click Wall tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .
4. Select the object to add to the wall.
5. Select the wall component to add the object to.
6. Select Additive or Additive Cut Openings for Operation.
7. Enter a description for the body modifier.
8. Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.
9. Click OK.

Subtracting a Body Modifier from a Wall

Use this procedure to create a 3-dimensional (3D) body modifier and subtract it from a wall. You can apply the modifier to a single-component wall, or to a component in a multi-component wall.

You can create a body modifier from a mass element, a mass group, or any other AEC object with mass. You must place the object in the location you want in the drawing before defining the object as a body modifier.

Subtracting a body modifier from a wall component



1 Place the object in the location where you want to subtract the body modifier from the wall.

2 Select the wall from which you want to subtract the body modifier.

3 Click Wall tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .

4 Select the object to subtract from the wall.

5 Select the wall component to subtract the object from.

6 Select Subtractive for Operation.

7 Enter a description for the body modifier.

8 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

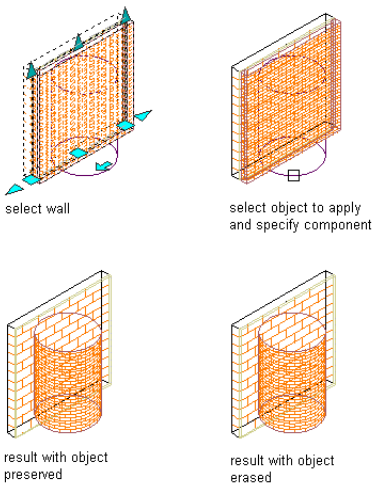
9 Click OK.

Replacing a Wall with a Body Modifier

Use this procedure to create a 3-dimensional (3D) body modifier and replace a wall or a wall component with the modifier. You can apply the modifier to a single-component wall, or to a selected component in a multi-component wall.

You can create a 3D body modifier from a mass element, a mass group, or any other AEC object with mass. You must place the object in the location you want in the drawing before defining the object as a body modifier.

Replacing a wall component with a body modifier



1 Place the object in the location where you want to replace the wall with the body modifier.

2 Select the wall that you want to replace with the body modifier.

3 Click Wall tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .

4 Select the object to replace the wall or wall component.

5 Select the wall component you want the object to replace.

6 Select Replace for Operation.

7 Enter a description for the body modifier.

8 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

9 Click OK.

Editing the Geometry of a Body Modifier

Use this procedure to edit the shape of a body modifier that is attached to a wall. You can edit the body using grips to edit faces, using Boolean commands to add or remove other objects from the body modifier, and other editing commands to change its shape.

1 Select the wall that has the body modifier you want to change.

2 Click Wall tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Edit In Place .

A temporary mass element is created for you to edit the geometry of the body modifier. If the wall contains multiple body modifiers, a mass element is created for each body modifier. If object was not originally a mass element (for example, if you used a slab as a body modifier), the object becomes a temporary Free Form mass element with faces that you can edit.

NOTE After you perform an editing task, you may need to select a profile again to perform another editing task.

3 Edit the body modifier:

If you want to …	Then …
change the shape of a body modifier that is a Free Form mass element	select the body modifier. Select a Face grip to activate edge grips for the face. Move the grips to the desired

If you want to …	Then …
	locations. Continue editing other faces in the same manner.
change the shape of a body modifier that is a conventional mass element	select the body modifier. Select grips and move them to change the shape of the body modifier. The grips that are available depend on the type of mass element used as a body modifier and the current view direction.
add an object to a body modifier	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Union . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
subtract an object from a body modifier	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Subtract . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
create a body modifier that is the intersection of the original body modifier with another object	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Intersect . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
trim a body modifier	select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Trim By Plane . Specify the points that define the trim plane, and select the side of the body modifier to be trimmed. The trimmed body modifier is converted to a Free Form mass element.
divide the face of a body modifier into 2 faces	select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Split Face . Specify the points that define the edge created by splitting the faces.
join 2 faces that are on the same plane into a single face	select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Join Faces . Select the edge that separates the coplanar faces.
remove a body modifier	select the object that forms the body modifier, and press *DELETE*.

4 Save or discard the changes:

If you want to …	Then …
restore the body modifier to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the body modifier	click Edit In Place tab ➤ Edits panel ➤ Finish . The body modifier uses the edited mass element to define its geometry.

Managing Body Modifiers

Use this procedure to edit or remove 3-dimensional (3D) body modifiers from an individual wall. You can change the component the body modifier is added to and select a different operation. You can also enter or edit the descriptions of body modifiers.

NOTE To remove a body modifier from a wall component and restore the modifier as a mass element that you can edit or apply to other walls, see Restoring a Body Modifier to a Mass Element on page 844.

1 Double-click the wall you want to change.

2 Expand Advanced, and expand Worksheets.

3 Click the setting for Body modifiers.

4 Select a body modifier, and change its settings:

If you want to …	Then …
apply the body modifier to a different wall component	select a different component for Component.
change the operation used to apply the body modifier to the wall	select a different operation for Operation: ■ Select Additive or Additive Cut Openings to add the body modifier to the wall component. ■ Select Subtract to subtract the shape of the body modifier from the wall component. ■ Select Replace to replace the wall component with the body modifier.
delete the body modifier from the wall component	select the body modifier, and click .
enter a description of the body modifier	click Description, enter text, and press *ENTER*.

5 Click OK.

Restoring a Body Modifier to a Mass Element

Use this procedure to remove a body modifier from a wall and add it to the drawing as a mass element. Restoring a body modifier to a mass element allows you to modify the shape as a mass element and then add it to the wall again as a body modifier. You can also restore the body modifier to a mass element while leaving the body modifier still applied to the wall. This is useful if you want to create other walls with the same shape.

If the object used to create the body modifier was a conventional mass element, it is restored to that mass element. For example, a Gable mass element is restored as a Gable mass element. However, if the body modifier was created from another object, such as a slab, or was edited using Boolean operations or face editing commands, the body modifier is restored as a Free Form mass element.

1 Select the walls you want to change.

2 Click Wall tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Restore .

3 **NOTE** This procedure restores all body modifiers attached to a wall.

Create mass elements from the body modifiers:

If you want to …	Then …
create mass elements from the body modifiers while keeping the body modifiers attached to the wall	press *ENTER*.
remove *all* body modifiers from the wall, and create mass elements from their shapes	enter **y** (Yes), and press *ENTER*.

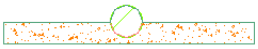
Working with Interference Conditions

Interference conditions use the geometry of 3-dimensional (3D) objects to create custom openings or cutouts in walls. You can specify how the interference condition is applied to the shrinkwrapping of a wall: added to the wall, subtracted to the wall, or ignored.

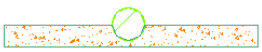
How Interference Conditions Affect the Display of Walls

Unlike wall modifiers and body modifiers, which apply to a selected wall component, interference conditions apply to all wall components that the interfering object touches. The wall stops at the interference condition. The way in which you apply the interference condition to the wall determines how the shrinkwrapping of the wall is affected by the condition in plan view:

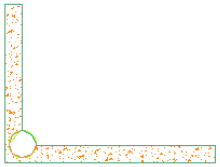
- Add the interference condition to include the condition in the shrinkwrapping.



- Subtract the interference condition to exclude the object from the shrinkwrapping.



- Ignore the interference condition to draw the shrinkwrapping as if the object were not there. You also use the ignore option to add interference conditions applied to one wall to subsequent walls.



In model views, the interference condition is always subtractive, regardless of the shrinkwrapping option you selected.

Editing Interference Conditions

When you edit the object that acts as the interference condition, the wall changes to accommodate the changes to the geometry of the object. For example, you can move the interfering object to change its location on the wall. Moving the object off the wall does not remove the interference condition for the object.

You can also change how interference conditions are applied to a wall, and you can delete interference conditions.

Adding an Interference Condition

Use this procedure to place objects, such as mass elements, in walls to create custom openings or cutouts in the wall. An example is a column grid structure where columns are connected by walls.

When you define the interference condition, you specify how the wall shrinkwrapping in plan views is affected by the interfering object. You can specify that the object be added to the wall, subtracted from it, or ignored. The option you select affects the wall only in plan views. In model display representations, interference is always subtracted from a wall, regardless of the option you select in this procedure.

NOTE If you want to apply the same object as the interference condition for multiple walls, such as walls that meet at a corner, use the ignore option for subsequent walls after the first wall. In plan views, the effect is additive for all the walls to which you apply the interference condition.

The shrinkwrap display component must be turned on in the display properties of the wall or the wall style for interference to be visible. In most sample wall styles provided with AutoCAD Architecture, shrinkwrap is turned on in plan display representations. For more information about specifying shrinkwrapping for a wall style, see Specifying the Display Properties of a Wall Style on page 860.

1. Place the object in the location where you want to specify the interference condition.
2. Select the wall to which you want to add an interference.
3. Click Wall tab ➤ Modify panel ➤ Interference drop-down ➤ Add .
4. Select the object intersecting the wall, and press *ENTER*.
5. Specify how shrinkwrapping in plan view is applied to the interference condition:

If you want to …	Then …
add the interference condition to the shrinkwrapping	enter **a** (Additive).
take the object shape out of the shrinkwrapping	enter **s** (Subtractive).
ignore the object when shrinkwrapping is applied	enter **i** (Ignore).

Removing an Interference Condition

Use this procedure to remove an object that was added to a wall as an interference condition.

1. Select the walls you want to change.
2. Click Wall tab ➤ Modify panel ➤ Interference drop-down ➤ Remove .
3. Select one or more objects to remove, and press *ENTER*.

4 Enter **r** (Remove) to continue removing interference conditions from other walls, or press *ENTER* to end the command.

Managing Wall Interference Conditions

Use this procedure to change the shrinkwrap effect for an interference condition, or to remove an interference condition from a wall.

1 Double-click a wall with interference conditions.

2 On the Properties palette, expand Advanced, and expand Worksheets.

3 Click the setting for Interference conditions.

4 Select an interference condition.

5 In the Shrinkwrap Effect column, specify the way shrinkwrap is applied to the interference object:

If you want to …	Then …
add the interference condition to the shrinkwrapping	select Add.
take the object shape out of the shrinkwrapping	select Subtract.
ignore the object when shrinkwrapping is applied	select Ignore.

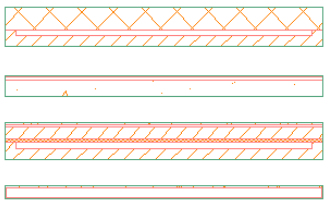
6 To delete the interference condition, select the condition, and click .

7 Click OK.

Wall Styles

Wall styles control the appearance of wall objects. Using wall styles, you can specify dimensions, components, endcaps, materials, and other characteristics to create new types of walls, such as concrete walls, masonry walls, and brick cavity walls. Catalogs provided with AutoCAD Architecture include sample wall styles for common wall types, such as concrete walls with footings or furring, CMU and brick cavity walls, and various stud partition walls.

Wall styles that use various components



Using Materials in Wall Styles

You can use materials to control how walls of each style are displayed in a drawing. You assign materials to the wall components in the style. The components are then displayed using the display properties of the assigned materials.

AutoCAD Architecture provides a large number of predefined materials for common design purposes. You can use these materials, modify them for your project requirements, and define new materials. For more information about materials and how to define them, see Materials on page 577.

Creating Tools from Wall Styles

You can create a wall tool from any wall style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any walls created from the tool. For more information, see Creating a Wall Tool on page 816.

Managing Wall Styles

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Wall Style

Use this procedure to create a wall style. By copying an existing style, you can create a style using default style properties. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Wall Styles.

3 Create a wall style:

If you want to …	Then …
create a style with default properties	right-click Wall Styles, and click New.
create a style from an existing style	right-click the wall style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new wall style, and press *ENTER*.

5 Edit the new wall style:

If you want to …	Then …
enter a description of the style	click the General tab, and enter a description.
specify the endcap styles used for wall openings and the ends of walls of the style	see Applying a Wall Endcap Style to a Wall Style on page 910.
specify the structural components of the style	see Specifying the Components of a Wall Style on page 849.
specify materials for the components of the style	see Specifying the Materials of a Wall Style on page 858.
specify wall hatching, cut plane properties, and other display properties of the style	see Specifying the Display Properties of a Wall Style on page 860.
add classifications to a wall style	see Adding Classifications to a Wall Style on page 864.
add notes and files to the style	see Attaching Notes and Files to a Wall Style on page 865.

6 When you finish specifying the properties of the wall style, click OK.

7 If you want to assign the style to a wall tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Wall Tool on page 816.

8 Click OK.

Adding Property Set Data to a Wall Style

You can add property set data to a wall style. Property set data is necessary if you want to tag a wall in a drawing later or include it in a schedule table. Property set data typically attached to a wall style are automatic properties, like wall height and wall width, or manual properties that are identical for all walls of that style, like the fire rating. For detailed information about property set data, see Property Set Definitions on page 2510.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the wall style you want to change.

4 Click the General tab.

5 Click Property Sets.

6 Click .

If the Add Property Set button is deactivated, no property sets for wall styles have been defined.

7 Select the property set you want to add to the style, and click OK.

The properties in the set are listed in the Edit Property Set Data worksheet.

8 To remove a property set from a style, click , clear the property set from the list, and click OK.

9 Click OK.

Specifying the Components of a Wall Style

Wall components are the physical structures of the components of a wall, such as concrete, CMU, studs, GWB, insulation, and air gaps.

Wall Components and Their Properties

Each component in a wall style corresponds to a structural component of a wall or a wall material, including air gaps in cavity walls. When you create a wall component, you specify the following characteristics of the component:

- The component name, which usually identifies the material used, such as brick, concrete, CMU, or insulation
- The component cleanup priority, which determines how the component cleans up with the components of intersecting walls
- The width (thickness) of the component
- The vertical offset of the component at the bottom and the top of the wall
- The position of the component within the wall, relative to the baseline of the wall and adjacent wall components

- The function of the component within the wall. Possible functions are structural and non-structural components.
- The position of dimension points on the component. Wall components can be dimensioned to the left and right edges and to the component center.

Using Components from Other Wall Styles

In addition to creating a wall component by specifying its individual properties, you can also copy components from other wall styles into a wall style. The Wall Component Browser is a utility that lets you view the components of other wall styles and copy components into the wall style you are editing.

Dimensioning Wall Components

Each wall component can be dimensioned separately. In the wall style, you define the settings for the dimensioning of the components. A wall component can be dimensioned to its left and right edges, or to its center.

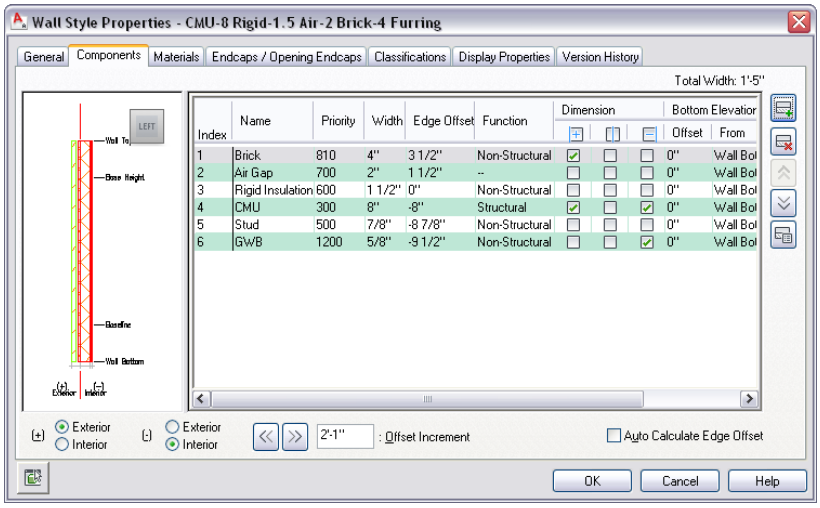
Wall components can be assigned a structural or non-structural function. When the wall is dimensioned, you can choose to dimension all components, or only structural components.

NOTE Additional settings for dimensioning wall components can be set in the AEC dimension style. Here, you can dimension a multi-component wall to its entire width and to the overall wall center. For more information, see Dimension Points for Walls on page 2221 and Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

Components Tab

The Components tab of the Wall Styles dialog lets you view wall components as you specify them.

Specifying the properties of wall components



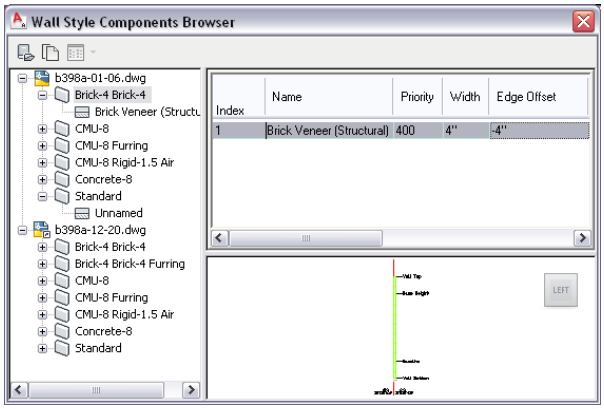
Use the features of the Components tab for the following tasks:

- Add, remove, and edit the properties of wall components for wall style.
- View the components as you specify them.
- Change the order of components relative to other components in the wall style.
- Access the Wall Style Components Browser, which lets you view and copy components from other wall styles in the current drawing and in other drawings.

Wall Style Components Browser

The Wall Style Components Browser is a utility that lets you view and copy wall components from wall styles in the current drawing and in other drawings. You can copy components from these styles to the current wall style. After you add them to the wall style, you can change their properties as needed for the style you are editing.

Viewing wall components from multiple styles and drawings



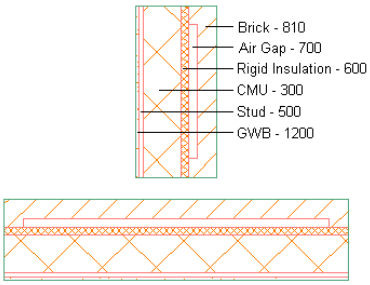
The Wall Style Components Browser has the following features:

Use this feature …	To …
icons	open other drawings, copy wall components, and change the view options for the right pane of the browser.
tree structure in the left pane of the browser	expand wall styles to view the list of components in the style. Select a wall style in the left pane to view the properties of its components and see the wall style in the right pane. You can use the context menu to copy an individual component or all components of a selected style. You can then paste the component(s) in the style you are editing.
right pane of the browser	view the component properties of a selected style, and preview the style in the viewer area of the pane.

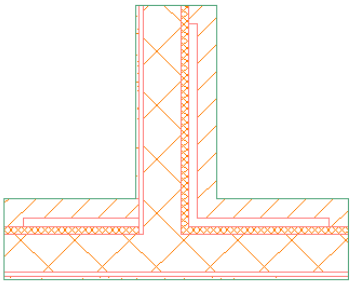
Default Cleanup Priorities of Wall Components

The component priority determines how each wall component cleans up with the components of an intersecting wall. The lower the component index number, the higher the priority of the component when it intersects other walls.

Wall cleanup priorities



wall components and priorities



resulting wall component cleanup

The following table lists the default cleanup priority for components used in sample wall styles provided in AutoCAD Architecture catalogs. You can assign different priorities to wall components in wall styles and individual walls to control cleanup with other walls.

Component	Index
Air Gap	700
Air Gap (Brick/Brick)	805
Air Gap (CMU/CMU)	305
Air Gap (Stud/Stud)	505
Brick	800
Brick Veneer	810
Bulkhead	1800
Casework - Backsplash	2030
Casework - Base	2010
Casework - Counter	2020
Casework - Upper	2000
CMU	300
CMU Veneer	350

Component	Index
Concrete	200
Concrete (Footing)	200
Glass	1200
GWB	1200
GWB (X)	1200,1210,1220,1230
Insulation (CMU/Brick, Stud/Brick)	600
Metal Panel	1000
Precast Panel	400
Rigid Insulation (Brick)	404
Siding	900
Stucco	1100
Stud	500
Toilet Partition	3000

Creating or Editing a Component in a Wall Style

Use this procedure to create a wall component, or to edit existing wall components in a wall style.

You can also add components to a wall style by copying them from other wall styles. For more information, see Adding a Component from Another Wall Style on page 855.

NOTE Only the first 20 components of a wall style are controlled by the display system. Although you can specify more than 20 components in a wall style, it is suggested that you limit the number of components to 20. Components 21 and higher are controlled by material assignment only.

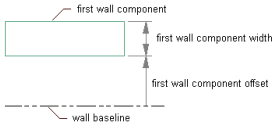
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Wall Styles.
3. Select the wall style that you want to change.
4. Click the Components tab.
5. Click .
6. Enter a name for the new component.
7. Enter the cleanup priority for the component when walls intersect.

   The lower the priority number, the higher the priority of the component when it intersects with the components of other walls. For more information, see Default Cleanup Priorities of Wall Components on page 851.

8 Specify the width of the component:

If you want to …	Then …
specify a fixed width that cannot be edited when you add or edit walls of this style	enter a value for Width.
specify a variable width that can be edited when you add or edit walls of this style	select the setting for Width. Enter a formula that defines how the component width is calculated. For more information, see Specifying the Width and Edge Offset of a Wall Component on page 917.

Adding the first wall component



9 Specify the edge offset, which is the offset of the exterior edge of the component from the baseline:

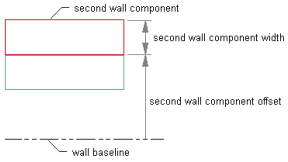
If you want to …	Then …
graphically specify the offset	select the component, select << or >> to offset the component by an increment that you specify. The viewer shows the position of the wall component as you click the icons. The selected component is highlighted in green.
let the software calculate the offset	select Auto Calculate Edge Offset.
specify a fixed offset	enter a value for Edge Offset.
specify a variable offset that is calculated from values that you specify	select the setting for Edge Offset. Enter a formula that defines how the edge offset is calculated for this component. For more information, see Specifying the Width and Edge Offset of a Wall Component on page 917.

10 To specify the top elevation offset or bottom elevation offset, enter a new value, and select from where the distance is to be measured: Wall Top, Base Height, Baseline, or Wall Bottom.

NOTE Do not define wall components with elevation offsets that are above Wall Top or below Wall Bottom. Walls that have components that are defined this way do not clean up correctly and may not be displayed correctly if you edit their roof line or floor line. To avoid cleanup and display problems, you can define wall components with elevation offsets that are above Base Height or below Baseline.

11 Repeat steps 5 through 10 to add more components to the wall style.

Adding the second wall component



12 To change the order of components in the wall style, select a wall component, and click or to move the component to the desired position relative to the other wall components.

13 Click OK.

Adding a Component from Another Wall Style

Use this procedure to copy one or more wall components from another wall style into the wall style you are editing.

NOTE Only the first 20 components of a wall style are controlled by the display system. Although you can specify more than 20 components in a wall style, it is suggested that you limit the number of components to 20. Components 21 and higher are controlled by material assignment only.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the wall style that you want to change.

4 Click the Components tab.

5 Click .

The Wall Style Components Browser lists the wall styles and their components in the current drawing.

6 Locate the wall components you want to copy:

If you want to …	Then …
view the wall components for wall styles in the current drawing	in the left pane, select a wall style. The right pane lists the components and their properties and displays the style in the viewer.
view the wall components in wall styles in other drawings	click . Navigate to the drawing you want, and click Open. In the left pane, select a wall style.
close a drawing that you opened in the browser	select the drawing name, right-click, and click Close. You cannot close the current drawing.

For more information about the information shown in the Wall Styles Component Browser, see Specifying the Components of a Wall Style on page 849.

7 Copy wall components, and add them to the wall style you are editing:

If you want to …	Then …
copy all components in a wall style	select the wall style, and drag the style to the list of components in the Style Manager. All the components are added to the wall style.
copy an individual wall component	select the wall component, and drag the component to the list of components in the Style Manager. The component you selected is added to the wall style.

8 Click to close the Wall Style Components Browser.

9 After you copy wall components to the current wall style, you can edit or delete the new components as needed.

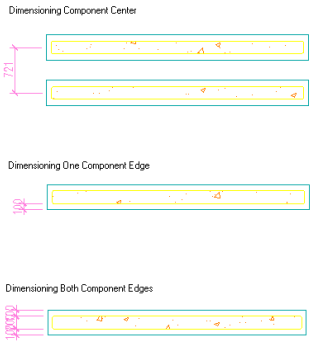
For more information, see Creating or Editing a Component in a Wall Style on page 853.

10 Click OK.

Defining the Dimension Settings for Wall Components

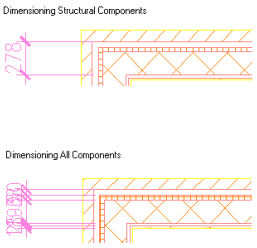
You have various options for dimensioning individual wall components. In the wall style, you can define the dimension settings for each individual wall component. Each component can be dimensioned to one or both of its edges, as well as to the component center. You also can select to not dimension a specific component at all.

- Component side to dimension: In the wall style, you can define for each wall component whether it should be dimensioned to its positive or negative side, or to the center of the component. The positive and negative sides of a wall are determined by the direction in which the wall is drawn: if you draw a wall from left to right, the positive side is the left (top). If you draw a wall from the right side to the left, then the positive side is the right (bottom). If you determine that a wall component is only dimensioned to one side, you can select either the positive or negative side of the wall



.

- Structural Function: You can define a wall component as structural or non-structural. When you set up the AEC dimension style you can define that only structural wall components, or all wall components should be dimensioned.

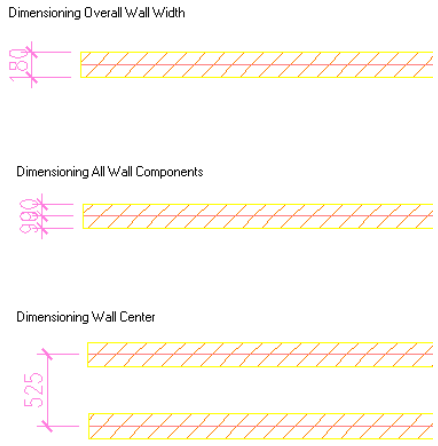


Alternatively, you can select to dimension a multi-component wall not to each individual component, but to the overall wall width or the overall wall center. You set these points in the AEC dimension style, as described in Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

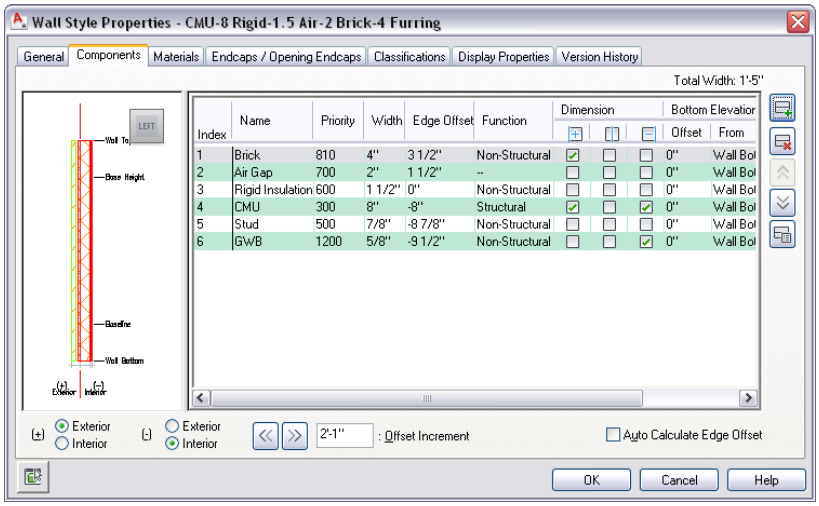
In the AEC dimension style you can define the following additional or overriding settings for dimensioning wall components:

- By Style: the dimension points selected in the wall style are used to dimension the wall components width.

- Structural by Style: the dimension points specified for the structural components of the wall style are used.
- Overall: the overall width of the wall is dimensioned.
- Center: the center of the wall is dimensioned.



Defining the dimensioning of components



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Wall Styles.
3 Select the wall style that you want to change.
4 Click the Components tab.
5 Define if the positive and negative sides of the wall should be an interior or exterior wall side by selecting Interior or Exterior for (+) and (-).
6 To define an offset for a wall component, select the component in the list view, and enter a value for Offset Increment.

   Alternatively, you can use the arrow keys.

7 Under Function, select if the component is a structural component or a non-structural one.

   This distinction is important when creating a dimension style for a multi-component wall, as you can define in the dimension style that it only dimensions structural components.

You can also leave the component function as unspecified.

8 To specify the dimension settings for a wall component, verify that the component is selected in the list view.

NOTE The component selected is highlighted in the graphic on the left.

9 Under Dimension, select if the component should be dimensioned to one side, to both sides, or to the center of the component.

- To dimension the component only to one side check the mark under or depending on whether you want to dimension the component to the left or right side.
- If you want to dimension the component to both sides, check both marks for and .
- If you want to dimension the component to its center, check the mark for .

10 Click OK to finish setting up component dimensioning in the wall style.

For information on creating a dimension style for wall components, see Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

Removing a Component from a Wall Style

Use this procedure to delete a component from a wall style. When you remove a component from a wall style, the component is also removed from all existing walls that use this style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the wall style that you want to change.

4 Click the Components tab.

5 Select the wall component you want to remove, and click .

6 Click OK.

Specifying the Materials of a Wall Style

A wall consists of a number of components whose display properties can be determined by the materials assigned to each component. When you assign materials to a wall style, you assign one material to each physical component of the wall. For example, you assign a wood or metal material to studs, concrete to a concrete component, and so on. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the wall style, instead of using material display properties, you can turn off the material assignments in the display properties of the wall style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3-dimensional (3D) model views and in elevations.

Wall Materials and Display Components

The following table identifies the material component that corresponds to each wall component.

Wall Component	Material Component
Plan, Plan Low Detail, Plan High Detail, Plan Presentation, Plan Screened	
Below Cut Plane	No Material
Above Cut Plane	No Material
Shrink Wrap	2D Linework
Shrink Wrap Hatch	Plan Hatch
Boundary 1 - 20	Plan Linework
Hatch 1 - 20	Plan Hatch
Reflected, Reflected Screened	
Below Cut Plane	No Material
Above Cut Plane	No Material
Shrink Wrap	2D Linework
Shrink Wrap Hatch	Plan Hatch
Boundary 1 - 20	Plan Linework
Hatch 1 - 20	Plan Hatch
Model, Model High Detail, Model Low Detail	
Shrinkwrap Body	3D Body
Boundary 1 - 20	3D Body
Sketch	
Baseline	No Material
Marker	No Material
Center Line	No Material
Graph	
Radius	No Material
Edge	No Material

Assigning Materials to a Wall Style

Use this procedure to assign materials to the individual components of a wall style. When you assign a material to a wall component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the wall. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, all structural components, such as brick and other masonry, studs, insulation, and air gaps, are physical components that you can assign materials.

NOTE If a material assignment does not determine the display properties of a wall component, you can change the display properties of the wall style as described in Specifying the Display Properties of a Wall Style on page 860.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Wall Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog, any changes you make to the material definition apply to all objects that are assigned the material.
11. Click OK.

Specifying the Display Properties of a Wall Style

In most cases, you can assign materials to wall components so that the appearance of walls that belong to the same style is consistent throughout a drawing and with other walls and objects that use the same materials.

If a component cannot be assigned a material, or if you do not want to use materials but still want consistency among walls of the same style, you can specify the display properties of the wall components in the wall style:

- The layer, color, and linetype of wall components
- The hatching used with each component
- The cut plane height and the display of components relative to the cut plane

- Other specific wall display information, such as whether complex endcaps are displayed and whether the wall is cut around door and window frames

Specifying the Layer, Color, and Linetype of a Wall Style

Use this procedure to change the following display properties of the components of a wall style:

- Visibility (component is on or off)
- By material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

To change these display properties for an individual wall, see Changing the Display Properties of Individual Walls on page 807.

NOTE If a material assignment determines the display properties of components in the wall style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Assigning Materials to a Wall Style on page 860.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Wall Styles.
3. Select the wall style that you want to change.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select the component to change, and select a different setting for the property.
9. Click OK.

Specifying the Hatching for Components of a Wall Style

Use this procedure to specify the hatching of the components of a wall style. Wall hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Wall Styles.
3. Select the wall style that you want to change.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Hatching tab.

8 Select a component, and click the setting for Pattern.

9 Select the hatching for the component:

If you want to …	Then …
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.

11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

13 Click Orientation, and specify how the hatching is oriented:

If you want to …	Then …
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

14 Click OK.

Specifying the Cut Plane Display of a Wall Style

Use this procedure to specify the properties of one or more cut planes for a wall style. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

To better visualize the elements of a wall in plan view, you can create cut planes. The main cut plane is where the shrinkwrap and hatching are applied. The plan display shows the components and objects in the wall as they are displayed at the height of each cut plane.

The cut plane settings you specify in the wall style override the cut plane settings in any display configuration applied to a viewport. When you add doors, windows, openings, or door/window assemblies to a wall, you can specify in the display properties of those objects or their styles whether they respect the cut plane of the wall or of the display configuration.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the wall style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Cut Plane tab.

8 Select Override Display Configuration Cut Plane.

9 To specify the cut plane where shrinkwrap, component boundaries, and hatching take effect, enter a value for Cut Plane Height.

10 Select Automatically Choose Above and Below Cut Plane Heights to show the components above and below the cut plane height.

11 To specifically define a cut plane, select Manual Above and Below Cut Plane Heights, click Add, and enter the height of the new cut plane.

If you add a cut plane …	Then …
at a height that is lower than the value for Cut Plane Height	objects are displayed using the properties specified for the Below Cut Plane component on the Layer/Color/Linetype tab.
at a height that is higher than the value for Cut Plane Height	objects are displayed using the properties specified for the Above Cut Plane component on the Layer/Color/Linetype tab.

You can click Remove to delete a cut plane that you added.

12 Click OK.

Specifying the Display of Other Characteristics of a Wall Style

Use this procedure to specify other display properties for the wall style, such as whether to display complex endcaps, to show door and window frames, or whether to show the miter of specific wall components. These display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the wall style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

8 Select the display properties for the wall style:

If you want to …	Then …
display the component lines within the wall above the cut plane (for example, through a window or door in the wall)	select Display Inner Lines Above. Clear this option if you do not want to display these lines.
display the component lines within the wall below the cut plane (for example, through a window or door in the wall)	select Display Inner Lines Below. Clear this option if you do not want to display these lines.
turn off lines below a window, door or opening at the cut plane	select Hide Lines Below Openings at Cut Plane. Clear this option if you want to display the lines.

If you want to …	Then …
turn off lines below a window, door or opening above the cut plane	select Hide Lines Below Openings Above Cut Plane. Clear this option if you want to display the lines.
display complex wall and opening endcaps	select Display Endcaps. Clear this option to display complex endcaps as a single line.
display door openings cutting the wall at the outer edge of the door frame	select Cut Door Frames. Clear this option if you want door openings to cut the wall at the inside of the door frame.
display window openings cutting the wall at the outer edge of the window frame	select Cut Window Frames. Clear this option if you want window openings to cut the wall at the inside of the window frame.
draw wall components by their priority number to control the display of a component over another component	select Component Draw Order by Priority. Clear this option if you want to draw the components in the order that they were created.
perform a slice of the actual 3-dimensional (3D) model at each cut plane to obtain more accurate views of walls with sweeps or body modifiers	select Do True Cut. Clear this option if the wall does not have sweeps or body modifiers, or if they do not change along the height of the wall.
display miter lines at wall corners for selected wall components	under Draw Miter for Components, select each component whose miter lines you want to display.

9 Click OK.

Adding Classifications to a Wall Style

Use this procedure to specify classifications for any classification definition applied to a wall style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Wall Styles.

3 Select the style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to wall styles.

5 For each classification definition, select the classification you want to apply to the current wall style.

6 Click OK.

Defining a Wall Style as Bounding for Associative Spaces

Use this procedure to define a wall style that can bound associative spaces.

When a wall style is set as bounding, by default all walls that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the wall style in an individual wall, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Wall Styles.
3 Select a wall style.
4 Click the General tab.
5 Select the check box for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Wall Style

Use this procedure to enter notes and attach reference files to a wall style. You can also edit notes and edit or detach reference files from a wall style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Wall Styles.
3 Select the wall style you want to change.
4 Click the General tab.
5 To add a description to the wall style, enter it for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

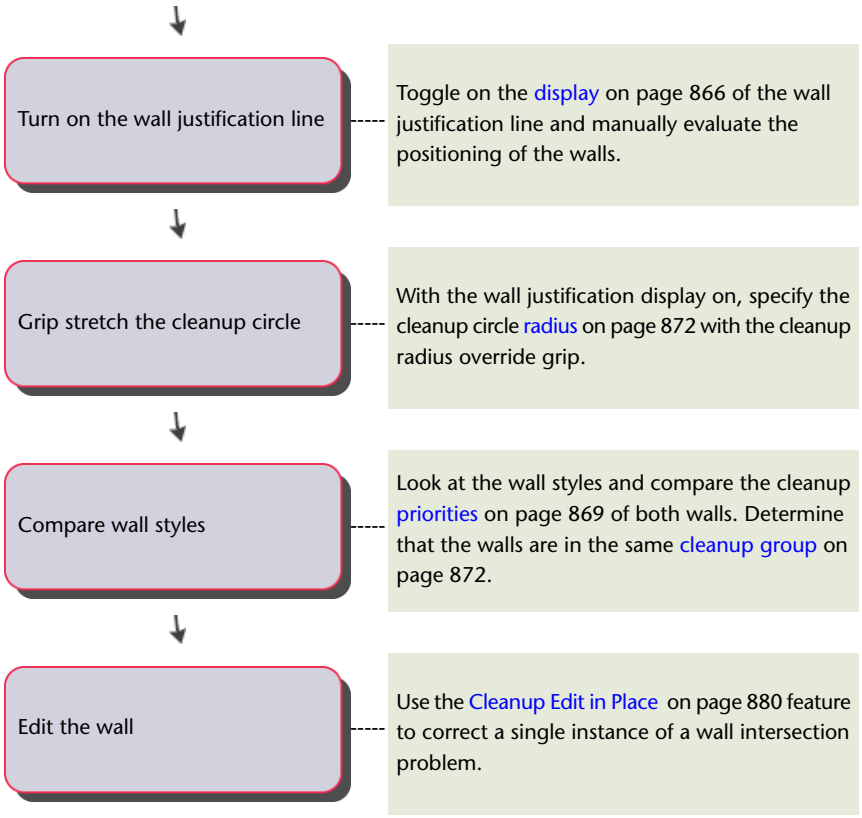
9 Click OK.

Workflow for Cleaning Up Wall Intersections

You can control how walls join other walls by using cleanup groups. Walls must be in the same cleanup group to clean up properly. You can assign walls to a cleanup group when you create the walls or after you create the walls.

Read the solution tips

Hold the cursor over the solution tip icon on page 49, review the suggestions provided, and try the tips on page 873.



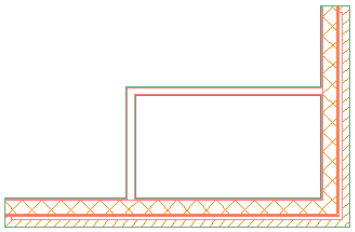
Cleanup Circles and Wall Justification Lines

Cleanup circles and wall justification lines are features of wall objects that are the basis for how AutoCAD Architecture calculates wall cleanup. Cleanup circles appear for walls only in the Diagnostic display representation, or when you toggle on the display of wall justification lines.

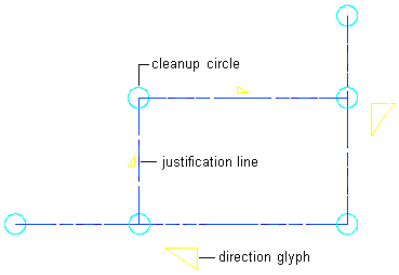
Displaying Cleanup Circles and Wall Justification Lines

The Diagnostic display representation displays the wall segment's cleanup circle radii, direction glyph, and justification line to help you troubleshoot wall cleanup. On the drawing status bar, click Display Representation ➤ Diagnostic.

Viewing wall segments in Medium Detail and Diagnostic display representations



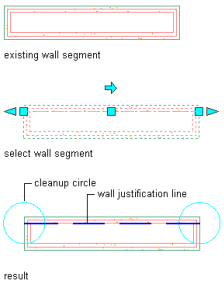
Medium Detail display representation



Diagnostic display representation

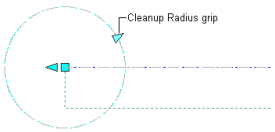
In addition, you can also toggle on the display of a wall segment's justification line and cleanup circles while maintaining the display of the wall components.

Toggling on the display of wall justification line and cleanup circles



Cleanup circles and justification lines display on all walls in the drawing. In addition, when you select the wall, Cleanup Radius grips are displayed at each cleanup circle. You can move the grip to increase or decrease the cleanup circle radius. Cleanup circles do not display if the cleanup circle radius for the wall is zero.

Viewing the cleanup circle radius grip

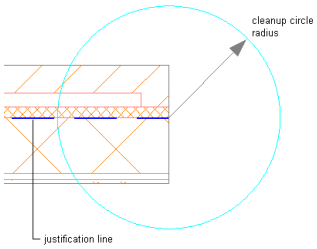


Cleanup Circles and Wall Justification Lines

A cleanup circle is located at the start point and the endpoint of each wall segment. The center point of each cleanup circle is the start point or endpoint of the wall justification line.

The cleanup circle radius determines the size of the cleanup circle. You can specify a cleanup circle radius in the wall tools you use to add walls to a drawing. If needed, you can override the default cleanup circle radius at each end of a wall segment. This allows you to adjust the cleanup circle radius for particular wall styles and for individual situations.

Specifying the cleanup circle radius

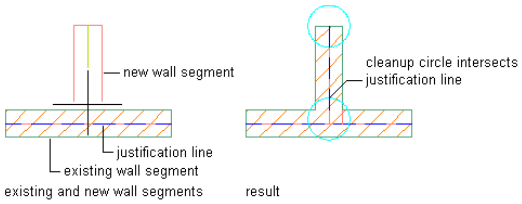


Wall Cleanup Conditions

Walls in the same cleanup group clean up when one of the following conditions applies:

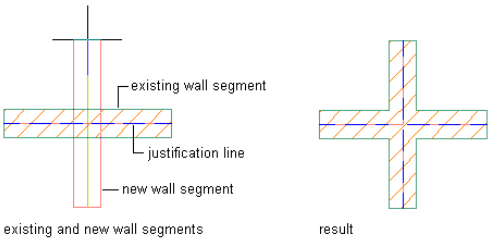
- The cleanup circle of one wall overlaps the center point of the cleanup circle of another wall.
- The cleanup circle of one wall overlaps the wall justification line of another wall.

  Wall cleanup with justification line intersecting cleanup circle



- The wall justification line of one wall intersects the wall justification line of another wall.

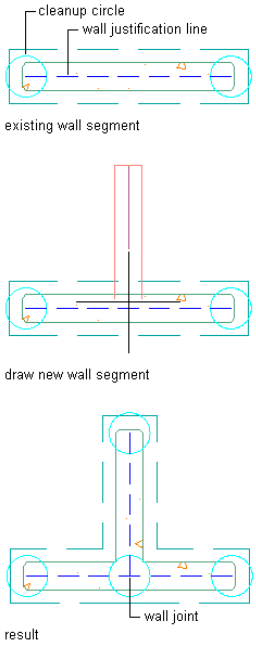
  Wall cleanup with intersecting justification lines



TIP The best practice for successful wall intersection cleanup is to ensure that the wall segment justification lines intersect and that you specify a zero (0) radius for the wall segment cleanup circles.

When walls intersect and clean up properly, a new wall joint is created at the intersection of the wall justification lines. The exact location of the wall joint depends on the location of the new wall segment endpoint. In many cases, the wall joint location does not coincide with the existing wall segment center line. The location of the wall joint is based on a weighted average distance between wall segment endpoints, as well as the thickness of the wall segments.

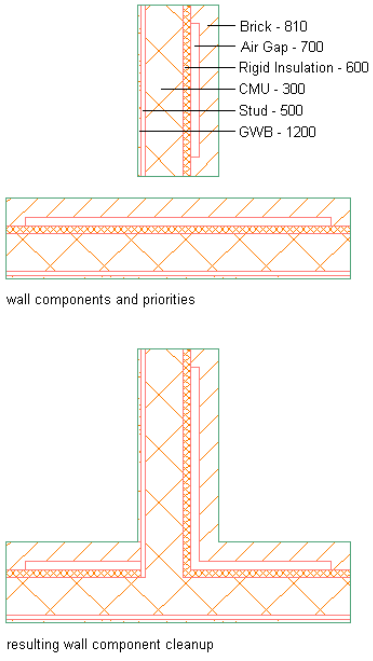
Wall justification lines and wall joint at wall intersections



Wall Cleanups and Priorities

Walls with multiple components clean up based on the priority assigned to each component and the location of each component within the wall. Matching component edges with the same priority are extended or trimmed to their intersection points. Components with a higher priority (a low priority number) cut through components with a lower priority (a high priority number).

Wall cleanup priorities



To identify the default cleanup priorities for the components used in the sample wall styles provided with AutoCAD Architecture, see Default Cleanup Priorities of Wall Components on page 851.

The software calculates and performs wall cleanups in the following sequence:

1. Component information is gathered from the wall graph:
   - Endcaps are calculated. If an endcap does not fit in the section, a solution tip icon displays. For more information, see Troubleshooting Wall Cleanups on page 873.
   - Sides of components are combined with endcaps to produce a component profile (like a 2-dimensional region).
   - If this profile is self-intersecting, a solution tip icon displays.
2. Adjacent higher priority components are gathered from the wall graph from neighboring wall segments.
3. Higher-priority component profiles are subtracted from the lower-priority component profiles.
4. Doors, windows, openings, and interferences are cut and/or applied.
5. Shrinkwrap may be calculated and hatching applied.

   A failed shrinkwrap calculation may also result in the display of a solution tip icon.
6. Graphics are drawn to an output device (for example, the AutoCAD screen, Object Viewer, Osnap stream, explode stream, and a plotter).
7. Solutions are cached for subsequent draw requests until the wall is modified again.

Guidelines for Successful Wall Cleanup

When cleanup settings or the placement of a wall segment are preventing correct wall cleanup, a solution tip icon displays to indicate the location of the problem and provide possible solutions.

Here are some recommendations for actions you can take to achieve successful wall cleanup:

- Wall justification lines should intersect.
- Review the wall cleanup circle radius settings for each wall segment. A good starting point is to set the wall cleanup circle radius equal to half of the wall width. However, this may not apply to every situation and you may need to adjust the cleanup circle radius to achieve the desired effect.

  NOTE A wall segment must be longer than its cleanup circle radius.

- Use a smaller cleanup circle radius. A small cleanup circle radius also makes the graph display more readable. The cleanup circle radius should be a value that is between one-half the wall width and the overall wall width.
- Look for very short wall segments. You can find these short segments by turning on the Diagnostic display representation. You can fix them by adjusting the baselines or by increasing the cleanup circle radii.
- Draw walls with center justification on and use an offset to simulate right or left justification. Using this method, you can draw very short segments and tight wall jogs, provided the appropriate cleanup circle radius is used.
- In order to ensure that exterior walls clean up properly with interior walls, switch the justification lines in the exterior wall segments to the inside so that the interior wall segment justification lines intersect.

Assigning a Different Wall Cleanup Group Definition to Existing Walls

Use this procedure to change the wall cleanup group assigned to existing walls. Assigning different cleanup groups is useful when you want to prevent 2 walls from cleaning up with each other. To create a new cleanup group, see Cleanup Group Definitions on page 878.

1 Select the walls to change, and double-click one of them.

2 On the Properties palette, expand Basic, and then expand General.

3 Select a cleanup group for Cleanup group definition.

Specifying Cleanup for Individual Walls

Use this procedure to specify the following cleanup settings for one or more walls:

- Whether the wall cleans up with other walls
- The cleanup group for the wall
- Whether the justification line position corresponds to the center line of the wall or to the wall justification
- The cleanup circle radius for both ends of the wall, or separate values for the start and endpoints of the wall

1 Select the walls you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and then expand General.

3 Turn wall cleanup on or off:

If you want to …	Then …
turn off wall cleanup so that the walls do not clean up with any other walls	select No for Cleanup automatically. If you select this option, you do not need to specify other settings.
turn on wall cleanup and specify cleanup settings	select Yes for Cleanup automatically, and proceed to step 4.

4 Select a cleanup group definition.

The walls will clean up with other walls that also belong to the cleanup group definition that you select.

5 Expand Advanced, expand Cleanups, and expand Cleanup Radius Overrides.

6 Specify the cleanup circle radius for the walls:

If you want to …	Then …
specify the same cleanup circle radius for the start and endpoints of the walls	enter a value for Cleanup radius, and verify that No is selected for Override start cleanup radius and Override end cleanup radius.
specify a cleanup circle radius for the start point of the walls	select Yes for Override start cleanup radius, and enter a value for Start cleanup radius.
specify a cleanup circle radius for the endpoint of the walls	select Yes for Override end cleanup radius, and enter a value for End cleanup radius.

Start and End are based on the direction the wall was drawn. If you enter zero for any cleanup circle radius, the wall justification lines need to touch for the walls to clean up with other walls.

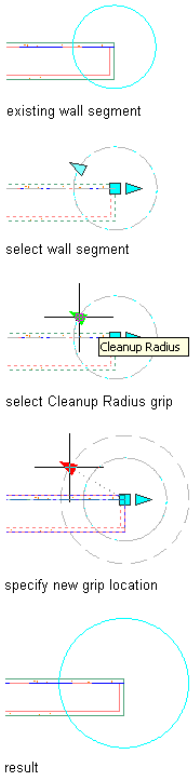
Overriding the Wall Cleanup Circle Radius

Use this procedure to override the default wall cleanup circle radius at one end of a wall. You can also override the cleanup circle radius on the Properties palette and using the context menu for the selected wall.

1. If the wall justification line is not displayed, select a wall, and click Wall tab ➤ Cleanup panel ➤ Justification Display .
2. Select a Cleanup Radius grip, and move the grip until you have properly resized the cleanup circle.

   If Dynamic Input is active, move the grip until the dimension you want is displayed.

Changing the cleanup circle radius at one end of a wall



Overriding Component Priorities

Use this procedure to change the priority of a wall component so that when it intersects with another wall, it has higher or lower priority than its counterpart on the other wall. The lower the priority number you enter, the higher the priority of the component when the wall intersects with another wall.

For the list of default priorities of the wall components used in sample wall styles provided with AutoCAD Architecture, see Default Cleanup Priorities of Wall Components on page 851.

1. Double-click the wall you want to change.
2. On the Properties palette, expand Advanced, and then expand Style Overrides.
3. Click the setting for Priority overrides.

4 Add or edit a priority override for a wall component:

If you want to …	Then …
add a new priority override	click , and proceed to step 5.
edit a priority override	proceed to step 5.
delete a priority override	select the priority override you want to delete, and click .

5 Specify the override settings:

If you want to …	Then …
change the component to which you assigned the override	select a different component.
specify a priority override at the start of the wall	select the component, select At start of wall, and enter a value for Priority.
specify a priority override at the end of the wall	select the component, select At end of wall, and enter a value for Priority.
change the priority of an existing override	select the value for Priority, and enter a new value.

6 Click OK.

Troubleshooting Wall Cleanups

This topic provides more details about the solution tips displayed when problems are detected with wall cleanup or display. Answers are also provided for common questions associated with wall cleanups.

Solution Tips for Walls

When you move the cursor over a solution tip icons on a wall, any of the following problem statements may display:

NOTE Not all problems that generate solution tips have an easily identifiable cause or a specific solution. This is often true in the case of Boolean operations where an entity such as a body modifier is added to or subtracted from an object. In these cases the solution tip identifies the kind of object or component involved and suggests corrective action. You may be advised to modify the location or the geometry of the object, but it is essentially a trial-and-error approach. The messages are tips rather than guaranteed solutions.

The walls are not cleaning up correctly

As described under Guidelines for Successful Wall Cleanup on page 870, there are various conditions that can prevent cleanup. The first step in determining the cause of this problem is to examine the condition of the wall justification lines at the intersection. To display the justification line for a wall, select the wall, and click Wall tab ➤ Cleanup panel ➤ Justification Display . (For more information, see Cleanup Circles and Wall Justification Lines on page 866.)

After looking at the justification lines, try one of the following possible solutions, as applicable:

- Extend or trim the walls using the AutoCAD Extend or Trim commands.
- With the wall selected, on the Wall tab ➤ Cleanup panel, click L Cleanup or T Cleanup. For more information, see Trimming Walls at L and T Intersections on page 795.
- Increase the wall cleanup radius by grip-editing (see Working with Intersections and Small Cleanup Circle Radii on page 876) or by changing the value of Cleanup radius on the Properties palette (see Specifying Cleanup for Individual Walls on page 871).
- With the wall selected, click Wall tab ➤ Cleanup panel ➤ ➤ Add Wall Merge Condition. For more information, see Merging Walls on page 789.

The wall's endcaps or opening endcaps cannot be displayed due to space limitations

If there is insufficient space to display an endcap, you can either modify the wall to provide more space, or you can modify the endcaps to reduce the amount of space required. Note that some endcap problems are evident only in 3D (isometric) views, so you may need to switch to model space in order to see and resolve the problem. Then, depending on your design requirements, do any of the following:

- Lengthen the wall (see Changing the Shape of a Wall on page 779).
- Remove one or more endcaps (see Modifying the Geometry of a Wall Endcap Style on page 911).
- Modify the wall endcap style or opening endcap style to require less space (see Modifying the Geometry of a Wall Endcap Style on page 911).

The wall cannot be displayed because it does not extend beyond its own cleanup radius or that of an adjacent wall.

In this case, you need to reduce the cleanup radius of the wall, and then regenerate the model.

To reduce the cleanup radius, do either of the following:

- On the Properties palette, enter a smaller value for Cleanup radius.
- Grip-edit the relevant cleanup radius so that it no longer encloses the defective wall.

To regenerate the model, do either of the following:

- Click View tab ➤ Appearance panel ➤ ➤ Regenerate drop-down ➤ Regenerate Model.
- On the command line, enter ObjRelUpdate.

A wall's cleanup radius intersects the justification line of another, non-connected wall.

Just as in the case of a wall that does not extend beyond its cleanup radius or that of another, you need to reduce the cleanup radius of the wall, and then regenerate the model.

To reduce the cleanup radius, do either of the following:

- On the Properties palette, enter a smaller value for Cleanup radius.
- Grip-edit the relevant cleanup radius so that it no longer encloses the defective wall.

To regenerate the model, do either of the following:

- Click View tab ➤ Appearance panel ➤ ➤ Regenerate drop-down ➤ Regenerate Model.

- On the command line, enter ObjRelUpdate.

Invalid roofline or floorline is causing the wall's 3D body to display incorrectly.

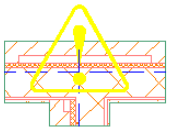
You can edit the roofline or floorline and correct the display using a worksheet accessed from the Properties palette. Expand Advanced ➤ Worksheets, and then click Roof/floor line. For more information, see Editing the Roof Line or the Floor Line of a Wall on page 801.

Working with Solution Tip Icons and Short Walls

Why do some short walls display a solution tip icon?

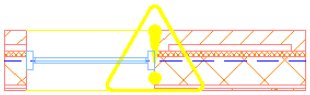
The cleanup circle radius is too large. Reduce the cleanup circle radii of all walls at the wall joint, or adjust the baselines so that the ends of all justification lines fall within the wall joint cleanup circle radii.

Solution tip icon displayed in a wall with a short wall segment



This situation can also occur if a door, window, opening, or door/window assembly is placed too close to the end of the wall and the wall or the objects in it use elaborate endcaps. In such cases, there may not be enough room for these conditions to be drawn correctly.

Solution tip icon displayed in a wall with a window near its end

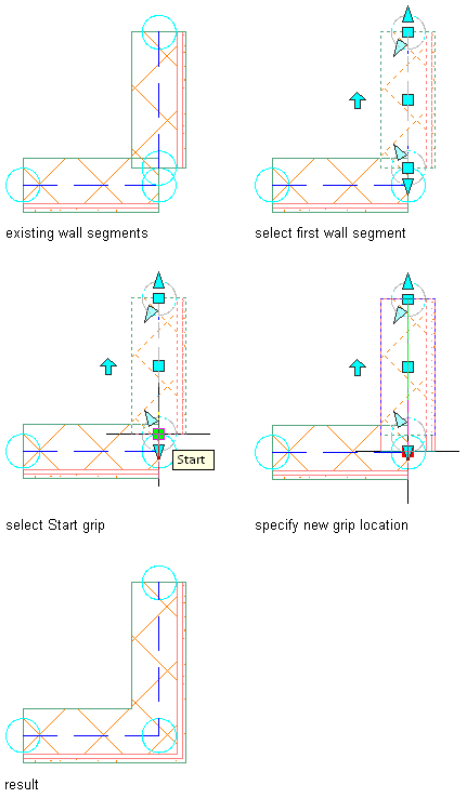


Working with Intersections and Adjacent Wall Segments

Why do some wall segments that have ends that are close together not clean up properly?

The wall segment justification lines do not intersect each other, or one justification line does not fall within an adjacent cleanup circle. Adjust one wall segment length so that the end of its justification line falls within the adjacent wall segment's cleanup circle.

Adjusting wall segment length for correct clean up

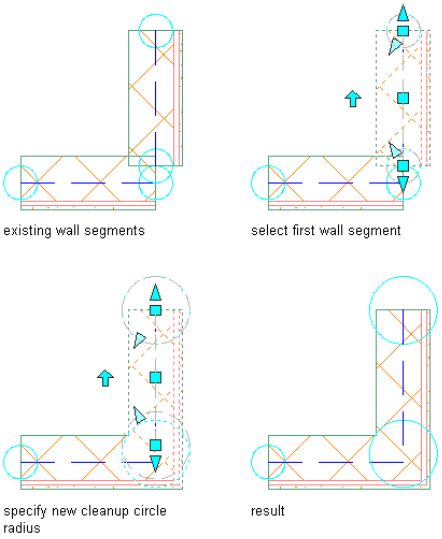


Working with Intersections and Small Cleanup Circle Radii

While using small cleanup circle radii, wall intersections clean up incorrectly or not at all. How can I fix this?

Turn on the Diagnostic display representation or toggle on justification lines and adjust the justification lines or increase the cleanup circle radii until the problem is fixed.

Adjusting wall cleanup circle radius for correct clean up



Also, make sure that there are no short wall segments in the wall. These can occur where center lines intersect, or when a segment is too short to produce a full profile. Delete the short wall segment to fix the cleanup problem.

Incorrect Cleanup Group Assignments When Copying or Moving Doors, Windows, and Openings

When I try to copy or move doors, windows, and openings from one wall to another, the command does not always work. Why?
This situation can occur if the cleanup group for the destination wall does not allow objects from walls assigned to other cleanup groups to be copied to this wall. This design rule is intended to prevent placing objects in walls, such as cubicle partitions, that should not have objects added to them.

You can address this situation in 2 ways:

- Turn off this design rule in the cleanup group definition. For more information, see Creating a Wall Cleanup Group Definition on page 879.
- Temporarily assign the walls to the same cleanup group, copy or move the objects, and then reassign the walls to their correct cleanup groups.

Opening a Drawing that Displays New Solution Tip Icons

When I closed my drawing, all the wall cleanups looked fine. Now when I open the drawing, there are solution tip icons in the drawing. What causes this, and how can I fix it?
Under some circumstances, the order in which walls are cleaned up affects the display.

When troubleshooting this condition, select the walls in question, and double-click one of them. On the Properties palette, select No for Cleanup automatically, and then select Yes. Try this on different walls to see whether you can locate the unstable wall. Usually, adjusting the justification line of the unstable wall fixes this problem. For more information about verifying justification line, see Cleanup Circles and Wall Justification Lines on page 866.

Working with Wall Cleanups and Xref Drawings

How can I get walls to clean up with walls in xref drawings?
There are several actions you can take to improve wall cleanup when you work with xref drawings that contain walls:

- Verify the design rules of the cleanup groups used in the xref drawings. If the cleanup group in the xref drawing does not allow cleanup with the walls in the host drawing, walls in the 2 drawings do not clean up, even when their cleanup groups have the same name. For more information about the design rules of cleanup groups, see Creating a Wall Cleanup Group Definition on page 879.
- When adding new walls during a Refedit session, add the existing walls to the current working set. Select the Xref cleanup group of the existing walls for the walls you are adding. Otherwise, the new walls do not clean up with the existing walls until you save changes to the drawings.
- Use the **Regenall** (Regenerate All) and **ObjRelUpdate** (Object Relationship Update) commands to update the relationships among walls in the drawing, especially if you move or transform walls involving xref drawings, or if you undo edits to walls in an xref drawing.
- For more information about xref drawings and wall cleanup, see additional troubleshooting topics in Troubleshooting Wall Cleanups on page 873.

Occurrence of Copied Walls in Xref Drawings

My xref drawing contains copies of walls that are in my host drawing. How did this happen?
If you added objects, such as doors or windows, to a wall in the host drawing while you had a Refedit session open for an xref drawing, a copy of the selected wall is added to the xref drawing. This occurs because any objects added during a Refedit session are always added to the xref drawing and not to the host drawing. Because the object you added was anchored to a wall, the wall is also added to the xref drawing.

To correct the drawings, review both the host drawing and the xref drawing for duplicate objects. Remove the duplicates from the incorrect drawing files. Allowing the duplicates to remain can create problems with the cutting of walls around doors, windows, door/window assemblies, and openings. Hidden line and shaded views are also affected.

To avoid creating duplicate objects in xref drawings, do not add or edit objects in the host drawing when a Refedit session is open for an xref drawing. Also, instead of opening a Refedit session, you can open the xref itself, and make edits directly. You can then save the xref drawing, and reload the updated drawing in the host drawing.

Adding a Door to a Wall in an Xref Drawing

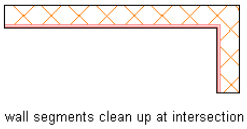
I added a wall in an xref drawing and then added a door to the wall. The door does not center correctly. What causes this, and how I can correct it?
Some changes that you make during Refedit sessions of xref drawings do not take effect until you save the changes to the xref drawing. When you add doors, windows, door/window assemblies, and openings to a new wall in an xref drawing, their placement is affected by whether the new wall cleans up with other walls in the drawing. Clean up does not occur between walls in xref and host drawings until you save the changes in the Refedit session.

For best results, if you add walls during a Refedit session, save and close the session before adding objects to those walls. Open a new Refedit session (or open the xref drawing directly, outside of the host drawing), verify that the walls clean up as you intend them to, and then add objects to the walls.

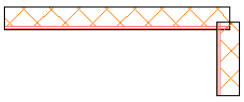
Cleanup Group Definitions

A wall cleanup group definition is a designation that you can assign to individual walls to control how intersecting walls clean up. Walls that belong to the same cleanup group clean up where they intersect according to the priority assigned to each component in each wall. Walls that belong to different cleanup groups do not clean up when they meet at corners or intersections.

Walls that do and do not clean up



wall segments clean up at intersection



wall segments do not clean up at intersection

Controlling Wall Cleanup through Design Rules

You use the design rules of a cleanup group definition to determine how walls assigned that cleanup group cleanup when you Xref them in other drawings. The setting for this design rule in the cleanup group definition in the xref drawing controls whether those walls clean up with walls in the host drawing.

Design rules also determine whether you can move or copy objects from walls assigned to other groups to walls assigned to the current cleanup group. Preventing copying or moving objects to walls in a certain cleanup group helps you avoid inadvertently placing objects in walls that should not contain them.

Managing Cleanup Group Definitions

To create, edit, copy, or purge cleanup group definitions, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with definitions and styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Wall Cleanup Group Definition

Use this procedure to create a wall cleanup group definition. A cleanup group definition must exist in the drawing before you can assign walls and wall styles to the cleanup group.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Wall Cleanup Group Definitions.

3 Create a cleanup group definition:

If you want to …	Then …
create a cleanup group definition with default properties	right-click Wall Cleanup Group Definitions, and click New.
create a cleanup group definition from an existing definition	right-click the cleanup group definition you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new cleanup group definition, and press *ENTER*.

5 Select the new cleanup group definition.

6 Click the General tab, and enter a description of the cleanup group.

7 Click the Design Rules tab.

8 Specify the design rules:

If you want to …	Then …
allow walls assigned to this cleanup group to clean up with walls in a host drawing when the current drawing is inserted as an Xref	Select Allow wall cleanup between host and xref drawings. Clear this option if you do not want the walls to cleanup with walls in the host drawing. **NOTE** The cleanup group definition in the xref drawing controls cleanup with walls in the host drawing.
allow objects anchored to walls assigned to other cleanup groups to be moved or copied to walls assigned to this cleanup group	Select Allow objects anchored to walls in other cleanup groups to be moved or copied to walls in this cleanup group. Clear this option if you do not want objects anchored to walls in other cleanup groups to be moved or copied to walls assigned to this cleanup group.

9 Click OK.

If you want to add notes, files, or documents to a cleanup group definition, see Attaching Notes and Files to a Wall Cleanup Group Definition on page 880.

Attaching Notes and Files to a Wall Cleanup Group Definition

Use this procedure to enter notes and attach reference files to a cleanup group definition. You can also edit notes and edit or detach reference files attached to the definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Wall Cleanup Group Definitions.

3 Select the cleanup group definition that you want to change.

4 Click the General tab.

5 To add a description to the cleanup group definition, enter it for Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

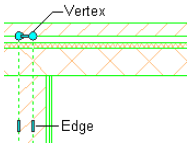
If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Using Edit in Place to Clean Up Wall Intersections

In cases where automatic wall cleanup does not produce the desired results, you can use the Cleanup Edit in Place feature to change the shape, width, length, or depth of individual wall components at an intersection.

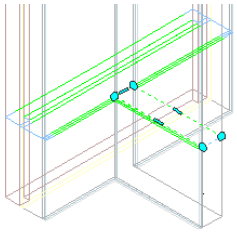
When you edit a wall intersection in place, a temporary profile is created for each component in the intersecting wall segments. The profiles for the component with the lowest index number in the wall style are displayed first. When you select a profile, it displays Vertex and Edge grips you can manipulate to edit its geometry. You can press *ESC* to clear selected components.



The Vertex grips allow you to manipulate component corners. When you move a Vertex grip that occurs at the end of an component polyline, additional Edge grips are added at the midpoints of the new edges that are created. Also, a new Vertex grip is automatically created at the location of the original Vertex that you moved.

The Edge grips allow you to offset a component edge, add a vertex to the component edge, or convert a straight component edge to an arc edge. When you offset a component edge or add a vertex to the component edge, additional Edge grips are added at the midpoints of the new edges that are created. In addition, when you offset a component edge, new component corner Vertex grips are created.

You can edit this profile in plan or model views. In a model view, you are prompted to select a point at the intersection you want to cleanup. This pick point determines the elevation of the profile.



IMPORTANT A wall style that has vertically stacked components may require unique intersection cleanup conditions at different elevations of the wall endcap. Change your cutplane height to specify these different wall intersection cleanup conditions at the appropriate elevation.

When working with intersecting walls in a plan view, the profile is located on the normal plane of the middle point of the wall segment nearest to your pick point. Components that don't intersect the cutplane of the wall will not be displayed.

You can use the Trim and Extend tools with defined boundaries and the Subtract and Merge tools with closed polyline areas or defined profiles to modify wall components to create the configuration that you want.

To Edit Cleanup Conditions in Place

1. Select the wall segment that has the intersection clean up condition that you want to change.
2. Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

   Temporary profiles are created for you to edit the geometry of the wall intersection for each wall component.
3. Select the profile and edit it as desired:

If you want to …	Then …
change the shape of the perimeter of the profile	use grips to adjust the shape.
hide an edge of the profile for a single wall component (plan view only)	click Edit In Place tab ➤ Profile panel ➤ Hide Edge .
display a hidden edge of the profile for a single wall component (plan view only)	click Edit In Place tab ➤ Profile panel ➤ Show Edge .
add vertices to the profile of a single wall component	click Edit In Place tab ➤ Profile panel ➤ Add Vertex .
remove vertices from the profile of a single wall component	click Edit In Place tab ➤ Profile panel ➤ Remove Vertex .
subtract profiles from wall components	click Edit In Place tab ➤ Modify panel ➤ Subtract .

If you want to …	Then …
merge profiles with wall components	click Edit In Place tab ➤ Modify panel ➤ Merge .
trim wall components to a boundary	click Edit In Place tab ➤ Modify panel ➤ Trim .
extend wall components to a boundary	click Edit In Place tab ➤ Modify panel ➤ Extend .

4 Save or discard the changes:

If you want to …	Then …
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

Specifying a Component Cleanup Override

When you are editing wall components to achieve the desired wall intersection condition, you may encounter a situation in which edited components overlap other components that have a higher priority. For example, if you drag a sheathing component with a lower priority over a structural component with a higher priority, you are specifying a component cleanup override condition. A dialog displays to allow you to specify whether to accept or discard the overlapping component condition.

NOTE Specifying a component cleanup override does not affect the wall style component priority or the display parameters on the Properties palette.

The following sections outline the various features that you can use to cleanup wall intersections.

Hiding the Edge of a Wall Intersection Component

Use this procedure to modify a wall intersection by hiding a wall component edge. This is useful if you have an intersection condition that has a component edge this is displayed incorrectly.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .
Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component that has the edge you want to hide.
You can only hide the edge of one component at a time. Press *ESC* to clear component selection.

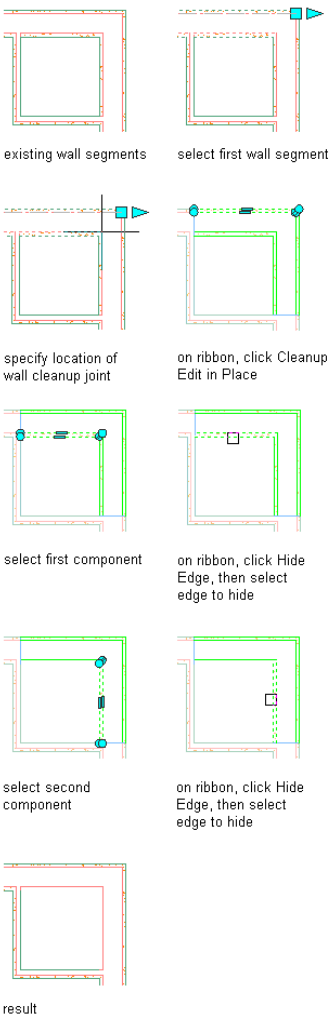
4 Click Edit In Place tab ➤ Profile panel ➤ Hide Edge .

5 Select the component edge to hide.

6 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, wallboard component edges are hidden to create an interior corner condition.



Showing the Edge of a Wall Intersection Component

Use this procedure to modify a wall intersection by showing a previously hidden wall component edge .

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component that has the edge you want to show.

You can only show the edge of one component at a time. Press *ESC* to clear component selection.

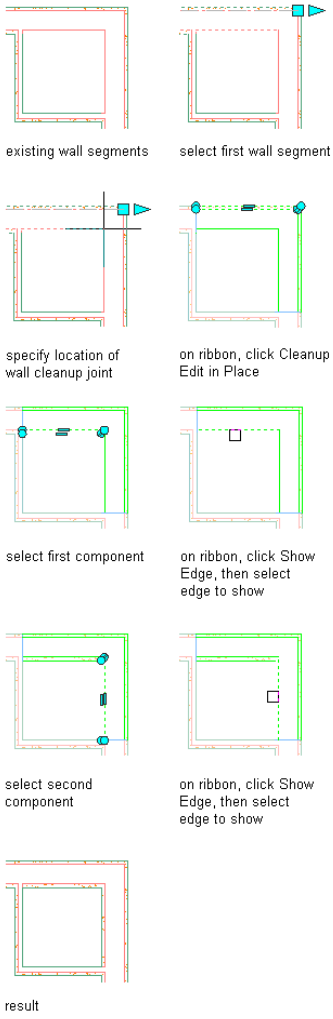
4 Click Edit In Place tab ➤ Profile panel ➤ Show Edge .

5 Select the component edge to show.

6 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, previously hidden wallboard component edges are shown to create an interior corner condition.



Adding a Vertex to a Wall Intersection Component

Use this procedure to modify a wall intersection by adding a vertex on or near to a component edge. By adding vertices to a component edge, you have more options for editing its shape.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component to which you want to add a vertex.

You can only add vertices to one component at a time. Press *ESC* to clear component selection.

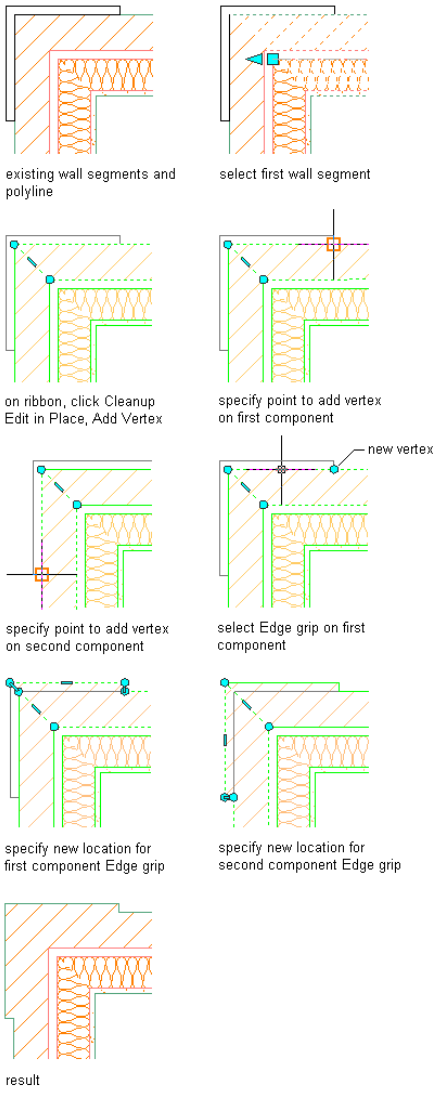
4 Click Edit In Place tab ➤ Profile panel ➤ Add Vertex .

5 Specify a location on or near the selected component edge for the new vertex.

6 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, new vertices are added to components, then Edge grips are used to modify a brick veneer corner condition.



Removing a Vertex from a Wall Intersection Component

Use this procedure to modify a wall intersection by removing a vertex from a component.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component from which you want to remove a vertex.

You can only remove vertices from one component at a time. Press *ESC* to clear component selection.

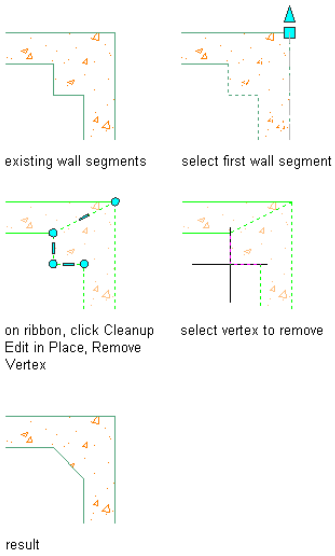
4 Click Edit In Place tab ➤ Profile panel ➤ Remove Vertex .

5 Select a vertex to remove.

6 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a vertex is removed from a foundation wall corner to create a chamfered condition.



Subtracting a Profile from a Wall Intersection Component

Use this procedure to modify a wall intersection by subtracting a profile from a component. The profile can be any polyline-enclosed area that overlaps the component.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component from which you want to subtract the profile.

You can subtract profiles from more than one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Subtract .

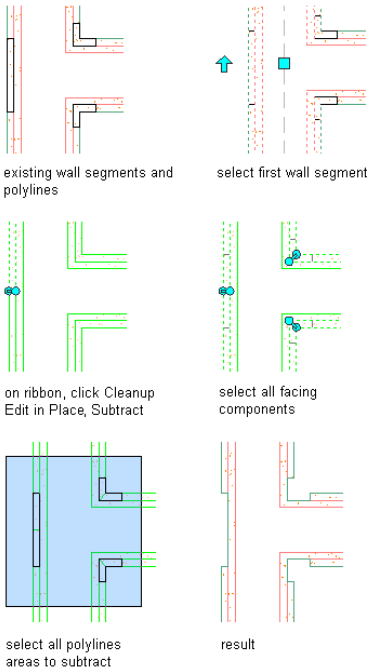
5 Select a profile to remove.

6 Enter *Y* to erase selected linework, or *N* to keep it.

7 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, profiles are subtracted from facing components to create cutout reveal conditions.



Merging a Profile with a Wall Intersection Component

Use this procedure to modify a wall intersection by merging a profile with a component. The profile may be any polyline-enclosed area that overlaps or is coincident with the component.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component to which you want to merge the profile.

Merge profiles with one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Merge .

5 Select a profile to merge.

6 Enter *Y* to erase selected linework, or *N* to keep it.

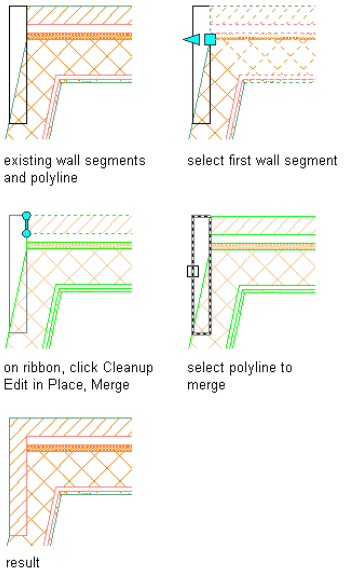
7 If the merged profile overlaps another component that has a higher priority, the Wall Cleanup Edit in Place - Component Cleanup Override dialog displays. Click Yes to have the merged

profile override the overlapped component, click No have the overlapped component override the merged profile, or click Cancel to end without merging the profile with the component.

8 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a profile is merged with a brick veneer component to create a corner condition. The modified brick component (lower priority) overrides the concrete block component (higher priority).



Trimming a Wall Intersection Component

Use this procedure to modify a wall intersection by trimming a component. The trim boundary can be a line, arc, circle, polyline, or wall component edge.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component that you want to trim.

You can trim multiple components at a time to a trim boundary. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Trim .

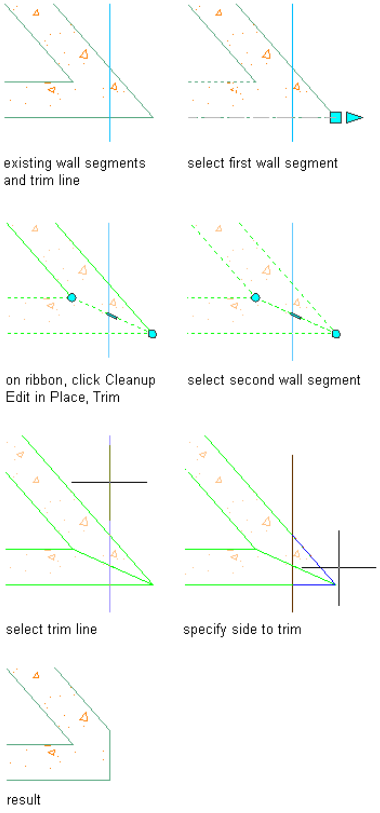
5 Either specify points to delineate a trim boundary, or press *ENTER* to select a trim boundary.

6 Specify the side to trim.

7 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a concrete wall corner is trimmed to a line trim boundary.



Extending a Wall Intersection Component

Use this procedure to modify a wall intersection by extending a component. The extension boundary can be a line, arc, circle, polyline, or wall component edge.

1 Select the wall segment with the wall intersection to modify.

2 Click Wall tab ➤ Cleanup panel ➤ Cleanup Edit In Place .

Vertex and Edge grips display for the first wall component, based upon the wall style index.

3 Select the component that you want to extend.

You can extend multiple components at a time to a extension boundary. Press *ESC* to clear component selection.

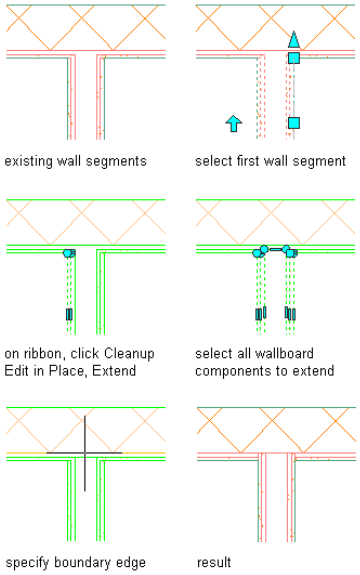
4 Click Edit In Place tab ➤ Modify panel ➤ Extend .

5 Select an extension boundary.

6 Exit the edit-in-place session:

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, wallboard components are extended to a concrete block component as the extension boundary to create a fire break.



Working with Wall Endcaps and Opening Endcaps

You can define different kinds of wall endcaps and wall opening endcaps conditions. When you encounter an unsuitable wall endcap configuration, you can modify the shape, width, and depth of individual wall components to achieve the desired result. Generally, you create a specific wall or opening endcap condition to use with a specific wall style.

To modify endcaps, you can use the Edit in Place mode and manipulate wall components with Vertex and Edge grips. You can hide or show component edges. You can also use Fillet, Chamfer, Trim, Extend, Subtract, and Merge tools to modify wall components to create the configuration that you want. The Calculate Automatically feature can also assist you in adding boundary segments to complete your partial endcap designs.

When necessary, you can override the wall endcap style assigned in a wall style. When you override the assigned endcap style, you can select a different endcap style for one or both ends of a wall segment.

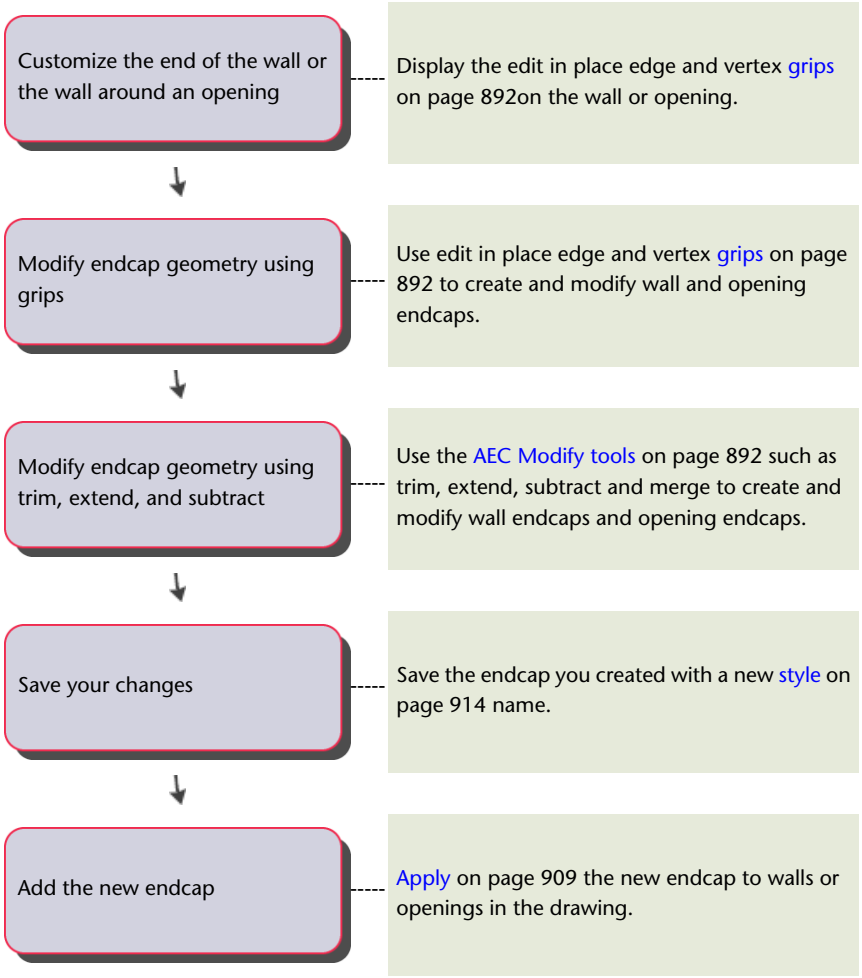
Opening Endcap Styles

Wall endcap styles are also used as a basis to define endcap styles for wall openings. When a wall has an opening, such as a window or a door, the shape of the wall endcap at each edge of the opening can be defined. You use opening endcap styles to specify the wall endcap style applied to each edge of the wall

adjacent to an opening. For more information about opening endcap styles, see Creating a Wall Opening Endcap Style on page 914.

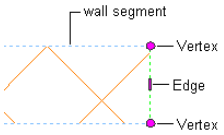
NOTE When you change a wall endcap style, all opening endcap styles based on that style are also modified.

Workflow for Creating Wall and Opening Endcaps



Using Edit in Place to Modify Wall Endcaps

You can use Edit in Place grips to modify wall endcaps and create the wall endcap conditions that you want. Vertex and Edge grips are displayed for all wall components at the wall endcap that you specify.

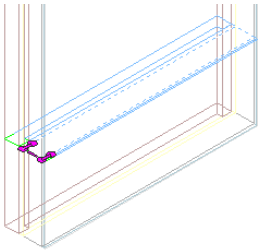


When you edit a wall endcap in place, a temporary profile is created for each component in the endcap. The profiles for the component with the lowest index number in the wall style are displayed first. When you select a profile, it displays Vertex and Edge grips you can manipulate to edit its geometry. You can press *ESC* to clear selected components.

The Vertex grips allow you to manipulate component corners. When you move a Vertex grip that occurs at the end of an component polyline, additional Edge grips are added at the midpoints of the new edges that are created. Also, a new Vertex grip is automatically created at the location of the original Vertex that you moved.

The Edge grips allow you to offset a component edge, add a vertex to the component edge, or convert a straight component edge to an arc edge. When you offset a component edge or add a vertex to the component edge, additional Edge grips are added at the midpoints of the new edges that are created. In addition, when you offset a component edge, new component corner Vertex grips are created.

You can edit this profile in plan or model views. In a model view, you are prompted to select a point at the endcap you want to modify. This pick point determines the elevation of the profile.



IMPORTANT A wall style that has vertically stacked components may require unique endcap conditions at different elevations of the wall endcap. Change your cutplane height to specify these different wall intersection cleanup conditions at the appropriate elevation.

When working with intersecting walls in a plan view, the profile is located on the normal plane of the middle point of the wall segment nearest to your pick point. Components that don't intersect the cutplane of the wall will not be displayed.

To Edit Endcap Conditions in Place

1. Select the wall that has the wall or opening endcaps that you want to change.
2. Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .
3. Specify a point near the endcap.

   Temporary profiles are created for you to edit the geometry of the wall endcap for each wall component.
4. Select the profile and edit it as desired:

If you want to …	Then …
change the shape of the perimeter of the profile	use grips to adjust the shape.
show an edge of the profile for a single component (plan view only)	click Edit In Place tab ➤ Profile panel ➤ Show Edge .
hide an edge of the profile for a single wall component (plan view only)	click Edit In Place tab ➤ Profile panel ➤ Hide Edge .
replace the geometry of an endcap component with a new polyline that lies on the end of the wall exclusive of existing endcaps	click Edit In Place tab ➤ Profile panel ➤ Replace Endcap .
remove an endcap component	click Edit In Place tab ➤ Profile panel ➤ Remove Endcap .

If you want to …	Then …
fillet an edge of the profile for a single wall component	click Edit In Place tab ➤ Modify panel ➤ Fillet .
chamfer an edge of the profile for a single wall component	click Edit In Place tab ➤ Modify panel ➤ Chamfer .
merge an enclosed polyline area with a wall component	click Edit In Place tab ➤ Modify panel ➤ Merge .
subtract an enclosed polyline area from a wall component	click Edit In Place tab ➤ Modify panel ➤ Subtract .
trim wall components to a trim boundary	click Edit In Place tab ➤ Modify panel ➤ Trim .
extend wall components to an extension boundary	click Edit In Place tab ➤ Modify panel ➤ Extend .

5 Save or discard the changes:

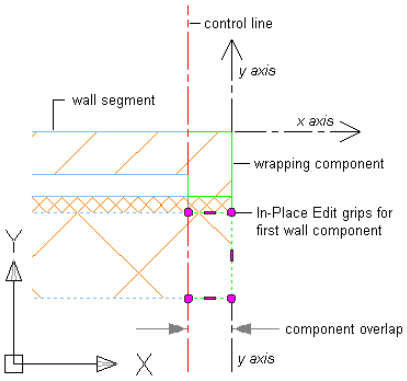
If you want to…	Then…
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

The Vertex grips allow you to manipulate component corners. When you move a Vertex grip that occurs at the end of an endcap polyline, additional edge grips are added at the midpoints of the new edges that are created.

The Edge grips allow you to offset a component edge, add a vertex to the component edge, or convert a straight component edge to an arc edge. When you offset a component edge or add a vertex to the component edge, additional edge grips are added at the midpoints of the new edges that are created. In addition, when you offset a component edge, new component corner Vertex grips are added.

Often you will work with wall styles that have one or more components that wrap at the wall endcap or opening. For example, a brick wall component in some wall styles wraps at the wall endcap. With this condition, a control line parallel to the Y axis delineates the innermost component face. Remaining components in the wall style will start at this control line, and the initial grips display along the control line.

In the following illustration you can see the component overlap distance and the grips that occur along the control line.



The following sections cover using Edit in Place to modify wall endcaps.

Using Vertex Grips to Modify a Wall Endcap

Use this procedure to modify a wall component with Vertex grips.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Specify a point near the wall endcap.

The Edit in Place grips for the wall component are displayed.

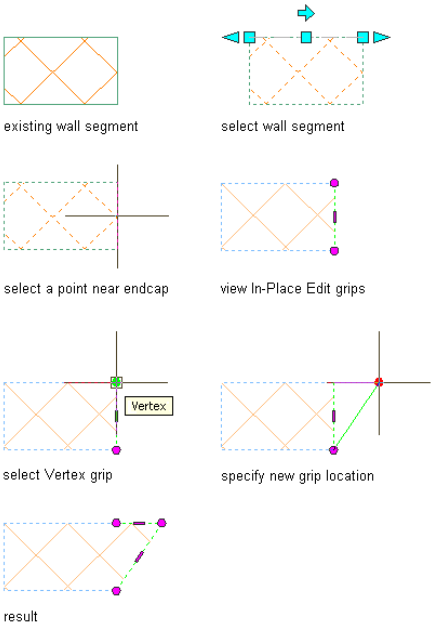
4 Select the Vertex grip.

5 Specify a new location for the Vertex grip.

6 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

7 In the following example, a wall endcap is modified with a Vertex grip.



Using Edge Grips to Offset a Wall Endcap Edge

Use this procedure to offset a wall component edge with Edge grips.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Specify a point at the wall endcap.

4 Move your cursor over the Edge grip to display the available modes.

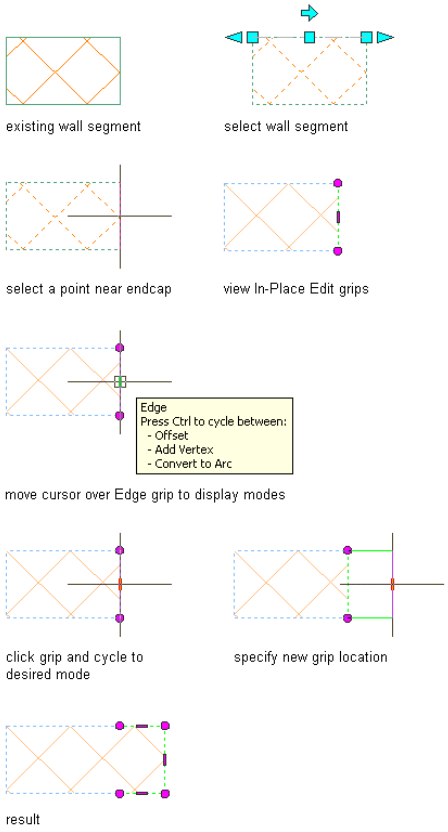
5 Select the Edge grip.

6 Specify a new location for the Edge grip.

7 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a wall component edge is offset with an Edge grip.



Using Edge Grips to Add a Vertex to a Wall Endcap Edge

Use this procedure to add a vertex to a wall component edge with Edge grips.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Specify a point at the wall endcap.

4 Move your cursor over the Edge grip to display the available modes.

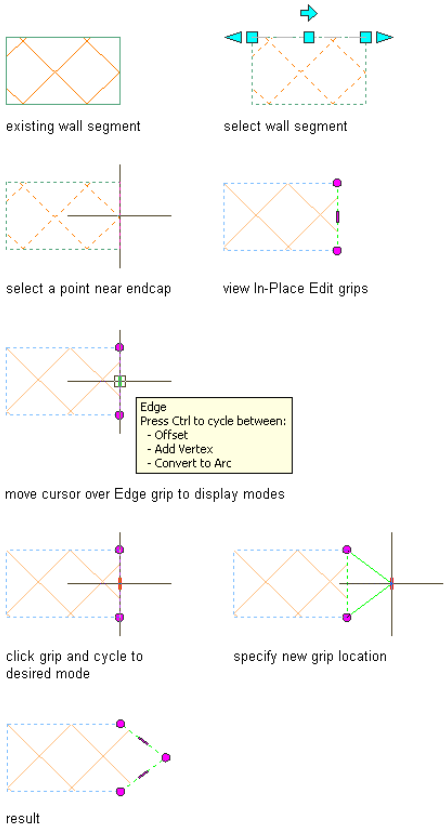
5 Select the Edge grip, and then press *CTRL* once.

6 Specify a new location for the Edge grip.

7 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a vertex is added to a wall component edge with an Edge grip.



Using Edge Grips to Convert a Wall Endcap Edge to an Arc

Use this procedure to convert a wall component edge to an arc with Edge grips.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Specify a point at the wall endcap.

4 Move your cursor over the Edge grip to display the available modes.

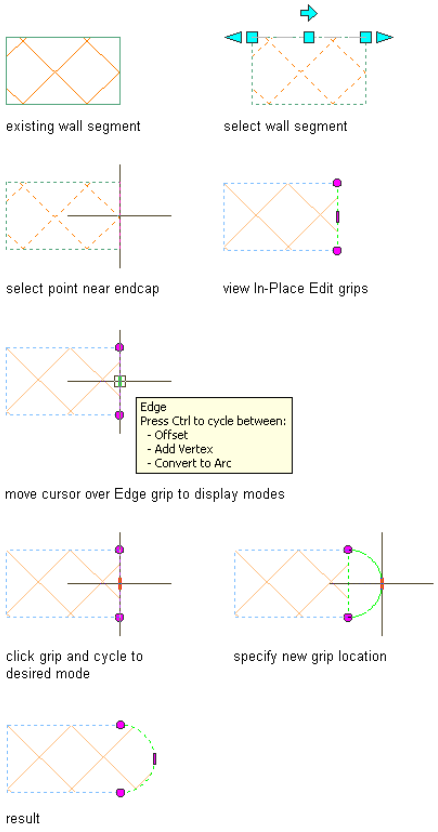
5 Select the Edge grip, and then press *CTRL* twice.

6 Specify a new location for the Edge grip.

7 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a wall endcap edge is converted to an arc with an Edge grip.



Filleting a Wall Endcap Component

Use this procedure to modify a wall endcap by filleting a wall component.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Select the component that has the corner you want to fillet.

You may only fillet the corner of one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Fillet .

5 Specify the fillet radius.

6 Select the first component edge to fillet.

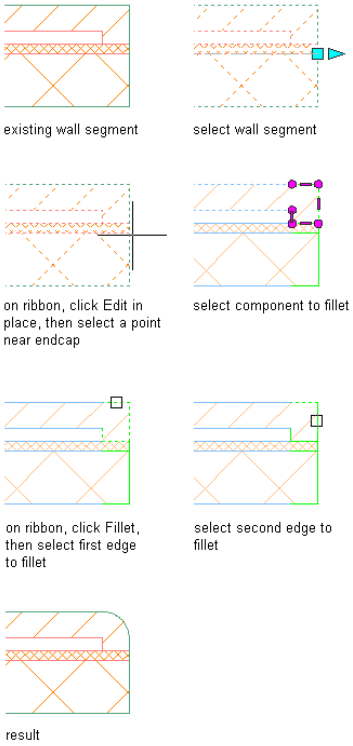
7 Select the second component edge to fillet.

8 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a brick veneer corner is filleted.



Chamfering a Wall Endcap Component

Use this procedure to modify a wall endcap by chamfering a wall component corner.

1. Select the wall segment with the wall endcap to modify.
2. Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .
3. Select the component that has the corner you want to chamfer.

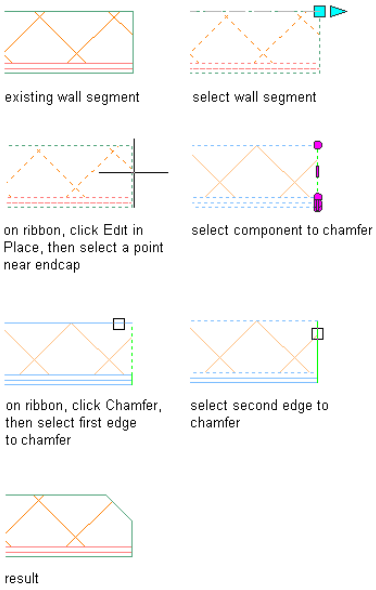
   You may only chamfer the corner of one component at a time. Press *ESC* to clear component selection.

4. Click Edit In Place tab ➤ Modify panel ➤ Chamfer .
5. Specify the chamfer distances.
6. Select the first component edge to chamfer.
7. Select the second component edge to chamfer.

8 Exit the edit-in-place session:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a CMU component corner is chamfered.



Showing the Edge of a Wall Endcap Component

Use this procedure to modify a wall endcap by showing a previously hidden wall component edge.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Select the component that has the edge you want to show.

You may only show the edge of one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Profile panel ➤ Show Edge .

5 Select the component edge to show.

6 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .

If you want to...	Then...
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

Hiding the Edge of a Wall Endcap Component

Use this procedure to modify a wall endcap by hiding a wall component edge.

1. Select the wall segment with the wall endcap to modify.
2. Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .
3. Select the component that has the edge you want to hide.

   You may only hide the edge of one component at a time. Press *ESC* to clear component selection.
4. Click Edit In Place tab ➤ Profile panel ➤ Hide Edge .
5. Select the component edge to hide.
6. Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

Trimming a Wall Endcap Component

Use this procedure to modify a wall endcap by trimming a component. A trim boundary may be a line, arc, circle, polyline, or wall component edge.

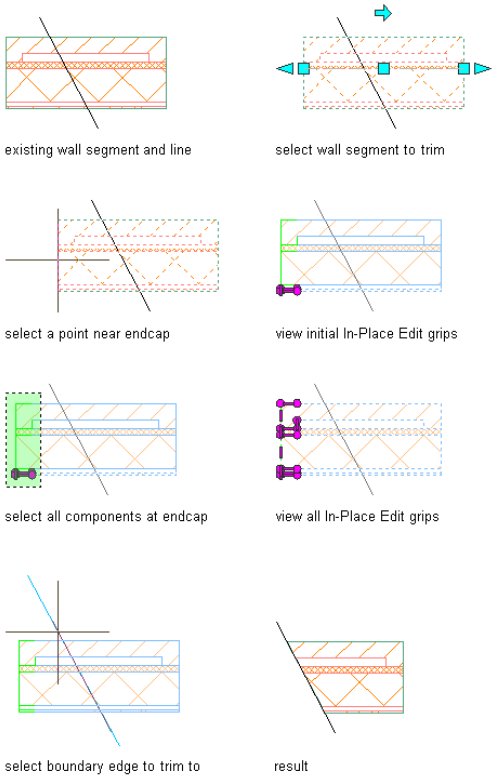
1. Select the wall segment with the wall endcap to modify.
2. Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .
3. Select the component that you want to trim.

   You may trim multiple components at a time to a trim boundary. Press *ESC* to clear component selection.
4. Click Edit In Place tab ➤ Modify panel ➤ Trim .
5. Either specify points to delineate a trim boundary, or press *ENTER* to select a trim boundary.
6. Specify the side to trim.

7 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, components are trimmed to a boundary line.



Extending a Wall Endcap Component

Use this procedure to modify a wall endcap by extending a component. An extension boundary may be a line, arc, circle, polyline, or wall component edge.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Select the component that you want to extend.

You may extend multiple components at a time to a extension boundary. Press *ESC* to clear component selection.

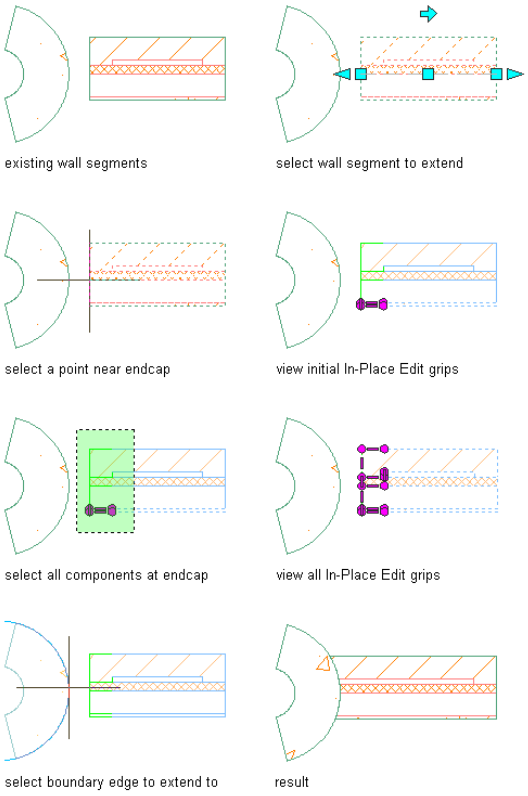
4 Click Edit In Place tab ➤ Modify panel ➤ Extend .

5 Select an extension boundary.

6 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, components are extended to another wall segment as an extension boundary.



Subtracting a Profile from a Wall Endcap Component

Use this procedure to modify a wall endcap by subtracting a profile from a component. A profile may be any polyline-enclosed area that overlaps a specific component.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Select the component from which you want to subtract the profile.

You may subtract profiles from more than one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Subtract .

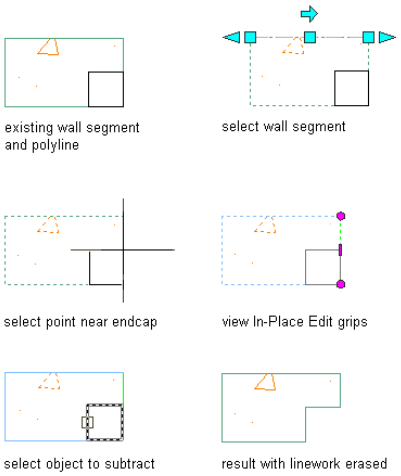
5 Select a profile to remove.

6 Enter *Y* to erase selected linework, or *N* to keep it.

7 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a profile is subtracted from a wall component.



Merging a Profile with a Wall Endcap Component

Use this procedure to modify a wall endcap by merging a profile with a component. A profile may be any polyline-enclosed area that overlaps or is coincident with a specific component.

1 Select the wall segment with the wall endcap to modify.

2 Click Wall tab ➤ Endcap panel ➤ Endcap Edit In Place .

3 Select the component to which you want to merge the profile.

You can only merge profiles with one component at a time. Press *ESC* to clear component selection.

4 Click Edit In Place tab ➤ Modify panel ➤ Merge .

5 Select a profile to merge.

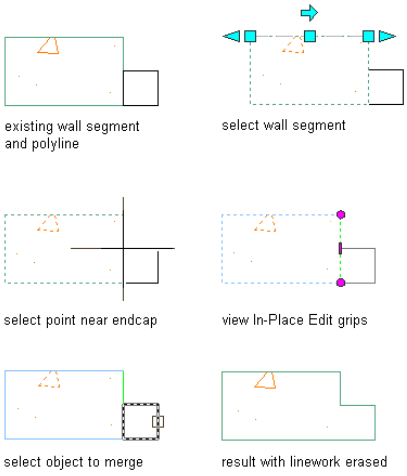
6 Enter *Y* to erase selected linework, or *N* to keep it.

7 If the merged profile overlaps another component that has a higher priority, the Wall Cleanup Edit in Place - Component Cleanup Override dialog is displayed. Click Yes to have the merged profile override the overlapped component, click No have the overlapped component override the merged profile, or click Cancel to end without merging the profile with the component.

8 Save or discard your changes:

If you want to...	Then...
Save any changes you made during the edit-in-place session as a new style	click Edit In Place tab ➤ Edits panel ➤ Save As .
Discard any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Cancel .
Save any changes you made during the edit-in-place session	click Edit In Place tab ➤ Edits panel ➤ Finish .

In the following example, a profile is merged with a wall component.



Creating Wall Endcaps Using Calculate Automatically

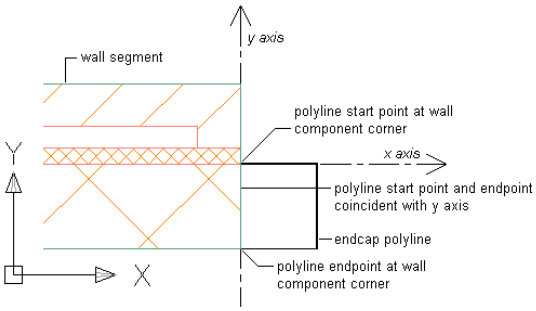
You can use the Calculate Automatically feature with appropriate polyline linework to create wall endcaps. Calculate Automatically will add boundary segments to complete an endcap configuration if the initial polyline is drawn with regard to location and orientation of the particular wall component.

Here are some guidelines for drawing polylines to use in endcap styles:

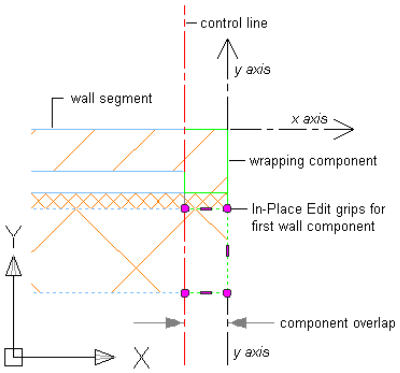
- Use only 2-dimensional (2D), open, lightweight polylines.
- To help you visualize how the endcap should appear for each component of the wall, draw the polylines in plan view, adjacent to the wall components that you want to change.
- When you draw polylines for an endcap style used in a multi-component wall, draw one polyline for each component, so that each polyline corresponds to the shape of the endcap for one wall component.

Working with Wall Endcap Polylines and Wall Components

Valid wall endcap polylines start at the wall component corner on the Y axis. Ideally, the polyline ends at the other wall component corner on the Y axis, so that both the polyline start point and endpoint are coincident with the Y axis and both have the same X value as shown.



Often you will work with wall styles that have one or more components that wrap at the wall endcap or opening. For example, a brick wall component in some wall styles wraps at the wall endcap. With this condition, a control line parallel to the Y axis delineates the innermost component face, and the remaining components in the wall style will start at this control line. When you select a wall segment in order to apply a new wall endcap condition for the first wall component, the Edit in Place grips display along the control line as shown.



Adding a Wall Endcap Polyline to a Single-Component Wall Segment

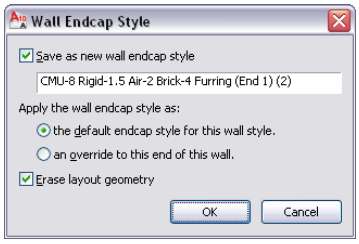
Use this procedure to associate a wall endcap polyline with the component of a single-component wall segment.

1. At the end of an existing single-component wall segment in plan view, draw a polyline to define the wall endcap condition.
2. Select the wall segment.
3. Click Wall tab ➤ Endcap panel ➤ Calculate Automatically .
4. Select the wall endcap polyline.
5. Press *ENTER* to accept the wall component that you want.

   The Wall Endcap Style dialog displays, in which you can do the following:

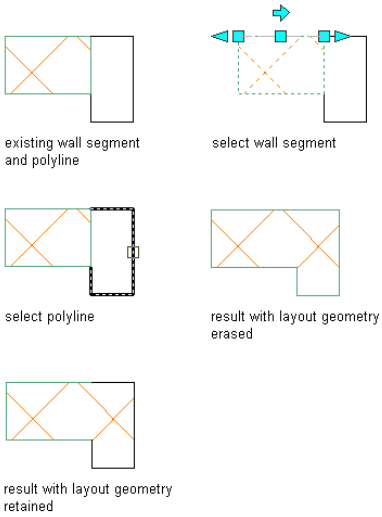
   - Save the new wall endcap as a new wall endcap style.
   - Apply the wall endcap style as a default endcap for this wall style. All existing and new instances of this wall style will display the new wall endcap condition.
   - Apply the wall endcap style as an override to the selected end of this wall style. Only this single instance of this wall style will display the new wall endcap condition.

- You can choose to erase or retain the original polyline layout geometry of the wall endcap.



Click OK, and the specified wall component is merged with the wall endcap polyline. Click Cancel to discard your changes.

In the following example, a wall endcap polyline is associated with a wall component.



Adding a Wall Endcap Polyline to a Multiple-Component Wall Segment

Use this procedure to associate a wall endcap polyline with a specific component in a multiple-component wall segment.

1. On an existing multi-component wall segment in plan view, draw a polyline to define the wall endcap condition.
2. Select the wall segment to edit.
3. Click Wall tab ➤ Endcap panel ➤ Calculate Automatically .
4. Select the wall endcap polyline.

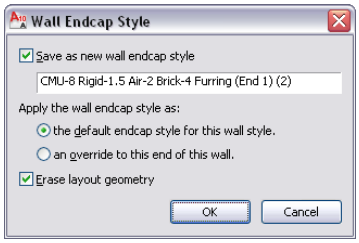
   The first wall component to which you could associate the polyline is highlighted with a red line inside the perimeter of the wall component.
5. Press *ENTER* to accept this wall component, or press *TAB* to advance to the next wall component.

   Continue to press *TAB* until the component that you want is highlighted.
6. Press *ENTER* to accept the wall component that you want.

   The Wall Endcap Style dialog displays, in which you can do the following:

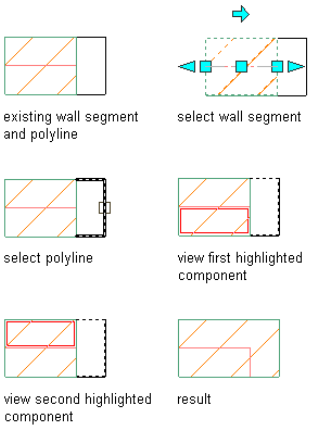
   - Save the new wall endcap as a new wall endcap style.
   - Apply the wall endcap style as a default endcap for this wall style. All existing and new instances of this wall style will display the new wall endcap condition.

- Apply the wall endcap style as an override to the selected end of this wall style. Only this single instance of this wall style will display the new wall endcap condition.
- You can choose to erase or retain the original polyline layout geometry of the wall endcap.



Click OK, and the specified wall component is merged with the wall endcap polyline. Click Cancel to discard your changes.

In the following example, a wall endcap polyline is applied to the second of two wall components in a multi-component wall segment.



Applying Wall Endcap Styles from the Style Manager

Although you can create a new wall endcap style from the Style Manager using the procedure described below, the new style is not automatically applied to any wall style or wall; you must apply it to wall styles or walls in a separate task. For more information, see Applying a Wall Endcap Style to a Wall Style on page 910 and Overriding a Wall Endcap Style on a Wall on page 910.

Creating a Wall Endcap Style in the Style Manager

1. Draw polyline(s) in the shape of the wall endcap you want to create.
2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects.
4. Right-click Wall Endcap Styles, and click New.
5. Enter a name for the new wall endcap style, and press *ENTER*.
6. Right-click the new style name, and click Set From.
7. Select a polyline, and enter the index number for the wall component to which the polyline applies.

When you select polylines to use in wall endcap styles, each polyline corresponds to the shape of the endcap for one wall component. Each polyline is scaled to fit its assigned component.

Wall components are numbered from exterior to interior. Component index 1 corresponds to the outermost exterior component.

8 When prompted, enter **y** (Yes) to assign a polyline to another component, or enter **n** (No) if there are no more components.

NOTE You can assign the same polyline to multiple wall components that you want to have the same endcap condition.

9 When you finish specifying endcap conditions for wall components, enter the return offset for the endcap.

A positive value offsets the endcap from the wall start point in the positive X direction.

10 Click OK.

You can apply the wall endcap style to a wall style (Applying a Wall Endcap Style to a Wall Style on page 910, an opening endcap style (Creating a Wall Opening Endcap Style on page 914,) or to individual walls (Overriding a Wall Endcap Style on a Wall on page 910.)

Applying a Wall Endcap Style to a Wall Style

Use this procedure to apply a wall endcap style to a wall style. When a wall endcap style is applied to a wall style, all walls of that style will have the specified at both ends. You can override the style-defined endcap style by assigning a different endcap to one wall end.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects.

3 Expand Wall Styles, and select the wall style to which you want to apply the wall endcap style.

4 Click the Endcaps/Opening Endcaps tab.

5 For Wall Endcap Style, select the style you want to apply.

The endcap style is applied to all existing walls of that style, as well as all new walls of that style.

TIP The endcap style defined in the wall style is always applied to both ends of the wall. If you want a different endcap for each end of the wall, you can override the style-defined endcap. For more information, see Overriding a Wall Endcap Style on a Wall on page 910.

6 Click OK.

Overriding a Wall Endcap Style on a Wall

Use this procedure to override the style-defined wall endcap style for one end of an individual wall.

NOTE A wall endcap style is generally created for use with a specific wall style. Overriding the endcap style for an individual wall may display solution tip icons in the wall.

1 Select a wall.

2 Click Wall tab ➤ Endcap panel ➤ ➤ Override Endcap Style .

3 Select a point close to the wall end where you want assign a different endcap.

4 In the Select an Endcap Style dialog, select an endcap style to use on the wall end, and click OK.

TIP Alternatively, you can double-click the wall to display the Properties palette, and scroll to the Style Overrides category. Under Starting endcap and Ending Endcap, you can select a different endcap style to override the style assignment.

Modifying the Geometry of a Wall Endcap Style

You can modify the geometry of an existing wall endcap style using either of the following methods:

- Enter an Edit in Place session to change the endcap profile and save the change back to the style. This is best suited to making small, detailed changes.
- Exchange the endcap definition with a newly created polyline. This is best suited for changing the endcap shape completely without having to reassign a new endcap style to all wall styles that use it.

Editing the Standard Wall Endcap Style

The Standard wall endcap style is a special case. While you can use the Standard style as a starting point for creating a new wall endcap style, the Standard style itself cannot be changed. The Standard style is used when no other endcap style is specified for a wall. It is also used when you remove all components from a wall endcap style.

The Wall Endcap Profile

When you edit a wall endcap in place, a temporary profile with grips for vertices and edges is created for each component of the endcap. You can edit this profile in both plan and model views. In model views, the profile is inserted at the mid-height of the wall. If the wall has components that do not extend to that height, such as a footing, additional profiles are created at the vertical midpoint of these components. Use model views to edit wall endcaps that lie in different planes.

If the profile is very complex or is obscured by the linework of other objects, use the location grip on the temporary profile to move the profile away from the wall. Changes to the profile are saved at its original location.

Changing a wall endcap style using Edit in Place

1. Select the wall that has the wall endcap style you want to change.
2. Click Wall tab ➤ Endcap panel ➤ Edit In Place .
3. Select a point near the endcap.

   Temporary profiles are created for you to edit the geometry of the wall endcap for each wall component.

   NOTE After performing an editing task, you may need to select a profile again to perform another editing task.

4. Select the profile and edit it as desired:

If you want to …	Then …
change the shape of the perimeter of the profile	use grips to adjust the shape. If the profile has no grips, the Standard style, which you cannot edit, is the current endcap style.
hide one or more edges of the profile (plan view only)	click Edit In Place tab ➤ Profile panel ➤ Hide Edge .Select the edges you want to hide, and press *ENTER*.

If you want to …	Then …
display an edge that you hid	click Edit In Place tab ➤ Profile panel ➤ Show Edge . Select the edges you want to show, and press *ENTER*.
add vertices to the profile	Edit In Place tab ➤ Profile panel ➤ Add Vertex . Select a point for each new vertex, and press *ENTER*.
remove vertices from the profile	Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Select each vertex to remove, and press *ENTER*.
replace the geometry of an endcap component with new polyline that lies on the end of the wall exclusive of existing endcaps	click Edit In Place tab ➤ Profile panel ➤ Replace Endcap . Select the endcap component to replace, and select a polyline to define the new geometry. Press *ENTER* to keep the polyline in the drawing, or enter **y** (Yes) to erase it.
remove an endcap component	click Edit In Place tab ➤ Profile panel ➤ Remove Endcap .

5 Save or discard the changes:

If you want to …	Then …
restore the wall endcap to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current wall endcap style	click Edit In Place tab ➤ Edits panel ➤ Finish .The wall endcap and the wall endcap style use the edited profile(s) to define its geometry. Any other walls or opening endcap styles that use this wall endcap style are also updated with the edited geometry.
save the changes to a new wall endcap style	click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new wall endcap style, and click OK. The wall endcap uses the new style to define its geometry. Other walls, wall styles, or opening endcap styles that use the original style are not affected.

Changing the wall endcap style by substituting its profile with a new polyline

1 Draw the polyline you want to exchange for an existing wall endcap style.
2 Select a wall in the drawing that has the wall endcap style you want to change.
3 Click Wall tab ➤ Endcap panel ➤ Calculate Automatically .
4 Select the polyline you have drawn, and press ENTER.
5 Enter **y** (Yes) to erase the polyline(s), or enter **n** (No) to keep the polyline(s).
If the current wall endcap style is not the Standard style, you are prompted to modify the current style.
6 Enter **y** (Yes) to modify the currently active endcap style.

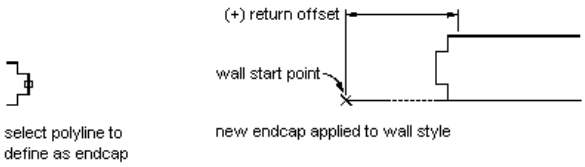
7 Enter **w** (Wallstyledefault) to use the modified wall endcap style as the default endcap style for that wall style. Otherwise, enter **o** (Override).

Changing the Return Offset of a Wall Endcap Style

Use this procedure to change the return offset of an existing wall endcap style.

A positive value offsets the endcap from the wall start point in the positive X direction.

Specifying the return offset for an endcap



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects.
3 Expand Wall Endcap Styles, and select the endcap style for which you want to change the return offset.
4 Click the Dimensions tab.
5 Enter a new offset value, and click OK.

Attaching Notes and Files to a Wall Endcap Style

Use this procedure to enter notes and attach reference files to a wall endcap style. You can also edit notes and edit or detach reference files that are attached to a wall endcap style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects.
3 Select the wall style you want to access.
4 Click the General tab.
5 Under Description, add a description of the endcap style.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and perform the following operations as needed:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Creating a Wall Opening Endcap Style

Wall opening endcap styles are endcap conditions assigned to a wall end adjacent to a door, window, or door and window assembly. An opening endcap style has no independent geometry, but must use a wall endcap style as its geometry definition. For information on creating wall endcap styles, see Creating Wall Endcaps Using Calculate Automatically on page 906 and Creating a Wall Endcap Style in the Style Manager on page 909.

NOTE When you change a wall endcap style, all opening endcap styles based on the wall endcap style are modified, too.

Like a wall endcap style, an opening endcap style must be assigned to a wall style. For more information, see Applying a Wall Opening Endcap Style to a Wall Style on page 914.

1. Verify that the wall endcap style you want to base your opening endcap style on is present in your drawing, and has the correct geometry.
2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects.
4. Expand Opening Endcap Styles, right-click, and click New.
5. Click the Design Rules tab.

   In an opening endcap style, you have to define the endcap condition between the wall and the opening separately for each direction: jamb start, jamb end, sill, and head.
6. Under Endcap Style, select the wall endcap style for each opening direction.
7. Click OK.

   For information on how to apply the opening endcap style to a wall style or a wall opening, see Applying a Wall Opening Endcap Style to a Wall Style on page 914 and Overriding a Wall Opening Endcap Style on a Wall on page 915.

Applying a Wall Opening Endcap Style to a Wall Style

After you create a wall opening endcap style, you need to assign it to the wall style where you want to use it when adding the following objects to the wall: doors, windows, openings, and door and window assemblies.

When necessary, you can override the wall opening endcap style assigned in a wall style on an individual wall.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects.
3. Expand Wall Styles, and select the wall style to which you want to apply the opening endcap style to.
4. Click the Endcaps/Opening Endcaps tab.
5. For Opening Endcaps, select an opening endcap style to use for each of the opening objects that can interact with the wall.
6. You can also edit an existing opening endcap style here, or create a new one from wall endcap styles, if necessary.
7. Click OK.

Overriding a Wall Opening Endcap Style on a Wall

Use this procedure to override the style-defined wall opening style for one intersection of a wall with an opening.

NOTE Each wall opening endcap style is generally created for use with a specific wall style. Overriding the endcap style for an individual wall and opening may display solution tip icons in the wall.

1 Select a wall with an opening.

2 Click Wall tab ➤ Endcap panel ➤ ➤ Override Endcap Style .

3 Select a point close to the wall opening where you want assign a different opening endcap.

4 In the Select an Endcap Style dialog, select an endcap style, and click OK.

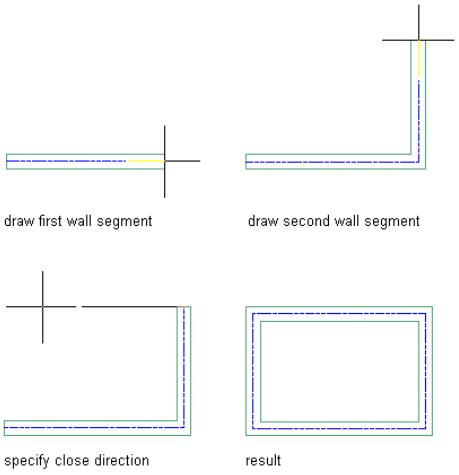
Using Ortho Close and Close with Walls

Ortho Close and Close are command-line options that let you efficiently create a closed space when you add walls.

Ortho Close

This option closes the space by drawing 2 walls based on the direction you specify. The direction is extended until it meets a line perpendicular to the initial edge of either the wall. You enter **or** (Ortho) at the command line to use this option when placing walls.

Closing walls with Ortho Close



Close

This option closes the wall by creating a wall segment from the last point specified for the walls to the first point specified in this group of walls. You enter **c** (Close) at the command line to use this option when placing walls.

About Wall Lengths

When you draw a wall, the “true” length of the wall is the distance between the 2 end grips. The wall can appear to have a different length when it cleans up with other walls; the difference can be twice the cleanup circle radius longer or shorter than the “true” length. The “true” length is the length reported by properties

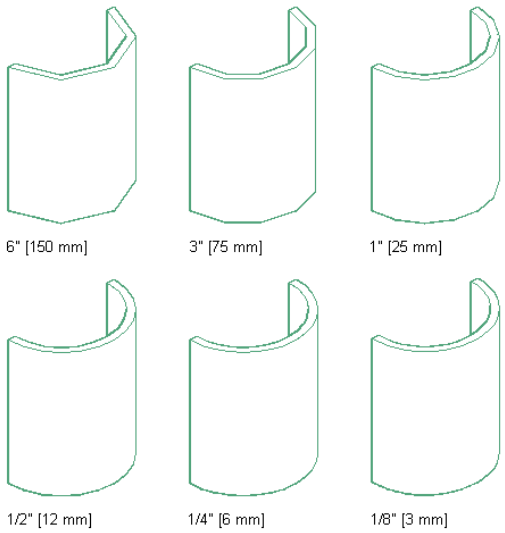
and schedules. To get the most accurate information about wall length in schedules, always make sure that walls that clean up with each other have end grips that coincide.

About Curved Walls

The smoothness (tesselation) of curved edges is controlled by the FACETDEV variable. This variable sets the number of facets to display on curved AEC objects. The default value is 1/2" for drawings created from imperial templates and is 12.7 mm for drawings created from metric templates.

The number you specify for facet deviation defines the maximum distance from the chord to the arc, the chord being an edge that is created from faceting the curve, to the true mathematical arc. The facet deviation has a range of greater than zero (0) and no upper limit.

Curved wall segments with facet deviation examples



The minimum number of facets is 8. For example, if you create a cylinder mass element to have a 1'-0" radius, and specify 1 for FACETDEV, the cylinder has 8 faces.

To specify the facet deviation values for the current drawing, see Specifying the Display Resolution of Objects with Facets on page 143. The settings apply to all curved objects in the drawing, including curved walls.

Specifying Offsets for Roof Line and Floor Line Vertices

When you add or move a vertex on the roof line or the floor line of a wall, you specify the horizontal and vertical offset of the vertex. You can specify the offset relative to other vertices or to the base height or the baseline of the wall. The following table identifies the locations you can specify for the horizontal offset of a vertex. The offset distance is measured in the direction the wall was drawn.

This setting …	Defines the horizontal offset from …
From Wall Start	the wall start point.
From Wall End	the wall endpoint.
From Wall Midpoint	the midpoint of the wall.
From Previous Point	the vertex that is one position closer to the wall start point than the vertex you are adding or moving.

This setting …	Defines the horizontal offset from …
From Next Point	the vertex that is one position closer to the wall endpoint than the vertex you are adding or moving.
From Midpoint of Neighbors	the midpoint of the distance between the current vertex and the vertex that is one position closer to the wall endpoint.

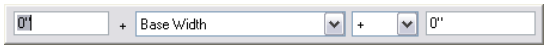
The following table identifies the locations you can specify for the vertical offset of a vertex. You can enter a negative distance for the vertical offset to position a vertex toward the ground.

This setting …	Defines the vertical offset from …
From Wall Base Height	the base height of the wall.
From Next Point.	the vertex that is one position closer to the wall endpoint than the vertex you are adding or moving.
From Previous Point	the vertex that is one position closer to the wall start point than the vertex you are adding or moving.
From Baseline	the baseline of the wall.

Specifying the Width and Edge Offset of a Wall Component

You can specify the width and edge offset of a wall component by entering values, creating a component with a fixed width and offset. You can also specify a formula for determining these values. The formula can include a value for Base Width. By including the Base Width variable in the formula, you can specify the width of the wall when you add or edit walls of this style to a drawing.

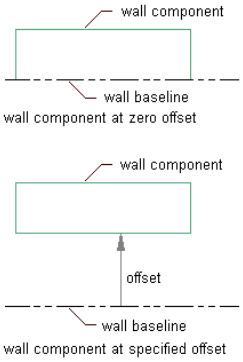
Specifying a formula to determine component width or edge offset



To calculate the edge offset or the width based on the base width, select Base Width and select an operator and an operand:

- If you select Base Width for any component, you can enter a width for walls of this style when you add or modify them in a drawing.
- If all components in the wall style use absolute values, you cannot change the width of individual walls of this style when you add or modify them.

Wall component baseline offset parameters



Curtain Walls

20

Curtain walls provide a grid or framework for inserting objects such as windows and doors. Curtain walls have many similarities to standard walls, such as baseline, roof line, and floor line, and they allow for interferences. You can insert doors, windows, and door/window assemblies into a curtain wall, just like standard walls, but the insertion process is different.

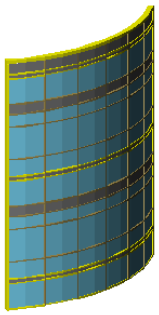
Curtain Walls

Curtain walls provide a grid or framework for inserting objects such as windows and doors. Curtain walls have many similarities to standard walls, such as baseline, roof line, and floor line, and they allow for interferences. You can insert doors, windows, and door/window assemblies into a curtain wall, just like standard walls, but the insertion process is different.

Curtain Wall Grids

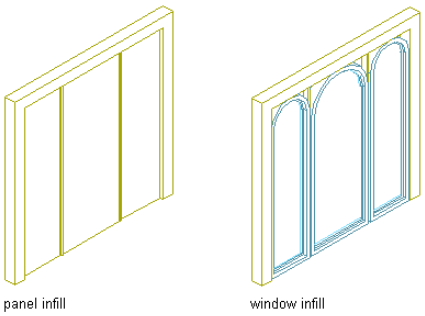
Curtain walls are made up of one or more grids. Each grid in a curtain wall has either a horizontal division or a vertical division, but you can nest the grids to create a variety of patterns from simple to complex.

Curtain wall nested grid example



Each cell in a grid can contain either a panel infill, to represent basic cladding materials such as a stone wall panel or glazing, or an object such as a window or a door.

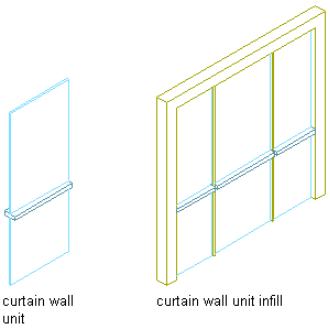
Assigned curtain wall infill types



Curtain Wall Units and Door/Window Assemblies

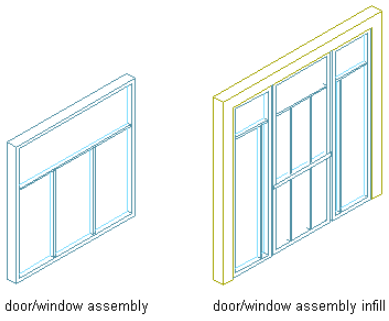
Other objects you can insert in a grid include curtain wall units and door/window assemblies. Curtain wall units are designed to represent complex elements that are repeated within your main curtain wall.

Assigned curtain wall unit infill



Window assemblies serve a similar function as curtain wall units but can contain panel infills or objects such as doors or windows. Door/window assemblies can be inserted into curtain walls and standard walls.

Assigned door/window assembly infill



Both curtain wall units and door/window assemblies can reduce the need for nested grids, making edits to the curtain wall easier.

Elements of Grids

Grids are the foundation of curtain walls, curtain wall units, and door/window assemblies. Every grid has four element types:

- **Divisions:** Define the direction of the grid (horizontal or vertical) and the number of cells
- **Cell Infills:** Contain another grid, a panel infill, or an object such as a window or a door

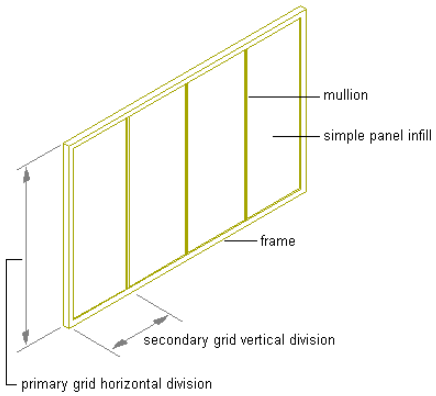
- **Frames:** Define the edge around the outside of the primary grid and nested grids
- **Mullions:** Define the edges between the cells

NOTE Division is an abstract element, in contrast to the other three element types that represent physical elements of the curtain wall.

Each element type is assigned a default definition that describes what elements of that type look like.

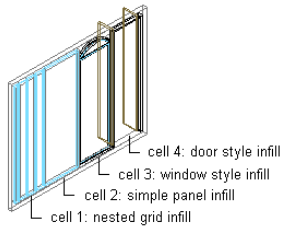
Element type	Default definitions
Divisions	Primary horizontal grid with a fixed cell dimension of 13' and secondary vertical grid with a fixed cell dimension of 3'
Cell Infills	Cells containing simple panels 2" thick
Frames	Left, right, top, and bottom outer edges of grid 3" wide and 3" deep
Mullions	Edges between cells 1" wide and 3" deep

Specifying grid element types



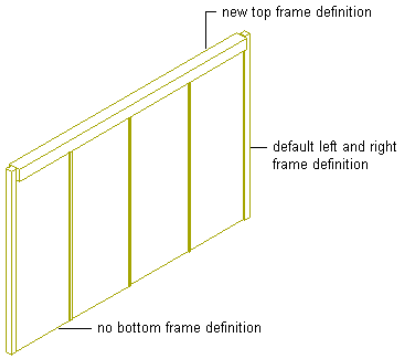
You can create new element definitions and assign those definitions within the curtain wall. For example, you can create multiple infill definitions, and then assign different infills to specific cells in the grid.

Assigning different infills to curtain wall cells



Likewise, you can create multiple frame definitions and then assign a different definition to each frame edge (top, bottom, left, or right). You can also create multiple mullion definitions.

Specifying different frame definitions for each edge of a frame



Experimenting with Curtain Wall Designs

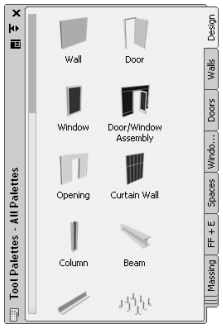
The templates provided with AutoCAD Architecture offer curtain wall styles as well as curtain wall unit styles and door/window assembly styles. To familiarize yourself with the curtain wall feature, you can look at those existing styles and experiment with them. That will make it easier to understand curtain wall behavior and create your own curtain wall designs. You can find curtain wall styles and curtain wall unit styles under *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial* or *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Metric*.

Using Curtain Wall Tools To Create Curtain Walls

Curtain walls are created in much the same way as standard walls. You can specify a style, a height, and start and endpoints. Curtain walls can be straight, curved, or a combination of the two.

Tools provided with AutoCAD Architecture let you quickly place curtain walls by selecting a curtain wall tool with a specific curtain wall style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can also use curtain wall tools to create new curtain walls by applying tool properties to existing walls, elevation sketches, 2D layout grids, or custom grids from two dimensional (2D) lines, arcs, and circles.

Tool palette containing a curtain wall tool



The following palettes contain one or more curtain wall tools:

Tool Palette	Curtain Wall Tools
Design palette in the Design palette group	a tool for the Standard curtain wall style and default settings for other curtain wall properties
Design Tool Catalog in Content Browser	a package of curtain wall and curtain wall unit tools. For information about accessing tools in Content Browser, see Using Tool Catalog Items in AutoCAD Architecture on page 122.

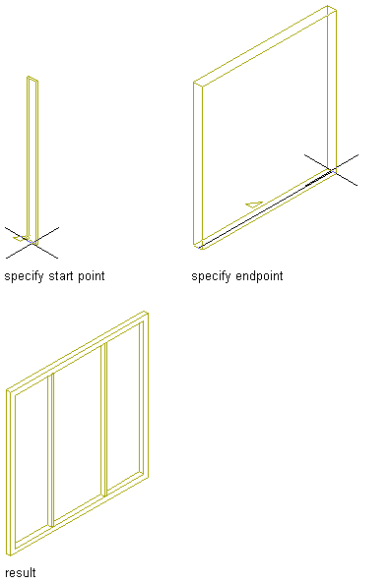
Tool Palette	Curtain Wall Tools
custom tool palettes created by your CAD manager	tools with curtain wall styles and properties that your CAD manager customized for your projects or office standards.

When you place curtain walls using curtain wall tools, you can use the default settings of the tool, or you can change settings for any curtain wall properties that are not controlled by the style.

Creating a Straight Curtain Wall

Use this procedure to create a straight curtain wall that has the properties specified in the curtain wall tool that you select. To specify settings when you add a curtain wall, see Creating a Curtain Wall with User-Specified Settings on page 923.

Drawing a straight curtain wall segment



1 Open the tool palette that you want to use, and select a curtain wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Curtain Wall .

2 Specify a start point for the curtain wall.

You can move or hide the Properties palette to expose more of the drawing area.

3 Specify an end point.

4 Press *ENTER*.

Creating a Curtain Wall with User-Specified Settings

Use this procedure to add a curtain wall with settings that you specify.

TIP To ensure that the Properties palette is displayed before you select a tool, right-click in the drawing area, and click Properties.

1 Open the tool palette that you want to use, and select a curtain wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Curtain Wall .

2 On the Properties palette, expand Basic, and expand General.

3 If desired, you can enter a description for the curtain wall by clicking the Description setting.

4 Select a style.

The curtain wall style determines many settings of the curtain wall, like the grid, the frames and mullions used, as well as cell infills and display settings. For information about curtain wall styles, see Curtain Wall Styles on page 933.

5 Under Bound Spaces, define if this curtain wall can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this curtain wall can be used as bounding object for associative spaces.
- No: this curtain wall cannot be used as bounding object for associative spaces.
- By style: this curtain wall will use the bounding settings from the curtain wall style.

For more information on associative spaces, see Generating Associative Spaces on page 1915.

6 Expand Dimensions.

7 Modify the dimensions of the curtain wall:

If you want to specify …	Then …
the base height of the curtain wall	enter a value for Base Height.
start and end miters	enter miter values for Start Miter and End Miter.
define an offset of the roof line from the curtain wall base height	enter the appropriate value for roof line offset from base height. This offset can be set only during the insertion of the curtain wall.
define an offset of the floor line from the curtain wall base line	enter the appropriate value for floor line offset from base line. This offset can be set only during the insertion of the curtain wall.

TIP The length of the curtain wall is defined on screen. You can however, edit it in the Properties palette later.

8 To make further edits to the roof line and floor line, expand Advanced, and click the Roof/floor line worksheet.

For more information, see Changing the Roof Line and the Floor Line of a Curtain Wall on page 1011.

9 In the drawing area, specify the insertion point of the curtain wall.

You can move or hide the Properties palette to expose more of the drawing area.

NOTE If you have Dynamic Input activated on the application window status bar (DYN), you can use dynamic dimensions to specify the curtain wall length and angle. After clicking the start point of the curtain wall, dynamic input fields for length and angle appear around the curtain wall preview. Enter values as desired, and use the TAB key to switch between input fields.

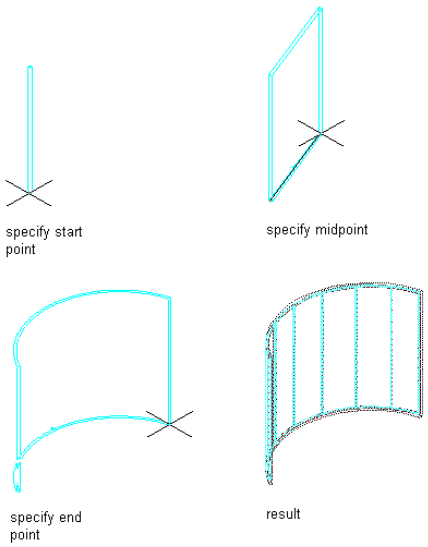
10 Specify the endpoint of the curtain wall, and press *ENTER*.

Creating a Curved Curtain Wall

Use this procedure to create a curved curtain wall in a drawing.

The display of curved objects is dependent on the facet deviation set in the application. For information see Facet Deviation on page 1093.

Drawing a curved curtain wall segment



1 Open the tool palette that you want to use, and select a curtain wall tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Wall drop-down ➤ Curtain Wall .

2 On the Properties palette, expand Basic, and expand General.

3 If desired, you can enter a description for the curtain wall by clicking the Description setting.

4 Select a style.

The curtain wall style determines many settings of the curtain wall, like the grid, the frames and mullions used, as well as cell infills and display settings. For information about curtain wall styles, see Curtain Wall Styles on page 933.

5 Under Bound Spaces, define if this curtain wall can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this curtain wall can be used as bounding object for associative spaces.
- No: this curtain wall cannot be used as bounding object for associative spaces.
- By style: this curtain wall will use the bounding settings from the curtain wall style.

For more information on associative spaces, see Generating Associative Spaces on page 1915.

6 Select Arc for Segment type.

7 Expand Dimensions.

8 Modify the dimensions of the curtain wall:

If you want to specify …	Then …
the base height of the curtain wall	enter a value for Base Height.

If you want to specify …	Then …
start and end miters	enter miter values for Start Miter and End Miter.
define an offset of the roof line from the curtain wall base height	enter the appropriate value for roof line offset from base height. This offset can be set only during the insertion of the curtain wall.
define an offset of the floor line from the curtain wall base line	enter the appropriate value for floor line offset from base line. This offset can be set only during the insertion of the curtain wall.

TIP The length and the radius of the curtain wall are defined on screen. You can however, edit them in the Properties palette later.

9 To make further edits to the roof line and floor line, expand Advanced, and click the Roof/floor line worksheet.

For more information, see Changing the Roof Line and the Floor Line of a Curtain Wall on page 1011.

10 Specify a start point for the curved curtain wall segment.

You can move or hide the Properties palette to expose more of the drawing area.

NOTE If you have Dynamic Input activated on the application window status bar (DYN), you can use dynamic dimensions to specify the curtain wall length and angle. After clicking the start point of the curtain wall, dynamic input fields for length and angle appear around the curtain wall preview. Enter values as desired, and use the TAB key to switch between input fields.

11 Specify the midpoint of the curved curtain wall segment.

12 Specify the endpoint of the curved curtain wall segment.

13 Continue placing curtain walls to create, for example, a building exterior or a room.

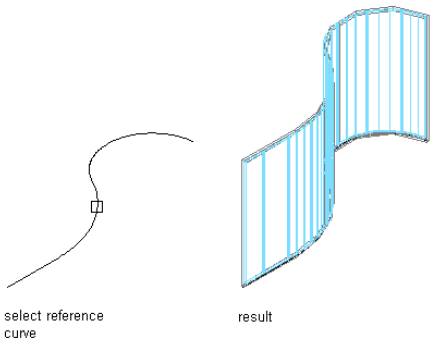
14 Press *ENTER*.

Creating a Curtain Wall that References a Curve

Use this procedure to create a curtain wall from linework such as lines, polylines, arcs, and circles.

If you want to create a curtain wall with a mixture of straight and curved segments, you can use the Add Curtain Wall command. However, for complicated designs, you might find it easier to draw the segments using lines, arcs, and circles, and then reference that curve as the baseline for the curtain wall. This method has an added advantage in that the curve remains in control of the length and baseline of the curtain wall. Any changes you make to the curve are reflected in changes to the curtain wall.

Creating a curtain wall that references a curve



Use any of the following objects to create the reference curve:

- Line
- Arc
- Circle
- Polyline
- Spline
- AEC objects (excluding stairs, columns, roof slabs, grids, and multi-view blocks. These objects might give you unexpected results when trying to generate a curtain wall from their base curve.)

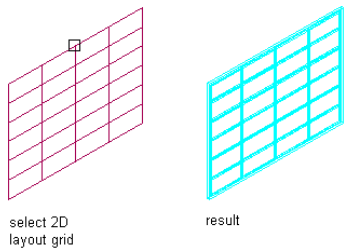
1. Open the tool palette that you want to use.
2. Right-click a curtain wall tool, and click Apply Tool Properties to ➤ Referenced Base Curve.
3. Select the geometry to reference.

   If the geometry you want to reference consists of multiple segments, you must repeat this procedure for each segment.
4. Edit the properties of the curtain walls in the Properties palette, if needed.

Converting a Layout Grid to a Curtain Wall

Use this procedure to create a curtain wall that is based on a 2D layout grid. If you already have 2D layout grids in a drawing, you can easily convert them to curtain walls. Or if you are already familiar with layout grids, it is an efficient way to create a curtain wall, and then experiment with the curtain wall commands to learn more about them.

Converting a 2D layout grid to a curtain wall

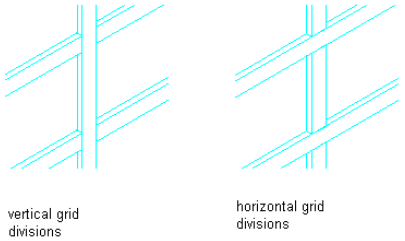


When you create a curtain wall from a 2D layout grid, you also create a new curtain wall style. The divisions in the new curtain wall style are taken from the divisions in the layout grid.

Curtain wall grids are one dimensional—divided either horizontally or vertically. To create the horizontal and vertical patterns in the 2D layout grid, the curtain wall uses a primary grid with a secondary grid nested inside it. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

When you create a curtain wall grid from a 2D layout grid, you need to decide the direction of the primary grid in the curtain wall. If you select horizontal, the primary grid has horizontal divisions that cross over the vertical divisions of the secondary grid. If you select vertical, the primary grid has vertical divisions that cross over the horizontal divisions of the secondary grid.

Specifying primary division directions



The horizontal and vertical lines of the 2D layout grid define the divisions for the curtain wall grids. The grid cells, frame, and mullions are assigned default definitions. For more information, see Assigning Definitions to Curtain Wall Elements on page 959.

1. Open the tool palette that you want to use.
2. Right-click a curtain wall tool, and click Apply Tool Properties to ➤ Layout Grid.
3. Select the layout grid to convert.
4. When prompted to erase the original geometry, press *ENTER* to keep the layout grid, or enter **y** (Yes) to erase it.
5. Press *ENTER* to specify horizontal as the orientation for the primary division, or enter **v** to specify vertical.
6. Enter a name for the curtain wall style generated from the grid layout, and click OK.
7. Edit the properties of the curtain wall in the Properties palette, if needed.

Creating a Curtain Wall from an Elevation Sketch

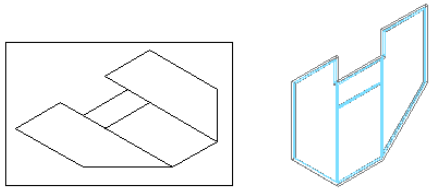
You can create a sketch of a custom grid with lines, arcs, and circles, and then convert that linework into a curtain wall.

NOTE Curtain wall grids are either horizontal or vertical. To create a grid pattern with horizontal and vertical cells, nested grids are used. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

The resulting curtain wall is assigned a custom grid division definition, which you cannot modify. You can, however, assign a different division definition to it. For more information, see Assigning a Division to a Curtain Wall Grid on page 959.

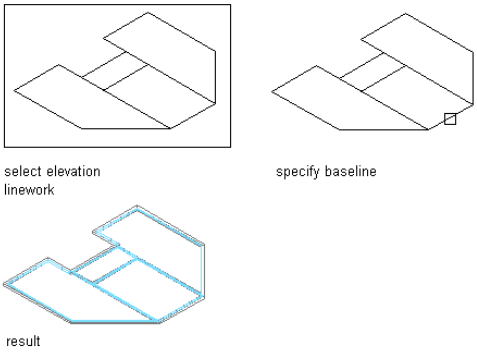
1. Verify that you are drawing in world coordinate system (WCS).
2. Use lines, arcs, and circles to create an elevation sketch.
3. Right-click a curtain wall tool, and click Apply Properties to ➤ Elevation Sketch.
4. Select the linework of the sketch.
5. Press *ENTER*.
6. Select one of the grid lines as the baseline for the curtain wall or press *ENTER* to use the line along the *X* axis as the default baseline.

Converting linework to curtain walls using the default baseline option



If you draw your linework in the *XY* plane (in Plan view) and accept the default baseline, the resulting curtain wall is displayed as it is projected in the *Z* direction.

Converting linework to curtain walls using the specified baseline option



7 To erase the lines, enter **y** (Yes). To have the lines remain after the curtain wall is created, enter **n** (No).

When you create a curtain wall from an elevation sketch, the properties and design rules of the curtain wall style are applied to the generated curtain wall. The grid of the generated curtain wall will however differ from the curtain wall style, and is defined as a custom grid.

The custom grid is not automatically saved back to the curtain wall style, but is treated as an object override on the generated curtain wall. You can proceed in these ways:

- You can leave the custom grid as an override on the curtain wall object. This is recommended if the curtain wall generated from the elevation sketch has a unique grid that does not need to be reused.
- You can save the custom grid of the elevation sketch back to the existing curtain wall style, changing the curtain wall style to reflect the grid of the elevation sketch.
- You can save the custom grid of the elevation sketch to a new curtain wall style and use that for other, similar curtain walls.

8 Proceed in one of the following ways:

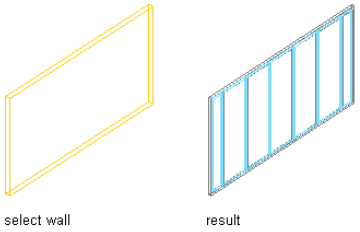
If you want to…	Then…
leave the custom grid on the curtain wall object as an override	no further action is required.
save the custom grid of the elevation sketch back to the existing curtain wall style	select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style. Verify that under Save Changes to Style the correct style is selected, and click OK.

If you want to…	Then…
save the custom grid of the elevation sketch to a new curtain wall style	select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style. Click New, and enter a name for the new curtain wall style. Then, click OK.

Converting a Wall to a Curtain Wall

Use this procedure to create curtain walls based on existing standard walls. For each wall segment, a separate curtain wall is created. During the conversion process, you are prompted to select a curtain wall style that determines the number and size of cells in the curtain wall grid as well as the appearance of the cells, frame, and mullions. For more information, see Curtain Wall Styles on page 933.

Converting a wall to a curtain wall



1 Open the tool palette that you want to use.

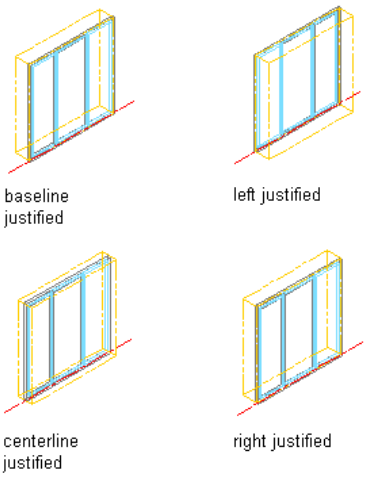
If necessary, scroll to display the tool that you want to use.

2 Right-click a curtain wall tool, and click Apply Tool Properties to ➤ Walls.

3 Select the wall, and press *ENTER*.

4 Specify if the curtain wall should be aligned to the left side, the right side, the center line, or the baseline of the wall it is created from.

Specifying the alignment of the curtain wall



5 To erase the wall, enter **y** (Yes). To have the wall remain after the curtain wall is created, enter **n** (No).

6 Press *ENTER*.

Converting a 3D Face to a Curtain Wall

Use this procedure to create curtain walls based on faces of existing mass elements, mass groups, or AutoCAD® entities, such as a mesh, ruled surface, or solid. This might be helpful after you have developed a building model. For more information, see Using the Model Explorer to Create Mass Models on page 715. For each face, a separate curtain wall is created. During the conversion process, you are prompted to select a curtain wall style that determines the number and size of cells in the curtain wall grid as well as the appearance of the cells, frame, and mullions. For more information, see Tips for Working Efficiently with Curtain Wall Styles on page 935.

Use this procedure to generate a curtain wall of the face of a 3D object. Objects that have faces that can be used to generate curtain walls are the following:

- mass elements
- mass groups
- 3D spaces
- slabs
- roof slabs
- roofs
- AutoCAD 3D meshes
- AutoCAD 3D solids

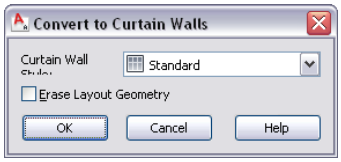
1. Open the tool palette that you want to use.

   If necessary, scroll to display the tool that you want to use.

2. Right-click a curtain wall tool, and click Apply Tool Properties to ➤ Faces.
3. Select a face to convert, or press *CTRL* and select multiple faces.

   You can press *TAB* to cycle through the faces.

   The Convert to Curtain Walls worksheet opens.



4. Select the curtain wall style.
5. To erase the object the face belongs to, select Erase Layout Geometry.
6. Click OK.

Creating a Curtain Wall Tool

Use this procedure to create a curtain wall tool and add it to a tool palette. You may want to create your own curtain wall tools if you are placing multiple curtain walls of specific styles with additional properties that you want to be the same each time you add a curtain wall of each type.

1. Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to …	Then …
create a tool from a curtain wall in the drawing	select the object, and drag it to the tool palette.
create a tool from a curtain wall style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager. Locate the style you want to copy, and drag it to the tool palette. Click OK. **NOTE** You can only drag a style to a tool palette if the style has previously been saved with the drawing. Otherwise you are prompted to save the drawing first, and then create a tool from the style.
copy a tool in the current tool palette	right-click the tool, and click Copy. Deselect the tool, right-click anywhere in the palette, and click Paste.
copy a tool from another tool palette	open the tool palette containing the tool you want to copy, right-click the tool, and click Copy. Open the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the curtain wall created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Specify the location of the curtain wall style used in this tool.

By default, the style location is set to Undefined (--) and the styles from the current drawing are displayed in the list of available styles. You can however navigate to one of the curtain wall styles drawings shipped with the product under *C:\ProgramData\Autodesk\ACA 2010\enu\Styles*, or to a user-defined styles drawing.

10 Select a style for the curtain wall tool.

11 Under Bound Spaces, define if this curtain wall tool can be used as a bounding object for associative spaces.

You can select four options here:

- Yes: this curtain wall tool can be used as bounding object for associative spaces.
- No: this curtain wall tool cannot be used as bounding object for associative spaces.
- By style: this curtain wall tool will use the bounding settings from the curtain wall style.

- Undefined (--): If you create a new curtain wall with this tool, it will use the default bounding setting (by style). If you apply the properties of this curtain wall tool to an existing curtain wall, the bounding settings of that curtain wall will be used.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

12 Modify the dimensions of the curtain wall:

If you want to specify …	Then …
the base height of the curtain wall	enter a value for Base height.
start and end miter angles	enter miter values for Start Miter and End Miter.
the roof line offset from the base height of the curtain wall	enter a value for Roof line offset from base height.
the floor line offset from the baseline of the curtain wall	enter a value for Floor line offset from baseline.

13 Click OK.

Curtain Wall Styles

Curtain walls are style-based, which means there are preset characteristics assigned to each curtain wall that determine its appearance and function. By changing from one style of curtain wall to another, you can quickly study several different design options. Any changes you make to the style updates all curtain walls of that particular style. You can also apply overrides to a single curtain wall, without changing other curtain walls of the same style.

A curtain wall style controls the following properties of a curtain wall:

- Division definitions/Grids
- Infill definitions
- Frame definitions
- Mullion definitions
- Assignments of grids, infills, frames, and mullions to curtain wall cells
- Materials for each element
- Display properties for each element
- Notes about the style and any associated reference files

Using Materials in Curtain Wall Styles

You can use materials to control how curtain walls of each style are displayed in a drawing. You assign materials to the curtain wall elements in the style. The elements are then displayed using the display properties of the assigned materials.

AutoCAD Architecture provides a large number of predefined materials for common design purposes. You can use these materials, modify them for your project requirements, and define new materials. For more information about materials and how to define them, see Materials on page 577.

Creating Tools from Curtain Wall Styles

You can create a curtain wall tool from any curtain wall style. You can drag the style from the Style Manager onto a tool palette. You can then specify settings for any curtain wall properties for the tool. For more information, see Creating a Curtain Wall Tool on page 931.

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture to work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Process Overview: Creating a Curtain Wall Style

When you create a curtain wall style, you assign characteristics to any or all elements of a curtain wall and save them as a named style. In this way, you standardize the appearance of all curtain walls that use the style. When you modify a style, all curtain walls in your drawing that use the style are updated to reflect the changes.

1. Define divisions for the curtain wall grid.

   For information on defining curtain wall grid definitions, see Defining Divisions for Curtain Wall Grids on page 937.

2. Define the infill for the cells of the curtain wall.

   For information on creating infills, see Defining Infills for Curtain Wall Cells on page 946.

3. Define the curtain wall frame, including using profiles and specifying offsets.

   For information on defining a frame for a curtain wall, see Defining Curtain Wall Frames on page 950.

4. Define the mullions for the curtain wall, including using profiles and specifying offsets.

   For information on ways to define mullions, see Defining Curtain Wall Mullions on page 954.

5. Assign the element definitions you created:

If you want to assign ...	Then ...
a division to a curtain wall grid	see Assigning a Division to a Curtain Wall Grid on page 959.
infills to curtain wall cells	see Assigning Infills to Curtain Wall Cells on page 960.
definitions to curtain wall frames	see Assigning Definitions to Curtain Wall Frames on page 968.
definitions to curtain wall mullions	see Assigning Definitions to Curtain Wall Mullions on page 971.

6. Specify the materials of the curtain wall style.

   For information on specifying materials, see Specifying the Materials of a Curtain Wall Style on page 973.

7. Specify the display properties of the curtain wall, including layer, color, linetype, and hatching.

   For information on specifying the display properties of a curtain wall, see Specifying the Display of Curtain Walls on page 975.

8. Attach notes and reference documents to the curtain wall style.

   For information on attaching notes and files, see Attaching Notes and Files to a Curtain Wall Style on page 980.

Tips for Working Efficiently with Curtain Wall Styles

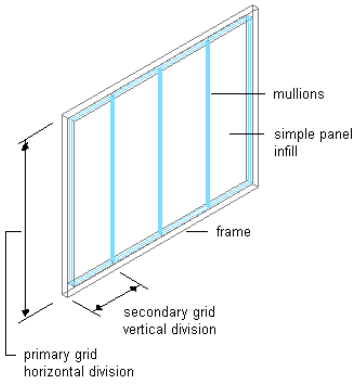
Use these suggestions to work efficiently and productively with curtain wall styles:

- Name grids and elements very clearly to identify where they are used and what they are. For example, use the name L3-FL1-H to represent a third-level grid used on the first floor and which has a horizontal division.
- Use the element definition that is applied most often as the default element definition. For example, if most cells are stone panels, define the default infill as the stone panel. This panel is then used in every cell that is not specifically assigned to another infill. Apply this rule to the default frame, mullion, and division.
- Use curtain wall units and door and window assemblies to simplify the complexity of a curtain wall style.
- Name the styles for doors, windows, curtain wall units, AEC polygons, and curtain walls to indicate where they are used and what they are.
- Use cell and edge overrides to define special conditions not accounted for in the curtain wall style.

Creating Element Definitions for a Curtain Wall Style

Element definitions determine the appearance of the four basic curtain wall elements. There is a different definition type for each element.

Curtain wall grid element types



Each type of element can have multiple definitions. For example, you can define a division to create a horizontal grid or a vertical grid, and you can define the cells to contain a nested grid or a door/window assembly. To make reuse easier, you can save the element definitions, and then assign them to grids, cells, frames, or mullions as needed.

Element definitions are style-specific. When you create element definitions for a specific curtain wall style, those definitions are available only for curtain walls of that style. For example, if you define a door and window assembly infill for one curtain wall style, that infill is not available as an option when you edit a curtain wall of a different style.

When you create a new element definition, like a new grid division, a new frame, cell infill, or mullion, you need to define a display component for this element in order to control the visual appearance (layer, color, and linetype properties) of this element separately from the other elements. For example, if you have defined a new panel infill, and want to assign a concrete gray color to that, you need to define a display component for the new infill, and assign it a grey color. For information on defining display components for elements, see Adding Curtain Wall Element Definitions as Display Components on page 976. If you do not define a display component for a new element, its display will be controlled by the display component of the default

element of that type. For example, if you have a new panel infill, but do not define a display component for it, then its display is controlled by the default infill display component.

Creating a Curtain Wall Style

Use this procedure to create a curtain wall style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style. You can also create a curtain wall tool based on the newly created curtain wall style. When you use the tool to add curtain walls, each curtain wall has the style specific to the tool.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Create a new curtain wall style:

If you want to create a style …	Then …
with default properties	right-click Curtain Wall Styles, and click New.
from an existing style	right-click the curtain wall style you want to copy, and click Copy. Right-click, and click Paste.
from a curtain wall, curtain wall unit, or door and window assembly in the drawing	right-click Curtain Wall Styles, and click New. Right-click the new style, click Set From, and then select a curtain wall, a curtain wall unit, or a door and window assembly in the drawing.

4 If necessary, right-click the style again, and click Rename to enter a descriptive name for the new curtain wall style.

5 Edit the new curtain wall style:

If you want to …	Then …
define the elements of a curtain wall style	see Defining Divisions for Curtain Wall Grids on page 937, Defining Infills for Curtain Wall Cells on page 946, Defining Curtain Wall Frames on page 950, and Defining Curtain Wall Mullions on page 954.
assign element definitions to the curtain wall style	see Assigning Definitions to Curtain Wall Elements on page 959, Assigning a Division to a Curtain Wall Grid on page 959, Assigning Infills to Curtain Wall Cells on page 960, Assigning Definitions to Curtain Wall Frames on page 968, and Assigning Definitions to Curtain Wall Mullions on page 971.
add curtain wall element definitions as display components	see Adding Curtain Wall Element Definitions as Display Components on page 976.
specify layer, color and linetype settings for the display components of a curtain wall	see Specifying the Layer, Color, and Linetype of a Curtain Wall Style on page 976.
specify curtain wall hatching	see Specifying the Hatching for Components of a Curtain Wall Style on page 977.
add custom graphics as display components of a curtain wall style	see Adding Custom Graphics as a Display Component of a Curtain Wall on page 978.

If you want to …	Then …
create individual cut planes for curtain wall styles	see Creating Cut Planes for a Curtain Wall on page 979.
specify the materials of the curtain wall style	see Specifying the Materials of a Curtain Wall Style on page 973.
add notes and files to the style	see Attaching Notes and Files to a Curtain Wall Style on page 980.

6 When you finish specifying the properties of the curtain wall style, click OK.

7 If you want to assign the style to a curtain wall tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Curtain Wall Tool on page 931.

8 Click OK.

Defining Divisions for Curtain Wall Grids

The divisions of a grid define the orientation that determines the direction of the grid cells and mullions, and they define a division type that determines the number and size of cells.

NOTE Creating a nested grid is not a division rule. To create a nested grid, add a cell assignment. For more information, see Creating a Nested Grid in a Curtain Wall on page 962 and Working with Nested Grids in Curtain Walls on page 961.

You can create a variety of division definitions under different names, and then assign different divisions to each grid in your curtain wall. Although you can create multiple definitions, there can be only one division assignment per grid. You create division definitions for a specific curtain wall style and those definitions can be assigned only to grids in curtain walls of that style.

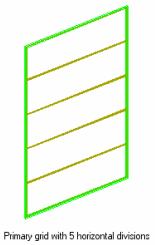
For more information about assigning divisions to a particular grid, see Assigning a Division to a Curtain Wall Grid on page 959.

Division of Curtain Wall Grids

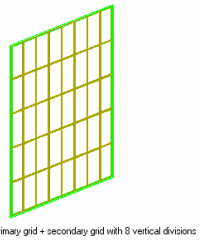
A curtain wall consists of one or more grids, which are the framework for placing design elements in the curtain wall. The highest-level grid is the primary grid, which is also the outside edge of the curtain wall.

Each grid in a curtain wall has one division assignment that determines whether the grid is divided horizontally or vertically. The division also determines the number of cells, their size, and their placement.

Within the primary grid, you can define multiple levels of grids. These grids within the primary grid are called nested grids. Each subdivision of a grid is called a cell.



Primary grid with 5 horizontal divisions

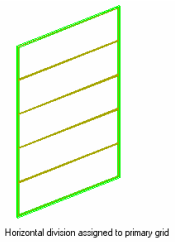


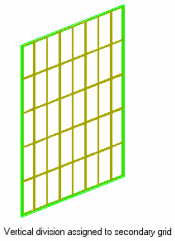
Primary grid + secondary grid with 8 vertical divisions

Creating a Division Definition for a Curtain Wall

Use this procedure to create divisions for a curtain wall grid.

Because curtain walls can contain multiple nested grids, it is helpful to use a naming convention for grids that indicates the level of each grid and the grid location or the purpose within the curtain wall. For example, L2-FL1-Stone Panels can identify a secondary grid that provides a row of stone panels on Floor 1.





1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Divisions under Element Definitions.
6 Click New Division ( ).
7 Enter a name for this division definition.
8 Select either Vertical orientation or Horizontal orientation .
9 Select one of the following division types and specify offsets if needed.

Division Type	Description
Fixed Cell Dimension	Creates a grid where the size of the individual cells is fixed at a user-defined size. For more information, see Specifying a Division with a Fixed Cell Size on page 939.
Fixed Number of Cells	Creates a grid where the number of grid cells is fixed at a user-defined cell number. For more information, see Specifying a Division with a Fixed Cell Number on page 941.
Manual	Creates a grid where the size and number of individual cells is manually determined by the user. For more information, see Specifying a Division with Manually Defined Cells on page 941.
Baseline/ Base Height (horizontal grids only)	Creates a horizontal grid that does not extend to gables or steps in a curtain wall. For more information, see Excluding Gables and Steps from a Curtain Wall Grid on page 942.
Polyline (vertical grids only)	Creates a vertical grid from a polyline that adds a grid line for each vertex of the polyline. For more information, see Dividing a Vertical Curtain Wall Grid at Each Vertex Along a Polyline on page 943.

After you create a division definition, you can assign the definition to a specific grid in a curtain wall. For more information, see Assigning a Division to a Curtain Wall Grid on page 959.

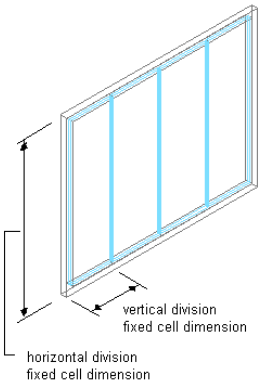
10 When you are finished creating division definitions, click OK.

Specifying a Division with a Fixed Cell Size

Use this procedure to define a division that has a fixed size for the cells contained in it. In this case, the number of cells is determined by the length or height of the grid, depending on the grid orientation.

When you specify a fixed cell size in a grid division, you can control how the cells of the grid adjust to accommodate any leftover space. This space occurs if the length (or the height) of the curtain wall cannot be evenly divided by the fixed size of the cell.

Specifying a fixed size for cells



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

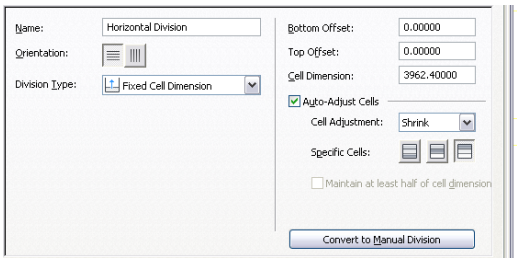
3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Divisions definition or create a new one.

7 Under Division Type, select Fixed Cell Dimension.



8 Under Cell Dimension, specify a size for the cells.

If you are defining a vertical division, the cell dimension is the length of the cell from mullion to mullion. If you are defining a horizontal division, the cell dimension is the height of the cell.

9 To specify an offset for the grid, enter an offset distance in Start Offset/Top Offset or End Offset/Bottom Offset. For more information, see Specifying an Offset for a Curtain Wall Grid on page 944.

TIP The frame width is calculated as part of the cell size. Therefore, cells adjacent to the frame can appear to be a different size than the other cells. If you do not want the frame width included in the cell size, specify an offset for the grid that is equal to the frame width.

When you draw a curtain wall using a fixed cell dimension, there is often extra space between the last full-size cell and the end of the curtain wall.

10 Adjust the cells to accommodate this extra space:

If you want to …	Then …
add the space to grid cells	select Auto-Adjust Cells, select Grow for Cell Adjustment, and select the specific cells where the space is to be added. You can select any combination of Specific Cells.
remove the space from grid cells	select Auto-Adjust Cells, select Shrink for Cell Adjustment, and select the specific cells where the space is to be removed. You can select any combination of Specific Cells.

11 Under Specific Cells, select the cells where the space is to be added or removed.

You have the following options:

- Start of curtain wall ( ): For a vertical division, you can add or remove extraneous space from the start cell of the curtain wall. The start cell is determined by the drawing direction of the curtain wall.
- Vertical middle of curtain wall ( ): If the curtain wall has an uneven number of vertical cells, the middle cell is grown or shrunk. If the curtain wall has a an even number of vertical cells, the two middle cells are grown or shrunk.
- End of curtain wall ( ): For a vertical division, you can add or remove extraneous space from the end cell of the curtain wall. The end cell is determined by the drawing direction of the curtain wall.
- Top of curtain wall ( ): For a horizontal division, you can add or remove extraneous space from the top cell of the curtain wall.
- Horizontal middle of curtain wall ( ): If the curtain wall has an uneven number of horizontal cells, the middle cell is grown or shrunk. If the curtain wall has a an even number of horizontal cells, the two middle cells are grown or shrunk.
- Bottom of curtain wall ( ): For a horizontal division, you can add or remove extraneous space from the bottom cell of the curtain wall.

You can select multiple options here; for example, you can select to add additional space to the start and end cells, or to the start, middle, and end cells.

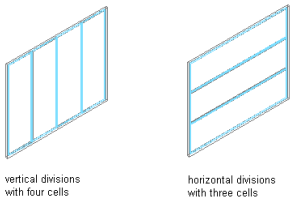
12 Click OK.

As the next step, you will assign the division definition to a grid in a curtain wall style. For more information, see Assigning a Division to a Curtain Wall Grid on page 959.

Specifying a Division with a Fixed Cell Number

Use this procedure to define a specific number of cells in a grid. In this case, the size of the cells is determined by the length or height of the grid, depending on how the grid is divided.

In some cases, when you create a complex curtain wall grid, you might want to start with a standard grid with a fixed number of cells, and then later fine-tune that manually. You can first create a grid with fixed cell numbers and then convert that to a manual grid. For information on manual grids, see Specifying a Division with Manually Defined Cells on page 941.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Divisions under Element Definitions.
6 Select a Division definition or create a new one.
7 Under Division Type, select Fixed Number of Cells.
8 Specify the number of cells.
9 To specify an offset for the grid, enter an offset distance for Start Offset or End Offset.

   For more information, see Specifying an Offset for a Curtain Wall Grid on page 944.

   NOTE If you want to fine-tune the initial layout with a fixed number of cells, click Convert To Manual Division and edit the grid as described in Specifying a Division with Manually Defined Cells on page 941.

10 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall, see Assigning a Division to a Curtain Wall Grid on page 959.

Specifying a Division with Manually Defined Cells

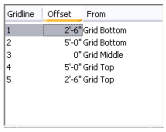
Use this procedure to manually add gridlines and specify an offset for each one when you need to create a unique grid that does not fit into any of the other division types. You can also start with a fixed cell dimension grid or a fixed number of cells grid, and then manually adjust the grid lines to suit your needs.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Divisions under Element Definitions.
6 Select a Division definition or create a new one.
7 Select Manual for Division Type.

8 Click Add Gridline to insert a grid line. Insert as many grid lines as you need. If you need to remove a grid line, select it from the table and click Remove Gridline.

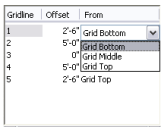
9 Under Offset in the gridline table, specify an offset distance for each grid line.

Gridline offset



10 Under From in the grid line table, select the grid location from which the grid line is offset.

Offset grid line from option



11 To specify an offset for the grid, enter an offset distance for Start Offset or End Offset.

For more information, see Specifying an Offset for a Curtain Wall Grid on page 944.

12 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall, see Assigning a Division to a Curtain Wall Grid on page 959.

Excluding Gables and Steps from a Curtain Wall Grid

If you are designing a curtain wall that has gables in the roof line or steps in the floor line, there may be occasions when you do not want the grid to extend into those areas. To define your curtain wall in this case, you can define a single-cell horizontal grid that excludes those areas, and then use that grid as a starting point for nested grids. For information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

NOTE For information about adding steps or gables to your curtain wall, see Changing the Roof Line and the Floor Line of a Curtain Wall on page 1011.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

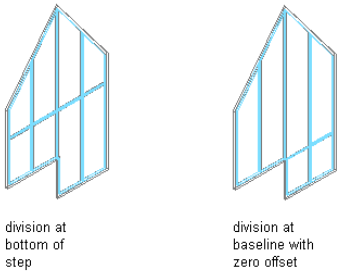
6 Select a Division definition or create a new one.

7 Select Horizontal for Orientation.

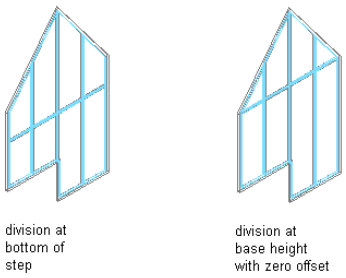
8 Select Baseline/Base Height for Division Type.

9 Select Divide at Baseline or Divide at Base Height.

- Divide at Baseline: Forces a division at the baseline to exclude steps from the grid.



- Divide at Base Height: Forces a division at the base height to exclude gables from the grid.



10 To offset the division from the baseline, enter a positive number for Baseline Offset.

11 To offset the division from the base height, enter a positive number for Base Height Offset.

12 Click OK.

The resulting grid contains a single, horizontal cell. To add additional divisions, use nested grids. For more information, see Creating a Nested Grid in a Curtain Wall on page 962.

For information about assigning the division definition to a specific grid in your curtain wall, see Assigning a Division to a Curtain Wall Grid on page 959.

Dividing a Vertical Curtain Wall Grid at Each Vertex Along a Polyline

If you create a curtain wall by referencing a polyline, you can define a vertical grid for your curtain wall by placing grid lines at each vertex along the polyline.

1 Draw a polyline and use it as a reference curve to create a curtain wall.

For more information, see Creating a Curtain Wall that References a Curve on page 926.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Curtain Wall Styles.

4 Select a curtain wall style.

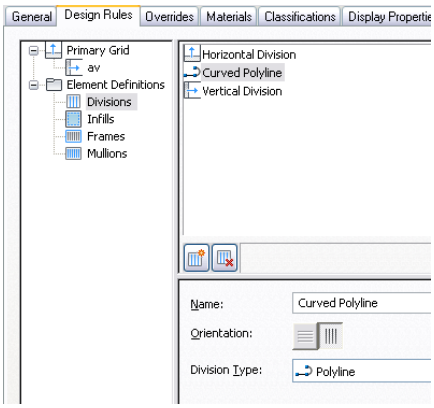
5 Click the Design Rules tab.

6 In the left pane, select Divisions under Element Definitions.

7 Select a Division definition or create a new one.

8 Select Vertical for Orientation.

9 Select Polyline for Division Type.



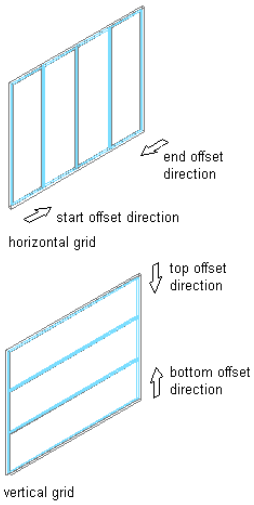
10 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall, see Assigning a Division to a Curtain Wall Grid on page 959.

Specifying an Offset for a Curtain Wall Grid

By default, grids cells are measured from the start and end points of the curtain wall baseline (for horizontal divisions) or from the floor line to the roof line (for vertical divisions). The width of the grid frame is not considered in calculating the size of the cell. For example, if you draw a curtain wall with a 14' baseline and a 1' frame on the left and right, and you specify a fixed number of vertical cells, the cells do not appear equal in size. The first and last cells appear smaller because they include the frame. To make the cells equal in size, offset the start and end of the grid by the width of the frame.

Specifying grid offset directions



NOTE You can offset the grid only when the division type is Fixed Cell Dimension, Fixed Number of Cells, or Manual.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Division definition or create a new one.

7 Select Fixed Cell Dimension, Fixed Number of Cells, or Manual for Division Type.

8 Specify an offset for the grid.

If you want to specify the distance between …	Then …
the start point of the curtain wall baseline and the start of the first cell in a horizontal grid	enter a value for Start Offset.
the end point of the curtain wall baseline and the end of the last cell in a horizontal grid	enter a value for End Offset.
the floor line of the curtain wall and the start of the bottom cell in a vertical grid	enter a value for Bottom Offset.
the roof line of the curtain wall and the end of the top cell in a vertical grid	enter a value for Top Offset.

9 Click OK.

Removing a Division Definition from a Curtain Wall Style

Use this procedure to remove a division definition that you no longer need. You cannot remove a division definition when it is currently assigned to a grid. In addition, you cannot remove the default division definition, but you can modify it.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

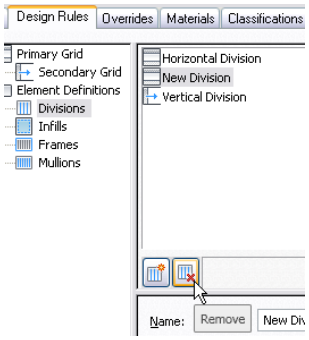
3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Division definition that you want to remove.

7 Click Remove.

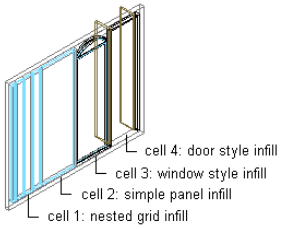


8 Click OK.

Defining Infills for Curtain Wall Cells

An infill defines the contents of a curtain wall cell. A curtain wall cell can have the default simple panel or contain a nested grid, an AEC Polygon, curtain wall unit, door, window, or door/window assembly style. The object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically represent glazing or other plain cladding, such as stone or concrete. For more information, see Assigning Infills to Curtain Wall Cells on page 960.

Specifying different infills



NOTE Nested grids and no infill are options you select when assigning an infill to a cell. These options do not require infill definitions. For more information, see Creating a Nested Grid in a Curtain Wall on page 962 and Removing an Infill from a Curtain Wall Cell on page 966.

You can define as many infills as you need, and then use cell assignments to specify the cells that use each infill. You can modify, as needed, a default infill that is used for all unassigned cells. For more information about cell assignments, see Assigning Definitions to Curtain Wall Elements on page 959.

NOTE Create infill definitions for a specific curtain wall style. Those definitions can be assigned only to grid cells in curtain walls of that style.

Materials

Styles use the materials of the object style assigned to each panel. For example, if you specify an infill to use the Standard door style, the materials of that infill are those designated in the door style. Simple Panels need material assigned in the curtain wall style.

If you do not use materials to control the display properties of infills, you can specify their display properties in the curtain wall style. The layer, color, linetype, and other display properties of the default infill are applied to all infills unless you create a custom display component for each infill definition. You can then control the display of each infill definition independently. For more information, see Specifying the Display of Curtain Walls on page 975.

Creating a Panel Infill for a Curtain Wall

Use this procedure to create a simple panel infill to represent basic cladding materials in the curtain wall, such as a stone wall panel, concrete panel, metal panel, or glazing infill.

Because curtain walls can contain multiple infills, it is helpful to use a naming convention for panel infills that indicates the infill location or purpose within the curtain wall. For example, L3-FL1- Stone Panel can identify a stone panel in a third-level grid on Floor 1.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select Infills under Element Definitions.

6 Click New Infill.

7 Enter a descriptive name for the infill.

8 Select Simple Panel as the infill type.

9 Specify an alignment for the infill.

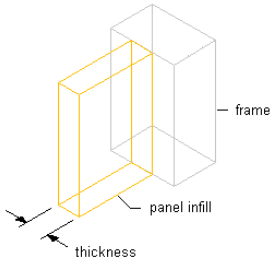
For more information, see Specifying an Alignment for a Curtain Wall Infill on page 948.

10 Specify an offset for the infill.

For more information, see Specifying an Offset for a Curtain Wall Infill on page 948.

11 Specify a thickness for the panel.

Specifying infill panel thickness



12 Click OK.

After you create an infill definition, you can assign it to any cell in a curtain wall grid. For more information, see Assigning Infills to Curtain Wall Cells on page 960.

Creating a Style Infill for a Curtain Wall

Use this procedure to create a style infill to insert objects into a curtain wall. You can insert doors, windows, door/window assemblies, curtain wall units, and AEC Polygons by defining a specific style of that object as an infill.

TIP After you insert an object in a cell, you can select that object independent of the grid and access editing options for the object.

Because curtain walls can contain multiple object styles, it is helpful to use a naming convention for style infills that indicates the infill location or purpose within the curtain wall. For example, L3-FL1-Octagonal Window can identify an octagonal window in a third-level grid on Floor 1.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Click New Infill.

7 Enter a descriptive name for the infill.

8 Select Style as the infill type.

The bottom right pane changes to display a tree view of the object styles available for insertion into a curtain wall.

9 Select an object style.

There is a unique icon for each type of style, for example the door style icon and the curtain wall unit icon . These icons are also displayed next to the infill name at the top of the dialog box to help you identify the type of infill.

10 Specify an alignment for the infill. For more information, see the next section Specifying an Alignment for a Curtain Wall Infill on page 948.

11 Specify an offset for the infill. For more information, see Specifying an Offset for a Curtain Wall Infill on page 948.

12 Click OK.

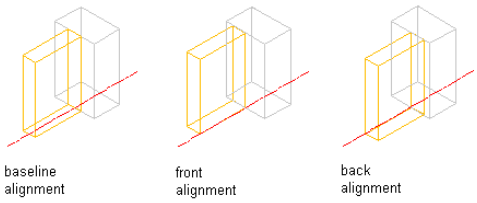
After you create an infill definition, you can assign it to any cell in a curtain wall grid. For more information, see Assigning Infills to Curtain Wall Cells on page 960.

Specifying an Alignment for a Curtain Wall Infill

Use this procedure to align an infill so that it is centered with the baseline of the curtain wall, in front of the baseline, or behind the baseline. In Plan view, the front of a curtain wall (drawn from left to right) is below the baseline and the back is above the baseline.

NOTE To move the infill away from the baseline, see Specifying an Offset for a Curtain Wall Infill on page 948.

Specifying infill alignments



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select an infill, or create a new one.

7 Select an alignment: front, center, or back.

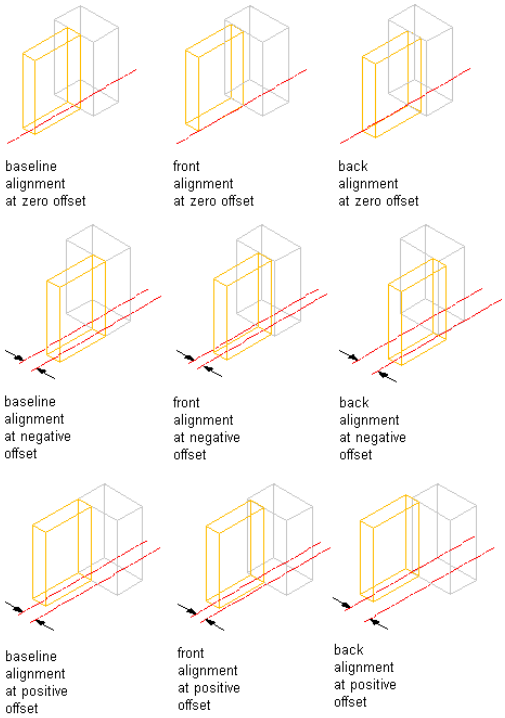
8 Click OK.

Specifying an Offset for a Curtain Wall Infill

Use this procedure to specify an offset for a curtain wall infill. By default, infills are centered on the curtain wall baseline. If your design requires that the infill be aligned with frame edges or some other part of the curtain wall, you can specify an offset for the infill.

You can also edit individual style-based infills directly in the drawing. The selected infill has Flip grips in both the *X* and *Y* directions so that you can change the orientation of the infill.

Specifying panel infill offsets



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Infills under Element Definitions.
6 Select an infill, or create a new one.
7 Enter an offset distance.

   In Plan view, positive numbers offset the infill above the baseline and negative numbers offset the infill below the baseline. The offset is also affected by the selected alignment for the infill.

8 Click OK.

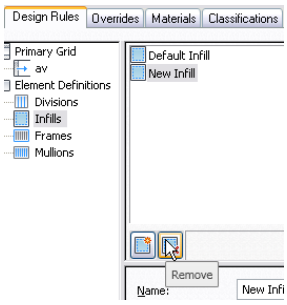
Removing an Infill Definition from a Curtain Wall Style

Use this procedure to delete an infill definition that you no longer need from the Infills definitions list. You cannot remove an infill definition when it is currently assigned to a cell. In addition, you cannot remove the default infill definition, but you can modify it as needed.

NOTE For information about removing an infill from a cell, see Removing an Infill from a Curtain Wall Cell on page 966.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Infills under Element Definitions.

6 Select the unneeded infill definition, and click Remove.

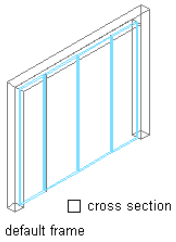


7 Click OK.

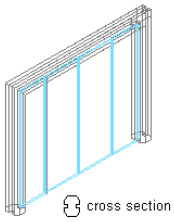
Defining Curtain Wall Frames

All curtain wall grids, including the primary grid, can have frame definitions. The frame of the primary grid defines the outer edges of the curtain wall. The overall frame size is determined by the length and height of the primary curtain wall grid or a nested curtain wall grid. You can define a frame by specifying a width and depth or by selecting a profile.

Specifying default and profile-based frames



default frame



profile-based frame

You create frame definitions for a specific curtain wall style. Those definitions can be assigned only to frames in curtain walls of that style. You can create as many frame definitions as you want, and then assign the definitions to the frames as needed. If you have nested grids, each grid has its own frame. There is a default frame definition that you can modify and assign as needed. Unassigned frames are not displayed. For more information, see Assigning Definitions to Curtain Wall Frames on page 968.

TIP Using Style Manager, you can copy a mullion definition and use it as a frame definition. Select the mullion definition and drag it to Frames in the left pane of the Design Rules tab.

Materials and Display Properties for Frames

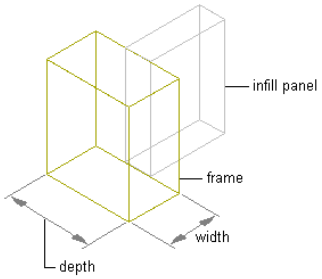
If you do not use materials to control the display properties of frames, you can specify their display properties in the curtain wall style. The layer, color, linetype, and other display properties of the default frame are applied to all frames unless you create a custom display component for each definition. You can then control

the display of each frame definition independently. For more information, see Specifying the Display of Curtain Walls on page 975.

Defining a Curtain Wall Frame by Width and Depth

You can define a frame by specifying its width and depth. The overall frame size is determined by the length and height of the curtain wall grid.

Specifying frame width and depth



Because curtain walls can contain multiple object styles with different frames, it is helpful to use a naming convention for grid frames that indicates the grid location or purpose within the curtain wall. For example, L3-FL1- Metal Frame can identify a metal frame for a third-level grid on Floor 1.

TIP To remove the frame edge and have the infill adjust to fill the space occupied by the frame, create a frame definition with both width and depth set to zero. Then, assign that definition to the frame edge that you want to remove. This is necessary for the infill to be mitered as it would be for a butt-glazed condition. For more information, see Removing a Frame Edge from a Curtain Wall on page 969.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select Frames under Element Definitions.
6. Click to create a new frame definition.
7. Enter a descriptive name for the frame.
8. Specify a width and depth for the frame.
9. Specify any offsets.

   For more information, see Specifying Offsets for a Curtain Wall Frame on page 953.
10. Click OK.

After you create a frame definition, you can assign it to any frame in a curtain wall. For more information, see Assigning Definitions to Curtain Wall Frames on page 968.

Creating a Profile for a Curtain Wall Frame

Use this procedure to create a profile that you can use to define the shape of a curtain wall frame. You can then extrude the profile to create a curtain wall frame.

The height and the width of the polyline you use to create the profile define the default height and width of the curtain wall frame. The insertion point of the profile is aligned with the centroid of the frame.

1. Draw a closed polyline of the height and the depth needed for the resulting curtain wall frame.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the frame.

4 Enter a name for the profile, and click OK.

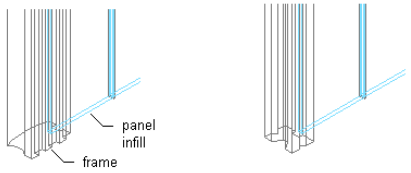
You can now use the profile as a curtain wall frame. For more information, see Defining a Curtain Wall Frame Using a Profile on page 952.

Defining a Curtain Wall Frame Using a Profile

Use this procedure to create a frame element definition from a profile. If you do not want a straight edge to your frame, you can use a profile to define edges with curves, jags, or any other shape you require.

You can also use an edit in-place routine to create a frame from a profile. For more information, see Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing on page 989.

Two profile-based frame examples



NOTE The insertion point of the profile is aligned with the centroid of the frame.

1 Create the profile for the frame.

For information on creating profiles for curtain wall frames, see Creating a Profile for a Curtain Wall Frame on page 951.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Curtain Wall Styles.

4 Select a curtain wall style.

5 Click the Design Rules tab.

6 In the left pane, select Frames under Element Definitions.

7 Click New Frame.

8 Enter a descriptive name for the frame.

9 Specify a width and depth for the frame edge.

These dimensions are used to calculate the center point of the edge for aligning the profile and also to specify a boundary for the adjacent infill.

10 Select Use Profile.

NOTE The Profile options are available only if you have profiles in the current drawing.

11 Select a profile from the list.

By default, the profile is inserted using the same width and depth with which it was created.

12 To adjust the size of the profile to fit within the width or depth dimension of the frame edge, select Auto-Adjust Profile Width or Depth.

13 To mirror the profile, select to mirror along the X or Y axis.

14 To rotate the profile, specify an angle for Rotation.

15 Specify any offsets.

For more information, see Specifying Offsets for a Curtain Wall Frame on page 953.

16 Click OK.

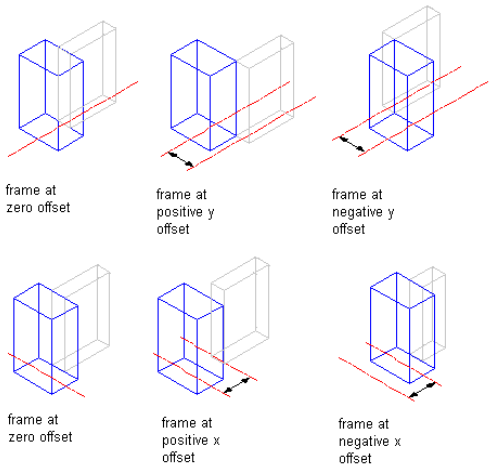
After you create a frame definition, you can assign it to any frame in a curtain wall. For more information, see Assigning Definitions to Curtain Wall Frames on page 968.

Specifying Offsets for a Curtain Wall Frame

Use this procedure to define the distance that a curtain wall frame is from the floor line, roof line, or baseline. By default, the outside edges of the frame align with the start and end of the floor line and the start and end of the roof line. When you adjust the width of the frame, the frame expands inward. However, you can use offsets to expand or contract the frame away from these default limits or to shift the frame away from the baseline in either the X or Y direction.

Offset	Description
X	Positive X offset moves the frame edge outward beyond the end of the curtain wall, while a negative X offset moves the frame edge inward toward the center of the curtain wall.
Y	In Plan view, a positive Y offset moves the frame edge above the baseline, while a negative Y offset moves the frame below the baseline.
Start	Negative Start offset lengthens the frame beyond the start point, while a positive Start offset shortens the frame. The start point for vertical edges is the baseline, and the start point for horizontal edges (drawn left to right) is the left side.
End	Negative End offset lengthens the frame beyond the end point, while a positive End offset shortens the frame. The end point for vertical edges is the base height, and the end point for horizontal edges (drawn left to right) is the right side.

Specifying frame offsets in the x and y directions



TIP To quickly identify the start and end of a curtain wall, select the curtain wall. The Reverse Direction grip is displayed near the center of the curtain wall and points toward the end of the curtain wall.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Frames under Element Definitions.
6 Select a frame definition from the list.
7 Specify an offset distance for the frame edge.
8 Click OK.

Removing a Frame Definition from a Curtain Wall Style

Use this procedure to remove a frame definition from the Frame definitions list. You cannot remove a frame definition if it is currently assigned to a frame edge, but you can remove it if it is assigned as an override to a frame edge. In addition, you cannot remove the default frame definition, but you can modify it as needed.

NOTE For information about removing a frame edge, see Removing a Frame Edge from a Curtain Wall on page 969.

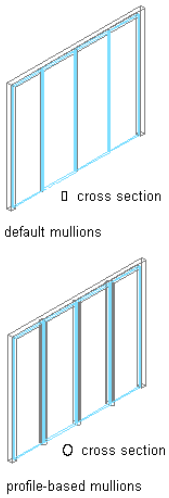
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Frames under Element Definitions.
6 Select the unneeded frame definition.
7 Click Remove Frame.
8 Click OK.

Defining Curtain Wall Mullions

All curtain wall grids, including the primary grid, can have mullion definitions. The mullion of the primary grid defines the outer edges of the curtain wall. You can define the mullions by specifying a width and depth or by selecting a profile from which the mullion is extruded.

Because curtain walls can contain multiple nested grids with different mullions, it is helpful to use a naming convention for grid mullions that indicates the level of each grid and the grid location or purpose within the curtain wall. For example, L3-FL1-Window Mullion can identify a mullion for a window in a third-level grid on Floor 1.

Specifying default and profile-based mullions



You create mullion definitions for a specific curtain wall style and those definitions can be assigned only to mullions in curtain walls of that style. You can create as many mullion definitions as you want, and then assign the definitions to mullions as needed. If you have nested grids, each grid has its own mullions. There is a default mullion definition that you can modify as needed that is used for any unassigned mullions. For more information, see Assigning Definitions to Curtain Wall Mullions on page 971.

TIP Using Style Manager, you can copy a frame definition and use it as a mullion definition. Select the frame definition and drag it to Mullions in the left pane of the Design Rules tab.

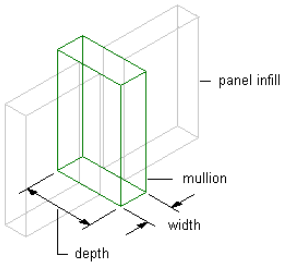
Materials and Display Properties for Mullions

If you do not use materials to control the display properties of mullions, you can specify their display properties in the curtain wall style. The layer, color, linetype, and other display properties of the default mullion are applied to all mullions unless you create a custom display component for each definition. You can then control the display of each mullion definition independently. For more information, see Specifying the Display of Curtain Walls on page 975.

Defining Curtain Wall Mullions by Width and Depth

You can define mullions by specifying a width and a depth.

Specifying mullion width and depth



TIP To remove mullions for butt glazing, create a definition with both width and depth set to zero. Then, assign that definition to the mullions that you want to remove. For more information, see Removing Mullions from a Curtain Wall Grid on page 973.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select Mullions under Element Definitions.

6 Click New Mullion.

7 Enter a descriptive name for the mullion.

8 Specify a width and depth for the mullion.

9 Specify the offsets you want.

For more information, see Specifying Offsets for the Mullions of a Curtain Wall on page 958.

10 Click OK.

After you create a mullion definition, you can assign it to any mullion in a curtain wall. For more information, see Assigning Definitions to Curtain Wall Mullions on page 971.

Creating a Profile for Curtain Wall Mullions

Use this procedure to create a profile that you can use to define the shape of a curtain wall mullion definition. You can then extrude the profile to create mullions from it.

The height and the width of the polyline you use to create the profile define the default height and width of the curtain wall mullion. The insertion point of the profile is aligned with the centroid of the mullion.

1 Draw a closed polyline of the height and the depth needed for the resulting curtain wall mullion.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the mullion.

4 Enter a name for the profile, and click OK.

You can now use the profile as a curtain wall mullion. For more information, see Defining the Mullions of a Curtain Wall Using a Profile on page 956.

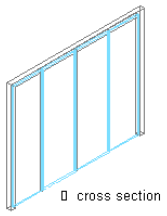
Defining the Mullions of a Curtain Wall Using a Profile

Use this procedure to create a mullion element definition from a profile. If you do not want a straight edge to your mullions, you can use a profile to define mullions with curves, jags, or any other shape.

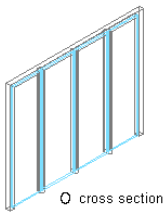
You can also use an edit in-place routine to create a mullion from a profile. For more information, see Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing on page 989.

NOTE The insertion point of the profile is aligned with the centroid of the mullion.

Infill alignments with default and profile-based mullions



default mullions



profile-based mullions

1. Create the profile to use for the mullion.

   For information, see Creating a Profile for Curtain Wall Mullions on page 956.

2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects, and expand Curtain Wall Styles.
4. Select a curtain wall style.
5. Click the Design Rules tab.
6. In the left pane, select Mullions under Element Definitions.
7. Click New Mullion.
8. Enter a descriptive name for the mullion.
9. Specify a width and depth for the mullion.

   These dimensions are used to calculate the center point of the mullion for aligning the profile, and also to specify a boundary for the adjacent infill.

10. Select Use Profile.

    NOTE The Profile options are available only if you have profiles in the current drawing.

11. Select a profile from the list.

    By default, the profile is inserted using the same width and depth with which it was created.

12. To adjust the size of the profile to fit within the width or depth dimension of the mullion, select Auto-Adjust Profile Width or Depth.
13. To mirror the profile, select X or Y for Mirror In.
14. To rotate the profile, specify a rotation angle for Rotation.
15. Specify any offsets.

    For more information, see Specifying Offsets for the Mullions of a Curtain Wall on page 958.

16. Click OK.

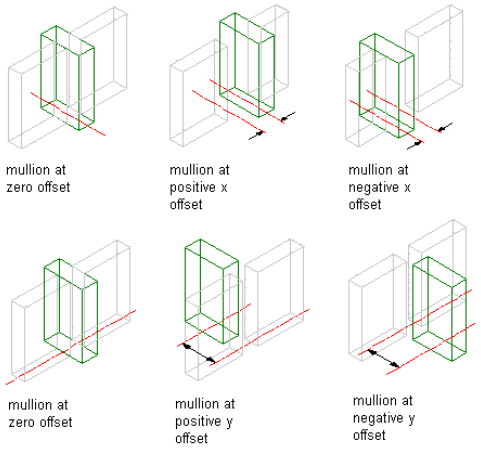
After you create a mullion definition, you can assign it to any mullion in a curtain wall. For more information, see Assigning Definitions to Curtain Wall Mullions on page 971.

Specifying Offsets for the Mullions of a Curtain Wall

Use this procedure to define mullions that are offset from the start or end of the curtain wall to lengthen or shorten the edge or offset in the X or Y direction to shift the edge. For example, you might want to represent butt glazing by offsetting the mullions to be behind glass panel infills.

Offset	Description
X	For vertical mullions, a positive X offset moves the mullions toward the end of the curtain wall, while a negative X offset moves the mullions toward the start of the curtain wall. For horizontal mullions, a positive X offset moves the mullions toward the top of the curtain wall, while a negative X offset moves the mullions toward the bottom of the curtain wall.
Y	In Plan view, a positive Y offset moves the mullions above the baseline, while a negative Y offset moves the mullions below the baseline.
Start	Negative Start offset lengthens the mullions beyond the start point, while a positive Start offset shortens the mullions.
End	Negative End offset lengthens the mullions beyond the end point, while a positive End offset shortens the mullions.

Specifying mullion offsets in x and y directions



TIP To quickly identify the start and end of a curtain wall, select the curtain wall. The Reverse Direction grip is displayed near the center of the curtain wall and points toward the end of the curtain wall.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager.
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select Mullions under Element Definitions.
6. Select a mullion definition from the list.
7. Specify an offset distance for the X, Y, Start, or End.
8. Click OK.

Removing a Mullion Definition from a Curtain Wall Style

Use this procedure to remove a mullion definition from the Mullions definitions list. You cannot remove a mullion definition if it is assigned to a mullion, but you can remove it if it is assigned as an override to a mullion. In addition, you cannot remove the default mullion definition, but you can modify it as needed.

NOTE For information about removing mullions from between cells, see Removing Mullions from a Curtain Wall Grid on page 973.

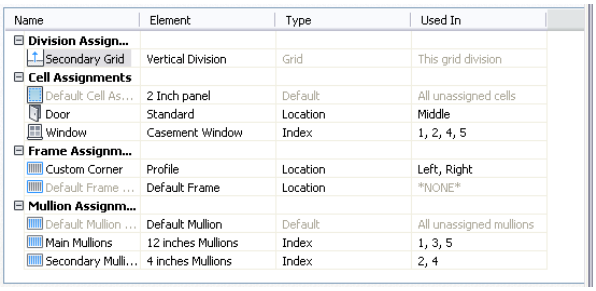
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select Mullions under Element Definitions.
6 Select the unneeded mullion definition from the list.
7 Click Remove Mullion.
8 Click OK.

Assigning Definitions to Curtain Wall Elements

After you've created element definitions for a curtain wall style, you can assign those definitions to each of the curtain wall element types: divisions, cell infills, frames, and mullions.

By default, one definition is assigned to all elements of a particular type. However, you can assign definitions to individual elements as well. For example, all cells in the grid are assigned the default infill. You can, however, create a new cell assignment, select a different infill, and then specify the cells to use that infill.

Assignment list



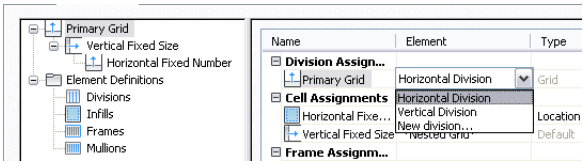
Name	Element	Type	Used In
Division Assign...			
Secondary Grid	Vertical Division	Grid	This grid division
Cell Assignments			
Default Cell As...	2 Inch panel	Default	All unassigned cells
Door	Standard	Location	Middle
Window	Casement Window	Index	1, 2, 4, 5
Frame Assignm...			
Custom Corner	Profile	Location	Left, Right
Default Frame ...	Default Frame	Location	*NONE*
Mullion Assignm...			
Default Mullion ...	Default Mullion	Default	All unassigned mullions
Main Mullions	12 inches Mullions	Index	1, 3, 5
Secondary Mulli...	4 inches Mullions	Index	2, 4

For more information about element definitions, see Creating Element Definitions for a Curtain Wall Style on page 935.

Assigning a Division to a Curtain Wall Grid

Use this procedure to assign a division to a curtain wall grid. A division defines the grid orientation (whether the direction of the grid cells and mullions is horizontal or vertical) and the division type (number and size of cells).

After you define a division, you can assign it to the primary grid or to nested grids. Nested grids are created by selecting Nested Grid as the cell assignment. For more information, see Working with Nested Grids in Curtain Walls on page 961.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select the grid you want to assign a division to.

The name of the grid you select is displayed in the table under the Division Assignment row.

TIP To rename a grid, select it, and click Rename and enter a new name.

6 Click the Element column for that grid and select a division definition from the list.

7 Click OK.

Assigning Infills to Curtain Wall Cells

An infill defines the contents of a curtain wall cell. A curtain wall cell can have the default simple panel or contain a nested grid, an AEC Polygon, curtain wall unit, door, window, or door/window assembly style. The object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically represent glazing or other plain cladding, such as stone or concrete. For more information, see Defining Infills for Curtain Wall Cells on page 946.

Cell Assignments

A cell assignment defines the infill definition used for the cells. You can use one cell assignment to assign the same infill to all cells, or you can create multiple cell assignments to assign different infills to different cells.

Cell assignments

Cell Assignments			
Default Cell As...	2 Inch panel	Default	All unassigned cells
Door	Standard	Location	Middle
Window	Casement Window	Index	1, 2, 4, 5

Do not assign multiple definitions to the same cell because only the last assigned definition to the cell is used.

Default Cell Assignment

The default cell assignment is used by all unassigned cells. You can modify the default assignment to be any type of infill, but you cannot delete the default cell assignment.

You may want to modify the default cell assignment to use the infill definition that occurs most frequently in your design. Any cells not assigned to other infills then use this infill definition.

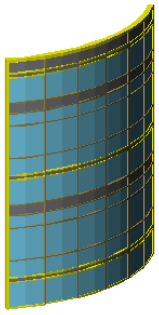
Materials and Display Properties of Infills

The layer, color, linetype, and other display properties of the default infill are applied to all infills unless you assign materials to the infills you created or you create a custom display component for each definition. You can then control the display of each infill definition independently. For more information, see Specifying the Display of Curtain Walls on page 975.

Working with Nested Grids in Curtain Walls

Each curtain wall grid is one-dimensional with either a horizontal or vertical division. By nesting grids in the curtain wall style, you can create a variety of patterns from simple to complex.

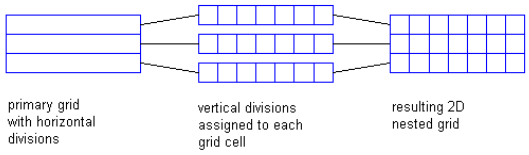
Example of nested grids



Simple Primary Grids

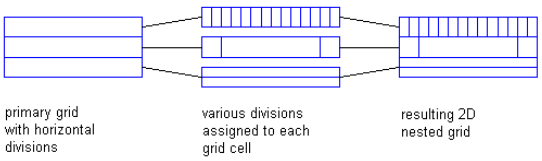
When you nest grids, you start with one primary grid. Each cell in the primary grid can then be filled with another grid. For example, if your primary grid is horizontal and has three cells, you can nest a vertical grid in each horizontal cell to create a simple two-dimensional (2D) grid. This is the nesting configuration for the Standard curtain wall style.

Specifying cell division definitions 1



The previous illustration shows all cells in the grid with the same cell assignment—a vertical division. However, each cell in a grid is independent and can have a separate assignment. For example, the following illustration shows a three cell horizontal grid with different assignments in each cell. The bottom cell contains another horizontal division, the middle cell contains vertical divisions of varying width, and the top cell contains a vertical divisions of a fixed width.

Specifying cell division definitions 2

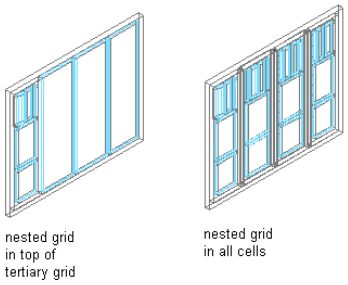


Multiple Nested Grids

You can continue to nest grids to create multiple levels. For example, the following illustrations show the Standard curtain wall style, which is a simple two-dimensional (2D) grid, with one horizontal cell and three

vertical cells. Another grid is nested in the first cell of the secondary grid. This creates a tertiary grid. The final illustration shows the nested grids assigned to all cells.

Specifying a sequence of nested grids



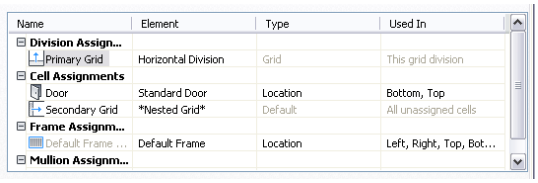
Defining Nested Grids

You can define nested grids by using the Design Rules tab of the Curtain Wall Style Properties dialog box. The tree in the left pane lists the grids. There is always one primary grid. The primary grid can have one or more secondary grids. Each secondary grid can have one or more tertiary grids, and so on.

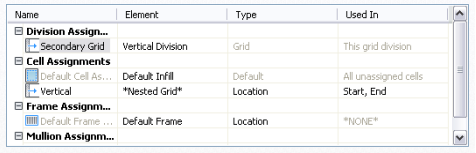
TIP To quickly create nested grids in all cells, change the default cell assignment to Nested Grid. If you want multiple levels of nesting, be sure to change the default cell assignment for each grid. For more information, see Creating a Nested Grid in a Curtain Wall on page 962.

Each grid has its own cell assignments. You assign cells to contain another grid, a panel infill, or an object such as a door or window. For more information, see Assigning Infills to Curtain Wall Cells on page 960.

Primary grid and cell assignments



Secondary grid and cell assignments



Creating a Nested Grid in a Curtain Wall

Use this procedure to create a nested grid in a curtain wall. A nested grid is a grid within a grid. Each nested grid has its own division, cell assignments, frame, and mullions. By default, the frame is turned off for nested grids.

For more information, see Working with Nested Grids in Curtain Walls on page 961.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to create a nested grid.

6 Click New Cell Assignment.

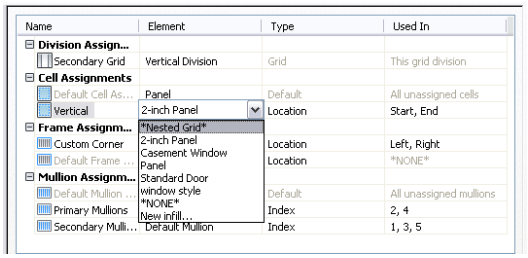
A new cell assignment is displayed in the list of cell assignments.

7 Select the cell assignment in the top right frame, right-click and click Rename, and then enter a descriptive name.

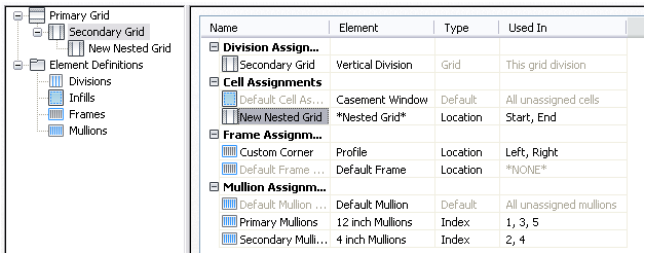
8 Select Nested Grid in the Element column.

A new grid is added to the list of grids in the left pane. If you are editing the primary grid, the new grid is added at the secondary level. If you are editing a grid at the secondary level, the additional grid is placed at the tertiary level, and so on.

Creating a nested grid



New nested grid in tree



NOTE To rename a grid, select it in the right pane, right-click and click Rename, and enter a new name.

9 Specify the cells to contain this nested grid.

For more information, see Specifying Which Curtain Wall Cells Use a Cell Assignment on page 967.

10 Click OK.

Inserting a Door, Window or Door/Window Assembly into a Curtain Wall Cell

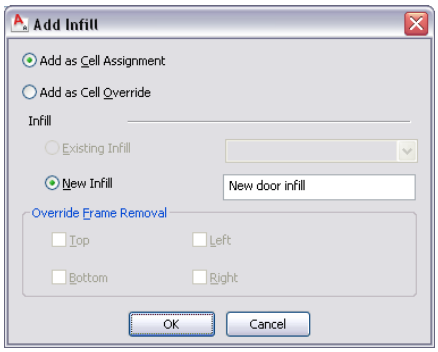
Use this procedure to add doors, windows and door/window assemblies to a curtain wall. For more information, see Defining Infills for Curtain Wall Cells on page 946.

1 Open the tool palette that you want to use, and select a door, window or door/window assembly.

2 Select the curtain wall in which to insert the door, window or door/window assembly.

3 Select the curtain wall cell marker for the cell in which to insert the door, window or door/window assembly.

The Add Infill worksheet opens.



4 Select the insertion method for the door, window or door/window assembly:

If you want to…	Then…
add the door, window or door/window assembly as a cell assignment and have all curtain walls using the same style display the same object added in a corresponding cell	select Add as Cell Assignment.
add the door, window or door/window assembly exclusively to the selected curtain wall	select Add as Cell Override.

If a door, window or door/window assembly of the style you selected already exists in your drawing, Existing Infill is selected by default.

5 Select the type of infill for the door, window or door/window assembly:

If you selected…	Then…
Add as Cell Assignment and you want to insert a door, window or door/window assembly of the existing style, Existing Infill is selected by default.	Click OK.
Add as Cell Assignment and you want to insert a door, window or door/window assembly of a different style than exists in your drawing	select New Infill, enter a name for the object and click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of the existing style and not modify the edge of the frame surrounding the object	Click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of a different style than exists in your drawing and not remove an edge of the frame surrounding the object	select New Infill, enter a name for the object and click OK.

If you selected…	Then…
Add as Cell Override and you want to insert a door, window or door/window assembly of the existing style and remove an edge of the frame surrounding the object	select Top, Bottom, Left, or Right for Override Frame Removal and click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of a different style than exists in your drawing and remove an edge of the frame surrounding the object	select New Infill and enter a name for the object. Then select Top, Bottom, Left, or Right for Override Frame Removal and click OK.

6 Press *ENTER*.

Filling a Curtain Wall Cell with a Simple Panel

Use this procedure to fill a curtain wall cell with a simple panel. Simple panels are generally used to represent basic cladding materials in the curtain wall, such as a stone wall panel or a concrete panel.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

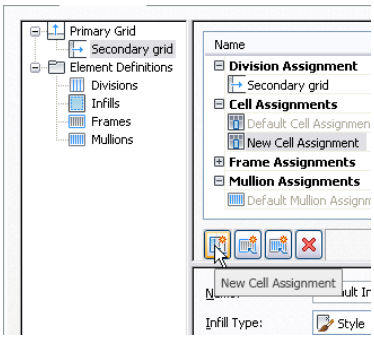
2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to put a simple panel infill.

6 Click New Cell Assignment.



A new cell assignment is displayed in the list of cell assignments.

7 Select the cell assignment in the top right pane, right-click and click Rename, and then enter a descriptive name.

8 Under Element, select an infill that defines a simple panel.

If you do not have a simple panel infill defined, then select New Infill and define one. For more information, see Creating a Panel Infill for a Curtain Wall on page 946.

9 Specify the cells to contain this simple panel.

For more information, see Specifying Which Curtain Wall Cells Use a Cell Assignment on page 967.

10 Click OK.

Inserting an Object into a Curtain Wall Cell

Use this procedure to insert objects, such as curtain wall units and AEC Polygons, into a curtain wall cell. Curtain wall cells can contain these objects when you create infill definitions that use them. For more information, see Creating a Style Infill for a Curtain Wall on page 947.

TIP After you insert an object in a cell, you can select that object independent of the grid, right-click, and access editing options for the object.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to insert objects.
6. Click New Cell Assignment.

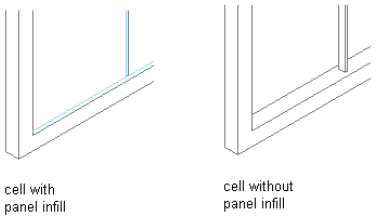
   A new cell assignment is displayed in the list of cell assignments.
7. Select the cell assignment in the top right frame, right-click and click Rename, and then enter a descriptive name.
8. Select an infill that uses an object style.
9. Specify the cells to contain this object.

   For more information, see Specifying Which Curtain Wall Cells Use a Cell Assignment on page 967.
10. Click OK.

Removing an Infill from a Curtain Wall Cell

Use this procedure to remove the infill of a cell and leave the cell empty. To do this, use None as the element definition. Using None also removes any frame edges that border the cell, but it does not affect the mullions.

Removing an infill assignment from a cell



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select the grid that contains the cells you want to assign to None.
6. Create a new cell assignment or select an existing cell assignment.
7. Select NONE under the Element column.
8. Specify the cells to contain the None infill.

   For more information, see Specifying Which Curtain Wall Cells Use a Cell Assignment on page 967.

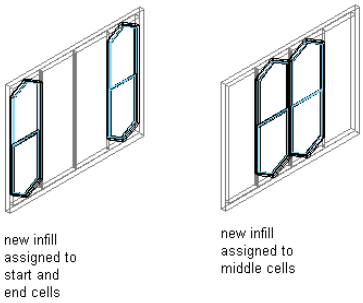
9 Click OK.

Specifying Which Curtain Wall Cells Use a Cell Assignment

When you create a cell assignment you need to specify the cells in the grid to use that assignment. There are two options for selecting cells:

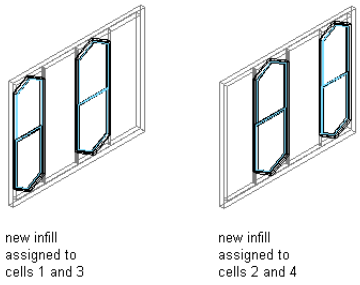
- Use Location to insert the infill into the start, middle, or end cells of a vertical grid or into the bottom, middle, or top cells of a horizontal grid. If there is an even number of cells (four or more), Middle refers to the two cells in the middle of the grid. If there is an odd number of cells (three or more), Middle refers to one cell in the middle of the grid.

  Specifying cell assignments by location



- Use Index to insert the infill into specific cells based on cell numbers. Cells are numbered from start to end or bottom to top. For example, typing 1, 3, 5 would place the infill in the first, third, and fifth cells.

  Specifying cell assignment by index



TIP When you are trying to determine cell assignments in a grid that has both vertical and horizontal cells it is helpful to remember that each of these directions is actually in a separate grid. You can have a vertical grid with a nested horizontal grid, or the other way around. Select each grid separately to make cell assignments.

Any cells that are not assigned a specific cell assignment use the default infill.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 In the right pane, select Location or Index for Type.

7 Select a cell assignment:

If you select …	Then …
Location	click the Used In column, and click the button at the far right of the row. Select the cells you want to use this assignment, and click OK.
Index	enter the cell numbers separated by commas in the Used In column. For vertical grids, cells are numbered from start to end and for horizontal grids, cells are numbered from bottom to top.

NOTE Do not assign multiple definitions to a cell because the last definition assigned to the cell is used.

8 Click OK.

Removing an Assignment from a Curtain Wall Style

Use this procedure to remove cell assignments, frame assignments, and mullion assignments from a curtain wall style. You cannot remove default assignments, but you can modify them to suit your needs.

NOTE Each grid requires one division assignment. Therefore, you cannot remove the division assignment, although you can change the division element used for the division assignment.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the Design Rules tab.
5 In the left pane, select the grid from which you want to remove an assignment.
6 Select a cell assignment, frame assignment, or a mullion assignment.
7 Click Remove Assignment.
8 Click OK.

Assigning Definitions to Curtain Wall Frames

The curtain wall frame is represented by the outer edges of the primary grid. Each nested grid has its own frame that is defined separately from the primary grid frame. By default, the frames of nested grids are turned off. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

Frame Assignments

A frame assignment defines the frame definition that is used by each frame edge. You can use one frame assignment to assign the same definition to all four edges of the frame, or you can create multiple frame assignments to assign different definitions to different edges of the frame. Unassigned edges are not displayed.

Do not assign multiple definitions to the frame edge because only the last definition assigned to the edge is used.

Default Frame Assignment

There is a default frame assignment and you can select the frame edges it applies to. You can modify the default assignment to use any frame definition, but you cannot delete the default frame assignment.

Materials and Display Properties of Frames

The layer, color, linetype, and other display properties of the default frame are applied to all frame edges unless you assign materials to the frame definition or you create a custom display component for each definition. You can then control the display of each frame definition independently. For more information, see Specifying the Display of Curtain Walls on page 975.

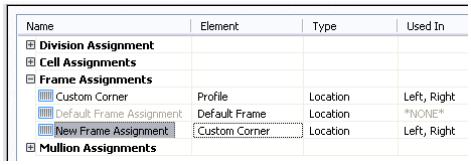
Adding a New Frame Assignment to a Curtain Wall

Use this procedure to add a frame assignment to a curtain wall. To assign different definitions to different frame edges, you need multiple frame assignments.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to create a new frame assignment.
6. Click New Frame Assignment.

   A new frame assignment is displayed in the list of frame assignments.

   New frame assignment



7. Select the frame assignment in the right pane, right-click and click Rename, and then enter a descriptive name.
8. Select a frame definition from the Element column.
9. Specify the sides of the frame to use this frame assignment.

   For more information, see Specifying Which Curtain Wall Edges Use a Frame Assignment on page 970.
10. Click OK.

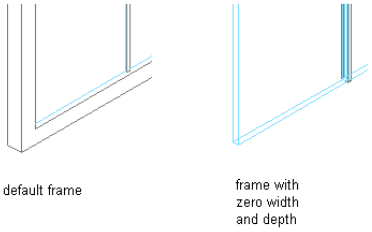
Removing a Frame Edge from a Curtain Wall

Use this procedure to remove a frame edge from a curtain wall. There are three ways to remove a frame edge:

- Set the width and depth of the edge to zero
- Leave the edge unassigned
- Specify None as an override to the edge assignment

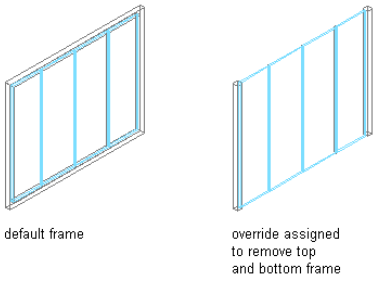
The first two methods remove the frame edge and expand the adjacent infills into the space occupied by the edge.

Specifying a frame width and depth of zero



By specifying None as an override, the frame edge is not displayed, but the adjacent infill is not expanded into the space the edge occupied.

Overriding a frame edge definition



For information about setting the width and depth to zero, see Defining a Curtain Wall Frame by Width and Depth on page 951.

For information about leaving the edge unassigned, see Specifying Which Curtain Wall Edges Use a Frame Assignment on page 970.

For information about overriding the edge, see Overriding Curtain Wall Frames and Mullions on page 987.

Specifying Which Curtain Wall Edges Use a Frame Assignment

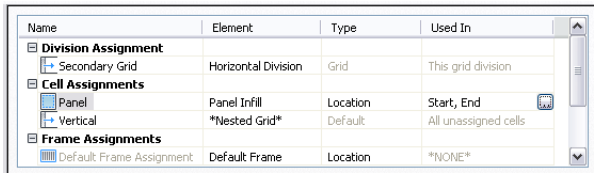
Use this procedure to specify edges that use a frame assignment. When you create a frame assignment, you need to specify the edges of the frame to use that assignment.

Frame edges that are not assigned a frame definition are not displayed.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Styles.
3. Select a curtain wall style.
4. Click the Design Rules tab.
5. In the left pane, select a grid.
6. Select a frame assignment.

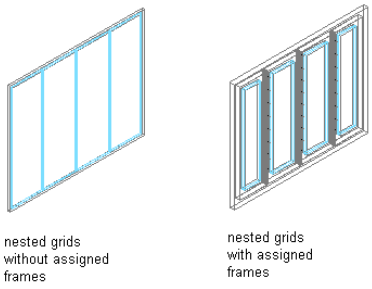
   Location is the only way to specify the frame edges.
7. Click the Used In column, and then click the [...] button at the far right of the row.

   Specifying frame location



8 Select the edges that you want to use this assignment - Left, Right, Top, or Bottom - and click OK.

Assigning frames to nested grids



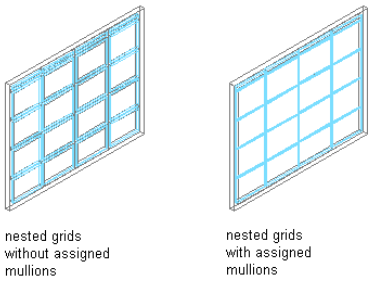
Do not assign multiple definitions to the same frame edge because only the last definition assigned to the edge is used.

9 Click OK.

Assigning Definitions to Curtain Wall Mullions

The mullions of a curtain wall are the edges between the grid cells. The primary grid and each nested grid have mullions that are defined separately from the other grids. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

Assign mullions to a nested grid



Mullion Assignments

A mullion assignment defines the definition used by each mullion. You can use one assignment to define all mullions, or you can create multiple assignments and assign different definitions to different mullions in any grid.

Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

Default Mullion Assignment

There is a default mullion assignment used by all unassigned mullions. You can modify the default assignment to be any mullion definition, but you cannot delete the default mullion assignment.

Adding a New Mullion Assignment to a Curtain Wall Style

Use this procedure to add a new mullion assignment to a curtain wall style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

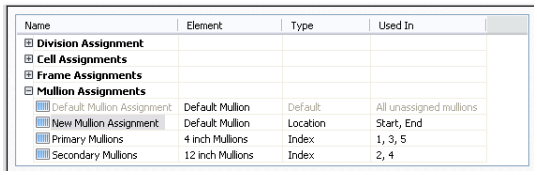
4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to create a new mullion assignment.

6 Click New Mullion Assignment.

A new mullion assignment is displayed in the list of mullion assignments.

New mullion assignment



7 Select the mullion assignment, right-click and click Rename, and then enter a descriptive name.

8 Select a mullion definition from the Element column.

9 Specify the mullions to use this assignment.

For more information, see Specifying Which Curtain Wall Mullions Use an Assignment on page 972.

10 Click OK.

Specifying Which Curtain Wall Mullions Use an Assignment

When you create a mullion assignment you need to specify the mullions in the grid to use that assignment. There are two options for selecting mullions:

- Use Location to assign a definition to the start, middle, or end mullions of a vertical grid or the bottom, middle, or top mullions of a horizontal grid. If there is an even number of mullions (four or more), Middle refers to the two mullions in the middle of the grid. If there is an odd number of mullions (three or more), Middle refers to the one mullion in the middle of the grid.
- Use Index to assign a definition to specific mullions based on mullion numbers. Mullions are numbered from start to end or bottom to top. For example, typing 1, 2, 3 would assign the definition to the first, second, and third mullions.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 Create a new mullion assignment or select an existing assignment.

7 Select Location or Index for Type.

8 Select a cell assignment.

If you selected …	Then …
Location	click the Used In column, and click the button at the far right of the row. Select the cells you want to use this cell assignment, and click OK.

If you selected …	Then …
Index	enter the mullion numbers separated by commas in the Used In column. For vertical grids, mullions are numbered from start to end and, for horizontal grids, mullions are numbered from bottom to top.

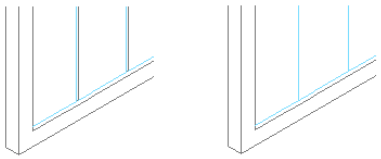
NOTE Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

9 Click OK.

Any mullions that are not assigned a specific mullion assignment use the default mullion definition.

Removing Mullions from a Curtain Wall Grid

Use this procedure to remove a mullion from the curtain wall. You can create a mullion definition whose edge width and depth are zero. Adjacent infills expand to fill in the space that was occupied by the mullion. This is an effective way to represent butt glazing.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to remove a mullion.

6 Create a new mullion assignment and enter **0** (zero) for the width and depth.

For more information, see Defining Curtain Wall Mullions by Width and Depth on page 955.

7 Under Mullion Assignments, select the mullion definition you created for any cell edges of any mullion assignment, where you want to remove the mullions.

For more information, see Specifying Which Curtain Wall Mullions Use an Assignment on page 972.

8 Click OK.

Specifying the Materials of a Curtain Wall Style

A curtain wall consists of a number of components whose display properties can be determined by the materials assigned to each component.

When you assign materials to a curtain wall style, you assign one material to each display component of the curtain wall. For example, you assign a wood material to the frame and a glass material to the glass inset. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the curtain wall style, instead of using material display properties, you can turn off the material assignments in the display properties of the curtain wall style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three dimensional (3D) model views and in elevations.

Curtain Wall Materials and Display Components

The following table identifies the material component that corresponds to each curtain wall component in the specified views.

Curtain Wall Component	Material Component
Plan, Plan High Detail, Plan Low Detail, Screened, Reflected Plan	
Frame Definitions	Linework
Mullion Definitions	Linework
Infill Definitions	Linework
Frame Definitions Hatch	Linework
Mullion Definitions Hatch	Linework
Infill Definitions Hatch	Linework
Model	
Frame	3D Body
Mullion	3D Body
Infill	3D Body

Assigning Materials to a Curtain Wall Style

Use this procedure to assign materials to the individual components of a curtain wall style. When you assign a material to a curtain wall component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the curtain wall. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, the frame, mullion, and infill are physical components of a curtain wall. The cell marker is a symbolic component.

NOTE If a material assignment does not determine the display properties of a curtain wall component, you can change the display properties of the curtain wall style as described in Specifying the Display of Curtain Walls on page 975.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall style.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select By Material for any component to which you want to assign a material, and click OK.

If the setting for By Material is not available, the display of this component cannot be determined by a material.

9 Click the Materials tab.

10 Select the component you want to change, select the value for Material Definition, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

11 Click OK.

Specifying the Display of Curtain Walls

The display of a curtain wall depends on the direction from which you view the curtain wall. In Plan view, the curtain wall object is displayed as parallel lines with vertices marking the grid lines, as an architect would typically draw a curtain wall. In 3D isometric views, the curtain wall object is displayed as it would appear in the real world, with surfaces showing length, thickness, and height. You control what you want to display in each particular view.

Element Definitions and Custom Display Components

By default, the display of all infills, frames, and mullions is controlled by the display properties of the default infill, default frame, and default mullions. However, you can add individual element definitions as components with separate display properties. For example, if you define two infills called stone panel and glass panel, by default they are both controlled by the default infill display properties. However, you can add each definition as a new display component, and then control the display properties separately.

NOTE The component name in the Custom Display Component dialog box must match the name of element definition in the Design Rules tab. Otherwise the element definition does not display properly.

For more information about the display system, see Display System on page 513.

Materials and Display Properties

You can use materials to control the display of both default and custom infills, frames, and mullions. When you assign materials to the element definitions you create, you do not need to define these definitions as custom display components. For more information, see Specifying the Materials of a Curtain Wall Style on page 973.

Adding Curtain Wall Element Definitions as Display Components

Use this procedure to add curtain wall element definitions. Before you can control the display properties of curtain wall elements according to the definition assigned to the element, you must create display components for each element definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select the curtain wall style that you want to change.

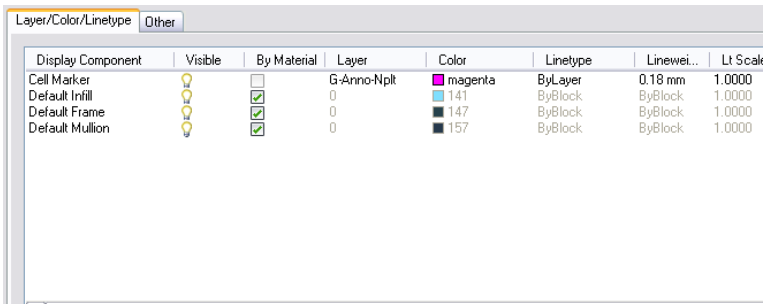
4 Click the Display Properties tab.

5 Select Model as the display representation.

6 Click .

The default list of components includes only the three basic elements and cell markers.

Default Model display components for curtain walls



7 Click the Other tab, and then click Add.

8 Select Infill, Frame, or Mullion for Component Type.

9 Enter a name for Component Name, or click Select Element and select an element from the list.

10 Click OK.

11 Click the Layer/Color/Linetype tab.

The element definition that you added is displayed in the list of components.

12 Click the Other tab to continue adding element definitions, or click OK twice.

Specifying the Layer, Color, and Linetype of a Curtain Wall Style

Use this procedure to change the following display properties of the components of a curtain wall style:

- Visibility (component is on or off)
- By Material
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select the curtain wall style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear.
6 Click Style Override.
7 Click the Layer/Color/Linetype tab.
8 Select the component to change, and select a different setting for the property.
9 Click OK twice.

Specifying the Hatching for Components of a Curtain Wall Style

Use this procedure to specify the hatching of the components of a curtain wall style. Curtain wall hatching is displayed only in display representations, such as Plan, that are used in Top view (Plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select the curtain wall style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override.
6 Click the Hatching tab.
7 Select a component, and click the setting for Pattern.
8 Specify the hatching for the component:

If you want to specify …	Then …
a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
single hatching	select User-defined for Type, and clear Double Hatch.
double hatching	select User-defined for Type, and select Double Hatch.
solid fill	select Solid Fill for Type.

9 Click OK.
10 Click the setting for Scale/Spacing, and enter a value that determines how the selected pattern is repeated.
11 Click the setting for Angle, and enter the angle for the selected pattern.
12 Click the setting for Orientation, and specify how the hatching is oriented:

If you want to orient the hatching …	Then …
to the object, regardless of the object rotation	select Object.
to the World Coordinate System	select Global.

13 Click OK twice.

Adding Custom Graphics as a Display Component of a Curtain Wall

There may be instances where an infill, frame, or mullion requires a custom two-dimensional (2D) or three-dimensional (3D) graphic. For example, you might need a highly detailed 3D truss as the mullions or a decorative light fixture applied to an infill. In cases like these, you can create a custom block, add a display component with the block attached, and associate that component with an element definition. When you assign that definition to an element, the block is also displayed.

1 Draw your custom component, and save it as a block.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Curtain Wall Styles.

4 Select the curtain wall style that you want to change.

5 Click the Display Properties tab.

6 Click .

7 Click the Other tab.

8 Click Add.

9 Select Infill, Frame, or Mullion as the element type.

10 Select the specific element from the list.

11 Select Draw Custom Graphics.

12 Specify the display of the element:

If you want to …	Then …
display the block instead of the associated curtain wall element	select Replace Graphics.
superimpose the block over the curtain wall element so that both are displayed	clear Replace Graphics.

13 Click Select Block, and select the custom block that you created.

14 Click OK.

15 Specify further settings for the custom display block:

If you want to …	Then …
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.
mirror the block	determine if it should mirror in the X, Y, or Z direction.
offset the block from the grid	specify the offset in the X, Y, or Z direction.

16 Click OK three times.

Creating Cut Planes for a Curtain Wall

Use this procedure to specify the properties of one or more cut planes for a curtain wall style. Cut plane display properties apply only to display representations, such as Plan, that are used in Top view (Plan view) of a drawing.

To better visualize the elements of a curtain wall in Plan view, you can create cut planes. The main cut plane is where the shrinkwrap and hatching are applied. The plan display shows the components and objects in the wall as they are displayed at the height of each cut plane.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select the curtain wall style that you want to change.

4 Click the Display Properties tab.

5 Select Plan, and click .

NOTE The Cut Plane tab is displayed only in some display representations, such as Plan.

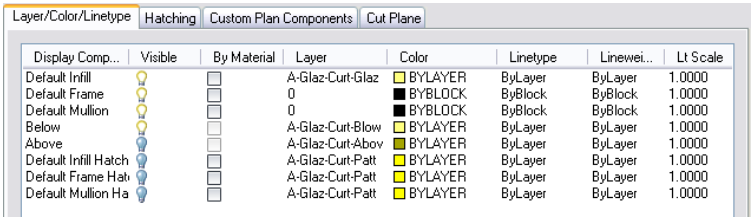
6 Click the Cut Plane tab to set the cut plane to be displayed in each display representation for the curtain wall style.

7 Enter a value for Cut Plane Height to specify the cut plane at which hatching takes effect.

8 To specifically define a cut plane, click Add, and enter the height of the new cut plane.

If you add a cut plane …	Then …
at a height that is lower than the value for Cut Plane Height	objects are displayed using the properties specified for the Below Cut Plane component on the Layer/Color/Linetype tab.
at a height that is higher than the value for Cut Plane Height	objects are displayed using the properties specified for the Above Cut Plane component on the Layer/Color/Linetype tab.

Below and Above components



You can click Remove to delete a cut plane that you added.

9 Click OK twice.

Defining a Curtain Wall Style as Bounding for Associative Spaces

Use this procedure to define a curtain wall style that can bound associative spaces.

When a curtain wall style is set as bounding, by default all curtain walls that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the curtain wall style in an individual curtain wall, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall style.
4 Click the General tab.
5 Select the checkbox for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Curtain Wall Style

Use this procedure to enter notes and attach reference files to a curtain wall style. You can also edit notes and edit or detach reference files from a curtain wall style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select the curtain wall style you want to change.
4 Click the General tab.
5 To add a description to the curtain wall style, enter it for Description.
6 Click Notes.
7 To add a note, click the Text Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Using Overrides in Curtain Walls

Curtain walls are geometrically complex objects that often have a large number of different elements, such as frames, panels, and window infills. The settings for these elements are defined in the curtain wall style and can be modified using Style Manager. However, there are cases when modifying a curtain wall directly on screen is more suitable:

- You want to add custom frame or mullion edges to a curtain wall and need direct visual feedback.
- You want to create an override, like a merged infill or an irregular panel shape in only one specific place in the curtain wall.
- You want to experiment with different visuals without having to change the curtain wall style for each idea immediately.

When you have finished your onscreen edits, you have three choices:

- apply the overrides to the curtain wall you have edited.
- save the overrides to the current curtain wall style.
- create a new style for the overrides.

Overrides you can set include assigning a different definition to a selected cell, frame, or mullion, and assigning a profile to a frame or mullion edge. Note that the definition or profile must already exist in the current drawing before you can use it as an override. For example, if you want to override a cell that has a simple panel infill with an octagonal window infill, you must first define the window (octagonal) style as a valid infill in the curtain wall style. Similarly, if you want to override a frame or mullion edge assignment in the curtain wall, the curtain wall style must contain the edge profile as a frame or mullion definition.

NOTE You cannot modify a definition using the Override method. For information about modifying definitions, see Modifying Element Definitions for Curtain Wall Styles on page 998.

Overrides do not affect the Design Rules for the curtain wall style. However, you can transfer overrides to a curtain wall style if you want all curtain walls of that style to have the same overrides.

You can view a list of overrides that are currently assigned to a curtain wall from the Overrides tab of the Curtain Wall Properties dialog box. For more information, see Removing Curtain Wall Overrides on page 997.

NOTE Overrides are also listed on the Overrides tab in the Curtain Wall Style Properties dialog box.

Overriding Curtain Wall Infills

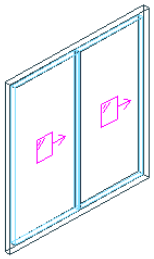
The cell infills of a curtain wall are set in the curtain wall style. You can, however, create overrides for these infills in cells. For example, you might want a row of glider windows for a first floor facade. In one specific position, however, you want a frosted glass window. In this case, you would set the row of glider windows in the curtain wall style, and then override the infill style in one specific cell with a frosted glass window.

Curtain wall infills can consist of simple panels, objects like windows or doors, or nested grids. You can change one infill for another, merge cells, or remove the frame from an infill altogether. This would be useful if you add a door into a grid cell and want to remove the bottom frame from that cell.

Turning on Cell Markers

Use this procedure to turn on the cell markers for each grid cell in a curtain wall. The cell markers must be on in order to select individual cells and make changes to them.

Viewing Cell Markers



1 Select the curtain wall for which you want to create an infill override.

2 Click Curtain Wall tab ➤ Modify panel ➤ Show Infill Markers .

Merging Curtain Wall Cells

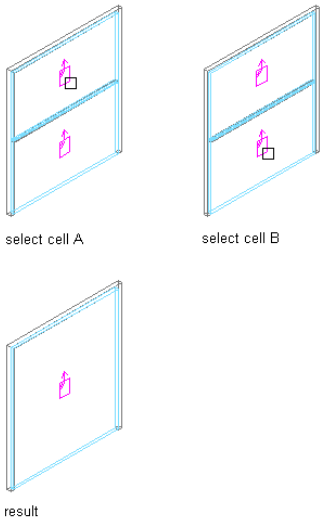
Use this procedure to merge two curtain wall cells.

NOTE To merge curtain wall cells, the cell markers need to be visible. For information on turning on cell markers, see Turning on Cell Markers on page 981.

You can only merge cells which are adjacent to each other.

In most cases you merge cells with the same infill type. The merged cell is then the same type as the original cells. For example, if you merge two solid panel infills, the resulting merged cell also has a solid panel infill. In some cases however, you might want to merge two cells that have different infill types. In that case, the infill type of the first selected cell is used for the merged cell. For example, if you want to merge a cell with a simple panel infill and a cell with a window infill, and you select the cell with the simple panel first during the merge command, the merged cell contains a simple panel infill, not a window. If you select the two cells in the opposite order, the merged cell contains a window and no simple panel infill.

Merging two cells



1 Select the curtain wall on which you want to merge two cells.

2 Click Curtain Wall tab ➤ Modify panel ➤ Infill drop-down ➤ Merge.

3 Select the first cell to be merged.

4 Select the second cell to be merged.

The cells are merged into one.

5 Specify where you want to save the curtain wall override:

If you want to save the override …	Then …
only on this specific curtain wall	no further steps are necessary. The override is saved to the curtain wall. For information about how to remove an override from a curtain wall, see Removing Curtain Wall Overrides on page 997.

If you want to save the override …	Then …
to a curtain wall style	select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you have chosen to save the override to a curtain wall style, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style.Then, decide to which curtain wall style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall style	select Transfer Merge Operations to Style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style checkbox is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.
to a new curtain wall style	select Transfer Merge Operations to Style, and click New. Then, enter a name for the new curtain wall style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style checkbox is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides still remain on the curtain wall, where they can be removed as described in Removing Curtain Wall Overrides on page 997, but they are not saved back to a curtain wall style.

In-Place Editing of Curtain Wall Cells

Use this procedure to edit curtain wall cells using in-place editing with the Edit Grid grip. With in-place editing, you can edit individual cells, bays, columns, or nested grids of the curtain wall directly and interactively in the drawing area, and later save the changes to the curtain wall or curtain wall style.

1 Select a curtain wall on which you want to edit cells with in-place editing.

2 Specify the mode in which to edit the curtain wall:

If you want to edit …	Then …
this instance of the curtain wall	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall style	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. If this option is not available, the design rules are already style-based for the curtain wall.

3 Click the Edit Grid grip.

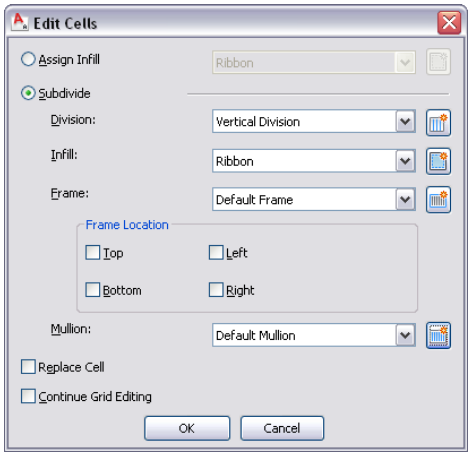
4 Enter **c** (Cell) and press ENTER.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the individual cells, bay, column, or nested grid to modify the cell assignment by hovering over a cell or pressing TAB, and press *ENTER*.

Press CTRL to select multiple cells, bays, columns or nested grids.

The Edit Cells worksheet displays.



6 Edit the cell for the selected grid:

If you want to…	Then…
assign an infill to selected cells	select Assign Infill and select an infill definition. Clear Replace Cell and click OK.
replace the selected cells with a new infill	select Assign Infill and select an infill definition. Select Replace Cell and click OK.
create and assign a new infill to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Curtain Wall Cells on page 960.

If you want to…	Then…
divide the selected cells with divisions, infills or frames	select Subdivision.
select a division for the subdivided cells	select a division definition.
create and assign a new division to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning a Division to a Curtain Wall Grid on page 959.
select an infill for the subdivided cells	select an infill definition.
create and assign a new infill to the subdivided cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Curtain Wall Cells on page 960.
select a frame definition for the grid created after the cell is subdivided	select the frame definition and click OK.
specify the location of frames on the grid created after the cell is subdivided	select Top, Bottom, Left, Right for Frame Location and click OK.
create and assign a new frame definition for the new grid created after the cell is subdivided	click and specify values on the Design Rules worksheet. For more information, see Adding a New Frame Assignment to a Curtain Wall on page 969.
select a mullion definition for the grid created after the cell is subdivided	select the mullion definition.
create and assign a new mullion definition to the selected grid	click and specify values on the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Curtain Wall Style on page 971.
replace the existing cell infill with the options selected on this worksheet	select Replace Cell.
continue in-place editing the grid after the cell is subdivided	select Continue Grid Editing.

7 Click OK.

8 Press ENTER.

Creating a Curtain Wall Infill Override

Use this procedure to override the infill of a curtain wall cell.

For example, you might have a row of simple concrete panels in your curtain wall, but want in one location a round window instead of the concrete panel. In that case, it might be simpler to use an infill override, instead of creating complex curtain wall unit definitions.

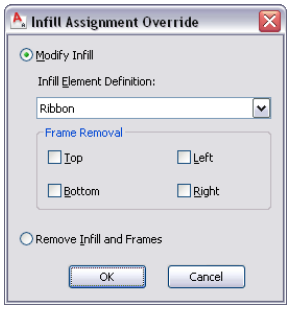
NOTE To override an infill assignment, the cell markers must be visible. For information on turning on cell markers, see Turning on Cell Markers on page 981.

To exchange an infill definition, the new infill definition must already be defined in the curtain wall style. For information on creating infill definitions, see Defining Infills for Curtain Wall Cells on page 946.

1 Select the curtain wall on which you want to override an infill.

2 Click Curtain Wall tab ➤ Modify panel ➤ Infill drop-down ➤ Override Assignment.

3 Select the marker of the cell where you want to create an override, and press *ENTER*.



4 Create the override.

If you want to …	Then …
exchange the existing infill for another	select a new infill definition from the list.
remove one or more of the frames around the infill	select the frame component to be removed. You could, for example, override a cell to contain a door infill instead of a panel infill; in this case, you would want to remove the bottom frame of the cell.
remove the complete infill and its frame	select Remove Infill and Frames. **NOTE** This works only for infills that border the exterior of the curtain wall.

5 Click OK.

6 Specify where you want to save the curtain wall override.

If you want to save the override …	Then …
only on this specific curtain wall	no further steps are necessary. The override is saved to the curtain wall. For information about how to remove an override from a curtain wall, see Removing Curtain Wall Overrides on page 997.
to a curtain wall style	select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a curtain wall style, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style.Then, decide to which curtain wall style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall style	select Transfer Cell Overrides to Style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.
to a new curtain wall style	select Transfer Cell Overrides to Style, and click New. Then, enter a name for the new curtain wall style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides remain on the curtain wall, where they can be removed as described in Removing Curtain Wall Overrides on page 997, but they are not saved back to a curtain wall style.

Overriding Curtain Wall Frames and Mullions

You can change a selected frame edge or mullion edge by using an edge assignment override.

NOTE To exchange a frame edge or mullion edge, the new edge definition must already be defined in the curtain wall style.

Removing the edge does not affect the width of the cell. To remove the edge and have the adjacent cell resize, create an edge definition with a width and depth of zero. For more information, see Defining a Curtain Wall Frame by Width and Depth on page 951or Defining Curtain Wall Mullions by Width and Depth on page 955.

You can also create a new edge profile by drawing a polyline or using an existing profile in the drawing. This edge profile can be interactively edited onscreen by in-place editing.

Creating a Frame or Mullion Override

Use this procedure to override an individual frame or mullion.

To exchange a frame or mullion, the new definition must already be defined in the curtain wall style. For information on creating frames and mullions, see Defining Curtain Wall Frames on page 950 and Defining Curtain Wall Mullions on page 954.

1 Select the curtain wall on which you want to override an edge.

2 Click Curtain Wall tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Override Assignment.

3 Select the frame or mullion edge you want to override.

If you selected a frame edge, the Frame Assignment Override dialog box is displayed.

If you selected a mullion, the Mullion Assignment Override dialog box is displayed.

4 Create the override.

If you want to …	Then …
exchange the existing edge for another	select a new edge definition from the list.
remove the frame or mullion edge	select Remove Edge.

5 Click OK.

6 Specify where you want to save the curtain wall override.

If you want to save the override …	Then …
only on this specific curtain wall	no further steps are necessary. The override is saved to the curtain wall. For information about how to remove an override from a curtain wall, see Removing Curtain Wall Overrides on page 997.
to a curtain wall style	select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a curtain wall style, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style. Then, decide to which curtain wall style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall style	select Transfer Edge Overrides to Style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.

If you want to save the override …	Then …
to a new curtain wall style	select Transfer Edge Overrides to Style, and click New. Then, enter a name for the new curtain wall style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.

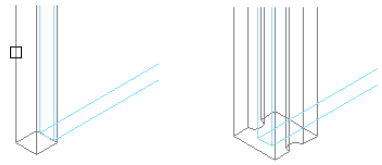
NOTE If you do not want to save the override back to a style at all, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides remain on the curtain wall, where they can be removed as described in Removing Curtain Wall Overrides on page 997, but they are not saved back to a curtain wall style.

Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing

Use this procedure to assign a profile to a vertical edge of a frame or mullion. The curtain wall edge profile can be any profile or any closed polyline that you specify. You can use a profile edge to create a unique corner in situations where a simple miter is not sufficient.

NOTE Adjacent infills are not trimmed or expanded to accommodate the new edge. To adjust the infill, change the width of the frame edge. For more information, see Defining a Curtain Wall Frame by Width and Depth on page 951.

Overriding edge profile



1 Draw a closed polyline in the location where you want it to display in the curtain wall.

NOTE For best results, it is recommended to draw the polyline in Plan view.

2 Select the curtain wall for which you want to create a frame or mullion edge profile override.

3 Specify the mode in which to edit the curtain wall:

If you want to edit …	Then …
this instance of the curtain wall	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

If you want to edit …	Then …
the curtain wall style	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. If this option is not available, the design rules are already style-based for the curtain wall.

4 Click Curtain Wall tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Add Profile.

5 Select a vertical frame or mullion edge.

6 Select a profile for the override.

If you want to create the edge profile …	Then …
from the polyline drawn in step 1	select Start from scratch for Profile Definition, and enter a name for New Profile Name.
from an existing profile in the drawing	select the existing profile for Profile Definition, and click Continue Editing.

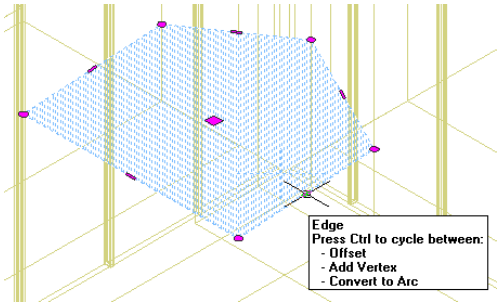
7 Select whether to apply the profile to the shared edge element definition or as an edge profile override.

8 Click OK.

You are now in-place edit mode, and can edit the profile.

9 Click Edit In Place tab ➤ Profile panel ➤ Zoom To .

10 Select the profile and edit it using Edge and Vertex grips, by using the commands on the contextual Edit in Place tab, or by right-clicking the context menu.



The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary.

Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well.

Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.

11 Save or discard changes to the curtain wall grid:

If you want to exit the in-place editing session …	Then …
without saving your changes	click Edit in Place tab ➤ Edits panel ➤ Cancel .
after saving your changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

In-Place Editing of Edge Profiles for Curtain Walls

Use this procedure to edit profile edges using in-place editing. With in-place editing, you can edit the curtain wall directly and interactively in the drawing area and later save the changes to the profile definition.

1 Select a curtain wall that has the edge profile you want to edit with in-place editing.

2 Click Curtain Wall tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Edit Profile.

This command is only available if you have profile-based edges in the curtain wall.

NOTE If the profile is not drawn to size, it must be converted in order for you to begin the in-place editing session. Click Yes if prompted to convert the profile to its actual size.

3 Select the edge you want to edit.

NOTE You have entered the in-place editing session now. You can see this from the magenta-colored grips and light blue hatch of the temporary in-place editing profile, as well as the faded color of all other objects in the drawing. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

4 Edit the profile:

If you want to …	Then …
use grips to edit the profile	move the grips as needed. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you

If you want to …	Then …
	can stretch the midpoint of the edge after it has been converted to an arc.
add a vertex to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Alternatively, you can click Edit In Place tab ➤ Profile panel ➤ Add Vertex . Move the edge to the desired location and click, or enter a value and press *ENTER*.
remove a vertex from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Alternatively, you can click Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Move the cursor off the selected vertex, and click.
add a ring to the profile	select the profile, right-click and click Add Ring. Alternatively, you can click Edit In Place tab ➤ Profile panel ➤ Add Ring . Then, select a closed polyline, spline, ellipse, or circle for an additional ring. Specify if you want to erase the source linework, and press *Enter*.
remove a ring from a profile	select the profile, right-click and click Remove Ring. Alternatively you can click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Then select the ring you want to remove. **NOTE** You cannot remove the last ring from a profile.
replace a ring on a profile	select the profile, right-click and click Replace Ring. Alternatively you can click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Then, select a closed polyline, spline, ellipse, or circle for the replaced ring. Specify if you want to erase the source linework, and press *Enter*.

5 Save the changes to the profile.:

If you want to …	Then …
change the existing profile definition to reflect the new shape	click Edit In Place tab ➤ Edits panel ➤ Finish .
create a new profile definition with the shape you have created	click Edit In Place tab ➤ Edits panel ➤ Save As . Then, enter a name for the new profile and click OK. The in-place edit session is exited and the new profile definition is available in the Style Manager.

If you want to …	Then …
discard all changes on the profile and revert back to the previous shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .

In-Place Editing of Curtain Wall Frames and Mullions

Use this procedure to edit frames and mullions using in-place editing with the Edit Grid grip. With in-place editing, you can edit bays, columns or nested grids of the curtain wall directly and interactively in the drawing area, and later save the changes to the curtain wall or curtain wall style.

1 Select a curtain wall on which you want to edit frames or mullions with in-place editing.

2 Specify the mode in which to edit the curtain wall:

If you want to edit …	Then …
this instance of the curtain wall	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall style	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules.

3 Click the Edit Grid grip.

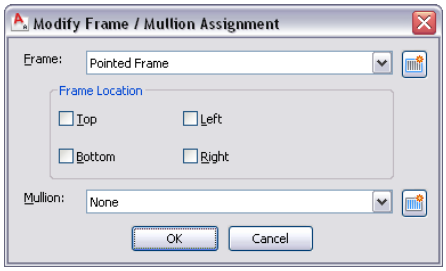
4 Enter **f** (Frame and mullion assignment) and press ENTER.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the bay, column or nested grid to modify the frame and mullion assignment and press *ENTER*.

Press CTRL to select multiple bays, columns or nested grids.

The Modify Frame/Mullion Assignment worksheet displays.



6 Select a frame definition for the selected grid:

If you want to…	Then…
modify the frame of the selected grid	select a frame definition and click OK.
specify the location of the frame on the selected grid	select Top, Bottom, Left, Right for Frame Location and click OK.

If you want to…	Then…
create and assign a new frame definition to the selected grid	click . For more information, see Adding a New Frame Assignment to a Curtain Wall on page 969.

7 Select the mullion definition for the selected grid:

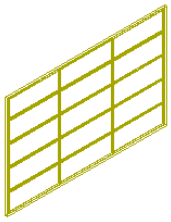
If you want to…	Then…
modify the mullion of the selected grid	select the mullion definition and click OK.
create and assign a new mullion definition to the selected grid	click and complete the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Curtain Wall Style on page 971.

8 Press ENTER.

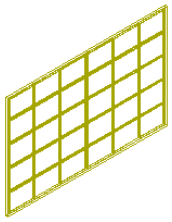
Overriding Curtain Wall Divisions

The grid of a curtain wall is made up of one or more divisions that define how the curtain wall is partitioned. Divisions can be horizontal or vertical, and can be nested in each other. For detailed information on curtain wall divisions, see Defining Divisions for Curtain Wall Grids on page 937.

You can override a division in a curtain wall, thereby changing the grid of the curtain wall.



five cell horizontal grid and three cell vertical grid before override



five cell horizontal grid and six cell vertical grid after override

Creating a Division Override

Use this procedure to create a division override on a curtain wall.

NOTE To exchange a curtain wall division, the new division definition must already be defined in the curtain wall style. For information on curtain wall divisions, see Defining Divisions for Curtain Wall Grids on page 937.

1 Select the curtain wall for which you want to create a division override.

2 Click Curtain Wall tab ➤ Modify panel ➤ Division drop-down ➤ Override Assignment.

3 Select an edge of the curtain wall to determine if a horizontal or vertical division is overridden.

For example, if you want to override the primary horizontal division, you could select the bottom horizontal frame of the curtain wall.

TIP The Division Assignment Override dialog box shows you which grid type and which grid division you have selected, e.g. Selected Nested Grid: Secondary Grid, Division Element Definition: Vertical 3 Cells. If you have accidentally selected the wrong division, click Cancel and reselect the correct grid.

4 Select the appropriate division override, and click OK.

5 Specify where you want to save the curtain wall override:

If you want to save the override …	Then …
only on this specific curtain wall	no further steps are necessary. The override is saved to the curtain wall. For information about how to remove an override from a curtain wall, see Removing Curtain Wall Overrides on page 997.
to a curtain wall style	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you have chosen to save the override to a curtain wall style, select the curtain wall again, and click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style. Then, decide to which curtain wall style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall style	select Transfer Division Overrides to Style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.
to a new curtain wall style	select Transfer Division Overrides to Style, and click New. Then, enter a name for the new curtain wall style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes, too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides remain on the curtain wall, where they can be removed as described in Removing Curtain Wall Overrides on page 997, but they are not saved back to a curtain wall style.

In-Place Editing of Curtain Wall Divisions

Use this procedure to edit divisions using in-place editing with the Edit Grid grip. With in-place editing, you can edit the curtain wall directly and interactively in the drawing area, and later save the changes to the curtain wall or curtain wall style. For more information, see Division of Curtain Wall Grids on page 937.

1 Select a curtain wall on which you want to edit divisions with in-place editing.

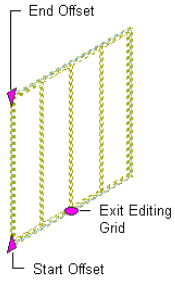
2 Specify the mode in which to edit the curtain wall:

If you want to edit …	Then …
this instance of the curtain wall	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall style	click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules.

3 Click the Edit Grid grip.

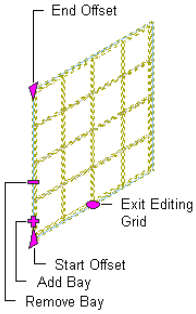
4 Enter **d** (Division in place) and press ENTER.

Viewing edit in-place grips for a primary division



NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

Viewing edit in-place grips for adding and removing bays



5 Edit the division:

If you want to …	Then …
add a bay to the grid	click the Add Bay grip.
remove a bay from the grid	click the Remove Bay grip.

If you want to …	Then …
change the start offset of the grid	select the Start Offset grip and move it to the appropriate position.
change the end offset of the grid	select the End Offset grip and move it to the appropriate position.
change the spacing of bays	click the Auto Grid Bay Spacing grip and move it to the appropriate position.
manually edit the grid	click Edit In Place tab ➤ Division panel ➤ Convert To Manual . You can manually add and remove gridlines, change the offsets, and change the position of individual gridlines.
use a worksheet to edit the cell dimensions	click the Fixed Cell Dimension Rules grip, and edit the values in the worksheet.

6 Save or discard changes to the curtain wall grid:

If you want to …	Then …
save the changes	click Edit in Place tab ➤ Edits panel ➤ Finish .
discard all changes	click Edit in Place tab ➤ Edits panel ➤ Cancel .

7 In the Save Changes dialog box, specify to which division to save the changes:

If you want to …	Then …
save the changes to the style in the current curtain wall division	verify the current division is selected for Save Changes to Existing Division, and click Save. The changes are made in the style and affect all curtain walls of that style in the drawing.
create an override to the style by saving the changes in a new curtain wall division	click New, enter a name for the new division override, and click OK. Click Save. The changes are saved as an override to the style, and affect only the curtain walls to which the override is applied.

Removing Curtain Wall Overrides

Use this procedure to remove curtain wall overrides either from the curtain wall or the curtain wall style.

1 Select the curtain wall.

If you want to remove an override …	Then …
from a curtain wall	expand Advanced in the Properties palette, and click Overrides.
from the curtain wall style	click Curtain Wall tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style.Then, click the Overrides tab.

2 Select an override from the list and click Remove.

3 Click OK.

Modifying Element Definitions for Curtain Wall Styles

Use this procedure to modify existing elements in a curtain wall style. A curtain wall consists of division, infill, frame and mullion elements, all of which are defined in the design rules of the curtain wall style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

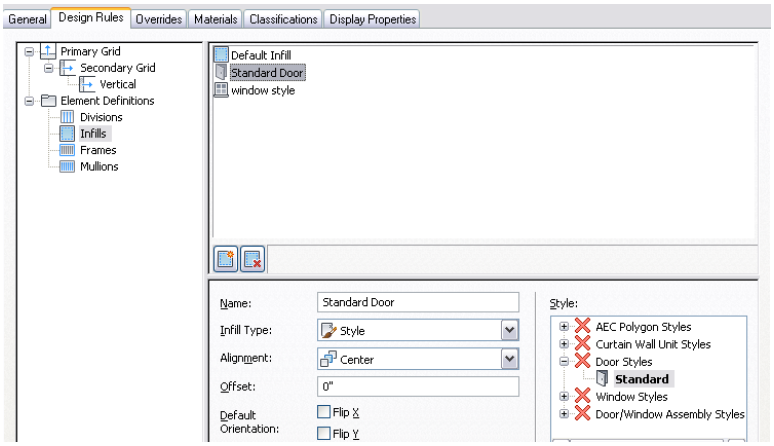
3 Select the curtain wall style that you want to change.

4 Click the Design Rules tab.

5 In the left pane, click Element Definitions.

The list of element types is displayed.

Element definitions list



6 Decide the type of elements you want to edit:

If you want to modify …	Then …
a division definition	click Divisions under Element Definitions. In the right pane, select the division definition you want to modify and edit it as described in Defining Divisions for Curtain Wall Grids on page 937.
an infill definition	click Infills under Element Definitions. In the right pane, select the infill definition you want to modify and edit it as described in Defining Infills for Curtain Wall Cells on page 946.
a frame definition	click Frames under Element Definitions. In the right pane, select the frame definition you want to modify and edit it as described in Defining Curtain Wall Frames on page 950.
a mullion definition	click Mullions under Element Definitions. In the right pane, select the mullion definition you want to modify and edit it as described in Defining Curtain Wall Mullions on page 954.

7 Click OK twice.

Editing Curtain Walls

Most relevant settings for a curtain wall are defined in the curtain wall style. These include divisions, infills, frames, and mullions. For information on modifying a curtain wall style, see Curtain Wall Styles on page 933.

You can make other changes directly to individual curtain walls. These changes affect only the curtain wall you select:

- Dimensions of a curtain wall
- Roof and floor line settings
- Interference conditions
- Cleanup settings

Methods of Editing Curtain Walls

AutoCAD Architecture offers several methods for editing curtain walls:

- You can directly edit curtain walls using grips for dimensions, base height, location, and other physical characteristics.
- You can directly edit curtain walls using the Edit Grid grip for grid divisions, cells, frames, and mullions. For more information, see In-Place Editing of Curtain Wall Divisions on page 996, In-Place Editing of Edge Profiles for Curtain Walls on page 991 and Overriding Curtain Wall Infills on page 981.
- You can change curtain wall settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- You can select editing commands from the context menu for a selected curtain wall.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.

Using Grips to Edit Curtain Walls

There are many different curtain wall grips. The grips that appear in your drawing when you select a curtain wall are dependent upon the design rules of the curtain wall. For more information, see Curtain Wall Styles on page 933.

Editing Curtain Wall Dimensions

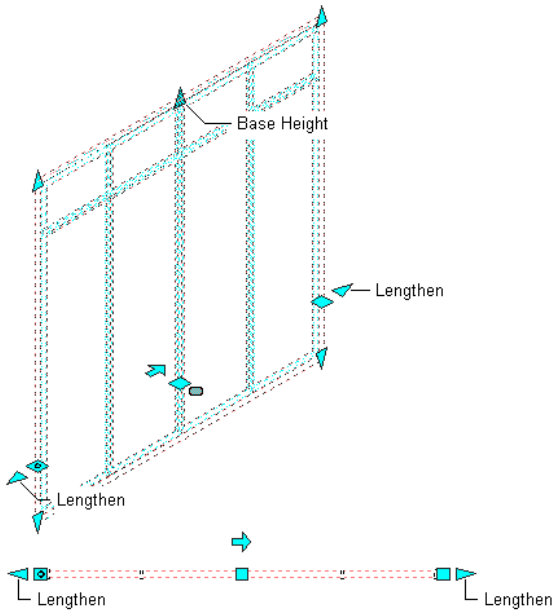
Use this procedure to change the dimensions of a curtain wall.

1 Select the curtain wall.

2 Select the grip for the dimension you want to change.

You can modify the dimensions of the length, roof line, floor line, and base height for a curtain wall.

Viewing Curtain Wall Lengthen and Base Height grips



3 Enter a value for the dimension and press *ENTER*, or drag the grip until the dimension value you want is displayed.

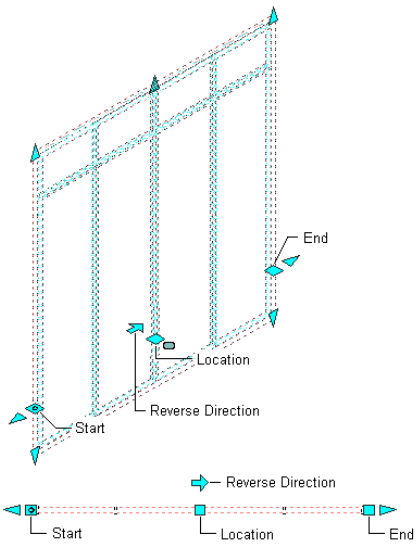
Changing the Location or Position of a Curtain Wall

Use this procedure to change the location or the position of a curtain wall with grips.

1 Select the curtain wall.

2 Select the appropriate grip to change the location of the curtain wall, its start point, or its endpoint.

Viewing Curtain Wall Start, End, Location, and Reverse Direction Grips



In Model view, the Location grip has three possible edit modes: Edit Along Object's XY Plane, Edit Along Object's YZ Plane, and Edit Along Object's XZ Plane. Press *CTRL* to cycle between

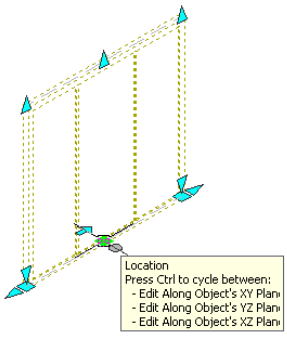
modes until you are in the desired mode. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

3 Move the curtain wall to the desired location and click once, or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the curtain wall along a specific direction. If you enter a value for either of the dimension directions in the current edit mode and then press *TAB*, the movement of the curtain wall is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the curtain wall is constrained to the *Y* dimension direction.

Viewing Curtain Wall Location Grip



4 Right-click, and click Deselect All to turn off grips.

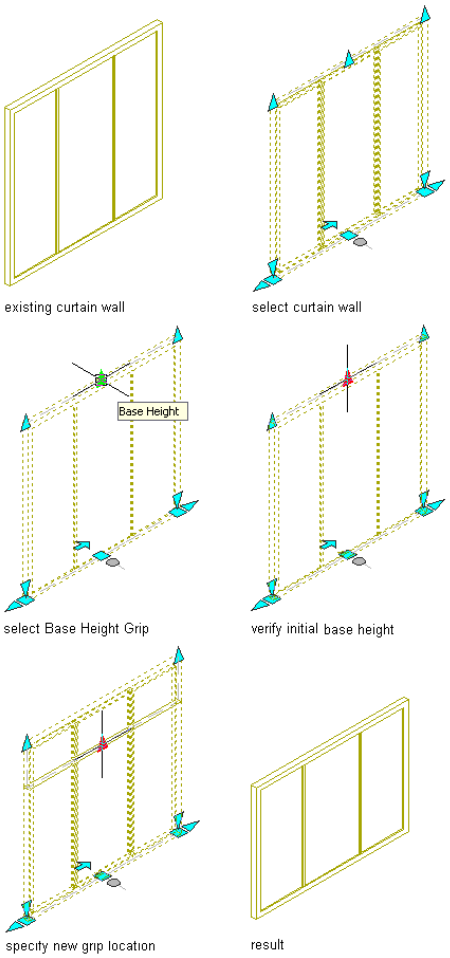
Changing the Base Height of a Curtain Wall

Use this procedure to change the base height of a curtain wall with grips.

1 Select the curtain wall.

2 Select the Base Height grip, move the grip until the height value you want is displayed, and click once.

NOTE As you move the grip, the original base height value is displayed in addition to the new base height and the difference between the two values.



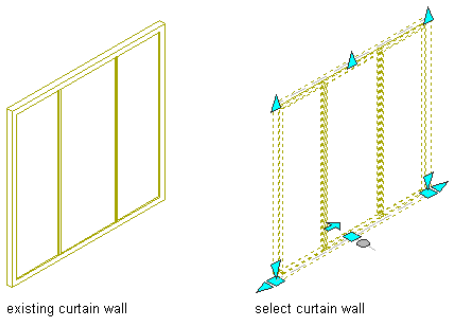
After selecting the grip, you can also enter a new value for the base height of the curtain wall.

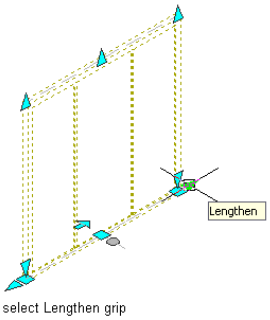
Changing the Length of a Curtain Wall

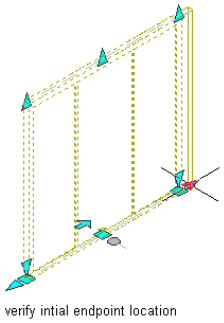
Use this procedure to change the length of a curtain wall with grips.

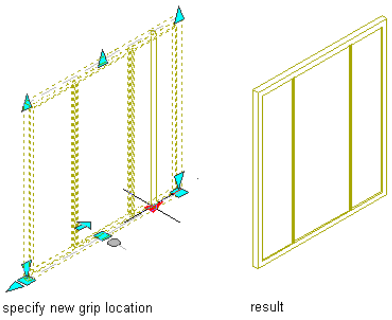
1. Select the curtain wall.
2. Select the Lengthen grip, move the grip until the length value you want is displayed, and click once.

NOTE As you move the grip, the original length value is displayed in addition to the new length and the difference between the two values.









After selecting the grip, you can also enter a new value for the length of the curtain wall.

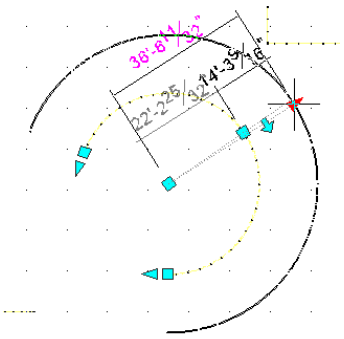
Changing the Radius of a Curtain Wall

Use this procedure to change the radius of a curved curtain wall with grips.

1 Select the curtain wall.

2 Select the Curve Radius grip, move the grip until the radius value you want is displayed, and click once.

NOTE As you move the grip, the original radius value is displayed in addition to the new radius and the difference between the two values.



After selecting the grip, you can also enter a new value for the radius of the curtain wall.

Reversing the Direction of a Curtain Wall

Use this procedure to change the direction in which a curtain wall is drawn by reversing the start point and the end point of the curtain wall with grips.

Curtain walls are drawn from the first specified point to the last point. Some commands and properties are affected by that order.

To determine the direction in which a curtain wall was drawn, select the curtain wall. The Reverse Direction grip is shaped like an arrow and points in the direction in which the curtain wall has been drawn.

1 Select the curtain wall for which you want to reverse the direction.

2 Click on the Reverse Direction grip.

The direction of the wall is reversed, which switches the Start and End grips.

Selecting a Different Curtain Wall Style

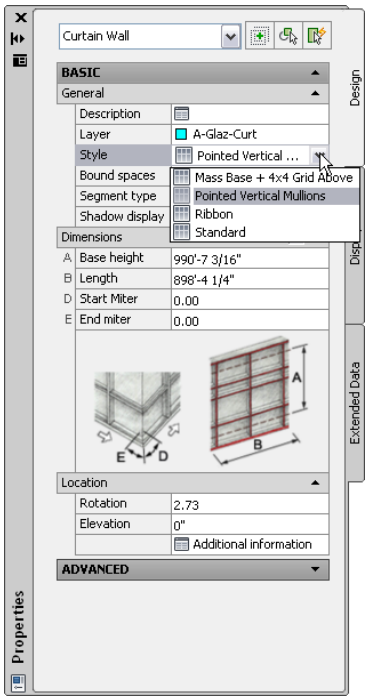
Use this procedure to select a different style for the curtain wall on the Properties palette.

1 Double-click the curtain wall for which you want to change the style.

You can select multiple curtain walls and change the style for all at the same time.

2 On the Properties palette, scroll to the General subcategory.

3 Select a different style.



Applying the Properties of an Existing Curtain Wall

Use this procedure to apply the properties of a curtain wall tool to one or more existing curtain walls. The properties include the curtain wall style and any other settings specified in the tool you select.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a curtain wall tool, and click Apply Tool Properties to ➤ Curtain Wall.

3 Select the curtain wall(s), and press *ENTER*.

The properties of the selected curtain wall(s) match the properties of the curtain wall tool.

Changing the Dimensions of a Curtain Wall

Use this procedure to change the dimensions of a curtain wall on the Properties palette.

1 Double-click a curtain wall.

2 On the Properties palette, expand Dimensions.

3 Change the dimension:

Dimension	Description
Base Height	Height of the curtain wall from the baseline
Length	Length of a straight curtain wall from the start grip on the baseline to the end grip
Radius (curved curtain walls only)	Radius of a curved curtain wall from the start grip on the baseline to the end grip

Dimension	Description
Start Miter	Angle of all infills and horizontal edges (frame or mullion) at the start of the curtain wall: for more information about miter angles, see Mitering Curtain Walls on page 1007.
End Miter	Angle of all infills and horizontal edges (frame or mullion) at the end of the curtain wall

Changing the Curtain Wall Location Properties

Use this procedure to relocate a curtain wall by changing the coordinate values of its insertion point. The curtain wall also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the curtain wall are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the curtain wall by aligning its normal with another axis. You can also rotate the curtain wall on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1. Double-click the curtain wall you want to change.
2. Expand Location.
3. Click Additional information.
4. Specify the location of the curtain wall:

If you want to …	Then …
relocate the curtain wall	enter new coordinate values under Insertion Point.
locate the curtain wall on the *XY* plane	make the normal of the wall parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the curtain wall on the *YZ* plane	make the normal of the curtain wall parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the curtain wall on the *XZ* plane	make the normal of the curtain wall parallel to the *Y* axis: under Normal, enter **1** for Y, and enter**0** for X and Z.
change the rotation of the curtain wall	enter a new value for Rotation Angle.

5. Click OK.

Adding an Interference Condition to a Curtain Wall

Use this procedure to add an interference condition to a curtain wall. Interference conditions use the geometry of 3D objects to create custom openings or cutouts in curtain walls. You can specify how the interference condition is applied to the curtain wall: added to the curtain wall, subtracted from the curtain wall, or ignored.

You can specify whether the interference condition applies to an infill, frame, or mullions of a curtain wall.

1 Place the object in the location where you want to specify the interference condition.

2 Select the curtain wall to which you want to add an interference condition.

3 Click Curtain Wall tab ➤ Modify panel ➤ Interference drop-down ➤ Add .

4 Select the object intersecting the curtain wall, and press *ENTER*.

5 Specify to which curtain wall component the interference should be added:

If you want to add the interference condition …	Then …
to the infill	enter **y** (Yes) when prompted for the infill component.
to the frame	enter **y** (Yes) when prompted for the frame component.
to the mullion	enter **y** (Yes) when prompted for the mullion component.

6 Press *ENTER*.

Removing an Interference Condition from a Curtain Wall

Use this procedure to remove an object, such as a mass element, from a curtain wall that the object was added to as an interference condition.

1 Select the curtain wall from which you want to remove an interference object.

2 Click Curtain Wall tab ➤ Modify panel ➤ Interference drop-down ➤ Remove .

3 Select the object intersecting the curtain wall, and press *ENTER*.

Mitering Curtain Walls

Use this procedure to miter the corners where curtain walls meet. The corner where adjacent curtain walls meet is not mitered by default. However, you can determine the necessary angles automatically.

The miter angle applies to all infills and horizontal edges (frame or mullion) that are adjacent to the corner. Vertical edges are not affected.

TIP If you want to create a custom corner condition between two curtain walls, you can replace the edge of one curtain wall with an AEC profile and remove the edge of the other curtain wall by using the frame override Remove Edge option. For more information, see Overriding Curtain Wall Frames and Mullions on page 987 and Defining Curtain Wall Frames on page 950.

1 Select one of the curtain walls.

2 Click Curtain Wall tab ➤ Modify panel ➤ Set Miter Angles .

3 Select the other curtain wall.

If you change the angle of either curtain wall, use Set Miter Angles again to recalculate the angles.

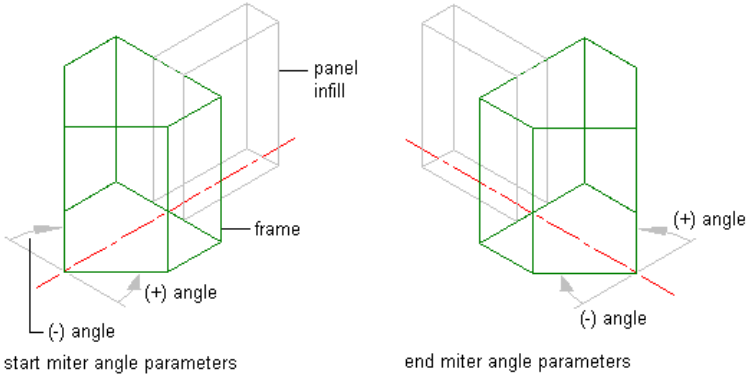
Specifying a Miter Angle for a Curtain Wall Adjacent to Another Object

Use this procedure to manually create a mitered corner between a curtain wall and another object, such as a standard wall or a mass element. For example, if your curtain wall connects with a standard wall that is at a 60-degree angle from the curtain wall, you would set the miter angle to 30.

The miter angle applies to all infills and horizontal edges that are adjacent to the corner. Vertical edges are not affected.

TIP To quickly identify the start and end of a curtain wall, select the curtain wall. The Reverse Direction grip points toward the end of the curtain wall.

Frame miter angles for a curtain wall



1 Double-click the curtain wall.

2 Expand Dimensions.

3 Miter the curtain wall on the start or the end point:

If you want to miter the curtain wall …	Then …
at its start point	enter an angle for Start Miter, and press *ENTER*.
at its end point	enter an angle for End Miter, and press *ENTER*.

Specifying the Cut Plane Display of a Curtain Wall

Use this procedure to specify the properties of one or more cut planes for an individual curtain wall. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the curtain wall.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all curtain walls in the drawing, select Drawing default setting. To apply changes to all curtain walls of this style, select Curtain Wall Style:<style name>. For more information on styles, see Curtain Wall Styles on page 933.

5 If necessary, expand Object Display Properties ➤ Cut Plane.

6 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

7 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object.

8 For Use cut plane of containing object when anchored, specify whether you want the containing object's cut plane to be used when the curtain wall is anchored to that object.

9 To define additional cut planes for the curtain wall, click Manual cut planes.

10 On the Manual Above and Below Cut Plane Heights worksheet, click Add, and under Cut Plane, enter the height of the new cut plane.

If you add a cut plane ...	Then ...
at a height that is lower than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Below Cut Plane component of the object.
at a height that is higher than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Above Cut Plane component of the object.

You can click Remove to delete a cut plane that you added.

You can also access and modify these same cut plane settings through the curtain wall's context menu, as follows

1 Select the curtain wall you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.

5 Click OK twice.

Specifying the Display of Other Characteristics of a Curtain Wall

Use this procedure to specify other display properties for a curtain wall, including cell marker size, the display of miters at frame corners, and the display of custom components. If you are going to use custom graphics for a component, draw the component and save it as a block before you start this procedure.

1 Double-click the curtain wall.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all curtain walls in the drawing, select Drawing default setting. To apply changes to all curtain walls of this style, select Curtain Wall Style:<style name>. For more information on styles, see Curtain Wall Styles on page 933.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 If you want to change the size of the markers used for cells in the curtain wall grid, click Cell marker size, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)

7 Optionally, for Show mitres at frame corners, select Yes/No.

8 If you want to add or edit a custom component, for Custom model components (or for Custom plan components, if in a plan view), click .

9 On the Custom Model (or Plan) Components worksheet, click Add, or select one of the components in the list, and click Edit.

10 On the Custom Display Component worksheet, for Component Type, select Infill, Frame, or Mullion.

11 Enter a name for Component Name, or click Select Component, and in the Select <component type> Definition dialog, select a definition and click OK.

12 Select Draw Custom Graphics.

13 Specify the display of the element:

If you want to …	Then …
display the block instead of the associated curtain wall element	select Replace Graphics.
superimpose the block over the curtain wall element so that both are displayed	clear Replace Graphics.

14 Click Select Block, select the custom block that you created, and click OK.

15 Specify further settings for the custom display block:

If you want to …	Then …
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.
mirror the block	determine whether it should mirror in the X, Y, or Z direction.
offset the block from the grid	specify the offset in the X, Y, or Z direction.

16 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Curtain Wall

Use this procedure to enter notes and attach reference files to a curtain wall. You can also edit notes and edit or detach reference files from a curtain wall.

1 Double-click the curtain wall.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 To add a note, click the setting for Notes, and enter the text.

5 Click OK.

6 To attach a reference file, click under Reference documents, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click the description. Enter the new text, and press *ENTER*.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

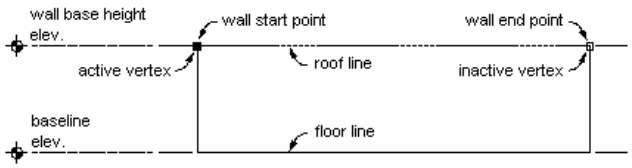
7 Click OK twice.

Changing the Roof Line and the Floor Line of a Curtain Wall

You can modify the roof and floor lines of a curtain wall to create a non-rectangular curtain wall:

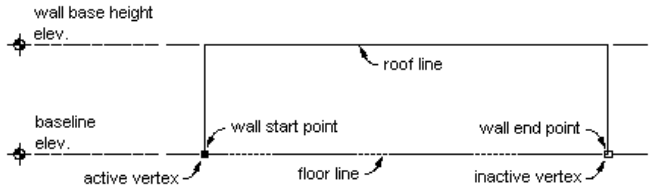
- You edit vertex locations on the roof line to create steps, gables, and other roof conditions.

  Modifying the roof line of a curtain wall



- You edit vertex locations on the floor lines to create steps and other floor conditions.

  Modifying the floor line of a curtain wall



You can also create non-rectangular roof and floor conditions by projecting to polylines.

AutoCAD Architecture offers multiple methods of editing roof lines and floor lines. You may want to begin by graphically creating a custom roof line or floor line condition. You can then fine-tune that condition by specifying precise values in the Roof/Floor Line worksheet on the Properties palette.

Offsetting or Projecting the Roof Line of a Curtain Wall

Use this procedure to change the height or the shape of the roof line of a curtain wall:

- Offset the roof line from the current height of the curtain wall.
- Project the roof line of the curtain wall to a polyline.

- Project the roof line of the curtain wall to another object, such as a roof or stairs.

You can also create a polyline that represents the current roof line of the selected curtain wall. You can then use this polyline to change the roof line of other curtain walls.

NOTE To project the roof line to a polyline, draw the polyline first in Elevation view. For best results, the polyline should be parallel to the curtain wall. The polyline does not need to be in the same plane as the curtain wall.

1. Select a curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Modify Roof Line .
   The current roof line is the default value in the curtain wall style.
2. Change the roof line of the wall:

If you want to …	Then …
offset the roof line from the current height of the curtain wall	enter **o** (Offset), select the curtain walls to change, and enter an offset distance. Enter a negative value to project the roof line below the current curtain wall height.
project the roof line to a polyline	enter **p** (Project), select the curtain walls to change, and select the polyline.
generate a polyline of the current roof line	enter **g** (Generate), and select the curtain walls for the polyline to be created from.
project the roof line to another object, such as a roof or stairs	enter **a** (Auto-project), select the curtain walls to change, and select the object to project to. When projecting to stairs, make sure that the bottom riser or the stringer does not create a zero-height segment of curtain wall.
remove any changes to the roof line	enter **r** (Reset), and select the curtain walls to change.

3. Press *ENTER*.
   The new roof line value is used only on the selected curtain walls. The curtain wall style is unchanged.

Offsetting or Projecting the Floor Line of a Curtain Wall

Use this procedure to change the height or the shape of the floor line of a curtain wall:

- Offset the floor line from the current baseline of the curtain wall.
- Project the floor line of the curtain wall to a polyline.
- Project the floor line of the curtain wall to another object, such as a floor slab or stairs.

You can also create a polyline that represents the current floor line of the selected curtain walls. You can then use this polyline to change the floor line of other curtain walls.

NOTE To project the floor line to a polyline, draw the polyline first in Elevation view. For best results, the polyline should be parallel to the curtain wall. The polyline does not need to be in the same plane as the curtain wall.

1 Select a curtain wall, and click click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Modify Floor Line .
The current floor line is the default value in the curtain wall style.

2 Change the floor line of the curtain wall:

If you want to …	Then …
offset the floor line from the current baseline of the curtain wall	enter **o** (Offset), select the curtain walls to change, and enter an offset distance. Enter a negative value to offset the floor line below the current baseline.
project the floor line to a polyline	enter **p** (Project), select the curtain walls to change, and select the polyline.
generate a polyline of the current floor line	enter **g** (Generate), and select the curtain walls for the polyline to be created from.
project the floor line to another object, such as a floor slab or stairs	enter **a** (Auto-project), select the curtain walls to change, and select the object to project to.
remove any changes to the floor line	enter **r** (Reset), and select the curtain walls to change.

3 Press *ENTER*.
The new floor line value is used only in the selected curtain wall. The curtain wall style is unchanged.

Editing the Roof Line or the Floor Line of a Curtain Wall

Use this procedure to edit the geometry of the roof line or the floor line of a curtain wall:

- Add, modify, or remove gables.
- Add, modify, or remove steps.
- Project the roof line or the floor line to a polyline or to other objects, such as roofs, roof slabs, slabs, and stairs.
- Create custom roof line or floor line conditions by adding and adjusting vertices and edges.
- Reverse the roof line or the floor line of the curtain wall without reversing the curtain wall itself.
- Remove all changes to the roof line or the floor line of a curtain wall.

You can also edit the roof line and the floor line on the Roof/Floor Line worksheet on the Properties palette. For more information, see Changing Vertices in the Roof Line or Floor Line of a Curtain Wall on page 1018.

NOTE If you want to project the roof line or the floor line to a polyline, draw the polyline before you start this procedure.

1 Select the curtain wall that you want to change, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .
A temporary profile is created for you to edit the geometry of the roof line or the floor line.

2 Edit the profile:

If you want to …	Then …
add a gable to the roof line or the floor line	click Edit In Place tab ➤ Profile panel ➤ Add Gable . Then, select the roof line or the floor line.
add a step to the roof line or the floor line	click Edit In Place tab ➤ Profile panel ➤ Add Step . Then, select the roof line or the floor line.
change the shape of the roof line or the floor line	select the profile, and use Vertex and Edge grips to adjust the shape.
add vertices to the roof line or the floor line	select the profile, right-click and click Add Vertex. Select a point for each new vertex, and press *ENTER*.
remove vertices from the roof line or the floor line	select the profile, right-click and click Remove Vertex. Select each vertex to remove, and press *ENTER*.
project the roof line or the floor line to a polyline	click Edit In Place tab ➤ Profile panel ➤ Project To Polyline . Select the roof line or the floor line, and select the polyline. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
project the roof line or the floor line to another object, such as a stair or a roof	click Edit In Place tab ➤ Profile panel ➤ Auto Project . Select the roof line or the floor line, and select the object.
reverse the roof line or the floor line	click Edit In Place tab ➤ Profile panel ➤ Reverse . Select the roof line or the floor line.
restore the roof line to the base height of the curtain wall, or restore the floor line to the baseline of the curtain wall	click Edit In Place tab ➤ Profile panel ➤ Remove . Select the roof line or the floor line.

NOTE To add a gable or a step to a roof line or a floor line that has been edited, first use the Remove command on the contextual ribbon tab to remove an existing roof line or floor line condition.

3 Save or discard the changes:

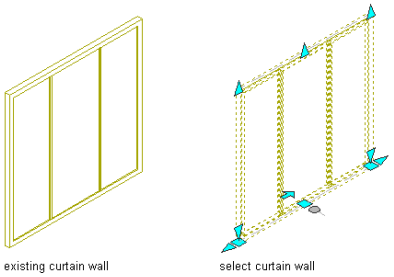
If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit in Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

Changing the Roof Line and the Floor Line

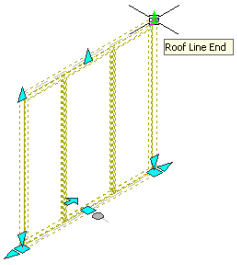
Use this procedure to change the height or the shape of the roof line and the floor line using grips.

1 Select a curtain wall.

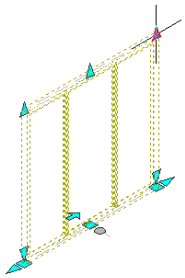
2 Select a Roof Line End or Floor Line End grip, move the grip to the appropriate position, and click once.

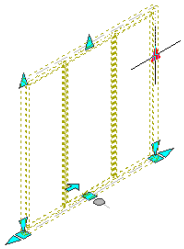

existing curtain wall

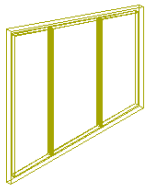
select curtain wall

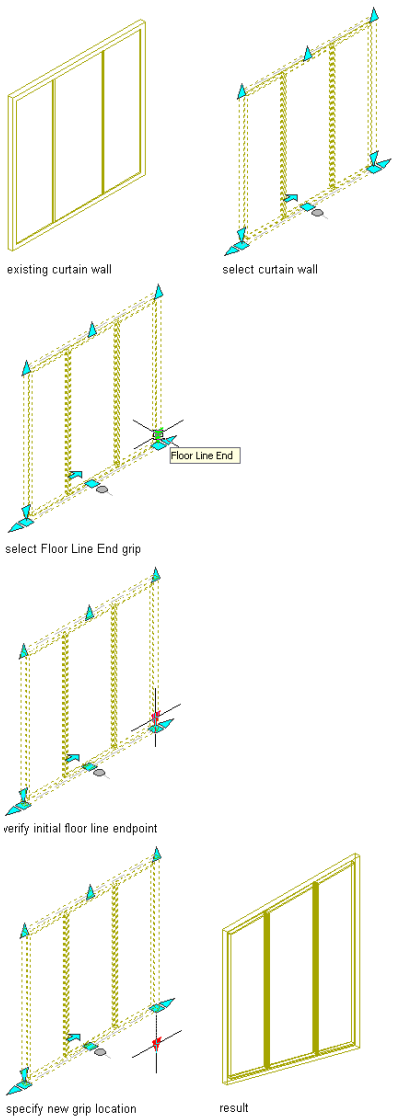


select Roof Line End grip


verify initial roof line endpoint


specify new grip location


result



Adding a Gable to the Roof Line of a Curtain Wall

Use this procedure to add a gable to the roof line of a curtain wall. You can also add a gable on the Roof/Floor Line worksheet on the Properties palette. For more information, see Specifying Gable Settings for a Roof Line on page 1019.

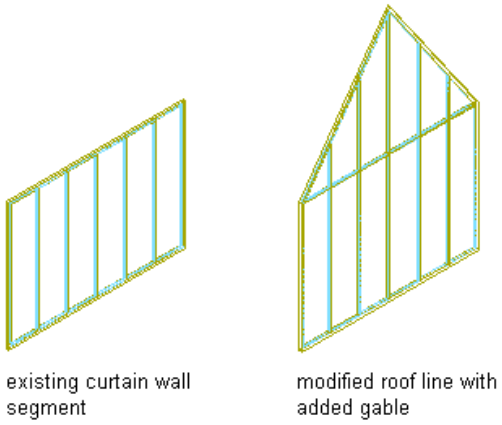
NOTE This option is available only if the roof line has not been edited. After the roof line changes, you cannot add a gable using this option. To add a gable to a roof line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Curtain Wall on page 1018.

1. Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .
   A temporary profile is created for you to edit the geometry of the Roof line.
2. Click Edit In Place tab ➤ Profile panel ➤ Add Gable .

If Add Gable cannot be selected, the roof line was previously edited.

3 Select the roof line.

Modifying a curtain wall roof line by adding a gable



A third vertex is added to the roof line halfway between the two ends of the roof line.

4 Continue editing the roof line or the floor line, if needed.
For more information, see Changing the Roof Line and the Floor Line on page 1014.

5 Save or discard the changes:

If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit in Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

Adding a Step to the Roof Line or Floor Line of a Curtain Wall

Use this procedure to add a step to the roof line or the floor line of a curtain wall. You can also add a step on the Roof/Floor Line worksheet on the Properties palette. For more information, see Specifying Step Settings for a Roof Line or Floor Line on page 1020.

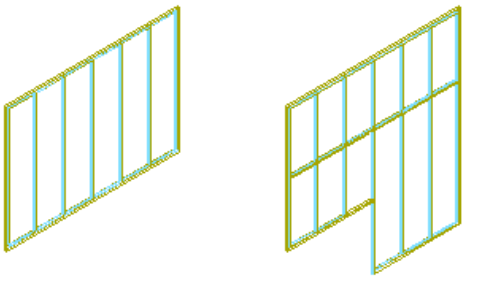
NOTE This option is available only when the roof line or the floor line has not been edited. After the line has been changed, you cannot automatically add a step using this option. To add a step to a roof line or a floor line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Curtain Wall on page 1018.

1 Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .
A temporary profile is created for you to edit the geometry of the Roof line.

2 Click Edit In Place tab ➤ Profile panel ➤ Add Step .
If Add Step cannot be selected, the roof line or the floor line was previously edited.

3 Select the roof line or the floor line.

Modifying a curtain wall floor line by adding a step



A third vertex is added to the line halfway between the two ends of the line and four feet from the line. A step is created from the selected vertex to the second vertex.

4 Continue editing the roof line or the floor line, if needed.

For more information, see Changing the Roof Line and the Floor Line on page 1014.

5 Save or discard the changes:

If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit in Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

Changing Vertices in the Roof Line or Floor Line of a Curtain Wall

Use this procedure to perform the following tasks:

- Add, move, or remove vertices and edges in the roof line or the floor line of a curtain wall.
- Add gables or steps to a roof line or steps to a floor line that was previously edited by adding vertices that define these conditions.
- Remove all changes to the roof line or the floor line, restoring the original base height or baseline of a curtain wall.

NOTE You can also edit vertices in a curtain wall with the curtain wall worksheets. For information, see Specifying Vertex Settings for a Roof Line or Floor Line on page 1021.

1 Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Edit In Place .

A temporary profile is created for you to edit the geometry of the Roof line.

2 Edit the vertices:

If you want to …	Then …
change the position of a vertex or an edge	select its grip and move it to the appropriate position.
add a vertex	select the profile, right-click and click Add Vertex. Select a point for each new vertex, and press *ENTER*.

If you want to …	Then …
remove a vertex	select the profile, right-click and click Remove Vertex. Select each vertex to remove, and press *ENTER*.
restore the original roof line or floor line	click Edit In Place tab ➤ Profile panel ➤ Remove . Select the roof line or the floor line.

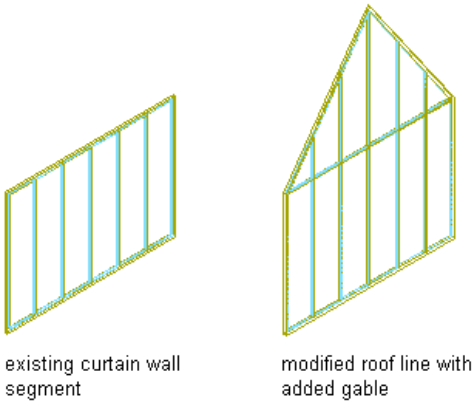
3 Save the changes to the curtain wall:

If you want to …	Then …
restore the roof line and the floor line to their shape before editing	click Edit in Place tab ➤ Edits panel ➤ Cancel .
save the changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

Specifying Gable Settings for a Roof Line

Use this procedure to add a gable to the roof line of a curtain wall by adding a vertex to the roofline.

Modifying a curtain wall roof line by adding a gable



NOTE This option is available only if the roof line has not been edited. After the roof line changes, you cannot add a gable using this option. To add a gable to a roof line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Curtain Wall on page 1018.

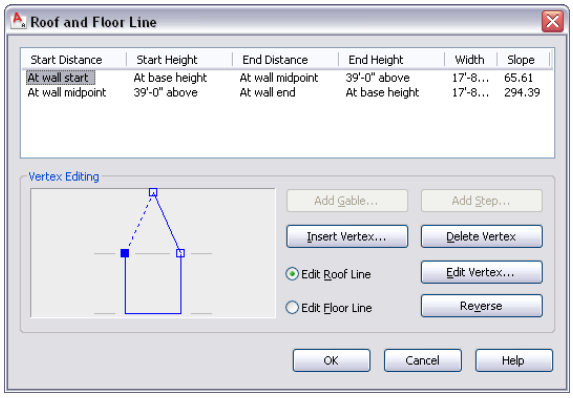
1 Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Roof/Floor Line Settings .

2 Select Edit Roof Line or Edit Floor Line.

3 Click Add Gable.

A third vertex is added to the roof line halfway between the two ends of the roof line.

The table at the top of the dialog box displays information about each vertex in the curtain wall. You can also select the vertex to edit from the list.

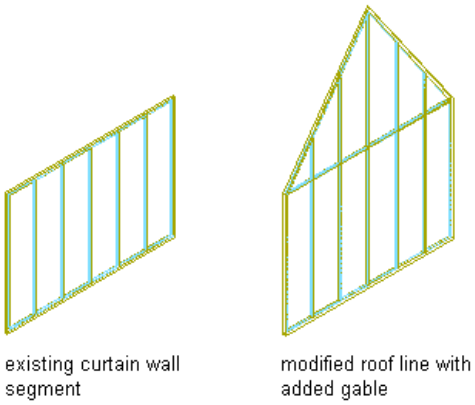


4 Click OK.

Specifying Step Settings for a Roof Line or Floor Line

Use this procedure to add a step to the roof line or the floor line of a curtain wall.

Modifying a curtain wall roof line by adding a gable



existing curtain wall segment

modified roof line with added gable

NOTE This option is available only when the roof line or the floor line has not been edited. After the line has been changed, you cannot automatically add a step using this option. To add a step to a roof line or a floor line that has been edited, see Changing Vertices in the Roof Line or Floor Line of a Curtain Wall on page 1018.

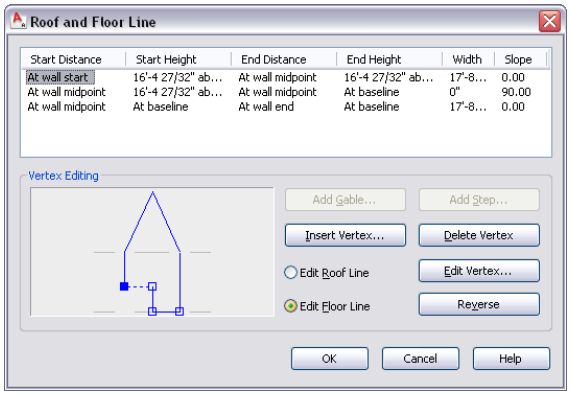
1 Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Roof/Floor Line Settings .

2 Select Edit Roof Line or Edit Floor Line.

3 Click Add Step.

A third vertex is added to the line halfway between the two ends of the line. A step is created from the selected vertex to the second vertex.

The table at the top displays information about each vertex in the curtain wall. You can select a vertex to edit from the list.



4 Click OK.

Specifying Vertex Settings for a Roof Line or Floor Line

Use this procedure to perform the following tasks:

- Add, move, or remove vertices in the roof line or the floor line of a curtain wall.
- Add gables or steps to a roof line or steps to a floor line that was previously edited by adding vertices that define these conditions.

1 Select the curtain wall, and click Curtain Wall tab ➤ Modify panel ➤ Roof/Floor Line drop-down ➤ Roof/Floor Line Settings .

2 Select Edit Roof Line or Edit Floor Line.

The active vertex in the illustration changes when you select a different line to edit. Any changes you make to the wall are reflected in the illustration.

3 Specify vertex settings:

If you want to ...	Then ...
add a vertex	click Insert Vertex. In the Wall Roof/Floor Line Vertex dialog box, specify the horizontal offset and vertical offset for the new vertex, specify a distance, and click OK.
move a vertex	select a vertex from the list, and then click Edit Vertex.
delete a vertex	select a vertex from the list, and then click Delete Vertex. The selected vertex is deleted, and the line automatically connects the two adjacent vertices.

4 Specify the horizontal offset.

The horizontal offset specifies the existing vertex from which to measure the placement of the next vertex and how far away from the existing vertex to place the new one. Distance is measured in the direction the curtain wall is drawn. You can enter a negative number to offset the vertex in the reverse direction.

5 Specify the vertical offset.

The vertical offset specifies the location from which to measure the height of the next vertex and how far away from the existing location to place the new vertex. You can enter a negative number to offset the vertex toward the ground.

6 Click OK twice.

Editing Objects Anchored in Curtain Walls

When you fill a curtain wall cell with an infill that contains an object, such as a door or window, you can edit that object independently from the curtain wall. For example, you can select a door from a curtain wall and edit its properties. You can edit the anchor settings for the door to change the orientation of the door and the alignment or offset of the door in relation to the curtain wall.

You can also move objects from one cell to another or release the object anchor so that the object moves independently of the curtain wall.

When you move or release an object or edit its properties, you are creating a variation from the infill cell assignment for the curtain wall style. By default, these variations (except release) are allowed to persist in the drawing when you reapply the style to a curtain wall. However, if you want these variations to be overridden when you reapply a curtain wall style, turn off the Allow Variation from Infill Element Definition option on the Anchor worksheet of the Properties palette of the object. This option is set on a per object basis.

Changing the Orientation of an Object Anchored in a Curtain Wall

Use this procedure to change the orientation of an object anchored in a curtain wall using grips.

1 Click the object in the curtain wall for which you want to change the orientation.

2 Click the appropriate Flip grip to change the *X* or *Y* direction of the object.

You can also change the orientation of an object, including the *Z* direction, using the Anchor worksheet found on the object's Properties palette.

Changing the Alignment of an Object Anchored in a Curtain Wall

Use this procedure to modify the alignment of an object that is anchored in a curtain wall.

1 Double-click the object in the curtain wall.

2 Expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Select a new alignment for the object.

For more information, see Specifying an Alignment for a Curtain Wall Infill on page 948.

5 Click OK.

Changing the Offset of an Object Anchored in a Curtain Wall

Use this procedure to change the offset of an object anchored in a curtain wall.

1 Double-click the object in the curtain wall.

2 Expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Specify a new offset for the object.

For more information, see Specifying an Offset for a Curtain Wall Infill on page 948.

5 Click OK.

Swapping Two Objects Anchored in a Curtain Wall

When you fill a curtain wall cell with an object, such as a door or window, you can swap that object with another object in the curtain wall.

1 Select one of the objects from the curtain wall, right-click, and click Infill Anchor ➤ Swap Objects.

2 Select the object you want to swap with.

Releasing an Object Anchored in a Curtain Wall

When you fill a curtain wall cell with an object, such as a door or window, that object is anchored to the curtain wall. While the anchor is in place, the object moves when you move the curtain wall and is removed when you erase the curtain wall. If you want to move or erase an object independently from the curtain wall, you can release the anchor of the object.

NOTE You can also move or erase the object by changing the element definition for the cell that contains the object. For more information, see Defining Infills for Curtain Wall Cells on page 946.

- Select one of the objects from the curtain wall, right-click, and click Infill Anchor ➤ Release.

Curtain Wall Units

Curtain wall units are an important building block of curtain walls.

The Concept of Curtain Wall Units

Curtain wall units can significantly reduce the complexity of the curtain wall design and, thereby, the necessary design time.

You can think of a curtain wall unit as a "mini" curtain wall itself, which can have frames, mullions and divisions, but is normally not a standalone building object. A curtain wall unit is used in the larger context of a curtain wall. You usually assign curtain wall units to specific cells within a curtain wall grid. For more information, see Inserting an Object into a Curtain Wall Cell on page 966.

Curtain Wall Unit Styles

Curtain wall units are style-based, permitting maximum efficiency and flexibility. Curtain wall unit styles are created and edited independently from the curtain wall style. You can use a curtain wall unit style in different curtain wall styles. For example, you can create a decorative three-tiled panel as a curtain wall unit and use that for several curtain wall styles.

Curtain Wall Units and Door/Window Assemblies

Curtain wall units and door/window assemblies are very similar in their functionality. Both can contain nested grids and be anchored as building blocks in curtain walls. A curtain wall unit usually is not used as a standalone object, whereas a door/window assembly could be.

Curtain Wall Unit Grids

Like curtain walls, curtain wall units are made up of one or more grids. Each grid has either a horizontal division or a vertical division, but you can nest the grids to create a variety of patterns.

Using curtain wall units in a curtain wall can Help you limit the complexity in the curtain wall design.

Elements of Grids

Grids are the foundation of curtain walls and curtain wall units. Every grid has four element types:

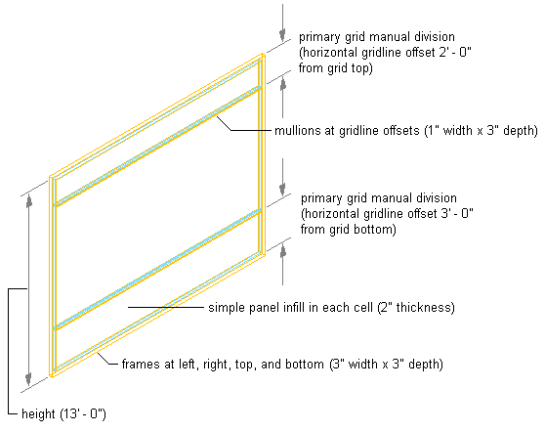
- **Divisions:** Define the direction of the grid (horizontal or vertical) and the number of cells
- **Cell Infills:** Contain another grid, a panel infill, or an object such as a window or a door
- **Frames:** Define the edge around the outside of the primary grid and nested grids
- **Mullions:** Define the edges between the cells

NOTE Division is an abstract element, in contrast to the other three element types that represent physical elements of the curtain wall unit.

Each element type is assigned a default definition that describes what elements of that type look like.

Element type	Default definitions
Divisions	Horizontal grid with two manual divisions offset from the top and bottom of the grid
Cell Infills	Cells containing simple panels
Frames	Outer edges of grid 3" wide and 3" deep
Mullions	Edges between cells 1" wide and 3" deep

Curtain wall units default element definitions



Getting Started with Curtain Wall Units

To get started with curtain wall units, draw a curtain wall unit using one of the methods described in Creating Curtain Wall Units on page 1025. Try a variety of the existing curtain wall unit styles, find a style you like and make a copy of it. Then, modify the element definitions and assignments to suit your own needs. For more information, see Creating Element Definitions for a Curtain Wall Unit Style on page 1028.

For more information about element definitions and assignments, see Creating Element Definitions for a Curtain Wall Unit Style on page 1028 and Assigning Infills to Curtain Wall Unit Cells on page 1048.

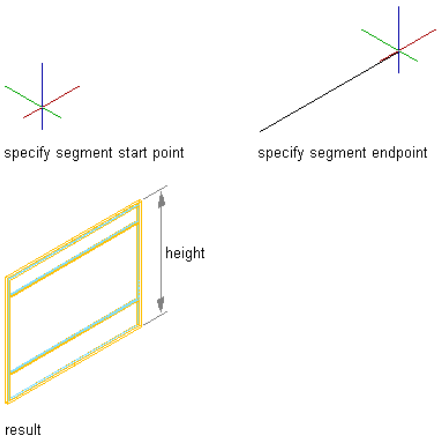
Creating Curtain Wall Units

Creating curtain wall units is similar to creating curtain walls. You specify a style, a height, and start and end points. You can also create curtain wall units by converting a 2D layout grid to a curtain wall or converting two-dimensional (2D) lines, arcs, and circles. Unlike curtain walls, you cannot create a curtain wall unit based on a curve. Curtain wall units can only be planar.

Creating a Curtain Wall Unit

Use this procedure to create a curtain wall unit.

Drawing a curtain wall unit



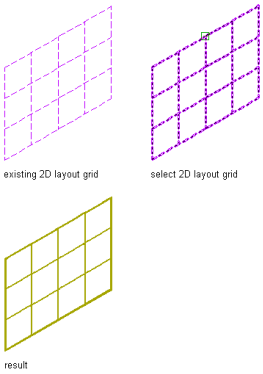
1. Click Home tab ➤ Build panel ➤ Wall drop-down ➤ Curtain Wall Unit .
2. Select a start point and an end point.
3. Specify a height for the curtain wall unit.
4. Select a style, and click OK.

For information about curtain wall unit styles, see Curtain Wall Unit Styles on page 1028.

Converting a Layout Grid to a Curtain Wall Unit

You can create a curtain wall unit grid that is based on a 2D layout grid. If you already have 2D layout grids in a drawing, you can easily convert them to curtain wall units. Or if you are already familiar with layout grids, it is an efficient way to create a curtain wall unit, and then experiment with the curtain wall commands to learn more about them.

Converting a 2D layout grid to a curtain wall unit

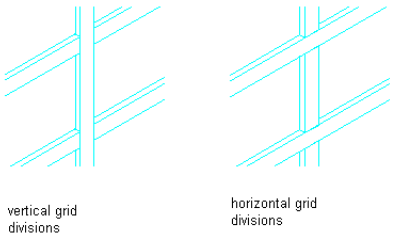


When you create a curtain wall unit from a 2D layout grid, you also create a new curtain wall unit style. The divisions in the new curtain wall unit style are taken from the divisions in the layout grid.

Curtain wall unit grids are one-dimensional, divided either horizontally or vertically. To create the horizontal and vertical patterns in the 2D layout grid, the curtain wall unit uses a primary grid with a secondary grid nested inside it. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

When you create a curtain wall unit grid from a 2D layout grid, you need to decide the direction of the primary grid in the curtain wall unit. If you select horizontal, the primary grid has horizontal divisions that cross over the vertical divisions of the secondary grid. If you select vertical, the primary grid has vertical divisions that cross over the horizontal divisions of the secondary grid.

Specifying primary division directions



The horizontal and vertical lines of the 2D layout grid define the divisions for the curtain wall unit grids. The grid cells, frame, and mullions are assigned default definitions.

1. Create a layout grid.

   For more information, see Using Layout Grids on page 1786.
2. At the command line, enter **cwunit**.
3. Enter **c** (Convert).
4. Enter **LA** (LayoutGrid).
5. Select the layout grid.
6. To erase the layout grid, enter **y** (Yes). To have the layout grid remain after the curtain wall unit is created, enter **n** (No).
7. When prompted for the primary division, enter **v** (Vertical) or **h** (Horizontal) as the orientation.
8. Enter a name for this new curtain wall unit style.
9. Click OK, and press *ENTER* to end the command.

Creating a Curtain Wall Unit with a Custom Grid

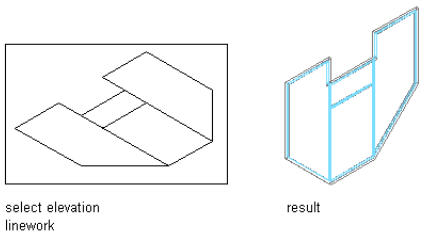
Curtain wall units contain one or more grids. You can define a custom grid with lines, arcs, and circles, and then convert that linework into a curtain wall unit.

NOTE Curtain wall unit grids are either horizontal or vertical. To create a grid pattern with horizontal and vertical cells, nested grids are used. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

You cannot modify the division definition of a custom grid created from lines, arcs, and circles. You can, however, assign a different division definition to it. For more information, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

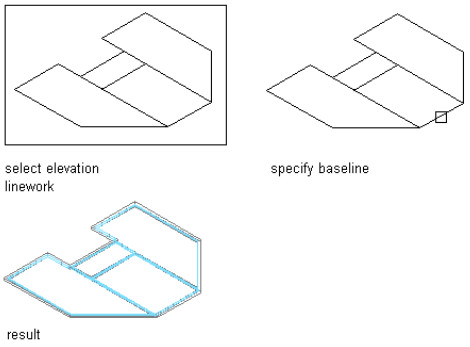
1. Use lines, arcs, and circles to draw a grid in the current world coordinate system (WCS).
2. At the command line, enter **cwunit**.
3. Enter **c** (Convert).
4. Enter **LI** (LInework).
5. Select the lines, arcs, or circles that define your grid.
6. Press *ENTER*.
7. Select one of the grid lines as the baseline for the curtain wall or press *ENTER* to use the line along the *X* axis as the baseline.

Converting linework to curtain walls units using the default baseline option



TIP If you draw your linework in the XY plane (in Plan view) and accept the default baseline, the resulting curtain wall unit is displayed as it is projected in the Z direction.

Converting linework to curtain walls using the specified baseline option



8. To erase the lines, enter **y** (Yes). To have the lines remain after the curtain wall unit is created, enter **n** (No).

   Each enclosed area is assigned the default cell infill. The lines between the cells are assigned the default mullion definition, and the boundary around the grid is assigned the default frame

definition. For more information, see Assigning Definitions to Curtain Wall Elements on page 959.

9 Select the resulting custom curtain wall unit.

10 Click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style.

11 Click New to create a new curtain wall unit style.

12 Enter a name for the new curtain wall unit style.

13 Click OK twice.

Curtain Wall Unit Styles

Curtain wall units are style-based, meaning there are preset characteristics assigned to each curtain wall unit that determine its appearance and function. By changing from one style of curtain wall unit to another, you can quickly study several different design options. Any changes you make to the style are reflected throughout your building, updating all curtain walls that use that particular curtain wall unit style. You can also apply overrides to a single curtain wall unit, without changing other curtain walls of the same style.

A curtain wall unit style controls the following properties of a curtain wall:

- Element definitions
- Definition assignments for each element
- Materials for each element
- Display properties for each element
- Notes about the style and any associated reference files

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating Element Definitions for a Curtain Wall Unit Style

Element definitions determine the appearance of the four basic curtain wall unit elements. There is a different definition type for each element.

Element type	Default definitions
Divisions	Horizontal grid with two manual divisions offset from the top and the bottom of the grid
Cell Infills	Cells containing simple panels
Frames	Left, right, top, and bottom outer edges of grid 3" wide and 3" deep
Mullions	Edges between cells 1" wide and 3" deep

Each type of element can have multiple definitions. For example, you can define a division to create a horizontal grid or a vertical grid, and you can define the cells to contain a nested grid or a panel infill. To make reuse easier, you can save the element definitions, and then assign them to grids, cells, frames, or mullions as needed.

Element definitions are style-specific. When you create element definitions for a specific curtain wall unit style, those definitions are available only for curtain wall units of that style. For example, if you define a panel infill for one curtain wall unit style, that infill is not available as an option when you edit a curtain wall unit of a different style.

For information about defining the color, linetype, or layer of curtain wall elements, see Specifying the Display of Curtain Wall Units on page 1061.

Creating a Curtain Wall Unit Style

Use this procedure to create a curtain wall unit style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Create a new curtain wall style:

If you want to create a style ...	Then ...
with default properties	right-click Curtain Wall Unit Styles, and click New.
from an existing style	right-click the curtain wall unit style you want to copy, and click Copy. Right-click, and click Paste.
from a curtain wall, curtain wall unit, or door/window assembly in the drawing	right-click Curtain Wall Unit Styles, and click New. Right-click the new style, click Set From, and then pick a curtain wall, a curtain wall unit, or a door/window assembly.

4 Enter a name for the new curtain wall unit style, and press *Enter*.

5 Edit the new curtain wall unit style:

If you want to ...	Then ...
define the elements of a curtain wall unit style	see Defining Divisions for Curtain Wall Unit Grids on page 1030, Defining Infills for Curtain Wall Unit Cells on page 1036, Defining Curtain Wall Unit Frames on page 1039, and Defining Curtain Wall Unit Mullions on page 1043.
assign element definitions to the curtain wall unit style	see Assigning a Division to a Curtain Wall Unit Grid on page 1048, Assigning Infills to Curtain Wall Unit Cells on page 1048, Assigning Definitions to Curtain Wall Unit Frames on page 1054, and Assigning Definitions to the Mullions of a Curtain Wall Unit on page 1057.
add curtain wall element definitions as display components	see Adding Curtain Wall Unit Element Definitions as Display Components on page 1061.
specify layer, color and linetype settings for the display components of a curtain wall	see Specifying the Layer, Color, and Linetype of a Curtain Wall Unit Style on page 1062.
specify curtain wall unit hatching	see Specifying the Hatching for Components of a Curtain Wall Unit Style on page 1062.

If you want to …	Then …
add custom graphics as display components of a curtain wall unit style	see Adding Custom Graphics as a Display Component of a Curtain Wall Unit on page 1063.
create individual cut planes for curtain wall unit styles	see Creating Cut Planes for a Curtain Wall Unit on page 1064.
add notes and files to the style	see Attaching Notes and Files to a Curtain Wall Unit Style on page 1065.

6 Click OK.

Defining Divisions for Curtain Wall Unit Grids

The divisions of a grid define the orientation that determines the direction of the grid cells and mullions, and they define a division type that determines the number and size of cells.

NOTE Creating a nested grid is not a division rule. To create a nested grid, add a cell assignment. For more information, see Creating a Nested Grid in a Curtain Wall Unit on page 1049 and Working with Nested Grids in Curtain Walls on page 961.

You can create a variety of division definitions under different names, and then assign different divisions to each grid in your curtain wall unit. Although you can create multiple definitions, there can be only one division assignment per grid. You create division definitions for a specific curtain wall unit style and those definitions can be assigned only to grids in curtain wall units of that style.

For more information about assigning divisions to a particular grid, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

Division of Curtain Wall Unit Grids

A curtain wall unit consists of one or more grids, which are the framework for placing design elements in the curtain wall unit. The highest-level grid is the primary grid, which is also the outside edge of the curtain wall unit.

Each grid in a curtain wall unit has one division assignment that determines whether the grid is divided horizontally or vertically. The division also determines the number of cells, their size and their placement.

Within the primary grid, you can define multiple levels of grids. These grids within are called nested grids. Each subdivision of a grid is called a cell.

Creating a Division Definition for a Curtain Wall Unit

Use this procedure to create divisions for a curtain wall unit grid.

Because curtain wall units can contain multiple nested grids, it is helpful to use a naming convention for grids that indicates the level of each grid and the grid location or the purpose within the curtain wall unit. For example, L3-FL1-Stone Panels can identify a third level grid that provides a row of stone panels on Floor 1.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Click New Division.

7 Enter a name for this division definition.

8 Click either Horizontal or Vertical for Orientation.

9 Select one of the following division types and specify offsets if needed.

Division Type	Description
Fixed Cell Dimension	Creates a grid where the size of the individual cells is predetermined. For more information, see Specifying a Fixed Size for Cells in a Curtain Wall Unit Grid on page 1031.
Fixed Number of Cells	Creates a grid where the number of grid cells is predetermined. For more information, see Specifying a Fixed Number of Cells for a Curtain Wall Unit Grid on page 1033.
Manual	Creates a grid where the size and number of individual cells is manually determined by the user. For more information, see Manually Defining the Number and Size of Cells in a Curtain Wall Unit Grid on page 1034.

After you create a division definition, you can assign the definition to a specific grid in a curtain wall unit. For more information, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

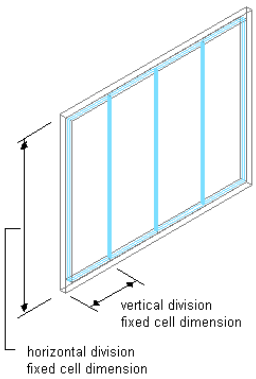
10 When you are finished creating division definitions, click OK.

Specifying a Fixed Size for Cells in a Curtain Wall Unit Grid

Use this procedure to define a specific size for the cells in a grid. In this case, the number of cells is determined by the length or height of the grid, depending on how the grid is divided.

When you specify a fixed cell size in a grid, you can control how the cells of the grid adjust to accommodate any leftover space. This space occurs if the length (or the height) of the curtain wall unit cannot be evenly divided by the fixed size of the cell. For more information, see Using the Auto-Adjust Cells Option to Resize Cells in a Curtain Wall Unit Grid on page 1033.

Specifying a fixed size for cells



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

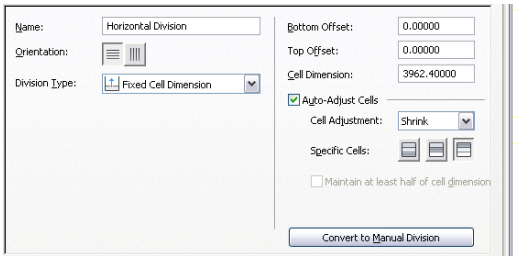
3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Division definition or create a new one.

7 Select Fixed Cell Dimension for Division Type.



8 Specify a size for the cells in Cell Dimension.

If you are defining a vertical division, the cell dimension is the length of the cell from mullion to mullion. If you are defining a horizontal division, the cell dimension is the height of the cell.

9 To specify an offset for the grid, enter an offset distance in Start Offset or End Offset. For more information, see Specifying an Offset for a Curtain Wall Unit Grid on page 1035.

TIP The frame width is calculated as part of the cell size. Therefore, cells adjacent to the frame can appear to be a different size than the other cells. If you do not want the frame width included in the cell size, specify an offset for the grid that is equal to the frame width.

When you draw a curtain wall unit using a fixed cell dimension, there is often extra space between the last full-size cell and the end of the curtain wall unit.

10 To adjust the cells and accommodate this extra space automatically as you draw curtain wall units, select the Auto-Adjust Cells option.

11 Adjust the cells to accommodate this extra space:

If you want to …	Then …
add the space to grid cells	select Auto-Adjust Cells, select Grow for Cell Adjustment, and select the specific cells where the space is added. You can select any combination of specific cells.
remove the space from grid cells	select Auto-Adjust Cells, select Shrink for Cell Adjustment, and select the specific cells where the space is removed. You can select any combination of specific cells.

For information about offsets, see Specifying an Offset for a Curtain Wall Unit Grid on page 1035.

12 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall unit, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

Using the Auto-Adjust Cells Option to Resize Cells in a Curtain Wall Unit Grid

Use this procedure to automatically resize cells in a grid when the result of dividing the grid by the specified cell dimension is not a whole number.

For example, if a vertical primary grid in a curtain wall unit style is 17 feet in length and you specify a fixed cell dimension of 3 feet, the grid has five cells of 3 feet each with 2 feet remaining. Using the Auto-Adjust Cells option, you can specify how the grid distributes the remaining quantity.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Styles.
3 Select a curtain wall unit style.
4 Click the Design Rules tab.
5 In the left pane, select Divisions under Element Definitions.
6 Select a Divisions definition or create a new one.
7 Select Fixed Cell Dimension as the division type.
8 Select Auto-Adjust Cells, and specify the cell adjustment:

If you want to …	Then …
add the remaining space to grid cells	select Grow, and select the specific cells to which you want the space added.
remove the remaining space from grid cells	select Shrink, and select the specific cells from which you want the space removed. You can then select Maintain at least half of cell dimension in order to control the cell shrinkage.

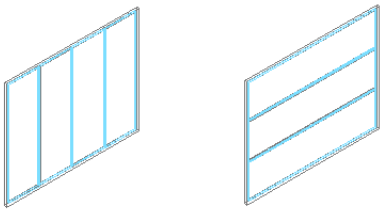
The cells that you do not select maintain the fixed value you specified for Cell Dimension.

Specifying a Fixed Number of Cells for a Curtain Wall Unit Grid

Use this procedure to define a specific number of cells in a grid. In this case, the size of the cells is determined by the length or height of the grid, depending on how the grid is divided.

In some cases, when you create a complex curtain wall unit grid, you might want to start with a standard grid with a fixed number of cells, and then later fine-tune that manually. You can first create a grid with fixed cell numbers and then convert that to a manual grid. For information on manual grids, see Manually Defining the Number and Size of Cells in a Curtain Wall Unit Grid on page 1034.

Specifying a fixed number of cells



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Division definition or create a new one.

7 Select Fixed Number of Cells for Division Type.

8 Specify the number of cells.

9 To specify an offset for the grid, enter an offset distance for Start Offset or End Offset. For more information, see Specifying an Offset for a Curtain Wall Unit Grid on page 1035.

NOTE If you want to fine-tune the initial layout with a fixed number of cells, click Convert To Manual Division and edit the grid as described in Manually Defining the Number and Size of Cells in a Curtain Wall Unit Grid on page 1034.

10 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall unit, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

Manually Defining the Number and Size of Cells in a Curtain Wall Unit Grid

Use this procedure to manually add gridlines and specify an offset for each one when you need to create a unique grid that does not fit into any of the other division types. You can also start with a fixed cell dimension grid or a fixed number of cells grid, and then manually adjust the grid lines to suit your needs.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

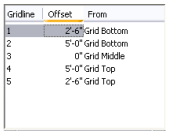
6 Select a Division definition or create a new one.

7 Select Manual for Division Type.

8 Click the Add Gridline icon to insert a grid line. Insert as many grid lines as you need. If you need to remove a grid line, select it from the table and click the Remove Gridline icon.

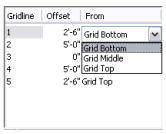
9 Under Offset in the gridline table, specify an offset distance for each grid line.

Gridline offset



10 Under From in the grid line table, select the grid location from which the grid line is offset.

Offset grid line from option



11 To specify an offset for the grid, enter an offset distance for Start Offset or End Offset.

For more information, see Specifying an Offset for a Curtain Wall Unit Grid on page 1035.

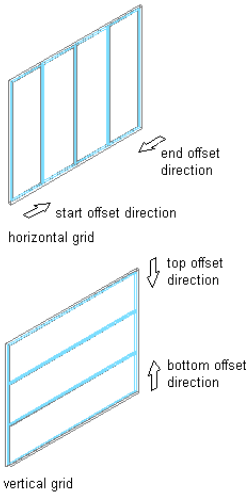
12 Click OK.

For information about assigning the division definition to a specific grid in your curtain wall, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.

Specifying an Offset for a Curtain Wall Unit Grid

By default, grids cells are measured from the start and end points of the curtain wall unit baseline. The width of the grid frame is not considered in calculating the size of the cell. For example, if you draw a curtain wall unit with a 14' baseline and a 1' frame on the left and right, and you specify a fixed number of vertical cells, the cells do not appear equal in size. The first and last cells appear smaller because they include the frame. To make the cells equal in size, offset the start and end of the grid by the width of the frame.

Specifying grid offset directions



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Division definition or create a new one.

7 Specify an offset for the grid:

If you want to specify the distance between …	Then …
the start point of the curtain wall baseline and the start of the first cell in a horizontal grid	enter a value for Start Offset.
the end point of the curtain wall baseline and the end of the last cell in a horizontal grid	enter a value for End Offset.
the floor line of the curtain wall and the start of the first cell in a vertical grid	enter a value for Bottom Offset.
the roof line of the curtain wall and the end of the top cell in a vertical grid	enter a value for Top Offset.

8 Click OK.

Removing a Division Definition from a Curtain Wall Unit Style

Use this procedure to remove a division definition that you no longer need. You cannot remove a division definition when it is currently assigned to a grid. In addition, you cannot remove the default division definition, but you can modify it.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select a curtain wall unit style.
4 Click the Design Rules tab.
5 In the left pane, select Divisions under Element Definitions.
6 Select a Division definition that you want to remove.
7 Click Remove Division.
8 Click OK.

Defining Infills for Curtain Wall Unit Cells

An infill defines the contents of a curtain wall unit cell. A curtain wall unit cell can have the default simple panel or contain a nested grid, an AEC Polygon, door, window, or door/window assembly style. The object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically represent glazing or other plain cladding, such as stone or concrete. For more information, see Assigning Infills to Curtain Wall Unit Cells on page 1048.

NOTE Nested grids and no infill are options you select when assigning an infill to cell. These options do not require infill definitions. For information, see Creating a Nested Grid in a Curtain Wall Unit on page 1049 and Removing an Infill Definition from a Curtain Wall Unit Style on page 1039.

You can define as many infills as you need, and then use cell assignments to specify the cells that use each infill. You can modify, a default infill that is used for all unassigned cells.

NOTE Create infill definitions for a specific curtain wall unit style. Those definitions can be assigned only to grid cells in curtain wall units of that style.

Materials

Styles use the materials of the object style assigned to each panel. For example, if you specify an infill to use the Standard door/window assembly style, the materials of that infill are those designated in the door/window assembly style. Simple panels need material assigned in the curtain wall style.

If you do not use materials to control the display properties of infills, you can specify their display properties in the curtain wall unit style. The layer, color, linetype, and other display properties of the default infill are applied to all infills unless you create a custom display component for each infill definition. You can then control the display of each infill definition independently. For more information, see Specifying the Display of Curtain Wall Units on page 1061.

Creating a Panel Infill for a Curtain Wall Unit

Use this procedure to create a simple panel infill to represent basic cladding materials in the curtain wall, such as a stone wall panel, concrete panel, metal panel, or glazing infill.

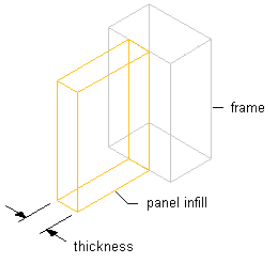
Because curtain wall units can contain multiple infills, it is helpful to use a naming convention for panel infills that indicates the infill location or purpose within the curtain wall unit. For example, L3-FL1- Stone Panel can identify a stone panel in a third-level grid on Floor 1.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Infills under Element Definitions.
6. Click New Infill.
7. Enter a descriptive name for the infill.
8. Specify an alignment for the infill.

   For more information, see Specifying an Alignment for a Curtain Wall Unit Infill on page 1037.
9. Specify an offset for the infill.

   For more information, see Specifying an Offset for a Curtain Wall Unit Infill on page 1038.
10. Specify a thickness for the panel.

    Specifying infill panel thickness

11. Click OK.

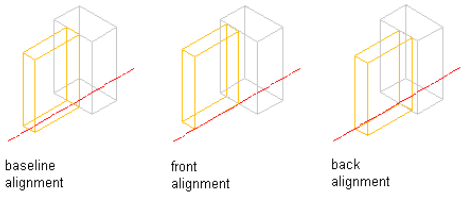
After you create an infill definition, you can assign it to any cell in a curtain wall unit grid. For more information, see Assigning Infills to Curtain Wall Unit Cells on page 1048.

Specifying an Alignment for a Curtain Wall Unit Infill

Use this procedure to align an infill so that it is centered with the baseline of the curtain wall unit, in front of the baseline, or behind the baseline. In Plan view, the front of a curtain wall unit (drawn from left to right) is below the baseline and the back is above the baseline.

NOTE To move the infill away from the baseline, see Specifying an Offset for a Curtain Wall Unit Infill on page 1038.

Specifying infill alignments



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select an infill, or create a new one.

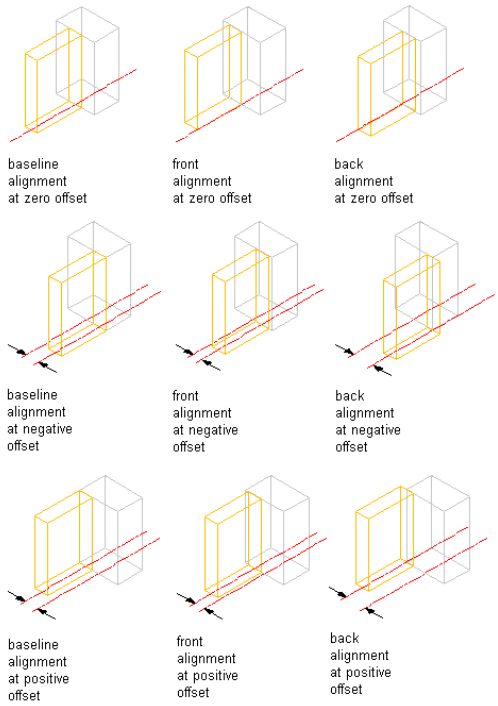
7 Select an alignment: front, center, or back.

8 Click OK.

Specifying an Offset for a Curtain Wall Unit Infill

Use this procedure to specify an offset for a curtain wall unit infill. By default, infills are centered on the curtain wall unit baseline. If your design requires that the infill be aligned with frame edges or some other part of the curtain wall unit, you can specify an offset for the infill.

Specifying panel infill offsets



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select an infill, or create a new one.

7 Enter an offset distance.

In Plan view, positive numbers offset the infill above the baseline and negative numbers offset the infill below the baseline. The offset is also affected by the selected alignment for the infill.

8 Click OK.

Removing an Infill Definition from a Curtain Wall Unit Style

Use this procedure to delete an infill definition that you no longer need from the Infills definitions list. You cannot remove an infill definition when it is currently assigned to a cell. In addition, you cannot remove the default infill definition, but you can modify it.

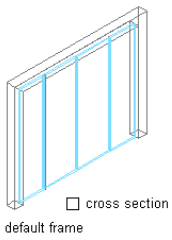
NOTE For information about removing an infill from a cell, see Removing an Infill from a Curtain Wall Unit Cell on page 1052.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Infills under Element Definitions.
6. Select the unneeded infill definition from the list.
7. Click Remove Infill.
8. Click OK.

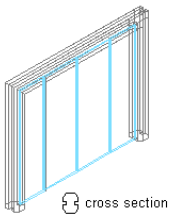
Defining Curtain Wall Unit Frames

All curtain wall unit grids, including the primary grid, can have frame definitions. The frame of the primary grid defines the outer edges of the curtain wall unit. The overall frame size is determined by the length and height of the primary curtain wall unit grid or a nested curtain wall unit grid. You can define a frame by specifying a width and depth or by selecting a profile.

Specifying default and profile-based frames



default frame



profile-based frame

You create frame definitions for a specific curtain wall unit style. Those definitions can be assigned only to frames in curtain wall units of that style. You can create as many frame definitions as you want, and then assign the definitions to the frames. If you have nested grids, each grid has its own frame. There is a default frame definition that you can modify and assign as needed. Unassigned frames are not displayed. For more information, see Assigning Definitions to Curtain Wall Unit Frames on page 1054.

TIP You can copy a mullion definition and use it as a frame definition. Select the mullion definition and drag it to Frames in the tree on the left side of the dialog box.

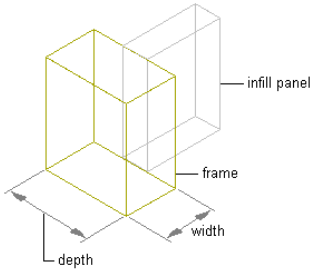
Materials and Display Properties for Frames

If you do not use materials to control the display properties of frames, you can specify their display properties in the curtain wall style. The layer, color, linetype, and other display properties of the default frame are applied to all frames unless you create a custom display component for each definition. You can then control the display of each frame definition independently. For more information, see Specifying the Display of Curtain Wall Units on page 1061.

Defining a Curtain Wall Unit Frame by Width and Depth

You can define a frame by specifying its width and depth. The overall frame size is determined by the length and height of the curtain wall unit grid.

Specifying frame width and depth



Because curtain wall units can contain multiple nested grids with different frames, it is helpful to use a naming convention for grid frames that indicates the grid location or purpose within the curtain wall unit. For example, L3-FL1- Metal Frame can identify a metal frame for a third-level grid on Floor 1.

TIP To remove the frame edge and have the infill adjust to fill the space occupied by the frame, create a frame definition with both width and depth set to zero. Then, assign that definition to the frame edge that you want to remove. This is necessary for the infill to be mitered as it would be for a butt-glazed condition. For more information, see Removing a Frame Edge from a Curtain Wall Unit on page 1055.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Frames under Element Definitions.
6. Click the New Frame icon to create a new frame definition.
7. Enter a descriptive name for the frame.
8. Specify a width and depth for the frame.
9. Specify any offsets.

   For more information, see Specifying Offsets for a Curtain Wall Unit Frame on page 1042.
10. Click OK.

After you create a frame definition, you can assign it to any frame in a curtain wall unit. For more information, see Assigning Definitions to Curtain Wall Unit Frames on page 1054.

Creating a Profile for a Curtain Wall Unit Frame

Use this procedure to create a profile that you can use to define the shape of a curtain wall unit frame. You can then extrude the profile to create a curtain wall unit frame.

The height and the width of the polyline you use to create the profile define the default height and width of the curtain wall unit frame. The insertion point of the profile is aligned with the centroid of the frame.

1 Draw a closed polyline of the height and the depth needed for the resulting curtain wall unit frame.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the frame.

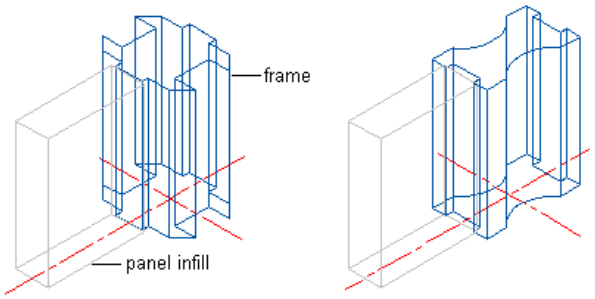
4 Enter a name for the profile, and click OK.

You can now use the profile as a curtain wall frame. For more information, see Defining a Curtain Wall Unit Frame Using a Profile on page 1041.

Defining a Curtain Wall Unit Frame Using a Profile

Use this procedure to create a frame element definition from a profile. If you do not want a straight edge to your frame, you can use a profile to define edges with curves, jags, or any other shape.

Two profile-based frame examples



NOTE The insertion point of the profile is aligned with the centroid of the frame.

1 Create the profile for the frame.

For information on creating profiles for curtain wall unit frames, see Creating a Profile for a Curtain Wall Unit Frame on page 1040.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

4 Select a curtain wall unit style.

5 Click the Design Rules tab.

6 In the left pane, select Frames under Element Definitions.

7 Click New Frame.

8 Enter a descriptive name for the frame.

9 Specify a width and depth for the frame edge.

These dimensions are used to calculate the center point of the edge for aligning the profile and also to specify a boundary for the adjacent infill.

10 Select Use Profile.

NOTE The Profile options are available only if you have profiles in the current drawing.

11 Select a profile from the list.

By default, the profile is inserted using the same width and depth with which it was created.

12 To adjust the size of the profile to fit within the width or depth dimension of the frame edge, select Auto-Adjust Profile Width or Depth.

13 To mirror the profile, select X or Y for Mirror In.

14 To rotate the profile, specify an angle for Rotation.

15 Specify any offsets.

For more information, see Specifying Offsets for a Curtain Wall Unit Frame on page 1042.

16 Click OK.

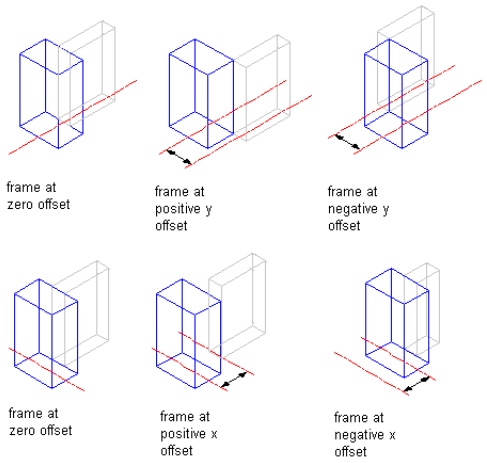
After you create a frame definition, you can assign it to any frame in a curtain wall unit. For more information, see Assigning Definitions to Curtain Wall Unit Frames on page 1054.

Specifying Offsets for a Curtain Wall Unit Frame

Use this procedure to define the distance that a curtain wall unit frame is from the floor line, roof line, or baseline. By default, the outside edges of the frame align with start and end of the floor line and the start and end of the roof line. When you adjust the width of the frame, the frame expands inward. However, you can use offsets to expand or contract the frame away from these default limits or to shift the frame away from the baseline in either the X or Y direction.

Offset	Description
X	Positive X offset moves the frame edge outward beyond the end of the curtain wall unit, while a negative X offset moves the frame edge inward toward the center of the curtain wall unit.
Y	In Plan view, a positive Y offset moves the frame edge above the baseline, while a negative Y offset moves the frame below the baseline.
Start	Negative Start offset lengthens the frame beyond the start point, while a positive Start offset shortens the frame. The start point for vertical edges is the baseline and, for horizontal edges (drawn left to right), it is the left side.
End	Negative End offset lengthens the frame beyond the end point, while a positive End offset shortens the frame. The end point for vertical edges is the base height and, for horizontal edges (drawn left to right), it is the right side.

Specifying frame offsets



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select a curtain wall unit style.
4 Click the Design Rules tab.
5 In the left pane, select Frames under Element Definitions.
6 Select a frame definition from the list.
7 Specify an offset distance for the frame edge X, Y, Start, or End.
8 Click OK.

Removing a Frame Definition from a Curtain Wall Unit Style

Use this procedure to remove a frame definition from the Frame definitions list. You cannot remove a frame definition if it is currently assigned to a frame edge, but you can remove it if it is assigned as an override to a frame edge. In addition, you cannot remove the default frame definition, but you can modify it.

NOTE For information about removing a frame edge, see Removing a Frame Edge from a Curtain Wall Unit on page 1055.

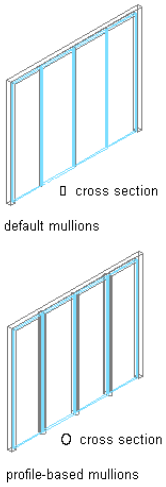
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select a curtain wall unit style.
4 Click the Design Rules tab.
5 In the left pane, select Frames under Element Definitions.
6 Select the unneeded frame definition from the list.
7 Click the Remove Frame icon.
8 Click OK.

Defining Curtain Wall Unit Mullions

The mullions of a curtain wall unit are the edges between the grid cells. You can define the mullions by specifying a width and depth or by selecting a profile from which the mullion is extruded.

Because curtain wall units can contain multiple nested grids with different mullions, it is helpful to use a naming convention for grid mullions that indicates the grid location or purpose within the curtain wall unit. For example, L3-FL1- Panel Decorative Mullion can identify a mullion for a panel in a third-level grid on Floor 1.

Specifying default and profile-based mullions



You create mullion definitions for a specific curtain wall unit style and those definitions can be assigned only to mullions in curtain wall units of that style. You can create as many mullion definitions as you want, and then assign the definitions to mullions as needed. If you have nested grids, each grid has its own mullions. There is a default mullion definition that you can modify as needed that is used for any unassigned mullions. For more information, see Assigning Definitions to the Mullions of a Curtain Wall Unit on page 1057.

TIP You can copy a frame definition and use it as a mullion definition. Select the frame definition and drag it to Mullions in the left pane of the dialog box.

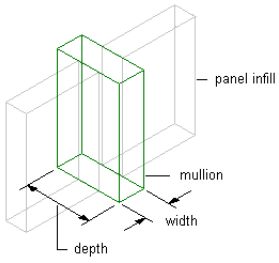
Materials and Display Properties for Mullions

If you do not use materials to control the display properties of mullions, you can specify their display properties in the curtain wall unit style. The layer, color, linetype, and other display properties of the default mullion are applied to all mullions unless you create a custom display component for each definition. You can then control the display of each mullion definition independently. For more information, see Specifying the Display of Curtain Wall Units on page 1061.

Defining Curtain Wall Unit Mullions by Width and Depth

You can define mullions by specifying a width and a depth.

Specifying mullion width and depth



TIP To remove mullions for butt glazing, create a definition with both width and depth set to zero. Then, assign that definition to the mullions that you want to remove. For more information, see Removing Mullions from a Curtain Wall Unit Grid on page 1059.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Mullions under Element Definitions.
6. Click New Mullion.
7. Enter a descriptive name for the mullion.
8. Specify a width and depth for the mullion.
9. Specify the offsets you want.

   For more information, see Specifying Offsets for the Mullions of a Curtain Wall Unit on page 1047.
10. Click OK.

After you create a mullion definition, you can assign it to any mullion in a curtain wall unit. For more information, see Assigning Definitions to the Mullions of a Curtain Wall Unit on page 1057.

Creating a Profile for Curtain Wall Unit Mullions

Use this procedure to create a profile that you can use to define the shape of a curtain wall unit mullion definition. You can then extrude the profile to create mullions from it.

The height and the width of the polyline you use to create the profile define the default height and width of the curtain wall unit mullion. The insertion point of the profile is aligned with the centroid of the mullion.

1. Draw a closed polyline of the height and the depth needed for the resulting curtain wall unit mullion.
2. Select the polyline, right-click, and click Convert to ➤ Profile Definition.
3. Enter *c* (Centroid) for the insertion point of the profile.

   The insertion point of the profile is aligned with the centroid of the mullion.
4. Enter a name for the profile, and click OK.

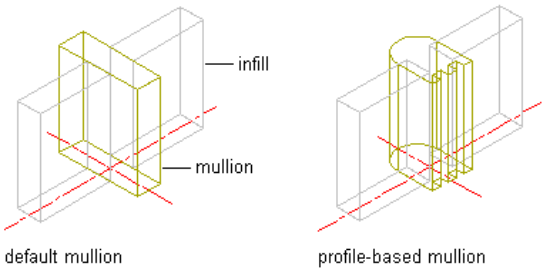
   You can now use the profile as a curtain wall unit mullion. For more information, see Defining the Mullions of a Curtain Wall Unit Using a Profile on page 1045.

Defining the Mullions of a Curtain Wall Unit Using a Profile

Use this procedure to create a mullion element definition from a profile. If you do not want a straight edge to your mullions, you can use a profile to define mullions with curves, jags, or any other shape.

NOTE The insertion point of the profile is aligned with the centroid of the mullion.

Infill alignments with default and profile-based mullions



1 Create the profile to use for the mullion.

   For information, see Creating a Profile for Curtain Wall Unit Mullions on page 1045.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

4 Select a curtain wall unit style.

5 Click the Design Rules tab.

6 In the left pane, select Mullions under Element Definitions.

7 Click the New Mullion icon to create a new mullion definition.

8 Enter a descriptive name for the mullion.

9 Specify a width and depth for the mullion.

   These dimensions are used to calculate the center point of the mullion for aligning the profile and also to specify a boundary for the adjacent infill.

10 Select Use Profile.

   NOTE The Profile options are available only if you have profiles in the current drawing.

11 Select a profile from the list.

   By default, the profile is inserted using the same width and depth with which it was created.

12 To adjust the size of the profile to fit within the width or depth dimension of the mullion, select Auto-Adjust Profile Width or Depth.

13 To mirror the profile, select X or Y for Mirror In.

14 To rotate the profile, specify a rotation angle for Rotation.

15 Specify any offsets.

   For more information, see Specifying Offsets for the Mullions of a Curtain Wall Unit on page 1047.

16 Click OK.

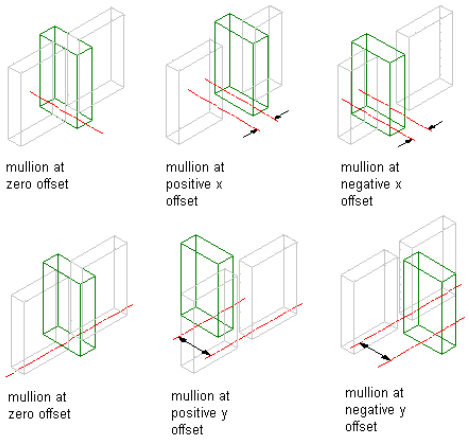
After you create a mullion definition, you can assign it to any mullion in a curtain wall unit. For more information, see Assigning Definitions to the Mullions of a Curtain Wall Unit on page 1057.

Specifying Offsets for the Mullions of a Curtain Wall Unit

Use this procedure to define mullions that are offset from the start or end of the curtain wall unit to lengthen or shorten the edge or offset in the X or Y direction to shift the edge. For example, you might want to represent butt glazing by offsetting the mullions to be behind glass panel infills.

Offset	Description
X	For vertical mullions, a positive X offset moves the mullions toward the end of the curtain wall unit, while a negative X offset moves the mullions toward the start of the curtain wall unit. For horizontal mullions, a positive X offset moves the mullions toward the top of the curtain wall unit, while a negative X offset moves the mullions toward the bottom of the curtain wall unit.
Y	In Plan view, a positive Y offset moves the mullions above the baseline, while a negative Y offset moves the mullions below the baseline.
Start	Negative Start offset lengthens the mullions beyond the start point, while a positive Start offset shortens the mullions.
End	Negative End offset lengthens the mullions beyond the end point, while a positive End offset shortens the mullions.

Specifying mullion offsets



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Mullions under Element Definitions.
6. Select a mullion definition from the list.
7. Specify an offset distance for the X, Y, Start, or End.
8. Click OK.

Removing a Mullion Definition from a Curtain Wall Unit Style

Use this procedure to remove a mullion definition from the Mullions definitions list. You cannot remove a mullion definition if it is assigned to a mullion. In addition, you cannot remove the default mullion definition, but you can modify it as needed.

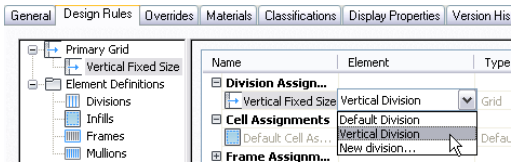
NOTE For information about removing mullions from between cells, see Removing Mullions from a Curtain Wall Unit Grid on page 1059.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select Mullions under Element Definitions.
6. Select the unneeded mullion definition from the list.
7. Click the Remove Mullion icon to remove the mullion definition.
8. Click OK.

Assigning a Division to a Curtain Wall Unit Grid

Use this procedure to assign a division to a curtain wall unit grid. A division defines the grid orientation (whether the direction of the grid cells and mullions is horizontal or vertical) and the division type (number and size of cells).

After you define a division, you can assign it to the primary grid or to nested grids. Nested grids are created by selecting Nested Grid as the cell assignment. For more information, see Working with Nested Grids in Curtain Walls on page 961.



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select the grid you want to assign a division to. The name of the grid you select is displayed in the table under the Division Assignment row.

   TIP To rename a grid, select it, and click Rename, and enter a new name.

6. Click the Element column for that grid and select a division definition from the list.
7. Click OK.

Assigning Infills to Curtain Wall Unit Cells

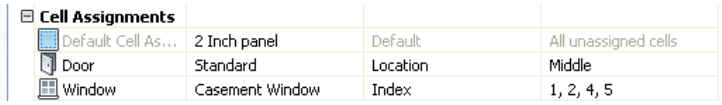
An infill defines the contents of a curtain wall unit cell. A curtain wall unit cell can have the default simple panel or contain a nested grid, an AEC Polygon, door, window, or door/window assembly style. The object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically

represent glazing or other plain cladding, such as stone or concrete. For more information, see Defining Infills for Curtain Wall Unit Cells on page 1036.

Cell Assignments

A cell assignment defines the infill definition used for the cells. You can use one cell assignment to assign the same infill to all cells, or you can create multiple cell assignments to assign different infills to different cells.

Cell assignments



Do not assign multiple definitions to the same cell because only the last definition assigned to the cell is used.

Default Cell Assignment

The default cell assignment is used by all unassigned cells. You can modify the default assignment to be any type of infill, but you cannot delete the default cell assignment.

You may want to modify the default cell assignment to use the infill definition that occurs most frequently in your design. Any cells not assigned to other infills then use this infill definition.

Materials and Display Properties of Infills

The layer, color, linetype, and other display properties of the default infill are applied to all infills unless you assign materials to the infills you created or you create a custom display component for each definition. You can then control the display of each infill definition independently. For more information, see Specifying the Display of Curtain Wall Units on page 1061.

Creating a Nested Grid in a Curtain Wall Unit

Use this procedure to create a nested grid in a curtain wall unit. A nested grid is a grid within a grid. Each nested grid has its own division, cell assignments, frame, and mullions. By default, the frame is turned off for nested grids.

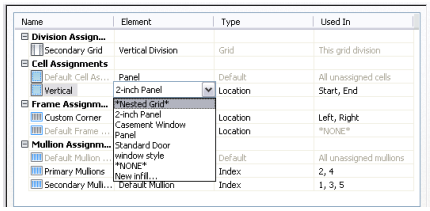
For more information, see Working with Nested Grids in Curtain Walls on page 961.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to create a nested grid.
6. Click the New Cell Assignment icon.

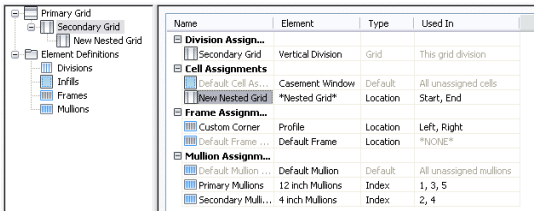
   A new cell assignment is displayed in the list of cell assignments.
7. Click New Cell Assignment, and enter a descriptive name for the assignment.
8. Select Nested Grid in the Element column.

   A new grid is added to the list of grids in the tree view to the left of the dialog box. If you are editing the primary grid, the new grid is added at the secondary level. If you are editing a grid at the secondary level, the additional grid is placed at the tertiary level, and so on.

Creating a nested grid



New nested grid in tree



NOTE To rename a grid, select it in the right pane, right-click and click Rename, and enter a new name.

9 Specify the cells to contain this nested grid.

For more information, see Specifying Which Curtain Wall Unit Cells Use a Cell Assignment on page 1053.

10 Click OK.

Inserting a Door, Window or Door/Window Assembly into a Curtain Wall Unit Cell

Use this procedure to add doors, windows and door/window assemblies to a curtain wall unit. For more information, see Defining Infills for Curtain Wall Unit Cells on page 1036

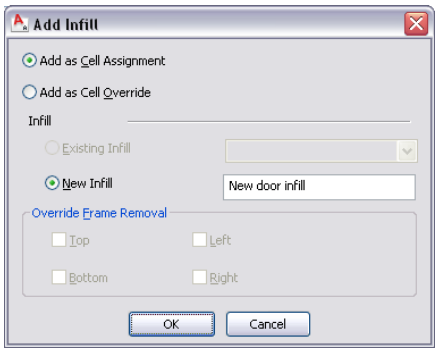
1 Open the tool palette that you want to use, and select a door, window or door/window assembly.

2 Select the curtain wall unit in which to insert the door, window or door/window assembly.

You can move or hide the Properties palette to expose more of the drawing area.

3 Select the curtain wall unit cell marker for the cell in which to insert the door, window or door/window assembly.

The Add Infill worksheet displays.



4 Select the insertion method for the door, window or door/window assembly:

If you want to…	Then…
add the door, window or door/window assembly as a cell assignment and have all curtain wall units using the same style display the same object added in a corresponding cell	select Add as Cell Assignment.
add the door, window or door/window assembly exclusively to the selected curtain wall unit	select Add as Cell Override.

If a door, window or door/window assembly of the style you selected already exists in your drawing, Existing Infill is selected by default.

5 Select the type of infill for the door, window or door/window assembly:

If you selected…	Then…
Add as Cell Assignment and you want to insert a door, window or door/window assembly of the existing style, Existing Infill is selected by default.	Click OK.
Add as Cell Assignment and you want to insert a door, window or door/window assembly of a different style than exists in your drawing	select New Infill, enter a name for the object and click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of the existing style and not modify the edge of the frame surrounding the object	Click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of a different style than exists in your drawing and not remove an edge of the frame surrounding the object	select New Infill, enter a name for the object and click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of the existing style and remove an edge of the frame surrounding the object	select Top, Bottom, Left, or Right for Override Frame Removal and click OK.
Add as Cell Override and you want to insert a door, window or door/window assembly of a different style than exists in your drawing and remove an edge of the frame surrounding the object	select New Infill and enter a name for the object. Then select Top, Bottom, Left, or Right for Override Frame Removal and click OK.

6 Press *ENTER*.

Filling a Curtain Wall Unit Cell with a Simple Panel

Use this procedure to fill a curtain wall unit cell with a simple panel. Simple panels are generally used to represent basic cladding materials in the curtain wall, such as a stone wall panel or a concrete panel.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to put a simple panel infill.
6. Click the New Cell Assignment icon.

   A new cell assignment is displayed in the list of cell assignments.
7. Click New Cell Assignment, and enter a descriptive name for the assignment.
8. Under Element, select an infill that defines a simple panel.

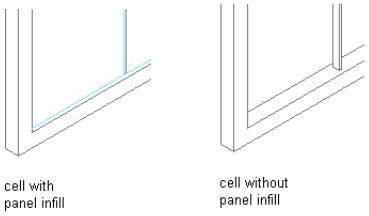
   If you do not have a simple panel infill defined, select New Infill and define one. For more information, see Creating a Panel Infill for a Curtain Wall Unit on page 1036.
9. Specify the cells to contain this simple panel.

   For more information, see Specifying Which Curtain Wall Unit Cells Use a Cell Assignment on page 1053.
10. Click OK.

Removing an Infill from a Curtain Wall Unit Cell

Use this procedure to remove the infill of a cell and leave the cell empty. To do this, use None as the element definition. Using None also removes any frame edges that border the cell, but it does not affect the mullions.

Removing an infill assignment from a cell



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select the grid that contains the cells you want to assign to None.
6. Create a new cell assignment or select an existing cell assignment.
7. Select None under the Element column.
8. Specify the cells to contain the None infill.

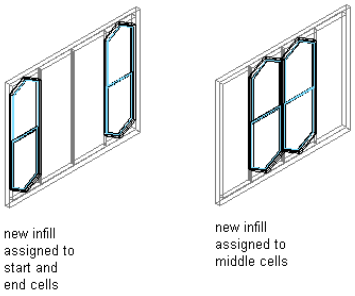
   For more information, see Specifying Which Curtain Wall Unit Cells Use a Cell Assignment on page 1053.
9. Click OK.

Specifying Which Curtain Wall Unit Cells Use a Cell Assignment

When you create a cell assignment you need to specify the cells in the grid to use that assignment. There are two options for selecting cells:

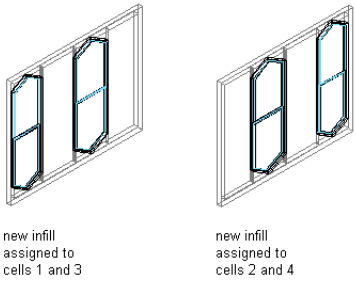
- Use Location to insert the infill into the start, middle, or end cells of a vertical grid or into the bottom, middle, or top cells of a horizontal grid. If there is an even number of cells (four or more), Middle refers to the two cells in the middle of the grid. If there is an odd number of cells (three or more), Middle refers to one cell in the middle of the grid.

  Specifying cell assignments by location



- Use Index to insert the infill into specific cells based on cell numbers. Cells are numbered from start to end or bottom to top. For example, typing 1, 3, 5 would place the infill in the first, third, and fifth cells.

  Specifying cell assignment by index



Any cells that are not assigned a specific cell assignment use the default infill.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select a grid.
6. Under the Type column, select Location or Index.
7. Select a cell assignment:

If you selected …	Then …
Location	click the Used In column, and click the button at the far right of the row. Select the cells you want to use this assignment, and click OK.
Index	enter the cell numbers separated by commas in the Used In column. For vertical grids, cells are numbered

If you selected …	Then …
	from start to end and for horizontal grids, cells are numbered from bottom to top.

NOTE Do not assign multiple definitions to a cell because the last definition assigned to the cell is used.

8 Click OK

Removing an Assignment from a Curtain Wall Unit Style

Use this procedure to remove cell assignments, frame assignments, and mullion assignments from a curtain wall unit style. You cannot remove default assignments, but you can modify them to suit your needs.

NOTE Each grid requires one division assignment. Therefore, you cannot remove the division assignment, although you can change the division element used for the division assignment.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select the grid from which you want to remove an assignment.

6 Select a cell assignment, frame assignment, or a mullion assignment.

7 Click the Remove Assignment icon.

8 Click OK twice.

Assigning Definitions to Curtain Wall Unit Frames

The curtain wall unit frame is represented by the outer edges of the primary grid. Each nested grid has its own frame that is defined separately from the primary grid frame. By default, the frames of nested grids are turned off. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

Frame Assignments

A frame assignment defines the frame definition that is used by each frame edge. You can use one frame assignment to assign the same definition to all four edges of the frame, or you can create multiple frame assignments to assign different definitions to different edges of the frame. Unassigned edges are not displayed.

Do not assign multiple definitions to the frame edge because the last definition assigned to the edge is used.

Default Frame Assignment

There is a default frame assignment, and you can select the frame edges it applies to. You can modify the default assignment to use any frame definition, but you cannot delete the default frame assignment.

Materials and Display Properties of Frames

The layer, color, linetype, and other display properties of the default frame are applied to all frame edges unless you assign materials to the frame definition or you create a custom display component for each definition. You can then control the display of each frame definition independently. For more information, see Specifying the Display of Curtain Wall Units on page 1061.

Adding a New Frame Assignment to a Curtain Wall Unit

Use this procedure to add a frame assignment to a curtain wall unit. To assign different definitions to different frame edges, you need multiple frame assignments.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

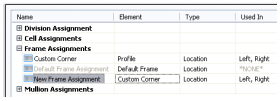
4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to create a new frame assignment.

6 Click the New Frame Assignment icon.

A new frame assignment is displayed in the list of frame assignments.

New frame definition



7 Click New Frame Assignment and enter a descriptive name for the assignment.

8 Select a frame definition from the Element column.

9 Specify the sides of the frame to use this frame assignment.

For more information, see Specifying Which Curtain Wall Unit Edges Use a Frame Assignment on page 1056.

10 Click OK.

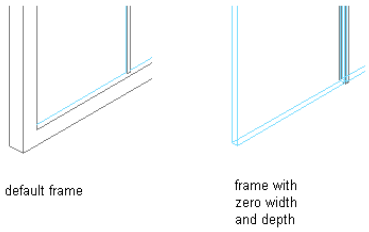
Removing a Frame Edge from a Curtain Wall Unit

Use this procedure to remove a frame edge from a curtain wall unit. There are three ways to remove a frame edge:

- Set the width and depth of the edge to zero
- Leave the edge unassigned
- Specify None as an override to the edge assignment

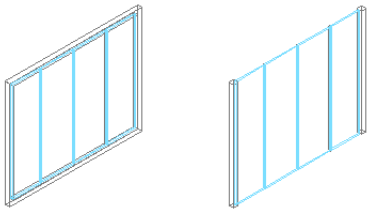
The first two methods remove the frame edge and expand the adjacent infills into the space occupied by the edge.

Specifying a frame width and depth of zero



By specifying None as an override, the frame edge is not displayed, but the adjacent infill is not expanded into the space the edge occupied.

Overriding a frame edge definition



For information about setting the width and depth to zero, see Defining a Curtain Wall Unit Frame by Width and Depth on page 1040.

For information about leaving the edge unassigned, see Specifying Which Curtain Wall Unit Edges Use a Frame Assignment on page 1056.

Specifying Which Curtain Wall Unit Edges Use a Frame Assignment

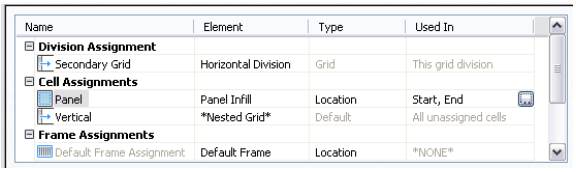
Use this procedure to specify edges that use a frame assignment. When you create a frame assignment, you need to specify the edges of the frame to use that assignment.

Frame edges that are not assigned a frame definition are not displayed.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select a grid.
6. Select a frame assignment.

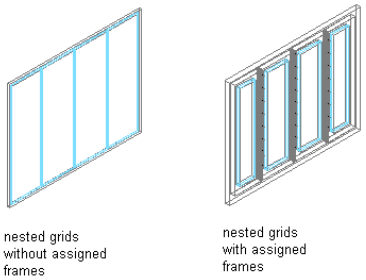
   Location is the only way to specify the frame edges.
7. Click the Used In column, and then click the [...] button at the far right of the row.

   Specifying frame location



8. Select the edges that you want to use this assignment - Left, Right, Top, or -Bottom - and click OK.

   Assigning frames to nested grids



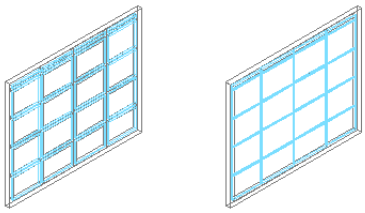
Do not assign multiple definitions to the same frame edge because only the last definition assigned to the edge is used.

9 Click OK.

Assigning Definitions to the Mullions of a Curtain Wall Unit

The mullions of a curtain wall unit are the edges between the grid cells. The primary grid and each nested grid have mullions that are defined separately from the other grids. For more information about nested grids, see Working with Nested Grids in Curtain Walls on page 961.

Assign mullions to a nested grid



nested grids without assigned mullions

nested grids with assigned mullions

Mullion Assignments

A mullion assignment defines the definition used by each mullion. You can use one assignment to define all mullions, or you can create multiple assignments and assign different definitions to different mullions in any grid.

Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

Default Mullion Assignment

There is a default mullion assignment used by all unassigned mullions. You can modify the default assignment to be any mullion definition, but you cannot delete the default mullion assignment.

Adding a New Mullion Assignment to a Curtain Wall Unit Style

Use this procedure to add a new mullion assignment to a curtain wall unit style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

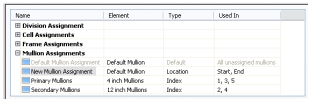
4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to create a new mullion assignment.

6 Click New Mullion Assignment.

A new mullion assignment is displayed in the list of mullion assignments.

New mullion assignment



7 Select the mullion assignment, right-click and click Rename, and then enter a descriptive name.

8 Select a mullion definition from the Element column.

9 Specify the mullions to use this assignment.

For more information, see Specifying Which Curtain Wall Unit Mullions Use an Assignment on page 1058.

10 Click OK.

Specifying Which Curtain Wall Unit Mullions Use an Assignment

When you create a mullion assignment you need to specify the mullions in the grid to use that assignment. There are two options for selecting mullions:

- Use Location to assign a definition to the start, middle, or end mullions of a vertical grid or the bottom, middle, or top mullions of a horizontal grid. If there is an even number of mullions (four or more), Middle refers to the two mullions in the middle of the grid. If there is an odd number of mullions (three or more), Middle refers to the one mullion in the middle of the grid.
- Use Index to assign a definition to specific mullions based on mullion numbers. Mullions are numbered from start to end or bottom to top. For example, entering **1, 2, 3** would assign the definition to the first, second, and third mullions.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select a curtain wall unit style.

4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 Create a new mullion assignment or select an existing assignment.

7 Select Location or Index for Type.

8 Select a cell assignment.

If you selected …	Then …
Location	click the Used In column, and click the button at the far right of the row. Select the cells you want to use this assignment, and click OK.
Index	enter the mullion numbers separated by commas in the Used In column. For vertical grids, mullions are numbered start to end and for horizontal grids, mullions are numbered from bottom to top.

NOTE Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

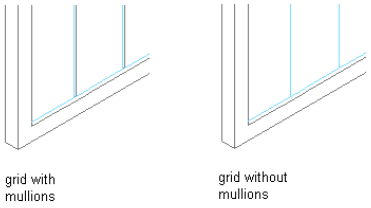
9 Click OK.

Any mullions that are not assigned a specific mullion assignment use the default mullion definition.

Removing Mullions from a Curtain Wall Unit Grid

Use this procedure to remove a mullion from the curtain wall unit. You can create a mullion definition whose edge width and depth are zero. Adjacent infills expand to fill in the space that was occupied by the mullion. This is an effective way to represent butt glazing.

Removing mullions from a curtain wall unit grid



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select a curtain wall unit style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to remove a mullion.
6. Create a new mullion assignment and enter **0** (zero) for the width and depth.

   For more information, see Defining Curtain Wall Unit Mullions by Width and Depth on page 1044.
7. Under Mullion Assignments, select the mullion definition you created for any cell edges of any mullion assignment where you want to remove the mullions.

   For more information, see Specifying Which Curtain Wall Unit Mullions Use an Assignment on page 1058.
8. Click OK.

Specifying the Materials of a Curtain Wall Unit Style

A curtain wall unit consists of a number of components whose display properties can be determined by the materials assigned to each component.

When you assign materials to a curtain wall unit style, you assign one material to each display component of the curtain wall unit. For example, you assign a wood material to the frame and a glass material to the glass inset. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the curtain wall unit style, instead of using material display properties, you can turn off the material assignments in the display properties of the curtain wall unit style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three dimensional (3D) model views and in elevations.

Curtain Wall Unit Materials and Display Components

The following table identifies the material component that corresponds to each curtain wall unit component in the specified views.

Curtain Wall Unit Component	Material Component
Plan, Plan High Detail, Plan Low Detail, Screened, Reflected Plan	
Frame Definitions	Linework
Mullion Definitions	Linework
Infill Definitions	Linework
Frame Definitions Hatch	Linework
Mullion Definitions Hatch	Linework
Infill Definitions Hatch	Linework
Model	
Frame	3D Body
Mullion	3D Body
Infill	3D Body

Assigning Materials to a Curtain Wall Unit Style

Use this procedure to assign materials to the individual components of a curtain wall unit style. When you assign a material to a curtain wall unit component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the curtain wall unit. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, the frame, mullion, and infill are physical components of a curtain wall unit. The cell marker is a symbolic component.

NOTE If a material assignment does not determine the display properties of a curtain wall unit component, you can change the display properties of the curtain wall unit style as described in Specifying the Display of Curtain Wall Units on page 1061.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

If the setting for By Material is not available, the display of this component cannot be determined by a material.

9 Click the Materials tab.

10 Select the component you want to change, select the value for Material Definition, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

11 Click OK.

Specifying the Display of Curtain Wall Units

The display of a curtain wall unit depends on the direction from which you view the curtain wall unit. In Plan view, the curtain wall unit is displayed as parallel lines with vertices marking the grid lines, as an architect would typically draw a curtain wall unit. In 3D isometric views, the curtain wall unit is displayed as it would appear in the real world, with surfaces showing length, thickness, and height. You control what you want to display in each particular view.

Element Definitions and Custom Display Components

By default, the display of all infills, frames, and mullions are controlled by the display properties of the default infill, default frame, and default mullions. However, you can add individual element definitions as components with separate display properties. For example, if you define two infills called stone panel and acetylene panel, by default they are both controlled by the same default infill display properties. However, you can add each definition as a new display component and control the display properties separately.

NOTE The component name in the Custom Display Component dialog box must match the name of element definition in the Design Rules tab. Otherwise the element definition does not display properly.

For more information about the display system, see Display System on page 513.

Materials and Display Properties

You can use materials to control the display of both default and custom infills, frames, and mullions. When you assign materials to the element definitions you create, you do not need to define these definitions as custom display components. For more information, see Specifying the Materials of a Curtain Wall Unit Style on page 1059.

Adding Curtain Wall Unit Element Definitions as Display Components

Use this procedure to add curtain wall unit element definitions. Before you can control the display properties of curtain wall unit elements according to the definition assigned to the element, you must create display components for each element definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select the curtain wall unit style that you want to change.

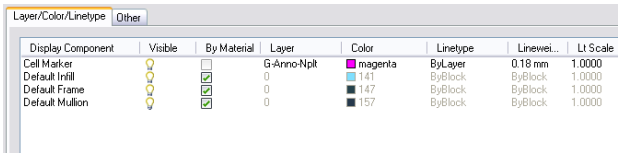
4 Click the Display Properties tab.

5 Select Model as the display representation.

6 Click .

The default list of components includes only the three basic elements and cell markers.

Default Model display components for curtain wall units



7 Click the Other tab, and then click Add.

8 Select Infill, Frame, or Mullion for Component Type.

9 Enter a name for Component Name, or click Select Element and select an element from the list.

10 Click OK.

11 Click the Layer/Color/Linetype tab.

The element definition that you added is displayed in the list of components.

12 Click the Other tab to continue adding element definitions, or click OK twice.

Specifying the Layer, Color, and Linetype of a Curtain Wall Unit Style

Use this procedure to change the following display properties of the components of a curtain wall unit style:

- Visibility (component is on or off)
- By Material
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.

3 Select the curtain wall unit style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear.

6 Click Style Override.

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK twice.

Specifying the Hatching for Components of a Curtain Wall Unit Style

Use this procedure to specify the hatching of the components of a curtain wall unit style. Curtain wall hatching is displayed only in display representations, such as Plan, that are used in Top view (Plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select the curtain wall unit style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override.
6 Click the Hatching tab.
7 Select a component, and click the setting for Pattern.
8 Specify the hatching for the component:

If you want to select …	Then …
a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
single hatching	select User-defined for Type, and clear Double Hatch.
double hatching	select User-defined for Type, and select Double Hatch.
solid fill	select Solid Fill for Type.

9 Click OK.
10 Click the setting for Scale/Spacing, and enter a value that determines how the selected pattern is repeated.
11 Click the setting for Angle, and enter the angle for the selected pattern.
12 Click the setting for Orientation, and specify how the hatching is oriented:

If you want to orient the hatching …	Then …
to the object, regardless of the object rotation	select Object.
to the World Coordinate System	select Global.

13 Click OK twice.

Adding Custom Graphics as a Display Component of a Curtain Wall Unit

There may be instances where an infill, frame, or mullion requires a custom two-dimensional (2D) or three-dimensional (3D) graphic. For example, you might need a highly detailed three-dimensional truss as the mullions or a decorative light fixture applied to an infill. In cases like these, you can create a custom block, add a display component with the block attached, and associate that component with an element definition. When you assign that definition to an element, the block is also displayed.

1 Draw your custom component and save it as a block.
2 Select a curtain wall unit, right-click, and click Edit Curtain Wall Unit Style.
3 Click the Display Properties tab.
4 Click .
5 Click the Custom Plan Components tab.

If Model is the current display representation, the tab is called Other.

6 Click Add.

7 Select Infill, Frame, or Mullion for Component Type.

8 Select the specific element from the list.

9 Select Draw Custom Graphics.

10 Specify the display of the component:

If you want to …	Then …
display the block instead of the associated curtain wall unit element	select Replace Graphics.
superimpose the block over the curtain wall unit element so that both are displayed	clear Replace Graphics.

11 Click Select Block, and select the custom block that you created.

12 Click OK.

13 Specify further settings for the custom display block:

If you want to …	Then …
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.
mirror the block	determine if it should mirror in the X, Y, or Z direction.
offset the block from the grid	specify the offset in the X, Y, or Z direction.

14 Click OK three times.

Creating Cut Planes for a Curtain Wall Unit

Use this procedure to specify the properties of one or more cut planes for a curtain wall unit style. Cut plane display properties apply only to display representations, such as Plan, that are used in Top view (Plan view) of a drawing.

To better visualize the elements of a curtain wall unit in Plan view, you can create cut planes. The main cut plane is where the shrinkwrap and hatching are applied. The plan display shows the components and objects in the wall as they are displayed at the height of each cut plane.

1 Select a curtain wall unit.

2 Click Curtain Wall Unit tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

3 Click the Display Properties tab.

4 Select Plan, and click .

NOTE The Cut Plane tab is displayed only in some display representations, such as Plan.

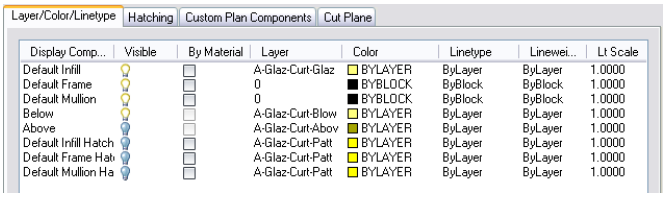
5 Click the Cut Plane tab to set the cut plane to be displayed in each display representation for the curtain wall unit style.

6 Enter a value for Cut Plane Height to specify the cut plane at which hatching takes effect.

7 To specifically define a cut plane, click Add, and enter the height of the new cut plane:

If you add a cut plane …	Then …
at a height that is lower than the value for Cut Plane Height	objects are displayed using the properties specified for the Below Cut Plane component on the Layer/Color/Linetype tab.
at a height that is higher than the value for Cut Plane Height	objects are displayed using the properties specified for the Above Cut Plane component on the Layer/Color/Linetype tab.

Below and Above components



You can click Remove to delete a cut plane that you added.

8 Click OK to exit all dialog boxes.

Defining a Curtain Wall Unit Style as Bounding for Associative Spaces

Use this procedure to define a curtain wall unit style that can bound associative spaces.

When a curtain wall unit style is set as bounding, by default all curtain wall units that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the curtain wall unit style in an individual curtain wall unit, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select a curtain wall unit style.
4 Click the General tab.
5 Select the checkbox for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Curtain Wall Unit Style

Use this procedure to enter notes and attach reference files to a curtain wall unit style. You can also edit notes and edit or detach reference files from a curtain wall unit style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Curtain Wall Unit Styles.
3 Select the curtain wall unit style you want to change.
4 Click the General tab.
5 To add a description to the curtain wall unit style, enter the description for Description.
6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Using Overrides in Curtain Wall Units

Curtain wall units are subunits of geometrically complex curtain walls, which often have a large number of different elements, like frames, panels, and infills. Most of these settings are defined in the style. However, there are cases when modifying a curtain wall unit directly on screen is more suitable:

- You want to add custom frame or mullion edges to a curtain wall unit and need direct visual feedback.
- You want to create an override, like a merged infill or nested grid, in only one specific place in the curtain wall unit.
- You want to experiment with different visuals without having to change the curtain wall unit style for each idea immediately.

When you have finished your onscreen edits, you can decide if you want to

- Apply the overrides to the curtain wall unit you have edited.
- Save the overrides to the current curtain wall unit style.
- Create a new style for the overrides.

Overrides you can set include assigning a different definition to a selected cell, frame, or mullion, and assigning a profile to a frame or mullion edge. Note that the definition or profile must already exist in the current drawing before you can use it as an override.

Overrides do not affect the Design Rules for the curtain wall unit style. However, you can transfer overrides to a curtain wall unit style if you want all curtain wall units of that style to have the same overrides.

You can view a list of overrides that are currently assigned to a curtain wall unit from the Overrides tab of the Curtain Wall Unit Properties dialog box. For more information, see Removing Curtain Wall Unit Overrides on page 1083.

NOTE Overrides are also listed on the Overrides tab in the Curtain Wall Unit Style Properties dialog box.

Overriding Curtain Wall Unit Infills

The cell infills of a curtain wall unit are set in the curtain wall unit style. You can however, create overrides for these infill overrides in cells. For example, you might want a row of normal rectangular panel infills for a first floor facade. In one specific position, however, you want a decorative nested grid. In this case, you

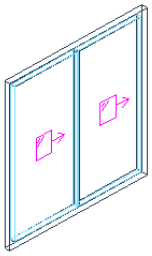
would set the row of concrete panels in the curtain wall unit style, and then override the panel at one specific place with the nested grid.

Curtain wall unit infills can consist of simple panels or nested grids. You can change one infill for another, merge cells, or remove frames from an infill altogether.

Turning on Cell Markers for Curtain Wall Units

Use this procedure to turn on the cell markers for each grid cell in a curtain wall unit. The cell markers must be on in order to select individual cells and make changes to them.

Viewing Cell Markers



1 Select the curtain wall unit for which you want to create an infill override.

2 Click Curtain Unit Wall tab ➤ Modify panel ➤ Show Infill Markers .

Merging Curtain Wall Unit Cells

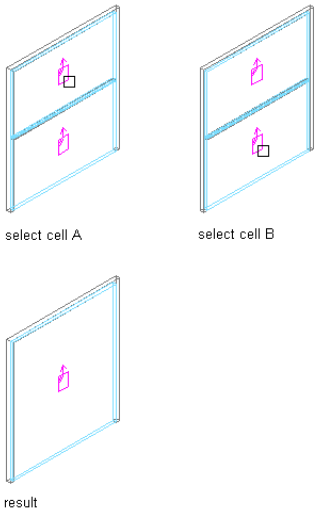
Use this procedure to merge two curtain wall unit cells.

NOTE To merge curtain wall unit cells, the cell markers need to be visible. For information on turning on cell markers, see Turning on Cell Markers for Curtain Wall Units on page 1067.

You can only merge cells that are adjacent to each other.

In most cases, you merge cells with the same infill type. The merged cell is then of the same type as the original cells. For example, if you merge two solid panel infills, the resulting merged cell also has a solid panel infill. In some cases, however, you might want to merge two cells that have different infill types. In that case, the infill type of the first selected cell is used for the merged cell. For example, if you want to merge a cell with a simple panel infill and a cell with a nested grid, and you select the cell with the simple panel first during the merge command, the merged cell contains a simple panel infill, and not a nested grid. If you select the two cells in the opposite order, the merged cell contains a nested grid and no simple panel infill.

Merging two cells



1 Select the curtain wall unit on which you want to merge two cells.

2 Click Curtain Wall Unit tab ➤ Modify panel ➤ Infill drop-down ➤ Merge.

3 Select the first cell to be merged.

4 Select the second cell to be merged.

The cells are merged into one.

5 Specify where you want to save the curtain wall unit override.

If you want to save the override …	Then …
only on this specific curtain wall unit	no further steps are necessary. The override is saved to the curtain wall unit. For information about how to remove an override from a curtain wall unit, see Removing Curtain Wall Unit Overrides on page 1083.
to a curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you have chosen to save the override to a curtain wall unit style, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style, and decide to which curtain wall unit style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall unit style	select Transfer Merge Operations to Style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style checkbox is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

If you want to save the override …	Then …
to a new curtain wall unit style	select Transfer Merge Operations to Style, and click New. Enter a name for the new curtain wall unit style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style checkbox is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides still remain on the curtain wall unit, where they can be removed as described in Creating a Curtain Wall Unit Infill Override on page 1069, but they are not saved back to a curtain wall unit style.

Creating a Curtain Wall Unit Infill Override

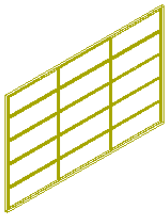
Use this procedure to override the infill of a curtain wall unit cell.

For example, you might have a row of simple concrete panels in your curtain wall unit, but want in one location a nested grid instead of the concrete panel. In that case, it might be simpler to use an infill override, instead of creating a complex curtain wall unit style setting.

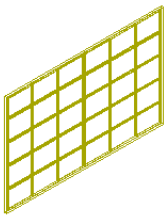
NOTE To override an infill assignment, the cell markers need to be visible. For information on turning on cell markers, see Turning on Cell Markers for Curtain Wall Units on page 1067.

To exchange an infill definition, the new infill definition must already be defined in the curtain wall unit style. For information on creating infill definitions, see Defining Infills for Curtain Wall Unit Cells on page 1036.

Overriding a curtain wall unit cell definition



five cell horizontal grid and three cell vertical grid before override

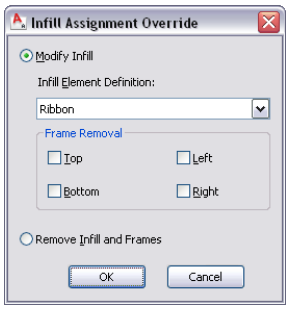


five cell horizontal grid and six cell vertical grid after override

1 Select the curtain wall unit on which you want to override an infill.

2 Click Curtain Wall Unit tab ➤ Modify panel ➤ Infill drop-down ➤ Override Assignment.

3 Select the marker of the cell where you want to create an override.



4 Create the override:

If you want to …	Then …
exchange the existing infill for another	select a new infill definition from the list. **NOTE** To exchange an infill definition, the new infill definition must already be defined in the curtain wall unit style.
remove one or more of the frames around the infill	select the frame component to be removed.
remove the complete infill and its frame	select Remove Infill and Frames. **NOTE** This works only for infills that are bordering the exterior of the curtain wall unit.

5 Click OK.

6 Specify where you want to save the curtain wall unit override.

If you want to save the override …	Then …
only on this specific curtain wall unit	no further steps are necessary. The override is saved to the curtain wall unit. For information about how to remove an override from a curtain wall unit, see Removing Curtain Wall Unit Overrides on page 1083.
to a curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a curtain wall unit style, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style, and decide to which curtain wall unit style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall unit style	select Transfer Cell Overrides to Style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.
to a new curtain wall unit style	select Transfer Cell Overrides to Style, and click New. Enter a name for the new curtain wall unit style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules.The overrides still remain on the curtain wall unit, where they can be removed as described in Removing Curtain Wall Unit Overrides on page 1083, but they are not saved back to a curtain wall unit style.

In-Place Editing of Curtain Wall Unit Cells

Use this procedure to edit curtain wall unit cells using in-place editing with the Edit Grid grip. With in-place editing, you can edit individual cells, bays, columns, or nested grids of the curtain wall unit directly and interactively in the drawing area, and later save the changes to the curtain wall unit or curtain wall unit style.

1 Select a curtain wall unit on which you want to edit cells with in-place editing.

2 Specify the mode in which to edit the curtain wall unit:

If you want to edit …	Then …
this instance of the curtain wall unit	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. If this option is not available, the design rules are already style-based for the curtain wall unit.

3 Click the Edit Grid grip.

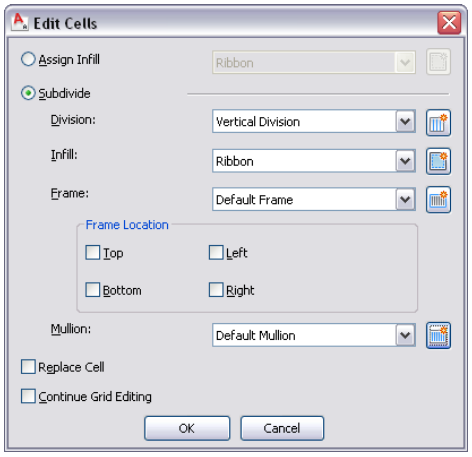
4 Enter **c** (Cell) and press ENTER.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the individual cells, bay, column, or nested grid to modify the cell assignment by hovering over a cell or pressing TAB, and press *ENTER*.

Press CTRL to select multiple cells, bays, columns or nested grids.

The Edit Cells worksheet displays.



6 Edit the cell for the selected grid:

If you want to…	Then…
assign an infill to selected cells	select Assign Infill and select an infill definition. Clear Replace Cell and click OK.
replace the selected cells with a new infill	select Assign Infill and select an infill definition. Select Replace Cell and click OK.
create and assign a new infill to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Curtain Wall Unit Cells on page 1048.
divide the selected cells with divisions, infills or frames	select Subdivision.
select a division for the subdivided cells	select a division definition.
create and assign a new division to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning a Division to a Curtain Wall Unit Grid on page 1048.
select an infill for the subdivided cells	select an infill definition.

If you want to…	Then…
create and assign a new infill to the subdivided cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Curtain Wall Unit Cells on page 1048.
select a frame definition for the grid created after the cell is subdivided	select the frame definition and click OK.
specify the location of frames on the grid created after the cell is subdivided	select Top, Bottom, Left, Right for Frame Location and click OK.
create and assign a new frame definition for the new grid created after the cell is subdivided	click and specify values on the Design Rules worksheet. For more information, see Adding a New Frame Assignment to a Curtain Wall Unit on page 1055.
select a mullion definition for the grid created after the cell is subdivided	select the mullion definition.
create and assign a new mullion definition to the selected grid	click and specify values on the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Curtain Wall Unit Style on page 1057.
replace the existing cell infill with the options selected on this worksheet	select Replace Cell.
continue in-place editing the grid after the cell is subdivided	select Continue Grid Editing.

7 Click OK.

8 Press ENTER.

Overriding Curtain Wall Unit Frames and Mullions

You can change a selected frame edge or mullion edge by using an edge assignment override.

NOTE To exchange a frame edge or mullion edge, the new edge definition must already be defined in the curtain wall unit style.

Removing the edge does not affect the width of the cell. To remove the edge and have the adjacent cell resize, create an edge definition with a width and depth of zero. For more information, see Defining a Curtain Wall Unit Frame by Width and Depth on page 1040or Defining Curtain Wall Unit Mullions by Width and Depth on page 1044.

You can also create a new edge profile by drawing a polyline or using an existing profile in the drawing. This edge profile can be interactively edited onscreen using in-place editing.

Creating a Curtain Wall Unit Frame or Mullion Override

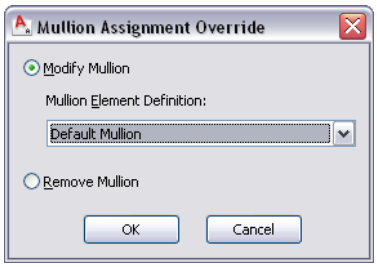
Use this procedure to override an individual frame or mullion in a curtain wall unit.

To exchange a frame or mullion, the new definition must already be defined in the curtain wall unit style. For information on creating frames and mullions, see Defining Curtain Wall Unit Frames on page 1039 and Defining Curtain Wall Unit Mullions on page 1043.

1 Select the curtain wall unit on which you want to override an edge.

2 Click Curtain Wall Unit tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Override Assignment.

3 Select the frame or mullion edge you want to override.



4 Create the override:

If you want to …	Then …
exchange the existing edge for another	select a new edge definition from the list. **NOTE** To exchange an edge definition, the new edge definition must already be defined in the curtain wall unit style.
remove the frame or mullion edge	select Remove Edge.

5 Click OK.

6 Specify where you want to save the curtain wall unit override.

If you want to save the override …	Then …
only on this specific curtain wall unit	no further steps are necessary. The override is saved to the curtain wall unit. For information about how to remove an override from a curtain wall unit, see Removing Curtain Wall Unit Overrides on page 1083.
to a curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a curtain wall unit style, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style, and decide to which curtain wall unit style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall unit style	select Transfer Edge Overrides to Style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.
to a new curtain wall unit style	select Transfer Edge Overrides to Style, and click New. Then, enter a name for the new curtain wall unit style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

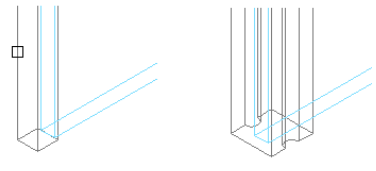
NOTE If you do not want to save the override back to a style at all, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides still remain on the curtain wall unit, where they can be removed as described in Removing Curtain Wall Unit Overrides on page 1083, but they are not saved back to a curtain wall unit style.

Creating a Curtain Wall Unit Frame or Mullion Edge from a Polyline or Profile

You can assign a profile to any vertical edge of a frame or mullion. The profile can be any profile or any closed polyline that you specify. You can use a profile edge to create a unique corner in situations where a simple miter is not sufficient.

NOTE Adjacent infills are not trimmed or expanded to accommodate the new edge. To adjust the infill, change the width of the frame edge. For more information, see Defining a Curtain Wall Unit Frame by Width and Depth on page 1040.

Overriding edge profile



1 Draw a closed polyline in the location where you want it to display in the curtain wall unit.

NOTE For best results, it is recommended that you draw the polyline in Plan view.

2 Select the curtain wall unit for which you want to create a frame or mullion edge profile override.

3 Click Curtain Wall Unit tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Add Profile.

4 Select a vertical frame or mullion edge.

5 Select a profile for the override:

If you want to create the edge profile …	Then …
from the polyline drawn in step 1	select it in the drawing, and enter a name for it. Click OK.
from an existing profile in the drawing	press *Enter*, select the profile, and click OK.

6 Specify where you want to save the curtain wall unit override.

If you want to save the override …	Then …
only on this specific curtain wall unit	no further steps are necessary. The override is saved to the curtain wall unit. For information about how to remove an override from a curtain wall unit, see Removing Curtain Wall Unit Overrides on page 1083.
to a curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a curtain wall unit style, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style, and decide to which curtain wall unit style you want to save the override.

If you want to …	Then …
to the current curtain wall unit style	select Transfer Edge Profile Overrides to Style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Edge Profile Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

If you want to …	Then …
to a new curtain wall unit style	select Transfer Edge Overrides to Style, and click New. Enter a name for the new curtain wall unit style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Edge Profile Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a division override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules.The overrides still remain on the curtain wall unit, where they can be removed as described in Removing Curtain Wall Unit Overrides on page 1083, but they are not saved back to a curtain wall unit style.

In-Place Editing of Edge Profiles for Curtain Wall Units

Use this procedure to edit profile edges with in-place editing. With in-place editing, you can use edge grips to edit the profile directly and interactively on screen, and later save the changes to the profile definition.

1. Select a curtain wall unit that has the edge profile you want to edit onscreen with in-place editing.
2. Click Curtain Wall Unit tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Edit Profile.

   This command is only available if you have profile-based edges in the curtain wall unit.

   NOTE If the profile is not drawn to size, it must be converted in order for you to begin the in-place editing session. Click Yes if prompted to convert the profile to its actual size.

3. Select the edge you want to edit.

   NOTE You have entered the in-place editing session now. You can see this from the magenta colored grips and light blue hatch of the temporary in-place editing profile, as well as the faded color of all other objects in the drawing. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

4. Edit the profile:

If you want to …	Then …
use grips to edit the profile	move the grips as needed. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary.

If you want to …	Then …
	Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.
add a vertex to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*. Alternatively, you can click Edit In Place tab ➤ Profile panel ➤ Add Vertex .
remove a vertex from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click. Alternatively you can click Edit In Place tab ➤ Profile panel ➤ Remove Vertex .
add a ring to the profile	click Edit In Place tab ➤ Profile panel ➤ Add Ring . Select a closed polyline, spline, ellipse, or circle for an additional ring. Specify if you want to erase the source linework, and press *Enter*.
remove a ring from a profile	click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Select the ring you want to remove. **NOTE** You cannot remove the last ring from a profile.
replace a ring on a profile	click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select a closed polyline, spline, ellipse, or circle for the replaced ring. Specify if you want to erase the source linework, and press *Enter*.

5 Save the changes to the profile.

If you want to …	Then …
change the existing profile definition to reflect the new shape	click Edit in Place tab ➤ Edits panel ➤ Finish .
create a new profile definition with the shape you have created	click Edit in Place tab ➤ Edits panel ➤ Save As . Enter a name for the new profile and click OK. The in-place edit session is exited and the new profile definition is available in the Style Manager.

If you want to …	Then …
discard all changes on the profile and revert back to the previous shape	click Edit in Place tab ➤ Edits panel ➤ Cancel .

In-Place Editing of Curtain Wall Unit Frames and Mullions

Use this procedure to edit frames and mullions using in-place editing with the Edit Grid grip. With in-place editing, you can edit bays, columns or nested grids of the curtain wall unit directly and interactively in the drawing area, and later save the changes to the curtain wall unit or curtain wall unit style.

1 Select a curtain wall unit on which you want to edit frames or mullions with in-place editing.

2 Specify the mode in which to edit the curtain wall unit:

If you want to edit …	Then …
this instance of the curtain wall unit	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. If this option is not available, the design rules are already style-based for the curtain wall unit.

3 Click the Edit Grid grip.

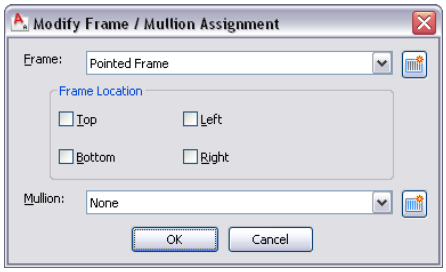
4 Enter **f** (Frame and mullion assignment) and press ENTER.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the bay, column or nested grid to modify the frame and mullion assignment and press *ENTER*.

Press CTRL to select multiple bays, columns or nested grids.

The Modify Frame/Mullion Assignment worksheet displays.



6 Select a frame definition for the selected grid:

If you want to…	Then…
modify the frame of the selected grid	select a frame definition and click OK.
specify the location of the frame on the selected grid	select Top, Bottom, Left, Right for Frame Location and click OK.

If you want to…	Then…
create and assign a new frame definition to the selected grid	click . For more information, see Adding a New Frame Assignment to a Curtain Wall on page 969.

7 Select the mullion definition for the selected grid:

If you want to…	Then…
modify the mullion of the selected grid	select the mullion definition and click OK.
create and assign a new mullion definition to the selected grid	click and complete the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Curtain Wall Style on page 971.

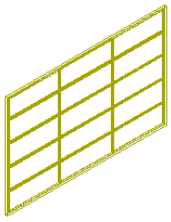
8 Press ENTER.

Overriding Curtain Wall Unit Divisions

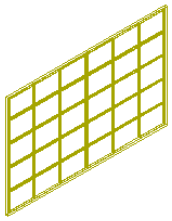
The grid of a curtain wall unit is made up of one or more divisions that define how the curtain wall unit is partitioned. Divisions can be horizontal or vertical and can be nested in each other. For detailed information on curtain wall unit divisions, see Defining Divisions for Curtain Wall Unit Grids on page 1030.

You can override a division in a curtain wall unit, thereby changing the grid of the curtain wall unit.

Overriding number of Curtain Wall Unit cells



five cell horizontal grid and three cell vertical grid before override



five cell horizontal grid and six cell vertical grid after override

Creating a Curtain Wall Unit Division Override

Use this procedure to create a division override on a curtain wall unit.

NOTE To exchange a curtain wall unit division, the new division definition must already be defined in the curtain wall unit style. For information on curtain wall unit divisions, see Defining Divisions for Curtain Wall Unit Grids on page 1030.

1 Select the curtain wall unit for which you want to create a division override.

2 Click Curtain Wall Unit tab ➤ Modify panel ➤ Division drop-down ➤ Override Assignment.

3 Select an edge of the curtain wall unit to determine if a horizontal or vertical division is overridden.

For example, if you want to override the primary horizontal division, you could select the bottom horizontal frame of the curtain wall unit.

TIP The Division Assignment Override dialog box shows you which grid type and which grid division you have selected, e.g., Selected Nested Grid: Secondary Grid, Division Element Definitions: Vertical 3 Cells. If you accidentally selected the wrong division, click Cancel and reselect the correct grid.

4 Select the appropriate division override, and click OK.

5 Specify where you want to save the curtain wall unit override.

If you want to save the override …	Then …
only on this specific curtain wall unit	no further steps are necessary. The override is saved to the curtain wall unit. For information about how to remove an override from a curtain wall unit, see Removing Curtain Wall Unit Overrides on page 1083.
to a curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you have chosen to save the override to a curtain wall unit style, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save To Style, and decide to which curtain wall unit style you want to save the override.

If you want to save the override …	Then …
to the current curtain wall unit style	select Transfer Division Overrides to Style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.
to a new curtain wall unit style	select Transfer Division Overrides to Style, and click New. Enter a name for the new curtain wall unit style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style checkbox is active. If you have also created other overrides, such as a cell merge or a edge override, these checkboxes are available as well. If you also want to save these overrides to the style, select their checkboxes too.

NOTE If you do not want to save the override back to a style at all, click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. The overrides still remain on the curtain wall unit, where they can be removed as described in Removing Curtain Wall Unit Overrides on page 1083, but they are not saved back to a curtain wall unit style.

In-Place Editing of Curtain Wall Unit Divisions

Use this procedure to edit divisions using in-place editing with the Edit Grid grip. With in-place editing, you can edit the curtain wall unit directly and interactively in the drawing area and later save the changes to the curtain wall unit or curtain wall unit style.

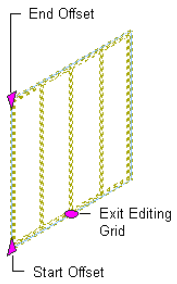
For more information, see Division of Curtain Wall Unit Grids on page 1030.

1. Select a curtain wall unit on which you want to edit divisions with in-place editing.
2. Specify the mode in which to edit the curtain wall unit:

If you want to edit …	Then …
this instance of the curtain wall unit	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the curtain wall unit style	click Curtain Wall Unit tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert To Style Design Rules. If this option is not available, the design rules are already style-based for the curtain wall unit.

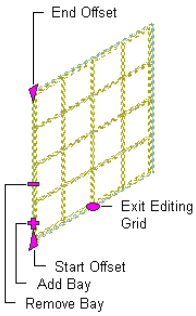
3. Click the Edit Grid grip.
4. Enter **d** (Division in place).

Viewing edit in-place grips for a primary division



NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

Viewing edit in-place grips for adding and removing bays



5 Edit the division:

If you want to …	Then …
add a bay to the grid	click the Add Bay grip.
remove a bay from the grid	click the Remove Bay grip.
change the start offset of the grid	select the Start Offset grip and move it to the position.
change the end offset of the grid	select the End Offset grip and move it to the position.
change the spacing of bays	click the Auto Grid Bay Spacing grip and move it to the position.
manually edit the grid	click Edit In Place tab ➤ Division panel ➤ Convert To Manual .You can manually add and remove gridlines, change the offsets, and change the position of individual gridlines.
use a worksheet to edit the cell dimensions	click the Set Fixed Cell Dimension Rules command grip, and edit the values in the worksheet.

6 Save or discard changes to the curtain wall unit grid:

If you want to exit the in-place editing session …	Then …
without saving your changes	click Edit in Place tab ➤ Edits panel ➤ Cancel .
after saving your changes	click Edit in Place tab ➤ Edits panel ➤ Finish .

7 In the Save Changes dialog box, specify to which division to save the changes:

If you want to …	Then …
save the changes to the style in the current curtain wall unit division	verify the current division is selected for Save Changes to Existing Division, and click Save. The changes are made in the style and affect all curtain wall units of that style in the drawing.
create an override to the style by saving the changes in a new curtain wall unit division	click New, enter a name for the new division override, and click OK. Click Save. The changes are saved as an override to the style, and affect only the curtain wall units to which the override is applied.

Removing Curtain Wall Unit Overrides

Use this procedure to remove curtain wall unit overrides either from the curtain wall unit or the curtain wall unit style.

1 Select the curtain wall unit:

If you want to remove an override …	Then …
from a curtain wall unit	double-click the curtain wall unit. In the Properties palette, expand Advanced, and click the Overrides worksheet.
from the curtain wall unit style	click Curtain Wall tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style, then, click the Overrides tab.

2 Select an override from the list and click Remove.

3 Click OK.

Editing Curtain Wall Units

Most relevant settings for a curtain wall unit are defined in the curtain wall unit style. These include divisions, infills, frames, and mullions. For information on modifying a curtain wall unit style, see Curtain Wall Unit Styles on page 1028.

You can make other changes directly to individual curtain wall units. These changes affect only the curtain wall unit you select:

- Dimensions of a curtain wall unit
- Roof and floor line settings
- Interference conditions
- Cleanup settings

Methods of Editing Curtain Wall Units

AutoCAD Architecture offers several methods for editing curtain wall units:

- You can directly edit curtain wall units using grips for dimensions, base height, location, and other physical characteristics.
- You can directly edit curtain wall units using the Edit Grid grip for grid divisions, cells, frames, and mullions. For more information, see In-Place Editing of Curtain Wall Unit Divisions on page 1082, In-Place Editing of Edge Profiles for Curtain Wall Units on page 1077 and Overriding Curtain Wall Unit Infills on page 1066.
- You can change curtain wall unit settings on the Properties palette.
- You can select editing commands from the context menu for a selected curtain wall unit.

Using Grips to Edit Curtain Wall Units

There are many different curtain wall unit grips. The grips that appear in your drawing when you select a curtain wall unit are dependent upon the design rules of the curtain wall unit. For more information, see Curtain Wall Unit Styles on page 1028.

Editing Curtain Wall Unit Dimensions

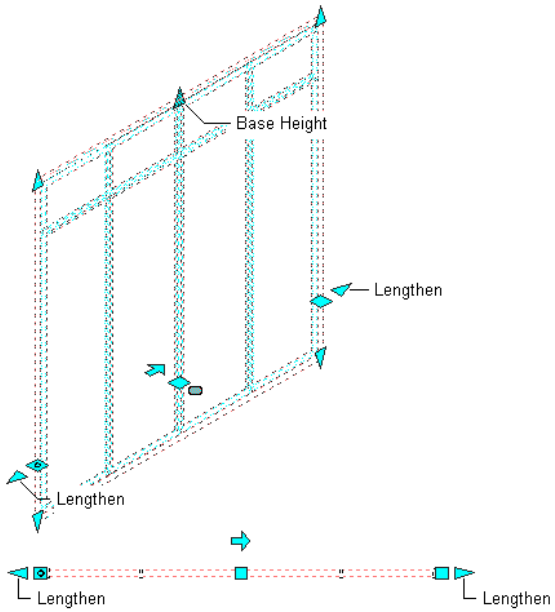
Use this procedure to change the dimensions of a curtain wall unit.

1 Select the curtain wall unit.

2 Select the grip for the dimension you want to change.

You can modify the dimensions of the height and length for a curtain wall unit.

Viewing Curtain Wall Unit Lengthen and Base Height grips



3 Enter a value for the dimension and press *ENTER*, or drag the grip until the dimension value you want is displayed.

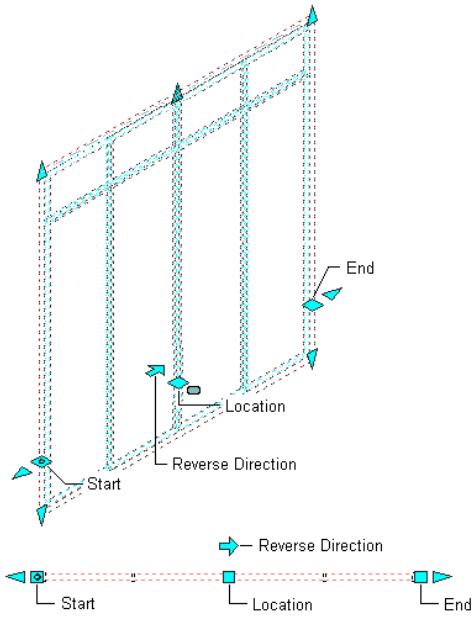
Changing the Location or Position of a Curtain Wall Unit

Use this procedure to change the location or the position of a curtain wall unit with grips.

1 Select the curtain wall unit.

2 Select the appropriate grip to change the location of the curtain wall unit, its start point, or its end point.

Viewing Curtain Wall Unit Start, End, Location, and Reverse Direction Grips



In Model view, the Location grip has three possible edit modes: Edit Along XY Plane, Edit Along YZ Plane, and Edit Along ZX Plane. Press *CTRL* to cycle between modes until you are in the desired mode. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

3 Move the curtain wall unit to the desired location and click once, or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the curtain wall unit along a specific direction. If you enter a value for either of the dimension directions in the current edit mode and then press *TAB*, the movement of the curtain wall unit is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the curtain wall unit is constrained to the *Y* dimension direction.

4 Right-click, and click Deselect All to turn off grips.

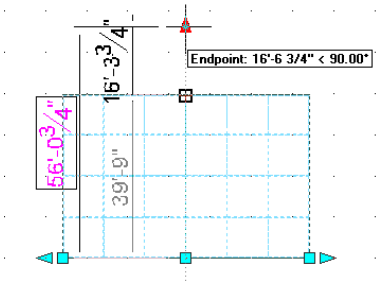
Changing the Base Height of a Curtain Wall Unit

Use this procedure to change the base height of a curtain wall unit. You can also change the base height on the Properties palette.

1 Select the curtain wall unit.

2 Select the Base Height grip, move the grip until the height value you want is displayed, and click once.

As you move the grip, the original base height value is displayed in addition to the new base height and the difference between the two values.



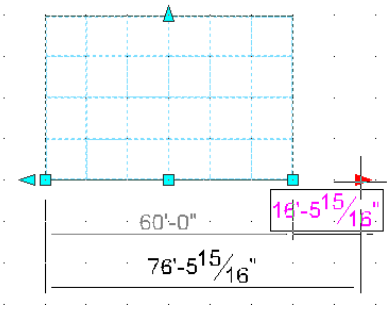
After selecting the grip, you can also enter a new value for the base height of the curtain wall unit.

Changing the Length of a Curtain Wall Unit

Use this procedure to change the length of a curtain wall unit. You can also change the length on the Properties palette. For more information, see Changing the Dimensions of a Curtain Wall Unit on page 1088.

1. Select the curtain wall unit.
2. Select the Lengthen grip, move the grip until the length value you want is displayed, and click once.

   As you move the grip, the original length value is displayed in addition to the new length and the difference between the two values.



After selecting the grip, you can also enter a new value for the length of the curtain wall unit.

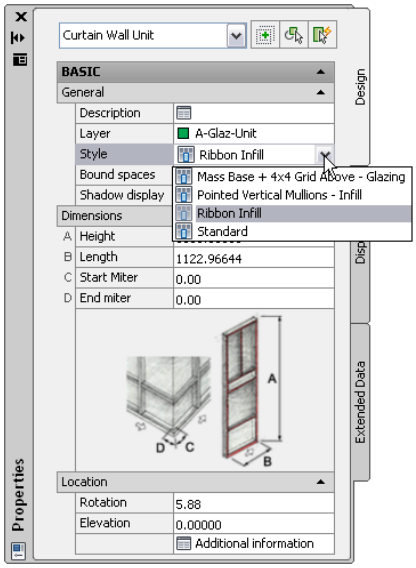
Selecting a Different Curtain Wall Unit Style

Use this procedure to select a different style for the curtain wall unit.

1. Select the curtain wall unit for which you want to change the style.

   You can select multiple curtain wall units and change the style for all at the same time.
2. On the Properties palette, scroll to the General subcategory.

3 Select a different style.



Matching the Properties of an Existing Curtain Wall Unit

Use this procedure to apply the properties of a curtain wall unit tool to one or more existing curtain wall units. The properties include the curtain wall unit style and any other settings specified in the tool you select.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a curtain wall unit tool, and click Apply Tool Properties to ➤ Curtain Wall Unit.

3 Select the curtain wall units, and press *ENTER*.

The properties of the selected curtain wall units match the properties of the curtain wall unit tool.

Changing the Dimensions of a Curtain Wall Unit

Use this procedure to change the dimensions of a curtain wall unit.

Dimension	Description
Height	Height of the curtain wall unit from the baseline
Length	Length of a straight curtain wall unit from the start grip on the baseline to the end grip
Start Miter	Angle of all infills and horizontal edges (frame or mullion) at the start of the curtain wall unit. For more information about miter angles, see Mitering Curtain Walls on page 1007.
End Miter	Angle of all infills and horizontal edges (frame or mullion) at the end of the curtain wall unit. For more information about miter angles, see Mitering Curtain Walls on page 1007.

1 Select a curtain wall unit.

2 Expand Dimensions.

3 Change the dimension.

Specifying a Miter Angle for a Curtain Wall Unit Adjacent to Another Object

Use this procedure to manually create a mitered corner between a curtain wall unit and another object, such as a standard wall or a mass element. For example, if your curtain wall unit connects with a standard wall that is at 60-degree angle from the curtain wall unit, you would specify the miter angle as 30.

The miter angle applies to all infills and horizontal edges that are adjacent to the corner. Vertical edges are not affected.

TIP To quickly identify the start and end of a curtain wall unit, select the curtain wall unit. The Reverse Direction grip points toward the end of the curtain wall unit.

1 Select a curtain wall unit.

2 Expand Dimensions.

3 Miter the curtain wall unit on the start or the end point:

If you want to miter the curtain wall unit …	Then …
at its start point	enter an angle for Start Miter Angle, and press *ENTER*.
at its end point	enter an angle for End Miter Angle, and press *ENTER*.

Changing the Location of a Freestanding Curtain Wall Unit

Use this procedure to relocate a freestanding curtain wall unit by changing the coordinate values of its insertion point. The curtain wall unit also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the curtain wall unit are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the curtain wall unit by aligning its normal with another axis. You can also rotate the curtain wall unit on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1 Double-click the curtain wall unit you want to change.

2 Expand Location.

3 Click Additional information.

4 Specify the location of the curtain wall unit:

If you want to …	Then …
relocate the curtain wall unit	enter new coordinate values under Insertion Point.
locate the curtain wall unit on the *XY* plane	make the normal of the wall parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the curtain wall unit on the *YZ* plane	make the normal of the curtain wall unit parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.

If you want to …	Then …
locate the curtain wall unit on the *XZ* plane	make the normal of the curtain wall unit parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the curtain wall unit	enter a new value for Rotation Angle.

5 Click OK.

Modifying the Position of Anchored Curtain Wall Units

When you use a curtain wall unit as an infill for a curtain wall or a door/window assembly, the curtain wall unit is anchored to the other object. While anchored, the curtain wall unit moves when you move the curtain wall and is erased when you erase the curtain wall.

You can change the orientation, alignment, or offset of the curtain wall unit without affecting the anchor.

NOTE For information about releasing the curtain wall unit anchor so that it moves and erases independently from the curtain wall, see Releasing an Object Anchored in a Curtain Wall on page 1023.

Changing the Orientation of an Anchored Curtain Wall Unit

Use this procedure to change the orientation of an anchored curtain wall unit using grips.

1 Select the anchored curtain wall unit.

2 Click the appropriate Flip grip to change the X or Y direction of the object.

You can also change the orientation of an object, including the Z direction, using the Anchor worksheet found on the object's Properties palette.

Changing the Alignment of an Anchored Curtain Wall Unit

Use this procedure to change the alignment of a curtain wall unit anchored into a curtain wall.

1 Double-click the anchored curtain wall unit.

2 Expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Select a new alignment for the curtain wall unit.

For more information, see Specifying an Alignment for a Curtain Wall Unit Infill on page 1037.

5 Click OK.

Changing the Offset of an Anchored Curtain Wall Unit

Use this procedure to change the offset of an anchored curtain wall unit.

1 Double-click the anchored curtain wall unit.

2 Expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Specify a new offset for the curtain wall unit.

For more information, see Specifying an Offset for a Curtain Wall Unit Infill on page 1038.

5 Click OK.

Specifying the Cut Plane Display of a Curtain Wall Unit

Use this procedure to specify the properties of one or more cut planes for an individual curtain wall unit. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the curtain wall unit you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all curtain wall units in the drawing, select Drawing default setting. To apply changes to all curtain wall units of this style, select Curtain Wall Unit Style:<style name>. For more information on styles, see Curtain Wall Unit Styles on page 1028.

5 If necessary, expand Object Display Properties ➤ Cut Plane.

6 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

7 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object.

8 For Use cut plane of containing object when anchored, specify whether you want the containing object's cut plane to be used when the curtain wall unit is anchored to that object.

9 To define additional cut planes for the curtain wall unit, click Manual cut planes.

10 On the Manual Above and Below Cut Plane Heights worksheet, click Add, and under Cut Plane, enter the height of the new cut plane.

If you add a cut plane …	Then …
at a height that is lower than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Below Cut Plane component of the object.
at a height that is higher than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Above Cut Plane component of the object.

You can click Remove to delete a cut plane that you added.

You can also access and modify these same cut plane settings through the curtain wall unit's context menu, as follows

1 Select the curtain wall unit you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.

5 Click OK twice.

Specifying the Display of Other Characteristics of a Curtain Wall Unit

Use this procedure to specify other display properties for a curtain wall unit, including cell marker size, the display of miters at frame corners, and the display of custom components. If you are going to use custom graphics for a component, draw the component and save it as a block before you start this procedure.

1. Double-click the curtain wall unit.
2. Click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

NOTE To apply your changes to all curtain wall units in the drawing, select Drawing default setting. To apply changes to all curtain wall units of this style, select Curtain Wall Unit Style:<style name>. For more information on styles, see Curtain Wall Styles on page 933.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. If you want to change the size of the markers used for cells in the curtain wall grid, click Cell marker size, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)
7. Optionally, for Show mitres at frame corners, select Yes/No.
8. If you want to add or edit a custom component, for Custom model components (or Custom plan components, if in a plan view), click .
9. On the Custom Model (or Plan) Components worksheet, click Add, or select one of the components in the list, and click Edit.
10. On the Custom Display Component worksheet, for Component Type, select Infill, Frame, or Mullion.
11. Enter a name for Component Name, or click Select Component, and in the Select <component type> Definition dialog, select a definition, and click OK.
12. Select Draw Custom Graphics.
13. Specify the display of the element:

If you want to …	Then …
display the block instead of the associated curtain wall unit element	select Replace Graphics.
superimpose the block over the curtain wall unit element so that both are displayed	clear Replace Graphics.

14. Click Select Block, select the custom block that you created, and click OK.
15. Specify further settings for the custom display block:

If you want to …	Then …
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.
mirror the block	determine if it should mirror in the X, Y, or Z direction.

If you want to …	Then …
offset the block from the grid	specify the offset in the X, Y, or Z direction.

16 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Curtain Wall Unit

Use this procedure to enter notes and attach reference files to a curtain wall unit. You can also edit notes and edit or detach reference files from a curtain wall unit.

1 Double-click the curtain wall unit.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 To add a note, click the setting for Notes, and enter the text.

5 Click OK.

6 Click under Reference documents, and attach, edit, or detach a reference file:

If you want to …	Then …
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click the description. Enter the new text, and press *ENTER*.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

7 Click OK twice.

Facet Deviation

The smoothness (tesselation) of curved curtain wall edges is controlled by the FACETDEV variable. Specify the facet deviation to set the number of facets to display on curved objects. This must be set before converting a polyline to a curtain wall.

The facet deviation is available only on the command line by typing **-AecFacetDev**.

The number you set as the facet deviation defines the maximum distance from the chord to the arc, the chord being an edge that is created from faceting the curve, to the true mathematical arc. The facet deviation has a range of greater than zero (0) and no upper limit.

The minimum number of facets is 8. For example, when you create a cylinder mass element with a 1' radius, and specify a FACETDEV value of 1', the cylinder has 8 faces.

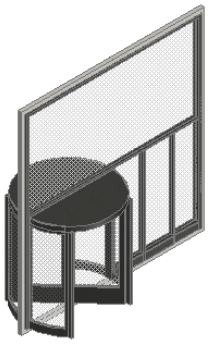
Door and Window Assemblies

21

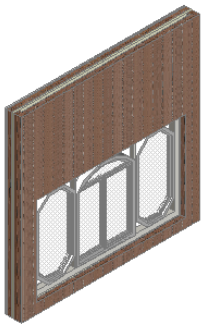
Door and window assemblies provide a mechanism for creating door and window compounds for inserting in walls and curtain walls.

Door and Window Assemblies

Door/window assemblies provide a grid or framework for inserting objects such as windows and doors. With this framework, you can create complex window and door assemblies, which can then be inserted in standard walls or used as repeated elements in curtain walls.



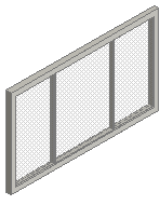
assembly added to curtain wall segment



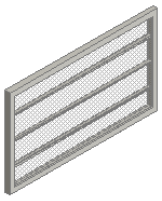
assembly added to wall segment

Door/Window Assembly Grids

Door/window assemblies are made up of 1 or more grids. Each grid has either a horizontal division or a vertical division, but you can nest the grids to create a variety of patterns from simple to complex.



vertical divisions



horizontal divisions

nested grids

TIP Using a door/window assembly in a curtain wall can help you avoid the complexities of too many nested grids in the curtain wall.

Elements of Grids

Grids are the foundation of curtain walls, curtain wall units, and door/window assemblies. Every grid has four element types:

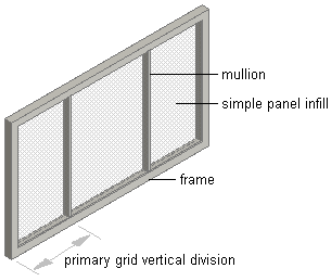
- **Divisions:** Define the direction of the grid (horizontal or vertical) and the number of cells
- **Cell Infills:** Contain another grid, a panel infill, or an object such as a window or a door
- **Frames:** Define the edge around the outside of the primary grid and nested grids
- **Mullions:** Define the edges between the cells

NOTE Division is an abstract element, in contrast to the other three element types that represent physical elements of the door/window assembly.

Each element type is assigned a default definition that describes what elements of that type look like.

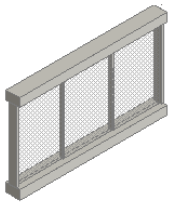
Element type	Default definitions
Divisions	Vertical divisions with a fixed cell dimension of 3'
Cell Infills	Cells containing simple panels with a 2" thickness
Frames	Outer edges of grid 3" wide and 3" deep

Element type	Default definitions
Mullions	Edges between cells 1" wide and 3" deep



You can create new element definitions and assign those definitions within the door/window assembly. For example, you can create multiple infill definitions and then assign different infills to specific cells in the grid. Likewise, you can create multiple frame definitions and then assign a different definition to each frame edge (top, bottom, left, right). This is also true for mullion definitions.

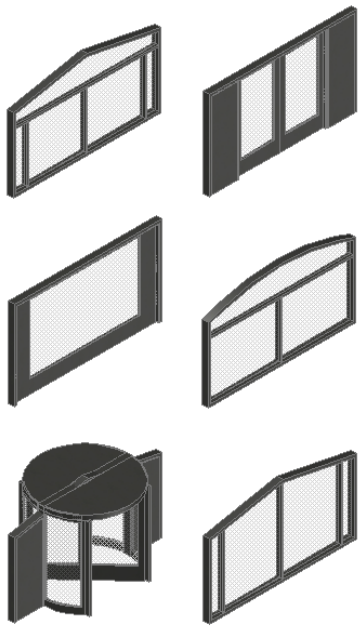
assembly with different assigned infill definitions



assembly with different assigned frame definitions

Experimenting with Door/Window Assembly Designs

The templates provided with AutoCAD Architecture offer door/window assembly styles. Looking at these styles and experimenting with them makes it easier to understand door/window assembly behavior and create your own door/window assembly designs.



For more information about element definitions and assignments, see Creating Element Definitions for a Door and Window Assembly Style on page 1109 and Assigning Definitions to Door and Window Assembly Elements on page 1133.

Door and Window Assembly Endcaps

Door and window assemblies that are anchored in a wall can have endcap styles applied to them. The endcap shapes for wall openings are defined in the wall style and are a property of the wall. For information on setting an opening endcap style in a wall, see Working with Wall Endcaps and Opening Endcaps on page 891.

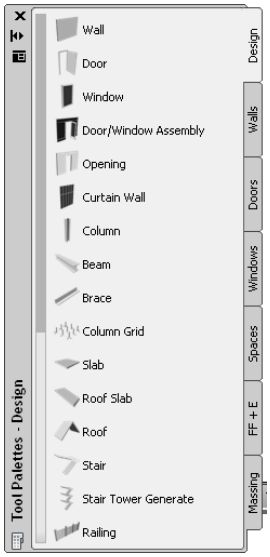
Using Door and Window Assembly Tools to Create Door and Window Assemblies

Door/window assemblies are planar and defined by an insertion point, as opposed to curtain walls, which have a baseline that can be curved or straight. You can create a door/window assembly based on a 2D layout grid or on a combination of lines, arcs, and circles.

To create a door/window assembly for use in a standard wall, you draw the wall first. You can then insert the door/window assembly and modify the door/window assembly elements as needed.

To create a door/window assembly for use in a curtain wall, insert the door/window assembly in space. Modify the element definitions and assignments as needed. Save your changes as a new door/window assembly style, and then assign that style to cells in your curtain wall grid. For more information, see Inserting an Object into a Curtain Wall Cell on page 966.

Tool palettes provided with AutoCAD Architecture let you quickly place door/window assemblies by selecting a door/window assembly tool with a specific door/window assembly style and other predefined properties. When you place door/window assemblies using door/window assembly tools, you can use the default settings of the tool, or you can change settings for the door/window assembly properties. You can also use door/window assembly tools to convert linework to door/window assemblies and to apply the settings of a door/window assembly tool to existing door/window assemblies.



The following palettes contain one or more door/window assembly tools:

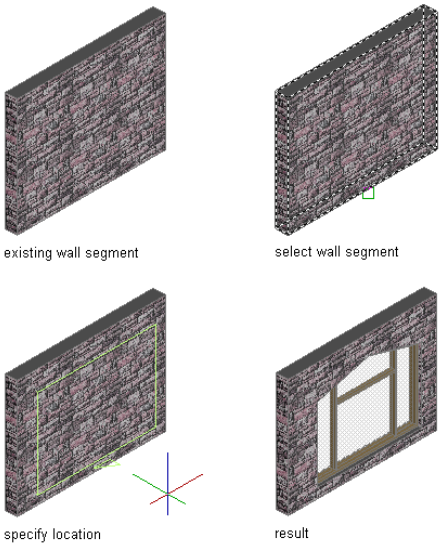
Tool Palette	Door/Window Assembly Tools
Design palette in the Sample Palette catalog in the Content Browser	Standard door/window assembly style and default settings for other door/window assembly properties

Tool Palette	Door/Window Assembly Tools
Design Tool Catalog ➤ Doors and Windows ➤ Door and Window Assemblies in the Content Browser	a large number of door and window assembly styles for many design uses
custom tool palettes created by your CAD manager	door/window assembly styles and properties that your CAD manager customized for your projects or office standards

When you place door/window assemblies using door/window assembly tools, you can use the default settings of the tool, or you can change settings for any door/window assembly properties that are not controlled by the style.

Creating a Door and Window Assembly

Use this procedure to add a new door/window assembly that has the properties specified in the door/window assembly tool that you select. To specify settings when you add a door/window assembly, see Creating a Door and Window Assembly with User-Specified Settings on page 1099.



1 Open the tool palette that contains the door/window assembly tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After you select it, you can move or hide the Properties palette to expose more of the drawing area.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Door drop-down ➤ Door/Window Assembly .

2 Select a wall, or press *ENTER* and then specify the insertion point of the door/window assembly.

3 Continue adding door/window assemblies, and then press *ENTER*.

Creating a Door and Window Assembly with User-Specified Settings

Use this procedure to add a door/window assembly with settings that you specify.

1 Open the tool palette that contains the door/window assembly tool you want to use, and select it.

(You may have to scroll to display the desired tool.)

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Door drop-down ➤ Door/Window Assembly .

2 On the Properties palette, expand Basic, and expand General.

3 Select a style.

4 Under Bound Spaces, specify if this door and window assembly can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this door and window assembly can be used as bounding object for associative spaces.
- No: this door and window assembly cannot be used as bounding object for associative spaces.
- By style: this door and window assembly will use the bounding settings from the door and window assembly style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

5 Expand Dimensions.

6 Modify the dimensions of the door/window assembly:

If you want to specify…	Then…
the length of the door/window assembly	enter a value for Length.
the height of the door/window assembly	enter a value for Height.
the rise of the door/window assembly	enter a value for Rise.
start and end miters	enter miter values for Start miter angle and End miter angle.

7 Expand Location.

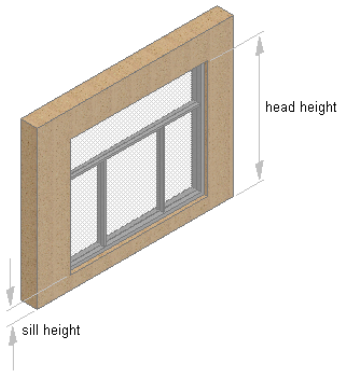
8 Modify the location properties of the door/window assembly:

If you want to specify…	Then…
the position of the door/window assembly	select Unconstrained or Offset/Centered for Position along the wall. **NOTE** If you selected Offset/Centered, enter a value for the Automatic offset.
the vertical alignment of the door/window assembly	select Head or Sill for Vertical Alignment.
the head height of the door/window assembly	enter a value for Head height.
the sill height of the door/window assembly	enter a values for Sill height.
the rotation reference angle of the door/window assembly	enter a value for Rotation.

Vertical alignment controls how you place the door/window assembly in the wall and how the door/window assembly responds to modifications in height. The Sill height and Head height options allow you to determine the working point on the door/window assembly. You can place the working point at the sill or at the head. The vertical alignment value determines the location of the working point vertically in the wall.

Modifications to the door/window assembly height respect the working point. For example, if you specify the working point of the window as sill, the vertical alignment as 0", and the door/window assembly height as 7'–0", the height in the wall where the top of the door/window assembly is placed is 7–0". If you modify the height of the window to 6'–8", the window sill remains at 0", and the top of the door/window assembly becomes 6–8". The sill working point is maintained.

If you specify the working point as the door/window assembly head, the Vertical Alignment value as 7'–0", and the door/window assembly height as 7'–0", the height in the wall where the top of the door/window assembly is placed is 7–0". If you modify the height of this door/window assembly to 6'–8", the door/window assembly head remains at 7'–0" and the window sill becomes 4". The head working point is maintained.



TIP You can move or hide the Properties palette to expose more of the drawing area.

9 In the drawing area, select a wall, or press *ENTER* and then specify the insertion point of the door/window assembly.

10 Continue adding door/window assemblies, and press *ENTER*.

Creating a Door and Window Assembly from a Layout Grid

Use this procedure to create a door/window assembly based on a 2D layout grid. If you already have 2D layout grids in a drawing, you can easily convert them to door/window assemblies. Or, if you are already familiar with layout grids, it is an efficient way to create a door/window assembly and then experiment with the door/window assembly commands to learn more about them. For more information, see Using Layout Grids on page 1786.

NOTE Only rectangular layout grids can be converted to a door/window assemblies.

When you create a door/window assembly from a 2D layout grid, you also create a new door/window assembly style. The divisions in the new door/window assembly style are taken from the divisions in the layout grid.

1 Open the tool palette that contains the door/window assembly tool you want to use.

(You may have to scroll to display the desired tool.)

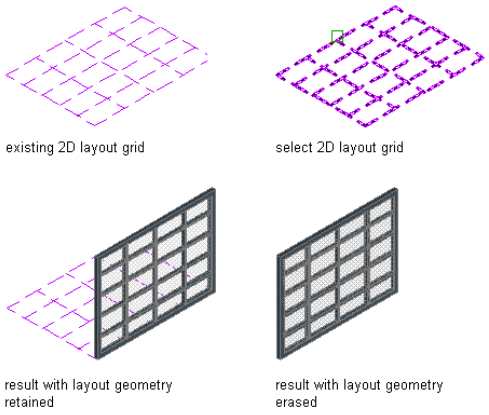
2 Right-click a door/window assembly tool, and click Apply Tool Properties to ➤ Layout Grid.

3 Select the layout grid to convert.

4 When prompted to erase the original geometry, press *ENTER* to keep the layout grid, or enter **y** (Yes) to erase it.

5 Press *ENTER* to specify horizontal as the orientation for the primary division, or enter **v** to specify vertical.

6 Enter a name for the door/window assembly style, and click OK.



7 If necessary, edit the properties of the door/window assembly in the Properties palette.

Creating a Door and Window Assembly from Doors, Windows and Openings

Use this procedure to convert doors, windows, and openings to a door/window assembly that has the properties of the door/window assembly tool you select. You can edit the properties of the door/window assembly after you create it.

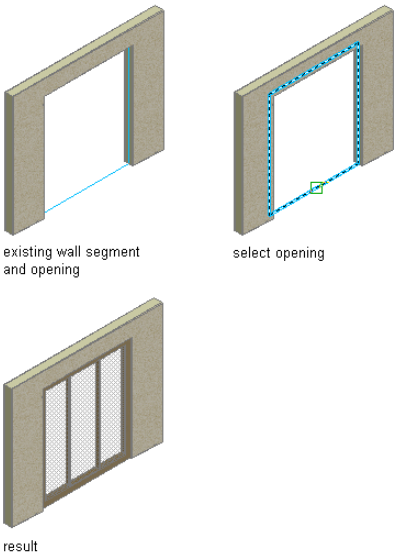
NOTE When you create a door/window assembly from a collection of doors, windows and openings, you create a single assembly from each object selected. For more information about how to create an assembly from a specific configuration, see Creating a Door and Window Assembly from an Elevation Sketch on page 1103.

1 Open the tool palette that contains the door/window assembly tool you want to use.

(You may have to scroll to display the desired tool.)

2 Right-click a door/window assembly tool, and click Apply Tool Properties to ➤ Door, Opening, Window.

3 Select the door, window or opening to convert.



4 Edit the properties of the door/window assembly in the Properties palette, if necessary.

Creating a Door and Window Assembly from an Elevation Sketch

Use this procedure to create a sketch of a custom grid with lines, arcs, and circles, and then convert that linework into a door/window assembly.

NOTE You cannot modify the division definition of a custom grid created from lines, arcs, and circles. You can, however, assign a different division definition to it. For more information, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

NOTE Door/window assembly grids are either horizontal or vertical. To create a grid pattern with horizontal and vertical cells, nested grids are used. For more information about nested grids, see Working with Nested Grids in Door and Window Assemblies on page 1135.

1 Use lines, arcs, and circles to draw a grid in the world coordinate system (WCS).

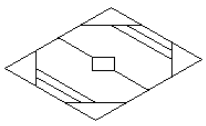
2 Open the tool palette that contains the door/window assembly tool you want to use.

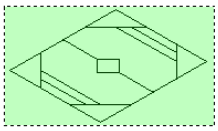
(You may have to scroll to display the desired tool.)

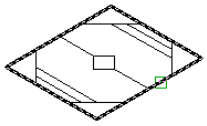
3 Right-click a door/window assembly tool, and click Apply Properties to ➤ Elevation Sketch.

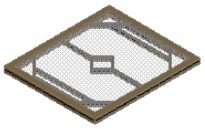
4 Select the linework of your sketch, and press *ENTER*.

5 You have the option of either selecting a baseline for the door/window assembly or accepting the default baseline. Select one of the grid lines as the baseline for the door/window assembly.

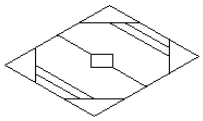

existing elevation sketch

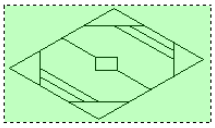

select elevation sketch

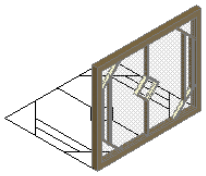

select baseline

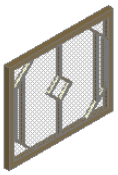

result with layout geometry erased

Or press *ENTER* to use the line along the *X* axis as the default baseline.


existing elevation sketch


select elevation sketch


result with layout geometry retained


result with layout geometry erased

TIP If you draw your linework in the *XY* plane (in Plan view) and accept the default baseline, the resulting door/window assembly is displayed from the *Z* direction.

6 To erase the lines, enter **y** (Yes). To have the lines remain after the door/window assembly is created, enter **n** (No).

If there is a style applied to the door/window assembly tool, the new custom style is based on the existing style. The infill, mullion, and frame definitions are those of the existing style. You can modify the style without having to create a new one from scratch. For more information, see Assigning Definitions to Door and Window Assembly Elements on page 1133.

7 Select the resulting custom door/window assembly, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save to Style.

8 Click New to create a new door/window assembly style.

9 Enter a name for the new door/window assembly style.

10 Click OK twice.

Creating a Door and Window Assembly Tool

Use this procedure to create a door/window assembly tool and add it to a tool palette. You may want to create your own door/window assembly tools if you are placing multiple door/window assemblies of specific styles that have the same properties.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a door/window assembly in the drawing	select the door/window assembly, and drag it to the tool palette.
create a tool from a door/window assembly style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager. Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Click next to Description, enter a description of the door/window assembly created from this tool, and click OK.

8 Click next to Layer key to specify a layer key.

9 Click next to Layer overrides to specify any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

10 Select a style.

11 Select the drawing file containing the style used for this door/window assembly for Style location.

12 Under Bound Spaces, define if this door and window assembly tool can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this door and window assembly tool can be used as bounding object for associative spaces.
- No: this door and window assembly tool cannot be used as bounding object for associative spaces.
- By style: this door and window assembly tool will use the bounding settings from the door and window assembly style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

13 Expand Dimensions.

14 Modify the dimensions of the door/window assembly

If you want to specify…	Then…
the length of the door/window assembly	enter a value for Length.
the height of the door/window assembly	enter a value for Height.
the rise of the door/window assembly	enter a value for Rise.
start and end miters	enter miter values for Start miter angle and End miter angle.

15 Expand Location.

16 Modify the location properties of the door/window assembly:

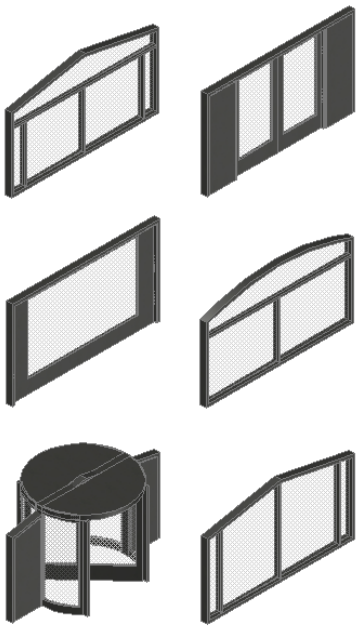
If you want to…	Then…
specify the position of the door/window assembly	select Unconstrained or Offset/Center for Position along the wall. **NOTE** If you selected Offset/Center, enter a value for the Automatic offset.
specify the head height of the door/window assembly	enter a value for Head height.
specify the sill height of the door/window assembly	enter a value for Sill height.

17 Click OK.

Door and Window Assembly Styles

Door/window assemblies are style-based, meaning there are preset characteristics assigned to each door/window assembly that determine its appearance and function. By changing from one style of door/window assembly to another, you can quickly study several different design options. Any changes you make to the style are reflected throughout your building, updating all door/window assemblies of that

particular style. You can also apply overrides to a single door/window assembly, without changing other door/window assemblies of the same style.



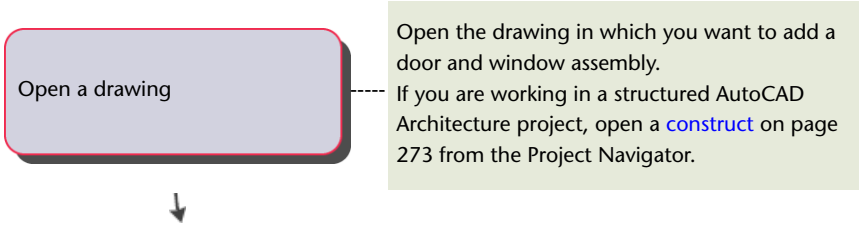
A door/window assembly style controls the following properties of a door/window assembly:

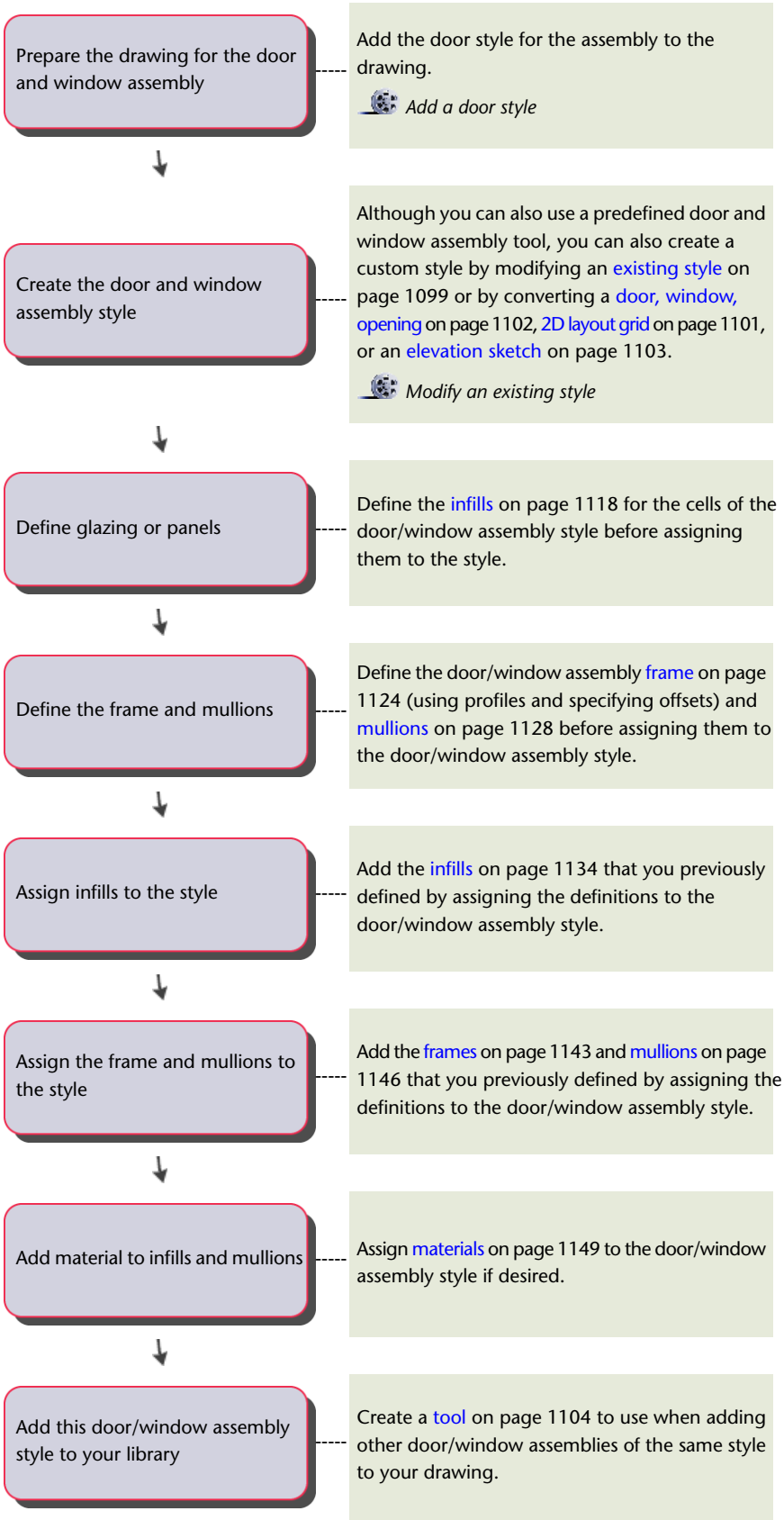
- Element definitions
- Definition assignments for each element
- Materials for each element
- Display properties for each element
- Default dimensions
- Notes about the style and any associated reference files

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Workflow to Create a Door and Window Assembly Style

When you create a door/window assembly style, you assign characteristics to any or all of the components, and save them as a named style. In this way, you standardize the appearance of all assemblies with that style. When you modify a style, all door/window assemblies in your drawing that use the style are updated to reflect the changes. For more information about working with styles, see Style Manager Overview on page 566.




Prepare the drawing for the door and window assembly
Add the door style for the assembly to the drawing.
Add a door style
Create the door and window assembly style
Although you can also use a predefined door and window assembly tool, you can also create a custom style by modifying an existing style on page 1099 or by converting a door, window, opening on page 1102, 2D layout grid on page 1101, or an elevation sketch on page 1103.
Modify an existing style
Define glazing or panels
Define the infills on page 1118 for the cells of the door/window assembly style before assigning them to the style.
Define the frame and mullions
Define the door/window assembly frame on page 1124 (using profiles and specifying offsets) and mullions on page 1128 before assigning them to the door/window assembly style.
Assign infills to the style
Add the infills on page 1134 that you previously defined by assigning the definitions to the door/window assembly style.
Assign the frame and mullions to the style
Add the frames on page 1143 and mullions on page 1146 that you previously defined by assigning the definitions to the door/window assembly style.
Add material to infills and mullions
Assign materials on page 1149 to the door/window assembly style if desired.
Add this door/window assembly style to your library
Create a tool on page 1104 to use when adding other door/window assemblies of the same style to your drawing.

Tips for Working Efficiently with Door and Window Assembly Styles

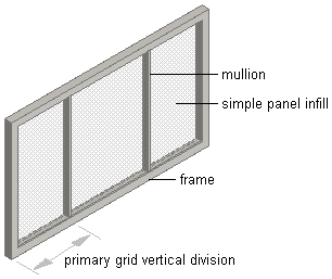
Use these suggestions to work with door/window assembly styles efficiently.

- Name grids and elements very clearly to identify where they are used and what they are. For example, use the name L3-FL1-H to represent a third-level grid used on the first floor and that is horizontally divided. Incorporating this suggestion makes it easier to ensure that you are using elements correctly.
- Use the element definition that is applied most often as the default element definition. For example, if most cells are stone panels, define the default infill as the stone panel. This panel is then used in every cell that is not specifically assigned to another infill. Apply this rule to the default frame, mullion, and division.
- Name the styles for doors, windows, curtain wall units, AEC Polygons, and curtain walls to indicate where they are used and what they are.
- Remember that you can use cell and edge overrides to define special conditions not accounted for in the door/window assembly style.

Creating Element Definitions for a Door and Window Assembly Style

Element definitions determine the appearance of the four basic door/window assembly elements. There is a different definition type for each element.

Definition	Sample definitions
Divisions	Horizontal grid with six cells
Cell Infills	Cells contain windows
Frames	Outer edge of grid is 6" wide
Mullions	Edges between cells are 4" wide



Each type of element can have multiple definitions. For example, you can define the divisions to create a horizontal grid or a vertical grid and you can define the cells to contain a nested grid or a door/window assembly. To make reuse easier, you can save the element definitions and then assign them to grids, cells, frames, or mullions as needed.

Element definitions are style-specific. When you create element definitions for a specific door/window assembly style, those definitions are available only for door/window assemblies of that style. For example, if you define a door/window assembly infill for one door/window assembly style, that infill is not available as an option when you edit a door/window assembly of a different style.

Creating a Door and Window Assembly Style

Use this procedure to create a door/window assembly style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style. You can also create a door/window assembly tool based on the newly created door/window assembly style. When you use the tool to add door/window assemblies, each door/window assembly has the style specific to the tool.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

3 Create a new door/window assembly style:

If you want to…	Then…
create a style with default properties	right-click Door/Window Assembly Styles, and click New.
create a style from an existing style	right-click the door/window assembly style you want to copy, and click Copy. Right-click, and click Paste.
create a style from a curtain wall, curtain wall unit, or door/window assembly in the drawing	right-click Door/Window Assembly Styles, and click New. Right-click the new style, click Set From, and then pick a curtain wall, a curtain wall unit, or a door/window assembly.

4 Enter a name for the new door/window assembly style, and press *ENTER*.

5 Edit the new door/window assembly style:

If you want to…	Then…
define the elements of a door/window assembly style	see Creating a Division Definition for a Door and Window Assembly on page 1112, Defining Infills for Door and Window Assembly Cells on page 1118, Defining Door and Window Assembly Frames on page 1124, and Defining Door and Window Assembly Mullions on page 1128.
assign element definitions to the door/window assembly style	see Assigning Definitions to Door and Window Assembly Elements on page 1133, Assigning a Division to a Door and Window Assembly Grid on page 1134, Assigning Infills to Door and Window Assembly Cells on page 1134, Assigning Definitions to Door and Window Assembly Frames on page 1143, and Assigning Definitions to the Mullions of a Door and Window Assembly on page 1146.
add door/window assembly element definitions as display components	see Adding Door and Window Assembly Element Definitions as Display Components on page 1151.
specify layer, color and linetype settings for the display components of a door/window assembly	see Specifying the Layer, Color, and Linetype of a Door and Window Assembly Style on page 1152.
specify door/window assembly hatching	see Specifying the Hatching for Components of a Door and Window Assembly Style on page 1152.

If you want to…	Then…
add custom graphics as display components of a door/window assembly style	see Adding Custom Graphics as a Display Component of a Door and Window Assembly on page 1153.
create individual cut planes for door/window assembly styles	see Creating Cut Planes for a Door and Window Assembly on page 1154.
specify the materials of the door/window assembly style	see Specifying the Materials of a Door and Window Assembly Style on page 1149.
add notes and files to the style	see Attaching Notes and Files to a Door and Window Assembly Style on page 1155.

6 When you finish specifying the properties of the door/window assembly style, click OK.

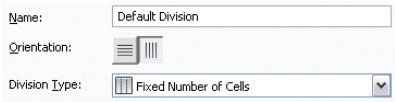
7 If you want to assign the style to a door/window assembly tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Door and Window Assembly Tool on page 1104.

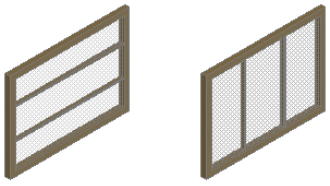
8 Click OK.

Division of Door and Window Assembly Grids

A door/window assembly consists of one or more grids, which are the framework for placing design elements in the door/window assembly. The highest-level grid is the primary grid, which is also the outside edge of the door/window assembly.



Each grid in a door/window assembly has one division assignment that determines whether the grid is divided horizontally or vertically. The division also determines the number of cells, their size, and their placement.



Within the primary grid, you can define multiple levels of grids. These grids within the primary grid are called nested grids. Each subdivision of a grid is called a cell.

You can create a variety of division definitions under different names and then assign different divisions to each grid in your door/window assembly. Although you can create multiple definitions, there can be only one division assignment per grid. You create division definitions for a specific door/window assembly style and those definitions can be assigned only to grids in door/window assemblies of that style. For more information about assigning divisions to a particular grid, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

Creating a Division Definition for a Door and Window Assembly

Use this procedure to create divisions for a door/window assembly grid.

Because door/window assemblies can contain multiple nested grids, it is helpful to use a naming convention for grids that indicates the level of each grid and the grid location or the purpose within the door/window assembly. For example, L3-FL1-Stone Panels identifies a third level grid that provides a row of stone panels on Floor 1.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Click to create a new division definition.

7 Enter a name for this division definition.

8 For Orientation, select either Horizontal , or Vertical .

9 Select one of the following division types and specify offsets if needed:

Division Type	Description
Fixed Cell Dimension	Creates a grid where the size of the individual cells is predetermined. For more information, see Specifying a Fixed Size for Cells in a Door and Window Assembly Grid on page 1112.
Fixed Number of Cells	Creates a grid where the number of grid cells is predetermined. For more information, see Specifying a Fixed Number of Cells for a Door and Window Assembly Grid on page 1115.
Manual	Creates a grid where the size and number of individual cells is manually determined by the user. For more information, see Manually Defining the Number and Size of Cells in a Door and Window Assembly Grid on page 1116.

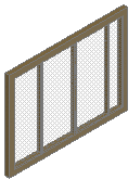
After you create a division definition, you can assign the definition to a specific grid in a door/window assembly. For more information, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

10 When you are finished creating division definitions, click OK.

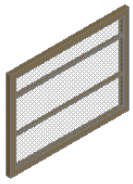
Specifying a Fixed Size for Cells in a Door and Window Assembly Grid

Use this procedure to define a specific size for the cells in a grid. In this case, the number of cells is determined by the length or height of the grid, depending on how the grid is divided.

When you specify a fixed cell size in a grid, you can control how the cells of the grid adjust to accommodate any leftover space. This space occurs if the length (or the height) of the door/window assembly cannot be evenly divided by the fixed size of the cell. For more information, see Using the Auto-Adjust Cells Option on page 1114.



fixed cell size vertical grid



fixed cell size horizontal grid

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

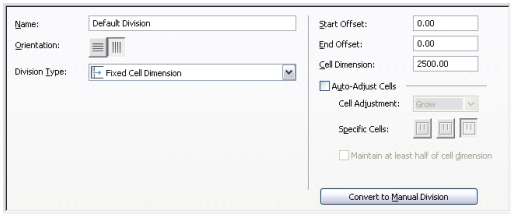
3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Divisions definition or click to create a new one.

7 Select Fixed Cell Dimension for Division Type.



8 Specify a size for the cells in Cell Dimension.

If you are defining a vertical grid, the cell dimension is the length of the cell from mullion to mullion. If you are defining a horizontal grid, the cell dimension is the height of the cell.

9 To specify an offset for the grid,

if the orientation is...	then...
horizontal	specify an offset distance in Bottom Offset or Top Offset.
vertical	specify an offset distance in Start Offset or End Offset.

TIP The frame width is calculated as part of the cell size. Therefore, cells adjacent to the frame can appear to be a different size than the other cells. If you do not want the frame width included in the cell size, specify an offset for the grid that is equal to the frame width.

When you draw a door/window assembly using a fixed cell dimension, there is often extra space between the last full-size cell and the end of the door/window assembly.

For more information about grid offsets, see Specifying an Offset for a Door and Window Assembly Grid on page 1117.

10 Adjust the cells to accommodate this extra space:

If you want to…	Then…
add the space to grid cells	select Auto-Adjust Cells, select Grow for Cell Adjustment, and select the specific cells where the space is to be added. You can select any combination of Specific Cells.
remove the space from grid cells	select Auto-Adjust Cells, select Shrink for Cell Adjustment, and select the specific cells where the space is to be removed. You can select any combination of Specific Cells.

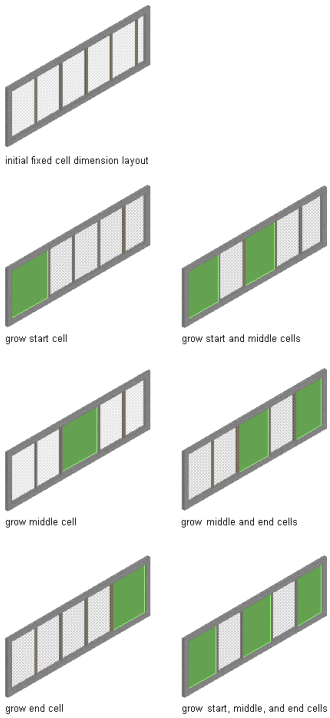
11 Click OK.

For information about assigning the division definition to a specific grid in your door/window assembly, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

Using the Auto-Adjust Cells Option

Use this procedure to automatically resize cells in a grid when the result of dividing the grid by the specified cell dimension is not a whole number. You can adjust the size of cells by specifying a cell or combination of cells to grow or shrink according to your layout.

For example, if a vertical primary grid in a door/window assembly style is 17 feet in length and you specify a fixed cell dimension of 3 feet, the grid has five cells of 3 feet each with 2 feet remaining. Using the Auto-Adjust Cells option, you can specify how the grid distributes the remaining quantity.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Divisions definition or click to create a new one.

7 Select Fixed Cell Dimension as the division type.

Auto-Adjusting Cells by Growing

8 Select Auto-Adjust Cells, and specify the cell adjustment:

If you want to…	Then…
add the remaining space to grid cells	select Grow, and select the specific cells to which you want the space added.
remove the remaining space from grid cells	select Shrink, and select the specific cells from which you want the space removed. You can then select Maintain at least half of cell dimension in order to control the cell shrinkage.

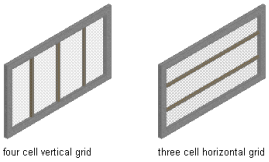
The cells that you do not select maintain the fixed value you specified for Cell Dimension.

You can auto-adjust the grid divisions by specifying the start, middle, or end cell, or any combination of those cells, to receive the cell growth. The size of each cell depends on which combination of cells you specify. In the following illustration, all of the possible cell growth combinations for an example door/window assembly are shown, with highlighted cells in green.

Specifying a Fixed Number of Cells for a Door and Window Assembly Grid

Use this procedure to define a specific number of cells in a grid. In this case, the size of the cells is determined by the length or height of the grid, depending on how the grid is divided.

Specifying a fixed number of cells for Door/Window Assembly grids



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Divisions definition or click to create a new one.

7 Select Fixed Number of Cells for Division Type.

8 Enter the desired number of cells in Number of Cells.

9 Specify an offset distance:

If the orientation is…	Then…
horizontal	specify an offset distance in Bottom Offset or Top Offset.
vertical	specify an offset distance in Start Offset or End Offset.

For more information, see Specifying an Offset for a Door and Window Assembly Grid on page 1117.

TIP The frame width is calculated as part of the cell size. Therefore, cells adjacent to the frame can appear to be a different size than the other cells. If you do not want the frame width included in the cell size, specify an offset for the grid that is equal to the frame width.

For information about assigning the division definition to a specific grid in your door/window assembly, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

Manually Defining the Number and Size of Cells in a Door and Window Assembly Grid

Use this procedure to manually add gridlines and specify an offset for each one when you need to create a unique grid that does not fit into any of the other division types. You can also start with a fixed cell dimension grid or a fixed number of cells grid and then manually adjust the gridlines to suit your needs.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

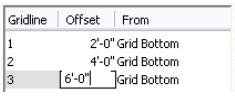
6 Select a Divisions definition or click to create a new one.

7 Select Manual for Division Type.

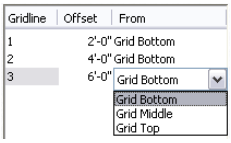
8 Click to add a gridline.

Insert as many grid lines as you need. If you need to remove a grid line, select it from the table, and then click .

9 Under Offset in the grid line table, specify an offset distance for each grid line.



10 Under From in the grid line table, select the grid location from which the grid line is offset.



11 Specify an offset distance:

If the orientation is...	Then...
horizontal	specify an offset distance in Bottom Offset or Top Offset.
vertical	specify an offset distance in Start Offset or End Offset.

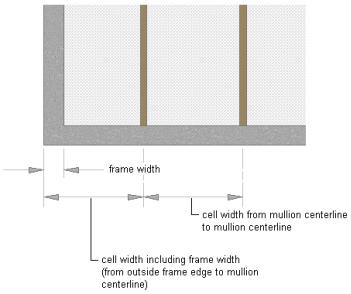
For more information, see Specifying an Offset for a Door and Window Assembly Grid on page 1117.

12 Click OK.

For information about assigning the division definition to a specific grid in your door/window assembly, see Assigning a Division to a Door and Window Assembly Grid on page 1134.

Specifying an Offset for a Door and Window Assembly Grid

By default, grids cells are measured from the start and end points of the door/window assembly baseline (for horizontal divisions) or in the baseline to the base height (for vertical divisions). The width of the grid frame is not considered in calculating the size of the cell. For example, if you draw a door/window assembly with a 14 ft. baseline and a 1 ft. frame on the left and right, and you specify a fixed number of vertical cells, the cells do not appear equal in size. The first and last cells appear smaller because they include the frame.



To make the cells equal in size, offset the start and end of the grid by the width of the frame.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

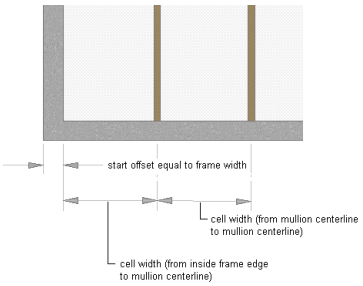
3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select a Divisions definition or click to create a new one.

7 Specify an offset for the grid.



If you want to specify the distance between…	Then…
the start point of the door/window assembly baseline and the start of the first cell in a horizontal grid	enter a value for Start Offset.
the end point of the door/window assembly baseline and the end of the last cell in a horizontal grid	enter a value for End Offset.
the baseline of the door/window assembly and the start of the bottom cell in a vertical grid	enter a value for Bottom Offset.
the base height of the door/window assembly and the end of the top cell in a vertical grid	enter a value for Top Offset.

8 Click OK.

Removing a Division Definition from a Door and Window Assembly Style

Use this procedure to remove a division definition that you no longer need. You cannot remove a division definition that is currently assigned to a grid. In addition, you cannot remove the default division definition, but you can modify it.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Divisions under Element Definitions.

6 Select the division definition that you want to remove.

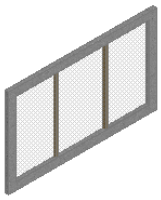
7 Right-click and click Remove, or click .

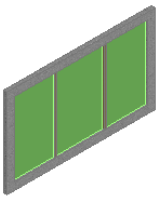
8 Click OK.

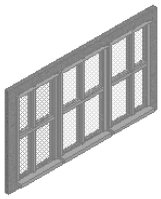
Defining Infills for Door and Window Assembly Cells

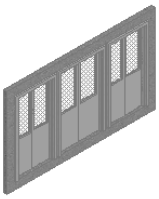
An infill defines the contents of a door/window assembly cell. A door/window assembly cell can have the default simple panel or contain a nested grid, an AEC Polygon, curtain wall unit, door or window style. The

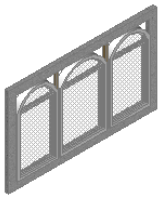
object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically represent glazing or other plain cladding, such as stone or concrete.


simple panel infill


AEC polygon style infill


curtain wall unit style infill


door style infill


window style infill

NOTE Nested grids and no infill are options you select when assigning an infill to a cell. They do not require infill definitions. For more information, see Creating a Nested Grid for a Door and Window Assembly on page 1137 and Removing an Infill from a Door and Window Assembly on page 1141.

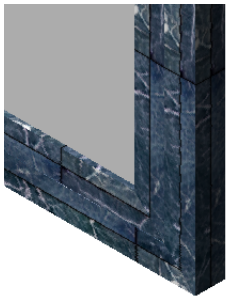
You can define as many infills as you need and then use cell assignments to specify the cells that use each infill. A default infill, which you can modify, is used for all unassigned cells. For more information about cell assignments, see Assigning Definitions to Door and Window Assembly Elements on page 1133.

NOTE Create infill definitions for a specific door/window assembly style. Those definitions can be assigned only to grid cells in door/window assemblies of that style.

Materials

Styles use the materials of the object style assigned to each panel. For example, if you specify an infill to use the Standard door style, the materials of that infill are those designated in the door style.

Simple panels need materials assigned in the door/window assembly style.



If you do not use materials to control the display properties of infills, you can specify their display properties in the door/window assembly style. The layer, color, linetype, and other display properties of the Default

Infill are applied to all infills unless you create a custom display component for each infill definition. Then you can control the display of each infill definition independently. For more information, see Specifying the Display of Door and Window Assemblies on page 1150.

Creating a Panel Infill for a Door and Window Assembly

Use this procedure to create a simple panel infill to represent basic cladding materials in the door/window assembly, such as a stone wall panel, concrete panel, metal panel, or glazing infill.

Because door/window assemblies can contain multiple infills, it is helpful to use a naming convention for panel infills that indicates the infill location or purpose within the door/window assembly. For example, L3-FL1- Stone Panel identifies a stone panel in a third-level grid on Floor 1.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3. Select a door/window assembly style.
4. Click the Design Rules tab.
5. In the left pane, select Infills under Element Definitions.
6. Click to create a new infill.
7. Enter a descriptive name for the infill.
8. Select Simple Panel for Infill Type.
9. Select an alignment for the infill.

   For more information, see Specifying an Alignment for a Door and Window Assembly Infill on page 1121.
10. Specify an offset value for the infill.

    For more information, see Specifying an Offset for a Door and Window Assembly Infill on page 1122.
11. Specify a thickness for the panel.
12. Click OK.

After you create an infill definition, you can assign it to any cell in a door/window assembly grid. For more information, see Assigning Infills to Door and Window Assembly Cells on page 1134.

Creating an Infill for Inserting an Object into a Door and Window Assembly

Use this procedure to create a style infill to insert objects into a door/window assembly. You can insert doors, windows, curtain wall units, and AEC Polygons by defining a specific style of that object as an infill.

TIP After you insert an object in a cell, you can select that object independent of the grid and access editing options for the object.

Because door/window assemblies can contain multiple infills, it is helpful to use a naming convention for panel infills that indicates the infill location or purpose within the door/window assembly. For example, L3-FL1-Stone Panel identifies a stone panel in a third-level grid on Floor 1.

NOTE The object styles you use in infills must exist in the current drawing to be added to an infill definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Click to create a new infill.

7 Enter a descriptive name for the infill.

8 Select Style for Infill Type.

The right side of the dialog box changes to display a tree view of the object styles available for insertion into a door/window assembly.

9 Select an object style.

There is a unique icon for each type of style, for example the door style icon and the curtain wall unit icon . These icons also are displayed next to the infill name at the top of the dialog box to help you identify the type of infill.

10 Select an alignment for the infill.

For more information, see Specifying an Alignment for a Door and Window Assembly Infill on page 1121.

11 Specify an offset value for the infill.

For more information, see Specifying an Offset for a Door and Window Assembly Infill on page 1122.

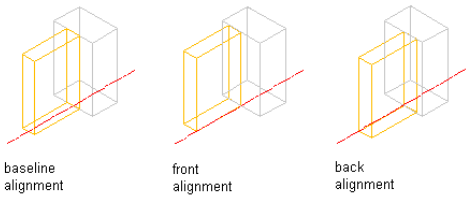
12 Click OK.

After you create an infill definition, you can assign it to any cell in a door/window assembly grid. For more information, see Assigning Infills to Door and Window Assembly Cells on page 1134.

Specifying an Alignment for a Door and Window Assembly Infill

Use this procedure to align an infill so that it is centered with the baseline of the door/window assembly, in front of the baseline, or behind the baseline. In Plan view, the front of a door/window assembly (drawn from left to right) is below the baseline and the back is above the baseline.

Specifying Door/Window Assembly panel infill alignments



NOTE To move the infill away from the baseline, see Specifying an Offset for a Door and Window Assembly Infill on page 1122.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select an infill definition or click to create a new one.

7 Select an alignment: front, center, or back.

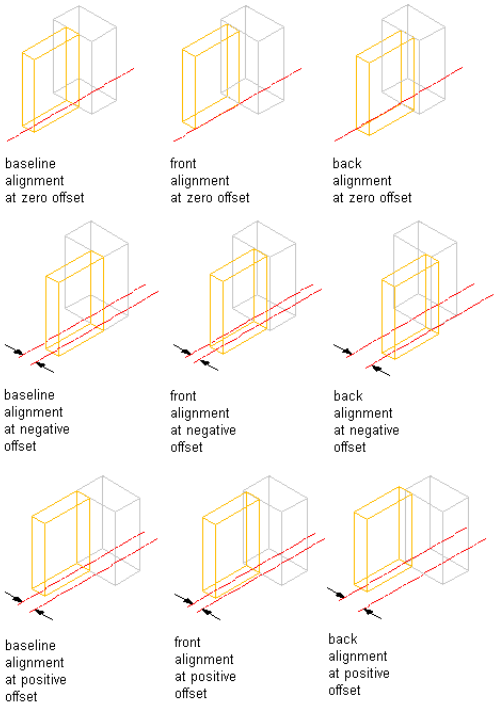
8 Click OK.

Specifying an Offset for a Door and Window Assembly Infill

Use this procedure to specify an offset for a door/window assembly infill. By default, infills are centered on the door/window assembly baseline. If your design requires that the infill be aligned with frame edges or some other part of the door/window assembly, you can specify an offset for the infill.

You can also edit individual style-based infills directly in the drawing. The selected infill has Flip grips in both the *X* and *Y* directions so that you can change the orientation of the infill.

Specify Door/Window Assembly infill panel offsets



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select an infill definition or click to create a new one.

7 Enter an offset distance.

In plan view, positive numbers offset the infill above the baseline and negative numbers offset the infill below the baseline. The offset is also affected by the selected alignment for the infill.

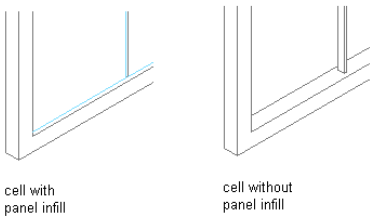
8 Click OK.

Removing an Infill Definition from a Door and Window Assembly Style

Use this procedure to delete an infill definition that you no longer need. However, you cannot remove an infill definition that is currently assigned to a cell in the primary grid or any nested grid. Also, you cannot remove the default infill definition, but you can modify it as needed.

NOTE For information about removing an infill from a cell, see Removing an Infill from a Door and Window Assembly on page 1141.

Removing panel infill from a Door/Window Assembly



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

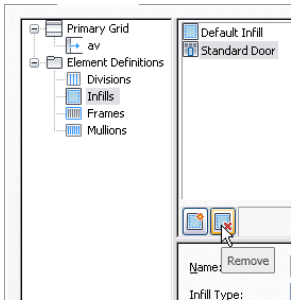
NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Infills under Element Definitions.

6 Select the unneeded infill definition, and click (Remove).

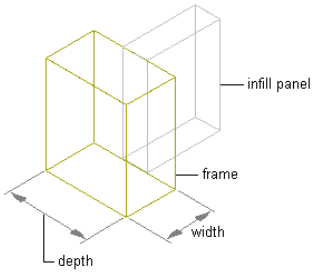


7 Click OK.

Defining Door and Window Assembly Frames

All door/window assembly grids, including the primary grid, can have frame definitions. The door/window assembly frame is represented by the outer edges of a grid. The overall frame size is determined by the length and height of the door/window assembly grid. You can define a frame by specifying a width and depth or by selecting a profile.

Specifying Door/Window Assembly frame width and depth



You create frame definitions for a specific door/window assembly style. Those definitions can be assigned only to frames in door/window assemblies of that style. You can create as many frame definitions as you want and then assign the definitions to the frame edges as needed. If you have nested grids, each grid has its own frame. There is a default frame definition that you can modify and assign as needed. Unassigned frame edges are not displayed. For more information, see Assigning Definitions to Door and Window Assembly Frames on page 1143.

TIP Using Style Manager, you can copy a mullion definition and use it as a frame definition. Select the mullion definition and drag it to Frames in the left pane.

Materials and Display Properties for Frames

If you do not use materials to control the display properties of frames, you can specify their display properties in the door/window assembly style. The layer, color, linetype, and other display properties of the default frame are applied to all frames unless you create a custom display component for each definition. You can then control the display of each frame definition independently. For more information, see Specifying the Display of Door and Window Assemblies on page 1150.

NOTE You create frame definitions for a specific door/window assembly style and those definitions can be assigned only to frames in door/window assemblies of that style.

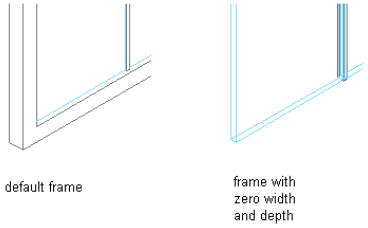
Defining a Door and Window Assembly Frame by Width and Depth

Use this procedure to define a frame by specifying its width and depth. The overall frame size is determined by the length and height of the door/window assembly grid.

Because door/window assemblies can contain multiple styles with different frames, it is helpful to use a naming convention for grid frames that indicates the grid location or purpose within the door/window assembly. For example, L3-FL1- Metal Frame identifies a metal frame in a third-level grid on Floor 1.

TIP To remove the frame edge and have the infill adjust to fill the space occupied by the frame, create a frame definition with both width and depth set to zero. Then assign that definition to the frame edge that you want to remove. This is necessary for the infill to be mitered as it would be for a butt-glazed condition. For more information, see Removing a Frame Edge from a Door and Window Assembly on page 1145.

Specifying a Door/Window Assembly frame width and depth of zero



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Frames under Element Definitions.

6 Click to create a new frame definition.

7 Enter a descriptive name for the frame.

8 Specify a width and depth for the frame.

9 Specify any offsets.

For more information, see Specifying Offsets for a Door and Window Assembly Frame on page 1127.

10 Click OK.

After you create a frame definition, you can assign it to any frame in a door/window assembly. For more information, see Assigning Definitions to Door and Window Assembly Frames on page 1143.

Creating a Profile for a Door and Window Assembly Frame

Use this procedure to create a profile that you can use to define the shape of a door/window assembly frame. You can then extrude the profile to create a door/window assembly frame.

The height and the width of the polyline you use to create the profile define the default height and width of the door/window assembly frame. The insertion point of the profile is aligned with the centroid of the frame.

1 Draw a closed polyline of the height and the depth needed for the resulting door/window assembly frame.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the frame.

4 Enter a name for the profile, and click OK.

You can now use the profile as a door/window assembly frame. For more information, see Defining a Door and Window Assembly Frame Using a Profile on page 1126.

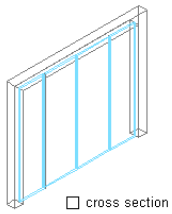
Defining a Door and Window Assembly Frame Using a Profile

Use this procedure to create a frame element definition from a profile. If you do not want a straight edge to your frame, you can use a profile to define edges with curves, jags, or any other shape you require.

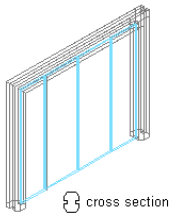
You can also use an edit in-place routine to create a frame from a profile. For more information, see Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing on page 1165.

It is helpful to use a naming convention for profiles that indicates the grid location or purpose within the door/window assembly. For example, L3-FL1- Metal Frame identifies a metal frame in a third-level grid on Floor 1.

Specifying default and profile-based Door/Window Assembly frames



default frame



profile-based frame

NOTE The insertion point of the profile is aligned with the centroid of the frame.

1. Create the profile to use for the frame.

   For more information, see Creating a Profile for a Door and Window Assembly Frame on page 1125.

2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

4. Select a door/window assembly style.
5. Click the Design Rules tab.
6. In the left pane, select Frames under Element Definitions.
7. Select a frame definition or click to create a new one.
8. Enter a descriptive name for the frame.
9. Specify a width and depth for the frame edge.

   These dimensions are used to calculate the center point of the edge for aligning the profile and also to specify a boundary for the adjacent infill.

10. Select Use Profile.

NOTE The Profile options are available only when you have profiles in the current drawing.

11 Select a profile from the list.

By default, the profile is inserted using the same width and depth with which it was created.

12 To adjust the size of the profile to fit within the width or depth dimension of the frame edge, select Auto-Adjust Profile Width or Depth.

13 To mirror the profile along the *X* or *Y* axis, select X or Y for Mirror In.

14 To rotate the profile, specify a rotation angle.

15 Specify any offsets.

For more information, see the next section Specifying Offsets for a Door and Window Assembly Frame on page 1127.

16 Click OK.

After you create a frame definition, you can assign it to any frame in a door/window assembly. For more information, see Assigning Definitions to Door and Window Assembly Frames on page 1143.

Specifying Offsets for a Door and Window Assembly Frame

Use this procedure to define the distance that a door/window assembly frame is from the floor line, roof line, or baseline. By default, the outside edges of the frame align with start and end of the baseline and the start and end of the base height. When you adjust the width of the frame, the frame expands inward. However, you can use offsets to expand or contract the frame away from these default limits or to shift the frame away from the baseline in either the X or Y direction.

Offset	Description
X	Positive X offset moves the frame edge outward beyond the end of the door/window assembly, while a negative X offset moves the frame edge inward toward the center of the door/window assembly.
Y	In Plan view, a positive Y offset moves the frame edge above the baseline, while a negative Y offset moves the frame below the baseline.
Start	Negative Start offset lengthens the frame beyond the start point, while a positive Start offset shortens the frame. The start point for vertical edges is the baseline, and the start point for horizontal edges (drawn left to right) is the left side.
End	Negative End offset lengthens the frame beyond the end point, while a positive End offset shortens the frame. The end point for vertical edges is the base height, and the end point for horizontal edges (drawn left to right) is the right side.

TIP To quickly identify the start and end of a door/window assembly, select the door/window assembly. The Reverse Direction grip is displayed near the center of the door/window assembly and points toward the end of the door/window assembly.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Frames under Element Definitions.

6 Select a frame definition or click to create a new one.

7 Specify an offset distance for the frame edge: X, Y, Start, or End.

8 Click OK.

Removing a Frame Definition from a Door and Window Assembly Style

Use this procedure to remove a frame definition that you no longer need. You cannot remove a frame definition if it is currently assigned to a frame edge, but you can remove it if it is assigned as an override to a frame edge. Also, you cannot remove the default frame definition, but you can modify it as needed.

NOTE For information about removing a frame edge, see Removing a Frame Edge from a Door and Window Assembly on page 1145.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Frames under Element Definitions.

6 Select the unneeded frame definition from the list, and click (remove frame).

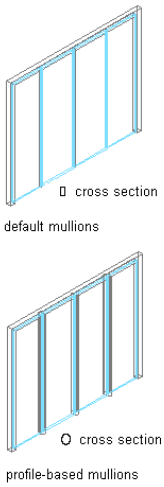
7 Click OK.

Defining Door and Window Assembly Mullions

All door/window assembly grids, including the primary grid, can have mullion definitions. The mullions of a door/window assembly are the edges between the grid cells. You can define the mullions by specifying a width and depth or by selecting a profile from which the mullion is extruded.

Because door/window assemblies can contain multiple nested grids with different mullions, it is helpful to use a naming convention for grid mullions that indicates the grid location or purpose within the door/window assembly. For example, L3-FL1- Window Mullion identifies a mullion for a window in a third-level grid on Floor 1.

Specifying default and profile-based Door/Window Assembly mullions



You create mullion definitions for a specific door/window assembly style and those definitions can be assigned only to mullions in door/window assemblies of that style. You can create as many mullion definitions as you want and then assign the definitions to mullions as needed. If you have nested grids, each grid has its own mullions. A default mullion definition, which you can modify and assign as needed, is used for any unassigned mullions. For more information, see Assigning Definitions to the Mullions of a Door and Window Assembly on page 1146.

TIP Using Style Manager, you can copy a frame definition and use it as a mullion definition. Select the frame definition and drag it to Mullions in the left pane.

Materials and Display Properties for Mullions

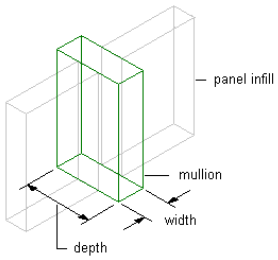
If you do not use materials to control the display properties of mullions, you can specify their display properties in the door/window assembly style. The layer, color, linetype, and other display properties of the default mullion are applied to all mullions unless you create a custom display component for each definition. You can then control the display of each mullion definition independently. For more information, see Specifying the Display of Door and Window Assemblies on page 1150.

Defining Door and Window Assembly Mullions by Width and Depth

Use this procedure to define mullions by specifying a width and a depth.

Because door/window assemblies can contain multiple nested grids with different mullions, it is helpful to use a naming convention for grid mullions that indicates the grid location or purpose within the door/window assembly. For example, L3-FL1- Window Mullion identifies a mullion for a window in a third-level grid on Floor 1.

Specifying Door/Window Assembly mullion width and depth



TIP To remove mullions for butt glazing, create a definition with both width and depth set to zero. Then assign that definition to the mullions that you want to remove. For more information, see Removing Mullions from a Door and Window Assembly Grid on page 1148.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

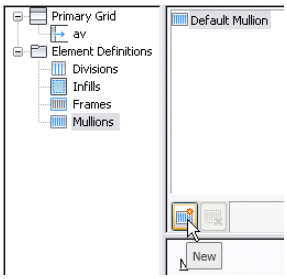
NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Mullions under Element Definitions.

6 Click to create a new mullion definition.



7 Enter a descriptive name for the mullion definition.

8 Specify a width and depth for the mullion definition.

9 Specify any offsets.

For more information, see Specifying Offsets for the Mullions of a Door and Window Assembly on page 1132.

10 Click OK.

After you create a mullion definition, you can assign it to any mullion in a door/window assembly. For more information, see Assigning Definitions to the Mullions of a Door and Window Assembly on page 1146.

Creating a Profile for Door and Window Assembly Mullions

Use this procedure to create a profile that you can use to define the shape of a door/window assembly mullion definition. You can then extrude the profile to create mullions from it.

The height and the width of the polyline you use to create the profile define the default height and width of the door/window assembly mullion. The insertion point of the profile is aligned with the centroid of the mullion.

1 Draw a closed polyline of the height and the depth needed for the resulting door/window assembly mullion.

2 Select the polyline, right-click, and click Convert to ➤ Profile Definition.

3 Enter **c** (Centroid) for the insertion point of the profile.

The insertion point of the profile is aligned with the centroid of the mullion.

4 Enter a name for the profile, and click OK.

You can now use the profile as a door/window assembly mullion. For more information, see Defining the Mullions of a Door and Window Assembly Using a Profile on page 1131.

Defining the Mullions of a Door and Window Assembly Using a Profile

Use this procedure to create a mullion element definition from a profile. If you do not want a straight edge to your mullions, you can use a profile to define mullions with curves, jags, or any other shape.

You can also use an edit in-place routine to create a mullion from a profile. For more information, see Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing on page 1165.

Because door/window assemblies can contain multiple nested grids with different mullions, it is helpful to use a naming convention for grid mullions that indicates the grid location or purpose within the door/window assembly. For example, L3-FL1- Window Mullion identifies a mullion for a window in a third-level grid on Floor 1.

NOTE The insertion point of the profile is aligned with the centroid of the mullion.

1. Create the profile to use for the mullion.

   For more information, see Creating a Profile for Door and Window Assembly Mullions on page 1130.

2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

4. Select a door/window assembly style.
5. Click the Design Rules tab.
6. In the left pane, select Mullions under Element Definitions.
7. Select a mullion definition or click to create a new one.
8. Enter a descriptive name for the mullion definition.
9. Specify a width and depth for the mullion definition.

   These dimensions are used to calculate the center point of the mullion for aligning the profile, and also to specify a boundary for the adjacent infill.

10. Select Use Profile.

    NOTE The Profile options are available only when you have profiles in the current drawing.

11. Select a profile from the list.

    By default, the profile is inserted using the same width and depth with which it was created.

12. To adjust the size of the profile to fit within the width or depth dimension of the mullion, select Auto-Adjust Profile Width or Depth.
13. To mirror the profile along the *X* or *Y* axis, select X or Y for Mirror In.
14. To rotate the profile, specify a rotation angle.
15. Specify any offsets.

    For more information, see Specifying Offsets for the Mullions of a Door and Window Assembly on page 1132.

16 Click OK.

After you create a mullion definition, you can assign it to any mullion in a door/window assembly. For more information, see Assigning Definitions to the Mullions of a Door and Window Assembly on page 1146.

Specifying Offsets for the Mullions of a Door and Window Assembly

Use this procedure to define mullions that are offset from the start or end of the door/window assembly to lengthen or shorten the edge or offset in the X or Y direction to shift the edge. For example, you might want to represent butt glazing by offsetting the mullions to be behind glass panel infills.

Offset	Description
X	For vertical mullions, a positive X offset moves the mullions toward the end of the door/window assembly, while a negative X offset moves the mullions toward the start of the door/window assembly. For horizontal mullions, a positive X offset moves the mullions toward the top of the door/window assembly, while a negative X offset moves the mullions toward the bottom of the door/window assembly.
Y	In Plan view, a positive Y offset moves the mullions above the baseline, while a negative Y offset moves the mullions below the baseline.
Start	Negative Start offset lengthens the mullions beyond the start point, while a positive Start offset shortens the mullions.
End	Negative End offset lengthens the mullions beyond the end point, while a positive End offset shortens the mullions.

TIP To quickly identify the start and end of a door/window assembly, select the door/window assembly. The Reverse Direction grip is displayed near the center of the door/window assembly and points toward the end of the door/window assembly.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Mullions under Element Definitions.

6 Select a mullion definition or click to create a new one.

7 Specify an offset distance for the X, Y, Start, or End.

8 Click OK.

Removing a Mullion Definition from a Door and Window Assembly Style

Use this procedure to remove a mullion definition that you no longer need. You cannot remove a mullion definition if it is assigned to a mullion, but you can remove it if it is assigned as an override to a mullion. Also, you cannot remove the Default Mullion definition, but you can modify it as needed.

NOTE For information about removing mullions from between cells, see Removing Mullions from a Door and Window Assembly Grid on page 1148.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

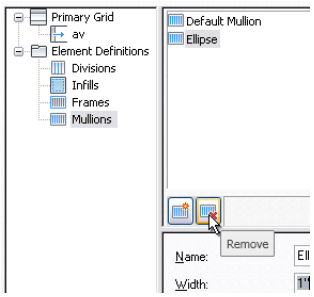
NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select Mullions under Element Definitions.

6 Select the unneeded mullion definition from the list, and click (remove mullion).



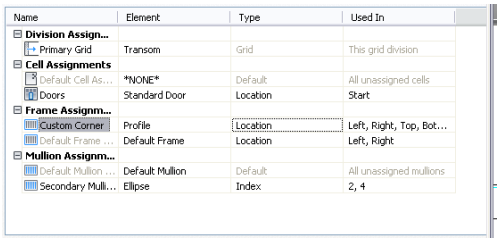
7 Click OK.

Assigning Definitions to Door and Window Assembly Elements

After you've created element definitions for a door/window assembly style, you can assign those definitions to each of the door/window assembly element types: divisions, cell infills, frames, and mullions.

By default, one definition is assigned to all elements of a particular type. However, you can assign definitions to individual elements as well. For example, all cells in the grid are assigned the default infill. But you can create a new cell assignment, select a different infill, and then specify the cells to use that infill.

Assignment list

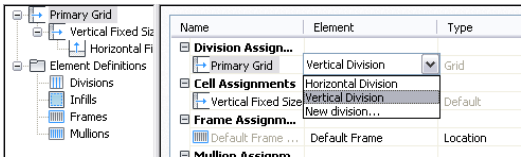


For more information about element definitions, see Creating Element Definitions for a Door and Window Assembly Style on page 1109.

Assigning a Division to a Door and Window Assembly Grid

Divisions define the grid orientation (whether the direction of the grid cells and mullions is horizontal or vertical) and the division type (number and size of cells).

After you define a division, you can assign it to the primary grid or to nested grids. Nested grids are created by selecting Nested Grid as the cell assignment. For more information, see Working with Nested Grids in Door and Window Assemblies on page 1135.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid you want to assign rules to.

The name of the grid you select is displayed in the table under the Division Assignment row.

TIP To rename a grid, select it, click Rename, and enter a new name.

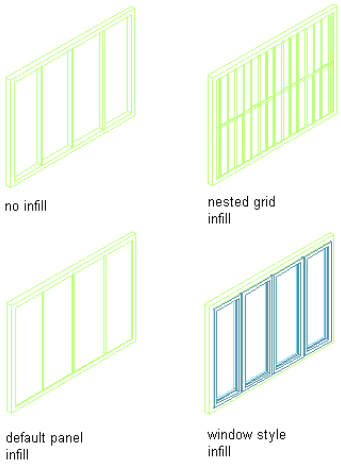
6 Click the Element column for that grid and select a division definition from the list.

7 Click OK.

Assigning Infills to Door and Window Assembly Cells

An infill defines the contents of a door/window assembly cell. A door/window assembly cell can have the default simple panel or contain a nested grid, an AEC Polygon, curtain wall unit, door or window style. The object styles you use in infills must exist in the current drawing to be added to an infill definition. Panels typically represent glazing or other plain cladding, such as stone or concrete.

Specifying Door/Window Assembly infill definitions



Cell Assignments

A cell assignment defines the infill definition used for cells. You can use one cell assignment to assign the same infill to all cells, or you can create multiple cell assignments to assign different infills to different cells.

Name	Element	Type	Used In
Division Assign...			
Secondary Grid	Vertical Division	Grid	This grid division
Cell Assignments			
Default Cell As...	2 Inch panel	Default	All unassigned cells
Door	Standard	Location	Middle
Window	Casement Window	Index	1, 2, 4, 5

Do not assign multiple definitions to the same cell. If you do, the last definition assigned to the cell is used.

Default Cell Assignment

The default cell assignment is used by all unassigned cells. You can modify the default assignment to be any type of infill, but you cannot delete the default cell assignment.

You may want to modify the default cell assignment to use the infill definition that occurs most frequently in your design. Any cells not assigned to other infills then use this infill definition.

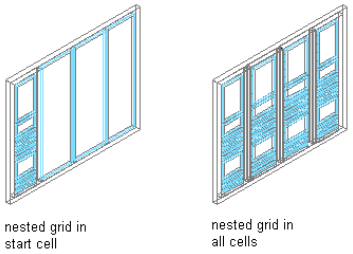
Materials and Display Properties of Infills

The layer, color, linetype, and other display properties of the default infill are applied to all infills unless you assign materials to the infills you created or you create a custom display component for each definition. Then you can control the display of each infill definition independently. For more information, see Specifying the Display of Door and Window Assemblies on page 1150.

Working with Nested Grids in Door and Window Assemblies

Each door/window assembly grid is one dimensional with either a horizontal or vertical division. By nesting grids in the door/window assembly style, you can create a variety of patterns from simple to complex.

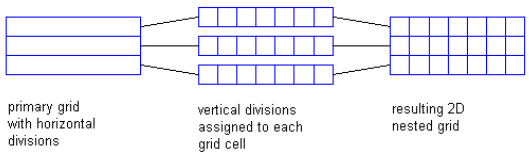
Specifying Door/Window Assembly nested grid locations



Simple Primary Grids

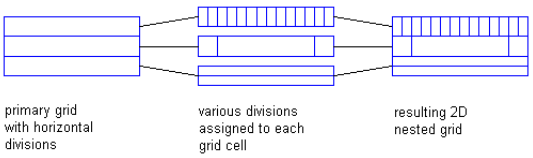
When you nest grids, you start with one primary grid. Then each cell in the primary grid can be filled with another grid. For example, the following illustration has a horizontal primary grid with four cells. You can nest a vertical grid in each horizontal cell to create a simple 2D grid.

Specifying Door/Window Assembly cell divisions 1



The previous illustration shows all cells in the grid with the same cell assignment—a vertical division. But each cell in a grid is independent and can have a separate assignment. For example, the following illustration shows one cell in the primary grid that contains another horizontal grid, the next cell contains a vertical grid with three divisions, and the next cell contains a vertical grid with six divisions.

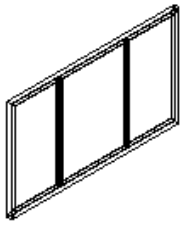
Specifying Door/Window Assembly cell divisions 2



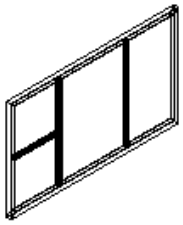
Multiple Nested Grids

You can continue to nest grids to create multiple levels. For example, the following illustrations show the Standard door/window assembly style grid, the same grid with a nested grid in one cell of the secondary grid, and the same grid again with nested grids in all cells of the secondary grid.

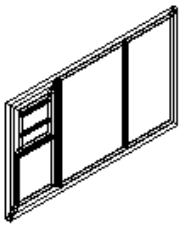
Specifying a nested grid in a door/window assembly



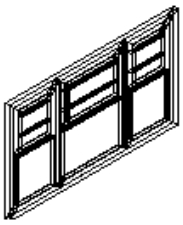
primary grid with vertical divisions



nested grid in cell 1 of secondary grid



nested grid in top of tertiary grid



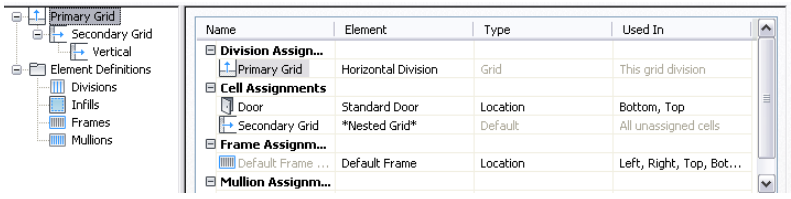
nested grids assigned to all cells

Defining Nested Grids

You can define nested grids on the Design Rules tab of the Door/Window Assembly Style Properties dialog box. The tree on the left side of the tab lists the grids. There is always one primary grid. The primary grid can have one or more secondary grids. Each secondary grid can have one or more tertiary grids and so on.

TIP To quickly create nested grids in all cells, change the default cell assignment to Nested Grid. If you want multiple levels of nesting, be sure to change the default cell assignment for each grid. For more information, see Creating a Nested Grid for a Door and Window Assembly on page 1137.

Each grid has its own cell assignments. You assign cells to contain another grid, a panel infill, or an object such as a door or window. For more information, see Assigning Infills to Door and Window Assembly Cells on page 1134.



Creating a Nested Grid for a Door and Window Assembly

Use this procedure to create a nested grid, which is a grid within a grid. Each nested grid has its own division rules, cell assignments, frame, and mullions. By default, the frame is off for nested grids.

For more information, see Working with Nested Grids in Door and Window Assemblies on page 1135.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to create a nested grid.

6 Click (new cell assignment).

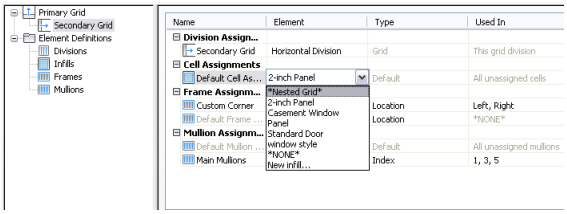
A new cell assignment is displayed in the list of cell assignments.

7 Right-click the default name, click Rename, and enter a descriptive name for the assignment.

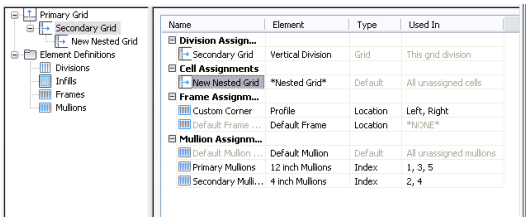
8 Select Nested Grid in the Element column.

A new grid is added to the list of grids in the left pane of the dialog box. If you are editing the primary grid, the new grid is added at the secondary level. If you are editing a grid at the secondary level, the additional grid is placed at the tertiary level, and so on.

Creating a nested grid



New nested grid in tree



NOTE To rename a grid, select it in the right pane, right-click, and click Rename, and enter a new name.

9 Specify the cells to contain this nested grid.

For more information, see Specifying Which Door and Window Assembly Cells Use a Cell Assignment on page 1142.

10 Click OK.

Filling a Door and Window Assembly Cell with a Simple Panel

Use this procedure to fill a door/window assembly cell with a simple panel. Simple panels are generally used to represent basic cladding materials in the door/window assembly, such as a stone wall panel or a concrete panel.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to assign a simple panel.

6 Click (new cell assignment).

A new cell assignment is displayed in the list of cell assignments.

7 Right-click the default name, click Rename, and enter a descriptive name for the assignment.

8 Select an infill that defines a simple panel.

9 Specify the cells to contain this simple panel.

For more information, see Specifying Which Door and Window Assembly Cells Use a Cell Assignment on page 1142.

10 Click OK.

Inserting a Door or Window into a Door and Window Assembly

Use this procedure to add doors and windows to door/window assemblies. For more information, see Defining Infills for Door and Window Assembly Cells on page 1118.

1 Open the tool palette that you want to use, and select a door, window or door/window assembly.

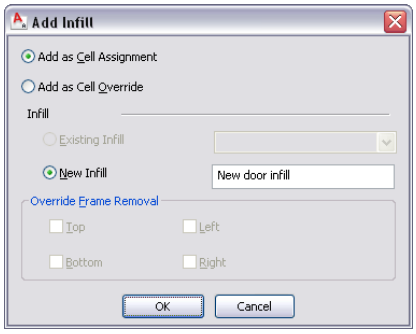
NOTE Alternatively, on the Home tab ➤ Build panel, click one of the following: Window , Door drop-down ➤ Door , or Door drop-down ➤ Door/Window Assembly .

2 Select the door/window assembly in which to insert the door or window.

You can move or hide the Properties palette to expose more of the drawing area.

3 Select the door/window assembly cell marker for the cell in which to insert the door or window.

The Add Infill worksheet displays.



4 Select the insertion method for the door or window:

If you want to…	Then…
add the door or window as a cell assignment and have all door/window assemblies using the same style display the same object added to a corresponding cell	select Add as Cell Assignment.
add the door or window exclusively to the selected door/window assembly	select Add as Cell Override.

If a door or window of the style you selected already exists in your drawing, Existing Infill is selected by default.

5 Select the type of infill for the door or window:

If you selected…	Then…
Add as Cell Assignment and you want to insert a door or window of the existing style, Existing Infill is selected by default.	Click OK.
Add as Cell Assignment and you want to insert a door or window of a different style than exists in your drawing	select New Infill, enter a name for the object and click OK.
Add as Cell Override and you want to insert a door or window of the existing style and not modify the edge of the frame surrounding the object	Click OK.
Add as Cell Override and you want to insert a door or window of a different style than exists in your drawing and not remove an edge of the frame surrounding the object	select New Infill, enter a name for the object and click OK.
Add as Cell Override and you want to insert a door or window of the existing style and remove an edge of the frame surrounding the object	select Top, Bottom, Left, or Right for Override Frame Removal and click OK.
Add as Cell Override and you want to insert a door or window of a different style than exists in your drawing and remove an edge of the frame surrounding the object	select New Infill and enter a name for the object. Then select Top, Bottom, Left, or Right for Override Frame Removal and click OK.

6 Press *ENTER*.

Inserting an Object into a Door and Window Assembly Cell

Use this procedure to insert objects, such as doors, windows, curtain wall units, and AEC Polygons, into a door/window assembly cell. Door/window assembly cells can contain these objects when you create infill

definitions that use them. For more information, see Creating an Infill for Inserting an Object into a Door and Window Assembly on page 1120.

TIP After you insert an object in a cell, you can select that object independent of the grid, and access editing options for the object. For more information, see Editing Objects Anchored in Door and Window Assemblies on page 1185.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3. Select a door/window assembly style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to insert objects.
6. Click (new cell assignment).

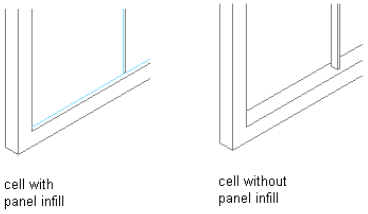
   A new cell assignment is displayed in the list of cell assignments.
7. Right-click the default name, click Rename, and then enter a descriptive name for the assignment.
8. Select an infill that uses an object style.
9. Specify the cells to contain this object.

   For more information, see Specifying Which Door and Window Assembly Cells Use a Cell Assignment on page 1142.
10. Click OK.

Removing an Infill from a Door and Window Assembly

Use this procedure to remove the infill of a cell and leave the cell empty. To do this, use None as the element definition. Using None also removes any frame edges that border the cell, but it does not affect the mullions.

Removing infill from a Door/Window Assembly cell



To remove the infill of a cell

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3. Select a door/window assembly style.
4. Click the Design Rules tab.

5 In the left pane, select the grid that contains the cells you want to assign to None.

6 Select an existing cell assignment or create a new one.

7 Select None under the Element column.

8 Specify the cells to contain the None infill.

For more information, see Specifying Which Door and Window Assembly Cells Use a Cell Assignment on page 1142.

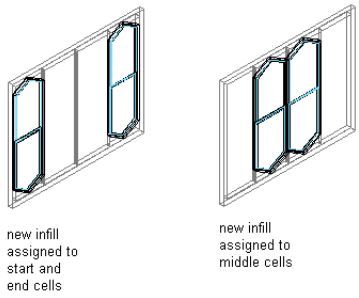
9 Click OK.

Specifying Which Door and Window Assembly Cells Use a Cell Assignment

When you create a cell assignment you need to specify the cells in the grid to use that assignment. There are two options for selecting cells:

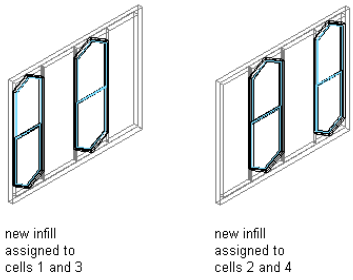
- Use Location to insert the infill into the start, middle, or end cells of a vertical grid or into the bottom, middle, or top cells of a horizontal grid. If there is an even number of cells (four or more), Middle refers to the two cells in the middle of the grid. If there is an odd number of cells (three or more), Middle refers to one cell in the middle of the grid.

Specifying Door/Window Assembly infill by location



- Use Index to insert the infill into specific cells based on cell numbers. Cells are numbered from start to end or bottom to top. For example, typing 1, 2, 3 would place the infill in the first, second and third cells.

Specifying Door/Window Assembly infill by index



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 Select a cell assignment:

If you selected…	Then…
Location for Type	click the Used In column, and click . Select the cells you want to use this assignment, and click OK.
Index for Type	enter the cell numbers separated by commas in the Used In column. For vertical grids, cells are numbered from start to end and for horizontal grids, cells are numbered from bottom to top.

NOTE Do not assign multiple definitions to a cell. If you do, the last definition assigned to the cell is used.

7 Click OK.

Any cells that are not assigned a specific cell assignment use the default infill.

Removing an Assignment from a Door and Window Assembly Style

Use this procedure to remove cell assignments, frame assignments, and mullion assignments from a door/window assembly style. You cannot remove default assignments, but you can modify them to suit your needs.

NOTE Each grid requires one division assignment, therefore you cannot remove the division assignment. You can change the division element used for the division assignment.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid from which you want to remove an assignment.

6 Select a cell assignment, frame assignment, or a mullion assignment.

7 Click (remove assignment).

8 Click OK.

Assigning Definitions to Door and Window Assembly Frames

The door/window assembly frame is represented by the outer edges of the primary grid. Each nested grid has its own frame that is defined separately from the primary grid frame. By default, the frames of nested grid are turned off. For more information about nested grids, see Working with Nested Grids in Door and Window Assemblies on page 1135.

Frame Assignments

A frame assignment defines the frame definition used by each frame edge. You can use one frame assignment to assign the same definition to all four edges of the frame, or you can create multiple frame assignments to assign different definitions to different edges of the frame. Unassigned edges are not displayed.

Default Frame Assignment

Do not assign multiple definitions to the frame edge. If you do, the last definition assigned to the edge is used.

There is a default frame assignment and you can select the frame edges it applies to. You can modify the default assignment to use any frame definition, but you cannot delete the default frame assignment.

Materials and Display Properties of Frames

The layer, color, linetype, and other display properties of the default frame are applied to all frame edges unless you assign materials to the frame definition or create a custom display component for each definition. Then you can control the display of each frame definition independently. For more information, see Specifying the Display of Door and Window Assemblies on page 1150.

Adding a New Frame Assignment to a Door and Window Assembly Grid

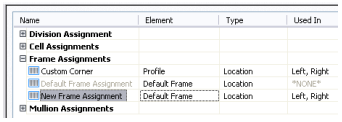
Use this procedure to add a frame assignment to a door/window assembly. To assign different definitions to different frame edges, you need multiple frame assignments.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3. Select a door/window assembly style.
4. Click the Design Rules tab.
5. In the left pane, select the grid in which you want to create a new frame assignment.
6. Click (new frame assignment).

   A new frame assignment is displayed in the list of frame assignments.



7. Right-click the default name, click Rename, and then enter a descriptive name.
8. Under Element, select a frame definition.
9. Specify the sides of the frame to use this frame assignment.

   For more information, see Specifying Which Door and Window Assembly Edges Use a Frame Assignment on page 1145.

10. Click OK.

Specifying Which Door and Window Assembly Edges Use a Frame Assignment

When you create a frame assignment, you need to specify the edges of the frame to use that assignment.

Frame edges that are not assigned a frame definition are not displayed.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

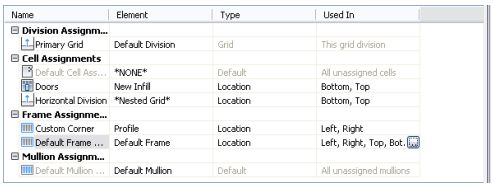
4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 Select a frame assignment.

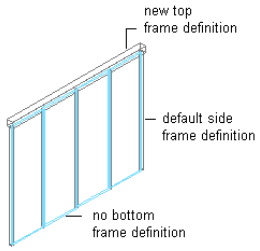
Location is the only way to specify the frame edges.

7 Click the Used In column, and then click the .



8 Select the edges that you want to use this assignment - Left, Right, Top, or Bottom - and click OK.

Specifying different Door/Window Assemblies frame definitions



NOTE Do not assign multiple definitions to the same frame edge because only the last definition assigned to the edge is used.

9 Click OK.

Removing a Frame Edge from a Door and Window Assembly

Use this procedure to remove a frame edge from a door/window assembly. There are three ways to remove a frame edge:

- Set the width and depth of the edge to zero.

- Leave the edge unassigned.
- Specify None as an override to the edge assignment.

The first two methods remove the frame edge and expand the adjacent infills into the space occupied by the edge.

By specifying None as an override, the frame edge is not displayed, but the adjacent infill is not expanded into the space the edge occupied.

For information about setting the width and depth to zero, see Defining a Door and Window Assembly Frame by Width and Depth on page 1124.

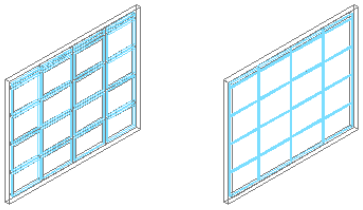
For information about leaving the edge unassigned, see Specifying Which Door and Window Assembly Edges Use a Frame Assignment on page 1145.

For information about overriding the edge, see Creating a Frame or Mullion Override on page 1163.

Assigning Definitions to the Mullions of a Door and Window Assembly

The mullions of a door/window assembly are the edges between the grid cells. The primary grid and each nested grid have mullions that are defined separately from the other grids. For more information about nested grids, see Working with Nested Grids in Door and Window Assemblies on page 1135.

Specifying mullions for Door/Window Assembly nested grids



Mullion Assignments

A mullion assignment defines the definition used by each mullion. You can use one assignment to define all mullions, or you can create multiple assignments and assign different definitions to different mullions in any grid.

Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

Default Mullion Assignment

There is a default mullion assignment used by all unassigned mullions. You can modify the default assignment to be any mullion definition, but you cannot delete the default mullion assignment.

Adding a New Mullion Assignment to a Door and Window Assembly Style

Use this procedure to add a new mullion assignment to a door/window assembly style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

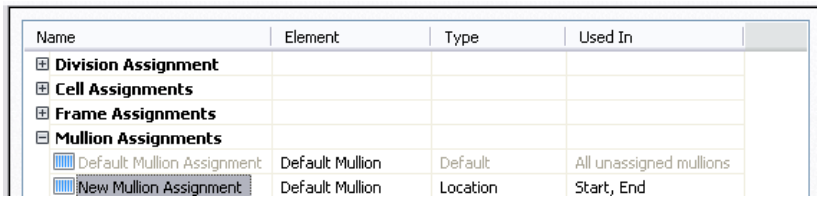
3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to create a new mullion assignment.

6 Click (new mullion assignment).

A new mullion assignment is displayed in the list of mullion assignments.



7 Right-click the default name, click Rename, and then enter a descriptive name.

8 Under Element, select a mullion definition.

9 Specify the mullions to use this assignment.

For more information, see Specifying Which Door and Window Assembly Mullions Use an Assignment on page 1147.

10 Click OK.

Specifying Which Door and Window Assembly Mullions Use an Assignment

When you create a mullion assignment you need to specify the mullions in the grid to use that assignment. There are two options for selecting mullions:

- Use Location to assign a definition to the start, middle, or end mullions of a vertical grid or the bottom, middle, or top mullions of a horizontal grid. If there is an even number of mullions (four or more), Middle refers to the two mullions in the middle of the grid. If there is an odd number of mullions (three or more), Middle refers to the one mullion in the middle of the grid.
- Use Index to assign a definition to specific mullions based on mullion numbers. Mullions are numbered from left to right or bottom to top. For example, typing 1, 2, 3 would assign the definition to the first, second, and third mullions.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select a grid.

6 Select an existing mullion assignment or click to create a new one.

7 Select a mullion assignment:

If you selected…	Then…
Location	click the Used In column, and click . Select the mullions you want to use this assignment, and click OK.
Index	enter the mullion numbers separated by commas in the Used In column. For vertical grids, mullions are numbered from start to end and, for horizontal grids, mullions are numbered from bottom to top.

NOTE Do not assign multiple definitions to the same mullion because only the last definition assigned to the mullion is used.

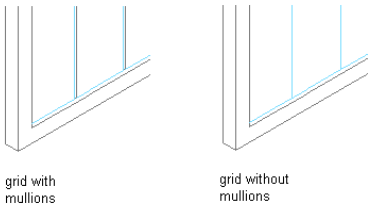
8 Click OK.

Any mullions that are not assigned a specific mullion assignment use the default mullion definition.

Removing Mullions from a Door and Window Assembly Grid

Use this procedure to remove a mullion from the door/window assembly. You can create a mullion definition whose edge width and depth are zero. Adjacent infills expand to fill in the space that was occupied by the mullion. This is an effective way to represent butt glazing.

Removing a mullion from Door/Window Assembly grid



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the Design Rules tab.

5 In the left pane, select the grid in which you want to remove a mullion.

6 Create a new mullion assignment, and enter **0** (zero) for the width and depth.

For more information, see Defining Door and Window Assembly Mullions by Width and Depth on page 1129.

7 Under Mullion Assignments, select the mullion definition you created for mullion edges of any mullion assignment where you want to remove the mullions.

For more information, see Specifying Which Door and Window Assembly Mullions Use an Assignment on page 1147.

8 Click OK.

Specifying the Materials of a Door and Window Assembly Style

A door/window assembly consists of a number of components whose display properties can be determined by the materials assigned to each component.

When you assign materials to a door/window assembly style, you assign one material to each display component of the door/window assembly. For example, you assign a wood material to the frame and a glass material to the glass inset. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the door/window assembly style, instead of using material display properties, you can turn off the material assignments in the display properties of the door/window assembly style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three dimensional (3D) model views and in elevations.

Door and Window Assembly Materials and Display Components

The following table identifies the material component that corresponds to each door/window assembly component in the specified views.

Door/Window Assembly Component	Material Component
Plan, Plan High Detail, Plan Low Detail, Screened, Reflected Plan	
Default Infill	Linework
Default Frame	Linework
Default Mullion	Linework
Default Infill Hatch	Linework
Default Frame Hatch	Linework
Default Mullion Hatch	Linework
Model	
Default Infill	3D Body
Default Frame	3D Body
Default Mullion	3D Body

Assigning Materials to a Door and Window Assembly Style

Use this procedure to assign materials to the individual components of a door/window assembly style. When you assign a material to a door/window assembly component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the door/window assembly. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, the frame, mullion, and infill are physical components of a door/window assembly. The cell marker is a symbolic component.

NOTE If a material assignment does not determine the display properties of a door/window assembly component, you can change the display properties of the door/window assembly style as described in Specifying the Display of Door and Window Assemblies on page 1150.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, select the value for Material Definition, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.
11. Click OK.

Specifying the Display of Door and Window Assemblies

The display of a door/window assembly depends on the direction from which you view the door/window assembly. In plan view, the door/window assembly object is displayed as parallel lines with vertices marking the grid lines, as an architect would typically draw a door/window assembly. In 3D view, the door/window assembly object is displayed as it would appear in the real world, with surfaces showing length, thickness, and height. You control what you want to display in each particular view.

Element Definitions and Custom Display Components

By default, the display of all infills, frames, and mullions is controlled by the display properties of the default infill, default frame, and default mullion. However, you can add individual element definitions as components with separate display properties. For example, if you define two infills called stone panel and glass panel, by default they are both controlled by the default infill display properties. But you can add each definition as a new display component and then control the display properties separately.

NOTE The component name in the Custom Display Component dialog box must match the name of element definition in the Design Rules tab. Otherwise, the element definition does not display properly.

For more information about the display system, see Display System on page 513.

Materials and Display Properties

You can use materials to control the display of both default and custom infills, frames, and mullions. When you assign materials to the element definitions you create, you do not need to define these definitions as custom display components. For more information, see Specifying the Materials of a Door and Window Assembly Style on page 1149.

Adding Door and Window Assembly Element Definitions as Display Components

Use this procedure to add door/window assembly element definitions. Before you can control the display properties of door/window assembly elements according to the definition assigned to the element, you must create display components for each element definition.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door/Window Assembly Styles.

   NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .
3. Select the door/window assembly style that you want to change.
4. In the Door/Window Assembly Style Properties dialog box, click the Display Properties tab.
5. Click Edit Display Properties .
6. Click the Other tab, and then click Add.

   NOTE If you click the Custom Plan Components tab, the Custom Display Component dialog box is similar, except that you do not specify the Z insertion point and Z offset for the custom graphic.
7. Select Infill, Frame, or Mullion for Component Type.
8. Enter a name for Component Name, or click Select Element and select an element from the list.
9. Click OK.
10. Click the Layer/Color/Linetype tab.

    The element definition that you added is displayed in the list of components.
11. Click the Other tab to continue adding element definitions, or click OK twice.

Specifying the Layer, Color, and Linetype of a Door and Window Assembly Style

Use this procedure to change the following display properties of the components of an individual door/window assembly:

- Visibility (component is on or off)
- By Material
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select the door/window assembly style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override.
6 Click the Layer/Color/Linetype tab.
7 Select the component to change, and select a different setting for the property.
8 Click OK twice.

Specifying the Hatching for Components of a Door and Window Assembly Style

Use this procedure to specify the hatching of the components of an individual door/window assembly. Door/window assembly hatching is displayed only in display representations, such as Plan, that are used in the Top view (Plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select the door/window assembly style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override.
6 Click the Hatching tab.
7 Select a component, and click the setting for Pattern.

8 Select the hatching for the component:

If you want to select…	Then…
a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
single hatching	select User-defined for Type, and clear Double Hatch.
double hatching	select User-defined for Type, and select Double Hatch.
solid fill	select Solid Fill for Type.

9 Click OK.

10 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

11 Click Angle, and enter the angle for the selected pattern.

12 Click Orientation, and specify how the hatching is oriented:

If you want to orient the hatching…	Then…
to the object, regardless of the object rotation	select Object.
to the World Coordinate System	select Global.

13 Click OK twice.

Adding Custom Graphics as a Display Component of a Door and Window Assembly

There may be instances where an infill, frame, or mullion requires a custom 2D or 3D graphic. For example, you might need a highly detailed three-dimensional truss as the mullions or a decorative light fixture applied to an infill. In cases like these, you can create a custom block, add a display component with the block attached, and associate that component with an element definition. When you assign that definition to an element, the block is also displayed.

1 Draw your custom component, and save it as a block.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

4 Select the door/window assembly style that you want to change.

5 Click the Display Properties tab.

6 Click .

7 Click the Custom Plan Components tab.

If Model, Sill Plan, or Sill Plan Screened is the current display representation, the tab is called Other.

8 Click Add.

9 Select Infill, Frame, or Mullion as the element type.

10 Select the specific element from the list.

11 Select Draw Custom Graphics.

12 Specify the display of the element:

If you want to…	Then…
display the block instead of the associated door/window assembly element	select Replace Graphics.
superimpose the block over the door/window assembly element so that both are displayed	clear Replace Graphics.

13 Click Select Block and select the custom block that you created.

14 Click OK.

15 Specify further settings for the custom display block:

If you want to…	Then…
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
mirror the block	determine if it should mirror in the X, Y, or Z direction.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.
offset the block from the grid	specify the offset in the X, Y, or Z direction.

16 Click OK three times.

Creating Cut Planes for a Door and Window Assembly

Use this procedure to specify the properties of one or more cut planes for a door/window assembly style. Cut plane display properties apply only to display representations, such as Plan, that are used in Top view (Plan view) of a drawing.

To better visualize the elements of a door/window assembly in plan view, you can create cut planes. The main cut plane is where the shrinkwrap and hatching are applied. The plan display shows the components of the door/window assembly as they are displayed at the height of each cut plane.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select the door/window assembly style that you want to change.

4 Click the Display Properties tab.

5 Select Plan, and click .

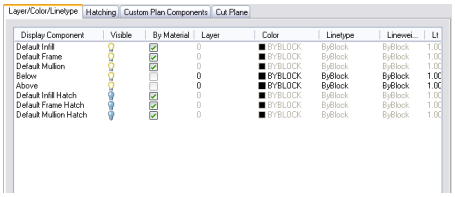
NOTE The Cut Plane tab is displayed only in some display representations, such as Plan.

6 Click the Cut Plane tab to set the cut plane to be displayed in each display representation for the door/window assembly style.

7 Enter a value for Cut Plane Height to specify the cut plane at which hatching takes effect.

8 To specifically define a cut plane, click Add, and enter the height of the new cut plane:

If you add a cut plane…	Then…
at a height that is lower than the value for Cut Plane Height	objects are displayed using the properties specified for the Below Cut Plane component on the Layer/Color/Linetype tab.
at a height that is higher than the value for Cut Plane Height	objects are displayed using the properties specified for the Above Cut Plane component on the Layer/Color/Linetype tab.



9 Click OK twice.

Defining a Door and Window Assembly Style as Bounding for Associative Spaces

Use this procedure to define a door and window assembly style that can bound associative spaces.

When a door and window assembly style is set as bounding, by default all door and window assemblies that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the object style in the object settings, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the General tab.

5 Select the check box for Objects of this style may act as a boundary for associative spaces.

6 Click OK.

Attaching Notes and Files to a Door and Window Assembly Style

Use this procedure to enter notes and attach reference files to a door/window assembly. You can also edit notes and edit or detach reference files from a door/window assembly.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select a door/window assembly style.

4 Click the General tab.

5 To add a description to the door/window assembly, enter it for Description.

6 Click Notes.

7 To add a note, click the Text Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Using Overrides in Door and Window Assemblies

Door/window assemblies are geometrically complex objects that often have a large number of different elements, such as frames, panels, and window infills. The settings for these elements are defined in the door/window assembly style and can be modified using Style Manager. However, there are cases when modifying a door/window assembly directly on screen is more suitable:

- You want to add custom frame or mullion edges to a door/window assembly and need direct visual feedback.
- You want to create an override, like a merged infill or an irregular panel shape in only one specific place in the door/window assembly.
- You want to experiment with different visuals without having to change the door/window assembly style for each idea immediately.

When you have finished your on-screen edits, you can decide if you want to

- apply the overrides to the door/window assembly you have edited.
- save the overrides to the current door/window assembly style.
- create a new style for the overrides.

NOTE You cannot modify a definition using the Override method. For information about modifying definitions, see Modifying Element Definitions for Door and Window Assembly Styles on page 1175.

Overrides do not affect the door/window assembly design rules. However, you can transfer overrides to a door/window assembly style when you want all door/window assemblies of that style to have the same overrides.

You can view a list of overrides that are currently assigned to a door/window assembly from the Overrides tab of the Door/Window Assembly Properties dialog box. For more information, see Creating a Division Override on page 1171.

NOTE Overrides are also listed on the Overrides tab in the Door/Window Assembly Style Properties dialog box.

Overriding Door and Window Assembly Infills

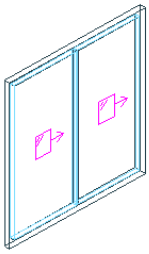
The cell infills of a door/window assembly are set in the door/window assembly style. You can, however, create overrides for these infills in cells. For example, you might want a row of glider windows for a first floor facade. In one specific position, however, you want a frosted glass window. In this case, you would set the row of glider windows in the door/window assembly style, and then override the infill style in one specific cell with a frosted glass window.

Door/window assembly infills can consist of simple panels, objects like windows or doors, or nested grids. You can change one infill for another, merge cells, or remove the frame from an infill altogether. This would be useful if you add a door into a grid cell and want to remove the bottom frame from that cell.

Turning on Cell Markers

Use this procedure to turn on the cell markers for each grid cell in a door/window assembly. The cell markers must be on in order to select individual cells and make changes to them.

Viewing Door/Window Assembly cell markers



1 Select the door/window assembly for which you want to create an infill override.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Show Infill Markers .

Merging Door and Window Assembly Cells

Use this procedure to merge two door/window assembly cells.

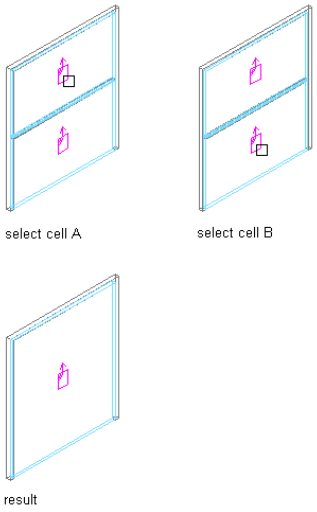
NOTE To merge door/window assembly cells, the cell markers need to be visible. For information on turning on cell markers, see Turning on Cell Markers on page 1157.

You can only merge cells that are adjacent to each other.

In most cases, you merge cells with the same infill type. The merged cell is then of the same type as the original cells. For example, if you merge two solid panel infills, the resulting merged cell also has a solid panel infill. In some cases however, you might want to merge two cells that have different infill types. In that case, the infill type of the first selected cell is used for the merged cell. For example, if you want to

merge a cell with a simple panel infill and a cell with a window infill, and you select the cell with the simple panel first during the merge command, the merged cell contains a simple panel infill, not a window. If you select the two cells in the opposite order, the merged cell contains a window and no simple panel infill.

Merging two Door/Window Assembly cells



1 Select the door/window assembly on which you want to merge two cells.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Infill drop-down ➤ Merge.

3 Select the first cell to be merged.

4 Select the second cell to be merged.

The cells are merged into one.

5 Specify where you want to save the door/window assembly override:

If you want to save the override…	Then…
only on this specific door/window assembly	no further steps are necessary. The override is saved to the door/window assembly. For information about how to remove an override from a door/window assembly, see Creating a Division Override on page 1171.
save the override to a door/window assembly style	select the door/window assembly, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you chose to save the override to a door/window assembly style, select the door/window assembly again, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules

drop-down ➤ Save to Style. Then choose the door/window assembly style in which to save the override.

If you want to…	Then…
save the override to the current door/window assembly style	select Transfer Merge Operations to Style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style check box is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.
save the override to a new door/window assembly style	select Transfer Merge Operations to Style, and click New. Then, enter a name for the new door/window assembly style, and click OK. **NOTE** If you have created only a cell merge, only the Transfer Merge Operations to Style check box is active. If you have also created other overrides, such as a new cell assignment or a frame or mullion edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.

NOTE If you do not want to save the override back to a style at all, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. The overrides still remain on the door/window assembly, where they can be removed as described in Creating a Division Override on page 1171, but they are not saved back to a door/window assembly style.

Creating a Door and Window Assembly Infill Override

Use this procedure to override the infill of a door/window assembly cell.

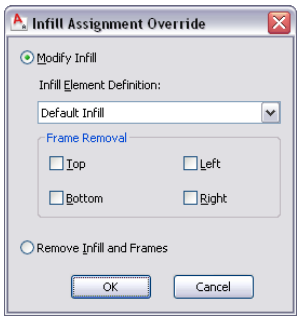
For example, you might have a row of simple concrete panels in your door/window assembly, but want in one location a round window instead of the concrete panel. In that case, it might be simpler to use an infill override, instead of creating complex door/window assembly definitions.

NOTE To override an infill assignment, the cell markers must be visible. For information on turning on cell markers, see Turning on Cell Markers on page 1157.

To exchange an infill definition, the new infill definition must already be defined in the curtain wall style. For information on creating infill definitions, see Defining Infills for Door and Window Assembly Cells on page 1118.

1. Select the door/window assembly on which you want to override an infill.
2. Click Door/Window Assembly tab ➤ Modify panel ➤ Infill drop-down ➤ Override Assignment.

3 Select the marker of the cell(s) where you want to create an override, and press *ENTER*.



4 Create the override:

If you want to…	Then…
exchange the existing infill for another	select a new infill definition from the list.
remove one or more of the frames around the infill	select the frame component to be removed. You could, for example, override a cell to contain a door infill instead of a panel infill; in this case, you would want to remove the bottom frame of the cell.
remove the complete infill and its frame	select Remove Infill and Frames. **NOTE** This works only for infills that border the exterior of the door/window assembly.

5 Click OK.

6 Specify where you want to save the door/window assembly override:

If you want to…	Then…
save the override only on this specific door/window assembly	no further steps are necessary. The override is saved to the door/window assembly. For information about how to remove an override from a door/window assembly, see Creating a Division Override on page 1171.
save the override to a door/window assembly style	select the door/window assembly, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a door/window assembly style, select the door/window assembly again, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules

drop-down ➤ Save to Style and decide to which door/window assembly style you want to save the override.

If you want to…	Then…
save the override to the current door/window assembly style	select Transfer Cell Overrides to Style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.
save the override to a new door/window assembly style	select Transfer Cell Overrides to Style, and click New. Then, enter a name for the new door/window assembly style, and click OK. **NOTE** If you have created only an infill override, only the Transfer Cell Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a frame or mullion edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.

NOTE If you do not want to save the override back to a style at all, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. The overrides remain on the door/window assembly, where they can be removed as described in Creating a Division Override on page 1171, but they are not saved back to a door/window assembly style.

In-Place Editing of Door and Window Assembly Cells

Use this procedure to edit door/window assembly cells using in-place editing with the Edit Grid grip. With in-place editing, you can edit individual cells, bays, columns, or nested grids of the door/window assembly directly and interactively in the drawing area, and later save the changes to the door/window assembly or door/window assembly style.

1 Select a door/window assembly on which you want to edit cells with in-place editing.

2 Specify the mode in which to edit the door/window assembly:

If you want to edit …	Then …
this instance of the door/window assembly	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the door/window assembly style	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. If this option is not available, the design rules are already style-based for the door/window assembly.

3 Click the Edit Grid grip.

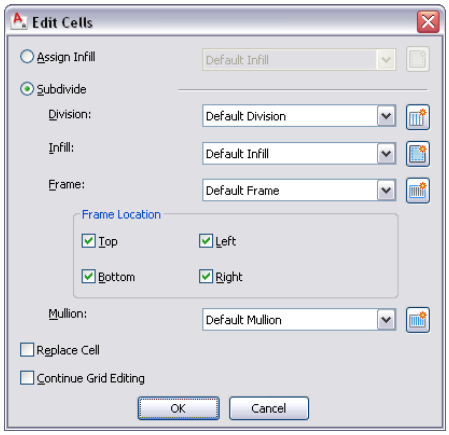
4 Enter **c** (Cell) and press *ENTER*.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the individual cells, bay, column, or nested grid to modify the cell assignment by hovering over a cell or pressing TAB, and press *ENTER*.

Press *CTRL* to select multiple cells, bays, columns or nested grids.

The Edit Cells worksheet displays.



6 Edit the cell for the selected grid:

If you want to…	Then…
assign an infill to selected cells	select Assign Infill and select an infill definition. Clear Replace Cell and click OK.
replace the selected cells with a new infill	select Assign Infill and select an infill definition. Select Replace Cell and click OK.
create and assign a new infill to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Door and Window Assembly Cells on page 1134.
divide the selected cells with divisions, infills or frames	select Subdivision.
add a division to the subdivided cells	select a division definition.
create and assign a new division to the selected cells	click and specify values on the Design Rules worksheet. For more information, see Assigning a Division to a Door and Window Assembly Grid on page 1134.
select an infill for the subdivided cells	select an infill definition.

If you want to…	Then…
create and assign a new infill to the subdivided cells	click and specify values on the Design Rules worksheet. For more information, see Assigning Infills to Door and Window Assembly Cells on page 1134.
select a frame definition for the grid created after the cell is subdivided	select the frame definition and click OK.
specify the location of frames on the grid created after the cell is subdivided	select Top, Bottom, Left, Right for Frame Location and click OK.
create and assign a new frame definition for the new grid created after the cell is subdivided	click and specify values on the Design Rules worksheet. For more information, see Adding a New Frame Assignment to a Door and Window Assembly Grid on page 1144.
select a mullion definition for the grid created after the cell is subdivided	select the mullion definition.
create and assign a new mullion definition to the selected grid	click and specify values on the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Door and Window Assembly Style on page 1146.
replace the existing cell infill with the options selected on this worksheet	select Replace Cell.
continue in-place editing the grid after the cell is subdivided	select Continue Grid Editing.

7 Click OK.

8 Press *ENTER*.

Overriding Door and Window Assembly Frames and Mullions

You can change a selected frame edge or mullion edge by using an edge assignment override.

NOTE To exchange a frame edge or mullion edge, the new edge definition must already be defined in the door/window assembly style.

Removing the edge does not affect the width of the cell. To remove the edge and have the adjacent cell resize, create an edge definition with a width and depth of zero. For more information, see Defining a Door and Window Assembly Frame by Width and Depth on page 1124 or Defining Door and Window Assembly Mullions by Width and Depth on page 1129.

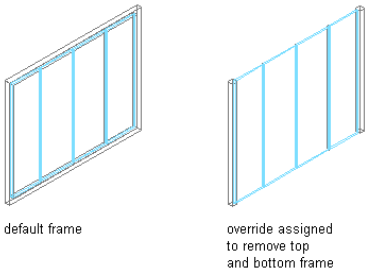
You can also create a new edge profile by drawing a polyline or using an existing profile in the drawing. This edge profile can be interactively edited on screen by in-place editing.

Creating a Frame or Mullion Override

Use this procedure to select a different element definition for a selected frame edge or mullion by using an edge assignment override.

To exchange a frame or mullion, the new definition must already be defined in the door/window assembly style. For information on creating frames and mullions, see Defining Door and Window Assembly Frames on page 1124 and Defining Door and Window Assembly Mullions on page 1128.

Overriding a Door/Window Assembly frame definition



1 Select the door/window assembly on which you want to override an edge.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Override Assignment.

3 Select the frame or mullion edge you want to override.

4 Create the override:

If you want to…	Then…
exchange the existing edge for another	select a new edge definition from the list.
remove the frame or mullion edge	select Remove.

5 Click OK.

6 Specify where you want to save the door/window assembly override:

If you want to…	Then…
save the override only on this specific door/window assembly	no further steps are necessary. The override is saved to the door/window assembly. For information about how to remove an override from a door/window assembly, see Creating a Division Override on page 1171.
save the override to a door/window assembly style	select the door/window assembly, and click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

7 If you have chosen to save the override to a door/window assembly style, select the door/window assembly again, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules

drop-down ➤ Save to Style and decide to which door/window assembly style you want to save the override.

If you want to…	Then…
save the override to the current door/window assembly style	select Transfer Edge Overrides to Style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a division override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.
save the override to a new door/window assembly style	select Transfer Edge Overrides to Style, and click New. Then, enter a name for the new door/window assembly style, and click OK. **NOTE** If you have created only a frame or mullion edge override, only the Transfer Edge Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a division override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.

NOTE If you do not want to save the override back to a style at all, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. The overrides remain on the door/window assembly, where they can be removed as described in Creating a Division Override on page 1171, but they are not saved back to a door/window assembly style.

Creating a Frame or Mullion Edge from a Polyline or Profile Using In-Place Editing

Use this procedure to assign a profile to a vertical edge of a frame or mullion. The profile can be any profile or any closed polyline that you specify. You can use a profile edge to create a unique corner in situations where a simple miter is not sufficient.

NOTE Adjacent infills are not trimmed or expanded to accommodate the new edge. To adjust the infill, change the width of the frame edge. For more information, see Defining a Door and Window Assembly Frame by Width and Depth on page 1124.

1 Draw a closed polyline in the location where you want it to display in the door/window assembly.

NOTE For best results, it is recommended to draw the polyline in Plan view.

2 Select the door/window assembly for which you want to create a frame or mullion edge profile override.

3 Specify the mode in which to edit the door/window assembly:

If you want to edit…	Then…
this instance of the door/window assembly	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the door/window assembly style	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. If this option is not available, the design rules are already style-based for the door/window assembly.

4 Click Door/Window Assembly tab ➤ Modify panel ➤ Frame/Mullion drop-down ➤ Add Profile.

5 Select a vertical frame or a mullion edge.

6 Select a profile for the override:

If you want to create the edge profile from…	Then…
the polyline drawn in step 1	select Start from scratch for Profile Definition, and enter a name for New Profile Name.
an existing profile in the drawing	select the existing profile for Profile Definition.

7 Select whether to apply the profile to the shared edge element definition or as an edge profile override.

8 Click OK.

You are now in-place edit mode, and can edit the profile. For more information, see In-Place Editing of Edge Profiles for Door/Window Assemblies on page 1168.

9 Click Edit in Place tab ➤ Profile panel ➤ Zoom To to zoom to the profile.

10 Use the grips, the ribbon, or the context menu in order to make any of the following changes to the profile.

If you want to…	Then…
Move a Vertex	Select the vertex grip, and move it.
Add a Vertex	■ Grips: Select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*. ■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Add Vertex . Then, specify the location of the new vertex on screen. ■ Context menu: Click Add Vertex, and specify the location of the new vertex on screen.
Remove a vertex	■ Grips: Select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click.

If you want to...	Then...
	■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Then, select the vertex to remove on screen. ■ Context menu: Click Remove Vertex, and select the vertex to remove.
Offset a vertex with its edges	■ Grips: Select the vertex grip which you want to offset with its associated edges. Then, press Ctrl twice and drag the vertex to the desired location.
Offset a profile edge	■ Grips: Select the grip of the edge you want to offset and drag it to the desired location.
Convert an edge to an arc	■ Grips: Select the grip of the edge you want to convert, and press Ctrl twice. Then, drag the grip until the desired arc shape is in place.
Offset all edges of the profile	■ Grips: Select any edge grip on the profile, and press Ctrl three times. Then, drag the grip until the overall profile shape is correct.
Add a ring to a profile	■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Add Ring . Then, select a closed polyline, spline, ellipse or circle to convert. ■ Context menu: Select the profile, and click Add ring. Then, select a closed polyline, spline, ellipse to convert.
Remove a ring from a profile	■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Then, select the ring you want to remove from the profile, and press Enter. ■ Context menu: Select the profile, and click Remove Ring. Then, select the ring you want to remove from the profile, and press Enter.
Replacing a ring with another	■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Then, select the ring you want to replace and the ring that should be used instead. ■ Context menu: Select the profile, and click Replace Ring. Then, select the ring you want to replace, and after that the ring that should be used instead.

11 Save or discard changes to the door/window assembly grid:

If you want to exit the in-place editing session…	Then…
without saving your changes	click Edit in Place tab ➤ Edits panel ➤ Cancel .
after saving your changes	click Edit in Place tab ➤ Edits panel ➤ Finish .
and save the changes to a new profile definition	click Edit in Place tab Edits panel ➤ Save As . Enter a name for the new profile definition, and click OK. The in-place edit session is exited and the new profile definition is available in the Style Manager.

In-Place Editing of Edge Profiles for Door/Window Assemblies

Use this procedure to edit profile edges using in-place editing. With in-place editing, you can edit the door/window assembly directly and interactively in the drawing area and later save the changes to the profile definition.

1 Select the door/window assembly that has the edge profile you want to edit on screen with in-place editing.

2 Click Door/Window Assembly tab ➤ Profile panel ➤ Edit In Place .

This command is only available if you have profile-based edges in the door/window assembly.

NOTE If the profile is not drawn to size, it must be converted in order for you to begin the in-place editing session. Click Yes if prompted to convert the profile to its actual size.

3 Select the edge you want to edit.

NOTE You have entered the in-place editing session now. You can see this from the magenta-colored grips and light blue hatch of the temporary in-place editing profile, as well as the faded color of all other objects in the drawing. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

4 Edit the profile:

If you want to…	Then…
move or offset edges, or convert edges to arcs	move the grips as needed. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.

If you want to…	Then…
add a vertex	■ Grips: Select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*. ■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Add Vertex . Then, specify the location of the new vertex on screen. ■ Context menu: Click Add Vertex, and specify the location of the new vertex on screen.
remove a vertex	■ Grips: Select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click. ■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Then, select the vertex to remove on screen. ■ Context menu: Click Remove Vertex, and select the vertex to remove.
add a ring	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Ring . Then, select a closed polyline, spline, ellipse, or circle for an additional ring. Specify if you want to erase the source linework, and press *Enter*.
remove a ring	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Then select the ring you want to remove. **NOTE** You cannot remove the last ring from a profile.
replace a ring	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Then, select a closed polyline, spline, ellipse, or circle for the replaced ring. Specify if you want to erase the source linework, and press *Enter*.

5 Save the changes to the profile:

If you want to…	Then…
change the existing profile definition to reflect the new shape	click Edit in Place tab ➤ Edits panel ➤ Finish .
create a new profile definition with the shape you have created	Click Edit in Place tab ➤ Edits panel ➤ Save As . Then, enter a name for the new profile and click OK.

If you want to…	Then…
	The in-place edit session is exited and the new profile definition is available in the Style Manager.
discard all changes on the profile and revert back to the previous shape	click Edit in Place tab ➤ Edits panel ➤ Cancel .

In-Place Editing of Door and Window Assembly Frames and Mullions

Use this procedure to edit frames and mullions using in-place editing with the Edit Grid grip. With in-place editing, you can edit bays, columns or nested grids of the door/window assembly directly and interactively in the drawing area, and later save the changes to the door/window assembly or door/window assembly style.

1 Select a door/window assembly on which you want to edit frames or mullions with in-place editing.

2 Specify the mode in which to edit the door/window assembly:

If you want to edit …	Then …
this instance of the door/window assembly	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
the door/window assembly style	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. If this option is not available, the design rules are already style-based for the door/window assembly.

3 Click the Edit Grid grip.

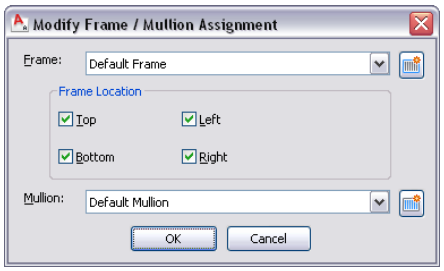
4 Enter **f** (Frame and mullion assignment) and press *ENTER*.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

5 Select the bay, column or nested grid to modify the frame and mullion assignment and press *ENTER*.

Press *CTRL* to select multiple bays, columns or nested grids.

The Modify Frame/Mullion Assignment worksheet displays.



6 Select a frame definition for the selected grid:

If you want to…	Then…
modify the frame of the selected grid	select a frame definition and click OK.
specify the location of the frame on the selected grid	select Top, Bottom, Left, Right for Frame Location and click OK.
create and assign a new frame definition to the selected grid	click and complete the Design Rules worksheet. For more information, see Adding a New Frame Assignment to a Door and Window Assembly Grid on page 1144.

7 Select the mullion definition for the selected grid:

If you want to…	Then…
modify the mullion of the selected grid	select the mullion definition and click OK.
create and assign a new mullion definition to the selected grid	click and complete the Design Rules worksheet. For more information, see Adding a New Mullion Assignment to a Door and Window Assembly Style on page 1146.

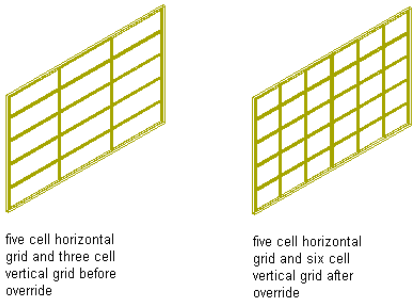
8 Press *ENTER*.

Overriding Door and Window Assembly Divisions

The grid of a door/window assembly is made up of one or more divisions that define how the door/window assembly is partitioned. Divisions can be horizontal or vertical, and can be nested in each other. For detailed information on door/window assembly divisions, see Creating a Division Definition for a Door and Window Assembly on page 1112.

You can override a division in a door/window assembly, thereby changing the grid of the door/window assembly.

Overriding a Door/Window Assembly cell division definition



Creating a Division Override

Use this procedure to create a division override on a door/window assembly.

NOTE To exchange a door/window assembly division, the new division definition must already be defined in the door/window assembly style. For information on door/window assembly divisions, see Division of Door and Window Assembly Grids on page 1111.

1 Select the door/window assembly for which you want to create a division override.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Division drop-down ➤ Override Assignment.

3 Select an edge of the door/window assembly to determine if a horizontal or vertical division is overridden.

For example, if you want to override the primary horizontal division, you could select the bottom horizontal frame of the door/window assembly.

TIP The Division Assignment Override dialog box shows you which grid type and which grid division you have selected, e.g. Selected Nested Grid: Secondary Grid, Division Element Definition: Vertical 3 Cells. If you have accidentally selected the wrong division, click Cancel and reselect the correct grid.

4 Select the division to override, and click OK.

5 Specify where you want to save the door/window assembly override:

If you want to save the override…	Then…
only on this specific door/window assembly	no further steps are necessary. The override is saved to the door/window assembly. For information about how to remove an override from a door/window assembly, see Removing Door and Window Assembly Overrides on page 1175.
to a door/window assembly style	select the door/window assembly, and click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.

6 If you want to save the override to a door/window assembly style, select the door/window assembly again, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Save to Style and decide to which door/window assembly style you want to save the override.

If you want to…	Then…
save the override to the current door/window assembly style	select Transfer Division Overrides to Style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.

If you want to…	Then…
save the override to a new door/window assembly style	select Transfer Division Overrides to Style, and click New. Then, enter a name for the new door/window assembly style, and click OK. **NOTE** If you have created only a profile edge override, only the Transfer Division Overrides to Style check box is active. If you have also created other overrides, such as a cell merge or a edge override, these check boxes are available as well. If you also want to save these overrides to the style, select their check boxes too.

NOTE If you do not want to save the override back to a style at all, click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. The overrides remain on the door/window assembly, where they can be removed as described in Removing Door and Window Assembly Overrides on page 1175, but they are not saved back to a door/window assembly style.

In-Place Editing of Door and Window Assembly Divisions

Use this procedure to edit divisions using in-place editing with the Edit Grid grip. With in-place editing, you can edit the door/window assembly directly and interactively in the drawing area, and later save the changes to the door/window assembly or door/window assembly style. For more information, see Division of Door and Window Assembly Grids on page 1111.

1 Select a door/window assembly on which you want to edit divisions on screen with in-place editing.

2 Specify the mode in which to edit the door/window assembly:

If you want to…	Then…
edit this instance of the door/window assembly	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Transfer To Object.
edit the door/window assembly style	click Door/Window Assembly tab ➤ Modify panel ➤ Design Rules drop-down ➤ Revert to Style Design Rules. If this option is not available, the design rules are already style-based for the door/window assembly.

3 Click the Edit Grid grip.

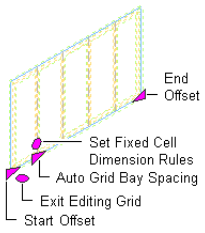
NOTE Alternatively, you can click Door/Window Assembly tab ➤ Modify panel ➤ Division drop-down ➤ Edit.

4 Enter **d** (Division in place) and press *ENTER*.

For example, if you want to edit the primary grid, select an edge on the outer door/window assembly frame.

NOTE You have entered the in-place editing session now. You can see this from the faded color of all objects in the drawing, as well as from the different grips at your disposal. Note that while you are in the in-place editing session, you have only limited editing access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

Viewing Edit In Place grips



5 Edit the division:

If you want to…	Then…
add a bay to the grid	click the Add Bay grip.
remove a bay from the grid	click the Remove Bay grip.
change the start offset of the grid	select the Start Offset grip and move it to the appropriate position.
change the end offset of the grid	select the End Offset grip and move it to the appropriate position.
change the spacing of bays	click the Auto Grid Bay Spacing grip and move it to the appropriate position.
manually edit the grid	Click Edit In Place tab ➤ Division panel ➤ Convert To Manual . You can manually add and remove gridlines, change the offsets, and change the position of individual gridlines.
use a worksheet to edit the cell dimensions	click the Set Fixed Cell Dimension Rules command grip, and edit the values in the worksheet.

6 Save or discard changes to the door/window assembly grid:

If you want to…	Then…
exit the in-place editing session without saving your changes	click Edit in Place tab ➤ Edits panel ➤ Cancel .
exit the in-place editing session after saving your changes	click Edit in Place tab ➤ Edits panel ➤ Finish . If you edited the grid by instance, the changes are saved to the design rules for the individual grid. If you edited the door/window assembly style, the Save Changes dialog box is displayed.

7 In the Save Changes dialog box, specify to which division to save the changes:

If you want to…	Then…
save the changes to the style in the current door/window assembly division	verify the current division is selected for Save Changes to Existing Division, and click Save. The changes are made in the style and affect all door/window assemblies of that style in the drawing.
create an override to the style by saving the changes in a new door/window assembly division	click New, enter a name for the new division override, and click OK. Click Save. The changes are saved as an override to the style, and affect only the door/window assemblies to which the override is applied.

Removing Door and Window Assembly Overrides

Use this procedure to remove door/window assembly overrides either from the door/window assembly or the door/window assembly style.

1 Select the door/window assembly:

If you want to…	Then…
remove an override from a door/window assembly	double-click the door/window assembly, expand Advanced in the Properties palette, and click next to Overrides.
remove an override from the door/window assembly style	select the door/window assembly, click Door/Window Assembly tab ➤ General panel ➤ Edit Style , and then click the Overrides tab.

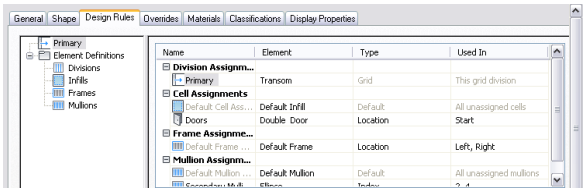
2 Select an override from the list and click Remove.

3 Click OK.

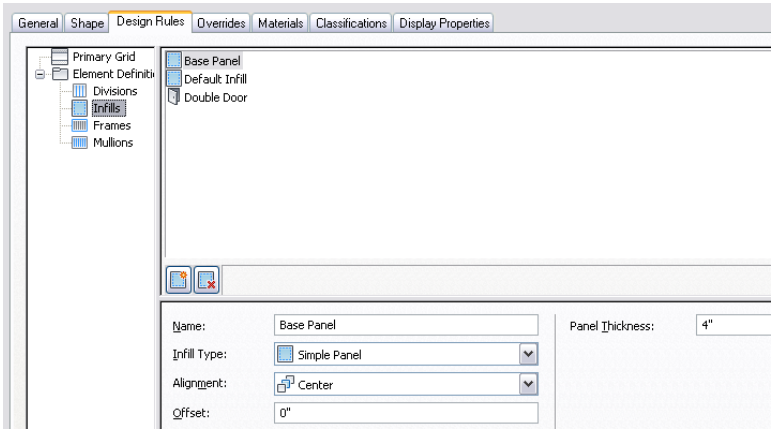
Modifying Element Definitions for Door and Window Assembly Styles

You can modify element definitions using the Design Rules tab of the Door/Window Assembly Style Properties dialog box. You can access these definitions from the assignments list and from the definitions list:

- **From the assignments list:** Select a grid from the tree view to display the assignments list. Then select an assignment that uses that definition. Make your changes below the assignment list.



- **From the definitions list:** Select an element type from the tree view to display all definitions for that element type. Select a definition and make your changes below the definitions list.



Any changes you make, including changes to the definition name, overwrite the existing definition. To create a new definition from the assignments list, select New from the Element list. To create a new definition from the definitions list, click the New Division icon, the New Infill icon, the New Frame icon, or the New Mullion icon.

Editing Door and Window Assemblies

Most relevant settings for a door/window assembly are defined in the door/window assembly style. These settings include divisions, infills, frames, and mullions. For information on modifying a door/window assembly style, see Door and Window Assembly Styles on page 1106.

You can make other changes directly to individual door/window assemblies, which affect only the door/window assembly you select:

- The dimensions of a door/window assembly
- Interference conditions
- Cleanup settings

Methods of Editing Door and Window Assemblies

AutoCAD Architecture offers several methods for editing door/window assemblies:

- You can directly edit door/window assemblies using grips for dimensions and other physical characteristics.
- You can directly edit door/window assemblies using the Edit Grid grip for grid divisions, cells, frames, and mullions. For more information, see In-Place Editing of Door and Window Assembly Divisions on page 1173, In-Place Editing of Edge Profiles for Door/Window Assemblies on page 1168, and Overriding Door and Window Assembly Infills on page 1157.
- You can change door/window assembly settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- You can select editing commands from the contextual ribbon and context menu for a selected door/window assembly.

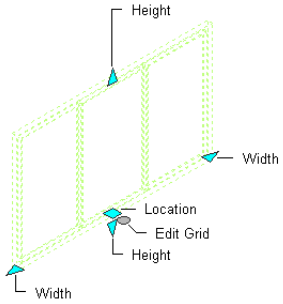
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see "Use Dynamic Input" in AutoCAD Help.

NOTE For information about changing the elements within a door/window assembly, see Using Overrides in Door and Window Assemblies on page 1156. For information about changing the display of the door/window assemblies, see Specifying the Display of Door and Window Assemblies on page 1150.

Using Grips to Edit Door and Window Assemblies

You can use the following grips to edit a door and window assembly:

Viewing Door/Window Assembly Grips



Grip	Description	Animation
(Width)	Lets you change the overall width of a door/window assembly	*Changing the Door/Window Assembly Width with Grips Animation*
(Height)	Lets you change the height of the door and window assembly	*Changing the Door/Window Assembly Width with Grips Animation*
(Location)	Lets you move a door and window assembly. If the assembly is anchored to a wall, you can use these three methods: ■ Drag the cursor to move the assembly along the length of the wall ■ Press CTRL and drag to move the assembly within the width of the wall ■ Press CTRL twice and drag to move the assembly vertically within the wall	*Changing the Door/Window Assembly Width with Grips Animation*

Changing the Location Properties of a Door and Window Assembly

Use this procedure to change the location properties of a door/window assembly. Location properties include vertical alignment, head height, sill height, and rotation.

Location Property	Description
Vertical alignment	Specifies whether to measure the vertical height of the window to the sill or head
Head height	The head height of the window
Sill height	The sill height of the window
Rotation	Reference angle for the object

1. Double-click the door/window assembly.
2. On the Properties palette, expand Location.
3. Change the location properties.
4. Select Additional information to display the Location worksheet, where you can change additional location properties, such as coordinate system, insertion point, and normal.

Selecting a Different Door and Window Assembly Style

Use this procedure to select a different style for a door/window assembly.

1. Double-click the door/window assembly for which you want to change the styles.

   You can select multiple door/window assemblies and change the style for all at the same time.
2. On the Properties palette, expand General.
3. Select a different style.

Matching the Properties of an Existing Door and Window Assembly

Use this procedure to apply the properties of a door/window assembly tool to one or more existing door/window assemblies. The properties include the door/window assembly style and any other settings specified in the tool you select.

1. Open the tool palette that you want to use.

   If necessary, scroll to display the tool that you want to use.
2. Right-click a door/window assembly tool, and click Apply Tool Properties to ➤ Door/Window Assembly.
3. Select the door/window assemblies, and press *ENTER*.

   The properties of the selected door/window assemblies match the properties of the door/window assembly tool.

Changing the Door and Window Assembly Dimensions

Use this procedure to change the dimensions of a door/window assembly.

1. Double-click a door/window assembly.
2. On the Properties palette, expand Dimensions.

3 Change the dimensions:

Dimension	Description
Height	The distance from the baseline to the top of the door/window assembly, including any rise.
Rise	The distance from the base height to the top of the door/window assembly.
Start Miter	Angle of all infills and horizontal edges (frame or mullion) at the start of the door/window assembly. For more information about miter angles, see Mitering Door and Window Assemblies on page 1181.
End Miter	Angle of all infills and horizontal edges (frame or mullion) at the end of the door/window assembly.

Changing the Shape of a Door and Window Assembly

Use this procedure to change the shape of a door/window assembly. There are several predefined shapes for door/window assemblies. You can use any of these shapes or use an AEC profile as the shape. For more information about profiles, see Creating a Profile for a Door and Window Assembly Frame on page 1125.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door/Window Assembly Styles.

NOTE Alternatively, select a door/window assembly in the drawing, and click Door/Window Assembly tab ➤ General panel ➤ Edit Style drop-down ➤ Door/Window Assembly Styles .

3 Select the door/window assembly style that you want to change.
4 Click the Shape tab.
5 Select a shape from the Predefined list or select Use Profile, and select an existing AEC Profile as the shape.
6 Click OK.

Changing the Location of a Freestanding Door and Window Assembly

You can relocate an existing door/window assembly by changing the coordinate values of its insertion point. The door/window assembly also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the door/window assembly are parallel to the XY plane, its normal is parallel to the Z axis. You can change the orientation of the door/window assembly by aligning its normal with another axis. You can also rotate the door/window assembly on its plane by changing the rotation angle.

For more information about the world coordinate system, see “Use Coordinates and Coordinate Systems” in AutoCAD Help.

1 Double-click the door/window assembly.
2 On the Properties palette, expand Location.
3 Click Additional information.

4 Specify the location of the door/window assembly:

If you want to…	Then…
relocate the door/window assembly	enter new coordinate values under Insertion Point.
locate the door/window assembly on the *XY* plane	make the normal of the door/window assembly parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the door/window assembly on the *YZ* plane	make the normal of the door/window assembly parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the door/window assembly on the *XZ* plane	make the normal of the door/window assembly parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the door/window assembly	enter a new value for Rotation Angle.

5 Click OK.

Adding an Interference Condition to a Door and Window Assembly

Use this procedure to add an interference condition to a door/window assembly. Interference conditions use the geometry of 3D objects to create custom openings or cutouts in door/window assemblies. You can specify how the interference condition is applied to the door/window assembly: added to the door/window assembly, subtracted from the door/window assembly, or ignored.

1 Place the object in the location where you want to specify the interference condition.

2 Select the door/window assembly to which you want to add an interference condition.

3 Click Door/Window Assembly tab ➤ Modify panel ➤ Interference drop-down ➤ Add .

4 Select the object intersecting the door/window assembly, and press *ENTER*.

5 Specify to which door/window assembly component the interference should be added:

If you want to add the interference condition…	Then…
to the infill	enter **y** (Yes) when prompted for the infill component.
to the frame	enter **y** (Yes) when prompted for the frame component.
to the mullion	enter **y** (Yes) when prompted for the mullion component.

6 Press *ENTER*.

Removing an Interference Condition from a Door and Window Assembly

Use this procedure to remove an object, such as a mass element, from a door/window assembly that the object was added to as an interference condition.

1 Select the door/window assembly from which you want to remove an interference object.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Interference drop-down ➤ Remove .

3 Select the object intersecting the door/window assembly, and press *ENTER*.

Mitering Door and Window Assemblies

Use this procedure to miter the corners where door/window assemblies meet. The corner where adjacent door/window assemblies meet is not mitered by default. However, you can automatically determine the necessary angles.

The miter angle applies to all infills and horizontal edges (frame or mullion) that are adjacent to the corner. Vertical edges are not affected.

TIP If you want to create a custom corner condition between two door/window assemblies, you can replace the edge of one door/window assembly with an AEC profile and remove the edge of the other door/window assembly by using the frame override Remove Edge option. For more information, see Overriding Door and Window Assembly Frames and Mullions on page 1163 and Defining Door and Window Assembly Frames on page 1124.

1 Select one of the door/window assemblies.

2 Click Door/Window Assembly tab ➤ Modify panel ➤ Set Miter Angles .

3 Select the other door/window assembly.

If you change the angle of either door/window assembly, use Set Miter Angles again to recalculate the angles.

Specifying a Miter Angle for a Door and Window Assembly Adjacent to Another Object

Use this procedure to manually create a mitered corner between a door/window assembly and another object, such as a standard wall or a mass element. For example, if your door/window assembly connects with a standard wall that is at a 60-degree angle from the door/window assembly, you would set the miter angle to 30.

The miter angle is applied to all infills and horizontal edges that are adjacent to the corner. Vertical edges are not affected.

1 Double-click the door/window assembly.

2 On the Properties palette, expand Dimensions.

3 Miter the door/window assembly on the start or the end point:

If you want to miter the door/window assembly…	Then…
at its start point	enter an angle for Start Miter, and press *ENTER*.
at its end point	enter an angle for End Miter, and press *ENTER*.

Specifying the Cut Plane Display of a Door and Window Assembly

Use this procedure to specify the properties of one or more cut planes for an individual door and window assembly. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the door and window assembly you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all door and window assemblies in the drawing, select Drawing default setting. To apply changes to all assemblies of this style, select Door/Window Assembly Style:<style name>. For more information on styles, see Door and Window Assembly Styles on page 1106.

5 If necessary, expand Object Display Properties ➤ Cut Plane.

6 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

7 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)

8 For Use cut plane of containing object when anchored, specify whether you want the containing object's cut plane to be used when the assembly is anchored to that object.

9 To define additional cut planes for the assembly, click Manual cut planes.

10 On the Manual Above and Below Cut Plane Heights worksheet, click Add, and under Cut Plane, enter the height of the new cut plane.

If you add a cut plane …	Then …
at a height that is lower than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Below Cut Plane component of the object.
at a height that is higher than the current cut plane	objects are displayed using the Layer/Color/Linetype properties specified for the Above Cut Plane component of the object.

You can click Remove to delete a cut plane that you added.

You can also access and modify these same cut plane settings through the assembly's context menu, as follows:

1 Select the door and window assembly you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.

6 Click OK twice.

Specifying the Display of Sills for a Door and Window Assembly

Use this procedure to change the sill dimensions for a door and window assembly in the Sill Plan display representation.

1 Double-click the door and window assembly.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all door and window assemblies in the drawing, select Drawing default setting. To apply changes to all assemblies of this style, select Door/Window Assembly Style:<style name>. For more information on styles, see Door and Window Assembly Styles on page 1106.

5 For Display representation, select Sill Plan.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Sill dimensions.

7 On the Sill Dimensions worksheet, enter the sill extension and depth dimensions.

Sill components A and B are for the outside of the door and window assembly. Sill components C and D are for the interior side.

8 Click OK.

9 On the Display component drop-down list, click the light bulb icons for individual sill components to turn visibility on or off as desired.

You can also access and modify sill dimensions and visibility settings through the door and window assembly's context menu, as follows:

1 Select the door and window assembly you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

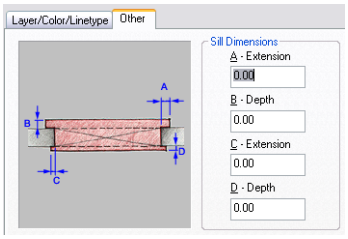
3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.

Door and window assembly sill dimensions



6 Under Sill Dimensions, enter the sill extension and depth dimensions.

7 On the Layer/Color/Linetype tab, under Visible, click the icons to turn on visibility for individual sill display components as necessary.

8 Click OK twice.

Specifying the Display of Other Characteristics of a Door and Window Assembly

Use this procedure to specify other display properties for an individual door and window assembly, including cell marker size, the display of miters at frame corners, and the display of custom components. If you are going to use custom graphics for a component, draw the component and save it as a block before you start this procedure.

1. Double-click the door and window assembly.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

> **NOTE** To apply your changes to all door and window assemblies in the drawing, select Drawing default setting. To apply changes to all assemblies of this style, select Door/Window Assembly Style:<style name>. For more information on styles, see Door and Window Assembly Styles on page 1106.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. If you want to change the size of the markers used for cells in the door/window assembly, click Cell marker size, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new size.)
7. Optionally, for Show mitres at frame corners, select Yes/No.
8. If you want to add or edit a custom component, for Custom model components (or Custom plan components, if in a plan view), click .
9. On the Custom Model (or Plan) Components worksheet, click Add, or select one of the components in the list, and click Edit.
10. On the Custom Display Component worksheet, for Component Type, select Infill, Frame, or Mullion.
11. Enter a name for Component Name, or click Select Component, and in the Select <component type> Definition dialog, select a definition and click OK.
12. Select Draw Custom Graphics.
13. Specify the display of the element:

If you want to …	Then …
display the block instead of the associated door/window assembly element	select Replace Graphics.
superimpose the block over the door/window assembly element so that both are displayed	clear Replace Graphics.

14. Click Select Block, select the custom block that you created, and click OK.
15. Specify further settings for the custom display block:

If you want to …	Then …
scale the block to fit a particular dimension	select Width, Height, or Depth. To prevent the block from losing its proportions, select Lock XY Ratio.
specify how the block is inserted into the grid in the X, Y, and Z directions	specify an insertion point on the X, Y, and Z planes.

If you want to …	Then …
mirror the block	determine if it should mirror in the X, Y, or Z direction.
offset the block from the grid	specify the offset in the X, Y, or Z direction.

16 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Door and Window Assembly

Use this procedure to enter notes and attach reference files to a door/window assembly. You can also edit notes and edit or detach reference files from a door/window assembly.

1 Double-click the door/window assembly.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.

For more information about adding hyperlinks, "Add Hyperlinks to a Drawing" in AutoCAD Help.

4 To add a note, click next to Notes, and enter the text.

5 Click OK.

6 To attach a reference file, click next to Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click the description. Enter the new text, and press *ENTER*.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

7 Click OK twice.

Editing Objects Anchored in Door and Window Assemblies

When you fill a door/window assembly cell with an infill that contains an object, such as a door or window, you can edit that object independently from the door/window assembly. For example, you can select a door from a door/window assembly and edit its properties. You can edit the anchor settings for the door to change the orientation of the door and the alignment or offset of the door in relation to the door/window assembly.

You can also move objects from one cell to another or release the object anchor so that the object moves independently of the door/window assembly.

When you move or release an object or edit its properties, you are creating a variation from the infill cell assignment for the door/window assembly style. By default, these variations (except release) are allowed to persist in the drawing when you reapply the style to a door/window assembly. However, if you want these variations to be overridden when you reapply a door/window assembly style, turn off the Allow Variation

from Infill Element Definition option on the Anchor worksheet of the object's Properties palette. This option is set on a per object basis.

Changing the Orientation of an Object Anchored in a Door and Window Assembly

Use this procedure to change the orientation of an object anchored in a door/window assembly using grips.

1 Click the object in the door/window assembly for which you want to change the orientation.

2 Click the appropriate Flip grip to change the *X* or *Y* direction of the object.

NOTE Alternatively, click Door/Window Assembly tab ➤ Modify panel ➤ Flip X or Door/Window Assembly tab ➤ Modify panel ➤ Flip Y .

You can also change the orientation of an object, including the *Z* direction, using the Anchor worksheet found on the object's Properties palette.

Changing the Alignment of an Object Anchored in a Door and Window Assembly

Use this procedure to modify the alignment of an object that is anchored in a door/window assembly.

1 Double-click the object in the door/window assembly.

2 On the Properties palette, expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Select a new alignment for the object.

For more information, see Specifying an Alignment for a Door and Window Assembly Infill on page 1121.

5 Click OK.

Changing the Offset of an Object Anchored in a Door and Window Assembly

Use this procedure to change the offset of an object anchored in a door/window assembly.

1 Double-click the object in the door/window assembly.

2 On the Properties palette, expand Location, and click Anchor.

3 Click Allow Variation from Infill Element Definition.

4 Specify a new offset for the object.

For more information, see Specifying an Offset for a Door and Window Assembly Infill on page 1122.

5 Click OK.

Swapping Two Objects Anchored in a Door and Window Assembly

When you fill a door/window assembly cell with an object, such as a door or window, you can swap that object with another object in the door/window assembly.

1 Select one of the objects from the door/window assembly, right-click, and click Infill Anchor ➤ Swap Objects.

2 Select the object you want to swap with.

Releasing an Object Anchored in a Door and Window Assembly

When you fill a door/window assembly cell with an object, such as a door or window, that object is anchored to the door/window assembly. While the anchor is in place, the object moves when you move the door/window assembly and is removed when you erase the door/window assembly. If you want to move or erase an object independently from the door/window assembly, you can release the anchor.

NOTE You can also move or erase the object by changing the element definition for the cell that contains the object. For more information, see Defining Infills for Door and Window Assembly Cells on page 1118.

- Select one of the objects from the door/window assembly, and click Door/Window Assembly tab ➤ Anchor panel ➤ Release .

AEC Polygons

22

An AEC Polygon is a two-dimensional (2D) area object that can be used as infill for structures such as curtain walls and layout grids. You can use a True Color display representation to assign a solid fill to the edges and interiors of AEC Polygons, making these objects useful for conceptual rendering.

AEC Polygons

An AEC Polygon is a two-dimensional (2D) area object that can be used as infill for structures such as curtain walls and layout grids. You can use a True Color display representation to assign a solid fill to the edges and interiors of AEC Polygons, making these objects useful for conceptual rendering.

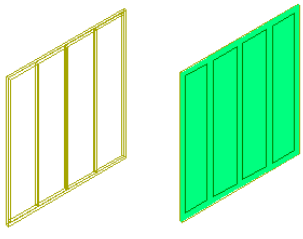
AEC Polygons and Curtain Walls

Curtain walls provide a framework for inserting objects such as panels, windows, and doors. You can use curtain walls to model structures such as the following:

- Large scale curtain walls
- Storefronts with components
- Assemblies of custom-shaped doors and windows

In AutoCAD Architecture, a curtain wall object consists of one or more grids. Each grid contains cells that can be filled by a panel, or by an object such as a window or door. AEC Polygons are ideally suited to create panel infills for curtain walls.

Curtain wall with AEC Polygon infill assignment



A curtain wall can include curtain wall units. Curtain wall units are similar to curtain walls except that their grid cells can contain only panel infills, and not objects. Curtain wall units are designed to represent complex elements that are repeated within the main curtain wall. You can use AEC Polygons to fill the grids in a curtain wall unit.

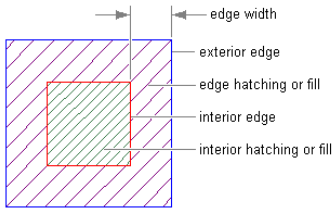
Paving and Tiling Patterns

You can use AEC Polygons to create intricate paving and tiling patterns in a drawing. Using the join, subtract, trim, and split functions of AEC Polygons, and by creating AEC Polygons from profiles and polylines, you can create complex and irregular polygon outlines. By adding edges and hatch patterns to the AEC Polygons, you can display a realistic tiling and paving look.

AEC Polygon Style Components

You can use AEC Polygon styles to define the look and edge widths of a polygon. You can use the edges to display framing components of infill panels, or to represent a shadow. Framing components can have different dimensions, casting shadows with different widths along the edges. When you render the curtain wall, you can depict different sun angles with different edge widths.

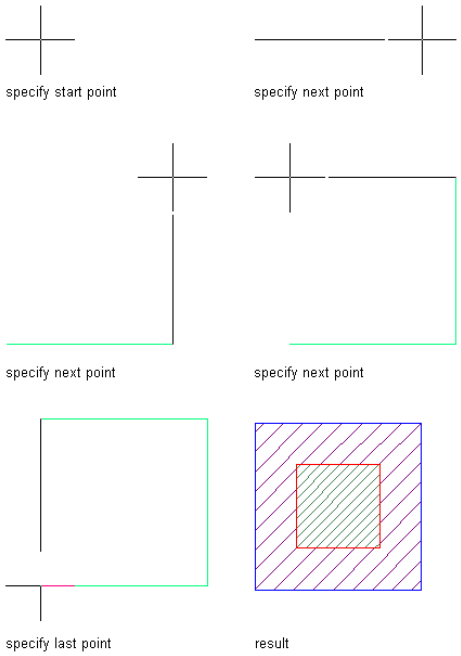
AEC Polygon components



Polylines and Profiles

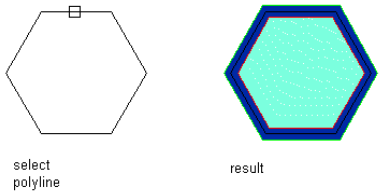
Using straight line segments, you can create a freehand AEC Polygon by drawing a closed contour of the object.

Creating an AEC Polygon

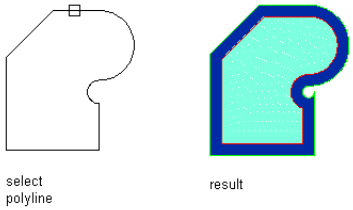


To define complex and curved shapes, either convert an existing polyline into an AEC Polygon or use a profile definition as the source of the AEC Polygon.

Converting a polyline to an AEC Polygon



Converting a complex polyline to an AEC Polygon



True Color Display

AEC Polygons have a True Color display representation. When you attach AEC Polygons as infill panels to curtain walls, you can use the True Color display representation to create a conceptual rendering of the curtain wall.

Using AEC Polygon Tools to Create AEC Polygons

Tools provided with AutoCAD Architecture let you quickly place AEC Polygons by selecting an AEC Polygon tool with a specific AEC Polygon style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can also use AEC Polygon tools to create new AEC Polygons by applying tool properties to existing closed polylines.

An AEC Polygon tool is included in the AutoCAD Architecture Stock Tool catalog supplied with the Content Browser. For information about using the Content Browser, see Content Browser Overview on page 97.

Custom palettes created by your CAD manager or other users may also contain AEC Polygon tools with styles and properties customized for your projects or office standards.

Creating an AEC Polygon

Use this procedure to create a new AEC Polygon.

You create an AEC Polygon from straight line segments. The AEC Polygon must have a minimum of three sides and must not intersect itself. The style that you select controls the width and the justification of the AEC Polygon edges. The justification determines whether the edges are displayed inside, outside, or centered on the AEC Polygon vertices.

1 Click Home tab ➤ Draw panel ➤ Shapes drop-down ➤ AEC Polygon .

Alternatively, you can open a tool palette containing an AEC Polygon tool, and select the tool.

To use the AEC Polygon tool supplied in the AutoCAD Architecture Stock Tool catalog, open the Content Browser and navigate to Helper Tools in the Stock Tool catalog; then drag the AEC Polygon to the drawing area. For more information on using a catalog tool, see Using a Tool in the AutoCAD Architecture 2010 Workspace on page 123.

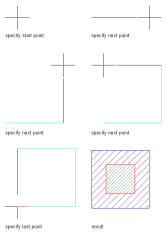
2 Specify the start point of the AEC Polygon.

3 Specify further points to define the AEC Polygon.

NOTE You must specify enough points to create at least three sides for the AEC Polygon.

4 Enter *c* (Close) to close the AEC Polygon.

Creating an AEC Polygon



Creating an AEC Polygon with User-Specified Settings

Use this procedure to create an AEC Polygon with settings that you specify.

1 Click Home tab ➤ Draw panel ➤ Shapes drop-down ➤ AEC Polygon .

Alternatively, you can open a tool palette containing an AEC Polygon tool, and select the tool.

To use the AEC Polygon tool supplied in the AutoCAD Architecture Stock Tool catalog, open the Content Browser and navigate to Helper Tools in the Stock Tool catalog; then drag the AEC Polygon to the drawing area. For more information on using a catalog tool, see Using a Tool in the AutoCAD Architecture 2010 Workspace on page 123.

2 On the Properties palette, expand Basic, and expand General.

3 Specify the start point of the AEC Polygon.

4 Specify further points to define the AEC Polygon.

NOTE You must specify enough points to create at least three sides for the AEC Polygon.

5 Enter **c** (Close) to close the AEC Polygon.

Creating an AEC Polygon from a Polyline

Use this procedure to create an AEC Polygon from a closed polyline in a drawing.

When you create an AEC Polygon by converting a closed polyline in your drawing, the object that you convert can be created from a combination of line and arc segments. The polyline must have a minimum of three sides and must not intersect itself. After you convert the polyline to an AEC Polygon, the width and justification of the AEC Polygon edges are set by the style that you select for the AEC Polygon.

1 Draw a polyline in your drawing.

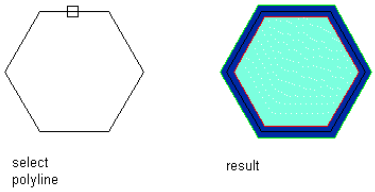
2 Open a palette containing an AEC Polygon tool, right-click the tool, and click Apply Tool Properties to ➤ Closed Polyline.

3 Select the polyline that you created in step 1, and press *ENTER*.

4 Enter **y** (Yes) to erase the polyline after creating the AEC Polygon, or **n** (No) to keep the polyline in the drawing.

5 Press *ENTER*.

Converting a polyline to an AEC Polygon



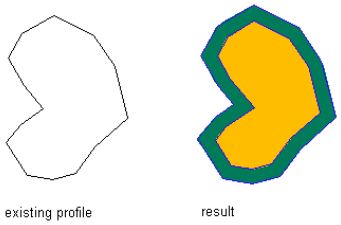
Creating an AEC Polygon from a Profile

Use this procedure to create an AEC Polygon from a profile definition in a drawing.

The profile definition that you convert can be created from a combination of line and arc segments. The profile definition must have a minimum of three sides and must not intersect itself. After you create an AEC Polygon from the profile definition, the width and justification of the AEC Polygon edges are set by the style that you select for the AEC Polygon. For additional information, see Editing Profile-based Object Components in Place on page 753.

1. On the command line, enter **aecpolygon**.
2. Enter **c** (Convert) and press *ENTER*.
3. Enter **pr** (Profile) and press *ENTER*.
4. Select the desired profile definition and click OK.
5. Select the insertion point for the new AEC Polygon.
6. Press *ENTER*.

Converting a profile to an AEC Polygon



Creating an AEC Polygon Tool

Use this procedure to create an AEC Polygon tool and add it to a tool palette. You may want to create your own AEC Polygon tools if you are placing multiple AEC Polygons of specific styles that have the same properties.

You can use any of the following methods to create an AEC Polygon tool:

- Drag an AEC Polygon with the desired properties to a tool palette.
- Drag an AEC Polygon style from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Copy an existing AEC Polygon tool, and then customize the properties of the new tool.
- Drag an AEC Polygon tool from a tool catalog in the Content Browser to a tool palette, and then customize the properties of the tool.

1 Open the tool palette on which you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from an AEC Polygon in the drawing	select the AEC Polygon and drag it to the tool palette.
create a tool from an AEC Polygon style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy under Multi-Purpose Objects, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current palette	right-click the tool, click Copy, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the tool catalog in the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic and expand General.

7 Enter a description of the AEC Polygon that you can create using this AEC Polygon tool.

8 Specify a layer key and any layer key overrides, if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select an AEC Polygon style.

10 For Style location, select the drawing file containing the style used for this AEC Polygon, or select Browse and use a standard file selection dialog box to select the file.

11 Click OK.

Editing AEC Polygons

You can change the location of an AEC Polygon, adjust the width and justification of its edges, and change how it is displayed in your drawing. You can also redefine the geometry of an AEC Polygon or define how AEC Polygons interact with each other. You can join two AEC Polygons, create a hole in an AEC Polygon by subtracting the area of another one, create an AEC Polygon from the intersection of two others, divide or trim an AEC Polygon, and add or remove its vertices.

AutoCAD Architecture offers several methods for editing AEC Polygons:

- You can directly edit AEC Polygons using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see "Use Dynamic Input" in AutoCAD Help.

- You can change AEC Polygon settings on the Properties palette.
- You can select editing commands from the contextual ribbon tab and context menu for a selected AEC Polygon.

Using Grips to Edit AEC Polygons

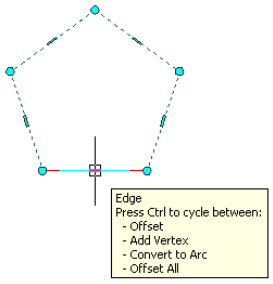
Use this procedure to change the shape and size of an AEC Polygon in your current drawing by using grips.

Changing the edge of an AEC Polygon

1 Select the AEC Polygon you want to change.

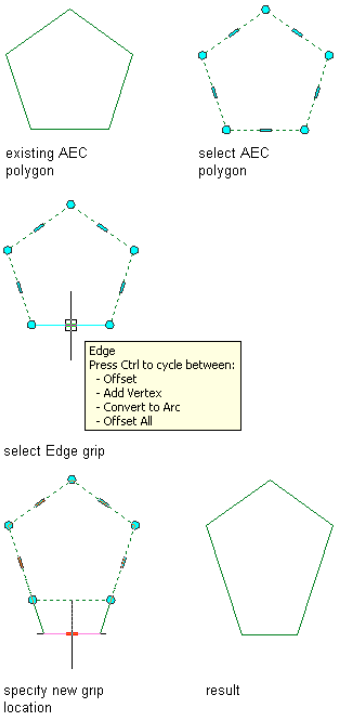
2 Select an Edge grip.

Viewing the AEC Polygon Edge grip tooltip



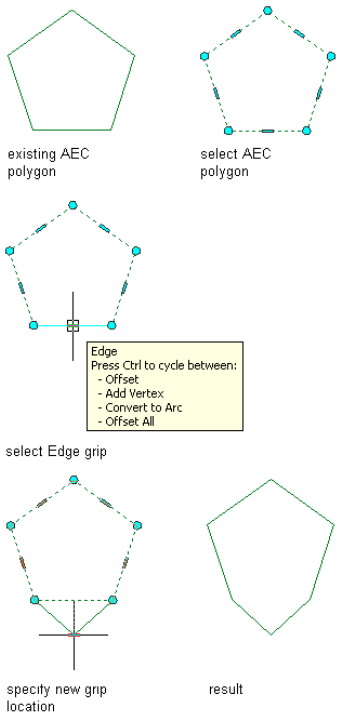
The Edge grip has four edit modes: Offset, Add Vertex, Convert to Arc, and Offset All. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the AEC Polygon and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary.

Offsetting the edge of an AEC Polygon using its Edge grip



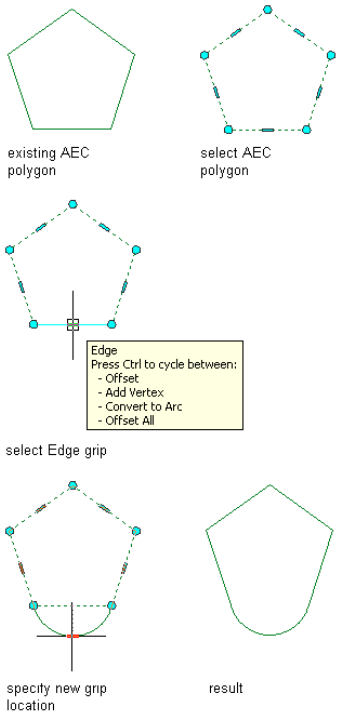
Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well.

Adding a vertex to the edge of an AEC Polygon using its Edge grip



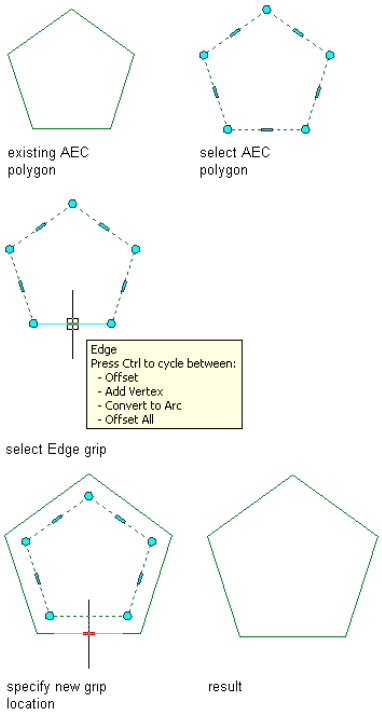
Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.

Converting the edge of an AEC Polygon to an arc using its Edge grip



Offset All moves all edges of an AEC Polygon at an identical distance. When you drag one edge, all other edges are repositioned accordingly. This option is very useful for regular resizing operations, like scaling an AEC Polygon.

Offsetting all the edges of an AEC Polygon using its Edge grip



3 Specify the new edge location:

If you want to…	Then…
offset the edge	move the edge to the desired location and click, or enter a value and press *ENTER*.
add a vertex and create an edge	press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
change the selected edge to an arc	press *CTRL* twice to switch to the Convert to Arc edit mode. Stretch the midpoint to the desired location and click, or enter a value and press *ENTER*.
offset all edges at an identical distance	press *CTRL* three times to switch to the Offset All edit mode. Move the selected edge to the desired location for all edges and click, or enter a value and press *ENTER*.

You can press *CTRL* to toggle among the edit modes.

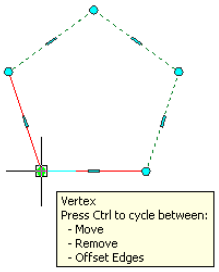
4 Right-click, and click Deselect All to turn off grips.

Changing the vertex of an AEC Polygon

1 Select an existing AEC Polygon.

2 Select the Vertex grip for the vertex you want to change.

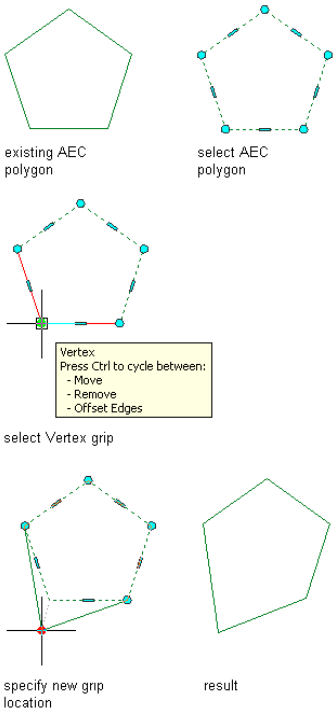
Viewing the AEC Polygon Vertex grip tooltip



The Vertex grip has three edit modes:

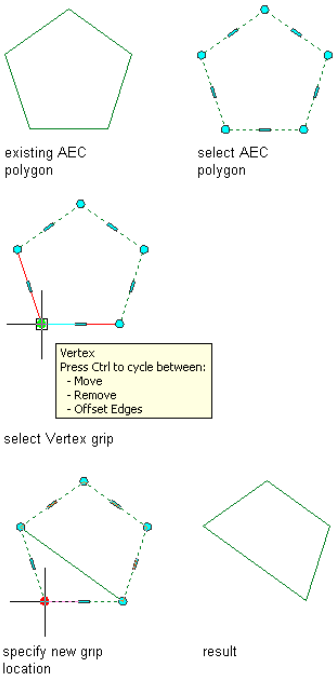
- Move: This is the default mode. Use this mode to move the selected vertex in any direction. The neighboring segments are stretched, as necessary.

Moving the vertex of an AEC Polygon using its Vertex grip



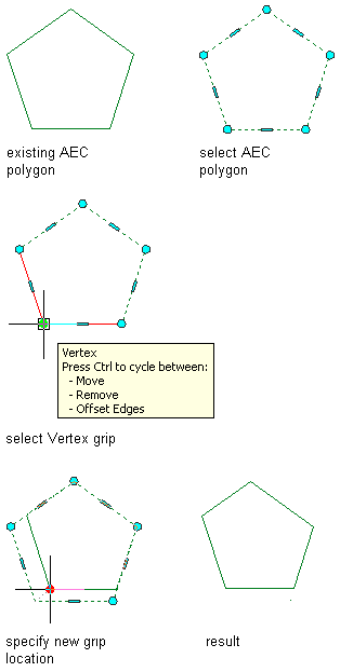
- Remove: Use this mode to remove a vertex. The neighboring segments are replaced with a line.

Removing the vertex of an AEC Polygon using its Vertex grip



- Offset Edges: Use this edit mode to move a vertex and the adjacent edges of the AEC Polygon with it.

Offsetting the edges of an AEC Polygon using its Vertex grip



3 Edit the vertex as necessary:

If you want to…	Then…
move the vertex	move the vertex to the desired location and click; or enter a value, and press *ENTER*.
remove the vertex	press *CTRL* to switch to the Remove Vertex edit mode, and click to confirm the removal.
move the vertex and the adjacent edges	press *CTRL* twice to switch to the Offset Edges edit mode. Move the vertex to the desired location, and click; or enter a value, and press *ENTER*.

4 Right-click, and click Deselect All to turn off grips.

Changing the AEC Polygon Style

Use this procedure to change the style of one or more AEC Polygons. The style controls the width and justification of the AEC Polygon edges. The justification determines whether the edges are displayed inside, outside, or centered on the vertices of the AEC Polygon. The style can also control the display properties of the AEC Polygon. For more information about styles, see AEC Polygon Styles on page 1208.

1 Double-click the AEC Polygon you want to change.

2 On the Properties palette, expand Basic, and expand General.

3 Select an AEC Polygon style.

Merging Two AEC Polygons

Use this procedure to merge two or more AEC Polygons in a drawing. When you merge two AEC Polygons that overlap each other, their common boundary is combined to form the boundary of the merged AEC Polygon.

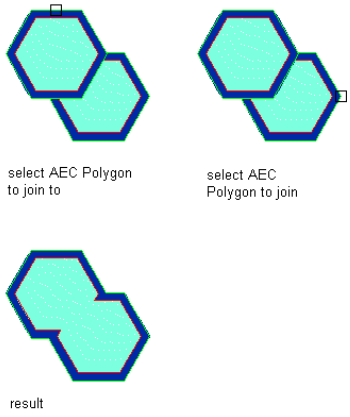
NOTE When you merge one AEC Polygon with another, the properties of the merged AEC Polygon are identical to the properties of the first selected AEC Polygon.

1. Create two overlapping AEC Polygons. For more information, see Creating an AEC Polygon on page 1191.
2. Select one of the AEC Polygons to be merged, right-click, and click AEC Modify Tools ➤ Merge.
3. Select the AEC Polygon to merge with the first AEC Polygon.

   NOTE You can merge only those AEC Polygons that lie on the same *Z*-plane. Two AEC Polygons with different *Z*-positions in the same coordinate system cannot be merged.

4. Enter **y** (Yes) to erase the second AEC Polygon, or **n** (No) to leave the AEC Polygon in the drawing.

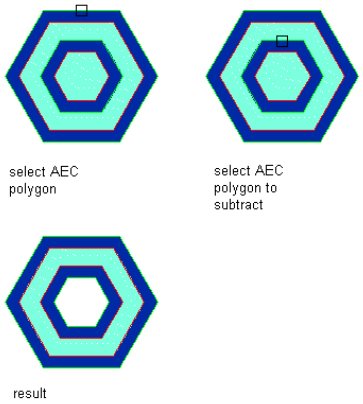
Merging two overlapping AEC Polygons



Creating a Hole in an AEC Polygon

Use this procedure to subtract AEC Polygons from one another in order to create a hole in an AEC Polygon. This would be useful, for example, for creating a complex pattern for a curtain wall infill.

Subtracting an AEC Polygon from an AEC Polygon



To perform a subtraction operation, you need to select AEC Polygons that intersect one another. You can choose whether to keep the subtracted AEC Polygon in the drawing as a separate unit. For example, you may want to keep the AEC Polygon if you need to subtract the same shape from other AEC Polygons.

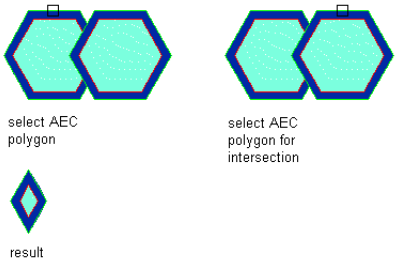
1. Create an AEC Polygon from which to subtract a hole. For more information, see Creating an AEC Polygon on page 1191.
2. Create a second, smaller AEC Polygon to represent the area to be subtracted from the larger AEC Polygon.

   You can draw the second AEC Polygon within or overlapping the area of the first AEC Polygon, or you can draw it in another location and then move it onto the larger AEC Polygon.
3. Select the larger AEC Polygon, right-click, and click AEC Modify Tools ➤ Subtract.
4. Select the smaller AEC Polygon to subtract from the larger AEC Polygon.
5. Enter **y** (Yes) to erase the subtracted AEC Polygon, or **n** (No) to leave the AEC Polygon in the drawing.

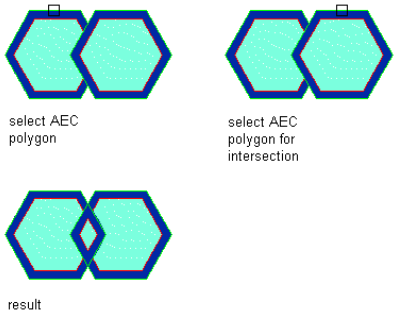
Creating AEC Polygons from the Intersection of Other AEC Polygons

Use this procedure to create a new AEC Polygon from the overlapping portion of two intersecting AEC Polygons. You can choose whether to retain the original geometry after creating the new intersection AEC Polygon.

Intersecting AEC Polygons with original geometry erased



Intersecting AEC Polygons with original geometry retained



1 Create two overlapping AEC Polygons. For more information, see Creating an AEC Polygon on page 1191.

2 Select the first overlapping AEC Polygon, right-click, and click AEC Modify Tools ➤ Crop.

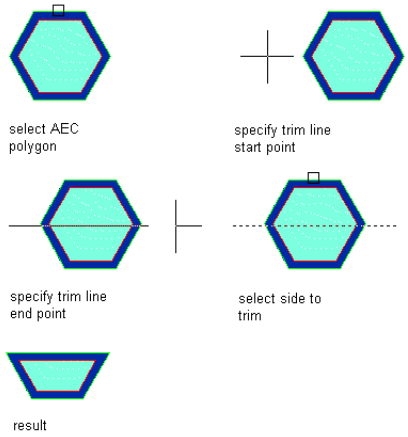
3 Select the second overlapping AEC Polygon.

4 Enter **y** (Yes) to erase the original AEC Polygons, or **n** (No) to leave the AEC Polygons in the drawing.

Trimming an AEC Polygon

Use this procedure to trim a side from an AEC Polygon by defining a trim line through an existing AEC Polygon.

Trimming an AEC Polygon



1 Select the AEC Polygon to be trimmed.

2 Right-click, and click AEC Modify Tools ➤ Trim.

NOTE Alternatively, click Home tab ➤ Modify panel ➤ Trim Extend drop-down ➤ AEC Trim .

3 Specify a start point for the trim line. This line cuts through the AEC Polygon, creating the area to trim and the area to retain.

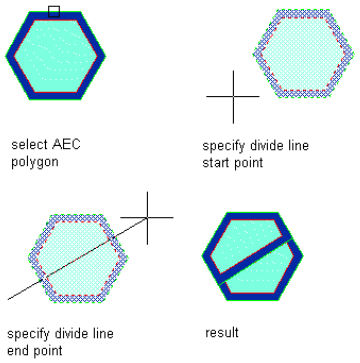
4 Specify an endpoint for the trim line.

5 Select the side of the AEC Polygon to be trimmed.

Dividing an AEC Polygon

Use this procedure to divide an AEC Polygon into two separate AEC Polygons by defining a division line through it.

Dividing an AEC Polygon



1 Select the AEC Polygon to be divided, right-click, and click AEC Modify Tools ➤ Divide.

2 Specify a start point for the division line.

NOTE You can specify only a start point and endpoint for your division line. You cannot specify additional points.

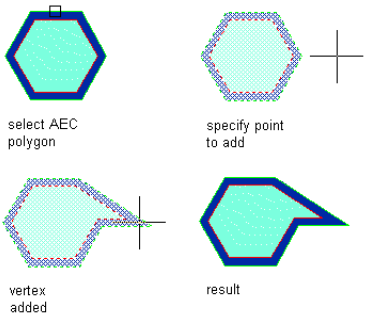
3 Specify an endpoint for the division line.

The AEC Polygon is divided by the line that you defined.

Adding a Vertex to an AEC Polygon

You can add a vertex to an existing AEC Polygon to change its shape. A vertex is the location where the edges of the AEC Polygon meet.

Adding a vertex to an AEC Polygon



1 Select the AEC Polygon for which to add a vertex.

2 Click AEC Polygon tab ➤ Modify panel ➤ Add Vertex .

3 Select the point in your drawing to add the new vertex.

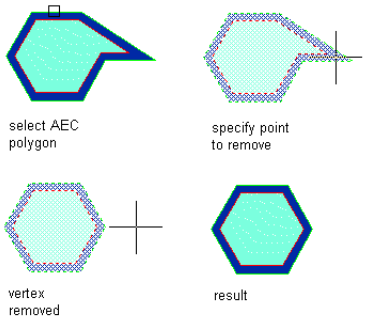
Line segments are drawn from the two existing vertices of the AEC Polygon closest to the point that you selected to form the new vertex.

4 Press *ENTER*.

Removing a Vertex from an AEC Polygon

You can remove a vertex from an existing AEC Polygon to change its shape.

Removing a vertex from an AEC Polygon



1 Select the AEC Polygon from which to remove a vertex.

2 Click AEC Polygon tab ➤ Modify panel ➤ Remove Vertex .

3 Select the vertex you want to remove.

4 Press *ENTER*.

Converting an AEC Polygon to a Polyline

Use this procedure to convert an existing AEC Polygon to a polyline. When you create a polyline from an AEC Polygon that contains a hole, each ring of the AEC Polygon is converted into an individual polyline.

1 Select the AEC Polygon from which to create a polyline.

2 Click AEC Polygon tab ➤ Convert To panel ➤ Polyline .

3 When prompted to erase the original geometry, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

Converting an AEC Polygon to a Profile

Use this procedure to convert an existing AEC Polygon to a profile definition. You can create a new profile definition or overwrite an existing profile definition. Then, use the profile definition you create with objects that are profile based or have profile-based components, such as the soffit of a roof slab. For detailed information, see the sections for the individual objects.

1 Select the AEC Polygon from which to create a profile definition.

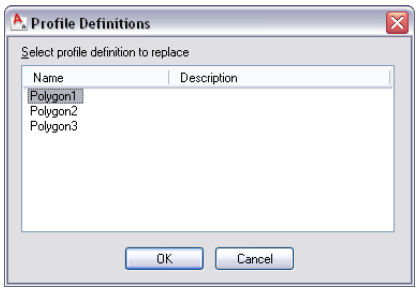
2 Click AEC Polygon tab ➤ Convert To panel ➤ Profile .

3 Specify the insertion point of the resulting profile, or press *ENTER* to use the centroid as the insertion point.

4 Enter **n** (New) to create a new profile definition, or **e** (Existing) to replace an existing profile.

5 Enter a name for the new profile definition, or select from the existing profile definitions on the Profile Definitions worksheet and click OK.

Profile Definitions worksheet



The existing profile definition you select is replaced by the one you are creating from an AEC Polygon.

Changing the Rotation of an AEC Polygon

Use this procedure to change the rotation of an AEC Polygon.

1. Double-click the AEC Polygon whose rotation you want to change.
2. On the Properties palette, expand Basic, and expand Location.
3. Enter a value for Rotation.

Changing the Elevation of an AEC Polygon

Use this procedure to change the elevation of an AEC Polygon.

1. Double-click the AEC Polygon for which to change the elevation.
2. On the Properties palette, expand Basic, and expand Location.
3. Enter a value for Elevation.

Changing the Location of an AEC Polygon

Use this procedure to relocate an AEC Polygon by changing the coordinate values of its insertion point. You can also move an AEC Polygon by cutting and pasting it.

AEC Polygons are oriented with respect to the WCS or the current UCS. For example, if the top and bottom of an AEC Polygon are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the AEC Polygon by aligning its normal with another axis. You can also rotate the AEC Polygon on its plane by changing the rotation angle. For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1. Double-click the AEC Polygon you want to move.
2. On the Properties palette, expand Location.
3. Click Additional information.
4. Specify the location of the AEC Polygon:

If you want to…	Then…
relocate the AEC Polygon	enter new coordinate values under Insertion Point.
locate the AEC Polygon on the *XY* plane	make the normal of the AEC Polygon parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.

If you want to…	Then…
locate the AEC Polygon on the *YZ* plane	make the normal of the AEC Polygon parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the AEC Polygon on the *XZ* plane	make the normal of the AEC Polygon parallel to the *Y* axis: under Normal, enter **1** for Y and enter **0** for X and Z.
change the rotation of the AEC Polygon	enter a new value for Rotation Angle.

5 Click OK.

Specifying Fill Properties for the True Color Display Representation of an AEC Polygon

Use this procedure to specify the fill properties for an AEC Polygon in the True Color display representation, which is used for high-resolution renderings.

NOTE Make sure that you do not use the True Color display representation and the Model display representation of an AEC Polygon simultaneously in one view. The Interior Fill and Edge Fill components of the Model display representation would be drawn on top of the Interior Fill and Edge Fill components of the True Color display representation. It is recommended that you create separate views for regular viewing and True Color renderings.

1 Double-click the AEC Polygon you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all AEC Polygons in the drawing, select Drawing default setting. To apply changes to all AEC Polygons of this style, select AEC Polygon Style:<style name>. For more information on styles, see AEC Polygon Styles on page 1208.

5 For Display representation, select True Color.

NOTE The True Color display representation is not turned on for any display sets by default. If it is not included on the drop-down list, click Manage tab ➤ Style & Display panel ➤ Display Manager . Expand Representations by Object ➤ AEC Polygon, and then select the display set for the current display configuration and any others for which you want this display representation turned on.

6 If necessary, expand Object Display Properties ➤ Advanced, and click next to Fill properties.

7 Specify the fill properties:

If you want…	Then…
a True Color fill for the outer part of the AEC Polygon	in the Exterior panel, select Edge Fill, and then select a color for Edge Color, or click Other to choose a different color.
a True Color fill for the inner part of the AEC Polygon	in the Interior panel, select Interior Fill, and then select a color for Interior Color, or click Other to choose a different color.

NOTE If the edge dimensions of the AEC Polygon are set to 0, the edge fill is not displayed.

8 Click OK.

You can also access and modify these same settings through the AEC Polygon's context menu, as follows:

1 Select the AEC Polygon, right-click, and click Edit Object Display.
2 Click the Display Properties tab.
3 Select the True Color display representation, and select Object Override.
4 If necessary, click .
5 On the Fill Properties tab, adjust the settings as needed.
6 Click OK twice.

Attaching Hyperlinks, Notes, or Files to an AEC Polygon

Use this procedure to attach hyperlinks, enter notes, or attach reference files to an AEC Polygon. You can also edit notes and edit or detach reference files from an AEC Polygon.

1 Double-click the AEC Polygon to which to attach information.
2 On the Properties palette, click the Extended Data tab.
3 To add a hyperlink, click next to Hyperlink, and specify the link.

For more information about adding hyperlinks, see "Add Hyperlinks in a Drawing" in AutoCAD help.

4 To add or edit a note, click next to Notes, enter text, and click OK.
5 To attach, detach, or edit a reference file, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

AEC Polygon Styles

An AEC Polygon style is a group of properties that determines the appearance and other characteristics of AEC Polygons. AEC Polygon styles control the following parameters:

- default dimensions, including edge width and justification
- default display properties for the interior and edges of the AEC Polygon

The display properties of an AEC Polygon allow you to hatch its interior and edges, or fill its edges and interior with a solid color fill.

- masking capability

Creating Tools from AEC Polygon Styles

You can create an AEC Polygon tool from any AEC Polygon style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any AEC Polygon created with that tool. For more information, see Using AEC Polygon Tools to Create AEC Polygons on page 1191.

Managing AEC Polygon Styles

To create, copy, or edit styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information, see Style Manager Overview on page 566.

Creating an AEC Polygon Style

Use this procedure to create an AEC Polygon style. You can create a new style using default style properties, or by copying an existing style. After you create a style, you edit its properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3 Create an AEC Polygon style:

If you want to…	Then…
create a style with default properties	right-click AEC Polygon Styles, and click New.
create a style from an existing style	right-click the AEC Polygon style you want to copy, and click Copy. Right-click, and click Paste.

4 To rename the new AEC Polygon style, right-click the style, and click Rename.

5 Enter a name for the new AEC Polygon style, and press *ENTER*.

6 Edit the style properties of the new AEC Polygon style:

If you want to…	Then…
change the edge width and edge alignment	see Changing the Width and Justification of the AEC Polygon Edges on page 1210.
add an AEC Polygon as a background mask	see Masking Underlying Objects with AEC Polygons on page 1211.
change the Layer/Color/Linetype properties	see Specifying the Layer, Color, and Linetype of an AEC Polygon Style on page 1212.
change the AEC Polygon interior and exterior hatching	see Specifying the Hatching of an AEC Polygon Style on page 1213.

If you want to…	Then…
change the colors of the True Color display representation	see Setting the Colors of the True Color Display Representation on page 1214.
add notes and files to the style	see Attaching Notes and Files to an AEC Polygon Style on page 1214.
add classifications to an AEC Polygon style	see Adding Classifications to an AEC Polygon Style on page 1215.

7 If you want to create an AEC Polygon tool from the new style, drag the style from the Style Manager to a tool palette.

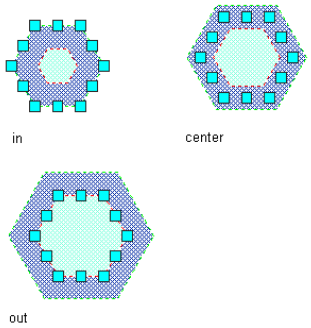
You can later rename the tool and specify other properties for it as described in Creating an AEC Polygon Tool on page 1193.

8 Click OK.

Changing the Width and Justification of the AEC Polygon Edges

Use this procedure to change the width and justification of the edges of an AEC Polygon in the AEC Polygon style. The justification determines whether the edges are displayed inside, outside, or centered on the vertices of the AEC Polygon.

Justifying AEC Polygon edges



1 Select an AEC Polygon.

2 Click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

3 Click the Dimensions tab.

4 To change the width of the AEC Polygon edges, enter a new value for Edge Width.

5 Change the justification of the AEC Polygon edges as desired:

If you want to…	Then …
display the edges inside the AEC Polygon vertices	select In for Justify.
display the edges centered within the vertices of the AEC Polygon	select Center for Justify.
display the edges outside the AEC Polygon vertices	select Out for Justify.

6 Click OK.

Masking Underlying Objects with AEC Polygons

Use this procedure to change an AEC Polygon style to mask a background. This style property also determines if masking break marks display correctly in your drawings. For more information about working with break marks, see The Basic Annotation Tool on page 2353.

1 Select an AEC Polygon.

2 Click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

3 Click the Other tab.

4 Select Use Background Mask.

5 Click OK.

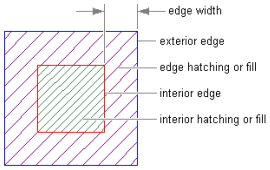
All AEC Polygons of this style use a background mask in the current drawing.

Specifying the Display Properties of an AEC Polygon Style

In most cases, you want the appearance of AEC Polygons that belong to the same style to be consistent throughout a drawing. To achieve this, you specify the display properties of the AEC Polygons in each AEC Polygon style:

- The layer, color, and linetype of AEC Polygon components
- The hatching used for the components of the AEC Polygon

AEC Polygon components



Display components in Model view

Component	Description
Interior Edge	Inner edge of the AEC Polygon. **NOTE** When the edge dimensions are set to 0, the interior edge is the only edge of the AEC Polygon.
Exterior Edge	Outer edge of the AEC Polygon. **NOTE** When the edge dimensions are set to 0, the exterior edge is not displayed in the AEC Polygon.
Interior Hatch	Hatch component of the inner part of the AEC Polygon. **NOTE** When the edge dimensions are set to 0, the interior hatch is the only hatch of the AEC Polygon.
Edge Hatch	Hatch component of the outer part of the AEC Polygon. **NOTE** When the edge dimensions are set to 0, the edge hatch is not displayed in the AEC Polygon.

Display components in Model view	
Component	**Description**
Interior Fill	The fill component of the inner part of the AEC Polygon. This component is displayed only in rendered views. Make sure that for each rendered view you use either the Interior Fill and Edge Fill components of the Model display representation or the Interior Fill and Edge Fill components of the True Color display representation. If you use both display representations simultaneously, the fills are drawn on top of each other. For detailed information, see Setting the Colors of the True Color Display Representation on page 1214.
Edge fill	The fill component of the outer part of the AEC Polygon. This component is displayed only in rendered views. Make sure that for each rendered view you use either the Interior Fill and Edge Fill components of the Model display representation or the Interior Fill and Edge Fill components of the True Color display representation. If you use both display representations simultaneously, the fills are drawn on top of each other. For detailed information, see Setting the Colors of the True Color Display Representation on page 1214. **NOTE** When the edge dimensions have been set to 0, the edge fill is not displayed in a rendered AEC Polygon.

Specifying the Layer, Color, and Linetype of an AEC Polygon Style

Use this procedure to change the following display properties of an AEC Polygon style:

- Visibility (component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype Scale
- Plot Style

Materials cannot be assigned to AEC Polygons. Note that you can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

   NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3. Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the Model display representation, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK twice.

Specifying the Hatching of an AEC Polygon Style

Use this procedure to specify the hatching of an AEC Polygon style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which changes should appear, and select Style Override.

6 If necessary, click .

7 Click the Hatching tab.

8 Click the setting for Pattern.

9 Select the hatching pattern:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

TIP Mask blocks do not hide the True Color representation of AEC Polygons, but you can use hatching to work around this. Use the Model representation of the AEC Polygon, set the hatch to Solid, and select the appropriate True Color for the hatch.

10 Click OK.

11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the AEC Polygon, regardless of the object's rotation	select object.
orient the hatching to the World Coordinate System	select global.

14 Click OK twice.

Setting the Colors of the True Color Display Representation

Use this procedure to set the colors of the AEC Polygon with True Color display representations. Use True Color display representation for high-resolution renderings.

NOTE Make sure that you do not use the True Color display representation and the Model display representation of an AEC Polygon simultaneously in one view. The Interior Fill and Edge Fill components of the Model display representation would be drawn on top of the Interior Fill and Edge Fill components of the True Color display representation. It is recommended that you create separate views for regular viewing and True Color renderings.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the True Color display representation, and select Style Override.

6 If necessary, click .

7 Specify the fill properties:

If you want…	Then…
a True Color fill for the outer part of the AEC Polygon	select Edge Fill, and select a color for Edge Color, or click Other to choose a different color.
a True Color fill for the inner part of the AEC Polygon	select Interior Fill, and select a color for Interior Color, or click Other to choose a different color.

NOTE If the edge dimensions of the AEC Polygon are set to 0, the edge fill is not displayed.

8 Click OK twice.

Attaching Notes and Files to an AEC Polygon Style

Use this procedure to enter notes and attach reference files to an AEC Polygon style. You can also edit notes and edit or detach reference files from an AEC Polygon style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3 Select the style you want to edit.

4 Click the General tab.

5 To add a description to the AEC Polygon, enter it under Description.

6 Click Notes.

7 To add or edit a note, click the Notes tab, and enter the note.

8 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click open. Click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
change the reference file	double-click the reference file to start its application. Close the application when you are finished editing.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Adding Classifications to an AEC Polygon Style

Use this procedure to specify classifications for any classification definition applied to an AEC Polygon style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand AEC Polygon Styles.

NOTE Alternatively, you can select an AEC Polygon in the drawing, and click AEC Polygon tab ➤ General panel ➤ Edit Style drop-down ➤ AEC Polygon Styles .

3 Select the style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to AEC Polygon styles.

5 For each classification definition, select the classification you want applied to the current AEC Polygon style.

6 Click OK.

Doors

23

You can add many different types of doors in AutoCAD Architecture. Doors can be anchored to walls or door/window assemblies.

Doors

You can create doors using different design parameters for style, standard size, width and height, threshold height, and head height. You can choose styles with glass shapes that receive standard muntins patterns, and create your own custom glass shapes from profiles.

AutoCAD Architecture provides ready-to-use door styles. The door style determines the default dimensions of doors and the door shape and type:

- The door shape determines the geometry of the door panel, such as rectangular, half-round, and arch. You can also create custom door shapes from profiles.
- The door type determines the number of panels and the method of opening the door, such as single, double, bifold, pocket, revolving, and overhead.

You can define standard sizes in a door style and then select the size you want to use when you place the door in a drawing.

Anchoring Doors

Doors can be anchored to specific locations in walls or door and window assemblies, so that when the wall or door and window assembly moves or changes size, the location of the door in that object remains constant.

Door Dimensions

Some door dimensions depend on the shape and type specified in the door style.

Rise is the height from the top of the rectangular portion of a door to the peak of the door opening for Gothic, Arch, and Peak Pentagon door shapes.

Leaf specifies the door size for pairs of Uneven, Uneven-Dhung, and Uneven Opposing door types. For more information about leaf, see Door Properties on page 1220.

Door Endcaps

Doors that are anchored in a wall can have endcap styles applied to them. The endcap shapes for wall openings are defined in the wall style and are a property of the wall. For information on setting an opening endcap style in a wall, see Working with Wall Endcaps and Opening Endcaps on page 891.

Vertical Alignment of Doors

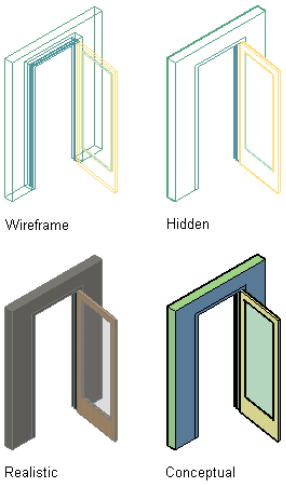
You use vertical alignment settings to control the placement of the door in the wall, the location of the working point vertically in the wall, and how the door responds to modifications in height. To determine the working point on the door, use the threshold and head height settings. You can place the working point at the sill or at the head. For example, if you specify the vertical alignment as 0" and the door height as 7'–0", the door opening height is 7'–0". If you next specify the height of the door as 6'–8", the door threshold remains at 0" and the door opening height becomes 6'–8".

For the door head working point, if you specify the vertical alignment as 7'–0" and the door height as 7'–0", the door opening height is 7–0". If you specify the door height as 6'–8", the door head remains at 7'–0" and the door threshold becomes 4".

Materials in Doors

You can assign materials to a door. Materials are displayed in wireframe and working shade views, or when rendered. Materials have specific settings for individual components of a door, such as the panel, the stop, the frame, or a glass inset.

Doors in Wireframe, Hidden, Realistic, and Conceptual Visual Style representations



AutoCAD Architecture provides predefined materials for common design purposes, which contain settings for doors. You can use the predefined materials "as is," or modify them for your special designs. You can also create your own materials. Styles provided with the software have appropriate materials already assigned to them. For more information, see About Door Display Components and Materials on page 1243.

Creating a Door

Use this procedure to add a door to the drawing. For information on the properties of doors, see Door Properties on page 1220.

Where can I find Door Tools?

In a standard US installation of AutoCAD Architecture, you can find door tools in the following locations:

- Tool Palettes: Design Tool Palettes group ➤ Design tab (standard door tool)

- Tool Palettes: Design Tool Palettes group ➤ Doors tab
- Content Browser ➤ Stock Tool Catalog ➤ Architectural Object Tools (standard door tool)
- Content Browser ➤ Sample Palette Catalog ➤ Design ➤ Doors
- Content Browser ➤ Design Tool Catalog ➤ Doors and Windows ➤ Doors

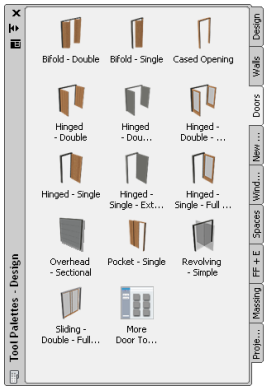
For information about finding tools in Content Browser, see Searching for Items in a Tool Catalog on page 114

How can I create Door Tools?

There are multiple ways to create door tools in AutoCAD Architecture:

- Creating a Tool from an Object in the Drawing on page 72
- Copying a Tool from a Tool Palette on page 72
- Creating a Tool from the Style Manager on page 73
- Creating a Tool from AEC Content in DesignCenter on page 73

Predefined door tools



1 Select a door tool on a tool palette.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Door drop-down ➤ Door .

2 In the drawing, select a wall or a door and window assembly in which to insert the door, or press *ENTER* to add a freestanding door.

3 Specify the insertion point for the door.

In order to have full flexibility for defining the insertion point, verify the following:

- The Position along wall setting on the Properties palette is set to Unconstrained.
- The OSNAP setting in the status bar is turned off.

Otherwise the door insertion point will be aligned to the center or end points of the wall, or to any of the active OSNAP points.

Command line options for easier insertion

- Enter **CY** (cycle measure to) once or twice on the command line in order to switch the insertion point of the door from hinge (default) to center and latch.

- Enter **RE** (Reference point on) in order to measure the insertion point of a door in relation to a specified point in the drawing.

4 Continue adding doors, and press *ENTER*.

Creating a Door in a Door and Window Assembly

Inserting a Door or Window into a Door and Window Assembly on page 1139.

Converting Objects to a Door

Use this procedure to convert one of the following objects to a door:

- Door and window assembly
- Window
- Opening

For information about the properties you can set, see Door Properties on page 1220.

1 Select a door tool on a tool palette.
2 Right-click the tool, and click Apply Tool Properties to ➤ Door/Window Assembly, Opening, Window.
3 Select the door/window assembly, window, or opening to convert, and press *ENTER*.
4 Edit the properties of the door in the Properties palette, if needed.

Door Properties

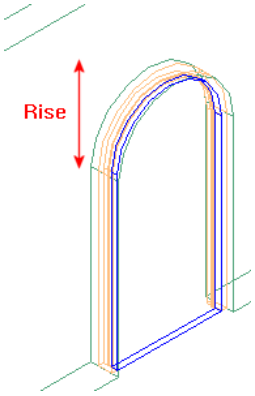
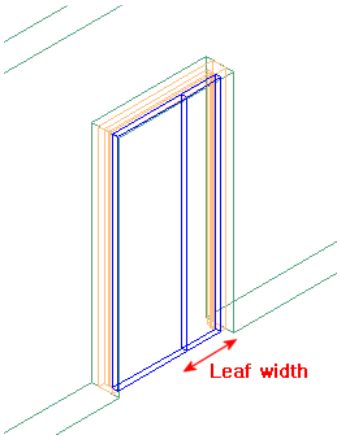
The following properties can be set for a door. Note that some properties are available only during adding a door, or for door tools.

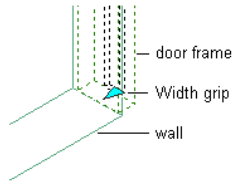
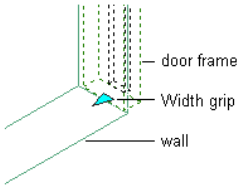
For information about using these properties for a door or door tool, see the following:

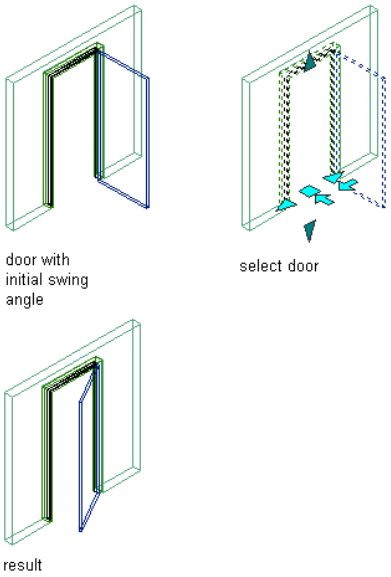
- Creating a Door on page 1218
- Changing the Tool Properties on page 69

Property	Special Condition	Description	How to set
General Category			
Description		User-defined description of the door. **NOTE** You can add a description to a door object or to a door tool.	Click the description icon and enter a description text.
Layer key/Layer Overrides	Door tools only	If you do not want to use the door layer assignment specified in the layer key style of the drawing, you	Click the icon for Layer key or Layer override, and select a layer key or a layer override. Layer

Property	Special Condition	Description	How to set
		can specify a layer key and layer key overrides for the door tool.	overrides are now available for all layer key styles.
Layer	Door object only/not during door insertion	When you insert a door, the layer assignment is defined either by the layer key style used for the drawing, or by the layer key and layer overrides in the door tool. You can change the layer later with the Layer property.	Click the drop-down list and select a layer.
Style		Specifies the door style. The style defined in the door tool is the default.	Click the drop-down list and select a style.
Style Location	Door tools only	Specifies the drawing file containing the style used for this door tool.	Click the drop-down list and either select a file, or click Browse to navigate to the file containing the style you want to use for this tool.
Bound Spaces		Defines if this door can be used as a boundary when generating associative spaces. This setting is relevant only for standalone doors. **NOTE** If a door, window, or opening is anchored in a wall, the Bound Spaces setting of the wall is used for the opening, too. For information on associative spaces, see Generating Associative Spaces on page 1915.	Click the drop-down list and select a setting. **Options** ■ By style (default): The Bound spaces setting defined in the door style is used. ■ Yes: this door can be used as a boundary object for associative spaces. ■ No: this door cannot be used as a boundary object for associative spaces.
Dimensions Category			
Standard sizes		In the door style, you can define a number of standard sizes. When you add a door, you can select one of the predefined sizes.	Click the drop-down list, and select a standard size. If no standard sizes are available, see Specifying the Standard

Property	Special Condition	Description	How to set
			Sizes of a Door Style on page 1240
Rise	available only for Gothic, Arch, and Peak Pentagon door shapes	Specifies the height of a pointed or arched top of the door **Illustration** 	Enter a value for Rise, or click to pick points on the screen to specify the rise.
Leaf width	Uneven, Uneven-Dhung, and Uneven Opposing door types only	Determines the width of the door panel in an uneven door type **Illustration** 	Enter a value for Leaf width, or click to pick points on the screen to specify the leaf.
Width/Height		If no standard sizes have been defined in the door style, or you do want to use a different size, you can edit the width and height of the door.	
Measure to		Specifies whether the width and height of the door is	Click the drop-down list and select Inside of

Property	Special Condition	Description	How to set
		measured to the inside of the door frame or the outside. When a door is measured to the outside of the frame it is smaller by the amount that is deducted for the frame. **Illustration**  measuring to inside of frame  measuring to outside of frame	Frame or Outside of Frame.
Swing Angle		Lets you determine at which opening angle the door will be displayed. **Swing angle and display properties** The swing angle can also be determined in the display properties of the door style. The settings in the style override properties setting. For more information, see Specifying the Opening Percentage for Display Representations in a Door on page 1250.	Enter a value.

Property	Special Condition	Description	How to set
		Illustration  	
Location Category			
Position along wall	Only during adding a door/anchored walls	Specifies the insertion point of the door relative to the wall or door/window assembly. You have the following options: ■ Unconstrained: you can place the door anywhere on the wall. **NOTE** This will work only if the Osnap is turned off, otherwise the door will snap to wall points. ■ Offset/Center: allows you either place the door in the center of the wall, or at a specified offset from the wall end.	Click the drop-down list and select Unconstrained or Offset/Center.
Automatic Offset	Only during adding an anchored door	Specifies the offset from the wall end during insertion if you have chosen Offset/Center for Position along wall	Enter a value for Automatic Offset, or click to pick points on the screen to specify the offset.

Property	Special Condition	Description	How to set
Vertical Alignment	anchored doors only	Lets you specify if the vertical height of the door should be measured to the door threshold or the door head.	Click the drop-down list and select Threshold or Head.
Head Height/Threshold Height	anchored doors only	Depending on the vertical alignment you chose, you can modify either the head height or the threshold height of the door. For example, if you want to create an elevated threshold, you select Threshold for Vertical Alignment, and then enter the elevation of the threshold under Threshold height.	Enter a value for Head Height or Threshold height, or click to pick points on the screen to specify the height.
Anchor	anchored doors only/not available for door tools	The anchor worksheet lets you change the position and rotation of the door in relation to the wall it is anchored to.	Click the Anchor worksheet, and enter the desired values there. **More information** ■ Using Anchors to Change the Horizontal Position of a Door on page 1229 ■ Using Anchors to Change the Vertical Position of a Door on page 1230 ■ Using Anchors to Change the Position of a Door Within a Wall on page 1231 ■ Changing the Orientation of a Door to a Wall on page 1232
Additional Information	freestanding doors only/not available for door tools	The additional information worksheet lets you change the position of a a freestanding door relative to the WCS or UCS.	Click the Additional Information worksheet, and enter the desired values there. For more information, see Changing the Location of a Freestanding Door on page 1233.
Endcaps Category			

Property	Special Condition	Description	How to set
Opening Endcap	anchored doors only/not available for door tools	Lets you define an endcap style for the door where it is connected to the wall. For more information, see Working with Wall Endcaps and Opening Endcaps on page 891.	Click the drop-down list, and select an endcap style. If you select By Wall Style, the wall endcaps will be used.

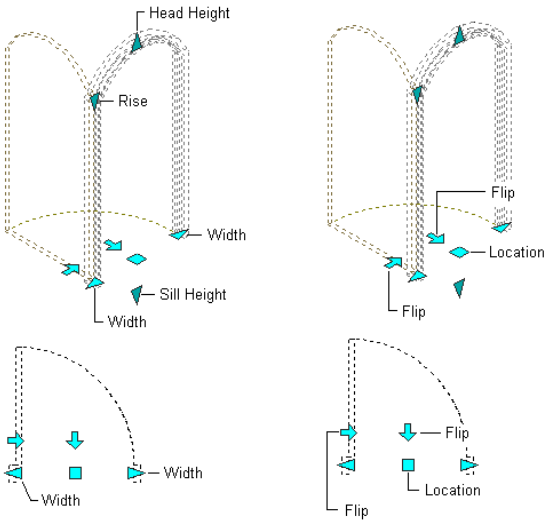
Editing Doors

you can edit doors in your drawing with different tools and metods.

Using Grips to Edit Doors

For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.

You can use the following grips to modify doors:



Grip	Description	Animation
(Width)	Lets you change the width of a door **NOTE** Initially the grip is set to constrain the sizing to one of the standard values on page 1240defined for the door’s style. The *CTRL* key acts as a toggle between standard and custom sizing.	*Changing a Door Width with Grip Animation*

Grip	Description	Animation
	Additional information A series of tick marks indicates the standard sizes for the selected dimension. As you move the grip, it snaps to each tick mark and displays the measurement at that mark. The size and color of the grip tick marks indicate whether setting a standard value for the dimension will result in a standard door size. For example, if the height of the door is set to a non-standard value, then even if you set the door width to a standard value for that door's style, the door is still not a standard size. Long grey tick marks indicate that a standard size is possible; short red marks indicate that another dimension is already set to a non-standard value.	
(Height)	Lets you change the Height of a door	*Changing the Door Height with Grips Animation*
(Location)	Lets you move a door within a wall **More options for moving a door** ■ Moving a Door Along a Wall on page 1228 ■ Moving a Door Within a Wall on page 1228 ■ Moving a Door to a Different Wall on page 1232 ■ Releasing a Door from a Wall on page 1232	*Changing the Location of a Door with Grips Animation*
(Flip Hinge)	Lets you change the hinge side of the door	*Flipping the Door Hinge Side with a Grip Animation*
(Flip Swing Direction)	Lets you change the swing direction of the door	*Flipping the Door Swing Side with a Grip Animation*
	Rise Rise applies to Peak Pentagon, Arch, and Gothic door shapes. For more information, see Specifying the Design Rules of a Door Style on page 1239.	*Changing the Door Rise with a Grip Animation*

Moving a Door Along a Wall

Use this procedure to change the location of one or more doors along a wall by offsetting the doors from a reference location.

This feature is useful when you want to position a door at a specified distance from another object. For example, you may want to specify an exact distance between a series of doors along a wall.

1 Select the doors you want to move.

2 Click Door tab ➤ Anchor panel ➤ Reposition Along Wall .

A marker indicates the current location within the opening: left jamb, center of door, or right jamb.

3 Specify how to measure the offset:

If you want to…	Then…
measure the offset from the center of the door	select a point near the center of the door.
measure the offset from the left or right jamb	select a point on the jamb of the door you want to measure from.

4 Select a point to measure to (the reference point).

5 Specify the distance between the points you selected:

If you want to…	Then…
move the door to the reference point	enter 0.
move the door a specified distance from the reference point	enter a value for the offset distance.
specify the distance as a measurement between two points, such as the distance between the centers of two doors that are correctly positioned	select the two points measuring the distance.

Moving a Door Within a Wall

Use this procedure to move one or more doors within a wall by offsetting the doors from a reference location.

This feature allows you to align doors within the thickness of a wall. You can set an offset distance from any point within a wall, or center the doors between the faces of a wall. You can select doors, windows, or openings, and reposition them at the same time. If you select more than one object, you can select only one side to offset.

1 Select the doors you want to move.

2 Click Door tab ➤ Anchor panel ➤ Reposition Within Wall .

A marker indicates the current location within the opening. This may be the center of the frame, the interior face of the frame, or the exterior face of the frame.

3 Specify how to measure the offset:

If you want to…	Then…
center the doors between the faces of the wall	select a point near the center of the door jamb.
offset the doors from the interior or exterior face	select a point on the side of the face you want to measure from.

4 Select a point to measure to.

5 Specify the offset distance from the selected point:

If you want to…	Then…
center the doors between the faces of the wall	use the Midpoint osnap to select the midpoint of the end of the wall.
move the doors to the reference point	enter 0.
move the doors a specified distance	enter a value for the offset distance.
specify the distance as a measurement between two points	select the two points measuring the distance.

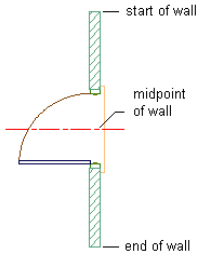
Using Anchors to Change Doors

You can use anchors to change the position and orientation of a door.

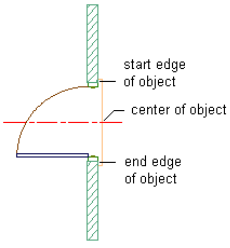
Using Anchors to Change the Horizontal Position of a Door

Use this procedure to change the horizontal position of doors along a wall to which the doors are anchored.

Door position along the X axis parameters



x-axis wall parameters



x-axis door parameters

1 Select the door you want to change.

2 Click Door tab ➤ Anchor panel ➤ Settings .

3 Select the reference point for the anchor along the *X* axis:

If you want to…	Then…
use the start of the wall as your reference point	under Position Along (X), select Start of wall (curve) for From.
use the midpoint of the wall as your reference point	under Position Along (X), select Midpoint of wall (curve) for From.
use the end of the wall as your reference point	under Position Along (X), select End of Wall (curve) for From.

4 Enter the distance from the reference point at which to place the doors.

Use a negative value to measure from endpoint to start point.

5 Select the position of the doors to measure to:

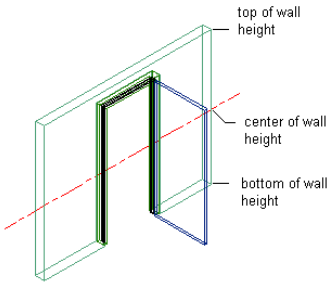
If you want to…	Then…
measure to the start edge of the doors	select Start Edge of object for To.
measure to the center of the doors	select Center of object for To.
measure to the end edge of the doors	select End Edge of object for To.

6 Click OK.

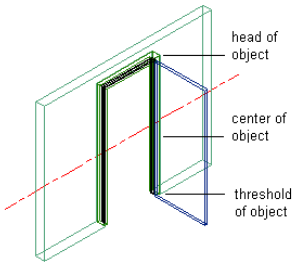
Using Anchors to Change the Vertical Position of a Door

Use this procedure to change the vertical position of doors in a wall to which the doors are anchored.

Door position along the Z axis parameters



z-axis wall parameters



z-axis door parameters

1 Select the door you want to change.

2 Click Door tab ➤ Anchor panel ➤ Settings .

3 Select the reference point for the anchor along the *Z* axis:

If you want to…	Then…
use the bottom of the wall height as your reference point	select Bottom of wall (curve) height for From.
use the center of the wall height as your reference point	select Center of wall (curve) height for From.
use the top of the wall height as your reference point	select Top of wall (curve) height for From.

4 Enter the distance from the reference point at which to place the doors.
Use a negative value to measure from endpoint to start point.

5 Select the position of the doors to measure to:

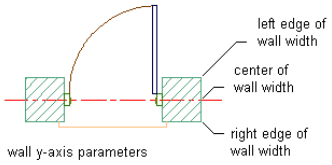
If you want to…	Then…
measure to the bottom of the doors	select Threshold (Bottom) of object for To.
measure to the center of the doors	select Center of object for To.
measure to the top of the doors	select Head (Top) of object for To.

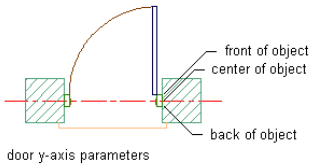
6 Click OK.

Using Anchors to Change the Position of a Door Within a Wall

Use this procedure to change the position of doors horizontally within a wall to which the doors are anchored.

Door position along the Y axis parameters





1 Select the door you want to change.

2 Click Door tab ➤ Anchor panel ➤ Settings .

3 Select the reference point for the anchor along the *Y* axis:

If you want to…	Then…
use the left edge of the wall as your reference point	select Left edge of wall (curve) width for From.

If you want to…	Then…
use the center of the wall as your reference point	select Center of wall (curve) width for From.
use the right edge of the wall as your reference point	select Right edge of wall (curve) width for From.

4 Enter the distance from the reference point at which to place the doors.
Use a negative value to measure from endpoint to start point.

5 Select the position of the doors to measure to:

If you want to…	Then…
measure to the front of the doors	select Front for To.
measure to the center of the doors	select Center for To.
measure to the back of the doors	select Back for To.

6 Click OK.

Changing the Orientation of a Door to a Wall

Use this procedure to change the vertical orientation of doors in a wall to which the doors are anchored.

1 Select the doors you want to change.

2 Click Door tab ➤ Anchor panel ➤ Settings .

3 Enter the *X* and *Z* rotation angles of the doors.

4 Indicate if you want to reverse the flip direction of the doors in the *X*, *Y*, and *Z* axes:

If you want to…	Then…
reverse the direction the doors open to	select Flip X.
reverse the side of the wall the doors open to	select Flip Y.
reverse the top and bottom of the doors	select Flip Z.

5 Click OK.

Moving a Door to a Different Wall

Use this procedure to move a door from one wall to another.

1 Select the door you want to move.

2 Click Door tab ➤ Anchor panel ➤ Set .

3 Select the wall to move the door to.

Releasing a Door from a Wall

Use this procedure to release doors from the wall to which they are anchored.

■ Select the doors you want to release.

- Click Door tab ➤ Anchor panel ➤ Release .

Changing the Location of a Freestanding Door

Use this procedure to relocate a freestanding door by changing the coordinate values of its insertion point. The door also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the door are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the door by aligning its normal with another axis. You can also rotate the door on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use World and User Coordinate Systems in 3D" in AutoCAD Help.

1. Double-click the door you want to move.
2. On the Properties palette, expand Basic, then expand Location and click next to Additional Information.
3. In the Location dialog box, specify the door's location:

If you want to…	Then…
relocate the door	enter new coordinate values under Insertion Point.
locate the door on the *XY* plane	make the normal of the door parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the door on the *YZ* plane	make the normal of the door parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the door on the *XZ* plane	make the normal of the door parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the door	enter a new value for Rotation Angle.

4. Click OK.

Display Properties of Doors

The display properties of a door determine how the door appears the drawing. They are different from door object properties (Door Properties on page 1220), which describe real world characteristics of doors, like the direction of the door swing, or the width of the door. Display properties describe how the door objects are displayed in the drawing, like cut plane, and layer, color, linetype settings.

Display properties are often dependent on a specific view; for example, the door swing and the threshold symbol appear only in plan views.

The display properties of a door can be set on 3 different levels:

- for an individual object
- for the object style
- globally for all objects of the type (drawing default settings)

What happens when I change the display source?

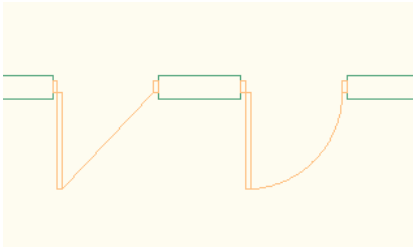
When you change the display source from the style or drawing default settings to the object then any changes you make to the display are not propagated to the style or drawing default settings anymore. The object will become inconsistent with the other objects inserted with this tool.

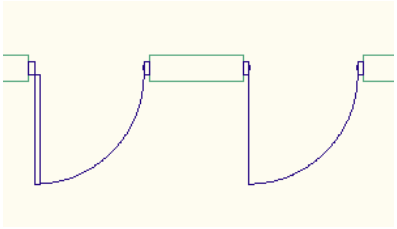
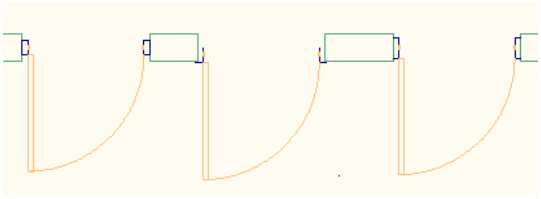
When you change the display settings from the object to the door style or the drawing default, any overrides you have made will be overwritten by the style or drawing defaults.

To change the display properties of a door

1. Double-click the door you want to change.
2. In the Properties palette, click the Display tab.
3. Change the display properties as needed:

Display Property	Description	How to Set
Display component	Lets you select individual object components for editing. If no component is selected, the change applies to the whole door.	Select *NONE* from the drop-down list. This allows you to make a change to the entire door.
Display controlled by	Displays the currently selected display source. **Options** ■ This object: Display properties are used for this object only. ■ Door Style: Display properties come from the door style on page 1237 ■ Drawing default settings: display properties come bfrom the global drawing settings on page 138.	
Display representation	Shows you which display representations are active in the current drawing view. Multiple display representations can be turned on. For example in Plan view, both plan and threshold symbol plan display representations are visible.	Select the display representation in which you want to change a display property from the drop-down menu. If the list is greyed out, the view only has one associated display representation.
Use cut plane of containing object when anchored (Plan views only)	Specifies whether a selected door will use the cut plane of the wall or door/window assembly it is anchored to	Select Yes or No from the drop-down menu.

Display Property	Description	How to Set
Straight Swing (Plan Views only)	Specifies whether to display the swing of a selected door as a straight line in the current display representation. **Illustration** **Straight swing (left) and curved (right)** 	Select Yes or No from the drop-down menu.
Override Swing Angle/Swing Angle (Plan and Elevation views only)	Lets you define an override to the swing angle that was defined in the Door Properties on page 1220.	For Override Swing angle, select Yes. Then, enter a door angle under Swing Angle.
Custom Block Display	Custom blocks are AutoCAD blocks that you can add to a specific display representation of a door, like a door knob, or a custom panel. In this worksheet, you can add on page 1248, edit on page 1247, disable on page 1249, or remove on page 1250 custom blocks from the door.	Click the Custom Block Display worksheet ( ), and add blocks to the door in the selected display representation.
Threshold Dimensions (Threshold Plan only)	Lets you specify the depth and extension of the threshold display.	Click the Threshold Dimensions worksheet ( ), and add values for the depth and extension.
Threshold Symbol (Threshold Symbol Plan Only)	Lets you define a Threshold symbol.	Click the Symbol worksheet ( ), and select one of the available symbols - Heel, Passthrough, Threshold, or no - in the list.
Muntins (Elevation and Model view)	Door muntins are secondary framing members that hold multiple lights in door glass. AutoCAD Architecture provides an easy way to create muntins with different layout patterns.This worksheet lets you add, edit, disable, or remove muntins from a door.	Click the Muntins worksheet ( ), and add or remove muntins. For detailed information, see Creating Muntins in a Door Style on page 1253.
Reverse Handing (Elevation views only)	??	Click the drop-down list and select Yes or No.

Display Property	Description	How to Set
Single Line Panel (Plan High Detail view only)	Lets you display the door panel as a single line **Illustration** **Single line door panel (right)** 	Click the drop-down list and select Yes or No.
Frame Display (Plan High Detail Only)	Lets you display the door frame with different representations in Plan High Detail **Illustration** 	Click the Frame Display worksheet, and select the desired Frame representation there.

Attaching Hyperlinks, Notes, and Files to a Door

Use this procedure to enter notes and attach reference files to a door. You can also edit notes and edit or detach reference files from a door.

1 Double-click the door to which to attach notes or files.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.
For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

4 To add a note, click next to Notes, enter text, and click OK.

5 To attach, detach, or edit a reference file, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.

If you want to…	Then…
detach a reference file	select the file name, and click .

6 Click OK.

Door Styles

A door style is a group of properties assigned to a door that determines the appearance and characteristics of the door.

You can use door styles to represent standard door types for specific jobs and drawings or for your office standards. When you create or modify a door style, the doors using the style have the settings and characteristics of the style. Templates provided with AutoCAD Architecture contain door styles for many typical doors. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

Creating Tools from Door Styles

To create a door tool from any door style, you drag the style from the Style Manager onto a tool palette. You can then specify default settings for doors created with that tool. For more information, see Creating a Tool from the Style Manager on page 73.

Managing Door Styles

To create, edit, copy, or purge door styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture in which to work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Door Style

Use this procedure to create a door style.

You can create a style with default style properties, or you can create a style by copying an existing one. After you create the style, you edit its properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

3 Create a door style:

If you want to…	Then…
create a style with default properties	right-click Door Styles, and click New.
create a style from an existing style	right-click the door style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new door style, and press *ENTER*.

5 Edit the properties of your new door style:

If you want to…	Then…
enter a description of the style	click the General tab, and enter a description.

If you want to…	Then…
change dimension properties of the style	see Specifying the Dimensions of a Door Style on page 1238.
change design rules of the style	see Specifying the Design Rules of a Door Style on page 1239.
change the standard door sizes of the style	see Specifying the Standard Sizes of a Door Style on page 1240.
assign materials to the components of the door style	see Assigning Materials to a Door Style on page 1244 and Turning on Materials for a Door Style on page 1247.
add classifications to a door style	see Adding Classifications to a Door Style on page 1245.
specify the display properties of the style	see Specifying the Display Properties of a Door Style on page 1246.
change the appearance of the display components of the style	see Changing the Layer, Color, and Linetype of Door Components on page 1246.
add components to the style	see Adding Components to a Door Style on page 1248.
remove components from the style	see Removing Custom Components from a Door Style on page 1250.
turn off components in the style	see Turning Off Custom Components in a Door Style on page 1249.
display a straight door swing from the style	see Displaying a Straight Door Swing on page 1250.
override the opening percentage in the style	see Specifying the Opening Percentage for Display Representations in a Door on page 1250.
change the threshold in the style	see Changing the Door Threshold in a Door Style on page 1251.
add muntins to the style	see Creating Muntins in a Door Style on page 1253.
add notes, files, or documents to the style	see Attaching Notes and Files to a Door Style on page 1252.

6 If you want to assign the style to a door tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Tool from the Style Manager on page 73.

7 Click OK.

Specifying the Dimensions of a Door Style

Use this procedure to change the default dimensions of a door style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

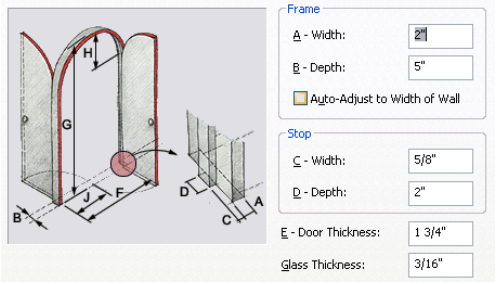
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Dimensions tab.

Changing door style dimensions



5 Change dimension values:

If you want to…	Then…
change the frame width and depth	under Frame, enter values for Width and Depth.
set the frame width to the wall thickness	under Frame, select Auto-Adjust to Width of Wall.
change the stop dimensions	under Stop, enter values for Width and Depth.
change the door thickness	enter a value for Door Thickness.
change the glass thickness	enter a value for Glass Thickness.

6 Click OK.

Specifying the Design Rules of a Door Style

Use this procedure to specify the shape and the type of door for a door style.

Door shapes are named geometrical descriptions of a door. You can select predefined and custom door shapes, or create your own shape from profiles. For more information, see Creating a Custom Door Shape on page 1240.

The door type describes the type of opening for the door, such as bifold or pocket.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Design Rules tab.

5 Select a door shape:

If you want to…	Then…
use a predefined door shape	under Shape, click Predefined, and select a shape.
use a custom door shape	under Shape, click Use Profile, and select a profile.

6 Select a door type.

7 Click OK.

Specifying the Standard Sizes of a Door Style

Use this procedure to create standard door sizes in a door style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Standard Sizes tab, and add, change, or remove door-size values:

If you want to…	Then…
create standard sizes	click Add . Under Standard Sizes, enter values for Description, Width, Height, Rise, and Leaf.
change a size	select the size, and click Edit . Enter new values for Width, Height, Rise, and Leaf.
delete a size	select a size, and click Remove .

The description can be used to identify standard door sizes in door schedules. For example, you can specify a manufacturer's size or model code for Description.

Rise is available for Arch, Gothic, and Peak Pentagon door shapes. Leaf controls the width of Uneven, Uneven-Dhung, and Uneven-Opposing door types. For more information on door types and shapes, see Specifying the Design Rules of a Door Style on page 1239.

5 Click OK.

Creating a Custom Door Shape

Use this procedure to create a profile that you can use to define a custom door shape in a door style. To create a custom door shape that includes glazing, see Creating a Void for Door Muntins on page 1255.

1 Draw a closed polyline in the shape you want.

2 Select the polyline, right-click, and click Convert To ➤ Profile Definition.

3 Specify the insertion point of the profile.

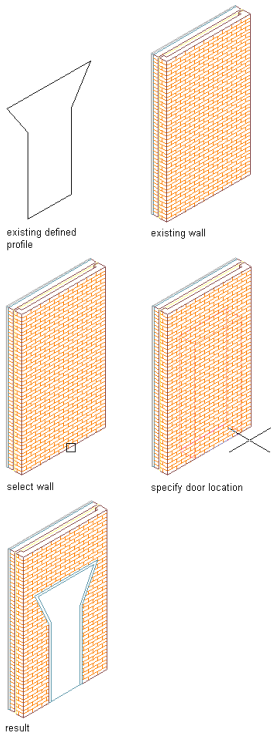
The insertion point is not used for doors.

4 Enter **n** (New).

5 Enter a name for the profile, and click OK.

Replacing the Door Shape in a Door Style

Use this procedure to replace a predefined shape in a door style with a custom shape created from a profile.



1 Select a door that uses the style you want to modify.

2 Click Door tab ➤ Profile panel ➤ Add Profile .

3 Specify the profile to use for the custom shape:

If you want to…	Then…
use a predefined door shape	select a profile for Profile Definition, and click OK. For information about creating a profile, see Creating a Custom Door Shape on page 1240.
use a predefined door shape, but modify it	select a profile for Profile Definition, select Continue Editing, and click OK. For information about modifying the shape, see Editing the Geometry of a Door Style on page 1242.
create a custom shape	select Start from scratch for Profile Definition, enter a name for the new profile, and click OK. For information about modifying the default shape, see Editing the Geometry of a Door Style on page 1242.

Editing the Geometry of a Door Style

Use this procedure to edit the geometry of the profile used to define a door style. You can also add a profile to a door style that does not currently use a profile to define its shape.

1 Add a door that has the style you want to change.

2 Add or edit a profile:

If you want to…	Then…
add an existing profile to the style	select the door, and click Door tab ➤ Profile panel ➤ Add Profile . Select the name of the profile, and click OK.
add and an existing profile to the style and edit it immediately	select the door, and click Door tab ➤ Profile panel ➤ Add Profile . Select the name of the profile, click Continue Editing, then click OK.
create a profile and add it to the style	select the door, and click Door tab ➤ Profile panel ➤ Add Profile . Select Start from scratch for Profile Definition, enter a name for the new profile, and click OK. A rectangular profile is created for you to edit to define the required geometry.
edit the existing profile for the style	select the door, and click Door tab ➤ Profile panel ➤ Edit In Place .

3 If you receive a message that the profile is not drawn to size, click Yes.

The area of the door defined by the profile is selected in the drawing.

4 **NOTE** After you perform an editing task, you may need to select the profile again to perform another editing task. If the editing commands that you want to use are not available, select the profile again.

Edit the profile as necessary:

If you want to…	Then…
change the shape of the perimeter of the profile or its rings	select the profile, and use edge or vertex grips to adjust the shape. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.

If you want to…	Then…
add vertices to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
remove vertices from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click.
replace an existing ring of the profile with new geometry	click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
add a ring to the profile	click Edit In Place tab ➤ Profile panel ➤ Add Ring . Select the geometry to define the ring. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
remove a ring from the profile	click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Select the ring to remove, and press *ENTER*.

5 Save or discard the changes:

If you want to…	Then…
restore the profile to its original shape	click Edit in Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current profile	click Edit in Place tab ➤ Edits panel ➤ Finish . The door style uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.
save the changes to a new profile definition	click Edit in Place tab ➤ Edits panel ➤ Save As . Enter a name for the new profile definition, and click OK. The door uses the new profile to define its geometry. Any doors of this style are updated with the new geometry. Other styles or objects that use the original profile are not affected.

About Door Display Components and Materials

A door object consists of a number of components whose display properties can be determined by the materials assigned to each component.

You assign one material to each display component of the door. For example, you assign a wood material to the frame and a glass material to the glass inset. You assign materials to door components in each display representation in which the materials are to be used.

To use the display properties of the door object or the door style, instead of using material display properties, you can turn off the material assignments in the display properties of the door or the door style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their descriptions, see Material Components and Display Properties on page 585.

The following table lists door components that can be displayed using materials assigned to them, and identifies the material component of each.

Door Component	Material Component
Plan, Plan High Detail, Reflected	
Door Panel	Linework
Frame	Linework
Stop	Linework
Plan Low Detail	
Panel	Linework
Model	
Door Panel	3D Body
Frame	3D Body
Stop	3D Body
Glass	3D Body
Elevation	
Door Panel	2D Section/Elevation Linework
Frame	2D Section/Elevation Linework
Stop	2D Section/Elevation Linework
Glass	2D Section/Elevation Linework

Assigning Materials to a Door Style

Use this procedure to assign materials to the individual components of a door style. Components use the display properties of the material. For more information, see About Door Display Components and Materials on page 1243.

You can specify the materials used to display the following components of a door style:

- Frame
- Stop
- Panel

- Glass
- Muntin

NOTE If a material assignment does not determine the display properties of a door component, you can change the display properties of the door style as described in Specifying the Display Properties of a Door Style on page 1246.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door Styles.

   NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation in which to display the changes, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Click the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog box, any changes you make apply to all objects that are assigned the material.
11. Click OK.

Adding Classifications to a Door Style

Use this procedure to specify classifications for definitions applied to a door style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door Styles.

   NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3. Select the style that you want to change.
4. Click the Classifications tab.

The default setting for classification definitions is Unspecified. If no classification definitions are listed, none are applied to door styles.

5 For each classification definition, select the classification you want to apply to the current door style.

6 Click OK.

Specifying the Display Properties of a Door Style

In most cases, you want the appearance of doors that belong to the same style to be consistent throughout a drawing. To achieve this, you specify the following display properties of the doors in each door style:

- The layer, color, and linetype of door components
- The hatching used with each component
- The cut plane height and the display of components relative to the cut plane
- Other specific door display information, such as the shape of the door swing

You can also use materials to control the display properties of the physical components of a door. Symbolic components, such as the door swing, are not controlled by materials. For more information about using materials in doors, see About Door Display Components and Materials on page 1243.

Changing the Layer, Color, and Linetype of Door Components

Use this procedure to change the following properties of the display components of a door style:

- Visibility (display component is on or off)
- By material (material assigned to the display component determines its layer properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514. Note also, that If a material assignment determines the properties of components in the door style, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Assigning Materials to a Door Style on page 1244.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK.

Turning on Materials for a Door Style

Use this procedure to turn on material assignments for individual display representations in a door style.

For more information about using materials to control the display of door components, see About Door Display Components and Materials on page 1243.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select By Material for each component to be controlled by the material. The By Material check box is unavailable for components that cannot be assigned a material.

When you select By Material for a display component, all other settings in the dialog are unavailable. Since the display properties are now taken from the material definition, you can no longer set them directly in the display properties of the door style.

9 Click OK.

Using Custom Blocks to Create Door Components

You can add custom blocks for components, such as door hardware, to the display components, or to replace the default display components. For example, you can replace a simple door leaf with a custom six-panel door leaf in which the custom component is to appear. You can have a different custom block for each display representation.

When you add a custom block, you can specify rules for positioning and scaling the new component. Each custom block also appears in the display properties component list so that you can control its layer, color, and linetype. For more information on adding custom blocks, see Adding Components to a Door Style on page 1248.

If you create a custom block from mass elements, you can use the material assignments of the mass elements to determine the display properties of the custom block.

Be sure to set the properties of objects used to create your custom blocks to ByBlock. Otherwise, you cannot control these objects through the display properties. For more information about ByBlock, see “Use Layers to Manage Complexity” in AutoCAD Help.

Adding Components to a Door Style

Use this procedure to add or edit custom block components in the display representation of door styles.

1 Create a block for the component to add to the door style.

Create the block in the same plane as the door that you use to represent the style. For more information about custom blocks, see Using Custom Blocks to Create Door Components on page 1247.

2 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

3 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

4 Select the style you want to edit.

5 Click the Display Properties tab.

6 Select the display representation in which to display the changes, and select Style Override.

7 If necessary, click .

8 Click the Other tab.

9 Specify whether to add or edit a block component:

If you want to…	Then…
add a new block component	click Add.
edit an existing block component	select the component to edit, and click Edit. Proceed to step 11.

10 Click Select Block.

11 Select the block to use, and click OK.

12 Specify whether to scale to fit the block component to the object by width, depth, or height, or to lock the *XY* ratio:

If you want to…	Then…
set the block scale to the width of the object	select Width.
set the block scale to the depth of the object	select Depth.
set the block scale to the height of the object	select Height.
scale the whole block equally, so that one direction is scaled to fit another of the scale criteria	select Lock XY Ratio.
scale the block to its original size	clear all options under Scale to Fit.

13 Specify whether to mirror the block in the X,Y, or Z direction:

If you want to…	Then…
create a mirror of the block in the *X* direction	select Mirror X.
create a mirror of the block in the *Y* direction	select Mirror Y.

If you want to…	Then…
create a mirror of the block in the *Z* direction	select Mirror Z.

14 Specify the *X*, *Y*, and *Z* location of the insertion point.

15 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

16 Specify whether the component is for the door frame, leaf or glass:

If you want to…	Then…
add the block to the inside or outside of the frame	click Frame Component, and click either Outside or Inside.
add the block to all leaf components or to a single leaf component	click Leaf Component, and click either All or Single. If you select Single, enter the component number.
add the block to all glass components or to a single glass component	click Glass Component, and click either All or Single. If you select Single, enter the component number. **NOTE** If you specified Depth for Scale to Fit, the depth will be scaled to the glass thickness. You can scale to the door panel thickness instead by selecting Scale Depth to Panel Thickness.

17 Leaf and glass components are not available in some display representations.

Click OK three times.

Turning Off Custom Components in a Door Style

Use this procedure to turn off custom blocks in a door style.

You can turn off the display of component blocks without removing them from the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which to turn off the display of the door component, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

8 Select Disable Custom Blocks.

9 Click OK.

Removing Custom Components from a Door Style

Use this procedure to remove components from a door style.

Removing component blocks from a door style deletes them from the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation from which to remove the door component, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Select the component to remove, and click Remove.
9 Click OK.

Displaying a Straight Door Swing

Use this procedure to display the door swing as a straight line in a door style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation in which to display a straight door swing, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Select Straight Swing.
9 Click OK.

Specifying the Opening Percentage for Display Representations in a Door

Use this procedure to override the opening percentage in the display representation of a door style. For example, you can specify that a door is displayed closed in model and elevation representations, but open in plan representations.

NOTE This setting overrides other door opening percent settings. If the opening percent is specified here, the opening percent entered on the Properties palette when you add or modify doors is ignored.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation in which to override the opening percent, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Select Override Opening Percent.
9 Enter a value for the opening percent.
10 Click OK.

Changing the Door Threshold in a Door Style

Use this procedure to display a door threshold and change its dimensions in threshold display representations.

You can turn on threshold display representations in addition to door display representations.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select Threshold Plan, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Under Threshold Dimensions, enter the threshold extension and depth dimensions. Component A is the swing side of the door. Component B is the other side.
9 Click the Layer/Color/Linetype tab.
10 Under Visible, click the icons to turn on visibility.
11 Click OK.

Changing the Door Threshold Symbol in a Door Style

Use this procedure to specify the symbol indicating a threshold that appears in a door opening for the door style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select Threshold Symbol Plan, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Select the type of symbol you want to display in the door opening.
9 Click the Layer/Color/Linetype tab.
10 Under Visible, click the icon to turn on visibility.
11 Click OK.

Defining a Door Style as Bounding for Associative Spaces

Use this procedure to define a door style that can bound associative spaces.

When a door style is set as bounding, by default all doors that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the door style in an individual door, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select a door style.
4 Click the General tab.
5 Select the checkbox for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Door Style

Use this procedure to enter notes and attach reference files to a door style. You can also edit reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.
4 Click the General tab.
5 To add a description to the door, enter the description under Description.

6 Click Notes.

7 To add or edit a note, click the Notes tab, and enter the note.

8 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you finish editing.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK.

Creating Muntins in a Door Style

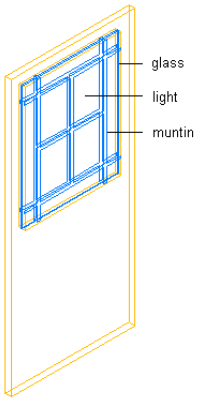
Door muntins are secondary framing members that hold multiple lights in door glass. AutoCAD Architecture provides an easy way to create muntins with different layout patterns.

Door muntins are available in the following patterns that you can customize into different styles:

- Rectangular
- Diamond
- Prairie 9 Lights
- Prairie 12 Lights
- Starburst
- Sunburst

Starburst and Sunburst patterns are a combined-rectangular pattern with a half-round or quarter-round spoked top. They can be used for half- and quarter-round door glass as well as rectangular door glass. The other patterns are primarily rectangular but fit into half-round glass. You can make up custom glass shapes by creating profiles from polylines and adding them to a new door style.

Door muntin components



Process Overview: Creating Door Muntins

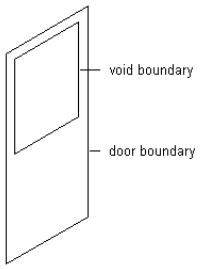
You must have a void for the glass in the door in order to add muntins. Sample content provided with the software includes several door styles that already have glass and can receive muntins. The door style description indicates whether the style has glass. You can create door styles with a glazing void to receive muntins.

The process of creating a door style with door glass and muntins has three steps:

1. Create a void for door glass and muntins.

   You create a profile from two concentric polylines that define the door shape and the door glass.

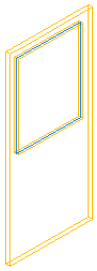
   Concentric closed polylines for a door profile



2. Add glass to a door style.

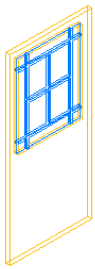
   You apply the profile with a void to a door style so that the style has glass for doors to receive muntins.

   Door style created from a profile



3. Add muntins to the door style.

   Door glass with muntins



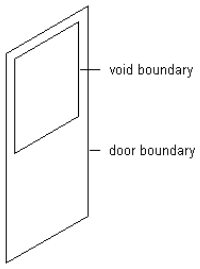
Creating a Void for Door Muntins

Use this procedure to create a profile of a door with a void for glass to receive muntins. This is the first step for adding muntins to door styles that do not have glass.

The profile is made up of concentric, closed polylines. The outer polyline, or ring, becomes the door shape, and the inner polyline becomes the void for the glass. You can create multiple voids by adding more inner polylines. Voids for glazing must be entirely within the polyline representing the door shape. The polylines are proportional in size and shape to each other and also to the individual doors created from the door style.

You can draw these polylines anywhere in the drawing and use any convenient scale relative to your final door and glass size. One method for sizing the polylines relative to the door is to draw them by snapping to an existing door, and then move them to the side.

Concentric closed polylines for a door profile



1. Draw concentric, closed polylines representing the door and the glass that receives the muntin pattern.
2. Select the polylines, right-click, and click Convert To ➤ Profile Definition.
3. Select the outermost polyline.
4. Enter **a** (Add ring).
5. Select an inner polyline.
6. Repeat steps 3 and 4 as needed to add more voids to the profile.
7. Specify the insertion point of the profile.
8. Enter **n** (New), enter a name for the profile, and click OK.

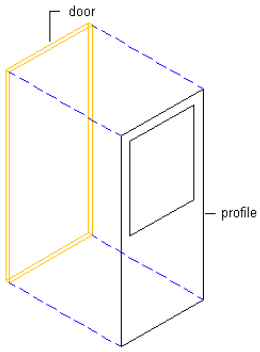
To add the profile to a door style, see Adding Glass to a Door Style on page 1255.

Adding Glass to a Door Style

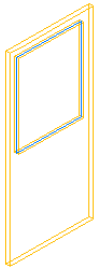
Use this procedure to create a door style with glass for doors to accept muntin patterns.

The drawing must contain a profile that defines the door style and the void for the door glass. For more information about creating such a profile, see Creating a Void for Door Muntins on page 1255.

Door profile with a void for glass



Door style created from the profile



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Door Styles.
3 Create a door style:

If you want to…	Then…
create a style with default properties	right-click Door Styles, and click New.
create a style from an existing style	right-click the Door style you want to copy, and click Copy. Right-click, and click Paste.

4 Select the new door style, right-click, and click Rename.
5 Enter a name for the new door style, and press *ENTER*.
6 Select the new door style.
7 Click the Design Rules tab.
8 Under Shape, select Use Profile, and select a profile that defines a door style containing a void for door glass.
9 Click the Standard Sizes tab.
10 Add new sizes to the style.

For more information about adding standard sizes to a door style, see Specifying the Standard Sizes of a Door Style on page 1240.

11 Click OK.

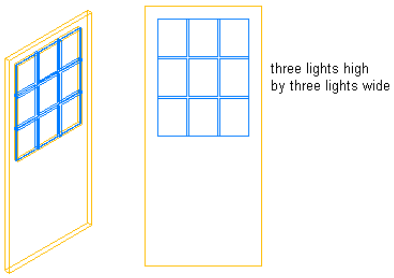
The door style now contains glass. You can now add muntins to a door style.

Adding Rectangular or Diamond Muntins to a Door Style

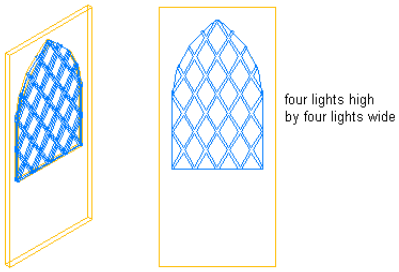
Use this procedure to add rectangular or diamond muntins to a door style that contains glass.

You add muntins by editing the display properties of the door style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and apply them to all display representations of that door style. You add the muntins block to glass components of the door style in display properties. Each muntins block becomes a display component of the door style.

Rectangular door glass with rectangular muntins



Gothic door glass with diamond muntins



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

NOTE A door style must contain glass to receive muntins. For more information about adding glass to a door style, see Adding Glass to a Door Style on page 1255.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Muntins tab.

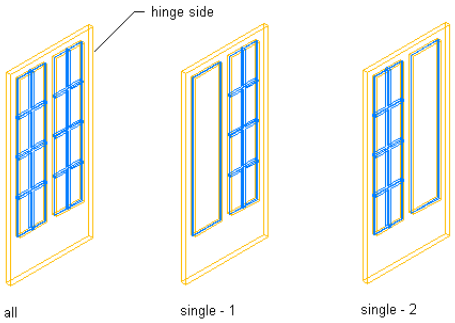
8 Click Add.

9 Enter a name for the muntins block.

10 If the door style contains multiple glass components, specify whether you want to apply muntins to all glass components or to one glass component in the door:

If you want to…	Then…
attach muntins to all glass components	under Glass Component, select All.
apply muntins to an individual glass component	under Glass Component, select Single, and specify the index number. Lights are indexed counterclockwise, starting from the lower-left corner.

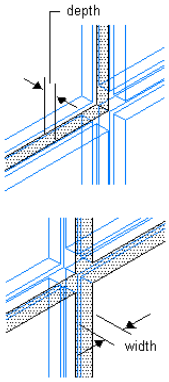
Muntins applied to all or one glass component



11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

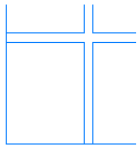
Specifying muntin width and depth



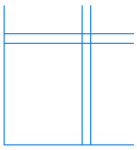
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying muntin cleanup joints

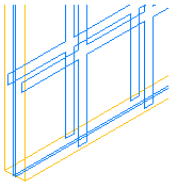


cleanup muntin joints on

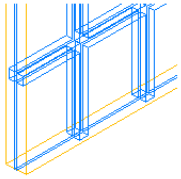


cleanup muntin joints off

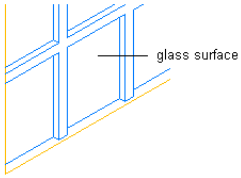
Converting muntins to a body



muntins with
joint cleanup



muntins convetred
to body



hidden line view

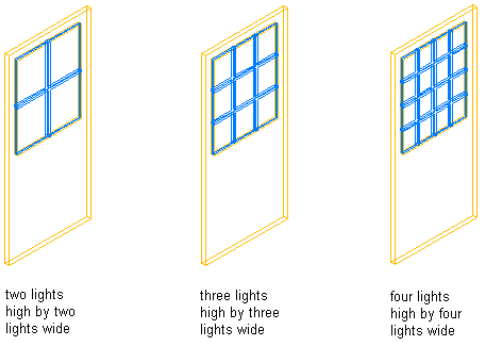
14 Under Lights, select a pattern:

If you want to…	Then…
use a rectangular pattern	select Rectangular for pattern.
use a diamond pattern	select Diamond for pattern.

15 Enter a value for Lights High to specify the number of light rows in the vertical direction.

16 Enter a value for Lights Wide to specify the number of light columns in the horizontal direction.

Values for lights high and lights wide



17 Click OK.

18 Add other muntins:

If you want to…	Then…
add muntins to another glass component in the door style	repeat this procedure from step 8.
add muntins to another display representation	click OK, and repeat this procedure from step 5.
add muntins to all display representations of the selected door style	select Automatically Apply to Other Display Representations and Object Overrides.

19 When you finish adding muntins to the door style, click OK three times.

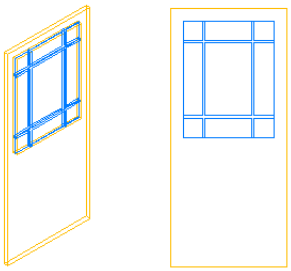
After you add a muntins block to a door style, you can assign a material, such as wood sash, and specify the display properties, such as color and linetype. For more information, see Assigning Materials to a Door Style on page 1244 and Changing the Layer, Color, and Linetype of Door Components on page 1246.

Adding Prairie-Lights Muntins to a Door Style

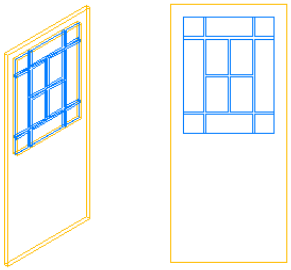
Use this procedure to add prairie-9-lights or prairie-12-lights muntins to a door style that contains glass.

You add muntins by editing the display properties of the door style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and apply them to all display representations of that door style. You add the muntins block to glass components of the door style in display properties. Each muntins block becomes a display component of the door style.

Rectangular door glass with prairie-9-lights muntins



Rectangular door glass with prairie-12-lights muntins



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

NOTE A door style must contain glass to receive muntins. For more information about adding glass to a door style, see Adding Glass to a Door Style on page 1255.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Muntins tab.

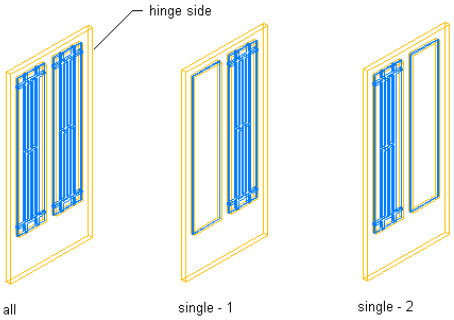
8 Click Add.

9 Enter a name for the muntins block.

10 If the door style contains multiple glass components, specify whether you want to apply muntins to all glass components or to one glass component in the door:

If you want to…	Then…
attach muntins to all glass components	under Glass Component, select All.
apply muntins to an individual glass component	under Glass Component, select Single, and specify the index number. Lights are indexed counterclockwise, starting from the lower-left corner.

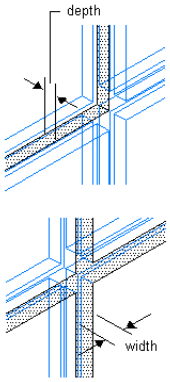
Muntins applied to all or one glass component



11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

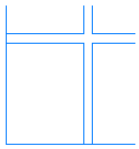
Specifying muntin width and depth



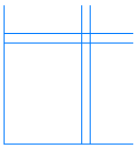
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying muntin cleanup joints

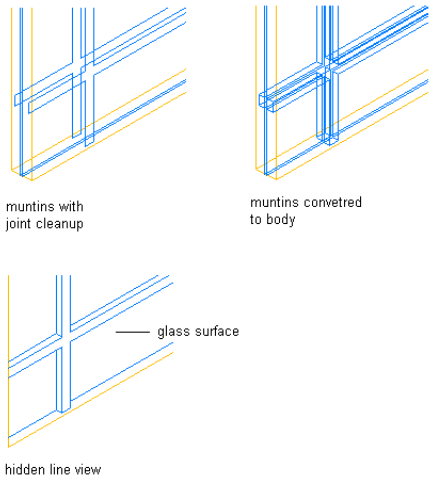


cleanup muntin joints on



cleanup muntin joints off

Converting muntins to a body



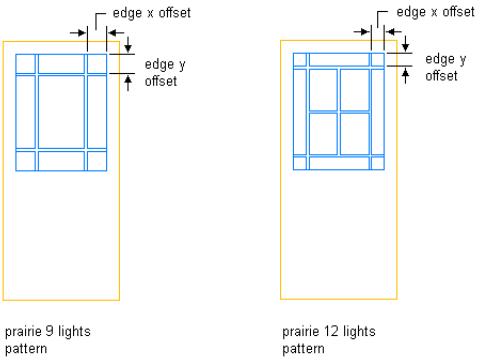
14 Under Lights, select a pattern:

If you want to…	Then…
use a nine-light prairie pattern	select Prairie-9 Lights for Pattern.
use a twelve-light prairie pattern	select Prairie-12 Lights for Pattern.

15 Enter a value for Edge X Offset to specify the horizontal distance of the muntins from the edges of the glass.

16 Enter a value for Edge Y Offset to specify the vertical distance of the muntins from the edges of the glass.

Specifying edge X and Y offsets



17 Click OK.

18 Add other muntins:

If you want to…	Then…
add muntins to another glass component in the door style	repeat this procedure from step 8.
add muntins to another display representation	click OK, and repeat this procedure from step 5.

If you want to…	Then…
add muntins to all display representations of the selected door style	select Automatically Apply to Other Display Representations and Object Overrides.

19 When you finish adding muntins to the door style, click OK three times.

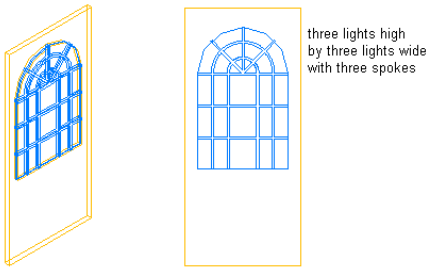
After you add a muntins block to a door style, you can assign a material, such as wood sash, and specify the display properties, such as color and linetype. For more information, see Assigning Materials to a Door Style on page 1244 and Changing the Layer, Color, and Linetype of Door Components on page 1246.

Adding Starburst Muntins to a Door Style

Use this procedure to add starburst muntins to a door style that contains glass.

You add muntins by editing the display properties of the door style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and apply them to all display representations of that door style. You add the muntins block to glass components of the door style in display properties. Each muntins block becomes a display component of the door style.

Half-round door glass with starburst muntins



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

NOTE A door style must contain glass to receive muntins. For more information about adding glass to a door style, see Adding Glass to a Door Style on page 1255.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Muntins tab.

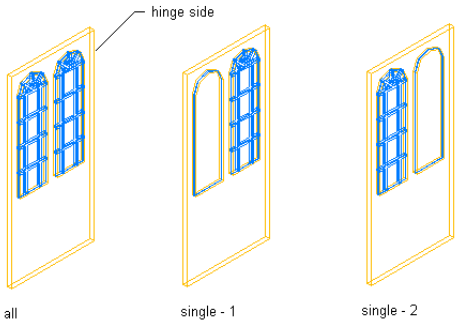
8 Click Add.

9 Enter a name for the muntins block.

10 If the door style contains multiple glass components, specify whether you want to apply muntins to all glass components or to one glass component in the door:

If you want to…	Then…
attach muntins to all glass components	under Glass Component, select All.
apply muntins to an individual glass component	under Glass Component, select Single, and specify the index number. Lights are indexed counterclockwise, starting from the lower-left corner.

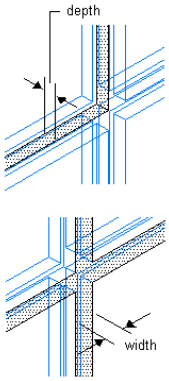
Muntins applied to all or one glass component



11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

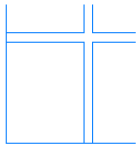
Specifying muntin width and depth



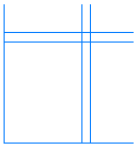
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying muntin cleanup joints

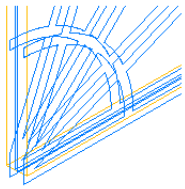


cleanup muntin joints on

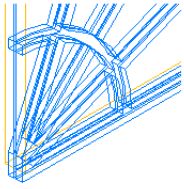


cleanup muntin joints off

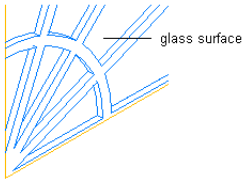
Converting muntins to a body



muntins with
joint cleanup



muntins convetred
to body



hidden line view

14 Under Lights, select Starburst for pattern.

15 Under Shape, select Half Round or Quarter Round.

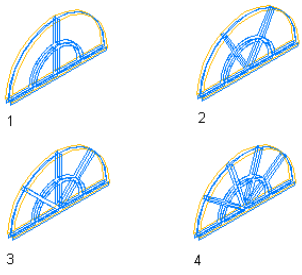
16 Enter a value for Lights High to specify the number of light rows in the vertical direction, exclusive of the spoked lights.

17 Enter a value for Lights Wide to specify the number of light columns in the horizontal direction.

Count the columns as though they continue around the hub. For a half-round starburst, five apparent columns are counted as three. For a quarter-round starburst, three apparent columns are also counted as three.

18 Enter a value for Spokes to specify the number of radial muntin spokes.

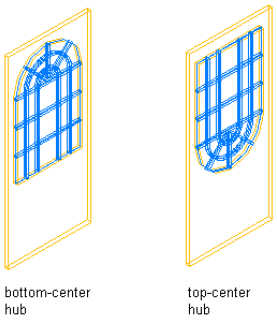
Specifying the number of radial muntin spokes



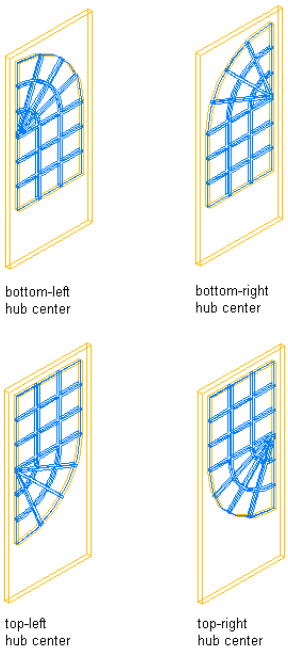
19 Specify where to place the hub:

If you want to…	Then…
place the hub at the bottom of a half-round shape	under Hub, select Bottom Center.
place the hub at the top of a half-round shape	under Hub, select Top Center.
place the hub at the bottom left of a quarter-round shape	under Hub, select Bottom Left.
place the hub at the bottom right of a quarter-round shape	under Hub, select Bottom Right.
place the hub at the top left of a quarter-round shape	under Hub, select Top Left.
place the hub at the top right of a quarter-round shape	under Hub, select Top Right.

Specifying hub placement of half-round shape



Specifying hub placement of quarter-round shape



20 Click OK.

21 Add other muntins:

If you want to…	Then…
add muntins to another glass component in the door style	repeat this procedure from step 8.
add muntins to another display representation	click OK, and repeat this procedure from step 5.
add muntins to all display representations of the selected door style	select Automatically Apply to Other Display Representations and Object Overrides.

22 When you finish adding muntins to the door style, click OK three times.

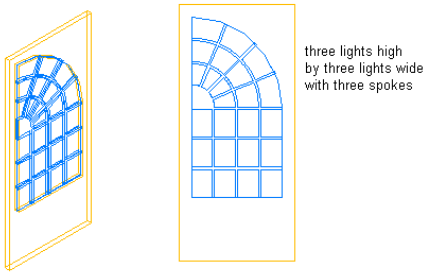
After you add a muntins block to a door style, you can assign a material, such as wood sash, and specify the display properties, such as color and linetype. For more information, see Assigning Materials to a Door Style on page 1244 and Changing the Layer, Color, and Linetype of Door Components on page 1246.

Adding Sunburst Muntins to a Door Style

Use this procedure to add sunburst muntins to a door style that contains glass.

You add muntins by editing the display properties of the door style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and apply them to all display representations of that door style. You add the muntins block to glass components of the door style in display properties. Each muntins block becomes a display component of the door style.

Quarter-round door glass with sunburst muntins and closed hub



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

NOTE A door style must contain glass to receive muntins. For more information about adding glass to a door style, see Adding Glass to a Door Style on page 1255.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and select Style Override.

6 If necessary, click .

7 Click the Muntins tab.

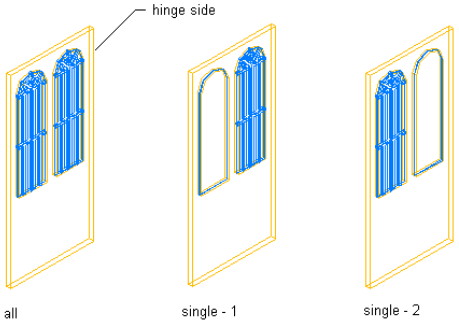
8 Click Add.

9 Enter a name for the muntins block.

10 If the door style contains multiple glass components, specify whether you want to apply muntins to all glass components or to one glass component in the door:

If you want to…	Then…
attach muntins to all glass components	under Glass Component, select All.
apply muntins to an individual glass component	under Glass Component, select Single, and specify the index number. Lights are indexed counterclockwise, starting from the lower-left corner.

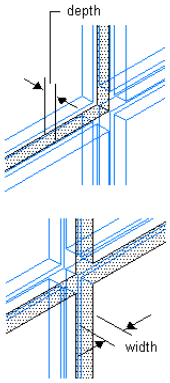
Muntins applied to all or one glass component



11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

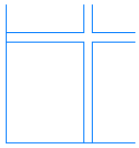
Specifying muntin width and depth



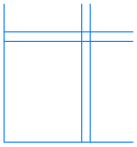
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying muntin cleanup joints

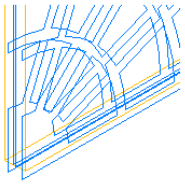


cleanup muntin joints on

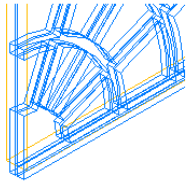


cleanup muntin joints off

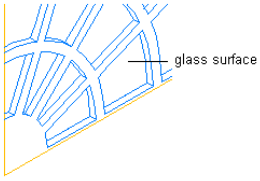
Converting muntins to a body



muntins with joint cleanup



muntins convetred to body



hidden line view

14 Under Lights, select Sunburst for pattern.

15 Under Shape, select Half Round or Quarter Round.

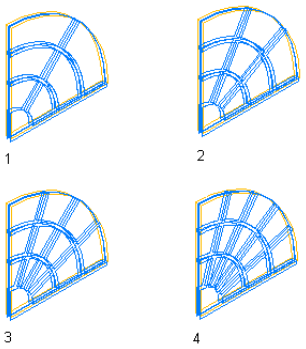
16 Enter a value for Lights High to specify the number of light rows in the vertical direction, exclusive of the spoked lights.

17 Enter a value for Lights Wide to specify the number of light columns in the horizontal direction.

Count the columns as though they continue around the hub. For a half-round sunburst, five apparent columns are counted as two. For a quarter-round sunburst, three apparent columns are also counted as two.

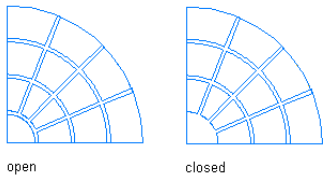
18 Enter a value for Spokes to specify the number of radial muntin spokes.

Specifying the number of radial muntin spokes



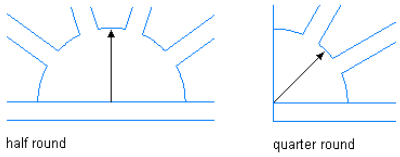
19 Under Hub Style, select Closed for no hub light, or select Open for a hub light.

Specifying closed and open hubs



20 Enter a value for Radius to specify the radius for the hub.

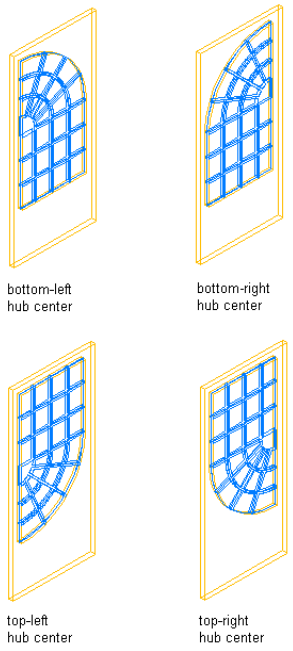
Specifying hub radius



21 Specify where to place the hub:

If you want to…	Then…
place the hub at the bottom of a half-round shape	under Hub, select Bottom Center.
place the hub at the top of a half-round shape	under Hub, select Top Center.
place the hub at the bottom left of a quarter-round shape	under Hub, select Bottom Left.
place the hub at the bottom right of a quarter-round shape	under Hub, select Bottom Right.
place the hub at the top left of a quarter-round shape	under Hub, select Top Left.
place the hub at the top right of a quarter-round shape	under Hub, select Top Right.

Specifying hub placement of quarter-round shape



22 Click OK.

23 Add other muntins:

If you want to…	Then…
add muntins to another glass component in the door style	repeat this procedure from step 8.
add muntins to another display representation	click OK, and repeat this procedure from step 5.
add muntins to all display representations of the selected door style	select Automatically Apply to Other Display Representations and Object Overrides.

24 When you finish adding muntins to the door style, click OK three times.

After you add a muntins block to a door style, you can assign a material, such as wood sash, and specify the display properties, such as color and linetype. For more information, see Assigning Materials to a Door Style on page 1244 and Changing the Layer, Color, and Linetype of Door Components on page 1246.

Editing a Door Muntins Block in a Door Style

Use this procedure to edit the muntins settings for a door style.

After you create a muntins block, you can change its settings by editing the display properties of the door style for each display representation, such as Model or Elevation. You can edit the muntins for display representations individually. You can also edit the muntins for a single display representation and apply the changes to all display representations of that door style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which to display the changes, and click .

6 Click the Muntins tab.

7 Select the muntins block to edit.

8 Click Edit.

9 Edit any of the settings.

For more information on settings, refer to the door muntins type in Creating Muntins in a Door Style on page 1253.

10 Select Automatically Apply to Other Display Representations and Object Overrides to apply edits to all display representations of the selected door style.

Clear this setting to apply edits to only the selected display representation.

11 When you finish editing the door muntins block in the door style, click OK three times.

You can edit the display properties, such as color and linetype, for the muntins block. For more information, see Changing the Layer, Color, and Linetype of Door Components on page 1246.

You can also edit the material applied to the muntins. For more information, see Assigning Materials to a Door Style on page 1244.

Turning Off the Display of Muntins in a Door Style

Use this procedure to turn off the display of muntins in a door style. You can turn off the display of door muntins without removing them from the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Door Styles.

NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which to turn off the display of door muntins, and click .

6 Click the Muntins tab.

7 Select Disable Muntins Blocks.

8 Select Automatically Apply to Other Display Representations and Object Overrides to turn off muntins block(s) for all display representations of the selected door style.

Clear this setting to turn off muntins block(s) for only the selected display representation.

9 Click OK two times.

Removing a Door Muntins Block from a Door Style

Use this procedure to remove muntins from a door style.

When you remove muntins blocks from a door style, they are deleted. To turn off muntins without deleting them, see Turning Off the Display of Muntins in a Door Style on page 1273.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Door Styles.

   NOTE Alternatively, you can select a door, and click Door tab ➤ General panel ➤ Edit Style drop-down ➤ Door Styles .

3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation for which to remove door muntins, and click .
6. Click the Muntins tab.
7. Select the muntins block to remove.
8. Click Remove.
9. Repeat steps 7 and 8 to remove multiple muntins blocks.
10. Select Automatically Apply to Other Display Representations and Object Overrides to remove muntins block(s) from all display representations of the selected door style.

    Clear this setting to remove muntins block(s) from only the selected display representation.
11. When you finish removing muntins blocks from the door style, click OK two times.

Windows

24

A window is an AEC object that interacts with walls and door and window assemblies. After a window is placed in a wall or door and window assembly, the window is constrained to the object and cannot move outside it. Windows can be anchored to specific locations in walls or door and window assemblies; when the wall or door and window assembly moves or changes size, the location of the window in that object stays constant. Windows can also be freestanding objects.

Windows

A window is an AEC object that interacts with walls and door and window assemblies. After a window is placed in a wall or door and window assembly, the window is constrained to the object and cannot move outside it. Windows can be anchored to specific locations in walls or door and window assemblies; when the wall or door and window assembly moves or changes size, the location of the window in that object stays constant. Windows can also be freestanding objects.

Creating Windows

You can create windows using all of the typical design parameters for style, standard size, width and height, threshold height, head height, and vertical alignment. You can choose styles with glass shapes that receive standard muntins patterns, and create your own custom glass shapes from profiles.

Working with Window Styles

Templates provided with AutoCAD Architecture contain ready-to-use window styles. The design rules of a window style determine the default dimensions of windows created from the style. The window style also determines the window shape and the window type:

- The window shape determines the geometry of the window frame, such as rectangular, half round, and arch. You can also create custom window shapes from profiles.
- The window type determines the number of panels and the method of opening the window, such as glider, pass-through, hopper, or picture.

You can also define standard sizes in a window style and then select the size you want to use when you place the window in a drawing.

Anchoring Windows

After a window is placed in a wall or door and window assembly, the window is constrained to the object and cannot move outside it.

Windows can also be anchored to specific locations in walls or door and window assemblies that when the wall or door and window assembly moves or changes size, the location of the window in that object stays constant.

Window Dimensions

Some window dimensions depend on the window shape and type specified in the window style.

Rise is the height from the top of the rectangular portion of a window to the peak of the window opening for Gothic, Arch, and Peak Pentagon window shapes.

Vertical Alignment of Windows

To control how you place the window in the wall, the location of the working point vertically in the wall, and how the window responds to modifications in height, use the vertical alignment settings. To determine the working point on the window, use the threshold and head height settings. You can place the working point at the sill or at the head.

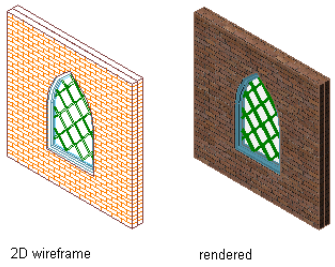
The threshold height is maintained. For example, if you specify the vertical alignment as 0" and the window height as 7'–0", the window opening height is 7'–0". If you next specify the height of the window as 6'–8", the window threshold remains at 0" and the window opening height becomes 6'–8".

The window head work point is maintained. For example, if you specify the vertical alignment as 7'–0" and the window height as 7'–0", the window opening height is 7–0". If you specify the window height as 6'–8", the window head remains at 7'–0" and the window threshold becomes 4".

Materials in Windows

In AutoCAD Architecture, you can assign materials to a window. These materials then are displayed in wireframe or rendered views. Materials have specific settings for individual components of a window, such as the frame, the sash, or the muntins. For more information, see Material Components and Display Properties on page 585.

Window in 2D wireframe and rendered views



AutoCAD Architecture provides a large number of predefined materials for all common design purposes, which contain settings for windows. You can use these predefined materials, or modify them to your special designs. You can also create your own materials. If you create a material that should specifically be used only for windows, it is recommended that you name it accordingly; for example, Window - Wood Frame or Window Sill - Marble. For more information, see Creating and Editing Material Definitions on page 599.

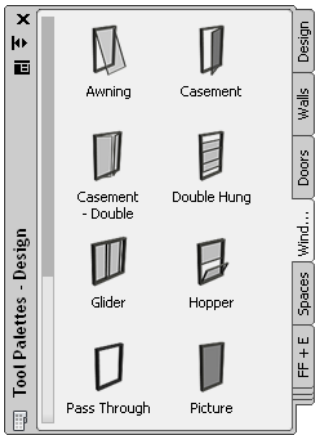
Window Endcaps

Windows that are anchored in a wall can have endcap styles applied to them. The endcap shapes for wall openings are defined in the wall style and are a property of the wall. For information on setting an opening endcap style in a wall, see Working with Wall Endcaps and Opening Endcaps on page 891.

Using Window Tools to Create Windows

Tools provided with AutoCAD Architecture let you quickly place windows by selecting a window tool with a specific window style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can also use window tools to create new windows by applying tool properties to existing door/window assemblies, openings and doors.

Tool palette containing window tools



The following palettes contain one or more window tools:

Tool palette…	Contains…
Design	a window tool for the Standard window style and default settings for other window properties
Windows	a window tool for sample window styles, with default properties appropriate for each window style
Custom tool palettes created by your CAD manager	window tools with window styles and properties that are customized for your projects or office standards

When you place windows using windows tools, you can use the default settings of the tool, or you can change settings for any windows properties that are not controlled by the style.

Creating a Window

Use this procedure to add a new window that has the properties specified in the window tool that you select. To specify settings when you add a window, see Creating a Window with User-Specified Settings on page 1278.

1 Open the tool palette that you want to use, and select a window tool.

If necessary, scroll the palette to display the tool that you want to use.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Window .

2 Select a wall or door and window assembly in which to insert the window, or press *ENTER* to add a freestanding window.

You can move or hide the Properties palette to expose more of the drawing area.

3 Specify the insertion point of the window.

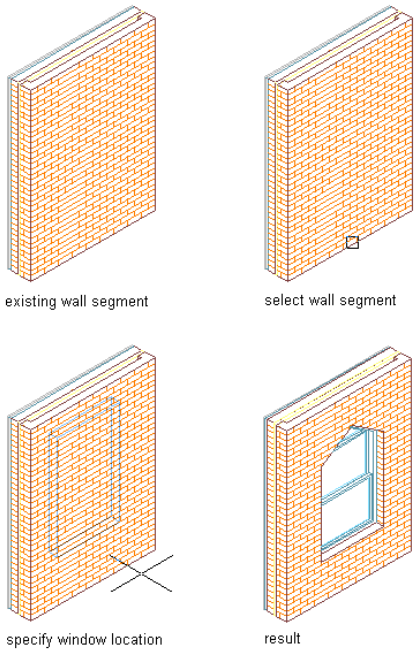
4 Continue adding windows, and press *ENTER*.

Creating a Window with User-Specified Settings

Use this procedure to create any of the following, with settings that you specify:

- Freestanding windows
- Windows in walls

Adding a window to a wall



TIP)To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

1 Open the tool palette that you want to use, and select a Window tool.

If necessary, scroll the tool palette to display the tool you want to use.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Window .

2 On the Properties palette, expand Basic, and expand General.

3 Select a window style.

4 Under Bound Spaces, define if this window can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this window can be used as bounding object for associative spaces.
- No: this window cannot be used as bounding object for associative spaces.
- By style: this window will use the bounding settings from the window style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

5 Expand Dimensions.

6 Specify a window size:

If you want to…	Then…
use a standard window size	click Standard Sizes, and then select a window size.
use a custom window size	enter values for Width and Height.

7 Enter a value for Rise, if applicable to the selected style and window type.

8 Specify where the window width and height are measured to:

If you want to measure to…	Then…
the outside of the window frame	Select Outside of frame for Measure to.
the inside of the window frame	Select Inside of frame for Measure to.

9 Enter a value for Opening percent or Swing angle.

Zero indicates a closed window.

10 Expand Location.

11 If you are placing the window in a wall, specify the position of the window:

If you want to…	Then…
position the window at a specific distance between the edge of the opening and the end of a wall segment	select Offset/Center for Position along wall, and enter a value for Automatic offset.
center the window on a wall segment	select Offset/Center for Position along wall, and specify a point near the center of the wall segment.
position the window anywhere along the wall	click Position along wall, and select Unconstrained.

12 Specify whether you want the window aligned vertically by sill height or by head height:

If you want to align the window…	Then…
by sill height	select Sill for Vertical alignment, and enter a value for Sill height.
by head height	select Head for Vertical alignment, and enter a value for Head height.

13 Specify the insertion point for a freestanding window or a window in a wall:

If you want to insert…	Then…
a freestanding window	press *ENTER*, and specify an insertion point and a rotation angle for the window.
the window in a wall	select the wall and specify an insertion point along the wall.

TIP There are 2 command line options that make the insertion of a window in a specific location easier: You can switch the insertion point of the window from left (default) to center and right by entering **CY** (cycle measure to) once or twice on the command line. You can also measure the insertion point of a window in relation to a specified point in the drawing - for example the frame of a door - by entering **RE** (Reference point on) and then selecting the point from which the distance should be measured.

14 Continue to place windows by selecting window styles and specifying insertion points, or press *ENTER* to end the command.

Creating a Window in a Door and Window Assembly

Use this procedure to insert a window into a door and window assembly.

1 Open the tool palette that you want to use, and select a Window tool.

If necessary, scroll the tool palette to display the tool you want to use.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Window .

2 Select a door and window assembly to insert the window into.

3 Select the grid cell on the door and window assembly into which you want to insert the window.

4 Commence adding the window to the door and window assembly, as described in Inserting a Door or Window into a Door and Window Assembly on page 1139.

Creating a Window from Doors, Door/Window Assemblies and Openings

Use this procedure to convert a door, door/window assembly, or opening to a window that has the properties of the window tool you select. You can edit these properties after creating the window.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a window tool, and click Apply Tool Properties to ➤ Door, Door/Window Assembly, Opening.

3 Select the door or window assembly, opening, or door to convert, and press *ENTER*.

4 Edit the properties of the window in the Properties palette, if needed.

Creating a Window Tool

Use this procedure to create a window tool and add it to a tool palette. You may want to create your own window tools if you are placing multiple windows of specific styles with additional properties that you want to be the same each time you add a window of each type.

For example, you are creating an office floor plan that contains two custom window styles: fixed casement for conference rooms and operable casement for offices. To work efficiently, you can create a window tool for each style. You can then select the appropriate tool to place windows in offices and conference rooms.

You can use any of the following methods to create a window tool:

- Drag a window that has the properties you want to a tool palette.
- Drag a window style from the Style Manager to a tool palette, and then customize the properties of the new tool.

- Copy an existing tool, and then customize the properties of the new tool.
- Drag a tool from a tool catalog in the Content Browser, and then customize the properties of the tool. For information about using the Content Browser to create a tool, see Using Tool Catalog Items on page 122.

1 Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a window in the drawing	select the object, and drag it to the tool palette.
create a tool from a window style in the Style Manager.	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK.
copy a tool in the current palette	right-click the tool, click Copy, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Enter a description of the tool.

8 If you do not want to use the default layer key for windows, select a layer key.

9 If you want to override the default layer name for windows, select a layer override.

10 Select a window style.

11 For Style location, select the drawing file containing the style used for this window, or select Browse and use a standard file selection dialog box to select the file.

12 Under Bound Spaces, define if this window tool can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this window tool can be used as bounding object for associative spaces.
- No: this window tool cannot be used as bounding object for associative spaces.
- By style: this window tool will use the bounding settings from the window style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

13 Expand Dimensions.

14 Specify a window size:

If you want to…	Then…
use a standard window size	click Standard Sizes, and then select a window size.

If you want to…	Then…
use a custom window size	enter values for Width and Height.

15 Specify where the window width and height are measured to:

If you want to measure to…	Then…
the outside of the window frame	Select Outside of frame for Measure to.
the inside of the window frame	Select Inside of frame for Measure to.

16 Enter a value for Rise, if applicable to the selected style and window type.

17 Enter a value for the Opening percent or Swing angle.

Zero indicates a closed window.

NOTE Defining the opening percent in display properties overrides this setting on the Tool Properties palette. For more information, see Specifying the Display Properties of a Window Style on page 1308.

18 Expand Location.

19 Specify the position of the window when it is placed in a wall:

If you want to…	Then…
position the window at a specific distance between the edge of the opening and the end of a wall segment	select Offset/Center for Position along wall, and enter a value for Automatic offset.
center the window on a wall segment	select Offset/Center for Position along wall, and specify a point near the center of the wall segment
position the window anywhere along the wall	click Position along wall, and select Unconstrained.

20 Enter a value for the head height.

21 Enter a value for the sill height.

22 Click OK.

Editing Windows

After you create a window, you can change the size, height, width, rise, and opening. You can also move the window within the wall, flip the hinge or swing, and change the swing opening.

You can change the properties of existing windows in your drawing by changing the window style, changing the dimensions of the window, moving the anchor location of the window, and specifying the endcap conditions of the window.

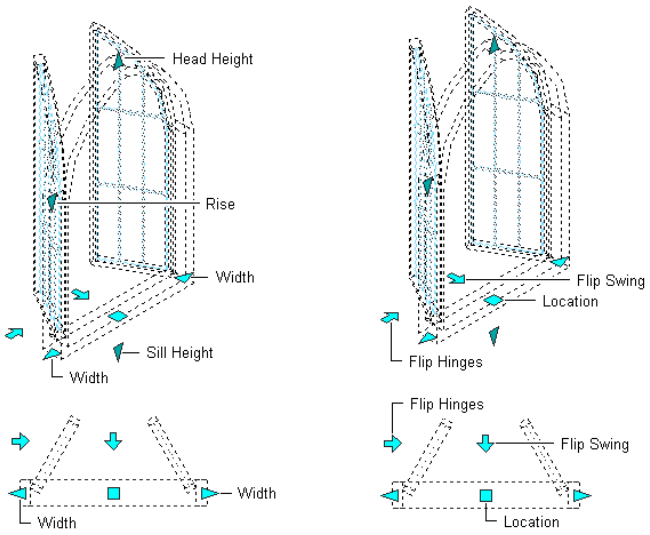
AutoCAD Architecture offers several methods for editing windows:

- You can directly edit windows using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.

- You can change window settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- You can select editing commands from the context menu for a selected window.

Using Grips to Edit Windows

You can use the following grips to modify windows:



Grip	Description	Animation
(Width)	Lets you change the width of a window **NOTE** Initially the grip is set to constrain the sizing to one of the standard values on page 1301 defined for the window style. The *CTRL* key acts as a toggle between standard and custom sizing. **Additional information** A series of tick marks indicates the standard sizes for the selected dimension. As you move the grip, it snaps to each tick mark and displays the measurement at that mark. The size and color of the grip tick marks indicate whether setting a standard value for the dimension will result in a standard window size. For example, if the height of the window is set to a non-	*Changing a Window Width with Grip Animation*

Grip	Description	Animation
	standard value, then even if you set the window width to a standard value for that window's style, the window is still not a standard size. Long grey tick marks indicate that a standard size is possible; short red marks indicate that another dimension is already set to a non-standard value.	
/ (Sill Height/Head Height)	Lets you change the Height of a window. you can choose if you want to change the sill height or the head height.	*Changing the Window Height with Grips Animation*
(Location)	Lets you move a window within a wall **More options for moving a window** ■ Moving a Window Along a Wall on page 1286 ■ Moving a Window Within a Wall on page 1288 ■ Moving a Window to a Different Wall on page 1293 ■ Releasing a Window from a Wall on page 1293	*Changing the Location of a Window with Grips Animation*
(Flip Hinge)	Lets you change the hinge side of the window	*Flipping the Window Hinge Side with a Grip Animation*
(Flip Swing Direction)	Lets you change the swing direction of the window	*Flipping the Window Swing Side with a Grip Animation*
	Rise Rise applies to Peak Pentagon, Arch, and Gothic window shapes. For more information, see Specifying the Design Rules of a Window Style on page 1303.	

Changing the Window Style

Use this procedure to change the style for a window or group of windows.

1. Select one or more windows, and double-click one of them.
2. On the Properties palette, expand Basic, and expand General.
3. Select a window style.

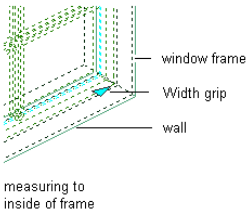
Changing How Window Width is Measured

Use this procedure to change how the width of a window or windows is measured.

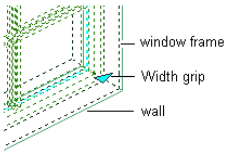
1 Select the windows you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Dimensions.

Specifying window frame measurement



measuring to
inside of frame



measuring to
outside of frame

3 Specify the location to which window width is measured:

If you want to size the windows...	Then...
to the inside frame	select Inside of frame for Measure to.
to the outside frame	select Outside of frame for Measure to.

Changing the Window Swing Angle or Opening Percent

Use this procedure to change the swing angle or opening percent of a window or group of windows.

A window with an opening percent of zero is closed.

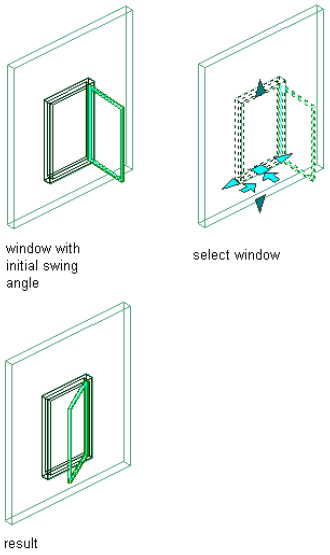
NOTE Defining the opening percent in display properties overrides this setting on the Properties palette. For more information, see Specifying the Display Properties of a Window Style on page 1308.

1 Select the windows you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Dimensions.

3 Enter a value for Swing angle or Opening percent.

Changing a window swing angle



Changing the Vertical Alignment of a Window

Use this procedure to change the vertical alignment of a window or group of windows.

1 Select the windows you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Location.

3 Specify whether you want the window aligned vertically by sill height or by head height:

If you want to align the windows…	Then…
by sill height	select Sill for Vertical alignment, and enter a value for Sill height.
by head height	select Head for Vertical alignment, and enter a value for Head height.

Moving a Window Along a Wall

Use this procedure to change the location of one or more windows along a wall by offsetting the windows from a reference location.

This feature is useful when you want to position a window at a specified distance from another object. For example, you may want to specify an exact distance between a series of windows along a wall.

NOTE If the defect marker appears in the wall after you move a window, the window is too close to other objects in the wall or to the end of the wall for the endcaps to fit. Adjust the position of the window until the defect marker disappears.

1 Select the window you want to move.

2 Click Window tab ➤ Anchor panel ➤ Reposition Along Wall .

A marker indicates the current location within the opening.

3 Specify where to measure the offset from:

If you want to measure the offset…	Then…
from the center of the window	select a point near the center of the window.
from an end of the window	select a point on the end of the window you want to measure from.

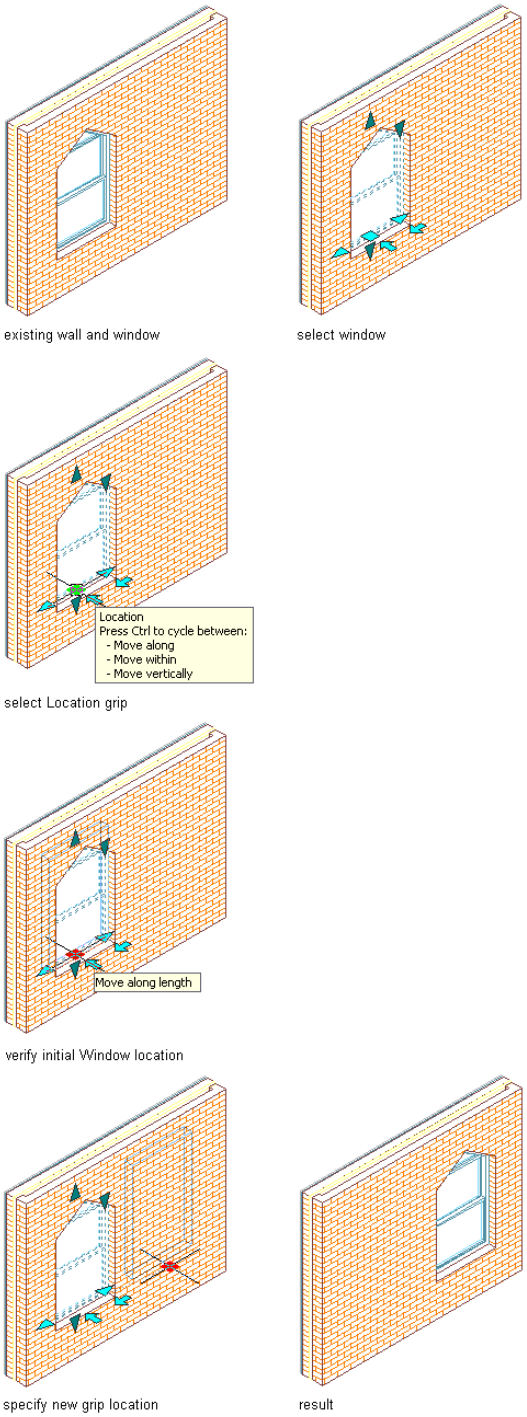
4 Select a point to measure to (the reference point).

You can select a point along the wall.

5 Specify the distance between the points you selected:

If you want to…	Then…
move the window to the reference point	enter 0.
move the window a specified distance from the reference point	enter a value for the offset distance.
specify the distance as a measurement between two points, such as the distance between the centers of two windows that are correctly positioned	select the two points measuring the distance.

Repositioning a window along a wall



Moving a Window Within a Wall

Use this procedure to move one or more windows within a wall by offsetting the windows from a reference location.

This feature allows you to align windows within the thickness of a wall. You can set an offset distance from any point within a wall, or center the windows between the faces of a wall. You can select doors, windows, and openings and reposition them at the same time. If you select more than one object, you can select only one side to offset.

1 Select the windows you want to move.

2 Click Window tab ➤ Anchor panel ➤ Reposition Within Wall .

A marker indicates the current location within the opening. This may be the center of the frame, the interior face of the frame, or the exterior face of the frame.

3 Specify where to measure the offset from:

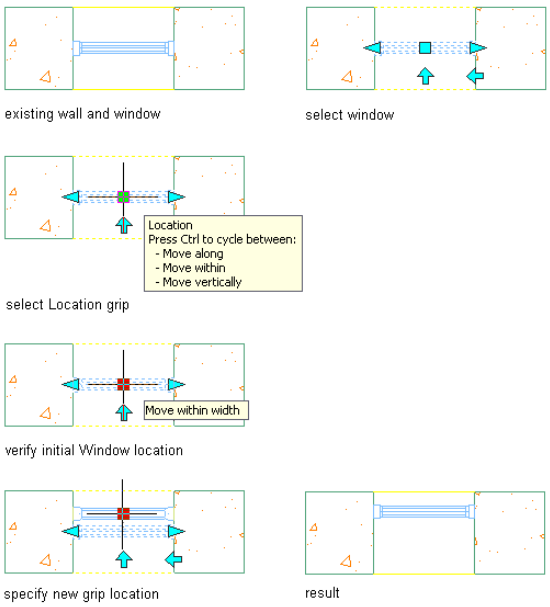
If you want to…	Then…
center the windows between the faces of the wall	select a point near the center of the window.
offset the windows from the interior or exterior face	select a point on the side of the face you want to measure from.

4 Select a point to measure to.

5 Specify the offset distance from the selected point:

If you want to…	Then…
center the windows between the faces of the wall	use the Midpoint osnap to select the midpoint of the end of the wall.
move the windows to the reference point	enter 0.
move the windows a specified distance	enter a value for the offset distance.
specify the distance as a measurement between two points	select the two points measuring the distance.

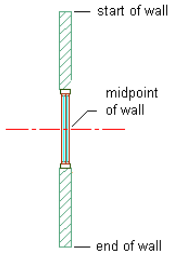
Repositioning a window within a wall



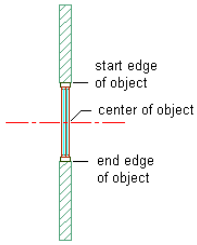
Using Anchors to Change the Horizontal Position of a Window

Use this procedure to change the horizontal position of windows along a wall to which the windows are anchored.

Window position along the X axis parameters



x-axis wall parameters



x-axis window parameters

1 Select the windows you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Location.

3 Click Anchor.

4 Select the reference point for the anchor along the *X* axis:

If you want to…	Then…
use the start of the wall as the reference point	under Position Along (X), select Start of wall for From.
use the midpoint of the wall as the reference point	under Position Along (X), select Midpoint of wall for From.
use the end of the wall as the reference point	under Position Along (X), select End of wall for From.

5 Enter the distance from the reference point at which to place the windows.

Use a negative value to measure from endpoint to start point.

6 Select the position of the windows to measure to:

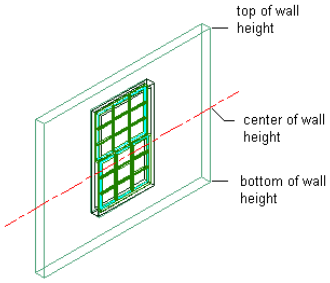
If you want to measure to…	Then…
the start edge of the windows	select Start Edge of object for To.
the center of the windows	select Center of object for To.
the end edge of the windows	select End Edge of object for To.

7 Click OK.

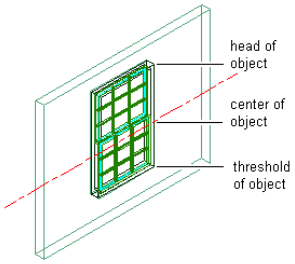
Using Anchors to Change the Vertical Position of a Window

Use this procedure to change the vertical position of windows in a wall to which the windows are anchored.

Window position along the Z axis parameters



z-axis wall parameters



z-axis window parameters

1 Select the windows you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Location.

3 Click Anchor.

4 Select the reference point for the anchor along the *Z* axis:

If you want to…	Then…
use the bottom of the wall height as the reference point	under Position Along (Z), select Bottom of wall height for From.
use the center of the wall height as the reference point	under Position Along (Z), select Center of wall height for From.
use the top of the wall height as the reference point	under Position Along (Z), select Top of wall height for From.

5 Enter the distance from the reference point at which to place the windows.
Use a negative value to measure from endpoint to start point.

6 Select the position of the windows to measure to:

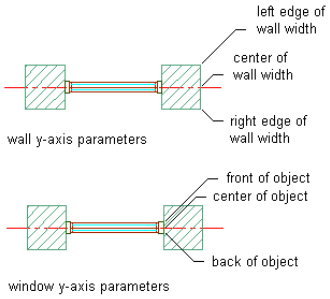
If you want to measure to…	Then…
the bottom of the windows	select Sill (Bottom) of object for To.
the center of the windows	select Center of object for To.
the top of the windows	select Head (Top) of object for To.

7 Click OK.

Using Anchors to Change the Position of a Window Within a Wall

Use this procedure to change the position of windows horizontally within a wall to which the windows are anchored.

Window position along the Y axis parameters



1 Select the windows you want to change, and double-click one of them.
2 On the Properties palette, expand Basic, and expand Location.
3 Click Anchor.
4 Select the reference point for the anchor along the *Y* axis:

If you want to…	Then…
use the left edge of the wall as your reference point	select Left edge of wall width for From.
use the center of the wall as your reference point	select Center of wall width for From.
use the right edge of the wall as your reference point	select Right edge of wall width for From.

5 Enter the distance from the reference point at which to place the windows.
Use a negative value to measure from endpoint to start point.

6 Select the position of the windows to measure to:

If you want to measure to…	Then…
the front of the windows	select Front of object for To.
the center of the windows	select Center of object for To.
the back of the windows	select Back of object for To.

7 Click OK.

Changing the Orientation of a Window to a Wall

Use this procedure to change the vertical orientation of windows in a wall to which the windows are anchored.

1 Select the windows you want to change, and double-click one of them.
2 On the Properties palette, expand Basic, and expand Location.
3 Click Anchor.
4 Enter the X and Z rotation angles of the windows.

5 Indicate if you want to reverse the flip direction of the windows in the X, Y, and Z axes:

If you want to reverse…	Then…
the direction the windows open to	select Flip X.
the side of the wall the windows open to	select Flip Y.
the top and bottom of the windows	select Flip Z.

6 Click OK.

Moving a Window to a Different Wall

Use this procedure to move a window from one wall to another.

1 Select the window you want to move.

2 Click Window tab ➤ Anchor panel ➤ Set .

3 Select the wall to move the window to.

Releasing a Window from a Wall

Use this procedure to release windows from the wall to which they are anchored.

1 Select the windows you want to release.

2 Click Window tab ➤ Anchor panel ➤ Release .

Changing the Opening Endcap Assigned to a Window

Use this procedure to change the opening endcap style assigned to windows.

NOTE Each opening endcap style is generally created for use with a specific wall style. Changing the opening endcap style used for individual windows may cause the wall to display a defect marker.

For more information, see Working with Wall Endcaps and Opening Endcaps on page 891.

1 Select the windows whose endcaps you want to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand Location.

3 Click Window tab ➤ Endcap panel ➤ Opening Endcap drop-down.

4 Select the opening endcap style.

Changing the Location of a Freestanding Window

Use this procedure to relocate a freestanding window by changing the coordinate values of its insertion point. The window also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the window are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the window by aligning its normal with another axis. You can also rotate the window on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1 Double-click the window you want to move.

2 On the Properties palette, expand Basic, expand Location, and click Additional Information.

3 In the Location dialog box, specify the window location:

If you want to…	Then…
relocate the window	enter new coordinate values under Insertion Point.
locate the window on the *XY* plane	make the normal of the window parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the window on the *YZ* plane	make the normal of the window parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the window on the *XZ* plane	make the normal of the window parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the window	enter a new value for Rotation Angle.

4 Click OK.

Changing the Cut Plane Setting for a Window

Use this procedure to specify whether a selected window will use the cut plane of the containing object when anchored to that object in the current display representation. Note that cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Cut Plane.

7 For Use cut plane of containing object when anchored, select Yes or No.

Specifying the Display of Muntins Blocks for a Window

Use this procedure to specify the display of muntins for an individual window in model and elevation views.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and for Muntins, click (the number in parentheses indicates the number of muntins blocks currently attached to the window).

7 If you want to turn off the display of muntins blocks for this window without removing them, select Disable Muntins Blocks.

8 Specify whether to add, edit, or remove a block:

If you want to…	Then…
add a new muntins block	click Add.
edit an existing muntins block	select the block to edit, and click Edit.
remove an existing muntins block	select the block, click Remove, and click OK.

9 For Name, enter a name for the new block or edit the existing one as applicable.

10 The rest of the parameters on the Muntins Block worksheet vary according to the type of window and type of pattern selected for the lights. For detailed instructions on specifying these parameters for a particular pattern, refer to the pattern-specific topic as listed under Creating Muntins in a Window Style on page 1314. When the worksheet parameters are set as desired, click OK.

11 If you want your changes to apply only to the current display representation, clear Automatically Apply to Other Display Representations. (If this option is not selected, you will be prompted to identify the other display representations to which you want your changes applied.

12 Click OK.

Specifying the Display of Sills for a Window

Use this procedure to change the sill dimensions for a window in the Sill Plan display representation.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, select Sill Plan.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Sill dimensions.

7 On the Sill Dimensions worksheet, enter the sill extension and depth dimensions.

Sill components A and B are for the outside of the opening. Sill components C and D are for the interior side.

8 Click OK.

9 On the Display component drop-down list, click the light bulb icons for individual sill components to turn visibility on or off as desired.

You can also access and modify sill dimensions and visibility settings through the window's context menu, as follows:

1 Select the window you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

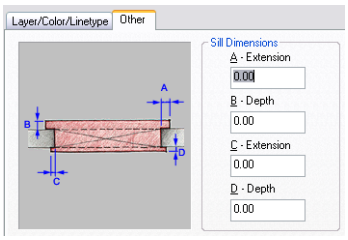
3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.

Window sill dimensions



6 Under Sill Dimensions, enter the sill extension and depth dimensions.

7 On the Layer/Color/Linetype tab, under Visible, click the icons to turn on visibility for individual sill display components as necessary.

8 Click OK twice.

Reversing the Handing for a Window in an Elevation View

Use this procedure to specify whether to reverse the current handing of a selected window in the Elevation display representation.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced.

7 For Reverse handing, select Yes or No.

Specifying the Display of Frames for a Window

Use this procedure to change the frame display for a window in the Plan High Detail display representation.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, select Plan High Detail.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Frame display.

7 On the Frame Display worksheet, under Type, select either Standard or Offset.

8 For A-Extension, enter a value to indicate the distance you want the frame to extend.

9 Click OK.

You can also access and modify frame display settings through the window's context menu, as follows:

1 Select the window you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the Plan High Detail display representation, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Frame Display tab.

6 Adjust the settings as desired, and click OK twice.

Specifying the Display of Custom Block Components of a Window

Use this procedure to specify the display of custom block components for an individual window in a particular display representation. If you are going to use custom graphics for a new component, draw the component and save it as a block before you start this procedure.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all windows in the drawing, select Drawing default setting. To apply changes to all windows of this style, select Window Style:<style name>. For more information on styles, see Window Styles on page 1299.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and for Custom block display, click (the number in parentheses indicates the number of blocks currently attached to the window).

7 If you want to turn off the display of custom blocks for this window without removing them, select Disable Custom Blocks.

8 Specify whether to add, edit, or remove a block component:

If you want to…	Then…
add a new block component	click Add, and then click Select Block, select the block, and click OK.
edit an existing block component	select the component to edit, and click Edit.
remove an existing block component	select the block, click Remove, and click OK.

9 Specify whether you want to scale to fit the block component to the object by width, depth, and height, or to lock the *XY* ratio:

If you want to…	Then…
set the block scale to the width of the object	select Width.
set the block scale to the depth of the object	select Depth.
set the block scale to the height of the object	select Height.
scale the whole block equally, so that one direction is scaled to fit another of the scale criteria	select Lock to XY Ratio.
scale the block to its original size	clear all options under Scale to Fit.

10 Specify whether to mirror the block in the X,Y, or Z direction:

If you want to create a mirror of the block…	Then…
in the *X* direction	select Mirror X.
in the *Y* direction	select Mirror Y.
in the *Z* direction	select Mirror Z.

11 Specify the *X*, *Y*, and *Z* location of the insertion point.

12 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

13 Specify whether the component is for the window frame or window glass component:

NOTE Both frame and glass components are not available in all display representations.

If you want to add the block…	Then…
to the inside or outside of the frame	select Frame Component, and select either Outside or Inside.
to all window glass components or a single window glass component	click Window Component, and click either All or Single. If you select Single, enter the component number. **NOTE** If you specified Depth for Scale to Fit, the depth is scaled to the glass thickness. You can scale to the window panel thickness instead by selecting Scale Depth to Panel Thickness.

14 Click OK twice.

Attaching Hyperlinks, Notes, and Files to a Window

Use this procedure to enter notes and attach reference files to a window. You can also edit notes and edit or detach reference files from a window.

1 Double-click the window you want to attach notes or files to.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 To add a note, click next to Notes, enter text, and click OK.

5 Click next to Reference documents, and then attach, detach, or edit a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Window Styles

A window style is a group of properties assigned to a window that determines the appearance and other characteristics of the window.

You can use window styles to represent standard window types for specific jobs and drawings or for office standards. When you create or modify a window style, the windows using the style have the settings and characteristics of the style. Templates provided with AutoCAD Architecture contain window styles for many standard windows. You can create your own window styles and window types for custom windows.

Each window you create has a window style associated with it. The window style controls window properties such as dimensions, design rules, and standard sizes for windows. Style control means that when you change a window style, the windows in the current drawing that use that style change globally.

The design rules are window-style properties that determine the predefined or custom shape and window type. Window shapes such as Arch, Gothic, Rectangular, and Round are the geometric configurations of the window. Custom shapes, such as Hinged-Single-Full Lite, are available for particular window types, for example a Single Casement window type. Window types, such as Awning, Pass Through, or Casement, describe window opening characteristics of closure, swing, and hinging.

You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

Creating Tools from Window Styles

You can create a window tool from any window style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any window created with that tool. For more information, see Using Window Tools to Create Windows on page 1277.

Creating a Window Style

Use this procedure to create a window style.

You can create a new style with default style properties, or you can create a new style by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Create a window style:

If you want to create a new style…	Then…
with default properties	right-click Window Styles, and click New.
from an existing style	right-click the window style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new window style, and press *ENTER*.

5 Edit the style properties of your new window style:

If you want to…	Then…
enter a description of the style	click the General tab, and enter a description.
change dimension properties of the style	see Specifying the Dimensions of a Window Style on page 1301.
change the design rules of the style	see Specifying the Design Rules of a Window Style on page 1303.
change the standard window sizes of the style	see Specifying the Standard Sizes of a Window Style on page 1301.
assign materials to the components of the window style,	see Assigning Materials to a Window Style on page 1307 and Turning on Materials for a Window Style on page 1309.
add classifications to a window style	see Adding Classifications to a Window Style on page 1308.
specify the display properties of the style	see Specifying the Display Properties of a Window Style on page 1308.
change the appearance of the display components in the style	see Changing the Layer, Color, and Linetype of Window Components on page 1308.
add custom block components to the style	see Adding Components to a Window Style on page 1310.
turn off components in the style	see Turning Off Components in a Window Style on page 1311.
remove components from the style	see Removing Components from a Window Style on page 1311.
override the opening percentage from the style	see Specifying the Opening Percentage for a Window Style on page 1312.
change the sill from the style	see Specifying the Display of Window Sills in a Window Style on page 1312.
add muntins to the style	see Creating Muntins in a Window Style on page 1314.

If you want to…	Then…
add notes, files, or documents to the style	see Attaching Notes and Files to a Window Style on page 1313.

6 If you want to assign the style to a window tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Window Tool on page 1280.

7 Click OK.

Specifying the Dimensions of a Window Style

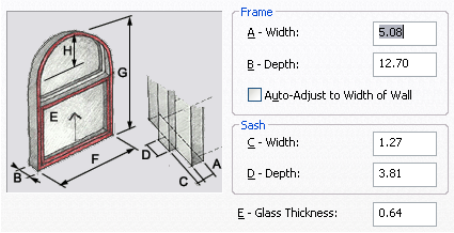
Use this procedure to change the default dimensions of a window style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select the style you want to edit.

4 Click the Dimensions tab.



5 Change dimension values:

If you want to…	Then…
change the frame width and depth	under Frame, enter values for Width and Depth.
set the frame width to the wall thickness	under Frame, select Auto-Adjust to Width of Wall.
change the sash dimensions	under Sash, enter values for Width and Depth.
change the window thickness	enter a value for Glass Thickness.

6 Click OK.

Specifying the Standard Sizes of a Window Style

Use this procedure to create the standard window sizes in a window style.

Standard sizes ensure consistency by allowing designers to select sizes from a predefined list specific to the window style. You can also enter custom sizes when you add or modify individual windows.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select the window style you want to edit.

4 Click the Standard Sizes tab, and add, change, or remove window-size values:

If you want to…	Then…
create standard sizes	click Add . Under Standard Sizes, enter values for Description, Width and Height; if applicable, enter values for Rise and Bottom Sash.
change a size	select the size, and click Edit . Enter new values as needed.
delete a size	select a size, and click Remove .

Description can be used to identify standard window sizes in window schedules. For example, you can specify a manufacturer's size or model code for Description.

Rise applies to Arch, Gothic, and Peak Pentagon window shapes. Bottom Sash applies to Uneven Single Hung and Uneven Double Hung windows. For more information on window types and shapes, see Specifying the Design Rules of a Window Style on page 1303.

5 Click OK.

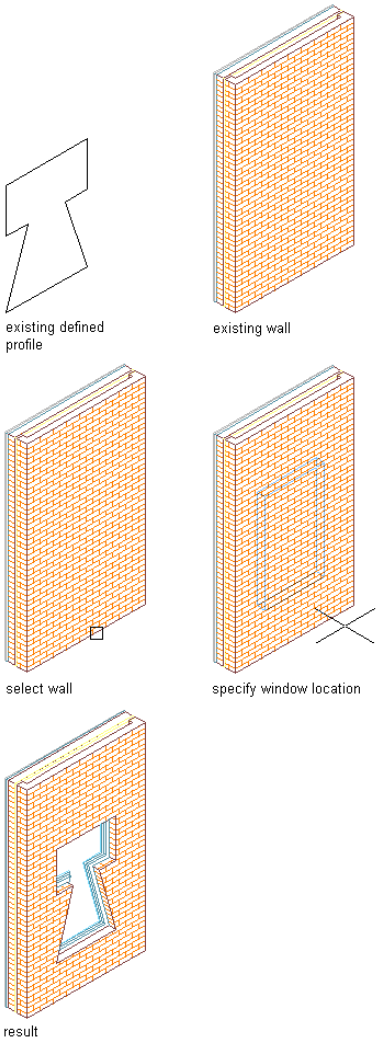
Creating a Custom Window Shape

Use this procedure to create a profile for a custom window shape. You can make custom shapes for windows and apply them to window styles.

The profile is made up of two concentric, closed polylines. The outer polyline, or ring, becomes the window shape, and the inner polyline creates a void for the inside shape of the window frame. You can create multiple voids by adding more inner polylines. The inner polyline must be entirely within the polyline representing the outer shape of the window frame. The polylines are proportional in size and shape to each other and also to the windows created from the window style.

You can draw these polylines anywhere in the drawing and use any convenient scale relative to your final window frame size. One method for sizing the polylines relative to the window is to draw them by snapping to an existing window, and then moving the completed polylines to the side.

Adding a profile-based window to a wall



1 Draw concentric, closed polylines representing the outer and inner lines of the window frame.

2 Select the outer polyline, right-click, and click Convert To ➤ Profile Definition.

3 Enter **a** (Add ring).

4 Select the inner polyline.

5 Specify the insertion point of the profile.

The insertion point is typically the lower-left corner.

6 Enter a name for the profile, and click OK.

To add the profile to a window style, see Specifying the Design Rules of a Window Style on page 1303.

Specifying the Design Rules of a Window Style

Use this procedure to specify the shape and the type of window for a window style.

Window shapes are named geometrical descriptions of a window. You can select predefined and custom window shapes, or create your own shape from profiles. For more information, see Creating a Custom Window Shape on page 1302.

The window type describes the method for opening the window. For example, you can use the Rectangular or Half Round predefined shapes for the Double Casement or Single Hopper window types. Or, you can use a custom Hinged-Single-Full Lite shape for a Single Casement with Muntins.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Window Styles.
3 Select the window style you want to edit.
4 Click the Design Rules tab.
5 Select a window shape:

If you want to…	Then…
use a predefined window shape	under Shape, click Predefined, and select a shape.
use a custom window shape	under Shape, click Use Profile, and select a profile.

6 Select a window type.
7 Click OK.

Replacing the Window Shape in a Window Style

Use this procedure to replace a predefined shape in a door style with a custom shape created from a profile.

1 Select a window that uses the style you want to modify.
2 Click Window tab ➤ Profile panel ➤ Add Profile .
3 Specify the profile to use for the custom shape:

If you want to…	Then…
use a predefined window shape	select a profile for Profile Definition, and click OK. For information about creating a profile, see Creating a Custom Window Shape on page 1302.
use a predefined window shape, but modify it	select a profile for Profile Definition, select Continue Editing, and click OK. For information about modifying the shape, see Editing the Geometry of a Window Style on page 1304.
create a custom shape	select Start from scratch for Profile Definition, enter a name for the new profile, and click OK. For information about modifying the default shape, see Editing the Geometry of a Window Style on page 1304.

Editing the Geometry of a Window Style

Use this procedure to edit the geometry of the profile used to define a window style. You can also add a profile to a window style that does not currently use a profile to define its shape.

1 Add a window that has the style you want to change.

2 Add or edit a profile:

If you want to…	Then…
add an existing profile to the style	select the window, click Window tab ➤ Profile panel ➤ Add Profile . Select the name of the profile, and click OK.
create a profile and add it to the style	select the window, click Window tab ➤ Profile panel ➤ Add Profile . Select Start from scratch for Profile Definition, enter a name for new profile, and click OK. A rectangular profile is created for you to edit to define the required geometry.
edit the existing profile for the style	select the window, click Window tab ➤ Profile panel ➤ Edit In Place .

3 If prompted that the profile is not drawn to size, click Yes.

The area of the window defined by the profile is selected and hatched in the drawing.

NOTE After you perform an editing task, you may need to select the profile again to perform another editing task.

4 Edit the profile:

If you want to…	Then…
change the shape of the perimeter of the profile or its ring	select the profile, and use edge and vertex grips to adjust the shape. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.
add vertices to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
remove vertices from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click.

If you want to…	Then…
replace an existing ring of the profile with new geometry	select the profile, click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.

5 Save or discard the changes:

If you want to…	Then…
restore the profile to its original shape	select the profile and click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current profile	select the profile, and clickEdit In Place tab ➤ Edits panel ➤ Finish . The window style uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.
save the changes to a new profile definition	select the profile, and click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new profile definition, and click OK. The window uses the new profile to define its geometry. Any windows of this style are updated with the new geometry. Other styles or objects that use the original profile are not affected.

About Window Display Components and Materials

A window object consists of a number of components whose display properties can be determined by a material assigned to each component.

When you assign materials to a window, you assign one material to each display component of the window. For example, you assign a wood material to the frame and a glass material to the window glass.

If you want to use the display properties of the window object or window style instead of using material display properties, you can turn off the material assignments in the display properties of the window or the window style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in Plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their description, see Material Components and Display Properties on page 585.

The following table lists all window components that can be displayed using materials assigned to them, and identifies the material component of each window component.

Window Component	Material Component
Plan, Plan High Detail, Reflected	
Frame	LInework

Window Component	Material Component
Sash	LInework
Glass	Linework
Plan Low Detail	
Window	Linework
Model	
Frame	3D Body
Sash	3D Body
Glass	3D Body
Elevation	
Frame	2D Section/Elevation Linework
Sash	2D Section/Elevation Linework
Glass	2D Section/Elevation Linework

Assigning Materials to a Window Style

Use this procedure to assign materials to the individual components of a window style. When you assign materials to window components, the components use the display properties of the material. For more information, see About Window Display Components and Materials on page 1306.

You can specify the materials used to display the following components of a window style:

- Frame
- Sash
- Glass
- Muntin

NOTE If a material assignment does not determine the display properties of a window component, you can change the display properties of the window style as described in Specifying the Display Properties of a Window Style on page 1308.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Window Styles.
3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation in which you want changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Layer/Color/Linetype tab.

8 Select By Material for any component to which you want to assign a material, and click OK.

If the setting for By Material is not available, the display of this component cannot be determined by a material.

9 Click the Materials tab.

10 Click the component you want to change, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

11 Click OK.

Adding Classifications to a Window Style

Use this procedure to specify classifications for any classification definition applied to a window style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select the style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to window styles.

5 For each classification definition, select the classification you want to apply to the current window style.

6 Click OK.

Specifying the Display Properties of a Window Style

In most cases, you want the appearance of windows that belong to the same style to be consistent throughout a drawing. To achieve this, you specify the display properties of the windows in each window style:

- The layer, color, and linetype of window components
- The hatching used with each component
- The cut plane height and the display of components relative to the cut plane
- Other specific window display information, such as window rise

Changing the Layer, Color, and Linetype of Window Components

Use this procedure to change the display properties of the window style:

- Visibility (display component is on or off)
- By material (material assigned to the display component determines its layer properties)

- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE If a material assignment determines the properties of components in the window style, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Assigning Materials to a Window Style on page 1307.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation in which you want changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select the component to change, and select a different setting for the property.
9. Click OK.

Turning on Materials for a Window Style

Use this procedure to turn on material assignments for individual display representations in a window style.

For information on creating and assigning materials, see About Window Display Components and Materials on page 1306.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation in which you want changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for each component you want to be controlled by the material. The ByMaterial checkbox is unavailable for components that cannot be assigned a material.

   When you select By Material for a display component, all other settings in the dialog are greyed out. The display properties are now taken from the material definition, so you can no longer set them directly in the display properties of the window style.
9. Click OK.

Using Custom Blocks to Create Window Components

You can add custom blocks for components, such as window hardware, to the display components or to replace the default display components. For example, you can replace a simple window frame with a custom

window frame containing shutters in which you want the custom component to appear. You can have a different custom block for each display representation.

When you add a custom block, you can specify several rules for positioning and scaling the new component. Each custom block also appears in the display properties component list so that you can control its layer, color, and linetype. For more information on adding custom blocks, see Adding Components to a Window Style on page 1310.

If you create a custom block from mass elements, you can use the material assignments of the mass elements to determine the display properties of the custom block.

Be sure to set the properties of the objects used to create your custom blocks to ByBlock. Otherwise, you cannot control these objects through the display properties. For more information about ByBlock, see "Work with Layers" in AutoCAD Help.

Adding Components to a Window Style

Use this procedure to add or edit custom block components in the display representation of window styles.

1. Create a block for the component to add to the window style.

   Create the block in the same plane as the window that you use to represent the style. For more information about custom blocks, see Using Custom Blocks to Create Window Components on page 1309.

2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects, and expand Window Styles.
4. Select the style you want to edit.
5. Click the Display Properties tab.
6. Select the display representation in which you want changes to appear, and select Style Override.
7. If necessary, click .
8. Click the Other tab.
9. Specify whether to add or edit a block component:

If you want to…	Then…
add a new block component	click Add, and then click Select Block.
edit an existing block component	select the component to edit, and click Edit.

10. Select the block to use, and click OK.
11. Specify whether you want to scale to fit the block component to the object by width, depth, and height, or to lock the *XY* ratio:

If you want to…	Then…
set the block scale to the width of the object	select Width.
set the block scale to the depth of the object	select Depth.
set the block scale to the height of the object	select Height.
scale the whole block equally, so that one direction is scaled to fit another of the scale criteria	select Lock to XY Ratio.
scale the block to its original size	clear all options under Scale to Fit.

12 Specify whether to mirror the block in the X,Y, or Z direction:

If you want to create a mirror of the block…	Then…
in the *X* direction	select Mirror X.
in the *Y* direction	select Mirror Y.
in the *Z* direction	select Mirror Z.

13 Specify the *X*, *Y*, and *Z* location of the insertion point.

14 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

15 Specify whether the component is for the window frame or window glass component:

If you want to add the block…	Then…
to the inside or outside of the frame	click Frame Component, and click either Outside or Inside.
to all window glass components or a single window glass component	click Window Component, and click either All or Single. If you select Single, enter the component number. **NOTE** If you specified Depth for Scale to Fit, the depth is scaled to the glass thickness. You can scale to the window panel thickness instead by selecting Scale Depth to Panel Thickness.

16 Frame and Glass components are not available in some display representations.

Click OK three times.

Turning Off Components in a Window Style

Use this procedure to turn off custom blocks in a window style.

You can turn off the display of component blocks without removing them from the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation in which you want to turn off the display of the window component, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

8 Select Disable Custom Blocks.

9 Click OK.

Removing Components from a Window Style

Use this procedure to remove components from a window style.

Removing component blocks from a window style deletes them from the style.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation in which you want to remove the window component, and select Style Override.
6. If necessary, click .
7. Click the Other tab.
8. Select the component to remove, and click Remove.
9. Click OK.

Specifying the Opening Percentage for a Window Style

Use this procedure to override the opening percentage in the display representation of a window style. For example, you can specify that a window is displayed closed in model and elevation representations, but open in plan representations.

NOTE This setting overrides other window opening percent settings. If the opening percent is specified here, the opening percent entered on the Properties palette when you add or modify windows is ignored.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation in which you want to override the opening percent, and select Style Override.
6. If necessary, click .
7. Click the Other tab.
8. Select Override Open Percent.
9. Enter a value for the opening percent.
10. Click OK.

Specifying the Display of Window Sills in a Window Style

Use this procedure to change the window sill dimensions in the Sill Plan display representation.

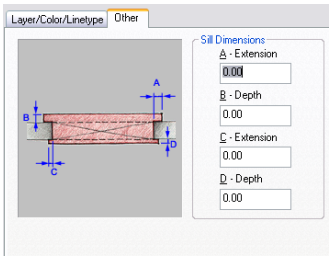
You must use a display representation for a window that has a sill. You can turn on the Sill Plan display representation in addition to the Plan display representation.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select Sill Plan for Display Representations, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

Window Sill Dimensions



8 Under Sill Dimensions, enter the sill extension and depth dimensions.

Sill components A and B are for the swing or outside of the window. Sill components C and D are for the interior side.

9 If you want to use the cut plane of the wall for anchored windows, instead of using the cut plane of the window, select Use Cut Plane of Containing Object when Anchored.

10 Click the Layer/Color/Linetype tab.

11 Under Visible, click the icons to turn on visibility.

12 Click OK twice.

Defining a Window Style as Bounding for Associative Spaces

Use this procedure to define a window style that can bound associative spaces.

When a window style is set as bounding, by default all windows that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the window style in an individual window, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select a window style.

4 Click the General tab.

5 Select the checkbox for Objects of this style may act as a boundary for associative spaces.

6 Click OK.

Attaching Notes and Files to a Window Style

Use this procedure to enter notes and attach reference files to a window style. You can also edit reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Window Styles.

3 Select the style you want to edit.

4 Click the General tab.

5 To add a description to the window, enter the description under Description.

6 Click Notes.

7 To add or edit a note, click the Notes tab, and enter the note.

8 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK.

Creating Muntins in a Window Style

Window muntins are secondary framing members that hold multiple panes of glass in a window sash. AutoCAD Architecture provides an easy way to create muntins with different layout patterns.

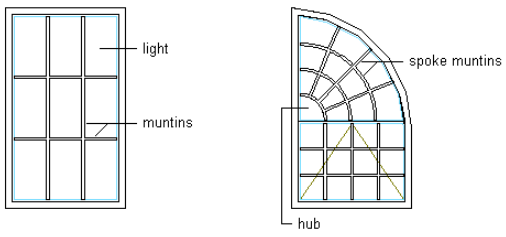
Window muntins are available in several patterns that you can customize into many different styles:

- Rectangular
- Diamond
- Prairie 9 Lights
- Prairie 12 Lights
- Starburst
- Sunburst
- Gothic

Starburst and Sunburst patterns are a combined-rectangular pattern with a half-round or quarter-round spoked top and can be used for half- and quarter-round as well as rectangular muntins. Gothic is similar but has a gothic muntin pattern. The other patterns are primarily rectangular but fit into half-round window sash.

You can make custom shapes for window muntins by creating profiles from polylines and adding them to a new window style. For information about creating profiles and adding them to a window style, see Creating a Custom Window Shape on page 1302.

Window muntin components



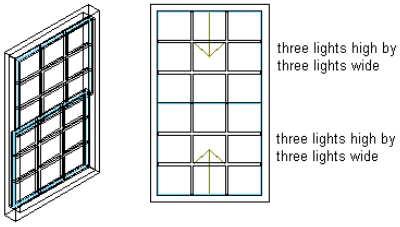
Adding Rectangular Muntins to a Window Style

Use this procedure to add rectangular muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can apply the rectangular pattern to all window shapes and window types except Pass Through.

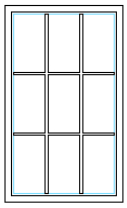
Specifying rectangular pattern muntins



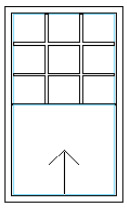
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Muntins tab.
8. Click Add.
9. Enter a name for the muntins block.
10. If the window style contains multiple sash, specify whether you want muntins applied to the Top, All, or a Single sash component in the window:

If you want to attach muntins to…	Then…
the top sash only	under Window Pane, select Top. Top also applies to single sash.
all sash	under Window Pane, select Other, and select All.
an individual sash component	under Window Pane, select Other. Select Single, and specify the index number for window sash. Sash is indexed counterclockwise, starting from the lower left corner.

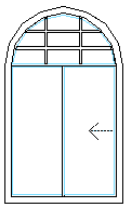
Specifying rectangular muntins for top sash



single pane treated as top pane

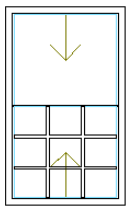


top pane in single-hung window

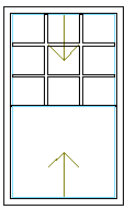


top pane in glider window

Specifying rectangular muntins for an individual sash component



single sash index 1



single sash index 2

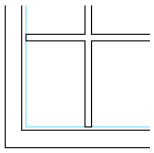
11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

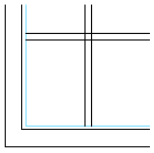
13 Clean up the muntin intersections:

If you want to convert…	Then…
the muntin intersections to corners	under Muntin, select Clean Up Joints.
all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying rectangular muntin cleanup joints



cleanup muntin joints on



cleanup muntin joints off

14 Under Lights, select Rectangular for Pattern.

15 Enter a value for Lights High to specify the number of light rows in the vertical direction.

16 Enter a value for Lights Wide to specify the number of light columns in the horizontal direction.

17 Click OK.

18 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

19 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

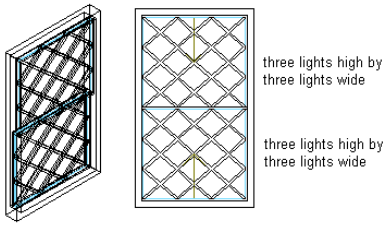
Adding Diamond Muntins to a Window Style

Use this procedure to add diamond muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can apply the diamond pattern to all window shapes and window types except Pass Through.

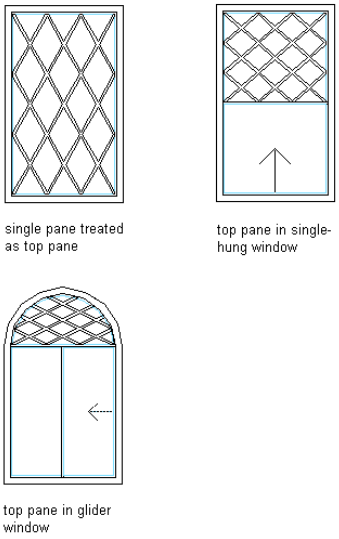
Specifying diamond pattern muntins



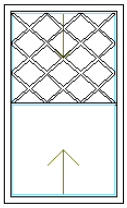
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Window Styles.
3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Muntins tab.
8 Click Add.
9 Enter a name for the muntins block.
10 If the window style contains multiple sash, specify whether you want muntins applied to the Top, All, or a Single sash component in the window:

If you want to attach muntins to…	Then…
the top sash only	under Window Pane, select Top. Top also applies to single sash.
all sash	under Window Pane, select Other, and select All.
an individual sash component	under Window Pane, select Other. Select Single, and specify the index number for window sash. Sash is indexed counterclockwise, starting from the lower left corner.

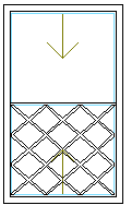
Specifying diamond muntins for top sash



Specifying diamond muntins to an individual sash component



single sash index 1



single sash index 2

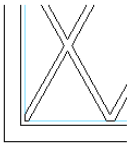
11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

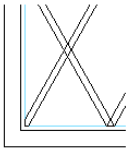
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying diamond muntin cleanup joints



cleanup muntin joints on



cleanup muntin joints off

14 Under Lights, select Diamond for Pattern.

15 Enter a value for Lights High to specify the number of light rows in the vertical direction.

16 Enter a value for Lights Wide to specify the number of light columns in the horizontal direction.

17 Click OK.

18 Add additional muntins:

If you want to add muntins to …	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

19 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

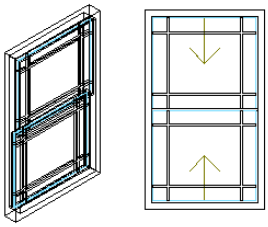
Adding Prairie-9 Lights Muntins to a Window Style

Use this procedure to add prairie-9 lights muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can apply the prairie-9 lights pattern to all window shapes and window types except Pass Through.

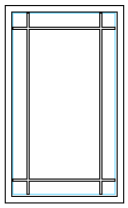
Specifying prairie-9 lights pattern muntins



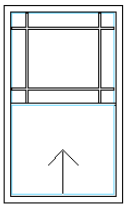
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Muntins tab.
8. Click Add.
9. Enter a name for the muntins block.
10. If the window style contains multiple sash, specify whether you want muntins applied to the Top, All, or a Single sash component in the window:

If you want to attach muntins to…	Then…
the top sash only	under Window Pane, select Top. Top also applies to single sash.
all sash	under Window Pane, select Other, and select All.
an individual sash component	under Window Pane, select Other. Select Single, and specify the index number for window sash. Sash is indexed counterclockwise, starting from the lower left corner.

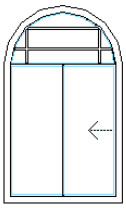
Specifying prairie-9 lights muntins for top sash



single pane treated as top pane

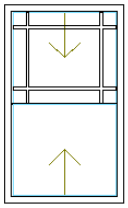


top pane in single-hung window

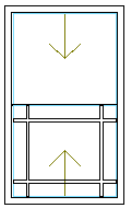


top pane in glider window

Specifying prairie-9 lights muntins to an individual sash component



single sash index 1



single sash index 2

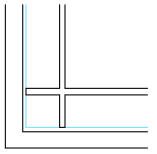
11 Enter a value for the width of all muntins.

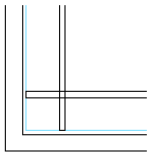
12 Enter a value for the depth of all muntins.

13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying prairie-9 lights muntin cleanup joints



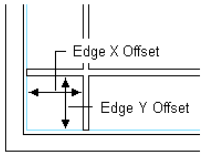


14 Under Lights, select Prairie-9 Lights for Pattern.

15 Enter a value for Edge X Offset to specify the horizontal distance of the muntins from the edges of the pane.

16 Enter a value for Edge Y Offset to specify the vertical distance of the muntins from the edges of the pane.

Specifying prairie-9 lights pattern muntin edge X and Y offsets



17 Click OK.

18 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

19 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

Adding Prairie-12 Lights Muntins to a Window Style

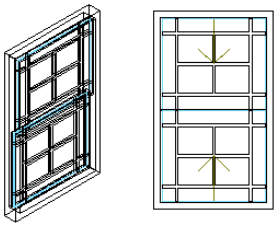
Use this procedure to add prairie-12 lights muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the

muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can apply the prairie-12 lights pattern to all window shapes and window types except Pass Through.

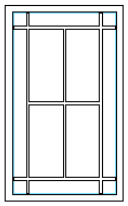
Specifying prairie-12 lights pattern muntins



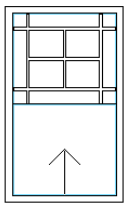
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Muntins tab.
8. Click Add.
9. Enter a name for the muntins block.
10. If the window style contains multiple sash, specify whether you want muntins applied to the Top, All, or a Single sash component in the window:

If you want to attach muntins to…	Then…
the top sash only	under Window Pane, select Top. Top also applies to single sash.
all sash	under Window Pane, select Other, and select All.
an individual sash component	under Window Pane, select Other. Select Single, and specify the index number for window sash. Sash is indexed counterclockwise, starting from the lower left corner.

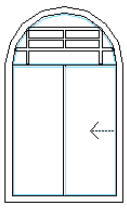
Specifying prairie-12 lights muntins for top sash



single pane treated as top pane

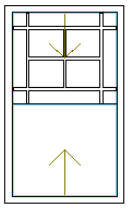


top pane in single-hung window

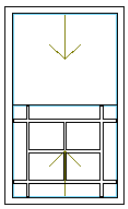


top pane in glider window

Specifying muntins to an individual sash component



single sash index 1



single sash index 2

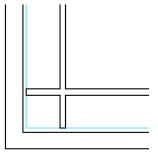
11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

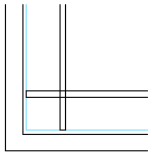
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying muntin cleanup joints



cleanup muntin joints on



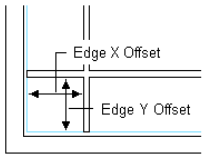
cleanup muntin joints off

14 Under Lights, select Prairie-12 Lights for Pattern.

15 Enter a value for Edge X Offset to specify the horizontal distance of the muntins from the edges of the pane.

16 Enter a value for Edge Y Offset to specify the vertical distance of the muntins from the edges of the pane.

Specifying prairie-12 lights pattern muntin edge X and Y offsets



17 Click OK.

18 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

19 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

Adding Starburst Muntins to a Window Style

Use this procedure to add starburst muntins to a window style.

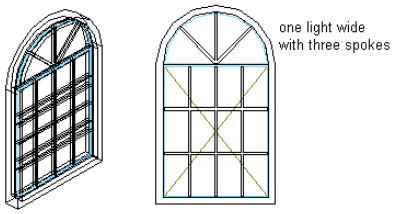
You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the

muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can add the starburst pattern only to the top window sash. You can apply the starburst pattern to window shapes with a round, half round, or quarter round top.

You can apply the starburst pattern to the following window types: awning, single hopper, single transom, vertical pivot, horizontal pivot, double hung, glider, single hung, single casement, and picture.

Specifying starburst pattern muntins



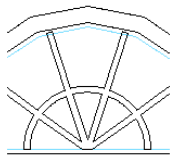
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Muntins tab.
8. Click Add.
9. Enter a name for the muntins block.
10. Under Window Pane, select Top.

NOTE The Starburst pattern is available only when Top is selected for Window Pane.

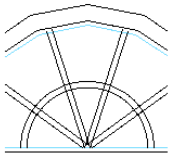
11. Enter a value for the width of all muntins.
12. Enter a value for the depth of all muntins.
13. Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying starburst muntin cleanup joints



cleanup muntin joints on



cleanup muntin joints off

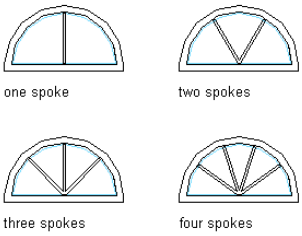
14 Under Lights, select Starburst for pattern.

15 Enter a value for Lights High to specify the number of light rows in a vertical direction.

16 Enter a value for Lights Wide to specify the number of panes in the radial direction.

17 Enter a value for Spokes to specify the number of radial muntin spokes.

Specifying number of spokes for starburst muntins



18 Click OK.

19 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

20 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

Adding Sunburst Pattern Muntins to a Window Style

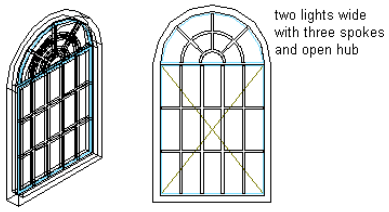
Use this procedure to add sunburst muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can add the sunburst pattern only to the top window sash. You can apply the sunburst pattern to window shapes with a round, half round, or quarter round top.

You can apply the sunburst pattern to the following window types: awning, single hopper, single transom, vertical pivot, horizontal pivot, double hung, glider, single hung, single casement, and picture.

Specifying sunburst pattern muntins



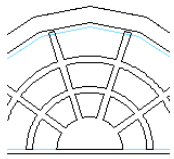
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Muntins tab.
8. Click Add.
9. Enter a name for the muntins block.
10. Under Window Pane, select Top.

NOTE The Sunburst pattern is available only when Top is selected for Window Pane.

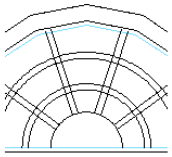
11. Enter a value for the width of all muntins.
12. Enter a value for the depth of all muntins.
13. Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying sunburst muntin cleanup joints



cleanup muntin joints on



cleanup muntin joints off

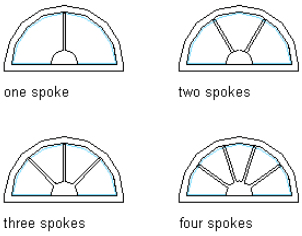
14 Under Lights, select Sunburst for Pattern.

15 Enter a value for Lights High to specify the number of light rows in a vertical direction.

16 Enter a value for Lights Wide to specify the number of panes in the radial direction.

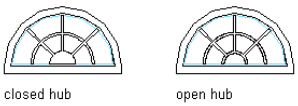
17 Enter a value for Spokes to specify the number of radial muntin spokes.

Specifying number of spokes for sunburst muntins



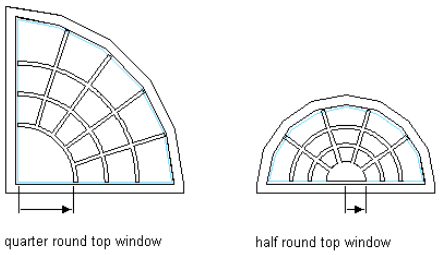
18 Under Hub Style, select Closed for no hub pane, or select Open for a hub pane.

Specifying sunburst muntin open and closed hubs



19 Enter a value for Radius to specify the radius for the hub.

Specifying sunburst muntin hub radius



20 Click OK.

21 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

22 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

Adding Gothic Muntins to a Window Style

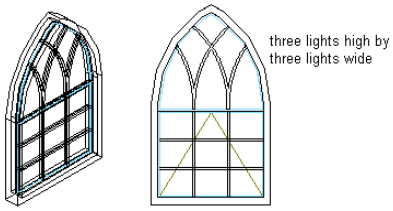
Use this procedure to add gothic muntins to a window style.

You add the muntins by editing the display properties of the window style for a display representation, such as Model or Elevation, where you want the muntins to appear. You can add muntins to display representations individually. You can also add muntins to a single display representation and automatically apply the muntins to all display representations of that window style. You add the muntins block to the window style in the display properties. Each muntins block becomes a display component of the window style.

You can add the gothic pattern only to the top window sash. You can apply the gothic pattern to the following window shapes: round, half round, gothic, peak pentagon, or arch.

You can apply the gothic pattern to the following window types: awning, single hopper, single transom, vertical pivot, horizontal pivot, double hung, glider, single hung, single casement, and picture.

Specifying gothic pattern muntins



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Window Styles.
3 Select the style you want to edit.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Muntins tab.
8 Click Add.
9 Enter a name for the muntins block.
10 Under Window Pane, select Top.

NOTE The Gothic pattern is available only when Top is selected for Window Pane.

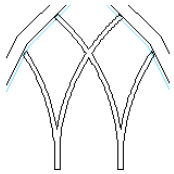
11 Enter a value for the width of all muntins.

12 Enter a value for the depth of all muntins.

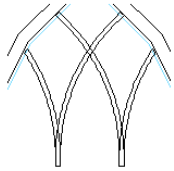
13 Clean up the muntin intersections:

If you want to…	Then…
convert the muntin intersections to corners	under Muntin, select Clean Up Joints.
convert all the muntins to one body with the joints cleaned up	under Muntin, select Convert to Body.

Specifying gothic muntin cleanup joints



cleanup muntin joints on



cleanup muntin joints off

14 Under Lights, select Gothic for Pattern.

15 Enter a value for Lights High to specify the number of light rows in the vertical direction.

16 Enter a value for Lights Wide to specify the number of panes in the horizontal direction. Count the panes across the bottom row.

17 Click OK.

18 Add additional muntins:

If you want to add muntins to…	Then…
another window sash in the window style	repeat this procedure from step 8.
another display representation	click OK, and repeat this procedure from step 5.
all display representations of the selected window style	select Automatically Apply to Other Display Representations and Object Overrides.

19 Click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599

Editing a Window Muntins Block in a Window Style

Use this procedure to edit the muntins settings for a window style.

After you create a muntins block, you can change any of its settings by editing the display properties of the window style for each display representation, such as Model or Elevation. You can edit the muntins for display representations individually. You can also edit the muntins for a single display representation and automatically apply the changes to all display representations of that window style.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and click .
6. Click the Muntins tab.
7. Select the muntins block to edit.
8. Click Edit.
9. Edit any of the settings.

   For more information on the settings, see the window muntins type in Creating Muntins in a Window Style on page 1314.
10. Select Automatically Apply to Other Display Representations and Object Overrides to apply the changes to all display representations of the selected window style.

    Clear this setting to apply the changes to only the selected display representation.
11. When you finish editing the window muntins block in the window style, click OK three times.

After you add a muntins block to a window style, you can assign a material, such as wood, and specify display properties, such as color and linetype, for the muntins. For more information, see About Window Display Components and Materials on page 1306, Specifying the Display Properties of a Window Style on page 1308, and Creating and Editing Material Definitions on page 599 respectively.

Turning Off the Display of Muntins in a Window Style

Use this procedure to turn off the display of muntins in a window style. You can turn off the display of window muntins without removing them from the window.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want to turn off the display of window muntins, and click .
6. Click the Muntins tab.
7. Select Disable Muntins Blocks.
8. Select Automatically Apply to Other Display Representations and Object Overrides to apply the changes to all display representations of the selected window style.

   Clear this setting to apply the changes to only the selected display representation.
9. Click OK twice.

Removing a Window Muntins Block from a Window Style

Use this procedure to remove muntins from a window style. When you remove existing muntins blocks from the window style, they are deleted.

To turn off muntins without deleting them, see Turning Off the Display of Muntins in a Window Style on page 1332.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Window Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want to remove window muntins, and click .
6. Click the Muntins tab.
7. Select the muntins block to remove.
8. Click Remove.
9. Repeat steps 7 and 8 to remove multiple muntins blocks.
10. Select Automatically Apply to Other Display Representations and Object Overrides to apply the changes to all display representations of the selected window style.

    Clear this setting to apply the changes to only the selected display representation.
11. When you finish removing muntins blocks from the window style, click OK twice.

Openings

25

An opening is an AEC object that interacts with walls to represent an opening of any size at any elevation. You can also add openings as freestanding objects.

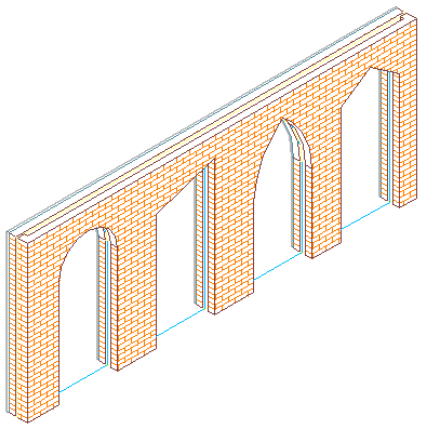
Openings

An opening is an AEC object that interacts with walls to represent an opening of any size at any elevation. You can also add openings as freestanding objects.

Opening Shapes

When you add an opening to a drawing, you can select from a number of predefined shapes, such as rectangular, half-round, oval, or arch. You can also create openings with custom shapes using profiles to define the geometry of the opening.

Examples of predefined shapes for openings



Anchoring Openings

After you place an opening in a wall, the opening is constrained to the object and cannot move outside it.

Openings can also be anchored to specific locations in walls, so that when the wall moves or changes size, the location of the opening in that object remains constant.

Opening Endcaps

Openings that are anchored in a wall can have endcap styles applied to them. The endcap shapes for wall openings are defined in the wall style and are a property of the wall. For information on setting an opening endcap style in a wall, see Working with Wall Endcaps and Opening Endcaps on page 891.

Opening Dimensions

All openings have height and width. The rise dimension depends on the opening shape. Rise is the height from the top of the rectangular portion of an opening to the peak of the opening for gothic, arch, peak pentagon, and trapezoid shapes.

Vertical Alignment of Openings

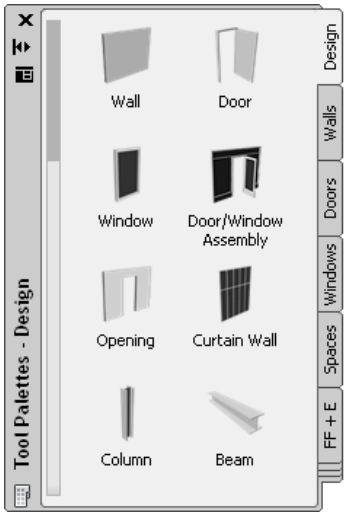
Use the vertical alignment settings to control how to place an opening in the wall, the location of the working point vertically in the wall, and how the opening responds to modifications in height. Use the sill and head height settings to determine the working point on the opening. You can place the working point at the sill or at the head. For example, if you specify the vertical alignment as 0" and the opening height as 7'–0", the opening height is 7'–0". If you next specify the height of the opening as 6'–8", the sill remains at 0" and the opening height becomes 6'–8".

For the opening head working point, if you specify the vertical alignment as 7'–0" and the opening height as 7'–0", the opening height is 7–0". If you specify the opening height as 6'–8", the head remains at 7'–0" and the sill becomes 4".

Using Opening Tools to Create Openings

Tools provided with AutoCAD Architecture let you quickly place openings by selecting an opening tool with a specific opening style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can also use opening tools to create new openings by applying tool properties to existing door/window assemblies, doors and windows.

Tool palette containing opening tool



The default tool palettes in the workspace contain a sample opening tool that you can use and customize as needed. In addition, the following catalogs provided with the software contain opening tools that you can add to your tool palettes:

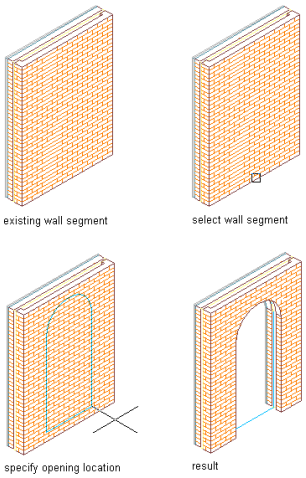
- Stock Tool catalog
- Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain opening tools with properties that are customized for your projects or office standards.

Creating an Opening

Use this procedure to add an opening that has the properties specified in the opening tool that you select. To specify settings when you add an opening, see Creating an Opening with User-Specified Settings on page 1337.

Adding an opening to a wall



1 Open the tool palette that you want to use, and select an opening tool.

If necessary, scroll to display the desired tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Door drop-down ➤ Opening .

---

2 Select a wall in which to insert the opening, or press *ENTER* to add a freestanding opening.

You can move or hide the Properties palette to expose more of the drawing area.

3 Specify the insertion point of the opening.

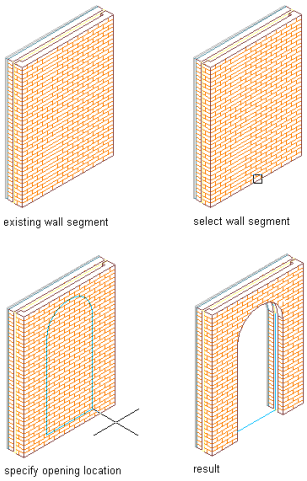
If you are adding a freestanding opening, specify the rotation of the opening after you specify the insertion point.

4 Continue adding openings, and press *ENTER*.

Creating an Opening with User-Specified Settings

Use this procedure to create an opening with settings that you specify.

Adding an opening to a wall



1 Open the tool palette that you want to use, and select an opening tool.

If necessary, scroll to display the desired tool.

2 On the Properties palette, expand Basic, and expand General.

3 Select a shape for the opening.

To specify a custom shape, select Custom for Shape, and select the profile that provides the geometry of the shape for Profile.

NOTE Alternatively, after creating an opening, you can later add a profile to it by selecting the opening, and clicking Opening tab ➤ Profile panel ➤ Add Profile .

4 Expand Dimensions.

5 Enter values for Width, Height, and Rise.

Rise is available only for arch, gothic, peak pentagon, and trapezoid shapes.

6 Expand Location.

7 If you are placing the opening in a wall, specify the opening position:

If you want to…	Then…
position the edge of the opening at a specific distance from the end of a wall segment	select Offset/Center for Position along wall, and enter a value for Automatic offset.
center the opening on a wall segment	select Offset/Center for Position along wall, and specify a point near the center of the wall segment.
position the opening anywhere along the wall	select Unconstrained for Position along wall.

8 Specify whether you want the opening to be aligned vertically by sill height or by head height:

If you want to…	Then…
align the opening by sill height	select Sill for Vertical alignment, and enter a value for Sill height.
align the opening by head height	select Head for Vertical alignment, and enter a value for Head height.

9 Specify the insertion point for an opening in a wall or for a freestanding opening:

If you want to…	Then…
place an opening in a wall	select the wall, and specify an insertion point along the wall.
place a freestanding opening	press *ENTER*, and specify an insertion point and rotation angle for the opening.

10 Continue to place openings, and press *ENTER*.

Creating an Opening from Doors, Door/Window Assemblies and Windows

Use this procedure to convert a door, door/window assembly, or window to an opening that has the properties of the opening tool you select. You can edit these properties after creating the opening.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click an opening tool, and click Apply Tool Properties to ➤ Door, Door/Window Assembly, Window.

3 Select the door, door/window assembly or window to convert, and press *ENTER*.

4 Edit the properties of the opening in the Properties palette, if needed.

Creating and Editing Custom Openings

In addition to using predefined shapes for openings, you can create openings with custom shapes. You create a profile from a closed polyline to define the two-dimensional (2D) geometry of the shape. The profile is then extruded when it is applied to an opening. You can edit the profile to change the shape of the opening. You can then save the changes to the current profile or to a new profile. You can apply the profiles you create to any openings.

Creating a Profile for a Custom Opening

Use this procedure to create a profile that provides the geometry for an opening with a custom shape.

You can create the profile as you add it to an opening. However, if the shape you need is elaborate and has curved segments, you may find it easier to create the profile from a polyline first. You can then add the profile to the opening.

1 Draw concentric, closed polylines representing the opening and any insets.

2 Select the polylines, right-click, and click Convert to ➤ Profile Definition.

3 Select the outermost polyline.

4 Enter **a** (Add ring).

5 Select an inner polyline.

6 Repeat steps 4 and 5 as needed to add more rings to the profile.

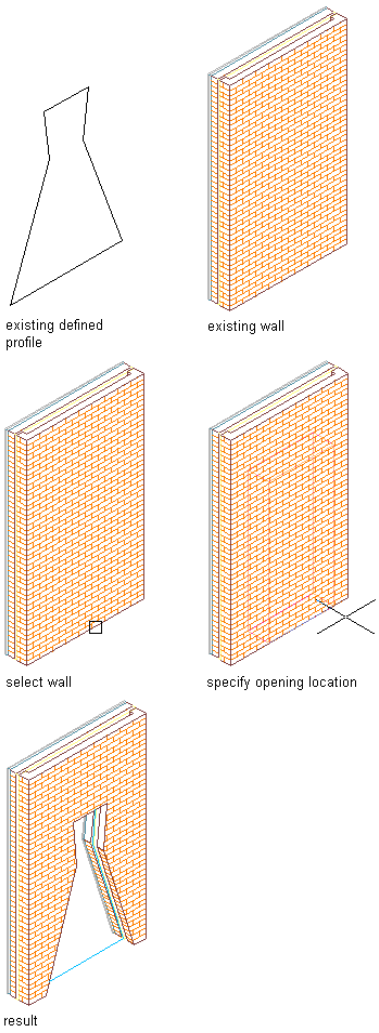
7 Specify the insertion point of the profile.

8 Enter **n** (New), enter a name for the profile, and click OK.

Creating an Opening with a Custom Shape

Use this procedure to create an opening with a custom shape and other settings that you specify.

Adding an opening with a custom shape



1 Open the tool palette that you want to use, and select an opening tool.
If necessary, scroll to display the desired tool.

2 On the Properties palette, expand Basic, and expand General.

3 Select Custom for Shape.

4 Select the profile that provides the geometry of the shape for Profile.

5 Expand Dimensions.

6 Enter values for Width and Height.

7 Expand Location.

8 If you are placing the opening in a wall, specify the opening position:

If you want to…	Then…
position the edge of the opening at a specific distance from the end of a wall segment	select Offset/Center for Position along wall, and enter a value for Automatic offset.

If you want to…	Then…
center the opening on a wall segment	select Offset/Center for Position along wall, and specify a point near the center of the wall segment.
position the opening anywhere along the wall	select Unconstrained for Position along wall.

9 Specify whether you want the opening to be aligned vertically by sill height or by head height:

If you want to…	Then…
align the opening by sill height	select Sill for Vertical alignment, and enter a value for Sill height.
align the opening by head height	select Head for Vertical alignment, and enter a value for Head height.

10 Specify the insertion point for an opening in a wall or for a freestanding opening:

If you want to…	Then…
place an opening in a wall	select the wall, and specify an insertion point along the wall.
place a freestanding opening	press *ENTER*, and specify an insertion point and a rotation angle for the opening.

11 Continue to place openings, and press *ENTER*.

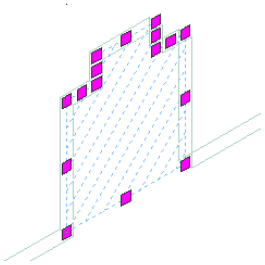
Editing the Geometry of a Custom Opening

Use this procedure to edit the geometry of a profile that determines the shape of a custom opening. You can save the changes to the existing profile or to a new profile.

1 Select the opening that has the shape you want to change, and click Opening tab ➤ Profile panel ➤ Edit In Place .

A temporary profile is created for you to edit the geometry of the custom opening.

A temporary profile for editing a custom opening

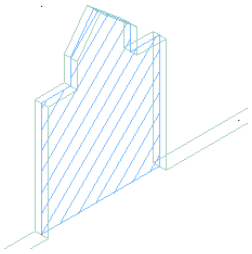


2 **NOTE** After you perform an editing task from the Edit in Place tab, you may need to select the profile again to perform another editing task. If you do not see the editing commands that you expect on the ribbon, select the profile, and click Edit in Place once again.

Edit the profile:

If you want to…	Then…
change the shape of the perimeter of the profile or its rings	select the profile, and use edge and vertex grips to adjust the shape. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added, as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc, as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.
add vertices to the profile	select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
remove vertices from the profile	select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click.
replace an existing ring of the profile with new geometry	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **y** (Yes) to erase it.
add a ring to the profile	draw the linework in place on the temporary profile. Select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Ring . Select the geometry to define the ring. Press *ENTER* to keep the geometry, or enter **y** (Yes) to erase it.
remove a ring from the profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Select the ring to remove, and press *ENTER*. This option does not appear if the profile has only one ring.

Profile for custom opening after editing



3 Save or discard the changes:

If you want to…	Then…
restore the opening to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current profile	click Edit In Place tab ➤ Edits panel ➤ Finish . The opening uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.
save the changes to a new profile	select the profile, and click Edit In Place tab ➤ Edits panel ➤ Save As . Enter a name for the new profile, and click OK. The opening uses the new profile to define its geometry. Other styles or objects that use the original profile are not affected.

Creating an Opening Tool

Use this procedure to create an opening tool and add it to a tool palette. You may want to create your own opening tools if you are placing multiple openings that have the same properties.

For example, you are creating a restaurant floor plan that contains openings of various sizes. To work efficiently, you can create an opening tool for each size. You can then select the appropriate tool to place openings in the floor plan.

1 Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from an opening in the drawing	select the opening, and drag it to the tool palette.
copy a tool in the current palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog	open the tool catalog in the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Enter a description of the opening that you can create using this opening tool.

8 If you do not want to use the default layer key for openings, select a layer key.

9 If you want to override the default layer name for openings, select a layer override.

10 Select a shape for the opening.

To specify a custom shape, select Custom for Shape, and select the profile that provides the geometry of the shape for Profile.

11 Expand Dimensions.

12 Enter values for Width, Height, and Rise.

Rise is available only for arch, gothic, peak pentagon, and trapezoid shapes.

13 Expand Location.

14 If you are placing the opening in a wall, specify the opening position:

If you want to…	Then…
position the edge of the opening at a specific distance from the end of a wall segment	select Offset/Center for Position along wall, and enter a value for Automatic offset.
center the opening on a wall segment	select Offset/Center for Position along wall, and specify a point near the center of the wall segment.
position the opening anywhere along the wall	select Unconstrained for Position along wall.

15 Specify whether you want the opening to be aligned vertically by sill height or by head height:

If you want to…	Then…
align the opening by sill height	select Sill for Vertical alignment, and enter a value for Sill height.
align the opening by head height	select Head for Vertical alignment, and enter a value for Head height.

16 Click OK.

Editing Openings

After you create an opening, you can change the height, width, and rise. You can also change the endcap conditions applied to the opening. You can move the opening within the wall.

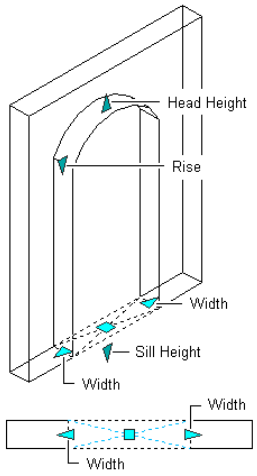
AutoCAD Architecture offers several methods for editing openings:

- Edit openings directly using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.
- Change settings on the Design tab of the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- Select editing commands from the Opening context tab for a selected opening.

Using Grips to Edit Openings

You can use the following grips to edit openings:

Opening dimension grips



Grip	Description	Animation
(Width)	Lets you change the width of an opening	*Changing the Opening Width with Grip Animation*
/ (Sill Height/Head Height)	Lets you change the Height of an opening. You can choose if you want to change the sill height or the head height.	*Changing the Opening Height with Grips Animation*
(Location)	Lets you move an opening within a wall ■ Drag the cursor to move the opening along the length of the wall ■ Press CTRL and drag to move the opening within the width of the wall ■ Press CTRL twice and drag to move the opening vertically within the wall	*Changing the Location of an Opening with Grips Animation*
	Rise Rise applies to Peak Pentagon, Arch, and Gothic opening shapes.	

Changing the Shape and Dimensions of an Opening

Use this procedure to change the shape and size of an opening.

1 Double-click the opening you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Select a shape.

To specify a custom shape, select Custom for Shape, and select the profile that provides the geometry of the shape for Profile.

4 Expand Dimensions.

5 Change the width, height, or rise for the opening.

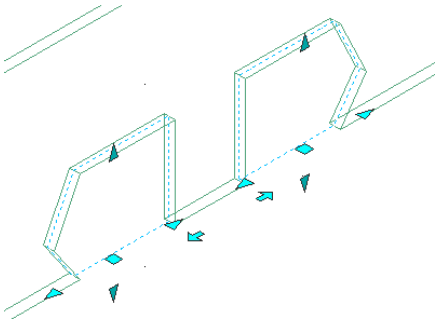
Flipping an Opening along the X or Y Axis

Use this procedure to reorient an opening along its *X* or *Y* axis.

TIP You can also flip an opening along its *X* axis using the Flip grip that is displayed when you select an opening.

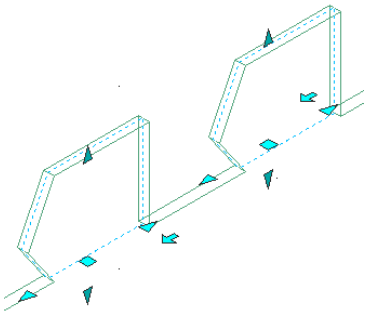
1 To flip an opening along the *X* axis, select the openings you want to change, right-click, and click Wall Anchor ➤ Flip X.

Opening in original position, and flipped along its X axis



2 To flip an opening along the *Y* axis, select the openings, right-click, and click Wall Anchor ➤ Flip Y.

Opening in original position, and flipped along its Y axis



Changing Endcap Style for an Opening

Use this procedure to change the opening endcap style used at each side of an opening. An endcap is a user-definable condition for the edges of an opening. For more information about opening endcap styles, see Working with Wall Endcaps and Opening Endcaps on page 891.

1 Select the opening you want to change.

2 Click Opening tab ➤ Endcap panel ➤ Opening Endcap: drop-down menu.

3 Select an opening endcap style.

Alternatively, you can change endcap styles on the Design tab of the Properties palette.

Applying Tool Properties to an Existing Opening

Use this procedure to apply the properties of an opening tool to one or more openings.

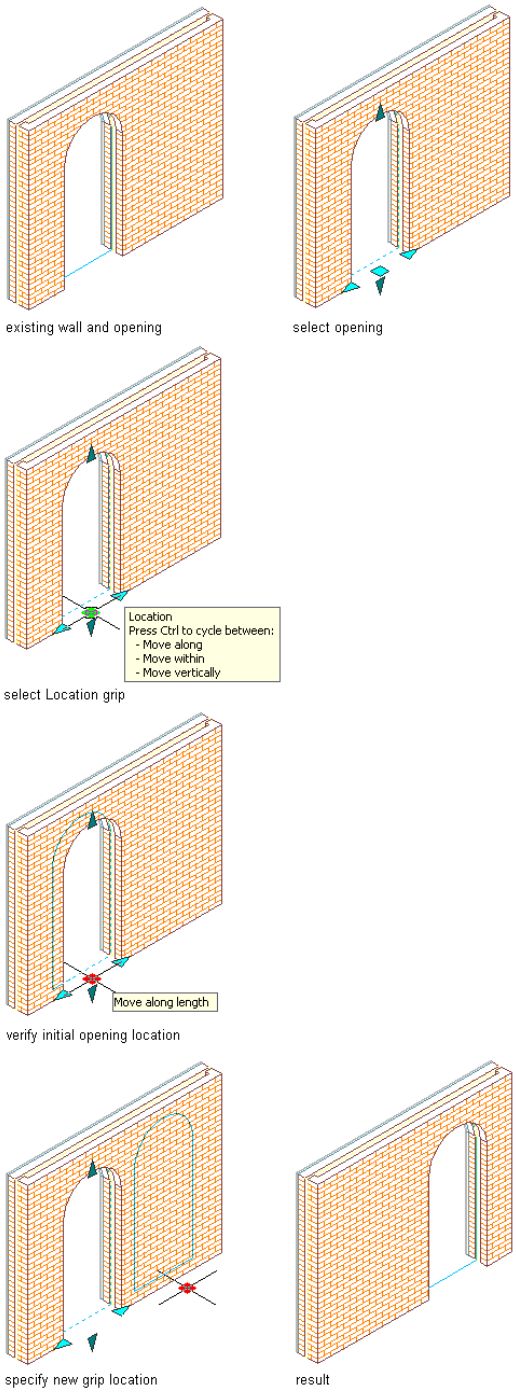
1. Open the tool palette that you want to use.
   If necessary, scroll to display the desired tool.
2. Right-click an opening tool, and click Apply Tool Properties to Opening.
3. Select the openings, and press *ENTER*.
4. Edit the properties of the openings in the Properties palette, if necessary.

Repositioning an Opening

Use this procedure to change the location of an opening along the wall by offsetting the opening from a reference location.

This feature is useful when you want to position an opening at a specified distance from another object. For example, you may want to specify an exact distance between a series of openings along a wall.

Repositioning an opening by offsetting points



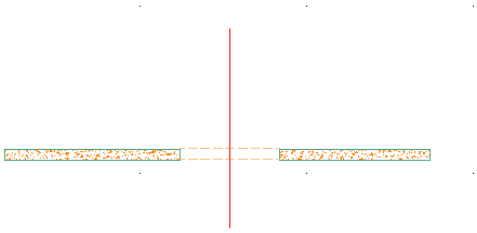
1 Select the opening you want to move, and click Opening tab ➤ Anchor panel ➤ Reposition Along Wall .

A marker indicates the current location within the opening: left jamb, center of opening, or right jamb.

2 Specify how to measure the offset:

If you want to…	Then…
measure the offset from the center of the opening	select a point near the center of the opening.
measure the offset from the left or right jamb	select a point on the jamb of the opening from which you want to measure.

Selecting the center of the opening for measuring the offset



3 Select a point to measure to (the reference point).

You can select a point along the wall.

Specifying a reference point

4 Specify the distance between the points you selected:

If you want to…	Then…
move the opening to the reference point	enter **0** (zero).
move the opening a specified distance from the reference point	enter a value for the offset distance.
specify the distance as a measurement between two points, such as the distance between the centers of two openings that are correctly positioned	specify the two points measuring the distance.

Opening repositioned along the wall

Using Anchors to Change the Position and Orientation of an Opening

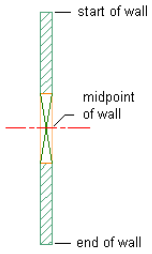
When an opening is anchored to a wall, you can use the anchor to change position and orientation of the opening in relation to the wall.

Using Anchors to Change the Horizontal Position of an Opening

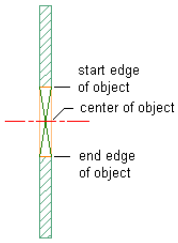
Use this procedure to change the horizontal position of openings along a wall to which the openings are anchored.

You can also change the horizontal position of the opening using the Location grip. For more information, see Using Grips to Edit Openings on page 1345.

Positioning an opening horizontally



x-axis wall parameters



x-axis opening parameters

1 Select the openings you want to change, and click Opening tab ➤ Anchor panel ➤ Settings .

Alternatively, you can access anchor settings on the Properties palette.

2 Select the reference point for the anchor along the *X* axis:

If you want to…	Then…
use the start of the wall as the reference point	under Position Along (X), select Start of wall for From.
use the midpoint of the wall as the reference point	under Position Along (X), select Midpoint of wall for From.
use the end of the wall as the reference point	under Position Along (X), select End of wall for From.

3 Enter the distance from the reference point at which to place the openings.

Use a negative value to measure from endpoint to start point.

4 Select the position of the openings to measure to:

If you want to measure…	Then…
to the start edge of the opening	select Start edge of object for To.
to the center of the opening	select Center of object for To.
to the end edge of the opening	select End edge of object for To.

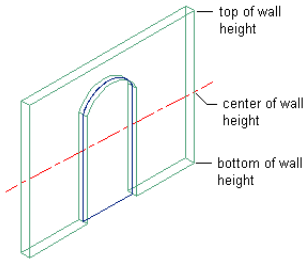
5 Click OK.

Using Anchors to Change the Vertical Position of an Opening

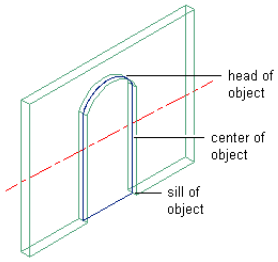
Use this procedure to change the vertical position of openings in a wall to which the openings are anchored.

You can also change the vertical position of the opening using the Location grip. For more information, see Using Grips to Edit Openings on page 1345.

Changing the vertical position of an opening



z-axis wall parameters



z-axis opening parameters

1 Select the openings you want to change, and click Opening tab ➤ Anchor panel ➤ Settings .

Alternatively, you can access anchor settings on the Properties palette.

2 Select the reference point for the anchor along the *Z* axis:

If you want to…	Then…
use the bottom of the wall height as the reference point	under Position Vertical (Z), select Bottom of wall height for From.
use the center of the wall height as the reference point	under Position Vertical (Z), select Center of wall height for From.
use the top of the wall height as the reference point	under Position Vertical (Z), select Top of wall height for From.

3 Enter the distance from the reference point at which to place the openings.

Use a negative value to measure from endpoint to start point.

4 Select the position of the openings to measure to:

If you want to…	Then…
measure to the bottom of the openings in wall	select Sill of object for To.
measure to the center of the openings in walls	select Center of object for To.
measure to the top of the openings in walls	select Head of object for To.

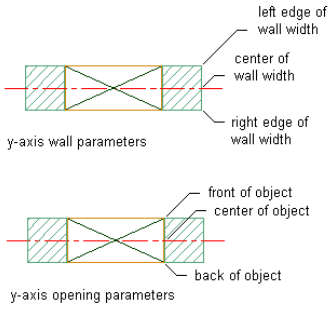
5 Click OK.

Changing the Position of an Opening Within a Wall

Use this procedure to change the horizontal position of openings within a wall to which the openings are anchored.

You can also change the position of the opening within a wall using the Location grip. For more information, see Using Grips to Edit Openings on page 1345.

Changing the position of an opening within a wall



1 Select the openings you want to change, and click Opening tab ➤ Anchor panel ➤ Settings .

Alternatively, you can access anchor settings on the Properties palette.

2 Select the reference point for the anchor along the *Y* axis:

If you want to…	Then…
use the left edge of the wall as your reference point	under Position Within (Y), select Left edge of wall width for From.
use the center of the wall as your reference point	under Position Within (Y), select Center of wall width for From.
use the right edge of the wall as your reference point	under Position Within (Y), select Right edge of wall width for From.

3 Enter the distance from the reference point at which to place the openings.

Use a negative value to measure from endpoint to start point.

4 Select the position of the openings to measure to:

If you want to…	Then…
measure to the front of the opening	select Front of object for To.
measure to the center of the opening	select Center of object for To.
measure to the back of the opening	select Back of object for To.

5 Click OK.

Changing the Orientation of an Opening to a Wall

Use this procedure to change the vertical orientation of an opening in a wall to which the openings are anchored.

1 Select the opening you want to change, and click Opening tab ➤ Anchor panel ➤ Settings .

Alternatively, you can access anchor settings on the Properties palette.

2 Enter the *X* and *Z* rotation angles of the openings.

3 Indicate if you want to reverse the flip direction of the opening in the *X*, *Y* or *Z* axes:

If you want to…	Then…
reverse the direction of the opening	select Flip X.
reverse the top and bottom of the opening	select Flip Z.
reverse the position of the opening in the side of the wall	select Flip Y.

4 Click OK.

Changing the Location of an Opening

Use this procedure to relocate a freestanding opening by changing the coordinate values of its insertion point. The opening also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the opening are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the opening by aligning its normal with another axis. You can also rotate the opening on its plane by changing the rotation angle.

1 Double-click the opening, and on the Properties palette, expand Basic, and expand Location.

2 Click Additional information.

3 Specify a new location, orientation, or rotation angle:

If you want to…	Then…
relocate the opening	enter new coordinate values under Insertion Point.
locate the opening on the *XY* plane	make the normal of the opening parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the opening on the *YZ* plane	make the normal of the opening parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the opening on the *XZ* plane	make the normal of the opening parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the opening	enter a new value for Rotation Angle.

4 Click OK.

Changing the Cut Plane Setting for an Opening

Use this procedure to specify whether a selected opening will use the cut plane of the containing object when anchored to that object in the current display representation. Note that cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1. Double-click the opening.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display controlled by, select This object.

   NOTE To apply your changes to all openings in the drawing, select Drawing default setting.

4. For Display representation, verify that the desired display representation is selected.
5. If necessary, expand Object Display Properties ➤ Cut Plane.
6. For Use cut plane of containing object when anchored, select Yes or No.

Specifying the Display of Sills for an Opening

Use this procedure to change the sill dimensions for an opening in the Sill Plan display representation.

1. Double-click the opening.
2. Click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

   NOTE To apply your changes to all openings in the drawing, select Drawing default setting.

5. For Display representation, select Sill Plan.
6. If necessary, expand Object Display Properties ➤ Advanced, and click Sill dimensions.
7. On the Sill Dimensions worksheet, enter the sill extension and depth dimensions.

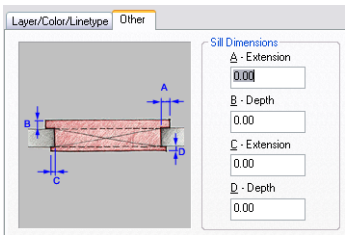
   Sill components A and B are for the outside of the opening. Sill components C and D are for the interior side.
8. Click OK.
9. In the Display component drop-down list, click the light bulb icons next to individual sill components to turn their visibility on or off as desired.

You can also access and modify sill dimensions and visibility settings through the opening's context menu, as follows:

1. Select the opening you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.

   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. Click the Other tab.

Opening sill dimensions



5 Under Sill Dimensions, enter the sill extension and depth dimensions.

6 On the Layer/Color/Linetype tab, under Visible, click the light bulb icons to turn on visibility for individual sill display components as necessary.

7 Click OK twice.

Specifying the Display of Custom Block Components of an Opening

Use this procedure to specify the display of custom block components for an individual opening. If you are going to use custom graphics for a new component, draw the component and save it as a block before you start this procedure.

1 Double-click the opening.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all openings in the drawing, select Drawing default setting.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and for Custom block display, click (The number in parentheses indicates the number of blocks currently attached to the opening.)

7 If you want to turn off the display of custom blocks for this opening without removing them, select Disable Custom Blocks.

8 Specify whether to add, edit, or remove a block component:

If you want to…	Then…
add a new block component	click Add, and then click Select Block, select the block, and click OK.
edit an existing block component	select the component to edit, and click Edit.
remove an existing block component	select the block, click Remove, and click OK.

9 When adding or editing a block component, specify whether you want to scale to fit the block component to the object by width, depth, and height, or to lock the XY ratio:

If you want to…	Then…
set the block scale to the width of the object	select Width.
set the block scale to the depth of the object	select Depth.

If you want to…	Then…
set the block scale to the height of the object	select Height.
scale the whole block equally, so that one direction is scaled to fit another of the scale criteria	select Lock to XY Ratio.
scale the block to its original size	clear all options under Scale to Fit.

10 Specify whether to mirror the block in the X,Y, or Z direction:

If you want to create a mirror of the block…	Then…
in the *X* direction	select Mirror X.
in the *Y* direction	select Mirror Y.
in the *Z* direction	select Mirror Z.

11 Specify the *X*, *Y*, and *Z* locations of the insertion point.

12 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

13 Click OK twice.

Specifying the Display of Fill Type for an Opening

Use this procedure to specify the type of fill to display for an opening in display representations used in the Top view (plan view) of a drawing.

1 Double-click the opening.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 Under the General category, for Display controlled by, select This object.

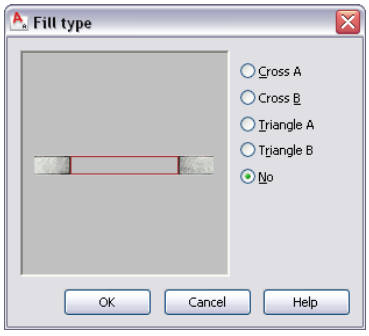
NOTE To apply your changes to all openings in the drawing, select Drawing default setting.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Fill type.

7 On the Fill type worksheet, select the desired fill type.

Opening fill types



8 Click OK.

You can also access and modify frame display settings through the opening's context menu, as follows:

1 Select the opening you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 Click the Fill type tab.
5 Under Hatch Type, select the desired option.
6 Click OK twice.

Attaching Hyperlinks, Notes, and Files to an Opening

Use this procedure to enter notes and attach hyperlinks or reference files to an opening. You can also edit reference files attached to the style.

1 Double-click the opening to which you want to attach information.
2 On the Properties palette, click the Extended Data tab.
3 To add a hyperlink, click the setting for Hyperlink, specify the link, and click OK.
For more information, see "Add Hyperlinks to a Drawing" in AutoCAD help.
4 To add a note, click the setting for Notes, enter the note, and click OK.
5 Click the setting for Reference Docs.
6 Attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click OPEN.
edit the description of a reference file	select the description of the file, and edit the description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

7 Click OK.

Changing the Display Properties of Openings

You use the display properties of openings to control their appearance in a drawing. In addition, you can create custom components for openings by adding custom blocks to any display representation where you want the components to appear.

Specifying the Display Properties of an Opening

Use this procedure to change the properties of the following display components of an individual opening:

- Visibility (display component is on or off)

- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE Openings do not have material assignments.

1 Select the opening you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 In the Object Display dialog, click the Display Properties tab.

The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 Click the Layer/Color/Linetype tab.

5 Select the component to change, and select a different setting for the property.

6 Click OK twice.

Specifying the Hatching of an Opening

Use this procedure to specify the hatching of the components of an opening. Hatching is displayed only in display representations used in the Top view (plan view) of a drawing.

1 Select the opening you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 Click the Display Properties tab.

3 Select the display representation in which to display the changes.

4 Specify whether changes apply to all openings, or only to the selected opening:

If you want to…	Then…
apply the hatching to all openings in the drawing	verify that Object Override is cleared, and click .
apply the hatching only to the selected opening	select Object Override. If it is already selected, click .

The display representation in bold is the current one.

5 Click the Layer/Color/Linetype tab.

6 Verify that the Hatch display component is turned on.

7 Click the Hatching tab.

8 Click the setting for Pattern.

9 Select the hatching:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-Defined for Type, and clear Double Hatch.
select double hatching	select User-Defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.

11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

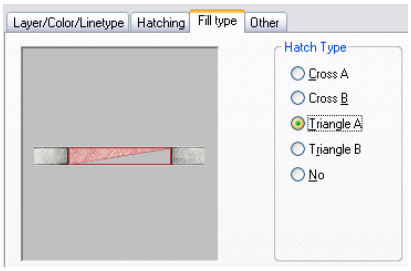
13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

14 Click the Fill type tab.

15 Select a graphic representation to use for hatching the opening.

Specifying hatching graphics for openings



16 Click OK twice.

Using Custom Blocks to Create Opening Components

You can add custom blocks for components, such as hardware, to the display components or to replace the default display components. You can have a different custom block for each display representation.

You can specify several rules for positioning and scaling the new component. Each custom block also appears in the display properties component list so that you can control its layer, color, and linetype.

If you create a custom block from mass elements, you can use the material assignments of the mass elements to determine the display properties of the custom block.

Be sure to set the properties of the objects used to create your custom blocks to ByBlock. Otherwise, you cannot control these objects through the display properties. For more information, see "Control the Color and Linetype Properties in Blocks" in AutoCAD help

Adding Components to an Opening

Use this procedure to add or edit custom block components in the display representation of openings.

1. Create a block for the component to add to the opening.
   Create the block in the same plane as the opening.
2. Select the opening you want to change, right-click, and click Edit Object Display.
3. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
4. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
5. Click the Other tab.
6. Specify whether to add or edit a block component:

If you want to…	Then…
add a new block component	click Add.
edit an existing block component	select the component to edit, and click Edit. Proceed to step 10.

7. Click Select Block.
8. Select the block to use, and click OK.
9. Specify whether you want to scale to fit the block component to the object by width, depth, and height, or to lock the *XY* ratio:

If you want to…	Then…
set the block scale to the width of the object	select Width.
set the block scale to the depth of the object	select Depth.
set the block scale to the height of the object	select Height.
scale the whole block equally, so that one direction is scaled to fit another of the scale criteria	select Lock XY Ratio.
scale the block to its original size	clear all options under Scale to Fit.

10. Specify whether to mirror the block in the *X*,*Y*, or *Z* direction:

If you want to…	Then…
create a mirror of the block in the *X* direction	select Mirror X.
create a mirror of the block in the *Y* direction	select Mirror Y.

If you want to…	Then…
create a mirror of the block in the *Z* direction	select Mirror Z.

11 Specify the *X*, *Y*, and *Z* location of the insertion point.
12 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.
13 Click OK three times.

Turning Off Custom Components in an Opening

Use this procedure to turn off custom blocks in an opening.

You can turn off the display of component blocks without removing them from the opening.

1 Select the opening you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 Click the Other tab.
5 Select Disable Custom Blocks.
6 Click OK twice.

Removing Custom Components from an Opening

Use this procedure to remove components from an opening.

Removing custom blocks deletes them from the opening.

1 Select the opening you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 Click the Other tab.
5 Select the component to remove, and click Remove.
6 Click OK twice.

Stairs

26

Stairs are AEC objects that use flights of treads and risers to accommodate vertical circulation. Stairs also interact with railing objects. You can control the style of the stair, the shape of the landing, the type of treads, and the height and width of the stair run.

Stairs

Stairs are AEC objects that use flights of treads and risers to accommodate vertical circulation. Stairs also interact with railing objects. You can control the style of the stair, the shape of the landing, the type of treads, and the height and width of the stair run.

Stair Shapes

While strictly rectangular stairs are predominant in modern buildings, in some cases the edges of a flight are not parallel, or they might be curved. Landings can also be non rectangular. Stairs allow the use of nearly arbitrary profiles for the edges of flights and landings. In addition, railings and stringers can be anchored to stairs and can follow the edges of flights and landings. You can create custom stairs from linework or profiles to model different conditions as well.

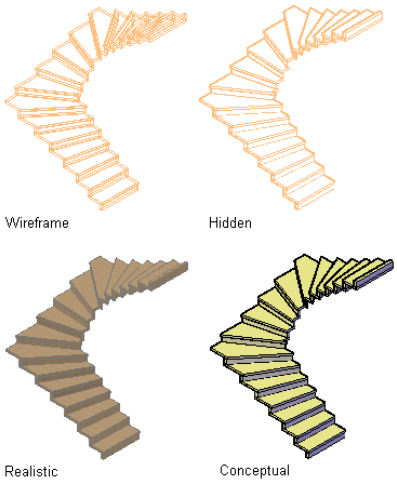
Landings and Turns

Stairs are created at a specified overall height that requires a total length based on the tread length. Within that length, you can place landings or turns. When you begin to create a stairway, a rectangular box is displayed that represents the width and length of the stair as if it were a straight stairway. As you select consecutive points, depending upon the shape of the stair, landings and turns are created.

Materials in Stairs

In AutoCAD Architecture, you can assign materials to a stair. These materials are displayed in the Realistic visual style, or when rendered. Materials have specific settings for the physical components of a stair, such as risers, nosing, and treads.

Viewing a stair in different visual styles

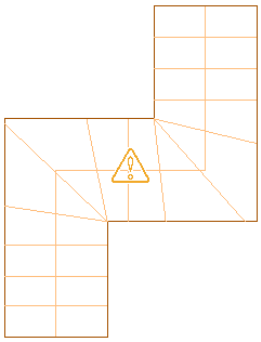


AutoCAD Architecture provides a number of predefined materials for common design purposes, which contain settings for stair components. You can use predefined materials, or modify them for your designs. You can also create your own materials. Object styles provided with the software have appropriate materials already assigned to them. For more information, see Stair Materials and Display Components on page 1493.

Solution Tips for Stairs

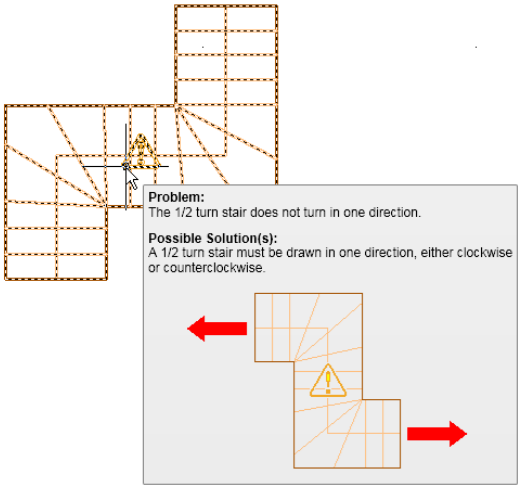
When AutoCAD Architecture detects a problem with the way a stair object is drawn, it displays a solution tip icon on the stair in the drawing.

Stair with solution tip icon

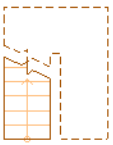
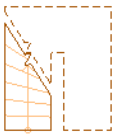


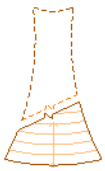
Move the cursor over the icon to display a message that describes the problem and provides one or more possible solutions. Where more detailed instructions are required, you can press *F1* to access the relevant topic in Help.

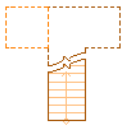
Stair with solution tip



A number of the solution tips for stair objects identify an invalid configuration for a particular type of stair. The F1 links for these tips bring you to this topic and the following table, which shows and describes the different types of stairs you can draw in AutoCAD Architecture. Follow the associated links to specific instructions for drawing each type of stair.

Stair 2D View	Stair 3D View	Stair Shape	Turn Type	How to Draw
		Straight	None	Specify flight start and endpoints. For more information, see Creating a Straight Stair with User-Specified Settings on page 1368.
		U-shaped	1/2 landing	Specify flight start and endpoints. For more information, see Creating a U-Shaped Stair with User-Specified Settings on page 1378.
		U-shaped	1/2 turn	Specify flight start and endpoints. For more information, see Creating a U-Shaped Stair with User-Specified Settings on page 1378.
		Multi-landing	1/2 landing	Specify first flight start and endpoints; specify next flight start and endpoints. For more information, see Creating a Multi-Landing Stair with User-Specified Settings on page 1371.

Stair 2D View	Stair 3D View	Stair Shape	Turn Type	How to Draw
		Multi-landing (straight)	1/2 landing	Specify first flight start and endpoints; specify next flight start and endpoints. For more information, see Creating a Multi-Landing Stair with User-Specified Settings on page 1371.
		Multi-landing	1/2 turn	Specify first flight start and endpoints; specify next flight start and endpoints - draw in one direction only. For more information, see Creating a Multi-Landing Stair with User-Specified Settings on page 1371.
		Multi-landing	1/4 landing	Specify first flight start and endpoints; specify next flight endpoint; specify next flight endpoint. For more information, see Creating a Multi-Landing Stair with User-Specified Settings on page 1371.
		Multi-landing	1/4 turn	Specify first flight start and endpoints; specify next flight endpoint; specify next flight endpoint. For more information, see Creating a Multi-Landing Stair with User-Specified Settings on page 1371.
		Spiral	None	Specify center of spiral stair; specify start point. For more information, see Creating a Spiral Stair with User-Specified Settings on page 1382.
		Custom stair (from linework)	None	Draw custom stair linework; select left and right sides; select stair path; select left, right, and center stringer paths; select first tread at current level; select remaining treads. For more information, see Creating a Custom Stair from Linework on page 1387.
		Custom stair (from tread profile)	None	Draw custom tread profile; array tread profile; select stair path; select left, right, and center stringer paths; select first tread profile at current level; select remaining tread profiles. For more information, see Creating a Custom Stair from Tread Profiles on page 1391.

Stair 2D View	Stair 3D View	Stair Shape	Turn Type	How to Draw
		Anchor Stair to Landing	None	Draw multi-landing stair; draw straight stair; select multi-landing stair; anchor straight stair to multi-landing stair landing. For more information, see Anchoring a Stair to a Landing on page 1438.

Specifying AEC Options for Stairs

Use this procedure to specify parameters and options for stairs that are not specified in the stair styles or display properties. These options are on the AEC Object Settings tab of the Options dialog box:

- Presentation format
- Node Osnaps
- Flight height measurement
- Calculator limits

1 Click ➤ Options.

2 Click the AEC Object Settings tab.

3 Specify the stair defaults:

If you want to…	Then…
display the stair with no cut lines or path	select Presentation Format (No Cut Lines or Path).
use Node Osnap to select the corners of the stairs and landings	select Flight & Landing Corners for Node Osnap.
specify the stair height distance above the start of the stair and below the end of the stair as the position for the Node Osnap	select Vertical Alignment for Node Osnap.
include top and bottom offsets in the stair height measurement	select Finished Floor to Floor for Measure Stair Height.
ignore top and bottom offsets in the stair height measurement	select Rough Floor to Floor for Measure Stair Height.
display the stair with a solution tip icon when an edit causes it to violate the calculation limits set in the Calculation Rules tab of the Stair Style dialog box	select Strict for Calculator Limits.
display the stair normally when an edit causes it to violate the calculation limits set in the Calculation Rules tab of the Stair Style dialog box	select Relaxed for Calculator Limits.

NOTE The Calculator Limits setting is stored with the drawing. Some earlier versions of the software have the Calculator limits set to Relaxed by default. Any new drawing has it set to Strict by default.

4 Click OK.

Using Stair Tools to Create Stairs

Tools provided with AutoCAD Architecture let you quickly place stairs using a stair tool with a specific stair style and other predefined properties. You can use the default settings of the tool, or you can change the properties that are not controlled by the style.

The following catalogs provided with the software contain stair tools that you can add to your tool palettes:

- Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog
- Design Tool catalog

Custom palettes created by your CAD manager or other users may also contain stair tools with stair styles and properties that are customized for your projects or office standards.

Creating a Stair

Use this procedure to add a new stair that has the properties specified in the stair tool that you select. To specify settings when you add a stair, see Creating a Straight Stair with User-Specified Settings on page 1368.

1 Open the tool palette that you want to use, and select a stair tool.

If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, you can create stairs by clicking Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

2 Specify the insertion point of the stair.

You can move or hide the Properties palette to expose more of the drawing area.

3 Specify the direction point of the stair.

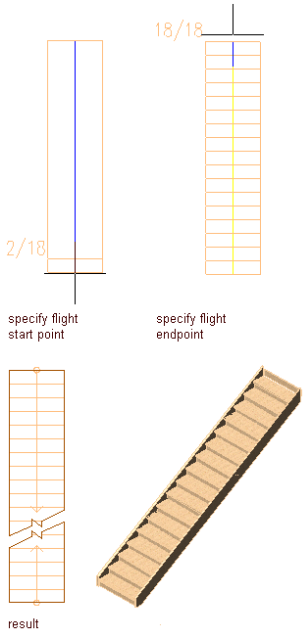
The stair is created at the length necessary to accommodate the values specified.

4 Continue adding stairs, and press *ENTER*.

Creating a Straight Stair with User-Specified Settings

Use this procedure to add a straight stair with settings that you specify.

Creating a straight stair



TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

1 Open the tool palette that you want to use, and select a stair tool.
If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

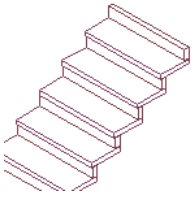
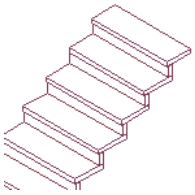
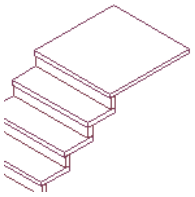
2 On the Properties palette, click the Design tab, expand Basic, and expand General.
3 Select a style.
4 For Shape, select Straight.
5 Specify the vertical orientation of the stair:

If you want to…	Then…
draw the stair from this floor to the floor above	select Up for Vertical Orientation.
draw the stair from this floor to the floor below	select Down for Vertical Orientation.

6 Expand Dimensions.
7 Specify stair width, height, and justification:

If you want to…	Then…
specify the width of the stair	enter a value for Width.
specify the height of the stair	enter a value for Height.
specify the justification of the stair	enter a value for Justify. The Justify value controls the insertion point when you place the stair (left, center, or right) at the beginning of the stair run.

8 Specify the stair termination:

If you want to…	Then…
end the stair run with a riser	select Riser for Terminate with.  **NOTE** Stairs that end with a riser will have an overall height that is one tread thickness less than the floor-to-floor height specified.
end the stair run with a tread	select Tread for Terminate with. 
end the stair run with a landing	select Landing for Terminate with. 

9 Click next to Calculation rules, and

if you want to…	then…
specify the overall linear length of the stair	enter values for Straight Length, and Riser Count, then click OK. ■ When Straight Length is set to (automatic), the value is calculated based on the tread size and riser count. ■ When Straight Length is (user-defined), the stair length is equal to the dimension entered, and the other three values are adjusted within the code limits. ■ When Riser Count is (user-defined), the tread depth is increased or decreased to accommodate the stair.

if you want to…	then…
specify the total number of stair risers	enter a value for Riser Count, then click OK. ■ When Riser Count is set to (automatic), the number of risers is based on the overall length and overall height of the stair and the code limits specified on the Design Rules tab. The Straight Length value of the stair is adjusted automatically. ■ When Riser Count is set to (user-defined), you can specify a value that is used to calculate the tread depth and riser height. If these values fall outside the stair limits, an error message is displayed.
specify the height of each riser in the stair flight	set all fields to (automatic), click the icon to Riser to change it to (user-defined) and enter a value for Riser. Click OK.
specify the tread depth for each tread in the stair flight	set all fields to (automatic), click the icon next to Tread to change it to (user-defined), and enter a tread depth value. You can also specify the Riser Count when you set the tread depth.

NOTE If a value is set to user-defined on the Calculation rules worksheet, it can be modified directly in the Properties palette.

NOTE If is displayed next to a field in the Calculation Rules dialog box, that field can't be changed until another field is changed from (user-defined) to (automatic).

10 In the drawing area, specify the insertion point of the stair.

You can move or hide the Properties palette to expose more of the drawing area.

11 Specify the endpoint of the stair.

12 Continue adding stairs, or press *ENTER*.

Creating a Multi-Landing Stair with User-Specified Settings

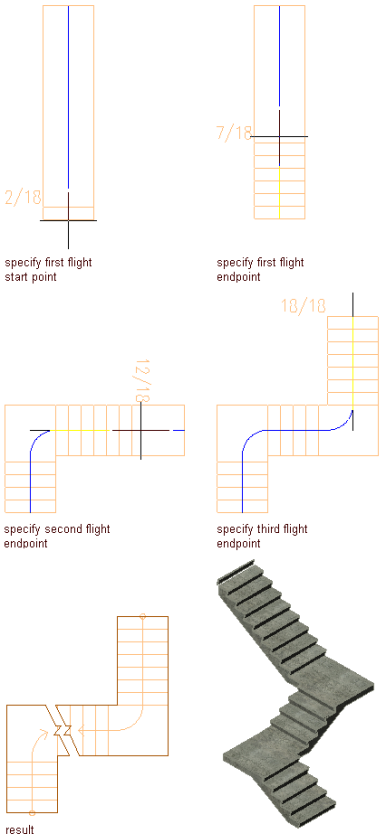
Use this procedure to create a multi-landing stair. You can use multi-landing stair shapes to define both straight and angled stair runs. You can insert quarter-landings, half-landings, and turns.

This type of stair is constrained by the design rules on the stair and the floor-to-floor height. For more information about stair design rules, see Specifying the Design Rules of a Stair Style on page 1486.

If you are drawing the risers or flights of a stair, lines for each tread are shown. If you are drawing a flat landing, no tread lines are shown. If you are drawing a turn-type landing, angled tread lines are shown through the turn. These temporary lines do not necessarily represent the actual locations of tread lines in the final stair. In addition, the number of risers currently added to the stair is displayed (to the left of the stair), as a fraction of the total number of risers required for the stair; for example, "10/18."

NOTE To create a straight stair with user-specified landings, use the multi-landing shape with half-landings. Select all the points in a straight line to define the flight start points and flight endpoints.

Creating a multi-landing stair with 1/4 landings



TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

1. Open the tool palette that you want to use, and select a stair tool.
   If necessary, scroll to display the tool that you want to use.

   NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

2. On the Properties palette, click the Design tab, expand Basic, and expand General.
3. Select a style.
4. For Shape, select Multi-landing.
5. Specify the turn type:

If you want to…	Then…
create a flat landing with a user-defined length where the stair run turns	select 1/2 landing for Turn type.

If you want to…	Then…
create stairs with a user-defined length where the stair run turns with treads through the turn	select 1/2 turn for Turn type. **NOTE** These stairs must have at least three segments and each corner must turn in the same direction.
create a flat landing where the stair turns, with the length of the landing equal to the width of the stair	select 1/4 landing for Turn type. **NOTE** These stairs typically have two or more flights joined by square landings.
create stairs having treads along the entire length, with one or more turns in any direction	select 1/4 turn for Turn type. **NOTE** These stairs may have two or more segments, and corners may turn in either direction.

6 Specify the vertical orientation of the stair:

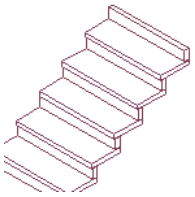
If you want to…	Then…
draw the stair from this floor to the floor above	select Up for Vertical Orientation.
draw the stair from this floor to the floor below	select Down for Vertical Orientation.

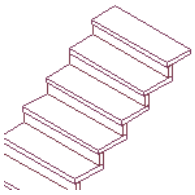
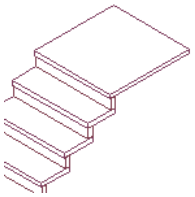
7 Expand Dimensions.

8 Specify stair width, height, and justification:

If you want to…	Then…
specify the width of the stair	enter a value for Width.
specify the height of the stair	enter a value for Height.
specify the justification of the stair	enter a value for Justify. The Justify value controls the insertion point when you place the stair (left, center, or right) at the beginning of the stair run.

9 Specify the stair termination:

if you want to…	then…
end the stair run with a riser	select Riser for Terminate with.  **NOTE** Stairs that end with a riser will have an overall height that is one tread thickness less than the floor-to-floor height specified.

if you want to…	then…
end the stair run with a tread	select Tread for Terminate with. 
end the stair run with a landing	select Landing for Terminate with. 

10 Click next to Calculation rules, and

if you want to…	then…
specify the overall linear length of the stair	enter values for Straight Length and Riser Count, then click OK. ■ When Straight Length is set to (automatic), the value is calculated based on the tread size and riser count. ■ When Straight Length is set to (user-defined), the stair length is equal to the dimension entered, and the other three values are adjusted within the code limits. ■ When Riser Count is set to (user-defined), the tread depth is increased or decreased to accommodate the stair.
specify the total number of stair risers	enter a value for Riser Count, then click OK. ■ When Riser Count is set to (automatic), the number of risers is based on the overall length and overall height of the stair and the code limits specified on the Design Rules tab. The Straight Length value of the stair is adjusted automatically. ■ When Riser Count is set to (user-defined), you can specify a value that is used to calculate the tread depth and riser height. If these values fall outside the stair limits, an error message is displayed.

if you want to…	then…
specify the height of each riser in the stair flight	set all fields to (automatic), click the icon for Riser to change it to (user-defined), and enter a value for Riser. Click OK.
specify the tread depth for each tread in the stair flight	set all fields to (automatic), click the icon next to Tread to change it to (user-defined), and enter a value for Tread. You can also specify the Riser count when you set the tread depth. Click OK.

NOTE If a value is set to user-defined on the Calculation rules worksheet, it can be modified directly in the Properties palette.

NOTE If is displayed next to a field in the Calculation Rules dialog box, that field can't be changed until another field is changed from (user-defined) to (automatic).

11 Expand Advanced.

12 Specify the Floor Settings:

If you want to…	Then…
change the thickness of the floor finish material at the top of the stair	enter a value for Top offset.
change the depth of the structure at the top of the stair	enter a value for Top depth.
change the thickness of the floor finish material at the bottom of the stair	enter a value for Bottom offset.
change the depth of the structure at the bottom of the stair	enter a value for Bottom depth.

13 Set the minimum height or number of risers in a stair flight, or specify *NONE*.

14 Set the maximum height or number of risers in a stair flight, or specify *NONE*.

15 In the drawing area, specify the insertion point of the stair.

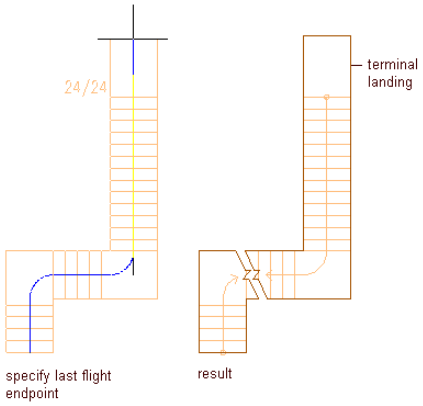
You can move or hide the Properties palette to expose more of the drawing area.

16 Specify the point of the first turn or landing for the stair.

17 Continue specifying points for the stair.

NOTE If you specified Landing for Terminate with, the last point for the stair beyond the final riser defines the end of the landing.

Specifying terminal landing length for multi-landing stair



18 Continue adding stairs, or press *ENTER*.

Creating an L-Shaped Stair with 45-Degree Tread

Use this procedure to add an L-shaped stair with a 45-degree turn in the winder.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Stair Winder Styles.

3 Right-click, select New, and enter **Single Point – 2 Tread** as the style name.

4 On the Settings tab, confirm that Use Riser Line is not selected.

5 Specify Single Point for Winder Type.

6 Select Adjust Winder Turn and enter **2** for Number of Treads in Turn.

7 Click OK.

8 Open the tool palette that you want to use, and select a stair tool.
If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

9 On the Properties palette, click the Design tab, expand Basic, and expand General.

10 For Shape, select Multi-landing.

11 For Turn type, select 1/4 turn.

12 For Winder Style, select Single Point – 2 Tread.

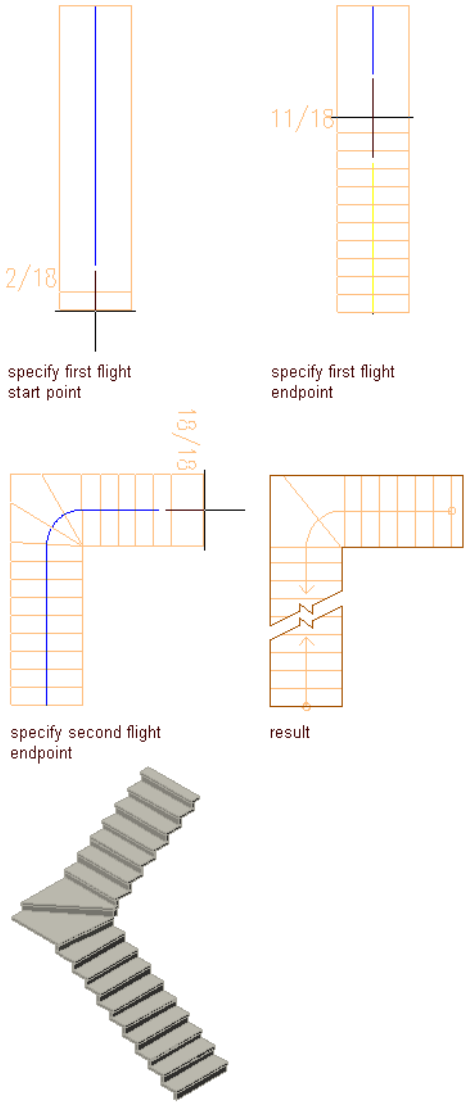
13 Expand Dimensions.

14 For Flight length, select Tread length.

NOTE If the stair style has Extend Landings to Prevent Risers and Treads Sitting under Landings turned on, the flight will not be pivoted exactly around the end of the stair.

15 Draw a stair with one 90-degree turn, and press *ENTER*.

Creating an L-shaped stair with a 45 degree tread



16 Select the stair, enter **winderturnadjust** at the command line, and press *ENTER*.

NOTE The winderturnadjust command changes the number of treads in a turn zone for a stair using a Single Point winder style. The default number of treads is specified in the Settings tab of the Stair Winder Styles. You can change the amount of treads on the command line while running the winderturnadjust command.

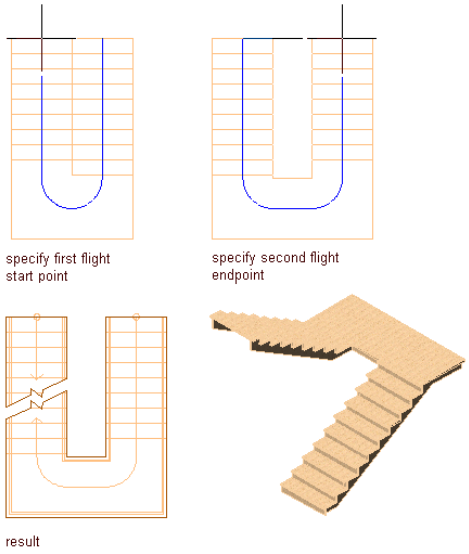
When you change the number of treads in the turn zone, the construction line changes location across the stair because the tread length must remain constant along the stair. Changing the winder treads changes the width, so the line moves. The construction line can be edited with grips. If you move the construction line, the winder treads are affected.

Creating a U-Shaped Stair with User-Specified Settings

Use this procedure to add a U-shaped stair with settings that you specify. U-shaped stairs have two equal-length runs joined by a half-landing. The justification setting controls where the points that define the stair fall within its width.

When drawing the stair, the flights are shown with lines for each tread. Flat landings have no tread lines, while turn-type landings show tread lines through the entire turn. For turn-type stairs, these temporary lines do not necessarily represent the actual locations of tread lines in the final stair.

Creating a U-shaped stair



TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

1 Open the tool palette that you want to use, and select a stair tool.

If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Select a style.

4 For Shape, select U-shaped.

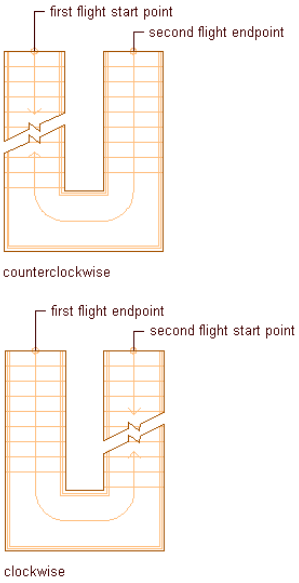
5 Specify the turn type:

If you want to…	Then…
create a flat landing where the stair run turns back in the opposite direction	select 1/2 landing for Turn type.
create stairs where the stair run turns back in the opposite direction with treads throughout the run	select 1/2 turn for Turn type.

6 Specify the horizontal orientation of the stair:

If you want to…	Then…
draw the U-shaped stair so that the right is the outer edge of the stair and left is the inner edge	select Counterclockwise for Horizontal Orientation.
draw the U-shaped stair so that the left is the outer edge of the stair and right is the inner edge	select Clockwise for Horizontal Orientation.

Specifying the horizontal direction for U-shaped stairs



7 Specify the vertical orientation of the stair:

If you want to…	Then…
draw the stair from this floor to the floor above	select Up for Vertical Orientation.
draw the stair from this floor to the floor below	select Down for Vertical Orientation.

8 Expand Dimensions.

9 Specify stair width, height, and justification:

If you want to…	Then…
specify the width of the stair	enter a value for Width.
specify the floor-to-floor height of the stair	enter a value for Height.
specify the justification of the stair	enter a value for Justify. The Justify value you select controls the insertion point when you place the stair (inside, center, or outside) at the beginning of the stair run.

10 Specify the stair termination:

If you want to…	Then…
end the stair run with a riser	select Riser for Terminate with. **NOTE** Stairs that end with a riser will have an overall height that is one tread thickness less than the floor-to-floor height specified.
end the stair run with a tread	select Tread for Terminate with.
end the stair run with a landing	select Landing for Terminate with.

11 Click next to Calculation rules, and

if you want to…	then…
specify the overall linear length of the stair	enter values for Straight Length and Riser Count, then click OK. ■ When Straight Length is set to (automatic), the value is calculated based on the tread size and riser count. ■ When Straight Length is set to (user-defined), the stair length is equal to the dimension entered, and the other three values are adjusted within the code limits. ■ When Riser Count is set to (user-defined), the tread depth is increased or decreased to accommodate the stair.

if you want to…	then…
specify the total number of stair risers	enter a value for Riser Count, then click OK. ■ When Riser Count is set to (automatic), the number of risers is based on the overall length and overall height of the stair and the code limits specified on the Design Rules tab. The Straight Length value of the stair is adjusted automatically. ■ When Riser Count is set to (user-defined), you can specify a value that is used to calculate the tread depth and riser height. If these values fall outside the stair limits, an error message is displayed.
specify the height of each riser in the stair flight	set all fields to (automatic), click the icon for Riser to change it to (user-defined), and enter a value for Riser. Click OK.
specify the tread depth for each tread in the stair flight	set all fields to (automatic), click the icon next to Tread to change it to (user-defined), and enter a value for Tread. You can also specify the Riser count when you set the tread depth. Click OK.

NOTE If a value is set to user-defined on the Calculation rules worksheet, it can be modified directly in the Properties palette.

NOTE If is displayed next to a field in the Calculation Rules dialog box, that field can't be changed until another field is changed from (user-defined) to (automatic).

12 Expand Advanced.

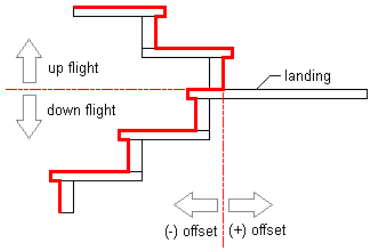
13 Specify the Constraints:

If you want to…	Then…
place the treads and risers with the minimum landing extension	select Free for Alignment.
align the tread of the up flight to the tread of the down flight	select Tread to tread for Alignment.
align the tread of the up flight to the riser of the down flight	select Tread to riser for Alignment.
align the riser of the up flight to the riser of the down flight	select Riser to riser for Alignment.

14 Specify a value for Alignment offset.

When you select Tread to tread, Tread to riser, or Riser to riser, you can specify an offset value. A positive offset value means that the down-flight tread location is closer to landing than the up-flight tread location.

Specifying tread to riser alignment offsets



15 Specify a value for the Extend alignment (Lower flight or Upper flight).

16 Specify a value for Uneven tread to determine which flight will be longer if the total number of treads is uneven. Select Upper flight to place the Uneven tread on the upper flight. Select Lower flight to place the uneven tread on the lower flight.

17 Specify floor settings:

If you want to…	Then…
change the thickness of the floor finish material at the top of the stair	enter a value for Top offset.
change the depth of the structure at the top of the stair	enter a value for Top depth.
change the thickness of the floor finish material at the bottom of the stair	enter a value for Bottom offset.
change the depth of the structure at the bottom of the stair	enter a value for Bottom depth.

18 Set the minimum height or number of risers in a stair flight, or specify *NONE*.

19 Set the maximum height or number of risers in a stair flight, or specify *NONE*.

20 In the drawing area, specify the insertion point of the stair.

You can move or hide the Properties palette to expose more of the drawing area.

21 Specify the endpoint of the stair.

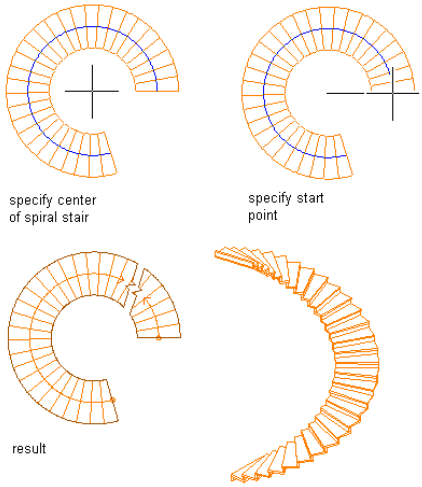
22 Continue adding stairs, or press *ENTER*.

Creating a Spiral Stair with User-Specified Settings

Use this procedure to create a circular sweeping and spiral stair. A spiral stair revolves about a common center point from bottom to top.

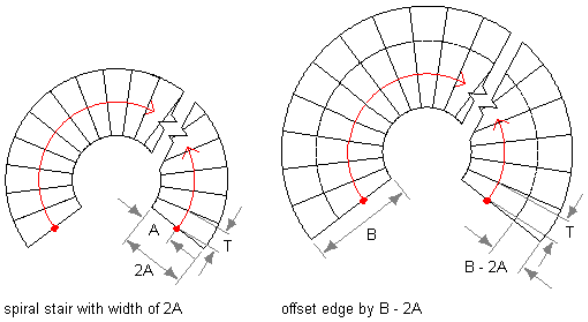
You can specify a radius directly or on the screen only when the arc constraint is free. Otherwise, the radius is determined from the specified tread length and arc constraint. In that case, you need to adjust the tread length to achieve the desired radius.

Creating a spiral stair



To create a spiral stair with the specified tread depth (T) that occurs at a specified distance from the inner edge, first construct the stair with a width equal to twice the required distance (A). Next, use Customized Edges to offset the outer edge to the desired total width B. The offset distance is equal to B - 2A.

Creating a spiral stair with a specified tread depth at a specified distance



TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

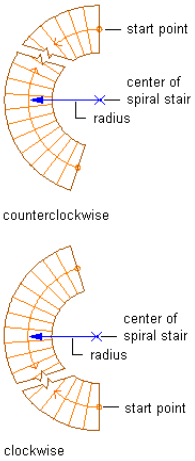
1 Open the tool palette that you want to use, and select a stair tool.
If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

2 On the Properties palette, click the Design tab, expand Basic, and expand General.
3 Select a style.
4 For Shape, select Spiral.
5 Specify the horizontal orientation of the stair:

If you want to…	Then…
draw the spiral stair in a counterclockwise direction	select Counterclockwise for Horizontal Orientation.
draw the spiral stair in a clockwise direction	select Clockwise for Horizontal Orientation.

Specifying the horizontal orientation for a spiral stair



6 Specify the vertical orientation of the stair:

If you want to…	Then…
draw the stair from this floor to the floor above	select Up for Vertical Orientation.
draw the stair from this floor to the floor below	select Down for Vertical Orientation.

NOTE If Terminate with is set to Landing, the vertical orientation is up and cannot be changed.

7 Expand Dimensions.

8 Specify stair width, height, and justification:

If you want to…	Then…
specify the width of the stair	enter a value for Width.
specify the floor-to-floor height of the stair	enter a value for Height.
specify the justification of the stair	enter a value for Justify. The Justify value you select controls the insertion point when you place the stair (inside, center, or outside) at the beginning of the stair run.

9 Specify the stair termination:

If you want to…	Then…
end the stair run with a riser	select Riser for Terminate with.

If you want to…	Then…
	NOTE Stairs that end with a riser will have an overall height that is one tread thickness less than the floor-to-floor height specified.
end the stair run with a tread	select Tread for Terminate with.
end the stair run with a landing	select Landing for Terminate with.

NOTE If the vertical orientation is set to Down, Terminate with is set to Riser and cannot be changed.

10 Specify the radius of the stair:

If you want to…	Then…
specify the exact radius for the spiral stair	select No for Specify On Screen and enter a value for Radius.
define the radius for the stair dynamically	select Yes for Specify On Screen.

11 Select the type of arc constraint to use when creating the spiral stair:

If you want to…	Then…
create a spiral stair run with no constraints	select Free for Arc constraint.
create a spiral stair with a specific number of degrees for the stair flight	select Total degrees for Arc constraint, and enter a value for Arc angle. This includes the terminal landing or tread.
create a spiral stair with a specific degree for each tread in the stair	select Degrees per tread for Arc constraint, and enter a value for Arc angle.

12 Click next to Calculation rules, and

if you want to…	then…
specify the overall linear length of the stair	enter values for Straight Length and Riser Count, then click OK. ■ When Straight Length is set to (automatic), the value is calculated based on the tread size and riser count. ■ When Straight Length is set to (user-defined), the stair length is equal to the dimension entered, and the other three values are adjusted within the code limits. ■ When Riser Count is set to (user-defined), the tread depth is increased or decreased to accommodate the stair.
specify the total number of stair risers	enter a value for Riser Count, then click OK. ■ When Riser Count is set to (automatic), the number of risers is based on the overall length and overall height of the stair and the code limits specified on the Design Rules tab. The Straight Length value of the stair is adjusted automatically. ■ When Riser Count is set to (user-defined), you can specify a value that is used to calculate the tread depth and riser height. If these values fall outside the stair limits, an error message is displayed.
specify the height of each riser in the stair flight	set all fields to (automatic), click the icon for Riser to change it to (user-defined), and enter a value for Riser. Click OK.
specify the tread depth for each tread in the stair flight	set all fields to (automatic), click the icon next to Tread to change it to (user-defined), and enter a value for Tread. You can also specify the Riser count when you set the tread depth. Click OK.

NOTE If a value is set to user-defined on the Calculation rules worksheet, it can be modified directly in the Properties palette.

NOTE If is displayed next to a field in the Calculation Rules dialog box, that field can't be changed until another field is changed from (user-defined) to (automatic).

13 Expand Advanced.

14 Specify the Floor Settings:

If you want to…	Then…
change the thickness of the floor finish material at the top of the stair	enter a value for Top offset.
change the depth of the structure at the top of the stair	enter a value for Top depth.
change the thickness of the floor finish material at the bottom of the stair	enter a value for Bottom offset.

15 Set the minimum height or amount of risers in a stair flight, or specify *NONE*.

16 Set the maximum height or number of risers in a stair flight, or specify *NONE*.

17 Specify the center point for the spiral stair.

18 Specify the location of the stair.

19 Continue adding stairs, or press *ENTER*.

Creating a Custom Stair from Linework

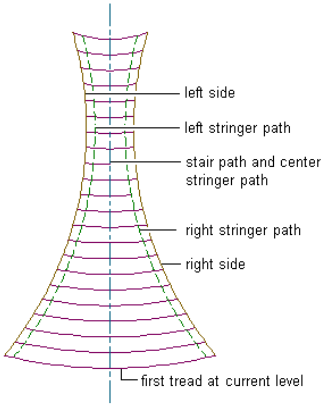
Use this procedure to create a custom stair from linework. You can model irregularly shaped stairs and treads, and specify multiple flights at varying angles with a custom stair. You can select or create linework defining stair edges and tread edges. Create a custom stair to model complex existing stair conditions for analysis and explore non-code compliant conditions, or generate stair types that are not possible to create using regular AutoCAD Architecture stair commands.

The stairs outline component of a custom stair is delineated by the left and right stair sides, the nosing of the first tread, and the front of the last tread or landing.

Stair stringers can be selected as linework, or they can be automatically generated by AutoCAD Architecture. After you create a custom stair, you can replace stringer paths. You can add or modify stringers by editing the stair style. The stair style applied to the custom stair must have stringers defined in that particular stair style. If the stair style does include stringers, the left and right stringer path lines are converted to appropriate stringer geometry. The current stair properties govern the appearance of stair components in various representations.

IMPORTANT The overall outline of the stair must not overlap at any point, or a Solution Tip will appear.

Create the linework for your custom stair using lines, light-weight polylines, or arc segments. All tread lines must intersect with the sides of the stair. Graphics representing the stringer paths must be continuous throught the path of the stair.



Linework for custom stairs can represent the following components:

- left and right stair sides (required)
- stair path (optional)
- left, right, and center stair stringers (optional)
- first tread at current level (required)
- remaining treads (required)

NOTE A custom stair must have a minimum of 2 treads. At least 2 lines must be selected for remaining treads when creating a custom stair.

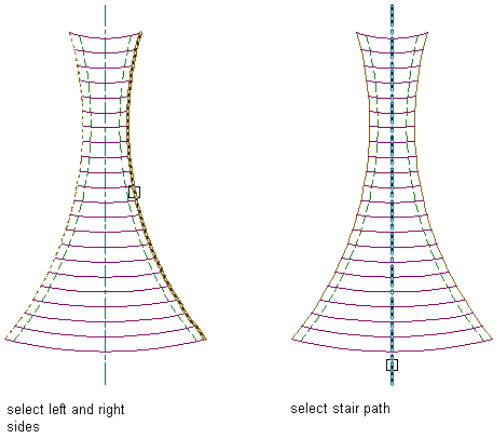
Creating a Custom Stair from Linework

1. Open the tool palette that contains the stair tool that you want to use, and select the tool.
   You may have to scroll to display the desired tool.

   TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

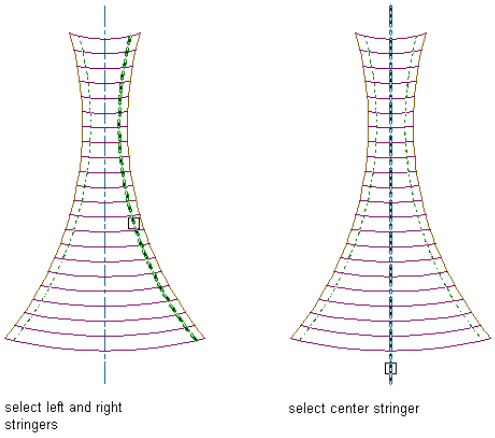
2. Verify that your current drawing includes a stair style with defined stringers.
3. Right-click the stair tool and click Apply Tool Properties to ➤ Linework.
4. Select the linework that represents the left and right sides of the custom stair.
   Only lines, light-weight polylines, or arc segments that intersect all treads can be selected for the stair sides.

5 Select the linework that represents the stair path, or press *ENTER* to have it generated automatically.



Only single or multi-segment light-weight polylines or arc segments that intersect all treads can be selected for the stair path.

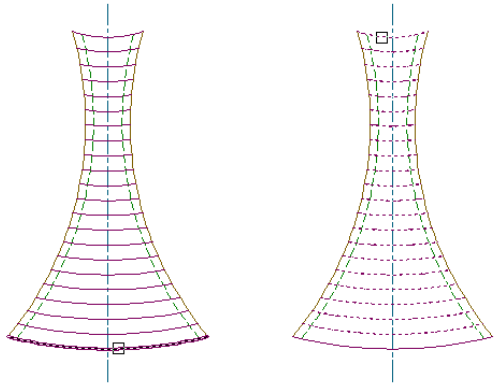
6 Select the linework that represents the left, right, and center stair stringers, or press *ENTER* to have the left, right, and center stair stringers generated automatically.



7 Select the linework that represents the first tread at the current level.

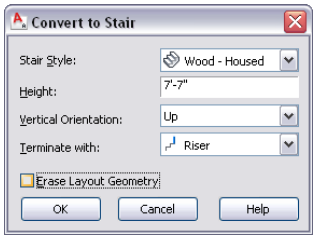
Only lines, light-weight polylines, or arc segments that intersect the stair sides can be selected for the stair treads.

8 Select the remaining treads.



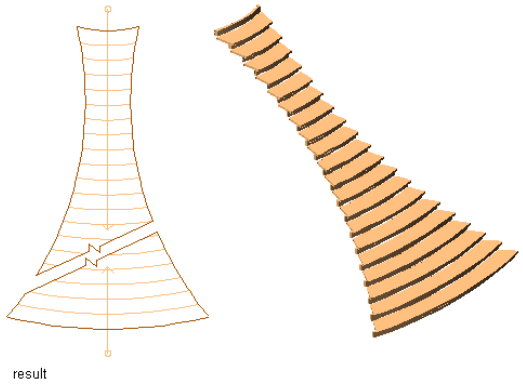
9 In the Convert to Stair dialog, verify or change the parameter values for Style, Height, Vertical Orientation, and Terminate with. Specify a style with defined stringers. Specify whether to erase the layout geometry, then click OK.

NOTE The Standard stair style does not have defined stringers.



IMPORTANT You cannot convert a custom stair to a ramp stair style.

The custom stair from linework is generated.



Once you create a custom stair, you can convert any part of it to a landing. See Modifying Custom Stairs on page 1393 to do this.

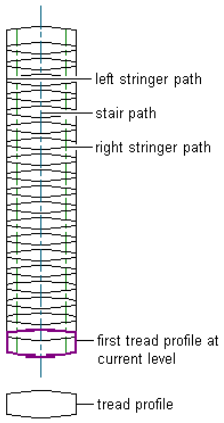
Creating a Custom Stair from Tread Profiles

Use this procedure to create a custom stair from tread profiles. Use defined profiles generated from closed polylines for custom stair treads. All tread profiles in each stair run must either intersect or overlap.

The stairs outline component of a custom stair is delineated by the left and right stair sides, the nosing of the first tread, and the front of the last tread or landing.

IMPORTANT The overall outline of the stair must not overlap at any point, or a Solution Tip will appear.

Stair stringers can be selected as linework or they can be automatically generated by AutoCAD Architecture. After you create a custom stair, you can replace stringer paths. You can add or modify stringers by editing the stair style. The current stair properties govern the appearance of stair components in various representations.



Linework and profiles for custom stairs can represent the following components:

- stair path (required)
- left and right stair stringers (optional)
- first tread profile at current level (required)
- remaining treads (required)

Creating a Custom Stair from Tread Profiles

1. Open the tool palette that contains the stair tool that you want to use, and select the tool.

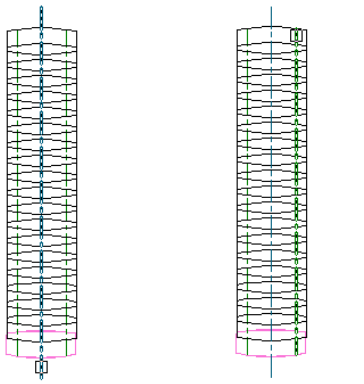
   You may have to scroll to display the desired tool.

   TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties.

2. Right-click the stair tool and click Apply Tool Properties to ➤ Linework.
3. Enter **T** for Treadprofile.
4. Select the linework that represents the stair path.

   Only single or multi-segment light-weight polylines or arc segments that intersect all treads can be selected for the stair path.

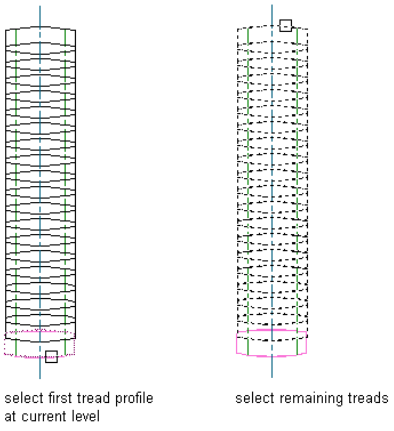
5 Select the linework that represents the left, right, and center stair stringers, or press *ENTER* to have the left, right, and center stair stringers generated automatically.



6 Select the linework that represents the first tread profile at the current level.

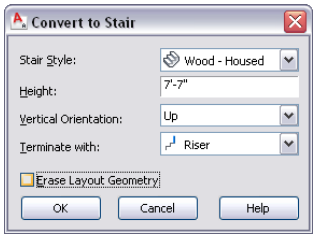
Only defined profiles can be selected for stair treads.

7 Select the remaining treads.



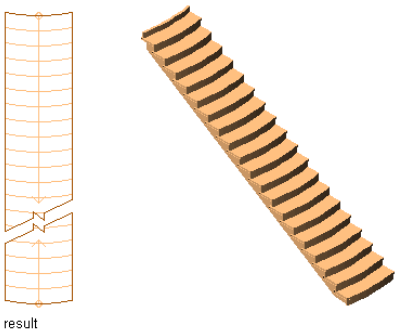
IMPORTANT You cannot covert a custom stair to a ramp stair style.

8 In the Convert to Stair dialog, verify or change the parameter values for Style, Height, Vertical Orientation, and Terminate with. Specify whether to erase the layout geometry, then click OK.



IMPORTANT You cannot convert a custom stair to a ramp stair style.

The custom stair from tread profiles is generated.



Once you create a custom stair, you can convert any part of it to a landing. See Modifying Custom Stairs on page 1393 to do this.

Modifying Custom Stairs

Use these procedures to perform the following modifications for custom stairs:

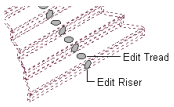
- Edit the faces of treads and risers
- Match treads and risers to source components
- Convert a tread to a landing and back again
- Replace an existing stringer path with a new stringer path by selecting linework

IMPORTANT When adding or changing the shape of treads, the overall outline of the stair must not overlap at any point, or a Solution Tip will appear.

Edit a Custom Stair Tread

1 Use this procedure to convert the edge of a custom stair tread to an arc.

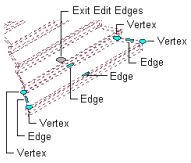
Select the custom stair that you want to change and click Stair tab ➤ Custom Stair panel ➤ Edit Tread/Riser .



A grip appears at the midpoint of each tread and riser.

2 Select the bottom Edit Tread grip.

You can select either edge or vertex grips to modify the face of the tread. The following grips are displayed for editing the face of a custom stair tread:



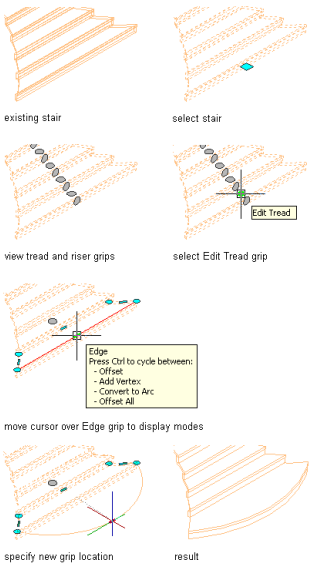
3 Move the cursor over the front Edge grip.

A tooltip with the following options is displayed:

- Offset
- Add Vertex
- Convert to Arc
- Offset All

4 Select the Edge grip, and press *CTRL* twice to cycle to the Convert to Arc option.

5 Specify a new location for the Edge grip.



Match Tread/Riser

1 Use this procedure to modify a custom stair tread by matching an existing tread on another custom stair.

Create 2 custom stairs: one with a source tread to match, and one as the destination custom stair.

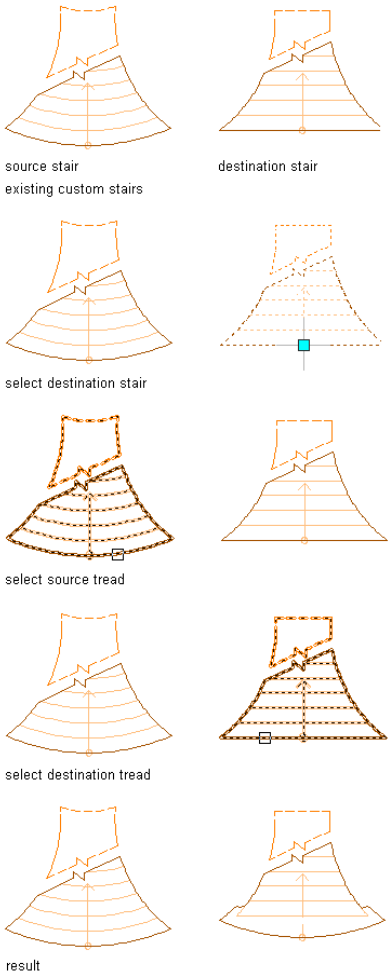
2 Select the custom stair that you want to change, and click Stair tab ➤ Custom Stair panel ➤ Match Tread/Riser .

3 Specify tread to match.

You have the option of matching a tread, a riser, or both.

4 Select the tread to match on the source custom stair.

5 Select the tread on the destination custom stair to replace.



Toggle Tread/Landing

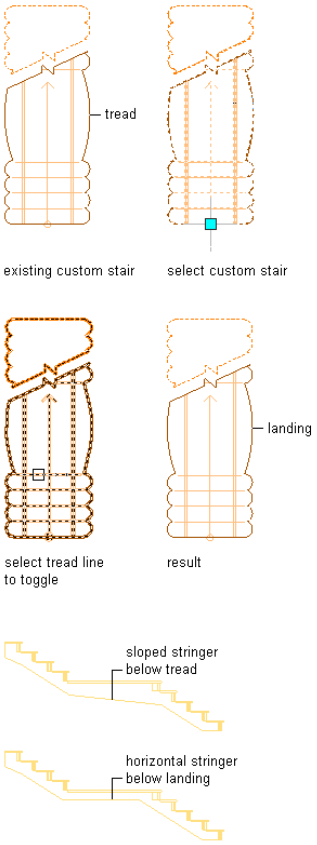
1 Use this procedure to convert a custom stair tread to a landing, or convert a custom stair landing to a tread.

Select the custom stair that you want to change, and click Stair tab ➤ Custom Stair panel ➤ Set To Tread/Landing .

2 Select the tread to convert to a landing.

When you use a stair style that has defined stringers, you can see that the stringer is parallel to the landing and sloping for the duration of the tread.

NOTE This feature does not override the Terminate with option. If Terminate with Landing is specified, you cannot use this feature to convert the landing to a tread.



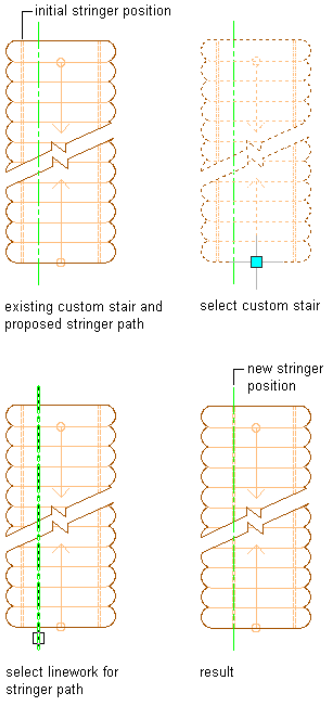
Replace Stringer Path

1 Use this procedure to replace an existing custom stair stringer path with a new stringer path by selecting linework. The linework must occur within the stair to be valid for selection as a replacement stringer path, and must follow the entire length of the stair.

Select the custom stair that you want to change, and click Stair tab ➤ Custom Stair panel ➤ Replace Stringer Path .

2 Specify the left, right, or center stringer path (depending on the custom stair configuration) to replace.

3 Select the linework to represent the new stringer path.



Creating a Ramp

Use this procedure to create a ramp using stairs. The Ramp-Concrete style (in the Stair Styles drawing) includes the correct settings for creating a ramp.

TIP For a listing of the location of all styles and support drawings, see Styles and Support Files on page 95.

The ramp stringer type should be used for creating ramps. The stringer facets display component provides the landing lines for ramps, and an End with tread setting makes the connection to the next level work correctly, instead of having one riser height between the ramp and the surface it should meet.

TIP To ensure that the Properties palette is displayed before you select a tool, click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties..

1 Import the ramp style from the Stair Styles drawing.

For information about copying styles into your drawing, see Copying Styles Between Drawings on page 570.

2 Open the tool palette that you want to use, and select a stair tool.

If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

3 On the Properties palette, expand Basic, and expand General.

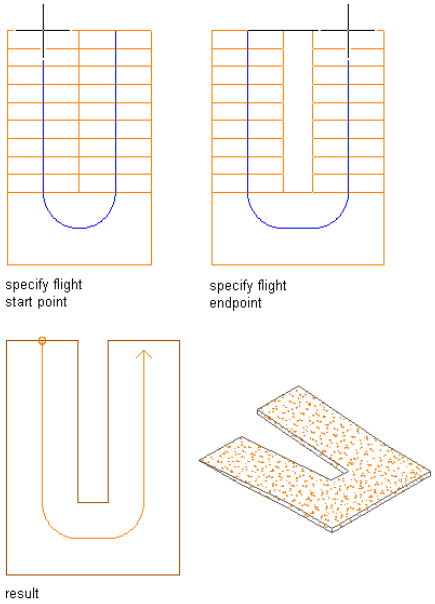
4 Select the Ramp-Concrete style.

5 Specify stair settings, such as shape, turn type, and so on.

6 Specify the location of the stair.

7 Continue adding stairs, or press *ENTER*.

Creating a U-shaped concrete ramp



Creating a Stair Tool

Use this procedure to create a stair tool and add it to a tool palette. You may want to create your own stair tools if you are placing multiple stairs of a specific style and they all have the same property.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a stair in the drawing	select the stair, and drag it to the tool palette.
create a tool from a stair style in the Style Manager	Click Manage tab ➤ Style & Display panel ➤ Style Manager. Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog	open the catalog in the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Click next to Description, enter a description of the stair created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select a stair style.

NOTE If a multi-landing or u-shaped stair is selected, the turn type can be set. If the turn type is 1/2 or 1/4 turn, the winder style can be set.

10 Select the drawing file containing the style used for this stair.

11 Click OK.

Editing Stairs

You can edit stairs by changing the style of the stair, the width and height of the stair, the size of the tread, and the justification. You can also change constraints, components, landing extensions, and location, in addition to the style and dimensions.

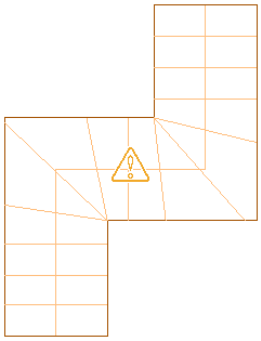
AutoCAD Architecture offers several methods for editing stairs:

- You can directly edit stairs using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see "Use Dynamic Input" in AutoCAD Help.
- You can change stair settings on the Properties palette.
- You can use editing commands from the contextual ribbon tab for a selected stair.

Using Grips to Edit Stairs

When you use grips to edit stairs, the stairway continues to be constrained by the design limits and length specified when the stair was created, if Automatic Length is set to No. This is the case for all stairs in earlier-version drawings. If you move beyond those limits, a solution tip icon is displayed.

Stair with solution tip icon



You can use grips to create multi-landing stairs that have skewed landings and angled stair runs. Changing the configuration of a landing may result in changes to the stair run.

You can increase or decrease the overall width of the stair run for U-shaped stairs.

The radius and start point can be changed for spiral stairs. You can use grips to increase or decrease the overall width of the stair run for spiral stairs. If you change the width of the stair after grip-editing a side, the changes are lost.

NOTE You cannot use any of the plan representation grips to alter the floor-to-floor height. Select the stair in a view direction other than TOP to use a grip to change the floor-to-floor height.

Each stair shape has different grips associated with it.

Using Grips to Edit Straight Stairs

Refer to the illustrations and steps in this topic to use straight stair grips to edit stairs.

Grip	Description	Animation
(Length)	Lets you change the length of a straight stair run.	*Changing the Straight Stair Length with Grips animation*
(Height)	Lets you change the height of a straight stair run.	*Changing the Straight Stair Height with Grips Animation*
(Flight Taper)	Lets you change the fight taper of a straight stair run.	*Changing the Straight Stair Flight Taper with Grips Animation*
(Edge)	Lets you change the flight width of a straight stair run by adding an edge.	*Changing the Straight Stair Flight Width Add Edge Grip Animation*
(Edge)	Lets you change the flight width of a straight stair run by moving an edge.	*Changing the Straight Stair Flight Width Move Edge Grip Animation*
(Construction Line Location)	Lets you change the construction line location of a straight stair run.	*Changing the Straight Stair Construction Line Location Grip Animation*

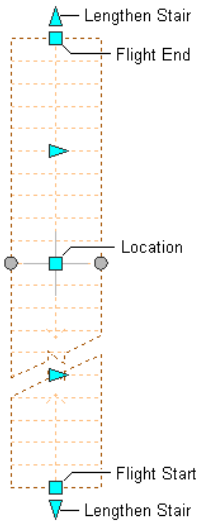
Grip	Description	Animation
(Graphics Path Location)	Lets you change the graphics path location of a straight stair run.	*Changing the Straight Stair Graphics Path Location Grip Animation*

Editing Stair Dimensions

1 Select the straight stair.

2 Select the grip for the dimension you want to change.

Straight stair Flight Start and End, Location, and Lengthen Stair grips



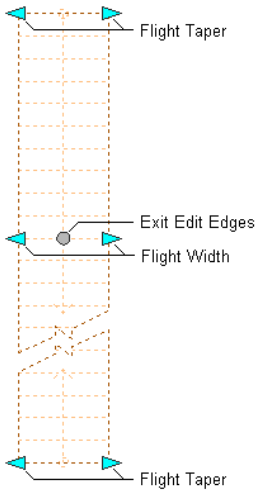
3 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

NOTE The Lengthen Stair grips move a straight stair unless it ends with a landing.

4 Click the Edit Edges grip to access the edges edit mode (flight width and flight taper).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

Straight stair Flight Taper, Flight Width, and Exit Edit Edges grips



5 When you have finished editing the stair edges, click the Exit Edit Edges grip to return to the default stair edit mode.

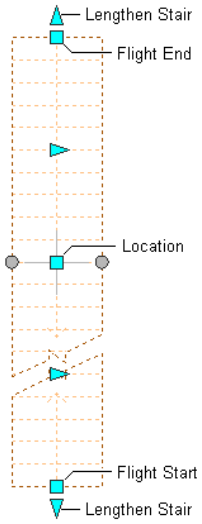
6 Continue edting, or right-click and click Deselect All to turn off grips.

Changing the Location or Position of a Straight Stair

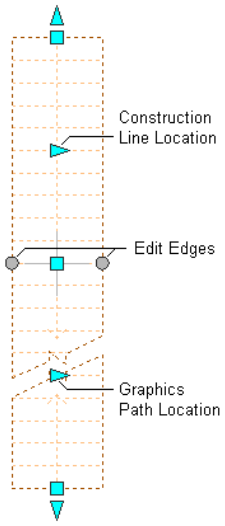
1 Select the straight stair.

2 Select the appropriate grip to change the location of the stair, its start point, construction line, graphics path, or endpoint.

Straight stair Flight Start and End, Lengthen Stair, and Location grips



Straight stair Construction Line Location, Graphics Path Location, and Edit Edges grips



3 Move the stair to the desired location, and click once; or enter a value, and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the stair along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the stair is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the stair is constrained to the *Y* dimension direction.

4 Right-click, and click Deselect All to turn off grips.

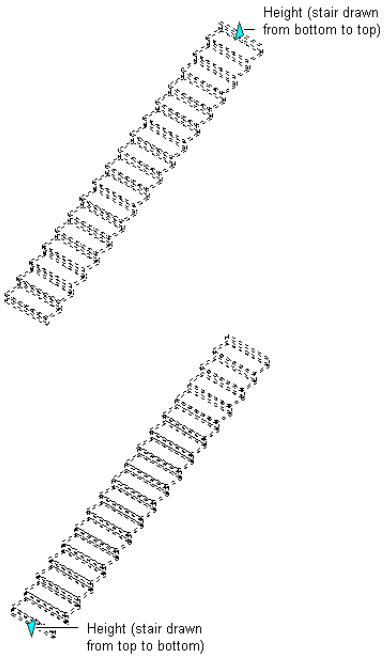
Changing the Height of a Straight Stair

1 Select the straight stair.

2 Move the Height grip to change the height of the stair.

NOTE This grip displays only in 3D views of the stair. Height cannot be edited in Plan view.

Straight stair Height grip



3 Right-click, and click Deselect All to turn off grips.

Using Grips to Edit Multi-Landing Stairs

Refer to the illustrations and steps in this topic to use multi-landing stair grips to edit stairs.

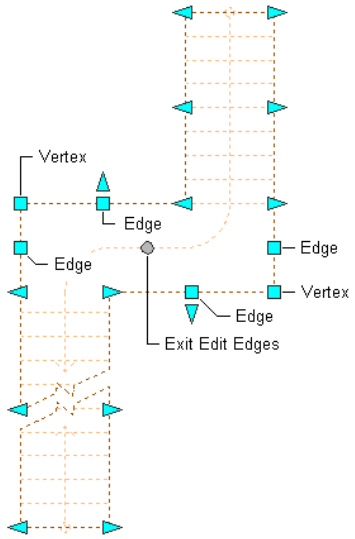
Grip	Description	Animation
(Move Flight)	Lets you move the flight of a multi-landing stair.	*Moving the Multi-landing Stair Flight with Grips animation*
(Turn Point)	Lets you move the turn point of a multi-landing stair.	*Moving the Multi-landing Stair Turn Point with Grips Animation*
(Flight Taper)	Lets you change the fight taper of a multi-landing stair.	*Changing the Multi-landing Stair Flight Taper with Grips Animation*
(Edge)	Lets you change the flight width of a multi-landing stair run by moving an edge.	*Changing the Multi-landing Stair Flight Width Move Edge Grip Animation*
(Construction Line Location)	Lets you change the construction line location of a multi-landing stair.	*Changing the Multi-landing Stair Construction Line Location Grip Animation*
(Graphics Path Location)	Lets you change the graphics path location of a multi-landing stair.	*Changing the Multi-landing Stair Graphics Path Location Grip Animation*

Editing Multi-Landing Stair Dimensions

1 Select the multi-landing stair.

2 Select the grip for the dimension you want to change.

Multi-landing stair landing Edge and Vertex, and Exit Edit Edges grips

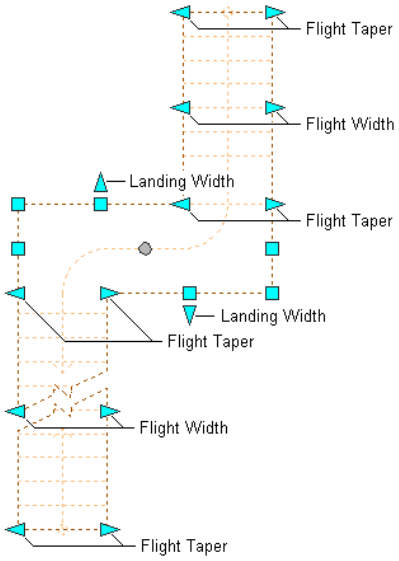


3 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

4 Click the Edit Edges grip to access the edges edit mode (flight width and flight taper).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

Multi-landing stair Flight Taper and Flight Width, and Landing Width grips



5 When you have finished editing the stair edges, click the Exit Edit Edges grip to return to the default stair edit mode.

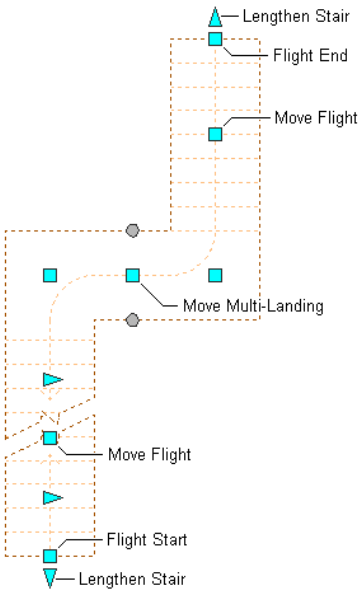
6 Continue edting, or right-click, and click Deselect All to turn off grips.

Changing the Location or Position of a Multi-Landing Stair

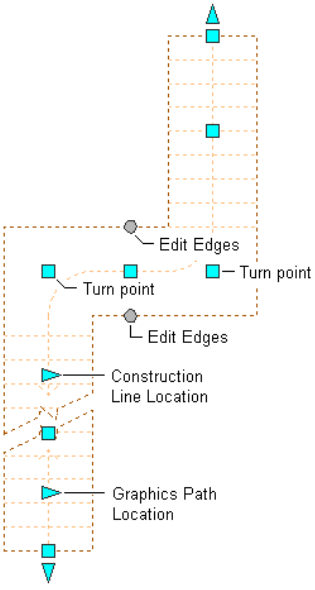
1 Select the multi-landing stair.

2 Select the appropriate grip to change the location of the stair, its start point, construction line, graphics path, or endpoint.

Multi-landing stair Flight Start and End, Move Flight, Move Multi-Landing, and Lengthen Stair grips



Multi-landing stair Landing Turn Point, Construction Line Location, Graphics Path Location, and Edit Edges grips



3 Move the stair to the desired location, and click once; or enter a value, and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the stair along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the stair is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the stair is constrained to the *Y* dimension direction.

4 Right-click, and click Deselect All to turn off grips.

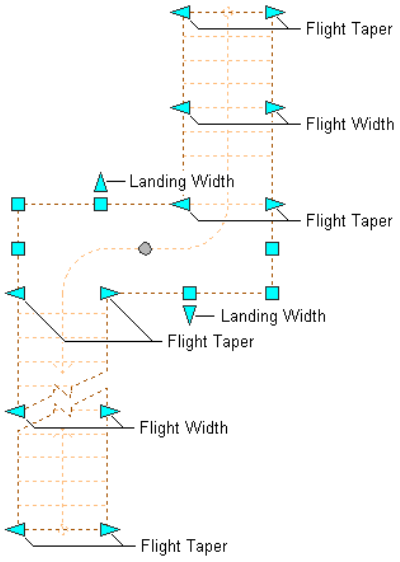
Changing the Shape of Landings for Multi-Landing Stair

1 Select the multi-landing stair.

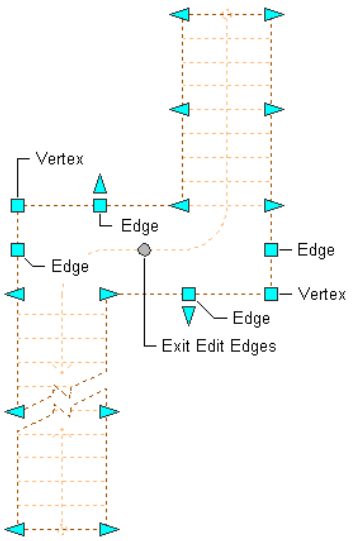
2 Select the Edit Edges grip to access the edges edit mode (landing width, landing edges, and landing vertices).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

Multi-landing stair Flight Taper and Flight Width, and Landing Width grips



Multi-landing stair Landing Edge and Vertex, and Exit Edit Edges grips



3 Move the appropriate grip to change the shape of the landing of the stair.

NOTE Once a landing edge has been customized by moving any of the vertex or edge grips, the landing width grips are no longer displayed.

4 When you have finished editing the landing edges, click the Exit Edit Edges grip to return to the default stair edit mode.

5 Right-click, and click Deselect All to turn off grips.

Changing the Location of a Landing for a Multi-Landing Stair

1 Select the multi-landing stair.

2 Move the appropriate grip to change the location of the landing by changing the location of the turn point for each side of the landing, or by moving the entire landing.

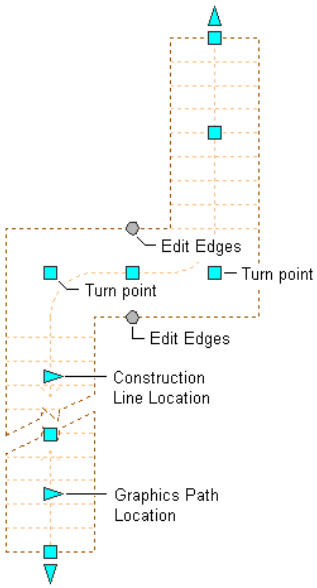
3 Right-click, and click Deselect All to turn off grips.

Changing the Construction Line or Graphics Path of a Multi-Landing Stair

1 Select the multi-landing stair.

2 Move the Construction Line or Graphics Path grip.

Multi-landing stair landing Turn Point, Construction Line Location, Graphics Path Location, and Edit Edges grips



NOTE Only one of the Construction Line or Graphics Path can be displayed at a time. This is controlled on the Other tab of the current plan display representation. For information about this setting, see Specifying the Display of Other Characteristics of a Stair on page 1480.

3 Right-click, and click Deselect All to turn off grips.

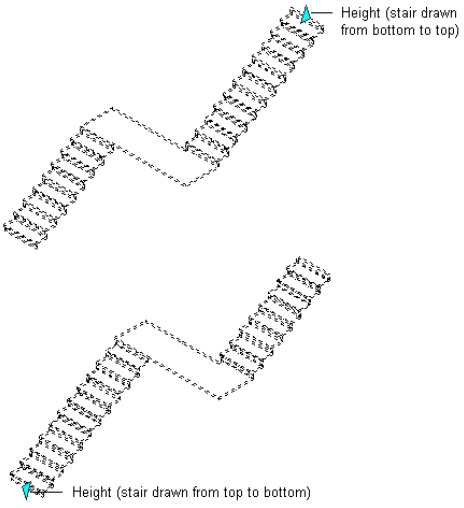
Changing the Height of a Multi-Landing Stair

1 Select the multi-landing stair.

2 Move the Height grip to change the height of the stair.

NOTE This grip displays only in 3D views of the stair.

Multi-landing stair Height grip



3 Right-click, and click Deselect All to turn off grips.

Using Grips to Edit U-Shaped Stairs

Refer to the illustrations and steps in this topic to use U-shaped stair grips to edit stairs.

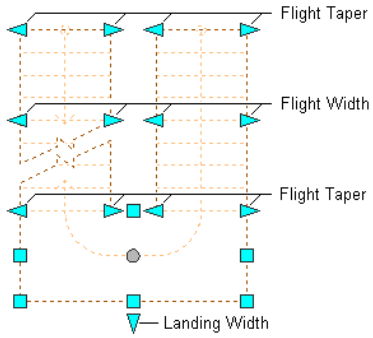
Grip	Description	Animation
(Flight Start)	Lets you change the flight start point of a u-shaped stair.	*Changing the U-shaped Stair Flight Start Point with Grips animation*
(Flip End)	Lets you flip the end of a u-shaped stair.	*Flipping the U-shaped Stair End with Grips Animation*
(Flip Side)	Lets you flip the side of a u-shaped stair.	*Flipping the U-shaped Stair Side with Grips Animation*
(Flight Taper)	Lets you change the fight taper of a u-shaped stair.	*Changing the U-shaped Stair Flight Taper with Grips Animation*
(Edge)	Lets you change the flight width of a u-shaped stair by adding an edge.	*Changing the U-shaped Stair Flight Width Add Edge Grip Animation*
(Edge)	Lets you change the flight width of a u-shaped stair by moving an edge.	*Changing the U-shaped Stair Flight Width Move Edge Grip Animation*
(Construction Line Location)	Lets you change the construction line location of a u-shaped stair.	*Changing the U-shaped Stair Construction Line Location Grip Animation*
(Graphics Path Location)	Lets you change the graphics path location of a u-shaped stair.	*Changing the U-shaped Stair Graphics Path Location Grip Animation*
(Edge)	Lets you change the landing width of a u-shaped stair by adding an edge.	*Changing the U-shaped Stair Landing Width Add Edge Grip Animation*
(Edge)	Lets you change the landing width of a u-shaped stair by moving an edge.	*Changing the U-shaped Stair Landing Width Move Edge Grip Animation*

Editing U-Shaped Stair Dimensions

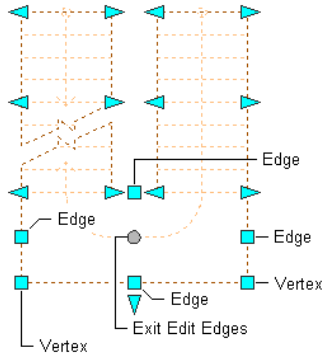
1. Select the U-shaped stair.
2. Select the Edit Edges grip to access the edges edit mode (flight width, flight taper, and landing width).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

U-shaped stair Flight Taper, Flight Width, and Landing Width grips



U-shaped stair Landing Vertex and Edge, and Exit Edit Edges grips



3 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

4 When you have finished editing the stair edges, click the Exit Edit Edges grip to return to the default stair edit mode.

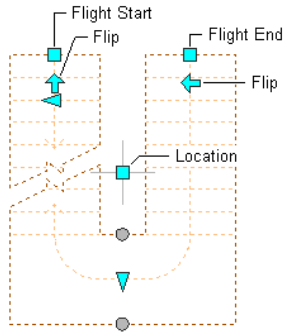
5 Right-click, and click Deselect All to turn off grips.

Changing the Location or Position of a U-Shaped Stair

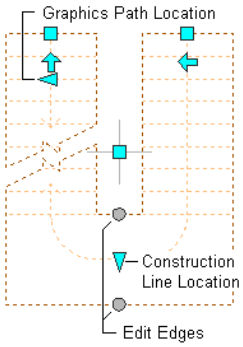
1 Select the U-shaped stair.

2 Select the appropriate grip to change the location of the stair, its start point, construction line, graphics path, or endpoint.

U-shaped stair Flight Start and End, Flip, and Location grips



U-shaped stair Graphics Path Location, Construction Line Location, and Edit Edges grips



3 Move the stair to the desired location, and click once; or enter a value, and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the stair along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the stair is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the stair is constrained to the *Y* dimension direction.

4 Right-click, and click Deselect All to turn off grips.

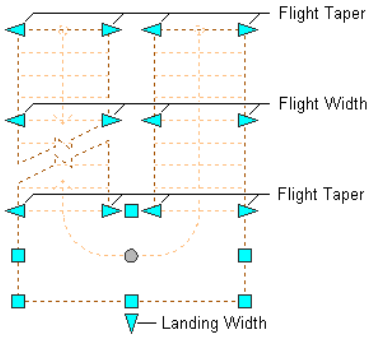
Changing the Shape of Landings for a U-Shaped Stair

1 Select the U-shaped stair.

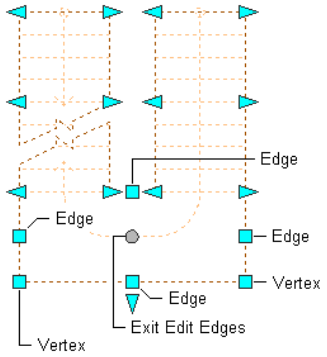
2 Select the Edit Edges grip to access the edges edit mode (landing width, landing edges, and landing vertices).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

U-shaped stair Flight Taper, Flight Width, and Landing Width grips



U-shaped stair Landing Vertex and Edge, and Exit Edit Edges grips



3 Move the appropriate grip to change the shape of the landing of the stair.

4 When you have finished editing the landing edges, click the Exit Edit Edges grip to return to the default stair edit mode.

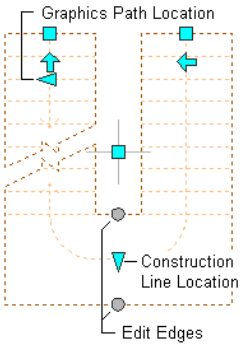
5 Right-click, and click Deselect All to turn off grips.

Changing the Construction Line or Graphics Path of a U-Shaped Stair

1 Select the U-shaped stair.

2 Move the Construction Line or Graphics Path grip.

U-shaped stair Graphics Path Location, Construction Line Location, and Edit Edges grips



NOTE Only one of the Construction Line or Graphics Path can be displayed at a time.

3 Move the appropriate Flip grip to flip the stair landing from one side of the flight start grip to the other, or to switch the two flights.

4 Right-click, and click Deselect All to turn off grips.

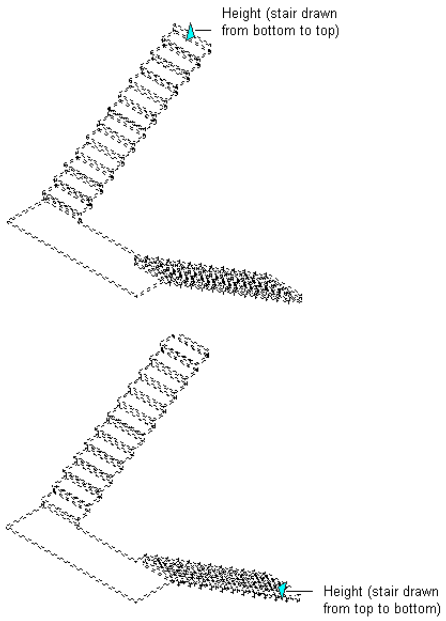
Changing the Height of a U-Shaped Stair

1 Select the U-shaped stair.

2 Move the Height grip to change the height of the stair.

NOTE This grip displays only in 3D views of the stair.

U-shaped stair Height grip



3 Right-click, and click Deselect All to turn off grips.

Using Grips to Edit Spiral Stairs

Refer to the illustrations and steps in this topic to use spiral stair grips to edit stairs.

Grip	Description	Animation
(Radius)	Lets you change the radius of a spiral stair.	*Changing the Spiral Stair Radius with Grips animation*
(Rotate Flight)	Lets you rotate the flight of a spiral stair.	*Rotating the Flight of a Spiral Stair with Grips Animation*
(Height)	Lets you change the height of a spiral stair.	*Changing the Height of a Spiral Stair with Grips Animation*
(Flight Taper)	Lets you change the fight taper of a spiral stair.	*Changing the Spiral Stair Flight Taper with Grips Animation*
(Edge)	Lets you change the flight width of a spiral stair by adding an edge.	*Changing the Spiral Stair Flight Width Add Edge Grip Animation*
(Edge)	Lets you change the flight width of a spiral stair by moving an edge.	*Changing the Spiral Stair Flight Width Move Edge Grip Animation*
(Flip)	Lets you flip a spiral stair.	*Flipping the Spiral Stair Grip Animation*

Grip	Description	Animation
(Graphics Path Location)	Lets you change the graphics path location of a spiral stair.	*Changing the Spiral Stair Graphics Path Location Grip Animation*

Editing Spiral Stair Dimensions

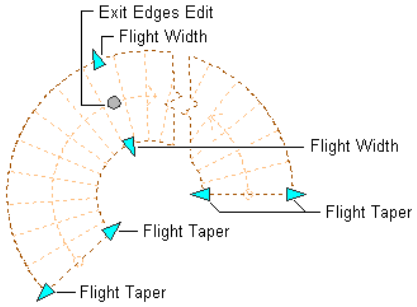
1 Select the spiral stair.

2 Select the Edit Edges grip to access the edges edit mode (flight width and flight taper).

NOTE Alternatively, click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Edit.

3 Select the grip for the dimension you want to change.

Spiral stair Flight Taper and Width, and Exit Edges Edit grips



4 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

5 When you have finished editing the stair edges, click the Exit Edit Edges grip to return to the default stair edit mode.

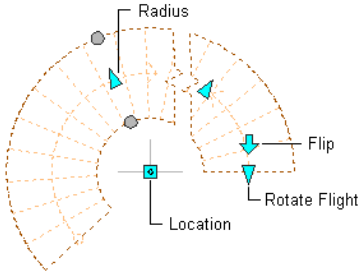
6 Right-click, and click Deselect All to turn off grips.

Changing the Location or Position of a Spiral Stair

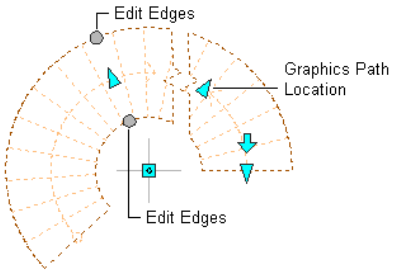
1 Select the spiral stair.

2 Select the appropriate grip to change the location of the stair, its start point, construction line, graphics path, or endpoint. You can also flip the stair around the start point.

Spiral stair Radius, Flip, Rotate Flight, and Location grips



Spiral stair Graphics Path Location and Edit Edges grips



3 Move the stair to the desired location, and click once; or enter a value, and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the stair along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the stair is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the stair is constrained to the *Y* dimension direction.

4 Right-click, and click Deselect All to turn off grips.

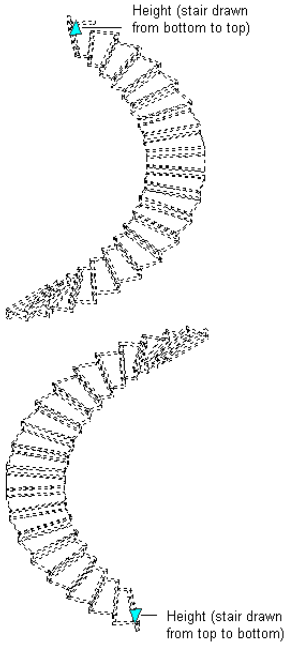
Changing the Height of a Spiral Stair

1 Select the spiral stair.

2 Move the Height grip to change the height of the stair.

NOTE This grip displays only in 3D views of the stair.

Spiral stair Height grip



3 Right-click, and click Deselect All to turn off grips.

Changing the Width of a Flight

Use this procedure to change width of a stair flight. You can also change the stair width on the Properties palette.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

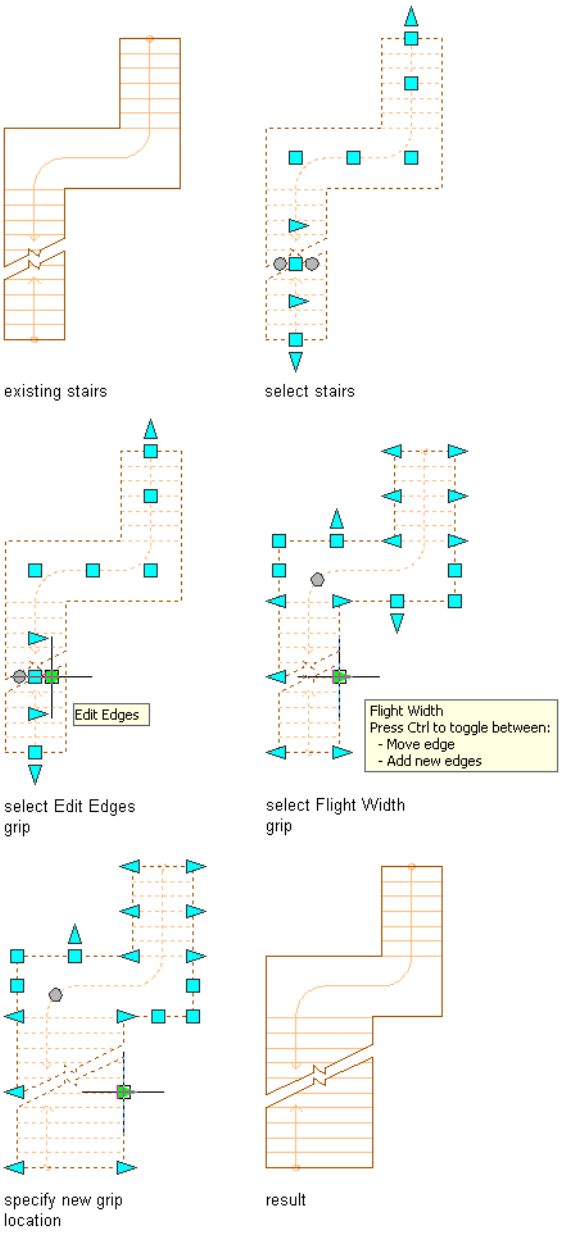
NOTE If you change the width of the stair after grip-editing a side, the grip changes are lost.

1. Select the stair.
2. Select a Flight Width grip, move the grip until the width value you want is displayed, and click once.

   After selecting a grip, you can also enter a precise value to increase or decrease the width of the stair.

   The entire edge of the flight moves to the selected location. The flight entry width also changes to fit the new stair width.

Using grips to change stair flight width



3 Right-click, and click Deselect All to turn off grips.

Changing the Shape of a Flight

Use this procedure to change the top and bottom width of a single flight on U-shaped, multi-landing, or spiral-shape stairs. Each side of a flight can be tapered independently using grip points.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

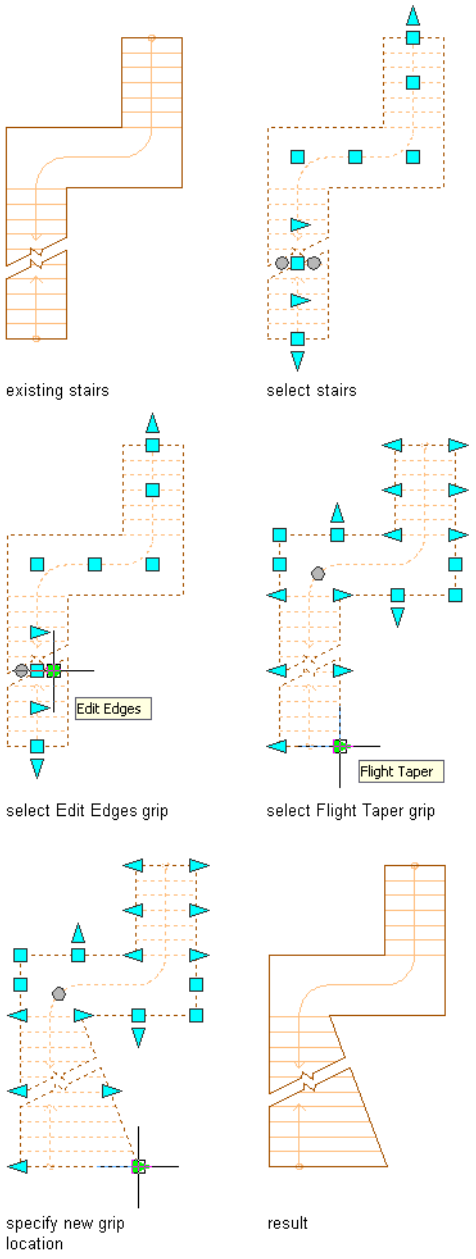
NOTE If you change the width of the stair after grip editing a side, the grip changes are lost.

1 Select the stair to modify.

2 Select the Flight Taper grip on the stair flight, and move the grip away from stair path to new location.

The flight changes to the new shape.

Using grips to change stair flight taper



3 Right-click, and click Deselect All to turn off grips.

Changing the Shape of a Landing

Use this procedure to change the angles and positions of landing edges on U-shaped and multi-landing stairs. Each edge of a landing can be tapered or moved independently using grip points.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

NOTE If you change the width of the stair after grip-editing a side, the grip changes are lost.

1 Select the stair to modify.

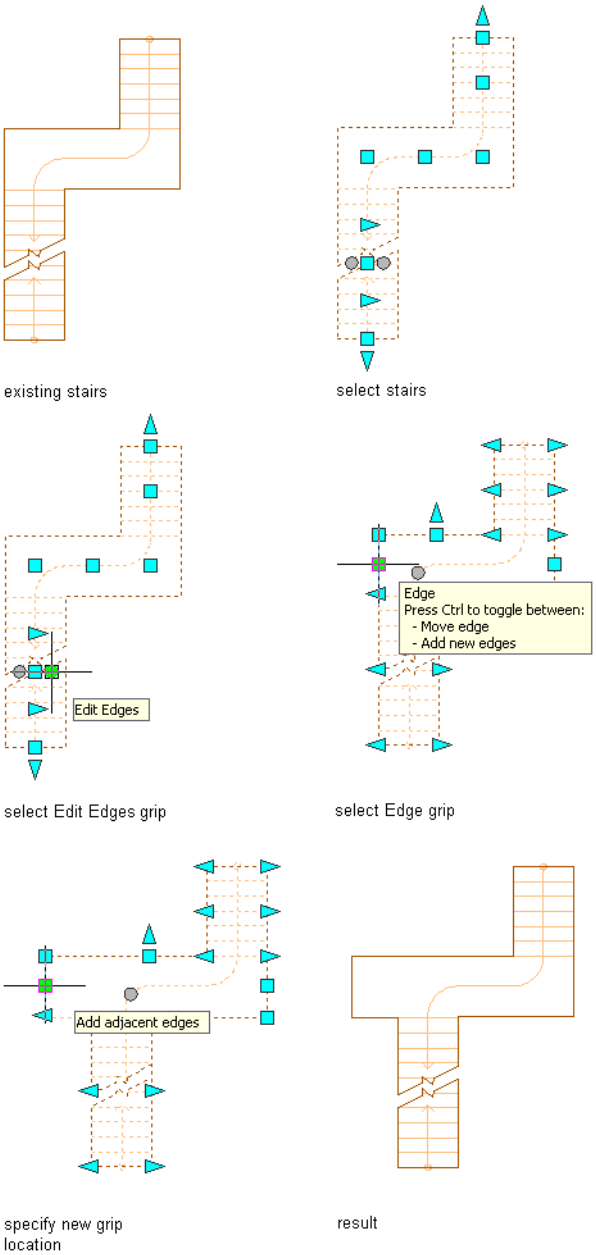
2 Select a Vertex grip on the landing, and move the grip away from the stair path to a new location.

The landing changes to the new shape. If the vertex grip is shared between a landing and flight, the flight moves with the landing.

3 Select an Edge grip on the landing, and move the grip perpendicular to the stair path to the new location.

The entire edge of the landing moves to the selected location.

Using grips to change a stair landing width by adding an edge



4 Select an Edge grip on the side of a landing, press *CTRL*, then move the grip away from the stair path.

   An adjacent edge of the landing is created.

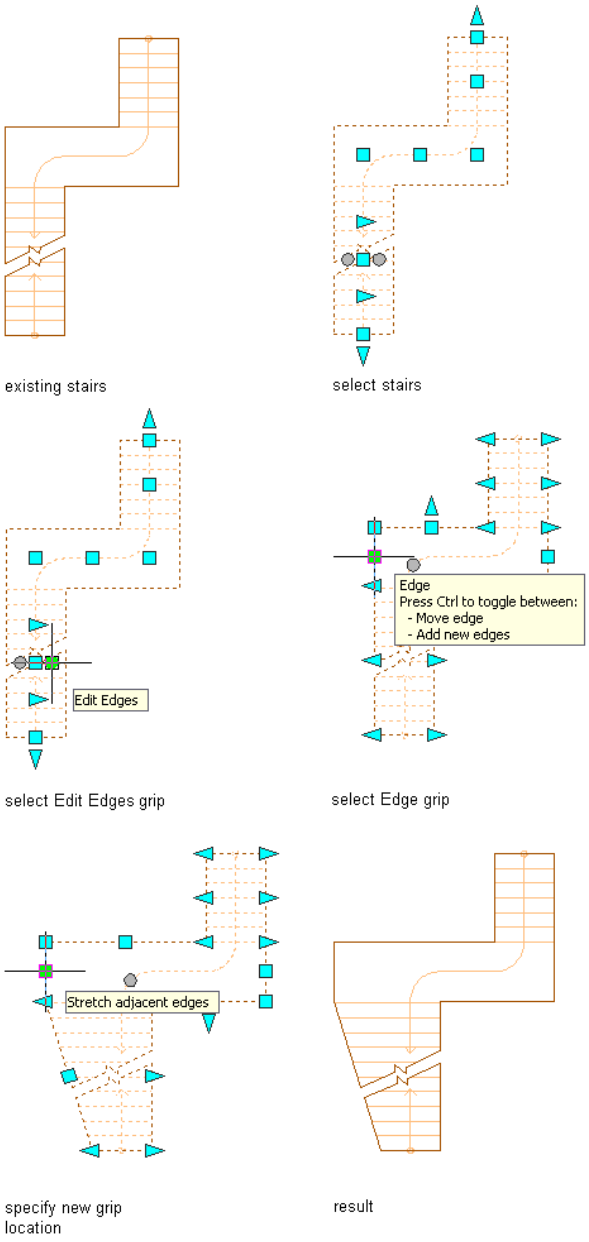
5 Right-click, and click Deselect All to turn off grips.

Changing the Side of a Stair

You can determine the shape of one edge of a stair run that includes flights and landings for straight, U-shaped, multi-landing, or spiral stairs.

The size of the landing must be adjusted to prevent overlapping treads when the inner edge of a stair is projected to a profile that lies outside the original stair. The initial size of the landing is determined by projecting the diagonal of the original landing to the profile.

Using grips to change a stair landing width

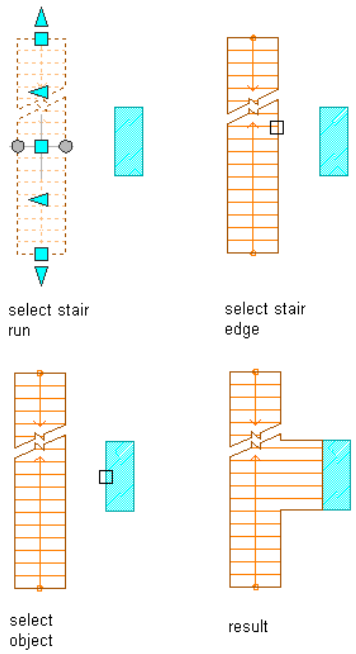


Pushing one tread into the landing with its grip forces the landing to lengthen in the other direction. Pulling one tread away from the landing does not affect the other end of the landing. The stair is lengthened at its top to accommodate the larger landing. You can modify the length with the top and bottom grips, at the end of the stair walking path.

About Projecting the Side of a Stair

You can project the edge of a stair to most AEC objects, such as walls or mass elements, but excluding multi-view blocks.

Projecting a stair edge to an object



NOTE When projecting an edge of a stair that has an inner corner, it is clear how to project the outer edge of the stair to the selected object, but projection of the inner corner is ambiguous. Rather than attempting to guess the correct solution, these cases are not projected, and a dialog box is displayed with an explanation that edges of stairs with interior corners can be projected only to objects that extend beyond both ends of the stair.

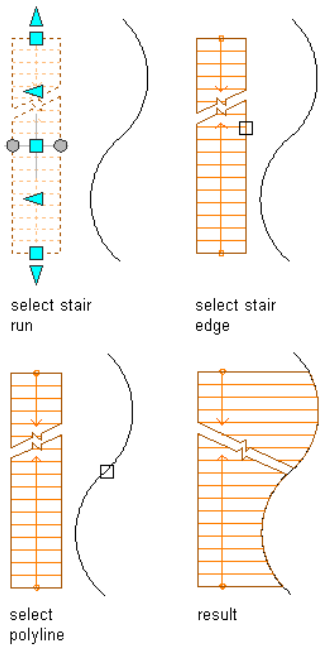
The stair length is extended at its original width when the object (or polyline) does not extend far enough for the stair to project completely.

Projecting the Side of a Stair

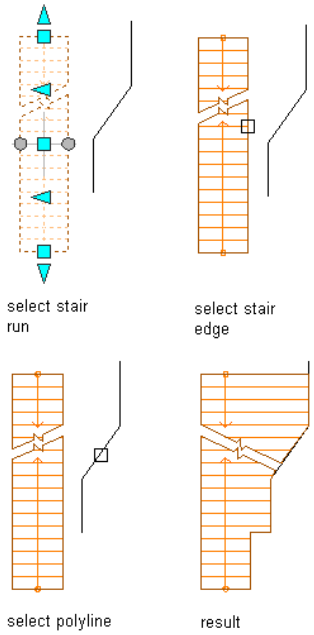
Use this procedure to project the side of a stair to an existing polyline, wall, other AEC object, or solid. Objects to project to must extend the full length of the stair for an interior corner to project properly.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

Projecting stair edges to curved polyline segments



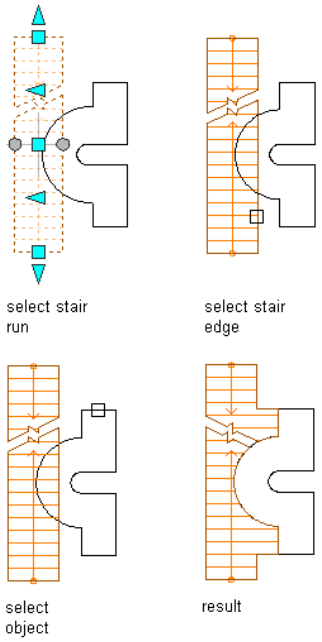
Projecting stair edges to straight polyline segments



NOTE If you change the width of the stair after projecting a side, the changes to the projected edge are lost.

1. Select a stair, and click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Project.
2. Select the edge of a stair to change.
3. Select a polyline, object or profile to project to, and press *ENTER*.

Projecting stair edges to a profile



Treads are extended using the line of the current front and back edge.

NOTE If edges intersect, which can happen with only spiral and winding shapes, a solution tip icon displays.

Offsetting the Side of a Stair

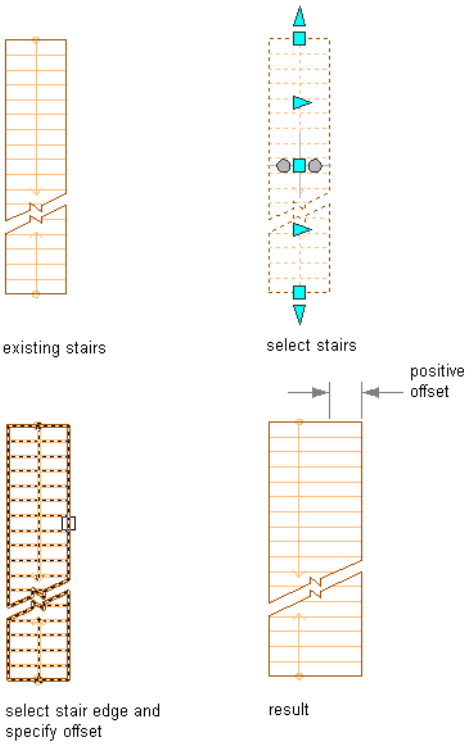
Use this procedure to offset the side of a stair flight by a specified value.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

NOTE If you change the width of the stair after offsetting a side, the offset changes are lost.

1. Select a stair, and click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Offset.
2. Select the edge of a stair to be offset.
3. Enter the distance to offset, where positive is out and negative is in, and press *ENTER*.
   Treads are extended using the line of the current front and back edge.

Offsetting the edge of a stair



NOTE If edges intersect, which can happen with only spiral and winding shapes, a solution tip icon displays.

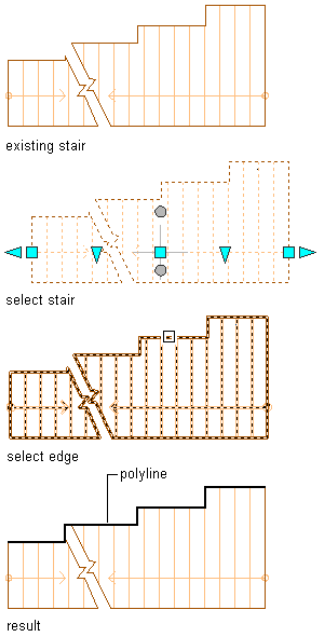
Generating a Polyline from the Edge of a Stair

Use this procedure to generate a polyline from the edge of a stair. The polyline is generated at the stair bottom elevation.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

You can keep some sample polylines in the drawing, and use the final choice to project to. That way, you can project the stair edge, edit the stair, and then generate the polyline, change the stair again, generate another polyline, change the stair again, and, finally, project to the best version you created.

Generating a polyline from a stair edge



1. Select a stair, and click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Generate Polyline.
2. Select the edge of a stair.
3. Press *ENTER*.

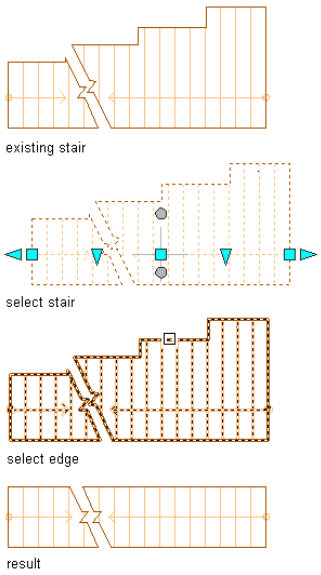
A polyline is created at the stair bottom elevation along the length of the stair run.

Removing Changes from the Side of a Stair

Use this procedure to return the selected edge of the stair to its default profile. If the stair is back to its original condition, the width is restored to the original value, rather than *VARIES*. This change affects the treads, risers, and stringers.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

Removing changes made to the side of a stair



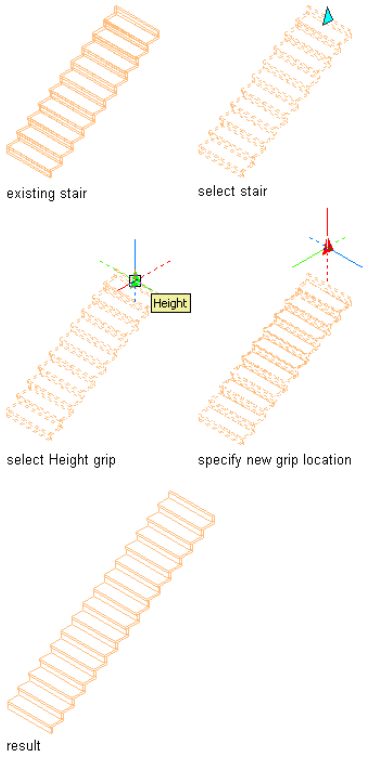
1. Select a stair, and click Stair tab ➤ Modify panel ➤ Customize Edge drop-down ➤ Remove Customization.
2. Select the edge of a stair.
3. Press *ENTER*.

Changing the Height of a Stair

Use this procedure to change the height of a stair. You can also change the stair height on the Properties palette.

For more information about stair grips, see Using Grips to Edit Stairs on page 1399.

Changing the height of a stair using grips



1 Select the stair in an isometric view.

2 Select the Height grip, move the grip until the value you want is displayed, and click once.

After selecting a grip, you can also enter a precise value to increase or decrease the height of the stair.

NOTE If you edit the height of a stair with landings, so that a landing would be below the new height, the landing is not displayed. If you edit the height again, and move it to a location above the previous landing, the landing is no longer there. To retain the stair path, which includes the landing, use the AecStairFit command to set Automatic Landings to No.

Changing the Justification of a Stair

Use this procedure to change the justification of an individual stair. The stair remains in the same location, but changes in the width keep the new justification point constant.

For example, a stair with right justification changes the left edge when the width is changed.

1 Select the stair you want to change, and double-click it.

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Select Left, Center, or Right for Justify.

This does not change the location of the stair, but changing this value specifies the point from which changes to the width are calculated from now on.

Changing the Style of a Stair

Use this procedure to select a different stair style for one or more stairs.

1 Select the stairs to change, and double-click one of them.

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Select a different style.

Changing the Horizontal Direction of a Spiral or U-Shaped Stair

Use this procedure to change the orientation of a spiral stair.

1 Double-click a spiral or U-shaped stair to open the Properties palette.

2 Click the Design tab, expand Basic, and expand General.

3 Specify the horizontal orientation of the stair:

If you want to…	Then…
draw the spiral or U-shaped stair in a counterclockwise direction	select Counterclockwise for Horizontal Orientation.
draw the spiral or U-shaped stair in a clockwise direction	select Clockwise for Horizontal Orientation.

NOTE This is equivalent to selecting the Flip grip that mirrors the stair around its start point.

Changing the Constraints of a Spiral Stair

Use this procedure to control what constrains the spiral stair by specifying the total degrees or the number of degrees per tread to use. These fields are available only when you select a spiral-shaped stair to modify.

1 Double-click a spiral stair to open the Properties palette.

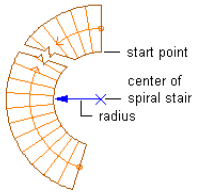
2 Click the Design tab, expand Basic, and expand Dimensions.

3 Specify the arc constraint:

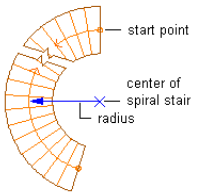
If you want to…	Then…
display the spiral stair with no constraint	select Free for Arc constraint.
specify the total degrees for the stair flight	select Total degrees for Arc constraint, and enter a value for Arc angle.
specify the specific degree for each tread in the stair	select Degrees per tread for Arc constraint, and enter a value for Arc angle.

4 Specify the Radius of the stair.

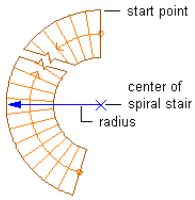
The radius is measured from the center point of the spiral stair to the selected justification point.



right-justified



center-justified



left-justified

Changing the Outside Edge of a Spiral Stair

Use this procedure to change the outside edge of a spiral stair. You can change the edge in two ways:

- When you use the Flight Width grip point, you uniformly change the width of the stair along the entire arc. The endpoints of the outer edges of the stair move. This changes the size of the stair.
- When you click the Flight Width grip point and press *CTRL*, you maintain the center of the stair and the outside grip points. This changes the shape of the stair.

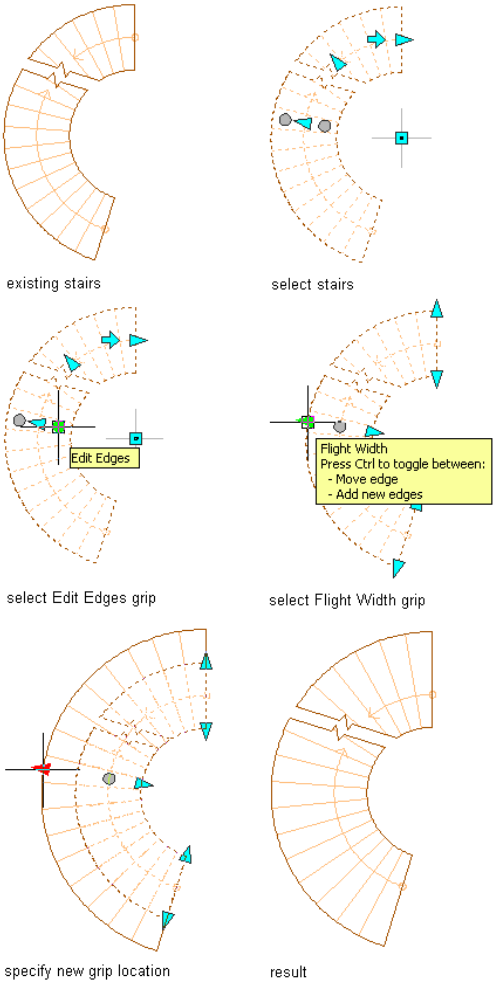
1 Select a spiral stair.

2 Change a spiral stair:

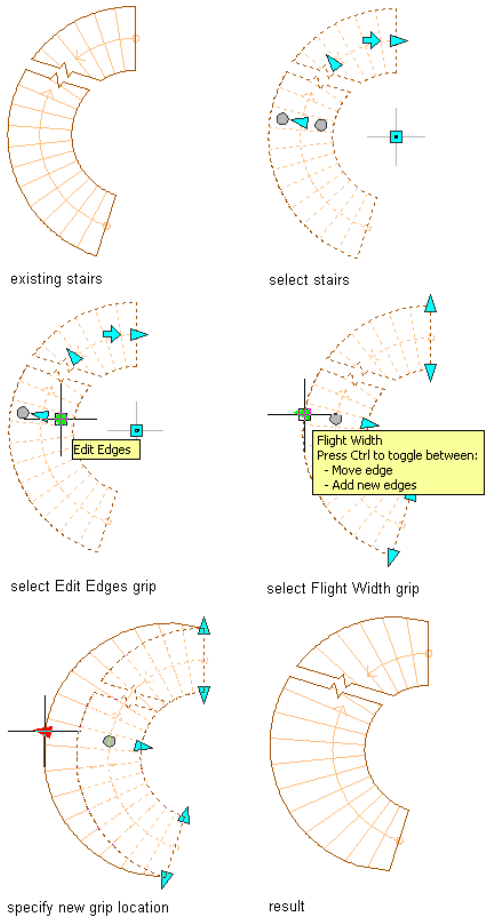
If you want to…	Then…
uniformly change the width of a spiral stair along the entire arc	click the Flight Width grip of the spiral stair.
maintain the center and outside grip points while changing the shape of a spiral stair	click the Flight Width grip of the spiral stair and press *CTRL*.

3 Move the grip to change the size or shape of the stair.

Using grips to change the flight width of a spiral stair run



Using grips to change the shape of a spiral stair run by adding an edge



4 Right-click, and click Deselect All to turn off grips.

Changing the Dimensions of a Stair

Use this procedure to control the various dimensions associated with calculating the stair.

Some of the interacting dimensions can be user-defined and some are automatic, depending upon the combination of fields that are selected. Only logical combinations are available when the rule-based calculator is in effect. When the rule-based calculator is not in effect, either tread or straight length can be user-defined and either riser count or riser height can be user-defined.

1 Double-click the stair to open the Properties palette.

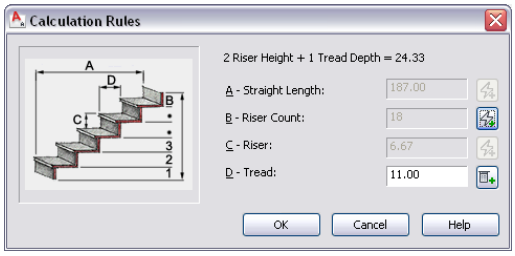
2 Click the Design tab, expand Basic, and expand Dimensions.

3 Change any of the dimensions of the stair:

If you want to…	Then…
specify the width of the stair run	enter a value for Width. **NOTE** If you change the width of the stair after grip-editing or otherwise customizing an edge, the changes are lost.

If you want to…	Then…
specify the floor-to-floor height for the stair	enter a value for Height.
specify the justification of the stair	select Left, Center, or Right for Justify. This does not change the location of the stair, but changing this value determines the point from which the width is calculated if it is subsequently changed.

4 Select next to Calculation rules:



If you want to…	Then…
specify the overall linear length of the stair	enter values for Straight Length and Riser Count. ■ When Straight Length is set to (automatic), the value is calculated based on the tread size and riser count. ■ When Straight Length is set to (user-defined), the stair length is equal to the dimension entered, and the other three values are adjusted within the code limits. If these values fall outside the stair limits, an error message is displayed. ■ When Riser Count is set to (user-defined), the tread depth is increased or decreased to accommodate the stair.
specify the total number of stair risers	enter a value for Riser Count. ■ When Riser Count is set to (automatic), the number of risers is based on the overall length and overall height of the stair and the code limits specified on the Design Rules tab. The Straight Length value of the stair is adjusted automatically. ■ When Riser Count is set to (user-defined), you can specify a value that is used to calculate the tread depth and riser height. If these values fall outside the stair limits, an error message is displayed.

If you want to…	Then…
specify the height of each riser in the stair flight	set all fields to (automatic), click the icon to Riser to change it to (user-defined), and enter a riser height value.
specify the tread depth for each tread in the stair flight	set all fields to (automatic), click the icon next to Tread to change it to (user-defined), and enter a tread depth value. You can also specify the Riser Count when you set the tread depth.

NOTE If is displayed next to a field in the Calculation Rules dialog box, that field can't be changed until another field is changed from (user-defined) to (automatic).

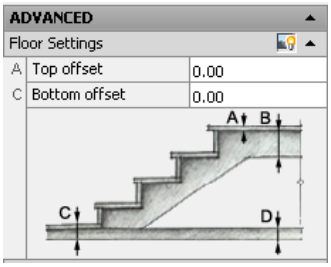
5 Click OK.

Changing the Floor Settings of a Stair

Use this procedure to control how the stair interacts with the floor at the beginning and end of the stair run.

1 Double-click a stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Floor Settings.



3 Change settings for how the stair meets the top and bottom floors:

If you want to…	Then…
specify the thickness of the floor finish material at the top floor of the stair	enter a value for Top Offset.
specify the depth of the structure at the top floor	enter a value for Top Depth.
specify the thickness of the floor finish material at the bottom floor of the stair	enter a value for Bottom Offset.
specify the depth of the structure at the bottom floor	enter a value for Bottom Depth.

NOTE The Top and Bottom Depth settings currently have no effect on the stair or stringers. In addition, the Top offset has no visible effect on the stair. Bottom offset extends or truncates any attached stringers. Both offset values affect the rough floor-to-floor height, if it is displayed.

Adjusting Stair Length Automatically

Use this procedure to adjust stair length automatically with the StairFit setting.

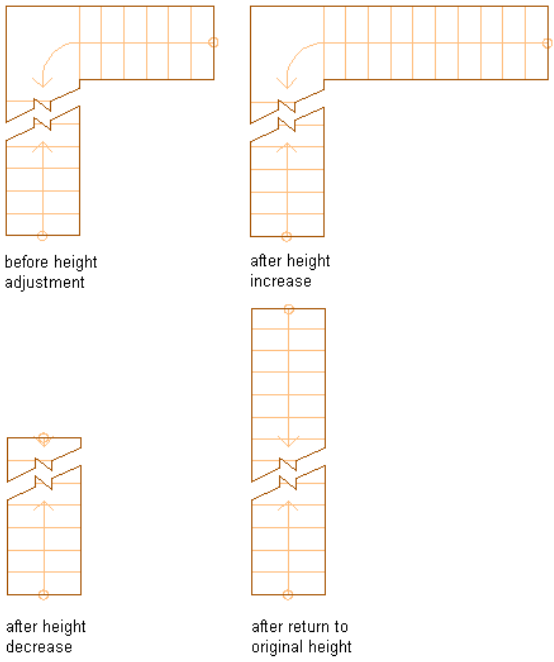
With the StairFit setting enabled, a stair adjusts its length to accommodate a height change. With the StairFit setting disabled, a stair does not adjust its length to accommodate a height change. Also, a solution tip icon displays if the stair path is not long enough to accommodate the new height.

All newly created stairs have the StairFit setting enabled. All stairs created in versions earlier than Autodesk Architectural Desktop 2004 have the StairFit setting disabled.

1. Draw a stair run.
2. On the Command Line, enter **StairFit**.
3. Select the stair run.
4. Enter **Y** to enable the StairFit setting or **N** to disable the StairFit setting.
5. Double-click the stair run to open the Properties palette.
6. Specify a new stair height.

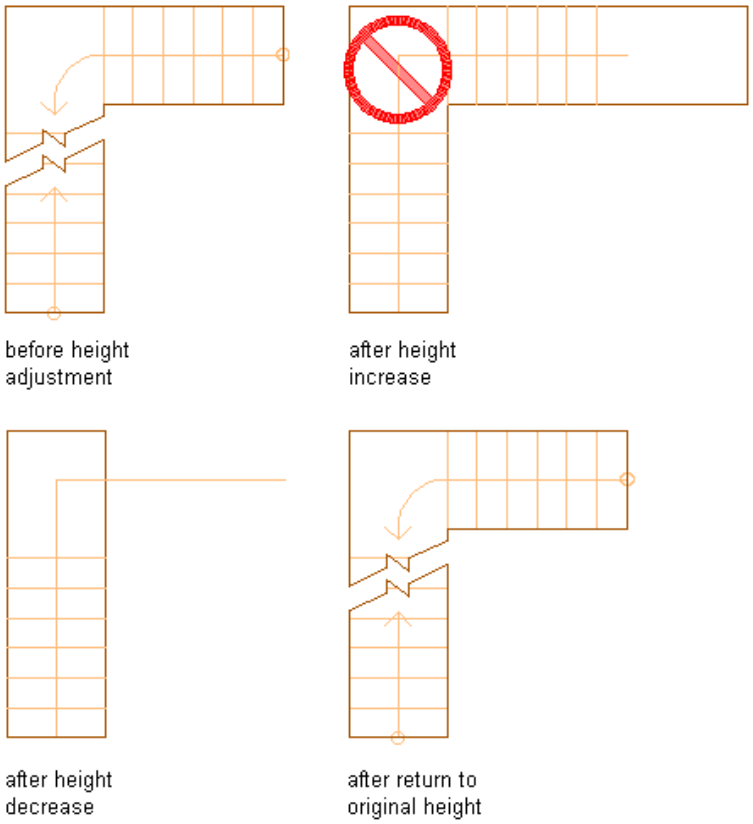
The following illustration shows an example of a straight stair run with the StairFit option enabled before and after height changes.

Stair run height change with StairFit option enabled



The following illustration shows an example of a straight stair run with the StairFit option disabled before and after height changes.

Stair run height change with StairFit option disabled

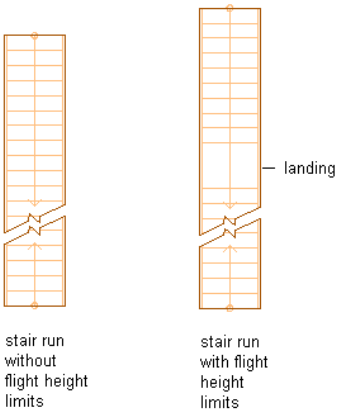


Changing the Length Limits of a Flight

Use this procedure to change the limits for the flight of a stair. A flight can have no limits, or limits that are constrained by a minimum number of risers, minimum height, maximum number of risers, or maximum height.

Use these settings to create automatic landings in a stair flight. For example, if a stair flight has 18 treads and you set the maximum treads to 15, the stair will have two flights with one landing in the middle, keeping under the 15 maximum risers on either side of the landing.

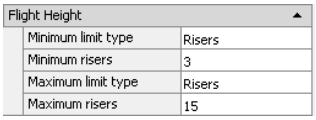
Specifying flight height limits for a stair run



1 Double-click a stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Flight Height.

Flight Height with Risers Limit type



3 Specify the constraints for flight length:

If you want to…	Then…
specify no limits on the flight	select None for Minimum Limit type and None for Maximum Limit type.
specify a minimum number of risers per flight	select Risers for Minimum Limit type, and enter a value for Minimum risers.
specify a minimum height for the flight	select Height for Minimum Limit type, and enter a value for Minimum height.
specify a maximum number of risers per flight	select Risers for Maximum Limit type, and enter a value for Maximum risers.
specify a maximum height for the flight	select Height for Maximum Limit type, and enter a value for Maximum height.

Anchoring a Stair to a Landing

Use this procedure to anchor a stair or other AEC object to an existing landing.

1 Draw a stair with a landing and draw a second stair to attach to the landing. For more information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.

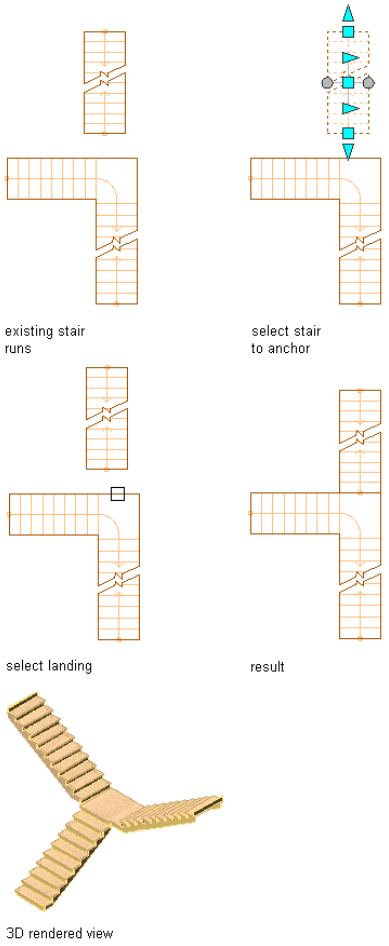
2 Select the stair with a landing, and click Stair tab ➤ Modify panel ➤ Anchor Object To Stair Landing .

3 Select the stair or other AEC object to anchor to the landing.

4 Select a location on the landing to anchor the center of the start of the stair run. The flight will be perpendicular to the landing edge.

Select the insertion point of the AEC object that you are attaching to the landing. The object will be oriented parallel to the edge of the landing.

Anchoring a stair run to a landing



NOTE Stairs created with a vertical orientation of Up go up from the landing, while stairs created with a vertical orientation of Down go down from the landing.

The riser numbering feature is helpful in this situation. See Specifying the Riser Numbering Display for Individual Stairs on page 1482.

Releasing Anchored Stairs

Use this procedure to release stairs anchored to landings.

- Select the stair to anchor to the landing, right-click, and click Stair Landing Anchor ➤ Release.

NOTE The stair remains in the same location, but is no longer anchored to the landing.

Editing Winders

Three different winder types give you different levels of control for 1/2 turn and 1/4 turn stairs: Balanced, Single Point, and Manual.

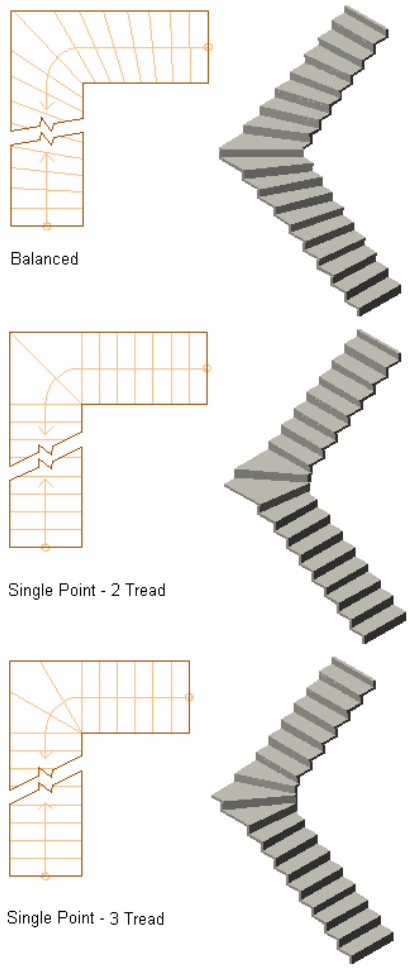
The Balanced winder style has the total turn distributed evenly throughout the stair run.

The Single Point winder styles allow you to align tread edges or riser faces with the winder turn center, and add or remove individual treads from the winder turn. You can also assign a default number of treads to a winder turn, resulting in the specified number of treads appearing in the stair turn zone.

Manual winder styles can be based on any winder style, by assigning either a Manual - Tread or Manual - Riser condition to a stair run. Both manual styles allow you to straighten individual treads or risers in the stair run and to move the tread endpoints on either side of individual treads so you can angle tread edges or riser faces to suit your stair design.

For information about creating new winder styles, see Creating a Stair Winder Style on page 1500.

Winder style examples



Lengthening a Flight to Align a Tread Edge with a Winder Turn Center

Use this procedure to lengthen a flight to align a Single Point winder style tread edge with a winder turn center.

The winders within the turn zone are set to an angle converging on the Turn Center grip.

1. Select a 1/2 turn or 1/4 turn stair to activate grips.
2. If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

NOTE Only the winder styles present in the drawing are displayed.

Select Winder Style dialog box

3 Select a Single Point style from the list, and click OK.

NOTE To select the style from the Properties palette, click the Design tab, expand Basic, expand General, and select Single Point for Winder Style.

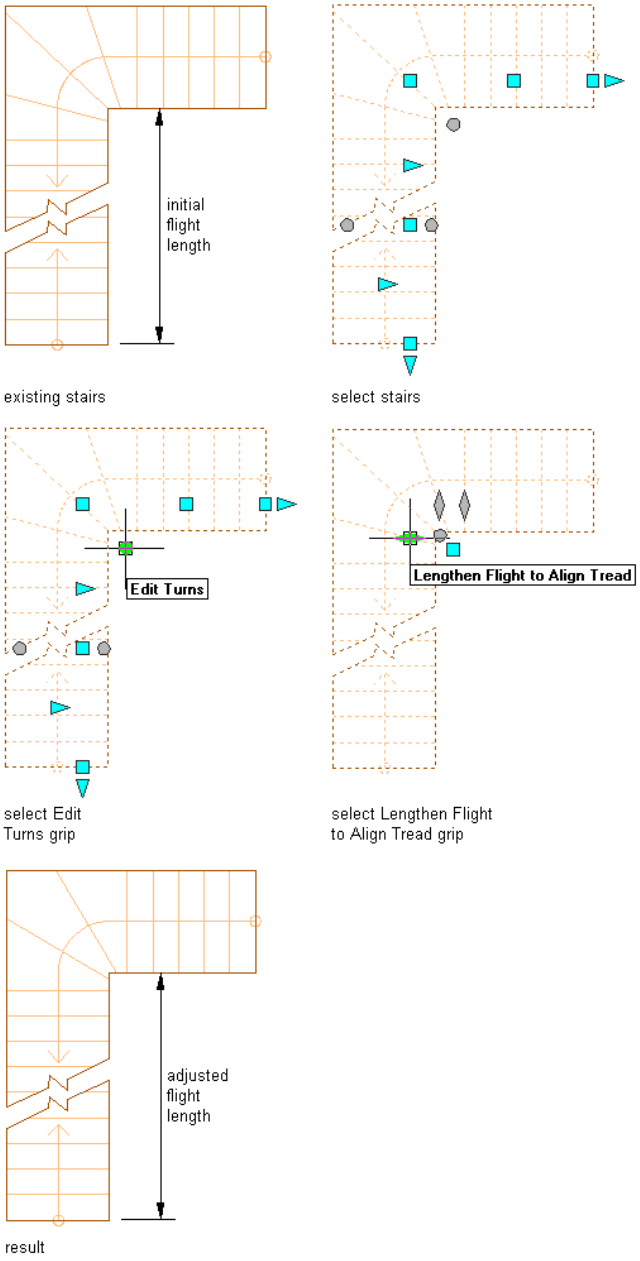
4 Select the Edit Turns trigger grip.

Note the initial flight length of the existing stairs.

5 Select the Lengthen Flight to Align Tread grip.

The flight is lengthened as the tread edge is now aligned with the turn center.

Lengthening a Flight to Align a Tread Edge with Turn Center



NOTE To have the converging point on the edge of the stair, you must clear the Use Riser Lines setting. See Specifying the Stair Winder Style Settings on page 1501 for more information about this setting.

6 When you have finished editing the flight length, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Aligning a Tread Edge with a Winder Turn Center

Use this procedure to align a Single Point winder style tread edge with a winder turn center.

The winders within the turn zone are set to an angle converging on the Turn Center grip.

1 Select a 1/2 turn or 1/4 turn stair.

2 If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

NOTE Only the winder styles present in the drawing are displayed.

Select Winder Style dialog box

3 Select a Single Point style from the list, and click OK.

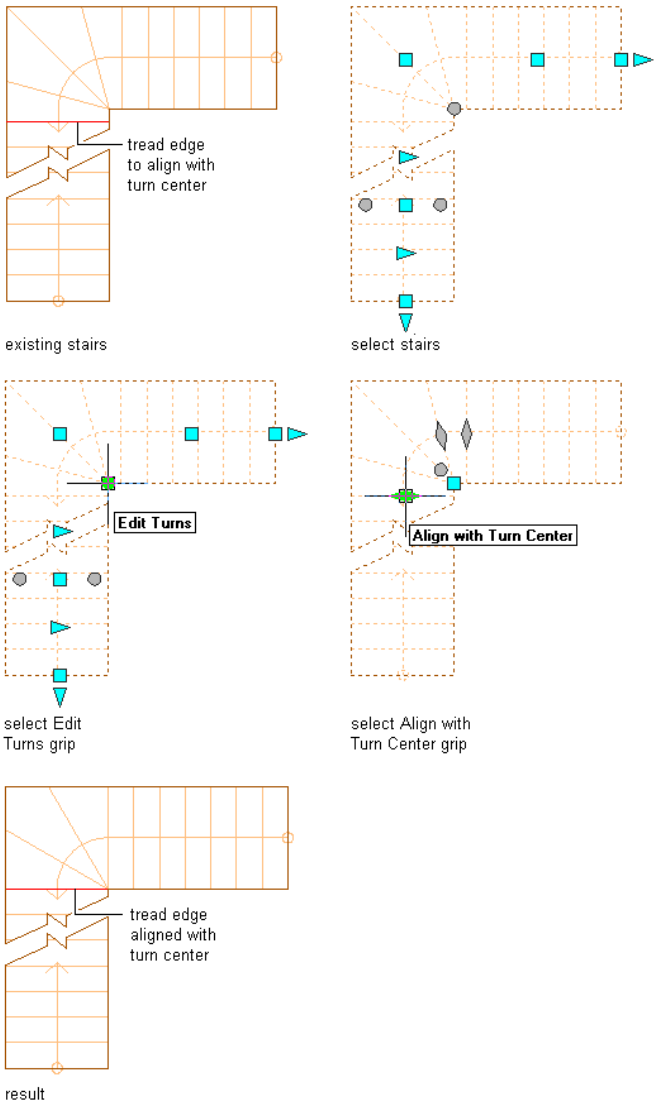
NOTE To select the style from the Properties palette, click the Design tab, expand Basic, expand General, and select Single Point for Winder Style.

4 Select the Edit Turns trigger grip.

5 Select the Align with Turn Center grip.

The tread edge is now aligned with the turn center, and the grip is no longer displayed.

Aligning a tread edge with turn center



NOTE To have the converging point on the edge of the stair, you must clear the Use Riser Lines setting. For more information about this setting, see Specifying the Stair Winder Style Settings on page 1501.

6 When you have finished editing the tread edge alignment, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Removing a Tread from a Winder Turn

Use this procedure to remove a tread from a winder turn.

The winders within the turn zone are set to an angle converging on the Turn Center grip.

1 Select a 1/2 turn or 1/4 turn stair.

2 If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

NOTE Only the winder styles present in the drawing are displayed.

Select Winder Style dialog box

3 Select a Single Point style from the list, and click OK.

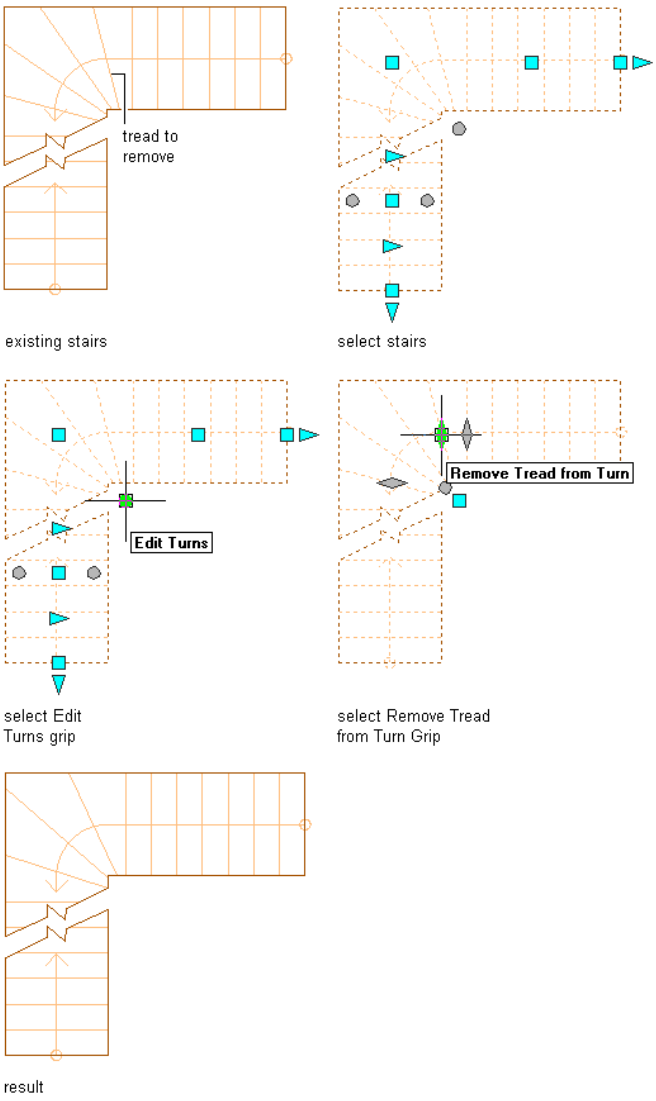
NOTE To select the style from the Properties palette, click the Design tab, expand Basic, expand General, and select Single Point for Winder Style.

4 Select the Edit Turns trigger grip.

5 Select the Remove Tread from Turn grip.

The selected tread is removed from the winder turn. If you continue to remove treads, the stair will eventually display a solution tip icon. Use the Undo command to restore the previous tread configuration.

Removing a Tread from a Winder Turn



NOTE To have the converging point on the edge of the stair, you must clear the Use Riser Lines setting. For more information about this setting, see Specifying the Stair Winder Style Settings on page 1501.

6 When you have finished removing treads, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Adding a Tread to a Winder Turn

Use this procedure to add a tread to a winder turn.

The winders within the turn zone are set to an angle converging on the Turn Center grip.

1 Select a 1/2 turn or 1/4 turn stair.

2 If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

NOTE Only the winder styles present in the drawing are displayed.

Select Winder Style dialog box

3 Select a Single Point style from the list, and click OK.

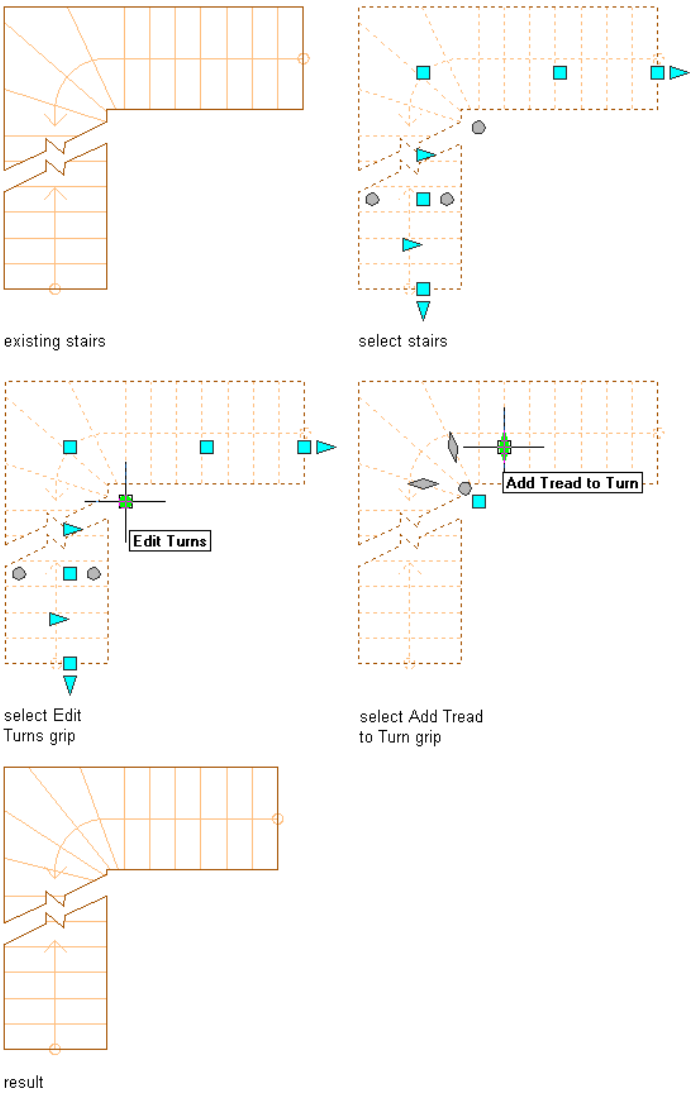
NOTE To select the style from the Properties palette, click the Design tab, expand Basic, expand General, and select Single Point for Winder Style.

4 Select the Edit Turns trigger grip.

5 Select the Add Tread to Turn grip.

A tread is added to the winder turn. If you continue to add treads, the stair will eventually display a solution tip icon. Use the Undo command to restore the previous tread configuration.

Adding a tread to a winder turn



NOTE To have the converging point on the edge of the stair, you must clear the Use Riser Lines setting. For more information about this setting, see Specifying the Stair Winder Style Settings on page 1501.

6 When you have finished adding treads, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Straightening Treads with the Manual Winder Style

Use this procedure to straighten individual treads on stairs assigned either the Manual - Tread or Manual - Riser Balanced winder style.

The Straighten Tread grip is located at the intersection of the tread edge or riser face and the stair construction line, based on the Use Riser Line setting in the Stair Winder Style dialog box. For more information, see Specifying the Stair Winder Style Settings on page 1501.

1 Select a 1/2 turn or 1/4 turn stair.

2 If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

Select Winder Style dialog box

3 Select either Manual - Tread or Manual - Riser from the list, and click OK.

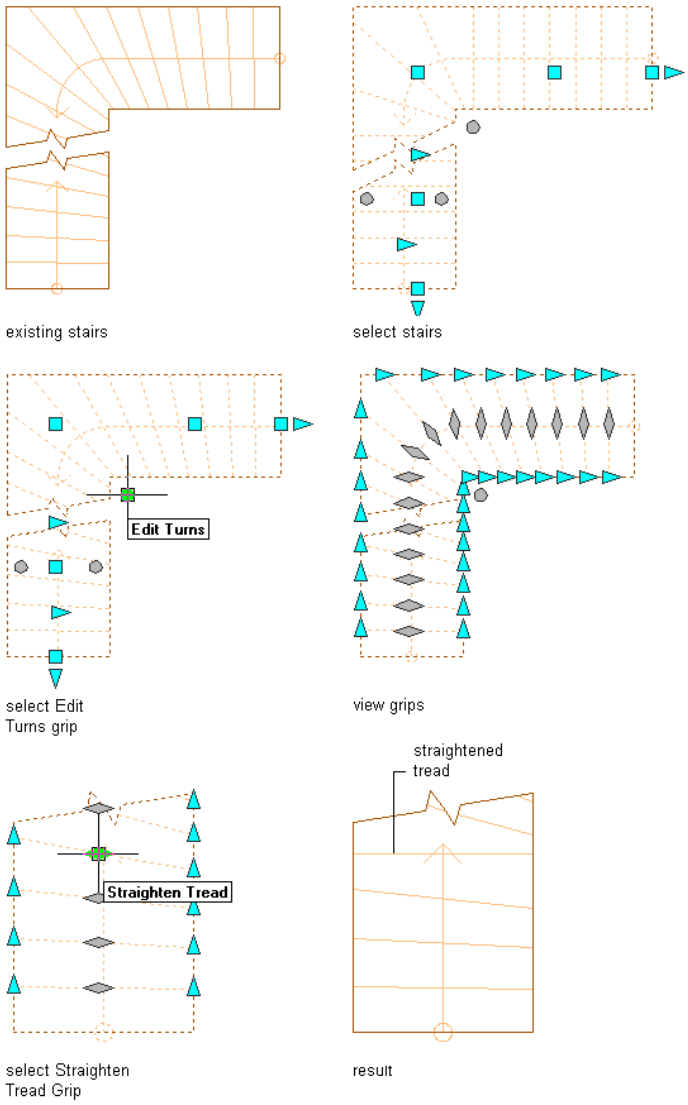
NOTE To select the style from the Properties palette, click the Design tab, expand Basic, expand General, and select either Manual - Tread or Manual - Riser for Winder Style.

4 Select the Edit Turns trigger grip.

5 Select the Straighten Tread grip on the tread edge or riser face that you want to straighten.

The selected tread is straightened.

Straightening a tread with a manual riser style



NOTE Because the tread depth must be the same for each tread, the tread edge line will pivot around the construction line.

6 When you have finished straightening treads, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Moving Tread Ends with the Manual Winder Style

Use this procedure to move the ends of individual treads on stairs assigned either the Manual - Tread or Manual - Riser Balanced winder style. Each tread edge or riser face pivots on a point established by the intersection of the tread edge and the stair's construction line. Drag the Tread Edge grip to a new location to specify a new angle for the tread edge.

The Tread End grips are located at each end of the tread edge or riser face, based on the Use Riser Line setting in the Stair Winder Style dialog box. For more information, see Specifying the Stair Winder Style Settings on page 1501.

1 Select a 1/2 turn or 1/4 turn stair.

2 If the Winder Style is balanced, select the circular Edit Turns trigger grip. The Select Winder Style dialog box is displayed.

Select Winder Style dialog box

3 Select either Manual - Tread or Manual - Riser from the list, and click OK.

NOTE To select the style from the Properties palette, expand Basic, expand General, and select either Manual - Tread or Manual - Riser for Winder Style.

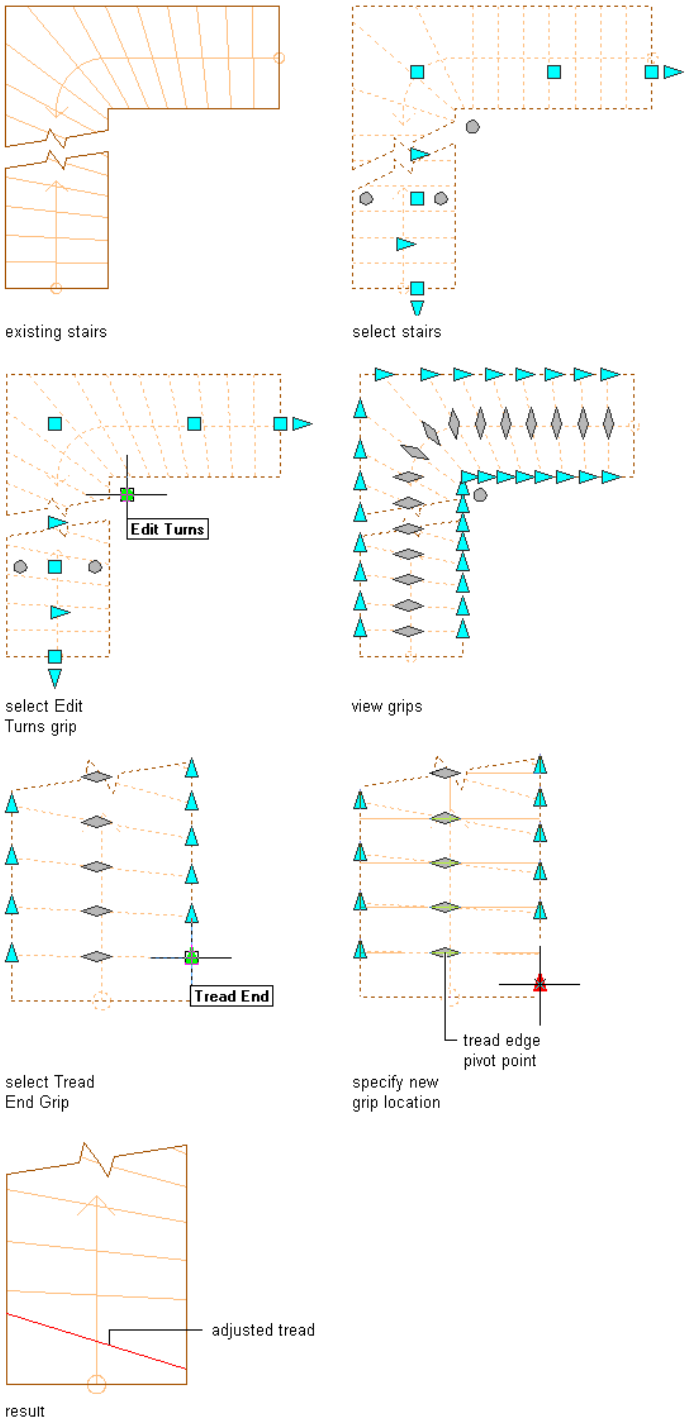
4 Select the Edit Turns trigger grip.

5 Select the Tread End grip on the tread edge or riser face that you want to move.

6 Specify a new location for the Tread End grip.

The selected tread is angled as specified.

Moving a tread edge with a manual riser style



NOTE Because the tread depth must be the same for each tread, the tread edge line will pivot around the construction line.

7 When you have finished moving tread ends, you can click the Exit Edit Turns grip to return to the default stair edit mode, or right-click and click Deselect All to turn off grips.

Working with Stair Body Modifiers

Body modifiers use the three-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to or subtract from a stair component (tread, riser, or stringer depending on the stair style). Body Modifiers only work on a single instance of a tread, riser, or stringer at a time.

After you create a body modifier from an object, you can delete the original object. However, if you have created a complex object, such as a mass group comprising many mass elements, you may want to retain the object in the drawing until you are sure you have the results you want for the stair.

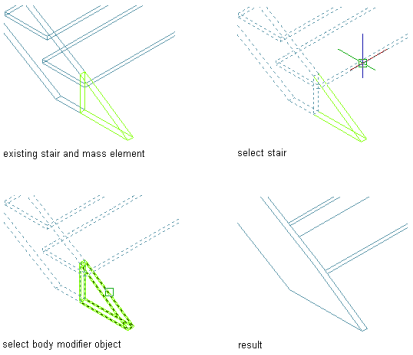
Adding a Body Modifier to a Stair Component

Use this procedure to create a body modifier and add it to a stair.

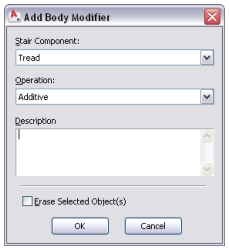
You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use a mass element as a body modifier to add to a stair stringer component.

Adding a body modifier to a stair component



1. Place the object in the location where you want to add the body modifier to the stair.
2. Select the stair you want to change with the body modifier, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Add .
3. Select the object to add to the stair component.
4. In the Add Body Modifier dialog box, select Stringer for Stair Component and Additive for Operation.



5. Enter a description for the body modifier.
6. Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

7 Click OK.

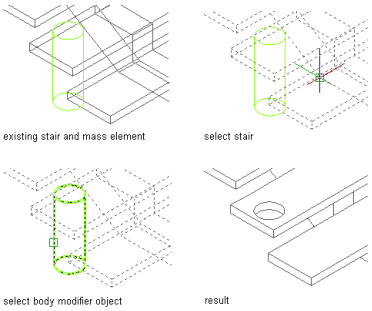
Subtracting a Body Modifier from a Stair Component

Use this procedure to create a body modifier and subtract it from a stair component.

You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use a mass element as a body modifier to subtract from a stair tread component.

Subtracting a body modifier from a stair component



1 Place the object in the location where you want to subtract the body modifier from the stair.

2 Select the stair you want to change with the body modifier, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Add .

3 Select the object to subtract from the stair.

4 In the Add Body Modifier dialog box, select Tread for Stair Component and Subtractive for Operation.

5 Enter a description for the body modifier.

6 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

7 Click OK.

Replacing a Stair Component with a Body Modifier

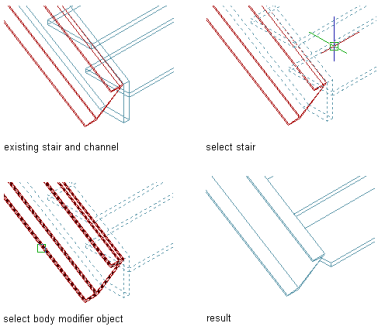
Use this procedure to create a body modifier to replace a stair component.

You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies.

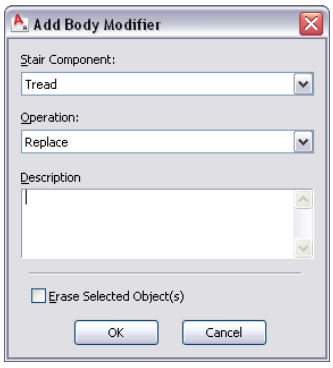
You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use a channel as a body modifier to replace a stair stringer component.

Replacing a stair component with a body modifier



1. Place the object in the location where you want to replace the stair component with the body modifier.
2. Select the stair you want to change with the body modifier, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Add .
3. Select the object to replace the stair component.
4. In the Add Body Modifier dialog box, select Stringer for Stair Component and Replace for Operation.



5. Enter a description for the body modifier.
6. Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.
7. Click OK.

Editing the Geometry of a Body Modifier

Use this procedure to edit the shape of a body modifier that is attached to a stair. You can edit the body using grips to edit faces, using Boolean commands to add or remove other objects from the body modifier, and other editing commands to change its shape.

1. Select the stair that has the body modifier you want to change, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Edit In Place .

A temporary mass element is created for you to edit the geometry of the body modifier. If the stair contains multiple body modifiers, a mass element is created for each body modifier. If the object was not originally a mass element (for example, if you used a slab as a body modifier), the object becomes a temporary Free Form mass element with faces that you can edit.

NOTE After you perform an editing task from the contextual Edit in Place ribbon, you may need to select a profile again to perform another editing task. If you do not see the editing commands that you expect on the ribbon, re-select a profile to redisplay the Edit in Place contextual tab.

2 Edit the body modifier:

If you want to …	Then …
change the shape of a body modifier that is a Free Form mass element	select the body modifier. Select a Face grip to activate edge grips for the face. Move the grips to the desired locations. Continue editing other faces in the same manner.
change the shape of a body modifier that is a conventional mass element	select the body modifier. Select grips and move them to change the shape of the body modifier. The grips that are available depend on the type of mass element used as a body modifier and the current view direction.
add an object to a body modifier	place the object in the location where it is needed. Select the body modifier and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Boolean drop-down ➤ Union. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
subtract an object from a body modifier	place the object in the location where it is needed. Select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Boolean drop-down ➤ Subtract. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
create a body modifier that is the intersection of the original body modifier with another object	place the object in the location where it is needed. Select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Boolean drop-down ➤ Intersect. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
trim a body modifier	select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Trim by Plane . Specify the points that define the trim plane, and select the side of the body modifier to be trimmed. The trimmed body modifier is converted to a Free Form mass element.
divide the face of a body modifier into two faces	select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Split Face .

If you want to …	Then …
	Specify the points that define the edge created by splitting the faces.
join two faces that are on the same plane into a single face	select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Modify panel ➤ Join Faces . Select the edge that separates the coplanar faces.
remove a body modifier	select the object that forms the body modifier, and press *DELETE*.

3 Save or discard the changes:

If you want to …	Then …
restore the body modifier to its original shape	select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Edits panel ➤ Cancel.
save the changes to the body modifier	select the body modifier, and click Edit in Place: Stair Body Modifier tab ➤ Edits panel ➤ Finish. The body modifier uses the edited mass element to define its geometry.

Managing Body Modifiers

Use this procedure to edit or remove three-dimensional (3D) body modifiers from a stair. You can change the component the body modifier is added to and select a different operation. You can also enter or edit the descriptions of body modifiers.

NOTE To remove a body modifier from a stair and restore the modifier as a mass element that you can edit or apply to other stairs, see Restoring a Body Modifier to a Mass Element on page 1458.

1 Select the stair you want to change, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Body Modifiers .

NOTE You can also access the Body Modifiers worksheet for a selected stair on the Properties palette's Design tab, under Advanced.

2 Select a body modifier, and change its settings:

If you want to …	Then …
apply the body modifier to a different stair component	select a different component for Component.
change the operation used to apply the body modifier to the stair	select a different operation for Operation: ■ Select Additive to add the body modifier to the stair component. ■ Select Subtract to subtract the shape of the body modifier from the stair component. ■ Select Replace to replace the stair component with the body modifier.

If you want to …	Then …
delete the body modifier from the stair component	select the body modifier, and click .
enter a description of the body modifier	click Description, enter text, and press *ENTER*.

3 Click OK.

Restoring a Body Modifier to a Mass Element

Use this procedure to remove a body modifier from a stair and add it to the drawing as a mass element. Restoring a body modifier to a mass element enables you to modify the shape as a mass element and then add it to the stair again as a body modifier. You can also restore the body modifier to a mass element while leaving the body modifier still applied to the stair. This is useful if you want to create other stairs with the same shape.

If the object used to create the body modifier was a conventional mass element, it is restored to that mass element. For example, a Gable mass element is restored as a Gable mass element. However, if the body modifier was created from another object, such as a slab, or was edited using Boolean operations or face editing commands, the body modifier is restored as a Free Form mass element.

1 Select the stair you want to change, and click Stair tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Restore.

NOTE This procedure restores all body modifiers attached to a stair.

2 Create mass elements from the body modifiers:

If you want to …	Then …
create mass elements from the body modifiers while keeping the body modifiers attached to the stair	press *ENTER*.
remove *all* body modifiers from the stair, and create mass elements from their shapes	enter **y** (Yes), and press *ENTER*.

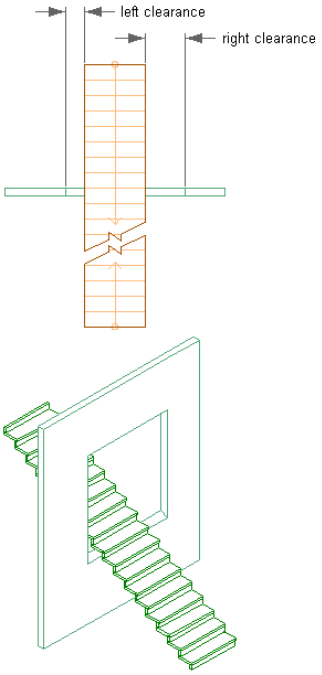
Stair Interference Conditions

You can control the height and width of a stair's interference condition with walls, slabs, spaces, curtain walls, and door and window assemblies. When you add an interference condition between a stair and one of the valid objects, a box is cut out around the stair, based on the specified headroom height and side clearance.

Creating an Interference Condition in a Wall

Use this procedure to create a stair interference area in a wall. When you add an interference condition between a stair and a wall, an opening is created in the wall around the stair, based on the stair's specified headroom height and left and right side clearances for straight and multi-landing stairs or inside and outside clearances for spiral and U-shaped stairs.

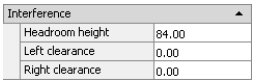
Specifying the left and right side clearances for a wall interference condition



1 Create a stair that intersects with a wall. For information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.

2 Double-click the stair object to open the Properties palette.

3 Click the Design tab, expand Advanced, and expand Interference.



4 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

5 Click in the drawing, not on the stair, to remove the selection.

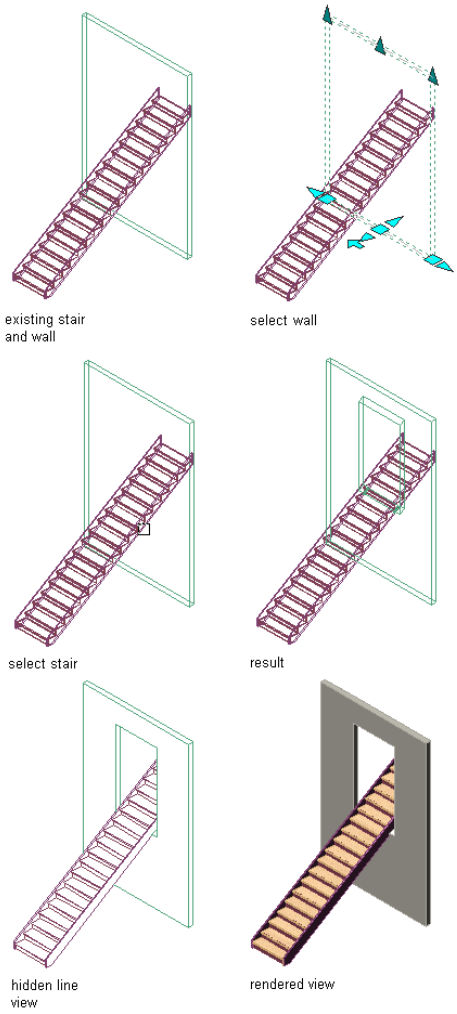
6 Select the wall to intersect, and click Wall tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

7 Select the stair, and press *ENTER*.

8 Select the shrinkwrap effect, and press *ENTER*. For more information about shrinkwrapping, see Working with Interference Conditions on page 845.

NOTE Changing the Interference values of the stair changes the size of the intersection with the wall.

Creating a wall and stair interference condition



Removing a Stair Interference Condition from a Wall

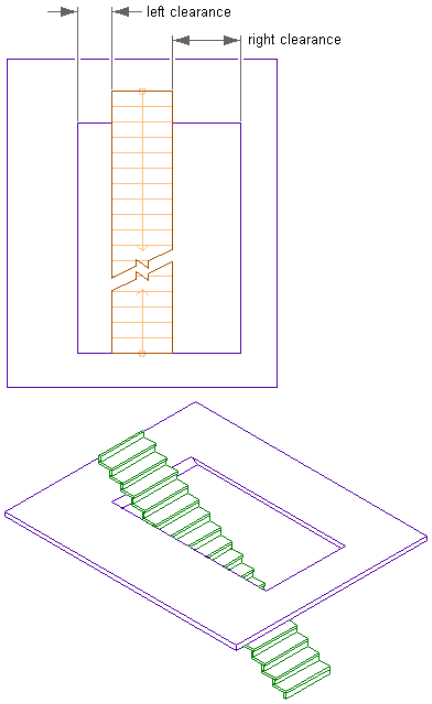
Use this procedure to remove a stair interference from a wall.

1. Click in the drawing.
2. Select the wall from which to remove the interference, and click Wall tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .
3. Select the stair, and press *ENTER*.

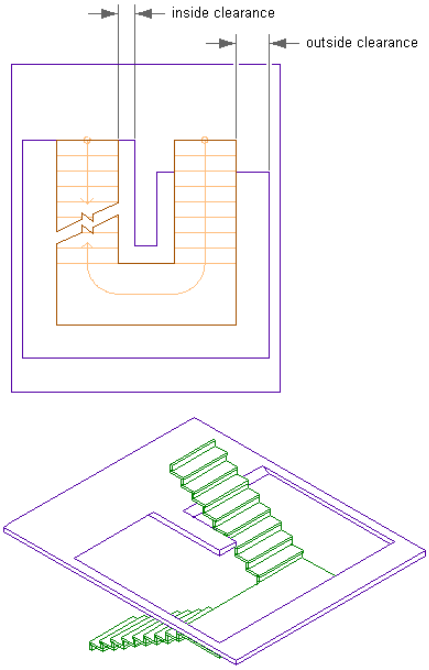
Creating an Interference Condition in a Slab

Use this procedure to create a stair interference area in a slab. When you add an interference condition between a stair and a slab, a box is cut out around the stair based on the specified headroom height and left and right side clearances for straight and multi-landing stairs or inside and outside clearances for spiral and U-shaped stairs.

Specifying the left and right side clearances for a slab interference condition

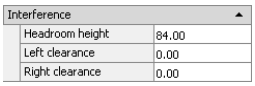


Specifying the inside and outside clearances for a slab interference condition



1. Create a stair that intersects with a slab. For information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.
2. Double-click the stair to open the Properties palette.

3 Click the Design tab, expand Advanced, and expand Interference.



4 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

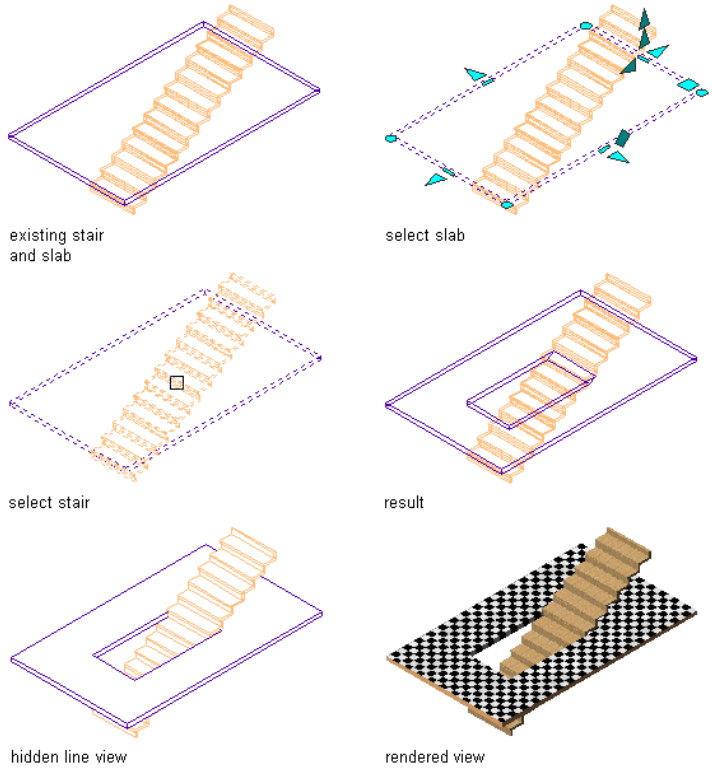
5 Click in the drawing, not on the stair, to remove the selection.

6 Select the slab to intersect, and click Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

7 Select the stair, and press *ENTER*.

8 Select the shrinkwrap effect, and press *ENTER*. For more information about shrinkwrapping, see Working with Interference Conditions on page 845.

Creating a slab and stair interference condition



NOTE Changing the Interference values of the stair changes the size of the intersection with the slab.

Removing a Stair Interference Condition from a Slab

Use this procedure to remove a stair interference from a slab.

1 Select the slab from which to remove the interference, and click Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .

2 Select the stair, and press *ENTER*.

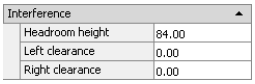
Creating an Interference Condition in a Space

Use this procedure to create a stair interference area in a space. When you add an interference condition between a stair and a space, a box is cut out around the stair based on the specified headroom height and side clearance.

1 Create a stair that intersects with a space. For information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.

2 Double-click the stair to open the Properties palette.

3 Click the Design tab, expand Advanced, and expand Interference.



4 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

5 Click in the drawing, not on the stair, to remove the selection.

6 Select the space to intersect, and click Space tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

7 Select the stair, and press *ENTER*.

NOTE Changing the Interference values of the stair changes the size of the intersection with the space.

Removing a Stair Interference Condition from a Space

Use this procedure to remove a stair interference from a space.

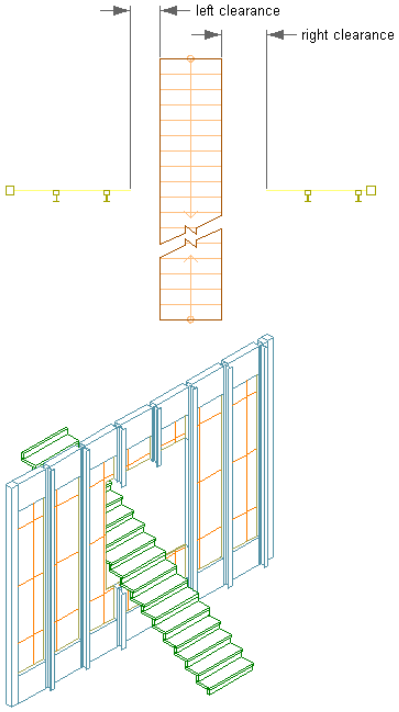
1 Select the space from which to remove the interference, and click Space tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .

2 Select the stair, and press *ENTER*.

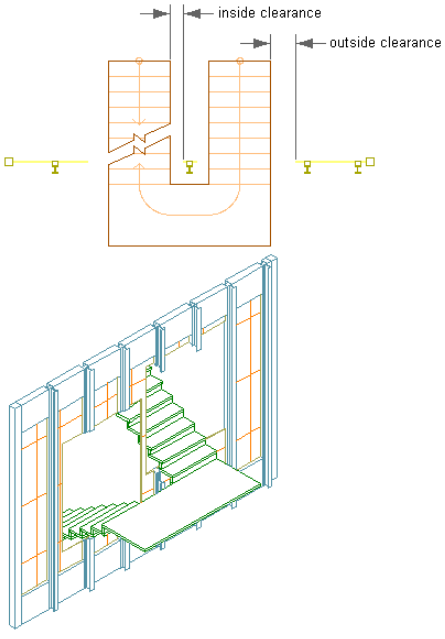
Creating an Interference Condition in a Curtain Wall

Use this procedure to create a stair interference area in a curtain wall. When you add an interference condition between a stair and a curtain wall, a box is cut out around the stair based on the specified headroom height and left and right side clearances for straight and multi-landing stairs or inside and outside clearances for spiral and U-shaped stairs. You have the option of cutting the infills, frames and mullions of the curtain wall.

Specifying the left and right side clearances for a curtain wall interference condition



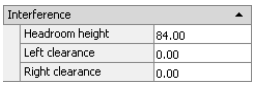
Specifying the inside and outside clearances for a curtain wall interference condition



1 Create a stair that intersects with a curtain wall. For information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.

2 Double-click the stair to open the Properties palette.

3 Click the Design tab, then expand Advanced, and expand Interference.



4 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

5 Click in the drawing, not on the stair, to remove the selection.

6 Select the curtain wall to intersect, and click Curtain Wall tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

7 Select the stair.

8 Specify whether to apply the interference condition to the infill, frames or mullions of the curtain wall.

Removing a Stair Interference Condition from a Curtain Wall

Use this procedure to remove a stair interference from a curtain wall.

1 Click in the drawing, not on the stair, to remove the selection.

2 Select the curtain wall from which to remove the interference, and click Curtain Wall tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .

3 Select the stair, and press *ENTER*.

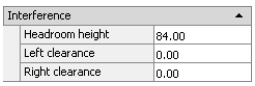
Creating an Interference Condition in a Door/Window Assembly

Use this procedure to create a stair interference area in a door/window assembly. When you add an interference condition between a stair and a door/window assembly, a box is cut out around the stair based on the specified headroom height and side clearance. You have the option of cutting the infills, frames, and mullions of the door/window assembly.

1 Create a stair that intersects with a door/window assembly. For information about creating stairs, see Using Stair Tools to Create Stairs on page 1368.

2 Double-click the stair to open the Properties palette.

3 Click the Design tab, expand Advanced, and expand Interference.



4 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

5 Click in the drawing, not on the stair, to remove the selection.

6 Select the door/window assembly to intersect, and click Door/Window Assembly tab ➤ Modify panel ➤ Interference drop-down ➤ Add .

7 Select the stair.

8 Specify whether to apply the interference condition to the infill, frames, or mullions of the door/window assembly.

Removing a Stair Interference Condition from a Door/Window Assembly

Use this procedure to remove a stair interference from a door/window assembly.

1 Click in the drawing, not on the stair, to remove the selection.

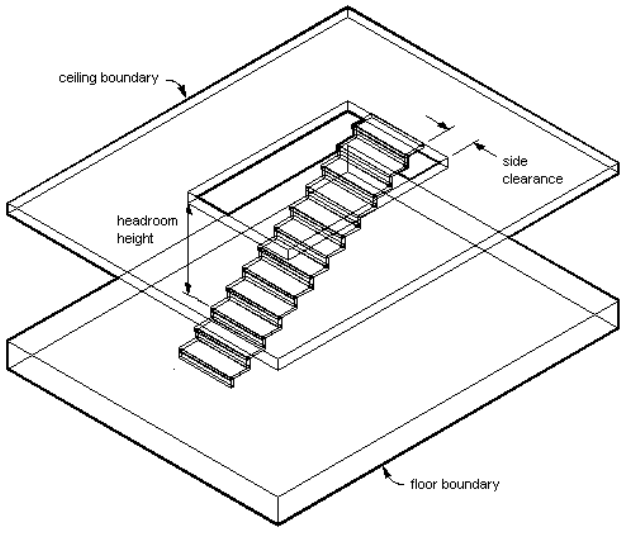
2 Select the door/window assembly from which to remove the interference, and click Door/Window Assembly tab ➤ Modify panel ➤ Interference drop-down ➤ Remove .

3 Select the stair, and press *ENTER*.

Changing the Interference Size of a Stair

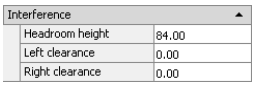
Use this procedure to control the size of the stair interference area.

Specifying headroom height and side clearance for a stair and a space object



1 Double-click the stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Interference.



3 Set the size of the interference condition:

If you want to…	Then…
specify the height above the treads for the interference condition	enter a value for Headroom height.
specify the left and right side clearances for the interference condition for straight and multi-landing stairs	enter values for Left and Right Clearance.
specify the inside and outside clearances for the interference condition for spiral and U-shaped stairs	enter values for Inside and Outside Clearance.

Changing the Alignment of a U-Shaped Stair

Use this procedure to change the alignment and the alignment offset of a U-shaped stair. These fields are available only when you select a U-shaped stair.

1 Double-click a U-shaped stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Constraints.

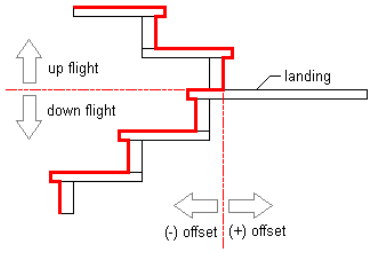
3 Specify the alignment of a U-shaped stair:

If you want to…	Then…
place the treads and risers where necessary to complete the stair	select Free for Alignment type.
align the tread of the up flight to the tread of the down flight	select Tread to Tread for Alignment type.
align the tread of the up flight to the riser of the down flight	select Tread to Riser for Alignment type.
align the riser of the up flight to the riser of the down flight	select Riser to Riser for Alignment type.

4 Specify a value for Alignment offset.

When you select Tread to Tread, Tread to Riser, or Riser to Riser, you can specify an offset value. A positive offset value means that the down flight tread location is closer to the landing than the up flight tread location.

Specifying tread to riser alignment offsets



5 Specify Upper flight or Lower flight for Extend alignment.

6 Specify a value for Uneven tread on. This value specifies which flight will be longer if the total number of treads is uneven. Select Upper flight to place the uneven tread on the upper flight. Select Lower flight to place the uneven tread on the lower flight.

Changing the Components of a Flight

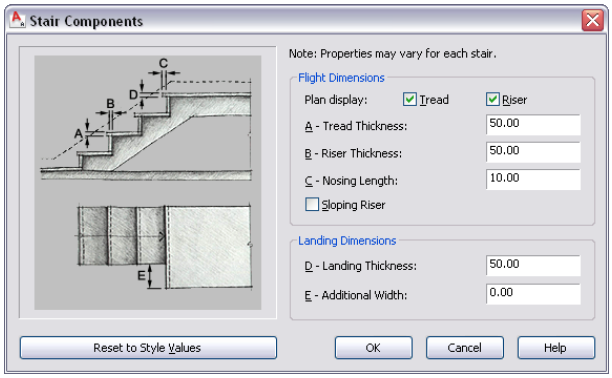
Use this procedure to change the tread, riser thickness, and nosing length for each stair. You can also turn on or off the display of the tread and riser.

NOTE If component settings are unavailable, they are controlled by the stair style, and you cannot change them for individual stairs.

1 Double-click the stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Worksheets.

3 Click next to Components.



4 Under Flight Dimensions, select or clear the Plan display of treads and risers.

When the tread or riser display is off, the corresponding thickness becomes unavailable.

5 Specify the flight dimensions:

If you want to…	Then…
specify the thickness of each tread	select Tread, and enter a value for Tread Thickness.
specify the thickness of the riser	select Riser, and enter a value for Riser Thickness.
specify the length of the edge of a stair tread that projects over the riser	enter a value for Nosing Length.
specify sloping risers	select Sloping Riser.

6 Click OK.

Changing the Components of a Landing

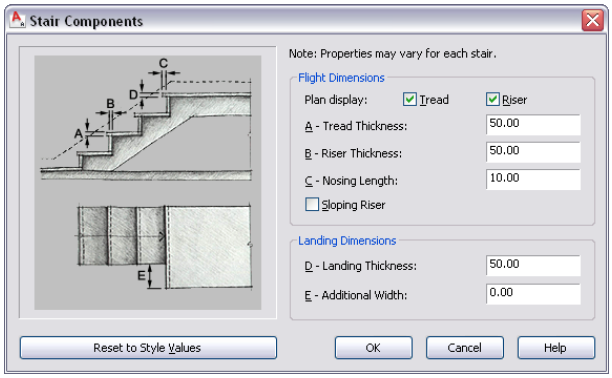
Use this procedure to change the landing thickness and specify additional width for stair landings.

NOTE If component settings are unavailable, they are controlled by the stair style, and you cannot change them for individual stairs.

1 Double-click the stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Worksheets.

3 Click next to Components.



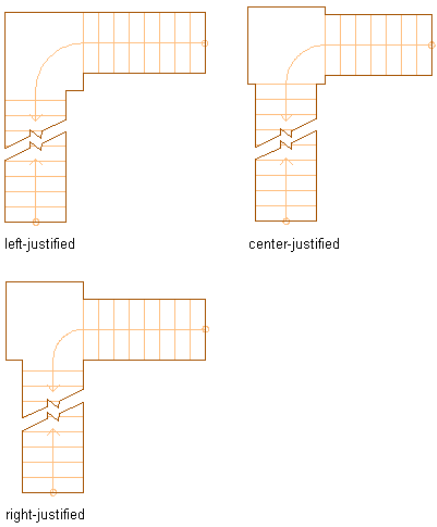
4 Enter a value for Landing Thickness.

5 Enter a value for Additional Width.

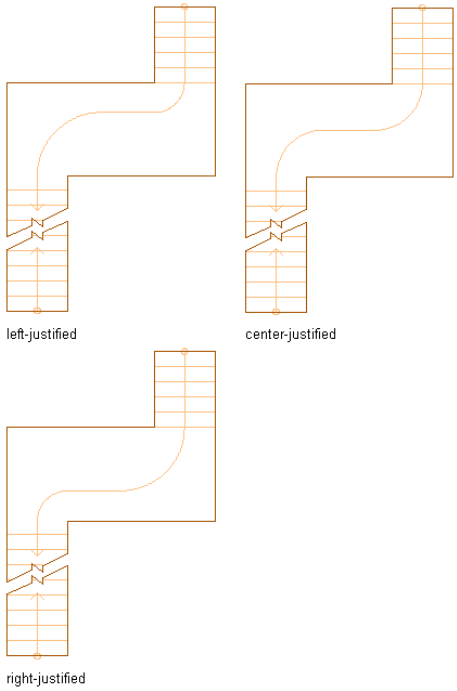
NOTE The setting for additional landing width affects only true landings of Multi-landing and U-shaped stairs. The automatic landings introduced by flight height limits and terminating landings are not affected by this setting.

The type of landing and the justification of the stair determine where the additional width is added to the landing.

Adding width to a quarter landing based on stair justification



Adding width to a half landing based on stair justification



6 Click OK.

About the Dimensions of Landing Components

Landing components are specified as part of the style, but apply only to multi-landing and U-shaped stairs. Stringer dimensions are specified for the flight and landing in a single table. The flight stringer type (slab, housed, or saddled) controls what is available for the landing (total depth *only* for housed and ramp, waist depth for all types). If the flight has no stringers, the landing has none.

All landings of a single stair initially use the same dimensions. You can then customize each one separately by grip-stretching or projection. Horizontal positions and the widths of stringers are identical between flights and landings.

Landing extension values apply only to U-shaped and multi-landing stairs with flat landings. Landing-specific dimensions are ignored for turn landings. The default values for styles in the Stair Styles drawing are specified in accordance with the most common situation for stairs.

If the option to resolve the meeting of flight and landing stringers is off, the flight stringer terminates at the landing.

Changing the Extension of a Landing

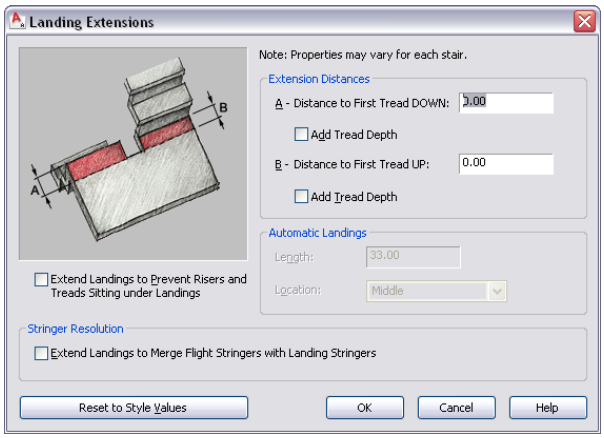
Use this procedure to change the distances between landings and treads and the stringer resolution for stairs. You can differentiate the size of landing components from those used for the stair flights.

NOTE If settings for landing extensions are unavailable, they are controlled by the stair style, and you cannot change them for individual stairs.

1 Double-click the stair to open the Properties palette.

2 Click the Design tab, expand Advanced, and expand Worksheets.

3 Click next to Landing extensions.



4 Specify the extension distances:

If you want to…	Then…
add to the distance to the first tread on the down side of the landing	enter a value for Distance to First Tread DOWN. To extend the landing down by a single tread, select Add Tread Depth.
add to the distance to the first tread on the up side of the landing	enter a value for Distance to First Tread UP. To extend the landing up by a single tread, select Add Tread Depth.

For more information about landing extensions and stringer resolution, see About the Dimensions of Landing Components on page 1470.

5 Under Stringer Resolution, select Extend Landings to Merge Flight Stringers with Landing Stringers to automatically merge the flight stringers with the landing stringers.

This provides additional landing extension, if necessary, to make the flight stringers meet the landing stringers without any discontinuity.

NOTE Automatic landing settings are always controlled by the stair style.

Stairs created in earlier versions of the software have the setting for Extend Landings to Prevent Risers and Treads Sitting Under Landings turned on. This setting should be turned off to achieve flush or rectangular landings, but it will change the position of the top or bottom of the stair, which may require adjusting other building objects.

6 Click OK.

Specifying Stair Component Display by Cut Plane Elevation

Use this procedure to specify the display of stair components in plan view depending on their occurrence above or below the cut plane elevation. You can specify the above cut plane, up, and down component properties for each type of stair component.

Cut Plane Elevation Display Properties

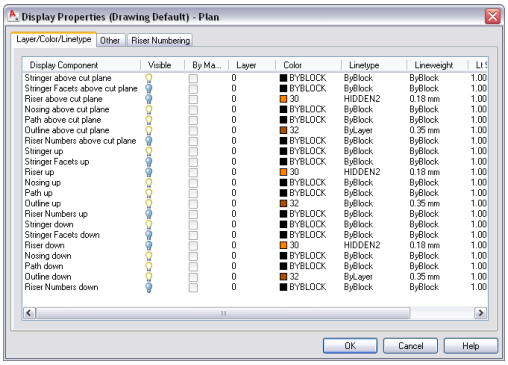
1 Take a look at the display properties for these kinds of stair components.

Select the stair and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Style .

2 Click the Display Properties tab.

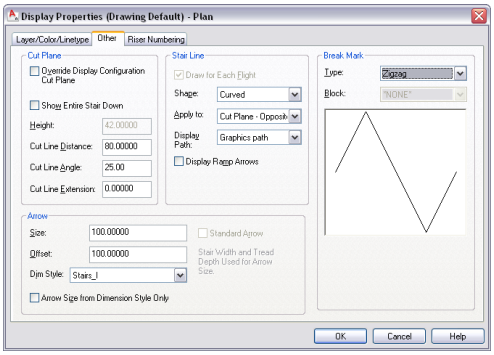
3 Verify that Plan is the default Display Representation, and then click (Edit Display Properties).

4 Click the Layer/Color/Linetype tab.



There are components to support the representation of stair components above the cut plane elevation so that the down stair components are only used to display the stair components that occur below the current level.

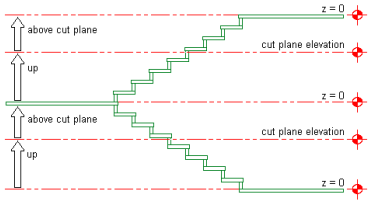
5 Click the Other tab.



For stairs created in versions of Autodesk Architectural Desktop earlier than 2004, the Override Display Configuration Cut Plane option is selected by default. In the current version, this option is cleared by default, and the display of stair components is handled automatically by specific display configurations for each level.

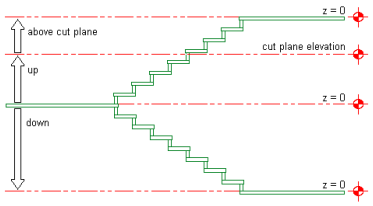
When the Override Display Configuration Cut Plane option is selected, the cut height elevation is measured from the bottom of each stair run. The up display components and the above cut plane display components above the current level are displayed, and the down display components are not.

Specifying cut plane elevation with display configuration override



When the Override Display Configuration Cut Plane option is cleared, the cut height elevation is measured from the current level. The up display components above the current level are displayed, as are the down display components below the current level.

Specifying cut plane elevation without display configuration override



6 Make changes to the display of stair components as needed, then click OK twice.

Specifying Stair Display at Different Levels

1 The following procedure provides an example of how to specify the display of stair components at different levels in a stair tower.

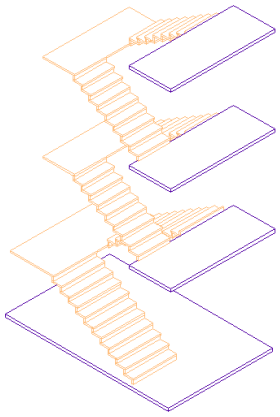
Create a U-shaped stair, 5'-0" (1520 mm) wide and 12'-0" (3650 mm) high to represent the lobby stairs.

2 Create a second U-shaped stair, 3'-8" (1120 mm) wide and 10'-0" (3050 mm) high, and locate it 12'-0" (1520 mm) above the lobby stairs.

3 Create a third U-shaped stair, 3'-8" (1120 mm) wide and 10'-0" (3050 mm) high, and locate it 10'-0" (3050 mm) above the second set of stairs.

The following illustration shows how the stair tower should appear with added floor slabs in a 3D view:

3D view of stair tower



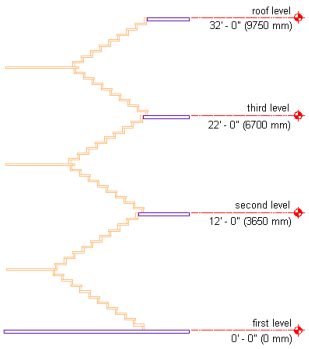
4 Save this stair tower configuration as the base stair drawing file.

5 Create 4 new host drawing files as follows:

- First Floor
- Second Floor
- Third Floor
- Roof Level

The following illustration shows how the levels should appear in an elevation view:

Elevation view of stair tower

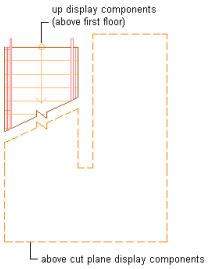


6 Open the First Floor drawing, and attach the base stair as an Xref at an elevation of 0'-0" (0 mm).

7 Verify that the Medium Detail display configuration is current.

8 View the first floor lobby stairs in plan.

Stair display components at first floor



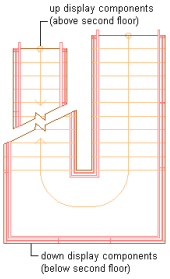
9 The up display components above the first floor are displayed, as are the above cut plane display components, in outline with a dashed linetype.

10 Open the Second Floor drawing, and attach the base stair as an Xref at an elevation of -12'-0" (-3650 mm).

11 Verify that the Medium Detail Intermediate Level display configuration is current.

12 View the second floor stairs in plan.

Stair display components at second floor



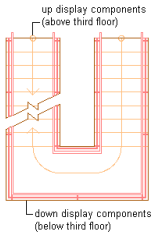
13 The up display components above the second floor are displayed, as are the down display components below the second floor.

14 Open the Third Floor drawing, and attach the base stair as an Xref at an elevation of -22'-0" (-6700 mm).

15 Verify that the Medium Detail Intermediate Level display configuration is current.

16 View the third floor stairs in plan.

Stair display components at third floor



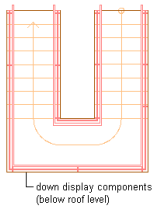
17 The up display components above the third floor are displayed, as are the down display components below the third floor.

18 Open the Roof Level drawing, and attach the base stair as an Xref at an elevation of -32'-0" (-9750 mm).

19 Verify that the Medium Detail Top Level display configuration is current.

20 View the roof level stairs in plan.

Stair display components at roof level



21 Only the down display components below the roof level are displayed.

Changing the Display of an Overlapping Stair

Use this procedure to create an overlapping stair and set the display properties to view the overlapped section correctly. For this example, we will display all components of the stair above the overlap section outlined in red.

To set the stair display, the Plan Overlapping display representation needs to be turned on and specific components need to be set. For overlapping stairs, in addition to the usual up and down groups, four other groups of display components are available in Plan Overlapping.

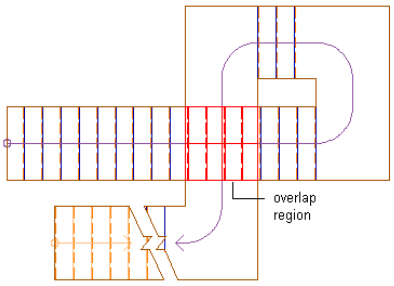
Display representation group	Definition
"components" up (above overlap)	Stair components below the cut height that are above the overlap section
"components" down (above overlap)	Stair components above the cut height that are above the overlap section
"components" up (below overlap)	Stair components below the cut height that are below the overlap section
"components" down (below overlap)	Stair components above the cut height that are below the overlap section

1 Open the tool palette that you want to use, and select a stair tool.
If necessary, scroll to display the tool that you want to use.

NOTE Alternatively, click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair .

2 On the Properties palette, click the Design tab, expand Basic, and expand General.
3 Select a style.
4 In Shape, select Multi-landing.
5 Specify the 1/2 landing for Turn type.
6 Draw a multi-landing stair that overlaps itself.

Viewing an overlapping stair condition



7 Click Manage tab ➤ Style & Display panel ➤ Display Manager .
8 Expand Sets, and select the current (bold) display set.
9 Click the Display Representation Control tab.
10 Scroll to the Stair object.
11 Turn on Plan Overlapping in addition to the current display representation.
12 Click OK.
13 Select the stair, right-click, and click Edit Object Display.
14 Click the Display Properties tab.
15 Click Object Override for Plan, Plan Low Detail, or Plan High Detail (whichever is displayed in the current display set). Select all the components, turn off visibility, and click OK.
16 Click Object Override for Plan Overlapping. Select the desired components and turn on visibility. For this example, turn on visibility for Riser up, Nosing up, Path up, Outline up, Riser down, Nosing down, Path down, Outline down, Riser down (above overlap), Nosing down (above overlap), Path down (above overlap), Outline down (above overlap), Riser down (below overlap), Nosing down (below overlap), Path down (below overlap), and Outline down (below overlap).
17 Select Riser down (above overlap), Nosing down (above overlap), Path down (above overlap), and Outline down (above overlap). Select any of the colors from the selected components; then select red in the Select Color dialog box.

NOTE If the stair style includes stringers, they should be added to the set of components.

18 Click OK twice.

Applying Tool Properties to an Existing Stair

Use this procedure to apply the properties of a stair tool to one or more existing stairs. The properties include the stair style and any other settings specified in the tool you select.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a stair tool, and click Apply Tool Properties to Stair.

3 Select the stairs, and press *ENTER*.

4 Edit the properties of the stairs in the Properties palette, if necessary.

NOTE Some tool properties cannot be applied to existing stairs. For example, stair shape and turn type do not change. In addition, some properties may be incompatible with existing stairs. For example, a stair that has a vertical orientation of Down cannot terminate with a landing.

Changing the Location of a Stair

Use this procedure to relocate a stair by changing the coordinate values of its insertion point. The stair also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the stair are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the stair by aligning its normal with another axis. You can also rotate the stair on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1 Double-click the stair you want to change.

2 In the Properties palette, click the Design tab, expand Basic, and expand Location.

3 Select next to Additional information.

4 Specify the location of the stair:

If you want to…	Then…
relocate the stair	enter new coordinate values under Insertion Point.
locate the stair on the *XY* plane	make the normal of the stair parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the stair on the *YZ* plane	make the normal of the stair parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the stair on the *XZ* plane	make the normal of the stair parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the stair	enter a new value for Rotation Angle.

5 Click OK.

Specifying the Materials of a Stair

Use this procedure to select a different material for components of an individual stair.

To change the materials assigned to all stairs of the same stair style, see Assigning Materials to a Stair Style on page 1493.

NOTE If a material assignment does not determine the display properties of a stair component, you can change the properties of the display component as described in Specifying the Display Properties of a Stair Style on page 1494.

1 Select the stair you want to change, right-click and click Edit Object Display.

2 To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation where you want the changes to appear, and click .

NOTE Only the Model display representation supports properties By Material.

3 Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.

4 Click the Materials tab.

5 Select the component you want to change, select Object Override, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

6 Click OK.

Changing the Display Properties of Individual Stairs

In most cases, you want the appearance of stairs that belong to the same style to be consistent throughout a drawing. However, in certain instances, you may need to override a display property for an individual stair to achieve a specific result. All the display properties that you can specify in stair styles are available for individual stairs. You can override the following specifications:

- Whether the display properties of stair components are determined by material assignments
- The layer, color, and linetype of the display components of the stair
- The cut plane height and the display of components relative to the cut plane
- Other specific stair display information, such as riser numbering

When you change the display properties of an individual stair, the changes apply only to that stair. Other stairs of the same style are not affected. To change the display properties of all stairs of a specific stair style, see Stair Styles on page 1484.

Specifying the Layer, Color, and Linetype of a Stair

Use this procedure to change the following display properties of the components of an individual stair:

- Visibility (component is on or off)
- By Material (a material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight

- Linetype scale

To change these display properties for all stairs of the same stair style, see Specifying the Display Properties of a Stair Style on page 1494.

NOTE If a material assignment determines the properties of a stair display component, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Materials of a Stair on page 1477.

1. Select the stair you want to change, right-click, and click Edit Object Display.

   NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2. Click the Display Properties tab.
3. Select the display representation where you want the changes to appear, and select Object Override.

   The display representation in bold is the current display representation.

4. If necessary, click .
5. Click the Layer/Color/Linetype tab.
6. Select the component to change, and select a different setting for the property.
7. Click OK twice.

Specifying the Cut Plane Display of a Stair

Use this procedure to specify the properties of one or more cut planes for an individual stair. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1. Double-click the stair you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

   NOTE To apply your changes to all stairs in the drawing, select Drawing default setting. To apply changes to all stairs of this style, select Stair Style:<style name>. For more information on styles, see Stair Styles on page 1484.

5. If necessary, expand Object Display Properties ➤ Cut Plane.
6. For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.
7. If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object.
8. For Cut line angle, enter a value to specify the angle between the stair cut lines.
9. For Cut line distance, enter a value to specify the distance between the 2 cut lines.
10. If you selected No for Override cut plane, for Show entire stair down, specify whether you want to display the stair's down display components (Stringer down, Riser down, Nosing down, and so on; for more information, see Specifying Stair Component Display by Cut Plane Elevation on page 1471).

You can also access and modify these same cut plane settings through the stair's context menu, as follows:

1 Select the stair you want to change, right-click, and click Edit Object Display.

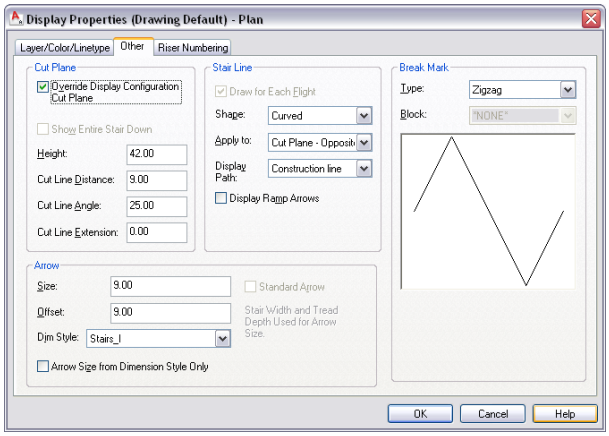
2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.



6 In the Cut Plane panel, change the settings as needed.

7 Click OK twice.

Specifying the Display of Other Characteristics of a Stair

Use this procedure to specify other display properties for an individual stair, such as how to display the arrow in the path, which Display Path to show, and what type of break mark to use in the stair display. These display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the stair you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all stairs in the drawing, select Drawing default setting. To apply changes to all stairs of this style, select Stair Style:<style name>. For more information on styles, see Stair Styles on page 1484.

5 If necessary, expand Object Display Properties ➤ Advanced, and click next to Additional properties.

6 Specify the additional display properties for the stair:

If you want to…	Then…
change the display size of the arrow and break mark	enter a value for Size.
change the offset location of the arrow display	enter a value for Offset.

If you want to…	Then…
change the dimension style used for the arrow display	select a style for Dim Style. **NOTE** If a dimension style other than Standard is used for the arrow, and you want the arrow size to be controlled by the dimension style, select Arrow Size from Dimension Style Only. This is the default for all previous version drawings. If you do not select this option, the size of the arrow is multiplied by the arrow size setting.
change the shape of the stair line	select a shape for Shape. Curved adds an arc when the stair line changes. Straight displays an angle when the stair line changes.
display the arrow at the end of each cut plane pointing in the same direction throughout the length of the stair	select Cut Plane - Parallel for Apply to and make sure that Draw for Each Flight is not selected.
display the arrow at the end of each cut plane and at the end of each flight pointing in the same direction	select Cut Plane - Parallel for Apply to and make sure that Draw for Each Flight is selected.
display the arrow at the end of the entire stair	select Entire Stair for Apply to and make sure that Draw for Each Flight is not selected.
display the arrow on each side of the cut plane	select Cut Plane - Opposite for Apply to.
change which stair line is displayed	select Graphics path or Construction line for Display Path.
change the type of break mark that is displayed at the cut plane	under Break Mark, select a mark for Type.
specify a custom break mark to display at the cut plane	select Custom Shape for Type, and then select a block for Block.

7 Click OK.

You can also access and modify these same settings through the stair's context menu, as follows:

1 Select the stair you want to change, right-click, and click Edit Object Display.

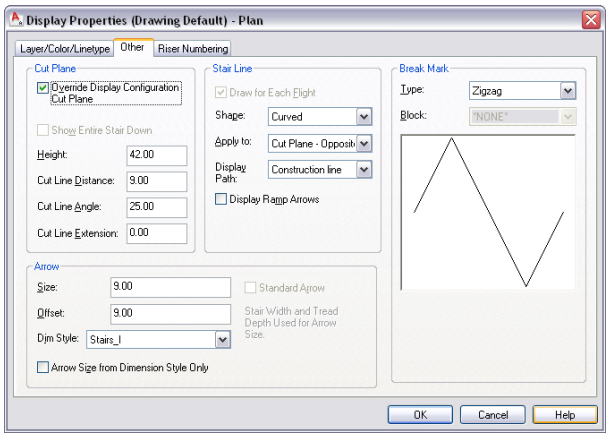
2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.



6 Specify the additional display properties as needed.

7 Click OK twice.

Specifying the Riser Numbering Display for Individual Stairs

Use this procedure to define and display riser numbers for individual stairs.

1 Double-click the stair you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all stairs in the drawing, select Drawing default setting. To apply changes to all stairs of this style, select Stair Style:<style name>. For more information on styles, see Stair Styles on page 1484.

5 If necessary, expand Object Display Properties ➤ Advanced, and click next to Riser numbering.

6 Specify the riser numbering display properties for the stair:

If you want to…	Then…
change the text style of the riser numbers	select a style for Text Style, or click to edit the text style.
change the alignment of the riser numbers	select an alignment for Text Alignment.
change the orientation of the riser numbers	select an orientation for Text Orientation.
change the text height of the riser numbers	enter a value for Text Height.
change the location to which the numbers are justified	select Left, Center or Right for Justify to.
change the location of the numbers along the length of the stair flight	enter a value for X Offset. This is relative to the selected position of the riser.
change the location of the numbers to the left or right	enter a value for Y Offset. This is relative to the selected position of the riser.

If you want to…	Then…
set the first number for the riser numbering	enter a value for First Riser Number.
number the last riser in the stair	select Number Final Riser.

7 Click OK.

You can also access and modify these same cut plane settings through the stair's context menu, as follows:

1 Select the stair you want to change, right-click, and click Edit Object Display.

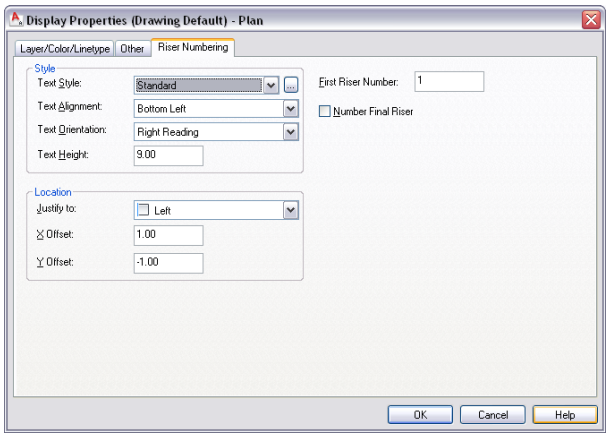
2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Riser Numbering tab.



6 Specify riser numbering settings as needed.

7 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Stair

Use this procedure to attach hyperlinks, notes, or files to a stair. You can also edit hyperlinks and notes, and edit or detach reference files from a stair.

1 Select the stair to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.

For more information about adding hyperlinks, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click OK.

5 To add a note, click next to Notes, and enter the note.

6 Click OK.

7 To add a reference file, click next to Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click, select a file, click Open and click OK.
edit the description of a reference file	click the document's Description field. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application. **NOTE** If the referenced file is an AutoCAD drawing, you must click OK in the Reference Docs dialog before the drawing is displayed.
detach a reference file	select the file name, and click .

8 Click OK.

Stair Styles

A stair style is a group of properties assigned to a stair that determines the appearance and other characteristics of the stair.

You can use a stair style to control properties for all stairs that use that style, rather than changing properties for each stair in the drawing. Various styles exist in the templates for common stair configurations, such as steel-pan, ramp - concrete, and wood-housed. Within the stair style, you can specify the dimensions, landing extensions, components, and display properties of the stair.

Stair Components and Design Rules

In a stair style, you specify these properties of stair components:

- risers and treads
- stringers
- landings
- landing extensions

Design rules determine the code limits for maximum, optimum, and minimum slopes for the stair style.

Display Components of Stairs

Display components determine the graphical characteristics, such as color and linetype, of stair components. Other display properties you can change for a stair style include cut plane, stair line, arrow properties, and the break mark.

Using Materials in Stair Styles

You can use materials to control how stairs of each style are displayed in a drawing. You assign materials to the stair components in the style. The components are then displayed using the display properties of the assigned materials.

Creating Tools from Stair Styles

You can create a stair tool from any stair style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any stair created from the tool. For more information, see Creating a Stair Tool on page 1398.

Managing Stair Styles

To create, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture for working with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Stair Style

Use this procedure to create a stair style. You can create a style that uses default style properties by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Stair Styles.

3 Create a stair style:

If you want to…	Then…
create a style with default properties	right-click Stair Styles, and click New.
create a style from an existing style	right-click the stair style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new stair style.

5 Edit the new stair style:

If you want to…	Then…
specify design rules for the style	see Specifying the Design Rules of a Stair Style on page 1486.
specify the stringer properties for the style	see Specifying the Stringers of a Stair Style on page 1487.
specify the thicknesses and widths of treads, risers, and landings for the style	see Specifying the Components of a Stair Style on page 1490.
specify the landing extension properties of the style	see Specifying the Landing Extension of a Stair Style on page 1492.
specify display properties, such as layer, color, and linetype, for the components of the style	see Specifying the Layer/Color/Linetype of a Stair Style on page 1495.
specify cut plane properties, arrow properties, and other display properties of the style	see Specifying the Display of Other Characteristics of a Stair Style on page 1496.

If you want to…	Then…
add notes and files to the style	see Adding Notes and Files to a Stair Style on page 1499.

6 When you finish specifying the properties of the stair style, click OK.

7 If you want to assign the style to a stair tool, drag the style from the Style Manager to a tool palette.

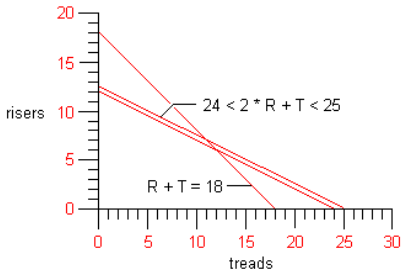
You can later rename the tool and specify other properties for it as described in Creating a Stair Tool on page 1398.

8 Click OK.

Specifying the Design Rules of a Stair Style

Use this procedure to specify the minimum, maximum, and optimal code limits for the riser height and tread depth, and to specify the stair calculator rules.

Specifying stair design rules



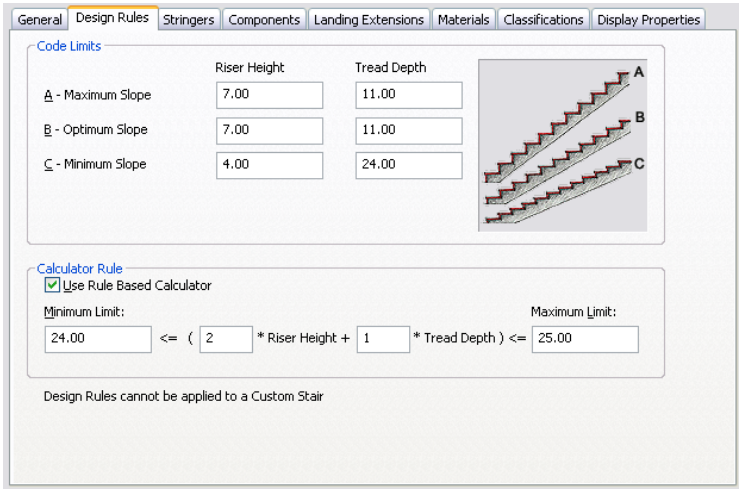
1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style you want to change.

4 Click the Design Rules tab.



5 Specify the default Riser Height and Tread Depth for Minimum Slope, Optimum Slope, and Maximum Slope.

NOTE Use values that represent the actual dimensions of the tread and riser components you want to create, and not just the ratios of these dimensions.

Subject to the constraints of the calculator rules and the fact that the tread heights must be an even divisor of the floor-to-floor height, the software gets as close as possible to the selected optimal tread length and riser height.

6 To change the default stair calculator, select Use Rule Based Calculator.

The fields in the Calculator Rule section become available for editing.

7 When you finish changing the properties of the stair style, click OK.

Specifying the Stringers of a Stair Style

Use this procedure to include stringers with the stair style. A stair style can have one or more stringers. You can specify the properties of each stringer. If the style uses stringers, you can specify the depth of the waist at flights and landings, as well as have center stringers with mitered or curved corners at landing turns. For Ramp or Housed stringers, you can also specify the total depth at flights and landings.

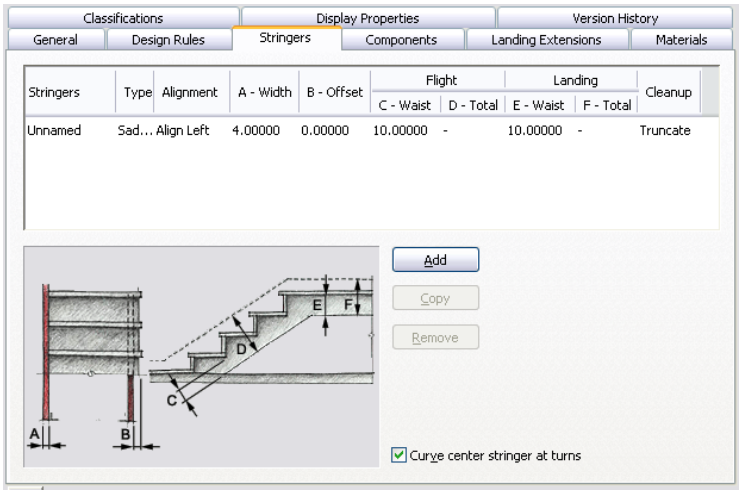
1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style you want to change.

4 Click the Stringers tab.



If the style does not use stringers, proceed to step 6.

5 Add or remove stringers:

If you want to…	Then…
add a stringer to the stair style	click Add.

If you want to…	Then…
add an identical stringer to the list	select the stringer you want to duplicate, and click Copy.
delete a stringer from the list	select the stringer, and click Remove.

6 Specify the properties of each stringer:

If you want to…	Then…
specify the name of a stringer	select the current name, and enter a new name.
specify the type of stringer	click the current Type, and select Saddled or Housed.
specify the alignment of a stringer	click the current alignment, and select Align Left, Align Right, Center, or Full Width.
specify the width of a stringer	enter a value for Width.
specify the offset of a stringer	enter a value for Offset.
specify the flight waist	under Flight, enter a value for Waist.
specify the flight total	under Flight, enter a value for Total.
specify the landing waist	under Landing, enter a value for Waist.
specify the landing total	under Landing, enter a value for Total.
stop the stringer at a landing	select Truncate for Cleanup.
allow the stringer to continue under a landing	select Cleanup for Cleanup.
specify mitered corners for a center stringer at a turn or landing	clear Curve center stringer at turns

7 Click Slab for Type to edit the slab settings:

If you want to…	Then…
specify the thickness of the slab at flights	under Flight, enter a value for Waist.
specify the thickness of the slab at landings	under Landings, enter a value for Waist.

8 When you finish changing the properties of the stair style, click OK.

Specifying Mitered Corners for Center Stringers

Use this procedure to specify mitered corners for center stringers at landings and turns. You can specify this option when working with multi-landing, u-shaped, and custom stairs. You cannot specify this option when working with straight or spiral stairs.

1 Open a tool palette that has a stair tool.

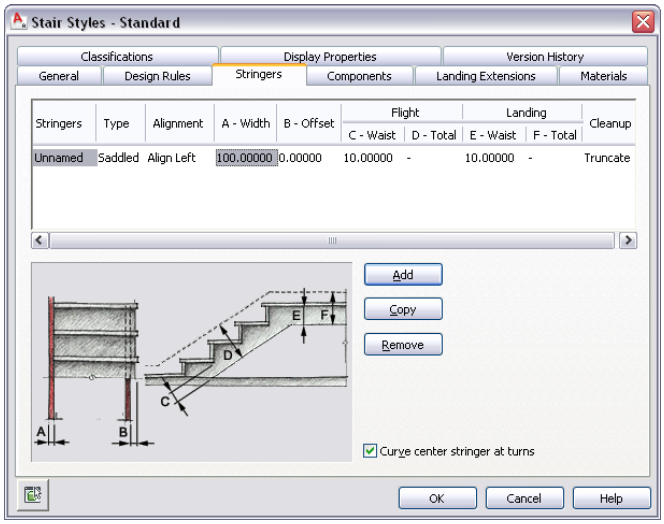
2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style you want to change.

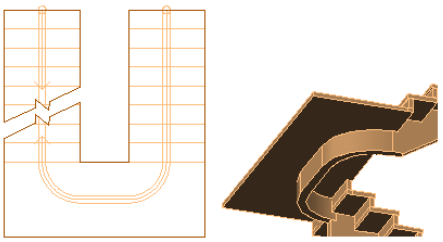
4 Click the Stringers tab.

5 Clear Curve center stringers at turns.

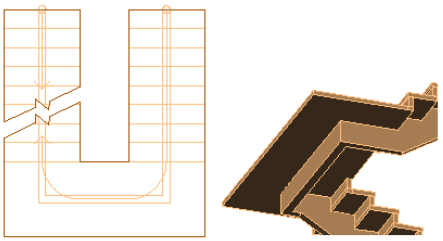


6 Click OK.

Curved and mitered center stringers at landing turns



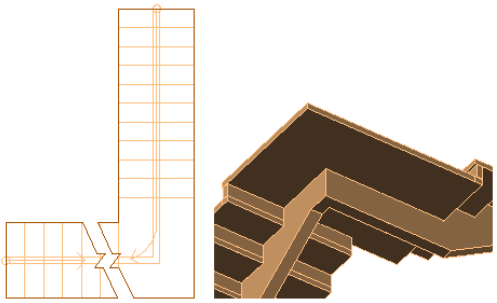
center stringer curved at landing turns



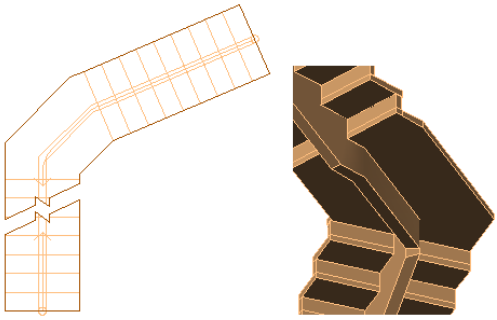
center stringer mitered at landing turns

With the Curve center stringers at turns option cleared, the center stringer is mitered to match the angle of the landing turn. In most cases, this will be a right angle, but any other angle is also possible.

Mitered center stringers at angled landing turns



mitered center stringer at right-angled landing turn



mitered center stringer at non-right-angled landing turn

Specifying the Components of a Stair Style

Use this procedure to specify the display of treads and risers and edit the thicknesses and widths of treads, risers, and landings. Also, you can specify whether these properties of the style are allowed to vary with individual stairs.

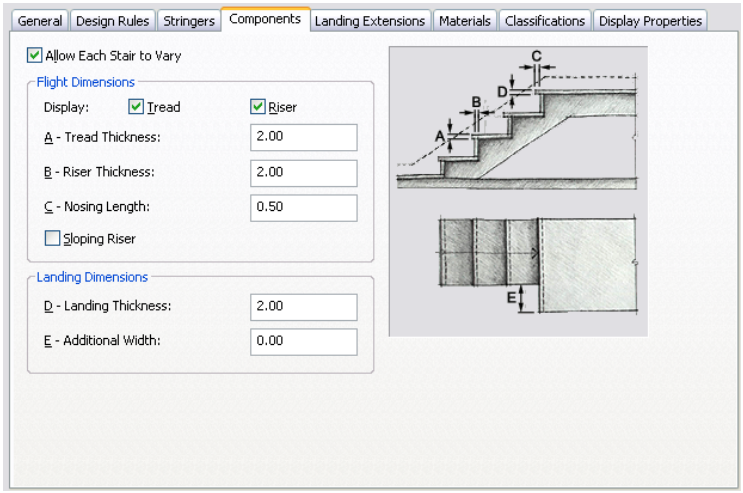
1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style you want to change.

4 Click the Components tab.



5 Specify whether stairs of this style can vary:

If you want to…	Then…
specify flight dimensions, such as tread thickness, riser thickness, and nosing length, when you add or modify stairs	select Allow Each Stair to Vary.
require that all stairs of this style use the flight dimension settings of the style	clear Allow Each Stair to Vary.

NOTE If Allow Each Stair to Vary is checked, changes on this tab do not affect existing stairs. To make these stairs match the style settings, select the stair, display its properties, display the Components worksheet, and click Reset to Style Values.

6 Turn the display of treads and risers on or off.

If tread is off, the tread thickness and landing thickness become unavailable.

7 Specify the flight dimensions:

If you want to…	Then…
specify the thickness of treads	enter a value for Tread Thickness.
specify the thickness of risers	enter a value for Riser Thickness.
specify the length of the edge of a stair tread that projects over the riser	enter a value for Nosing Length.
specify sloping risers	select Sloping Riser.

8 Specify the landing dimensions:

If you want to…	Then…
specify the thickness of landings	enter a value for Landing Thickness.
specify additional width for landings	enter a value for Additional Width.

9 When you finish changing the properties of the stair style, click OK.

Specifying the Landing Extension of a Stair Style

Use this procedure to change the distances between landings and treads and the stringer resolution of stairs. You can differentiate the size of landing components from those used for the stair flights.

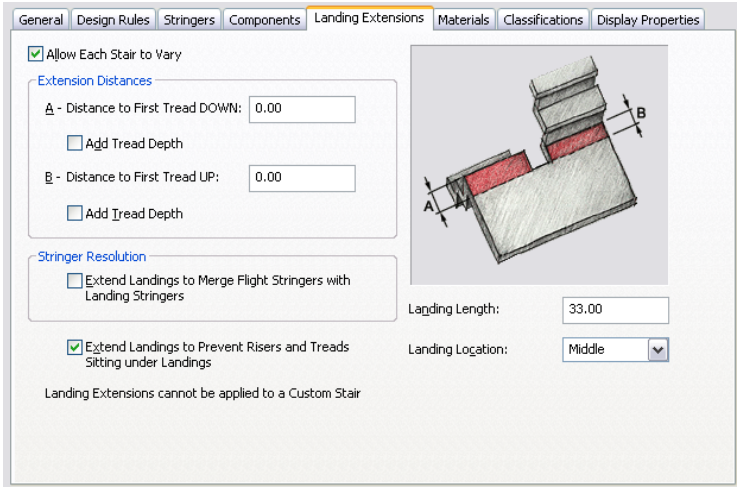
1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style you want to change.

4 Click the Landing Extensions tab.



5 Specify whether stairs of this style can vary:

If you want to…	Then…
specify stringer resolution and extension dimensions, such as distance to first tread up and distance to first tread down, when you add or modify stairs	select Allow Each Stair to Vary.
require that all stairs of this style use the extension dimension settings of the style	clear Allow Each Stair to Vary.

6 Specify extension distances:

If you want to…	Then…
increase the distance to the first tread on the down side of the landing	enter a value for Distance to First Tread DOWN. To extend the landing down by a single tread, select Add Tread Depth.
increase the distance to the first tread on the up side of the landing	enter a value for Distance to First Tread UP. To extend the landing up by a single tread, select Add Tread Depth.

7 Select Extend Landings to Merge Flight Stringers with Landing Stringers.

This option extends the landing to merge the flight stringers with the landing stringers.

8 Select Extend Landings to Prevent Risers and Treads Sitting Under Landings.

This option is on by default for all stairs from earlier-release drawings. Clear it to allow the creation of flush rectangular landings.

9 When landings are placed automatically, their length and location are specified in Landing Length and Landing Location.

If you want to…	Then…
set the size of automatic landings	enter a value for Landing Length.
set the placement of automatic landings	select Top, Middle, or Bottom for Landing Location.

10 When you finish changing the properties of the stair style, click OK.

Assigning Materials to Components in a Stair Style

A stair consists of a number of components whose display properties can be determined by the materials assigned to each component. You assign one material to each physical component of the stair; for example, you assign a wood or metal material to treads, concrete to a concrete component, and so on. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the stair style instead of material display properties, you can turn off the material assignments in the display properties of the stair style.

Material definitions consist of display components that correspond to component types of objects. For example, the 3D body component of a material is used for all linework in model views.

Stair Materials and Display Components

The following table identifies the material component that corresponds to each stair component.

Stair Component	Material Component
Model	
Stringer	3D Body
Tread	3D Body
Landing	3D Body
Riser	3D Body

Assigning Materials to a Stair Style

Use this procedure to assign materials to the individual components of a stair style. When By Material is selected for a component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the stair. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, a riser is a

physical component that can be assigned a material while the graphics path is a symbol that cannot be assigned a material.

NOTE If a material assignment does not determine the display properties of a stair component, you can change the display properties of the stair style as described in Specifying the Display Properties of a Stair Style on page 1494.

1. Open a tool palette that has a stair tool.
2. Right-click a stair tool, and click Stair Styles.

   NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.

   NOTE Only the Model display representation uses materials.

6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.
11. Click OK.

Specifying the Display Properties of a Stair Style

In most cases, you can assign materials to stair components so that the appearance of stairs that belong to the same style is consistent throughout a drawing and with other stairs and objects that use the same materials.

If a component cannot be assigned a material, or if you do not want to use materials but still want consistency among stairs of the same style, you can specify the following display properties of the stair components in the stair style:

- The layer, color, and linetype of stair components
- The cut plane height and the display of components relative to the cut plane
- Stair cut line extensions and ramp arrows
- Other specific stair display information, such as riser numbering

Specifying the Layer/Color/Linetype of a Stair Style

Use this procedure to specify how the various components of the stair are displayed in a particular view. You can change the following display properties of the components of a stair style:

- Visibility (on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale
- Plot style (if the drawing uses style-based rather than color-based plotting)

Plan views of stairs include stringers, risers, nosing, path symbols, and stair outlines. You can specify the visibility of these components for above and below the cut plane of the stair. Isometric (model) views of stairs include stringers, treads, and risers.

To change these display properties for an individual stair, see Changing the Display Properties of Individual Stairs on page 1478.

NOTE If a material assignment determines the display properties of components in the stair style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Assigning Materials to a Stair Style on page 1493.

1. Open a tool palette that has a stair tool.
2. Right-click a stair tool, and click Stair Styles.

   NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

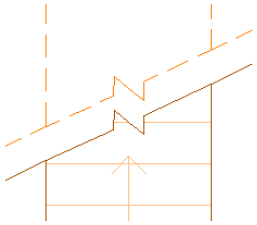
3. Select the stair style that you want to change.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select the component to change, and select a different setting for the property.
9. Click OK.

Specifying the Stair Cut Line Extension Distance

Use this procedure to specify the display of stair cut line extension distance in plan view.

You can specify the stair cut line extension distance between the edge of the stair and end of the stair cut line. In the Display Manager, access the appropriate Stair display representation and then specify the stair

cut line extension distance. A distance of 0 (zero) means the cut line does not extend past the edge of the stair.

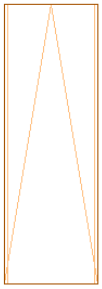


1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2 Expand Representation by Object, and scroll to the Stair object.
3 Expand Stair, and select the appropriate Plan display representation.
4 Click the Other tab.
5 Under Cut Plane, specify a distance for Cut Line Extension.

Specifying the Display of Ramp Arrows

Use this procedure to specify the display of ramp arrows in plan view.

In the Display Manager, access the appropriate Stair display representation and then specify the display of a ramp arrow.



1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2 Expand Representation by Object, and scroll to the Stair object.
3 Expand Stair, and select the appropriate Plan display representation.
4 Click the Other tab.
5 Under Stair Line, select Display Ramp Arrows.

Specifying the Display of Other Characteristics of a Stair Style

Use this procedure to specify settings for the cut plane and related symbols.

Plan views of stairs includes stringers, risers, nosing, path symbols, and stair outlines. You can specify the visibility of these components for above and below the cut plane of the stair.

1 Open a tool palette that has a stair tool.
2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

8 Click Override Display Configuration Cut Plane to change the elevation of the Display Configuration cut plane for the stair.

NOTE When the Display Configuration Cut Plane is used, stairs display only from the current floor elevation up to the cut height, and from the current floor elevation down to the appropriate cut height of the level below.

9 Enter a value for Elevation.

10 Enter a value for Cut Line Distance to change the space between the two cut plane lines.

11 Enter a value for Cut Line Angle to change the angle of the stair cut lines.

12 Specify the display of the cut plane:

If you want to…	Then…
specify the height of the cut plane measured from the beginning of the stair	enter a value for Elevation. The space for the cut plane is centered on the closest tread.
specify the width of the cut plane	enter a value for Cut Line Distance.
specify the angle of the cut plane	enter a value for Cut Line Angle.

13 Specify the display of the arrow and the stair line:

If you want to…	Then…
change the display size of the arrow	enter a value for Size.
change the offset location of the arrow display	enter a value for Offset.
change the dimension style used for the arrow display	select a style for Dim Style. **NOTE** If a dimension style other than Standard is used for the arrow, and you want the arrow size to be controlled by the dimension style, select Arrow Size from Dimension Style Only. This is the default for all previous version drawings. If you do not select this option, the size of the arrow is multiplied by the arrow size setting.
change the shape of the stair line	select a shape for Shape. Curved adds an arc when the stair line changes. Straight displays an angle when the stair line changes.
display the arrow at the end of each cut plane pointing in the same direction throughout the length of the stair	select Cut Plane - Parallel for Apply to and make sure that Draw for Each Flight is not selected.
display the arrow at the end of each cut plane and at the end of each flight pointing in the same direction	select Cut Plane - Parallel for Apply to and make sure that Draw for Each Flight is selected.

If you want to…	Then…
display the arrow at the end of the entire stair	select Entire Stair for Apply to and make sure that Draw for Each Flight is not selected.
display the arrow at the end of each flight pointing in the same direction	select Entire Stair for Apply to and make sure that Draw for Each Flight is selected.
display the arrow on each side of the cut plane	select Cut Plane - Opposite for Apply to.
change which stair line is displayed	select Graphics path, or Construction line, for Display Path.
change the type of break mark that is displayed at the cut plane	under Break Mark, select a mark for Type.
specify a custom break mark to display at the cut plane	select Custom Shape for Type, and then select a block for Block.

14 Specify the display of the break mark:

If you want to…	Then…
change the style of the break mark	select an option for Type. The available options are None, Curved, Zigzag, and Custom Shape.
specify a custom shape for the break mark	select Custom Shape for Type, and select the desired name for Block.

15 Click OK twice.

Specifying the Riser Numbering Display of a Stair Style

Use this procedure to define the display of riser numbers for a stair style.

1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Riser Numbering tab.

8 Select the riser numbering display properties for the stair style:

If you want to…	Then…
change the text style of the riser numbers	select a style for Text Style, or click to edit the text style.

If you want to…	Then…
change the alignment of the riser numbers	select an alignment for Text Alignment.
change the orientation of the riser numbers	select an orientation for Text Orientation.
change the text height of the riser numbers	enter a value for Text Height.
change the location to which the numbers are justified	select Left, Center or Right for Justify to.
change the location of the numbers along the length of the stair flight	enter a value for X Offset. This is relative to the selected position of the riser.
change the location of the numbers to the left or right	enter a value for Y Offset. This is relative to the selected position of the riser.
set the first number for the riser numbering	enter a value for First Riser Number.
number the last riser in the stair	select Number Final Riser.

9 Click OK twice.

Specifying Classifications for a Stair Style

Use this procedure to specify classifications for any classification definition applied to a stair style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to stair styles.

5 For each classification definition, select the classification you want to apply to the current stair style.

6 Click OK.

Adding Notes and Files to a Stair Style

Use this procedure to enter notes and attach reference files to a stair style. You can also edit notes and edit or detach reference files attached to the style.

1 Open a tool palette that has a stair tool.

2 Right-click a stair tool, and click Stair Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Stair Styles .

3 Select the stair style that you want to change.

4 Click the General tab.

5 To add a description to the stair style, enter it for Description.

6 Click Notes.

7 To add a note, click the Text Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Stair Winder Styles

A stair winder style is a group of properties assigned to a stair winder that determines the type of winder used in stairs that contain 1/4 turn or 1/2 turns.

To create, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture for working with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Stair Winder Style

Use this procedure to create a stair winder style. You can create a style that uses default style properties by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Stair Winder Styles.

3 Create a stair winder style:

If you want to…	Then…
create a style with default properties	right-click Stair Winder Styles, and click New.
create a style from an existing style	right-click the stair winder style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new stair winder style.

5 Edit the new stair winder style. For more information, see Specifying the Stair Winder Style Settings on page 1501.

6 When you finish specifying the properties of the stair winder style, click OK.

Specifying the Stair Winder Style Settings

Use this procedure to determine which type of winder is defined for the selected winder style.

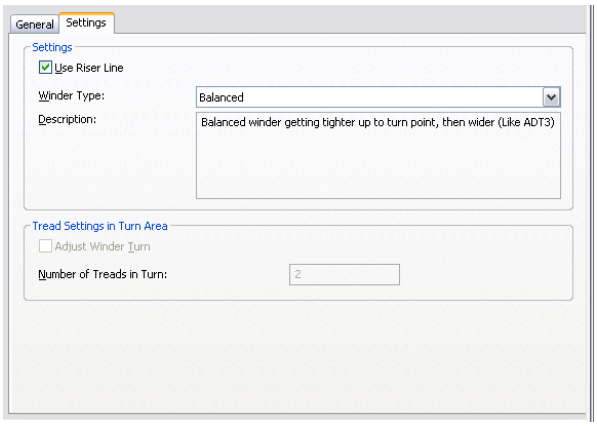
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Stair Winder Styles

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Winder Styles .

3 Select a Stair Winder Style.

4 Click the Settings tab.



5 Specify the stair winder settings:

If you want to…	Then…
use the riser lines to adjust the winders	select Use Riser Line.
use the tread lines to adjust the winders	clear Use Riser Line.
have the treads turn continuously along the length of the stair	select Balanced for Winder Type. **NOTE** This is the type used by all earlier-release version stairs with 1/2 or 1/4 turns.
adjust each winder separately	select Manual for Winder Type.
adjust winders based on a single point and a turn zone	select Single Point for Winder Type.
set a number of winders to use when Single Point is selected for Winder Type	select Adjust Winder Turn and enter a value for Number of Treads in Turn.

NOTE When using the single point type, it is important to clear Use Riser Line if the turn point will be on the edge or corner of the stair. Otherwise, the treads will overlap and the stair will be defective, causing a solution tip icon to display in the drawing.

6 When you finish specifying the properties of the stair winder style, click OK.

Adding Notes and Files to a Stair Winder Style

Use this procedure to enter notes and attach reference files to a stair winder style. You can also edit notes and edit or detach reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Stair Winder Styles.

NOTE Alternatively, select a stair in the drawing, and click Stair tab ➤ General panel ➤ Edit Style drop-down ➤ Winder Styles .

3 Select a Stair Winder Style.
4 Click the General tab.
5 To add a description to the stair style, enter it for Description.
6 Click Notes.
7 To add a note, click the Text Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Stair Tower Generator

The Stair Tower Generator creates vertically stacked stairs based on a single stair and selected levels in the building. Optionally, slabs and railings can be included in the stair tower.

Creating a Stair Tower

You create a stair tower from one stair, which is replicated on selected levels in the building. You can create a stair tower with all stair shapes except spiral. The floor-to-floor height and starting elevation of each stair are adjusted to match these values for each selected level. The *x,y* coordinates for each stair start point are fixed.

NOTE The stair must be in a construct with multiple levels for the stair tower to be created. For more information, see Constructs on page 265.

1 Create a stair within a construct.

2 Click Home tab ➤ Build panel ➤ Stair drop-down ➤ Stair Tower .

3 Select the stair.

4 Select any slabs or railings to be added to the stair tower.

NOTE If you select a slab to include in the stair tower, the slab should be at the top of the selected stair.

5 In the Select Levels dialog box, select the levels on which the stair tower generates the stairs.

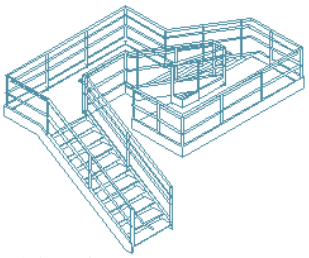
You can include anchored railings by clicking Include Anchored Railings, even if they have not been selected in step 3.

6 If the stair you created was U-shaped, you can select Keep Landing Location while Adjusting U-Shaped Stair to maintain the landing position instead of the start point of the stair when it is edited.

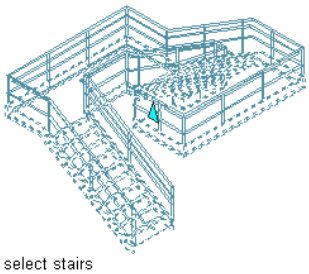
7 Click OK.

The stair tower is created by adding stairs to the selected levels.

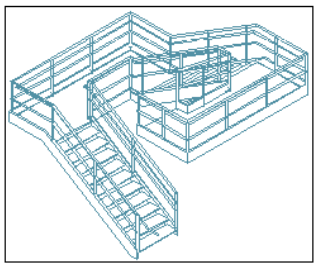
Generating a Stair Tower From and Existing U-Shaped Stair Run



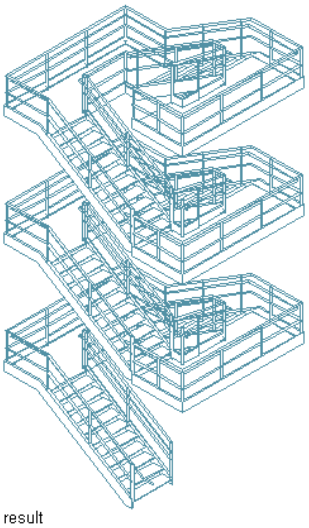
existing stairs
and railings



select stairs



select railings
and slabs



result

NOTE If the stair height is different than the floor to floor height, the height of the stair is changed to match the floor height.

Modifying a Stair Tower

Once a stair tower has been created, you can modify each stair individually. You can also change one stair and propagate that change throughout the stair tower.

1 Select a stair in the tower.

2 Modify the stair.

For more information about modifying stairs, see Editing Stairs on page 1399.

3 Select the edited stair, right-click, and then click Stair Tower Generate.

4 Select any slabs or railings to be added to the stair tower.

NOTE If you select a slab to include in the stair tower, the slab should be at the top of the selected stair.

5 In the Select Levels dialog box, select the levels on which to change the existing stairs.

You can include anchored railings by selecting Include Anchored Railings.

6 If the stair you created was U-shaped, you can select Keep Landing Location while Adjusting U-Shaped Stair to maintain the landing position instead of the start point of the stair when it is edited.

7 Click OK.

Each selected stair is changed to match the modified stair.

Railings

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Railings are objects that interact with stairs and other objects. You can add railings to existing stairs, or you can create freestanding railings.

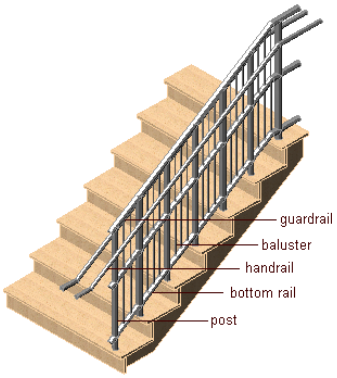
Railings

Railings are objects that interact with stairs and other objects. You can add railings to existing stairs, or you can create freestanding railings.

Railing Components

Railings can have guardrails, handrails, posts, balusters, and one or more bottom rails. Additionally, you can add custom blocks to railings.

Railing components



Railing Shapes

You can attach railings to one or both sides of a stair, and you can wrap them around a landing. You can also attach railings to any other type of AEC object, like a massing element. You can create a custom railing by converting a polyline. Therefore, railings can have a variety of shapes and can be anchored to a straight stair, a multi-landing stair, a U-shaped stair, or a spiral stair.

Custom Railings

You can create custom railings by specifying custom blocks and profiles to be used for individual railing components. You can assign profiles to railing components by style so that you can reuse the custom portion to create detailed railings.

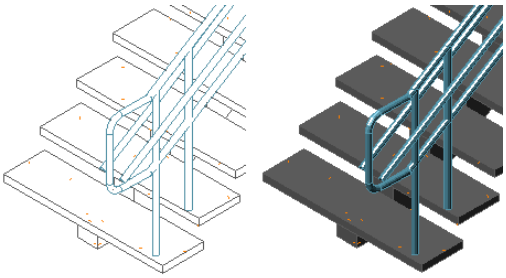
Railing Styles and Their Properties

You can use a railing style to control properties for all railings that use that style, rather than changing properties for each railing in the drawing. Various styles exist in the templates for common railing configurations, such as guardrail pipe, handrail grip, and handrail round. Within the railing style, you can specify the rail locations and height, post locations and intervals, components and profiles, extensions, material assignments, and display properties of the railing.

Materials in Railings

In AutoCAD Architecture, you can assign materials to a railing. These materials are displayed in wireframe and working shade views, or when rendered. Materials have specific settings for the physical components of a railing, such as the various types of rails and posts, and the baluster. You could, for example, create a wooden railing with a stainless steel handrail and bottomrail.

Railing in 2D wireframe model and rendered views



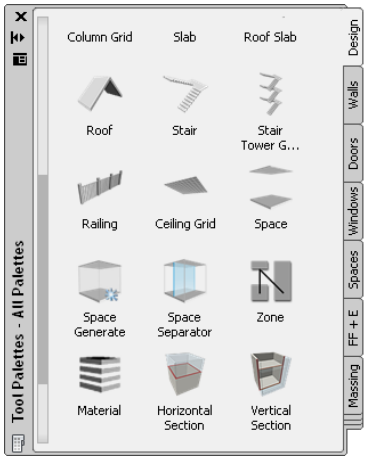
AutoCAD Architecture provides a number of predefined materials for common design purposes, which contain settings for railings. You can use these predefined materials "as is", or modify them to your special designs. You can also create your own materials from scratch.

For more information, see Specifying the Materials of a Railing Style on page 1547.

Using Railing Tools to Create Railings

Tools provided with AutoCAD Architecture let you quickly place railings using a railing tool with specific predefined properties. You can use the default settings of the tool, or you can change the properties. You can also use railing tools to convert linework to railings and to apply the settings of a railing tool to existing railings.

Tool palettes containing railing tools



The default tool palettes in the workspace contain sample railing tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain railing tools that you can add to your tool palettes:

- Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain railing tools with railing styles and properties that are customized for your projects or office standards.

Creating a Railing

Use this procedure to add a new railing that has the properties specified in the railing tool that you select. To specify settings when you add a railing, see Creating an Attached Railing with User-Specified Settings on page 1509 and Creating a Freestanding Railing with User-Specified Settings on page 1512.

1 Open the tool palette that you want to use, and select a railing tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Stair drop-down ➤ Railing .

2 Specify the start point of the railing.

You can move or hide the Properties palette to expose more of the drawing area.

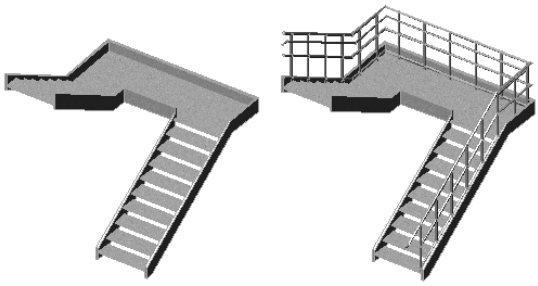
3 Specify the endpoint of the railing.

4 Continue adding railings, and press *ENTER*.

Creating an Attached Railing with User-Specified Settings

Use this procedure to create a railing that is attached to a stair and that has the settings that you specify.

Creating a railing attached to a stair



1 Open the tool palette that you want to use, and select a railing tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Stair drop-down ➤ Railing .

2 On the Properties palette, expand Basic, and expand General.

3 Select a style.

4 Expand Dimensions.

5 Click the setting for Rail Locations.

NOTE If the settings in the Rail Locations worksheet are read-only, the rail locations have been set in the style, and cannot be overridden here. For more information, see Specifying the Upper Rails of a Railing Style on page 1541 and Specifying the Bottom Rails of a Railing Style on page 1542.

6 Specify the parameters for the guardrail or the handrail:

If you want to…	Then…
specify the height of the guardrail or the handrail	enter a value for Horizontal Height.
specify the height of guardrail or the handrail while it is on a stair flight	enter a value for Sloping Height.
specify the distance that the guardrail or the handrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. Side for Offset is available only when there is an offset value.

Auto is useful only for railings attached to the edges of stairs. A positive value is toward the center of the stair, while a negative value is toward the outside edge. Side for Offset for handrails also has a selection of Both, so you can specify a handrail on both sides of the railing.

If you select Auto, and the railing is not attached to or is along the center of a stair, the offset is to the right.

7 Specify the settings for bottom rails:

If you want to…	Then…
specify the height of the lowest rail when it is horizontal	enter a value for Horizontal.

If you want to…	Then…
specify the height of the lowest rail when it is on a stair flight	enter a value for Sloping.
specify the distance that the bottomrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)
designate more than one bottom rail	enter a value for Number of Rails. When you designate multiple bottom rails, you can enter a value for Spacing of Rails.

8 If you want to revert to the rail settings defined in the style, click Reset To Style Values.

9 Click OK to return to the Properties palette.

10 Click the setting for Post Locations.

NOTE If the settings in the Post Locations worksheet are read-only, the post locations have been set in the style, and cannot be overridden here. For more information, see Specifying Posts of a Railing Style on page 1543.

11 Specify the post locations:

If you want to…	Then…
include fixed posts at the beginning and end of the railing	select Fixed Posts.
specify the distance above or below the top rail for all posts	enter a value for Extension of ALL Posts from Top Railing.
specify the height of all posts from the floor	enter a value for Extension of ALL Posts from Floor Level.
include fixed posts at the corners of the railing	select Fixed Posts at Railing Corners.
include dynamic posts with the railing	select Dynamic Posts. You can then enter a value for Maximum Center to Center Spacing.
include balusters with the railing	select Balusters.
specify the height of all balusters from the floor	enter a value for Extension of Balusters from Floor Level.
specify the maximum distance between the balusters	enter the appropriate value for Maximum Center to Center Spacing.
override the number of balusters on each stair tread	select Stair Tread Length Override. You can then enter a value for Number per Tread. (This applies only to railings that are attached to stairs.)

12 If you want to revert to the post settings defined in the style, click Reset To Style Values.

13 Click OK to return to the Properties palette.

14 Expand Location.

15 For Attached to, select Stair or Stair Flight.

16 To offset the railing in or out from the side of the stair, enter an offset value.

Positive values are in toward the center of the stair and negative values are out from the center of the stair. If the railing is center justified, a positive value is to the right and a negative value is to the left.

17 To attach the railing automatically to the full length of the stair or the stair flight, select Yes for Automatic Placement.

NOTE This option is available only if you have selected to attach the railing to a whole stair. If you are attaching the railing to a stair flight, it is always attached to the full length of the stair flight.

18 Select the stair or stair flight in the drawing to which you want to attach the new railing.

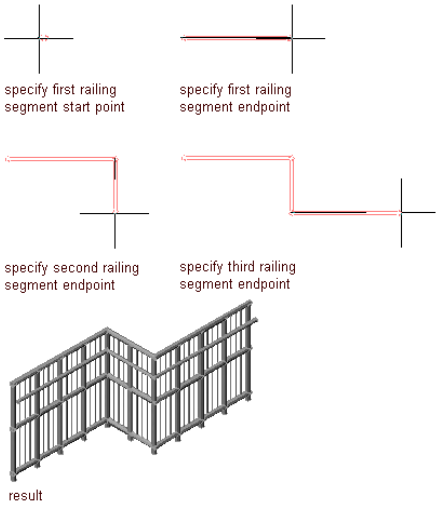
19 Select a side of a stair or a stair flight to place the railing.

20 If you have selected no automatic placement for the stair, define the contour of the desired railing by selecting points in the drawing. Then press *ENTER*.

Creating a Freestanding Railing with User-Specified Settings

Use this procedure to create a freestanding railing in the drawing.

Creating a freestanding railing



1 Open the tool palette that you want to use, and select a railing tool.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Stair drop-down ➤ Railing .

2 On the Properties palette, expand Basic, and expand General.

3 Select a style.

4 Expand Dimensions.

5 Click the setting for Rail Locations.

NOTE If the settings in the Rail Locations worksheet are read-only, the rail locations have been set in the style, and cannot be overridden here. For more information, see Specifying the Upper Rails of a Railing Style on page 1541 and Specifying the Bottom Rails of a Railing Style on page 1542.

6 Specify the parameters for the guardrail or the handrail:

If you want to…	Then…
specify the height of the guardrail or the handrail	enter a value for Horizontal Height.
specify the height of the guardrail or the handrail while it is on a stair flight	enter a value for Sloping Height.
specify the distance that the guardrail or the handrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)

Auto is useful only for railings attached to the edges of stairs. A positive value is toward the center of the stair, while a negative value is toward the outside edge. Side for Offset for handrails also has a selection of Both, so you can specify a handrail on both sides of the railing.

If you select Auto, and the railing is not attached to a stair, or, if the railing is along the center of a stair, the offset is to the right.

7 Specify the settings for bottom rails:

If you want to…	Then…
specify the height of the lowest rail when it is horizontal	enter a value for Horizontal.
specify the height of the lowest rail when it is on a stair flight	enter a value for Sloping.
specify the distance that the bottomrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)
designate more than one bottom rail	enter a value for Number of Rails. When you designate multiple bottom rails, you can enter a value for Spacing of Rails.

8 If you want to revert to the rail settings defined in the style, click Reset To Style Values.

9 Click OK to return to the Properties palette.

10 Click the setting for Post locations.

NOTE If the settings in the Post Locations worksheet are read-only, the post locations have been set in the style, and cannot be overridden here. For more information, see Specifying Posts of a Railing Style on page 1543.

11 Specify the post locations:

If you want to…	Then…
include fixed posts at the beginning and end of the railing	select Fixed Posts.
specify the distance above or below the top rail for all posts	enter a value for Extension of ALL Posts from Top Railing.
specify the height of all posts from the floor	enter a value for Extension of ALL Posts from Floor Level.
include fixed posts at the corners of the railing	select Fixed Posts at Railing Corners.
include dynamic posts with the railing	select Dynamic Posts. You can then enter a value for Maximum Center to Center Spacing.
include balusters with the railing	select Balusters.
specify the height of all balusters from the floor	enter a value for Extension of Balusters from Floor Level.
specify the maximum distance between the balusters	enter the appropriate value for Maximum Center to Center Spacing.
override the number of balusters on each stair tread	select Stair Tread Length Override. You can then enter a value for Number per Tread. (This applies only to railings that are attached to stairs.)

12 If you want to revert to the post settings defined in the style, click Reset To Style Values.

13 Click OK to return to the Properties palette.

14 Expand Location.

15 For Attached to, select NONE.

16 Specify the start point of the railing.

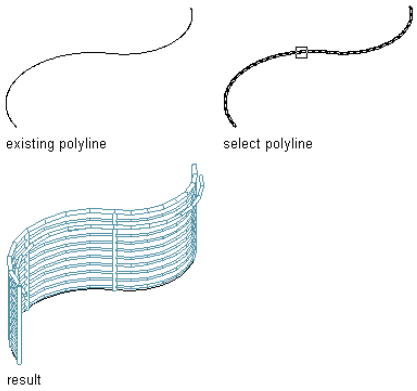
17 Specify further points for the railing.

18 Press *ENTER*.

Creating a Railing from a Polyline

Use this procedure to convert a polyline to a railing that has the properties of the railing tool you select. You can edit these properties after creating the railing.

Converting a polyline to a railing



1 Open the tool palette that you want to use.

   If necessary, scroll to display the tool that you want to use.

2 Right-click a railing tool, and click Apply Tool Properties ➤ Polyline.

3 Select the polyline to convert, and press *ENTER*.

4 When prompted to erase the original geometry, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

5 Edit the properties of the railing in the Properties palette, if needed.

Creating a Railing Tool

Use this procedure to create a railing tool and add it to a tool palette. You may want to create your own railing tools if you are placing multiple railings of a specific style that all have the same properties.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a railing in the drawing	select the railing, and drag it to the tool palette.
create a tool from a railing style in the Style Manager	Click Manage tab ➤ Style & Display panel ➤ Style Manager. Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Re-open the tool palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog	open the catalog in the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the railing created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select a railing style.

10 Select the drawing file containing the style used for this railing.

11 Expand Location.

12 Select whether railings created from this tool should be attached to a stair, a stair flight, or be freestanding (**NONE**).

13 Click OK.

Editing Railings

You can edit railings by changing the style of the railing, the inclusion and location of various rails and posts, and the insertion point. You can also specify the height and offset of guardrails and handrails, and the extension and spacing of posts.

Methods of Editing Railings

AutoCAD Architecture offers several methods for editing railings:

- You can directly edit railings using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.
- You can change railing settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- You can use editing commands from the contextual Railing ribbon tab and shortcut menu for a selected railing.

Using Grips to Edit Railings

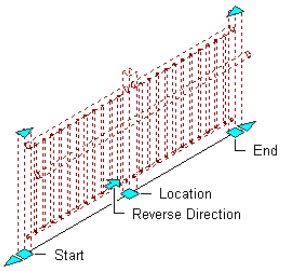
Use these procedures to edit railings using grips.

Editing Railing Dimensions

1 Select the railing.

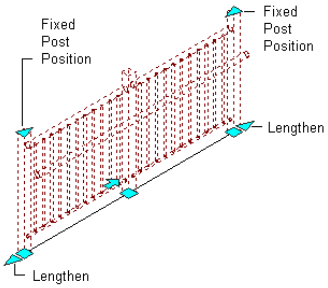
2 Select the grip for the dimension you want to change.

Viewing railing Start, End, Location, and Reverse Direction grips



3 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

Viewing railing Fixed Post Position and Lengthen grips



Changing the Location or Position of a Railing

1 Select the railing.

2 Move the appropriate grip to change the location of the railing, its start point, or its endpoint.

Reversing the direction of the Railing

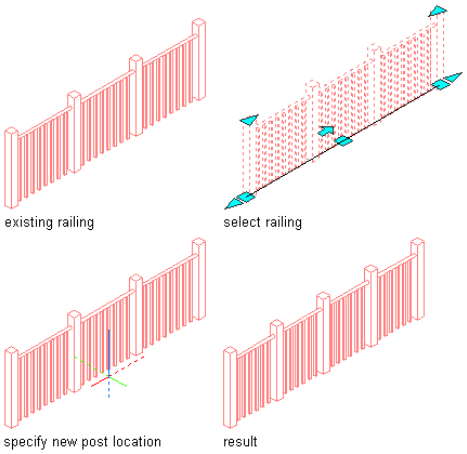
1 Select the railing.

2 Click the direction grip (arrow grip).

Adding a Post to a Railing

Use this procedure to add a post to a railing. The post is placed at a selected point on the railing.

Adding a post to a railing



1 Select a railing.

2 Click Railing tab ➤ Posts panel ➤ Add .

3 Select a location for a new post.

4 Press *ENTER*.

Removing a Post from a Railing

Use this procedure to remove posts you have added to railings. You can only remove fixed posts. You cannot remove dynamic posts. The manually added post closest to the selected point is removed from the railing. If two posts are equidistant from the selected point, the post closer to the starting point of the railing is removed. If the current first fixed post is removed, then the next post becomes the first fixed post. Likewise, if the current last fixed post is removed, then the next post from the last becomes the last fixed post. If all but one post is removed from a railing, then the sole remaining post becomes the first fixed post.

1 Select a railing.

2 Click Railing tab ➤ Posts panel ➤ Remove .

3 Select the railing post to remove.

4 Continue removing railing posts, or press *ENTER*.

Redistributing Posts on a Railing

Use this procedure to reposition dynamic posts to account for posts that have been added or removed. You cannot redistribute displayed posts to account for hidden posts.

You may also want to redistribute posts after dragging the endpoints (start and end offset) of a railing attached to a stair. If posts are lost after trimming a railing, use the Redistribute Posts command to restore the posts.

If you have created a railing that is so short that only one post can be created, grip-editing and dragging the railing does not create another post. You must use the Redistribute Posts command to add another post to the end of the railing.

1 Select an existing railing.

2 Click Railing tab ➤ Posts panel ➤ Redistribute .

Hiding Posts

Use this procedure to hide posts in a railing. It is useful to hide posts in plan view so that the railing is visible as a solid component. These posts are not deleted; they are merely hidden from view. You can only hide fixed posts. You cannot hide dynamic posts. If the current first or last fixed post is hidden, then it remains the first or last fixed post regardless of its visibility.

1 Select a railing.

2 Click Railing tab ➤ Posts panel ➤ Hide .

3 Select the railing post to hide.

4 Continue selecting railing posts, or press *ENTER*.

Showing Hidden Posts

Use this procedure to show hidden posts.

1 Select a railing.

2 Click Railing tab ➤ Posts panel ➤ Show .

Reversing the Direction of the Railing

Use this procedure to reverse the direction of the railing to change the location of railing components. The direction in which the railing is drawn affects the behavior of the railing and its components.

NOTE You can also reverse the direction of a railing by clicking its direction grip (arrow grip).

1 Select a railing.

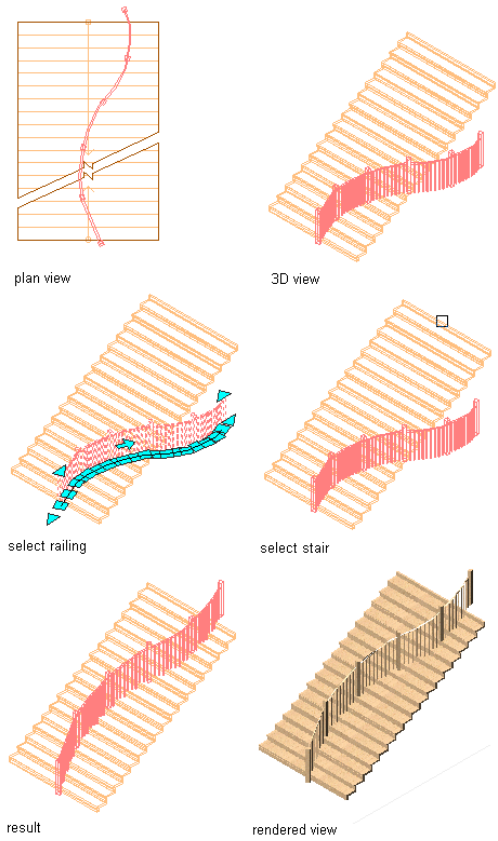
2 Click Railing tab ➤ Anchor panel ➤ Reverse .

Anchoring an Existing Railing to a Stair

Use this procedure to anchor an existing railing to a stair. Once attached, the railing stays where it is located in the drawing, but it moves when the attached stair is moved. This allows you to create free-form paths for a railing along a stair. For example, you might want to create a curved railing in the middle of a straight stair.

Railings attached to stairs respect the stair cut plane. The height of the railing follows the slope of the stair, no matter where the posts are placed on the treads.

Attaching a railing to a stair



Railings that are attached to a stair or to a stair flight when created are anchored to the stair, at either side of the stairs or at the centerline.

1 Select a railing.

2 Click Railing tab ➤ Anchor panel ➤ Set To Stair .

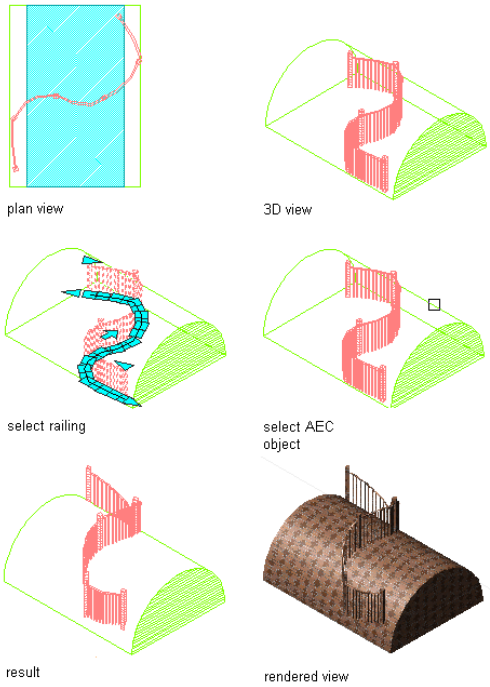
3 Select a stair.

Anchoring an Existing Railing to an Object

Use this procedure to anchor an existing railing to an AEC object other than a stair. Once attached, the railing stays where it is located in the drawing, but it moves when the attached object is moved. This allows you to create free-form paths for a railing along a stair or other object.

Railings attached to objects other than stairs follow the height of the centerline of each post.

Attaching a railing to an AEC object



1 Select a railing.

2 Click Railing tab ➤ Anchor panel ➤ Set To Objects .

3 Select an AEC object other than a stair, and press *ENTER*.

4 If you want to clean up the railing posts with the surface of the object to which it is attached, enter **y** (Yes) on the command line.

5 Define the contour of the railing:

If you want to…	Then…
adapt only the posts to the surface of the attached object, and have straight segments between the posts	press *ENTER* to specify At Post Locations Only for Calculate Height.
adapt the whole railing to the surface of the attached object,	enter **f** to Follow Surface for Calculate Height.

Releasing an Anchored Railing

Use this procedure to release an anchored railing from a stair. After the railing is released, it is independent of the stair. The railing and the stair can then be moved separately.

NOTE When a railing that is anchored to a stair is released, any changes to the railing (such as grip-editing or changing properties) may cause the railing to lose its slope. Be sure to correct the appearance of the railing before releasing it from the stair.

1 Select a railing.

2 Click Railing tab ➤ Anchor panel ➤ Release .

3 The railing is no longer anchored to the stair.

Specifying the Display of Custom Block Components of a Railing

Use this procedure to specify the display of custom block components for an individual railing in any of the display representations used for model views. If you are going to use custom graphics for a new component, draw the component and save it as a block before you start this procedure.

1 Double-click the railing.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all railings in the drawing, select Drawing default setting. To apply changes to all railings of this style, select Railing Style:<style name>. For more information on styles, see Railing Styles on page 1539.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and for Custom block display, click (the number in parentheses indicates the number of blocks currently attached to the railing).

7 If you want to turn off the display of custom blocks for this railing without removing them, select Disable Custom Blocks.

8 Specify whether to add, edit, or remove a block component:

If you want to…	Then…
add a new block component	click Add, and then click Select Block, select the block, and click OK.
edit an existing block component	select the component to edit, and click Edit.
remove an existing block component	select the block, click Remove, and click OK.

9 When adding or editing a block component, specify the scale of the custom block:

If you want to…	Then…
use the block at its drawn size	clear all options under Scale to Fit.
scale the custom block to the width of the object to which it is attached	select Width.
scale the custom block to the depth of the object to which it is attached	select Depth.
scale the custom block to the height of the object to which it is attached	select Height.
lock the *XY* shape of the object	select Lock Ratio. If the object is scaled in one direction to fit another criterion for Scale to Fit, the whole custom block is scaled equally.
add the selected block to the railings between the selected components	select Between Comp. Baluster, Fixed Post, and Dynamic Posts are the only valid component selections.

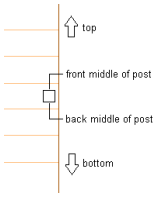
10 Specify the Mirror In direction, if necessary:

If you want to…	Then…
create a mirror of the component in the *X* direction, along the length of the railing	select Mirror X.
create a mirror of the component in the *Y* direction, across the width of the railing	select Mirror Y.
create a mirror of the component in the *Z* direction	select Mirror Z.

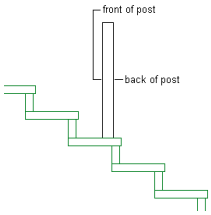
11 Specify the location of the insertion point in relation to the object:

If you want to…	Then…
specify the location of the *X* insertion point	select Left, Center, or Right for X.
specify the location of the *Y* insertion point	select Front, Center, or Back for Y.
specify the location of the *Z* insertion point	select Bottom, Middle, or Top for Z.

Specify the post orientation relative to the up and down directions on a stair run in plan view as shown in the following illustration:



Specify the post orientation relative to the up and down directions on a stair run in elevation view as shown in the following illustration:



12 Specify the insertion offset for the component in the *X*, *Y*, and *Z* directions.

13 Specify the type of railing component that the block represents:

If you want to…	Then…
represent balusters with the block	select Baluster for Component.
represent fixed posts with the block	select Fixed Post for Component.
represent dynamic posts with the block	select Dynamic Post for Component.
replace the current baluster, fixed post, or dynamic post with the block	select Replace.
represent a guardrail with the block	select Guardrail for Component.

If you want to…	Then…
represent a handrail with the block	select Handrail for Component.
represent a bottom rail with the block	select Bottomrail for Component.

The two groups of components are mutually exclusive, so selecting an object from one column makes the other unavailable. You can select more than one object in each column to apply the block to each selected component. For example, you can use the same block for the fixed posts and dynamic posts.

14 Specify where the block is applied to the components:

If you want to…	Then…
apply the block to all instances of the selected components	select All for Attach to.
apply the block to the first instance of the selected component, based on the direction the railing was drawn	select First for Attach to.
apply the block to the last instance of the selected component, based on the direction the railing was drawn	select Last for Attach to.
apply the block to a selected number of components	select Selection for Attach to. The components are numbered in the order the railing was drawn, beginning with 1.

15 Click OK.

You can also specify custom block display properties through the railing's context menu, as follows:

1 Right-click the railing, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

4 If necessary, click .

5 Click the Other tab.

6 Add, edit, or remove custom blocks as explained in the previous procedure.

Specifying Cleanup Settings for a Railing

Use this procedure to specify the cleanup settings for a railing in display representations used for model views.

1 Double-click the railing.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all railings in the drawing, select Drawing default setting. To apply changes to all railings of this style, select Railing Style:<style name>. For more information on styles, see Railing Styles on page 1539.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Cleanup properties.

7 Specify whether you want to disable the cleanup of rails at post.

8 Specify whether you want to disable the cleanup of balusters at rails.

9 Click OK.

You can also access and modify the same cleanup settings through the railing's context menu, as follows:

1 Select the railing you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the desired display representation, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.

6 Under Cleanup, adjust the settings as desired, and click OK twice.

Adding a Custom Profile to a Railing Component

Use this procedure to add a custom profile to a railing component.

Guardrails, handrails, bottom rails, and fixed and dynamic posts can be defined by a custom profile. You can add a profile to a railing component either in the railing style, as described in Specifying the Components of a Railing Style on page 1545 or directly on screen. When you add a custom profile on screen, the new profile is automatically saved back to the railing style. You can also add, remove, or edit custom profiles from the Properties palette, as described in Specifying the Display of a Custom Profile Component of a Railing on page 1528.

1 Create the necessary profile definition, as described in Creating a Profile for a Custom Railing Component on page 1545.

2 Select the railing.

3 Click Railing tab ➤ Profile panel ➤ Add Profile .

4 Select the railing component to which you want to add a profile.

You can select guardrails, handrails, bottom rails, fixed posts, and dynamic posts.

NOTE If you have difficulty selecting the correct component, switch to another view that makes the selection easier. For example, to select a bottom rail, switch to a Model view.

Adding a custom profile to a railing post

5 Select the profile for the railing component.

6 Either save the custom profile to the railing style immediately, or proceed with editing the profile:

If you want to…	Then…
save the new profile to the railing style	click OK.
edit the new profile	click Continue Editing, and then click OK. For information on editing a custom profile, see Editing a Custom Profile of a Railing Component on page 1526.

Editing a Custom Profile of a Railing Component

Use this procedure to edit a custom profile of a railing component.

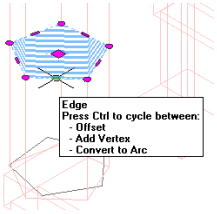
1 Select the railing with a custom profile you want to edit.

2 Click Railing tab ➤ Profile panel ➤ Edit In Place .

This command is available only if you have profile-based components in the railing.

3 Select the component you want to edit.

NOTE If you have difficulty selecting the correct component, switch to another view that makes the selection easier. For example, to select a bottom rail, switch to a Model view.



You have begun an in-place editing session, depicted by the magenta-colored grips and light blue hatch of the temporary in-place editing profile, as well as the faded color of other objects in the drawing. Note that while you are editing in-place, you have limited access to other commands in the drawing. Before working on other objects, you should first end the in-place editing session.

4 Use the grips or the ribbon in order to make any of the following changes to the profile:

If you want to…	Then…
use grips to edit the profile	move the edge or vertex grips as needed. The Edge grip has three edit modes: Offset, Add Vertex, and Convert to Arc. The default mode is Offset, which offsets the selected edge in a direction that is perpendicular to the midpoint of the edge. Depending on the shape of the profile and the edge you choose to modify, neighboring lines are extended or trimmed, and new lines are added as necessary. Use the Add Vertex edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is an arc as well. Convert to Arc changes the selected edge to an arc and stretches the midpoint of the edge. The edge

If you want to…	Then…
	grip for an arc also has a Stretch mode, so that you can stretch the midpoint of the edge after it has been converted to an arc.
add a vertex to the profile	■ Grips: Select an Edge grip, and press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location, and click; or enter a value, and press *ENTER*. ■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Add Vertex , and then select a point to add.
remove a vertex from the profile	■ Grips: Select the Vertex grip for the vertex you want to remove, and press *CTRL* to switch to the Remove edit mode. Move the cursor off the selected vertex, and click. ■ Ribbon: Click Edit In Place tab ➤ Profile panel ➤ Remove Vertex , and then select a point to remove.
add a ring to a profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Add Ring . Then select a closed polyline, spline, ellipse, or circle for an additional ring. Specify if you want to erase the source linework, and press *ENTER*.
remove a ring from a profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Then select the ring you want to remove. **NOTE** You cannot remove the last ring from a profile.
replace a ring on a profile	select the profile, and click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Then select a closed polyline, spline, ellipse, or circle for the replaced ring. Specify if you want to erase the source linework, and press *ENTER*.

5 Save the changes to the profile:

If you want to…	Then…
change the existing profile definition to reflect the new shape	click Edit In Place tab ➤ Edits panel ➤ Finish .
create a new profile definition with the shape you have created	click Edit In Place tab ➤ Edits panel ➤ Save As .Enter a name for the new profile, and click OK. The

If you want to…	Then…
	in-place edit session closes and the new profile definition is available in the Style Manager.
discard all changes on the profile and revert to the previous shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .

Specifying the Display of a Custom Profile Component of a Railing

Use this procedure to add, remove, or edit a custom profile component for an individual railing in any of the display representations used for plan views. If you are adding a new profile, you must first create the necessary profile definition, as described in Creating a Profile for a Custom Railing Component on page 1545.

1. Double-click the railing.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

NOTE To apply your changes to all railings in the drawing, select Drawing default setting. To apply changes to all railings of this style, select Railing Style:<style name>. For more information on styles, see Railing Styles on page 1539.

5. For Display representation, verify that the desired display representation is selected.
6. If necessary, expand Object Display Properties ➤ Advanced, and for Custom profile display, click (the number in parentheses indicates the number of profiles currently attached to the railing).
7. If you want to turn off the display of custom profiles for this railing without removing them, select Disable Custom Profiles.
8. Specify whether to add, edit, or remove a profile component:

If you want to…	Then…
add a new profile component	click Add, and then click Select Profile, select the profile, and click OK.
edit an existing profile component	select the component to edit, and click Edit.
remove an existing profile component	select the component, click Remove, and click OK.

9. Specify the scale of the custom profile:

If you want to…	Then…
use the profile at its drawn size	clear all options under Scale to Fit.
scale the custom profile to the width of the object to which it is attached	select Width.
scale the custom profile to the depth of the object to which it is attached	select Depth.

If you want to…	Then…
scale the custom profile to the height of the object to which it is attached	select Height.
lock the *XY* shape of the object	select Lock Ratio. If the object is scaled in one direction to fit another criterion for Scale to Fit, the entire custom profile is scaled equally.
add the selected profile to the railings between the selected components	select Between Comp. (Baluster, Fixed Post, and Dynamic Posts are the only valid component selections.)

10 Specify the Mirror In direction, if necessary:

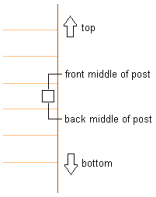
If you want to…	Then…
create a mirror of the component in the *X* direction, along the length of the railing	select Mirror X.
create a mirror of the component in the *Y* direction, across the width of the railing	select Mirror Y.

11 Specify the angle to rotate the component in the *Z* direction, if necessary.

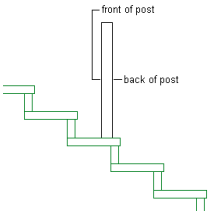
12 Specify the location of the insertion point in relation to the object:

If you want to…	Then…
specify the location of the *X* insertion point	select Left, Center, or Right for X.
specify the location of the *Y* insertion point	select Front, Center, or Back for Y.

Specify the post orientation relative to the up and down directions on a stair run in plan view as shown in the following illustration:



Specify the post orientation relative to the up and down directions on a stair run in elevation view as shown in the following illustration:



13 Specify the insertion offset for the component in the *X* and *Y* directions.

14 Specify the type of railing component that the profile represents:

If you want to…	Then…
represent balusters with the selected profile	select Baluster for Component.

If you want to…	Then…
represent fixed posts with the selected profile	select Fixed Post for Component.
represent dynamic posts with the selected profile	select Dynamic Post for Component.
replace the current baluster, fixed post, or dynamic post with the selected profile	select Replace.
add a guardrail to the selected profile	select Guardrail for Component.
add a handrail to the selected profile	select Handrail for Component.
add a bottom rail to the selected profile	select Bottomrail for Component.

The two groups of components are mutually exclusive, so selecting an object from one column makes the other unavailable. You can select more than one object in each column, and apply the profile to each selected component. For example, you can use the same profile for the fixed posts and dynamic posts.

15 Specify where the profile is applied to the components:

If you want to…	Then…
apply the profile to all instances of the selected components	select All for Attach to.
apply the profile to the first instance of the selected component, based on the direction the railing was drawn	select First for Attach to.
apply the profile to the last instance of the selected component, based on the direction the railing was drawn	select Last for Attach to.
apply the profile to a selected number of components	select Selection for Attach to. The components are numbered in the order the railing was drawn.

16 Click OK.

You can also specify custom profile display properties through the railing's context menu, as follows:

1 Right-click the railing, and click Edit Object Display.
2 Click the Display Properties tab.
3 Select the display representation where you want the changes to appear, and select Object Override.
4 If necessary, click .
5 Click the Other tab.
6 Add, edit, or remove custom profiles as explained in the previous procedure.

Changing the Style of a Railing

Use this procedure to change the style associated with existing railings.

1 Select the railings for which you want to change the style, and double-click one of them.
2 On the Properties palette, click the Design tab, then expand Basic, and expand General.
3 Under Style, select a different style.

Changing the Upper Rails

Use this procedure to change the following settings for an individual railing:

- guardrails
- handrails
- height
- sloping height
- offset from posts
- side for offset

NOTE If these settings are unavailable, they are controlled by the railing style. You cannot modify them for individual railings.

1 Double-click the railing for which you want to change the upper rails.
2 On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.
3 Click the setting for Rail Locations.
4 Select whether to include guardrails or handrails.

NOTE A railing must have a guardrail or a handrail. Both cannot be turned off.

5 Specify the parameters for the guardrail or the handrail:

If you want to…	Then…
specify the height of the guardrail or the handrail	enter a value for Horizontal Height.
specify the height of guardrail or the handrail while it is on a stair flight	enter a value for Sloping Height.
specify the distance that the guardrail or the handrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)

Auto is useful only for railings attached to the edges of stairs. A positive value is toward the center of the stair, while a negative value is toward the outside edge. Side for Offset for handrails also has a selection of Both, so you can specify a handrail on both sides of the railing.

If you select Auto, and the railing is not attached to or is along the center of a stair, the offset is to the right.

6 If you want to undo your changes and revert to the values set in the railing style, click Reset to Style Values.
7 Click OK.

Changing the Bottom Rails

Use this procedure to change the following settings for the bottom rails of an individual railing:

- whether to use bottom rails
- number of bottom rails
- distance between rails
- height of lowest rail

NOTE If these settings are unavailable, they are controlled by the railing style. You cannot modify them for individual railings.

1. Double-click the railing for which you want to change the bottom rails.
2. On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.
3. Click the setting for Rail Locations.
4. Select Bottomrail to add bottom rails to the railing.
5. Specify the settings for bottom rails:

If you want to…	Then…
specify the height of the lowest rail when it is horizontal	enter a value for Horizontal Height.
specify the height of the lowest rail when it is on a stair flight	enter a value for Sloping Height.
specify the distance that the bottomrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)
designate more than one bottom rail	enter a value for Number of Rails. When you designate multiple bottom rails, you can enter a value for Spacing of Rails.

6. If you want to undo your changes and revert to the values set in the railing style, click Reset to Style Values.
7. Click OK.

Changing the Posts

Use this procedure to change the following settings for the posts of an individual railing:

- type of posts
- number of posts that extend above the railing
- maximum center-to-center spacing between posts
- maximum center-to-center spacing between balusters
- number of balusters per tread for railings that are attached to stairs

NOTE If these settings are unavailable, they are controlled by the railing style. You cannot modify them for individual railings.

1. Double-click the railing for which you want to change the post locations.
2. On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.
3. Click the setting for Post locations.
4. Specify the post locations:

If you want to…	Then…
include fixed posts at the beginning and end of the railing	select Fixed Posts.
specify the distance above or below the top rail for all posts	enter a value for Extension of ALL Posts from Top Railing.
specify the height of all posts from the floor	enter a value for Extension of ALL Posts from Floor Level.
include fixed posts at the corners of the railing	select Fixed Posts at Railing Corners.
include dynamic posts with the railing	select Dynamic Posts. You can then enter a value for Maximum Center to Center Spacing.
include balusters with the railing	select Balusters.
specify the height of all balusters from the floor	enter a value for Extension of Balusters from Floor Level.
specify the maximum distance between the balusters	enter the appropriate value for Maximum Center to Center Spacing.
override the number of balusters on each stair tread	select Stair Tread Length Override. You can then enter a value for Number per Tread. (This applies only to railings that are attached to stairs.)

5. If you want to undo your changes and revert to the values set in the railing style, click Reset to Style Values.
6. Click OK.

Changing the Railing Extensions at Floor Levels

Use this procedure to control the length of the handrail and guardrail extensions at the top and bottom of stair flights. If a bottom rail exists, it extends as far as the railing above it.

NOTE If these settings are unavailable, they are controlled by the railing style. You cannot modify them for individual railings.

1. Double-click the railing for which you want to change the extensions.
2. On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.
3. Click the setting for Railing Extensions.

4 Specify the railing extension properties:

If you want to…	Then…
use values in this dialog box to specify extensions	under At Floor Levels, clear Use Stair Landing Extension.
specify the length of the handrail and guardrail at the top of an entire stair	under Top of Entire Stair, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.
specify the length of the handrail and guardrail at the bottom of an entire stair	under Bottom of Entire Stair, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.

5 If you want to undo your changes and revert to the values set in the railing style, click Reset to Style Values.

6 Click OK.

Changing the Railing Extensions at Landings

Use this procedure to control the length of the handrail and guardrail extensions at landings. If a bottom rail exists, it extends as far as the railing above it.

NOTE If these settings are unavailable, they are controlled by the railing style. You cannot modify them for individual railings.

1 Double-click the railing for which you want to change the extensions.

2 On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.

3 Click the setting for Railing Extensions.

4 Specify the railing extension properties:

If you want to…	Then…
use values in this dialog box to specify extensions	clear Use Stair Landing Extension under At Landings.
specify the length of the handrail and guardrail at the top of a flight	under Top of Flight, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.
specify the length of the handrail and guardrail at the bottom of a flight	under Bottom of Flight, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.

5 If you want to undo your changes and revert to the values set in the railing style, click Reset to Style Values.

6 Click OK.

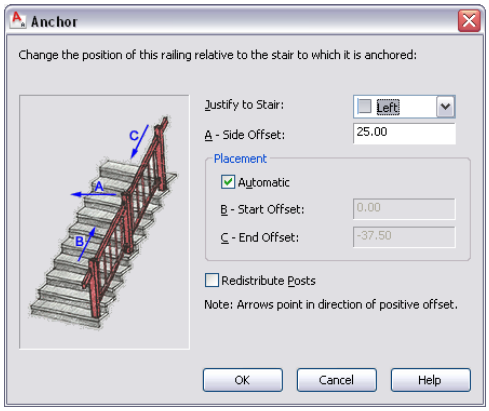
Changing the Anchor Properties of a Railing

Use this procedure to change the justification of a railing and the side, start, and end offsets. These properties apply only to railings attached to stairs.

1 Double-click the railing for which you want to change the anchor properties.

2 On the Properties palette, click the Design tab, expand Basic, and expand Location.

3 Click Anchor.



4 Change the justification of the railing.

5 Change the side offset from the stair:

- A value of zero places the start and end fixed posts exactly at the ends of the stair.
- Positive values move the start/end onto the stair.
- Negative values extend the railing beyond the stair bounds.

NOTE If Automatic is selected, the start and end offset options are not available.

6 Change the start offset from the top of the stair.

7 Change the ending offset at the bottom of the stair.

8 Click Redistribute Posts to change the existing posts.

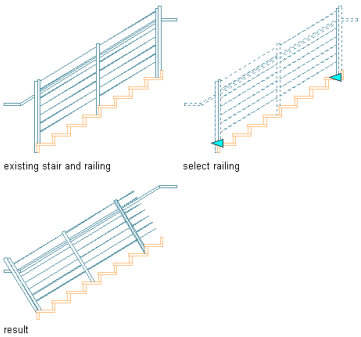
NOTE If you edit a railing using grips so that the railing does not end on a post, you can use Redistribute Posts to move a post to the end of the edited railing.

9 Click OK.

Specifying Perpendicular Railing Orientation

Use this procedure to specify perpendicular or vertical railing orientation relative to a stair flight. By default, railing have a vertical orientation when you create them.

Specifying perpendicular railings



1 Double-click the railing.

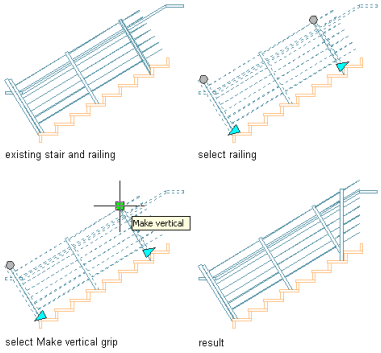
2 On the Properties palette, click the Design tab.

3 Under Dimensions, select Yes for Perpendicular Posts.

4 Under Location, select Yes for Automatic Cleanup.

Once a perpendicular railing orientation has been specified, you can use grips to change first and last posts to a vertical orientation.

Specifying perpendicular railings

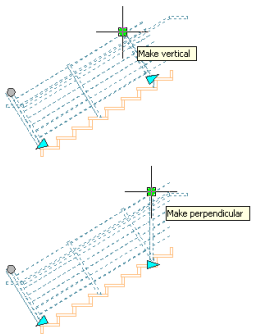


1 Select the perpendicular railing.

2 Select the Make Vertical grip.

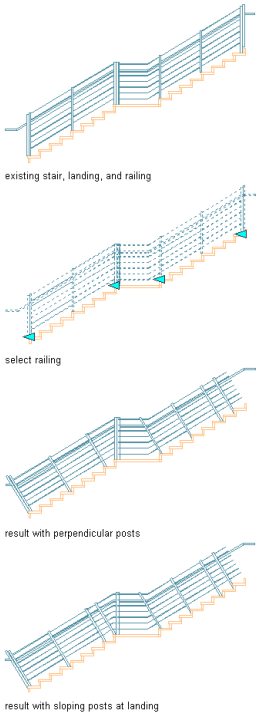
The Make vertical grip changes to a Make perpendicular grip once you have specified a vertical orientation for the railing post. Select the Make perpendicular grip to return the post to a perpendicular orientation.

Viewing post orientation grips



When a stair has a landing, you also have the option of specifying the orientation of landing posts.

Specifying landing post orientation



1 Double-click the railing, and on the Properties palette, click the Design tab.

2 Under Dimensions, select Yes for Perpendicular Posts, and Yes for Maintain Sloping Posts at Landings.

3 Under Location, select Yes for Automatic Cleanup.

Changing the Location of a Railing

Use this procedure to relocate a railing by changing the coordinate values of its insertion point. The railing also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the railing are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the railing by aligning its normal with another axis. You can also rotate the railing on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD help.

NOTE You can change the location of freestanding railings only. The location of a railing attached to a stair is defined by the stair.

1 Select the railings you want to relocate, and double-click one of them.

2 On the Properties palette, click the Design tab, expand Basic, and expand Location.

3 Enter a value for Rotation.

4 Enter a value for Elevation.

5 Click Additional Information for further location properties:

If you want to…	Then…
relocate the railing	enter new coordinate values under Insertion Point.

If you want to…	Then…
locate the railing on the *XY* plane	make the normal of the railing parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the railing on the *YZ* plane	make the normal of the railing parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the railing on the *XZ* plane	make the normal of the railing parallel to the *Y* axis: enter **1** for Y, and enter **0** for X and Z.
change the rotation of the railing	enter a new value for Rotation Angle.

6 Click OK.

Applying Tool Properties to an Existing Railing

Use this procedure to apply the properties of a railing tool to one or more existing railings. The properties include the railing style and any other settings specified in the tool you select.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a railing tool, and click Apply Tool Properties to ➤ Railing.

3 Select the railings, and press *ENTER*.

4 Edit the properties of the railing in the Properties palette, if necessary.

Attaching Hyperlinks, Notes, and Files to a Railing

Use this procedure to attach hyperlinks, text notes, and files to a railing.

1 Double-click the railing to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information about adding hyperlinks, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click the setting for Notes, and add a note. Then click OK.

5 Click the setting for Reference Documents.

6 Attach or detach reference files:

If you want to …	Then …
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

7 Click OK.

Railing Styles

A railing style is a group of properties assigned to a railing that determines the appearance and other characteristics of the railing.

Railing Components

In a railing style, you specify the following properties of railing components:

- guardrails
- handrails
- bottom rails
- first fixed post
- last fixed post
- interior fixed posts
- dynamic posts
- balusters

You can specify the height of rails and posts, the spacing between posts, the spacing between rails, and the width and depth of components. You can specify the display of different first and last posts, as well as different interior fixed posts. You can also create custom railing components by assigning custom profiles to replace standard railing components.

Custom Railing Components and Special Conditions

To create custom extruded components (railings, posts, or balusters) in a railing style, you define a profile and select it to replace a component on the Components tab of the railing style in the Style Manager. The resulting component is displayed appropriately in all views and does not have to be added to the display properties.

You can create a custom block to represent a complex design for a component that cannot be created from a profile, such as an elaborate wrought iron design in place of balusters, or an unusually shaped component. That block is used to represent the component in model views. You can create a profile to represent the custom component in plan views.

You can also use the custom blocks and profiles features of the display properties to represent additional railing components other than posts, rails, and balusters. In such cases, the component is added to the component rather than replacing it. For example, you can create a custom block for Model views and a profile for Plan views of a curved-railing return piece that ends by attaching to a wall. You can then add the block or profile to the rail components.

Using Materials in Railing Styles

You can use materials to control how railings of each style are displayed in a drawing. You assign materials to the railing components in the style. The components are then displayed using the display properties of the assigned materials.

AutoCAD Architecture provides a number of predefined materials for common design purposes. You can use these materials “as is,” or modify them for your project requirements. You can also define new materials. For more information about materials and how to define them, see Materials on page 577.

Creating Tools from Railing Styles

You can create a railing tool from any railing style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any railing created from the tool. For more information, see Creating a Railing Tool on page 1515.

Managing Railing Styles

To create, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture, for working with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Railing Style

Use this procedure to create a railing style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Railing Styles.

NOTE Alternatively, you can select a railing in the drawing, then click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Create a railing style:

If you want to…	Then…
create a style with default properties	right-click Railing Styles, and click New.
create a style from an existing style	right-click the railing style you want to copy, and click Copy. Right-click, and click Paste.

4 Right-click the new style name, and click Rename. Enter a name for the new railing style, and press *ENTER*.

5 Edit the new railing style:

If you want to…	Then…
specify default dimensions and offsets for upper rails of the style	see Specifying the Upper Rails of a Railing Style on page 1541.
specify default dimensions and offsets for bottom rails of the style	see Specifying the Bottom Rails of a Railing Style on page 1542.
specify the location and interval of posts and balusters for the style	see Specifying Posts of a Railing Style on page 1543.
specify the structural components of the style	see Specifying the Components of a Railing Style on page 1545.
specify railing extensions at floor levels and at landings	see Specifying the Railing Extensions of a Railing Style on page 1546.
assign materials to the components of the railing style	see Assigning Materials to a Railing Style on page 1548.

If you want to…	Then…
add classifications to a railing style	see Specifying Classifications for a Railing Style on page 1549.
specify display components of the style	see Specifying the Display Components of a Railing Style on page 1549.
add notes and files to the style	see Attaching Notes and Files to a Railing Style on page 1550.

6 If you want to assign the style to a railing tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Railing Tool on page 1515.

7 Click OK.

Specifying the Upper Rails of a Railing Style

Use this procedure to change the following settings for guardrails and handrails in a railing style:

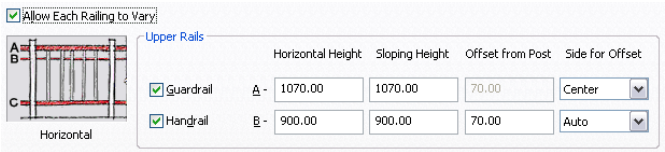
- sloping height
- offset from posts
- side for offsets

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Rail Locations tab.



5 Specify whether upper rail properties of this railing style can be overridden for individual railing objects:

If you want to…	Then…
specify guardrail and handrail properties, such as horizontal height, sloping height, and offset distance, when you add or modify railings	select Allow Each Railing to Vary.
require that all railings of this style use the upper rail settings of the style	clear Allow Each Railing to Vary.

NOTE Changes to guardrails and handrails do not affect existing railings of this style unless Allow Each Railing to Vary is cleared.

6 Select whether to include guardrails and handrails.

A railing must have a guardrail or handrail. Both cannot be turned off.

7 Specify the following parameters for the guardrail or the handrail:

If you want to…	Then…
specify the height for the guardrail or the handrail	enter a value for Horizontal Height.
specify the height for the guardrail or the handrail while it is on a stair flight	enter a value for Sloping Height.
specify the distance that the guardrail or the handrail is offset from the posts	enter a value for Offset from Post.
specify the side of the post for the offset, based on the direction the stair (or railing) was drawn	select Center, Left, Right, or Auto for Side for Offset. (Side for Offset is available only when there is an offset value.)

Auto is useful only for railings attached to the edges of stairs. A positive value is toward the center of the stair, while a negative value is toward the outside edge. Side for Offset for handrails also has a selection of Both, so you can specify a handrail on both sides of the railing.

If you select Auto, and the railing is not attached to a stair or is along the center of a stair, the offset is to the right.

8 Click OK.

Specifying the Bottom Rails of a Railing Style

Use this procedure to change the following settings for bottom rails in a railing style:

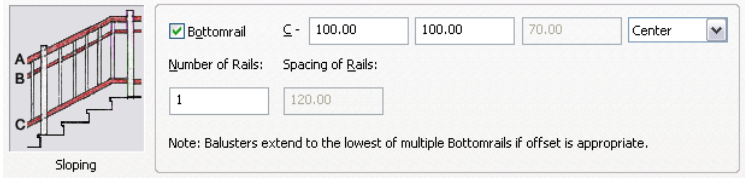
- number of bottom rails
- distance between rails
- height of lowest rail

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Rail Locations tab.



5 Specify whether bottom rail properties of this railing style can be overridden for individual railing objects:

If you want to…	Then…
specify bottom rail properties, such as horizontal height, sloping height, and number of rails, when you add or modify railings	select Allow Each Railing to Vary.

If you want to…	Then…
require that all railings of this style use the bottom rail settings of the style	clear Allow Each Railing to Vary.

6 Select Bottomrail to add bottom rails to the railing.

NOTE Changes to bottom rails do not affect existing railings of this style unless Allow Each Railing to Vary is cleared.

7 Specify the parameters for bottom rails:

If you want to…	Then…
specify the height of the lowest rail when it is horizontal	enter a value for Horizontal.
specify the height of the lowest rail when it is on a stair flight	enter a value for Sloping.
designate more than one bottom rail	enter a value for Number of Rails. When you designate multiple bottom rails, you can enter a value for Spacing of Rails.

8 Click OK.

Specifying Posts of a Railing Style

Use this procedure to change the following settings for posts in a railing style:

- type of posts (first fixed, last fixed, fixed, dynamic, and balusters)
- distance the posts extend above railings
- maximum spacing between posts and balusters
- number of balusters for each tread for railings that are attached to stairs

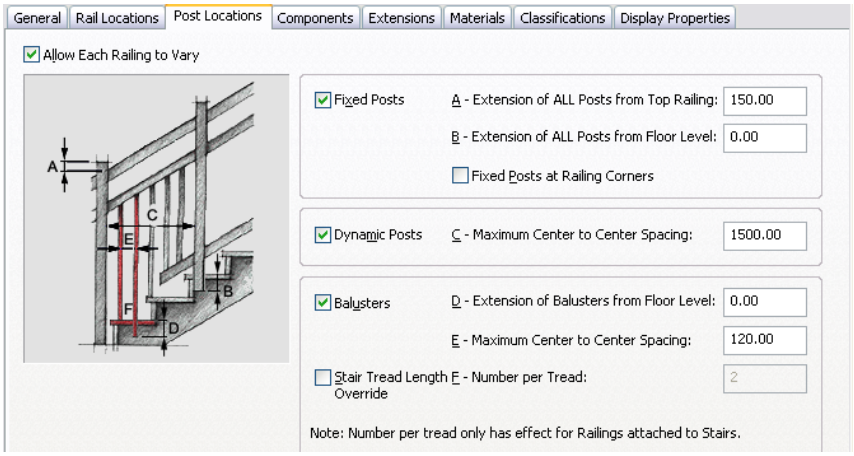
First fixed posts and last fixed posts are attached at the beginning and end of each railing, respectively. Additional fixed posts and dynamic posts are added to the railing between the first and last fixed posts. Balusters are closely spaced supports for a railing. You can specify the spacing between dynamic posts and between balusters.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Post Locations tab.



5 Specify whether the post properties of this railing style can be overridden for individual railing objects:

If you want to…	Then…
specify post properties, such as fixed posts, dynamic posts, and balusters, when you add or modify railings	select Allow Each Railing to Vary.
require all railings of this style to use the post settings of the style	clear Allow Each Railing to Vary.

NOTE Changes to posts do not affect existing railings of this style unless Allow Each Railing to Vary is cleared.

6 Specify the post locations:

If you want to…	Then…
include fixed posts at the beginning and end of the railing	select Fixed Posts.
specify the distance above or below the top rail for all posts	enter a value for Extension of ALL Posts from Top Railing.
specify the height of all posts from the floor	enter a value for Extension of ALL Posts from Floor Level.
include fixed posts at the corners of the railing	select Fixed Posts at Railing Corners.
include dynamic posts with the railing	select Dynamic Posts. You can then enter a value for Maximum Center to Center Spacing.
include balusters with the railing	select Balusters. You can then enter a value for Maximum Center to Center Spacing.
override the number of balusters on each stair tread	select Stair Tread Length Override. You can then enter a value for Number per Tread. This applies only to railings that are attached to stairs.

7 Click OK.

Specifying the Components of a Railing Style

Use this procedure to specify the shape of the railing components, and the width, depth, and rotation of each component for each railing style.

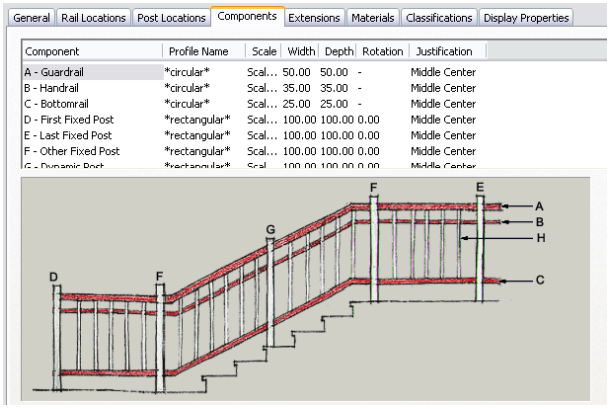
You can use profiles to create railing components with custom shapes. The custom profile replaces a component on the Components tab of the railing style in the Style Manager. For more information, see Creating a Profile for a Custom Railing Component on page 1545.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Components tab.



5 Select the component to change.

6 Select the profile you want to use for the selected component.

The default profiles are circular and rectangular. Any profiles in the current drawing are also displayed.

7 Click Width, and enter a width for the selected component.

8 Click Depth, and enter a depth for the selected component.

Depth is not available for the default circular profile.

9 Click Rotation, and enter a rotation for the selected component.

Rotation is not available for rail components, or when the default circular profile is used for posts.

10 Click OK.

Creating a Profile for a Custom Railing Component

Use this procedure to create a profile from a closed polyline. You can then use the profile to define a custom railing component. The custom shape is extruded from the profile along the length of the component.

The height and the width of the polyline you use to create the profile define the height and the width of the railing component. You can change the scale and dimensions of the profile as you add it.

1 Draw a closed polyline of the height and the depth needed for the resulting railing component.

2 Click Manage tab ➤ Style & Display panel ➤ ➤ Profile Definitions .

3 Right-click Profiles, and click New.

4 Enter a name for the profile.

5 In Style Manager, right-click the new profile, and click Set From.

6 Select the profile in the drawing area.

7 When prompted to add another ring, press *ENTER*.

8 Press *ENTER* to accept Centroid as the insertion point of the profile.

9 Click OK.

You can now use the profile to replace a railing component. For more information, see Adding Custom Railing Blocks and Profiles to a Railing Style on page 1550.

Specifying the Railing Extensions of a Railing Style

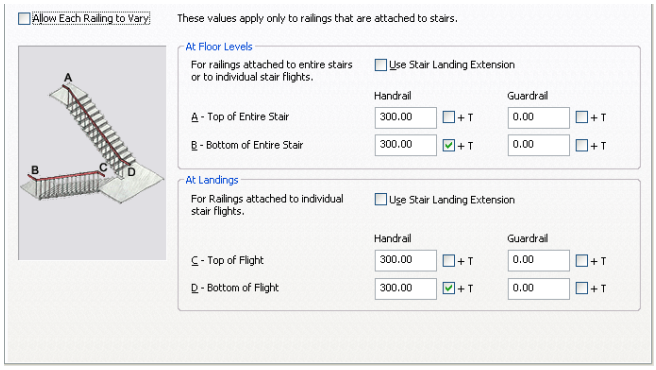
Use this procedure to control the length of the handrail and guardrail extensions at the top and bottom of stair flights. If a bottom rail exists, it extends as far as the railing above it. If railing extensions are not allowed to vary, the endpoint cannot be grip-edited.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Extensions tab.



5 Specify whether railing extensions of this railing style can be overridden for individual railing objects:

If you want to…	Then…
specify railing extension properties, such as handrails and guardrails at the top and bottom of entire stairs, when you add or modify railings	select Allow Each Railing to Vary.
require that all railings of this style use the extension settings of the style	clear Allow Each Railing to Vary.

NOTE Changes to railing extensions do not affect existing railings of this style unless Allow Each Railing to Vary is cleared.

6 Specify the properties of railing extensions:

If you want to…	Then…
use values in this dialog box to specify extensions at floor levels.	clear Use Stair Landing Extension under At Floor Levels.

If you want to…	Then…
specify the length of the handrail and guardrail at the top of an entire stair	under At Floor Levels, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.
specify the length of the handrail and guardrail at the bottom of an entire stair	under At Floor Levels, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.
use values in this dialog box to specify extensions at landings.	clear Use Stair Landing Extension under At Landings.
specify the length of the handrail and guardrail at the top of a flight	under At Landings, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.
specify the length of the handrail and guardrail at the bottom of a flight	under At Landings, enter values for Handrail and Guardrail. Select + T next to the value to add the tread length to the extension value.

7 Click OK.

Specifying the Materials of a Railing Style

A railing consists of a number of components whose display properties can be determined by the materials assigned to each component. You assign one material to each physical component of the railing. For example, you assign a wood material to the balusters of a railing and a stainless steel material to the handrail and bottomrail. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the railing style, instead of using material display properties, you can turn off the material assignments in the display properties of the railing style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three dimensional (3D) model views and in elevations.

Railing Materials and Display Components

The following table identifies the material component that corresponds to each railing component.

Railing Component	Material Component
Plan, Plan Screened, Plan High Detail	
Posts	Linework
Guardrail	Linework
Handrail	Linework
Bottomrail	Linework

Railing Component	Material Component
Plan Low Detail	
Posts	Linework
Guardrail	Linework
Handrail	Linework
Model, Model ByBlock, Model Monochrome	
Baluster	3D Body
Posts	3D Body
Guardrail	3D Body
Handrail	3D Body
Bottomrail	3D Body

Assigning Materials to a Railing Style

Use this procedure to assign materials to the individual components of a railing style. The component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the railing. Custom components and components that are only symbolic graphics do not use materials for their display properties.

NOTE If a material assignment does not determine the display properties of a railing component, you can change the display properties of the railing style as described in Specifying the Display Components of a Railing Style on page 1549.

1. Select a railing.
2. Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Although you can also edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.

11 Click OK.

Specifying the Display Components of a Railing Style

Use this procedure to change the following properties of the display components of a railing style:

- Visibility (display component is on or off)
- By Material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE If a material assignment determines the display properties of components in the railing style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Specifying the Materials of a Railing Style on page 1547.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK.

Specifying Classifications for a Railing Style

Use this procedure to specify classifications for any classification definition applied to a railing style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to area styles.

5 For each classification definition, select the classification you want to apply to the current railing style.

6 Click OK.

Attaching Notes and Files to a Railing Style

Use this procedure to enter notes and attach reference files to a railing style. You can also edit notes and edit or detach reference files from a railing style.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the General tab.

5 To add a description to the railing style, enter the description under Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you finish editing.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK.

Adding Custom Railing Blocks and Profiles to a Railing Style

You can specify custom blocks and profiles to add to or replace individual railing components. You can add to or replace posts, dynamic posts, and balusters can be added to or replaced, and you can add to (but not replace) other railing components.

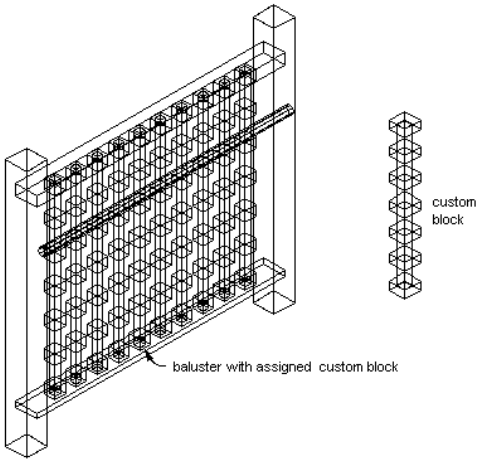
When you add a custom block and profile, you can specify several rules for positioning and scaling the new component. Each custom block or profile is also added to the display properties so that you can control its layer, color, and linetype. Be sure that the objects used to create the custom blocks are created with their properties designated as ByBlock. Otherwise, they cannot be controlled through the display properties. For more information about ByBlock, see "Control the Color and Linetype Properties in Blocks" in AutoCAD help.

After you create custom blocks and profiles, you can attach them to railing styles. Using custom blocks and profiles, railing styles can provide a much richer and more flexible set of railing graphics.

Adding a Custom Block to a Railing Style

Use this procedure to add a custom block to a railing style. The block can replace a railing component, such as a baluster, or be added to a component. You attach the block in display representations, such as Model, that show the railing in three dimensions.

Assigning a custom block as a baluster component to a railing



You can use a block to replace a component on the Components tab of a railing style in the Style Manager, or you can use a block to represent additional railing components in the display of railings. You add a block to the display components of a style; a component that you replace on the Components tab is already a part of the display properties.

1. Create a block to represent the component to add to the railing.

   Create the block in the same plane as the railing to which you will attach it. Be sure that the objects used to create the custom blocks are created with their properties designated as ByBlock. Otherwise, they cannot be controlled through the display properties.

2. Select a railing.
3. Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .
4. Select the style you want to edit.
5. Click the Display Properties tab.
6. Select the display representation where you want the changes to appear, and select Style Override.

   NOTE You can add a custom block to a railing only in Model-based display representations.

7. If necessary, click .
8. Click the Other tab.
9. Under Custom Block Display, click Add.
10. In the Custom Block dialog box, click Select Block.
11. Select the block to use, and click OK.
12. Specify the scale of the custom block:

If you want to…	Then…
use the block at its drawn size	clear all options under Scale to Fit.
scale the custom block to the width of the object to which it is attached	select Width.

If you want to…	Then…
scale the custom block to the depth of the object to which it is attached	select Depth.
scale the custom block to the height of the object to which it is attached	select Height.
lock the *XY* shape of the object	select Lock Ratio. If the object is scaled in one direction to fit another criterion for Scale to Fit, the whole custom block is scaled equally.
add the selected block to the railings between the selected components	select Between Comp. Baluster, Fixed Post, and Dynamic Posts are the only valid component selections.

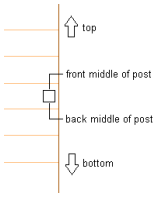
13 Specify the Mirror In direction, if necessary:

If you want to…	Then…
create a mirror of the component in the *X* direction, along the length of the railing	select Mirror X.
create a mirror of the component in the *Y* direction, across the width of the railing	select Mirror Y.
create a mirror of the component in the *Z* direction	select Mirror Z.

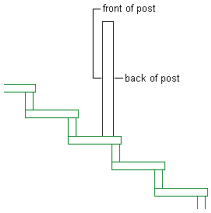
14 Specify the location of the insertion point in relation to the object:

If you want to…	Then…
specify the location of the *X* insertion point	select Left, Center, or Right for X.
specify the location of the *Y* insertion point	select Front, Center, or Back for Y.
specify the location of the *Z* insertion point	select Bottom, Middle, or Top for Z.

Specify the post orientation relative to the up and down directions on a stair run in plan view as shown in the following illustration:



Specify the post orientation relative to the up and down directions on a stair run in elevation view as shown in the following illustration:



15 Specify the insertion offset for the component in the *X*, *Y*, and *Z* directions.

16 Specify the type of railing component that the block represents:

If you want to…	Then…
represent balusters with the block	select Baluster for Component.
represent fixed posts with the block	select Fixed Post for Component.
represent dynamic posts with the block	select Dynamic Post for Component.
replace the current baluster, fixed post, or dynamic post with the block	select Replace.
represent a guardrail with the block	select Guardrail for Component.
represent a handrail with the block	select Handrail for Component.
represent a bottom rail with the block	select Bottomrail for Component.

The two groups of components are mutually exclusive, so selecting an object from one column makes the other unavailable. You can select more than one object in each column to apply the block to each selected component. For example, you can use the same block for the fixed posts and dynamic posts.

17 Specify where the block is applied to the components:

If you want to…	Then…
apply the block to all instances of the selected components	select All for Attach to.
apply the block to the first instance of the selected component, based on the direction the railing was drawn	select First for Attach to.
apply the block to the last instance of the selected component, based on the direction the railing was drawn	select Last for Attach to.
apply the block to a selected number of components	select Selection for Attach to. The components are numbered in the order the railing was drawn, beginning with 1.

18 Click OK twice.

After adding the block to the style, you can specify the layer, color, and linetype of the block. For more information, see Specifying the Display Components of a Railing Style on page 1549.

Adding a Custom Profile to a Railing Style

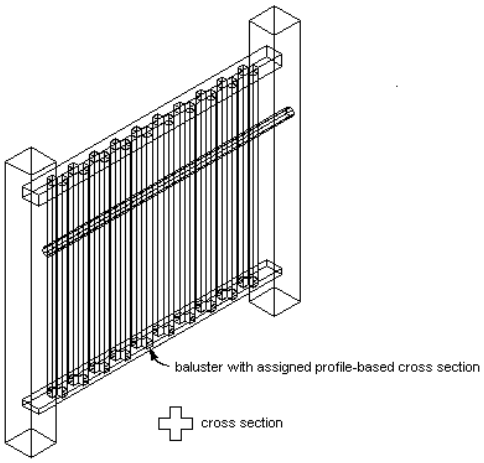
Use this procedure to add a custom profile to a railing style in the Plan display representation. You can replace one or more railing components with a custom profile, or you can assign different custom profiles to different railing components.

You can use a profile to replace a component on the Components tab of the railing style in the Style Manager, or you can use a profile to represent additional railing components in the display of railings. You add a

profile to the display properties of a style; a component that you replace on the Components tab is already a part of the display properties.

For more information about creating profiles for railing components, see Creating a Profile for a Custom Railing Component on page 1545.

Assigning a profile to a baluster in a railing



1. Create a profile to represent the component to add to the railing. Create the profile in the *XY* plane.
2. Select a railing.
3. Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .
4. Select the style you want to edit.
5. Click the Display Properties tab.
6. Select the display representation where you want the changes to appear, and select Style Override.

NOTE You can add a custom profile to a railing only in Plan-based display representations.

7. If necessary, click .
8. Click the Other tab.
9. Under Custom Profile Display, click Add.
10. In the Custom Profile dialog box, click Select Profile.
11. Select the profile, and click OK.
12. Specify the scale of the custom profile:

If you want to…	Then…
use the profile at its drawn size	clear all options under Scale to Fit.
scale the custom profile to the width of the object to which it is attached	select Width.
scale the custom profile to the depth of the object to which it is attached	select Depth.
scale the custom profile to the height of the object to which it is attached	select Height.

If you want to…	Then…
lock the *XY* shape of the object	select Lock Ratio. If the object is scaled in one direction to fit another criterion for Scale to Fit, the entire custom profile is scaled equally.
add the selected profile to the railings between the selected components	select Between Comp. Baluster, Fixed Post, and Dynamic Posts are the only valid component selections.

13 Specify the Mirror In direction, if necessary:

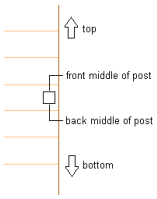
If you want to…	Then…
create a mirror of the component in the *X* direction, along the length of the railing	select Mirror X.
create a mirror of the component in the *Y* direction, across the width of the railing	select Mirror Y.

14 Specify the angle to rotate the component in the *Z* direction, if necessary.

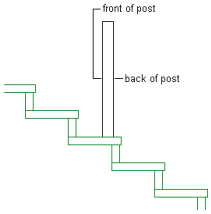
15 Specify the location of the insertion point in relation to the object:

If you want to…	Then…
specify the location of the *X* insertion point	select Left, Center, or Right for X.
specify the location of the *Y* insertion point	select Front, Center, or Back for Y.

Specify the post orientation relative to the up and down directions on a stair run in plan view as shown in the following illustration:



Specify the post orientation relative to the up and down directions on a stair run in elevation view as shown in the following illustration:



16 Specify the insertion offset for the component in the *X* and *Y* directions.

17 Specify the type of railing component that the profile represents:

If you want to…	Then…
represent balusters with the selected profile	select Baluster for Component.
represent fixed posts with the selected profile	select Fixed Post for Component.

If you want to…	Then…
represent dynamic posts with the selected profile	select Dynamic Post for Component.
replace the current baluster, fixed post, or dynamic post with the selected profile	select Replace.
add a guardrail to the selected profile	select Guardrail for Component.
add a handrail to the selected profile	select Handrail for Component.
add a bottom rail to the selected profile	select Bottomrail for Component.

The two groups of components are mutually exclusive, so selecting an object from one column makes the other unavailable. You can select more than one object in each column, and apply the profile to each selected component. For example, you can use the same profile for the fixed posts and dynamic posts.

18 Specify where the profile is applied to the components:

If you want to…	Then…
apply the profile to all instances of the selected components	select All for Attach to.
apply the profile to the first instance of the selected component, based on the direction the railing was drawn	select First for Attach to.
apply the profile to the last instance of the selected component, based on the direction the railing was drawn	select Last for Attach to.
apply the profile to a selected number of components	select Selection for Attach to. The components are numbered in the order the railing was drawn.

19 Click OK twice.

Turning Off a Custom Block or Custom Profile in a Railing Style

Use this procedure to turn off the display of all custom blocks or profiles without actually removing them from the railing style.

You can selectively turn off the visibility of individual display blocks on the Layer/Color/Linetype tab. This is one way to switch between alternate blocks. For more information, see Specifying the Display Components of a Railing Style on page 1549.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

NOTE Custom blocks are added and turned off in Model-based display representations; Custom profiles are added and turned off in Plan-based display representations.

6 If necessary, click .

7 Click the Other tab.

8 Disable the custom component:

If you want to…	Then…
turn off a custom block	click Disable Custom Blocks.
turn off a custom profile	click Disable Custom Profiles.

9 Click OK.

Removing a Custom Block from a Railing Style

Use this procedure to delete custom components from a railing style.

1 Select a railing.

2 Click Railing tab ➤ General panel ➤ Edit Style drop-down ➤ Railing Styles .

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

NOTE Custom blocks are added and removed in Model-based display representations; Custom profiles are added and removed in Plan-based display representations.

6 If necessary, click .

7 Click the Other tab.

8 Select the component to remove, and click Remove.

9 Click OK.

Roofs

28

Roofs are AEC objects that model an entire roof surface. You can create roofs independently of other objects, or you can select a polyline shape and place a roof on that shape. You can also select closed walls and place a roof on the walls, change the slope of a roof, and edit its edges and faces.

Roofs

Roofs are AEC objects that you can use to model an entire multiple-face roof surface. You can create roofs independently of other objects, or you can place a roof on a shape defined by a polyline or by a closed set of walls. After creating the roof, you can change its overall dimensions and slope, or edit its edges and faces individually. For more flexibility in customizing a roof, you can convert it to a collection of individual roof slabs.

Roof Slabs

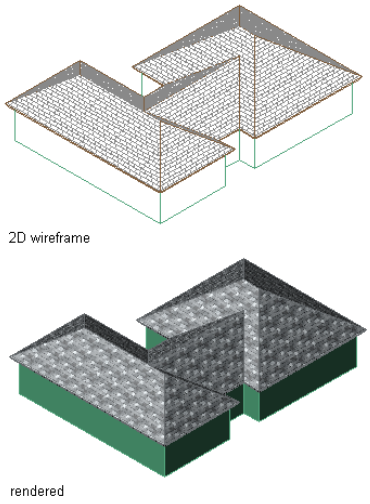
A roof slab models a single face of a roof. Roof slab objects also differ from roof objects in that each roof slab is a separate entity with no direct connection to other entities. When you use multiple roof slabs to model an entire roof surface, you have more flexibility in editing the roof, but the combined topology (3D geometry) of the roof is not calculated automatically. For this reason, it is recommended that when you design complex roofs, you start with a roof object. Then, when the design is substantially complete, but you need more flexibility for customizing edges and other details, you can convert the roof to individual roof slabs. For information on creating and editing roof slabs, see Slabs and Roof Slabs on page 1575.

While roof slabs do not dynamically interact with each other, they do allow significant control over the roof geometry. For example, you can trim roof slabs individually, extend them, and miter them with other roof slabs. You can also cut holes in roof slabs, add or subtract mass elements, and apply detailed fascia and soffit profiles to any edge at any angle and orientation. Because roof slabs are style-based, you can apply design changes globally.

Materials in Roofs

You can assign materials to a roof. Materials are displayed in wireframe and working shade views, or when rendered. Materials have specific settings for the physical components of a roof, such as slab. For more information see Material Components and Display Properties on page 585.

Viewing roofs in 2D wireframe and rendered views

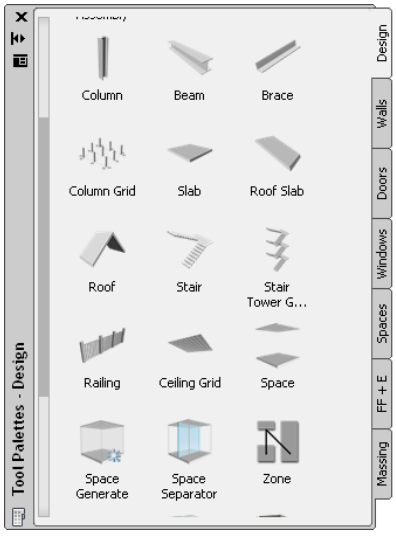


AutoCAD Architecture provides predefined materials for common design purposes. These materials contain settings for roof components. You can use the predefined materials as they are, or modify them for your designs. You can also create your own materials. Object styles provided with the software have appropriate materials already assigned to them. For more information, see Slab/Roof Slab Materials and Display Components on page 1638 and Material Components and Display Properties on page 585.

Using Roof Tools to Create Roofs

Tools provided with AutoCAD Architecture let you quickly place roofs by selecting a roof tool with a specific roof style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can create roofs with single or double slopes and gable roofs. You can also use roof tools to create new roofs by applying tool properties to existing polylines and walls.

Tool palette containing roof tool



The default tool palettes in the workspace contain sample roof tools that you can use and customize as necessary. In addition, the following catalogs provided with the software contain roof tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog

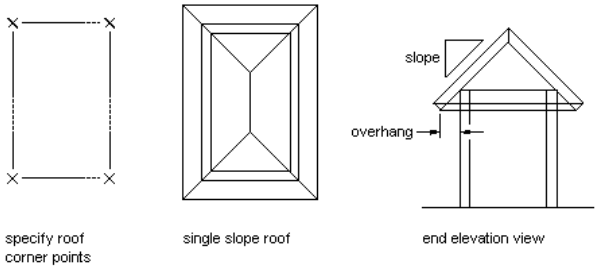
Custom palettes created by your CAD manager or other users may also contain roof tools with properties customized for your projects or office standards.

Creating a Slope Roof

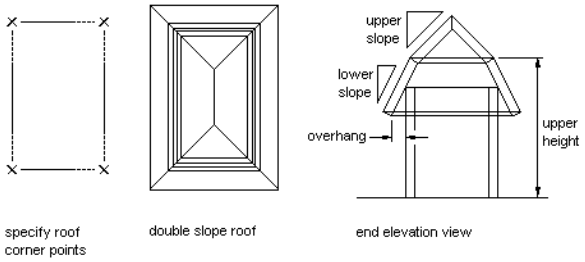
Use this procedure to add a slope roof that has the properties specified in the roof tool that you select. You can create a single slope or a double slope roof object. To specify settings when you add a roof, see Creating a Slope Roof with User-Specified Settings on page 1562.

NOTE To add additional slopes to a roof face, right-click a roof object and click Edit Edges/Faces.

Creating a single slope roof



Creating a double slope roof



1 Open the tool palette that contains the roof tool you want to use, and select the tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Roof .

2 On the Properties palette, select Single slope or Double slope for Shape.

TIP After specifying the desired setting, you can move or hide the Properties palette to expose more of the drawing area.

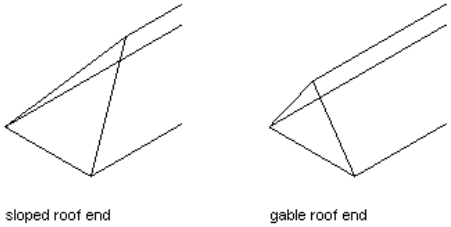
3 In the drawing area, specify points for the corners of the roof.

4 When you are finished specifying points, press *ENTER*.

Creating a Gable Roof

Use this procedure to add a gable roof that has the properties specified in the roof tool that you select. You can create a single sloped roof and set each edge to gable as needed. You can specify a slope for the gable ends to create a hip. To specify settings when you add a roof, see Creating a Gable Roof with User-Specified Settings on page 1563.

Viewing a gable roof end



NOTE You can create a gable on an existing roof by gripping any ridge line point and stretching it past the roof edge.

1. Open the tool palette that contains the roof tool you want to use, and select the tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Roof .
2. On the Properties palette, select Single slope for Shape.
3. In the drawing area, specify the first point for the first roof edge.
4. Specify the second point to complete the first sloped roof edge.
5. On the Properties palette, select Gable for Shape.
6. In the drawing area, specify the next point to create a gable roof edge.
7. Select Single slope for Shape.
8. Specify the next point to create a sloped roof edge.
9. Select Gable slope for Shape.
10. Specify additional points as needed to define the roof, and press *ENTER*.

    To create a clipped gable roof, you first need to convert the gabled roof to roof slabs. For more information, see Creating a Roof Slab from a Roof on page 1583 and Creating a Clipped Gable Roof on page 1629.

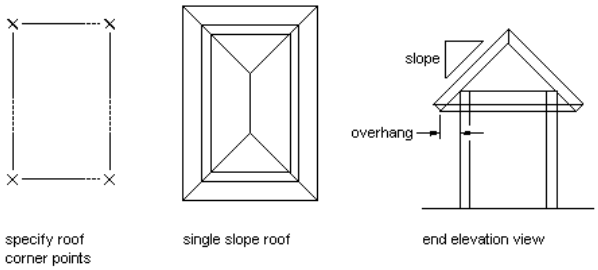
Creating Dormers

To add a dormer to a roof, you must first convert the roof to roof slabs, and then create additional roof slabs, walls, and all other parts of the dormer. For more information, see Creating a Roof Slab from a Roof on page 1583 and Creating a Dormer in a Roof Slab on page 1629.

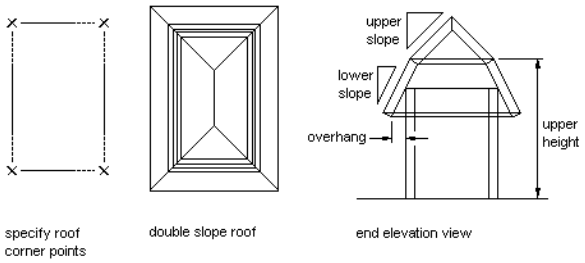
Creating a Slope Roof with User-Specified Settings

Use this procedure to add a slope roof with settings that you specify. You can create a single slope or a double slope roof object.

Creating a single slope roof



Creating a double slope roof



1 Open the tool palette that contains the roof tool you want to use, and select the tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Roof .

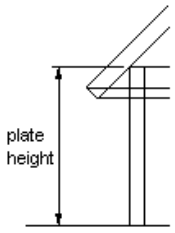
2 On the Properties palette, expand Basic, and expand Next Edge.

3 Select Single slope or Double slope for Shape.

4 Enter a value for Overhang.

5 Expand Lower Slope, and enter values for Plate Height, Rise, and Slope.

Plate height is the height of the bottom surface of the roof at its lowest edge (where the overhang begins). This is usually the height of the top plate of the wall that the roof sits on.



6 For a double slope roof, expand Upper Slope, and enter values for Upper Height, Rise, and Slope.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

7 In the drawing area, specify points for the corners of the roof.

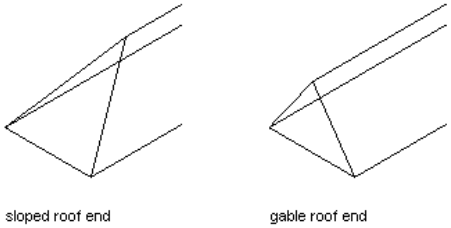
8 When you are finished specifying points, press *ENTER*.

Creating a Gable Roof with User-Specified Settings

Use this procedure to add a gable roof with settings that you specify. You create a single sloped roof and set each edge to gable as needed. You can specify a slope for the gable ends to create a hip.

TIP You can create a gable on an existing roof by dragging a ridge line grip to the roof edge or beyond, as shown.

Viewing a gable roof end



1 Open the tool palette that contains the roof tool you want to use, and select the tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Roof .

2 On the Properties palette, expand Basic, and expand Next Edge.

3 Select Single slope for Shape.

TIP You can move or hide the Properties palette to expose more of the drawing area.

4 In the drawing area, specify the first point for the first roof edge.

5 Specify the second point to complete the first sloped roof edge.

6 On the Properties palette, select Gable for Shape.

7 In the drawing area, specify the next point to create a gable roof edge.

8 Select Single slope for Shape.

9 Specify the next point to create a sloped roof edge.

10 Select Gable slope for Shape.

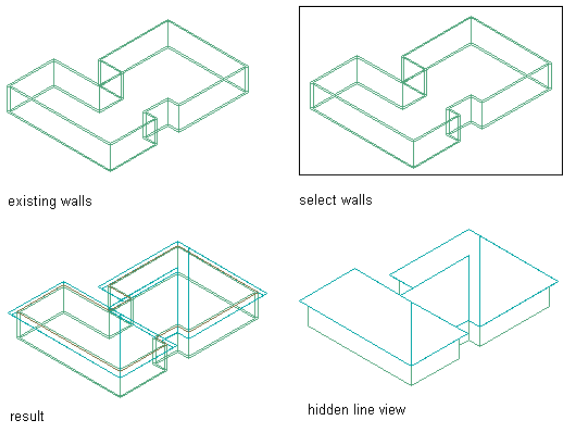
11 Specify additional points as needed to define the roof, and press *ENTER*.

Creating a Roof from Walls

Use this procedure to create a roof that is based on a selected closed set of walls and has the properties of the roof tool you select. You can edit these properties after creating the roof. The roof takes its plate height from the top of each wall segment.

NOTE If your walls are not properly cleaned up, the roof conversion is unpredictable. For more information, see Cleanup Group Definitions on page 878.

Creating a roof from walls



1 Open the tool palette that contains the roof tool you want to use.

2 Right-click a roof tool, and click Apply Tool Properties to ➤ Linework and Walls.

3 Select the walls to convert, and press *ENTER*.

NOTE If the walls you select are not closed, a roof is added to the top of each wall segment.

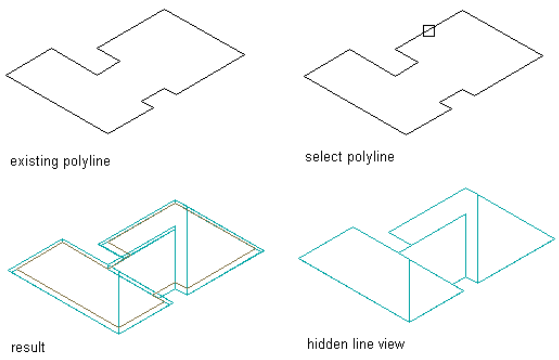
4 When prompted to erase the original geometry, press *ENTER* to keep the wall, or enter **y** (Yes) to erase it.

5 Edit the properties of the roof on the Properties palette, if needed.

Creating a Roof from Polylines

Use this procedure to create a roof that is based on a two-dimensional (2D) polyline and has the properties of the roof tool you select. You can edit these properties after creating the roof.

Creating a roof from a polyline



1 Draw a closed 2D polyline in the shape of the intended roof, in the location where you want to place the roof.

2 Open the tool palette that contains the roof tool you want to use.

(You may have to scroll to display the desired tool.)

3 Right-click a roof tool, and click Apply Tool Properties to ➤ Linework and Walls.

4 Select the polyline to convert, and press *ENTER*.

5 When prompted to erase the original geometry, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

6 Edit the properties of the roof on the Properties palette, if needed.

Creating a Roof Tool

Use this procedure to create a roof tool and add it to a tool palette. You may want to create your own roof tools if you are placing multiple roofs that have the same properties.

For example, you are creating an office building that has a multi-peaked roof. Although the entire roof is single sloped, each peak has a different slope. To work efficiently, you can create a roof tool for each slope, and select the appropriate tool to place the roofs with the correct slope on each area of the building.

1 Open the tool palette on which to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a roof in the drawing	select the object, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the roof created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Specify roof settings:

If you want to…	Then…
change the thickness value	expand Dimensions, and enter a value for Thickness.
change the type of edge	expand Dimensions, and select a new setting for Edge cut.
change the roof shape	expand Next Edge, and select a new setting for Shape.
add or remove the overhang, or change the overhang value	expand Next Edge, and enter a value for Overhang.
change the plate height	expand Lower Slope, and enter a value for Plate Height.

If you want to…	Then…
change the upper height for a double slope roof	expand Upper Slope, and enter a value for Upper Height.
change the rise or slope angle for each slope	expand Lower Slope, or Upper Slope for a double slope roof, and enter a value for Rise or Slope.

10 Click OK.

Editing Roofs

After placing roofs, you can edit any characteristics of the roof that you specified when you drew the roof. You can change the basic geometry of a roof, apply a different roof shape, and change the roof edge or overhang conditions.

AutoCAD Architecture offers several methods for editing roofs:

- Edit roofs directly using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see "Use Dynamic Input" in AutoCAD Help.
- Change roof settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.
- Select editing commands from the context menu for a selected roof.

Using Grips to Edit Roofs

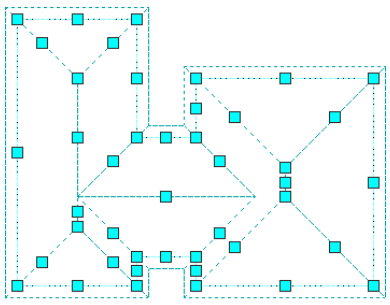
Refer to the illustrations and steps in this topic to use roof grips to edit roofs.

Editing Roof Dimensions

1 Select the roof.

2 Select the grip for the dimension you want to change.

Roof grips



3 Move the grip until the dimension value you want is displayed, and click once, or enter a value.

Applying Tool Properties to an Existing Roof

Use this procedure to apply the properties of a roof tool to one or more existing roofs. The properties include any settings specified in the tool you select.

1. Open the tool palette that you want to use.
   If necessary, scroll to display the tool that you want to use.
2. Right-click a roof tool, and click Apply Tool Properties to ➤ Roof.
3. Select the roof, and press *ENTER*.
4. When prompted to erase the original geometry, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.
5. Edit the properties of the roof on the Properties palette, if necessary.

Changing the Dimensions of a Roof

Use this procedure to change the dimensions of a roof, including the plate height, the upper height for a double slope (gambrel) roof, the slope, and the depth of the overhang. You can also change the thickness of the roof slabs and the type of roof edge.

NOTE You can create a gable end on a roof by gripping any ridge line point and stretching it past the roof edge.

1. Select the roof.
2. On the Properties palette, specify roof settings:

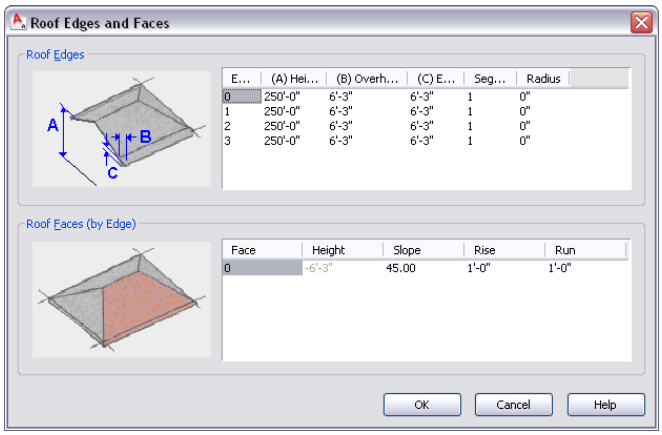
If you want to…	Then…
change the thickness value	under Dimensions, enter a value for Thickness.
change the type of edge	under Dimensions, select a new setting for Edge cut.
change the number of slopes	under Dimensions, select a new setting for Shape.
add or remove the overhang, or change the overhang value	under Dimensions, enter a value for Overhang.
change the plate height	under Lower Slope, enter a value for Plate Height.
change the upper height for a double slope roof	under Upper Slope, enter a value for Upper Height.
change the rise or slope angle for each slope	under Lower Slope, or Upper Slope for a double slope roof, enter a value for Rise or Slope.

Changing the Edges and Faces of a Roof

Use this procedure to edit the edges and faces of a roof. You can edit:

- the height and overhang of individual edges
- the number of segments and the radius for curved segments

- the height and slope of individual roof faces



1 Select the roof you want to change.

2 Click Roof tab ➤ Modify panel ➤ Edit Edges .

3 Select roof edges that you want to change and press *ENTER*.

As you select edges, they are numbered consecutively, beginning with zero, for display in the dialog box.

4 Specify new values for each roof edge:

If you want to...	Then...
change the height of a roof edge	select Height for the roof edge, and enter the height value.
change the overhang of a roof edge	select Overhang for the roof edge, and enter the overhang value.
change the number of segments in a curved roof for a roof edge	select Segments for the roof edge, and enter the number of segments.
change the radius of the curved roof edge	select Radius for the roof edge, and enter the radius.

5 Specify new dimensions for the roof faces of the selected edges:

If you want to...	Then...
change the height of a roof face	select Height for the roof face, and enter the height value.
change the slope of a roof face	select Slope for the roof face, and enter the slope value.
add a face to the selected edge	click the blank space under the last number in the Face column, and enter values for Height and Slope.
remove a roof face	select the Face column number, and press *DELETE*.

6 Click OK.

Converting a Roof to Roof Slabs

Use this procedure to convert a roof to one or more roof slabs, each modeling a separate face of the roof. Roof slab objects differ from roof objects in that each roof slab is a separate entity, defined by its perimeter, edge conditions, and style. This gives you more flexibility in controlling to geometry of the roof and its edges. Also, because roof slabs are style based, you can apply design changes globally.

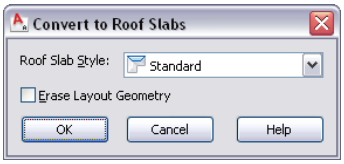
For more information about working with roof slabs, see Slabs and Roof Slabs on page 1575.

1 Select the roof you want to convert.

2 Click Roof tab ➤ Modify panel ➤ Convert .

The Convert to Roof Slabs worksheet displays the roof slab styles that exist in your current drawing.

Convert to Roof Slabs worksheet



3 Select a roof slab style.

4 Select Erase Layout Geometry to erase the roof and click OK.

5 Select individual roof slabs and edit them as needed.

Specifying the Material of a Roof

Use this procedure to select a different material for the components of an individual roof.

NOTE If a material assignment does not determine the display properties of the roof component, you can change the properties of the display component as described in Specifying the Display Properties of a Roof on page 1571.

1 Select the roof you want to change, right-click, and click Edit Object Display.

2 To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation in which to display the changes, and click .

3 Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.

4 Click the Materials tab.

5 Select the component you want to change, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new one and assign it to a component.

WARNING Although you can edit a material definition from this dialog box, any changes you make apply to all objects that are assigned the material.

6 Click OK.

Specifying the Display Properties of a Roof

Use this procedure to change the following properties of the display components of an individual roof:

- Visibility (display component is on or off)
- By material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE If a material assignment determines the properties of a roof display component, you can change the properties of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Material of a Roof on page 1570.

1 Select the roof you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 Click the Display Properties tab.

3 Select the display representation in which to display the changes, and select Object Override.

The display representation in bold is the current one.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab.

6 Select the component to change, and select a different setting for the property.

7 Click OK twice.

Specifying the Hatching of a Roof

Use this procedure to specify the hatching of the components of an individual roof. Hatching is displayed only in the section display representation.

NOTE If a material assignment determines the hatching properties of a roof display component, you can change the hatching of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Material of a Roof on page 1570.

1 Select the roof you want to change, right-click, and click Edit Object Display.

NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2 Click the Display Properties tab.

3 Select the Section display representation, and select Style Override.

4 If necessary, click .

5 Click the Hatching tab.

6 Select the display component, and click the setting for Pattern.

7 Select the hatching for the display component:

If you want to…	Then…
specify a hatching pattern that is available in the software	select Predefined for Type, and select a pattern.
specify a custom pattern	select Custom for Type, and enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder that contains the custom pattern file.
specify single hatching	select User-Defined for Type, and clear Double Hatch.
specify double hatching	select User-Defined for Type, and select Double Hatch.
specify solid fill	select Solid Fill for Type.

8 Click OK.

9 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

10 Click Angle, and enter the angle for the selected pattern.

11 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the roof slab, regardless of the roof slab rotation	select Object.
orient the hatching to the world coordinate system	select Global.

12 Click X Offset and Y Offset, and enter offset values.

13 Click OK twice.

Changing the Location of a Roof

Use this procedure to relocate a roof by changing the coordinate values of its insertion point. The roof also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the roof are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the roof by aligning its normal with another axis. You can also rotate the roof on its plane by changing the rotation angle.

For information about the WCS and UCS, see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1 Select the roof you want to change.

2 On the Properties palette, expand Basic, and expand Location.

3 Select Additional information.

4 Specify the location of the roof:

If you want to…	Then…
relocate the roof	enter new coordinate values under Insertion Point.

If you want to…	Then…
locate the roof on the *XY* plane	make the normal of the roof parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the roof on the *YZ* plane	make the normal of the roof parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the roof on the *XZ* plane	make the normal of the roof parallel to the *Y* axis: under Normal, enter **1** for Y, and enter**0** for X and Z.
change the rotation of the roof	enter a new value for Rotation Angle.

5 Click OK.

Attaching Hyperlinks, Notes, or Files to a Roof

Use this procedure to attach hyperlinks, notes, or files to a roof. You can also edit hyperlinks and notes, and edit or detach reference files from a roof.

1 Select the roof to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Slabs and Roof Slabs

29

In AutoCAD Architecture, a slab object is a three-dimensional (3D) body that is bounded by a planar polygon (perimeter) of any shape, and has multiple edges. A slab is defined by its perimeter, edge conditions, and style. You can use slabs to draw floors and other building model components that require a flat surface and edge conditions.

Roof slabs are similar to slabs in most respects, but are based on distinct roof slab styles. When modeling a roof, you can convert individual faces of the roof into roof slabs, which give you more flexibility in modeling details of the roof's geometry.

Overview of Slabs and Roof Slabs

Slabs and roof slabs are AutoCAD Architecture objects that you use to model floors, roof faces, and other flat surfaces where edge conditions need to be specified. The slab or roof slab object is a three-dimensional (3D) body bounded by a planar polygon (perimeter) of any shape, and has multiple edges. The object is defined by its perimeter, edge conditions, and style. Though they share many of the same properties, slabs and roof slabs represent separate style categories and tool types. For instance, you cannot apply the properties of a slab tool to an existing roof slab object.

Roof Slabs

A roof slab models a single face of a roof. Roof slab objects also differ from roof objects in that each roof slab is a separate entity with no direct connection to other entities. When you use multiple roof slabs to model an entire roof surface, you have more flexibility in editing the roof, but the combined topology (3D geometry) of the roof is not calculated automatically. For this reason, it is recommended that when you design complex roofs, you start with a roof object. Then, when the design is substantially complete, but you need more flexibility for customizing edges and other details, you can convert the roof to individual roof slabs.

While roof slabs do not dynamically interact with each other, they do allow significant control over the roof geometry. For example, you can trim roof slabs individually, extend them, and miter them with other roof slabs. You can also cut holes in roof slabs, add or subtract mass elements, and apply detailed fascia and soffit profiles to any edge at any angle and orientation. Like slabs, roof slabs are style-based, so you can apply design changes globally.

Methods of Creating Slabs/Roof Slabs

Using slab and roof slab tools, you can create slabs and roof slabs independently, or you can create them from existing objects, such as walls and polylines. Slabs and roof slabs created from other objects do not maintain a link to the original object.

Pitched roofs are usually designed by specifying a plate line and a slope angle. Roof slabs are designed so that you can use the same approach in laying them out. To add a roof slab, you simply specify two points and an angle.

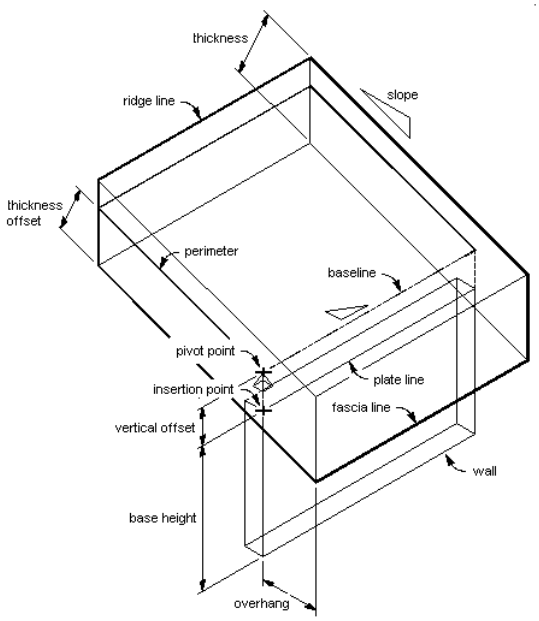
If you have a traditionally designed roof created from a two-dimensional (2D) plan showing ridge, hip, and valley lines, you can trace over that plan with roof slabs, specifying the desired height and slope. From these values and the specified points, the software creates the correct three-dimensional (3D) model.

Slab/Roof Slab Bodies

The body of a slab or roof slab is an extrusion perpendicular to the plane of the perimeter and is defined by the following geometry:

- The perimeter of a slab or roof slab is a planar polygon defined by the *X,Y,Z* coordinates of its vertices.
- A slab or roof slab has 3 or more vertices, with the ability to add or remove vertices. Each pair of vertices defines an edge.
- The thickness of a slab or roof slab extrusion is specified either in the object style (when it has a fixed thickness) or for the individual object.
- The position of the slab or roof slab bottom, relative to its perimeter plane, is controlled by the thickness offset value in the style.
- The baseline of a slab or roof slab is defined by the first two points you select when defining the vertices.
- The slab or roof slab insertion point, by default, is the first point on the baseline. You can offset the baseline either horizontally or vertically from the insertion point to allow for precise alignment with walls or structural elements.
- A slab or roof slab has a slope (pitch), which you can specify either as an angle or as a rise-to-run ratio. If you change the slope, the slab or roof slab rotates around the slope pivot point.
- The pivot point is initially the first vertex of the baseline, but you can move it to any other point, either on or off the slab or roof slab. A small pyramid-shaped marker represents the pivot point.
- An imaginary line passing through a slab or roof slab at the perimeter line (in section) is called the slopeline. The slopeline aligns the slab or roof slab with the wall base height. The slopeline is the position of the slab or roof slab baseline relative to its bottom face. The value you enter for the thickness offset in the slab or roof slab style determines the distance between the slab or roof slab baseline and the bottom face of the slab or roof slab.

Geometry of a roof slab



Slab/Roof Slab Edges

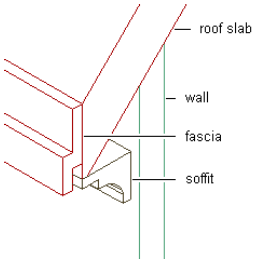
The following parameters define a slab or roof slab edge:

- edge cut orientation (plumb or square)
- angle (relative to the orientation)
- edge style (fascia and soffit)
- overhang (defines the point at which the fascia begins)

You apply a fascia and soffit to slab or roof slab edges with styles that define edge conditions

- The fascia is defined by a profile, with its insertion point located at the top of the slab or roof slab edge. The local *Y* axis of the profile polyline aligns with the slab or roof slab edge angle.
- The soffit is also defined by a profile, with its insertion point positioned at the *X* and *Y* offsets from the fascia insertion point.

Roof slab with fascia and soffit components



Edge Control

You can customize each slab or roof slab edge individually, applying styles and making other adjustments as required by your design. A slab or roof slab edge style defines the fascia and soffit design from profiles that you create for these components. You can specify whether the style uses a fascia, a soffit, both, or neither. You also specify how the fascia and soffit are positioned relative to the slab or roof slab.

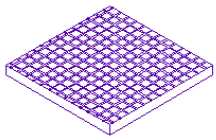
Slab and Roof Slab Styles

Slabs and roof slabs have their own distinct style categories in which individual styles specify the default properties for specific types of slabs or roof slabs. These properties include dimensions, edge styles for the fascia and soffit, and entity properties for layer, color, and linetype. Slab and roof slab styles allow you to use a different edge style for each edge.

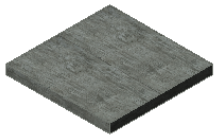
Materials in Slabs and Roof Slabs

You can assign materials to a slab or roof slab. For example, a floor slab can be assigned a material representing tiles with concrete edges. These materials are displayed in wireframe or rendered views. Materials have specific settings for individual components of slabs or roof slabs, such as the body, fascia and soffit.

Slab appearance in different views



2D wireframe



rendered

AutoCAD Architecture provides predefined materials for common design purposes. These materials contain settings for slabs or roof slabs that you can use as provided or modify for special designs. You can also create materials from scratch. If you create a material to use only for slabs, name it accordingly; for example, Slab—Ceramic Tile or Slab Edge—Concrete. This will help in organizing your material definitions. For more information, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

Editing Tools

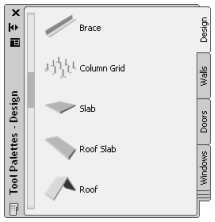
In addition to the control provided by slab or roof slab styles and edge styles, AutoCAD Architecture includes a variety of tools that let you edit slabs and roof slabs to fit unique conditions. For example, you can add holes to slabs for structures such as chimneys and vent pipes. You can also use roof slabs to create dormers. For a description of the tools available, see Editing Slabs and Roof Slabs on page 1589.

Using Tools to Create Slabs and Roof Slabs

Tools provided with AutoCAD Architecture let you quickly place slabs or roof slabs by selecting a tool with a specific slab or roof slab style and other predefined properties. You can use the tool with all of its default settings, or you can change any properties that are not controlled by the style. You can also use slab or roof slab tools to create new slabs or roof slabs by applying tool properties to existing linework, walls, and spaces.

The Design tool palette contains sample slab and roof slab tools that you can use and customize as needed. Custom palettes created by your CAD manager or other users may also contain slab or roof slab tools with styles and properties that are customized for your projects or office standards.

Tool palette containing slab and roof slab tools



Slab and roof slab tools are also included in the Stock Tool catalog supplied with the Content Browser. For information about using the Content Browser, see Content Browser Overview on page 97.

Creating a Slab or a Roof Slab

Use this procedure to add a new slab or roof slab that has the properties specified in the slab or roof slab tool you select. To specify your own settings when you add a slab or roof slab, see Creating a Slab/Roof Slab with User-Specified Settings on page 1580.

You add the slab or roof slab by specifying points to define its perimeter as follows:

- The first point determines the insertion point of the slab or roof slab and the start of the baseline. This point also locates the default pivot point of the slab or roof slab.
- The second point determines the endpoint of the baseline.
- Subsequent points establish the vertices of the perimeter.

1 Open the Design tool palette, and select the Slab tool or the Roof Slab tool.
(You may have to scroll to display the desired tool.)

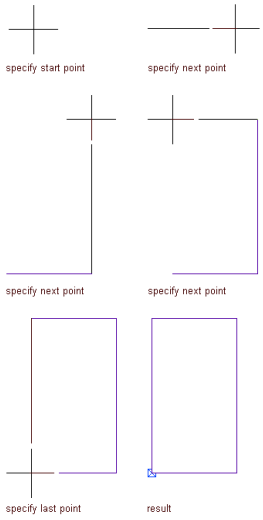
NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Roof Slab , or Home tab ➤ Build panel ➤ Roof Slab drop-down ➤ Slab .

2 Specify the start point of the slab or roof slab.
3 Specify a second point to define the first edge (baseline) of the slab.
4 Specify further points to finish defining the perimeter:

If you want to…	Then…
close the perimeter by drawing two edges that meet at a right angle	specify a point in the direction in which the perimeter is to close; then enter *o* (for Ortho). The edge is extended until it meets another edge perpendicular to the first edge.
close the perimeter by adding an edge from the previous point to the start point of the baseline	enter **c** (for Close).

5 Press *ENTER*.

Drawing a slab



Creating a Slab/Roof Slab with User-Specified Settings

Use this procedure to create a slab or roof slab with settings that you specify.

1 Open the Design tool palette, and select the Slab tool or the Roof Slab tool.
(You may have to scroll to display the desired tool.)

NOTE You can also access Slab and Roof Slab tools from the Build panel on the ribbon's Home tab.

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Under Style, select a slab or roof slab style.

4 Specify a value for Bound Spaces:

If you want to…	Then…
allow the slab or roof slab to be used as a bounding object for associative spaces	select Yes.
prevent the slab or roof slab from being used as a bounding object for associative spaces	select No.
use the bounding settings from the slab or roof slab style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

5 Select Projected or Direct for Mode.

If you select Projected, the *X*,*Y* coordinates of the first point you specify are projected to a Z value of the current base height. This establishes the insertion point. The second point establishes the baseline. All subsequent points are projected onto a plane established by the baseline and the specified slope angle. This mode is provided for architects who wish to lay out a slab or roof slab by tracing over a plan drawing.

If you select Direct, the points you specify become the vertices of the slab perimeter.

6 Expand Dimensions.

7 Enter a value for Thickness.

8 Enter a value for the vertical offset distance from the insertion point for Vertical Offset.

9 Enter a value for the horizontal offset distance from the insertion point for Horizontal Offset.

10 Select the justification:

If you want to align the …	Then, for Justify,…
top of the slab or roof slab with the first specified point	select Top.
center of the slab or roof slab with the first specified point	select Center.
bottom of the slab or roof slab with the first specified point	select Bottom.
slopeline of the slab or roof slab with the first specified point	select Slopeline.

NOTE This justification is used only for inserting a slab or roof slab and is not retained as a parameter of the inserted object. Justification is intended primarily for Direct mode.

The slopeline is the position of the slab or roof slab baseline relative to its bottom face. The thickness offset in the style determines the distance between the baseline and the bottom face.

11 Enter a value for the height of the slab or roof slab insertion point for Base Height.

This is available only when you select Projected mode.

12 Select a direction, or define how the slab or roof slab is drawn relative to the baseline.

13 Enter a value for the depth of the overhang for Overhang.

14 Select a style for Perimeter edge.

15 If you selected the Projected mode, expand Slope, and enter values for Rise, Run, or Angle to define the slope of the slab or roof slab.

16 Specify the start point of the slab or roof slab.

The start point is the insertion point and the start of the baseline. The start point also determines the location of the default pivot point for the slab or roof slab.

17 Specify a second point to define the first edge (baseline).

18 Specify further points to establish the vertices of the slab or roof slab perimeter:

If you want to…	Then…
close the perimeter by drawing two edges that meet at a right angle	specify a point in the direction in which the perimeter is to close; then enter *o* (for Ortho). The edge is extended until it meets another edge perpendicular to the first edge.
close the perimeter by adding an edge from the previous point to the start point of the baseline	enter **c** (for Close).

19 Continue to place slabs or roof slabs, and press *ENTER* when finished.

Creating a Slab or Roof Slab from Walls

Use this procedure to create a rectangular slab or roof slab from one or more walls. This is useful when you want a specific alignment between the slab or roof slab baseline and the wall baseline. When you create a

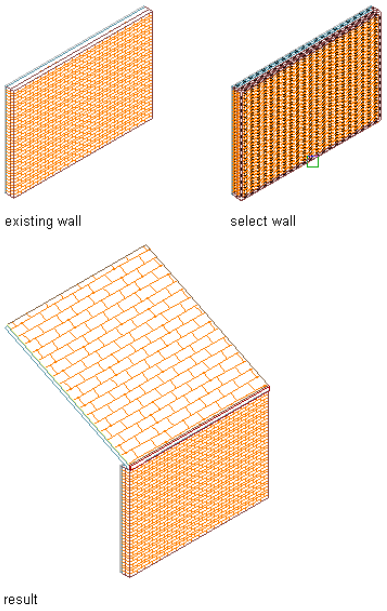
slab or roof slab from a single wall, the base height of the wall defines the baseline edge of the slab or roof slab. When you create a slab or roof slab from multiple walls, the top of the first selected wall defines the baseline edge of the slab or roof slab.

You can create a flat slab or roof slab that follows the outline of multiple walls by specifying a zero slope. If you select multiple walls and a non-zero slope, multiple slabs or roof slabs are created.

If the closed polyline intersects one of the selected walls, the slab or roof slab is invalid and you must select the walls again.

TIP This procedure is useful to place roof slabs on top of existing walls. The Convert command, accessed from an existing roof object's contextual Roof tab, is useful when you want a specific alignment between the slab baseline and the wall baseline.

Creating a roof slab from a wall



NOTE When selecting multiple walls, if your walls are not properly "cleaned up," the slab or roof slab conversion is unpredictable. For more information, see Cleanup Group Definitions on page 878.

1. Open the Design tool palette, and select the Slab tool or the Roof Slab tool.
   (You may have to scroll to display the desired tool.)
2. Right-click the tool, and click Apply Tool Properties to ➤ Linework and Walls (or Linework, Walls and Roof, in the case of roof slab tools).
3. Select one or more walls, and press *ENTER*.
4. Enter **y** (Yes) to erase the walls, or **n** (No) to keep the walls in the drawing.
5. Specify a slab justification method:

If you want to align the …	Then…
top of the slab or roof slab with the first specified point	enter **t** (Top).
center of the slab or roof slab with the first specified point	enter **c** (Center).
bottom of the slab or roof slab with the first specified point	enter **b** (Bottom).

If you want to align the …	Then…
slopeline of the slab or roof slab with the first specified point	enter **s** (Slopeline).

NOTE This justification is used only for inserting a slab or roof slab and is not retained as a parameter of the inserted object.

The slopeline is the position of the slab or roof slab baseline relative to its bottom face. The thickness offset in the style determines the distance between the baseline and the bottom face.

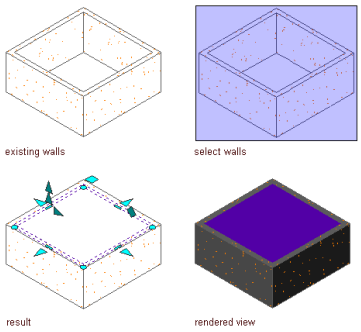
6 Specify the wall justification for edge alignment:

If you want to align the baseline edge of the slab or roof slab to the…	Then…
left side of the wall, based on the direction the wall was drawn	enter **l** (Left).
center of the wall	enter **c** (Center).
right side of the wall, based on the direction the wall was drawn	enter **r** (Right).
baseline of the wall	enter **b** (Baseline).

7 To specify the slope direction, enter **l** (Left) or **r** (Right).

This is based on the direction the wall was drawn.

Creating a slab based on walls

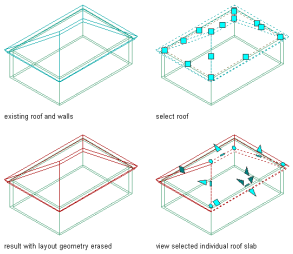


8 Edit the properties of the slab or roof slab in the Properties palette, if needed.

Creating a Roof Slab from a Roof

Use this procedure to convert the faces of an existing roof object to individual roof slabs that have the properties of the roof slab tool you select. You can then edit the roof slabs and their edges individually.

You can also convert a roof to roof slabs from the contextual Roof tab. For more information, see Converting a Roof to Roof Slabs on page 1570.



TIP When you convert a roof to roof slabs, the roof slabs will have the same overhang as the roof.

1. Open the tool palette that contains the roof slab tool you want to use.

   (You may have to scroll to display the desired tool.)

2. Right-click the tool, and click Apply Tool Properties to ➤ Linework, Walls and Roof.
3. Select the roof to convert, and press *ENTER*.
4. When prompted to erase the original geometry, press *ENTER* to keep the existing roof, or enter **y** (Yes) to erase it.
5. Edit the properties of the roof slabs on the Properties palette, if needed.

Creating a Slab or Roof Slab from a Polyline

Use this procedure to convert a closed polyline to a single slab or roof slab that has the properties of the tool you select. You can edit these properties after the object is created. The first line drawn in the polyline becomes the baseline edge of the slab or roof slab.

Creating slabs or roof slabs from polylines is useful when you need to create a complex shape or one with curved edges. The smoothness (tessellation) of curved edges is controlled by 2 AEC display resolution settings called Facet Deviation and Facet Maximum. Beginning with Autodesk Architectural Desktop 2007, you can adjust these settings after the slab or roof slab is created. Also, the individual segments or facets making up a curved edge are no longer treated as separate edges; each arc on the perimeter of a slab or roof slab is treated as a single edge. For more information, see Specifying the Display Resolution of Objects with Facets on page 143.

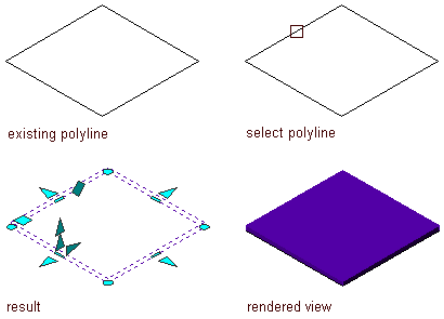
1. Draw a closed polyline of the desired shape in the location where you want to place the slab or roof slab.
2. Open the tool palette that contains the slab or roof slab tool you want to use.

   (You may have to scroll to display the desired tool.)

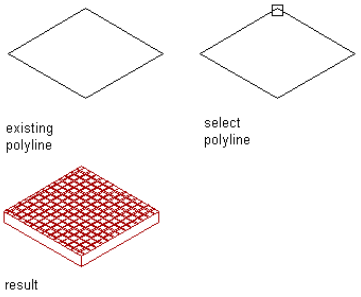
3. Right-click the tool, and click Apply Tool Properties to ➤ Linework and Walls (or Linework, Walls and Roof, in the case of roof slab tools).
4. Select a closed polyline, and press *ENTER*.
5. Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.
6. Specify a mode:

   If you enter **d** (Direct), the polyline vertices become the vertices of the slab or roof slab perimeter. Any slope value specified in the tool properties is ignored.

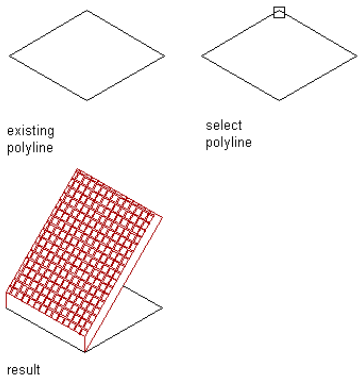
Converting a polyline to a slab using the direct mode



Converting a polyline to a roof slab using direct mode

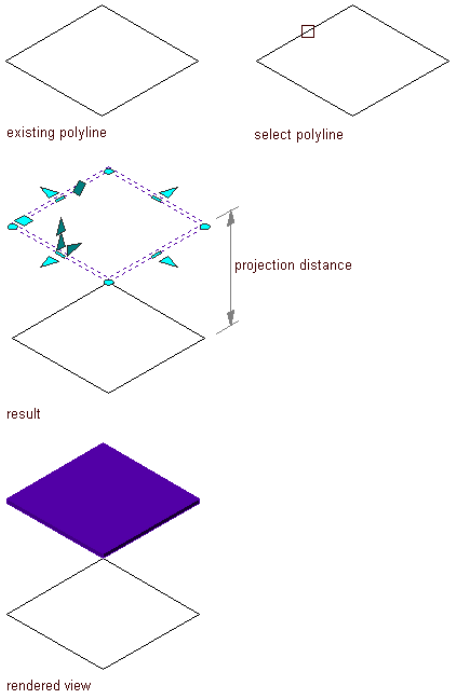


Converting a polyline to a roof slab using direct mode and adding a slope angle



If you enter **p** (Projected), you are prompted for the base height of the slab or roof slab. The *X,Y* coordinates of the first polyline vertex are projected to a Z value of the base height. This establishes the insertion point.

Converting a polyline to a slab using the projected mode



7 If you specified Projected mode, enter a value for Base Height.

8 Specify a slab justification method:

If you want to align the slab or roof slab…	Then…
top with the polyline (or base height, when using projected mode)	enter **t** (Top).
center with the polyline (or base height, when using projected mode)	enter **c** (Center).
bottom with the polyline (or base height, when using projected mode)	enter **b** (Bottom).
slopeline with the polyline (or base height, when using projected mode)	enter **s** (Slopeline).

NOTE This justification is used only for inserting a slab or roof slab and is not retained as a parameter of the inserted object.

9 Edit the properties of the slab or roof slab in the Properties palette, if needed. For example, you can add a slope angle.

Creating a Slab from a Space

Use this procedure to convert a space to a slab that has the properties of the slab tool you select. You can edit these properties after creating the slab. If there is an interference condition on any of the selected spaces, you can specify whether you want these applied as holes in the new slab.

NOTE This procedure is currently available for slab tools only.

1 Open the tool palette that contains the slab tool you want to use.
(You may have to scroll to display the desired tool.)

2 Right-click the tool, and click Apply Tool Properties to ➤ Space.

3 Select one or more spaces, and press *ENTER* to open the Convert Space to Slab worksheet.

4 If you want to create a slab from the ceiling of the space, select Convert Ceiling to Slab.

5 If you want to create a slab from the floor of the space, select Convert Floor to Slab.

6 If you want interference conditions on any of the spaces you selected to be ignored, clear Apply Interferences to Slab.

7 Select Erase Layout Geometry to erase the space.

8 Click OK.

9 Edit the properties of the new slab in the Properties palette, if needed.

Creating a Slab or Roof Slab Tool

Use this procedure to create a slab tool or a roof slab tool and add it to a tool palette. You may want to create your own tools if you are placing multiple slabs or roof slabs of specific styles that have the same properties.

For example, you are creating an office building that has a complex roof system. Although all sections of pitched roof use the same roof slab and edge style, each roof slab has a different slope. To work efficiently, you can create a roof slab tool for each slope, and select the appropriate tool to place the roof slabs with the correct slope for each section of the roof.

You can use any of the following methods to create a slab or roof slab tool:

- Drag a slab or roof slab that has the properties you want to a tool palette.
- Drag a slab or roof slab style from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Copy an existing slab or roof slab tool, and then customize the properties of the new tool.
- Drag a slab or roof slab tool from a tool catalog in the Content Browser, and then customize the properties of the tool.

1 Open the tool palette on which you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a slab or roof slab in the drawing	select the slab or roof, and drag it to the tool palette. **TIP** Drag the slab or roof slab by a point on its perimeter, not by one of its grips.
create a tool from a slab or roof slab style in the Style Manager	Click Manage tab ➤ Style & Display panel ➤ Style Manager, locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool on the current palette	right-click the tool, click Copy, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Click next to Description to enter a description of the tool.

8 If you do not want to use the default layer key, click next to Layer key to select a layer key.

9 If you want to override the default layer names, click next to Layer overrides to select a layer override.

10 Select a slab or roof slab style.

11 For Style location, select the drawing file containing the style to be used for this tool, or select Browse and use a standard file selection dialog box to select the file.

12 Specify a value for Bound Spaces:

If you want to…	Then…
allow the slab or roof slab to be used as a bounding object for associative spaces	select Yes.
prevent the slab or roof slab from being used as a bounding object for associative spaces	select No.
use the bounding settings from the slab or roof slab style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

13 Select Projected or Direct for Mode.

14 Expand Dimensions.

15 Enter a value for Thickness.

16 Enter a value for the vertical offset distance from the insertion point for Vertical Offset.

17 Enter a value for the horizontal offset distance from the insertion point for Horizontal Offset.

18 Select the justification:

If you want to align the …	Then…
top of the slab or roof slab with the first specified point	select Top.
center of the slab or roof slab with the first specified point	select Center.
bottom of the slab or roof slab with the first specified point	select Bottom.
slopeline of the slab or roof slab with the first specified point	select Slopeline.

NOTE This justification is used only when inserting the slab and is not retained as a parameter of the slab. Justification is intended primarily for Direct mode.

The slopeline is the position of the slab or roof slab baseline relative to its bottom face. The thickness offset in the style determines the distance between the baseline and the bottom face.

19 Select a direction, or define how the slab or roof slab is drawn relative to the baseline.

20 Enter a value for the depth of the overhang for Overhang.

21 Select a style for Perimeter edge.

22 For Edge style location, select the drawing file containing the edge style used for slabs created with this tool, or select Browse and use a standard file selection dialog box to select the file.

23 Click OK.

Editing Slabs and Roof Slabs

After placing a slab or roof slab object, you can change its style, location, size, shape, slope, edge styles, and other characteristics. You can miter its edges and trim or extend it using another object as a reference. You can also modify slabs and roof slabs using other objects as interference conditions or body modifiers.

Depending on the type of editing you want to perform, various methods may be available:

- After selecting a slab or roof slab, you can click any non-grip point along the perimeter and drag the entire object to a new location. You can also move the object by clicking a grip, pressing the Space bar, and then moving the object to the new location and clicking again.
- You can drag the grips that are displayed on a selected slab or roof slab to reorient it, resize it, or change other physical characteristics.
- For grip edits where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of dragging a grip. (This feature is activated by default; you can toggle it on and off by clicking DYN on the application status bar. For more information, see Dynamic Dimensions on page 90.)
- You can apply the properties of a slab tool to an existing slab or the properties of a roof slab tool to an existing roof slab.
- You can change settings on the object's Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

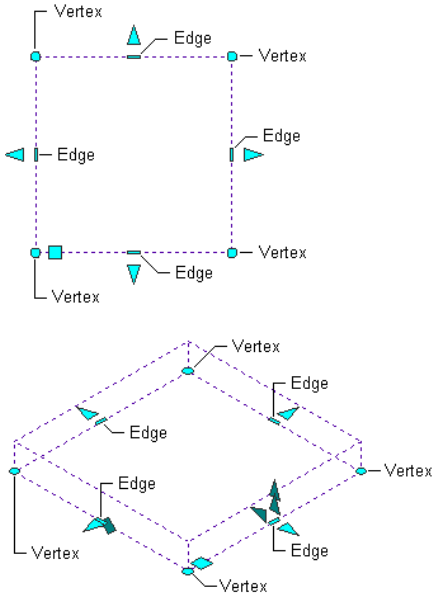
- You can use editing commands from the object's contextual ribbon tab.

Using Grips to Edit Slabs/Roof Slabs

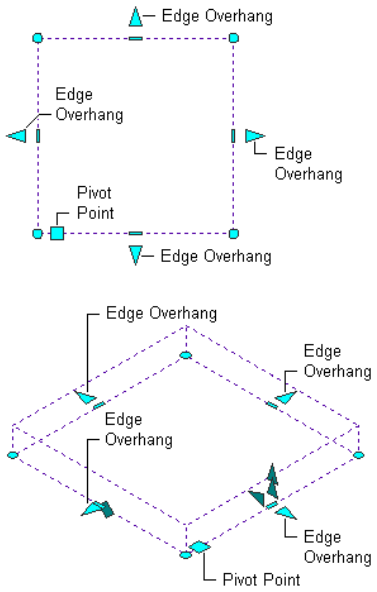
Various types of editing grips are displayed for a selected slab or roof slab object. You can drag these grips as needed to reposition or resize the object, or you can enter precise distance or angle values using the Dynamic Input feature. When you select a grip that has multiple functions, you can cycle among them by pressing *Ctrl*.

The types of editing grips available for a selected slab or roof slab depend on the view direction. As shown in the following illustrations, Edge, Edge Overhang, Vertex, and Pivot Point grips are displayed in both plan and three-dimensional (3D) isometric views. Angle, Vertical Offset, Horizontal Offset, and Thickness grips are available only in 3D isometric views.

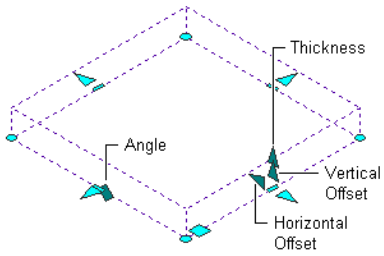
Slab Vertex and Edge grips



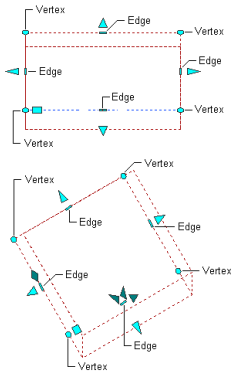
Slab Edge Overhang and Pivot Point grips



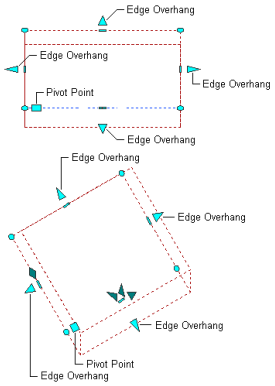
Slab Angle, Thickness, Horizontal Offset, and Vertical Offset grips



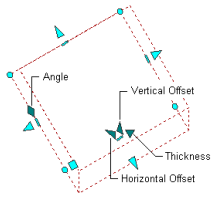
Roof Slab Vertex and Edge grips



Roof Slab Edge Overhang and Pivot Point grips



Roof Slab Angle, Thickness, Horizontal Offset, and Vertical Offset grips



Using Slab/Roof Slab Edge Grips

Edge grips let you change the size, shape, or slope of a selected slab or roof slab by moving one edge at a time. When you move the cursor over an Edge grip, a tooltip lists the available edit modes (see mode descriptions following the procedure below). After you click the Edge grip, you can cycle through the modes by pressing *Ctrl*.

Use the following general procedure to select an Edge grip mode and edit an edge of a slab or roof slab:

1. Select the slab or roof slab you want to edit.

   Edge grips are displayed.

2. Move the cursor over the Edge grip on the edge you want to edit.

   The list of available edit modes is displayed. (Modes differ for straight and curved edges; see descriptions below.)

3. Click the Edge grip, and move the cursor slightly in the direction that you want to move the edge. If you want to use the default edit mode, proceed to the next step; otherwise, press *Ctrl* to cycle through the edit modes to the one you want.
4. Either enter values as needed to specify a distance or position, or move the cursor until the preview is in the desired position, and then click to complete the edit and deselect the grip.
5. Press *Esc*, or right-click, and click Deselect All to deselect the slab and turn off all grips.

   Normal grip editing maintains the slope angle of the slab or roof slab regardless of the *Z* value of the specified point.

NOTE The pivot point is unaffected by editing the slab or roof slab edges with grips.

Edit Modes for Straight Edges

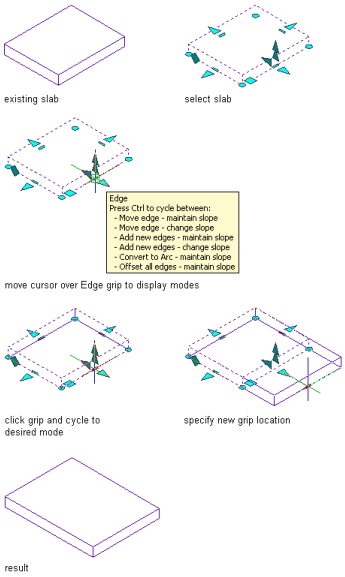
Edge grips for straight slab or roof slab edges have the following 6 edit modes:

- Move edge - maintain slope

- Move edge - change slope
- Add new edges - maintain slope
- Add new edges - change slope
- Convert to arc - maintain slope
- Offset all edges - maintain slope

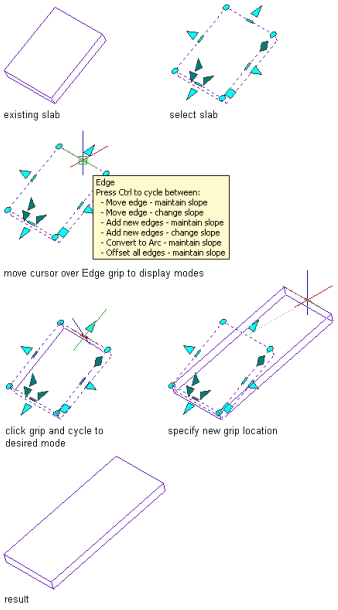
Move edge - maintain slope

As you move the edge, adjacent edges stretch or shorten accordingly with no change to the slope. This is the default mode for straight edges.

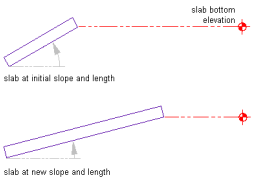


Move edge - change slope

As you move the edge, adjacent edges stretch or shorten according to the direction of the move, and the slope changes as necessary to maintain the elevation of the edge being moved.

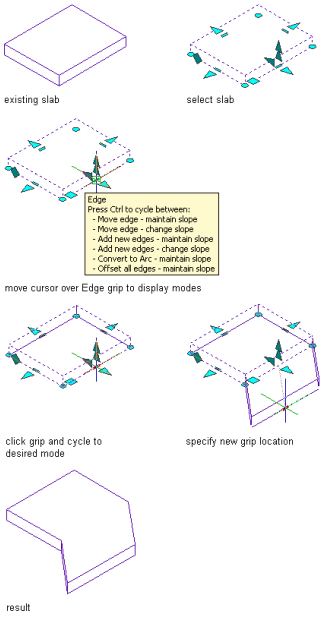


Side view



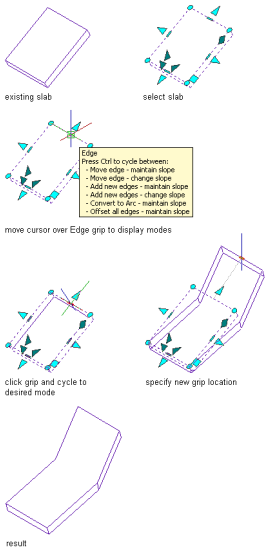
Add new edges - maintain slope

As you move the edge outward, rather than adjacent edges being stretched, new edges are added, each with its own Edge and Edge Overhang grips. There is no change to the slope.



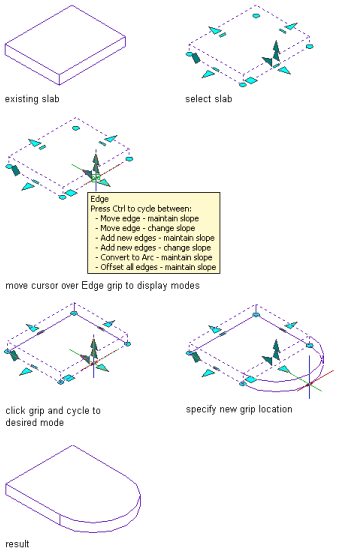
Add new edges - change slope

As you move the edge outward, rather than adjacent edges being stretched, new edges are added, each with its own Edge and Edge Overhang grips. The slope changes as necessary to maintain the elevation of the edge being moved.



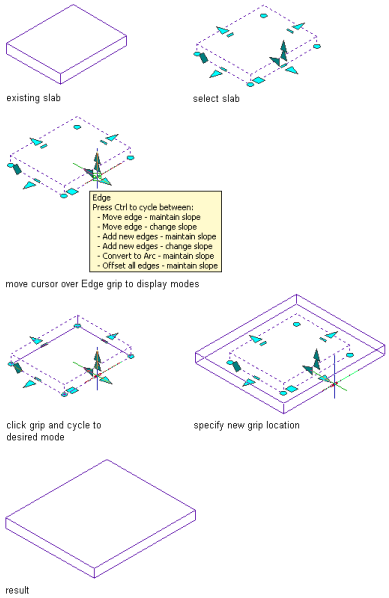
Convert to arc - maintain slope

Converts the edge to an arc, which you can move inward or outward in the current plane to specify the arc direction and degree. Adjacent edges are not affected.



Offset all edges - maintain slope

All outside perimeter edges move inward or outward in the current plane the same distance as you move the selected Edge grip. The degree of arc is maintained. If holes have been added to the slab or roof slab, their edges are unaffected.



Edge Grip Edit Modes for Curved Edges

For curved edges (whether originally created as such, or converted from a straight edge using the Convert to arc mode listed above), the Edge grip has 5 modes, none of which change the slope:

- Stretch edge - maintain slope

- Move edge - maintain slope
- Add new edges - maintain slope
- Convert to line - maintain slope
- Offset all edges - maintain slope

Stretch edge - maintain slope

Move the Edge grip inward or outward in the current plane to reposition the midpoint of the arc. Adjacent edges are not affected. This is the default mode for curved edges.

Move edge - maintain slope

As you move the Edge grip inward or outward in the current plane, adjacent edges stretch or shorten according to the direction of the move. The distance between the endpoints of the arc changes, but the degree of arc is maintained.

Add new edges - maintain slope

As you move the Edge grip outward in its current plane, rather than adjacent edges being stretched or reoriented, new edges are added, each with its own Edge and Edge Overhang grips. The degree of arc and the distance between the arc endpoints are both maintained.

Covert to line - maintain slope

When you click, the curved edge is converted to a straight line between the endpoints of the arc. Adjacent edges are not affected.

Offset all edges - maintain slope

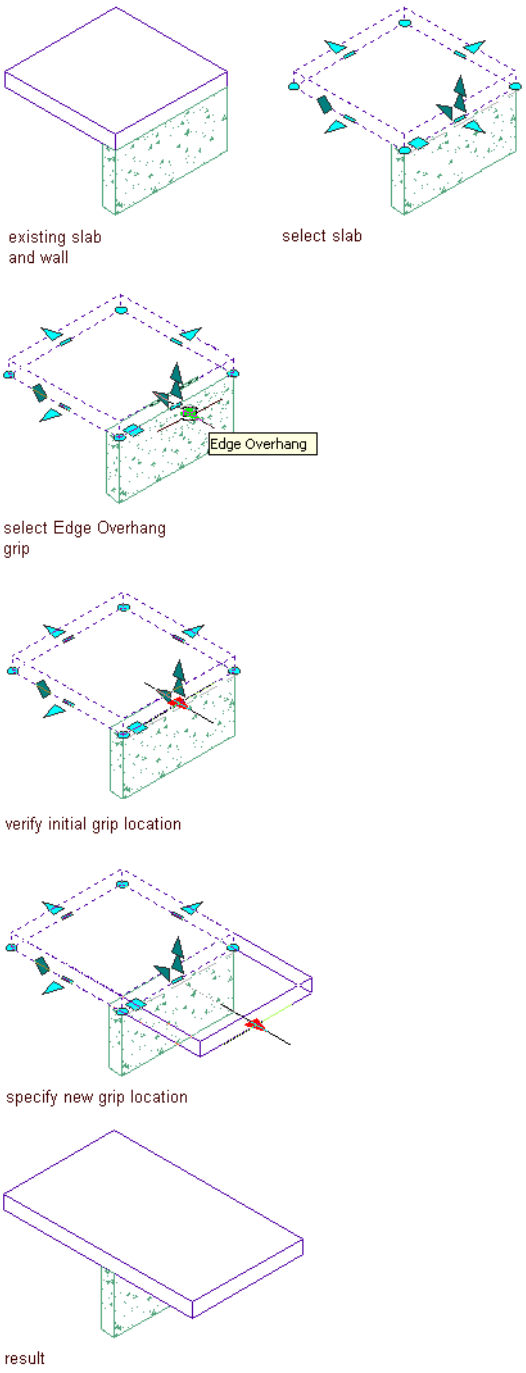
All outside perimeter edges move inward or outward in the current plane the same distance as you move the selected Edge grip. The degree of arc is maintained. If holes have been added to the slab or roof slab, their edges are unaffected.

Using Slab/Roof Slab Edge Overhang Grips

Use this procedure to change the overhang of a slab or roof slab edge. (You can also change the overhang using the worksheet available from the object's Properties palette or its contextual ribbon tab. For more information, see Changing the Edges of a Slab/Roof Slab on page 1608.)

1. Select the slab or roof slab.
2. Select an Edge Overhang grip.
3. Enter a value to specify the desired overhang distance, or move the grip until the desired value is displayed.

Changing the edge overhang of a slab using the Edge Overhang grip



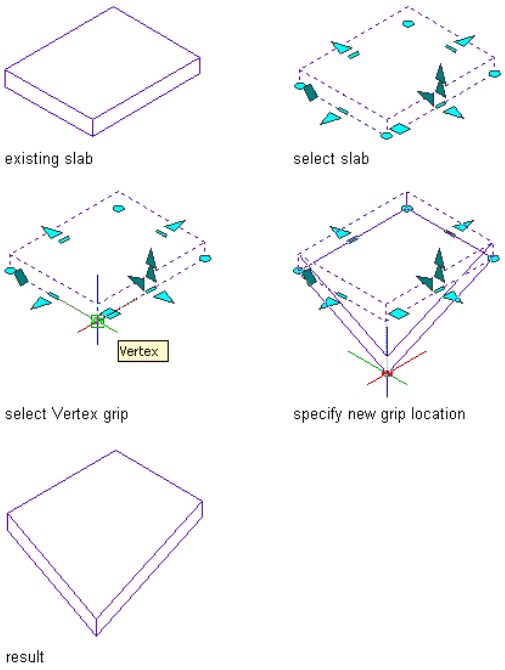
Using Slab/Roof Slab Vertex Grips

Use this procedure to change the size or shape of a slab or roof slab by moving one or more of its vertices.

1. Select the slab or roof slab.
2. Select the Vertex grip for the vertex you want to move (or press *Shift* while selecting multiple Vertex grips).

3 Move the vertex to the desired location, and click. Adjacent edges stretch or shorten accordingly. If you have Shift-selected multiple Vertex grips, drag one of them to the desired location, and click; any other selected Vertex grip also moves, maintaining its position relative to the grip you drag.

Changing the perimeter of a slab by moving a Vertex grip



Using Slab/Roof Slab Thickness Grips

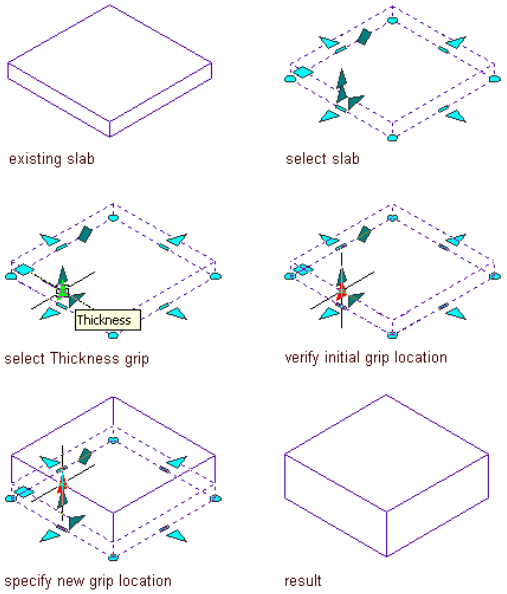
Use this procedure to change the thickness of a slab or roof slab in a 3D isometric view. (To change the thickness of multiple objects at once, regardless of the type of view, see Changing the Thickness of a Slab or Roof Slab on page 1605.)

1 Select the slab or roof slab.

2 Select the Thickness grip.

3 Enter a value to specify the desired thickness, or move the cursor until the desired value is displayed, and then click.

Changing the thickness of a slab using the Thickness grip



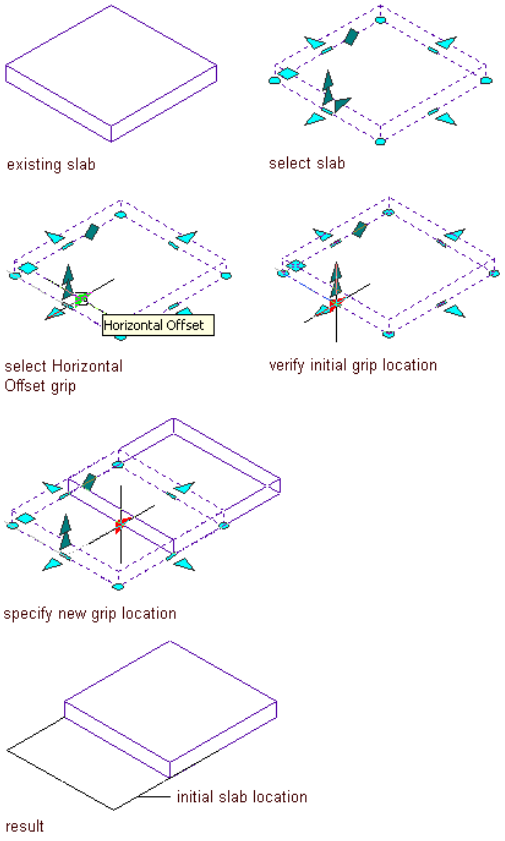
Using Slab/Roof Slab Offset Grips

Use this procedure to change the vertical and horizontal offsets of a slab or roof slab object in a 3D isometric view. (To change the horizontal or vertical offsets of multiple objects at once, regardless of the type of view, see Changing the Offsets of a Slab or Roof Slab on page 1605.)

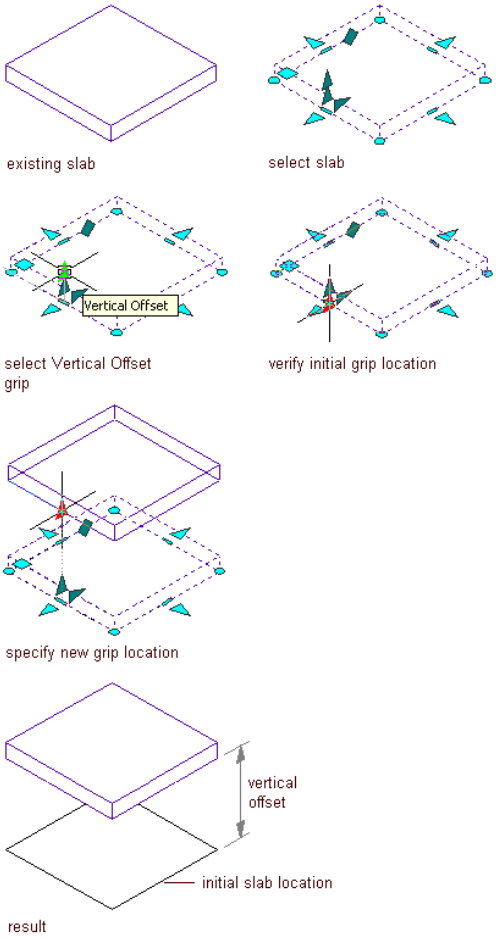
The offsets are the vertical and horizontal distances from the insertion point of the slab.

1. Select the slab.
2. Select the Vertical Offset or Horizontal Offset grip.
3. Enter a value to specify the desired offset distance, or move the cursor until the desired value is displayed, and then click.

Changing the horizontal offset of a slab using the Horizontal Offset grip



Changing the vertical offset of a slab using the Vertical Offset grip



Using Slab/Roof Slab Angle Grips

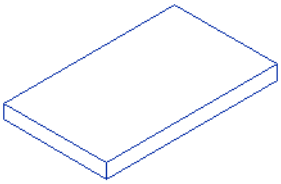
Use this procedure to change the slope of a slab or roof slab in a 3D isometric view. (You can also use the Properties palette to adjust the slope and control the automatic alignment of the fascia. For more information, see Changing Slab/Roof Slab Slope Settings on page 1606).

1 Select the slab.

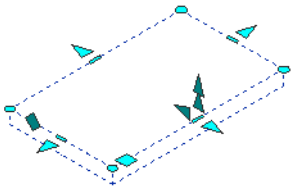
2 Select the Angle grip. If Dynamic Input is turned on, the associated Slope, Rise, and Run values are displayed in the drawing area.

IMPORTANT The Angle grip is available only when you select a slab or roof slab in a 3D isometric view.

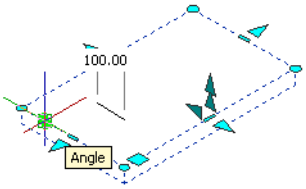
Using the Angle grip to edit slab slope



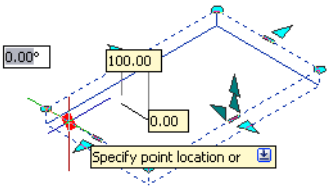
existing slab



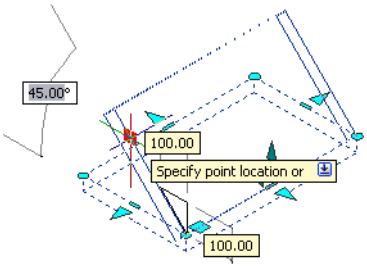
select slab



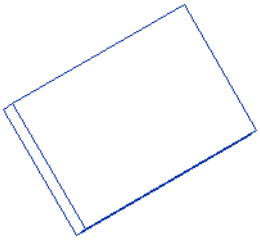
move cursor over Angle grip



verify initial grip location

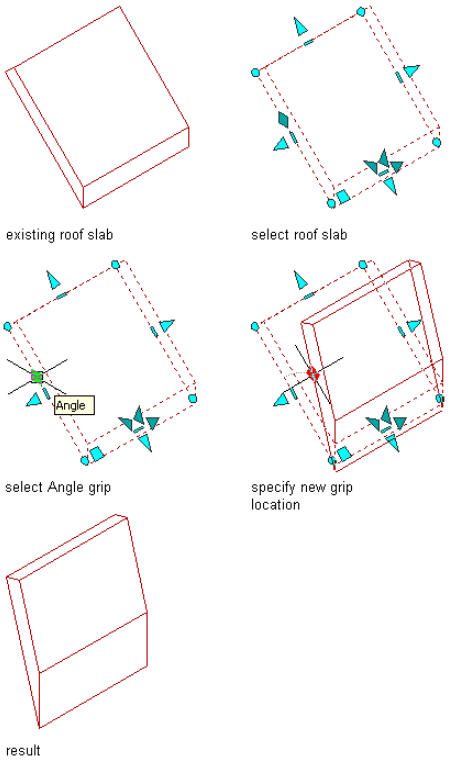


specify new grip location



result

Using the Angle grip to edit roof slab slope



3 Adjust the slope:

If you want to…	Then…
adjust the slope manually	either enter a value, or move the grip until the desired angle is displayed, and then click.
adjust the slope by changing the rise of the slab	press *TAB* until the rise value is highlighted, and then either enter a value, or move the grip until the desired rise is displayed, and then click.

4 Click once.

Using Slab/Roof Slab Pivot Point Grips

Use this procedure to change the pivot point of a slab or roof slab. (You can also use the Properties palette to change the *X*, *Y*, and *Z* values of the pivot point.)

By default, the pivot point is the first vertex of the baseline. However, you can move the pivot point to any other point, either on or off the slab or roof slab.

NOTE If a Hold fascia elevation constraint was set for the object, the pivot point is ignored. For information about setting this option, see Changing Slab/Roof Slab Slope Settings on page 1606.

1 Select the slab or roof slab.

2 Select the Pivot Point grip.

3 Move the cursor until the pivot point is in the desired location, and then click.

Applying Tool Properties to an Existing Slab/Roof Slab

Use this procedure to modify one or more slabs or roof slabs by applying the properties of a slab or roof slab tool. The properties include the style and any other settings specified in the tool you select.

1. Open the tool palette that contains the slab or roof slab tool you want to use.

   (You may have to scroll to display the desired tool.)

2. Right-click the tool, and click Apply Tool Properties to ➤ Slab or Apply Tool Properties to ➤ Roof Slab.
3. Select the slabs or roof slabs to be modified, and press *ENTER*.
4. Edit the properties of the modified slabs or roof slabs in the Properties palette, if necessary.

Changing the Properties of Slabs or Roof Slabs

Many of the slab or roof slab properties that you can edit using grips can also be edited on the Properties palette. In cases where multiple selected objects have the same value for a property, you can change the value for all the objects with a single entry on the Properties palette. The Properties palette also provides access to the Slab Edges and Roof Slab Edges worksheets, and enables you to attach hyperlinks, notes, or files to slabs or roof slabs.

Changing the Style of Slabs or Roof Slabs

Use this procedure to change the style for one or more slabs or for one or more roof slabs in a drawing. Note that the procedure cannot be applied to slabs and roof slabs simultaneously.

1. Select one or more slabs or roof slabs, and double-click one of them.
2. On the Properties palette, click the Design tab, expand Basic, and expand General.

   If the selected objects are of different styles, the value of the Style property is *VARIES*.

3. For Style, select a new style from the drop-down list.

   The selected style is assigned to all selected objects.

Changing the Thickness of a Slab or Roof Slab

Use this procedure to change the thickness of a slab or roof slab for which the Base Thickness (BT) variable is used to define the Thickness value in the object style. If the style specifies a fixed thickness for the slab or roof slab (or for any component of a multi-component slab or roof slab), then the Thickness value on the Properties palette is read-only and can only be changed by editing the style or applying a different style. For more information on using the BT variable, see Specifying the Thickness and Offset of a Slab/Roof Slab Component on page 1635.

1. Select the slab or roof slab you want to change.
2. On the Properties palette, expand Basic, and expand Dimensions.
3. Click the Thickness value, and enter a new value.

Changing the Offsets of a Slab or Roof Slab

Use this procedure to change the vertical or horizontal offset of a slab or roof slab. The offsets are the vertical and horizontal distances from the insertion point of the slab or roof slab.

1. Double-click the slab or roof slab you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.

3 Click the Vertical offset or Horizontal offset value, and enter a new value.

Changing Slab or Roof Slab Edges

Use this procedure to access the Slab Edges or Roof Slab Edges worksheet from the Properties palette.

1 Double-click the slab or roof slab whose edge(s) you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.

3 Click next to Edges.

The Slab Edges and Roof Slab Edges worksheets are identical in function to the Edit Slab Edges and Edit Roof Slab Edges worksheets accessed from the slab or roof slab contextual tab. For more information on using these worksheets, see Changing the Edges of a Slab/Roof Slab on page 1608

4 Click OK.

Changing Slab/Roof Slab Slope Settings

Use this procedure to change the slope settings of a slab or roof slab, and to specify whether the fascia is to be aligned when the slope is changed.

You can also control the adjustment of the overhang or baseline height of the slab. This constraint applies only to the baseline edge, and it works only when the baseline is horizontal.

1 Double-click the slab you want to change.

2 On the Properties palette, click the Design tab, expand Dimensions, and expand Slope.

3 Enter a value for Rise, Run, or Angle to define the slope.

4 Select a setting for Hold fascia elevation:

If you want to…	Then…
force the fascia to align with other slab or roof slab fascias, regardless of style, by adjusting the overhang	select By adjusting overhang.
force the fascia to align with other slab or roof slab fascias, regardless of style, by adjusting the baseline height	select By adjusting baseline height.
ignore fascia alignment	select No.

Changing the Location of a Slab or Roof Slab

Use this procedure to relocate a slab or roof slab by changing the coordinate values of its insertion point. The slab or roof slab object also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the object are parallel to the *XY* plane, the object's normal is parallel to the *Z* axis. You can change the orientation of the object by aligning its normal with another axis. You can also rotate the object on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1 Double-click the slab or roof slab you want to move.

2 On the Properties palette, click the Design tab, expand Basic, and expand Location.

3 Click next to Additional Information.

4 Specify the location of the slab or roof slab:

If you want to…	Then…
relocate the slab or roof slab	enter new coordinate values under Insertion Point.
locate the slab or roof slab on the *XY* plane	make the normal of the slab or roof slab parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the slab or roof slab on the *YZ* plane	make the normal of the slab or roof slab parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the slab or roof slab on the *XZ* plane	make the normal of the slab or roof slab parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the slab or roof slab	enter a new value for Rotation Angle.

5 Click OK.

Specifying the Cut Plane Display of a Slab or Roof Slab

Use this procedure to specify the properties of one or more cut planes for an individual slab or roof slab. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the slab or roof slab you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all slabs or roof slabs in the drawing, select Drawing default setting. To apply changes to all slabs or roof slabs of this style, select Slab or Roof Slab Style:<style name>. For more information on styles, see Slab and Roof Slab Styles on page 1630.

5 If necessary, expand Object Display Properties ➤ Cut Plane.

6 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

7 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. Alternatively, you can click , and specify 2 points in the drawing area to define the new height.

You can also access and modify these same cut plane settings through the slab's or roof slab's context menu, as follows:

1 Select the slab or roof slab you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.
5 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Slab/Roof Slab

Use this procedure to attach hyperlinks, enter notes, or attach reference files to a slab or roof slab. You can also edit existing notes and edit or detach currently attached reference files.

1 Double-click the slab or roof slab to which to attach information.
2 On the Properties palette, click the Extended Data tab.
3 To add a hyperlink, click next to Hyperlink, and specify the link.
4 To add or edit a note, click next to Notes, enter text, and click OK.
5 To attach, detach, or edit a reference, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Using Slab and Roof Slab Contextual Tools

In addition to grip-editing slabs and roof slabs, or changing values on their Properties palettes, you can edit these objects using the tools available on their contextual ribbon tabs and context menus. These tools let you trim, extend, and cut an object, edit its edges, add and edit interference conditions and body modifiers, and edit the object display properties.

Changing the Edges of a Slab/Roof Slab

Use this procedure to edit one or more edges of a slab or roof slab. For each selected edge, you can change the overhang, style, cut (square or plumb), and angle. A viewer box shows you which edge(s) of the slab you are editing.

1 Select the slab or roof slab to be modified, and,

if the object selected is...	then...
a slab	click Slab tab ➤ Edge panel ➤ Edit .
a roof slab	click Roof Slab tab ➤ Edge panel ➤ Edit .

2 Select the edges to be modified, and press *ENTER*.

3 In the Edit Slab Edges or Edit Roof Slab Edges worksheet, in the list of edges, select the edge to edit. To modify multiple edges using the same values, press and hold *CTRL* while selecting each edge.

NOTE Beginning with Autodesk Architectural Desktop 2007, the individual segments or facets making up a curved edge are no longer listed as separate edges on this worksheet. Each arc on the perimeter of a slab or roof slab is treated as a single edge.

The selected edges are highlighted in the viewer in the right pane of the worksheet.

4 Enter a value for Overhang.

5 Select a slab edge style.

6 Select Square or Plumb for Edge Cut.

7 Enter a value for Angle.

To reset the angle to the slab or roof slab style defaults, right-click the edge number, and click Reset to Style Defaults. This option is available only if an edge style has been assigned, and the value for Angle is different than the default.

8 If desired, select additional edges from the list and edit them as described above.

9 When edits are completed for all edges, click OK.

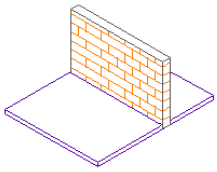
Trimming a Slab/Roof Slab

Use this procedure to trim a slab or roof slab using a polyline, wall, roof slab, or slab to define the trim plane. The trimming object itself does not need to intersect the slab or roof slab, as long as it projects an intersection in the current user coordinate system (UCS). However, the trim plane must intersect the slab or roof slab perimeter line; you cannot trim only the overhang.

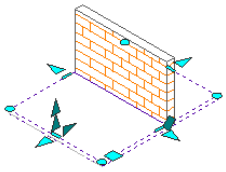
Any fascia or soffit profile that intersects the trim plane is trimmed at the same angle as the slab or roof slab.

If the trimming object is a wall or a slab, the trim plane is at the closest surface. The new edge at the trim plane has its edge angle defined by the trim plane.

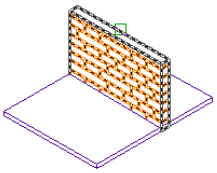
Trimming a slab to a wall



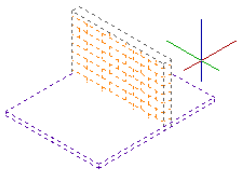
existing slab and wall



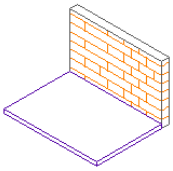
select slab



select trimming object

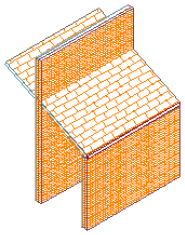


specify side to trim

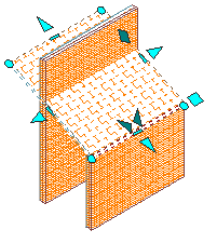


result

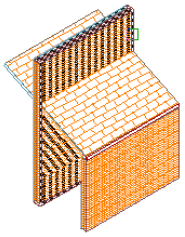
Trimming a roof slab to a wall



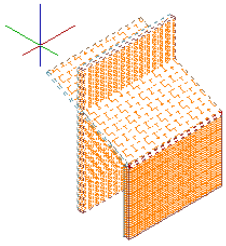
existing roof slab and wall segments



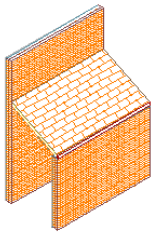
select roof slab



select trimming object



specify side to be trimmed



result

1 Select the slab or roof slab to be trimmed, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Trim .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Trim .

2 Select a wall, a polyline, or another slab or roof slab for the trimming object.

3 Select the side of the slab or roof slab to be trimmed.

Extending a Slab/Roof Slab

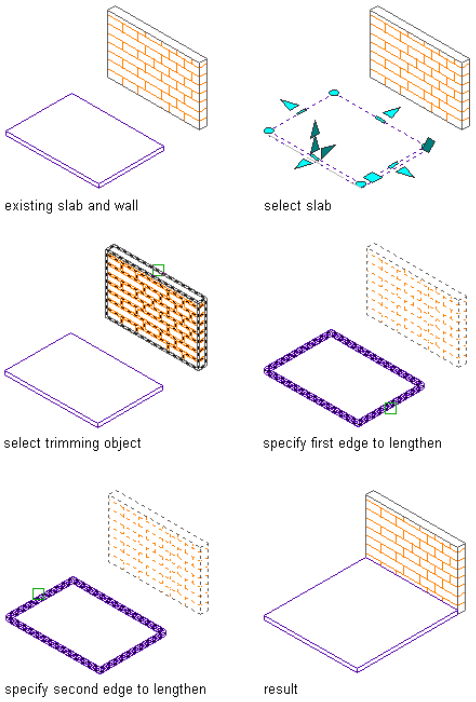
Use this procedure to extend a slab or roof slab to a plane defined by another slab, roof slab, or wall. This target object itself does not have to intersect with the extended slab or roof slab, as long as it projects an intersection in the current user coordinate system (UCS).

Because multiple edges may need to move in an extend operation, you are prompted to select the adjacent edges to lengthen, rather than the specific edges to move. These selected edges retain their current vector (angle) and are stretched until they intersect the plane of the target object.

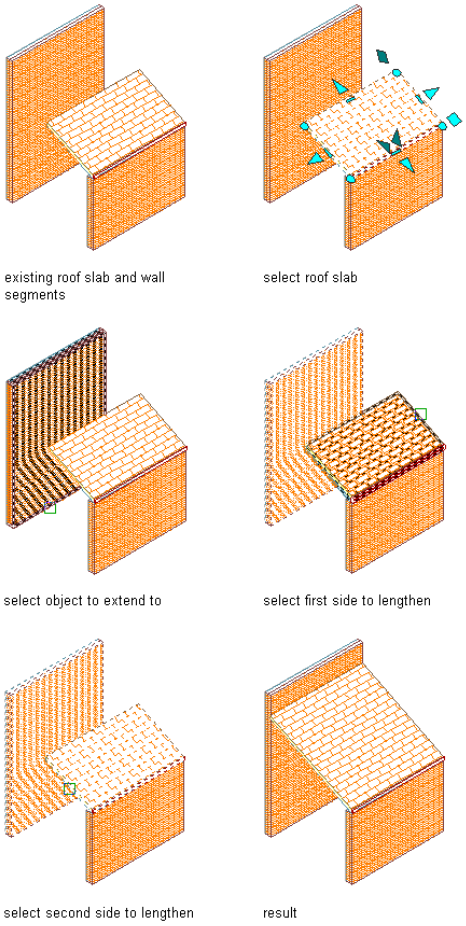
If multiple edges exist between the selected edges, they are joined to form a single edge. The new edge is set to the angle of the target surface.

Any fascia or soffit profile on the adjacent edges is extended to the target surface and trimmed to its angle.

Extending a slab to a wall



Extending a roof slab to a wall



1 Select the slab or roof slab to be extended, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Extend .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Extend .

2 Select the target wall, slab, or roof slab to which the slab or roof slab is to be extended.

3 Select the slab or roof slab to be extended.

4 Select the first edge to lengthen.

5 Select the second edge to lengthen.

NOTE You cannot use curved walls as objects to lengthen a slab or roof slab to.

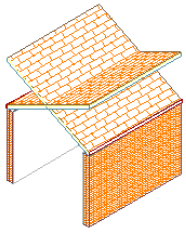
Mitering Slabs/Roof Slabs by Intersection

Use this procedure to miter 2 intersecting slabs or roof slabs. Both slabs or roof slabs are trimmed along the intersection of their perimeter lines. Vertices are added or removed as required. The new edges of the slabs

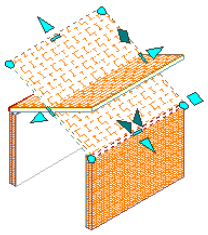
or roof slabs are set to angles required for a true miter cut. If the slab thicknesses of the two edges are different, the angles are different.

If you want to miter slabs or roof slabs that do not intersect, you can miter them by edges. For more information, see Mitering Roof Slabs Using Edges on page 1614

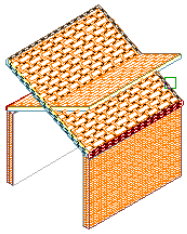
Mitering roof slabs by intersection



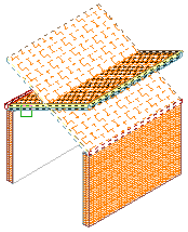
existing roof slabs and wall segments



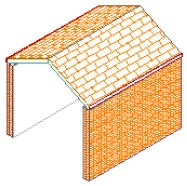
select roof slab



select first roof slab at side to keep



select second roof slab at side to keep



result

1 Select one of the two slabs or roof slabs you want to miter, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Miter .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Miter .

2 Enter **i** (Intersection) to miter at the intersection of the two slabs or roof slabs.

3 Select the first roof slab at the side of that slab to keep.

The opposite side is trimmed.

4 Select the second roof slab at the side of that slab to keep.

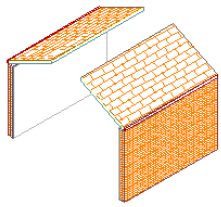
The opposite side is trimmed.

Mitering Roof Slabs Using Edges

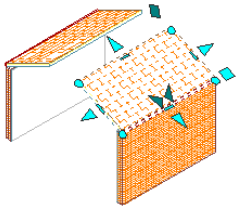
Use this procedure to miter two roof slabs that do not intersect. You can select particular edges to miter. You can miter edges of overlapping roof slabs without trimming the entire slab. To accomplish this, however, you may need to insert additional vertices. Only one edge of each roof slab is mitered.

If you need to miter multiple edges of a roof slab, stretch them to overlap the other roof slab and then miter them at their intersection. For more information, see Mitering Slabs/Roof Slabs by Intersection on page 1612.

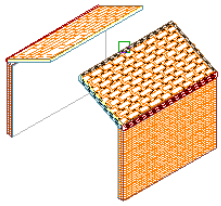
Mitering roof slabs by edge



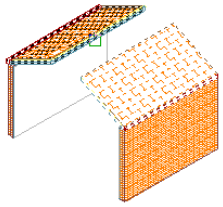
existing roof slabs and wall segments



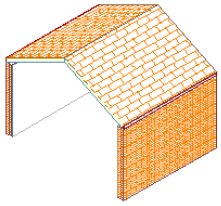
select roof slab



select edge on first slab



select edge on second slab



result

1 Select one of the two roof slabs you want to miter, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Miter .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Miter .

2 Enter **e** (Edges) to miter selected edges of the roof slabs.

3 Select one edge on the first roof slab.

4 Select one edge on the second roof slab.

Cutting a Slab/Roof Slab

Use this procedure to cut a slab or roof slab into two or more slabs or roof slabs. You can use any 3D object or polyline to define the cutting geometry. If you use a 3D body, such as a wall, slab, mass element, or closed polyline, the slab or roof slab is cut along the intersection lines of the surfaces.

The slab or roof slab is cut only when the 3D body or closed polyline intersects its perimeter line. If you use an open polyline, the slab or roof slab is cut along the projection to its surface.

In either case, when the intersection line crosses the slab or roof slab multiple times, multiple slabs or roof slabs are created. If the intersection line has multiple edges, multiple edges are added to the new objects.

The smoothness (tessellation) of curved edges is controlled by 2 AEC display resolution settings called Facet Deviation and Facet Maximum. Beginning with Autodesk Architectural Desktop 2007, you can adjust these settings after the slab or roof slab is created. Also, the individual segments or facets making up a curved edge are no longer treated as separate edges; each arc on the perimeter of a slab or roof slab is treated as a single edge. For more information, see Specifying the Display Resolution of Objects with Facets on page 143.

1 Draw an object or polyline for defining the cutting geometry.

2 Select the slab or roof slab to be cut, and

if the object selected is...	then...
a slab	click Slab tab ➤ Modify panel ➤ Cut .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Cut .

3 Select the objects or polylines that represent the cutting geometry, and press *ENTER*.

4 Enter **n** (No) to keep the geometry, or enter **y** (Yes) to erase the geometry.

Adding a Vertex to a Slab/Roof Slab

Use this procedure to add a vertex to a slab or roof slab edge. Adding a vertex creates two edges from one edge.

1 Select a slab or roof slab, and

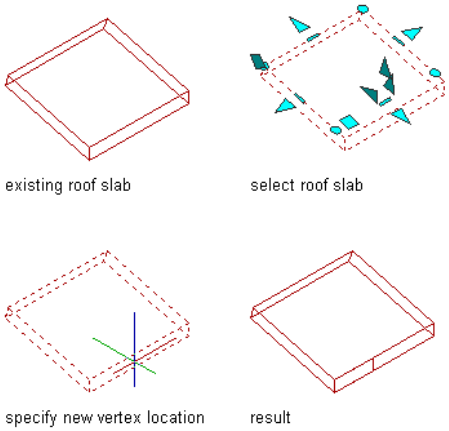
if the object selected is...	then...
a slab	click Slab tab ➤ Modify panel ➤ Vertex drop-down ➤ Add .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Vertex drop-down ➤ Add .

2 Specify a point for the new vertex.

To place a new vertex at a precise intersection point, use Intersection or Apparent Intersection object snaps.

The new vertex is added to the nearest edge, perpendicular to the specified point. If there is no point perpendicular to the slab or roof slab, no vertex is added.

Adding a vertex to a roof slab



3 To see the new vertex, select the slab or roof slab.

A new Vertex grip is displayed at the point you specified, and new grips are displayed for the edge that has been added.

Deleting a Vertex from a Slab/Roof Slab

Use this procedure to delete a vertex from a slab or roof slab. After the vertex is deleted, the 2 adjacent vertices connect in a straight line.

1 Select the slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Vertex drop-down ➤ Remove .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Vertex drop-down ➤ Remove .

2 Select the vertex to remove.

Adding a Hole to a Slab/Roof Slab

Use this procedure to add a hole to a slab or roof slab. The hole adds new vertices and edges, which you can edit as you do other slab or roof slab vertices and edges.

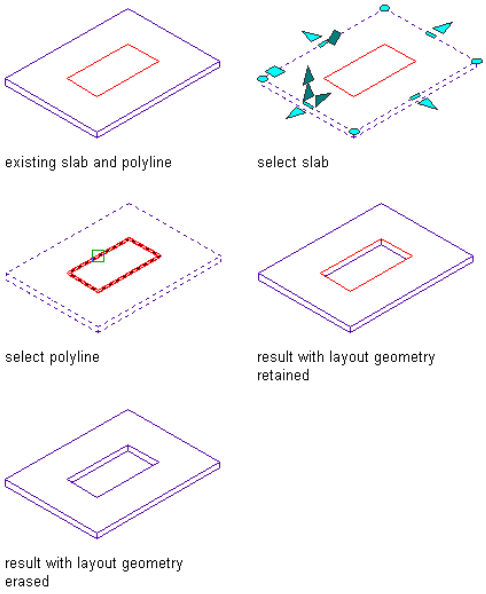
You can use polylines or three-dimensional (3D) objects, such as walls and mass elements, to create the hole.

- Holes generated by a closed polyline are projected from the polyline to the slab or roof slab, using the current user coordinate system (UCS).
- 3D objects must intersect the slab or roof slab without any projection.

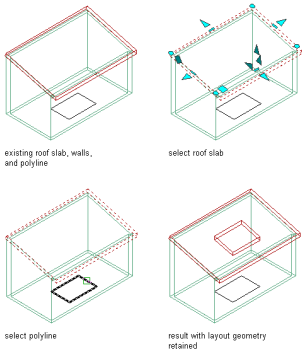
If the objects contain an interior void, you are prompted to use the inside or outside surface to create the hole. For example, if you create a chimney using four wall objects, you can cut the hole at the inside or outside of the chimney. The new hole faces are aligned with the surfaces of the cutting bodies, and are not necessarily parallel to each other.

The smoothness (tessellation) of curved edges is controlled by 2 AEC display resolution settings called Facet Deviation and Facet Maximum. Beginning with Autodesk Architectural Desktop 2007, you can adjust these settings after the slab or roof slab is created. Also, the individual segments or facets making up a curved edge are no longer treated as separate edges; each arc on the perimeter of a slab or roof slab is treated as a single edge. For more information, see Specifying the Display Resolution of Objects with Facets on page 143.

Adding a hole to a slab



Adding a hole to a roof slab



1 Draw a closed polyline in the shape and location for the hole, or add an object in the location for the hole.

2 Select the slab or roof slab, and

if the object selected is...	then...
a slab	click Slab tab ➤ Modify panel ➤ Hole drop-down ➤ Add .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Hole drop-down ➤ Add .

3 Select the closed polyline or the connected objects that define the hole, and press *ENTER*.

4 Enter **n** (No) to keep the geometry, or enter **y** (Yes) to erase the geometry.

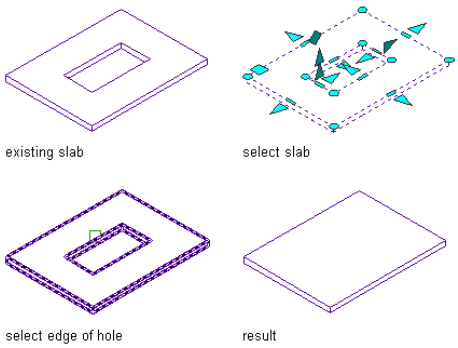
5 If you select 3D objects, you are prompted to create the hole at the inside or outside surface of the cutting objects. Press *ENTER* to use the outside of the object to define the hole, or enter **i** (Inside) to use the inside or void of the object to define the hole. This prompt is displayed even if the bodies do not contain an inner void, in which case the Inside option does not create a hole.

NOTE If you create a hole that is outside or which overlaps the slab or roof slab baseline or perimeter line at an overhang, the body of the slab or roof slab is cut, but the fascia and soffit remain. In this case, it is better to create a hole by cutting the slab or roof slab. For more information, see Cutting a Slab/Roof Slab on page 1614.

Removing a Hole from a Slab/Roof Slab

Use this procedure to remove a hole from a slab or roof slab.

Removing a hole from a slab



1 Select the slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Hole drop-down ➤ Remove .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Hole drop-down ➤ Remove .

2 Select any edge of the hole to remove.

Creating Slab/Roof Slab Interference Conditions

Just as you can use another object to define the perimeter of a hole you want to add to a slab or a roof slab, you can also modify the geometry of a slab or roof slab by using another object to create an interference condition within the slab or roof slab. Unlike the object used to add a hole, which has no connection to the slab or roof slab and can be erased after the hole is added, the object used to create an interference condition remains partially or wholly embedded in the slab or roof slab, cutting out and replacing a part of its geometry. All interference conditions are subtractive in this sense, but the shrinkwrap effect option you use to create the interference condition (Additive or Subtractive) determines whether the outline of the interference condition is included in or excluded from the shrink wrap outline of the slab or roof slab in plan view.

Typically, after creating interference conditions for a slab or roof slab, you freeze the layer where the interfering objects are placed. If you move or edit the objects, the slab or roof slab updates accordingly.

NOTE Objects used as interference conditions are not included for the Area in the LIST command or in a Schedule Query result.

Use the following procedure to create either additive or subtractive interference conditions for a slab or roof slab. If you want to create both additive and subtractive interference conditions, you need to perform the procedure separately for each type.

1 Create one or more objects in the actual location where you want the interference condition positioned in relation to the slab or roof slab.

2 Select the slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

3 Select the objects to use as interference conditions, and press *ENTER*.

NOTE AEC objects from externally referenced (xref) files can be added to a slab or roof slab as interference conditions so long as the following conditions are met:

- The object is a three-dimensional (3D) body
- The xref is found
- The xref is read/write
- The xref is not locked or opened by another user
- The xref is loaded

4 Specify the desired shrinkwrap effect:

If you want to…	Then…
include the interference condition(s) within the shrink wrap outline in plan view	enter **a** (Additive).
exclude the interference condition(s) from the shrink wrap outline in plan view	enter **s** (Subtractive).

The selected objects are added to the slab or roof slab as either additive or subtractive interference conditions. You can delete an interference condition or change its shrinkwrap effect using the Interference Conditions worksheet. For more information, see Editing Slab/Roof Slab Interference Conditions on page 1620

Removing Slab/Roof Slab Interference Conditions

Use this procedure to remove an interference condition from a slab or roof slab. Note that only the interference condition is removed; the object from which the interference condition was created remains in the drawing.

1 Select the slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .

2 Select the objects to remove as interference conditions, and press *ENTER*.

NOTE You can also remove interference conditions through the Interference Conditions worksheet. For more information, see Editing Slab/Roof Slab Interference Conditions on page 1620.

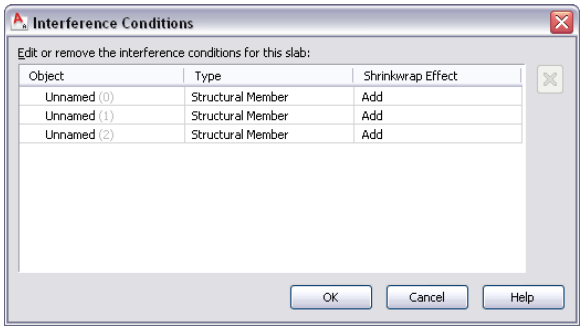
Editing Slab/Roof Slab Interference Conditions

Objects applied as interference conditions in slabs and roof slabs can be edited like any other objects, using grips, contextual tab options, or the Properties palette. If you move or edit the objects, the slab or roof slab updates accordingly. You can also change the setting that determines whether an interference condition is added to or subtracted from the shrink wrap outline of the slab or roof slab in plan view by using the following procedure.

1 Select the slab or roof slab, and,

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Interference Conditions .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Interference Conditions .

NOTE You can also access this worksheet on the Design tab of the Properties palette, under Advanced.



2 On the Interference Conditions worksheet, click the Shrinkwrap Effect value you want to change, and select a different value from the drop-down menu.

3 Click OK.

NOTE You can also use this worksheet to remove an interference condition by right-clicking its Object or Type value and then clicking Remove. The alternate method is to use the contextual tab of the slab or roof slab, as explained under Removing Slab/Roof Slab Interference Conditions on page 1619. When you remove an interference condition, you remove the association between the slab or roof slab and the object that was used to create the interference condition. The object itself is not removed from the drawing.

Creating Slab/Roof Slab Body Modifiers

Like interference conditions, body modifiers let you modify the geometry of a slab or roof slab by incorporating another three-dimensional (3D) object. However, where interference conditions always subtract from the mass of a slab or roof slab and affect only components that they touch, body modifiers can be used to add to, subtract from, or completely replace a specific component. If a slab or roof slab has only one component, then the body modifier applies to the entire slab or roof slab.

You can create a body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

After you create a body modifier from an object, you can delete the original object. However, if you have created a complex object, such as a mass group comprising many mass elements, you may want to retain the object in the drawing until you are sure you have the results you want for the slab or roof slab.

NOTE Objects used as interference conditions are not included for the Area in the LIST command or in a Schedule Query result.

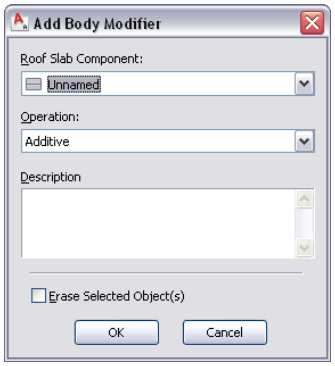
To create a body modifier for a slab or roof slab:

1 Create one or more objects in the location where you want the body modifier positioned in relation to the slab or roof slab.

2 Select the slab or roof slab you want to modify, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Add .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Add .

3 Select the objects to be applied as body modifiers, and press *ENTER*.



4 On the Add Body Modifier worksheet, specify the following:

- For Slab Component (or Roof Slab Component), select the component to which you want the body modifier applied.
- For Operation, select Additive, Subtractive, or Replace, depending on whether you want the body modifier added to the selected component, subtracted from it, or used to replace the entire component.
- For Description, enter a text description of the body modifier(s) you are applying.

5 If you do not want the outline of the object(s) to be visible in the drawing, select Erase Selected Object(s).

6 Click OK.

Editing a Slab/Roof Slab Body Modifier in Place

Use this procedure to edit the shape of a body modifier that is attached to a slab or a roof slab. You can edit the body using grips to edit faces, using Boolean commands to add or remove other objects from the body modifier, and other editing commands to change its shape.

1 Select the slab or roof slab that has the body modifier you want to change, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Edit In Place .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Edit In Place .

A temporary mass element is created for you to edit the geometry of the body modifier. If the slab or roof slab contains multiple body modifiers, a mass element is created for each body modifier. If an object was not originally a mass element (for example, if you used a structural member as a body modifier), the object becomes a temporary Free Form mass element with faces that you can edit.

2 **NOTE** After you perform an editing task from the Edit in Place contextual tab, you may need to select a profile again to perform another editing task. If you do not see the editing commands that you expect on the contextual tab, re-select a profile to redisplay the Edit in Place contextual tab.

Edit the body modifier:

If you want to …	Then …
change the shape of a body modifier that is a Free Form mass element	select the body modifier. Select a Face grip to activate edge grips for the face. Move the grips to the desired locations. Continue editing other faces in the same manner.
change the shape of a body modifier that is a conventional mass element	select the body modifier. Select grips and move them to change the shape of the body modifier. The grips that are available depend on the type of mass element used as a body modifier and the current view direction.

If you want to …	Then …
add an object to a body modifier	place the object in the location where it is needed. ■ For a slab object, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Union. ■ For a roof slab object, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Union. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
subtract an object from a body modifier	place the object in the location where it is needed. ■ For a slab object, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Subtract. ■ For a roof slab object, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Subtract. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
create a body modifier that is the intersection of the original body modifier with another object	place the object in the location where it is needed. ■ For a slab object, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Intersect. ■ For a roof slab object, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Boolean drop-down ➤ Intersect. Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
trim a body modifier	■ if the object is a slab, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Trim by Plane . ■ if the object is a roof slab, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Trim by Plane . Specify the points that define the trim plane, and select the side of the body modifier to be trimmed. The trimmed body modifier is converted to a Free Form mass element.
divide the face of a body modifier into two faces	■ if the object is a slab, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Split Face . ■ if the object is a roof slab, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Split Face .

If you want to …	Then …
	Specify the points that define the edge created by splitting the faces.
join two faces that are on the same plane into a single face	■ if the object is a slab, click Edit In Place: Slab Body Modifier ➤ Modify panel ➤ Join Faces . ■ if the object is a roof slab, click Edit In Place: Roof Slab Body Modifier ➤ Modify panel ➤ Join Faces . Select the edge that separates the coplanar faces.
remove a body modifier	select the object that forms the body modifier, and press *DELETE*.

3 Save or discard the changes:

If you want to …	Then …
restore the body modifier to its original shape	select the body modifier, and ■ if the object is a slab, click Edit In Place: Slab Body Modifier ➤ Edits panel ➤ Cancel. ■ if the object is a roof slab, click Edit In Place: Roof Slab Body Modifier ➤ Edits panel ➤ Cancel.
save the changes to the body modifier	select the body modifier, and ■ if the object is a slab, click Edit In Place: Slab Body Modifier ➤ Edits panel ➤ Finish. ■ if the object is a roof slab, click Edit In Place: Roof Slab Body Modifier ➤ Edits panel ➤ Finish.

Managing Slab/Roof Slab Body Modifiers

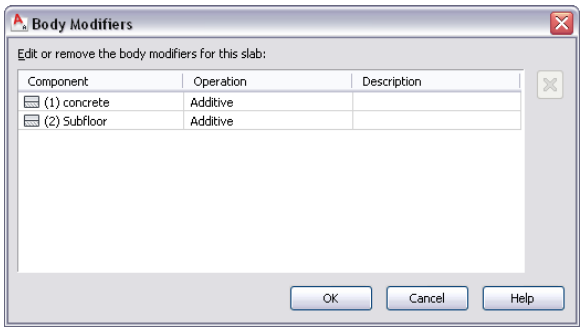
Use this procedure to edit or remove three-dimensional (3D) body modifiers from a slab or a roof slab. You can change the component to which the body modifier is applied or the way it is applied (whether it adds to, subtracts from, or replaces the selected component). You can also enter or edit the descriptions of body modifiers.

NOTE To remove a body modifier from a slab or roof slab component and restore the modifier as a mass element that you can edit or apply to other slabs or roof slabs, see Restoring a Slab/Roof Slab Body Modifier to a Mass Element on page 1625.

1 Select the slab or roof slab you want to change, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Body Modifiers .
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Body Modifiers .

NOTE You can also access this worksheet on the Design tab of the Properties palette, under Advanced.



2 Select a body modifier, and change its settings:

If you want to …	Then …
apply the body modifier to a different slab or roof slab component	select a different component for Component.
change the operation used to apply the body modifier to the slab or roof slab component	select a different operation for Operation: ■ Select Additive to add the body modifier to the component. ■ Select Subtract to subtract the shape of the body modifier from the component. ■ Select Replace to replace the component with the body modifier.
delete the body modifier from the slab or roof slab component	select the body modifier, and click , or right-click, and click Remove.
enter a description of the body modifier	click Description, enter text, and press *ENTER*.

3 Click OK.

Restoring a Slab/Roof Slab Body Modifier to a Mass Element

Use this procedure to remove a body modifier from a slab or a roof slab and add it to the drawing as a mass element. Restoring a body modifier to a mass element enables you to modify the shape as a mass element and then add it to the slab or roof slab again as a body modifier. You can also restore the body modifier to a mass element while leaving the body modifier still applied to the slab or roof slab. This is useful if you want to create other slabs or roof slabs with the same shape.

If the object used to create the body modifier was a conventional mass element, it is restored to that mass element. For example, a Gable mass element is restored as a Gable mass element. However, if the body modifier was created from another object, such as a structural member, or was edited using Boolean operations or face editing commands, the body modifier is restored as a Free Form mass element.

1 Select the slab or roof slab you want to change, and

if the object selected is…	then…
a slab	click Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Restore .

if the object selected is…	then…
a roof slab	click Roof Slab tab ➤ Modify panel ➤ Body Modifier drop-down ➤ Restore .

2 **NOTE** This procedure restores all body modifiers attached to a slab or roof slab.

Create mass elements from the body modifiers:

If you want to …	Then …
create mass elements from the body modifiers while keeping the body modifiers attached to the slab or roof slab	press *ENTER*.
remove *all* body modifiers from the slab or roof slab, and create mass elements from their shapes	enter **y** (Yes), and press *ENTER*.

Specifying the Material of a Slab/Roof Slab

Use this procedure to select a different material for components of an individual slab or roof slab.

To change the materials assigned to all slabs or roof slabs of the same style, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

NOTE If a material assignment does not determine the display properties of the component, you can change the properties of the display component as described in Specifying the Display Properties of a Slab/Roof Slab on page 1626.

1. Select the slab or roof slab you want to change, right-click, and click Edit Object Display.
2. To verify that the material assignment determines the display properties of the component, click the Display Properties tab, select the display representation on which to display the changes, and click .
3. Click the Layer/Color/Linetype tab, verify that By Material is selected for the component, and click OK.
4. Click the Materials tab.
5. Select the component you want to change, and select a different material definition.

   You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

   WARNING When you edit a material definition from this dialog box, any changes you make will apply to all objects that are assigned the material.

6. Click OK.

Specifying the Display Properties of a Slab/Roof Slab

Use this procedure to change the following properties of the display components of an individual slab or roof slab:

- Visibility (display component is on or off)

- By Material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

To change these display properties for all slabs or roof slabs of the same style, see Specifying the Display Properties of a Slab or Roof Slab Style on page 1639.

NOTE If a material assignment determines the display properties of a component, you can change the properties by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Material of a Slab/Roof Slab on page 1626.

1. Select the slab or roof slab you want to change, right-click, and click Edit Object Display.

   NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. Click the Layer/Color/Linetype tab.
5. Select the component to change, and select a different setting for the property.
6. Click OK twice.

Specifying the Hatching of a Slab/Roof Slab

Use this procedure to specify the hatching of the components of a slab or roof slab. Hatching is displayed only in display representations that are used in the Top view (plan view) of a drawing.

To change the hatching for all slabs or roof slabs of the same style, see Specifying the Hatching of a Slab/Roof Slab Style on page 1641.

NOTE If a material assignment determines the hatching properties of a slab display component, you can change the hatching of the display component by clearing By Material or by overriding the material assignment with a different material. For more information, see Specifying the Material of a Slab/Roof Slab on page 1626.

1. Select the slab or roof slab you want to change, right-click, and click Edit Object Display.

   NOTE You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

2. On the Display Properties tab, select the display representation for which you want to change a property, and select Style Override.
3. If necessary, click .

4 On the Hatching tab, select the display component, and click the setting for Pattern.

5 Select the hatching for the display component:

If you want to…	Then…
specify a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
specify a custom pattern	select Custom for Type, and enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
specify single hatching	select User-Defined for Type, and clear Double Hatch.
specify double hatching	select User-Defined for Type, and select Double Hatch.
specify solid fill	select Solid Fill for Type.

6 Click OK.

7 Click the setting for Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

8 Click the setting for Angle, and enter the angle for the selected pattern.

9 Click the setting for Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the slab or roof slab, regardless of its rotation	click to select Object.
orient the hatching to the World Coordinate System	click to select Global.

10 Click the setting for X Offset, and enter an offset value.

11 Click the setting for Y Offset, and enter an offset value.

12 Click OK twice.

Specifying the Cut Plane Height of a Slab/Roof Slab

Use this procedure to specify the cut plane height of a slab or roof slab.

If the value you specify for the cut plane height is greater than zero, you must specify the layer, color, and linetype for the elements above and below the cut plane height. This is especially important for slabs or roof slabs with interference conditions or body modifiers.

To change the cut plane height for all slabs or roof slabs of the same style, see Specifying the Cut Plane Height of a Slab/Roof Slab Style on page 1642.

1 Select the slab or roof slab you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 Click the Other tab.

5 Select Override Display Configuration Cut Plane, and enter a value for Cut Plane Height.

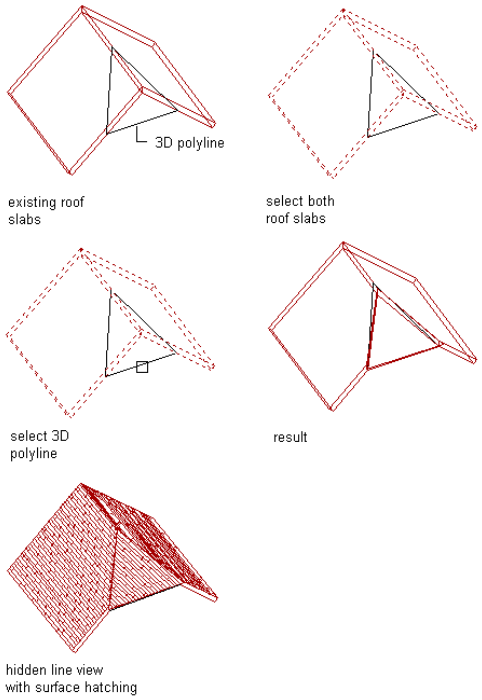
6 Click OK twice.

Creating a Clipped Gable Roof

Use this procedure to modify two roof slabs to add a third slab, creating a clipped gable roof.

1 Create a gable roof with two roof slabs.
2 In an isometric view, draw a 3D polyline in the shape and location of the clipped roof slab.
3 Enter **roofslab**.
4 Enter **e** (Edit).
5 Enter **x** (Xcut).
6 Select the two roof slabs and press *ENTER*.
7 Select the 3D polyline and press *ENTER* twice.

Creating a clipped gable roof

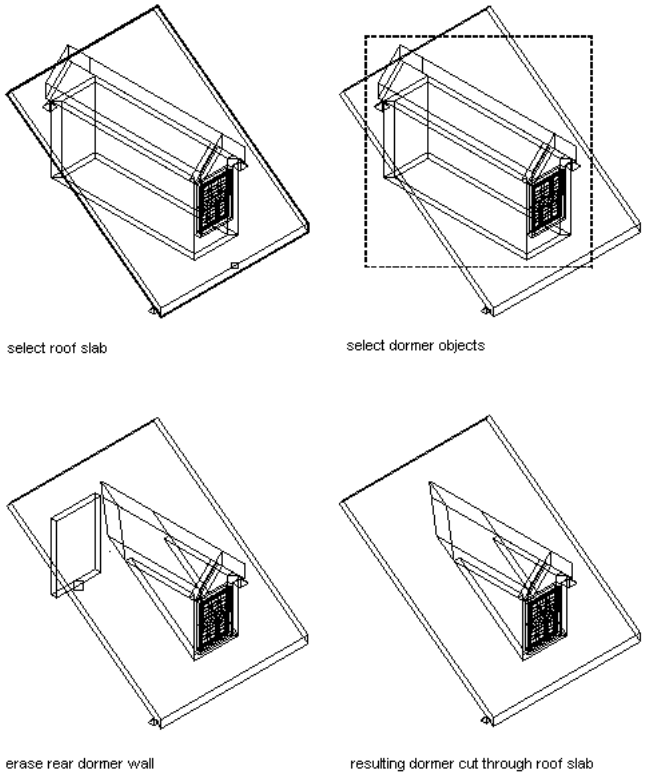


NOTE You can edit the outside edge of the new roof slab to change it from square to plumb. For more information, see Changing Slab or Roof Slab Edges on page 1606.

Creating a Dormer in a Roof Slab

Use this procedure to add a dormer to a roof slab. You must first create the roof slabs, walls, and all other parts of the dormer, so that an appropriate hole can be cut in the roof slab. The walls you create for the dormer must include a back segment, so that a complete hole for the dormer can be cut in the roof slab.

Adding a dormer to a roof slab



1. Create the walls for the dormer, including a closing rear wall.
2. Open the tool palette that contains the roof slab tool you want to use.
   (You may have to scroll to display the desired tool.)
3. Right-click the tool, and click Apply Tool Properties to ➤ Linework, Walls and Roof.
4. Select the walls, and press *ENTER*.
5. Miter the roof slab edges as required.
6. Move the structure so that the walls and roof slabs of the dormer fully penetrate the existing roof slab in the correct position.
7. Select the roof slab to add the dormer to, and click Roof Slab tab ➤ Dormer panel ➤ Add .
8. Select the objects that form the dormer, and press *ENTER*.
9. When prompted to slice the walls with the roof slab, press *ENTER* to slice the walls, or enter **n** (No) to leave the walls as they are.
10. Erase the wall at the rear of the dormer.

Slab and Roof Slab Styles

A slab or roof slab style is a set of parameters that determines the appearance and other characteristics of the slab or roof slab object to which it is assigned. By editing a style, you can control the properties of all objects that use that style, without having to change the properties of each such object in a drawing. For slabs and roof slabs, the style controls the following properties:

- default dimensions, including thickness
- default edge conditions, including fascia and soffit styles

- default display properties, including fascia and soffit
- physical components (concrete, metal deck, and so on)
- materials assigned to components of slabs

The default slab and roof slab tools provided with the software use standard styles. You can use these as provided, edit the standard styles in the Style Manager, or create your own styles and use them to make new tools.

Using Materials in Slab/Roof Slab Styles

You can control how slabs or roof slabs of a particular style are displayed in a drawing by assigning materials to the slab or roof slab components in the style. The components are then displayed using the display properties of the assigned materials. For more information see Material Components and Display Properties on page 585.

AutoCAD Architecture provides predefined materials for common design purposes. You can use these materials as provided, modify them to meet your project requirements, or define new materials. For more information about materials and how to define them, see Creating and Editing Material Definitions on page 599 and Specifying the Material of a Slab/Roof Slab on page 1626.

Creating Tools from Slab/Roof Slab Styles

You can create a slab or roof slab tool from a slab or roof slab style by dragging the style from the Style Manager onto a tool palette. The default settings provided by the style are then applied to any object created with that tool. For more information, see Using Tools to Create Slabs and Roof Slabs on page 1578.

Managing Slab/Roof Slab Styles

To create, copy, edit, or purge styles for slabs and roof slabs, you use the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information, see Style Manager Overview on page 566.

Creating a Slab or Roof Slab Style

Use this procedure to create a slab or roof slab style. You can start by using the default properties of the standard style, or you can copy an existing style to use as your template. You then edit the style properties to customize the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Slab Styles or Roof Slab Styles.

3 Create a style:

If you want to…	Then …
create a style with default properties	right-click Slab or Roof Slab Styles, and click New. Enter a name for the new style, and press *ENTER*.
create a style from an existing style	right-click the slab or roof slab style you want to copy, and click Copy. Right-click, and click Paste. Right-click the copy, and click Rename. Enter a name for the new style, and press *ENTER*.

4 To specify or edit the properties of the new style, use the tabs on the right pane of the Style Manager as described in the following table.

If you want to …	Then …
enter a description of the style	click the General tab, and enter a description.
specify the physical components of the slab or roof slab	see Specifying the Components of a Slab or Roof Slab Style on page 1632.
specify either a fixed or variable thickness or offset for the slab or roof slab or its components	see Specifying the Thickness and Offset of a Slab/Roof Slab Component on page 1635.
assign materials to the display components of the style	see Assigning Materials to a Slab/Roof Slab Style on page 1638 and Turning on Materials for a Slab/Roof Slab Style on page 1640.
add classifications to the style	see Adding Classifications to a Slab or Roof Slab Style on page 1642.
specify hatching, cut plane properties, and other display properties of the style	see Specifying the Display Properties of a Slab or Roof Slab Style on page 1639.
add notes and files to the style	see Attaching Notes and Files to a Slab or Roof Slab Style on page 1643.

5 If you want to create a tool that uses the new style, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Slab or Roof Slab Tool on page 1587.

6 Click OK.

Specifying the Components of a Slab or Roof Slab Style

Slab or roof slab components are the physical structures of the slab or roof slab, such as concrete, metal deck, insulation, and so on.

Slab/Roof Slab Components and Their Properties

Each component in a slab or roof slab style corresponds to a structural component or material of a slab or roof slab. When you create a component, you specify values for the following properties of the component:

- **Name** (generally identifies the material used, such as concrete, metal deck, or insulation)
- **Thickness** (analogous to the Width property of a wall component; can be a fixed value or a variable)
- **Thickness Offset** (specifies the position of the component within the slab or roof slab, relative to the slab or roof slab baseline or to adjacent slab or roof slab components; can be a fixed value or a variable)

Using Components from Other Slab/Roof Slab Styles

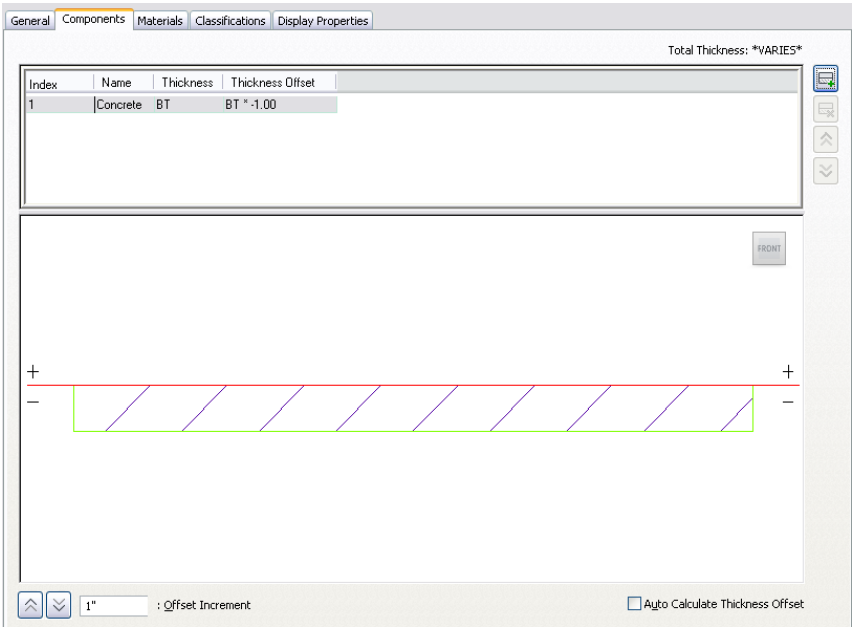
In addition to creating new components from scratch within a slab or roof slab style, you can also paste in components you have copied from a different style of the same type. That is, you can paste components from one slab style into another slab style, or components from one roof slab style into another roof slab style.

Components Tab

Use the Components tab of the Style Manager for the following tasks:

- Add or remove slab or roof slab components and edit their properties.
- View the components as you create and configure them.
- Change the order of components relative to other components in the style.

Specifying the properties of slab components



Creating or Editing a Component in a Slab/Roof Slab Style

Use this procedure to create a slab or roof slab component, or to edit existing components in a slab or roof slab style.

You can also add components to a style by pasting in components you have copied from other styles of the same type.

TIP Only the first 20 components of a slab or roof slab style are controlled by the display system. It is suggested that you limit the number of components to 20, since any additional components would be controlled by material assignment only.

1. Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

   NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2. Select the style that you want to change.
3. Click the Components tab.
4. To add a new component, click .

If no existing component was selected, the new component is assigned an Index number of 2, but otherwise has the same values as the first component in the list. If an existing component was selected, the new component is a duplicate of the selected component, except that its Index number is 1 higher. In either case, you can edit the properties of the new component as described in the following steps.

5 To edit the name of a selected component, click in the Name column, and enter a new name.

6 To specify the thickness of a component, double-click its Thickness value, and then do one of the following:

If you want to …	Then …
specify a fixed thickness that cannot be edited when you add or edit objects of this style	enter a new value for Thickness.
specify a variable thickness based on a Base Thickness (BT) value that can be determined when you add or edit objects of this style	click ▼ to display text boxes that let you specify a formula that defines how the Base Thickness variable is used to calculate component thickness. For more information, see Specifying the Thickness and Offset of a Slab/Roof Slab Component on page 1635.

7 To specify the offset distance between the component and the slab or roof slab baseline, double-click the Thickness Offset value for the component, and then do one of the following:

If you want to …	Then …
move the component up or down by a specified increment	click ⌃ or ⌄ in the lower-left corner of the Components tab to offset the component by the Offset Increment value that you specify. The selected component is highlighted in green in the viewer.
let the software calculate the offset	select Auto Calculate Thickness Offset.
specify a fixed offset	enter a value for Thickness Offset.
specify a variable offset that is calculated from values that you specify	click ▼ in the Thickness Offset column to display text boxes that let you specify a formula that defines how the Base Thickness variable is used to calculate component thickness. For more information, see Specifying the Thickness and Offset of a Slab/Roof Slab Component on page 1635.

8 Repeat steps 5 through 8 to add more components to the style.

9 To change the order of components in the style, select a component, and click ⌃ or ⌄ at the upper-right side of the tab to move the component to the desired position relative to the other components.

The Index numbers update to reflect the new order.

10 Click OK.

Adding a Component from Another Slab or Roof Slab Style

Use this procedure to copy a slab or roof slab component from one style and add it to another style of the same type that you are creating or editing.

TIP Only the first 20 components of a slab or roof slab style are controlled by the display system. It is suggested that you limit the number of components to 20, since any additional components would be controlled by material assignment only.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style that contains the component you want to copy:

If you want to …	Then …
view the components for a style in the current drawing	in the left pane of the Style Manager, select a style. The right pane lists the components and their properties and displays the style in the viewer.
view the components for a style in another drawing	click , navigate to the drawing you want, click Open, and then select a style in the left pane of the Style Manager.

3 On the Components tab for the selected style, right-click the desired component, and click Copy.

4 In the left pane of the Style Manager, select the style to which you want to add the component:

5 Move the cursor onto the Components tab, right-click, and click Paste.

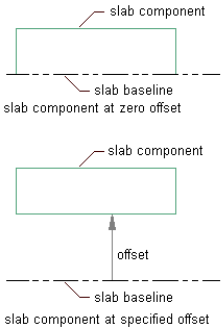
You can now edit or delete the new components as needed. For more information, see Creating or Editing a Component in a Slab/Roof Slab Style on page 1633 and Removing a Component from a Slab/Roof Slab Style on page 1637.

6 Click OK to save the style with the new component.

Specifying the Thickness and Offset of a Slab/Roof Slab Component

When you create or edit a slab or roof slab component in a style, you can enter values that establish a fixed thickness and a fixed offset from the slab or roof slab baseline. If all the components in a slab or roof slab style use these fixed values, then you cannot change the thickness for an object of that style when you add one to a drawing. (The Thickness value on the Properties palette is read-only, and no Thickness grip is available on the object itself.)

Specifying slab component offsets



Alternatively, when you specify the Thickness or Thickness Offset values for a slab or roof slab component, you can use a variable called Base Thickness (BT), which has a default value of 4" but can be changed at the time you add the slab or roof slab to a drawing or subsequently, either through the Properties palette or by grip editing. You can use the Base Thickness variable by itself, or as part of a formula that will be used to calculate the component thickness or offset.

For example, if you want to create a style in which a 2" paving component is positioned directly above a paving base of variable thickness whose bottom edge is the same as the slab baseline, you would specify the Thickness and Thickness Offset values as follows:

Index	Name	Thickness	Thickness Offset
1	Paving	2.00000	BT
2	Paving B...	BT	0.00000

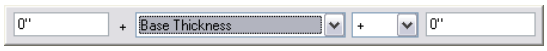
For more complicated positioning relationships involving the Base Thickness variable, you can construct formulas for calculating the Thickness and Thickness Offset values. For example, if you know you want .5" rebar to be positioned in the middle of a concrete layer with a fixed thickness of 6", you might configure the components in the slab style as follows:

Index	Name	Thickness	Thickness Offset
1	Concrete	6"	0"
2	Rebar	1/2"	2 3/4"

However, if you want the rebar to be positioned in the middle of the concrete component, regardless of its thickness, you can configure the components as follows, where the concrete thickness is specified as a variable (BT), and the offset of the rebar component is specified as one half of the concrete thickness, whatever that may be, minus half the thickness of the rebar (1/4").

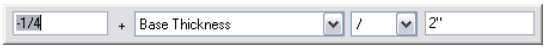
Index	Name	Thickness	Thickness Offset
1	Concrete	BT	0"
2	Rebar	1/2"	-1/4"+ BT / 2.00000

To specify a formula using the Base Thickness variable, click the Thickness or Thickness Offset value for the component, and then click ▼ to display the text boxes for the formula as shown.



The formula can be as simple as the one shown, in which only the Base Thickness is used, or it can specify a value to be added to the Base Thickness, or a further mathematical operation involving the Base Thickness. (Note that the operation drop-down menu and the operand box at the far right are only available if Base

Thickness is selected.) In the case of the 1/2" rebar positioned in the middle of a variable thickness concrete slab, the formula for the rebar Thickness Offset would be constructed as follows:



After you have entered the desired formula, press *Enter* to dismiss the text boxes and transfer the formula to the Thickness or Thickness Offset value for the selected component.

Removing a Component from a Slab/Roof Slab Style

Use this procedure to delete a component from a slab or roof slab style. When you remove a component from a style, the component is also removed from all existing objects that use that style.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style that you want to change.

3 Click the Components tab.

4 Select the slab or roof slab component you want to remove, and click .

5 Click OK.

Specifying the Materials of a Slab or Roof Slab Style

A slab or roof slab object consists of a number of components whose display properties can be determined by the materials assigned to them.

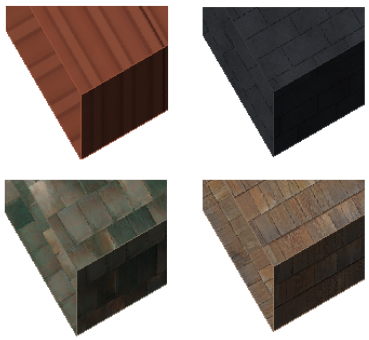
You assign one material to each display component of the object. For example, you might assign a floor tile material to a slab body and a concrete material to a slab edge.

If you want to use the display properties of a slab or roof slab object or style, instead of using material display properties, you can turn off the material assignments in the display properties of the object or its style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in Plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their description, see Material Components and Display Properties on page 585.

Roof slabs with assigned materials



Slab/Roof Slab Materials and Display Components

The following table identifies the material component that corresponds to each slab or roof slab component.

Display Representations	Slab/Roof Slab Display Component	Material Display Component
Plan, Plan High Detail, Plan Low Detail, Reflected Plan, Screened	Below Cut Plane Body Shrinkwrap	
	Above Cut Plane Body Shrinkwrap	None
	Below Cut Plane Outline	None
	Above Cut Plane Outline	None
	Cut Plane Shrinkwrap	None
	Cut Plane Shrinkwrap Hatch	None
	Boundary	Plan Linework
	Hatch	Plan Hatch
	Baseline	None
	Fascia	Plan Linework
	Soffit	Plan Linework
	Pivot Point	None
Model	Baseline	None
	Slab	3D Body
	Fascia	3D Body
	Soffit	3D Body
	Pivot Point	None

Assigning Materials to a Slab/Roof Slab Style

Use this procedure to assign materials to the individual components of a slab or roof slab style. The components will then use the display properties of the materials instead of the style display properties.

You can assign a material to any physical component of the slab or roof slab. Custom components and components that are only symbolic do not use materials for their display properties. For example, the slab or roof slab body is a physical component, while the pivot point is a symbolic component.

NOTE Although fascias and soffits are physical components of slabs or roof slabs, they are defined in the slab or roof slab edge style, and not in the slab or roof slab style. For information on assigning materials to edge styles, see Assigning Materials to a Slab/Roof Slab Edge Style on page 1653.

NOTE If a material assignment does not determine the display properties of a slab or roof slab component, you can change the display properties of the style as described in Specifying the Display Properties of a Slab or Roof Slab Style on page 1639.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the Display Properties tab.

4 Select the display representation in which to display the changes, and select Style Override.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab.

7 Select By Material for any component to which you want to assign a material, and click OK.

If the setting for By Material is not available, the display of this component cannot be determined by a material.

8 Click the Materials tab.

9 Click the component you want to change, click its current material definition, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Any changes you make to the material definition in this dialog will apply to all objects that are assigned the material.

10 Click OK.

Specifying the Display Properties of a Slab or Roof Slab Style

In most cases, you want the appearance of slabs or roof slabs that use the same style to be consistent throughout a drawing. To achieve this, you specify the following display properties in each style:

- The layer, color, and linetype of slab or roof slab components
- The hatching used for the surface of the slab or roof slab in plan views
- The cut plane height

Components with display properties include dimensions for slab or roof slab thickness, edge conditions for the fascia and soffit, line work, cut planes, cut lines, 3D shading factors, baseline, and pivot point. The display properties of the fascia and soffit are also controlled by the slab or roof slab style, although the geometry of these components is controlled through edge styles.

You can also use materials to control the display properties of the physical components of a slab or roof slab. Symbolic components, such as the pivot point, are not controlled by materials. For more information about using materials in slabs and roof slabs, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

Specifying the Layer, Color, and Linetype of a Slab/Roof Slab Style

Use this procedure to change the following display properties for display components of a slab or roof slab style:

- Visibility (component is on or off)
- By material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype Scale

NOTE If a material assignment determines the properties of components in the slab or roof slab style, you can change the properties of the display component by clearing By Material, or by overriding the material assignment with a different material. For more information, see Assigning Materials to a Slab/Roof Slab Style on page 1638.

1. Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

   NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2. Select the style you want to edit.
3. Click the Display Properties tab.
4. Select the display representation in which to display the changes, and select Style Override.
5. If necessary, click .
6. Click the Layer/Color/Linetype tab.
7. Select the component to change, and select a different setting for the property.
8. Click OK.

Turning on Materials for a Slab/Roof Slab Style

Use this procedure to turn on material assignments for individual display representations in a slab or roof slab style.

For more information about using materials to control the display of slab or roof slab components, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

1. Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

   NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2. Select the style you want to edit.
3. Click the Display Properties tab.
4. Select the display representation in which to display the changes, and select Style Override.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab.

7 Select By Material for each component to be controlled by the material. The By Material check box is unavailable for components that cannot be assigned a material.

When you select By Material for a display component, all other settings in the dialog box are unavailable. Since the display properties are now taken from the material definition, you can no longer set them directly in the display properties of the slab or roof slab style.

8 Click OK.

Specifying the Hatching of a Slab/Roof Slab Style

Use this procedure to specify the hatching of a slab or roof slab style. Hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the Display Properties tab.

4 Select the display representation in which to display the changes, and select Style Override.

5 If necessary, click .

6 Click the Hatching tab.

7 Click the setting for Pattern.

8 Select the hatching pattern:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and then clear Double Hatch.
select double hatching	select User-defined for Type, and then select Double Hatch.
select solid fill	select Solid Fill for Type.

9 Click OK.

10 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

11 Click Angle, and enter the angle for the selected pattern.

12 Click Orientation, and specify how the hatching is to be oriented:

If you want to…	Then…
orient the hatching to the slab or roof slab, regardless of its rotation	click to select object.
orient the hatching to the World Coordinate System	click to select global.

13 Click OK twice.

Specifying the Cut Plane Height of a Slab/Roof Slab Style

Use this procedure to specify the cut plane height of a slab or roof slab style.

If the value you specify for the cut plane height is greater than zero, you must specify the layer, color, and linetype for the elements above and below the cut plane height. This is especially important when interference conditions or body modifiers are present.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the Display Properties tab.

4 Select the display representation in which to display the changes, and select Style Override.

5 If necessary, click .

6 Click the Other tab.

7 Select Override Display Configuration Cut Plane, and enter a value for Cut Plan Height.

8 Click OK twice.

Adding Classifications to a Slab or Roof Slab Style

Use this procedure to specify classifications for any classification definition applied to a slab or roof slab style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to slab or roof slab styles.

4 For each classification definition, select the classification you want to apply to the current style.

5 Click OK.

Defining a Slab/Roof Slab Style as Bounding for Associative Spaces

Use this procedure to define a slab or roof slab style that can bound associative spaces.

When a style is set as bounding, by default all objects of that style will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

By default, this setting is checked.

You can override the bounding setting for the style in an individual slab or roof slab if necessary.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the General tab.

4 Select the checkbox for Objects of this style may act as a boundary for associative spaces.

5 Click OK.

Attaching Notes and Files to a Slab or Roof Slab Style

Use this procedure to enter notes and attach reference files to a slab or roof slab style. You can also edit notes and edit or detach reference files from the style.

1 Open a tool palette that has a slab or roof slab tool, right-click the tool, and click Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the General tab.

4 To add a description to the style, enter it under Description.

5 Click Notes.

6 To add or edit a note, click the Notes tab, and enter the note or edits.

7 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you are finished editing.
detach a reference file	select the file name, click Delete, and click OK.

8 Click OK.

Slab and Roof Slab Edge Styles

Slab and roof slab edge styles control the appearance of the edges of slab and roof slab objects. Using edge styles, you can specify dimensions, such as the overhang length, and the orientation and angle of the edges. You can also specify a fascia and soffit for the edge style.

Components of Slab/Roof Slab Edge Styles

The slab or roof slab edge style defines the appearance of slab or roof slab edges. Each style consists of two optional components: a fascia and a soffit.

A fascia is a shape applied to the outside face of a slab or roof slab edge. A soffit is a shape applied to the underside of an edge overhang.

You can create fascia and soffit components by defining profiles that provide the two-dimensional (2D) geometry of the component whose shape is then extruded along the slab or roof slab edge.

The fascia component follows the orientation of the slab edge (plumb or square cut). The soffit component, however, is always oriented to the horizontal. Either component can have a positive or negative angle, relative to its base orientation.

The +/- directions for edge component angles remain the same regardless of their orientation in the *XY* plane. They always follow the slab or roof slab slope, so that, for example, a +30° soffit and a +30° slab or roof slab would be parallel to each other. Similarly, a +10° (plumb cut) fascia and a -10° soffit would meet at a right angle. Mirroring a slab or roof slab maintains the same angle signs for all components.

Controlling the Placement of the Fascia and Soffit on Slab/Roof Slab Edges

The fascia profile is drawn at actual size, except when you select Auto-Adjust. If the slab or roof slab edge is sloped relative to the ground plane, then the length is measured parallel to that slope, and not plumb with the ground. When you select Auto-Adjust to Edge Height, the fascia profile is scaled about its insertion point so that its lowest *Y* axis point aligns with the bottom of the slab or roof slab edge.

NOTE Slope offsets are measured relative to the slab or roof slab edge angle from the ground plane, and not relative to the world UCS.

The soffit profile is drawn at actual size, except when you select Auto-Adjust. The soffit angle is measured about its insertion point, using the local *X* axis of the profile.

When you select Auto-Adjust to Overhang Depth, the soffit profile is scaled about the insertion point, so that the furthest *X* axis point aligns with a plumb line from the slab or roof slab baseline or perimeter line. Auto-Adjust scaling is adjusted by the horizontal offset from the baseline dimension.

Display Properties of the Fascia and Soffit

In most cases, you want the appearance of fascias or soffits that use the same edge style to be consistent throughout a drawing. To achieve this, you specify the following display properties in each slab or roof slab edge style:

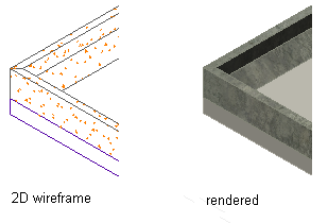
- The layer, color, and linetype of slab or roof slab edge components
- The hatching used for the surface of slab or roof slab edges in plan views
- The cut plane height

Slab edge components with display properties include dimensions for slab thickness, fascia and soffit, vertical and horizontal offsets, line work, cut planes, cut lines, 3D shading factors, baseline, slab, and pivot point. The display properties of the fascia and soffit are also controlled by slab or roof slab style, although the geometry of these components is controlled through slab or roof slab edge styles.

Materials in Slab/Roof Slab Edges

You can assign materials to a slab or roof slab edge. These materials are then displayed in wireframe or rendered views. Materials have specific settings for individual components of a slab or roof slab edge, such as the fascia and soffit.

Viewing Slab Edge detail in 2D wireframe and rendered views



AutoCAD Architecture provides predefined materials for common design purposes. These materials contain settings for slabs and slab edges that you can use "as is" or modify for special designs. You can also create materials from scratch. For more information, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

Managing Slab/Roof Slab Edge Styles

To create, import, export, or edit styles, you use the Style Manager. The Style Manager provides a central location where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Slab or Roof Slab Edge Style

Use this procedure to create a new slab or roof slab edge style. You can start by using the default properties of the standard style, or you can copy an existing style to use as your template. You then edit the style properties to customize the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Slab Edge Styles or Roof Slab Edge Styles.

NOTE Alternatively, select a slab or roof slab object drawing, and then from the contextual ribbon's General panel, click the Edit Style drop-down menu, and choose Edge Styles.

3 Create a slab or roof slab edge style:

If you want to…	Then…
create a style with default properties	right-click Slab Edge Styles or Roof Slab Edge Styles, and click New. Enter a name for the new style, and press *ENTER*.
create a style from an existing style	right-click the style you want to copy, and click Copy. Right-click, and click Paste. Right-click the copy, and click Rename. Enter a name for the new style, and press *ENTER*.

4 To specify or edit the properties of the new style, use the tabs on the right pane of the Style Manager as described in the following table:

If you want to…	Then…
enter a description of the style	click the General tab, and enter a description.

If you want to…	Then…
specify the overhang, edge cut, and angle for the style	see Specifying the Overhang, Edge Cut, and Angle of a Slab/Roof Slab Edge Style on page 1646.
specify soffits and fascias for the style	see Specifying a Fascia and a Soffit for a Slab/Roof Slab Edge Style on page 1649.
assign materials to the display components of the style	see Assigning Materials to a Slab/Roof Slab Edge Style on page 1653.
turn on materials for the style	see Turning on Materials for a Slab/Roof Slab Edge Style on page 1654.
add notes and files to the style	see Attaching Notes and Files to a Slab/Roof Slab Edge Style on page 1654.

5 When you finish specifying the properties of the style, click OK.

Specifying the Overhang, Edge Cut, and Angle of a Slab/Roof Slab Edge Style

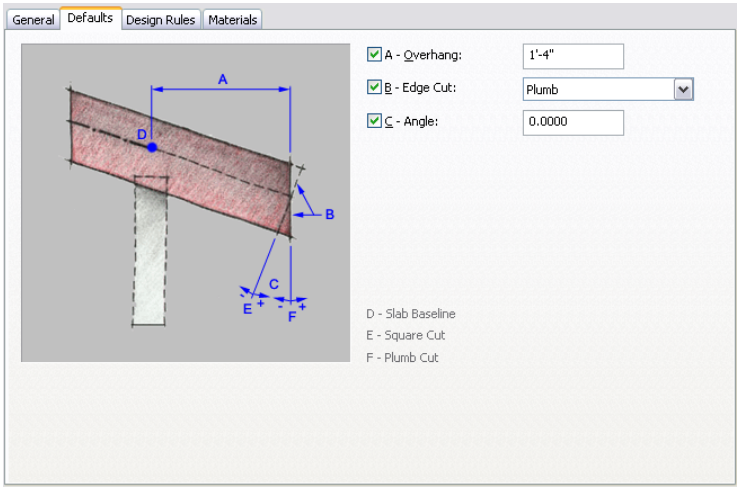
Use this procedure to specify the default overhang depth, edge cut, and edge angle for slab or roof slab edges using an edge style.

1 Select a slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ General panel ➤ Edit Style drop-down ➤ Slab Edge Style .
a roof slab	clickRoof Slab tab ➤ General panel ➤ Edit Style drop-down ➤ Roof Slab Edge Style.

2 Select an edge of the slab or roof slab.

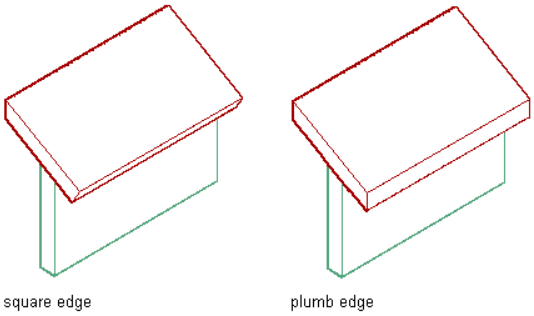
3 Click the Defaults tab.



4 Specify the overhang, edge cut, and angle of the edge:

If you want to…	Then…
specify the overhang of the slab or roof slab	enter a value for Overhang.
specify the orientation of the edge cut	select a setting for Edge Cut: ■ Select Square to cut the edge 90 degrees with the plane of the slab or roof slab. ■ Select Plumb to cut the edge perpendicular to the ground.
specify the angle of the edge	enter a value for Angle. A positive value moves the bottom of the edge out and a negative value moves the bottom of the edge in.

Specifying square and plumb edges



5 Click OK.

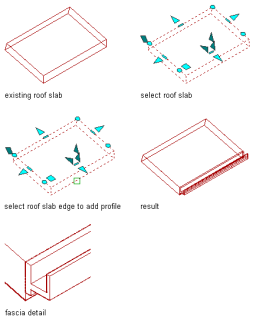
Creating Profiles for the Fascia and Soffit

Use this procedure to create a profile for the fascia and soffit.

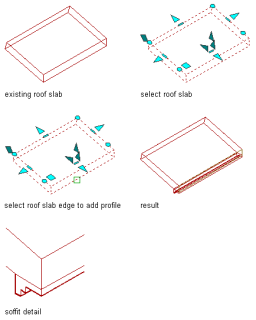
The profile is made up of closed polylines. To represent solid fascia or soffits, such as a wood fascia, you can create a profile from a single polyline. To represent fascia or soffits that are extruded, such as aluminum soffits, you can create a profile from concentric polylines that can include one or more voids. The outer polyline, or ring, becomes the exposed shape, and the inner polyline, if used, becomes the void. You can create multiple voids by adding more inner closed polylines. The polylines are proportional in size and shape to each other and to the slab.

You can draw these polylines anywhere in the drawing and use any convenient scale relative to your final fascia or soffit size. One method for sizing the polylines relative to the slab or roof slab edge is to draw them by snapping to an existing fascia, and then move your completed polylines to an open area of the drawing to create the profile.

Assigning a profile as a fascia



Assigning a profile as a soffit



1 Draw one or more closed polylines representing the fascia or soffit.

2 Select the polylines, right-click, and click Convert to ➤ Profile Definition.

3 Select the outermost polyline.

4 Enter **a** (Add ring) as needed.

5 Select an inner polyline as needed.

6 Repeat steps 3 and 4 as needed to add more voids to the profile.

7 Specify the insertion point for the fascia or soffit. (The insertion point is typically the lower-left corner.)

8 Enter **n** (New), enter a name for the profile, and click OK.

Controlling Profile Edges and Extrusion

Use this procedure to specify the following parameters for a profile:

- the position of each edge in a profile (left, right, back, discard, none)
- the axis along which an object is extruded from the shape of a profile

These settings determine how surface hatching is applied to objects created from the profile and how the objects are extruded from the two-dimensional (2D) profile.

NOTE Objects already created from the profile change when you change profile edges or the axis of extrusion.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Profile Definitions .

2 Select the profile you want to change.

3 Click the Profile Edges tab.

4 Specify edge positions:

If you want to…	Then…
let the software determine the position of edges	click Calculate Default Edge Positions. You can then override the position of individual edges, if necessary.
select a position for an edge	select edge number under Edge, and select a new position under Position.
exclude an edge from surface hatching	select the edge number under Edge, and select None under Position.
discard an edge	select the edge number under Edge, and select Discard under Position.

5 Specify the axis of extrusion based on the type of object created from the profile:

If you want to…	Then…
create a roof slab or slab fascia	select X for Extrusion Direction.
create a slab soffit	select Y for Extrusion Direction.
extrude mass elements	select Z for Extrusion Direction.

6 Click OK.

Specifying a Fascia and a Soffit for a Slab/Roof Slab Edge Style

Use this procedure to specify a fascia and a soffit for a slab or roof slab edge style. The drawing must contain profiles for the fascia and soffit. For more information, see Creating Profiles for the Fascia and Soffit on page 1647.

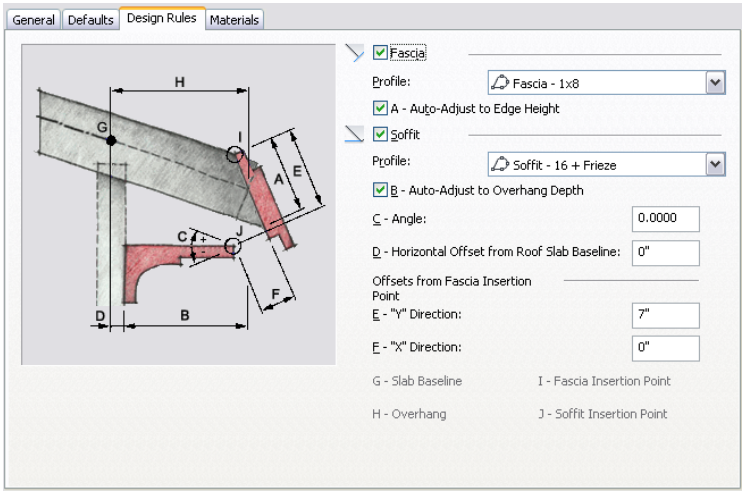
1 Select a slab or roof slab, and

if the object selected is…	then…
a slab	click Slab tab ➤ General panel ➤ Edit Style drop-down ➤ Slab Edge Styles .
a roof slab	click Roof Slab tab ➤ General panel ➤ Edit Style drop-down ➤ Roof Slab Edge Styles.

NOTE Alternatively,click Manage tab ➤ Style & Display panel ➤ Style Manager , and then expand Architectural Objects, and expand Slab Edge Styles or Roof Slab Edge Styles.

2 Select the slab or roof slab edge style that you want to edit.

3 Click the Design Rules tab.



4 Select Fascia, and select a profile that defines the geometry of the fascia.

If you select *NONE*, display component settings apply to the slab or roof slab edge line or plane where the fascia is located.

5 Specify how the fascia is to be scaled on the slab or roof slab edge:

If you want to…	Then…
scale the fascia to fit the height of the edge	select Auto-Adjust to Edge Height to scale the fascia to edge height.
use the fascia at its drawn size	clear Auto-Adjust to Edge Height.

6 Select Soffit, and select a profile that defines the geometry of the soffit.

If you select *NONE*, display component settings apply to the slab or roof slab edge line or plane where the soffit is located.

7 Specify how the soffit is to be scaled on the slab or roof slab overhang:

If you want to…	Then…
scale the soffit to fit the depth of the overhang	select Auto-Adjust to Overhang Depth.
use the soffit at its drawn size	clear Auto-Adjust to Overhang Depth.

8 Specify the placement of the soffit:

If you want to…	Then…
specify the soffit angle of the slab or roof slab edge	enter a value for the Angle, with zero being horizontal. A positive value slopes the soffit up from the insertion point, and a negative value slopes the soffit down.
specify the horizontal offset from the slab or roof slab baseline or perimeter line for the slab edge	enter a value for Horizontal Offset from [Slab/Roof Slab] Baseline. (This option is available only if you select Auto-Adjust to Overhang Depth.)
specify the soffit offsets from the insertion point of the fascia	enter a value for “X” Direction and “Y” Direction.

9 Click OK.

Editing the Geometry of Fascia and Soffits

Use this procedure to edit the geometry of the profile used to define the fascia and soffit of a slab or roof slab edge style. You can also add a profile to the fascia or soffit of an edge style that does not currently use a profile to define its shape.

NOTE If you want to replace the geometry of the profile with newly drawn polylines, draw them before you start this procedure.

1 Select the slab or roof slab that has the style you want to change.

2 Add or edit a profile:

If you want to…	Then…
add an existing profile to the style	■ For a slab, click Slab tab ➤ Edge panel ➤ Add Profiles . ■ For a roof slab, click Roof Slab tab ➤ Edge panel ➤ Add Profiles . Select an edge. Select the name of the profile for the fascia or soffit, and click OK.
create a profile and add it to the style	■ For a slab, click Slab tab ➤ Edge panel ➤ Add Profiles . ■ For a roof slab, click Roof Slab tab ➤ Edge panel ➤ Add Profiles . Select an edge. Select Start from scratch for Fascia or Soffit Profile Definition, enter a name for the new profile, and click OK. A rectangle profile is created for you to edit.
edit the existing profile for the style	■ For a slab, click Slab tab ➤ Edge panel ➤ Edit Profile In Place . ■ For a roof slab, click Roof Slab tab ➤ Edge panel ➤ Edit Profile In Place .

NOTE If you are prompted about the selected edge not having an edge style and overhang, click Yes.

3 If you receive a message that the profile is not drawn to size, click Yes.

The area of the slab or roof slab edge defined by the profile is selected and hatched in the drawing.

NOTE After you perform an editing task from the Edit in Place contextual tab, you may need to select a profile again to perform another editing task. If you do not see the editing commands that you expect on the contextual tab, re-select a profile to redisplay the Edit in Place contextual tab.

4 Edit the profile as necessary:

If you want to…	Then…
change the shape of the perimeter of the profile or its rings	select the profile, and use edge and vertex grips to adjust the shape. The Edge grip has two edit modes: Stretch and Move. The default mode is Stretch, and the direction of the stretch depends on the orientation of edges connected to the selected edge. For example, if the edges at both ends of the selected edge are parallel to each other, the grip edit mode is Stretch (Parallel) and the stretch direction is limited to the direction of the parallel edges. If the connected edges are not parallel, the grip edit mode is Stretch (Offset) and the stretch direction is perpendicular to the direction of the selected edge. The Move edit mode allows an unconstrained move of the selected edge.
add vertices to the profile	■ if the object is a slab, click Edit In Place: Slab Edge Profile tab ➤ Profile panel ➤ Add Vertex . ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Profile panel ➤ Add Vertex . Select a point for each new vertex, and press *ENTER*.
remove vertices from the profile	■ if the object is a slab, click Edit In Place: Slab Edge Profile ➤ Profile panel ➤ Remove Vertex . ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Profile panel ➤ Remove Vertex . Select each vertex to remove, and press *ENTER*.
replace an existing ring of the profile with new geometry	■ if the object is a slab, click Edit In Place: Slab Edge Profile tab ➤ Profile panel ➤ Replace Ring . ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.

5 Save or discard the changes:

If you want to…	Then…
restore the profile to its original shape	■ if the object is a slab, click Edit In Place: Slab Edge Profile tab ➤ Edits panel ➤ Cancel. ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Edits panel ➤ Cancel.

If you want to…	Then…
save the changes to the current profile	■ if the object is a slab, click Edit In Place: Slab Edge Profile tab ➤ Edits panel ➤ Finish. ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Edits panel ➤ Finish. The slab or roof slab style uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.
save the changes to a new profile definition	■ if the object is a slab, click Edit In Place: Slab Edge Profile tab ➤ Edits panel ➤ Save As . ■ if the object is a roof slab, click Edit In Place: Roof Slab Edge Profile tab ➤ Edits panel ➤ Save As . Enter a name for the new profile definition, and click OK. The slab or roof slab uses the new profile to define its geometry. Any other objects of this style are updated with the new geometry. Other styles or objects that use the original profile are not affected.

Assigning Materials to a Slab/Roof Slab Edge Style

Use this procedure to assign materials to individual components of a slab or roof slab edge style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager , then expand Architectural Objects, and expand Slab Edge Styles or Roof Slab Edge Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Edge Styles or Roof Slab Edge Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style to which to assign materials.

3 Click the Materials tab.

4 Select the edge component to which to assign a material, and click its current material definition.

5 Select a material definition from the list.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Any changes you make to the material definition in this dialog will apply to all objects that are assigned the material.

6 Click OK.

Turning on Materials for a Slab/Roof Slab Edge Style

Use this procedure to turn on material assignments for individual display representations in a slab or roof slab edge style. Display components for edges are not turned on in the edge style, but rather in the slab or roof slab style that uses them.

For information on creating and assigning materials, see Specifying the Materials of a Slab or Roof Slab Style on page 1637.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager . Expand Architectural Objects, and expand Slab Styles or Roof Slab Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Styles or Roof Slab Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style that contains the edges you want to turn on.

3 Click the Display Properties tab.

4 Select the display representation in which to display the changes, and select Style Override.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab.

7 Select By Material for each component to be controlled by the material.

If the setting for By Material is not available, the display of this component cannot be determined by a material.

8 Click OK twice.

Attaching Notes and Files to a Slab/Roof Slab Edge Style

Use this procedure to enter notes and attach reference files to a slab or roof slab edge style. You can also edit notes and edit or detach reference files from the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager . Expand Architectural Objects, and expand Slab Edge Styles or Roof Slab Edge Styles.

NOTE Alternatively, you can select a slab or roof slab in the drawing, and click Slab Edge Styles or Roof Slab Edge Styles from the Edit Style drop-down on the General panel of ribbon's contextual menu.

2 Select the style you want to edit.

3 Click the General tab.

4 To add a description to the edge style, enter it under Description.

5 Click Notes.

6 To add or edit a note, click the Notes tab, and enter the note.

7 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.

If you want to…	Then…
edit a reference file	double-click the reference file name to start its application. Click OK when you are finished editing.
detach a reference file	select the file name, click Delete, and click OK.

8 Click OK.

Structural Members 30

A structural member is an object that can represent a beam, brace, or column in a drawing. All the beams, braces, and columns that you create are sub-types of a single structural member object.

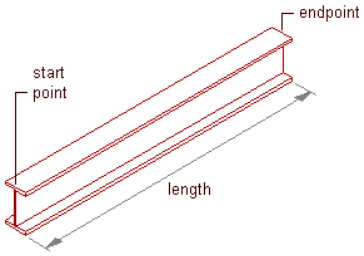
Structural Members

A structural member is an object that can represent a beam, brace, or column in a drawing. All the beams, braces, and columns that you create are sub-types of a single structural member object.

Creating Structural Members

You create a structural member in AutoCAD Architecture by extruding a structural shape along a path. The style that you use to create the structural member provides the shape. The shape, similar to a profile, is a 2-dimensional cross-section of a structural member. You define the extrusion path (axis) of the member when you specify start and endpoints for the member or when you convert linework to a member.

Creating a structural member



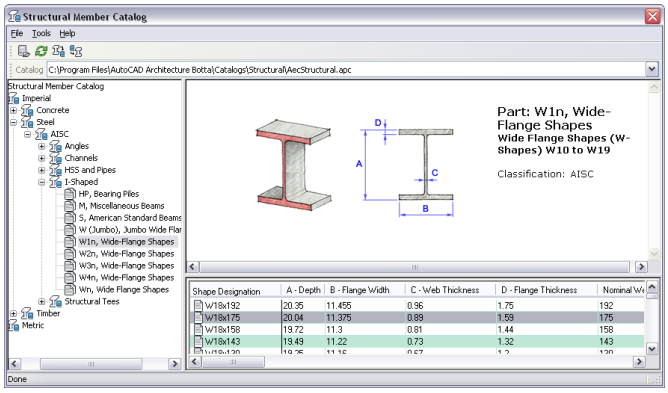
Connecting Structural Members

Connections between structural members are supported. Structural members are considered connected when an endpoint of one member lies on an endpoint or along the axis of another. With some exceptions, you have the option of maintaining or breaking these connections when you move a member using its Location grip. Connections between structural members are also recognized across external reference (xref) drawings, and you can use objects in an xref to position and establish trim planes for members you are adding. For example, while working in one drawing, you can open an xref containing a column grid and use it to lay out columns or beams. If you edit the xref in-place, connections between structural members are maintained just as they would be in the host drawing. For more information on the behavior of connections during edits, see Using Grips To Edit Structural Members on page 1695.

Creating Styles with the Structural Member Catalog and Structural Member Style Wizard

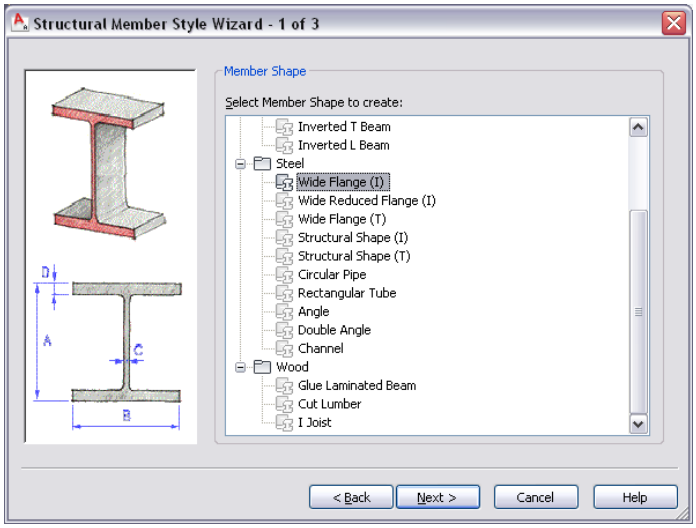
To create styles for most standard beams, braces, and columns, you can use the Structural Member Catalog included in AutoCAD Architecture. The catalog contains specifications for industry-standard concrete, steel, and timber structural shapes organized in a Windows® Explorer-like tree view. You can browse the catalog, select a shape, and create a style.

Structural Member Catalog



If you know the type, shape, and shape dimensions of the member that you want to create, you can quickly enter the information in the Structural Member Style wizard to create a style. You can create a structural member shape within a style that is based on any of the member shapes in the catalog.

Structural Member Style Wizard

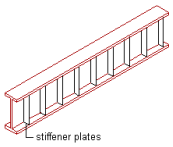


After you create structural member styles, you can drag them from the Style Manager onto tool palettes to create structural member tools.

Adding Graphics to Structural Members

You can add blocks to the display of structural members as components in display representations. For example, you can create blocks that represent stiffener plates and add them to beams or create blocks that represent clip angles and add them to members.

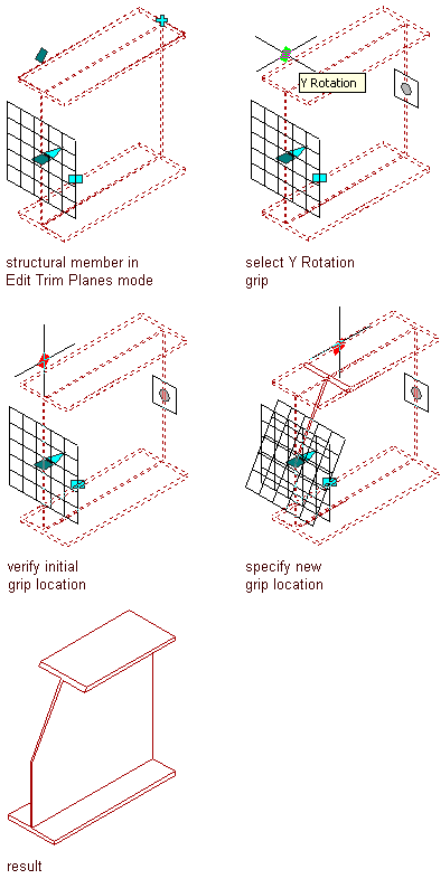
Beam with added stiffener plates



Trimming Structural Members

Structural members are trimmed using objects called trim planes, which let you clean up joints between multiple structural members or between structural members and other objects. Using the Properties palette for a structural member tool, you can create specific trim planes that are applied when you add a new member with the tool. Or you can specify that trim planes be created automatically when you connect the new member to an existing structural member in a drawing. Once a member has been added to a drawing, you can edit its trim planes or add new ones. Additional trim planes can be defined on the member itself or in relation to an edge of another object. For more information, see Trimming Structural Members on page 1706.

Trimming a structural member with a trim plane



Creating Column Grids

When you create a column, you can attach it to a grid. You can also create a column grid with the structural column grid tool that is included in AutoCAD Architecture. The tool creates a grid with columns pre-anchored to nodes on the grid. For more information, see Creating a Column Grid on page 1806.

Materials in Structural Members

In AutoCAD Architecture, you can assign materials to a structural member. These materials are displayed in wireframe and working shade views, or when rendered. Materials have specific settings for the physical components of a structural member.

AutoCAD Architecture provides a large number of predefined materials for all common design purposes, which contain settings for structural members. You can use these predefined materials, or modify them to your special designs. You can also create your own materials from scratch.

For more information, see Specifying the Materials of a Structural Member Style on page 1726.

Creating Custom Structural Members

You can use the styles from the Structural Member Catalog and Structural Member Style wizard to create structural members for most of your design needs. However, your project requirements may require you to create structural members that cannot be created from a shape in the catalog or created with the wizard. For example, you may want to create:

- a column with a shape that tapers from start to end
- a composite column created from a steel shape encased in a concrete shape
- a rigid frame created from multiple tapering shapes extruded along the path of the frame
- a structural member with a custom shape that cannot be created in the catalog or with the wizard

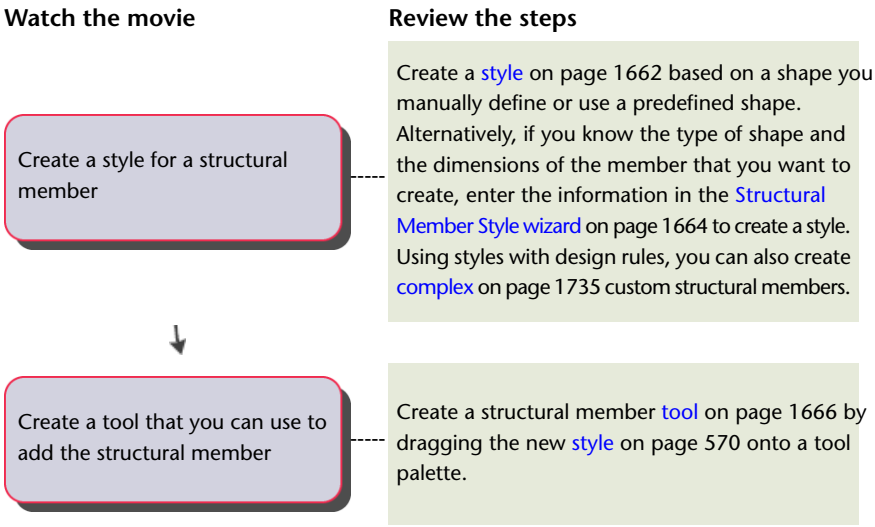
To create custom structural members, you use the design rules within a structural member style to extrude one or more shapes along the path of the member. You can use shapes created in the catalog or with the wizard, or you can create your own custom shapes.

Predefined Custom Structural Member Styles

You can access predefined styles for custom structural members from the Member Styles and Bar Joists Styles drawings located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>*.

Workflow to Create Styles for Structural Members

Structural members include braces, beams, and columns as the same object is used for all three, the orientation just differs to achieve them (diagonal, horizontal, vertical). In addition to predefined styles of structural members, you can also create new styles.



Watch the movie **Review the steps**

Add the structural member to your building

Create on page 1674 a structural member in the drawing with the tool you made.

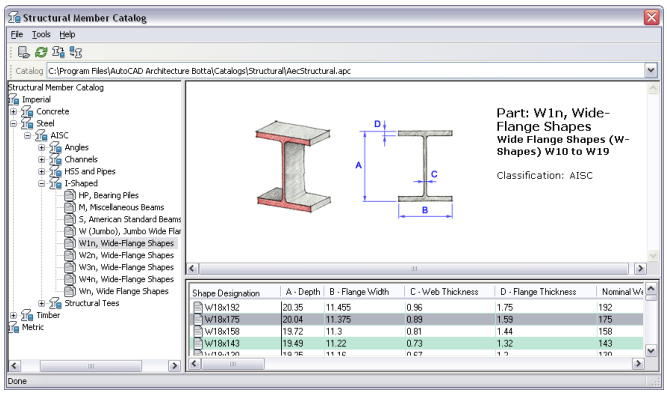
Creating Structural Member Styles in the Structural Member Catalog

The Structural Member Catalog contains specifications for different types and sizes of standard structural shapes. You can browse the catalog, select a shape, and create a structural member style that contains the selected shape. When you create a structural member with the style, the style provides the shape of the member.

Organization of the Structural Member Catalog

The left pane of the Structural Member Catalog contains standard structural shapes organized in a Windows® Explorer-like tree view. Several industry standard specifications are organized in the tree, first by imperial or metric units, and then by material.

Structural Member Catalog



Browsing the Catalog

You can open all the levels in the tree pane under a unit and material to view the different structural shape types available in the catalog. When you select a shape type in the tree view, a preview image of the shape with its dimensions displays in the upper right pane. All the available sizes of the shape type display in the lower right pane.

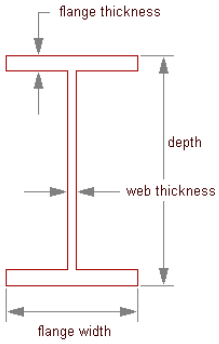
If you have a structural member in a drawing with a style created in the catalog, you can locate the catalog shape contained in that style from the member.

Creating Structural Member Styles from Catalog Shapes

When you create a structural member style in the catalog, the dimensions of the catalog shape that you select define and store the shape in the style.

For example, the dimensions of the steel beam selected in the previous illustration include its depth (d), flange width (bf), flange thickness (tf), and web thickness (tw). When you create a style, these dimensions create the following shape that is stored in the style.

Wide-flange structural shape cross-sectional parameters



When you create a beam in your drawing with this style, the style provides the shape of the beam. You determine the length, start and end offsets, justification, and roll of the beam when you create the beam.

Contents of the Structural Member Catalog

When you display the Structural Member Catalog, a default catalog file, -AecStructural.apc, provides the catalog content. This file is located in: *C:\Program Files\AutoCAD Architecture 2010\Catalogs\Structural.*

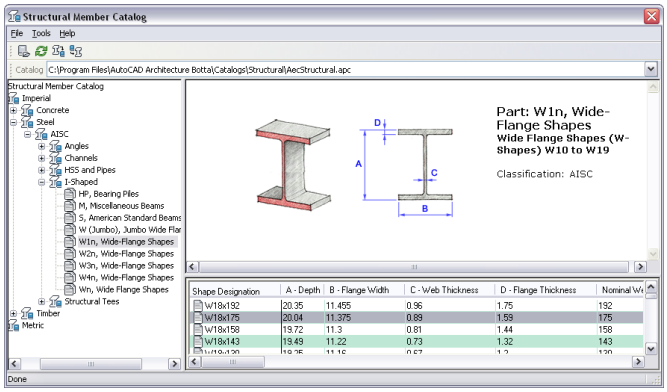
In the future, additional catalog files that you can open in the catalog may become available on the Autodesk web site, or you may create your own catalog files.

Opening the Structural Member Catalog

Use this procedure to open the Structural Member Catalog.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Structural Member Catalog .

Opening the Structural Member Catalog



2 Move and resize the Structural Member Catalog, or resize the left and right panes within the catalog as needed to view catalog information.

3 Click to close the Structural Member Catalog.

Creating a Style from a Shape in the Structural Member Catalog

Use this procedure to create a structural member style from a shape that you select in the Structural Member Catalog.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Structural Member Catalog .

A tree view in the left pane of the catalog lists the available shapes.

2 Expand Imperial or Metric in the tree view.

3 Expand the type of material (Concrete, Steel, or Timber) for the structural shape that you want to create with the style.

4 Expand the shape that you want to create.

Depending on the member, you may need to expand one or more levels in the tree.

5 Select the shape type of the member that you want to create.

In the top right pane, a preview of the shape displays.

In the bottom right pane, a list of the available sizes of the selected shape display. The following shapes may take a significant amount to time to display:

- Imperial ➤ Steel ➤ AISC ➤ HSS and Pipes ➤ HSS, Small Hollow Structural Sections
- Metric ➤ Steel ➤ CISC ➤ Angles ➤ L, Angle Shapes
- Metric ➤ Steel ➤ CISC ➤ I-Shaped ➤ W, Wide Flange Shapes
- Metric ➤ Steel ➤ CISC ➤ I-Shaped ➤ WWF, Welded Wide Flange Shapes
- Metric ➤ Steel ➤ CISC ➤ Structural Tees ➤ WT, Tee Shapes

6 Under Shape Designation in the bottom right pane, select the shape size that you want to use to create your style, right-click, and click Generate Member Style.

7 Enter a style name, if necessary, and click OK.

The name of the shape is used as the default style name. Special characters in the shape name, such as quotation marks, are substituted with underscores. If you change the default style name, you cannot use any of the following special characters in your style name:

- Less-than and greater-than symbols (< >)
- Forward slashes and backslashes (/ \)
- Quotation marks (")
- Colons (:)
- Semicolons (;)
- Question marks (?)
- Commas (,)
- Asterisks (*)
- Vertical bars (|)
- Equal signs (=)
- Back quotes (`)

8 Continue creating structural member styles, or click to close the Structural Member Catalog.

You can access the style that you created in the Style Manager, create a new structural member tool from the style, modify an existing tool to use that style, or apply the style to an existing member.

Locating a Shape in the Structural Member Catalog from a Structural Member in a Drawing

Use this procedure to locate a shape in the Structural Member catalog from a shape contained in the style of a structural member in a drawing. You may find this command useful if you created a style from a shape in the catalog and did not name it with the same name as the catalog shape.

1 Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Structural Member Catalog .
2 On the Tools menu in the Structural Member Catalog, click Locate.
3 Select the structural member in the drawing that you want to select in the catalog.

The shape that you located from the existing member is selected in the Structural Member Catalog.

Opening a Catalog File in the Structural Member Catalog

Use this procedure to open a new catalog file in the Structural Member Catalog.

1 Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Structural Member Catalog .
2 Specify the location of the new catalog file:

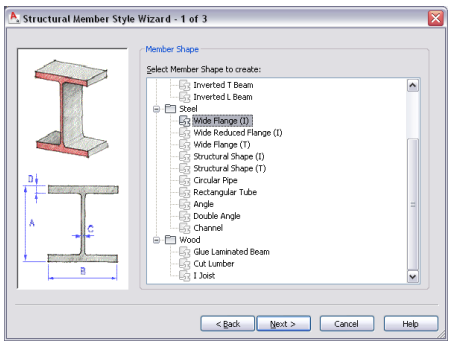
If you…	Then…
know the location and name of the catalog file	enter the full path and name of the catalog file in the Catalog bar under the Structural Member Catalog toolbar.
want to browse your hard disk or server for a catalog	on the File menu in the Structural Member Catalog, click Open. Select a new catalog file, and click Open.

Creating a Structural Member Style with the Structural Member Style Wizard

Use this procedure to create a structural member style with the Structural Member Style wizard. You can create a structural member shape within the style that is based on any of the 19 different shape types in the Structural Member Catalog. The current drawing units determine the units of the style that you create.

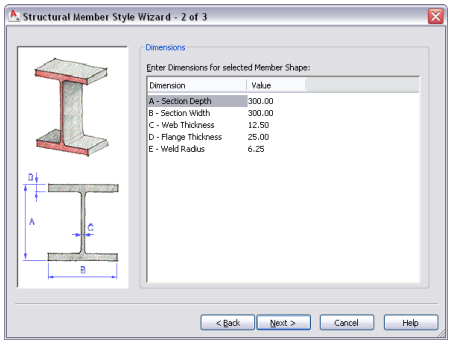
1 Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Structural Member Wizard .
2 Select the type of structural member shape that you want to create, and click Next.

Selecting a structural member shape type



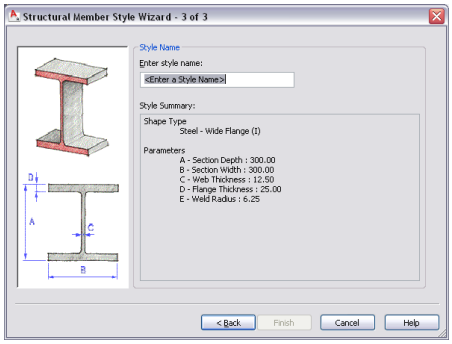
3 Enter dimensions for the shape, and click Next.

Entering the structural member dimensions



4 Enter a name for the structural member style, and click Finish.

Entering a structural member style name



You cannot use the following special characters in your style names:

- Less-than and greater-than symbols (< >)
- Forward slashes and backslashes (/ \)
- Quotation marks (")
- Colons (:)
- Semicolons (;)
- Question marks (?)
- Commas (,)
- Asterisks (*)
- Vertical bars (|)
- Equal signs (=)
- Back quotes (`)

You can access the style that you created in the Style Manager, create a new structural member tool from the style, modify an existing tool to use that style, or apply the style to an existing member.

Creating Structural Member Tools

You can create structural member tools and add them to tool palettes. Tool palettes in AutoCAD Architecture let you quickly place beams, braces, and columns by selecting a structural member tool with a specific style and other predefined properties.

If you created structural member styles in the Structural Member Catalog or with the Structural Member Style wizard, you can drag the styles from the Style Manager to tool palettes and then customize the properties of the new tools.

You can also use any of the following methods to create structural member tools:

- Drag a structural member that has the properties you want to a tool palette.
- Copy an existing tool in the current palette, paste it onto the current palette or a different palette, and then customize the properties of the new tool.
- Drag a tool from the Content Browser to a tool palette and then customize the properties of the new tool.

Creating a Beam Tool

Use this procedure to create a structural beam tool and add it to a tool palette.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a structural member style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
create a tool from a beam in the drawing	select the beam, and drag it to the tool palette.
copy a tool in the current palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

The description displays in the tooltip when you select the tool from the tool palette, and describes the tool if you store it in a tool catalog in the Content Browser.

6 Expand Basic, and expand General.

7 Enter a description of the beams that you can create using this beam tool.

8 If you do not want to use the layer assignments specified in the layer key style used in the drawing, specify a layer key and any layer key overrides.

9 Select a structural member style, and select a style location, if not the current drawing.

The style provides the shape of the beam.

10 Specify a value for Bound spaces:

If you want to…	Then…
allow the beam to be used as a bounding object for associative spaces	select Yes.
prevent the beam from being used as a bounding object for associative spaces	select No.
use the bounding setting from the beam style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

11 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the beam to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the beam from being trimmed automatically	select No.
use the trim setting from the beam style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

12 Expand Dimensions.

13 Specify offsets:

If you want to…	Then…
offset the beam on its extruded axis at the start point of the beam	enter a value for Start offset. A positive value shortens the beam on its axis, while a negative value lengthens the beam on its axis.
offset the beam on its extruded axis at the endpoint of the beam	enter a value for End offset. A positive value lengthens the beam on its axis, while a negative value shortens the beam on its axis.

14 Enter a value for Roll.

This value specifies the orientation of the beam relative to its extruded axis in terms of degrees of roll. A positive value rolls the beam counterclockwise when viewed from its end to its start.

15 If Layout type is Fill, and you want beams to be added to the selected edge of a column grid, slab, roof slab, or wall at an angle other than the default of 90 degrees, enter a value for Angle relative to selected object.

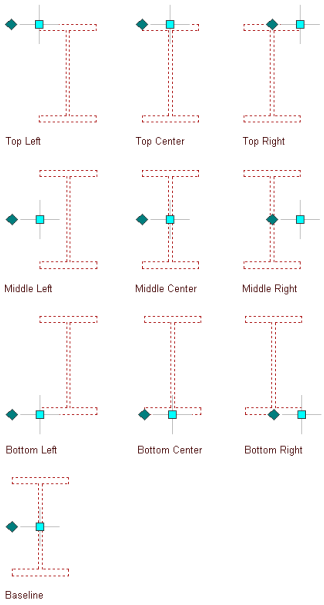
16 Select a Layout type to specify how a beam is positioned in relation to a highlighted edge of a column grid, slab, roof slab, or wall:

If you want to position the beam…	Then…
along the highlighted edge of the object	select Edge for Layout type.
within the boundaries of the object (from one edge to an opposite edge or edges)	select Fill for Layout type.

17 Specify the beam justification, which positions the beam shape in relation to its extruded axis when you draw the beam:

If you want to…	Then…
position the axis of the beam along the centroid of the beam shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the beam along one of 9 positions on the beam shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the beam from the end to the start.

Justification options for a beam



18 To specify the justification of members with multiple shapes and segments created with this tool, select a setting for Justify using overall extents:

If you want to justify the member…	Then…
based on the largest cross-sectional extent of the member's lowest priority shapes	select Yes. The justification is applied ONLY to the lowest priority shape definitions, and is calculated based on the node (vertex) of the member with the greatest cross section.

If you want to justify the member…	Then…
at each node, based on all shapes	select No. The justification is calculated based on the cross-sectional extents at each node, and applied to all the shapes without regard to priority.

For more information about members with multiple shapes and segments, see Creating Custom Structural Members on page 1735.

19 If Layout type is Fill, and you want to array multiple beams between two existing beams or within a column grid, slab, roof slab, or wall, expand Layout and select Yes for Array.

20 Specify the layout method for the array:

If you want to array beams…	Then…
so that they create a specific number of equal-sized bays	select Space evenly for Layout method, and enter a value for Number of bays.
at a specific distance from each other	select Repeat for Layout method, and enter a value for Bay size.

21 Click OK.

Creating a Brace Tool

Use this procedure to create a structural brace tool and add it to a tool palette.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a structural member style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
create a tool from a brace in the drawing	select the brace, and drag it to the tool palette.
copy a tool in the current palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

The description displays in the tooltip when you select the tool from the tool palette, and describes the tool if you store it in a tool catalog in the Content Browser.

6 Expand Basic, and expand General.

7 Enter a description of the braces that you can create using this brace tool.

8 If you do not want to use the layer assignments specified in the layer key style used in the drawing, specify a layer key and any layer key overrides.

9 Select a structural member style, and select a style location, if not the current drawing.

The style provides the shape of the brace.

10 Specify a value for Bound spaces:

If you want to…	Then…
allow the brace to be used as a bounding object for associative spaces	select Yes.
prevent the brace from being used as a bounding object for associative spaces	select No.
use the bounding setting from the brace style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

11 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the brace to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the brace from being trimmed automatically	select No.
use the trim setting from the brace style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

12 Expand Dimensions.

13 Specify offsets:

If you want to…	Then…
offset the brace on its extruded axis at the start point of the brace	enter a value for Start offset. A positive value shortens the brace on its axis, while a negative value lengthens the brace on its axis.
offset the brace on its extruded axis at the endpoint of the brace	enter a value for End offset. A positive value lengthens the brace on its axis, while a negative value shortens the brace on its axis.

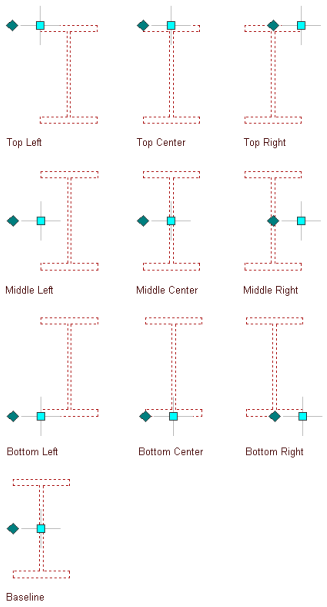
14 Enter a value for Roll.

This value specifies the orientation of the brace relative to its extruded axis in terms of degrees of roll. A positive value rolls the brace counterclockwise when viewed from its end to its start.

15 Specify the brace justification, which positions the brace shape in relation to its extruded axis when you draw the brace:

If you want to…	Then…
position the axis of the brace along the centroid of the brace shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the brace along one of 9 positions on the brace shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the beam from the end to the start.

Justification options for a brace



16 To specify the justification of braces with multiple shapes and segments created with this tool, select a setting for Justify using overall extents:

If you want to…	Then…
justify the brace based on the largest cross-sectional extent of the member's lowest priority shapes	select Yes. The justification is applied ONLY to the lowest priority shape definitions, and is calculated based on the node (vertex) of the member with the greatest cross section.
justify the brace at each node, based on all shapes	select No. The justification is calculated based on the cross-sectional extents at each node, and is applied to all the shapes without regard to priority.

For more information about members with multiple shapes and segments, see Creating Custom Structural Members on page 1735.

17 Specify the rise, which is the vertical distance between the start point and endpoint of the brace:

If you want to…	Then…
specify the rise of the brace before you draw it	select No for Specify Rise on Screen. For Method, select either Angle, Distance, or Height. If you select Angle, enter a value for Distance along first member (measured from the point where the two members are connected to the point on the first member where you want the brace to start) and a value for Angle from first member. If you select Distance, enter values for both Distance along first member and Distance along second member. If you select Height, enter a value for Rise.
specify the rise of the brace by specifying a 3D endpoint for the end of the brace	select Yes for Specify Rise on Screen.

18 Click OK.

Creating a Column Tool

Use this procedure to create a structural column tool and add it to a tool palette.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a structural member style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
create a tool from a column in the drawing	select the column, and drag it to the tool palette.
copy a tool in the current palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

The description displays in the tooltip when you select the tool from the tool palette, and describes the tool if you store it in a tool catalog in the Content Browser.

6 Expand Basic, and expand General.

7 Enter a description of the columns that you can create using this column tool.

8 If you do not want to use the layer assignments specified in the layer key style used in the drawing, specify a layer key and any layer key overrides.

9 Select a structural member style, and select a style location, if not the current drawing.

The style provides the shape of the column.

10 Specify a value for Bound spaces:

If you want to…	Then…
allow the column to be used as a bounding object for associative spaces	select Yes.
prevent the column from being used as a bounding object for associative spaces	select No.
use the bounding setting from the column style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

11 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the column to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the column from being trimmed automatically	select No.
use the trim setting from the column style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

12 Expand Dimensions.

13 Specify offsets:

If you want to…	Then…
offset the column on its extruded axis at the start point of the column	enter a value for Start offset. A positive value shortens the column on its axis, while a negative value lengthens the column on its axis.
offset the column on its extruded axis at the endpoint of the column	enter a value for End offset. A positive value lengthens the column on its axis, while a negative value shortens the column on its axis.

14 Specify the roll of the column (how it is oriented relative to its extruded axis):

If you want to…	Then…
specify the roll of the column before you insert it	select No for Specify on Screen, and enter a value for Roll.
specify the roll of the column when you insert it	select Yes for Specify on Screen.

This value specifies the orientation of the column relative to its extruded axis in terms of degrees of roll. A positive value rolls the column counterclockwise when viewed from the end (top) to the start (bottom) of the column.

15 Specify the column justification, which positions the column shape in relation to its extruded axis when you draw the column:

If you want to…	Then…
position the axis of the column along the centroid of the column shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the column along one of 9 positions on the column shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the column from the top to the bottom.

16 To specify the justification of members with multiple shapes and segments created with this tool, select a setting for Justify using overall extents:

If you want to…	Then…
justify the member based on the largest cross-sectional extent of the member's lowest priority shapes	select Yes. The justification is applied ONLY to the lowest priority shape definitions, and is calculated based on the node (vertex) of the member with the greatest cross section.
justify the member at each node, based on all shapes.	select No. The justification is calculated based on the cross-sectional extents at each node, and is applied to all the shapes without regard to priority.

For more information about members with multiple shapes and segments, see Creating Custom Structural Members on page 1735.

17 Click OK.

Using Structural Member Tools to Create Structural Members

Tool palettes in AutoCAD Architecture let you quickly place beams, braces, and columns by selecting a structural member tool with a specific style and other predefined properties. You can also use structural member tools to convert linework to structural members and to apply the settings of a structural member tool to existing structural members.

Custom palettes created by you or your CAD manager may contain structural member tools from styles created in the Structural Member Catalog or Structural Member Style wizard. These palettes may be customized for your projects or office standards.

The default tool palettes in the workspace contain sample structural member tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain structural member tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog

- My Tool catalog

When you create structural members using structural member tools, you can use the default settings of the tool, or you can specify settings for any structural member properties that are not controlled by the style.

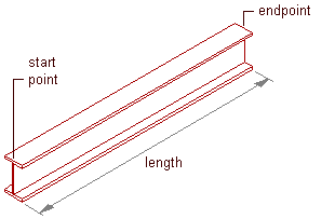
IMPORTANT Columns grids that have numerous columns attached to them can take longer than expected to display on screen. This is because structural members carry additional information that may be used for structural analysis.

Creating a Beam

Use this procedure to add one or more new beams that have the property settings specified in the structural beam tool that you select. You can add a beam anywhere in the drawing area by specifying a start point and an endpoint, or you can position and size a beam in relation to an edge of an existing object. The style specified in the tool provides the beam shape, which is extruded along the path you define in the drawing area.

To specify settings when you add a beam, see Creating Beams with User-Specified Settings on page 1676.

Creating a beam



1 Open the tool palette that contains the structural beam tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Beam .

2 If you want to offset the new beam(s) from the elevation of the current level, double-click the Elevation value on the application status bar at the bottom of the workspace, enter an elevation value (or specify a point on an existing object in the drawing area), click OK, and then click the Z-snap button to the right of the Elevation Value.

3 Position the new beam(s) in the drawing area:

If you want to…	Then…
create a single beam independent of other objects	specify a start point and an endpoint for the beam, and then press *ENTER*.
create multiple beams independent of other objects but connected to each other using the endpoint of one beam as the start point of the next beam	specify a start point and an endpoint, and then specify additional endpoints as required. Press *ENTER* to end the command.
create a beam that is connected to an existing structural member	specify a start point and an endpoint, one of which must be on the axis or the endpoint of the existing member. Press *ENTER* to end the command.

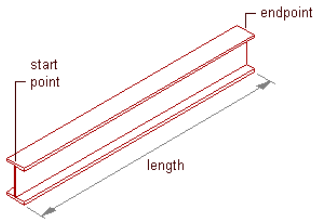
If you want to…	Then…
add beams along one or more edges of a slab, roof slab, or wall	move the cursor over an edge of the object to display a preview of the beam, and then click to add a beam along that edge, or press *Ctrl* and click to add beams along all edges of the object. Press *ENTER* to end the command.
add beams along one or more segments of a column grid	move the cursor over a segment of the grid to display a preview of the beam, and then click to add a beam along that segment; or press *Ctrl* and click to add beams along all segments in that grid line; or press *Ctrl* twice and click to add beams along all segments in the grid. Press *ENTER* to end the command.

NOTE If you want to add a beam that spans an object from edge to edge rather than lying along one of its edges, you can change the Layout type setting from Edge to Fill on the Properties palette. For more information on property settings for beam tools, see Creating Beams with User-Specified Settings on page 1676.

Creating Beams with User-Specified Settings

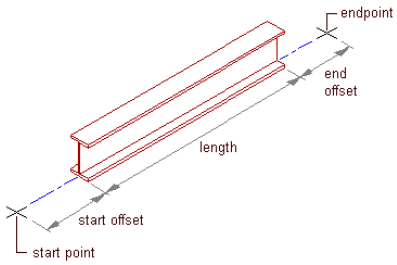
Use this procedure to add one or more new beams with property settings that you specify. You can add a beam anywhere in the drawing area by specifying a start point and an endpoint, or you can position and size a beam in relation to an existing object. You can also create multiple beams, either one at a time (connected endpoint to start point) or arrayed within boundaries defined by other beams or by column grids, slabs, roof slabs, or walls. The style specified in the tool provides the beam shape, which is extruded along the paths you define in the drawing area.

Creating a beam



Optionally, offset the beam from its start point or endpoint.

Offsetting a beam



1 Open the tool palette that contains the structural beam tool you want to use, and select the tool.

(You may have to scroll to display the desired tool).

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Beam .

2 On the Properties palette, under General, click Style, and select a structural beam style.

3 Specify a value for Bound spaces:

If you want to…	Then…
allow the beam to be used as a bounding object for associative spaces	select Yes.
prevent the beam from being used as a bounding object for associative spaces	select No.
use the bounding setting from the beam style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

4 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the beam to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the beam from being trimmed automatically	select No.
use the trim setting from the beam style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

5 Expand Dimensions.

6 Specify offsets:

If you want to…	Then…
offset the beam on its extruded axis at the start point of the beam	enter a value for Start offset. A positive value shortens the beam on its axis, while a negative value lengthens the beam on its axis.
offset the beam on its extruded axis at the endpoint of the beam	enter a value for End offset. A positive value lengthens the beam on its axis, while a negative value shortens the beam on its axis.

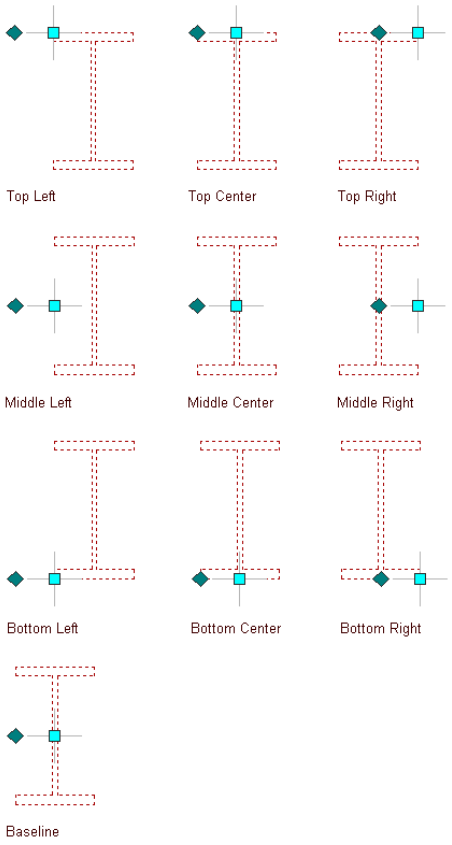
7 Enter a value for Roll.

This value specifies the orientation of the beam relative to its extruded axis in terms of degrees of roll. A positive value rolls the beam counterclockwise when viewed from its end to its start.

8 Specify the beam justification, which positions the beam shape in relation to its extruded axis when you draw the beam:

If you want to…	Then…
position the axis of the beam along the centroid of the beam shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the beam along one of 9 positions on the beam shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the beam from the end to the start.

Justification options for a beam



9 Select a Layout type to specify how a beam is positioned in relation to a highlighted edge of a column grid, slab, roof slab, or wall:

If you want to position the beam…	Then…
along the highlighted edge of the object	select Edge for Layout type.
within the boundaries of the object (from one edge to an opposite edge or edges)	select Fill for Layout type.

10 If Layout type is Fill, and you want to array multiple beams between 2 existing beams or within a column grid, slab, roof slab, or wall, expand Layout and select Yes for Array.

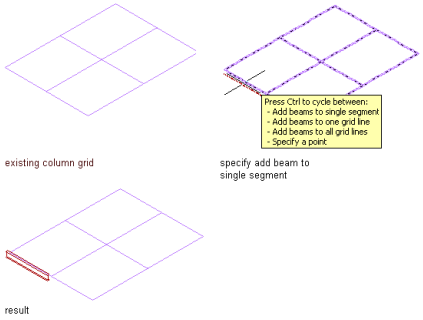
11 Specify the layout method for the array:

If you want to array beams…	Then…
so that they create a specific number of equal-sized bays	select Space evenly for Layout method, and enter a value for Number of bays.
at a specific distance from each other	select Repeat for Layout method, and enter a value for Bay size.

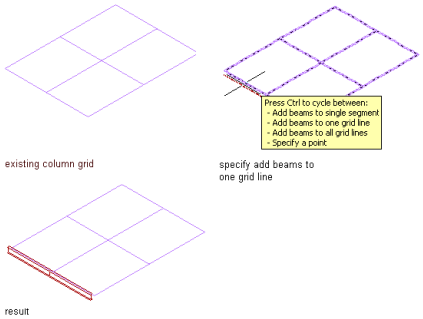
TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

12 If you want to offset the new beams from the elevation of the current level, double-click the Elevation value on the application status bar at the bottom of the workspace, enter an elevation value (or specify a point on an existing object in the drawing area), click OK, and then click the Z-snap button to the right of the Elevation value.

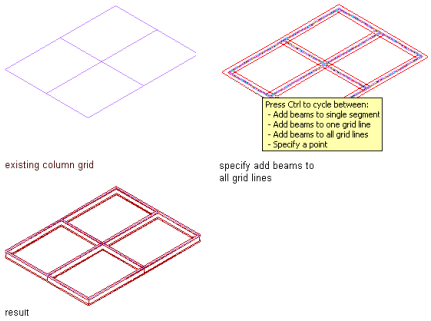
Adding a beam to a single segment



Adding beams to one grid line



Adding beams to all grid lines

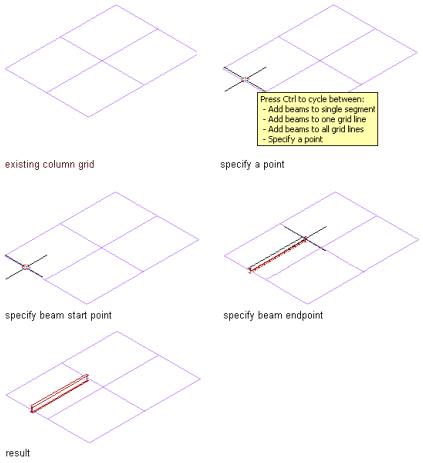


existing column grid

specify add beams to all grid lines

result

Adding a beam to a specified point



existing column grid

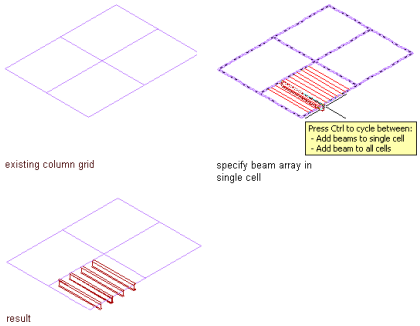
specify a point

specify beam start point

specify beam endpoint

result

Adding a beam array to a single cell

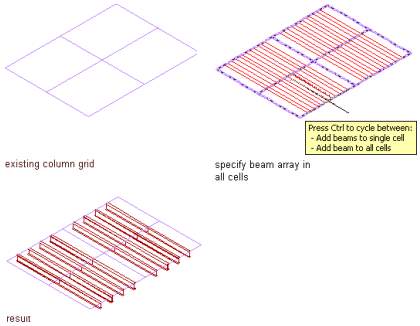


existing column grid

specify beam array in single cell

result

Adding a beam array to all cells



existing column grid

specify beam array in all cells

result

13 Position the new beams in the drawing area:

If you want to…	Then…
create a single beam independent of other objects	specify a start point and an endpoint for the beam, and then press *ENTER*.
create multiple beams independent of other objects but connected to each other using the endpoint of one beam as the start point of the next beam	specify a start point and an endpoint, and then specify additional endpoints as required. Press *ENTER* to end the command.
create a beam that is connected to an existing structural member	specify a start point and an endpoint, one of which must be on the axis or the endpoint of the existing member. Press *ENTER* to end the command.
add a beam along one or more edges of a slab, roof slab, or wall (assuming Layout type is Edge)	move the cursor over an edge of the object until a preview of the beam is displayed, and then click to add a beam along that edge, or press *Ctrl* and click to add beams along all edges of the object. Press *ENTER* to end the command.
add a beam along one or more segments of a column grid (assuming Layout type is Edge)	move the cursor over a segment of the grid until a preview of the beam is displayed, and then click to add a beam along that segment; or press *Ctrl* and click to add beams along all segments in that grid line; or press *Ctrl* twice and click to add beams along all segments in the grid. Press *ENTER* to end the command.
add a beam that spans a slab, roof slab, wall, or column grid cell from edge to edge at an angle of 90 degrees (assuming Layout type is Fill)	move the cursor over the object edge or column grid segment until a preview of the beam is displayed in the desired position perpendicular to the edge/segment, and then click. Press *ENTER* to end the command.
add a beam that spans a slab, roof slab, wall, or column grid cell from edge to edge at an angle other than 90 degrees (assuming Layout type is Fill)	move the cursor over the object edge or column grid segment until a preview of the beam is displayed, enter a value for the desired angle, press *ENTER*, and then click. Press *ENTER* to end the command.
array beams between 2 structural members (assuming Array is Yes)	move the cursor over one of the structural members until its baseline is displayed, click that member, specify a point on the second member, and press *ENTER*. New beams are arrayed according to the Layout Method selected on the Properties palette and at an angle determined by the point you specify on the second member. Press *ENTER* to end the command.
array beams perpendicularly within a slab, roof slab, wall, or one or more cells of a column grid (assuming Array is Yes)	move the cursor over an edge until a preview of the array is displayed, and click. New beams are arrayed perpendicular to the selected edge according to the Layout Method selected on the Properties palette. If you want to add the array to all cells of a column grid, press *Ctrl* before clicking. Press *ENTER* to end the command.

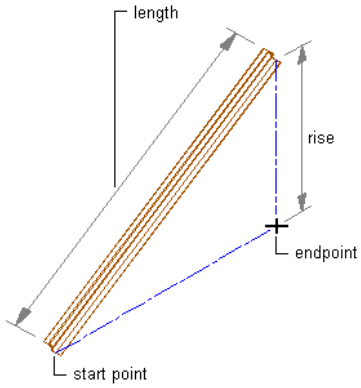
If you want to…	Then…
array beams at an angle other than 90 degrees within a slab, roof slab, wall, or one or more cells of a column grid (assuming Array is Yes)	move the cursor over an edge until a preview of the array is displayed, enter a value for the desired angle, press *ENTER*, and then click. New beams are arrayed at the specified angle according to the Layout Method selected on the Properties palette. If you want to add the array to all cells of a column grid, press *Ctrl* before clicking. Press *ENTER* to end the command.

Creating a Brace

Use this procedure to add a new brace that has the properties specified in the structural brace tool that you select. The style specified in the tool provides the brace shape, which is extruded along the path you define by specifying a start point and an endpoint.

To specify your own settings when you add a brace, see Creating a Brace with User-Specified Settings on page 1683.

Creating a brace



1 Open the tool palette that contains the structural brace tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Brace .

2 Specify the start point of the brace.

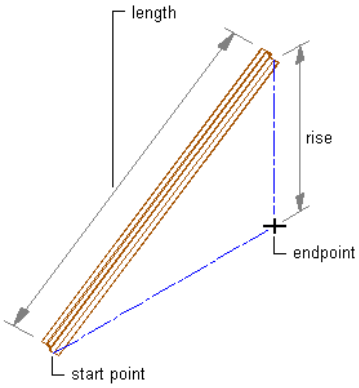
3 Specify an endpoint:

If you want to…	Then…
create a single brace	specify the endpoint of the brace, and press *ENTER*.
create additional braces	continue to specify brace start points and endpoints, and press *ENTER*.

Creating a Brace with User-Specified Settings

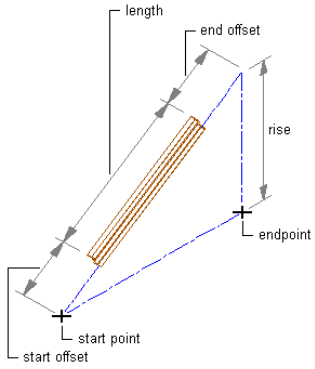
Use this procedure to add a new brace with property settings that you specify. The style specified in the tool provides the brace shape, which is extruded along the path you define by specifying a start point and an endpoint.

Creating a brace



Optionally, offset the brace from its start point or endpoint.

Offsetting a brace



1 Open the tool palette that contains the structural brace tool you want to use, and select the tool.

(You may have to scroll to display the desired tool).

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Brace .

---

2 On the Properties palette, under General, click Style, and select a structural brace style.

3 Specify a value for Bound spaces:

If you want to…	Then…
allow the brace to be used as a bounding object for associative spaces	select Yes.
prevent the brace from being used as a bounding object for associative spaces	select No.
use the bounding setting from the brace style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

4 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the brace to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the brace from being trimmed automatically	select No.
use the trim setting from the brace style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

5 Expand Dimensions.

6 Specify offsets:

If you want to…	Then…
offset the brace on its extruded axis at the start point of the brace	enter a value for Start offset. A positive value shortens the brace on its axis, while a negative value lengthens the brace on its axis.
offset the brace on its extruded axis at the endpoint of the brace	enter a value for End offset. A positive value lengthens the brace on its axis, while a negative value shortens the brace on its axis.

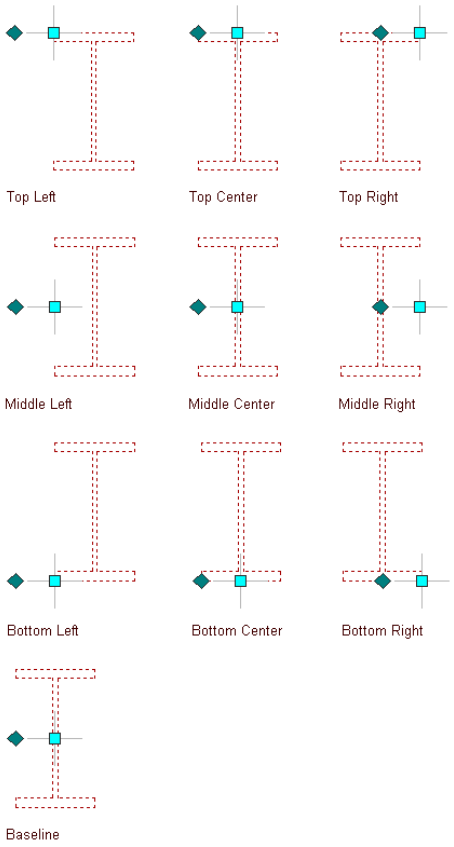
7 Enter a value for Roll.

This value specifies the orientation of the brace relative to its extruded axis in terms of degrees of roll. A positive value rolls the brace counterclockwise when viewed from its end to its start.

8 Specify the brace justification, which positions the brace shape in relation to its extruded axis when you draw the brace:

If you want to…	Then…
position the axis of the brace along the centroid of the brace shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the brace along one of 9 positions on the brace shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the beam from the end to the start.

Justification options for a brace



9 Specify the rise, which is the vertical distance between the start point and endpoint of the brace:

If you want to…	Then…
specify the rise of the brace before you draw it	select No for Specify rise on screen. For Method, select either Angle, Distance, or Height. If you select Angle, enter a value for Distance along first member (measured from the point where the two members are connected to the point on the first member where you want the brace to start) and a value for Angle from first member. If you select Distance, enter values for both Distance along first member and Distance along second member. If you select Height, enter a value for Rise.
specify the rise of the brace by specifying a 3D endpoint for the end of the brace.	select Yes for Specify Rise on Screen.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

10 In the drawing area, specify the start point of the brace.

11 Specify an endpoint for the brace:

- If you entered a value for Rise in step 9, then the endpoint of the brace is the *X* and *Y* coordinates of the endpoint that you selected. The *Z* coordinate equals the *Z* coordinate of the start point plus the value for the rise.

- If you selected Specify rise on screen in step 9, the endpoint of the brace is the 3D point that you selected.

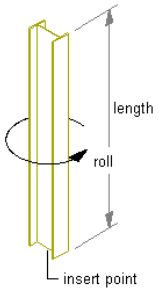
12 Continue adding braces, and press *ENTER*.

Creating a Freestanding Column

Use this procedure to add a new freestanding column that has the property settings specified in the structural column tool that you select. The style specified in the tool provides the column shape. When you specify an insert point for the column, the shape is extruded in a positive direction along the current UCS *Z*-axis to a height determined by the Start offset, End offset, and Logical length properties of the tool.

To specify settings when you add a column, see Creating a Freestanding Column with User-Specified Settings on page 1686.

Creating a column



1 Open the tool palette that contains the structural column tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column .

2 Specify the insert point for the column.

3 If the Properties palette value for Specify roll on screen is Yes, move the cursor to roll the column around its extruded axis as desired, and then click; or enter a value for the roll angle, and press *ENTER*.

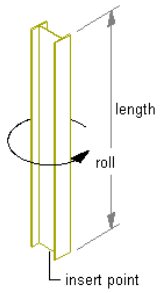
A positive value rolls the column counterclockwise around its extruded axis when viewed from its end (top) to its start (bottom).

4 Specify an insert point for another column, or press *ENTER* to end the command.

Creating a Freestanding Column with User-Specified Settings

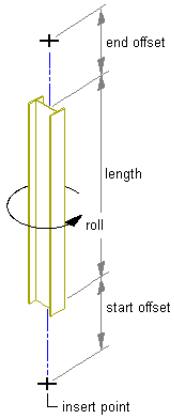
Use this procedure to create a new freestanding column with property settings that you specify. The style specified in the tool provides the column shape. When you specify an insert point for the column, the shape is extruded in a positive direction along the current UCS *Z*-axis to a height determined by the Start offset, End offset, and Logical length properties you specify.

Creating a free-standing column



Optionally, offset the column from its start point or endpoint.

Offsetting a column



1 Open the tool palette that contains the structural column tool you want to use, and select the tool.

(You may have to scroll to display the desired tool).

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column .

2 On the Properties palette, under General, click Style, and select a structural column style.

3 Specify a value for Bound spaces:

If you want to…	Then…
allow the column to be used as a bounding object for associative spaces	select Yes.
prevent the column from being used as a bounding object for associative spaces	select No.
use the bounding setting from the column style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

4 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the column to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the column from being trimmed automatically	select No.
use the trim setting from the column style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

5 Expand Dimensions.

6 Specify offsets:

If you want to…	Then…
offset the column on its extruded axis at the start point of the column	enter a value for Start offset. A positive value shortens the column on its axis, while a negative value lengthens the column on its axis.
offset the column on its extruded axis at the endpoint of the column	enter a value for End offset. A negative value lengthens the column on its axis, while a positive value shortens the column on its axis.

7 Enter a value for Logical length.

The logical length of the column is the length (height) of the column before offsets are applied.

8 Select Yes or No for Specify roll on screen:

If you want to…	Then…
specify the roll of the column before you insert it	select No for Specify Roll on Screen, and enter a value for Roll.
specify the roll of the column when you insert it	select Yes for Specify Roll on Screen, and specify the roll as explained in step 10.

A positive value rolls the column counterclockwise around its extruded axis when viewed from its end (top) to its start (bottom).

9 Specify the column justification, which positions the column shape in relation to its extruded axis when you draw the column:

If you want to…	Then…
position the extruded axis of the column at the centroid of the column shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.

If you want to…	Then…
position the extruded axis of the column along one of 9 positions on the column shape	select one of the 9 positions for Justify. **NOTE** These positions are defined at a roll of zero, viewing the column from the top to the bottom.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

10 In the drawing area, specify the insert point for the column.

11 If you selected Yes for Specify roll on screen, move the cursor to roll the column around its extruded axis as desired, and then click; or enter a value for degrees of roll, and press *ENTER*.

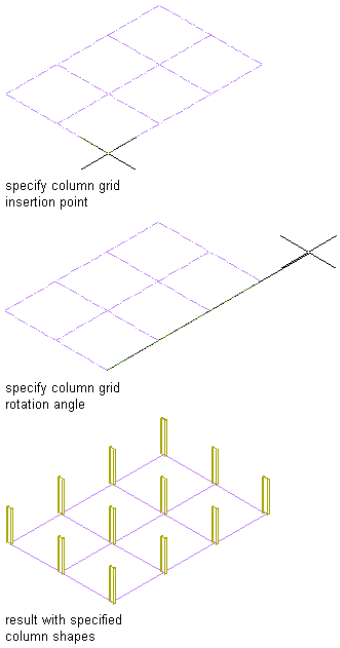
12 Specify an insert point for another column, or press *ENTER* to end the command.

Creating Grid-Anchored Columns

Use this procedure to create a column that is anchored to a grid and has the property settings specified in the structural column tool that you select. The style specified in the tool provides the column shape. When you specify an insert point on the grid, the shape is extruded in a positive direction along the current UCS *Z*-axis to a height determined by the Start offset, End offset, and Logical length properties of the tool. To specify your own settings when you anchor a column to a grid, see Creating Grid-Anchored Columns with User-Specified Settings on page 1690.

To create a column grid with pre-anchored columns, see Creating a Column Grid on page 1806.

Creating a column grid with specified column shapes



1 Open the tool palette that contains the structural column tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column .

2 Move the cursor over the grid so that the grid is highlighted and the list of column-add options is displayed. (You press *Ctrl* to cycle through the options.)

3 Specify the insert point for the column on the grid.

If you want to…	Then…
add a column at a particular node in the grid	move the cursor over the node (or near it), and click. A column is added to the node nearest to the cursor position.
add a column to all nodes in the grid	press *Ctrl*, and click.
add a column at a particular point on or within the grid	press *Ctrl* twice, move the cursor to the point where you want to add the column, and click. If the Properties palette value for Specify roll on screen is Yes, move the cursor to roll the column around its extruded axis as desired, and then click; or enter a value for the roll angle, and press *ENTER*. A positive value rolls the column counterclockwise around its extruded axis when viewed from its end (top) to its start (bottom).

4 When you are finished adding columns to the grid, press *ENTER* to end the command.

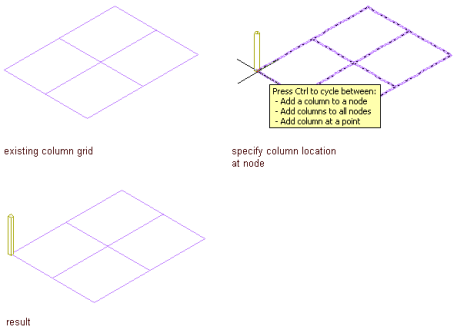
IMPORTANT Column grids that have numerous columns attached to them can take longer than expected to display on screen. This is because structural members carry additional information that may be used for structural analysis.

Creating Grid-Anchored Columns with User-Specified Settings

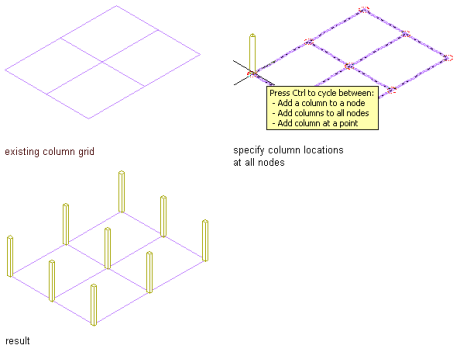
Use this procedure to anchor a column to a grid as you create it, with property settings that you specify. The style specified in the tool provides the column shape. When you specify an insert point on the grid, the shape is extruded in a positive direction along the current UCS *Z*-axis to a height determined by the Start offset, End offset, and Logical length properties of the tool.

To create a column grid with pre-anchored columns, see Creating a Column Grid on page 1806.

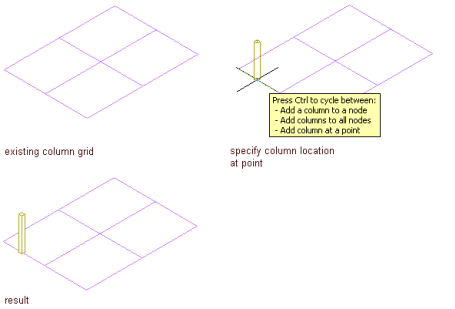
Add a column to a single node of a column grid



Add columns to all nodes of a column grid



Add a column to a single point on a column grid



1 Open the tool palette that contains the structural column tool you want to use, and select the tool.

(You may have to scroll to display the desired tool).

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column .

2 Select the grid.

3 On the Properties palette, under General, click Style, and select a structural column style.

4 Specify a value for Bound spaces:

If you want to…	Then…
allow the column to be used as a bounding object for associative spaces	select Yes.

If you want to…	Then…
prevent the column from being used as a bounding object for associative spaces	select No.
use the bounding setting from the column style	select By Style.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

5 Specify a value for Trim automatically:

If you want…	Then…
the geometry of the column to be automatically trimmed to any other structural members, other architectural objects, or linework to which it is logically connected	select Yes.
prevent the geometry of the column from being trimmed automatically	select No.
use the trim setting from the column style	select By Style.

NOTE This setting affects only the structural member being added. Adding a new structural member will not change the geometry of an existing structural member, regardless of the setting for Trim automatically.

6 Expand Dimensions.

7 Specify offsets:

If you want to…	Then…
offset the column on its extruded axis at the start point of the column	enter a value for Start offset. A positive value shortens the column on its axis, while a negative value lengthens the column on its axis.
offset the column on its extruded axis at the endpoint of the column	enter a value for End offset. A negative value lengthens the column on its axis, while a positive value shortens the column on its axis.

8 Enter a value for Logical length.

The logical length of the column is the length (height) of the column before offsets are applied.

9 Select Yes or No for Specify roll on screen:

If you want to…	Then…
specify the roll of the column before you insert it	select No for Specify Roll on Screen, and enter a value for Roll.
specify the roll of the column when you insert it	select Yes for Specify Roll on Screen, and specify the roll as explained in step 12.

A positive value rolls the column counterclockwise around its extruded axis when viewed from its end (top) to its start (bottom).

10 Specify the column justification, which positions the column shape in relation to its extruded axis when you draw the column:

If you want to…	Then…
position the axis of the column along the centroid of the column shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the column along one of 9 positions on the column shape	select one of the 9 positions for Justify.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

11 Move the cursor over the grid so that the grid is highlighted and the list of column-add options is displayed. (You press *Ctrl* to cycle through the options.)

12 Specify the insert point for the column on the grid.

If you want to…	Then…
add a column at a particular node in the grid	move the cursor over the node (or near it), and click. A column is added to the node nearest to the cursor position.
add a column to all nodes in the grid	press *Ctrl*, and click.
add a column at a particular point on or within the grid	press *Ctrl* twice, move the cursor to the point where you want to add the column, and click. If the Properties palette value for Specify roll on screen is Yes, move the cursor to roll the column around its extruded axis as desired, and then click; or enter a value for the roll angle, and press *ENTER*. A positive value rolls the column counterclockwise around its extruded axis when viewed from its end (top) to its start (bottom).

13 When you are finished adding columns to the grid, press *enter* to end the command.

NOTE Column grids that have numerous columns attached to them can take longer than expected to display on screen. This is because structural members carry additional information that may be used for structural analysis.

Creating a Structural Member from Linework

Use this procedure to convert any of the following objects to structural members with structural member tools:

- Arcs
- Lines
- Open polylines
- Open polylines with arc segments

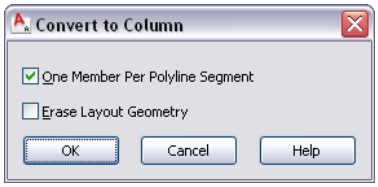
NOTE Converting an arc to a structural member is the only method of creating a curved structural member. For more information about curved structural members, see About Curved Structural Members on page 1704.

When you use a tool to convert linework to a structural member, the style specified in the tool provides the shape of the member. The linework defines the extrusion path for the shape. You can convert multiple lines to create multiple members, convert curved lines to create curved members, and convert multi-segmented lines to create multi-segmented members.

1. Open the tool palette that contains the structural member tool you want to use.
   (You may have to scroll to display the desired tool).
2. Right-click a structural member tool, and click Apply Tool Properties to ➤ Linework.
3. Select the linework to convert, and press *ENTER*.

   NOTE You cannot convert a closed polyline (a polyline with a start node that coincides with its end node) to a structural member.

   A worksheet opens appropriate to the tool you selected.



4. Clear One Member Per Polyline Segment to create a structural member for each segment.
5. Select Erase Layout Geometry to erase the linework, and click OK.

   If you created a structural member by converting a polyline, the initial orientation of the structural member is set to the UCS that was current when you drew the polyline. You can change the orientation by adjusting the Roll property of the member.

Editing Structural Members

After you create a structural member, you can change any properties of the member that you specified when you created it and make additional modifications. You can change the start and end offsets of a member, or add or remove them. You can change the length, justification, and location of a member, specifying whether its connections with other structural members are maintained. For a curved structural member, you can change the radius.

You can change the geometry of a structural member by trimming it. By changing the structural member type, you can change a brace to beam, or a column to a brace. By changing the style of a structural member, you can change its shape.

AutoCAD Architecture offers several methods for editing structural members:

- You can directly edit structural members using grips for dimensions and other physical characteristics.
- For grip edit operations where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip. When this feature is active (click DYN on the application status bar), selecting a grip displays a text box in which you can enter the desired value for the associated dimension or angle. For more information, see “Use Dynamic Input” in AutoCAD Help.
- You can change structural member settings on the Properties palette. You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

- You can use the tools available on the Modify panel of the Structural Member tab.
- You can select editing commands from the context menu for a selected structural member.

Using Grips To Edit Structural Members

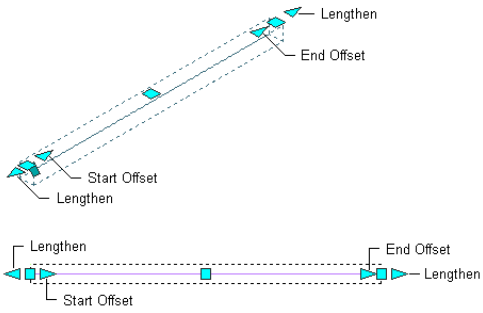
Refer to the illustrations and steps in this topic to use grips to edit structural members.

NOTE If the value of Trim automatically (on the Properties palette) is Yes for each of 2 connected structural members, then any kind of grip edit to either member will result in a mitered joint between them.

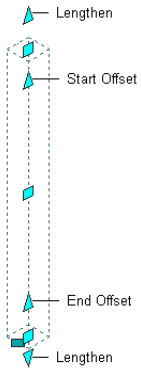
Editing Structural Member Dimensions

1. Select the structural member.
2. Select the grip for the dimension you want to change.

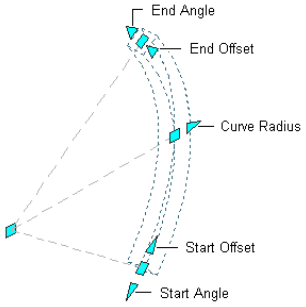
Grips for length, start offset, and end offset of a straight beam or brace



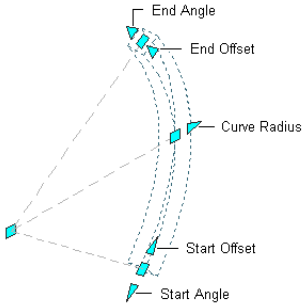
Grips for length, start offset, and end offset of a straight column



Grips for start and end angles, radius, and start and end offsets of a curved beam or brace



Grips for start and end angles, radius, and start and end offsets of a curved column



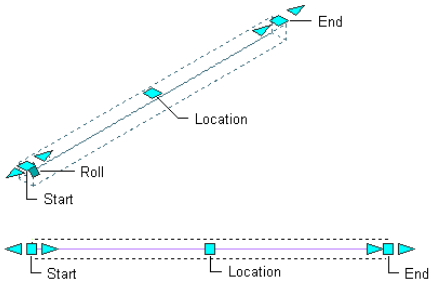
3 Move the grip until the dimension value you want is displayed, and click once; or enter a value.

Changing the Location of a Structural Member

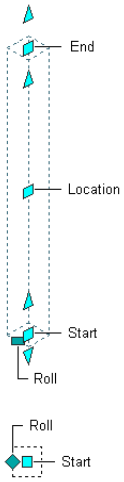
1 Select the structural member.

Select the Location grip to change the location of the structural member, or the Roll grip to change its roll (the rotation of the member around its extruded axis).

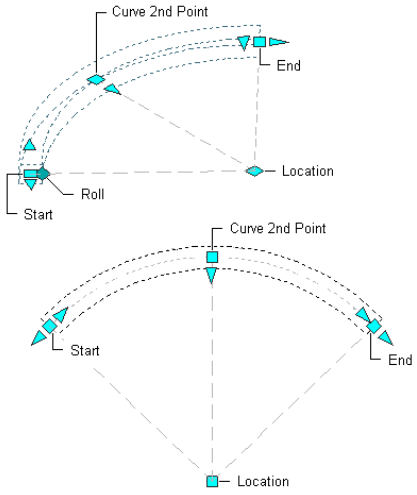
Location and roll grips for a straight beam or brace



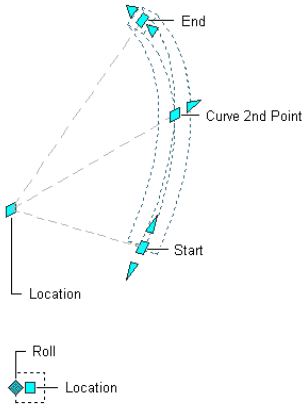
Location and roll grips for a straight column



Location and roll grips for a curved beam or brace



Location and roll grips for a curved column



In Model view, the Location grip has six edit options you can cycle through by pressing *CTRL*. For each plane in which you can move the member (*XY*, *YZ*, or *XZ*), you have the option of maintaining or breaking connections with other structural members.

When you choose to maintain connections, all connections are not necessarily maintained for every type of move. Maintenance of connections depends on whether the move is in or out of plane, how the members are connected, and which type of members are involved. Generally, columns take precedence over beams and braces in determining how connected members behave when one is moved. This behavior is summarized in the following table:

If you specify Maintain Connections when moving …	**Then …**
a column	other columns, beams, and braces connected to an endpoint of the column will also move, changing length and orientation as necessary to maintain the connection. (This is also true for any other members connected along the length of a member that is endpoint-connected to the column.) Structural members connected along the length of the column will only extend or shorten to remain connected; they will not change orientation unless the column is moved out of plane. For example, if a column is moved in the *XY* plane, beams or braces connected along its length will stay connected, even though their orientation changes.
a beam or a brace	other beams and braces connected to an endpoint of the beam or brace will also move, changing length and orientation as necessary to maintain the connection. Structural members connected along the length of the beam or brace will only extend or shorten to remain connected; they will not change orientation unless the beam is moved out of plane. For example, if a ridge beam is moved vertically, rafters connected along its length will stay connected, even though their orientation changes.

The default edit mode is to maintain connections for moves along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane, but you still have the option to maintain or break connections.

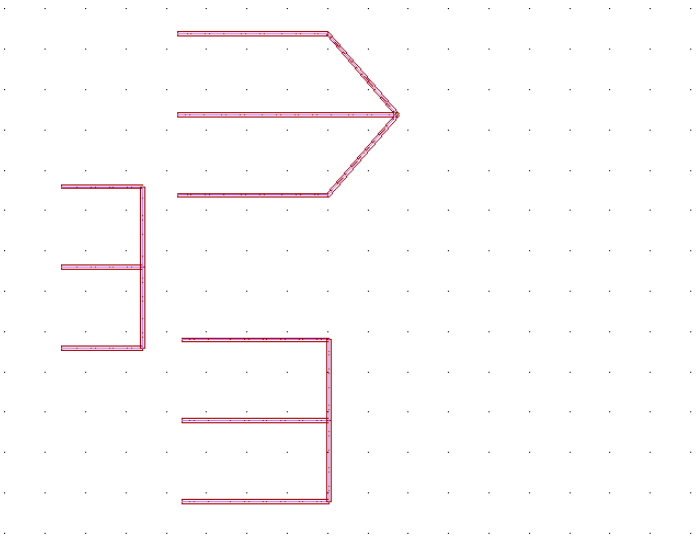
2 Move the grip until the dimension value you want is displayed, and click once; or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the structural member along a specific direction. If you enter a value for either of the dimension directions in the current edit mode and then press *TAB*, the movement of the structural member is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the structural member is constrained to the *Y* dimension direction.

3 Right-click, and click Deselect All to turn off grips.

NOTE When you shift-select the Location grips of end-connected beams, the common endpoint moves approximately twice as far as the grip you move. In the example shown below, if you shift-select the two vertical beams in the structure on the left, and then move a grip toward the right, the result is a configuration like the one at the top right. To get a configuration like the one at the bottom right, you would select all five beams using a crossing selection or a crossing polygon, and then use the **Stretch** command. (For more information, see "STRETCH Command" and "SELECT Command" in AutoCAD Help.) Beams may also move twice as far as you might expect when they are attached to columns on a column grid, and the grid, columns, and beams are all selected. If you select and move only the grid, the columns and beams will move with it, maintaining their same relative positions. For instructions on selecting one object when other objects are superimposed on it, see "Select Objects Individually" in AutoCAD Help.

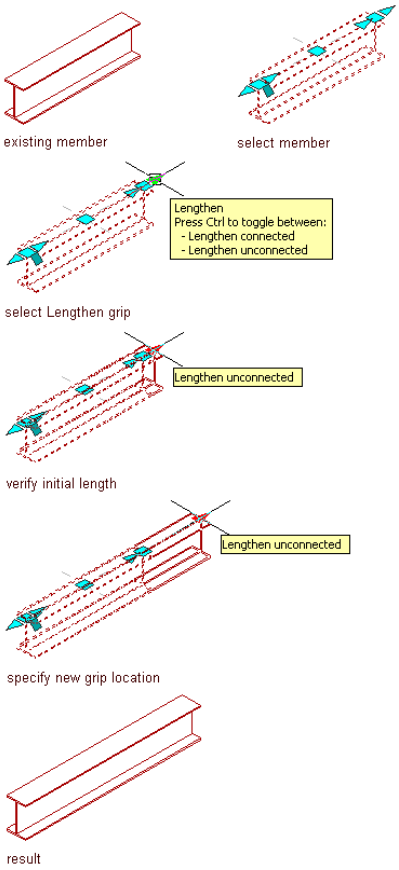


Changing the Structural Member Length

Use this procedure to change the length of a structural member. You can also change the structural member length on the Properties palette.

1. Select the structural member.
2. Select a Lengthen grip, move the grip until the length value you want is displayed, and click once.

Changing the length of a beam structural member with grips



After selecting a grip, you can also enter a value to increase or decrease the length of the structural member.

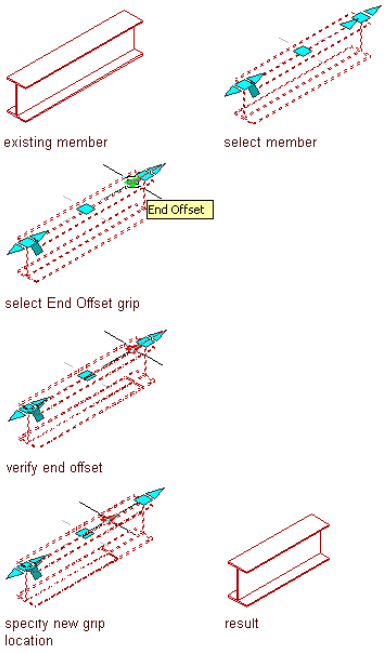
Changing the Structural Member Start and End Offsets

Use this procedure to offset a structural member from the start point or endpoint of its path. You can remove or change existing offsets, or add new offsets to the start point or endpoint of a structural member. You can also change the structural member start and end offsets on the Properties palette.

1. Select the structural member.
2. Select a Start Offset grip, move the grip until the start offset value you want is displayed, and click once.

   A positive start offset value shortens the member on its axis (path), while a negative start offset value lengthens the member on its axis.

Change the end offset of a beam structural member with grips



3 Select an End Offset grip, move the grip until the end offset value you want is displayed, and click once.

A positive end offset lengthens the member on its axis, while a negative end offset shortens the member on its axis.

After selecting a grip, you can also enter a value to increase or decrease the start or end offset of the structural member.

Changing the Structural Member Start Point and Endpoint

Use this procedure to change a structural member start point or endpoint. You can also change the structural member start and endpoints on the Properties palette.

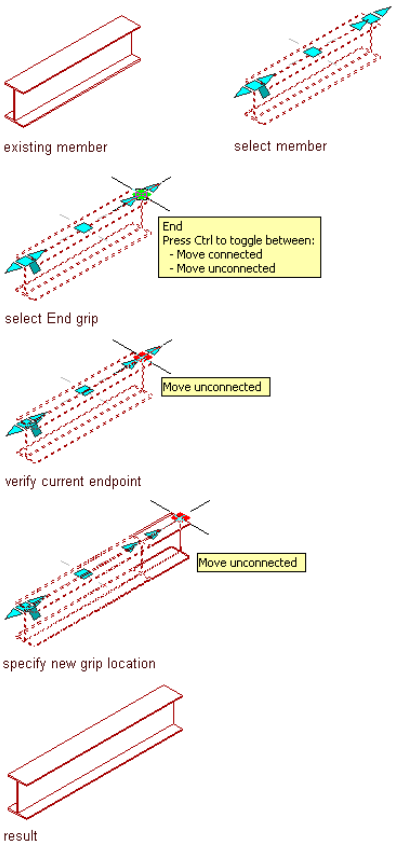
1 Select the structural member.

2 Select a Start or End grip, move the grip until the length value you want is displayed, and click once.

Moving the Start grip in the positive direction shortens the member on its axis (path), while moving the Start grip in the negative direction lengthens the member on its axis.

Moving the End grip in the positive direction lengthens the member on its axis (path), while moving the End grip in the negative direction shortens the member on its axis.

Change the end of a beam structural member with grips



3 Select a Start or End grip, move the grip until the length value you want is displayed, and click once.

After selecting a grip, you can also enter a value to increase or decrease the length of the structural member.

Changing the Structural Member Roll

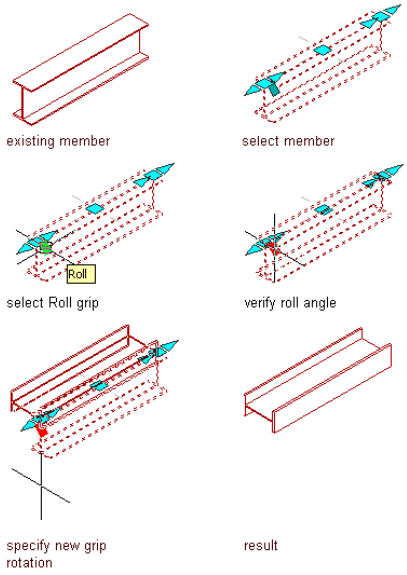
Use this procedure to change the orientation of a structural member relative to its extruded axis by specifying a number of degrees to roll it. A positive value rolls the member counterclockwise when viewed from its end to its start.

1 Select the structural member.

2 Select the Roll grip, move it until the desired number of degrees is displayed, and click once; or enter a value, and press *ENTER*.

A positive value rolls the member about its axis in a counterclockwise direction when viewed from its end to its start.

Changing beam orientation with the Roll grip

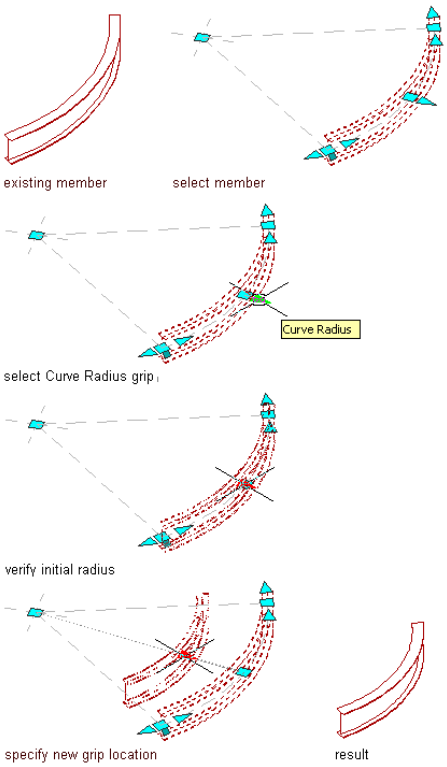


Changing the Radius of a Curved Structural Member

Use this procedure to change the radius of a curved structural member. You can also change the structural member radius on the Properties palette. For more information about curved structural members, see About Curved Structural Members on page 1704.

1. Select the structural member.
2. Select a Curve Radius grip, move the grip until the radius value you want is displayed, and click once.

Change the curve radius of a curved beam structural member with grips



About Curved Structural Members

The smoothness (tessellation) of curved edges is controlled by the FACETDEV variable. This variable sets the number of facets to display on curved AEC objects. The default value is 1/2" for drawings created from imperial templates and is 12.7 mm for drawings created from metric templates.

The number you specify for facet deviation defines the maximum distance from the chord to the arc—the chord being an edge that is created from faceting the curve to the true mathematical arc. The facet deviation has a range of greater than zero (0) and no upper limit.

The minimum number of facets is 8. For example, if you create a cylinder mass element to have a 1' radius, and specify 1' for FACETDEV, the cylinder has 8 faces.

The plan representation of individual curved components of columns uses the true curved representation of the member shapes. The above and below cut components will always be faceted.

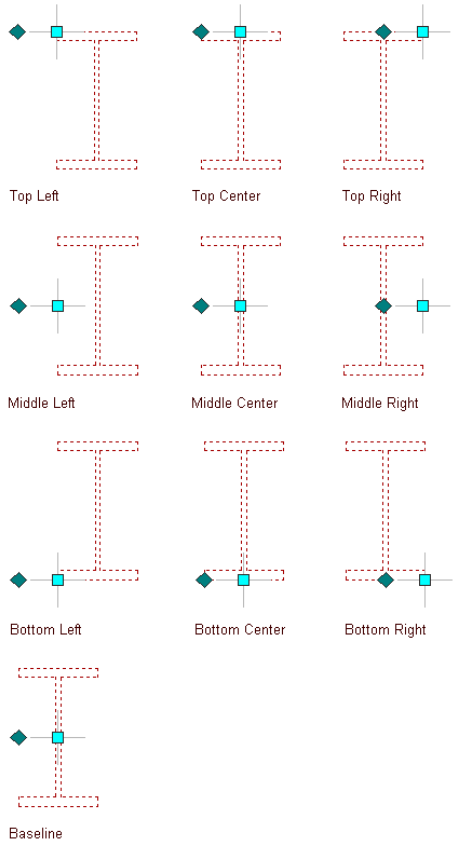
The maximum number of facets is controlled by the FACETMAX variable. This variable can be set from 100 to 10,000. Note that using a small value for FACETDEV and a large value for FACETMAX will adversely affect drawing performance.

To specify the facet deviation values for the current drawing, see Specifying the Display Resolution of Objects with Facets on page 143. The settings apply to all curved objects in the drawing, including curved structural members.

Changing the Structural Member Justification

Use this procedure to change the justification of a structural member. Justification positions the shape of a structural member in relation to its extruded axis. Changing the justification of an existing member moves the member and can affect how the member relates to other objects, such as how a column is positioned in relation to a column grid when it is anchored to the grid.

Justification options for a beam



You can also specify the justification of structural members with multiple shapes and segments. For more information about these members, see Creating Custom Structural Members on page 1735.

1 Select the structural member to change, and double-click it.

2 On the Properties palette, expand Basic, and expand Dimensions.

3 Select a setting for Justification:

If you want to…	Then…
position the axis of the member along the centroid of the member shape	select Baseline for Justify. **NOTE** This applies to members created with styles from the Structural Member Catalog only.
position the axis of the member along one of 9 positions on the member shape	select one of the 9 positions for Justify.

4 To specify the justification of members with multiple shapes and segments created with this tool, select a setting for Justify using overall extents:

If you want to…	Then…
justify the member based on the largest cross-sectional extent of the member's lowest priority shapes	select Yes. The justification is applied ONLY to the lowest priority shape definitions, and is calculated based on the node (vertex) of the member with the greatest cross section.
justify the member at each node, based on all shapes.	select No. The justification is calculated based on the cross-sectional extents at each node, and is applied to all the shapes without regard to priority.

Changing the Structural Member Type

Use this procedure to change the type of one or more structural members. Because beams, braces, and columns are sub-types of a single structural member object, you can change a beam to a brace, a column to beam, or a brace to a beam.

1 Select the structural members to change, and double-click one of them.

2 On the Properties palette, expand Basic, and expand General.

3 Select a setting for Member type: Beam, Brace, or Column.

Trimming Structural Members

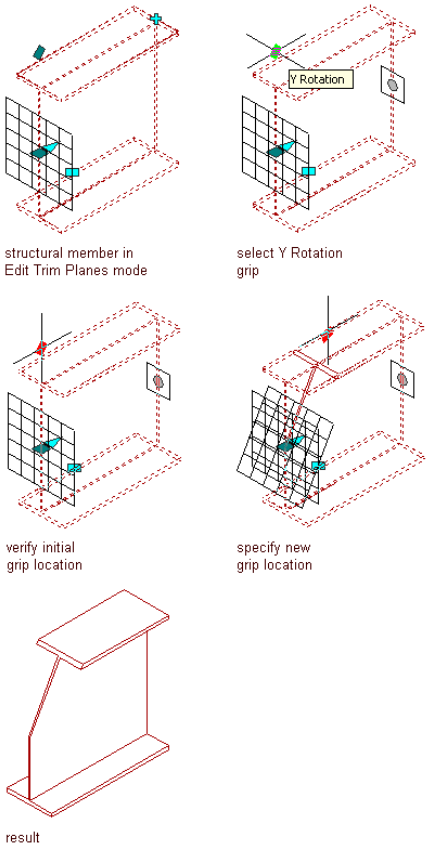
Structural members can be trimmed using 2-dimensional objects called trim planes. You can manually add a trim plane for a structural member either by defining its position in relation to the member itself (using the Trim Planes worksheet available from the Properties palette), or by selecting a plane defined (or implied) by another structural member, an architectural object of another type, or linework. You can also configure structural member styles and insertion tools so that a trim plane is created automatically when an endpoint of a new structural member is logically connected to an existing structural member or other object (see Creating a Structural Member Style in the Style Manager on page 1725).

You can add multiple trim planes to individual structural members, allowing you to clean up joints between multiple structural members. For example, use multiple trim planes to angle both ends of a brace in a diagonally braced frame.

Trim planes can be edited using the Trim Planes worksheet or grip-edited. You can remove trim planes from a structural member to restore it to its original dimensions.

NOTE Although trim planes are depicted as square grids when selected for editing, they are actually infinite planes; thus you cannot use them to notch, cope, or cut holes in structural members.

Trimming a structural member with a trim plane



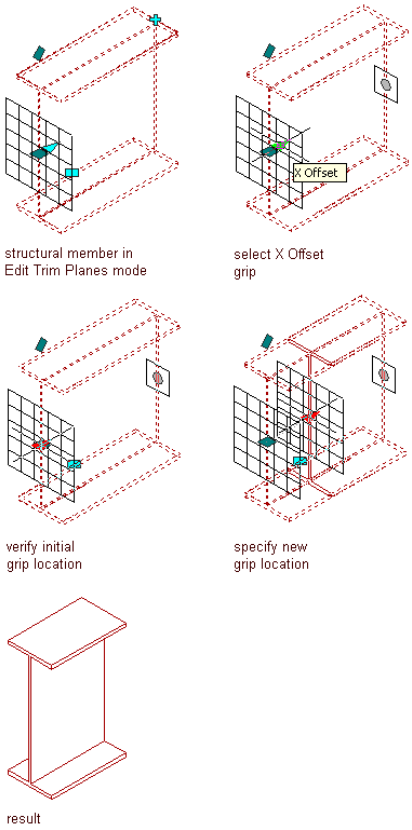
Adding a Trim Plane to a Structural Member

You can add any number of trim planes to a structural member. When you add a trim plane to one or more structural members, you define the position of the trim plane relative to the structural member that you are trimming.

When defining trim planes, you can:

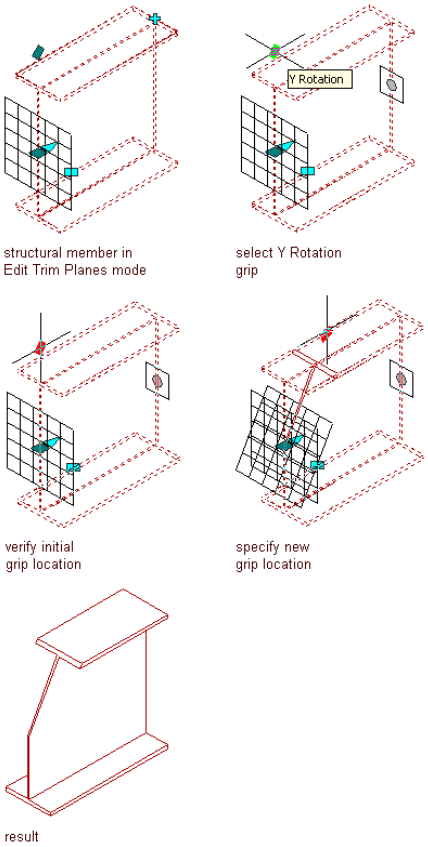
- Define the position of the trim plane relative to the start or end of the extruded axis of the member.
- Offset the trim plane in the *X* direction to move the origin of the trim plane along the extruded axis of the member.

Offsetting a trim plane in the X direction



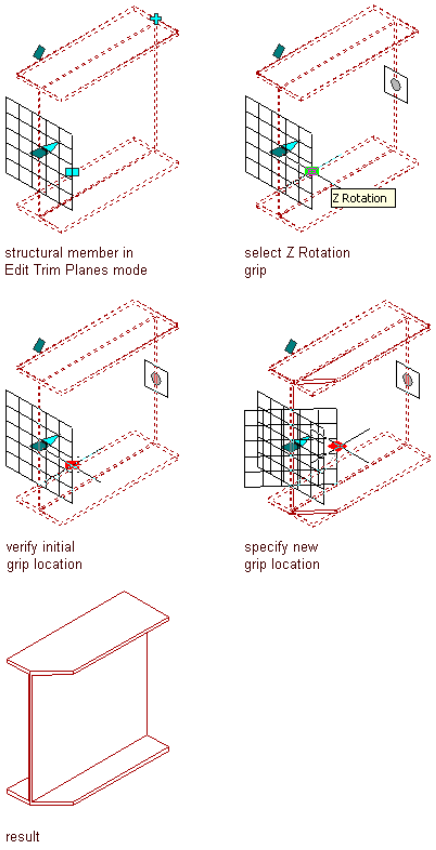
- Offset the trim plane in the *Y* and *Z* directions to move the origin of the trim plane perpendicular to the extruded axis of the member in the *Y* and/or *Z* direction.
- Rotate the trim plane around its *Y* axis to specify a cutting plane angle.

Rotating a trim plane about its Y axis



- Rotate the trim plane around its *Z* axis to specify a cutting plane angle.

Rotating a trim plane about its Z axis



1 Select the structural member you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Trim Planes .

3 Click Add .

4 Specify settings to position the trim plane:

If you want to…	Then…
offset the trim plane from the start point or endpoint of the member	select Start or End under Offset.
offset the trim plane in the *X* direction along the extruded axis of the member	enter an *X* value for Offset.
offset the trim plane in the *Y* and *Z* directions to position the trim plane perpendicular to the extruded axis of the member	enter *Y* and *Z* values for Offset.
rotate the trim plane around its *Y* or *Z* axis	enter *Y* and *Z* values for Rotation.

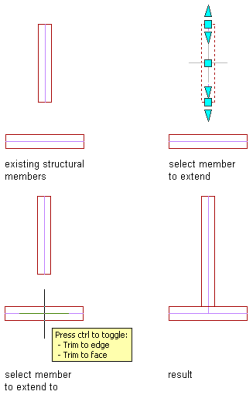
5 To copy a trim plane, select the trim plane, and click Copy .

6 Continue adding trim planes, and click OK.

Adding a Trim Plane Based on Another Object or Linework

Use this procedure to generate trim planes for one or more structural members based on a plane defined (or implied) by another structural member, an architectural object of another type, linework, or any 2 points you specify. The edge, face, or line that defines the trim plane does not have to intersect the members selected for trimming. The trim plane is projected perpendicular to the current UCS *XY* plane. Selected members are extended or trimmed to the trim plane, depending on whether they intersect it.

Extending a structural member to another structural member



1 Select the structural member(s) you want to extend or trim.

2 Click Structural Member tab ➤ Modify panel ➤ Add Trim Plane .

3 Define the trim plane:

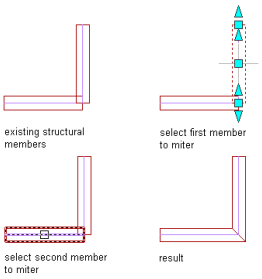
If you want to…	Then…
define a trim plane independent of any existing objects	press *ENTER*, specify the start point and endpoint of the trim plane, and then click the side on which you want to remove members.
use the edge or face of an existing object or linework as the trim plane	select the object or linework, and then click the side on which you want members removed. If you want to trim to the face of an object rather than its edge, press *Ctrl* before selecting the object.

Mitering Structural Members with Trim Planes

Use this procedure to generate trim planes that produce a mitered joint between 2 structural members that are connected at their endpoints.

NOTE If the value of Trim automatically (on the Properties palette) is Yes for each of the connected structural members, then any kind of grip edit to either member will result in a mitered joint between them.

Mitering two structural members with coincident endpoints



1 Select one of the structural member(s) you want to miter.

2 Click Structural Member tab ➤ Modify panel ➤ Miter .

3 Select the other structural member.

Changing a Structural Member Trim Plane

After you add one or more trim planes to a structural member, you can change the orientation of the trim planes. You can also grip-edit trim planes to move and rotate them.

1 Select the structural member you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Trim Planes .

3 Change any of the trim plane settings:

If you want to…	Then…
change the start or end offset of the trim plane	select Start or End under Offset.
change the trim plane offset in the *X* direction along the extruded axis of the member	change the *X* value for Offset.
change the trim plane offset in the *Y* and *Z* directions to position the trim plane perpendicular to the extruded axis of the member	change the *Y* and *Z* values for Offset.
change the rotation of the trim plane around the *Y* or *Z* axis	change *Y* and *Z* values for Rotation.

NOTE If you rotate a trim plane between 90 and 270 degrees, the opposite end of the structural member is completely removed.

4 Click OK.

Removing a Trim Plane from a Structural Member

Use this procedure to remove a trim plane from a structural member. When you remove all trim planes from a structural member, the structural member is restored to its original dimensions.

1 Select the structural member you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Trim Planes .

3 Select the trim plane that you want to remove.

4 Click Remove .

5 Click OK.

Changing the Style of a Structural Member

Use this procedure to select a different structural member style for one or more structural members. The style of a structural member provides its shape, so changing the style of a member changes its shape.

1 Select the structural members to change, and double-click one of them.

2 Expand Basic, and expand General.

3 Select a different style.

Applying Tool Properties to a Structural Member

Use this procedure to apply the properties of a structural member tool to one or more members of the same tool type (beam, brace, or column) in a drawing. The properties include any settings specified in the tool you select.

1 Open the tool palette that you want to use.

(You may have to scroll to display the desired tool.)

2 Right-click a structural member tool, and click Apply Tool Properties to ➤ <Beam, Brace, or Column>.

3 Select the structural members that coincide with the tool, and press *ENTER*.

4 Edit the properties of the structural member on the Properties palette, if needed.

Specifying the Cut Plane Display of a Structural Member

Use this procedure to specify the properties of one or more cut planes for an individual structural member. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Double-click the structural member you want to change.

2 On the Display tab of the Properties palette, under General, for Display component, verify that *NONE* is selected.

3 For Display controlled by, select This object.

NOTE To apply your changes to all structural members in the drawing, select Drawing default setting. To apply changes to all structural members of this style, select Structural Member Style:<style name>. For more information on styles, see Structural Member Styles on page 1724.

4 If necessary, expand Object Display Properties ➤ Cut Plane.

5 For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.

6 If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. (Alternatively, you can click the value, click , and specify 2 points in the drawing area to define the new height.)

7 Specify whether to display the true cut body of the structural member.

8 Specify whether to display object components both above and below the cut plane.

You can also access and modify these same cut plane settings through the structural member's context menu, as follows:

1 Select the structural member you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.

6 Click OK twice.

Specifying the Display of Custom Block Components of a Structural Member

Use this procedure to specify the display of custom block components for an individual structural member in a particular display representation. If you are going to use custom graphics for a new component, draw the component and save it as a block before you start this procedure.

1 Double-click the structural member.

2 On the Display tab of the Properties palette, under General, for Display component, verify that *NONE* is selected.

3 For Display controlled by, select This object.

NOTE To apply your changes to all structural members in the drawing, select Drawing default setting. To apply changes to all structural members of this style, select Structural Member Style:<style name>. For more information on styles, see Structural Member Styles on page 1724.

4 For Display representation, verify that the desired display representation is selected.

5 If necessary, expand Object Display Properties ➤ Advanced, and for Custom block display, click (the number in parentheses indicates the number of blocks currently attached to the structural member).

6 If you want to turn off the display of custom blocks for this structural member without removing them, select Disable Custom Blocks.

7 Specify whether to add, edit, or remove a block component:

If you want to…	Then…
add a new block component	click Add, and then click Select Block, select the block, and click OK.
edit an existing block component	select the component to edit, and click Edit.
remove an existing block component	select the block, click Remove, and click OK.

8 Select a setting for Position Along (x) to position the block in a location along the X-axis of the member.

9 Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

10 Specify whether you want repeat the block display along the X-axis of the member:

If you want to…	Then…
repeat the display of the block along the X-axis of the member	select Repeat Block Display.
offset the repeated blocks from the start or endpoint of the member	enter values for Start Offset and End Offset.
specify the space between the repeated blocks	enter a value for Space Between.
increase the spacing between repeated blocks so the insertion point of the last block is at the end offset distance from the end of the member	select Fit, and select Space Evenly.
scale the block so the extents of all the blocks fit between the start and end offset distances	select Fit, and select Scale to Fit.

11 Specify whether to mirror the block in the *X*,*Y*, or *Z* direction:

If you want to…	Then…
create a mirror of the block in the *X* direction	select Mirror X.
create a mirror of the block in the *Y* direction	select Mirror Y.
create a mirror of the block in the *Z* direction	select Mirror Z.

12 Click OK twice.

You can also add offsets between members to display them as you typically would in a top view framing plan. Note that the Use Member Offsets check box applies only to the start and end offsets. The Offset value below the check box applies only to structural braces, and allows you to offset them horizontally so that they are visible even when positioned directly underneath a beam.

Specifying the Offsets for a Structural Member in Plan Low Detail

Use this procedure to specify offset values for a selected structural member in the Plan Low Detail display representation.

Adding offsets between members lets you display them as you typically would in a top view framing plan. Note that the Use Member Offsets check box applies only to the start and end offsets.

1 Double-click the structural member.

2 On the Display tab of the Properties palette, under General, for Display component, verify that *NONE* is selected.

3 For Display controlled by, select This object.

NOTE To apply your changes to all structural members in the drawing, select Drawing default setting. To apply changes to all structural members of this style, select Structural Member Style:<style name>. For more information on styles, see Structural Member Styles on page 1724.

4 For Display representation, select Plan Low Detail.

5 If necessary, expand Object Display Properties ➤ Advanced, and click Offsets.

6 For Use Member Offsets, specify whether you want to use the start and end offsets of the member.

7 If you did not select Use Member Offsets, enter values for Start Offset and End Offset.

8 For Offset, enter the horizontal offset distance you want to use to make structural braces visible even when positioned directly underneath a beam.

9 Click OK.

Attaching Hyperlinks, Notes, and Files to a Structural Member

Use this procedure to enter notes and attach hyperlinks and reference files to a structural member. You can also edit notes and edit or detach reference files from a structural member.

1 Double-click the structural member.

2 In the Properties palette, click the Extended Data tab.

3 Click the setting for Hyperlink.

4 Specify the link, and click OK.

5 Click the setting for Notes.

6 Enter the note, and click OK.

7 Click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter your comments under Description for the document you are describing.
edit a reference file	double-click the reference file name to start the application needed to edit it.
detach a reference file	select the file name, and click Delete.

8 Click OK.

Working with Structural Member Body Modifiers

Body modifiers use the three-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to or subtract from a structural member. You can also use a body modifier to replace a structural member.

After you create a body modifier from an object, you can delete the original object. However, if you have created a complex object, such as a mass group comprising many mass elements, you may want to retain the object in the drawing until you are sure you have the results you want for the structural member.

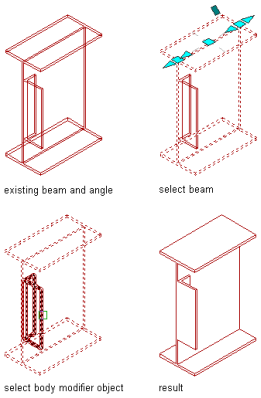
Adding a Body Modifier to a Structural Member

Use this procedure to create a body modifier and add it to a structural member.

You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use an angle as a body modifier to add to a beam.

Adding a body modifier to a structural member



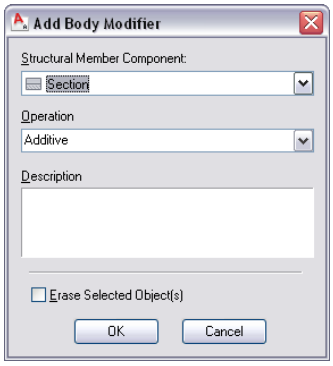
1 Place the object in the location where you want to add the body modifier to the structural member.

2 Select the structural member you want to change with the body modifier.

3 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .

4 Select the object to add to the structural member.

5 In the Add Body Modifier dialog box, select Additive for Operation.



6 Enter a description for the body modifier.

7 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

8 Click OK.

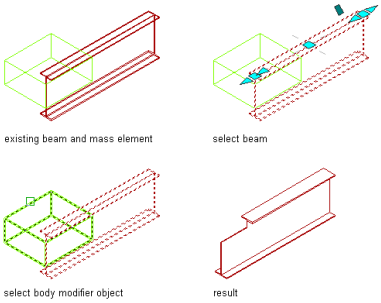
Subtracting a Body Modifier from a Structural Member

Use this procedure to create a three-dimensional (3D) body modifier and subtract it from a structural member.

You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use a box mass element as a body modifier to cope a beam.

Subtracting a body modifier from a structural member



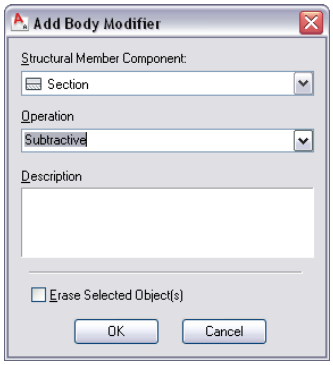
1 Place the object in the location where you want to subtract the body modifier from the structural member.

2 Select the structural member you want to change with the body modifier.

3 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .

4 Select the object to subtract from the structural member.

5 In the Add Body Modifier dialog box, select Subtractive for Operation.



6 Enter a description for the body modifier.

7 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

8 Click OK.

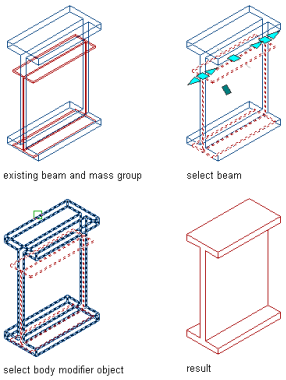
Replacing a Structural Member with a Body Modifier

Use this procedure to create a three-dimensional (3D) body modifier and replace a structural member with the modifier.

You can create a three-dimensional (3D) body modifier from a mass element, a mass group, or any other AEC object with mass. You can also create body modifiers from ACIS solids or blocks that form 3D bodies. You must place the object in the location you want in the drawing before defining the object as a body modifier.

The following illustration shows you how to use a mass group as a body modifier to replace a beam.

Replacing a structural member with a body modifier



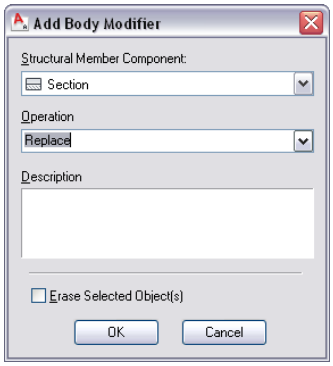
1 Place the object in the location where you want to replace the structural member with the body modifier.

2 Select the structural member you want to change with the body modifier.

3 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Add .

4 Select the object to replace the structural member.

5 In the Add Body Modifier dialog box, select Replace for Operation.



6 Enter a description for the body modifier.

7 Select Erase Selected Object(s) if you do not want to keep the original object, or clear this option to keep the object in the drawing.

8 Click OK.

Editing the Geometry of a Body Modifier

Use this procedure to edit the shape of a body modifier that is attached to a structural member. You can edit the body using grips to edit faces, using Boolean commands to add or remove other objects from the body modifier, and other editing commands to change its shape.

1 Select the structural member that has the body modifier you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Edit In Place .

A temporary mass element is created for you to edit the geometry of the body modifier. If the wall contains multiple body modifiers, a mass element is created for each body modifier. If object was not originally a mass element (for example, if you used a slab as a body modifier), the object becomes a temporary Free Form mass element with faces that you can edit.

NOTE After you perform an editing task, you may need to select a profile again to perform another editing task.

3 Edit the body modifier:

If you want to …	Then …
change the shape of a body modifier that is a Free Form mass element	select the body modifier. Select a Face grip to activate edge grips for the face. Move the grips to the desired locations. Continue editing other faces in the same manner.
change the shape of a body modifier that is a conventional mass element	select the body modifier. Select grips and move them to change the shape of the body modifier. The grips that are available depend on the type of mass element used as a body modifier and the current view direction.
add an object to a body modifier	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Union . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
subtract an object from a body modifier	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Subtract . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
create a body modifier that is the intersection of the original body modifier with another object	place the object in the location where it is needed. Select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Intersect . Select the object, and press *ENTER*. Enter **y** (Yes) to keep the object in the drawing, or press *ENTER* to erase it.
trim a body modifier	select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Trim By Plane . Specify the points that define the trim plane, and select the side of the body modifier to be trimmed. The trimmed body modifier is converted to a Free Form mass element.
divide the face of a body modifier into two faces	select the body modifier, and click Edit In Place tab ➤ Modify panel ➤ Split Face . Specify the points that define the edge created by splitting the faces.

If you want to …	Then …
join two faces that are on the same plane into a single face	select the body modifier and click Edit In Place tab ➤ Modify panel ➤ Join Faces . Select the edge that separates the coplanar faces.
remove a body modifier	select the object that forms the body modifier, and press *DELETE*.

4 Save or discard the changes:

If you want to …	Then …
restore the body modifier to its original shape	click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the body modifier	click Edit In Place tab ➤ Edits panel ➤ Finish . The body modifier uses the edited mass element to define its geometry.

Managing Body Modifiers

Use this procedure to edit or remove three-dimensional (3D) body modifiers from a structural member. You can select a different operation, or you can enter or edit the descriptions of body modifiers.

NOTE To remove a body modifier from a structural member and restore the modifier as a mass element that you can edit or apply to other structural members, see Restoring a Body Modifier to a Mass Element on page 1722.

1 Select the structural member you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Body Modifier .

3 Select a body modifier, and change its settings:

If you want to …	Then …
apply the body modifier to a different structural member	select a different structural member.
change the operation used to apply the body modifier to the structural member	select a different operation for Operation: ■ Select Additive to add the body modifier to the structural member ■ Select Subtractive to subtract the shape of the body modifier from the structural member ■ Select Replace to replace the structural member with the body modifier.
delete the body modifier from the structural member	select the body modifier, and click .
enter a description of the body modifier	click Description, enter text, and press *ENTER*.

4 Click OK.

Restoring a Body Modifier to a Mass Element

Use this procedure to remove a body modifier from a structural member and add it to the drawing as a mass element. Restoring a body modifier to a mass element enables you to modify the shape as a mass element and then add it to the structural member again as a body modifier. You can also restore the body modifier to a mass element while leaving the body modifier still applied to the structural member. This is useful if you want to create other structural members with the same shape.

If the object used to create the body modifier was a conventional mass element, it is restored to that mass element. For example, a cylinder mass element is restored as a cylinder mass element. However, if the body modifier was created from another object, such as a slab, or was edited using Boolean operations or face editing commands, the body modifier is restored as a Free Form mass element.

1 Select the structural member you want to change.

2 Click Structural Member tab ➤ Modify panel ➤ Body Modifiers drop-down ➤ Restore .

3 **NOTE** This procedure restores all body modifiers attached to a structural member.

Create mass elements from the body modifiers:

If you want to …	Then …
create mass elements from the body modifiers while keeping the body modifiers attached to the structural member	press *ENTER*.
remove *all* body modifiers from the structural member, and create mass elements from their shapes	enter **y** (Yes), and press *ENTER*.

Working with Structural Member Interference Conditions

You can modify the geometry of a Structural Member by using another object to create an interference condition within the structural member. For example, you can create a hole in a structural member. Unlike the object used to add a hole, which has no connection to the structural member and can be erased after the hole is added, the object used to create an interference condition remains partially or wholly embedded in the structural member, cutting out and replacing a part of its geometry. All interference conditions are subtractive in this sense, but the option you use to create the interference condition (Add or Subtract) determines whether the outline of the interference condition is included or excluded from the shrink wrap outline of the structural member in plan view.

Creating Structural Member Interference Conditions

Use the following procedure to create structural member interference conditions. Typically, after creating interference conditions for a structural member, you freeze the layer where the interfering objects are placed. If you move or edit the objects, the structural member updates accordingly.

NOTE Objects used as interference conditions are not included for the Area in the LIST command or in a Schedule Query result.

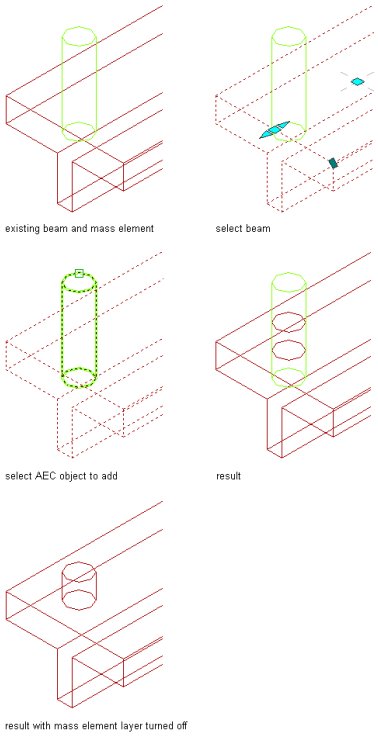
To create interference conditions for a structural member:

1 Create one or more objects in the actual location where you want the interference condition positioned in relation to the structural member.

2 Select the structural member.

3 Click Structural Member tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Add .

4 Select the objects to use as interference conditions, and press *ENTER*.



NOTE AEC objects from externally referenced (xref) files can be added to a structural member as interference conditions so long as the following conditions are met:

- The object is a three-dimensional (3D) body
- The xref is found
- The xref is read/write
- The xref is not locked or opened by another user
- The xref is loaded

Removing Structural Member Interference Conditions

Use this procedure to remove an interference condition from a structural member. Note that only the interference condition is removed; the object from which the interference condition was created remains in the drawing.

1 Select the structural member.

2 Click Structural Member tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Remove .

3 Select the objects to remove as interference conditions, and press *ENTER*.

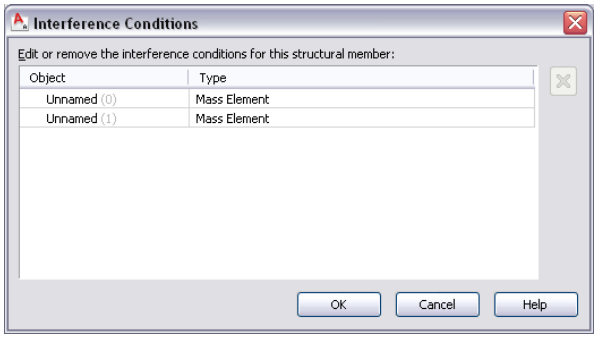
NOTE You can also remove interference conditions through the Interference Conditions worksheet. For more information, see Editing Structural Member Interference Conditions on page 1724.

Editing Structural Member Interference Conditions

Objects applied as interference conditions in structural members be edited like any other objects, using grips, tools on the Structural Member tab, context menu options, or the Properties palette. If you move or edit the objects, the structural member updates accordingly. You can also change the setting that determines whether an interference condition is added to or subtracted from the shrink wrap outline of the structural member in plan view by using the following procedure.

1 Select the structural member.

2 Click Structural Member tab ➤ Modify panel ➤ Interference Condition drop-down ➤ Interference Condition .



3 On the Interference Conditions worksheet, click the Shrinkwrap Effect value you want to change, and select a different value from the pull-down menu.

4 Click OK.

NOTE You can also use this worksheet to remove an interference condition by right-clicking its Object or Type value and then clicking Remove. The alternate method is to use the context menu of the structural member. When you remove an interference condition, you remove the association between the structural member and the object that was used to create the interference condition. The object itself is not removed from the drawing.

Structural Member Styles

A structural member style is a group of properties assigned to a structural member that determines the shape and other characteristics of the structural member. You can use structural member styles to represent standard structural member types for specific jobs and drawings or for office standards. When you create or modify a structural member style, the structural members using the style have the settings and characteristics of the style.

Usually you create structural member styles from the Structural Member Catalog or with the Structural Member wizard and drag them from the Style Manager onto a tool palette. You can also create your own structural member styles for custom structural members that you cannot create from the catalog or with the wizard. For more information, see Creating Custom Structural Members on page 1735.

Creating Tools from Structural Member Styles

You can create a structural member tool from any structural member style. Usually, you want to create structural members tools from styles that you create in the Structural Member Catalog or with the Structural Member Style wizard. However, you can also create a structural member tool from a style that you create in the Style Manager. You can save the style to a drawing file and create a structural member tool with the style. You can then specify default settings for any structural member created with that tool. For more information, see Creating Structural Member Tools on page 1666.

Managing Structural Member Styles

To create, edit, copy, or purge structural member styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

Creating a Structural Member Style in the Style Manager

Use this procedure to create a structural member style in the Style Manager. You can create a style using default style properties, by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Structural Member Styles.

3 Create a structural member style:

If you want to…	Then…
create a style with default properties	right-click Structural Member Styles, and click New.
create a style from an existing style	right-click the structural member style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new structural member style, and press *ENTER*.

5 Edit the new structural member style:

If you want to…	Then…
enter a description of the style	click the General tab, and enter a description.
specify whether a member with this style will automatically trim to existing members when added to a drawing and whether its trim planes will be adjusted automatically if it is grip edited directly, or if its endpoints move in response to grip-editing of a logically connected member	click the Design Rules tab, and select or clear Trim Members Automatically. This option is selected by default for new styles. The setting can be overridden in the tool or object properties.
change the design rules of the style to create a custom structural member	see Creating Custom Structural Members on page 1735.
specify materials for the components of the style	see Specifying the Materials of a Structural Member Style on page 1726.
specify hatching, cut plane properties, and other display properties of the style	see Specifying the Display Properties of a Structural Member Style on page 1727.
add classifications to a structural member style	see Specifying Classifications for a Structural Member Style on page 1734.
add notes and files to the style	see Attaching Notes and Files to a Structural Member Style on page 1735.

6 Click OK.

7 If you want to assign the style to a structural member tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating Structural Member Tools on page 1666.

8 Click OK.

Specifying the Materials of a Structural Member Style

A structural member consists of a number of components whose display properties can be determined by the materials assigned to each component. When you assign materials to a structural member style, you assign one material to each physical component of the structural member. You assign materials to components in each display representation where you want the materials to be used.

If you want to use the display properties of the structural member style, instead of using material display properties, you can turn off the material assignments in the display properties of the structural member style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component of a material is used to hatch all object surfaces in three dimensional (3D) model views and in elevations.

Structural Member Materials and Display Components

The following table identifies the material component that corresponds to each structural member component:

Structural Member Component	Material Component
Elevation, Elevation High Detail	
Visible Comp 1-10	Plan Linework
Model, Model High Detail, Model Low Detail	
Component 1 - 10	3D Body
Plan, Plan Low Detail, Plan High Detail, Plan Presentation, Plan Screened	
Visible Comp 1-10	Plan Linework
Hatch 1 - 20	Plan Hatch
Reflected, Reflected Screened	
Visible Comp 1-10	Plan Linework

Assigning Materials to a Structural Member Style

Use this procedure to assign materials to the individual components of a structural member style. When you assign a material to a structural member component, the component uses the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the structural member. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, all structural member components are physical components that you can assign materials. The connection and axis are symbols, and you cannot assign materials to them.

NOTE If a material assignment does not determine the display properties of a structural member component, you can change the display properties of the structural member style as described in Specifying the Display Properties of a Structural Member Style on page 1727.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Structural Member Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select By Material for any component to which you want to assign a material, and click OK.

   If the setting for By Material is not available, the display of this component cannot be determined by a material.
9. Click the Materials tab.
10. Select the component you want to change, and select a different material definition.

    You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

    WARNING Although you can edit a material definition from this dialog box, any changes you make to the material definition apply to all objects that are assigned the material.
11. Click OK.

Specifying the Display Properties of a Structural Member Style

In most cases, you can assign materials to structural member components so that the appearance of structural members that belong to the same style is consistent throughout a drawing and with other structural members and objects that use the same materials.

If a component cannot be assigned a material, or if you do not want to use materials but still want consistency among structural members of the same style, you can specify the display properties of the structural member components in the structural member style:

- Layer, color, and linetype of structural member components
- Hatching used with each component
- Cut plane height and the display of components relative to the cut plane
- Other specific structural member display information, such as whether custom blocks are added to the display of the structural member

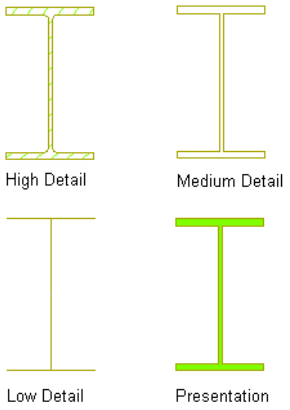
You can also use the Display tab of the Properties palette to change the display property settings for a selected object display component in the current display representation. For more information, see Using the Properties Palette to Change Display Properties on page 514.

About Structural Member Display Representations

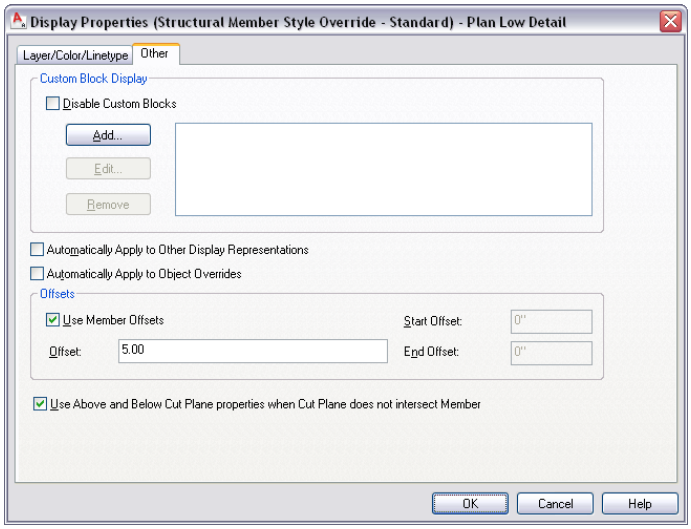
Structural member geometry is created by a shape contained in the style of the structural member that is extruded along the axis of the member. Each shape can have different levels of detail in its geometry, allowing different displays of the structural member that the shape is defining. If you look at the display representations of a structural member, you see that there may be more than one of the same representation. Each representation displays the structural shape in a different level of detail.

For example, you can use the Plan, Plan High Detail, and Plan Low Detail structural member representations to display a plan view of a structural member.

Displaying a structural member with the Plan High Detail, Plan Low Detail, and Plan display representations



The Plan Low Detail display representation displays the member with simple lines and arcs. You can use this display representation to create a top view framing plan where you want a single line representation of a column. The Plan Low Detail display representation includes two display components, Beam Sketch and Brace Sketch. You can change the display properties of these components, such as layer, color, and linetype, to differentiate the display of beams and braces. On the Other tab of the style override dialog box for this display representation, you can also add offsets between members to display them as you typically would in a top view framing plan. Note that the Use Member Offsets check box applies only to the start and end offsets. The Offset value below the check box applies only to structural braces, and allows you to offset them horizontally so that they are visible even when positioned directly underneath a beam.



The Plan and Plan High Detail display representations display the previous column using closed polylines. Both representations display the column geometry, but the Plan High Detail representation is more detailed,

including fillets in the column display. Use the Plan representation to improve performance while modeling, and the Plan High Detail representation to display an added level of detail for detail drawings.

The following table lists the structural member display representations and their uses:

Use this display representation…	To…
Elevation	display an elevation view of a structural member with simplified geometry for better performance when modeling.
Elevation High Detail	display an elevation view of a structural member in full detail.
Logical	display the extruded axis of a structural member and connections between members. Connections are automatically established between members when they touch endpoint to endpoint or endpoint to a point on the extruded axis of another member.
Model	display a 3D structural member with simplified geometry for better performance when modeling.
Model High Detail	display a 3D structural member in full detail for large scale details.
Plan	display a 2D structural member in less detail than the Plan High Detail representation to improve performance. Members display as closed polylines, rather than lines and arcs as in the Plan Low Detail representation.
Plan High Detail	display a 2D structural member in full detail.
Plan Low Detail	display a 2D structural member with simple lines and arcs to create a top view framing plan. Includes a Beam Sketch and Brace Sketch display component to differentiate beams and braces in plan view.
Plan Presentation	display a 2D structural member with solid hatching (poche) for plan view presentation drawings.
Plan Screened	display a 2D structural member in the screened portion of a screened floor plan, with components and hatching visibly lighter than some other objects.
Reflected	display a 2D structural member in a reflected ceiling plan.
Reflected Screened	display a 2D structural member in the screened portion of a screened reflected ceiling plan with components and hatching visibly lighter than some other objects.

Specifying the Layer, Color, and Linetype of a Structural Member Style

Use this procedure to change the following display properties of the components of a structural member style:

- Visibility (component is on or off)

- By material (material assigned to the display component determines its display properties)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE If a material assignment determines the display properties of components in the structural member style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Assigning Materials to a Structural Member Style on page 1726.

NOTE For multi-component structural members, hidden lines are calculated one component at a time.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the structural member style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Layer/Color/Linetype tab.
8 Select the component to change, and select a different setting for the property.
9 Click OK twice.

Specifying the Hatching for Components of a Structural Member Style

Use this procedure to specify the hatching of the components of a structural member style. Structural member hatching is displayed only in display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the structural member style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Hatching tab.
8 Select a component, and click the setting for Pattern.
9 Select the hatching for the component:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.

If you want to…	Then…
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.

11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

12 Click Angle, and enter the angle for the selected pattern.

13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

14 Click OK twice.

Specifying the Cut Plane Elevation of a Structural Member Style

Use this procedure to specify the cut plane elevation of a structural member style. The cut plane settings you specify in the structural member style override the cut plane settings in any display configuration applied to a viewport.

NOTE If the cut plane does not intersect the structural member, all visible and hidden components display. If the cut plane does intersect the member, only the cross section of the components of the structural member displays. These are the actual member shapes unless you select True Cut Body.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Structural Member Styles.

3 Select the structural member style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Other tab.

8 Select Override Display Configuration Cut Plane.

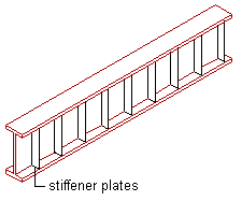
9 Enter a value for Cut Plane Height.

10 Click OK twice.

Using Custom Blocks to Add Graphics to a Structural Member Style

You can add custom blocks to the display of a structural member as a component in a display representation. For example, you can add stiffener plates to beams as a custom blocks or add clip angles to members as a custom blocks.

Adding stiffener plates to a beam



Custom blocks can be either 2D or 3D. When you add a custom block, you can specify several rules for positioning and scaling the new component. Each custom block also appears in the display properties component list so that you can control its layer, color, and linetype. For more information, see Adding Custom Blocks as a Display Component in a Structural Member Style on page 1732.

Be sure to set the properties of the objects used to create your custom blocks to ByBlock. Otherwise, you cannot control these objects through the display properties. For more information about ByBlock, see "Control the Color and Linetype Properties in Blocks" in AutoCAD help.

To change these display properties for all structural members of the same structural member style, see Specifying the Display Properties of a Structural Member Style on page 1727.

Adding Custom Blocks as a Display Component in a Structural Member Style

Use this procedure to add or edit custom block components in the display representation of a structural member style.

1. Create a 2D or 3D block for the component that you want to add to the structural member.

   Create the block in the same plane as the structural member that you use to represent structural member. For more information about custom blocks, see Using Custom Blocks to Add Graphics to a Structural Member Style on page 1732.

2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. Expand Architectural Objects, and expand Structural Member Styles.
4. Select the structural member style that you want to change.
5. Click the Display Properties tab.

   The display representation in bold is the current display representation.

6. Select the display representation where you want the changes to appear, and select Object Override.
7. If necessary, click .
8. Click the Other tab.
9. Under Custom Block Display, click Add.
10. Click Select Block and select the block you created.
11. Select a setting for Position Along (x) to position the block in a location along the X-axis of the member.
12. Specify an insertion offset of the block in the *X*, *Y*, and *Z* directions.

13 Specify whether you want repeat the block display along the X-axis of the member:

If you want to…	Then…
repeat the display of the block along the X-axis of the member	select Repeat Block Display.
offset the repeated blocks from the start or endpoint of the member	enter values for Start Offset and End Offset.
specify the space between the repeated blocks	enter a value for Space Between.
increase the spacing between repeated blocks so the insertion point of the last block is at the end offset distance from the end of the member	select Fit, and select Space Evenly.
scale the block so the extents of all the blocks fit between the start and end offset distances	select Fit, and select Scale to Fit.

14 Specify whether to mirror the block in the *X*,*Y*, or *Z* direction:

If you want to…	Then…
create a mirror of the block in the *X* direction	select Mirror X.
create a mirror of the block in the *Y* direction	select Mirror Y.
create a mirror of the block in the *Z* direction	select Mirror Z.

15 Click OK twice.

Turning Off Custom Blocks in a Structural Member Style

Use this procedure to turn off the display of custom blocks without removing them from the structural member style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the structural member style that you want to change.
4 Click the Display Properties tab.
The display representation in bold is the current display representation.
5 Select the display representation where you want to turn off custom blocks, and select Object Override.
6 If necessary, click .
7 Click the Other tab.
8 Under Custom Block Display, select Disable Custom Blocks.
9 Click OK twice.

Removing Custom Blocks from a Structural Member Style

Use this procedure to remove custom blocks from the display of a structural member.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the structural member style that you want to change.
4 Click the Display Properties tab.
   The display representation in bold is the current display representation.
5 Select the display representation where you want to turn off custom blocks, and select Object Override.
6 If necessary, click .
7 Click the Other tab.
8 Under Custom Block Display, select the block and click Remove.
9 Click OK twice.

Specifying Classifications for a Structural Member Style

Use this procedure to specify classifications for any classification definition applied to a structural member style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the style that you want to change.
4 Click the Classifications tab.
   By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to structural member styles.
5 For each classification definition, select the classification you want to apply to the current structural member style.
6 Click OK.

Defining a Structural Member Style as Bounding for Associative Spaces

Use this procedure to define a structural member style that can bound associative spaces.

When a structural member style is set as bounding, by default all beams, braces, and columns that have the style assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding setting from the structural member style in an individual beam, brace, or column, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select a structural member style.
4 Click the General tab.
5 Select the check box for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Structural Member Style

Use this procedure to enter notes and attach reference files to a structural member style. You can also edit notes and edit or detach reference files from a structural member style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Structural Member Styles.
3 Select the structural member style you want to change.
4 Click the General tab.
5 To add a description to the structural member style, enter it for Description.
6 Click Notes.
7 To add a note, click the Text Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK.

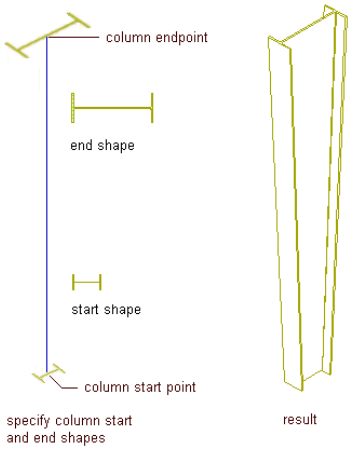
Creating Custom Structural Members

You can specify design rules within a structural member style to create a custom structural member. The design rules allow you to specify one or more shapes to extrude along the path (axis) of a structural member. You can assign and position a start and end shape for each segment of a structural member.

Creating Single-Segmented Custom Structural Members

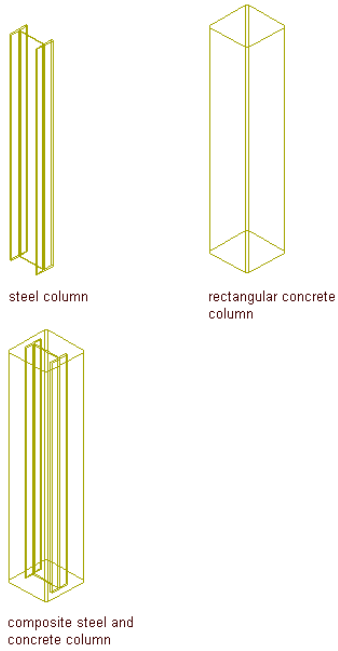
A single-segment member can start and end with the same shape, or you can specify different start and end shapes. For example, you can create a tapered column by assigning different start and end shapes to a single-segment column.

Creating a tapered column



You can also assign different shapes to the same single-segment member by adding a component to the member. By adding a component in the design rules and assigning different shapes to the same segment, you can create a structural member with overlapping shapes. For example, you can create a concrete encased steel column by adding a component with a steel column shape to a concrete column.

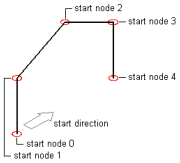
Creating a composite steel and concrete column



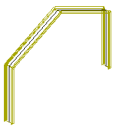
Creating Multi-Segmented Custom Structural Members

For multi-segmented structural members, you can assign different shapes to each segment of the member as components of the member. A series of nodes (starting at 0 at the start point of the member) correspond to each vertex of the member path. By assigning different shapes to segments between nodes on the member path, you can create a structural member that transforms from one shape to different shapes along the member path. For example, you can use this method to create a rigid frame.

Creating the rigid frame



custom member nodes


polyline converted to rigid frame

Creating Custom Shapes for Structural Members

When you create custom structural members, you can use the shapes contained in styles that you create from the Structural Member Catalog or Structural Member Style wizard, or you can create your own custom shapes. When you create a custom shape, you can only add it to a structural members in the design rules of the structural member style.

Understanding the Design Rules of a Structural Member

Use this procedure to access and understand the options in the design rules of a structural member.

1 Select a structural member.

2 Click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

3 Click Design Rules.

4 On the Design Rules tab, click Show Details.

You can use the following options in the design rules to create custom members:

This option…	Allows you to…
Component	add multiple components to a structural member. Each component includes a name and can include a start and end shape and a priority. You can remove and copy the components of a structural member.
Start Shape and End Shape	select a shape and a set of parameters to the start and end of a structural member component. The component shapes can be the same shape or a different shape. If End Shape is using the Start Shape, an asterisk (*) displays next to the end shape. To transform the shape of the member along the member path, the end shape must be explicitly set.
Priority	assign a priority to a component. Components that start and end at a common node are mitered based on their priorities. Components with the same priority are factored into the miter angle between the components. Components with different priorities are not factored into the miter angle. Components with the lowest priority will affect the justification of the member when Justify Overall Extents is cleared on the Dimensions tab in the properties of the member.

This option…	Allows you to…
Name	select shapes that you assign to the start and end of the member or member segment. You can select shapes contained in structural member styles, or custom shapes that you create.
Relative to	define the position of the shape relative to the start or end of the member.
Node	place shapes on the member path relative to the start or end of the member. To place shapes on the member path, assign them to nodes on the member path. A single segment member has two nodes; the start point and the endpoint of the member. Multi-segmented members have additional nodes located at each vertex of the member path, allowing you to assign different shapes to the start and end of each segment of the member. If you place shapes on the member path relative to the start of the member, then the start point of the member path is Node 0. The first vertex on the member path is Node 1, and so on until the endpoint of the member path is defined as the final node. If you place shapes on the member path relative to the end of the member, then the endpoint of the member is Node 0.
Scale	scale the shape.
Mirror	mirror the shape.
Rotation	rotate the shape.
X Offset	offset the shape in the *X* direction along the member path.
Y Offset	offset the shape in the *Y* direction perpendicular to the member path.
Z Offset	offset the shape in the *Z* direction perpendicular to the member path.

5 Click Add to add a component to a structural member.

A component with the same values as the preceding component is added to the design rules.

6 Click Copy to copy a component.

7 Click Remove to remove a component.

8 Click OK.

Changing the Shape in the Style of a Structural Member

Use this procedure to change the shape that is extruded along the axis of a structural member created from a single shape. You can create a new shape for the structural member by creating a custom shape, or by creating a new style from the Structural Member Catalog that contains a shape.

1 Create a structural member with a single shape.

For more information, see Using Structural Member Tools to Create Structural Members on page 1674.

2 Create a new shape for the structural member:

If you want to create…	Then…
a custom shape for the member	create a custom shape. See Creating a Custom Shape for a Structural Member on page 1750.
a shape from the Structural Member Catalog	create a structural member style in the Structural Member Catalog that contains the shape. See Creating a Style from a Shape in the Structural Member Catalog on page 1662.

3 Select the structural member.

4 Click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

5 Click the Design Rules tab.

6 In the Name list under Start Shape, select the shape that you created in step 2.

If you created a custom shape in step 2, the name of the shape displays in the Name list. If you created a style from the Structural Member Catalog, the shape displays in the Name list with the name of the shape that you selected in the catalog to create the style, not with the style name that you created.

7 Click OK.

Adding a Shape to a Structural Member

Use this procedure to add one or more shapes to a structural member in the design rules of the structural member style. You can create a new shape to add to the structural member by creating a custom shape, or by creating a new style from the Structural Member Catalog that contains a shape.

1 Create a structural member with a single shape.

For more information, see Using Structural Member Tools to Create Structural Members on page 1674.

2 Create a new shape to add to the structural member:

If you want to…	Then…
create a custom shape for the member	create a custom shape. See Creating a Custom Shape for a Structural Member on page 1750.
create a shape from the Structural Member Catalog	create a structural member style in the Structural Member Catalog that contains the shape. See Creating a Style from a Shape in the Structural Member Catalog on page 1662.

3 Select the structural member.

4 Click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

5 Click the Design Rules tab.

6 Click Add.

A new component is added to the structural member.

7 Type a name for each component under Component.

8 For the new component, from the Name list under Start Shape, select the shape that you created in step 2.

If you created a custom shape in step 2, the name of the shape is displayed in the Name list. If you created a style from the Structural Member Catalog, the shape is displayed in the Name list with the name of the shape that you selected in the catalog to create the style, not with the style name that you typed.

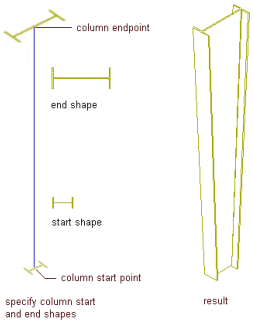
9 Click OK.

The structural member is redrawn with the new shape added to its geometry.

Process Overview: Creating a Single-Component Structural Member (Tapered Column)

Use this example to create a tapered column, a single-component structural member that starts with one shape and ends with another.

Creating a tapered column



The process of creating this tapered column has four steps:

1 Create two structural member styles in the Structural Member Catalog that contain the start and end shapes to taper over the length (height) of the column.

2 Create a Tapered Column tool.

3 Create a column with the tapered column style.

4 Specify design rules in the tapered column style to add the start and end shapes in the styles that you created in step 1 to the tapered column.

Creating Start and End Shapes for the Tapered Column

Use this procedure to create two styles that contain the start and end shapes for the tapered column. The first style contains the start shape for the column and the second style contains the end shape for the column.

1 Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Structural Member Catalog .

2 Expand Imperial in the tree view in the left pane of the Structural Member Catalog.

3 Expand Steel, AISC, and then I-Shaped.

4 Select Wn, Wide-Flange Shapes.

5 Right-click W8X31 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.

6 Enter W8X31, and click OK.

7 Select W1n, Wide-Flange Shapes in the tree view in the left pane.

8 Right-click W14X43 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.

9 Enter W14X43 and click OK.

10 Click to close the Structural Member Catalog.

Creating the Tapered Column Tool

Use this procedure to create a tapered column tool. Save the style for the tapered column in the Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Click Open Drawing .

3 Open Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.

4 Expand Architectural Objects, right-click Structural Member Styles, and click New.

5 Enter Tapered Column for the name, and press *ENTER*.

6 Click OK to close the Style Manager.

7 Click Yes to save changes to the *Member Styles (Imperial).dwg*.

8 In the title bar of the tool palettes set, click , and then click New Palette.

9 Enter Structural, and press *ENTER*.

10 Open the Design palette, select the Structural Column tool, right-click, and click Copy.

11 Open the Structural palette, right-click, and click Paste.

12 Select the new tool, right-click, and click Properties.

13 Enter Tapered Column for the Name.

14 Click the setting for Description.

15 Enter Creates a tapered column, and click OK.

16 Expand Basic, and expand General.

17 Click Style location.

18 Select Browse, select the Member Styles.dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*, and click Open.

19 Click Style and select Tapered Column.

20 Click OK.

Creating a Column with the Tapered Column Tool

Use this procedure to create a column with the tapered column tool that you created.

1 Select the Tapered Column tool from the tool palette.

2 Press *ENTER* to create a column that is not anchored to a grid.

3 Specify the insert point of the column.

4 Specify the roll, which is the rotation around the extruded axis of the column, and press *ENTER*.

Adding the Start and End Shapes to the Tapered Column

Use this procedure to add the start and end shapes to the tapered column and transform them along the member path.

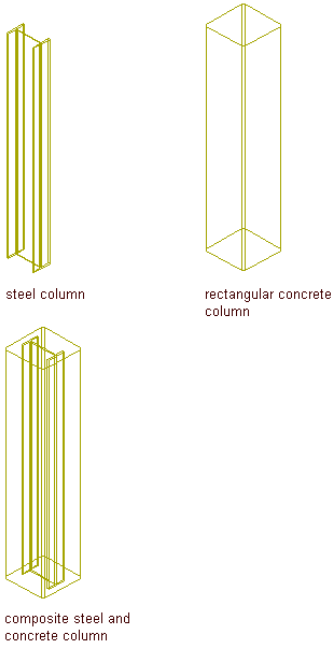
1. Select the column, and click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .
2. Click Design Rules.
3. Click Show Details.
4. Select Unnamed under Component, and enter Component 1.
5. Under Start Shape, select W8X31 from the Name list.
6. Scroll to the end of the Design Rules dialog box to display the End Shape parameters.
7. Under End Shape, select W14X43 from the Name list.
8. Click OK.

The complete tapered column displays in your drawing.

Process Overview: Creating a Multi-Component Structural Member (Composite Column)

Use this example to create a steel column encased in concrete, a multi-component structural member with a single segment. The steel column shape is one component of the member, the concrete column shape another.

Creating a composite steel and concrete column



The process of creating this composite column has four steps:

1. Create two structural member styles: one that contains the shape for the concrete column and one that contains the shape for the steel column.
2. Create a Composite Column tool.

3 Create a column with the composite column style.

4 Specify design rules in the composite column style to add the concrete and steel shapes to the column.

Creating the Steel and Concrete Shapes for the Composite Column

Use this procedure to create two styles: one that contains the steel shape and one that contains the concrete shape.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Structural Member Catalog .

2 Expand Imperial in the tree view in the left pane of the Structural Member Catalog.

3 Expand Steel, AISC, and then I-Shaped.

4 Select Wn, Wide-Flange Shapes.

5 Right-click W8X31 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.

6 Enter W8X31, and click OK.

7 Expand Concrete, and then Pre-Cast.

8 Select Rectangular Columns.

9 Right-click 16X16 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.

10 Enter 16X16 and click OK.

11 Click to close the Structural Member Catalog.

Creating the Composite Column Tool

Use this procedure to create a composite column tool. Save the style for the composite column in the Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Click Open Drawing .

3 Open Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.

4 Expand Architectural Objects, right-click Structural Member Styles, and click New.

5 Enter Composite Column for the name, and press *ENTER*.

6 Click OK to close the Style Manager.

7 Click Yes to save changes to the *Member Styles (Imperial).dwg*.

8 In the title bar of the tool palettes set, click , and then click New Palette.

9 Enter Structural, and press *ENTER*.

10 Open the Design palette, select the Structural Column tool, right-click, and click Copy.

11 Open the Structural palette, right-click, and click Paste.

12 Select the new tool, right-click, and click Properties.

13 Enter Composite Column for the Name.

14 Click the setting for Description.

15 Enter Creates a composite column, and click OK.

16 Expand Basic, and expand General.

17 Click Style location.

18 Select Browse, select the Member Styles.dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*, and click Open.

19 Click Style and select Composite Column.

20 Click OK.

Creating a Column with the Composite Column Tool

Use this procedure to create a column with the composite column tool that you created.

1 Select the Composite Column tool from the tool palette.

2 Press *ENTER* to create a column that is not anchored to a grid.

3 Specify the insertion point of the column.

4 Specify the roll, or rotation around the extruded axis of the column, and press *ENTER*.

Adding the Steel and Concrete Shapes to the Composite Column

Use this procedure to add the steel and concrete shapes to the composite column.

1 Select the column, and click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click Design Rules.

3 Click Show Details.

4 Select Unnamed under Component, and enter Component 1.

5 Under Start Shape, select 16X16 from the Name list.

6 Click Add.

A new component is added to the design rules of the column. By default, the start and end shapes are the same as the preceding component.

7 Select Unnamed under Component, and enter Component 2.

8 Under Start Shape for Component 2, select W8X31 from the Name list.

Do not change the other Start Shape parameters.

9 Click OK.

The composite column displays in your drawing.

Process Overview: Creating a Multi-Component Structural Member Using Multiple Segments (Rigid Frame)

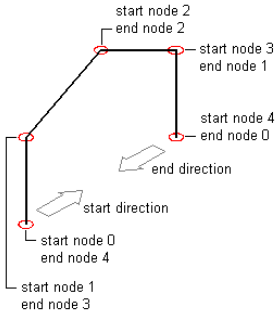
Use this example to create a rigid frame, a multi-segmented structural member created from multiple shapes that transform at each vertex of the structural member path.

To create the rigid frame, you convert a multi-segmented polyline to a structural member and assign different start and end shapes to each segment of the member as components in the design rules of the rigid frame style. A series of nodes correspond to the start point, vertices, and the endpoint of the member path. By assigning different shapes to segments between nodes on the member path, the rigid frame transforms from one shape to several shapes along its path.

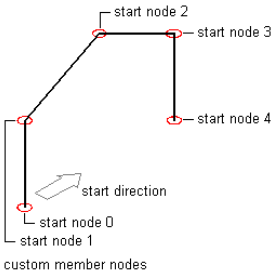
Assign shapes to the rigid frame member relative to the start of the member. The start point is defined as Node 0. The first vertex of the member is defined as Node 1, the next vertex is Node 2, and so on until the endpoint of the member, which is defined as the end node.

NOTE If you assign shapes relative to the end of the member, the endpoint of the member is defined as Node 0.

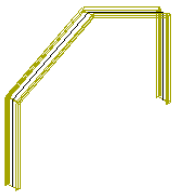
Identifying nodes on the member path



Creating the rigid frame



custom member nodes



polyline converted to rigid frame

The process of creating this rigid frame has seven steps:

1. Create two styles in the Structural Member Catalog that contain the shapes that transform over the path of the rigid frame.
2. Create a rigid frame style and tool.
3. Draw a multi-segmented polyline path for the rigid frame and use the rigid frame tool to convert the path to a structural member.
4. Create the first leg of the rigid frame by assigning start and end shapes to the first segment of the frame.
5. Create the first rafter of the rigid frame by assigning start and end shapes to the second segment of the frame.
6. Create the second rafter of the rigid frame by assigning start and end shapes to the third segment of the frame.
7. Create the second leg of the rigid frame by assigning start and end shapes to the fourth segment of the frame.

Creating Shapes for the Rigid Frame

Use this procedure to create two styles that contain the two shapes that transform over the path of the rigid frame.

1. Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Structural Member Catalog .
2. Expand Imperial in the tree view in the left pane of the Structural Member Catalog.
3. Expand Steel, AISC, and then I-Shaped.
4. Select Wn, Wide-Flange Shapes.
5. Right-click W8X31 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.
6. Enter W8X31, and click OK.
7. Select W1n, Wide-Flange Shapes in the tree view in the left pane.
8. Right-click W14X43 in the lower right pane of the Structural Member Catalog, and click Generate Member Style.
9. Enter W14X43 and click OK.
10. Click to close the Structural Member Catalog.

Creating the Rigid Frame Tool

Use this procedure to create a rigid frame tool. Save the style for the rigid frame in the Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.

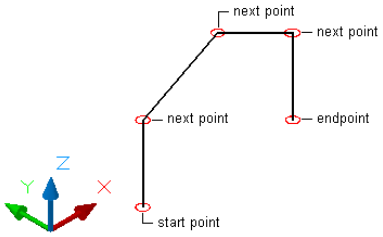
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Click Open Drawing .
3. Open Member Styles (Imperial).dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*.
4. Expand Architectural Objects, right-click Structural Member Styles, and click New.
5. Enter Rigid Frame for the name, and press *ENTER*.
6. Click OK to close the Style Manager.
7. Click OK to save changes to the *Member Styles (Imperial).dwg*.
8. In the title bar of the tool palettes set, click , and then click New Palette.
9. Enter Structural, and press *ENTER*.
10. Open the Design palette, select the Structural Column tool, right-click, and click Copy.
11. Open the Structural palette, right-click, and click Paste.
12. Select the new tool, right-click, and click Properties.
13. Enter Rigid Frame for the Name.
14. Click the setting for Description.
15. Enter Creates a rigid frame, and click OK.
16. Expand Basic, and expand General.
17. Click Style location.
18. Select Browse, select the Member Styles.dwg located in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial*, and click Open.
19. Click Style and select Rigid Frame.
20. Click OK.

Drawing the Rigid Frame Path and Converting it to a Structural Member

Use this procedure to draw a polyline path in the shape of the rigid frame, and then convert it with the Rigid Frame tool you created in Step 2.

1 In plan view, draw a polyline path for the rigid frame.

Drawing the rigid frame path



2 On the Structural palette, select the Rigid Frame tool.

3 Right-click, select Apply Tool Properties to ➤ Linework.

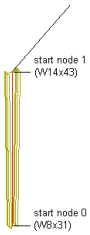
4 Select the polyline that you created in step 1.

5 Enter y (Yes) to leave the original polyline in the drawing and press *ENTER*.

Creating the First Leg of the Rigid Frame

Use this procedure to create the first leg of the rigid frame by assigning a different start and end shape to the first segment of the rigid frame member.

Creating the first leg of the rigid frame



1 Select the rigid frame.

2 Select the column, and click Structural Member tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

3 Click Design Rules.

4 Click Show Details.

5 Select Unnamed under Component, and enter Leg 1.

6 Under Start Shape, in the Name list, select W8X31.

7 Select Start for Relative to.

8 Enter 0 for Node.

Node 0 is relative to the start point of the member path.

9 Enter 90 for Rotation.

10 Scroll to the end of the Design Rules dialog box to display the End Shape parameters for Leg 1.

11 Under End Shape, in the Name list, select W14X43.

12 Select Start for Relative to.

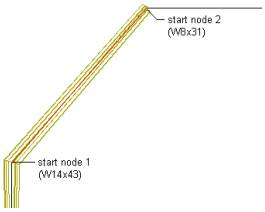
13 Enter 1 for Node.

Node 1 corresponds to the vertex formed by the endpoint of the first segment of the member path and the start point of the second segment of the member path.

Creating the First Rafter of the Rigid Frame

Use this procedure to create the first rafter of the rigid frame by assigning a different start and end shape to the second segment of the rigid frame member.

Creating the first rafter of the rigid frame

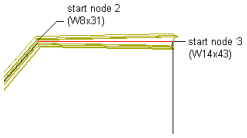


1 Click Add to add a second component to the structural member.
2 Select Unnamed under Component, and enter Rafter 1.
3 Under Start Shape, in the Name list, select W14X43.
4 Select Start for Relative to.
5 Enter 1 for Node.
6 Scroll to the end of the Design Rules dialog box to display the End Shape parameters for Rafter 1.
7 Under End Shape, in the Name list, select W8X31.
8 Select Start for Relative to.
9 Enter 2 for Node.

Creating the Second Rafter of the Rigid Frame

Use this procedure to create the second rafter of the rigid frame by assigning a different start and end shape to the third segment of the rigid frame member.

Creating the second rafter of the rigid frame

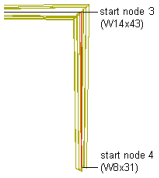


1 Click Add to add a third component to the structural member.
2 Select Unnamed under Component, and enter Rafter 2.
3 Under Start Shape, in the Name list, select W8X31.
4 Select Start for Relative to.
5 Enter 2 for Node.
6 Scroll to the end of the Design Rules dialog box to display the End Shape parameters for Rafter 2.
7 Under End Shape, in the Name list, select W14X43.
8 Select Start for Relative to.
9 Enter 3 for Node.

Creating the Second Leg of the Rigid Frame

Use this procedure to create the second leg of the rigid frame by assigning a different start and end shape to the final segment of the rigid frame member.

Creating the second leg of the rigid frame



1. Click Add to add a fourth component to the structural member.
2. Select Unnamed under Component, and enter Leg 2.
3. Under Start Shape, in the Name list, select W14X43.
4. Select Start for Relative to.
5. Enter 3 for Node.
6. Scroll to the end of the Design Rules dialog box to display the End Shape parameters for Leg 2.
7. Under End Shape, in the Name list, select W8X31.
8. Select Start for Relative to.
9. Enter 4 for Node.
10. Click OK.

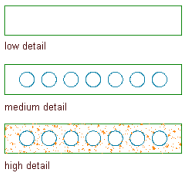
The complete rigid frame displays in your drawing.

Creating Custom Shapes for Structural Members

If you want to design a member with one or more shapes that are not available from the Structural Member Catalog and cannot be created using the Structural Member Style Wizard, you can use the Style Manager to create custom shapes.

When you create a custom shape, you can define three separate geometries (Low Detail, Medium Detail, and High Detail) to accommodate the different levels of detail in different display representations (for example, Plan Low Detail, Plan, and Plan High Detail). The geometries for the new shape can be set entirely from linework in the drawing area, or you can use an existing custom shape definition as a template and edit it to redefine any of its geometries.

Hollow core concrete plank display representations example



Once you have created a custom shape, it is added to the list of Structural Member Shape Definitions in the Style Manager. You can then create a new style from the shape, or you can assign the shape to an existing structural member style by adding it as a component in the design rules of the style. You can also edit, copy, paste, and purge shape definitions just as you can other styles. For more information on these operations, see Style Manager on page 565.

Creating a Custom Shape for a Structural Member

Use this procedure to create a custom shape for a structural member based on linework you have drawn or otherwise inserted in the drawing area.

1. In the drawing area, create three geometries to define the Plan Low Detail, Plan, and Plan High Detail display representations of the shape. You can draw entirely new geometries, or you can insert geometries from existing shape definitions (see Inserting a Custom Shape in a Drawing on page 1751.)

   For Plan Low Detail, you can use lines, arcs, circles, or polylines. For Plan and Plan High Detail, use closed polylines, splines, ellipses, or circles. Note that these entities must not intersect.

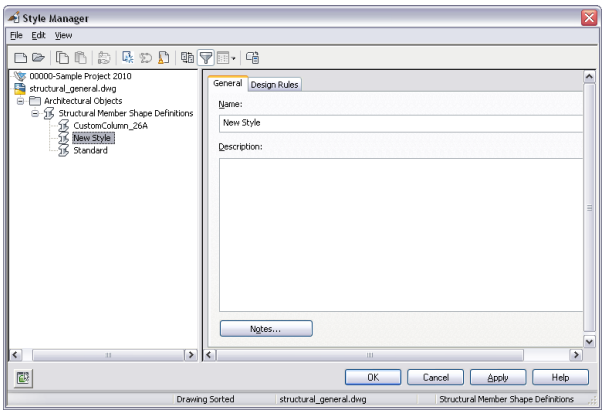
2. Select a structural member.

3. Click Structural Member tab ➤ Member Shape panel ➤ Edit Shape Style .

   The Style Manager is displayed with the Architectural Objects folder open and Structural Member Shape Definitions selected.

4. Right-click Structural Member Shape Definitions, and click New

5. In the right pane of the Style Manager, click the General tab.



6. Enter a name and description for the new shape, and then click the Design Rules tab.

7. For Shape Geometry, select Low Detail, and then click .

8. In the drawing area, select the line(s), arc(s), circle(s), or polyline(s) to define the Plan Low Detail display representation for the new shape, and then press *ENTER*.

9. Select an insertion point.

   The low detail shape is displayed in the viewer under the Design Rules tab.

10. For Shape Geometry, select Medium Detail, and then click .

11. In the drawing area, select a closed polyline, spline, ellipse, or circle to define the Plan display representation for the selected shape designation.

12. Select an insertion point, or enter **c** (Centroid) or **p** (Previous Point) to position the selected shape in the viewer.

13. For Shape Geometry, select High Detail, and then click .

14. In the drawing area, select a closed polyline, spline, ellipse, or circle to define the Plan High Detail display representation for the shape.

15. Select an insertion point, or enter **c** (Centroid) or **p** (Previous Point) to position the selected shape in the viewer.

16 If you want to create a new structural member style from the shape, click , enter a name for the new style, and click OK.

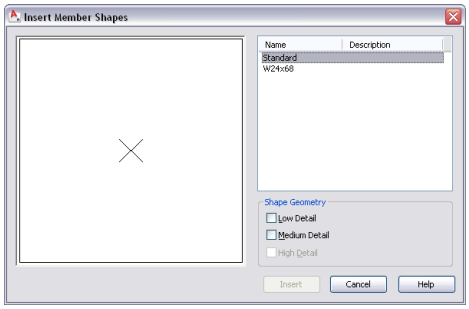
17 Click OK to add the new shape to the list of Structural Member Shape Definitions and dismiss the Style Manager.

The new shape can now be added to existing structural member styles. For more information, see Adding a Shape to a Structural Member on page 1739.

Inserting a Custom Shape in a Drawing

Use this procedure to insert one or more of the geometries defined for a custom shape into a drawing. The geometry can then be edited or used as is to define one of the display representations for another custom member shape you are creating or editing.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Member Shape .



2 In the right pane of the Insert Member Shapes worksheet, select a custom member shape.

3 Click one or more of the Shape Geometry check boxes.

The geometry for each selected shape designation is highlighted in the viewer.

4 Click Insert.

5 Specify an insertion point for each of the selected shape designations in the drawing area.

Design Utilities

Anchors

31

Anchors create links between different objects. Anchors are often used to connect an object, such as a column or a structural element, to a grid or layout curve. Anchors can also be used to anchor architectural objects to each other, or to linework objects, like lines and circles.

Anchors

An anchor links an AEC object to another object or to a layout curve or grid. You can create anchors between objects and also remove anchors from objects. AEC objects can be anchored to each other, to AutoCAD objects like lines and circles, or to layout curves or grids.

Automatic and user-defined anchors enable you to use anchors for many different purposes.

Automatic and User-Defined Anchors

Automatic anchors are set by the program. Certain objects are by default anchored to other objects. For example, doors and windows are usually anchored to walls. Curtain wall units or window assemblies might be anchored to curtain walls. Although these anchors are inserted automatically, when you place the objects their behavior can differ slightly. For example, a door that is anchored to a wall can be moved to an unconnected wall. The door cannot, however, be moved outside a wall and stand alone. To do this, you must remove the anchor between door and wall. The anchor of a column to a column grid behaves differently: you can move the column inside the grid, but you cannot move the column to another grid without first removing the anchor.

User-defined anchors are manual links that you can create between two objects. Most anchors are used with layout curves, layout grids, or volumes. You can also attach anchors to other AEC objects or AutoCAD objects.

Anchoring objects to a layout curve can be useful for positioning washbasins along a wall or rafters along a roof. Anchoring objects to layout grids can help you to position columns on a column grid, planters on a sidewalk grid, or tile accents on a floor tile grid. For information about layout curves or grids, see Using Layout Curves on page 1775 and Using Layout Grids on page 1786.

Types of User-Defined Anchors

There are six different types of anchors that you can use to attach objects:

If you want to…	Then…
attach AEC objects to other AEC objects	use object anchors.

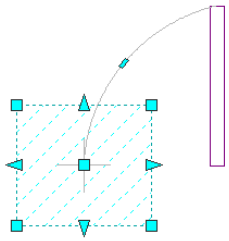
If you want to…	Then…
attach AEC objects to the base curve of other objects, such as lines, arcs, circles, mass elements, polylines, roofs, or walls	use curve anchors.
attach objects to nodes on layout curves or grids with leaders	use leader anchors.
attach objects to nodes on layout curves or grids	use node anchors.
attach objects to cell positions on 2D layout grids and 3D volume grids	use cell anchors.
attach objects to volumes on 3D grids	use volume anchors.

Working with Object Anchors

You can use object anchors to attach an AEC object to the base curve of another AEC object. When an AEC object is anchored to another AEC object, it will be moved together with the anchoring object. When the anchoring object is deleted, the anchored object will be deleted, too. Changes that are made to the anchored object, however, will not be replicated in the anchoring object.

When the anchored object is selected, a temporary graphic displays the anchor. The temporary anchor graphic contains a trigger grip to release the object anchor.

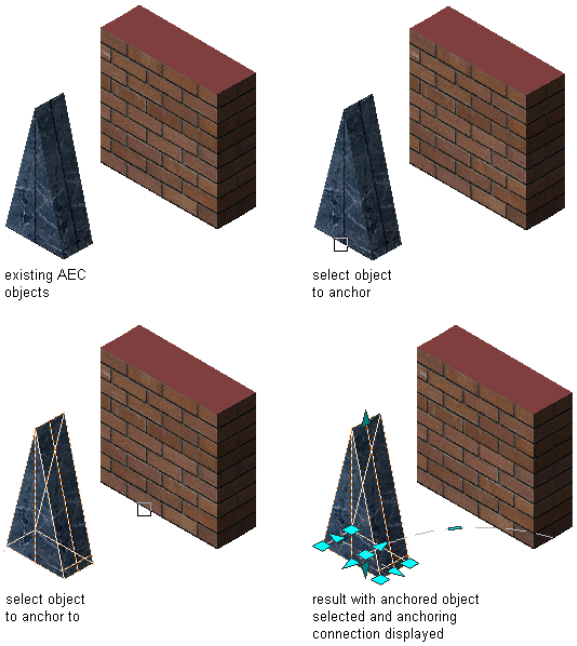
Mass element anchored to a wall



Adding Object Anchors

Use this procedure to create an object anchor between two AEC objects.

Creating an object anchor



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Object Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **ObjectAnchorAttach** on the command line.

4 Select the AEC object that should be anchored to another AEC object, and press ENTER.

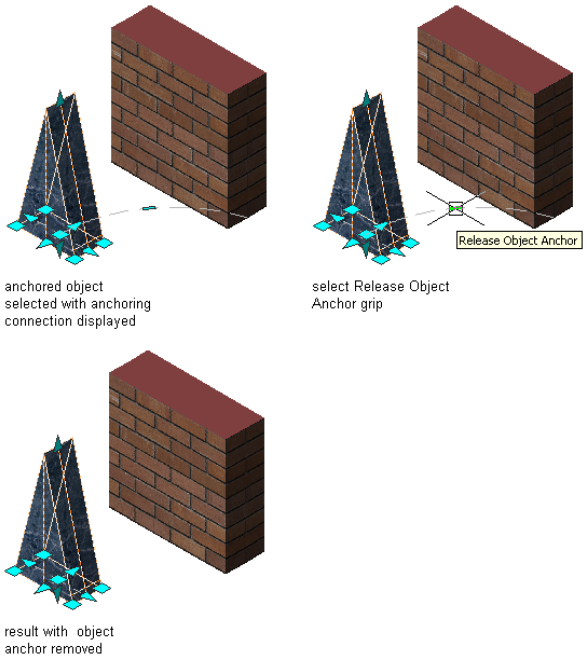
5 Select the anchoring AEC object.

An object anchor is added. When you select the anchored object, you can see the anchoring connection.

Releasing Object Anchors

Use this procedure to release an object anchor between two AEC objects.

Releasing an object anchor



1 Select the AEC object that is anchored to another AEC object.

2 Click the Release Object Anchor grip on the anchor line.

The object anchor is removed.

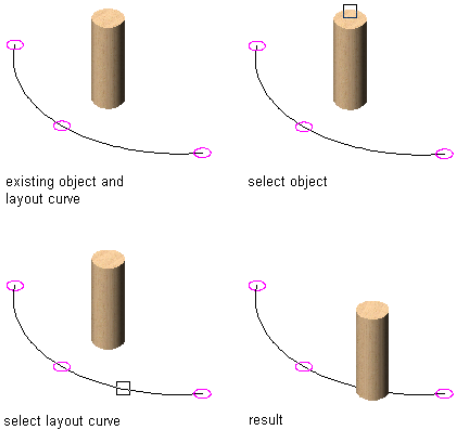
Working with Curve Anchors

You can use curve anchors to attach AEC objects to the base curve of other AEC objects or linework, such as lines, arcs, circles, mass elements, polylines, roofs, or walls. The movement of an object that is anchored to another object with a curve anchor is constrained by the object to which it is anchored. Curve anchors are best suited for attaching objects to linear objects like lines, arcs, or walls as opposed to grids or layout volumes.

Adding Curve Anchors

Use this procedure to add a curve anchor to attach objects to the base of other objects.

Anchoring an object to a layout curve



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Curve Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **CurveAnchor** on the command line.

4 Enter **at** (Attach object), and select the object to be anchored.

5 Select a point on the curve that you want to anchor the object to.

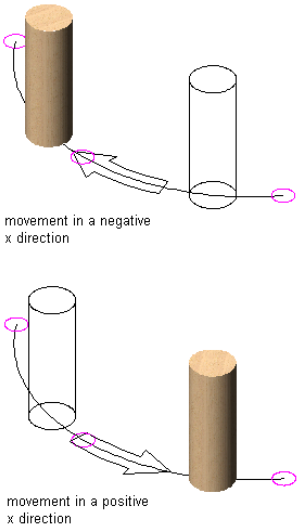
The object is anchored to the curve at the *X* position. When the object is first placed, the *Y* and *Z* positions are 0.

6 Press *ENTER*.

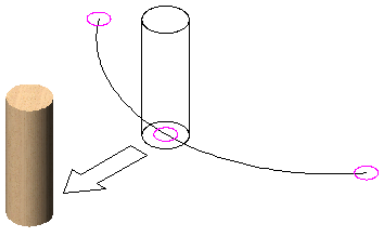
Changing the Position of Objects Anchored to Curves

Use this procedure to change the position of objects anchored to curves. You can change the position of an anchored object relative to the curve in the *X, Y,* and *Z* directions. You can also rotate and flip the object along its axes.

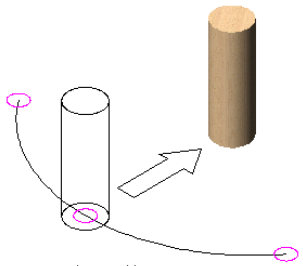
Moving an object along a layout curve in the X direction



Moving an object along a layout curve in the Y direction

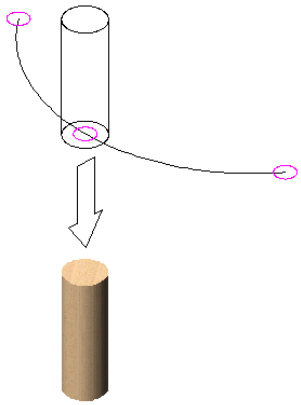


movement in a negative
y direction

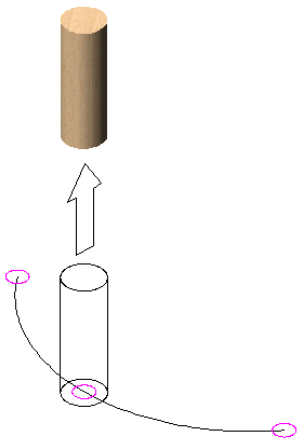


movement in a positive
y direction

Moving an object along a layout curve in the Z direction



movement in a negative
z direction



movement in a positive
z direction

NOTE The positioning of multi-view blocks assumes that the insertion point of the multi-view block is at its midpoint.

1 Double-click the anchored object.

2 On the Properties palette, expand Basic, and expand Location on Curve.

TIP You can also access commands to change the position of the anchored object from the context menu. Select the anchored object, right-click, and click Curve Anchor. From the submenu, choose the desired command to manipulate the anchored object in relation to its anchoring curve.

3 Click Anchor.

4 Change the position along the *X* axis:

If you want to…	Then…
change the *X* reference point on the curve	select Start of curve, Midpoint of curve, or End of curve for From.
specify the *X* distance between the reference point on the curve and the anchored object	enter a value for Distance.
select from which point on the anchored object the *X* distance to the curve is measured	select Start edge of object, Center of object, or End edge of object for To.

5 Change the position along the *Y* axis:

If you want to…	Then…
change the *Y* reference point on the curve	select Left edge of curve width, Center of curve width, or Right edge of curve width for From.
specify the *Y* distance between the reference point on the curve and the anchored object	enter a value for Distance.
select from which point on the anchored object the *Y* distance to the curve is measured	select Front of object, Center of object, or Back of object for To.

6 Change the position along the *Z* axis (vertical):

If you want to…	Then…
change the *Z* reference point on the curve	select Bottom of curve height, Center of curve height, or Top of curve height for From.
specify the *Z* distance between the reference point on the curve and the anchored object	enter a value for Distance.
select from which point on the anchored object the *Z* distance to the curve is measured	select Bottom of object, Center of object, or Top of object for To.

7 To change the rotation of the anchored object, enter values for the *X* and *Z* rotation.

8 To flip the object along one of the axes, select Flip X, Flip Y, or Flip Z.

9 Click OK.

Anchoring Objects to New Curves

Use this procedure to anchor objects to new curves. You can anchor an object to a new object without first releasing the previous anchor. The new anchor is of the same type as the previous one; in this case, it is a curve anchor.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Curve Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **CurveAnchor** on the command line.

4 Enter **s** (Set curve), and select anchored objects.

NOTE You can select only AEC objects here.

5 Press *ENTER*.

6 Select a new object to anchor the object to.

NOTE You can select AEC objects and AutoCAD objects here.

7 Press *ENTER*.

Working with Leader Anchors

You can use leader anchors to anchor objects to nodes on layout curves or grids with leaders. The movement of the anchored object is constrained by the leader on the anchor.

For information about creating layout curves or grids and nodes, see Using Layout Curves on page 1775 and Using Layout Grids on page 1786.

Adding Leader Anchors

Use this procedure to add leader anchors to your drawing. An object can be anchored to only one node at a time. When you try to anchor it to a second node, the object is released from the first node. You can, however, anchor any number of objects to a single layout node.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Leader Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **LeaderAnchor** on the command line.

4 Enter **a** (Attach object), select the object to be anchored, and then specify a point on or near a node on a layout curve, layout grid, or volume grid.

The object is anchored to the node that you selected. By default, the leader anchor is created at a direction of 0 from the node and has first and second extensions of 1 inch (25.4 mm). These extensions are measured from the node to the center of the anchored object.

5 Press *ENTER*.

Changing the Position of Objects Anchored to Layout Nodes with Leader Anchors

Use this procedure to change the position of objects anchored to layout nodes with leader anchors. You can change the coordinate system, orientation, and rotation of an object anchored to a layout node. You can also define offsets from the node.

1. Double-click the object anchored to a layout node.
2. On the Properties palette, expand Basic, and expand Location from Node.

TIP You can also access commands to change the position of the anchored object from the context menu. Select the anchored object, right-click, and click Leader Anchor. From the submenu, choose the desired command to manipulate the anchored object in relation to its anchoring node and leader.

3. Click Anchor.
4. Specify changes in the position or orientation of anchored objects:

If you want to…	Then…
specify an offset from the object to the node	specify insertion offset values for the *X*, *Y*, or *Z* position.
anchor the object to the center of the node	select Center on Node.
have the anchored object use the coordinate system of the node	select Use Node Coordinate System.
not have the anchored object use the coordinate system of the node	specify *X*, *Y*, or *Z* normals for the anchored object.
change the rotation angle of the anchored object	specify values for the *X*, *Y*, or *Z* rotation angles.
flip the object along the *X*, *Y*, or *Z* axes	select Flip X, Flip Y, or Flip Z.
change the angle of the leader to the node	specify a value for Angle to Node.
change the offset of the leader start grip from the center of the base curve of the layout node	enter an offset value for First Extension.
change the offset of the leader end grip from the center of the base curve of the anchored object	enter an offset value for Second Extension. **NOTE** By default the leader extensions are slightly offset so as not to overlap the leader grip with the object location grip.

5. Click OK.

Grip-Editing Leaders

Use this procedure to grip-edit leaders. A leader anchor connects an object to a layout node with a leader between the two. You can change the length and shape of the leader.

A leader consists of one segment or several segments. You can change the leader shape by grip-editing the object.

You can use grips to add segments to existing leaders.

1 Select the anchored object.
2 Move the leader grip to move the leader in the appropriate direction.
3 After you release the leader, select the anchored object again.
An additional leader grip is added at the point from which the leader originally started.
4 Move the leader grip at the start of the leader line to add another segment to the leader.
5 Repeat this procedure until the leader has all the segments you need.
You can later edit the leader in the same way you edit an AutoCAD polyline.

Extending Leaders

Use this procedure to extend the leader line beyond the first and last grip points on the leader line.

1 Double-click the anchored object.
2 On the Properties palette, expand Basic, and expand Location from Node.
3 Click Anchor.
4 Edit the leader line:

If you want to extend…	Then…
the start point of the leader line	in the First Extension field, enter the extension value.
the endpoint of the leader line	in the Second Extension field, enter the extension value.

5 Click OK.

Copying Objects to All Layout Nodes

Use this procedure to copy objects to all layout nodes. You can select an AEC object and, instead of manually anchoring it to a layout node, you can copy the object and anchor one copy to each node on a layout curve or grid.

TIP If you want the leader to be displayed in the same way at every node, first anchor the object to a single node. Adjust the leader attributes (direction, extension, or properties), and then use the Copy to Nodes option. Next, select the object that is anchored to the single node, and select the layout curve or grid.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.
3 Select the Leader Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **LeaderAnchor** on the command line.

4 To copy the anchored object to every node on the layout curve or grid, enter **c** (Copy to Nodes).
5 Select the object that you want to copy and anchor to every node on the layout curve or grid.
6 Select the layout curve or grid.
If an existing object is anchored to any of the nodes, you are prompted to specify whether you want to skip nodes that already have something anchored to them. Enter **y** to avoid duplicate anchored objects on those nodes.

Working with Node Anchors

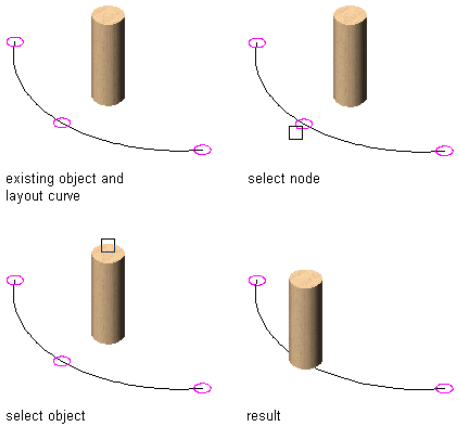
You can use node anchors to attach objects to nodes on layout curves or grids. Anchoring objects to a layout curve might be useful for positioning washbasins along a wall or rafters along a roof. Anchoring objects to layout grids might help you to position columns on a column grid, planters on a sidewalk grid, or tile accents on a floor tile grid.

WARNING When you change the position of an object that is anchored to a curve, the anchored object needs to stay on the curve. Keeping the association between the object and the node prevents all objects that are being moved from attaching to the same node.

Adding Node Anchors

Use this procedure to add node anchors. You can add as many node anchors in your drawing as you have layout nodes. An individual object can be anchored to only one layout node. If you try to anchor an object to a second node, the first anchor is released. You can, however, anchor several objects to the same layout node and edit them individually.

Anchoring an object to a layout curve node



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Node Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **NodeAnchor** on the command line.

4 Enter **a** (Attach object), and select the object to be anchored.

5 Specify a point on or near a node on a layout curve or grid.

6 Press *ENTER*.

Changing the Position of Objects Anchored to Layout Nodes with Node Anchors

Use this procedure to change the position of objects anchored to layout nodes with node anchors. You can change the coordinate system and orientation of an object anchored to a layout node. You can also define offsets from the node.

1 Double-click the anchored object.

2 On the Properties palette, expand Basic, and expand Location from Node.

TIP You can also access commands to change the position of the anchored object from the context menu. Select the anchored object, right-click, and click Node Anchor. From the submenu, choose the desired command to manipulate the anchored object in relation to its anchoring node.

3 Click Anchor.

4 Change the position or orientation of the anchored object:

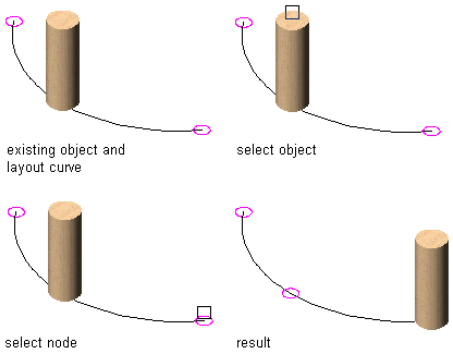
If you want to…	Then…
specify an offset from the object to the node	specify offset values for the *X*, *Y*, or *Z* position.
anchor the object to the center of the node	select Center on Node.
have the anchored object use the coordinate system of the node	select Use Node Coordinate System.
not have the anchored object use the coordinate system of the node	specify *X*, *Y*, or *Z* normals for the anchored object.
flip the object along the *X*, *Y*, or *Z* axes	select Flip X, Flip Y, or Flip Z.

5 Click OK.

Anchoring Objects to Different Nodes

Use this procedure to anchor objects to different nodes. You can attach an anchored object to another node on the same layout curve or grid, or to another layout curve or grid altogether.

Moving an anchored object to another layout curve node



NOTE If you want to move an anchored object to a different node on the same layout curve or grid, you can also drag the object to the node.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Node Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **NodeAnchor** on the command line.

4 Enter **s** (Set node), and select the anchored object.

5 Press *ENTER*.

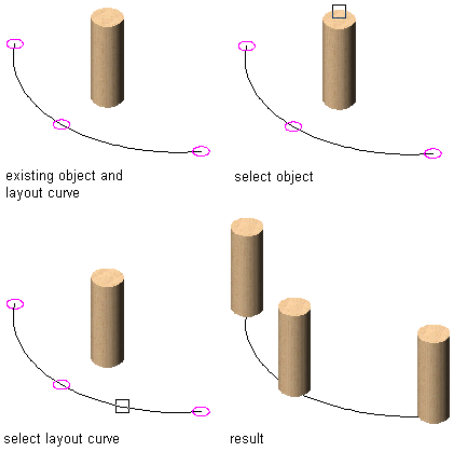
6 Select the node you want to anchor the object to.

7 Press *ENTER*.

Copying Objects to All Layout Nodes

Use this procedure to copy objects to all layout nodes. You can select an AEC object and, instead of manually anchoring it to a layout node, you can copy the object and anchor one copy to each node on the layout curve or grid.

Copying an object to all layout curve nodes



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Node Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **NodeAnchor** on the command line.

4 To copy the object to every node on the layout curve or grid, enter **c** (Copy to each node).

5 Select the object that you want to copy and anchor to every node on the layout curve or grid.

6 Select the layout curve or grid.

If an object is already anchored to any of the nodes, you are prompted to specify whether you want to skip nodes that already have something anchored to them. Enter **y** (Yes) to avoid duplicate anchored objects on those nodes.

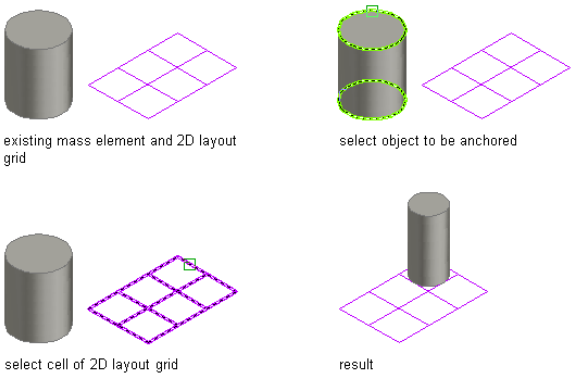
Working with Cell Anchors

A cell is a subdivision of a layout grid or volume grid. A cell anchor attaches objects to cell positions on layout grids and volume grids. When an object is anchored to a cell, the object is resized to fit the cell size. When the grid or volume itself is resized, you can decide whether the anchored object is updated accordingly or remains its original size.

Adding Cell Anchors

Use this procedure to add cell anchors. You can add cell anchors to objects to connect them to cells in layout grids and volume grids.

Anchoring an object to a layout grid cell



NOTE There is no rule that determines which cell the object attaches to when you anchor it. You can turn on the Node display component to display the cell nodes of the layout grid or volume for easier cell selection. You can also move the object after you anchor it to the layout grid or volume.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Cell Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **CellAnchor** on the command line.

4 Enter **a** (Attach object), and select the object to be anchored.

5 Specify a point on or near a cell of a layout grid or volume grid.
The object is automatically scaled to fill the entire cell.

6 Press *ENTER*.

Changing the Position and Size of Objects Anchored to Layout Cells

Use this procedure to change the position and size of objects anchored to layout cells. You can change the coordinate system and orientation of an object anchored to a layout cell. You can also define insertion and size offsets and indicate whether the object should be resized when the cell is resized.

1 Double-click the anchored object.

2 On the Properties palette, expand Basic, and expand Location in Cell.

TIP You can also access commands to change the position of the anchored object from the context menu. Select the anchored object, right-click, and click Cell Anchor. From the submenu, choose the desired command to manipulate the anchored object in relation to its anchoring grid cell.

3 Click Anchor.

4 Change the position or orientation of anchored objects:

If you want to…	Then…
specify an offset from the object to the cell	specify offset values for the *X*, *Y*, or *Z* position.
anchor the object to the center of the cell	select Center on Cell.

If you want to…	Then…
have the anchored object use the coordinate system of the cell	select Use Cell Coordinate System.
not have the anchored object use the coordinate system of the cell	clear Use Cell Coordinate System, and specify *X*, *Y*, or *Z* normals for the anchored object.
flip the object along the *X*, *Y*, or *Z* axes	select Flip X, Flip Y, or Flip Z.

5 Specify how an anchored object is resized to fit the edges of the cell:

If you want to…	Then…
resize the object every time the cell is resized	select Apply Resize.
not resize object every time the cell is resized	clear Apply Resize.
specify a distance between the anchored object and the cell	enter an appropriate negative value for Size Offset.
extend the anchored object beyond the cell edges	enter an appropriate positive value for Size Offset.

6 Click OK.

Anchoring Objects to a Different Cell

You can attach an anchored object to another cell in the same layout grid or volume grid, or to another grid altogether.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Cell Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **CellAnchor** on the command line.

4 Enter **se** (Set cell), and select the object.

5 Press *ENTER*.

6 Select the cell you want to anchor the object to.

The object is moved to the new cell. If the new cell is different in size from the original one, the object is resized accordingly.

NOTE You can also drag the object if you want to move an anchored object to a different cell on the same layout grid or volume grid.

Copying Objects to All Layout Cells

Use this procedure to copy objects to all layout cells. You can select an AEC object and, instead of manually anchoring it to a layout cell, you can copy the object and anchor one copy to each cell on the layout grid or volume grid.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Cell Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **CellAnchor** on the command line.

4 To copy the anchored object to every cell in the layout grid or volume grid, enter **c** (Copy to each cell).

5 Select the object.

6 Select the layout grid or volume grid that you want to copy and anchor the object to.

If an object is already anchored to any of the cells, you are prompted to specify whether you want to skip cells that already have something anchored to them. Enter **y** (Yes) to avoid duplicate anchored objects appear in those cells.

Working with Volume Anchors

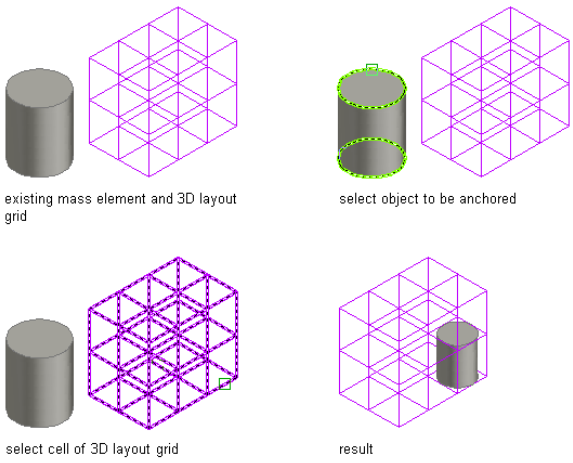
You can use volume anchors to attach objects to volumes in 3D volume grids. The movement of an object that is anchored to a volume grid is constrained by that volume grid.

When an object is anchored to a volume inside a volume grid, the object is resized to fit the volume size. When the volume itself is resized, you can decide whether the anchored object is updated accordingly or remains its original size.

Adding Volume Anchors

Use this procedure to add volume anchors. You can add volume anchors to objects to connect them to volume grids.

Anchoring an object to a volume grid



1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Volume Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **VolumeAnchor** on the command line.

4 Enter **a** (Attach object), and select the object to be anchored.

5 Specify a point on or near a volume in a volume grid.

The object is scaled to fill the entire volume.

6 Press *ENTER*.

Changing the Position and Size of Objects Anchored to Volumes

Use this procedure to change the position and size of objects anchored to volumes. You can change the coordinate system and orientation of an object anchored to a volume. You can also define insertion and size offsets and indicate whether the object should be resized when the volume is resized.

1 Double-click the anchored object.

2 On the Properties palette, expand Basic, and expand Location in volume.

TIP You can also access commands to change the position of the anchored object from the context menu. Select the anchored object, right-click, and click Volume Anchor. From the submenu, choose the desired command to manipulate the anchored object in relation to its anchoring volume grid.

3 Click Anchor.

4 Change the position or orientation of anchored objects:

If you want to…	Then…
specify an offset from the object to the volume	specify offset values for the *X*, *Y*, or *Z* position.
anchor the object to the center of the volume	select Center on Node.
have the anchored object use the coordinate system of the volume grid	select Use Node Coordinate System.
not have the anchored object use the coordinate system of the volume grid	clear Use Node Coordinate System, and specify *X*, *Y*, or *Z* normals for the anchored object.
flip the object along the *X*, *Y*, or *Z* axes	select Flip X, Flip Y, or Flip Z.

5 Specify how an anchored object is resized to fit the edges of the volume:

If you want to…	Then…
resize the object every time the volume is resized	select Apply Resize.
not resize the object every time the volume is resized	clear Apply Resize.
specify a distance between the anchored object and the volume	enter an appropriate negative value for Size Offset.
extend the anchored object beyond the volume edges	enter an appropriate positive value for Size Offset.

6 Click OK.

Anchoring Objects to a Different Volume

Use this procedure to anchor objects to a different volume. You can attach an anchored object to another volume in the same volume grid, or to another volume grid.

NOTE If you want to move an anchored object to a different volume on the same volume grid, you can also drag it there.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Volume Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **VolumeAnchor** on the command line.

4 Enter **s** (Set volume), and select the anchored object.

5 Press *ENTER*.

6 Select the volume you want to anchor the object to.

The object is moved to the new volume. If the new volume is different in size from the original one, the object is resized accordingly.

Copying Objects to All Layout Volumes

Use this procedure to copy objects to all layout volumes. You can select an AEC object and, instead of manually anchoring it to a volume, you can copy the object and anchor one copy to each volume on the volume grid.

1 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

2 Navigate to Stock Tool Catalog ➤ Parametric Layout & Anchoring Tools.

3 Select the Volume Anchor tool, and drag it to the workspace.

NOTE Alternatively you can enter **VolumeAnchor** on the command line.

4 To copy the anchored object to every volume in the volume grid, enter **c** (Copy to each volume).

5 Select the object that you want to copy and anchor to every volume in the volume grid.

6 Select the volume grid.

If an object is already anchored to any of the volumes, you are prompted to specify whether you want to skip volumes that already have something anchored to them. Enter **y** (Yes) to avoid duplicate anchored objects on those volumes.

Releasing and Positioning Anchored Objects

You can release and position anchored objects. Release an anchored object from another object to remove the relationship between the objects. Position an anchored object to offset it from the object it is anchored to.

Releasing Anchored Objects

Use this procedure to release objects from anchors and remove the anchoring relationship. Any anchored object can be released, including a railing that is anchored to a stair object or a window that is anchored to a wall.

- Right-click the anchored object, and click <Type> Anchor ➤ Release.

Positioning Anchored Objects

Use this procedure to position anchored objects. You can position an object with anchors to offset it from the object that it is anchored to.

1 Right-click the anchored object, and change the position of the anchored object:

If you want to…	Then…
specify the *X* position	click Set X Position.
specify the *Y* position	click Set Y Position.
specify the *Z* position	click Set Z Position.
specify the end position	click Set Anchored End.
specify the rotation	click Set Rotation.
flip the *X* position	click Flip X.
flip the *Y* position	click Flip Y.
flip the *Z* position	click Flip Z.

2 Enter an *XYZ* coordinate value for the desired offset position.

Entering a coordinate for the offset distance is equivalent to setting all three of the individual position offsets.

Creating an Anchor Tool

Use this procedure to create an anchor tool and add it to a tool palette. You may want to create your own anchor tools if you are placing multiple anchors of specific styles with additional properties that you want to be the same every time you add an anchor of each type.

You can use any of the following methods to create an anchor tool:

- Drag a copy of a tool from another palette to the current palette, and then customize the properties of the new tool.
- Copy an existing tool in the current palette, and then customize the properties of the new tool.
- Drag a tool from the Content Browser to a tool palette, and then customize the properties of the new tool.

1 Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to…	Then…
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

If you want to…	Then…
copy a tool from the Content Browser	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Click OK.

Layout Curves and Grids 32

Three types of layout objects help you to position objects relative to each other: layout curves, two-dimensional (2D) layout grids, and three-dimensional (3D) layout volumes (also called volume grids). Each type of layout object has anchors to which you can attach objects. All use nodes as anchor points. Layout grids and layout volumes also provide cells as anchoring points for cell anchors and volume anchors. For more information, see Anchors on page 1755.

Layout Curves and Grids

Three types of layout objects help you to position objects relative to each other: layout curves, two-dimensional (2D) layout grids, and three-dimensional (3D) layout volumes (also called volume grids). Each type of layout object has anchors to which you can attach objects. All use nodes as anchor points. Layout grids and layout volumes also provide cells as anchoring points for cell anchors and volume anchors. For more information, see Anchors on page 1755.

Layout Curve

By defining an object as a layout curve and placing nodes along the curve, you can position objects precisely along a path. Layout curves are useful for positioning wash basins along a wall or rafters along a roof.

Layout Grid

A layout grid is an arrangement of rectangular or radial spaces, called *bays*, that are delineated with parallel or radial lines. Use a two-dimensional (2D) layout grid to position objects in a grid pattern. Anchoring objects to layout grids might help you to position planters in a sidewalk grid, or tile accents in a floor tile grid.

Layout Volume

A layout volume (also called a volume grid) is a three-dimensional (3D) arrangement of rectangular spaces. Use three-dimensional (3D) layout volumes to position objects on a multilevel grid. Changing the size of a layout volume changes the spacing of objects attached to that grid and can also change the size and height of objects attached to that grid.

Using Layout Curves

Use a layout curve to anchor objects along a path. You can define the following objects as layout curves:

- Walls

- Curtain walls
- Window assemblies
- Spaces
- Mass elements
- Roofs
- Lines
- Arcs
- Circles
- Ellipses
- Polygons
- Polylines
- Splines

Layout curves are best suited for objects with linear geometry, such as polylines, walls, or splines. If you need nodes on a two-dimensional (2D) object, consider using a layout grid instead.

Creating a Layout Curve Tool

Use this procedure to create a layout curve tool and add it to a tool palette. You may want to create your own layout curve tools if you are placing multiple layout curves of a specific style and they all have the same properties.

1 Open the tool palette where you want to add the tool.

2 Create the tool:

If you want to…	Then…
create a tool from a layout curve in the drawing	select the object, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 For Name, enter the name you want displayed for this tool's tooltip. This name will also be displayed with the tool if it is published to a catalog in the Content Browser.

5 For Description, click in the text box, and then enter the description you want displayed for this tool's tooltip. This description will also be displayed with the tool if it is published to a catalog in the Content Browser.

6 Expand Basic, and expand General.

7 Under General, click the Description text box, enter a description of the tool, and click OK.

8 For Layer key, click the text box, select a layer key, and click OK.

9 For Layer overrides, click the text box, select a layer key override, and click OK.

10 Under Dimensions, specify a Layout type.

11 Specify the number of nodes, or enter a spacing value.

12 Click OK.

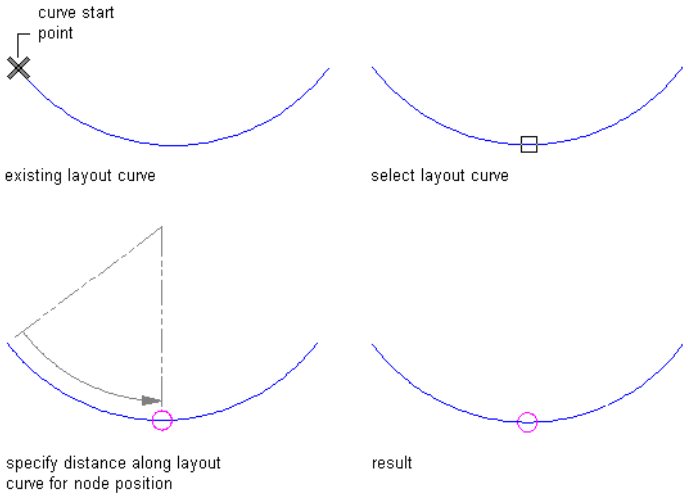
Adding Layout Curves

Use this procedure to define an object as a layout curve. The spacing between anchor nodes determines the spacing between objects that you attach to the layout curve, even if you change the geometry of the layout curve.

The following spacing options are available:

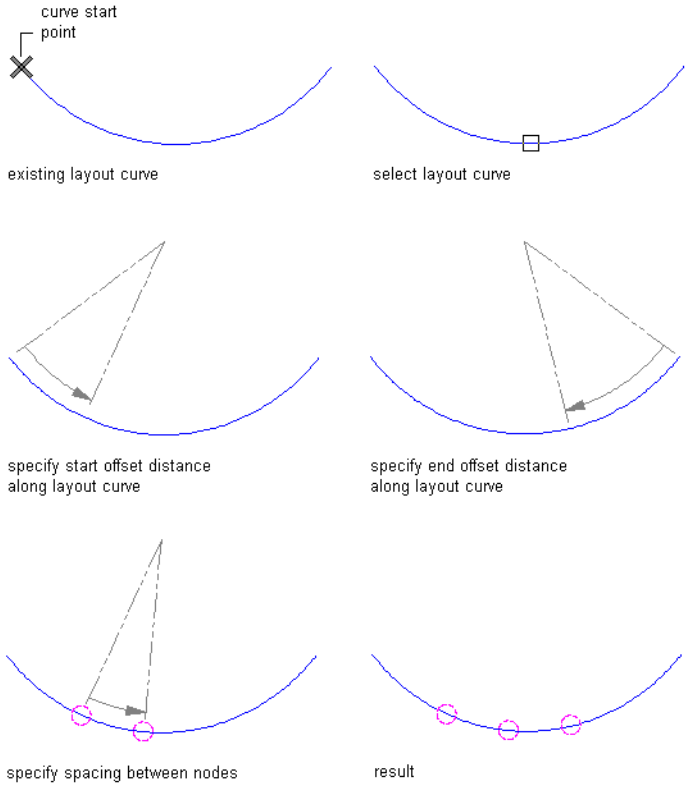
- **Manual**: You specify the position of each node along the layout curve.

  Manually placing a node on a layout curve



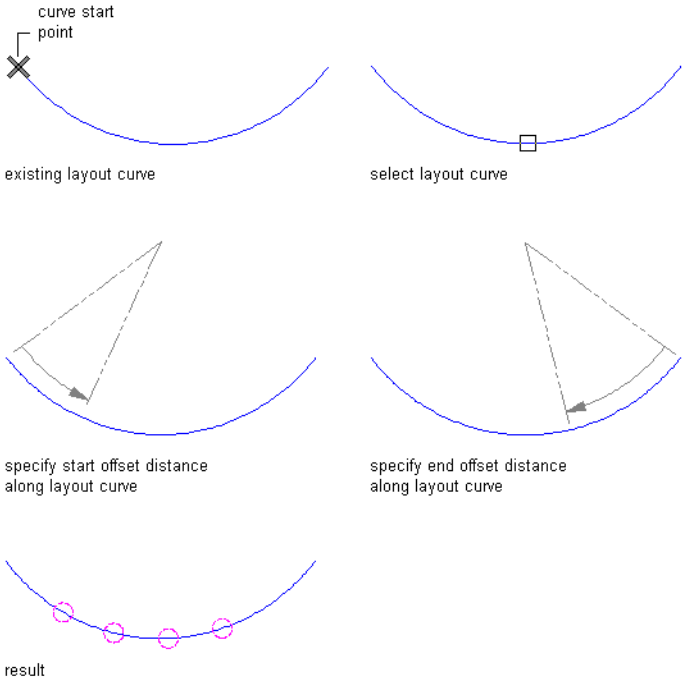
- **Repeat**: You specify equidistant spacing between nodes along the layout curve. The number of anchor nodes is determined by the length of the layout curve. As the length of the curve changes, nodes are added or subtracted accordingly. The spacing of the nodes remains fixed.

Placing nodes at repeat spacing on a layout curve



- **Space Evenly**: You specify the number of nodes along the curve. The space between nodes is determined by the length of the layout curve. As the length of the curve changes, the spacing between nodes is lengthened or shortened accordingly. The number of nodes remains fixed.

Placing nodes at even spacing on a layout curve



1 Open the tool palette that contains the layout curve tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

If there are no layout curve tools available on tool palettes in the workspace, you can use the Content Browser to access the Stock Tool catalog, which contains a layout curve tool under Parametric Layout and Anchoring Tools. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 Select the object to define as a layout curve.

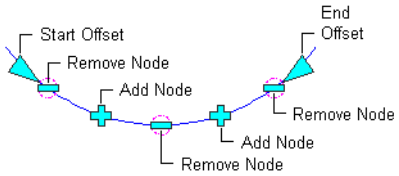
3 Place nodes along the layout curve:

If you want to…	Then…
Place nodes at locations that you specify	press *ENTER*. Enter the number of nodes, and specify the locations of nodes by selecting them or by entering distances from the start point of the curve.
Repeat nodes at fixed intervals along the curve	enter **r** (Repeat). Specify the start and end offsets of the first and last nodes, and specify the spacing between nodes.
Space a fixed number of nodes along the curve	enter **s** (Space evenly). Specify the start and end offsets of the first and last nodes, and specify the number of nodes.

Adding Nodes to Layout Curves

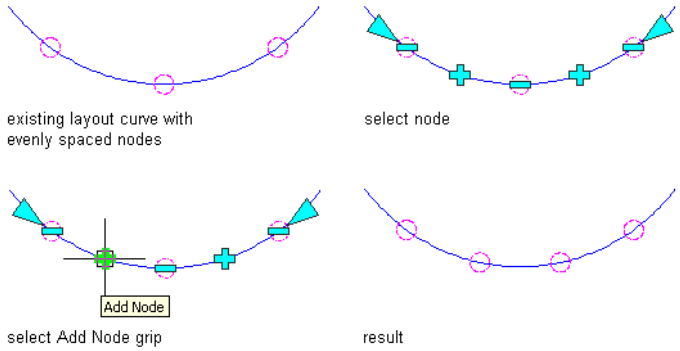
Use this procedure to add nodes to layout curves.

Layout curve with evenly spaced node grips



You can add nodes only to those layout curves that have manually spaced or evenly spaced nodes. Layout curves with nodes at fixed repeated spacing cannot be changed without changing either the length of the curve or the spacing of the first node. For more information, see Changing the Spacing Mode of Layout Curves on page 1783.

Adding a node to a layout curve using grips



1 Select the layout curve by selecting one of the node anchors.

2 Click an Add Node grip.

Alternatively you can click Layout Curve tab ➤ Modify panel ➤ Add Node .

- If you have added a node to a layout curve with manually spaced nodes, the new node is inserted at the specified position. The position of the other nodes remains unchanged.
- If you have added a node to a layout curve with evenly spaced nodes, the new node is added and all nodes are recalculated, so that they are evenly spaced again.

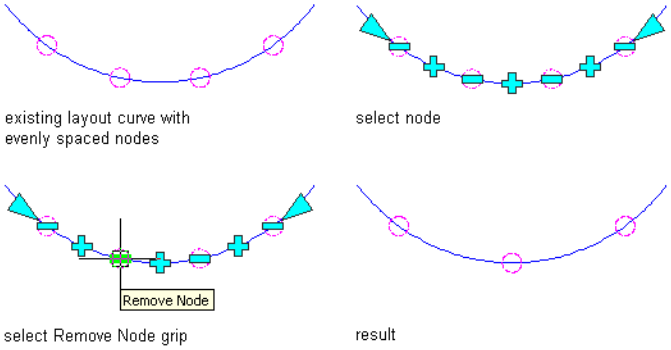
3 Right-click, and click Deselect All to turn off grips.

Removing Nodes from Layout Curves

Use this procedure to remove nodes from layout curves.

You can remove nodes from only those layout curves that have manually spaced or evenly spaced nodes. Layout curves with nodes at fixed repeated spacing cannot be changed without changing either the length of the curve or the spacing of the first node.

Removing a node from a layout curve using grips



1 Select the layout curve by selecting one of the node anchors.

2 Click a Remove Node grip.

Alternatively, you can click Layout Curve tab ➤ Modify panel ➤ Remove Node .

- If you have removed a node from a layout curve with manual nodes, the node is removed from the specified position. The position of the other nodes remains unchanged.
- If you have removed a node from a layout curve with evenly spaced nodes, the node is removed from the specified position and the remaining nodes are recalculated, so that they are evenly spaced again.

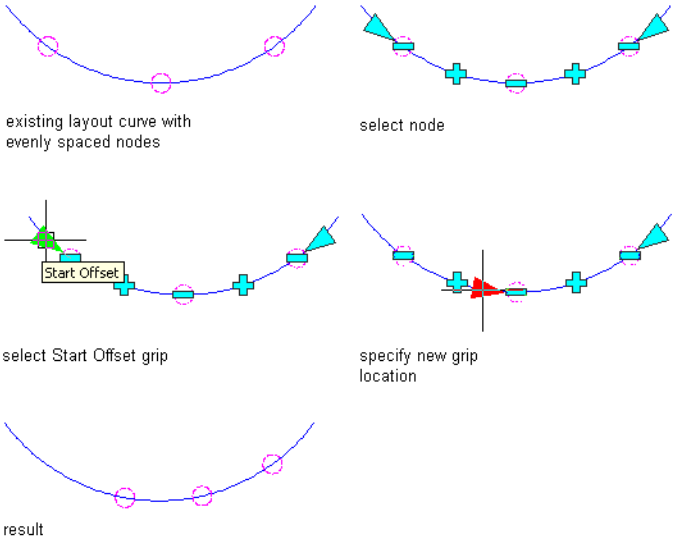
3 Right-click, and click Deselect All to turn off grips.

Changing the Offsets of Layout Curves

Use this procedure to change the start and end offsets of layout curves.

You can change the offsets for evenly spaced and repeated layout curves. By repositioning the offset grips, you can move the start or end offset to any position on the layout curve. You cannot extend an offset beyond the bounds of the curve.

Changing the start offset node location of a layout curve using grips



1 Select a layout curve by selecting one of the node anchors.

2 Click an Offset grip.

3 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

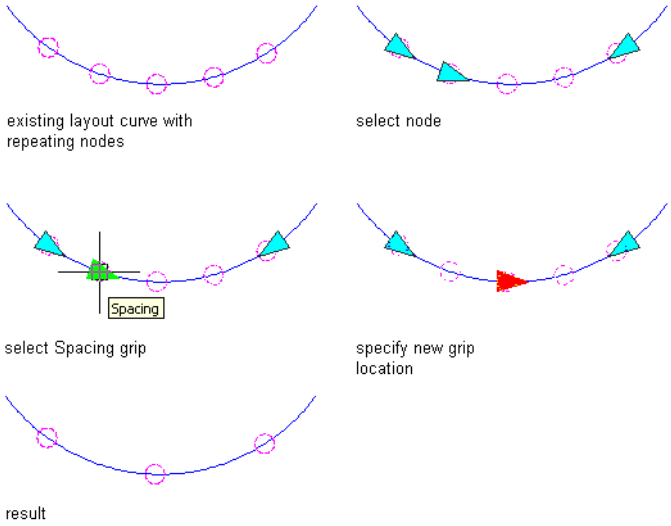
4 Right-click, and click Deselect All to turn off grips.

Changing the Node Spacing of a Layout Curve

Use this procedure to change the spacing between nodes on a layout curve with fixed repeated spacing.

Layout curve with evenly spaced node grips

Changing the node spacing of a layout curve using grips



1 Select a layout curve by selecting one of the node anchors.

2 Click the Spacing grip.

The Spacing grip is attached to the first node of the layout curve.

3 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

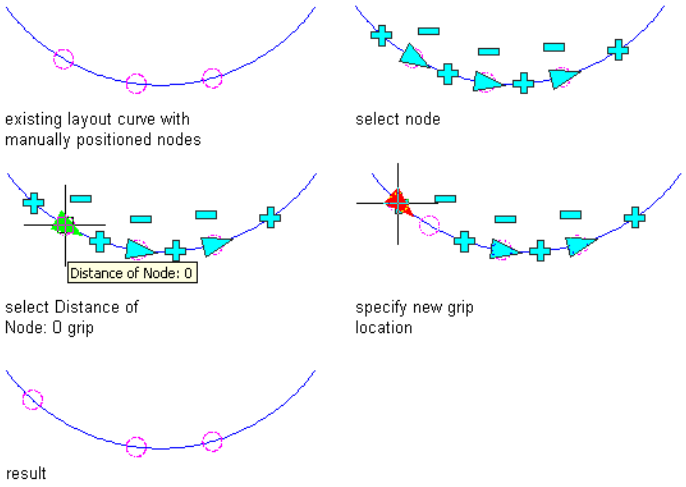
If you move the grip to the left to decrease the space between nodes, the number of nodes increases. If you move the grip to the right to increase the space between nodes, the number of nodes decreases.

4 Right-click, and click Deselect All to turn off grips.

Changing the Node Positions on a Layout Curve

Use this procedure to change the positions of nodes on a layout curve with manual node placement.

Changing a node position on a layout curve using grips



1 Select a layout curve by selecting one of the node anchors.

2 Click a Node Distance grip.

3 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

4 Right-click, and click Deselect All to turn off grips.

Changing the Spacing Mode of Layout Curves

Use this procedure to change how modes are positioned along a layout curve. For more information, see Adding Layout Curves on page 1777.

For example, you can change the mode so that a curve with manually spaced nodes becomes a curve with evenly spaced nodes. If you want to add nodes to a layout curve with a fixed number of nodes, you must first convert the layout curve to manually spaced or evenly spaced mode.

You can also change the layout mode on the Properties palette.

1 Select the layout curve by selecting one of the node anchors.

2 Click Layout Curve tab ➤ Modify panel ➤ Layout Mode . Alternatively, you can right-click, and click Layout Mode.

3 Select the desired mode, and press *ENTER*.

- If you are changing a layout curve with manually spaced nodes to a curve with nodes at fixed repeated spacing, you are prompted for start and end offsets, and the distance between nodes. If there are too few nodes on the curve to fill it, new nodes are created at the specified distance.
- If you are changing a layout curve with manually spaced nodes to a curve with evenly spaced nodes, you are prompted for start and end offsets for the curve. The existing nodes are distributed evenly on the curve.
- If you are changing a curve with nodes placed at a fixed repeated spacing value to a curve with manually spaced nodes, there is no visible change. However, the nodes have been converted to manual nodes, so that you now can add nodes to and remove nodes from the curve.
- If you are changing a curve with nodes placed at a fixed repeated spacing value to a curve with evenly spaced nodes, you are prompted for start and end offsets. The existing nodes

are then recalculated and distributed evenly. You can now add nodes to and remove nodes from the curve.

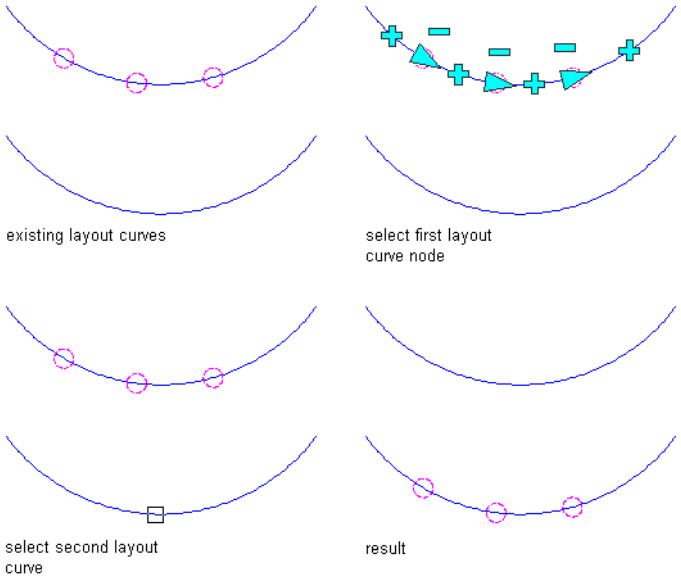
- If you are changing a curve with evenly spaced nodes to a curve with manually spaced nodes, there is no visible change. If you change the curve, however, the nodes remain fixed and are no longer redistributed evenly.
- If you are changing a curve with evenly spaced nodes to a curve with nodes placed at fixed repeated spacing, you are prompted for start and end offsets, and the distance between nodes. If there are too few nodes on the curve to fill it, new nodes are created at the specified distance.

Switching Layout Curves

Use this procedure to move a layout curve from one object to another object. The layout mode is retained in this action. If the layout curve was inserted originally with evenly spaced nodes, the nodes remain evenly spaced on the new object.

If you switch the curve to an object that already contains a layout curve, the two curves are not merged. They are still separate objects and can be edited separately.

Switching nodes from one layout curve to another



1. Select the layout curve by selecting one of the node anchors.
2. Click Layout Curve tab ➤ Modify panel ➤ Switch Curve . Alternatively, you can right-click, and click Switch Curve.
3. Select the object to which to attach the layout curve.

The layout curve is moved to the new object.

Changing the Display Properties of Layout Curves

Use this procedure to change the display properties of the nodes on a layout curve. Display properties you can change include the following:

- Visibility (display component is on or off)

- Layer
- Color
- Linetype
- Lineweight
- Linetype scale
- Node size

1. Select the layout curve that you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. Click the Layer/Color/Linetype tab.
5. Select the component to change, and select a different setting for the property.
6. Click OK twice.

Changing the Node Radius for a Layout Curve

Use this procedure to change the node radius for a layout curve by editing its display properties.

1. Double-click the layout curve you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

   NOTE To apply your changes to all layout curves in the drawing, select Drawing default setting.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. Click the value for Node radius, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new radius.)

You can also access and modify the node radius property through the layout curve's context menu, as follows:

1. Select the layout curve, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. In the Display Properties dialog, click the Other tab, and then change the radius as needed.
5. Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Layout Curve

Use this procedure to attach hyperlinks, notes, or files to a layout curve. You can also edit hyperlinks and notes, and edit or detach reference files from a layout curve.

1 Select the layout curve to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click OK.
edit the description of a reference file	select the file, enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

8 Click OK.

Using Layout Grids

Use a layout grid to arrange objects in a 2D grid pattern. You can create a radial or rectangular layout grid. You can anchor objects to the intersection of the grid lines (node anchors) or to the center of the grid bays (cell anchors). For more information about anchors, see Working with Node Anchors on page 1765 and Working with Cell Anchors on page 1767.

NOTE By default, the markers for node anchors and cell anchors are not displayed when you insert a grid. To display them, turn these components on in the Entity Display. For information about turning on display components, see Changing the Display Properties of Layout Curves on page 1784.

Changing the size of a grid changes the spacing of objects anchored to that grid and can also change the size of objects anchored to that grid. You can use a clipping profile to define a boundary around a layout grid or to make a hole in a layout grid. The layout grid is not displayed outside a boundary or inside a hole. Use closed polylines to define the boundary or hole. For example, you can use a clipping profile to cut a hole in a reflected ceiling grid.

Creating a Layout Grid Tool

Use this procedure to create a 2D layout grid tool and add it to a tool palette. You may want to create your own layout grid tools if you are placing multiple layout grids of a specific style and they all have the same properties.

1 Open the tool palette where you want to add the tool.

2 Create the tool:

If you want to…	Then…
create a tool from a layout grid in the drawing	select the object, and drag it to the tool palette.

If you want to…	Then…
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the tool palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 For Name, enter the name you want displayed for this tool's tooltip. This name will also be displayed with the tool if it is published to a catalog in the Content Browser.

5 For Description, click in the text box, and then enter the description you want displayed for this tool's tooltip. This description will also be displayed with the tool if it is published to a catalog in the Content Browser.

6 Expand Basic, and expand General.

7 Under General, click the Description text box, enter a description of the tool, and click OK.

8 For Layer key, click the text box, select a layer key, and click OK.

9 For Layer overrides, click the text box, select a layer key override, and click OK.

10 Expand Dimensions.

11 Click Yes to specify the dimension of the grid on the drawing screen as you are creating it.

12 Click No to specify numerical values for the Width, Depth, and Height of the grid.

13 Expand X Axis, and specify a Layout type, a Bay size, and Start and End offsets.

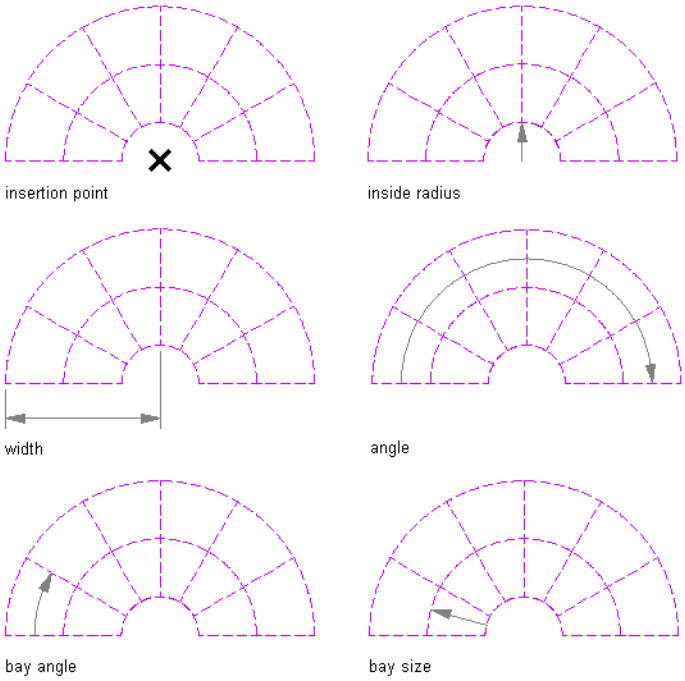
14 Expand Y Axis, and specify a Layout type, a Bay size, and Start and End offsets.

15 Click OK.

Adding Radial Layout Grids

Use this procedure to create a 2D radial layout grid.

Radial layout grid parameters



1 Open the tool palette that contains the layout grid 2D tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

If there are no layout grid 2D tools available on tool palettes in the workspace, you can use the Content Browser to access the Stock Tool catalog, which contains a layout grid 2D tool under Parametric Layout and Anchoring Tools. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 On the Properties palette, expand Basic, and expand General.

3 For Shape, select Radial.

4 Specify the boundary object attached to the grid, if necessary.

5 Expand Dimensions, and select Yes to specify dimensions on the drawing screen or No to specify dimensions on the Properties palette.

6 On the Properties palette, enter the width and the angular dimension of the grid.

7 Expand X Axis.

8 For Layout type, select Space evenly, and enter a value for Number of bays, or select Repeat, and enter a value for Bay size.

9 Enter a value for Inside radius.

10 Enter a value for End offset.

11 Expand Y Axis.

12 For Layout type, select Space evenly, and enter a value for Number of bays, or select Repeat, and enter values for Bay angle, Start angle offset, and End angle offset.

13 Specify an insertion point in the drawing for the center of the radial layout grid.

14 Specify the rotation of the radial grid about the insertion point.

Changing Radial Layout Grids

Use this procedure to change the angle or size of a radial layout grid. You can also change the number and size of the grid bays.

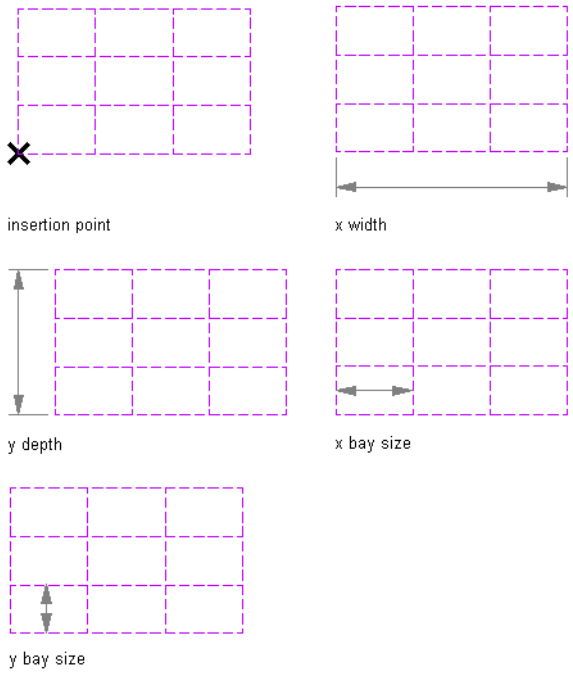
If you use grips to stretch a radial layout grid, the behavior of the radial layout grid depends on the spacing type of each axis. The overall size of the grid "jumps" in directions that are specified to use a certain bay size with repeat spacing because the exact bay size is maintained. The overall size changes in directions that are specified to be evenly spaced or manually spaced.

1. Double-click one or more 2D layout grids.
2. On the Properties palette, expand Basic, expand General.
3. Expand Dimensions and enter new values for the width and angle.
4. Expand X Axis, and depending on the layout type, enter new values for Number of bays, Bay size, Inside radius, and End offset.
5. Expand Y Axis, and depending on the layout type, enter new values for Number of bays, Bay angle, Start angle offset, and End angle offset.

Adding Rectangular Layout Grids

Use this procedure to add rectangular layout grids.

Rectangular layout grid parameters



1. Open the tool palette that contains the layout grid 2D tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

If there are no layout grid 2D tools available on tool palettes in the workspace, you can use the Content Browser to access the Stock Tool catalog, which contains a layout grid 2D tool under Parametric Layout and Anchoring Tools. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 On the Properties palette, expand Basic, and expand General.

3 For Shape, select Rectangular.

4 Specify the boundary object attached to the grid, if necessary.

5 Expand Dimensions, and select Yes to specify dimensions on the drawing screen or No to specify dimensions on the Properties palette.

6 Enter values for the X-Width and Y-Depth properties.

7 Expand X Axis.

8 For Layout type, select Space evenly, and enter values for Number of bays and Start and End offset, or select Repeat, and enter values for Bay size and Start and End offset.

9 Expand Y Axis.

10 For Layout type, select Space evenly, and enter values for Number of bays and Start and End offset, or select Repeat, and enter values for Bay size and Start and End offset.

11 Specify an insertion point in the drawing for the lower-left corner of the rectangular layout grid.

12 Specify the rotation of the rectangular grid about the insertion point.

Changing Rectangular Layout Grids

Use this procedure to change the angle or size of a rectangular layout grid. You can also change the number and size of the grid bays.

If you use grips to stretch a rectangular layout grid, the behavior of the rectangular layout grid depends on the spacing type of each axis. The overall size of the grid "jumps" in directions that are specified to use a specific bay size with repeat spacing because the exact bay size is maintained. The overall size changes in directions that are specified to be evenly spaced or manually spaced.

1 Double-click one or more 2D layout grids.

2 On the Properties palette, expand Basic, and expand General.

3 Enter a new X width and Y depth value.

4 Select the repeat spacing option and enter a value, or enter a new X and Y bay size value.

Creating a Layout Grid with User-Specified Settings

Use this procedure to add a layout grid with settings that you specify. Layout grids can be either rectangular or radial.

1 Open the tool palette that contains the layout grid tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

If there are no layout grid 2D tools available on tool palettes in the workspace, you can use the Content Browser to access the Stock Tool catalog, which contains a layout grid 2D tool under Parametric Layout and Anchoring Tools. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 On the Properties palette, expand Basic, and expand General.

3 Click the setting for Description, enter a description of the grid, and click OK.

4 For Shape, select either Rectangular or Radial.

5 Specify the boundary object attached to the grid, if necessary.

6 Expand Dimensions, and for Specify on screen select No.

7 If you selected a rectangular grid shape, specify the dimensions.

- For X - Width, enter a value to define the width of the grid.
- For Y - Depth, enter a value to define the depth of the grid.

8 Under X Axis, specify the layout:

If you want to…	Then…
lay out the grid with evenly spaced bays along the X direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the X direction	select Repeat for Layout type, and enter a value for Bay size.

- For Start offset, enter the offset distance from the start point of the grid.

  NOTE The offset distance may be used to reduce the effective grid size.

- For End offset, enter the offset distance from the end point of the grid.

9 Under Y Axis, specify the layout:

If you want to…	Then…
lay out the grid with evenly spaced bays along the Y direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the Y direction	select Repeat for Layout type, and enter a value for Bay size.

- For Start offset, enter a value for the offset distance from the start point of the grid.

  NOTE Offsets may be used to reduce the effective grid size.

- For End offset, enter the offset distance from the end point of the grid.

10 If you selected a radial grid shape, specify the dimensions.

- For X - Width, enter a value to define the width of the grid.
- For A - Angle, enter a value to define the angle of the grid.

11 Under X Axis, specify the layout:

If you want to…	Then…
lay out the grid with evenly spaced bays along the X direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the X direction	select Repeat for Layout type, and enter a value for Bay size.

- For Inside radius enter a value for the inside radius of the grid.
- For End offset enter a value for the offset distance from the end point of the grid. The offset distance may be used to reduce the effective grid size.

12 Under Y Axis, specify the layout:

If you want to…	Then…
lay out the grid with evenly spaced bays along the Y direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay angle along the Y direction	select Repeat for Layout type, and enter a value for Bay angle.

- For Start angle offset enter a value for the offset angle from the start angle of the grid.

  NOTE Offsets may be used to reduce the effective grid size.

- For End angle offset enter a value for the offset angle from the end angle of the grid.

13 In the drawing area, specify the insertion point of the grid.

14 Specify the rotation angle of the grid, and press *ENTER*.

Creating a Custom Layout Grid from Linework

Use this procedure to convert custom linework to a layout grid that has the properties of the layout grid tool you select. You can edit these properties after creating the layout grid.

1 Open the tool palette that contains the layout grid tool you want to use.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

2 Right-click a layout grid tool, and click Apply Tool Properties to ➤ Linework.

3 Select the linework to convert, and press *ENTER*.

4 When prompted to erase the original linework, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

5 Edit the properties of the layout grid on the Properties palette, if necessary.

Adding Lines to Layout Grids

Use this procedure to add grid lines to a grid. You can separately add grid lines on the *X* plane and on the *Y* plane. If you are adding lines to a custom grid that was created by applying tool properties to linework, draw the new line or lines in the desired position before staring the procedure.

NOTE For non-custom grids, you can add lines only if the grid was inserted with manually spaced lines or evenly spaced lines. Layout grids with lines placed at a fixed repeated spacing value cannot be changed manually. For information about grid modes, see Changing the Spacing Mode of Layout Grids on page 1794.

1 Select the layout grid

2 Select an add option:

If you want to add a grid line to …	Then…
the *X* plane of the grid	click Layout Grid 2D tab ➤ X Axis panel ➤ Add Grid Line , then proceed to next step.

If you want to add a grid line to …	Then…
the *Y* plane of the grid	click Layout Grid 2D tab ➤ Y Axis panel ➤ Add Grid Line, then proceed to next step.
a custom grid that was created by applying tool properties to linework	click Layout Grid 2D tab ➤ Custom Grid panel ➤ Add Grid Lines. Then select the linework to be added, and press ENTER. Press ENTER again to keep the linework, or enter **y** (Yes) to erase it.

3 Specify the distance of the new grid line from the start of the grid.

- If you have added a line to a layout grid with manually spaced lines, the new line is inserted at the specified position. The position of the other lines remains unchanged. The grid size changes accordingly.
- If you have added a line to a layout grid with evenly spaced lines, the new line is inserted and all lines are recalculated, so that they are evenly distributed again. The grid size remains unchanged.

Removing Grid Lines from Layout Grids

Use this procedure to remove individual grid lines from a grid. You can separately remove grid lines from the *X* plane and the *Y* plane.

NOTE You can remove lines only from grids that have been inserted with manually spaced lines or evenly spaced lines. Layout grids with lines placed at a fixed repeated spacing value cannot be changed. For information about grid modes, see Changing the Spacing Mode of Layout Grids on page 1794.

1 Select the layout grid, and:

If you want to remove a grid line from…	Then…
the *X* plane of the grid	click Layout Grid 2D tab ➤ X Axis panel ➤ Remove Grid Line. Then proceed to next step.
the *Y* plane of the grid	click Layout Grid 2D tab ➤ Y Axis panel ➤ Remove Grid Line. Then proceed to next step.
a custom grid that was created by applying tool properties to linework	click Layout Grid 2D tab ➤ Custom Grid panel ➤ Remove Grid Lines. Then select the linework to be removed, and press ENTER. The linework remains visible in the drawing but is no longer part of the grid. You can select it and delete it if desired.

2 Click the grid line to be removed from the grid.

- If you have removed a line from a layout grid with manually spaced lines, the specified line is removed from the grid. The position of the other lines remains unchanged.
- If you have removed a line from a layout grid with evenly spaced lines, the specified line is removed from the grid. All remaining lines are recalculated, so that they are evenly distributed again.

Changing the Spacing Mode of Layout Grids

Use this procedure to change the spacing mode of a radius or rectangular layout grid. Layout grids can have three different spacing modes. These modes are set separately for the *X* and *Y* planes:

- **Manual:** You specify the position of each line on the layout grid.
- **Repeat:** You specify equidistant spacing between lines on the layout grid. The number of lines is determined by the size of the layout grid. As the size of the grid changes, lines are added or subtracted accordingly. The distance between the lines remains fixed.
- **Space Evenly:** You specify the number of lines on the grid. The space between the lines is determined by the size of the layout grid. As the size of the grid changes, the spacing between the lines is lengthened or shortened accordingly. The number of lines remains fixed.

By default, layout grids are inserted with evenly spaced lines.

1 Select the layout grid, and:

If you want to change…	**Then…**
the spacing mode of the *X* plane of the grid	click Layout Grid 2D tab ➤ X Axis panel ➤ Layout Mode .
the spacing mode of the *Y* plane of the grid	click Layout Grid 2D tab ➤ Y Axis panel ➤ Layout Mode .

2 Select the desired mode, and press *ENTER*.

- If you are changing a layout grid with manually spaced lines to a grid with lines placed at a fixed repeated spacing value, you are prompted for start and end offsets, and the distance between the lines. If there are too few lines on the grid to fill it according to your specifications, new lines are created.
- If you are changing a layout grid with manually spaced lines to a grid with evenly spaced lines, you are prompted for start and end offsets for the grid. The existing lines are distributed evenly on the grid.
- If you are changing a layout grid with lines placed at a fixed repeated spacing value to a grid with manually spaced lines, there is no visible change, but the lines have been converted to manual lines, so that you now can add lines to and remove lines from the grid.
- If you are changing a layout grid with lines placed at a fixed repeated spacing value to a grid with evenly spaced lines, you are prompted for start and end offsets. The existing lines are then recalculated and distributed evenly. You can now add lines to and remove lines from the grid.
- If you are changing a grid with evenly spaced lines to a grid with manually spaced lines, there is no visible change. However, if you change the grid, the lines remain fixed and are not distributed evenly anymore.
- If you are changing a grid with evenly spaced lines to a grid with lines placed at a fixed repeated spacing value, you are prompted for start and end offsets, and the distance between the lines. If there are too few lines on the grid to fill the grid according to your specifications, new lines are created.

Changing the Display Properties of Layout Grids

Use this procedure to change any of the following display properties of the nodes on a layout grid:

- Visibility (display component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale
- Node size

1. Select the layout grid that you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. Click the Layer/Color/Linetype tab.
5. Select the component to change, and select a different setting for the property.
6. Click OK twice.

Changing the Node Radius for a Layout Grid

Use this procedure to change the node radius for a layout grid by editing its display properties.

1. Double-click the layout grid you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

   NOTE To apply your changes to all layout grids in the drawing, select Drawing default setting.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. Click the value for Node radius, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new radius.)

You can also access and modify the node radius property through the layout grid's context menu, as follows:

1. Select the layout grid, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. In the Display Properties dialog, click the Other tab, and then change the radius as needed.
5. Click OK twice.

Creating and Removing Boundaries for Layout Grids

Use this procedure to create a boundary around a 2D layout grid. Areas of the grid outside the boundary are not shown. However, objects anchored to the grid outside the boundary are still displayed. Boundaries are useful when you need to create a grid in an irregularly shaped area.

You can also remove a boundary to redisplay the entire grid.

1. Draw a closed polyline to define the grid boundary.
2. Select a layout grid, and then click Layout Grid 2D tab ➤ Clipping panel ➤ Set Boundary .
3. Select the layout grid, and press *ENTER*.
4. Select the closed polyline for the boundary of the layout grid, and press *ENTER*.
5. To remove a grid boundary, erase the polyline that defines the boundary.

Creating Holes in Layout Grids

Use this procedure to create a hole in a layout grid. The area of the grid within the hole is not displayed.

1. Draw a closed polyline to define the hole.
2. Select a layout grid, and click Layout Grid 2D tab ➤ Clipping panel ➤ Add Hole .
3. Select the layout grid, and press *ENTER*.
4. Select the closed polyline for the hole, and press *ENTER*.

A hole is cut in the layout grid.

Removing Holes from Layout Grids

Use this procedure to remove holes that you have created in layout grids.

1. Select a layout grid, and click Layout Grid 2D tab ➤ Clipping panel ➤ Remove Hole .
2. Select a layout grid, and press *ENTER*.
3. Select the closed polyline of the hole.

Changing the Location of Layout Grids

Use this procedure to change the location of layout grids. You can relocate a layout grid by changing the coordinate values of its insertion point. The layout grid also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the layout grid are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the layout grid by aligning its normal with another axis. You can also rotate the layout grid on its plane by changing the rotation angle.

For information about WCS and UCS, see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1. Double-click the layout grid that you want to change.
2. On the Properties palette, expand Basic, and expand Location.
3. Select Additional information.
4. In the Location dialog, specify the location of the layout grid:

If you want to…	Then…
relocate the layout grid	enter new coordinate values under Insertion Point.

If you want to…	Then…
locate the layout grid on the *XY* plane	make the normal of the layout curve parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the layout grid on the *YZ* plane	make the normal of the layout grid parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the layout grid on the *XZ* plane	make the normal of the layout grid parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the layout grid	enter a new value for Rotation Angle.

5 Click OK.

Attaching Hyperlinks, Notes, or Files to a Layout Grid

Use this procedure to attach hyperlinks, notes, or files to a layout grid. You can also edit hyperlinks and notes, and edit or detach reference files from a layout grid.

1 Double-click the layout grid to which to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click OK.
edit the description of a reference file	select the file, enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

8 Click OK.

Using Layout Volumes

Use a layout volume to arrange objects in a 3D grid. Changing the size of a layout volume changes the spacing of objects attached to that volume and can also change the size and height of objects attached to that volume.

Creating a Layout Volume Tool

Use this procedure to create a layout volume tool and add it to a tool palette. You may want to create your own layout volume tools if you are placing multiple layout volumes of a specific style and they all have the same properties.

1. Open the tool palette where you want to add the tool.
2. Create the tool:

If you want to…	Then…
create a tool from a layout volume in the drawing	select the object, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3. Right-click the new tool, and click Properties.
4. For Name, enter the name you want displayed for this tool's tooltip. This name will also be displayed with the tool if it is published to a catalog in the Content Browser.
5. For Description, click in the text box, and then enter the description you want displayed for this tool's tooltip. This description will also be displayed with the tool if it is published to a catalog in the Content Browser.
6. Expand Basic, and expand General.
7. Under General, click the Description text box, enter a description of the tool, and click OK.
8. For Layer key, click the text box, select a layer key, and click OK.
9. For Layer overrides, click the text box, select a layer key override, and click OK.
10. Expand Dimensions.
11. For Specify on screen:

If you want to…	Then…
specify the dimension of the grid on the drawing screen as you are creating it	click Yes.
specify numerical values on the Properties palette	click No, and enter values for Width, Depth, and Height.

12. Expand X Axis.
13. Select Space evenly for Layout type, and enter a value for Number of bays.
14. Select Repeat for Layout type, and enter a value for Bay size.
15. Enter a value for Start offset.
16. Enter a value for End offset.
17. Expand Y Axis.
18. Select Space evenly for Layout type, and enter a value for Number of bays.
19. Select Repeat for Layout type, and enter a value for Bay angle.

20 Enter a value for Start offset.

21 Enter a value for End offset.

22 Expand Z Axis.

23 Select Space evenly or Repeat for Layout type.

24 Enter a value for Start offset.

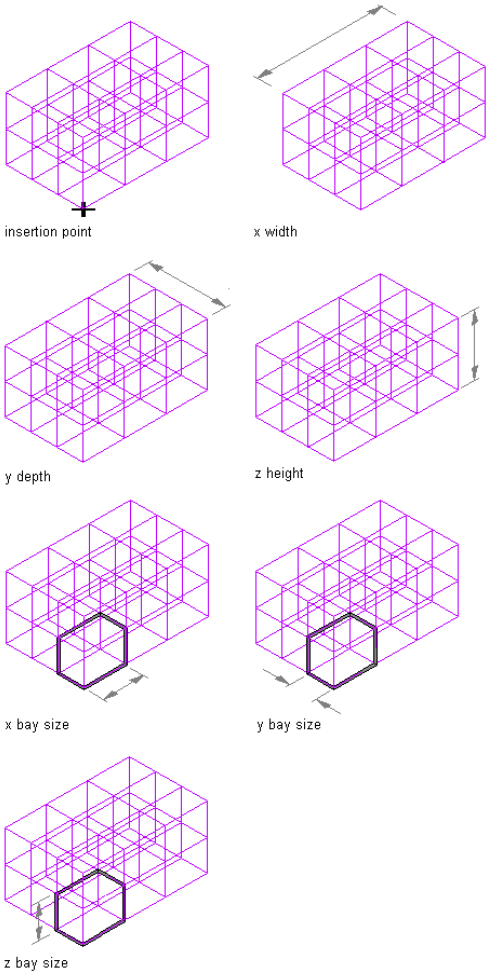
25 Enter a value for End offset.

26 Click OK.

Adding Layout Volumes

Use this procedure to add a layout volume, which is a three-dimensional (3D) layout grid.

Layout volume parameters



1 Open the tool palette that contains the volume layout tool you want to use, and select the tool.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

If there are no volume layout tools available on tool palettes in the workspace, you can use the Content Browser to access the Stock Tool catalog, which contains a volume layout tool under

Parametric Layout and Anchoring Tools. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 Select the volume layout tool.

3 On the Properties palette, expand Basic, and expand General.

4 Enter a value for the X width, Y depth and the Z height.

5 Select the Repeat option for Layout type, and enter values, for X Axis, Y Axis, and Z Axis bay size and start and end offsets.

6 Specify an insertion point in the drawing for the lower-left corner of the rectangular layout grid.

7 Specify the rotation of the rectangular grid about the insertion point.

Changing Layout Volumes

Use this procedure to change the angle or size of three-dimensional (3D) layout volumes. You can also change the number and size of the grid bays.

If you use grips to stretch a layout volume, the behavior of the layout volume depends on the spacing type of each axis. The overall size of the grid "jumps" in directions that are specified to use a certain bay size with repeat spacing because the exact bay size is maintained. The overall size changes in directions that are specified to be evenly spaced or manually spaced.

1 Double-click one or more 3D volume grids.

2 On the Properties palette, expand Basic, and expand General.

3 Enter a new X width, Y depth, and Z height value.

4 Select and change the Layout type option under X Axis, Y Axis, and Z Axis, if necessary, and adjust values for Number of Bays or Bay size, Start offset, and End offset.

Adding Grid Lines to Layout Volumes

Use this procedure to add grid lines to a layout volume. You can add grid lines on the *X, Y,* and *Z* planes separately.

NOTE You can add lines only to volumes inserted with manually spaced lines or evenly spaced lines. Layout volumes with lines placed at a fixed repeated spacing value cannot be changed. For information about grid modes, see Changing the Spacing Mode of Layout Grids on page 1794.

1 Select the layout volume.

2 Specify the axis to which to add the grid line:

If you want to add…	Then…
a grid line to the *X* plane of the volume	click Layout Grid 3D tab ➤ X Axis panel ➤ Add Grid Line .
a grid line to the *Y* plane of the volume	click Layout Grid 3D tab ➤ Y Axis panel ➤ Add Grid Line .
a grid line to the *Z* plane of the volume	click Layout Grid 3D tab ➤ Z Axis panel ➤ Add Grid Line .

3 Specify the distance of the new grid line from the start of the grid.

- If you have added a line to a layout volume with manually spaced lines, the new line is inserted at the specified position. The position of the other lines remains unchanged. The grid size changes accordingly.
- If you have added a line to a layout volume with evenly spaced lines, the new line is inserted and all lines are recalculated, so that they are evenly distributed again. The grid size remains unchanged.

Removing Grid Lines from Layout Volumes

Use this procedure to remove individual grid lines from a volume. You can remove grid lines from the *X*, *Y*, and *Z* planes separately.

NOTE You can remove lines only from volumes which have been inserted with manually spaced lines or evenly spaced lines. Layout volumes with lines placed at a fixed repeated spacing value cannot be changed. For information about grid modes, see Changing the Spacing Mode of Layout Grids on page 1794.

1 Select the layout volume.

2 Specify the axis from which to remove the grid line:

If you want to remove…	Then…
a grid line from the *X* plane of the volume	click Layout Grid 3D tab ➤ X Axis panel ➤ Remove Grid Line .
a grid line from the *Y* plane of the volume	click Layout Grid 3D tab ➤ Y Axis panel ➤ Remove Grid Line .
a grid line from the *Z* plane of the volume	click Layout Grid 3D tab ➤ Z Axis panel ➤ Remove Grid Line .

3 Click the grid line to be removed from the volume.

- If you have removed a line from a layout volume with manually spaced lines, the specified line is removed from the volume. The position of the other lines remains unchanged.
- If you have removed a line from a layout volume with evenly spaced lines, the specified line is removed from the volume. All remaining lines are recalculated, so that they are evenly distributed again.

Changing the Spacing Mode of Layout Volumes

Use this procedure to change how modes are positioned along a layout volume. For more information, see Adding Layout Volumes on page 1799.

For example, you can change the mode so that a volume with manually spaced nodes becomes a volume with evenly spaced nodes. If you want to add nodes to a layout volume with a fixed number of nodes, you must first convert the layout volume to the manually spaced or evenly spaced mode.

You can also change the layout mode on the Properties palette.

1 Select the layout volume by selecting one of the node anchors.

2 Choose the desired command:

- For X axis, click Layout Grid 3D tab ➤ X Axis panel ➤ Layout Mode .
- For Y axis, click Layout Grid 3D tab ➤ Y Axis panel ➤ Layout Mode .
- For Z axis, click Layout Grid 3D tab ➤ Z Axis panel ➤ Layout Mode .

3 Select the desired mode, and press *ENTER*.

- If you are changing a layout volume with manually spaced nodes to a volume with nodes placed at a fixed repeated spacing value, you are prompted for start and end offsets, and the distance between the nodes. If there are too few nodes on the curve to fill it, new nodes are created at the specified distance.
- If you are changing a layout volume with manually spaced nodes to a volume with evenly spaced nodes, you are prompted for start and end offsets for the volume. The existing nodes are distributed evenly on the volume.
- If you are changing a volume with nodes placed at a fixed repeated spacing value to a volume with manually spaced nodes, there is no visible change. However, the nodes have been converted to manual nodes, so that you now can add nodes to and remove nodes from the volume.
- If you are changing a volume with nodes placed at a fixed repeated spacing value to a volume with evenly spaced nodes, you are prompted for start and end offsets. The existing nodes are than recalculated and distributed evenly. You can now add nodes to and remove nodes from the volume.
- If you are changing a volume with evenly spaced nodes to a volume with manually spaced nodes, there is no visible change. If you change the volume, however, the nodes remain fixed and are no longer redistributed evenly.
- If you are changing a volume with evenly spaced nodes to a volume with nodes placed at a fixed repeated spacing value, you are prompted for start and end offsets, and the distance between the nodes. If there are too few nodes on the curve to fill it, new nodes are created at the specified distance.

Changing the Display Properties of Layout Volumes

Use this procedure to change any of the following display properties of the nodes on a layout volume:

- Visibility (display component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale
- Node size

1 Select the layout volume that you want to change, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 Click the Layer/Color/Linetype tab.

5 Select the component to change, and select a different setting for the property.

6 Click OK twice.

Changing the Node Radius for a Layout Volume

Use this procedure to change the node radius for a layout volume by editing its display properties.

1 Double-click the layout volume you want to change.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all layout volumes in the drawing, select Drawing default setting.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 Click the value for Node radius, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new radius.)

You can also access and modify the node radius property through the layout volume's context menu, as follows:

1 Select the layout volume, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 In the Display Properties dialog, click the Other tab, and then change the radius as needed.

5 Click OK twice.

Changing the Location of Layout Volumes

Use this procedure to change the location of layout volumes. You can relocate a layout volume by changing the coordinate values of its insertion point. The layout volume also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the layout volume are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the layout volume by aligning its normal with another axis. You can also rotate the layout volume on its plane by changing the rotation angle.

For information about WCS and UCS, see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1 Double-click the layout volume that you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand Location.

3 Select Additional information.

4 Specify the location of the layout volume:

If you want to…	Then…
relocate the layout volume	enter new coordinate values under Insertion Point.
locate the layout volume on the *XY* plane	make the normal of the layout volume parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the layout volume on the *YZ* plane	make the normal of the layout volume parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the layout volume on the *XZ* plane	make the normal of the layout volume parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the layout volume	enter a new value for Rotation Angle.

5 Click OK.

Attaching Hyperlinks, Notes, or Files to a Layout Volume

Use this procedure to attach hyperlinks, notes, or files to a layout volume. You can also edit hyperlinks and notes, and edit or detach reference files from a layout volume.

1 Double-click the layout volume to which to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click OK.
edit the description of a reference file	select the file, enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

8 Click OK.

Grids

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Grids are AEC objects on which you can anchor other objects, such as columns, and constrain their locations.

Grids

Grids are AEC objects on which you can anchor other objects, such as columns, and constrain their locations. Grids are useful in the design and documentation phases of a project.

Types of Grids

There are several types of grids, each with its own purpose:

Layout grids help you position objects relative to each other in your building design. For more information about layout grids, see Layout Curves and Grids on page 1775.

Column grids are layout grids that place a column at each intersection of the grid as you add it to your drawing. They are unique also in that they have automatic labeling tools. For more information about columns, see Creating a Freestanding Column on page 1686 or Creating Grid-Anchored Columns on page 1689.

Ceiling grids are specialized layout grids that represent suspended ceiling systems or cassette ceilings. They can be anchored to a space object at ceiling height.

All of these grid types share some common features.

Layout Types for Grids

There are 3 different layout types that control the spacing of lines in a grid. Layout type is specified separately for the X and Y planes.

- **Manual:** You specify the position of each line on the grid.
- **Repeat (Fixed Bay Size):** You specify equidistant spacing between lines on the grid. The number of lines is determined by the size of the grid. As the size of the grid changes, lines are added or subtracted accordingly. The distance between lines remains fixed.
- **Space Evenly:** You specify the number of lines on the grid. The space between lines is determined by the size of the grid. As the size of the grid changes, the spacing between lines is lengthened or shortened accordingly. The number of lines remains fixed.

NOTE By default, grids are inserted with evenly spaced lines.

Anchoring Objects to Grids

Grids can be used to anchor other objects. This is most visible in column grids, where special functionality allows you to anchor columns to the grid during insertion. Once the grid is inserted, you can add other objects to it as well.

There are 2 anchoring mechanisms available for grids:

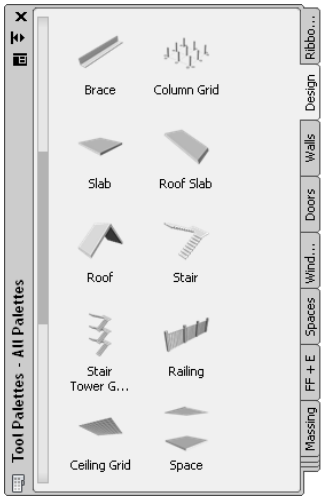
- Anchoring objects to a grid cell (Cell Anchor)
- Anchoring objects to a grid intersection (Node Anchor)

For more information about anchoring objects, see Anchors on page 1755.

Using Column Grid Tools to Create Column Grids

Tools in the software let you quickly place column grids using a structural column grid tool with specific predefined properties. You can use the default settings of the tool, or you can change the properties. You can also use structural column grid tools to convert linework to column grids, and to apply the settings of a structural column grid tool to existing column grids.

Tool palettes containing structural column grid tools



The default tool palettes in the workspace contain sample structural column grid tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain structural column grid tools that you can add to your tool palettes:

- AutoCAD Architecture Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain structural column grid tools with column grid properties that are customized for your projects or office standards.

Creating a Column Grid

Use this procedure to add a new column grid that has the properties specified in the structural column grid tool that you select. To specify settings when you add a column grid, see Creating a Column Grid with User-Specified Settings on page 1790.

1 Open the tool palette that contains the structural column grid tool you want to use, and select the tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column Grid .

2 Specify the insertion point of the column grid.

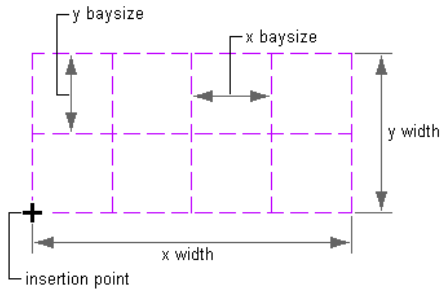
3 Specify the rotation of the column grid, and press *ENTER*.

4 Continue adding column grids, and press *ENTER*.

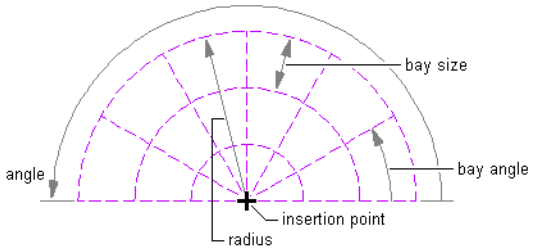
Creating a Column Grid with User-Specified Settings

Use this procedure to add a column grid with settings that you specify. Column grids can be either rectangular or radial.

Rectangular grid



Radial grid



1 Open the tool palette that you want to use, and select a structural column grid tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column Grid .

2 On the Properties palette, expand Basic, and expand General.

3 Select a shape, either Rectangular or Radial.

4 Expand Dimensions.

5 If you have selected a rectangular grid shape, specify the settings:

If you want to…	Then…
define the width of the grid	expand Dimensions, and enter a value for X - Width.
define the depth of the grid	expand Dimensions, and enter a value for Y - Depth.
lay out the grid with evenly spaced bays along the X direction	expand X Axis, select Space evenly for Layout type, and enter a value for Number of bays.

If you want to…	Then…
lay out the grid with a fixed bay size along the X direction	expand X Axis, select Repeat for Layout type, and enter a value for Bay size.
specify the offset distance from the start point along the X direction of the grid	expand X Axis, and enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the end point along the X direction of the grid	expand X Axis, and enter a value for End offset. The offset distance may be used to reduce the effective grid size.
lay out the grid with evenly spaced bays along the Y direction	expand Y Axis, select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the Y direction	expand Y Axis, select Repeat for Layout type, and enter a value for Bay size.
specify the offset distance from the start point along the Y direction of the grid	expand Y Axis, and enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the end point along the Y direction of the grid	expand Y Axis, and enter a value for End offset. The offset distance may be used to reduce the effective grid size.

6 If you have selected a radial grid shape, specify the settings:

If you want to…	Then…
define the width of the grid	expand Dimensions, and enter a value for X - Width.
define the angle of the grid	expand Dimensions, and enter a value for A - Angle.
lay out the grid with evenly spaced bays along the X direction	expand X Axis, select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the X direction	expand X Axis, select Repeat for Layout type, and enter a value for Bay size.
specify the inside radius of the grid	expand X Axis, and enter a value for Inside radius.
specify the offset distance from the end point along the X direction of the grid	expand X Axis, and enter a value for End offset. The offset distance may be used to reduce the effective grid size.
lay out the grid with evenly spaced bays along the Y direction	expand Y Axis, select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay angle along the Y direction	expand Y Axis, select Repeat for Layout type, and enter a value for Bay angle.
specify the offset angle from the start angle along the X direction grid curve	expand Y Axis, and enter a value for Start angle offset. The offset angle may be used to reduce the grid size.

If you want to…	Then…
specify the offset angle from the end angle along the X direction grid curve	expand Y Axis, and enter a value for End angle offset. The offset distance may be used to reduce the grid size.

7 To add columns to the grid intersection during insertion, expand Column, and specify a style for the structural member.

If you choose to add columns, you can specify the dimensions of the column:

- Start offset
- End offset
- Logical length
- Justify
- Justify using overall extents

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

8 In the drawing area, specify the insertion point of the column grid.

9 Specify the rotation angle of the grid, and press *ENTER*.

10 Continue adding column grids, and press *ENTER*.

Creating a Column Grid from a Layout Grid

Use this procedure to convert a two-dimensional (2D) layout grid to a column grid that has the properties of the structural column grid tool you select. You can edit these properties after creating the column grid.

1 Open the tool palette that contains the column grid tool you want to use.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

2 Right-click the tool, and click Apply Tool Properties to ➤ Layout Grid 2D.

3 Select the layout grid to convert, and press *ENTER*.

4 When prompted to erase the original geometry, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

5 Edit the properties of the column grid in the Properties palette, if necessary.

Creating a Custom Column Grid from Linework

Use this procedure to convert custom linework to a column grid that has the properties of the structural column grid tool you select. You can edit these properties after creating the column grid.

1 Open the tool palette that contains the column grid tool you want to use.

TIP You may have to scroll to display the desired tool. After selecting it, you can move or hide the Properties palette to expose more of the drawing area.

2 Right-click a structural column grid tool, and click Apply Tool Properties to ➤ Linework.

3 Select the linework to convert, and press *ENTER*.

4 When prompted to erase the original linework, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

5 Edit the properties of the column grid in the Properties palette, if necessary.

Creating a Column Grid Dynamically

Use this procedure to create column grids dynamically by specifying their dimensions on screen as you draw them.

1 Open the tool palette that contains the column grid tool you want to use.

Alternatively, you can click Home tab ➤ Build panel ➤ Column Grid drop-down ➤ Column Grid .

2 On the Properties palette, expand Dimensions, and select Yes for Specify on screen.

3 To add columns to the grid during insertion, expand Column, and select the desired column style.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

4 Specify the insertion point for the grid in the drawing.

5 Specify the overall size of the grid by dragging the cursor to the desired size and clicking once.

6 Drag the crosshairs inside the resulting shape vertically and horizontally to define the correct number of bays in the column grid.

NOTE The closer the crosshairs go to the left and bottom of the grid, the more spaces are created.

7 Click once to confirm the number of vertical and horizontal bays.

8 Specify the rotation angle of the grid, and press *ENTER*.

The column grid is inserted into the drawing according to your specifications.

Creating a Structural Column Grid Tool

Use this procedure to create a structural column grid tool and add it to a tool palette. You may want to create your own structural column grid tools if you are placing multiple column grids of a specific style, and they all have the same properties.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a column grid in the drawing	select the object, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

If you want to…	Then…
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the column grid created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select a column grid shape.

10 Specify the settings for the dimensions of the grid.

For more information, see Creating a Column Grid with User-Specified Settings on page 1790.

11 Click OK.

Working with Column Grids

After you have created column grids in your drawing, you can customize them for your project. You can add labels, extend grid lines, and add dimensions to the grids.

Labeling Column Grids

You can label existing column grids in the X direction and the Y direction.

1 Select the column grid you want to label.

2 Click Column Grid tab ➤ Label panel ➤ Label.

3 Specify the grid location for labels:

If you want to…	Then…
add labels to the X axis of the grid	click the X - Labeling tab.
add labels to the Y axis of the grid	click the Y - Labeling tab.

4 Enter a starting number or letter for the label under Number in the table.

Each grid line in the X direction or the Y direction is listed in the table. If Automatically Calculate Values for Labels is selected, numbers or letters are consecutively assigned to the remaining grid lines in the order you specify (ascending or descending).

NOTE To renumber a grid, enter a new value in the first location. The remaining values are updated if Automatically Calculate Values for Labels is selected.

5 If you do not want to use certain characters in the sequence, select Never Use Characters, and enter the characters, separated by commas.

6 To change the label symbol, click Bubble.

7 Select a new label symbol from the MvBlockDef Select dialog box, and click OK.
Any multi-view block currently defined in the drawing can be used.

8 Click Generate New Bubbles On Exit to update the bubbles.

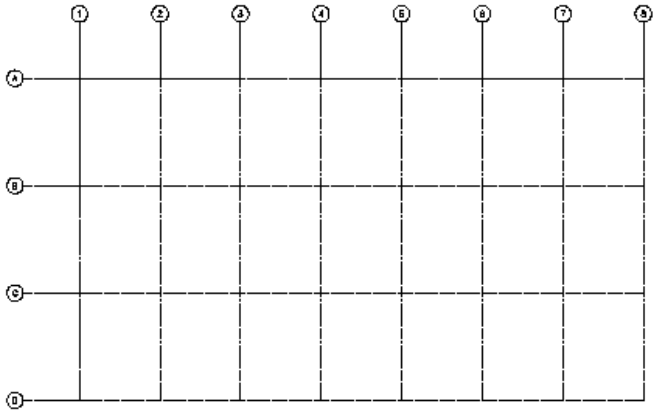
9 Specify the location of bubbles:

If you want to...	Then...
place bubbles in the X direction of the grid	select Top and/or Bottom.
place bubbles in the Y direction of the grid	select Left and/or Right.

10 Enter a value for Extension.
Extension is the length of the bubble lines from the grid to the bubble.

11 Click OK.

Labeling a column grid



Extending Column Grid Lines Beyond the Grid Boundary or Limits

Use this procedure to label 2 sides of a column grid and have the lines of the other 2 sides extend beyond the edge of the column grid rectangle.

1 Label the 2 sides of the column grid.
For more information, see Labeling Column Grids on page 1811.

2 Create a multi-view block definition that has no view blocks.
For more information, see Creating a New Multi-View Block Definition on page 1884.

3 Select the column grid.

4 Click Column Grid tab ➤ Label panel ➤ Label .

5 Click the Labeling tab for the axis you wish to extend.

6 Under Bubble Parameter, select the side (Left or Right, Top or Bottom) that has not been labeled, but do not clear a side that is already labeled, or the bubbles will be removed from that side.

7 Click Bubble, select the new multi-view block you created, and then click OK.

8 Clear Generate New Bubbles On Exit.

9 Click OK.

Dimensioning Column Grids

Use this procedure to dimension column grids and set the distance between the dimensions and the grid. For this, you can use the automatic AEC Dimension.

Dimensioning Column Grids with Automatic AEC Dimension

When you dimension a column grid with an automatic AEC dimension, the resulting dimension is associative. When you update the grid, the dimension is updated accordingly. Also, you can choose an AEC dimension style. For more information, see AEC Dimensions on page 2217.

With an AEC dimension, you cannot display angle dimensions or edit individual dimension chains.

1. Select the column grid you want to dimension.
2. Click Column Grid tab ➤ General panel ➤ Dimension .
3. On the Properties palette, expand Basic, and expand General.
4. Select a style.

   NOTE Be sure to select an AEC dimension style that contains dimensioning points for grids. For more information about AEC dimension contents, see Associative Dimensions from Objects on page 2221.

5. Click to specify the position of the AEC dimension.

   The dimension can, for example, be placed above or below the column grid.

   - To set the direction of the dimension, drag the mouse. The extension lines are drawn in the opposite direction.
   - If you want to align the dimension, enter **a** on the command line, and select the geometry to align to.
   - If you want a user-defined angle for the dimension, enter **r** and enter the rotation angle on the command line.

     NOTE The angle you specify here is calculated in relation to the UCS, and not to the dimensioned grid.

Editing Column Grids

You can change column grids by modifying the overall dimensions of the grid, the number and position of grid lines, as well as the location of the grid within the drawing. You can also set a clipping boundary for the grid and use that to mask the grid or insert a hole into the grid.

NOTE You cannot change the shape of an existing column grid, such as changing a radial grid to a rectangular grid.

Changing the Dimensions of a Column Grid

Use this procedure to change the overall dimensions of a column grid. A rectangular grid is defined by its width and depth. A radial grid is defined by its radius, angle, and optionally, its inner radius.

1. Double-click the column grid to which you want to make changes.
2. Expand General, and expand Dimensions.

3 Modify the desired settings:

If you want to…	Then…
change the dimensions of a rectangular column grid	enter new values for X - Width and Y - Depth.
change the dimensions of a radial column grid	enter new values for X - Width and A - Angle.

TIP You can also change the size of a grid by dragging its grip points. When you have a manual grid, you drag the individual lines, and not the grid.

Changing the Lines of a Column Grid

Apart from the overall dimensions of a column grid, you can also change the number and position of grid lines on the X and Y axes. There are 3 different layout types that control the spacing of lines in a grid. Layout type is specified separately for the X and Y planes on the Properties palette for the grid.

- **Manual:** You specify the position of each line on the grid.
- **Repeat (Fixed Bay Size):** You specify equidistant spacing between lines on the grid. The number of lines is determined by the size of the grid. As the size of the grid changes, lines are added or subtracted accordingly. The distance between lines remains fixed.
- **Space Evenly:** You specify the number of lines on the grid. The space between lines is determined by the size of the grid. As the size of the grid changes, the spacing between lines is lengthened or shortened accordingly. The number of lines remains fixed.

NOTE By default, grids are inserted with evenly spaced lines.

The procedures for adding or removing grid lines vary depending on the Layout type in effect, as explained in the following sections.

Adding Lines to a Column Grid

In some cases, you need to add lines to an existing grid. Depending on the Layout type in effect, you do this in different ways.

Adding Lines to a Column Grid with Evenly Spaced Lines

Use this procedure to add lines to a grid with evenly spaced lines. The lines will always be distributed evenly along the grid axis. If you need non-regular lines with different spacing between them, open the grid's Properties palette, and change the Layout type to Manual.

1 Select the column grid to which you want to add lines.

2 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	click Column Grid tab ➤ X Axis panel ➤ Add Grid Line . Click the grid X axis. The number of grid lines increases by one while the overall size of the grid remains the same.

If you want to…	Then…
add grid lines to the Y axis of the grid	click Column Grid tab ➤ Y Axis panel ➤ Add Grid Line .Click the grid Y axis. The number of grid lines increases by one while the overall size of the grid remains the same.

Alternatively, you can add grid lines by increasing the value of Number of Bays for X axis and Y axis on the Properties palette.

Adding Grid Lines to a Manual Column Grid

Use this procedure to add lines to a manual grid. A manual grid allows maximum control over the grid, but requires that you define the exact number and position of grid lines.

1 Select the column grid to which you want to add lines.

2 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	click Column Grid tab ➤ X Axis panel ➤ Add Grid Line . Then, specify the position on the X axis where you want to add a line.
add grid lines to the Y axis of the grid	click Column Grid tab ➤ Y Axis panel ➤ Add Grid Line . Then, specify the position on the Y axis where you want to add a line.

3 Alternatively, on the Properties palette, click Bays for the X and Y axis, and change the number of lines in the Bays worksheet.

4 To add a line, click under the last number in the Bays list.

A new line is inserted with default values for distance and spacing. You can edit these values by clicking them and entering new values.

NOTE You cannot enter a line number for the new line. The line number is provided by the application after you close the worksheet.

5 Click OK.

Adding Grid Lines to a Column Grid with Fixed Bay Size

Use this procedure to add lines to a grid with bays of a fixed size. Normally, in a grid with fixed bays, the distance between the grid lines is more important than the number of grid lines.

To add lines to a grid with a fixed bay size, you have 2 options:

- Enlarge the overall grid size (for more information, see Changing the Dimensions of a Column Grid on page 1813).
- Decrease the size of the bays.

TIP In cases where the number of lines is important for the grid, change the Layout type of the grid from Repeat to Space evenly or Manual.

1 Double-click the column grid to which you want to add lines.

2 Expand Dimensions.

3 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	expand X Axis, and enter a value for Bay size.
add grid lines to the Y axis of the grid	expand Y Axis, and enter a value for Bay size.

If you enter a value that reduces the size of the bays, the number of grid lines increases as the extra bays are added to the grid.

Adding Lines to Custom Column Grids

Use this procedure to add grid lines to a custom column grid that was created by applying tool properties to linework.

1 Draw the new line or lines in the desired position.

2 Select the column grid.

3 Click Column Grid tab ➤ Custom Grid panel ➤ Add Grid Lines

4 Select the linework to be added, and press ENTER.

5 Press ENTER again to keep the linework, or enter **y** (Yes) to erase it.

Removing Lines from a Column Grid

You can remove individual grid lines from column grids. The method used will depend on the layout type of the specific column grid.

Removing Lines from a Column Grid with Evenly Spaced Lines

Use this procedure to remove lines from a grid with evenly spaced lines. The lines will always be distributed evenly along the grid axis. To remove a particular line and have all the other lines stay in their original places, open the grid's Properties palette, and change the Layout type to Manual.

1 Select the column grid from which you want to remove lines.

2 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	click Column Grid tab ➤ X Axis panel ➤ Remove Grid Line . Then, click on the X axis. The number of grid lines decreases by one, while the overall size of the grid remains the same.
remove grid lines from the Y axis of the grid	Click Column Grid tab ➤ Y Axis panel ➤ Remove Grid Line . Then, click on the Y axis. The number of grid lines decreases by one, while the overall size of the grid remains the same.

Removing Grid Lines from a Manual Column Grid

Use this procedure to remove grid lines from a manual grid. On a manual grid, you can remove each line individually.

1 Select the column grid from which you want to remove lines.

2 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	click Column Grid tab ➤ X Axis panel ➤ Remove Grid Line . Then, click on the grid line on the X axis you want to remove.
remove grid lines from the Y axis of the grid	Click Column Grid tab ➤ Y Axis panel ➤ Remove Grid Line . Then, click on the grid line on the Y axis you want to remove.

NOTE The Bays worksheet lists all bays on the selected axis, their distance from the start point of the grid, and the spacing between the grid lines that define the bays. You can also remove manual grid lines here.

Removing Lines from a Column Grid with Fixed Bay Size

Use this procedure to remove lines from a grid with fixed bays. Normally, in a grid with fixed bays, the distance between the grid lines is more important than the number of grid lines.

To remove lines from a grid with a fixed bay size, you have 2 options:

- Decrease the overall grid size (for more information, see Changing the Dimensions of a Column Grid on page 1813).
- Increase the size of the bays

TIP In cases where the number of lines is important for the grid, change the Layout type of the grid from Repeat to Space evenly or Manual.

1 Double-click the column grid from which you want to remove lines.

2 Expand Dimensions.

3 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	expand X Axis, and enter a value for Bay size.
remove grid lines from the Y axis of the grid	expand Y Axis, and enter a value for Bay size.

If you enter a value that increases the size of the bays, the number of grid lines decreases as the extra bays are removed from the grid.

Removing Lines from Custom Column Grids

Use this procedure to remove grid lines from a custom column grid that was created by applying tool properties to linework.

1 Select the column grid.

2 Click Column Grid tab ➤ Custom Grid panel ➤ Remove Grid Lines

3 Select the linework to be removed, and press ENTER.

The linework remains visible in the drawing but is no longer part of the grid. You can select it and delete it if desired.

Changing the Position of Column Grid Lines

You can change the position of individual lines in column grids for which the Layout type is Manual. (Grids with a Layout type of Repeat or Space evenly calculate line position according to the number of bays or the size of the grid.) A manual grid has grip points for every line. You can use either the grip points or the Bays worksheet to change the position of a grid line.

Using Grip Points to Move Column Grid Lines

Use this procedure to move a column grid line by dragging the grip points of the line. Manual grids have a pair of grip points for the start point and endpoint of each line.

1 Select the grid where you want to move grid lines.

For each line in the grid, a pair of grip points (start point and endpoint) is displayed.

TIP If your grid displays only four lines for the corners of the grid, the Layout type needs to be changed to Manual on the grid's Properties palette.

2 Use the grip points to drag the lines in either a horizontal or vertical direction.

- If you move a grid line beyond the grid border, the grid is enlarged accordingly.
- If you move one of the border lines to the inside of the grid, the grid is decreased accordingly.

Changing the Position of Column Grid Lines by Editing Grid Bays

Use this procedure to reposition grid lines by editing the number and spacing of grid bays using the Bays worksheet.

1 Double-click the column grid where you want to move lines.

2 Expand Dimensions.

3 Edit grid bays:

If you want to…	Then…
edit grid bays along the X axis	expand X Axis, and click the value for Bays.
edit grid bays along the Y axis	expand Y Axis, and click the value for Bays.

The Bays worksheet lists all bays on the selected axis, their distance from the start point of the grid, and the spacing of each bay.

4 To change a bay, click one of its measuring values in the list, and edit the value.

5 Click OK.

The line positions have changed according to your specifications.

Attaching Clipping Profiles to Column Grids

You can attach a clipping profile to define a mask around a column grid or to make a hole in a column grid. You could, for example, create a mask to define a column grid for an irregularly shaped room, or exclude parts of a room from the column grid.

NOTE To attach a clipping profile, you must first draw a closed polyline with the desired boundary or hole shape.

Masking Column Grids

Use this procedure to mask a column grid. A mask is a polyline shape that defines the boundaries of a column grid. Those parts of the grid outside the boundary are not displayed.

1 Draw a closed polyline with the boundary or hole shape you want.

2 Select the grid you want to mask.

3 Click Column Grid tab ➤ Clipping panel ➤ Set Boundary .

4 Select the column grid, and press ENTER.

5 Select the closed polyline you want to use as a mask.

The parts of the column grid that are outside the masking polyline are no longer displayed.

TIP If columns are connected to the invisible part of the grid, they are still displayed after masking. If necessary, you can delete them.

TIP If you want to restore the original grid shape, go to the Properties palette, and select None for Boundary.

Creating Holes in Column Grids

Use this procedure to create a hole in an existing column grid. The hole is created from a closed polyline placed within the boundaries of the grid. Any parts of the grid inside the hole are not displayed.

1 If it does not already exist within the boundaries of the grid, draw a closed polyline in the shape of the desired hole.

2 Select the grid.

3 Click Column Grid tab ➤ Clipping panel ➤ Add Hole .

4 Select the column grid, and press *ENTER*.

5 Select a closed polyline for the hole.

A hole is cut in the column grid.

6 Press *ESC* to end the command.

TIP If columns are connected to the hole in the grid, they are still displayed. If necessary, you can delete them.

Removing Holes from Column Grids

Use this procedure to remove holes you have created in column grids.

1 Select the grid from which you want to remove holes.

2 Click Column Grid tab ➤ Clipping panel ➤ Remove Hole .

3 Select the grid again, and press *ENTER*.

4 Select the closed polyline of the hole.

The hole is removed from the layout grid. The polyline, however, remains in the drawing. If necessary, you can delete it.

Attaching Hyperlinks, Notes, or Files to a Column Grid

Use this procedure to attach hyperlinks, notes, or files to a column grid. You can also edit hyperlinks and notes, and edit or detach reference files from a column grid.

1 Select the column grid to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Changing the Location of Column Grids

Use this procedure to change the location of column grids. You can relocate a column grid by changing the coordinate values of its insertion point. The column grid also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the column grid are parallel to the XY plane, its normal is parallel to the Z axis. You can change the orientation of the column grid by aligning its normal with another axis. You can also rotate the column grid on its plane by changing the rotation angle.

For more information about the world coordinate system, see "Use World and User Coordinate Systems in 3D" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1 Select the column grid that you want to change.
2 On the Properties palette, expand Basic, and expand Location.
3 Select Additional information.
4 Specify the location of the column grid:

If you want to…	Then…
relocate the column grid	enter new coordinate values under Insertion Point.
locate the column grid on the XY plane	make the normal of the column grid parallel to the Z axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the column grid on the YZ plane	make the normal of the column grid parallel to the X axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the column grid on the XZ plane	make the normal of the column grid parallel to the Y axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the column grid	enter a new value for Rotation Angle.

5 Click OK.

Changing the Display of Column Grids

Use this procedure to change any of the following display properties for lines, node markers, or cell markers in a column grid:

- Visibility (display component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

1 Select the column grid you want to change, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 Click the Layer/Color/Linetype tab.
5 Select the component to change, and select a different setting for the property.
6 Click OK twice.

Changing the Node Radius for a Column Grid

Use this procedure to change the node radius for a column grid by editing its display properties.

1. Double-click the column grid you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

NOTE To apply your changes to all column grids in the drawing, select Drawing default setting.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. Click the value for Node radius, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new radius.)

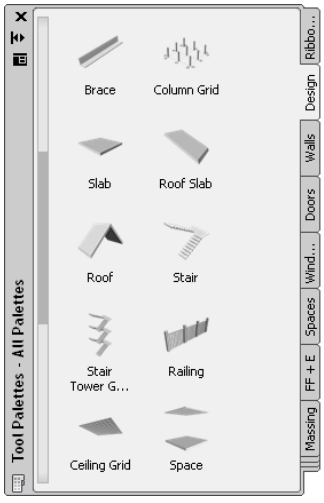
You can also access and modify the node radius property through the column grid's context menu, as follows:

1. Select the column grid, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. In the Display Properties dialog, click the Other tab, and then change the radius as needed.
5. Click OK twice.

Using Ceiling Grid Tools to Create Ceiling Grids

Tools in the software let you quickly place ceiling grids using a ceiling grid tool with a specific ceiling grid style and other predefined properties. You can use the default settings of the tool, or you can change its properties. You can also use ceiling grid tools to convert linework to ceiling grids and to apply the settings of a ceiling grid tool to existing ceiling grids.

Tool palettes containing ceiling grid tools



The default tool palettes in the workspace contain sample ceiling grid tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain ceiling grid tools that you can add to your tool palettes:

- AutoCAD Architecture Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain ceiling grid tools with ceiling grid properties that are customized for your projects or office standards.

Creating a Ceiling Grid

Use this procedure to add a new ceiling grid that has the properties specified in the ceiling grid tool that you select. To specify settings when you add a ceiling grid, see Creating a Ceiling Grid with User-Specified Settings on page 1823.

1 Open the tool palette that contains the ceiling grid tool you want to use, and select the tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Ceiling Grid .

2 Specify the insertion point of the ceiling grid.

3 Specify the rotation of the ceiling grid, and press *ENTER*.

4 Continue adding ceiling grids, and press *ENTER*.

Creating a Ceiling Grid with User-Specified Settings

Use this procedure to add a ceiling grid with settings that you specify on the Properties palette. Spaces and closed polylines can be used as boundaries for ceiling grids.

1 Open the tool palette that you want to use, and select a ceiling grid tool.

   Alternatively, you can click Home tab ➤ Build panel ➤ Ceiling Grid .

2 On the Properties palette, expand Basic, and expand General.

3 Select a boundary:

If you want to…	Then…
place a ceiling grid within a space	click Select object for Boundary, and select a space in the drawing.
place a ceiling grid within a closed polyline	click Select object for Boundary, and select a closed polyline in the drawing.

4 Expand Dimensions, and select No for Specify on screen.

5 Specify the settings:

If you want to…	Then…
define the width of the grid	enter a value for X - Width.
define the depth of the grid	enter a value for Y - Depth.
lay out the grid with evenly spaced bays along the X direction	expand X Axis, select Space evenly for Layout type, and enter a value for Number of bays.

If you want to…	Then…
lay out the grid with a fixed bay size along the X direction	expand X Axis, select Repeat for Layout type, and enter a value for Bay size.
specify the offset distance from the start point along the X direction of the grid	expand X Axis, and enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the endpoint along the X direction of the grid	expand X Axis, and enter a value for End offset. The offset distance may be used to reduce the effective grid size.
lay out the grid with evenly spaced bays along the Y direction	expand Y Axis, select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the Y direction	expand Y Axis, select Repeat for Layout type, and enter a value for Bay size.
specify the offset distance from the start point along the Y direction of the grid	expand Y Axis, and enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the endpoint along the Y direction of the grid	expand Y Axis, and enter a value for End offset. The offset distance may be used to reduce the effective grid size.

TIP After specifying the desired settings, you can move or hide the Properties palette to expose more of the drawing area.

6 In the drawing area, specify the insertion point of the ceiling grid.

7 Specify the rotation angle of the grid, and press *ENTER*.

8 Continue adding ceiling grids, and press *ENTER*.

Creating a Ceiling Grid from a Layout Grid

Use this procedure to convert a two-dimensional (2D) layout grid to a ceiling grid that has the properties of the ceiling grid tool you select. You can edit these properties after creating the ceiling grid.

1 Open the tool palette that contains the ceiling grid tool you want to use.
(You may have to scroll to display the desired tool.)

2 Right-click the ceiling grid tool, and click Apply Tool Properties to ➤ Layout Grids.

3 Select the layout grid to convert, and press *ENTER*.

4 When prompted to erase the original geometry, press *ENTER* to erase the linework, or enter **n** (No) to keep it.

5 Edit the properties of the ceiling grid in the Properties palette, if necessary.

Creating a Custom Ceiling Grid from Linework

Use this procedure to convert custom linework to a ceiling grid that has the properties of the ceiling grid tool you select. You can edit these properties after creating the ceiling grid.

1 Open the tool palette that contains the ceiling grid tool you want to use.
(You may have to scroll to display the desired tool.)

2 Right-click a ceiling grid tool, and click Apply Tool Properties to ➤ Linework.

3 Select the linework to convert, and press *ENTER*.

4 When prompted to erase the original linework, press *ENTER* to keep the linework, or enter **y** (Yes) to erase it.

5 Edit the properties of the ceiling grid in the Properties palette, if necessary.

Creating a Ceiling Grid Dynamically

Use this procedure to create ceiling grids dynamically by specifying their dimensions on the screen as you draw them.

1 Open the tool palette that contains the ceiling grid tool you want to use, and select the tool.

Alternatively, you can click Home tab ➤ Build panel ➤ Ceiling Grid .

2 On the Properties palette, expand Dimensions, and select Yes for Specify on screen.

3 Expand X Axis and Y Axis, and specify the settings:

If you want to…	Then…
lay out the grid with evenly spaced bays along the X direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the X direction	select Repeat for Layout type, and enter a value for Bay size.
specify the offset distance from the start point along the X direction of the grid	enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the endpoint along the X direction of the grid	enter a value for End offset. The offset distance may be used to reduce the effective grid size.
lay out the grid with evenly spaced bays along the Y direction	select Space evenly for Layout type, and enter a value for Number of bays.
lay out the grid with a fixed bay size along the Y direction	enter a value for Bay size.
specify the offset distance from the start point along the Y direction of the grid	enter a value for Start offset. The offset distance may be used to reduce the effective grid size.
specify the offset distance from the endpoint along the Y direction of the grid	enter a value for End offset. The offset distance may be used to reduce the effective grid size.

4 Specify an insertion point in the drawing.

5 Specify the overall size of the grid by dragging the cursor to the desired size and clicking once.

6 Specify the rotation angle for the grid, and press *ENTER*.

Creating a Ceiling Grid with a Clipping Boundary

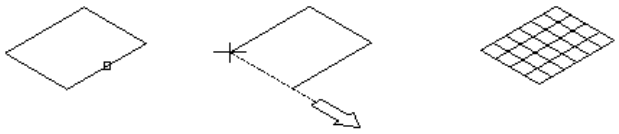
Use this procedure to create a ceiling grid within a closed polyline or a space object. If the ceiling grid is within a space, the grid is created at the ceiling height of the space.

1. Open the tool palette that contains the ceiling grid tool you want to use, and select the tool.
   (You may have to scroll to display the desired tool.)
2. On the Properties palette, expand Basic, and expand General.
3. Click the setting for Boundary.
4. Click Select object, and then select an existing space or a closed polyline in the drawing.
5. Specify an insertion point in the drawing.

   NOTE The insertion point of the ceiling grid is the lower-left corner of the ceiling grid if the rotation is set to 0 degrees.

6. Specify the overall size of the grid by dragging the cursor to the desired size and clicking once.
   Drag the cursor along the X axis to specify the number of bays along the X direction, and drag the cursor along the Y axis to specify the number of bays along the Y direction.
7. Specify the rotation angle of the grid, and press *ENTER*.
   The grid is displayed only within the space or closed polyline.

Creating a ceiling grid from a polyline



NOTE In some templates, the ceiling grid object is turned off in a number of plan views. It is displayed in most model views, however, so if you cannot see your grid in top view, switch to a model view to make sure it is there. For more information about turning on the display of ceiling grids in plan view, see Display System on page 513.

Creating a Ceiling Grid Tool

Use this procedure to create a ceiling grid tool and add it to a tool palette. You may want to create your own ceiling grid tools if you are placing multiple ceiling grids of a specific style, and they all have the same properties.

1. Open the tool palette on which you want to add a tool.
2. Create the tool:

If you want to…	Then…
create a tool from a ceiling grid in the drawing	select the object, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

If you want to…	Then…
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the ceiling grid created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Specify the settings for the dimensions of the grid.

For more information, see Creating a Ceiling Grid with User-Specified Settings on page 1823.

10 Click OK.

Editing Ceiling Grids

You can change existing ceiling grids in different ways. You can change the overall dimensions of the grid, the number and position of grid lines, and the location of the grid within the drawing. You can also specify a clipping boundary for the grid and use that to mask the grid or insert a hole into the grid.

Changing the Dimensions of a Ceiling Grid

Use this procedure to change the overall dimensions of a ceiling grid. A ceiling grid is defined by its width and depth.

1 Double-click the ceiling grid you want to change.

2 Expand General, and expand Dimensions.

3 Modify the values for X - Width or Y - Depth.

TIP You can also change the size of a grid by dragging its grip points. Note that when you have a manual grid, you are dragging the individual lines, and not the grid.

Changing the Lines of a Ceiling Grid

Apart from the overall dimensions of a ceiling grid, you can also change the number and position of grid lines on the X and Y axes. There are 3 different layout types that control the spacing of lines in a grid. Layout type is specified separately for the X and Y planes on the Properties palette for the grid.

- **Manual:** You specify the position of each line on the grid.
- **Repeat (Fixed Bay Size):** You specify equidistant spacing between lines on the grid. The number of lines is determined by the size of the grid. As the size of the grid changes, lines are added or subtracted accordingly. The distance between lines remains fixed.

- **Space Evenly:** You specify the number of lines on the grid. The space between lines is determined by the size of the grid. As the size of the grid changes, the spacing between lines is lengthened or shortened accordingly. The number of lines remains fixed.

NOTE By default, grids are inserted with evenly spaced lines.

The procedures for adding or removing grid lines vary depending on the Layout type in effect, as explained in the following sections.

Adding Lines to a Ceiling Grid

In some cases, you need to add lines to an existing grid. Depending on the Layout type in effect, you do this in different ways.

Adding Lines to a Ceiling Grid with Evenly Spaced Lines

Use this procedure to add lines to a grid with evenly spaced lines. The lines will always be distributed evenly along the grid axis. If you need non-regular lines with different spacing between them, open the grid's Properties palette, and change the Layout type to Manual.

1 Select the ceiling grid to which you want to add lines.

2 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	click Ceiling Grid tab ➤ X Axis panel ➤ Add Grid Line . Then, click on the X axis of the grid. The number of grid lines increases by one, while the overall size of the grid remains the same.
add grid lines to the Y axis of the grid	click Ceiling Grid tab ➤ Y Axis panel ➤ Add Grid Line . Then, click on the Y axis of the grid. The number of grid lines increases by one, while the overall size of the grid remains the same.

Your grid has been updated accordingly, with the new number of grid lines distributed evenly along the grid axis.

Adding Lines to a Manual Ceiling Grid

Use this procedure to add lines to a manual grid. A manual grid allows maximum control over the grid, but requires that you specify the exact number and position of grid lines.

1 Select the ceiling grid to which you want to add lines.

2 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	click Ceiling Grid tab ➤ X Axis panel ➤ Add Grid Line . Then, click the location on the X axis where the new grid line should appear.

If you want to…	Then…
add grid lines to the Y axis of the grid	click Ceiling Grid tab ➤ Y Axis panel ➤ Add Grid Line . Then, click the location on the X axis where the new grid line should appear.

The Bays worksheet lists all of the bays on the selected axis, their distance from the start point of the grid, and the spacing between the grid lines that define the bays.

3 Alternatively, on the Properties palette, click Bays for the X and Y axis, and change the number of lines in the Bays worksheet.

4 To add a line, click under the last number in the Bays list.

A new line is inserted with default values for distance and spacing. You can edit these values by clicking them and entering new values.

NOTE You cannot enter a line number for the new line. The line number is provided by the application after you close the worksheet.

5 Click OK.

TIP To add lines to the ceiling grid, you can also right-click the grid, and click X Axis/Y Axis ➤ Add Grid Line.

Adding Lines to a Ceiling Grid with Fixed Bay Size

Use this procedure to add lines to a grid with fixed bays. Normally, in a grid with fixed bays, the distance between the grid lines is more important than the number of grid lines.

To add lines to a grid with a fixed bay size, you have 2 options:

- Enlarge the overall grid size (for more information, see Changing the Dimensions of a Ceiling Grid on page 1827).
- Decrease the size of the bays

TIP In cases where the number of lines is important for the grid, change the Layout type of the grid from Repeat to Space evenly or Manual.

1 Double-click the ceiling grid to which you want to add lines.

2 Expand Dimensions.

3 Add grid lines:

If you want to…	Then…
add grid lines to the X axis of the grid	expand X Axis, and enter a value for Bay size.
add grid lines to the Y axis of the grid	expand Y Axis, and enter a value for Bay size.

If you enter a value that reduces the size of the bays, the number of grid lines increases as the extra bays are added to the grid.

A number of new lines have been added by decreasing the size of the individual bays.

Adding Lines to Custom Ceiling Grids

Use this procedure to add grid lines to a custom ceiling grid that was created by applying tool properties to linework.

1 Draw the new line or lines in the desired position.

2 Select the ceiling grid.

3 Click Ceiling Grid tab ➤ Custom Grid panel ➤ Add Grid Lines

4 Select the linework to be added, and press ENTER.

5 Press ENTER again to keep the linework, or enter **y** (Yes) to erase it.

Removing Lines from a Ceiling Grid

In the same way that lines can be added to a ceiling grid, they can also be removed.

Removing Lines from a Ceiling Grid with Evenly Spaced Lines

Use this procedure to remove lines from a grid with evenly spaced lines. The lines will always be distributed evenly along the grid axis. To remove a particular line and have all the other lines stay in their original places, open the grid's Properties palette, and change the Layout type to Manual.

1 Double-click the ceiling grid from which you want to remove lines.

2 Expand Dimensions.

3 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	click Ceiling Grid tab ➤ X Axis panel ➤ Remove Grid Line . Then, click anywhere on the X axis. The number of grid lines is decreased by one.
remove grid lines from the Y axis of the grid	click Ceiling Grid tab ➤ Y Axis panel ➤ Remove Grid Line . Then, click anywhere on the Y axis. The number of grid lines is decreased by one.

Your grid has been updated accordingly, with the new number of grid lines distributed evenly along the grid axis.

Removing Lines from a Manual Ceiling Grid

Use this procedure to remove grid lines from a manual grid. On a manual grid, you can remove each line individually.

1 Select the ceiling grid from which you want to remove lines.

2 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	click Ceiling Grid tab ➤ X Axis panel ➤ Remove Grid Line . Then, click on the grid line on the X axis to remove.

If you want to…	Then…
remove grid lines from the Y axis of the grid	click Ceiling Grid tab ➤ Y Axis panel ➤ Remove Grid Line . Then, click on the grid line on the Y axis to remove.

3 Alternatively, on the Properties palette, click Bays for the X and Y axis, and change the number of lines in the Bays worksheet.

4 To remove a line, click the bay number in the Bays list, and click Remove.

5 Click OK.

The bay is deleted from the grid, and the grid size is reduced accordingly.

Removing Lines from a Ceiling Grid with Fixed Bay Size

Use this procedure to remove lines from a grid with bays of fixed size. Normally, in a grid with fixed bays, the distance between the grid lines is more important factor than the number of grid lines.

To remove lines from a grid with a fixed bay size, you have 2 options:

- Decrease the overall grid size (for more information, see Changing the Dimensions of a Ceiling Grid).
- Increase the size of the bays.

TIP In cases where the number of lines is important for the grid, change the Layout type of the grid from Repeat to Space evenly or Manual.

1 Double-click the ceiling grid from which you want to remove lines.

2 Expand Dimensions.

3 Remove grid lines:

If you want to…	Then…
remove grid lines from the X axis of the grid	expand X Axis, and enter a value for Bay size.
remove grid lines from the Y axis of the grid	expand Y Axis, and enter a value for Bay size.

If you enter a value that increases the size of the bays, the number of grid lines decreases as the extra bays are removed from the grid.

A number of lines have been removed by increasing the size of the individual bays.

Removing Lines from Custom Column Grids

Use this procedure to remove grid lines from a custom ceiling grid that was created by applying tool properties to linework.

1 Select the ceiling grid.

2 Click Ceiling Grid tab ➤ Custom Grid panel ➤ Remove Grid Lines

3 Select the linework to be removed, and press ENTER.

The linework remains visible in the drawing but is no longer part of the grid. You can select it and delete it if desired.

Changing the Position of Ceiling Grid Lines

You can change the position of individual lines in ceiling grids for which the Layout type is Manual. (Grids with a Layout type of Repeat or Space evenly calculate line position according to the number of bays or the size of the grid.) A manual grid has grip points for every line. You can use either the grip points or the Bays worksheet to change the position of a grid line.

Using Grip Points to Move Ceiling Grid Lines

Use this procedure to move a ceiling grid line by dragging the grip points of the line. Manual grids have a pair of grip points for the start point and end point of each line.

1. Select the grid where you want to move grid lines.

   For each line in the grid, a pair of grip points (start point and end point) is displayed.

   TIP If your grid displays only four lines for the corners of the grid, the Layout type needs to be changed to Manual on the grid's Properties palette.

2. Use the grip points to drag the lines in either horizontal or vertical direction.
   - If you move a grid line beyond the grid border, the grid is enlarged accordingly.
   - If you move one of the border lines of the grid to the inside of the grid, the grid is decreased accordingly.

Changing the Position of Ceiling Grid Lines by Editing Grid Bays

Use this procedure to reposition grid lines by editing the number and spacing of grid bays using the Bays worksheet.

1. Double-click the ceiling grid where you want to move lines.
2. On the Properties palette, expand Dimensions.
3. Edit grid bays:

If you want to…	Then…
edit grid bays along the X axis	expand X Axis, and click the value for Bays.
edit grid bays along the Y axis	expand Y Axis, and click the value for Bays.

   The Bays worksheet lists all bays on the selected axis, their distance from the start point of the grid, and the spacing of each bay.

4. To change a bay, click one of its measuring values in the list, and edit the value.
5. Click OK.

The line positions have changed according to your settings.

Attaching Clipping Profiles to Ceiling Grids

You can attach a clipping profile to define a mask around a ceiling grid or to make a hole in a ceiling grid. You could, for example, create a mask to define a ceiling grid for an irregularly shaped room, or exclude parts of a room from the ceiling grid.

For a mask, you can use closed polylines and spaces. For more information, see Creating a Ceiling Grid with a Clipping Boundary on page 1826.

NOTE To attach a clipping profile, you must first draw a closed polyline or space with the desired boundary or hole shape.

Masking Ceiling Grids

Use this procedure to mask a ceiling grid. A mask is a polyline shape or space that defines the boundaries of a ceiling grid. Those parts of the grid outside the boundary are not displayed.

1. Draw a closed polyline with the boundary or hole shape you want.
2. Select the grid you want to mask.
3. Click Ceiling Grid tab ➤ Clipping panel ➤ Set Boundary .
4. Select the closed polyline or space you want to use as a mask.

The parts of the ceiling grid that are outside the masking polyline or space are no longer displayed.

TIP If you want to restore the original grid shape, go to the Properties palette and select None for Boundary.

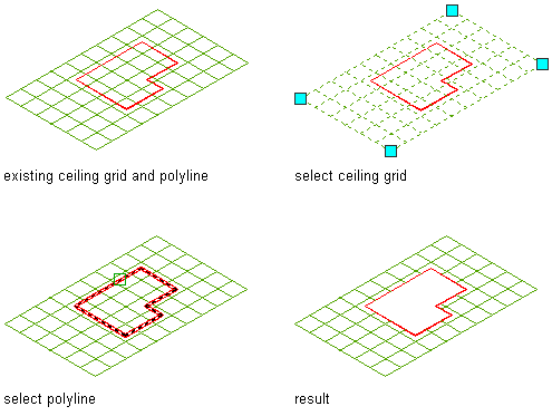
Creating Holes in Ceiling Grids

Use this procedure to create a hole in an existing ceiling grid. The hole is created from a closed polyline or AEC object placed within the boundaries of the grid. Any parts of the grid inside the hole are not displayed.

1. If it does not already exist within the boundaries of the grid, draw a closed polyline in the shape of the desired hole.
2. Select the ceiling grid to which you want to add a hole.
3. Click Ceiling Grid tab ➤ Clipping panel ➤ Add Hole .
4. Select a closed polyline or AEC object for the hole.

   A hole is cut in the ceiling grid.
5. Press *ENTER* to end the command.

Adding a hole to a ceiling grid



Removing Holes from Ceiling Grids

Use this procedure to remove holes you have created in ceiling grids.

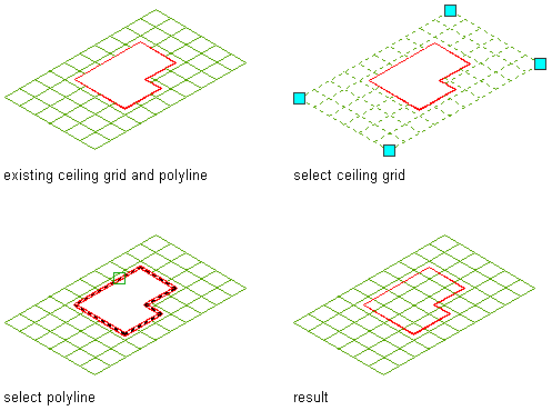
1 Select the grid from which you want to remove holes.

2 Click Ceiling Grid tab ➤ Clipping panel ➤ Remove Hole .

3 Select the closed polyline of the hole.

The hole is removed from the ceiling grid. The polyline, however, remains in the drawing. If necessary, you can delete it.

Removing a hole from a ceiling grid



Attaching Hyperlinks, Notes, or Files to a Ceiling Grid

Use this procedure to attach hyperlinks, notes, or files to a ceiling grid. You can also edit hyperlinks and notes, and edit or detach reference files from a ceiling grid.

1 Select the ceiling grid to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

4 Click OK.

5 To add a note, click the setting for Notes, and enter the note.

6 Click OK.

7 To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.

If you want to…	Then…
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Changing the Location of Ceiling Grids

Use this procedure to change the location of ceiling grids. You can relocate an existing ceiling grid by changing the coordinate values of its insertion point. The ceiling grid also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the ceiling grid are parallel to the XY plane, its normal is parallel to the Z axis. You can change the orientation of the ceiling grid by aligning its normal with another axis. You can also rotate the ceiling grid on its plane by changing the rotation angle.

For more information about the world coordinate system, see "Use World and User Coordinate Systems in 3D" in AutoCAD help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1 Select the ceiling grid that you want to change.

2 On the Properties palette, expand Basic, and expand Location.

3 Select Additional information.

4 Specify the location of the ceiling grid:

If you want to…	Then…
relocate the ceiling grid	enter new coordinate values under Insertion Point.
locate the ceiling grid on the XY plane	make the normal of the ceiling grid parallel to the Z axis: under Normal, enter **1** for Z and enter **0** for X and Y.
locate the ceiling grid on the YZ plane	make the normal of the ceiling grid parallel to the X axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the ceiling grid on the XZ plane	make the normal of the ceiling grid parallel to the Y axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the ceiling grid	enter a new value for Rotation Angle.

5 Click OK.

Changing the Display of Ceiling Grids

Use this procedure to change any of the following display properties for lines, node markers, or cell markers in a ceiling grid:

- Visibility (display component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

1. Select the ceiling grid you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. Click the Layer/Color/Linetype tab.
5. Select the component to change, and select a different setting for the property.
6. Click OK twice.

Changing the Node Radius for a Ceiling Grid

Use this procedure to change the node radius for a ceiling grid by editing its display properties.

1. Double-click the ceiling grid you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

   NOTE To apply your changes to all ceiling grids in the drawing, select Drawing default setting.

5. If necessary, expand Object Display Properties ➤ Advanced.
6. Click the value for Node radius, and enter a new value. (Alternatively, you can click and specify 2 points in the drawing area to set the new radius.)

You can also access and modify the node radius property through the ceiling grid's context menu, as follows:

1. Select the ceiling grid, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. In the Display Properties dialog, click the Other tab, and then change the radius as needed.
5. Click OK twice.

Detail Drafting Tools

34

AutoCAD Architecture includes a number of easily accessible tools designed to help you work more intuitively and effectively with linework in detail drawings.

Construction Lines

Construction lines (also known as xlines) are temporary linework entities that can be used as references when creating and positioning other objects or linework. For example, you can use construction lines to prepare multiple views of the same item, or create temporary intersections to serve as object snaps.

Construction lines are either circles or straight lines that extend to infinity in both directions. In either case, they do not change the total area of the drawing and have no effect on zooming or viewports. You can move, rotate, copy, or delete construction lines just like other objects.

The regular AutoCAD construction line functionality is still available via the XLINE command. However, the AutoCAD Architecture construction line feature is designed to give you a more intuitive way of drawing construction lines based on the geometry of existing objects or linework. No command line entry is required.

In most cases, you would probably want to draw construction lines based on segments of existing objects, but you can also draw them by specifying any two points in the drawing area, without regard to existing objects or linework.

Creating Construction Lines From Existing Objects/Linework

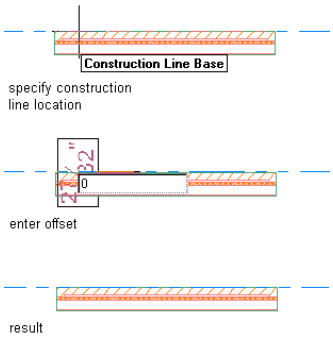
Use this procedure to create a construction line based on the geometry of any straight, arced, or circular segment of any object or linework, except hatches, splines, and ellipses. If based on a straight segment, the resulting construction line is a straight line that extends to infinity in both directions; if based on an arced or circular segment, the construction line is a circle.

1. Click Home tab ➤ Draw panel ➤ Line drop-down ➤ Construction Line .
2. In the drawing area, move the cursor over the segment on which you want to base your construction line (the “construction line base”).

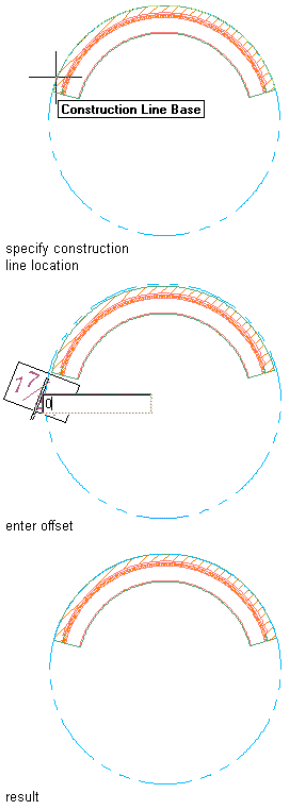
   A preview of the construction line is displayed.
3. Click to display an offset indicator, which dynamically shows the distance between the preview line and the construction line base.

4 Either drag the preview line to the desired distance, and click to position the construction line, or enter the desired distance and press *ENTER*.

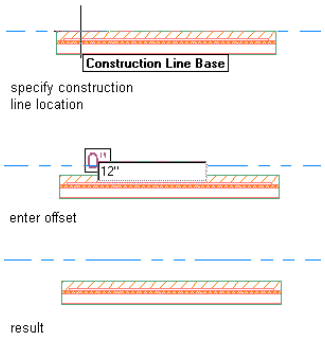
Drawing a construction line at a zero offset based on a straight wall segment



Drawing a construction line at a zero offset based on a arc wall segment



Drawing a construction line at a specified offset based on a straight wall segment



The resulting construction line displays three grips when selected. You can move the line by moving the middle grip, or you can change its orientation by moving either of the end grips.

Creating Construction Lines Independently

Use this procedure to create a straight construction line that passes through any two points of your choice.

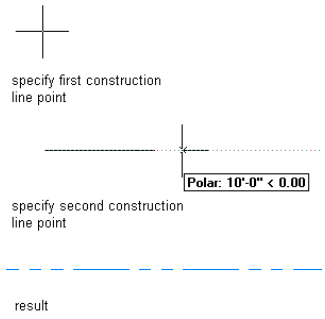
1 Click Home tab ➤ Draw panel ➤ Line drop-down ➤ Construction Line .

2 Press *ENTER*.

3 In the drawing area, specify the first point that you want the construction line to pass through. (This will be the root or conceptual midpoint of the construction line.)

4 Specify a second point.

Drawing a construction line by specifying points



The construction line is displayed. If you select it, three grips are displayed. You can move the line by moving the middle grip, or you can change its orientation by moving either of the end grips.

Hatch Productivity Tools

The context menu for hatches includes options that allow you to easily reposition hatches relative to their origins, generate AEC Polygons to provide boundaries for non-bounded hatches, and redefine hatch boundaries based on other selected closed-boundary linework.

Repositioning a Hatch

Use this procedure to align brick and masonry hatch patterns within a boundary so that whole units display along a particular edge.

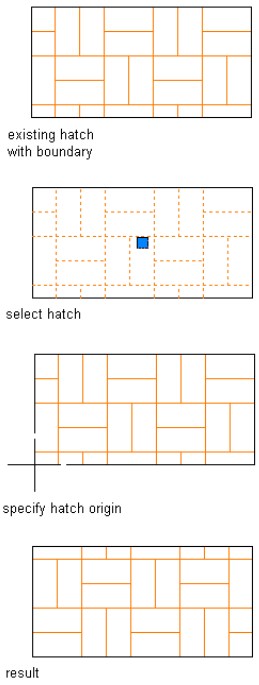
1 Select the hatch.

2 Right-click, and click Set Origin.

3 Specify an endpoint on the boundary, and press *ENTER*.

The hatch is repositioned with its origin at the endpoint you specified.

Repositioning a hatch within a boundary



Generating a Hatch Boundary

Use this procedure to generate a boundary for a hatch whose original boundary has been deleted or moved during the course of other drawing operations. The boundary generated by this procedure is an AEC Polygon, which is created with the POLYGON layer key. AEC Polygons are also created for any islands within the selected hatch. These AEC Polygons remain selected after you generate the boundary, so you can directly manipulate them into the desired configuration. You can then apply the hatch to the new boundary configuration using the Set Boundary option, as described under Redefining a Hatch Boundary on page 1841.

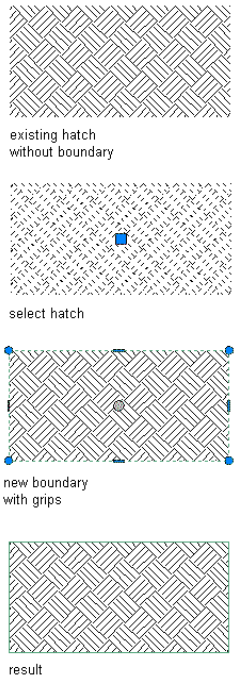
1 Select the hatch.

2 Right-click, and click Generate Boundary.

All grips are displayed for any AEC Polygons created.

TIP If you want to generate a polyline copy of an AEC Polygon created by this process, select the AEC Polygon, click AEC Polygon tab ➤ Convert To panel ➤ Polyline .

Generating a hatch boundary



Redefining a Hatch Boundary

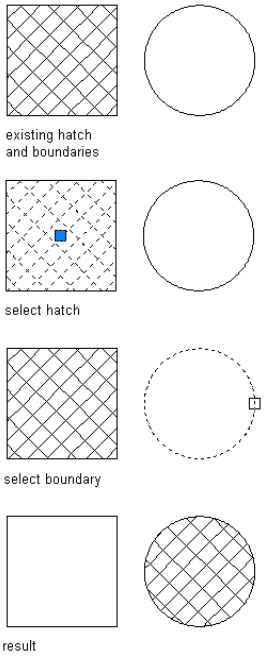
Use this procedure to redefine the boundaries of associative or non-associative hatches based on any selected closed-boundary linework. In cases where a non-associative hatch originally filled closed-boundary linework, but the linework was subsequently stretched or moved, this procedure lets you expand or reposition the hatch to fill the new boundary.

You can also use this procedure to extend or move a hatch from one boundary to others. (If you do not also select the linework currently bounding the hatch, the hatch is moved from the original boundary to the other boundaries that you select.) The linework you select for the new hatch boundaries can be AEC Polygons, closed polylines, circles, text, or multiline text (Mtext).

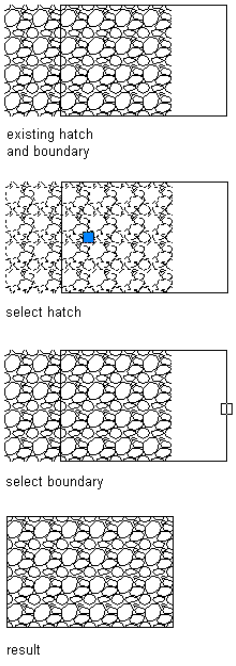
1. Select the hatch.
2. Right-click, and click Set Boundary.
3. Select the linework, and press *ENTER*.
4. Press *ENTER* to keep the selected linework, or enter **y** (Yes) to erase it.

   The selected hatch is applied within all selected boundaries.

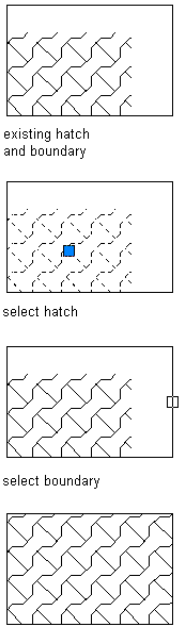
Transferring a hatch from one boundary to another



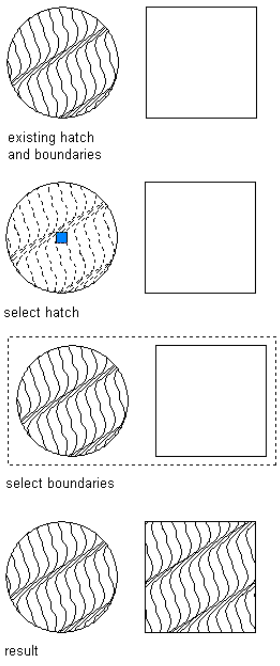
Moving a hatch back to original boundary



Resizing a hatch to fill a boundary



Copying a hatch from one boundary to another



NOTE If a hatch was originally created as associative, its associativity is *not* transferred to other linework to which the hatch is applied using the Set Boundary option. And if the original boundary itself is one of the boundaries selected during the operation, the association between the boundary and the hatch is discontinued.

AEC Modify Tools

You can perform a variety of editing operations on linework components and certain architectural objects using AEC Modify tools. AEC Modify tools can be used on any of the following objects:

- Hatches
- Polylines
- Circles
- Arcs
- Text/Multiline text (Mtext)
- Spaces
- AEC Polygons
- Mass element extrusions
- Any of the above when embedded in blocks

Although some of the AEC Modify Tools can only be applied to the types of objects listed above, objects of any type can be used as reference points or boundaries for the editing operations. For example, linework can be trimmed or extended in relation to architectural objects such as walls. Likewise, architectural objects can be used to define a cropping boundary or an area to subtract from linework. Architectural objects can also be included as part of a collection of objects for which a shrinkwrap outline is generated.

When you work with architectural objects, such as windows and doors, you can use Array, Reposition From, Space Evenly, and Center tools in this suite in addition to linework and profile-based objects.

Trimming Linework or Profile-Based Objects

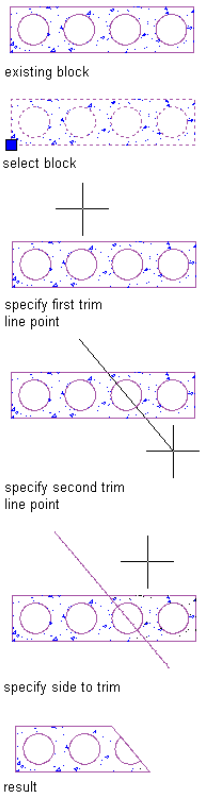
Use this procedure to trim hatches, lines, polylines, arcs, circles, AEC Polygons, mass element extrusions, spaces, or any block-based content (including detail components) made up of these types of linework or objects.

1. Select the linework, object, or block to trim.
2. Click Home tab ➤ Modify panel ➤ Trim Extend drop-down ➤ AEC Trim .
3. Specify two points to establish the trim line.

   The trim line changes color once the second point is selected, as does all linework (except hatches) on the side of the trim line where the cursor is positioned.
4. Click the side of the trim line where the region you want to remove is located.

   All linework on the selected side of the trim line is removed, and boundaries for any closed polylines on the other side are redrawn along the trim line.

Trimming a block



Trimming Linework or Profile-Based Objects to an Edge

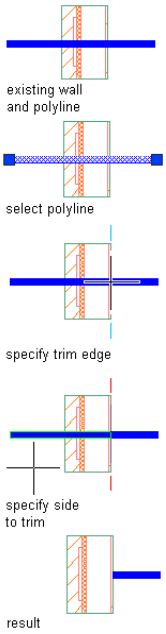
Use this procedure to trim one or more lines, polylines, arcs, circles, hatches, AEC Polygons, mass element extrusions, or spaces precisely to a selected edge or side of any straight segment of AEC linework. This feature lets you easily trim linework to components of walls.

TIP If you need to trim linework to the edge of an arced segment of an object, use either the Crop option (see Cropping Linework or Profile-Based Objects on page 1851) or the Subtract option (see Subtracting from Linework and Profile-Based Objects on page 1848). The Crop option removes linework outside the implied boundary of the arc, while the Subtract option removes linework inside the implied boundary of the arc.

1. Select the linework or object to trim.
2. Click Home tab ➤ Modify panel ➤ Trim Extend drop-down ➤ AEC Trim .
3. Press *ENTER*.
4. Move the cursor over the edge or line to which you want to trim the selected linework or object.
5. Click when the trim line displays.
6. Click the side of the trim line you want trimmed.

   All selected linework is trimmed to the edge you selected.

Trimming linework to the edge of a wall



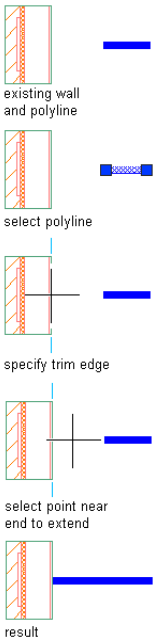
Extending Linework to an Edge

Use this procedure to extend one or more lines, open polylines, or arcs precisely to an implied edge of a straight or arced segment of any object, or to an implied extension of that segment.

1. Select the linework you want to extend.
2. Click Home tab ➤ Modify panel ➤ Trim Extend drop-down ➤ AEC Extend .
3. Move the cursor over the edge or line to which you want to extend the selected linework, and click when a temporary line is displayed extending along and beyond the edge/line in both directions.
4. Click any point on the linework you want to extend, or click the edge or line to which you want to extend the linework.

   The linework is extended to the edge. If you selected multiple lines, clicking on any one of them extends them all.

Extending linework to the edge of a wall



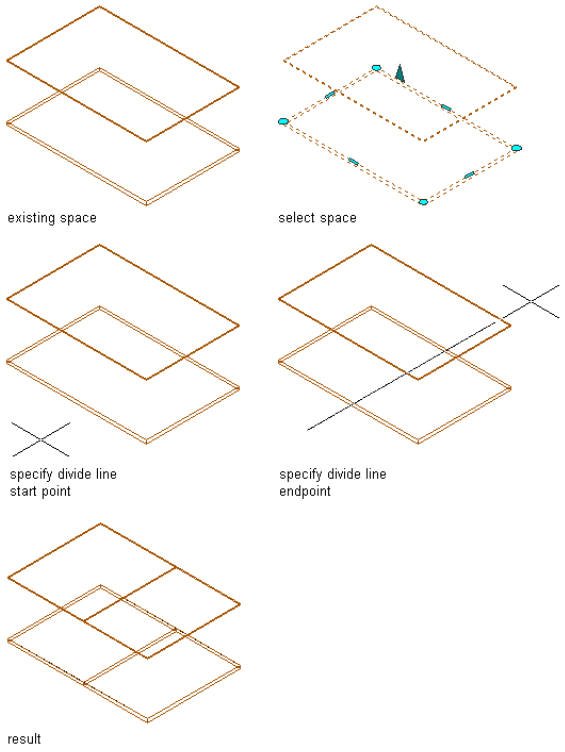
Dividing Linework and Profile-Based Objects

Use this procedure to divide linework, AEC Polygons, mass element extrusions, spaces, or a block containing any of these objects into two (or more) parts defined by a divide line you draw. The parts on either side of the line are then separately selectable. If a closed-boundary object is divided into two parts using this option, both parts are recreated as closed. If an open polyline in a zigzag pattern is divided along its length, many selectable segments are created.

1. Select the linework, object, or block you want to divide.
2. Click Home tab ➤ Modify panel ➤ ➤ Align drop-down ➤ Divide .
3. Specify two points to establish the divide line. In the case of a closed-boundary object, the points can be inside or outside the boundaries; the divide line is automatically extended until it intersects all boundaries of the selected object.

   The divided parts of the linework or object on either side of the divide line are now selectable. Note that the divide line is no longer visible once the second point is selected.

Dividing a space object



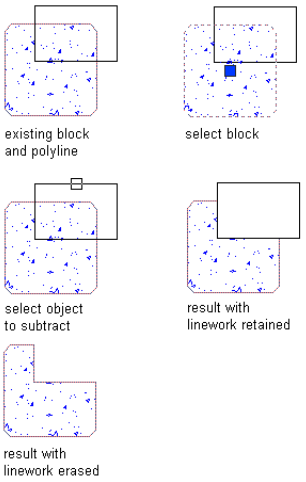
Subtracting from Linework and Profile-Based Objects

Use this procedure to subtract a selected part from linework, AEC Polygons, mass element extrusions, spaces, or from a block containing any of these objects, without having to redraw any of the remaining components. You can also specify the corners of a rectangle as the subtraction. The part to be subtracted can contain or be delineated by lines, polylines (closed or open), arcs, circles, text, or hatches. If the subtraction removes part of a closed polyline, the polyline is recreated as closed. If the subtraction bisects a closed polyline, both parts are recreated as separate closed polylines. However, in cases where the subtraction bisects a hatch, the hatch remains a single linework entity that you can select by clicking either "part."

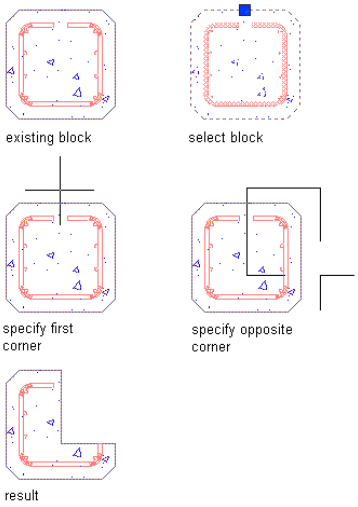
NOTE Anything subtracted by this operation is actually deleted from the drawing. If you only want to hide linework from view, you may want to use the Obscure command instead. For more information, see Obscuring Regions of Linework on page 1849.

1. If it does not already exist, draw the linework that delineates what you want to subtract.
2. Select the linework or object from which to subtract the delineated part.
3. Click Home tab ➤ Modify panel ➤ ➤ Merge Subtract drop-down ➤ Subtract .
4. Press *ENTER* and specify a rectangular shape to be subtracted from the object.
5. Alternately, select the linework delineating the part you want to subtract and press *ENTER*.
6. Press *ENTER* to keep the selected linework, or enter **y** (Yes) to erase it.

Subtracting part of a block with an existing polyline



Subtracting part of a block by specifying rectangle corners



Obscuring Regions of Linework

Use this procedure to obscure or "hide" a region of linework in relation to other linework. This feature is chiefly useful when you want to indicate that one entity extends behind or beneath another entity that you want to display in the foreground. The obscured linework is placed on the layer specified by the HIDDEN layer key. Once you have begun the Obscure command, you can also specify two corners of a rectangle to use.

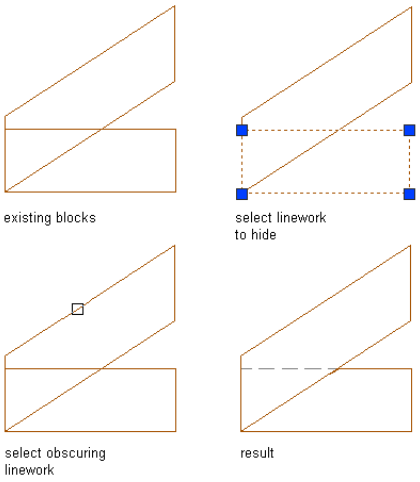
1 Select the linework to hide (the linework "being obscured").

2 Click Home tab ➤ Modify panel ➤ ➤ Obscure Crop drop-down ➤ Obscure .

3 Select the "obscuring linework" (that is, the linework behind which you want to hide the originally selected linework), and press *ENTER*.

The obscured region is delineated with a dashed line. You can select it (or its component segments) separately from the linework it was part of before being obscured.

Obscuring linework with a block



4 Alternately, press *ENTER* and specify a rectangular shape to obscure the object.

Merging Linework or Profile-Based Objects

Use this procedure to merge contiguous closed polylines, circles, hatches, AEC Polygons, mass element extrusions, spaces, or blocks into a single closed-boundary object or linework entity.

1 Select the linework or object to which you want to add one or more other linework entities or objects.

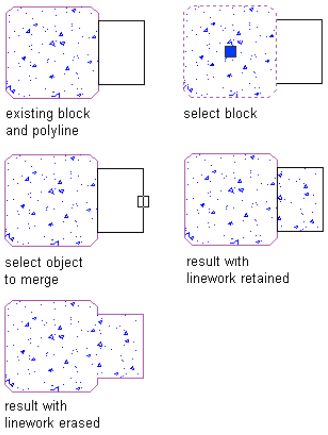
2 Click Home tab ➤ Modify panel ➤ ➤ Merge Subtract drop-down ➤ Merge .

3 Select the linework/object(s) you want to merge with the originally selected linework/object, and press *ENTER*.

4 Press *ENTER* to keep the selected linework, or enter **y** (Yes) to erase it.

All selected linework and/or objects are merged into a single entity of the type you selected first. That is, if you select an AEC Polygon in Step 1 and a space object in Step 3, the resulting entity is an AEC Polygon.

Merging a region with a block



5 Alternately, press *ENTER* after Step 2 and specify a rectangular shape to merge with the linework or object.

Cropping Linework or Profile-Based Objects

Use this procedure to crop linework or a profile-based object to a smaller area with a boundary you define. You can crop hatches, lines, polylines, arcs, circles, AEC Polygons, mass element extrusions, spaces, and/or blocks. Neither the linework to be cropped nor the linework that defines the new boundary needs to have closed boundaries. For example, you can use a v-shaped polyline to crop a circle, or you can use a circle to crop a v-shaped polyline. Once you have begun the Crop command, you can also specify two corners of a rectangle to crop the linework or objects.

1 Draw the linework that defines the new boundary to which you want to crop the existing linework.

2 Click Home tab ➤ Modify panel ➤ ➤ Obscure Crop drop-down ➤ Crop .

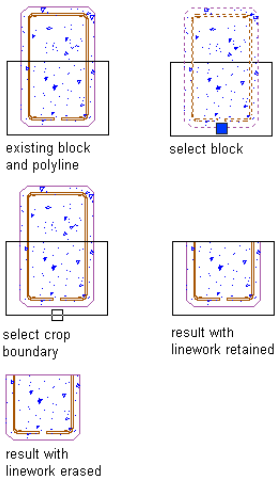
3 Select the linework to crop and press *ENTER*.

4 Select the linework you want to define the new boundary (the linework you drew in Step 1), and press *ENTER*.

5 Press *ENTER* to keep the selected linework (the crop boundary), or enter **y** (Yes) to erase it.

All of the originally selected linework outside the crop boundary is erased. If you choose to erase the crop boundary, boundaries are redrawn for any closed-boundary entities inside the crop area, but any open-boundary objects that have been cropped remain open.

Cropping a block with a polyline



6 Alternately, press *ENTER* after Step 2 and specify a rectangular shape to crop the linework or object.

Shrinkwrapping Linework

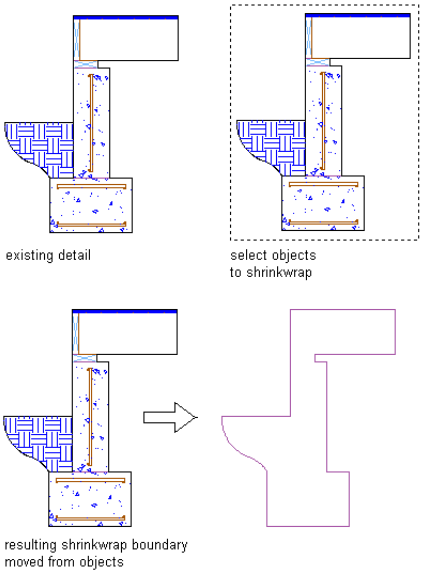
Use this procedure to automatically create a profile or shrinkwrap outline around any collection of contiguous linework entities, including architectural objects. The visual result of the procedure is similar to merging the entities (see Merging Linework or Profile-Based Objects on page 1850), but in this case the outline you create is a separately selectable entity. Unlike the other AEC Linework Tools, the Shrinkwrap tool is accessed from the General tool palette. The AecLineworkShrinkwrap command the tool invokes is wrapped in a DesignCenter command to accommodate layer keying (that is, shrinkwrap polylines created using this tool are automatically placed on a particular layer as specified by the associated layer key).

1 Open the Detailing tool palette, and click the Basic tab.

2 Click the Shrink Wrap tool.

3 Select all of the objects you want to shrinkwrap.

4 Press *ENTER*.



All objects within the shrinkwrap remain selected. You can now select and move the shrinkwrap profile independently of the linework it encloses.

Creating Arrays

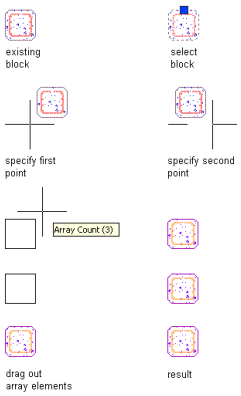
Use this procedure to create an array of identical linework (such as hatches and polylines), architectural objects (such as doors and walls), AEC polygons, or profile-based objects (such as mass element extrusions, and spaces). You can also array any block-based content (including detail components) made up of these types of linework and objects.

1 Select the linework, object, or block to array.

2 Click Home tab ➤ Modify panel ➤ ➤ Arrays drop-down ➤ AEC Array .

3 Select an edge and drag the cursor to specify the direction of the array for a rectangular array. The number of objects you are adding to the array is displayed in the tooltip as Array Count.

Arraying a block



4 Enter a value for the distance offset between each instance of the linework or object, and press *ENTER*.

Alternately, for a polar array, specify two points to establish the angle of the array, enter a value for the distance offset between the linework or object, and press *ENTER*.

5 Click in the drawing area to specify the endpoint of the array.

For more information on arrays, see "Array Dialog Box" in AutoCAD Help.

Repositioning from a Reference Point

Use this procedure to reposition architectural objects, linework, or blocks from a specific reference point in your drawing. For example, if you have a kitchen island that you want repositioned 6'-0" from existing cabinetry, you can place the island using the interior edge of the cabinet as a reference point. You can also use this procedure with hatches, lines, polylines, arcs, circles, AEC Polygons, mass element extrusions, spaces, or any block-based content (including detail components and DesignCenter content) made up of these types of linework or objects.

1 Select the linework, object, or block to reposition.

2 Click Home tab ➤ Modify panel ➤ ▾ ➤ Align drop-down ➤ Reposition From .

3 Select an existing edge from which to reposition the object, or specify two points to define a reference edge.

4 Select the object to be repositioned, and enter a value for the distance between it and the reference edge.

5 Press *ENTER*.

Evenly Spacing Linework or Objects

Use this procedure to space a collection of existing architectural objects, linework, or blocks at an equal distance from each other. For example, if you have windows along walls that are not colinear, you can space the windows evenly across the entire facade by specifying points along an axis. You can use this procedure with hatches, lines, polylines, arcs, circles, AEC Polygons, mass element extrusions, spaces, or any block-based content (including detail components) made up of these types of linework or objects.

1 Select the linework, object, or block to space.

2 Click Home tab ➤ Modify panel ➤ ▾ ➤ Align drop-down ➤ Space Evenly .

3 Select an edge as the axis along which to space all the objects evenly, and specify a start point and an endpoint along the edge; or press *ENTER*, and specify two points between which the objects will be spaced evenly from each other.

NOTE For example, if you select two objects to be spaced between two points, the spacing of the objects is from the specified start point to the center of the first object, from the center of the first object to the center of the second object, and from the center of the second object to the specified endpoint.

Centering Linework or Objects

Use this procedure to center any of the following between two points: architectural objects, hatches, lines, polylines, arcs, circles, AEC Polygons, mass element extrusions, spaces, or any block-based content (including detail components) made up of these types of linework or objects.

1 Select the linework, object or block to center.

2 Click Home tab ➤ Modify panel ➤ ➤ Align drop-down ➤ Center .

3 Select an existing edge as an axis, and then specify two points between which to center the object on that axis; or press *ENTER,* and specify any two points between which to center the object.

Profiles

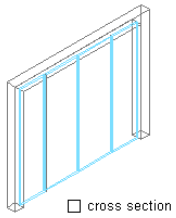
35

Profiles are closed linework shapes that can be used to define components of complex objects.

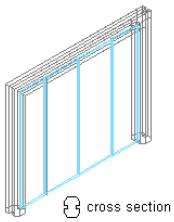
What are Profiles?

Profiles are closed linework shapes that can be used to define components of complex objects.

Example: default and profile-based curtain wall frames



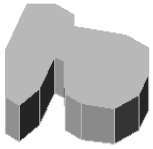
default frame



profile-based frame

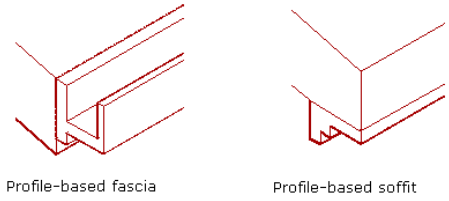
Example 2: extruded mass element

profile



result

Example 3: roof slab fascia and soffit



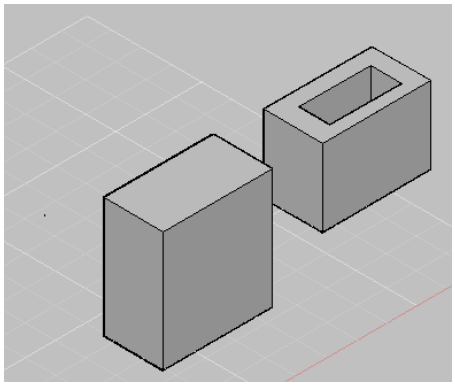
They can be used to create the following objects and components:

- extruded and revolution mass elements
- slab and roof slab edges (fascia and soffits)
- frames for doors, windows, openings, door and window assemblies, and curtain walls
- muntins for doors, windows, openings, door and window assemblies, and curtain walls
- railing guardrails, handrails, bottom rails, and posts
- wall sweeps

NOTE Because profiles are supporting objects that define the shape of other objects, you cannot create a profile tool on the tools palette, or insert a standalone profile in the drawing.

Profiles consist of one or more closed lines, which are referred to as rings.

Mass element extruded from profile.



Profiles can be created from the following objects:

- closed polylines
- rectangles
- circles
- ellipses
- splines
- AEC polygons

You can draw more than one closed linework ring in order to create a profile. A two-ring profile will create a void in the resulting object; a three-ring profile will create a void with an island.

Creating Profiles

Use this procedure to create a profile.

1 Draw closed linework in the shape you need for the profile-based component.

2 Select the linework, right-click, and click Convert To ➤ Profile Definition.

3 To add another closed linework component to the profile, enter **a** (Add Ring), and select the desired linework.

4 Define the insertion point of the profile:

- To create the insertion point at the object center, enter **c** (Centroid).
- To create the insertion point at a different point of the object, specify an insertion point on screen.

5 Press *ENTER*.

6 Enter a name for the profile, and click OK.

You can now use the profile as a building block for profile-based object components.

NOTE Alternatively, you can click Manage tab ➤ Style & Display panel ➤ ➤ Profile Definitions , and add a new profile. In order to define the geometry, right-click the new profile definition in Style Manager, click Set From, and select the desired linework on screen.

Defining the Direction of Profile Edges and Extrusion

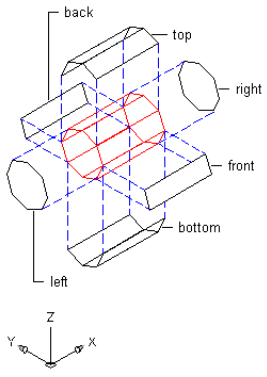
When a profile is used to extrude objects or components, you need to set the following parameters:

- the position of each edge in a profile (left, right, back, discard, none)
- the axis along which the object is extruded from the shape of the profile

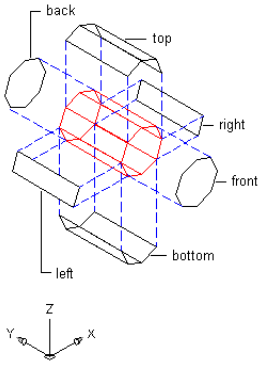
These settings determine how surface hatching is applied to objects created from the profile and how the objects are extruded from the two-dimensional (2D) profile.

For information of surface hatching, see Working with Surface Hatches on page 590. See below some examples for different extrusion directions.

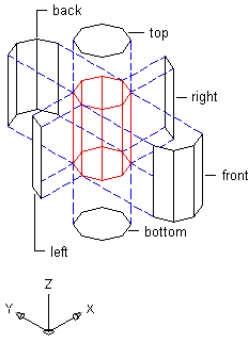
Face assignments from edges extruded in the X direction



Face assignments from edges extruded in the Y direction



Face assignments from edges extruded in the Z direction



NOTE Objects already created from the profile change when you change profile edges or the axis of extrusion.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Profile Definitions .
2 Select the profile you want to change.
3 Click the Profile Edges tab.
4 Select an edge, and specify its position:

If you want to…	Then…
let the software determine the position of edges	click Calculate Default Edge Positions. You can then override the position of individual edges, if necessary.
select a position for an edge	select the setting for Edge, and select a new position.
exclude an edge from surface hatching	select the setting for Edge, and select None.
discard an edge	select the setting for Edge, and select Discard.

5 Specify the axis of extrusion based on the type of object created from the profile:

If you want to…	Then…
create a profile for roof slab or slab fascia, wall sweeps, or railings	select X for Extrusion Direction.
create a profile for a slab soffit, or opening frame	select Y for Extrusion Direction.
create a profile for an extruded mass element	select Z for Extrusion Direction.

6 Click OK.

Adding a Profile to an Object Component

Profiles can be used to determine the shape of various objects and object components. The table below contains links for how to add a profile to the various objects and components:

Object component	How to
extruded mass elements	Creating a Mass Element by Extruding a Profile on page 667
revolution mass elements	Creating a Mass Element by Revolving a Profile on page 668
roof slab and slab edges	Specifying a Fascia and a Soffit for a Slab/Roof Slab Edge Style on page 1649
door frames	Specifying the Design Rules of a Door Style on page 1239 Replacing the Door Shape in a Door Style on page 1241
window frames	Specifying the Design Rules of a Window Style on page 1303 Replacing the Window Shape in a Window Style on page 1304
opening frames	Creating an Opening with a Custom Shape on page 1340
door muntins	Adding Glass to a Door Style on page 1255
railings	Adding a Custom Profile to a Railing Component on page 1525
curtain wall frames/mullions	Defining a Curtain Wall Frame Using a Profile on page 952 Defining the Mullions of a Curtain Wall Using a Profile on page 956 Defining a Curtain Wall Unit Frame Using a Profile on page 1041 Defining the Mullions of a Curtain Wall Unit Using a Profile on page 1045
door and window assembly	Defining a Door and Window Assembly Frame Using a Profile on page 1126 Defining the Mullions of a Door and Window Assembly Using a Profile on page 1131
AEC polygon	Creating an AEC Polygon from a Profile on page 1193
wall sweeps	Adding a Sweep to a Wall on page 824

Editing a Profile In Place

Profiles that are assigned to objects in the drawing provide in place editing, so that you can change the shape of the profile (and thereby the component) on screen. The edit in place mode is a special editing mode

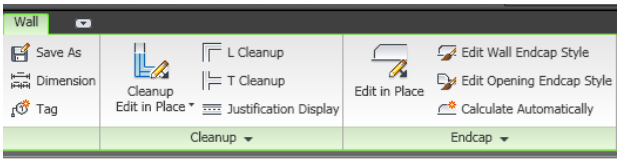
where object components can be edited, but other editing capabilities are limited. For example when you are in edit in place mode, you cannot save and close the drawing. Upon exiting the edit in place mode, you can choose if the changes should discarded, overwrite the existing profile definition, or if a new profile definition should be created.

Entering the edit in place mode

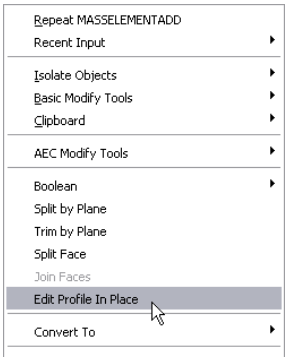
1 Insert an object with the desired profile into the drawing. For a list of objects that can have profiles, see What are Profiles? on page 1855.

2 Select the object and do one of the following:

- On the contextual tab of the object on the ribbon, select the Edit in Place command. Depending on the object, the edit in place command can be located in different panels. Also, some objects like walls or curtain walls can have multiple profile-based components. In this case, first select the appropriate panel for the component, and then the associated Edit in Place command.



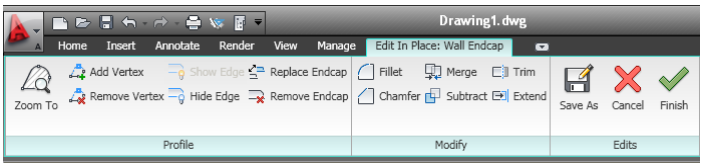
- Select the Edit Profile in Place command from the context menu of the object. If an object has multiple profile-based components, first select the correct submenu, for example Sweeps ➤ Edit in Place.



The edit in place mode is characterized by the following user interface changes:

- On the ribbon, the contextual Edit in Place tab for the selected component is displayed.

Edit in Place tab for Wall Endcaps

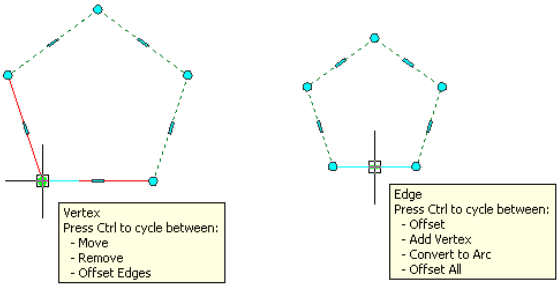


- Grips on editable profiles display in a magenta color to identify an edit in place grip mode.
- A number of commands, such as closing or saving the drawing, are deactivated while the in-place edit mode is active. In order to access them, you must exit the in-place edit mode first.

Editing the profile

3 Select the profile you want to edit.

Grip-edit options for profiles



4 Use the grips, the ribbon, or the context menu in order to make any of the following changes to the profile:

Move a Vertex	Select the vertex grip, and move it.
Add a Vertex	■ Grips: Select the edge grip that is closest to the location of the new vertex. Then, press Ctrl once and use the preview image to place the new vertex. ■ Ribbon: On the Edit in Place tab of the selected profile, click Profile panel ➤ Add Vertex . Then, specify the location of the new vertex on screen. ■ Context menu: Click Add Vertex, and specify the location of the new vertex on screen.
Remove a vertex	■ Grips: Select the vertex grip you want to remove. Then, press Ctrl once and click to remove the vertex. ■ Ribbon: On the Edit in Place tab of the selected profile, click Profile panel ➤ Remove Vertex . Then, select the vertex to remove on screen. ■ Context menu: Click Remove Vertex, and select the vertex to remove.
Offset a vertex with its edges	■ Grips: Select the vertex grip which you want to offset with its associated edges. Then, press Ctrl twice and drag the vertex to the desired location.
Offset a profile edge	■ Grips: Select the grip of the edge you want to offset and drag it to the desired location.
Convert an edge to an arc	■ Grips: Select the grip of the edge you want to convert, and press Ctrl twice. Then, drag the grip until the desired arc shape is in place.

Offset all edges of the profile	■ Grips: Select any edge grip on the profile, and press Ctrl three times. Then, drag the grip until the overall profile shape is correct.
Add a ring to a profile	■ Ribbon: On the Edit in Place tab of the selected profile, click Profile panel ➤ Add Ring . Then, select a closed polyline, spline, ellipse or circle to convert. ■ Context menu: Select the profile, and click Add ring. Then, select a closed polyline, spline, ellipse to convert.
Remove a ring from a profile	■ Ribbon: On the Edit in Place tab of the selected profile, click Profile panel ➤ Remove Ring . Then, select the ring you want to remove from the profile, and press Enter. ■ Context menu: Select the profile, and click Remove Ring. Then, select the ring you want to remove from the profile, and press Enter.
Replacing a ring with another	■ Ribbon: On the Edit in Place tab of the selected profile, click Profile panel ➤ Replace Ring . Then, select the ring you want to replace and the ring that should be used instead. ■ Context menu: Select the profile, and click Replace Ring. Then, select the ring you want to replace, and after that the ring that should be used instead.

Ending the edit in place mode

5 When you have made all changes to the profile, you can end the edit in place mode in one of the following ways:

If you want to…	Then…
discard the changes and revert the profile to its original shape	■ Ribbon: On the Edit in Place tab of the selected profile, click Edits panel ➤ Cancel . ■ Context menu: Click Discard All Changes.
save the changes to the current profile	■ Ribbon: On the Edit in Place tab of the selected profile, click Edits panel ➤ Finish . ■ Context menu: Click Save Changes.
save the changes to a new profile definition	■ Ribbon: On the Edit in Place tab of the selected profile, click Edits pan-

If you want to…	Then…
	el ➤ Save As . Enter a name for the new profile definition, and click OK. ■ Context menu: Click Save as New Profile.

Converting Profiles to Polylines

You cannot insert a standalone profile into a drawing. You can however insert a profile as a polyline into the drawing. This process would be most useful when you want to make changes to the profile shape. You insert the profile as a polyline, make changes to the polyline, and then re-convert the polyline to the profile.

1 Click Manage tab ➤ Style & Display panel ➤ ➤ Insert As Polyline.

2 Select the profile you want to insert as a polyline.

3 Select the insertion point in the drawing, and place the polyline.

4 Make changes to the polyline as needed.

5 If you want to save the polyline shape back to the profile, select the polyline, right-click, choose Convert to ➤ Profile.

6 On the command line, enter **e** (Existing), and select the name of the existing profile in the Profile Definitions worksheet.

The current polyline shape will overwrite the profile definition.

7 If you want to save the changed polyline shape to a new profile, enter **n** (New) and enter the name for the new profile.

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Mask Blocks

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A mask block is a two-dimensional (2D) block that covers, or "masks," part of the graphic display of an AEC object in a plan view. You can use mask blocks to clean up or correct objects in your drawings or to create custom 2D shapes from predefined drawing objects, such as walls or grids.

Mask Blocks

A mask block is a two-dimensional (2D) block that covers, or "masks," part of the graphic display of an AEC object in a plan view. You can use mask blocks to clean up or correct objects in your drawings or to create custom 2D shapes from predefined drawing objects, such as walls or grids.

For example, attach a light fixture as a mask block to a ceiling grid in a plan view. If the light fixture is bigger than one or more of the ceiling grid bays, the light fixture masks, or covers, the ceiling grid lines that would visibly pass through the light fixture if it had been defined as a regular AutoCAD block.

Before you can begin to mask objects in your plan view drawings, you must have an existing mask block or a mask block definition created in your drawing. You can find predefined mask blocks on the Drafting tool palette and in the AutoCAD Architecture Stock Tool catalog. You can also create a mask block with the AEC Content Wizard. For more information about custom content, see Creating an AEC Content Masking Block for DesignCenter on page 2573.

After you have selected a mask block, add it to your drawing in plan view. Adding the mask block to your drawing is like adding a regular AutoCAD block: specify an insertion point or scale factors and a rotation angle. The mask block and the object that you want to mask must be coplanar; that is, for the mask object to cover the other object, they must be on the same plane.

After you insert a mask block in your drawing, attach the objects to be masked. The mask block clips the graphics of the objects that you are masking when the objects regenerate themselves in a plan view. Only the objects that you attach to the mask block are clipped. The masked objects are plotted as you see them on your screen.

If you change your drawing from a 2D view to a three-dimensional (3D) view, the mask block is still displayed, but it no longer masks the objects that are attached to it. You can detach the mask block from the objects at any time. You can also import and export mask block definitions. If you create a mask block definition that you decide not to use in your drawings, you can purge it.

Creating Mask Block Definitions

You can define a mask block by selecting a closed polyline in the drawing and defining it as a mask block, by copying and editing an existing mask block, or by using the AEC Content Wizard.

Use the AEC Content Wizard to save mask blocks in content drawings for convenient reuse. For more information, see Creating an AEC Content Masking Block for DesignCenter on page 2573.

Managing Mask Block Definitions

To create, edit, copy, or purge mask block definitions, use the Style Manager. The Style Manager provides a central location in AutoCAD Architecture, where you can work with definitions and styles from multiple drawings and templates. For more information, see Style Manager Overview on page 566.

Creating a Mask Block Definition from a Polyline

Use this procedure to create a mask block definition from one or more closed polylines. If you use more than one polyline to create your mask block definition, the polylines must be completely within or completely outside each other: they cannot overlap or touch. Polylines that are within each other can be specified as void areas that become holes when the mask block is created. After you create the definition, edit the definition properties to customize the characteristics of the definition.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed, with the current drawing expanded in the tree view.
2. Expand Multi-Purpose Objects, right-click Mask Block Definitions, and click New.
3. Enter a name for the new mask block definition, and press *ENTER*.
4. Right-click the new mask block definition name, and click Set From.
5. Select the closed polyline to use to create the mask block definition.
6. Do one of the following to complete the mask block definition:
   - Press *ENTER* to create the mask block definition from a single polyline.
   - Enter **y** (Yes) to select additional polylines to add to the mask block definition. These polylines must be entirely within or outside each other; they cannot overlap or touch. Polylines that are within other rings can be specified as void areas that become holes in the mask block.
7. Specify an insertion base point for the mask block.
8. Select additional graphics to include in the mask block definition, or press *ENTER* if you do not want to include additional graphics.

   NOTE You can select text or symbols to include in the mask block definition.

9. Click OK.

A mask block definition is created from the polyline or polylines that you selected. The new mask block definition is listed in the mask block definition tree and can be viewed in the graphics screen of Style Manager. The original polylines remain in the drawing.

Creating a Mask Block Definition from an Existing Mask Block Definition

Use this procedure to create a mask block definition from a mask block definition that already exists in a drawing. After you create the new definition, you edit the definition properties to customize the characteristics of the definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed, with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand Mask Block Definitions.

3 Right-click the mask block definition to copy, and click Copy.

4 Right-click, and click Paste.

5 Right-click the new mask block definition, and click Rename.

6 Enter a name, and press *ENTER*.

7 Click OK.

Importing Mask Block Definitions

Use this procedure to import a mask block definition from another drawing. After you create the definition, you edit the definition properties to customize the characteristics of the definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed, with the current drawing expanded in the tree view.

2 On the File menu, click Open drawing to browse for the drawing that contains the definition that you want to copy to your current drawing.

3 Select the drawing with the definition to copy, and click Open.

4 Expand Multi-Purpose Objects, and expand Mask Block Definitions.

5 Right-click the mask block definition to copy, and click Copy.

6 Select the current drawing, and expand Multi-Purpose Objects.

7 Right-click Mask Block Definitions, and click Paste.

The definition is copied into the current drawing. If the current drawing already contains a definition with the same name, the duplicate names are displayed in the Import/Export - Duplicate Names Found dialog box.

8 To resolve duplicate names, select one of the following options:

- To *not* replace the existing definition in the drawing with the new definition of the same name, select Leave Existing, and click OK.
- To replace the existing definition in the drawing with the new definition, select Overwrite Existing, and click OK.
- To rename the new definition so both definitions exist in the drawing, select Rename to Unique, and click OK. New definition names are appended with a numeral in the Style Manager.

9 Click OK.

Exporting Mask Block Definitions to a New Drawing

Use this procedure to copy mask block definitions from your current drawing to a new drawing. After you create the definition, you edit the definition properties to customize the characteristics of the definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed, with the current drawing expanded in the tree view.

2 On the File menu, click New drawing to create the drawing to which you want to copy the definition.

3 Enter a name for the new drawing, and click Save.

The new drawing opens in the Style Manager.

4 In the current drawing, Expand Multi-Purpose Objects, and expand Mask Block Definitions.

5 Right-click the mask block definition to copy to the new drawing, and click Copy.

6 Select the new drawing, and expand Multi-Purpose Objects.

7 Right click Mask Block Definitions, and click Paste.

8 Click OK.

Exporting Mask Block Definitions to an Existing Drawing

Use this procedure to copy mask block definitions from your current drawing to another drawing. After you create the definition, you edit the definition properties to customize the characteristics of the definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed, with the current drawing expanded in the tree view.

2 On the File menu, click Open drawing to browse for the drawing to which you want to copy the definition.

3 Select the drawing that you want to copy the definition to, and click Open.

The drawing opens in the Style Manager.

4 In the current drawing, Expand Multi-Purpose Objects, and expand Mask Block Definitions.

5 Right-click the mask block definition to copy to the second drawing, and click Copy.

6 Select the second drawing, and expand Multi-Purpose Objects.

7 Right-click Mask Block Definitions, and click Paste.

8 The definition is copied into the second drawing. If the drawing already contains a definition with the same name, the duplicate names are displayed in the Import/Export - Duplicate Names Found dialog box.

9 To resolve duplicate names, select one of the following options:

- To *not* replace the existing definition in the drawing with the new definition of the same name, click Leave Existing, and click OK.
- To replace the existing definition in the drawing with the new definition, click Overwrite Existing, and click OK.
- To rename the new definition so both definitions exist in the drawing, click Rename to Unique, and click OK. New definition names are appended with a numeral in the Style Manager.

10 Click OK.

Editing a Mask Block Definition

Use this procedure to make any of the following types of modifications to a mask block definition:

- Change the objects or styles to which the mask block can be attached.
- Add and remove properties.
- Change the name, description, type, and format of properties.

Changes that you make to a mask block definition are immediately applied to any objects or styles to which the mask block created from the definition is attached.

1 Select a mask block object, and click Mask Block Reference tab ➤ General panel ➤ Edit Style drop-down ➤ Mask Definition Styles.

The Style Manager is displayed, and Mask Block Definitions is highlighted in the tree view of the current drawing.

NOTE Alternatively, you can click Manage tab ➤ Style & Display panel ➤ Style Manager, expand Multi-Purpose Objects, and expand Mask Block Definitions.

2 Select the mask block definition.

3 Click the Classifications tab.

4 Select a classification for the classification definition.

For more information, see Classification Definitions on page 2540.

5 Click the Display Properties tab.

6 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

7 If necessary, click .

8 Click the Layer/Color/Linetype tab.

9 Select the component to change, and select a different setting.

10 Click OK.

11 Click the General tab.

12 Enter text for Description.

13 Click Notes.

14 Click the Notes tab, and enter a note.

15 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

16 Click OK.

17 To attach or edit schedule data, click Property Sets. For more information, see Attaching Property Set Data to Objects on page 2502 and Entering Manual Properties and Fields for Objects on page 2502.

18 Click OK.

Adding Classifications to a Mask Block Definition

Use this procedure to specify classifications for any classification definition applied to a mask block definition. Classifications enable you to track objects by construction status, vendor, or other criteria. For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1. Open a tool palette that has a mask block definition tool.
2. Right-click a mask block definition tool, and click Mask Block Definitions.
3. Select the definition that you want to change.
4. Click the Classifications tab.

   By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to mask block definitions.
5. For each classification definition, select the classification you want to apply to the current mask block definition.
6. Click OK.

Purging Mask Block Definitions

Use this procedure to purge mask block definitions from your drawing. You have the option to purge any mask block definition unless it is currently applied as a mask block in the drawing.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

   The Style Manager is displayed, with the current drawing expanded in the tree view.
2. Expand Multi-Purpose Objects, and expand Mask Block Definitions.
3. Purge mask block definitions:

If you want to…	Then…
purge one unused mask block definition style	right-click the style you want to remove, and click Purge.
purge all unused mask block definition styles	right-click Mask Block Definitions, and click Purge. When prompted, verify that the styles you want to purge are selected, and click OK.

4. Click OK.

Using Mask Block Tools to Create Mask Blocks

Tools provided with AutoCAD Architecture let you quickly place mask blocks using tool with a specific mask block definition and other predefined properties. You can use the default settings of tool, or you can change any properties that are not controlled by the definition. You can also create new mask blocks by applying tool properties to existing mask blocks or to closed polylines. For more information, see Creating a Mask Block Tool on page 1872.

Mask block tools are found in the following locations:

Location	Tool
Drafting tool palette	a mask block tool for the Standard mask block definition style and default settings for other mask block properties

Location	Tool
Drafting Tools category in the Stock Tool catalog	a mask block tool for the Standard mask block definition style and default settings for other mask block properties. For more information on accessing tools in this catalog, see Content Browser Overview on page 97.
custom tool palettes created by your CAD manager	Mask block tools with mask block definition styles and properties customized for your projects or office standards

NOTE The Standard mask block definition style is imported if you create your drawing with a template. It will not be present if you start your drawing without using a template. For more information, see About Templates on page 129.

Adding a Mask Block

Use this procedure to add a new mask block that has the properties specified in the mask block tool that you select. To specify settings when you add a mask block, see Adding a Mask Block with User-Specified Settings on page 1871. You can add a mask block to a drawing if the drawing contains a mask block definition. For more information, see Creating Mask Block Definitions on page 1866.

TIP When you add mask blocks to your drawing, insert them on a separate layer. You can turn the layer off in 3D views, where the mask blocks no longer mask any objects.

1. If you have created your own mask block definition, create a tool from it as described in Creating a Mask Block Tool on page 1872.
2. If you are working with an existing mask block tool, open the palette it is located on.

   A mask block tool is located on the Drafting tool palette and in the Drafting Tools category in the AutoCAD Architecture Stock Tool catalog. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.
3. Select the mask block tool on the palette.
4. Specify the insertion point of the mask block.

   You can move or hide the Properties palette to expose more of the drawing area.

   NOTE If you are using a mask block to mask a wall, the mask block must be located at the baseline of the wall (Z = 0). Even though the wall components are at different heights, the plan display representation draws them at the height of the baseline, as they would be drawn on paper.
5. Continue adding mask blocks, and press *ENTER*.

   The mask blocks are displayed in the drawing at the insertion point you specified. To use a mask block to clean up or correct an object in the drawing, attach the object to the mask block.

Adding a Mask Block with User-Specified Settings

Use this procedure to add a mask block with settings that you specify.

1. Open the tool palette that contains the mask block tool you want to use, and select the tool. (You may have to scroll to display the desired tool.)
2. On the Properties palette, expand Basic, and expand General.
3. Select a definition.

4 Expand Scale.

5 Enter the *X*, *Y*, and *Z* scale of the mask block. The *X*, *Y*, and *Z* scales represent the distance from the insertion point.

6 Alternately, select Yes for Specify scale on screen. Use your pointing device to designate the scale of the mask block.

7 Expand Location.

8 Enter rotation and elevation values.

9 Alternately, select Yes for Specify rotation on screen. Use your pointing device to designate the rotation of the mask block.

10 In the drawing area, specify the insertion point of the mask block.

You can move or hide the Properties palette to expose more of the drawing area.

11 Continue adding mask blocks, and press *ENTER*.

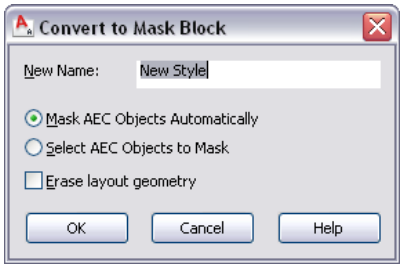
To use a mask block to clean up or correct an object in the drawing, attach the object to the mask block.

Creating a Mask Block from Polylines

Use this procedure to create a mask block reference from one or more closed polylines. If you use more than one polyline to create your mask block, the polylines must be completely within or completely outside each other; they cannot overlap or touch. Polylines that are within each other can be specified as void areas that become holes when the mask block is created.

1 Select the polylines, right-click, and click Convert To ➤ Mask Block.

The Convert to Mask Block worksheet is displayed.



2 Enter a name for the new mask block.

3 Clear Mask AEC Objects Automatically to avoid masking existing AEC objects overlapping the polylines being converted.

4 To select existing AEC objects for masking with the new mask block, make sure Select AEC Objects to Mask is selected.

5 Select Erase Layout Geometry to erase the original polylines, and click OK.

6 Edit the properties of the mask block in the Properties palette, if necessary.

Creating a Mask Block Tool

Use this procedure to create a mask block tool and add it to a tool palette. You may want to create your own mask block tools if you are placing multiple mask blocks of a specific style and they all have the same properties.

You can use any of the following methods to create a mask block tool:

- Drag a mask block that has the properties you want to a tool palette.

IMPORTANT Make sure that the mask block is in a drawing that has been saved and that will be available in the future.

- Drag a mask block definition from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Drag a copy of a tool from another palette to the current palette, and then customize the properties of the new tool.
- Copy an existing tool in the current palette, and then customize the properties of the new tool.
- Drag a tool from a tool palette in the Content Browser to a tool palette, and then customize the properties of the new tool.

1. Open the tool palette on which you want to add a tool.
2. Create the tool:

If you want to…	Then…
create a tool from a mask block in the drawing	select the mask block, and drag it to the tool palette.
create a tool from a mask block definition in the Style Manager	open Style Manager. Locate the mask block definition you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool palette in the Content Browser	open the Content Browser, and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3. Right-click the new tool, and click Properties.
4. Enter a name for the tool.
5. Click the setting for Description, enter a description of the tool, and click OK.

   This description is used as the tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.
6. Expand Basic, and expand General.
7. Specify properties for the mask block created from the tool:

If you want to…	Then…
enter a description of the mask block that you can create using this tool	click Description, enter a description of the tool, and click OK.
specify a unique layer key for the object type	click Layer Key, select a layer key, and click OK.
specify a layer override for the tool	click Layer Overrides, clear Do not specify Layer Overrides, specify the override, and click OK.
specify a definition	click Definition, select a mask block definition, and click OK.

If you want to…	Then…
specify a definition location	click Definition location, select the file containing the mask block definition you want to use, click Open, and click OK.

8 Expand Scale.

9 Specify the scale for the mask block created from the tool:

If you want to…	Then…
use your pointing device to designate the scale for the mask block	click Yes for Specify scale on screen.
specify the scale of the mask block on the Properties palette	click No for Specify scale on screen, and enter the *X*, *Y*, and *Z* scale for the mask block.

10 Expand Location.

11 Specify the rotation for the mask block created from the tool:

If you want to…	Then…
use your pointing device to designate the angle for the mask block	click Yes for Specify rotation on screen.
specify the angle of the mask block on the Properties palette	click No for Specify rotation on screen, and enter the angle for Rotation.

12 Click OK.

Attaching Mask Blocks to Objects

Use this procedure to mask an object by attaching the mask block to the object after you have the mask block placed correctly.

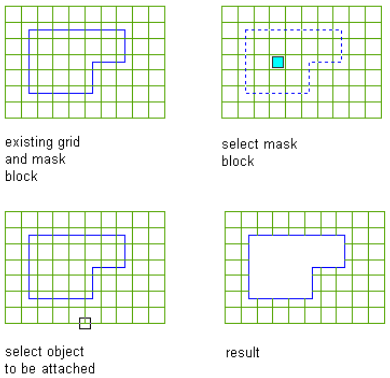
1 Select the mask block or blocks that you want to attach to an object.

2 Click Mask Block Reference tab ➤ Modify panel ➤ Attach Objects.

3 Select the object that you want to mask.

4 Select a display representation from the list of current display representations, and click OK.

Attaching a mask block to an object



The object is now hidden by the mask block.

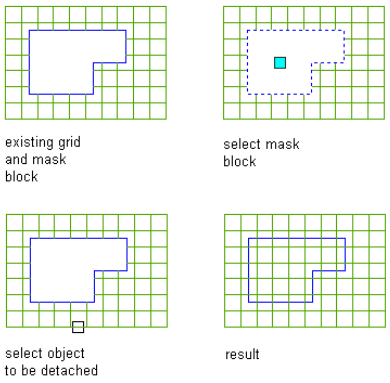
Mask blocks mask AutoCAD Architecture objects only and mask them only in plan views. Mask blocks are visible in 3D views, but they do not mask the objects that are attached to them.

Detaching Mask Blocks from Objects

Use this procedure to unmask an object in plan view by detaching the object from the mask block.

1. Select the mask block that you want to detach from an object.
2. Click Mask Block Reference tab ➤ Modify panel ➤ Detach Objects.
3. Select the object that you want to detach from the mask block.

Detaching an object from a mask block



The object is detached from the mask block and is no longer hidden by the mask block.

Editing Mask Blocks

AutoCAD Architecture offers several methods for editing mask blocks:

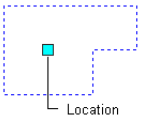
- Change the location using grips.
- Change settings on the Properties palette.
- Edit the profile.
- Select commands from the context menu.
- Change how a mask block is displayed.

Using Grips to Move Mask Blocks

Use this procedure to change the location of a mask block with grips.

1. Select the mask block.
2. Select the highlighted grip.

Viewing Mask Block Location grip



3 Move the grip until the door is in the desired location, and click once.

Changing the Location of a Mask Block

Use this procedure to change the rotation, elevation, and location of the mask block on the Properties palette.

You can relocate a mask block by changing the coordinate values of its insertion point. The mask block also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the mask block are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the mask block by aligning its normal with another axis. You can also rotate the mask block on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1 Double-click the mask block you want to change.

2 On the Properties palette, expand Basic, and expand Location.

3 Specify the placement of the mask block:

If you want to…	Then…
change the rotation	enter a new value for Rotation Angle.
change the elevation	enter a new value for Elevation.

4 Click Additional information to specify location of the mask block:

If you want to…	Then…
relocate the mask block	enter new coordinate values under Insertion Point.
locate the mask block on the *XY* plane	make the normal of the mask block parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the mask block on the *YZ* plane	make the normal of the mask block parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the mask block on the *XZ* plane	make the normal of the mask block parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the mask block	enter a new value for Rotation Angle.

Editing the Profile of a Mask Block

Use this procedure to edit the geometry of a mask block.

NOTE If you want to replace the geometry of the mask block with newly drawn polylines, ellipses, or circles, draw them before you start this procedure.

1 Select the mask block that you want to change.

2 Click Mask Block Reference tab ➤ Modify panel ➤ Edit In Place .

3 If prompted that the profile is not drawn to size, click Yes.

A temporary profile is created for you to edit the geometry of the mask block.

4 **NOTE** After you perform an editing task from the Edit in Place tab, you may need to select the profile again to perform another editing task. If you do not see the editing commands that you expect on the ribbon, reselect the profile, then choose the Edit in Place command again.

Edit the profile:

If you want to…	Then…
change the shape of the perimeter of the profile or its rings	select the profile, and use edge or vertex grips to adjust the shape. The Edge grip has two edit modes: Stretch and Move. The default mode is Stretch, and the direction of the stretch depends on the orientation of edges connected to the selected edge. For example, if the edges at both ends of the selected edge are parallel, the grip edit mode is Stretch (Parallel) and the stretch direction is limited to the direction of the parallel edges. If the connected edges are not parallel, the grip edit mode is Stretch (Offset) and the stretch direction is perpendicular to the direction of the selected edge. The Move edit mode allows an unconstrained move of the selected edge.
add vertices to the profile	Click Edit In Place tab ➤ Profile panel ➤ Add Vertex . Select a point for each new vertex, and press *ENTER*.
remove vertices from the profile	Click Edit In Place tab ➤ Profile panel ➤ Remove Vertex . Select each vertex to remove, and press *ENTER*.
replace an existing ring of the profile with new geometry	Click Edit In Place tab ➤ Profile panel ➤ Replace Ring . Select the ring to replace, and select the new geometry. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
add a ring to the profile	Click Edit In Place tab ➤ Profile panel ➤ Add Ring . Select the geometry to define the ring. Press *ENTER* to keep the geometry, or enter **n** (No) to erase it.
remove a ring from the profile	Click Edit In Place tab ➤ Profile panel ➤ Remove Ring . Select the ring to remove, and press *ENTER*.

5 Save or discard the changes:

If you want to…	Then…
restore the mask block to its original shape	Click Edit In Place tab ➤ Edits panel ➤ Cancel .
save the changes to the current mask block	Click Edit In Place tab ➤ Edits panel ➤ Finish . The mask block uses the edited profile to define its geometry. Any other objects or styles that use this profile are also updated with the edited geometry.

Applying Tool Properties to an Existing Mask Block Reference

Use this procedure to apply the properties of a mask block tool to one or more existing mask blocks. The properties include the mask block definition and any other settings specified in the tool you select.

1 Open the tool palette that you want to use.

If necessary, scroll to display the tool that you want to use.

2 Right-click a mask block tool, and click Apply Tool Properties to Mask Block Reference.

3 Select the mask block reference, and press *ENTER*.

4 Edit the properties of the mask blocks in the Properties palette, if necessary.

Changing Display Properties of Mask Blocks

In most cases, you want the appearance of objects that belong to the same style to be consistent throughout a drawing. To achieve this, you specify the display properties of the mask blocks in each mask block definition style. However, in certain instances, you may need to override a display property for an individual mask block to achieve a specific result. All the display properties that you can specify in mask block definition styles are available for individual mask blocks:

- The visibility of mask block components
- The layer, color, and linetype of mask block components
- The lineweight, linetype scale, and plot style of mask block components

NOTE If the mask block is attached to a grid, you can change the anchor properties as well.

When you change the display properties of a mask block, the changes apply only to that mask block. Other mask blocks of the same definition style are not affected. To change the display properties of all mask blocks of a specific definition style, see Creating Mask Block Definitions on page 1866.

Changing the Display Properties of a Mask Block

Use this procedure to change any of the following properties of the display components of an individual mask block:

- Visibility (display component is on or off)
- Layer
- Color

- Linetype
- Lineweight
- Linetype scale

1 Select the mask block you want to change, right-click, and click Edit Object Display.
2 Click the Display Properties tab.
3 Select the display representation where you want the changes to appear, and select Object Override.
   The display representation in bold is the current display representation.
4 If necessary, click .
5 Click the Layer/Color/Linetype tab.
6 Select the component to change, and select a different setting for the property.
7 Click OK twice.

Attaching Hyperlinks, Notes, and Files to a Mask Block

Use this procedure to attach hyperlinks, enter notes, or attach reference files to a mask block in a drawing. You can also edit notes and edit or detach reference files from a mask block.

1 Double-click the mask block to which you want to attach information.
2 On the Properties palette, click the Extended Data tab.
3 To add a hyperlink, click next to Hyperlink, and specify the link.
   For more information about adding hyperlinks, see "Add Hyperlinks to a Drawing" in AutoCAD Help.
4 To add or edit a note, click next to Notes, enter text, and click OK.
5 To attach, detach, or edit a reference file, click next to Reference documents:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

Multi-View Blocks

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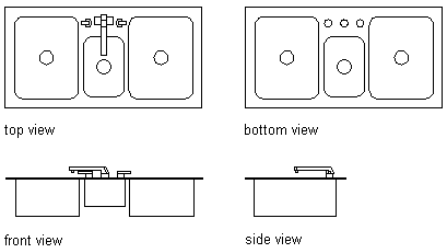
Understanding Multi-View Blocks

Multi-view blocks can represent different types of objects in AutoCAD Architecture. They are typically used to represent the following items:

- Furniture and fixtures, such as tables and kitchen sinks
- Annotation components, such as revision clouds or fire rating signs
- Schedule tags, such as door numbers

Multi-view blocks can be displayed differently in each view direction and each display representation. For example, the top view of a multi-view block representing a kitchen sink shows the top of the sink; the bottom view shows the bottom of the sink; and there are representations for left, right, front, and back views. Additionally, you can define a different group of displays for each display representation, so that you can have one set of views for Plan view and another for Reflected view.



You can use a multi-view block as a cutout in objects such as walls, slabs, and curtain walls. You create a view block to represent the cutting body. The block forms the body that will be subtracted from objects by

applying the multi-view block as interference. For example, you can create a skylight as a multi-view block and specify the block as a subtractive Boolean in a slab.

Predefined Multi-View Blocks

The content folders of AutoCAD Architecture contain predefined multi-view blocks for various design purposes, such as furniture, electrical appliances, annotation symbols, schedule tags, and other useful elements. You can access these multi-view blocks from DesignCenter™. For more information, see AEC Content and DesignCenter on page 2563.

Creating Multi-View Block Definitions

Each multi-view block in a drawing is based on a definition that specifies the display representations in which the block can be viewed, as well as the views available in each representation. From a multi-view block definition, you can create as many multi-view blocks as you need.

Multi-view blocks typically represent 3D architectural objects. For example, you can create customized cabinetry by drawing plan, elevation, and model views, and saving each view as an individual AutoCAD block. You assign each block to a view when you create the multi-view block definition. The blocks (top, bottom, front, back, left, right, and model views) are used to define the custom object as a single multi-view block. Prior to defining the block, you can add points on the Defpoints layer to identify additional insertion points for the view block. You set the display representations and view directions in the process of defining the multi-view block.

You can see the individual blocks of your custom object as one assembly in plan, elevation, and isometric views after inserting them in the drawing as a multi-view block. For more information about working with blocks, see "Overview of Blocks" in AutoCAD Help. For more information about display representations, see Display Representations on page 520.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

Process Overview: Creating Multi-View Block Definitions

There are four general steps for creating a multi-view block:

1. Create a set of view blocks for each view direction in every display representation you need.

   For example, if you need a multi-view block definition that displays in Model view and Reflected Plan view, create a set of views for each representation. You create views only for those view directions where you want a different result. For example, if the top and bottom views are supposed to look the same in the Reflected Plan display representation, you draw the view block only once, and assign it to both view directions.

2. Create a multi-view block definition in which you assign the view blocks to view directions in individual display representations.

3. If you want the new multi-view block definition to be available through DesignCenter™, add the definition to DesignCenter.

4. If you want the new multi-view block definition to be available from a tool palette, add it to a palette.

Creating View Blocks

Use this procedure to create AutoCAD blocks to represent each view of the multi-view block definition in display representations.

1 Draw the views you need for a specific display representation:

If you want to…	Then…
create views for the front and back directions	draw them on the *XZ* plane.
create views for the left and right directions	draw them on the *YZ* plane.
create views for the top and bottom directions	draw them on the *XY* plane.
create a block for an interference condition	create a block containing objects, such as mass elements, to be used as the subtractive body.

2 Specify additional insertion points on the Defpoints layer through the AutoCAD point command, if necessary.

NOTE The points added to view blocks are cumulative. For example, if you add one point to a view block used for the top view and two points to the view block used for the model view, you have a total of four points to cycle through. The fourth point is the regular base point defined during the creation of the block.

3 Select the World Coordinate System before making blocks from these individual views.

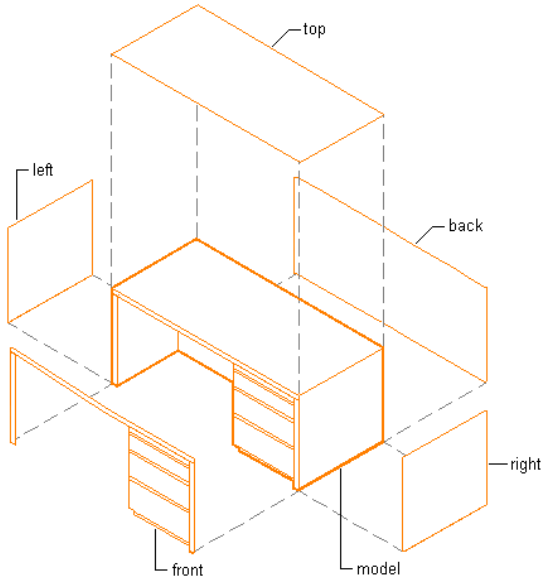
For more information about coordinate systems, see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

4 Define each view as a block, and coordinate the location of the insertion base point as you define each block.

For example, if you specify the insertion base point of the model view block as the midpoint of the bottom edge on the back side, the front and back view blocks have an insertion base point at the midpoint of the bottom edge. Then, the left and right view blocks have an insertion base point at the bottom corner on the back side, with the insertion base point for the top and bottom view blocks at the midpoint of the back edge.

For more information about blocks, see "Create and Use Blocks (Symbols)" in AutoCAD Help.

Creating individual blocks for multi-view block definition



TIP It is helpful to have a naming convention for saving views as blocks. For example, name the plan view block *desk-p,* and name the right view block *desk-r.*

Creating a New Multi-View Block Definition

Use this procedure to create a multi-view block definition from the view blocks you created to represent different views of a custom object.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects.

3 Right-click Multi-View Block Definitions, and click New.

4 Enter a name for the new multi-view block definition, and press *ENTER*.

5 Edit the new multi-view block definition:

If you want to…	Then…
connect view blocks to the view directions of the different display representations	see Connecting View Blocks to View Directions on page 1885.
add notes and files to the multi-view block definition	see Attaching Notes and Files to a Multi-View Block Definition on page 1886.
add classifications to a multi-view block definition	see Adding Classifications to a Multi-View Block Definition on page 1886.
specify a cut body for the multi-view block when the block is used as interference in other objects (for example, walls, curtain walls, spaces, slabs)	click Set Interference Block, select a block, and click OK.

6 Click OK.

Connecting View Blocks to View Directions

Use this procedure to connect view blocks to the view directions of individual display representations.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.

NOTE Alternatively, you can select a multi-view block in the drawing, and click Multi-View Block tab ➤ General panel ➤ Edit Style drop-down ➤ Multi-View Block Definitions .

3 Select the multi-view block definition to which you want to connect view blocks.

4 Click the View Blocks tab.

5 Select the display representation to which to connect view blocks.

Six display representations are available for multi-view blocks:

Display Representation	Purpose
General	Plan views, Section views, and Sketch views
Model	Model views
Plan	Plan views
Plan High Detail	Plan High Detail views
Plan Low Detail	Plan Low Detail views
Reflected	Reflected views

6 Click Add, and select a view block for the display representation.

7 Click OK.

8 Select the view directions that correspond to the selected block.

For example, to connect the view block to the left side of the multi-view block definition, select Left and clear all other directions.

You can connect a view block to multiple view directions. For example, if you have a symmetrical element that looks identical from left and right, you can select Left and Right.

The Other view direction represents a view that displays the block three-dimensionally. It is used for non-orthogonal (isometric or perspective) views of the custom object.

To ensure that the multi-view block is visible in all views, assign a block to every view direction.

9 To specify view blocks in other display representations, continue from step 5.

10 Click OK.

Defining a Multi-View Block Definition as Bounding for Associative Spaces

Use this procedure to define a multi-view block definition that can bound associative spaces.

When a multi-view block definition is set as bounding, by default all multi-view blocks that have the definition assigned will be used in the selection set for an associative space. For more information about associative spaces see Generating Associative Spaces on page 1915.

You can override the bounding settings from the multi-view block definition in an individual multi-view block, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.

NOTE Alternatively, you can select a multi-view block in the drawing, and click Multi-View Block tab ➤ General panel ➤ Edit Style drop-down ➤ Multi-View Block Definition .

3 Select a multi-view block definition.
4 Click the General tab.
5 Select the check mark for Objects of this style may act as a boundary for associative spaces.
6 Click OK.

Attaching Notes and Files to a Multi-View Block Definition

Use this procedure to enter notes and attach reference files to a multi-view block definition. You can also edit notes and edit or detach reference files from a multi-view block.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.

NOTE Alternatively, you can select a multi-view block in the drawing, and click Multi-View Block tab ➤ General panel ➤ Edit Style drop-down ➤ Multi-View Block Definitions .

3 Select the multi-view block definition to which you want to attach notes or files.
4 Click the General tab.
5 To add a description to the multi-view block, enter the description under Description.
6 Click Notes.
7 On the Notes tab, add or edit a note, as applicable.
8 On the Reference Docs tab, attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK twice.

Adding Classifications to a Multi-View Block Definition

Use this procedure to specify classifications for any classification definition applied to a multi-view block definition. For more information, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.

NOTE Alternatively, you can select a multi-view block in the drawing, and click Multi-View Block tab ➤ General panel ➤ Edit Style drop-down ➤ Multi-View Block Definitions .

3 Select the definition that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to multi-view block definitions.

5 For each classification definition, select the classification you want to apply to the current multi-view block definition.

6 Click OK.

Adding a Multi-View Block Definition to DesignCenter

Use this procedure to add a multi-view block to DesignCenter™. You can then create new multi-view blocks by dragging and dropping them from DesignCenter to your drawing. To add a multi-view block definition to DesignCenter, you need to create a DWG file using the AEC Content Wizard.

For a detailed description of the AEC Content Wizard, see Overview of AEC Content on page 2563.

1 On the command line, enter **AecCreateContent**.

2 Select Multi-View Block.

3 Under Current Drawing, select a multi-view block definition, and click Add to add it to the Content File list.

4 Click Next.

5 Select the layer key to use when the multi-view block is inserted, and specify any additional properties:

If you want to…	Then…
explode the multi-view block when it is inserted in a drawing	select Explode on Insert.
specify an elevation for the multi-view block	enter a value for Preset Elevation.
associate an anchor with the multi-view block	select an anchor type.
specify the scale for the multi-view block	under Scale, enter X, Y, and Z scale values, and select an option for Additional Scaling.
scale the multi-view block based on the drawing units specified in the Drawing Setup dialog box	select Enable AEC Unit Scaling.
specify properties for attributes associated with the multi-view block	select options for Attribute Text Style and Attribute Text Angle.

6 Click Next.

7 Specify the drawing file in which to store the multi-view block definition:

If you want to store the multi-view block…	Then…
in the current drawing	select Current Drawing.
in a different drawing	clear Current Drawing, and then either enter a file name or click Browse to specify a file.

8 Select the icon to represent the multi-view block in DesignCenter:

If you want to…	Then…
use a bitmap of the drawing as the icon	click Default Icon.
specify a bitmap (*.bmp*) file containing the image to be used as the icon	click New Icon, and select a bitmap file.

9 Enter a description of the multi-view block.

The description is displayed in DesignCenter, along with the icon representing the multi-view block.

10 Select Save Preview Graphics to enable previewing in DesignCenter, or clear Save Preview Graphics to disable previewing.

11 Click Finish.

Creating a Multi-View Block Tool

Use this procedure to create a multi-view block tool and add it to a tool palette. You may want to create your own multi-view block tool for customized multi-view blocks you plan to use repeatedly. For example, you might create an office floor plan in which each conference room and office contains a floor lamp. Conference rooms and executive offices get the deluxe model floor lamp, and all other rooms get the standard model. You could define a multi-view block to represent each type of floor lamp, and then create a floor lamp tool for each type. You would then select the appropriate tool to place a floor lamp in each room.

You can use any of the following methods to create a multi-view block tool:

- Drag a multi-view block that has the properties you want to a tool palette.
- Drag a multi-view block definition from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Copy an existing multi-view block tool, and then customize the properties of the new tool.
- Drag a multi-view block tool from a tool catalog in the Content Browser, and then customize the properties of the tool.

1 Open the tool palette on which you want to add a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a multi-view block in the drawing	select the multi-view block and drag it to the tool palette.
create a tool from a multi-view block definition in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the definition you want to copy,

If you want to…	Then…
	and drag it to the tool palette. Click OK to close the Style Manager.
copy a multi-view block tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser. Locate the multi-view block tool you want to copy, then click the icon associated with the tool and drag it to the tool palette in the workspace.
copy a tool on the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

This description is used as the tool's tooltip on the tool palette, and to describe the tool if it is stored in a tool catalog.

6 Expand Basic, and expand General.

7 Click next to Description to enter a description of the tool.

8 If you do not want to use the default layer key for multi-view blocks, click next to Layer key to select a layer key.

9 If you want to override the default layer name for multi-view blocks, click next to Layer overrides to select a layer override.

10 Select a multi-view block definition.

11 For Style location, select the drawing file containing the definition used for this multi-view block, or select Browse and use a standard file selection dialog box to select the file.

12 Under Bound Spaces, define if this multi-view block tool can be used as a bounding object for associative spaces.

You can select three options here:

- Yes: this multi-view block tool can be used as bounding object for associative spaces.
- No: this multi-view block tool cannot be used as bounding object for associative spaces.
- By style: this multi-view block tool will use the bounding settings from the multi-view block definition.

NOTE For more information on associative spaces, see Generating Associative Spaces on page 1915.

13 Expand Scale.

14 Specify the scale of the multi-view block:

If you want to…	Then…
specify fixed values for the scale	select No for Specify scale on screen, and enter X, Y, and Z values for the scale.
allow users to specify the scale of the object upon insertion	select Yes for Specify scale on screen.

15 Expand Location.

16 Specify the rotation of the multi-view block:

If you want to…	Then…
specify a fixed value for the rotation	select No for Specify rotation on screen, and enter a value for Rotation.
allow users to specify the rotation of the object upon insertion	select Yes for Specify rotation on screen.

17 Expand Advanced.

18 Click next to Insertion offsets, and enter X, Y, and Z offsets for each view block in the multi-view block, as necessary.

19 Click OK.

20 Click next to Attributes, and edit the prompt and value of each attribute, as necessary.

21 Click OK twice.

Adding Multi-View Blocks to a Drawing

Multi-view blocks are inserted in a drawing by referencing their definitions in one or more of the following locations:

- DesignCenter™
- Tool palettes
- Tool catalogs

Predefined multi-view blocks supplied with AutoCAD Architecture are available with DesignCenter. These blocks represent items such as furniture, electrical appliances, pipes, ducts, annotation symbols, and schedule tags.

A generic multi-view block reference tool is supplied in the AutoCAD Architecture Stock Tool catalog. This tool is in the Helper Tools category.

How you access a custom multi-view block definition—for example, blocks that you or someone else in your organization defined—depends on what you do with the block after you define it. You can use the multi-view block definition to create AEC content in DesignCenter, or to create a multi-view block tool that can be stored in a tool palette or tool catalog.

When you insert a multi-view block reference in a drawing, you are prompted to specify the insertion point for the block. Depending on how the multi-view block was defined, you may be prompted to specify rotation angle and scale values.

Inserting a Multi-View Block

Use this procedure to add a multi-view block to a drawing.

1 Find the multi-view block definition and begin the insertion process:

If the multi-view block is…	Then…
stored as AEC content	click Insert tab ➤ Content panel ➤ Content Browser drop-down ➤ Design Center . Locate the AEC content, and double-click the content.
inserted using a tool on a tool palette	open the tool palette containing the multi-view block tool, and click the tool.
inserted using a tool stored in a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser . Locate the tool, click the icon for the tool, and drag it to the drawing area.

2 Specify the insertion point for the block.

If you added insertion points to the view blocks, you can cycle through the points with the *CTRL* key.

3 Specify the scale, if prompted:

If you want to…	Then…
specify a scale value	enter a value at the Command prompt.
dynamically set the scale	use the pointing device, and click when you see the appropriate scale.
set the scale to match that of another multi-view block in the drawing	enter **m** (match) at the Command prompt, and select a multi-view block to match the scale.

4 Specify the rotation angle, if prompted:

If you want to…	Then…
specify a rotation value	enter a value at the Command prompt.
dynamically set the rotation	use the pointing device, and click when you see the appropriate rotation.
set the rotation to match that of another multi-view block in the drawing	enter **m** (match) at the Command prompt, and select a multi-view block to match the rotation.

5 To insert additional references to the multi-view block, continue from step 2.

6 Press *ENTER* to finish inserting blocks.

Modifying Multi-View Blocks

You can change the attributes of a multi-view block in a drawing. For example, you can change the rotation or the scaling factor.

Changing the Rotation of a Multi-View Block

Use this procedure to change the rotation of a multi-view block.

1. Double-click the multi-view block whose rotation you want to change.
2. On the Properties palette, expand Basic, and expand Location.
3. Enter a value for Rotation.

Changing the Associated Multi-View Block Definition

Use this procedure to change the multi-view block definition associated to the multi-view block. For information about the relationship between multi-view blocks and multi-view block definitions, see Creating Multi-View Block Definitions on page 1882.

1. Double-click the multi-view block you want to change.
2. On the Properties palette, expand Basic, and expand General.
3. Click Definition, and select a new multi-view block definition for the multi-view block.

Changing the Scale Factor of a Multi-View Block

Use this procedure to change the scale factor of a multi-view block.

1. Double-click the multi-view block you want to change.
2. On the Properties palette, expand Basic, and expand Scale.
3. Change the scale factor as needed:

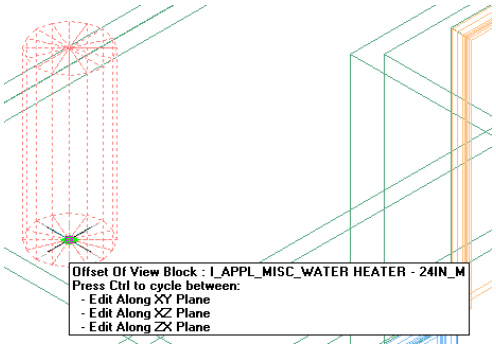
If you want to…	Then…
change the X scale factor	enter a new value for X.
change the Y scale factor	enter a new value for Y.
change the Z scale factor	enter a new value for Z.

Changing the Offset of a Multi-View Block Using Grips

Use this procedure to change the offset of a multi-view block using the Location grip.

When you first add a multi-view block to a drawing, the offset value is set to 0. You can change the position of the multi-view block by offsetting it from its original insertion point. You can also change the offset of a multi-view block using the Properties palette.

1. Select the multi-view block you want to change.
2. Click Multi-View Block tab ➤ Modify panel ➤ Edit View Block Offsets.
3. Select the view block to change.



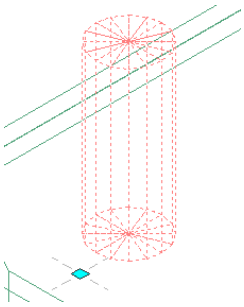
In Model view, the Location grip has three possible edit modes: Edit Along XY Plane, Edit Along XZ Plane, and Edit Along ZX Plane. Press *CTRL* to cycle among modes until you are in the desired mode. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

4 Offset the multi-view block to the desired location and click once, or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the multi-view block along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the multi-view block is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the multi-view block is constrained to the *Y* dimension direction.

5 Click Multi-View Block tab ➤ Modify panel ➤ Edit View Block Offsets to exit view block offset editing mode.



The selected view block is offset from the original insertion point.

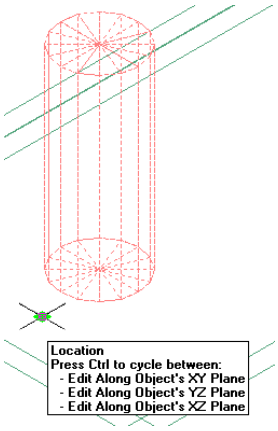
Changing the Location of a Multi-View Block Using Grips

Use this procedure to relocate an existing multi-view block using the Location grip. In Model view, the Location grip has three possible edit modes: Edit Along Object's XY Plane, Edit Along Object's YZ Plane, and Edit Along Object's XZ Plane. Press *CTRL* to cycle among modes until you are in the desired mode. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

You can also change the location of a multi-view block using the Properties palette.

1 Select the multi-view block you want to relocate.

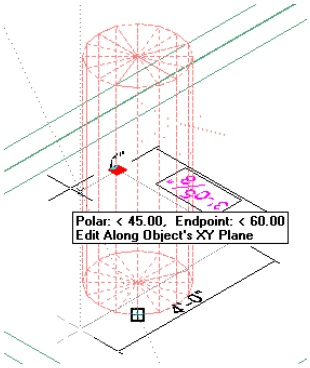
2 Select the Location grip.



3 Move the multi-view block to the desired location and click once, or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the multi-view block along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the multi-view block is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the multi-view block is constrained to the *Y* dimension direction.



4 Right-click, and click Deselect All to turn off grips.

Attaching Hyperlinks, Notes, or Files to a Multi-View Block

Use this procedure to attach hyperlinks, enter notes, or attach reference files to a multi-view block in a drawing. You can also edit notes and edit or detach reference files from a multi-view block.

1 Double-click the multi-view block to which you want to attach information.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.

For more information about adding hyperlinks, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

4 To add or edit a note, click next to Notes, enter text, and click OK.

5 To attach, detach, or edit a reference file, Click next to Reference documents:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

Editing the Location and Rotation of Attributes in a Multi-View Block

Use this procedure to change the location and rotation of attributes within a multi-view block.

NOTE The location and rotation of an attribute in a multi-view block can only be modified if the attributes have not been inserted with the Lock position in block option selected during attribute creation. For more information, see "Attribute Definition Dialog Box" in AutoCAD Help.

Rotating a tag attribute in Plan view

1 Select the multi-view block whose attributes you want to edit.

2 Click Multi-View Block tab ➤ Modify panel ➤ Edit Attributes.

Each attribute has a grip for location and for rotation.

In Model view, the Location grip has three possible edit modes: Edit Along Object's XY Plane, Edit Along Object's YZ Plane, and Edit Along Object's XZ Plane. Press *CTRL* to cycle among modes until you are in the desired mode. The default edit mode is along the *XY* plane. In Plan view, the Location grip is restricted to movement in one plane.

If there is more than one attribute with the same offset value, the attribute location grips reposition themselves according to their priority over other offset grips.

3 To change the location of an attribute relative to the multi-view block, select the Location grip, move the block attribute to the desired location and click once, or enter a value and press *ENTER*.

If you want to enter a specific value for the second direction in any edit mode (for example, in the *Y* direction when editing along the *XY* plane), press *TAB* to cycle to the second direction.

You can also lock the movement of the block attribute along a specific direction. If you enter a value for either dimension direction in the current edit mode, and then press *TAB*, the movement of the block attribute is constrained to the second dimension direction. When editing along the *XY* plane, for example, you can enter a value for *X* dimension, and then press *TAB*. The *X* dimension is locked at that value, and movement of the block attribute is constrained to the *Y* dimension direction.

4 To change the rotation of an attribute relative to the multi-view block, select the Rotation grip, rotate the block attribute to the desired angle and click once, or enter a value and press *ENTER*.

5 To exit the attribute editing mode, right-click, and click Exit Edit Attribute Orientations.

Alternatively, you can deselect the multi-view block.

Updating Multi-View Block Attributes

Use this procedure to update the attributes of blocks in your drawing, using the current attributes defined for the view blocks upon which each multi-view block is based. You need to do this if you change attribute definitions in one or more of the block definitions on which the multi-view block is based.

1. Select the multi-view block.
2. Click Multi-View Block tab ➤ Modify panel ➤ Update .
3. Enter **y** (Yes) to include text style properties (for example, width factor, oblique, mirroring) when updating attributes, or **n** (No) to update all attributes properties except those relating to text style.
4. Press *ENTER* to end the update process.

Documentation

Spaces

38

Spaces are 2-dimensional or 3-dimensional style-based architectural objects that contain spatial information about a building, including floor area, wall area, volume, surface information, and more. Spaces can be used for organizing reports such as statements of probable construction cost, energy requirements and analysis, leasing documents, operating costs and fixtures, and lists of furniture and equipment.

Space Types

The following types of spaces can be modeled in AutoCAD Architecture:

Associative and Non-Associative Spaces

Associative spaces are generated from boundary objects. When the boundary objects change, the space updates accordingly.

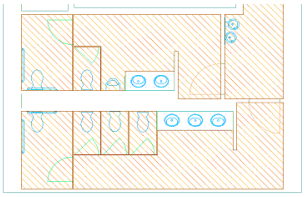
In addition to associative spaces you can also create non-associative spaces with user-defined geometry. A non-associative space can stand alone in the drawing, but you can use it to generate calculations just like you would use an associative space.

Non-associative spaces can be connected to boundary objects after their creation; similarly, associative spaces can be disconnected from their boundary objects.

2D Spaces

2D spaces display spatial information in 2 plan dimensions.

2D spaces in Plan view

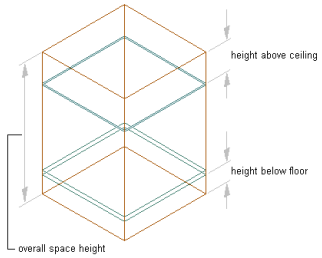


The Z direction is by default set to 0 and ignored during creating, editing, and scheduling the space. 2D spaces can be rectangular or polygonal. 2D spaces can either be non-associative or associative. A 2D space can be bounded by 3D objects and linework. 2D spaces are typically used for Plan views, where 3D information is not needed.

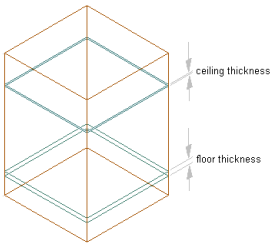
Extruded 3D Spaces

An extruded 3D space is similar to a 2D space, but has a user-defined extrusion height. Extruded spaces are useful for regularly shaped 3D spaces like uniform-height rooms in a building. Extruded spaces can have floor and ceiling components and space above the ceiling and below the floor. The space above the ceiling is often used to place ductwork, cables and electrical installations in a room.

Space height components

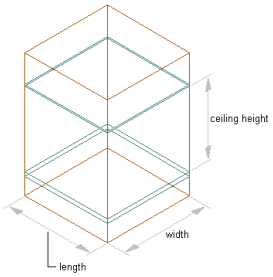


Space ceiling and floor components



Extruded 3D spaces can be associative to 3D objects and linework, but they are bounded only in the X and Y directions. The Z direction is defined by the extrusion height. If you need a space that is fully bounded by objects in all 3 spatial dimensions, you need to generate a 3D freeform space.

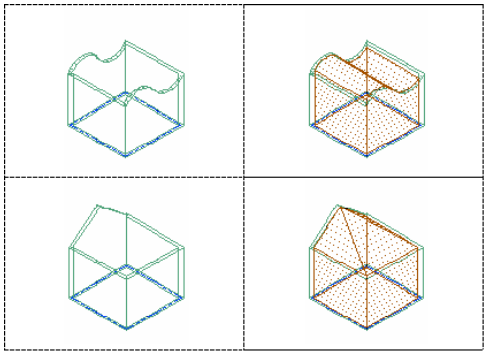
Additional space dimension components



3D Freeform Spaces

3D freeform spaces are generated from boundary objects, like walls and slabs, and are associative to them. Associative 3D freeform spaces must be bounded in all directions to form a valid boundary shape. A 3D freeform space is a complex 3D geometry with any number of surfaces needed to generate the space shape.

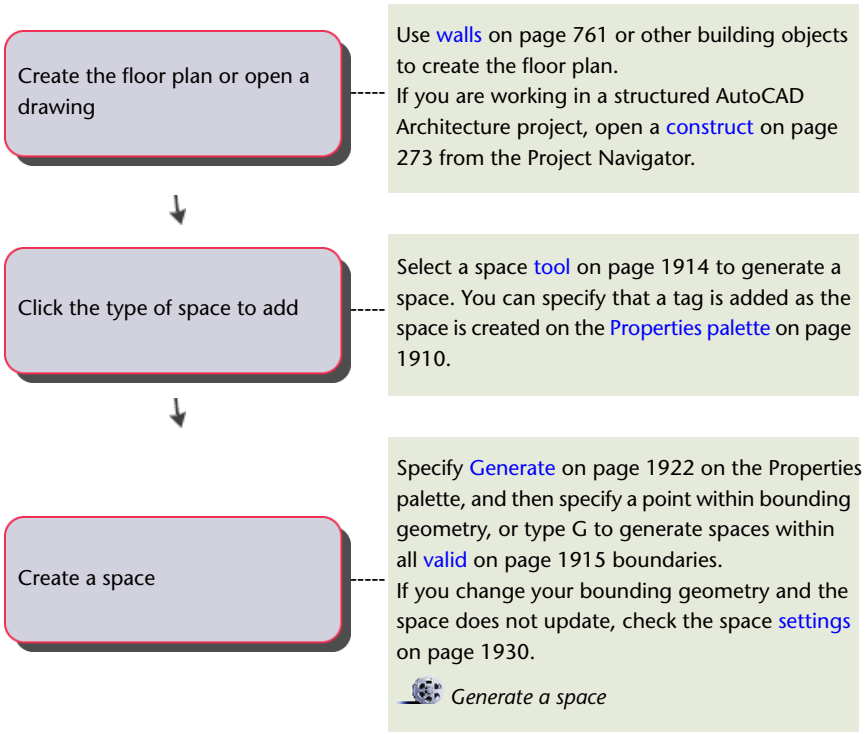
Some examples for 3D freeform spaces



Workflows for Spaces

Workflow for Generating Associative Spaces

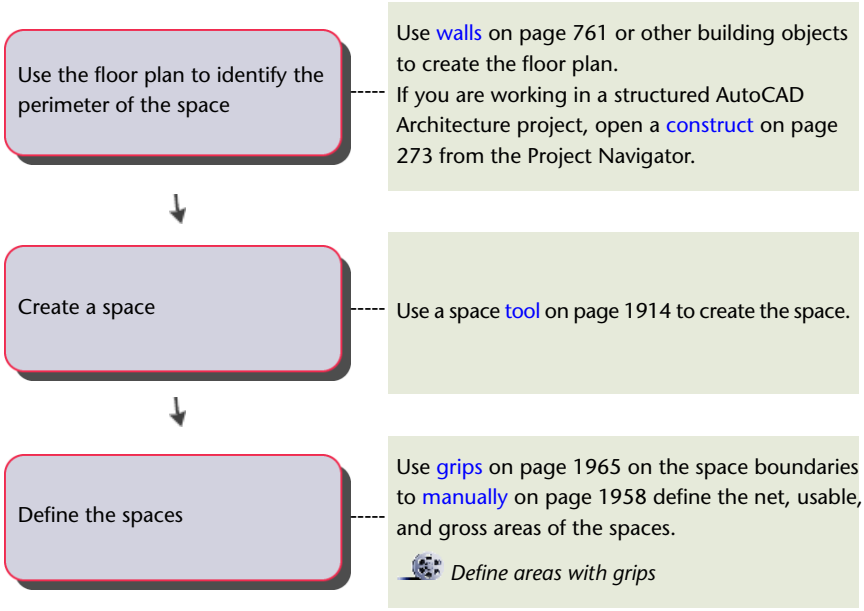
Associative spaces are generated from building geometry in the drawing and are updated if it changes. Updates can be triggered automatically or manually.



Workflow for Manually Defining Net, Usable, and Gross Areas

Spaces can have separate boundaries for the base area, net area, usable area, and gross area of the space. These can be defined manually.

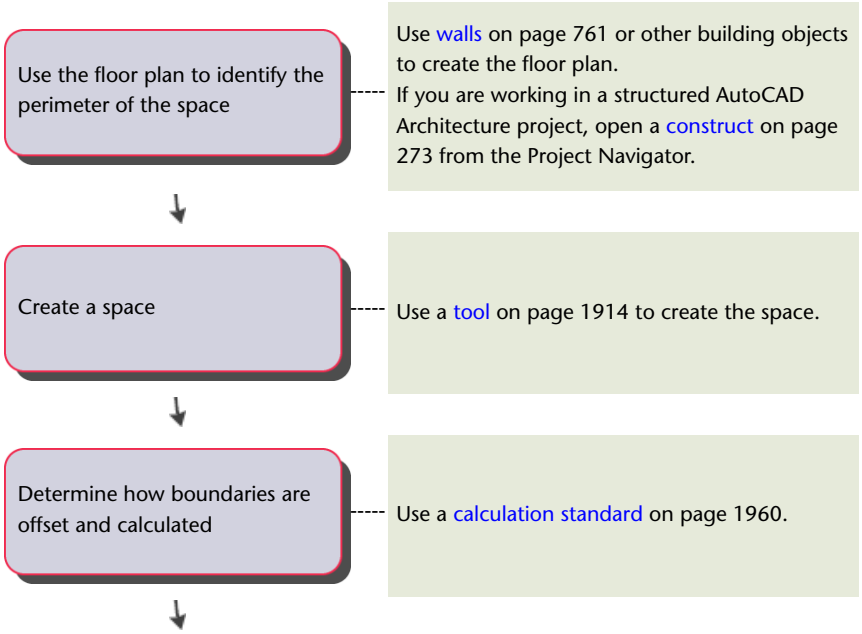
If you want to use a predefined area calculation standard, see Workflow for Determining Net, Usable, and Gross Areas With a Calculation Standard on page 1902.



Workflow for Determining Net, Usable, and Gross Areas With a Calculation Standard

Spaces can have separate boundaries for the base area, net area, usable area, and gross area of the space. AutoCAD Architecture includes standards based on the rules of DIN 277 (Germany), BOMA (United States), and SIS (Sweden).

If you want to define these manually, see Workflow for Manually Defining Net, Usable, and Gross Areas on page 1901.



Connect the building standard with a drawing	Classify on page 1961 spaces if required by the selected area calculation standard.

Workflow for Creating a Space Evaluation Report

After creating spaces and zones in your floor plan, you can generate a space evaluation report.

Create the space or zone needed for the evaluation	Generate the spaces and zones you need for the space evaluation with a tool on page 1914.
Apply a formula to modify an area or a perimeter value	Attach calculation modifiers on page 2065 as necessary.
Identify the type of file in which to display the evaluation	Specify on page 2074 how the space evaluation information displays.
Create the evaluation	Generate on page 2079 the evaluation file either as Microsoft® Excel spreadsheet or a text (TXT) document. *Create an evaluation*

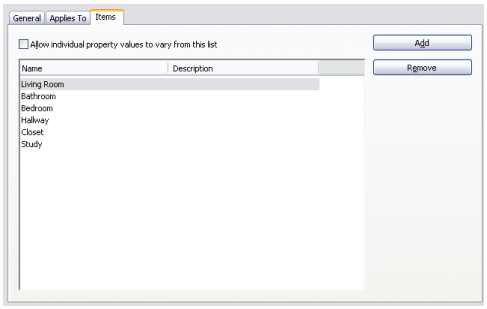
Adjusting Space Calculations

Spaces are a powerful tool to create any type of room-based object, schedule it and create calculations for it. The following sections outline some main features associated with spaces in AutoCAD Architecture.

Working with List Definitions - Overview

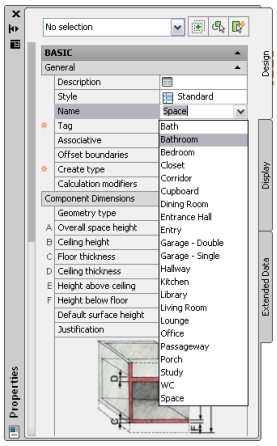
List definitions are named lists for spaces and zones. You can attach a list definition to a space style or to a zone style to ensure that all spaces or zones inserted with that style use names from the list. List definitions can be created for a number of purposes, for example to enforce consistent naming of spaces according to a building standard.

1 Create a list definition in Style Manager, as described in List Definitions on page 2030.



2 Attach the list definition to a space or zone style, as described in Attaching a List Definition to a Space Style on page 2021 and Attaching a List Definition to a Zone Style on page 2050.

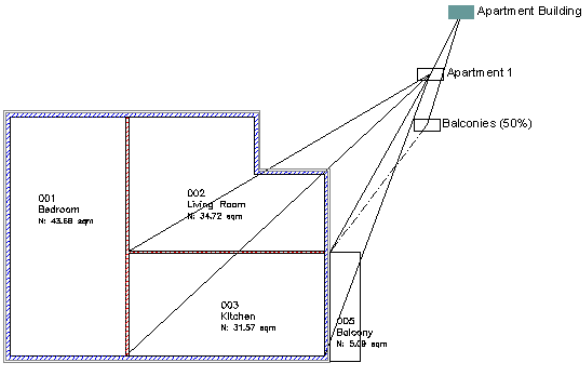
3 Add a space or zone to the drawing, and select a name from the list.



Working with Zones - Overview

Zones are objects that can be used to group spaces. Zones can have spaces attached to them and can contain other zones in an hierarchical structure. For example, you can create a zone called Office Building with sub-zones for the individual offices in the building. Each workplace within an office can be represented by a space.

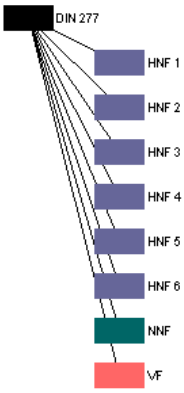
Zones in a building



1 Create a zone style in Style Manager, as described in Creating a Zone Style on page 2050.

2 If you have a zone structure that you want to use again because it represents a standard, create a zone template, as described in Creating a Zone Template on page 2057.

Zones based on DIN277 template

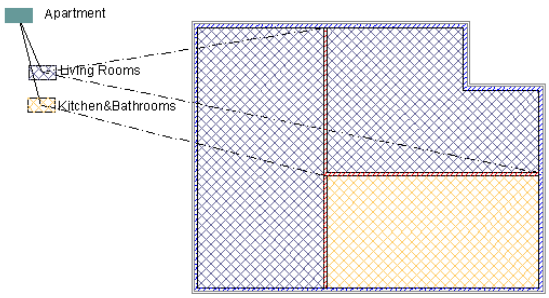


3 Add a zone or zone template to the drawing.

4 If necessary, attach calculation modifiers to the zone. A calculation modifier attached to a zone is used for all spaces and zones attached to the zone.

5 Attach spaces or other zones to the zone, as described in Attaching Spaces and Zones to Zones on page 2041.

Zone with attached subzones and spaces

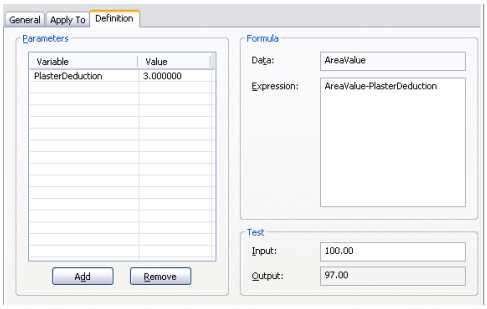


Working with Calculation Modifiers - Overview

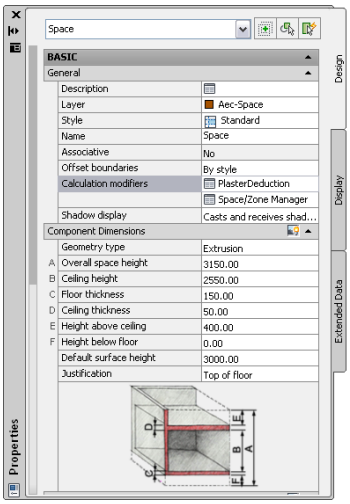
A calculation modifier is a value or formula you can add to the area and perimeter values of each boundary of a space to modify values for certain calculations. For example, you can specify a 3% plaster deduction for all interior walls, or calculate a balcony at only 50% of its square meters for renting.

1 In Style Manager, create a new calculation modifier style, as described in Creating a Calculation Modifier Style on page 2066.

2 Define a formula with which to calculate the value of the base area or base perimeter of the space.



3 Add the calculation modifier to a space or to a zone, as described in Adding and Removing Calculation Modifiers for Spaces on page 2065 and Changing Calculation Modifiers for a Zone on page 2045.

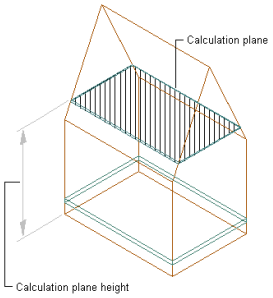


4 To apply the modifier to the net, usable, and gross boundaries of a space, create and apply a property set definition that contains properties for the calculated area and perimeter values of the net, usable and gross boundaries. For more information, see Property Set Definitions on page 2510.

5 Use the modified values in a schedule table or in a space evaluation. For more information, see Basic Schedules on page 2461 and Space Evaluation on page 2073.

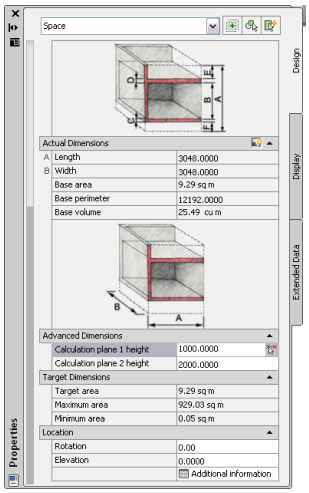
Working with Calculation Cut Planes - Overview

If you are working with 3D freeform spaces, you can calculate their area at 2 different cut plane heights. This is useful for attics, where different heights are calculated differently.



1 Create a 3D freeform space, as described in Generating an Associative Space on page 1922 or Converting Mass Elements to Spaces on page 1945.

2 Define the calculation cut planes of the space, as described in Setting Calculation Cut Planes for 3D Freeform Spaces on page 2069.



3 Define the display properties for the 2 calculation cut planes and the cut plane hatches, as described in Specifying the Display Properties of a Space Style on page 2024.

4 Generate and apply a property set definition with automatic properties for calculation cut planes. Then create a schedule table with the calculated cut plane values. For more information, see Basic Schedules on page 2461.

Moving Forward to AutoCAD Architecture 2010 from Autodesk Architectural Desktop 2006 and Earlier

If you are transitioning from Autodesk Architectural Desktop 2006 or earlier to AutoCAD Architecture, you will see a number of changes in the space planning features. In AutoCAD Architecture, spaces, areas, and space boundaries have been unified into one space object which contains the properties formerly associated with these other objects, as well as new and enhanced features designed to provide a comprehensive solution for spatial design within the building model.

The table below maps objects from earlier releases to their newer counterparts.

Prior Releases	AutoCAD Architecture 2010
Spaces	Spaces
Space boundaries	Spaces

Prior Releases	AutoCAD Architecture 2010
Areas	Spaces
Area groups	Zones
Area name definitions	List definitions
Area group templates	Zone templates
Area evaluation	Space evaluation

Spaces

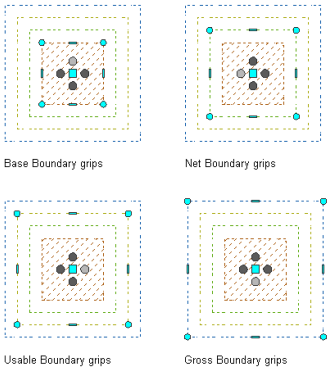
Spaces now contain the properties associated with spaces and areas prior to AutoCAD Architecture 2010, as well as engineering properties for working in AutoCAD MEP. Spaces can be associatively generated as 3D freeform objects, as extruded 3D spaces, or as 2D spaces. A space can have different boundaries for base area, net area, usable area, and gross area. Spaces can be grouped into zones and processed in space evaluations.

Space Boundaries

Space boundaries are now part of the space object, and not separate objects as they were prior to AutoCAD Architecture 2010. A space has a base boundary, net boundary, usable boundary, and a gross boundary. Space boundaries created in previous versions will be converted to walls when the drawing that contains them is opened in the current version of the software. Managed spaces will be converted to associative spaces. Space boundaries include a number of scheduling properties.

For information about converting space boundaries to walls and spaces, see Conversion of Space Boundaries to Walls and Spaces on page 2087.

Space boundaries



Areas

Areas have been integrated into spaces, which now include the properties formerly specific to areas. Among the area-specific features are the decomposition view, name definitions, calculation modifiers, and space evaluation. When you open a drawing that contains areas, the areas are automatically converted to spaces, with all area properties being converted to the corresponding space properties. For new properties, default values are used. Area tools are no longer needed and are omitted.

For information about converting areas to spaces, see Auto-Converting Legacy Areas to Spaces on page 1909.

Area Groups and Zones

Area groups have been converted to zones. When you open a drawing that contains area groups, the area groups are automatically converted to zones, with all area group properties being converted to the

corresponding zone properties. For new properties, default values are used. Area group tools are no longer needed and are omitted.

Zones are a new object and serve as a grouping mechanism for spaces. Zones can be created to group spaces according to function, location, or any user-defined system. You can attach specific calculation modifiers and schedule properties to a zone. You can also build hierarchical zone structures that represent the structure of your building, a space categorization standard, or any user-defined grouping structure.

For information about converting area groups to zones, see Converting Area Groups to Zones on page 2040.

Area Name Definitions and List Definitions

Area name definitions have been converted to list definitions. A list definition is a list of names that can be assigned to a space or zone style to ensure consistent naming of spaces and zones across a project. For example, a list definition could contain entries for bedroom, living room, bathroom, and so on. When you open a drawing that contains area name definitions associated with an area or area group, the area name definition is automatically converted to a list definition. You can assign the list definition to the converted space or zone through its style.

Area Group Templates and Zone Templates

Area group templates have been converted to zone templates, which provide structure definitions for zone hierarchies. You define a zone template with a set of subzones and content restrictions, and use it to create the zone structure in the drawing. When you open a drawing that contains area group templates, the area group templates are automatically converted to zone templates.

Area Evaluation and Space Evaluation

The area evaluation feature has been converted to the space evaluation feature. Space evaluation is a documentation feature that calculates the area and perimeter information for your finished floor plan. This information is displayed in a separate file that you export from AutoCAD Architecture to a spreadsheet or text processing application. Evaluation templates ensure that the information is displayed in a consistent, structured way. Architects need the space evaluation feature for submitting floor plans to the building authorities and customers. Space evaluation can also be used for performing cost estimates, assigning jobs to contractors, or organizing the facility management of buildings.

Auto-Converting Legacy Areas to Spaces

If you have legacy drawings created in previous versions, and they contain area objects, these areas will automatically be converted to spaces when you open the drawing with the current software. The following table maps area properties to space properties.

Area property	Space property	Value/Default value
Name	Name	Existing value
Description	Description	Existing value
Layer	Layer	Existing layer (A-Area-G)
Style	Style	Area style is converted to space style. Properties are matched where possible; new properties have default values. For more information, see Converting Area Styles to Space Styles on page 2028.

Area property	Space property	Value/Default value
Calculation modifiers	Calculation modifiers	Existing modifiers **NOTE** By default, converted calculation modifiers are applied only to the base area and base perimeter of the space.
N/A	Geometry	2D
Base Area	Base Area	Existing value
Calculated Area	Calculated Area	Existing value
Base Perimeter	Base Perimeter	Existing value
Calculated Perimeter	Calculated perimeter	Existing value
Rotation	Rotation	Existing value
Elevation	Elevation	Existing value
Additional Information (Location)	Additional Information (Location)	Existing values
N/A	Length	Existing value
N/A	Width	Existing value

NOTE Subtracted areas and hatches will be ignored when converting a legacy area from Autodesk Architectural Desktop 2006 or earlier to a space in AutoCAD Architecture. If necessary, you can re-subtract any void portions, as described in Creating Holes in Extruded 3D Spaces on page 1982.

If the legacy area has no override for display properties at the style level, then one will be created on the migrated space to mimic the drawing default display properties of the legacy areas. This is intended to preserve visual fidelity for legacy areas that do not have display property overrides. Existing style or object display property overrides on legacy areas will carry forward to the migrated spaces.

Previous versions of the software allowed users to create areas that self-intersect. Spaces cannot self-intersect. During migration, a self-intersecting area is converted into a self-intersecting space, and a solution tip displays, advising you to grip-edit the base boundary to remove the self-intersection. For more information on grip-editing, see Grip-Editing Space Boundaries on page 1965.

Space Properties

The properties of space objects are illustrated and described below. Note that some properties are limited to specific space types. For example, a 2D space does not have any height properties.

Property	Space Type	Description
General Category		
Description	All	User-defined description of the space.
Layer	All	Specifies the layer on which the space is placed. By default the layer assignment is defined in the space style.

Property	Space Type	Description
Style	All	Specifies the space style. The style defined in the space tool is the default.
Name	All	The name of the space. If a list definition has been specified in the space style, the defined list of names is available as a drop-down list. For more information, see Attaching a List Definition to a Space Style on page 2021.
Tag	All (only available during space add and in tool properties)	Specifies a space tag to be inserted when adding the space. Space tags are available in the sample drawings shipped with the software. You can also create your own space tags.
Associative	All	Indicates whether the space is associative. The geometry of an associative space is dependent on its boundary objects. You can disconnect the associativity of a space after adding it. **NOTE** If you insert a non-associative space, the Associative field reads No and is read-only. To change the space associativity, see Making a Space Associative or Non-Associative on page 1936.
Offset Boundaries	All	Specifies the calculation type by which the 4 space boundaries (base boundary, net boundary, usable boundary, and gross boundary) are calculated. ■ Manual: you use the grips on the individual boundaries to generate offsets between the individual boundaries. ■ By Style: you define the boundaries by defining offsets between them in the space style. ■ By Standard <Standard Name>: the space boundaries and their offsets from each other are determined by the area calculation standard listed. For more information, see Specifying an Area Calculation Standard for a Drawing on page 1960.
Calculation Modifiers	All	Identifies any calculation modifiers for the space. A calculation modifier is a formula that modifies area and perimeter values of the boundaries of the space. **NOTE** To apply the modifier to the net, usable, and gross boundaries of a space, you need to create and apply a property set definition that contains properties for the calculated area and perimeter values for those 3 boundaries. For more information, see Schedule Properties of Spaces on page 2061.
Space/Zone Manager	All	Accesses the Space/Zone Manager worksheet, in which you enter information used to process spaces in engineering applications. For more information, see Editing Space Surface Properties on page 1996.
Create Type	Non-Associative Spaces (only available during adding a space and in tool properties)	Specifies the type of space to be created: ■ Insert: inserts a space according to the target dimension settings in the space style. For information on setting target dimensions of a space in the space style, see Specifying Target Dimensions for the Space on page 2020.

Property	Space Type	Description
		■ Rectangle: lets you create a rectangular space with user-defined dimensions. ■ Polygon: lets you create a space composed of user-defined line and arc segments. ■ Generate: lets you generate a space from boundary objects. The space is associative to the boundary objects.
Segment type	Non-associative polygonal spaces (only available during adding a space and in tool properties)	Specifies whether the individual segments of a polygonal space are lines or arcs.
Generate Space Category	Associative spaces (only available during adding a space and in tool properties)	
Allow overlapping spaces		Specifies whether you can generate spaces from boundary objects that already contain a space. By default, this setting is set to No.
Component Dimensions Category		
Geometry Type	All	Specifies the geometry type of the space to be created: ■ 2D: creates a 2D space. ■ Extrusion: creates a 3D space with a height extruded from the 2D geometry. Extruded 3D spaces have floor and ceiling components and can have room above the ceiling and below the floor. ■ Freeform: creates a 3D freeform space. A 3D freeform space can be generated from boundary objects or be converted from a mass element shape.
Overall Space Height	3D spaces	Specifies the overall height of the space, including floor to ceiling height, floor thickness, ceiling thickness, space above ceiling, and space below floor. **NOTE** This value is read-only for 3D freeform spaces.
Ceiling height	3D spaces	Specifies the ceiling height of the space. **NOTE** This height is calculated from the top of the floor to the bottom of the ceiling. You can define additional floor and ceiling thickness.
Floor thickness	3D spaces	Specifies the thickness of the floor. If the floor thickness is set to 0, no floor is displayed.

Property	Space Type	Description
Ceiling thickness	3D spaces	Specifies the thickness of the ceiling. If the ceiling thickness is set to 0, no ceiling is displayed.
Height above ceiling	3D spaces	Specifies the distance between the top of the space ceiling to the top of the space.
Height below floor	3D spaces	Specifies the distance between the bottom of the space floor and the bottom of the space.
Default surface height	3D spaces	Specifies the combined height of ceiling height, ceiling thickness, and height above ceiling.
Justification	Extruded 3D spaces	Specifies the relative vertical position of the space insertion point on the space as one of the following: ■ Top of floor ■ Bottom of floor ■ Bottom of space below floor (available only if the height of the space below the floor is greater than 0.) 3D freeform spaces are always justified to the top of floor.
Actual Dimensions Category		
Length	All	Specifies the length of the space.
Width	All	Specifies the width of the space.
Base area	All	Displays the base area of the space. When inserting a space based on target dimensions, you can enter a base area value if you have not chosen to constrain the area.
Base Perimeter	All	Displays the base perimeter of the space.
Base Volume	3D spaces	Displays the base volume of the space.
Advanced Dimensions		
Calculation Plane 1 + 2 Height	3D freeform spaces	Specifies the height for calculating the areas of a 3D freeform space on 2 different calculation planes. This would be useful to calculate the rentable area of a room directly under the roof at 2 different room heights.
Target Dimensions		
Target area	Non-associative spaces based on target dimensions	Displays the target area defined in the space style.
Maximum area	Non-associative spaces based on target dimensions	Displays the maximum area defined in the space style.

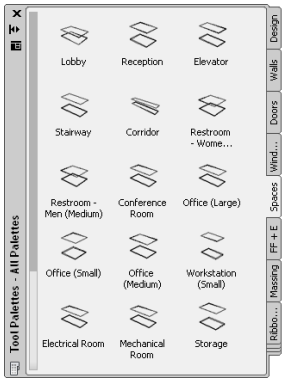
Property	Space Type	Description
Minimum area	Non-associative spaces based on target dimensions	Displays the minimum area defined in the space style.
Location		
Rotation	Non-associative spaces	Specifies the rotation of the space.
Elevation	Non-associative spaces	Specifies the elevation of the space.
Additional Information	Non-associative spaces	Specifies the location and coordinate system of the space.

In addition to these object properties there are a number of schedule properties that can be attached and calculated for a space. For a full list, see Schedule Properties of Spaces on page 2061.

Using Space Tools to Create Spaces

Tools provided with AutoCAD Architecture let you quickly place spaces by selecting a space tool with a specific space style and other predefined properties. You can use the tool with its default settings, or you can change any properties that are not controlled by the style. You can also use space tools to create new spaces by applying tool properties to existing objects.

Tool palette containing space tools



The default tool palettes in the workspace contain space tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain space tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog
- Design Tool catalog

For more information on accessing tools in these catalogs, see Content Browser on page 97.

Custom palettes created by your CAD manager or other users may also contain space tools with space styles and properties that are customized for your projects or office standards.

Generating Associative Spaces

Associative spaces are bounded by objects that define the space area. If the boundary objects change, the space inside them is updated, too. You will typically work with associative spaces when entering the documentation phase of the project.

Geometry Types of Associative Spaces

Associative spaces can be 2D spaces, extruded 3D spaces, or 3D freeform spaces. An associative 2D or extruded 3D space is associative only to the objects in the X and Y direction of the floor plan. The height is either 0 or a user-defined extrusion height. A 3D freeform space is associative to the objects bounding it in all 3 spatial dimensions.

Spaces can be associative to many 3D and linework objects. For a listing of valid boundary objects, see Valid Boundary Objects for Associative Spaces on page 1915.

External References

A space can be associative to boundary objects in external references. If the boundary objects in the external reference change, the space in the host drawing changes, too. However, spaces that have been generated in an external reference do not interact with boundary objects in the host drawing.

Boundary Objects for Associative Spaces

Associative spaces are bounded by objects. An object must fulfill a number of conditions to bound a space:

- The object must be a valid boundary object for associative spaces. For a complete list, see Valid Boundary Objects for Associative Spaces on page 1915.
- The Bound Spaces property of the object must be set to Yes. For more information, see Setting the Bound Spaces Property for Boundary Objects on page 1919.

Valid Boundary Objects for Associative Spaces

The following table lists all objects that are valid as boundary objects for associative spaces. There are different valid boundary objects for 2D/extruded 3D spaces and 3D freeform spaces. 3D freeform spaces must be bounded by objects that have a 3D geometry; 2D and extruded 3D spaces can be bounded by 2D linework, too.

All valid boundary objects must have their Bound Spaces property set to Yes in order for associative spaces to be generated from them. The Bound Spaces property for an object is located on the Properties palette. For objects that use styles, the Bound Spaces property can also be set in the style. The default value of the setting varies depending on the object type. Objects like walls and curtain walls ave a default Bound Spaces value of Yes. Others, like structural members or linework have a default Bound Spaces value of No. Change the Bound Spaces properties of objects as needed to generate your spaces (as described in Setting the Bound Spaces Property for Boundary Objects on page 1919).

IMPORTANT Objects that are set as boundary objects for associative spaces and then are placed on a frozen or hidden layer still participate in the generation of associative spaces. It is possible to generate spaces from invisible boundary objects. If this is the case, review your layer settings, and unhide or unfreeze those layers as necessary.

The following table lists all valid boundary objects for both 2D/Extruded 3D spaces and 3D freeform spaces, as well as the default value of their Bound Spaces property when inserted in a drawing:

Object	Boundary object for 3D freeform spaces	Boundary object for 2D/Extruded 3D spaces	Default Bound Spaces value
Wall	Yes The 3D freeform space is generated at the near face of the wall body (at base curve) **NOTE** If a modifier creates a hole or gap through the wall, then the gap might be ignored in the space generation if the maximum gap size value (see Defining a Maximum Gap Size for Associative Spaces on page 1928) is greater than the width of the hole. Plan modifiers, body modifiers, interferences, sweeps, end caps, and opening end caps are included in the geometry of the generated space.	Yes	Yes (by Style)
Curtain wall/Curtain wall unit	Yes The 3D freeform space is generated at the curtain wall body. Interferences, roof line, floor line, and frame profiles are included in the geometry of the generated space. **NOTE** Empty cells or holes created by a curtain wall modifier do not impact the space generation. They are ignored and the space is generated as if the curtain wall was closed.	Yes	Yes (by Style)
Door and window assembly	Yes The 3D freeform space is generated at the near face of the frame (at base curve). Interferences and frame profiles are included in the geometry of the generated space boundary. **NOTE** Empty cells or holes created by a door and window assembly modifier do not impact the space generation. They are ignored and the space is generated as if the assembly was closed.	Yes	Yes (by Style)
Door/Window/Opening	Yes **NOTE** If a door, window, or opening is anchored in a wall, the Bound Spaces setting of the wall is used for the opening, too. The opening shape also defines openings in generated freeform space surfaces.	Yes	Door/Window: Yes (by Style) Opening: Yes
Mass element	Yes The 3D freeform space is generated on the near face of the mass element body.	Yes The 2D/Extruded 3D space is generated at the near face of the mass element body at the mass element bottom.	No (by Style)
Roof	Yes The 3D freeform space is generated at the near face of the roof body.	No	Yes

Object	Boundary object for 3D freeform spaces	Boundary object for 2D/Extruded 3D spaces	Default Bound Spaces value
Roof slab	Yes The 3D freeform space is generated at the near face of the roof slab body (at cut plane). Body modifiers, fascia, and soffit bodies are included in the geometry of the generated space boundary. **NOTE** Interferences and holes in the roof slab will be ignored when the space is generated.	No	Yes (by Style)
Slab	Yes The 3D freeform space is generated at the near face of the slab body (at cut plane). Body modifiers, fascia, and soffit bodies are included in the geometry of the generated space boundary. **NOTE** Interferences and holes in the slab will be ignored when the space is generated.	No	Yes (by Style)
Structural member	Yes The freeform space is generated at the near face of the member body (at base curve). Holes or gaps in the structural member are ignored when the placement of the space boundary is determined.	Yes	No (by Style)
Multi-view block	Yes In order to bound 3D freeform spaces, a multi-view block must contain objects that have a 3D geometry and are valid boundary objects for spaces. The geometry stored in the model view block is used to generate the space. The space is generated from the model geometry (at bottom).	Yes	No (by Style)
Custom display blocks	Yes	No	Yes (by Style)
Block	Yes In order to bound 3D freeform spaces, a block must contain objects that have a 3D geometry and are valid boundary objects for spaces.	Yes	Dependent on the objects contained in the block
External Reference	Yes In order to bound 3D freeform spaces, an external reference must contain objects that have a 3D geometry and are valid boundary objects for spaces.	Yes	Yes
Line	No	Yes	No
Circle	No	Yes	No
Polyline	No	Yes	No
3D Polyline	No	Yes	No

Object	Boundary object for 3D freeform spaces	Boundary object for 2D/Extruded 3D spaces	Default Bound Spaces value
Ellipse	No	Yes	No
Spline	No	Yes	No
Arc	No	Yes	No

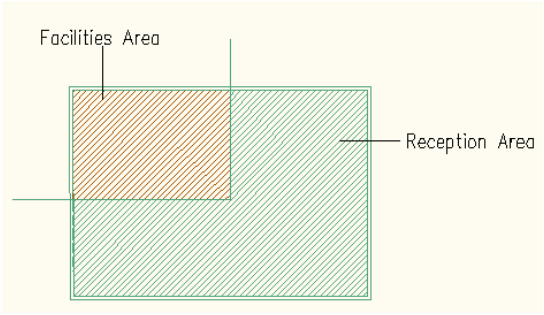
TIP AutoCAD 3D solids are not valid boundary objects for spaces. In order to use a 3D solid to generate a space, use one of the following methods:

- Convert the 3D solid to a mass element, as described in Creating a Mass Element from a 3D Solid on page 669, and use the mass element to generate the space.
- Wrap a polyline around the solid and use the polyline to generate the space.

The Space Separator Tool

In addition to the regular objects that can be used as boundary objects for spaces, you can also use a space separator tool that lets you separate spaces when no real object is there to separate them. This could be the case when you have different functional areas within the same room.

Using the room separator tool to create two different spaces in one room



1 Select the Space Separator tool on the Spaces tool palette.

If your tool palette layout does not contain the Spaces palette, open Content Browser (Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser) and search for "Space Separator".

NOTE Alternatively you can select the space to be divided and click Space tab ➤ Modify panel ➤ Divide Space.

2 Specify the separating line on screen.

TIP The space separator uses a polyline to generate the separating line, so that you can create a multi-segment separator line.

3 Press Enter to finish the separator line.

4 To remove the separator line, you can either delete it from the drawing, or select it, and set its Bound Spaces property on the Properties palette to No.

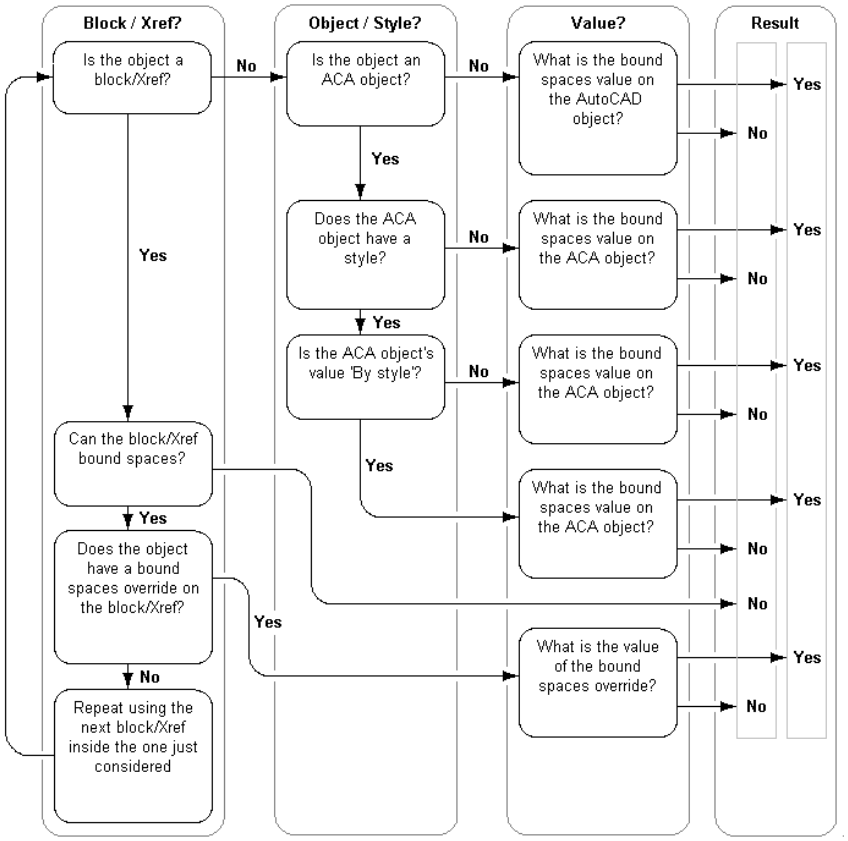
Setting the Bound Spaces Property for Boundary Objects

The objects designed to form the boundary of an associative space must have their Bound Spaces property set to Yes before generating the space. You can set the Bound Spaces property on the object, or, for objects that use styles, you can set it in the object style.

TIP Before setting the Bound Spaces property of a boundary object to Yes, verify that this type of object is a valid boundary object for the space you want to generate. For example, a roof or roof slab is a valid boundary object only for 3D freeform spaces; you cannot use it to generate an extruded 3D space or a 2D space, even if the slab's Bound Spaces property is set to Yes.

The following overview graphic shows how the setting of the Bound Spaces property on the boundary object affects the generation of associative spaces. For detailed information on how to set the Bound Spaces property for a boundary object, consult the sections following below.

Note that the term "AutoCAD object" in the graphic below refers to AutoCAD linework (lines, arcs, circles, and polylines etc.)



Migrating Profiles from Previous Versions of the Software

Beginning with AutoCAD Architecture 2009, the mechanism by which objects are defined as boundary objects for spaces has changed. In previous versions, objects were selected by applying an object filter during the space generation. In AutoCAD Architecture 2010, each object has its own Bound Spaces property on the Properties palette or in the object style and is there defined as a boundary object.

When you import a profile (ARG file) from a previous release, the Bound spaces property in the Properties palette is not displayed for AutoCAD linework (lines, arcs, circles, polylines) in the imported profile. In order to display that property for AutoCAD linework, run the **AecSpaceDisplayBoundSpacesProperty** command

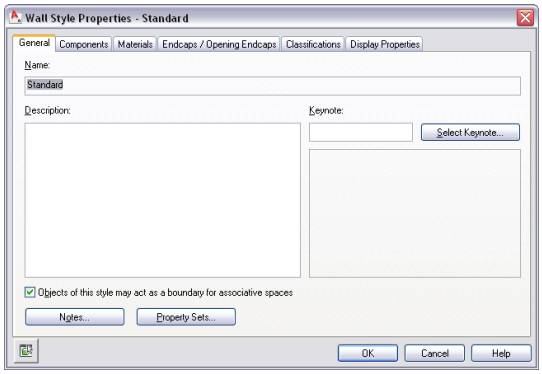
on the command line. This will enable the display of the Bound Spaces property for AutoCAD linework in the Properties palette.

Setting the Bound Spaces Property in the Object Style

Use this procedure to set the Bound Spaces property of objects designed to bound associative spaces in the object style. You can use this method for all boundary objects that use styles. When an object style is set to bound spaces, all objects of that style will bound associative spaces. You can however override the Bound Spaces property for an individual object of that style in the Properties palette.

For example, if walls of a specific style - such as toilet stall walls or half-height kitchen counter walls - should normally not be used as boundary objects, you can set the Bound Spaces property of the wall style to No, so that any walls of that style are ignored when you generate a space.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects.
3. Expand the desired object category, and select the style for which you want to set the Bound Spaces property.
4. Click the General tab.
5. Select the check box for Objects of this style may act as a boundary for associative spaces.



6. Click OK.

Setting the Bound Spaces Property in the Properties Palette

Use this procedure to set the Bound Spaces property of objects designed to bound associative spaces in the Properties palette. You can use this method for all boundary objects, regardless of whether they use styles. If you set a different value for the Bound Spaces property in the Properties palette than in the object style, the settings from the Properties palette override the settings from the style.

TIP If you want to define walls that do not act as boundary objects for spaces you must place these walls in a different cleanup group than those walls that do act as space boundaries. Otherwise the cleanup will result in unexpected results.

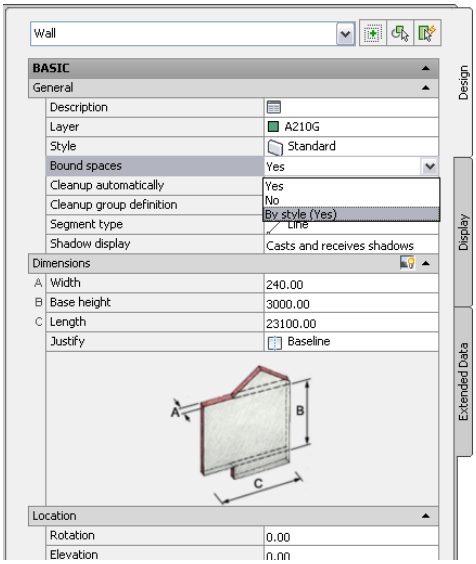
1. Select the object for which you want to set the Bound Spaces property, and double-click.
2. In the Properties palette, display the Bound Spaces setting in one the following locations:

Object Type	Location of Bound Spaces property
Architectural objects:	Expand the General category.
Linework objects:	Expand the Advanced category.

NOTE The Bound Spaces property will not be displayed when opening the drawing in an AutoCAD Architecture Object Enabler environment such as AutoCAD, Civil 3D, or Land Desktop, or when you run AutoCAD Architecture as AutoCAD. It will only be displayed in full installations of AutoCAD Architecture or AutoCAD MEP.

3 For Bound Spaces, select one of the following options:

- By Style (Yes/No): This object uses the Bound Spaces setting defined in the object's style. This is the default setting for objects that have styles.
- Yes: this object can bound associative spaces.
- No: this object cannot bound associative spaces.

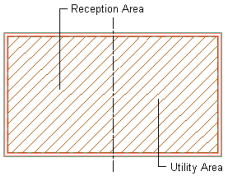


Displaying all Boundary Objects in the Drawing Area

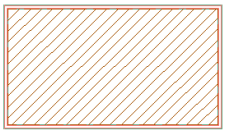
In large drawings it can sometimes be difficult to determine which objects can act as boundary objects for spaces. If you are trying to generate associative spaces, and you get unexpected results or error messages, this is frequently due to wrong boundary objects. Click Home tab ➤ Inquiry panel ➤ ➤ Show Space Boundaries to display only the objects in the drawing area that are currently defined as boundary objects. If one of the objects you need for a space boundary is not displayed, the object is either not a valid boundary object or its Bound Spaces property has been set to No.

You can use objects on frozen, hidden, and locked layers as boundary objects for associative spaces. When you choose to display all boundary objects in the drawing area, frozen and hidden objects are displayed, too. When you end the boundary objects-only view mode, these objects will be hidden or frozen again, and not displayed anymore. If you choose to remain in the boundary objects-only view, these objects will remain visible until you return to the normal view.

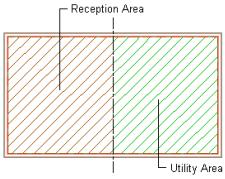
In the following example, you want to generate two spaces from the geometry below, for two different functional areas in a lobby. However, only one space is generated:



To find out if there is a problem with your boundary objects, you display only boundary objects, and get the following result:



From this result, you can deduce that the line that should separate the two functional areas has its Bound Spaces property currently set to No. After you have ended the command to display boundary objects, you can change the property accordingly (Setting the Bound Spaces Property in the Properties Palette on page 1920) in order to get the correct result:



1 Zoom in the drawing area until all desired spaces are visible.

2 Click Home tab ➤ Inquiry panel ➤ ➤ Show Space Boundaries .

3 Select one of the following options:

If you want to	Then
see boundary objects and associative spaces	press ENTER. **NOTE** The view includes boundary objects on frozen, hidden, and locked layers.
see only boundary objects but no associative spaces	enter **S** (hide associative Spaces).
exit the command and restore the original visibility settings	enter **X** (eXit). **NOTE** Any boundary objects on frozen, hidden, and locked layers will not be displayed anymore.

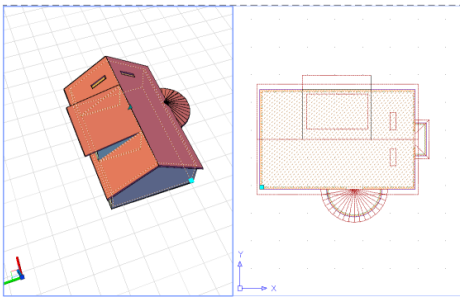
Generating an Associative Space

Use this procedure to generate an associative space. Associative spaces are generated from boundary objects, and are updated when the boundary objects change.

Associative 3D Freeform Spaces

To create an associative 3D freeform space, the space must be fully bounded by objects on all surfaces.

Generating a 3D freeform space



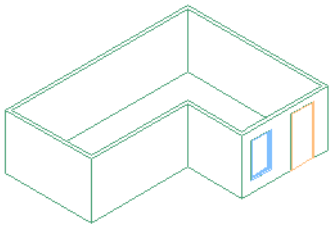
Associative 2D and Extruded 3D Spaces

When you generate an associative 2D or extruded 3D space from boundary objects, the boundary objects determine the extents of the space in the X and Y directions, and the space is associative to these. The Z-direction is either 0 (for a 2D space) or it is a user-defined extrusion height (in extruded 3D spaces).

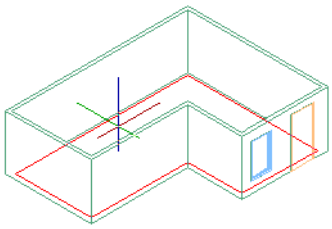
For an associative 2D or extruded 3D space, you can define the gap allowed between colinear boundary objects. This would be useful for example if you have created a plan of a building with lines, and represented doors and windows as gaps between the lines. You can set a gap tolerance for these gaps, and the software will calculate the missing geometry from the existing colinear line segments. (AEC windows, doors, and openings in walls are not considered as gaps.)

NOTE Gaps are allowed only between colinear segments that do not contain other boundary objects, not between objects that are at other angles to each other or between colinear segments when the gap contains other boundary objects.

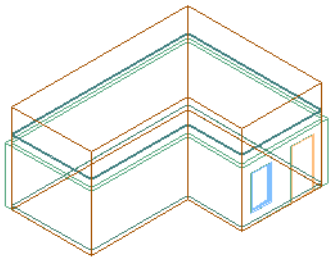
Generating an extruded 3D space from walls



existing walls, door, and window



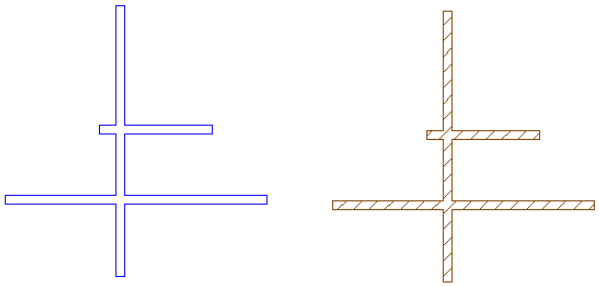
select internal point



result

As a special case, you can generate an associative 2D or extruded 3D space from the outline of an object in a drawing. In this case, the object outline will be used as the boundary of the new space. For example, if you generate spaces from wall outlines, spaces will be generated from the wall outline.

Walls (left) and space generated from wall outlines (right)



IMPORTANT In previous versions of the software, objects that were invisible due to a frozen or hidden layer were never included in the generation or update of associative spaces. Beginning with this version, frozen and hidden objects are included in the space generation and update if they are set as boundary objects.

Generating an associative space

1 Verify that all necessary boundary objects have their Bound Spaces property set to Yes.

TIP Click Home tab ➤ Inquiry panel ➤ ➤ Show Space Boundaries to display all objects that currently have their Bound Spaces property set to Yes (including objects on frozen, hidden, and locked layers.) If the selection does not meet your needs, cancel the space generation, and first change the Bound Spaces property on all necessary objects, as described in Setting the Bound Spaces Property for Boundary Objects on page 1919.

2 Open the tool palette that contains the Space tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Generate Space .

3 For Offset boundaries, select how the 4 space boundaries (base, net, usable, and gross boundary) are calculated. For information about space boundaries, see Working with Space Boundaries on page 1957.

- Manual: The net, usable, and gross boundaries can be manually edited with grips.
- By style: The net, usable, and gross boundaries are offset from the base boundary by a value defined in the space style. For more information, see Specifying Space Boundary Offsets in a Space Style on page 2020.
- By standard <Standard Name>: The net, usable, and gross boundaries are defined by the area calculation standard listed. For more information, see Specifying an Area Calculation Standard for a Drawing on page 1960.

4 On the Properties palette, for Create type, select Generate.

NOTE The Associative property is interlinked with the Create type. If the Create type is Generate, the Associative setting defaults to Yes. If the Create type is Insert, Rectangle, or Polygon, the Associative setting defaults to No and becomes read-only.

5 Select Yes for Allow Overlapping Spaces if you want to be able to generate spaces from boundaries that already contain a space.

This could be useful if you want to generate spaces from an xref drawing that already contains spaces, but you need to generate spaces with different settings (for example, with a different area calculation standard).

6 For Geometry type, select one of the following:

- 2D: generates an associative 2D space.
- Extrusion: generates an associative extruded 3D space. For an extruded 3D space, the height (Z) is defined by the user and is applied uniformly to the space.
- Freeform: generates an associative 3D freeform space.

IMPORTANT For descriptions of other Spaces settings on the Properties palette, see Space Properties on page 1910.

7 Before creating the spaces, you can perform these two optional steps to help with successfully creating spaces:

- Verify that all necessary boundary objects have their Bound Spaces property set to Yes. In order to do this, enter **sh** (SHow Bounding Objects). This option displays all objects that have their Bound Spaces property set to Yes. If an object you need for your space is not displayed, you can cancel the space generation and first change the Bound Spaces property on the object to Yes.
- Verify that all boundary objects are visible in the drawing area. If necessary, zoom in or out to display the desired objects, and then enter **v** (reset Visible boundaries) to update the drawing area.

8 In the drawing, generate the spaces:

If you want to…	Then…
generate a 3D freeform space	Enter **G** (Generate all).
generate a 2D or extruded 3D space	use one of the following options: ■ Enter **G** (Generate all) to generate spaces for all visible boundaries. ■ Pick inside closed boundaries in order to generate spaces for them.

Generating Associative Spaces from Xrefs and Blocks

You can generate associative spaces from objects in xrefs and blocks. The workflow for this has changed between the previous version of AutoCAD Architecture and the current version. The following sections describe the changes, as well as the workflows recommended for using xrefs and blocks for generating spaces.

Automatic Update of Associative Spaces through External References

Associative spaces that are bounded by objects in external references are now included in the automatic update of associative spaces. No manual updates are necessary anymore.

Migrating Xref Spaces from previous Versions of AutoCAD Architecture

Beginning with AutoCAD Architecture 2009, the mechanism by which linework objects (line, arc, circle, polyline) are defined as boundary objects for spaces has changed. In previous versions, linework boundaries were selected by applying an object filter during space generation. In AutoCAD Architecture 2010, each

linework object has its own Bound Spaces property on the Properties palette and can be defined as a boundary object there. Additionally, xrefs and blocks now have a Bound Spaces property as well.

When you migrate a drawing with associative spaces that use linework from an xref as boundary objects you'll see the following behavior:

- All lines, arcs, circles, and polylines (as well as object outlines selected via the All Linework filter) that were defined as boundary objects in the host drawing will have their Bound Spaces setting correctly translated to the new mechanism and will continue to bound spaces.
- All lines, arcs, circles, and polylines from not-yet migrated xrefs however will not act as boundary objects for spaces in the host drawing anymore, so that if the spaces in the host drawing are updated (or new spaces are generated), the generation or update fails for these xref linework objects.

In order to update your spaces correctly, you can use an xref override on the affected linework objects (see Changing the Display Configuration Used in Xref Drawings on page 545). Alternatively, you can open the xref drawing, set the Bound spaces property on the desired linework objects to Yes, re-load the xref, and regenerate the spaces.

NOTE When you are converting drawings with xrefs and associative spaces from a previous version, the first time the host drawing is opened, will be accompanied by a noticeable performance delay. This is however only a one-time effect; once the host drawing and its associated xref drawings have been opened and saved with the current version, the performance will be improved in all future sessions.

Generating Spaces from Xrefs or Blocks Using the Xref or Block Settings

Within an xref or block you can define objects as boundary objects for spaces. These objects can be used to generate spaces in a host drawing.

In order to use boundary objects from an xref in a host drawing, the xref must have its Bound Spaces property set to Yes. (This is the default setting when inserting an xref.) If the xref's Bound Spaces property is set to Yes, objects in it that have their Bound Spaces property set to Yes, too, will be used to generate spaces in the host drawing. If the Bound Spaces property of the xref has been set to No, any objects in the xref are ignored when generating spaces in the host drawing, regardless of whether they have their Bound Spaces property set to Yes.

Perform these steps to use boundary objects from an xref to generate spaces in a host drawing:

1. Set the Bound Spaces property of the desired objects in the xref drawing to Yes. For instructions, see Setting the Bound Spaces Property for Boundary Objects on page 1919.
2. Reference the drawing into the host drawing where you want to generate spaces.
3. Select the xref.
4. In the Properties palette, expand the Advanced category.
5. Verify that the Bound Spaces property is set to Yes.
6. Generate spaces as described in Generating an Associative Space on page 1922.

This mechanism allows you to generate different spaces from multiple instances of the same xref, because the same referenced geometry can be used as boundary for spaces in one instance but not in another.

NOTE External references in Project Navigator have different default settings for the Bound Spaces property: By default, external references attached to elements, constructs and views from Project Navigator have their Bound Spaces property set to Yes; external references attached to sheets from Project Navigator have their Bound Spaces property set to No.

Blocks work according to the same principle, except that the default setting for the Bound Spaces property of a block is dependent on the Bound Spaces properties of the objects inside the block. If none the objects inside the block has its Bound Spaces property set to Yes, then the block's Bound Spaces property will be No. If there is at least one object inside the block that has its Bound Spaces property set to Yes, then the block's Bound Spaces property will be set to Yes, too.

IMPORTANT When you change the Bound Spaces properties of objects inside a block via the Block Editor, these changes are not automatically updated in the host drawing upon saving and closing the Block Editor. In order to verify that all spaces are updated correctly, you must perform a manual update of all affected spaces, as described in Manually Updating Associative Spaces on page 1931.

When blocks or external references are nested, and a block or external reference in the hierarchy has its Bound Spaces property set to No, then all blocks and external references nested in it are not used to bound spaces, even if some of the nested blocks or external references contain objects that have their Bound Spaces property set to Yes. In order to use boundary objects from nested blocks and xrefs, the containing level must have its Bound Spaces property set to Yes.

If a legacy drawing is opened in AutoCAD Architecture 2010, all blocks and external references that contain boundary objects will by default have their Bound Spaces property set to Yes.

Generating Spaces from Xrefs Using Overrides in the Host Drawing

If you do not want to make changes to the Bound Spaces property of objects in the xref drawing, you can use an override in the host drawing to change the boundary objects in xrefs without making a change to the xref drawing. For example, if you are a building engineer and receive an architectural drawing from which you want to generate spaces, but you do not want to change any boundary objects in the original drawing, you can xref the drawing into a new host drawing, and override the Bound Spaces property of xref objects in the new host drawing. The source drawing remains unchanged, but you can still generate spaces in the new drawing that are different from those generated in the xref drawing.

Override the Bound Spaces properties of xref objects in a host drawing

1. Xref the drawing from which you want to generate spaces into the host drawing.
2. Select the xref.
3. In the Properties palette, expand the Advanced category.
4. Verify that the Bound Spaces setting is set to Yes.
5. Display all boundary objects in the drawing (both host and xref) by clicking Home tab ➤ Inquiry panel ➤ ➤ Show Space Boundaries .
   If the objects displayed by that command do not meet your needs, you need cancel space generation, and first apply overrides to the Bound Spaces properties of the desired xref objects.
6. At the command prompt, enter **AecSpaceSetBoundingObjects**.
7. Select the desired boundary objects in the xref, and press ENTER.
8. On the command line, enter Y (Yes) to generate the override, and press ENTER.

   NOTE An xref override is only valid for the selected instance of the xref in the host drawing where it is set. If the same xref drawing is referenced into a different host drawing, or as another instance into the same host drawing, no overrides exist.

   If you now generate the spaces, all overridden objects in the xref will now be used to generate spaces.

9 If you have not applied any overrides yet, and no valid space boundaries can be found because none of the objects in the xref drawing have their Bound Spaces property set to Yes or the objects that are do not enclose a valid space, a task dialog will appear and prompt you to select objects that should bound spaces.

10 In this case either select all visible objects as boundary objects, or select individual objects, and press ENTER. This will automatically set the Bound Spaces properties of all selected objects to Yes, and if those objects are in an xref will add an override to them in the current drawing.

You can remove space boundary overrides from objects in xrefs. When the override is removed, the Bound Spaces settings of the xref objects are used again.

To remove a space boundary override from an object in an xref

1 At the command prompt, enter **AecSpaceSetBoundingObjects**.

2 Select the boundary objects in the xref from which you want to remove the override, and press ENTER.

3 On the command line, enter R (Remove Override), and press ENTER.

4 If necessary, update the spaces in your drawing.

Generating Spaces from an Xref Drawing Containing Spaces

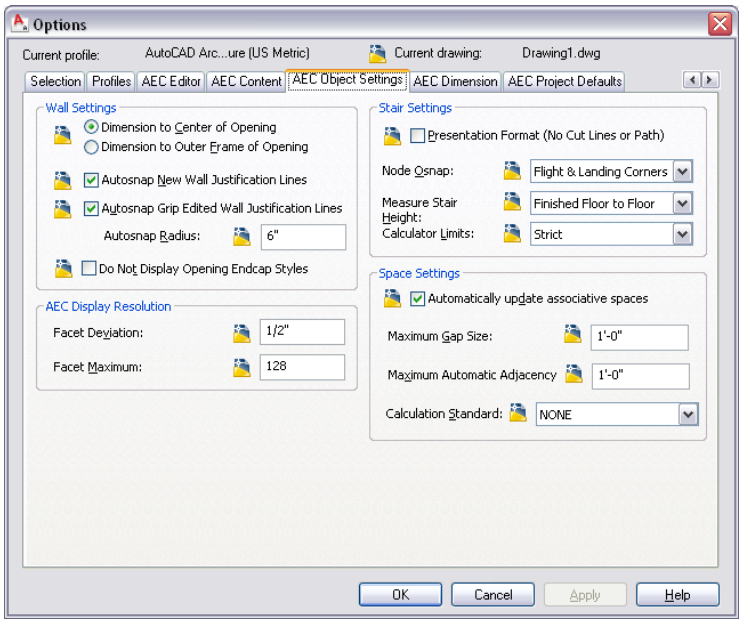
If you receive a drawing with spaces, but want to generate a different set of spaces, verify that the Allow Overlapping Spaces setting in the Properties palette is set to Yes before you pick your spaces. Otherwise, spaces can only be generated in areas that do not contain a space from the xref.

Defining a Maximum Gap Size for Associative Spaces

When you are generating 2D or extruded 3D spaces, it is possible to define an allowed gap size between colinear boundary objects. The software will calculate the missing segments and create the space profile from that. You cannot define a gap size for 3D freeform spaces.

1 Click ➤ Options.

2 Click the AEC Object Settings tab.



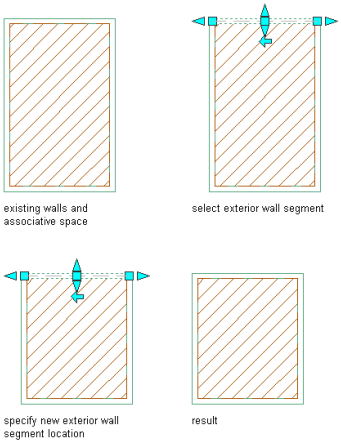
3 Under Maximum Gap Size, select the largest gap you want to allow between the boundary objects of an associative space.

4 Click OK.

TIP Alternatively, you can set the maximum allowed gap size between boundary objects on the command line by entering **AecSpaceMaxGapSize**.

Updating Associative Spaces

Associative spaces are defined by their boundary objects and are updated when the boundary objects change. You can choose to have associative spaces update automatically whenever there is a relevant change to boundary objects, or you can choose to perform the space update manually.



Updating Associative Spaces Bounded by External References

Objects in external references can serve as boundary objects for associative spaces in the host drawing. When the objects in the external reference change, the space is updated too. In previous versions, a manual update was necessary to propagate changes in the external reference's boundary objects to the spaces in the host

drawing; now changes from external references are automatically updated when reloading the external reference, if the automatic update of associative spaces is activated (see Activating and Deactivating Automatic Updates on page 1930).

Roundtripping Associative Spaces between AutoCAD Architecture 2010 and previous Versions

In previous versions of the software, boundary linework objects were defined by a filter selection during space generation. In the current version, each object has its own Bound Spaces property in the Properties palette. This includes blocks and xrefs. These changes can cause discrepancies when roundtripping drawings that contain 2D linework, blocks, and external references. For example, when a line in the current version of the software has its Bound Spaces property set to Yes, and is opened in a previous version, it will still be a boundary object for spaces, but it will be selected via the boundary filter of the space. When the filter is removed from the space in the previous version, and the drawing is re-opened in AutoCAD Architecture 2010, the change in the filter setting will be ignored. It is recommended that you carefully examine your spaces after roundtripping them between different versions of AutoCAD Architecture in order to avoid space errors.

Activating and Deactivating Automatic Updates

Use this procedure to activate or deactivate the automatic update of associative spaces.

Updating each temporary change to the space geometry might not be necessary or desirable. For example, if you delete a wall only to replace it with a different one in the same position, you only need the space to update after the new wall is in place, rather than once when the old wall is removed and again when the new one is inserted.

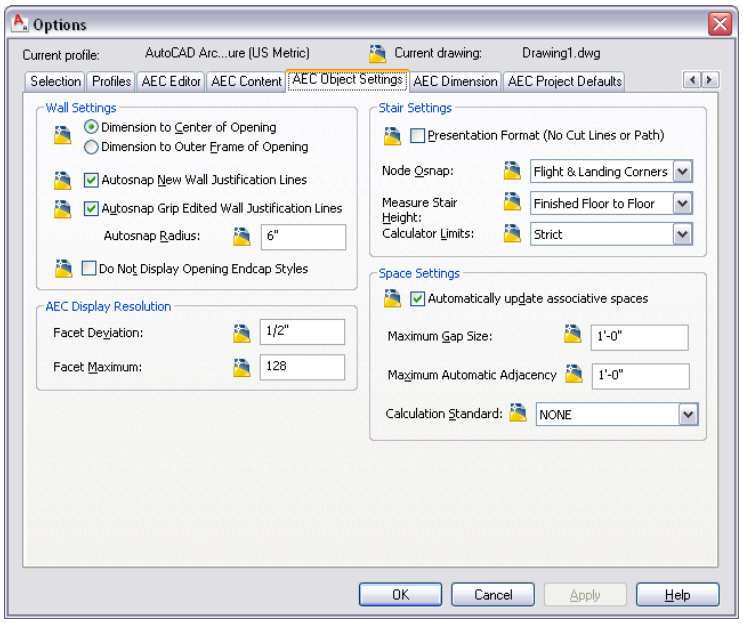
Manual updates offer better performance, but mean that the geometry of spaces and their boundary objects might be out-of-synch at a given time during the drawing session.

When the automatic update of associative spaces is deactivated, and an area calculation standard has been selected to calculate boundary offsets, the rules of the standard will only be applied to changed spaces when either the automatic update has been activated again or the spaces are updated manually, as described in Manually Updating Associative Spaces on page 1931.

IMPORTANT When you re-activate the automatic update of spaces, only those spaces will be updated that had no boundary objects added while the update was off. For example, if you added a dividing wall to a space while the automatic update was off, and then turn the automatic update on, the space will not be divided by the wall. Update the space manually to reflect the new geometry.

1 Click ➤ Options.

2 Click the AEC Object Settings tab.



3 Under Space Settings, specify whether associative spaces will be updated automatically:

If you want to…	Then…
update associative spaces automatically each time you make a change to the boundary objects	select Automatically update associative spaces.
update associative spaces manually	clear Automatically update associative spaces.

4 Click OK.

TIP The automatic update of spaces can also be turned on or off via the **AecSpaceAutoUpdate** command.

Manually Updating Associative Spaces

Use this procedure to manually update an associative space after its boundary objects have changed. A manual update can be necessary in these cases:

- The automatic update of associative spaces has been deactivated, as described in Activating and Deactivating Automatic Updates on page 1930, and the boundary objects of an associative space have been modified.
- A new boundary object has been added while the automatic update of spaces was deactivated.
- The automatic update cannot be performed due to any of the conditions described in Troubleshooting Associative Spaces on page 1937.

You can choose to either update only selected spaces, or all associative spaces in the drawing.

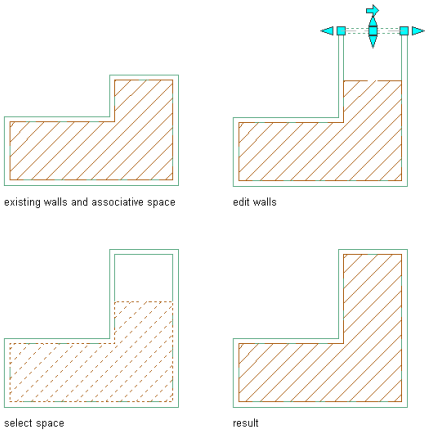
IMPORTANT Previously, objects that were on a frozen or hidden layer were not included in any space updates. Now, frozen or hidden objects are included in the space update if their Bound Spaces property is set to Yes.

When the automatic update of associative spaces is deactivated, and an area calculation standard has been selected to calculate boundary offsets, the rules of the standard will only be applied to changed spaces when either the automatic update has been activated again or the spaces are updated manually.

Manually updating selected spaces

1 Select the associative space you want to update.

2 Click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .



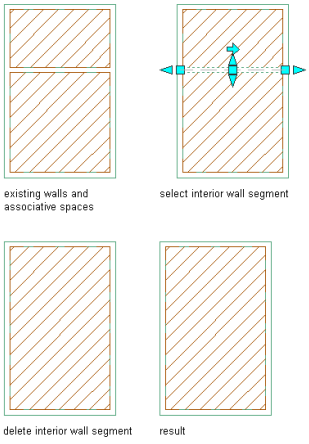
Manually updating all associative spaces in the drawing

1 Select any associative space in the drawing.

2 Click Space tab ➤ Modify panel ➤ Update drop-down ➤ All Associative Spaces .

Merging Associative Spaces

Associative spaces can be merged by removing boundary objects that separate them. If you activated the automatic update of associative spaces (as described in Activating and Deactivating Automatic Updates on page 1930), the update is run automatically.



The following rules determine in descending order the precedence of property inheritance in the merged space:

1 If only one of the spaces to be merged has object property set data, the properties of that space are applied to the merged space.

2 If only one of the spaces to be merged has classification data, the properties of that space are applied to the merged space.

3 If both of the spaces have object property set data or classification data, the properties of the larger space are applied to the resulting space.

4 If only one of the spaces to be merged has style-defined property set data, the properties of that space are applied to the merged space.

5 If all of the above criteria apply to none or both of the spaces to be merged, the properties of the older spaces are applied to the merged space.

   This can result in unexpected property assignments, so it is recommended that you check the merged space's properties.

If the automatic update of associative spaces is not activated, you need to merge spaces between deleted boundary objects manually. This process involves more steps than the automatic update, but allows you more control over which space's properties are retained in the resulting space.

Manually merging associative spaces

1 Verify that the automatic update of associative spaces is deactivated, as described in Activating and Deactivating Automatic Updates on page 1930.

2 Select the boundary object that separates the spaces you want to merge, and delete it.

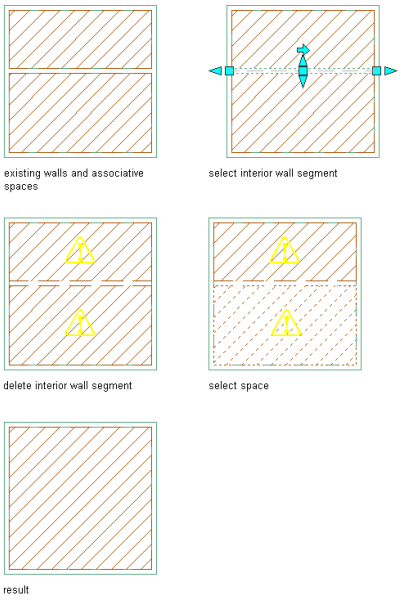
   You now have 2 separate spaces within the same boundary objects.

3 Select and delete the space whose properties you do not want to keep.

   If you have no preference, you can delete either space.

4 Click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .

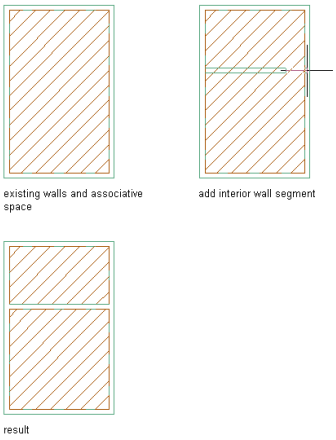
   The space is updated to the new boundaries.



Dividing an Associative Space

Associative spaces can be divided by adding new boundary objects. If you activated the automatic update of associative spaces (as described in Activating and Deactivating Automatic Updates on page 1930), the update is run automatically.

TIP To divide a space without additional boundary objects, see The Space Separator Tool on page 1918.



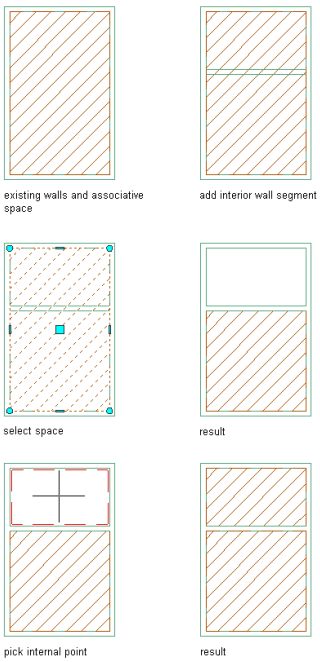
NOTE Verify that the new boundary object has its Bound Spaces property set to Yes before the space will be divided. For more information, see Setting the Bound Spaces Property in the Properties Palette on page 1920.

Manually dividing associative spaces

1. Verify that the automatic update of associative spaces is deactivated, as described in Activating and Deactivating Automatic Updates on page 1930.
2. Create a new boundary object to divide the existing space.

   The space object now spans 2 sets of boundary objects.
3. Select the space, and click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .

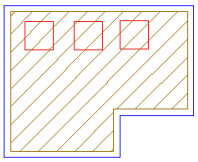
   The existing space is updated to fit into one of the 2 sets.
4. Create a new associative space in the empty set, as described in Generating an Associative Space on page 1922.



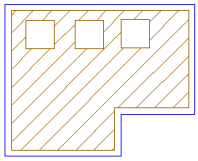
Deducting Spaces from an Associative Space

You can deduct objects enclosed in an associative space from the overall space area. This would be useful for deducting areas filled by columns or shafts.

Enclosed objects included in space area



Enclosed objects deducted from space area



1. Before generating the space, verify that the enclosed objects you want to deduct from the overall space volume are both valid boundary objects (see Valid Boundary Objects for Associative Spaces on page 1915) and have their Bound Spaces property set to Yes (see Setting the Bound Spaces Property for Boundary Objects on page 1919).
2. Generate the space by one of the methods described in Generating an Associative Space on page 1922.

   Objects that are fully enclosed in the generated space are automatically deducted.

Making a Space Associative or Non-Associative

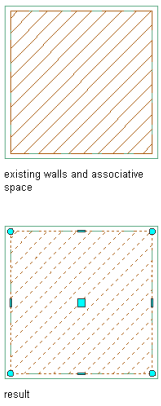
When you make a space associative, you connect it to a set of boundary objects that define the space's geometry. To make it non-associative you disconnect it from its boundary objects, so that it is not affected by future modifications to those objects.

If you make a non-associative space associative, the software checks if a valid set of enclosing boundary objects can be found. If this is so, the space is made associative to them and the geometry is updated accordingly.

Making a space associative to boundary walls

If you make an associative space non-associative, the space is disconnected from its boundary objects. The space geometry retains its current shape after the associativity is deactivated, but is grip-editable.

Removing the associativity of a space to the boundary walls



Making an associative space non-associative

1. Double-click the space you want to make non-associative.
2. On the Properties palette, for Associative select No.

   Edit the space as desired.

Making a non-associative space associative

1. Select the space you want to make associative to boundary objects.
2. Click Space tab ➤ Modify panel ➤ Make Associative .

   If a valid set of boundary objects is detected, the space geometry is updated to the boundary of these objects, and the Associative property on the Properties palette is set to Yes.

If no valid set of boundary objects is detected, the space geometry remains unchanged and the Associative property on the Properties palette remains read-only and set to No.

TIP When a non-associative space is made associative, and its Offset boundaries property is set to Manual, then making the space associative will align only the base boundary of the space to the new boundary objects. The net, usable, and gross boundaries will stay in their previous shape. You can fix this by changing the Offset boundaries property to either By style or By standard.

Troubleshooting Associative Spaces

In this section, frequently asked questions about associative spaces are addressed.

When I use the Generate all option to generate spaces from my drawing, the process takes a very long time. How can I speed it up?

Before starting the space generation, zoom in on the model to decrease the current drawing area. The space generation processes all objects in the current drawing area, so the larger the drawing area, the longer the processing will take.

I have noticed a decrease in performance between space drawings in previous versions of AutoCAD Architecture and in the current version. There have been no changes to the drawings, so what can be the reason?

Check if your drawing contains spaces bounded by objects in external references. In previous versions of the software, a manual update was necessary to propagate changes in the external reference's boundary objects to associative spaces in the current drawing; now changes from external references are automatically updated, if the automatic update of associative spaces is activated. This can result in a noticeable performance lag. Deactivate the automatic update, as described in Activating and Deactivating Automatic Updates on page 1930.

Another possibility can be that when you are converting drawings with xrefs and associative spaces from a previous version, the first time the host drawing is opened will be accompanied by a noticeable performance hit. This is however only a one-time effect; once the host drawing and its associated xref drawings have been and opened and saved with the current version, the performance will be improved for all future sessions.

When I try to generate a 3D freeform space from my model, why do I get an error message: Valid boundary not found?

The space generation mechanism may not be able to detect a valid space boundary for any of the following reasons:

1. The boundary objects are not 100% closed

Double-check your model to verify that the objects are really enclosing the space. There may be tiny, barely visible gaps between the designated boundary objects in the building model.

For example, if an interior wall is auto-projected to a roof slab without ceiling, and the interior wall extends only to the baseline and not to the outside of the outside wall, the 3D freeform space cannot be generated. In such a case you could create a ceiling under the roof slab, so that walls are projected to the ceiling instead of the actual roof. Or you could extend the interior wall all the way to the outside of the exterior wall. You could also place a sweep on the wall to make the top of the wall flush with the sloping roof slab.

2. Objects intended as boundary objects are not valid for the 3D freeform space generation

The boundary objects for an associative 3D freeform space must belong to the objects listed under Valid Boundary Objects for Associative Spaces on page 1915. Any other AutoCAD Architecture objects, such as railings or 2D linework, will not be recognized by the space generation. If your selection set includes one of these objects, it will be filtered out, and the boundary set will be considered not closed. To create a valid bounded space, substitute a valid boundary object for the invalid one.

3. Edges of boundary objects touch, but do not overlap

When boundary objects like walls, slabs, and other 3D geometry just touch each other but do not have any overlap, or when objects intersect only along an edge (to form a line rather than a surface intersection), they are considered open even though the corresponding real-world components would be closed. In such cases, no 3D freeform space can be created. To fix this problem, extend one of the objects just far enough to create an overlap.

When I try to generate a 2D or extruded 3D space from my model, why do I get an error message: Valid boundary not found?

The space generation mechanism may not be able to detect a valid space boundary for any of the following reasons:

1. Some objects are not boundary objects

Some objects that are needed to create a closed boundary for the space are either not valid boundary objects for spaces or their Bound Spaces property is set to No. To see all objects that are currently boundary objects for spaces, click Home tab ➤ Inquiry panel ➤ ➤ Show Space Boundaries . If an object that is needed for the boundary does not display, it is either not a valid boundary object or its Bound Spaces property is set to No. For more information see Valid Boundary Objects for Associative Spaces on page 1915 and Setting the Bound Spaces Property for Boundary Objects on page 1919.

2. The Maximum gap size is smaller than some colinear gaps in your model

When you generate a 2D or extruded 3D space, you can define an allowed gap size between colinear boundary objects. If the colinear gaps in your model are larger than the allowed gap size, the model is considered not closed, and a space cannot be generated or might flow into an adjacent area. In that case, change the maximum gap size to a value greater than your largest colinear gaps, as described in Defining a Maximum Gap Size for Associative Spaces on page 1928.

Are there other factors I should check if my associative spaces are not generated correctly?

There are a number of general possibilities to check when your spaces are not generated:

Boundary walls have been placed in the same cleanup group as walls that are no boundary objects

If a wall that is no boundary object intersects with a wall that is a boundary object, and they are in the same cleanup group, the wall that is a boundary object is considered to be not a boundary object because of its cleanup with the other wall. As a result, no space can be generated even if the geometry would otherwise be closed. In that case, you need to create a new cleanup group and place only the walls that are no boundary objects in that group.

The visible drawing area was changed by zooming or panning in between starting the Space tool and selecting the boundary objects

When you generate associative spaces, only boundary objects visible in the drawing area at the time you start the space generation tool are included in the selection set. If you have zoomed or panned before generating spaces, the space detection is not automatically updated to the new drawing area. To update the selection set, use the **v** (reset Visible boundaries) option on the command line. This option will update the drawing area to its current extents. Then, generate the space again.

When I generate spaces by using the Generate all option, the spaces are generated but not according to the boundary objects visible in the drawing area. The same happens when I try to update some existing spaces. What is the reason?

Some boundary objects for these spaces might be on a frozen or hidden layer. In previous versions of AutoCAD Architecture, objects that were invisible due to a frozen or hidden layer were not included in associative spaces. Now, frozen or hidden objects are included in the space generation if they are set as boundary objects and are located in the current drawing area. To verify if this is the case, display all boundary objects in the

drawing area, as described in Displaying all Boundary Objects in the Drawing Area on page 1921. If you now see previously invisible objects, these objects are on a frozen or hidden layer. To exclude objects on a frozen or hidden layer from the boundary set, unfreeze or unhide the layer, and change the Bound Spaces property of the objects from Yes to No.

I have generated spaces from walls with modifiers. Now I have edited the wall cleanup in place, and after saving the in-place edit changes, there are suddenly a number of new and unwanted spaces inside the walls. Where do these spaces come from?

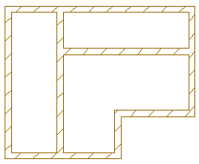
Extra spaces might be generated when walls with modifiers or wall cleanups are edited in place. This is due to the calculation mechanism of the space generation. If you encounter this case you should delete the unwanted spaces from the drawing.

I have one room that contains multiple functional areas, which I want to display and schedule independent from each other. There are however no real-live boundary objects between them. Is there a way to separate a space without adding boundary objects?

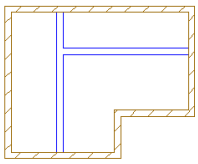
Use the Space Separator tool as described in The Space Separator Tool on page 1918.

When I try to generate a space from the outlines of walls, I get unexpected space boundaries. How can I fix this?

Generating spaces from object outlines can be useful for generating spaces that are deducted from other spaces, like a mass element representing a shaft, or walls that represent a construction space. A space generated from wall outlines should look like this:



In some cases, the space generation may result in different and segmented boundaries like this:



If this is the case, the maximum allowed gap size between boundary objects is too big, and the end wall conditions between walls are not calculated correctly. Recreate the space with a very small maximum gap size. For more information, see Defining a Maximum Gap Size for Associative Spaces on page 1928.

When I update the boundary objects for associative spaces (for example, I move a wall to a different position) the space does not update. In some cases, it displays a solution tip icon, but in other cases just does not update. How can I get the space to update?

The following factors can be responsible for spaces not updating:

1. The space is no longer associative

Verify that the Associative setting on the Properties palette is still set to Yes. If it has been accidentally set to No, the space loses its associativity to the boundary objects. The space no longer updates, but displays no solution tip icon.

2. In the AEC Options, the Automatic update of associative spaces has been disabled

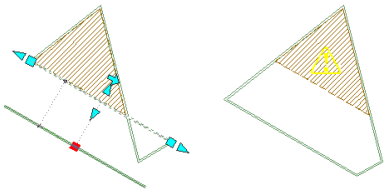
You can choose to not automatically update associative spaces each time a change in geometry occurs. This can be useful to improve performance. If the Automatically update associative spaces option on the AEC Object Settings tab of the Options dialog has been cleared, then a space will not automatically react to

changes in the boundary objects. You can either reselect the automatic update option, or, if you do not want to have automatic updates, you can select the space, and click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .

NOTE When you activate the automatic update of spaces, only those spaces will be updated that had no boundary objects added while the update was off. For example, if you add a dividing wall to a space while the automatic update is off, and then turn the automatic update on, the space will not be divided by the wall. You should then manually update the space. For more information, see Manually Updating Associative Spaces on page 1931.

3. Grip-editing the boundary objects has introduced a new boundary object for the space

If a grip-edit operation on the boundary objects has resulted in additional boundary objects, the space will not automatically update to reflect this change, but will display a solution tip icon. In that case, select the space and click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .



4. The change in the boundary objects has invalidated the closed boundary

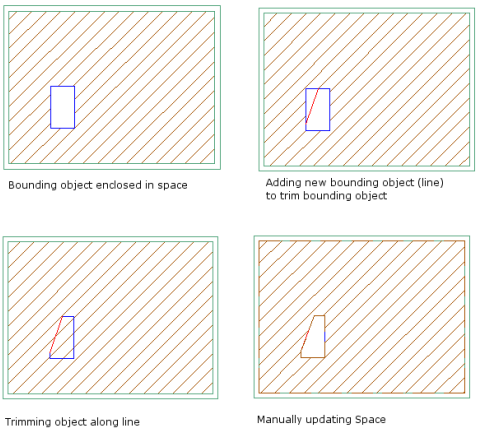
Verify that the change in the geometry has not accidentally opened up a gap in the boundary objects. This could happen if you move a wall so that it no longer intersects neighboring walls. It could also happen if a wall is moved so that it intersects with another wall that is not defined as a boundary object and is in the same cleanup group.

5. The visible drawing area has changed between creating and updating the space

The Update Space Geometry command uses the current viewport's zoom value. This might lead to unexpected results, if you have zoomed in on the drawing area between generating and updating the space. Zoom out so that the space and its boundary objects are entirely visible, and try to update again.

After trimming a part of a boundary object enclosed in a space (for example, if you trim a part of a shaft,) the enclosed object is not recognized as a boundary object anymore, and the surrounding space flows into it. What is the reason and how can I fix this?

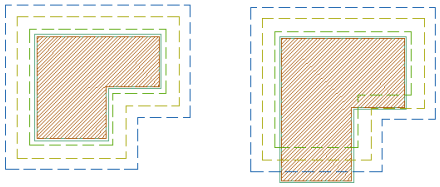
When trimming a boundary object by substituting a new boundary object in the trimming position, the new object will not be recognized automatically as boundary object for the space, because it did not bound the space previously. In this case, you need to update the space manually to recognize the new bounding object. See the following example:



I have updated an associative space. The base boundary updates correctly, but the net, usable, and gross boundaries stay as they were before the update. What causes that behavior?

If the net, usable, and gross boundaries of an associative space do not get updated when the base boundary is updated after a change in the boundary objects, the space uses manual boundary offsets.

Net, usable, and gross boundaries not updating



Manual net, usable, and gross boundaries do not automatically react to changes in the base boundary. To make the net, usable and gross boundaries update automatically when the base boundary is updated, you need to define the boundary offset of the space as By Style or By Standard on the Properties palette.

I am using an area calculation standard to generate associative spaces. Sometimes when generating or updating my spaces, I see solution tip icons for which I cannot find a valid reason in the boundary objects. What is the reason for this and how can I work around it?

A solution tip icon can appear when the area calculation standard is for some reason unable to generate or update the space boundaries correctly. Install the standard or support file as advised in the solution tip, or correct the boundary offsets, by deactivating the area calculation standard and working with manual offsets, as described in Defining the Boundary Offset Type of a Space on page 1959. Then, grip-edit the incorrect boundaries so that they are correct again. Note that you have to do this only for those spaces that display that solution tip icon, not for all associative spaces based on the area calculation standard. It is not recommended to switch back to the offset boundary type By Standard after making the change, because as soon as the space is updated again, the corrected boundaries will be overwritten with the incorrect standard-based ones.

I have problems with incorrect offsets of the net, usable, and gross boundaries of associative spaces when I use an area calculation standard to generate them. What can be the reason?

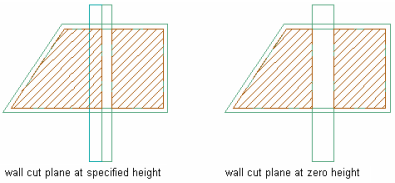
There are a number of conditions under which the correct calculation of boundary offsets for associative spaces does not work when using an area calculation standard:

- The space and its boundary objects have been mirrored. When associative spaces are mirrored, they need to be updated manually to recalculate the net, usable, and gross boundaries correctly. For instructions, see Manually Updating Associative Spaces on page 1931.

- Some boundary objects are arc walls. In some cases, the net, usable, and gross boundaries of associative spaces are not calculated correctly when the boundary objects include arc walls. If this happens, deactivate the rule based offset calculation and set manual offsets, as described in Defining the Boundary Offset Type of a Space on page 1959. Then, grip-edit the incorrect boundaries so that they are correct again. It is not recommended to switch back to the offset boundary type By Standard after making the change, because as soon as the space is updated again, the corrected boundaries will be overwritten with the incorrect standard-based ones.

Some of my walls have sweeps and modifiers attached to them. When I try to generate spaces from them, the space boundary ignores the sweeps and modifiers and generates the space from the wall profiles. How can I get the space generation to observe sweeps and modifiers?

To make the space generation include wall sweeps and wall modifiers into the boundary of an associative space, the cut plane height of the wall with the sweep or modifier must be set to 0. For more information, see Specifying the Cut Plane Display of a Wall Style on page 862.



When I turn on the automatic update of associative spaces, as described in Activating and Deactivating Automatic Updates on page 1930, some of my existing spaces suddenly display solution tip icons. How can I fix this?

When a solution tip icon appears after you have activated the automatic update of associative spaces, the space and its boundary objects are out-of-synch. Select the space with the solution tip icon showing, and click Space tab ➤ Modify panel ➤ Update drop-down ➤ Selected Space .

When I deselect the automatic update of associative spaces, and divide an associative space with a new boundary object, as described in Dividing an Associative Space on page 1934, the space will not be divided immediately. This is according to my expectations. However, if I then activate the automatic update of associative spaces, my space is not divided either. Is this correct?
Boundary objects added while the automatic space update is turned off will not be used to update spaces later when the setting is turned on again. Only objects added or modified while the automatic update is turned on will be used to update the spaces. If you encounter the situation above, delete the wall and re-insert it with the automatic update turned on.

When I insert a scaled external reference with boundary objects into a drawing, any associative spaces generated from the objects in the external reference will not be correctly calculated when using an area calculation standard. What I can I do to fix this?

Currently, when an external reference is scaled during insertion, the boundary offset calculation will never be correct if the boundary offsets are calculated by an area calculation standard. You can either re-insert the external reference without scaling, or you can change the boundary offsets from By Standard to By Style or Manual and try to emulate the rules of the area calculation standard in the style of by manually offsetting the boundaries.

Creating Non-Associative Spaces

Non-associative spaces are freestanding spaces with user-defined geometry. You can either draw a space or convert linework, object outlines, mass elements, or slabs to spaces, which you can then modify according to your needs.

Drawing a Non-Associative 2D or Extruded 3D Space

When you draw a non-associative 2D or extruded 3D space, you can either base it on target dimensions taken from the space style, or you can draw rectangular or polygonal spaces with dimensions that you define.

Inserting a Space with Style-Defined Target Dimensions

Use this procedure to insert a non-associative space based on target dimensions set in the space style. For information about setting target dimensions in the space style, see Specifying Target Dimensions for the Space on page 2020.

1 Open the tool palette that contains the Space tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Space .

2 On the Properties palette, for Create type, select Insert.

NOTE For spaces with the Create type of Insert, Rectangle, or Polygon, the Associative setting is always No.

3 Expand Component Dimensions.

4 Specify the geometry type of the new space:

If you want to…	Then…
create a 2D space	select 2D from the list.
create an extruded 3D space	select Extrusion from the list.

5 Expand Actual Dimensions.

6 To specify the geometry of the space within the boundaries of the target dimensions on screen, select Yes for Specify on screen.

To specify the geometry of the space by entering values in the Properties palette, select No for Specify on Screen.

7 Specify which dimension of the space is to be constrained during insertion:

If you want to…	Then…
fix the space area value during insertion	select Area for Constrain. This lets you change the length and width of the space, but only within the range of the target dimensions. For example, if you constrain the area to $9m^2$, you can still choose to make both length and width 3m, or to make the length 4m, and the width 2.25 meters, as both combinations result in an area of 9 m^2.
fix the space length during insertion	select Length for Constrain. If you constrain the length of a space, then any change to the space area will only change the width dimension of the space, and vice versa.
fix the space width during insertion	select Width for Constrain. If you constrain the width of a space, then any change to the space area will only change the length dimension of the space, and vice versa.

If you want to…	Then…
do not fix a specific dimension during insertion	select *NONE* for Constrain. In this case no individual dimension is constrained, and you can specify any geometry as long as it is within the target dimensions.

8 If you have selected to not specify the space on screen, enter values for the non-constrained dimensions for Base Area, Length, and Width.

9 Insert spaces in the drawing:

If…	Then…
you have selected to specify the space on screen,	click in the drawing to define the insertion point of the space. Then drag and click to define the space dimension, and specify a rotation.
you have entered values for the space geometry in the Properties palette	click in the drawing to define the insertion point of the space, and then specify a rotation.

10 Continue adding spaces, and press *ENTER*.

IMPORTANT For descriptions of other Spaces settings on the Properties palette, see Space Properties on page 1910.

Drawing a Rectangular Space

Use this procedure to draw a non-associative rectangular 2D or extruded 3D space.

1 Open the tool palette that contains the Space tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Space .

2 On the Properties palette, expand Basic, and expand General.

3 For Create type, select Rectangle.

NOTE For spaces with the Create type of Insert, Rectangle, or Polygon, the Associative setting is always No.

4 Expand Component Dimensions.

5 Specify the geometry type of the new space:

If you want to…	Then…
create a 2D space	select 2D from the list.
create an extruded 3D space	select Extrusion from the list.

6 In the drawing area, specify the start point of the space, and drag and click to define the opposite corner.

7 Continue adding spaces, and press *ENTER*.

IMPORTANT For descriptions of other Spaces settings on the Properties palette, see Space Properties on page 1910.

Drawing a Polygonal Space

Use this procedure to draw a non-associative polygonal 2D or extruded 3D space. A polygonal space is composed of line and arc segments and can be used to represent non-rectangular rooms.

1 Open the tool palette that contains the Space tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Space .

2 On the Properties palette, for Create type, select Polygon.

NOTE For spaces with the Create type of Insert, Rectangle, or Polygon, the Associative setting is always No.

3 For Segment type, select if the first space segment should be a line or an arc.

4 Expand Component Dimensions.

5 Specify the geometry type of the new space:

If you want to…	Then…
create a 2D space	select 2D from the list.
create an extruded 3D space	select Extrusion from the list.

6 If you have selected Line for Segment type, specify the start and end point of the first linear segment on screen.

7 If you have selected Arc for Segment type, specify the start point, a point on the arc, and the endpoint of the segment on screen.

8 Proceed with adding segments for the space.

By default, for each new segment the segment type of the previous segment is used. If necessary, you can change the segment type in the Properties palette.

9 Close the space and press ENTER.

IMPORTANT For descriptions of other Spaces settings on the Properties palette, see Space Properties on page 1910.

Converting Objects, Profiles, and Polylines to Non-Associative Spaces

Various objects can be converted to non-associative spaces. If you are converting a non-extruded mass element, you can convert its geometry to a 3D freeform space. If you are converting other AEC objects or polylines, the 2D profile of the object or polyline is converted to a 2D space or an extruded 3D space.

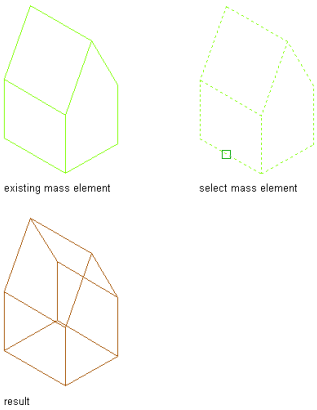
Converting Mass Elements to Spaces

Use this procedure to convert a mass element to a space.

Converting a Mass Element to a 3D Freeform Space

When you convert a non-extrusion type mass element to a space, it is created as a 3D freeform space, unless the space tool you use has its geometry type set expressly to Extrusion. Non-extrusion type mass elements include:

- Arch
- Barrel Vault
- Isosceles Triangle
- Right Triangle
- Pyramid
- Cone
- Dome
- Sphere
- Gable
- Freeform



Converting a Mass Element to an Extruded 3D Space

When you convert an extrusion type mass element to a space, it is created as an extruded 3D space. Non-extrusion type mass elements include:

Mass elements that can be converted to an extruded 3D space include:

- Box
- Cylinder
- Extrusion

NOTE To make sure that the converted space uses the mass element geometry, verify that the space tool used has its geometry type set to Undefined (--). If it is set to Extrusion, a mass element is converted based on its profile shape and extruded from that. A non-extruded mass element shape, like for example a pyramid, will be converted to an extruded box shape with the pyramid profile.

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1 Select the mass element that you want to convert to a space.

2 Click Mass Element tab ➤ Convert To panel ➤ Space .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass element or enter **y** (Yes) to erase it.

4 Edit the properties of the space in the Properties palette as needed.

Converting Mass Groups to Spaces

Use this procedure to convert a mass group to a space.

IMPORTANT If the mass group contains multiple mass elements that do not intersect, one space with multiple profiles will be created. In most cases, this is not the desired result, so it is recommended that you disconnect each mass element from the mass group first, and convert it individually.

1 Select the mass group that you want to convert to a space.

2 Click Mass Group tab ➤ Convert To panel ➤ Space .

3 When prompted to erase the original geometry, press *ENTER* to keep the mass group or enter **y** (Yes) to erase it.

4 Edit the properties of the space in the Properties palette as needed.

Converting Polylines, Profiles, and Object Outlines to Spaces

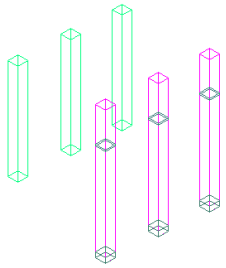
Use this procedure to convert polylines or 2D profiles of objects to spaces. This can be useful for defining construction spaces that usually consist of the outlines of walls, columns, stairs, and other building objects.

The new space generated from the profile of the object will be created with the properties defined in the space tool. If a specific setting has been set to Undefined (--) in the space tool properties or cannot be set in the tool properties, the last used setting on the Properties palette will be used.

You can use the following object outlines as space boundaries:

- Walls/Curtain walls
- Columns/Braces/Beams/Slabs
- Doors/Windows/Window assemblies
- Roofs/Roof slabs/Slabs
- Stairs/Railings
- Mass elements/Mass groups
- AEC polygons
- Profiles
- Closed polylines

Column objects (left), converted to spaces (right)



1 Open the tool palette that contains the Space tool you want to use, and select it.
(You may have to scroll to display the desired tool.)

2 Right-click a space tool, and click Apply Tool Properties to ➤ Linework and Aec objects.

3 Select the objects and closed polylines to convert, and press *ENTER*.

4 In the Convert to Space worksheet, under Cut Plane Height, the height at which the object should be cut to generate the profile of the new space.

5 If you want to erase the underlying object, select Erase Layout Geometry. To keep the object in the drawing, verify that the option is cleared.

6 If you want to define the cut plane height on screen, select Specify on Screen.

7 Click OK.

8 If necessary, select the cut plane height in the drawing.

Creating a Space Tool

Use this procedure to create a space tool add it to a tool palette. You may want to create your own tools if you frequently place multiple spaces of specific styles that have the same properties.

For example, you might create an office plan with spaces for cubicles. Although all cubicles use the same space style in your floor plan, the cubicle walls in administrative areas are lower than the walls in office areas. To work efficiently, you can create a space tool for each space height. You can then select the appropriate tool to place the cubicles with the correct height in each area of the floor plan.

TIP Space tools can be created for associative and non-associative spaces. When a tool for associative spaces is started, the initial processing of valid boundaries in the drawing can be a lengthy process, depending on the size of the model. Therefore, it is recommended to clearly name your space tools regards to their associativity.

1 Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a space in the drawing	select the space, and drag it to the tool palette.
create a tool from a space style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager. Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.

If you want to…	Then…
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new tool, and click Properties.

Defining general tool properties

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 To add keywords to the tool, click More Info.

7 Expand Basic, and expand General.

8 Click the setting for Description, enter a description displayed for all spaces created from this tool, and click OK.

9 If you do not want to use the layer assignments specified in the layer key style used in the drawing, specify a layer key and any layer key overrides.

10 Select a space style.

11 Select the drawing file containing the style used for this space tool.

12 Enter a name for spaces inserted with the tool.

13 Select a space tag.

14 Select the drawing file containing the tag used for this space tool.

NOTE The Associative property is interlinked with the Create type. If the Create type is Generate, the Associative setting can be edited. You can use the default setting of Undefined (--). If the Create type is Insert, Rectangle, or Polygon, the Associative setting defaults to Undefined (--) and becomes read-only.

15 For Offset boundaries, select how the 4 space boundaries (base, net, usable, and gross boundary) are calculated. For information about space boundaries, see Working with Space Boundaries on page 1957.

- Manual: The net, usable, and gross boundaries can be manually edited with grips.
- By style: The net, usable, and gross boundaries are offset from the base boundary by a value defined in the space style. For more information, see Specifying Space Boundary Offsets in a Space Style on page 2020.
- By standard <Standard Name> (associative spaces only): The net, usable, and gross boundaries are defined by the area calculation standard listed. For more information, see Specifying an Area Calculation Standard for a Drawing on page 1960.

16 Select the Create type of the space. You can choose one of these options:

- Insert: Inserts a space according to the target dimensions in the space style.
- Rectangle: Inserts a rectangular space with user-defined length and width.
- Polygon: Inserts a polygonal space with user-defined segments.
- Generate: Inserts a space associative to boundary objects.

17 If you selected Polygon for Create type, define the shape of the first space segment for Segment Type.

You can select a line or an arc segment.

Defining settings for associative spaces

18 If you need to generate spaces within boundaries that already contain a space, select Yes for Allow overlapping spaces.

By default, you cannot generate a new space in a boundary that already contains an existing space. However, a situation can arise where you want to establish an interference between 2 spaces and therefore need to generate a space within a boundary that already contains a space.

Defining the geometry type of the space

19 Expand Component Dimensions.

20 Specify the geometry type of the space tool:

If you want to…	Then…
create a 2D space tool	select 2D from the list.
create an extruded 3D space tool	select Extrusion from the list.
create an associative 3D freeform space tool (associative spaces only)	select Freeform from the list.
create multiple space types with the tool	select Undefined (--) from the list.

Defining the space height in the space tool

21 If you are creating a space tool for a 3D space, you can enter parameters for the space height.

NOTE If you want to create spaces of different heights with this tool, you can leave all the settings as Undefined (--).

If you want to…	Then…
specify the overall height of the space, including floor to ceiling height, ceiling and floor thickness, and space above ceiling and below floor	enter a value for Overall space height.
specify the ceiling height of the space	enter a height value.
specify a floor thickness	enter a value for Floor thickness.
specify a ceiling thickness	enter a value for Ceiling thickness.
specify the distance between the top of the space ceiling to the top of the space	enter the appropriate value for Height above ceiling.
specify the distance between the bottom of the space floor and the bottom of the space	enter the appropriate value for Height below floor.
specify the combined height of ceiling height, ceiling thickness, and height above ceiling	enter a value for Default surface height.

22 Select one of the following options for Justification to specify the vertical position of the space insertion point relative to the space:

- Top of floor
- Bottom of floor
- Bottom of space below floor (available only if the height of the space below the floor is bigger than 0.)

Defining target dimensions in the space tool

23 Expand Actual Dimensions.

NOTE The settings for target dimensions of a space are visible only if you have selected Insert as the Create type. Rectangular and polygonal spaces do not observe target dimensions. The range of values allowed here depends on the target dimensions defined in the space style.

24 To specify the geometry of the space within the boundaries of the target dimensions on screen, select Yes for Specify on Screen.

To specify the geometry of the space by entering values in the Properties palette, select No for Specify on Screen.

25 Specify which dimension of the space should be constrained during insertion:

If you want to…	Then…
fix the area value during insertion	select Area for Constrain. This lets you change the length and width of the space, but only within the range of the target dimensions. For example, if you constrain the area to 9m^2, you can still choose to make both length and width 3m, or to make the length 4m, and the width 2.25 meters, as both combinations result in an area of 9 m^2.
fix the length during insertion	select Length for Constrain. If you constrain the length of a space, then any change to the space area will only change the width dimension of the space, and vice versa.
fix the width during insertion	select Width for Constrain. If you constrain the width of a space, then any change to the space area will only change the length dimension of the space, and vice versa.
do not fix a specific dimension during insertion	select *NONE* for Constrain. In this case no individual dimension is constrained, and you can specify any geometry as long as it is within the target dimensions.

26 If you selected No for Specify on screen, enter values for the non-constrained dimensions for Base Area, Length, and Width.

27 If you have selected to generate a 3D freeform space, define the 2 calculation cut planes under Advanced Dimensions.

28 Click OK.

Editing General Space Properties

These general properties of a space can be edited for all space types:

Renaming a Space

Use this procedure to rename a space.

1. Double-click the space you want to rename.
2. On the Properties palette, expand Basic, and expand General.
3. For Name, do one of the following:
   - If a list definition has been attached to the space style, select a name from the list.
   - If no list definition has been attached to the space style, enter a name in the Name field. For more information, see List Definitions on page 2030.

Changing the Style of a Space

Use this procedure to assign a different space style to a space. The space style defines the list definition used, boundary offsets, and the display properties of the space. For more information, see Space Styles on page 2018.

1. Double-click the space you want to change.
2. On the Properties palette, select a new style for Style.

When you change the space style, and the new space style has a different list definition in which the existing space name is not contained, it is possible that the existing space name is deleted and the space name defaults to the first name in the new list definition.

For more information, see List Definitions on page 2030.

Changing the Location of a Space

Use this procedure to relocate a space by changing the coordinate values of its insertion point. The space also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the space are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the space by aligning its normal with another axis. You can also rotate the space on its plane by changing the rotation angle.

NOTE This procedure is valid only for non-associative spaces. The location of an associative space is determined by its boundary objects.

For information about moving individual space boundaries, see Changing the Location of a Space Boundary on page 1971.

For more information about the WCS and the UCS, see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1. Double-click the space you want to change.
2. On the Properties palette, expand Basic, and expand Location.
3. Click Additional information.
4. On the Location worksheet, specify the location of the space:

If you want to…	Then…
relocate the space	enter new coordinate values for Insertion Point.
locate the space on the *XY* plane	make the normal of the space parallel to the *Z* axis: for Normal, enter **1** for Z, and enter **0** for X and Y.

If you want to…	Then…
locate the space on the *YZ* plane	make the normal of the space parallel to the *X* axis: for Normal, enter **1** for X and enter **0** for Y and Z.
locate the space on the *XZ* plane	make the normal of the space parallel to the *Y* axis: for Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the space	enter a new value for Rotation Angle.

5 Click OK.

Specifying the Decomposition Type for a Space

Use this procedure to specify the type of subentities into which a space is decomposed and the type of AutoCAD entities into which the decomposed space is converted when exploded.

1 Double-click the decomposed space.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

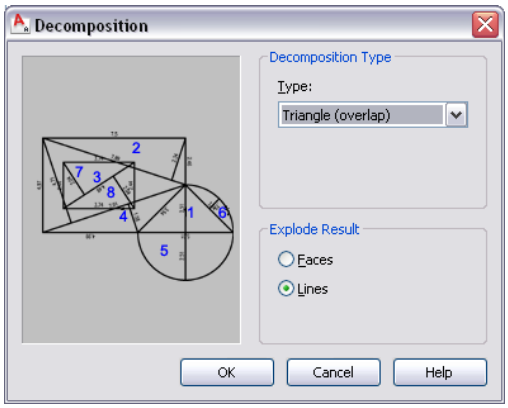
4 For Display controlled by, select This object.

NOTE To apply your changes to all space decompositions in the drawing, select Drawing default setting. To apply changes to all space decompositions of this style, select Space Style:<style name>. For more information on styles, see Space Styles on page 2018.

5 For Display representation, verify that Decomposed is selected.

6 If necessary, expand Object Display Properties ➤ Advanced.

7 Click Decomposition.



8 Under Decomposition Type, select an option for Type:

If you want to…	Then…
display a trapezoid decomposition	select Trapezoid.
display a triangular decomposition without overlapping triangles	select Triangle.

If you want to…	Then…
display a triangular decomposition with overlapping triangles	select Triangle (overlap).

9 Under Explode Result, select an option:

If you want to…	Then…
change the decomposed space into single lines after exploding	select Lines.
change the decomposed space into closed polylines for each decomposed part	select Faces.

10 Click OK.

You can also access these option through the decomposed space's context menu, as follows:

1 Select the decomposition, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 In the Display Properties dialog, click the Decomposition tab, and then specify the options that you want.
5 Click OK twice.

Specifying the Decomposition Text Properties for a Space

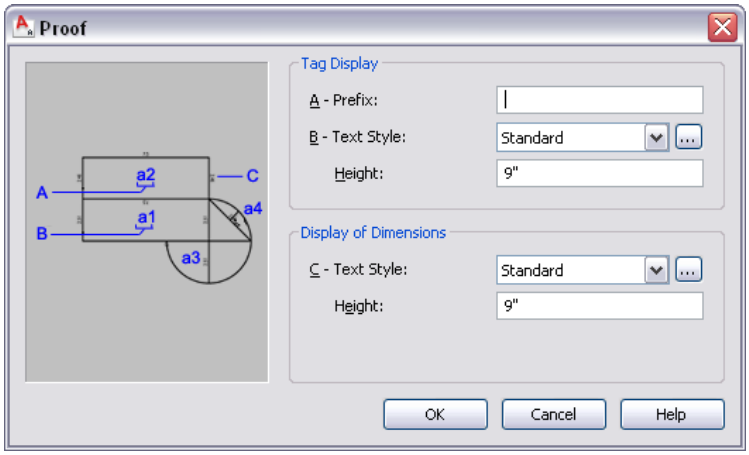
Use this procedure to specify the text properties for the tags and edge dimensions displayed for subentities in a space decomposition.

1 Double-click the decomposed space.
2 On the Properties palette, click the Display tab.
3 Under the General category, for Display component, verify that *NONE* is selected.
4 For Display controlled by, select This object.

NOTE To apply your changes to all space decompositions in the drawing, select Drawing default setting. To apply changes to all space decompositions of this style, select Space Style:<style name>. For more information on styles, see Space Styles on page 2018.

5 For Display representation, verify that Decomposed is selected.
6 If necessary, expand Object Display Properties ➤ Advanced.

7 Click Proof.



8 Under Tag Display, define the prefix settings:

If you want to…	Then…
display a prefix for the numbers of the space subdivisions	enter a prefix.
change the style of the numbers of the space subdivisions	either select a text style from the list or click the Browse button and create a new text style. For more information, see "Text Style Dialog Box" in AutoCAD Help.
change the height of the numbers in the space subdivisions	enter a value for Height.

9 Under Display of Dimensions, define the edge dimension settings:

If you want to…	Then…
change the style of the edge dimensions	either select a text style from the list or click the Browse button and create a new text style. For more information, see "Text Style Dialog Box" in AutoCAD Help.
change the height of the edge dimensions	enter a value for Height.

10 Click OK.

You can also access these option through the decomposed space's context menu, as follows:

1 Select the decomposition, right-click, and click Edit Object Display.
2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.
3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4 In the Display Properties dialog, click the Proof tab, and then specify these options as desired.
5 Click OK twice.

Specifying the Cut Plane Display of a Space

Use this procedure to specify the properties of one or more cut planes for an individual space. Cut plane display properties apply only to display representations, such as Plan, that are used in the Top view (plan view) of a drawing.

1. Double-click the space you want to change.
2. On the Properties palette, click the Display tab.
3. Under the General category, for Display component, verify that *NONE* is selected.
4. For Display controlled by, select This object.

> **NOTE** To apply your changes to all spaces in the drawing, select Drawing default setting. To apply changes to all spaces of this style, select Space Style:<style name>. For more information on styles, see Space Styles on page 2018.

5. If necessary, expand Object Display Properties ➤ Cut Plane.
6. For Override cut plane, specify whether you want to override the global cut plane defined for the current display configuration.
7. If you selected Yes for Override cut plane, enter a value for Height to define the cut plane for this object. (Alternatively, you can click the value, click , and specify 2 points in the drawing area to define the new height.)

You can also access and modify these same cut plane settings through the space's context menu, as follows:

1. Select the space you want to change, right-click, and click Edit Object Display.
2. In the Object Display dialog, click the Display Properties tab.
   The current display representation is displayed in bold.
3. Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.
4. In the Display Properties dialog, click the Cut Plane tab, and then change the settings as needed.
5. Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Space

Use this procedure to attach hyperlinks, notes, or files to a space. You can also edit hyperlinks and notes, and edit or detach reference files from a space.

1. Double-click the space to which you want to attach information.
2. On the Properties palette, click the Extended Data tab.
3. To add a hyperlink, click the setting for Hyperlink, and specify the link.
4. Click OK.
5. To add a note, click the setting for Notes, and enter the note.
6. Click OK.
7. To add a reference file, click the setting for Reference documents, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.

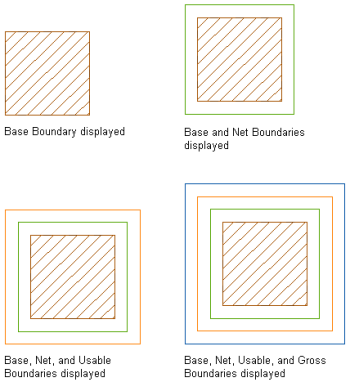
If you want to…	Then…
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Working with Space Boundaries

Spaces have 4 different boundaries. You can use them to display, edit, and schedule different aspects of the space. You can choose that these boundaries are not offset from each other, and lie on top of each other. If you do not need different boundaries, you can even turn off the display components for the additional boundaries. Here are some typical use cases for using individual boundaries:

- Base boundary: Normally representing the inner area of a room covered by a space. This is the area generated by boundary objects in an associative space. In most cases, the base boundary is identical to the net boundary, except in some area calculation standards like the Swedish SIS standard.
- Net boundary: This boundary can be used for planning and detailed design. For example, if you need to determine the hiring of cleaning personnel for an office, you would use the net area as the calculation basis. The net boundary can also be used for special applications when the calculated area of a space is smaller than the base boundary.
- Usable boundary: This boundary is in many area calculation standards used for planning and detailed design, renting calculations, tax and other duty calculations, statistical calculations, maintenance, pricing, and more. The usable boundaries typically extend from the inside of the exterior walls to the middle of the interior walls (or a specified distance into the interior walls).
- Gross boundary: the gross boundary can be used in connection with cost calculation, price estimation, calculation of tax and other duties, key numbers for the building or a specific floor, and more. Normally, the gross boundary is measured from the outside of the exterior walls to the middle of the interior walls.



There are different ways to determine how the boundaries should be offset from each other and calculated:

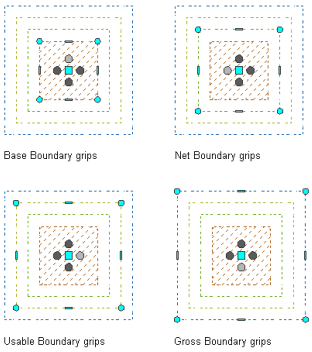
- Manual
- By style

- By area calculation standard

Working with Manual Boundaries

You can define the boundaries of a space manually. Manual boundaries have grips to edit the boundary shape of each boundary. If you insert a new space with manual boundaries, by default the offsets between the boundaries are 0. To grip-edit manual boundaries, you first must activate the boundaries (Activating Manual Space Boundaries on page 1964) and then grip edit them (Grip-Editing Space Boundaries on page 1965.)

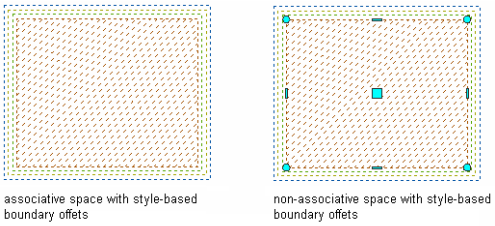
Grip-editable manual boundaries



In a non-associative space with manual boundaries all 4 boundaries are grip-editable. In an associative space with manual boundaries, the net, usable, and gross boundaries are editable. The base boundary of an associative space is controlled by the boundary objects.

Working with Style-Based Boundaries

You can define the offsets between space boundaries in the space style (Specifying Space Boundary Offsets in a Space Style on page 2020.) In a non-associative space with style-based boundary offsets, you can grip-edit the base boundary only; the net, usable, and gross boundary are controlled by the style. In an associative space with style-based offsets, you cannot grip-edit any boundary. The base boundary is controlled by the boundary objects of the space, and the net, usable, and gross boundaries are controlled by the style.



Working with Boundaries Based on an Area Calculation Standard

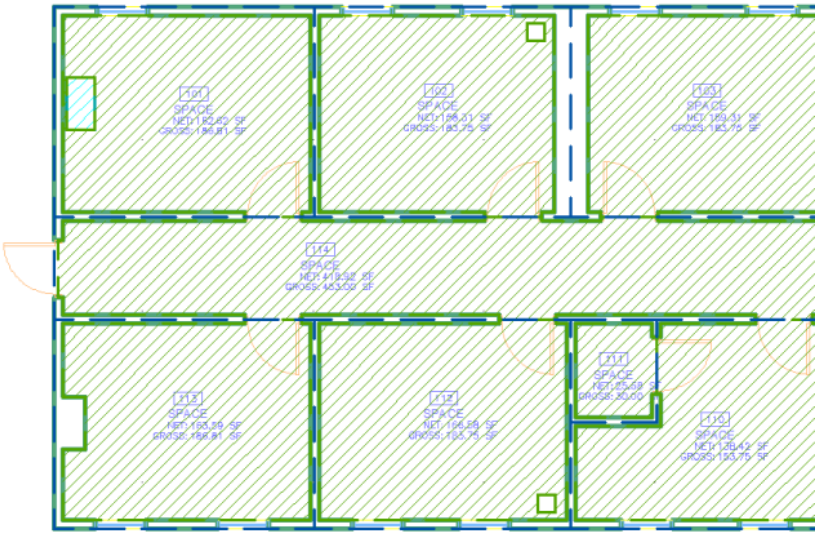
You can define the boundaries of a space by an area calculation standard specified in the drawing. The area calculation standard may consider the space's type, classification, location, and relation to other spaces when calculating the space's boundaries. For example if a room is bounded by an exterior wall, the area calculation standard may place the gross boundary of the space at the outside of the exterior wall. If a room is bounded by an interior wall, the area calculation standard may place the net boundary at the middle of the interior wall. In many cases, spaces need to be classified to have their offsets calculated correctly. For example, if a space is classified as Office Area using the BOMA area calculation standard, then its usable boundary is

measured to the inside face of the wall if the adjacent space is classified as Common Floor Area. If the adjacent space is also classified as Office Area, the usable boundary is measured to the centerline of the wall.

To use an area calculation standard, you need to define it for your drawing, as described in Specifying an Area Calculation Standard for a Drawing on page 1960. For some standards you also need to classify spaces, as described in Classifying a Space According to an Area Calculation Standard on page 1961.

Standards shipped with AutoCAD Architecture include a general Basic standard, DIN-277, BOMA, and SIS. For more information, see Appendix 2: Predefined Area Calculation Standards on page 2090.

Only associative spaces may have their boundaries calculated by an area calculation standard. In a space with standard-based offsets, you cannot grip-edit any boundary. The base boundary is controlled by the boundary objects of the space, and the net, usable, and gross boundaries are controlled by the area calculation standard.



Defining the Boundary Offset Type of a Space

Use this procedure to define how the boundaries of a space are offset. You can set the boundary offset type while creating a space or you can select an existing space and change the existing offset type.

For non-associative spaces, you can select manual and style-based offsets. For associative spaces, you can select manual, style-based, and calculation standard-based offsets.

Defining the boundary offset type of a new space

1 Select a space tool to create a space.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Space .

2 In the Properties palette, under Offset boundaries, select one of these boundary offset types:

- Manual
- By Style
- By Standard

3 Proceed with creating the space as described in Creating Non-Associative Spaces on page 1942.

Changing the boundary offset type of an existing space

1. Select the space where you want to change the boundary calculation.
2. In the Properties palette, under Offset boundaries, select the desired boundary offset type.

   Depending on which type you choose, the boundaries can react in different ways:

Associativity	Switch from	Switch to	Effect
Non-associative	Manual	By Style	The net, usable, and gross boundaries are re-calculated according to the style offsets, and become non-editable. The base boundary remains unchanged and editable.
Non-associative	By Style	Manual	The net, usable, and gross boundaries keep their offsets but become editable. The base boundary remains unchanged and editable.
Associative	Manual	By Style	The boundaries are re-calculated according to the style offsets, and become non-editable. The base boundary remains unchanged and non-editable.
Associative	Manual	By Standard	The boundaries are re-calculated according to the rules in the area calculation standard, and become non-editable. The base boundary remains unchanged and non-editable.
Associative	By Style	Manual	The net, usable, and gross boundaries keep their offsets but become editable. The base boundary remains unchanged and non-editable.
Associative	By Style	By Standard	The net, usable, and gross boundaries are re-calculated according to the rules in the area calculation standard. All boundaries remain non-editable.
Associative	By Standard	Manual	The net, usable, and gross boundaries keep their offsets but become editable. The base boundary remains unchanged and non-editable.
Associative	By Standard	By Style	The net, usable, and gross boundaries are re-calculated according to the offsets defined in the space style. All boundaries remain non-editable.

Specifying an Area Calculation Standard for a Drawing

Use this procedure to specify an area calculation standard for a drawing. The standard defines the calculation of the individual boundaries according to the rules of the chosen standard.

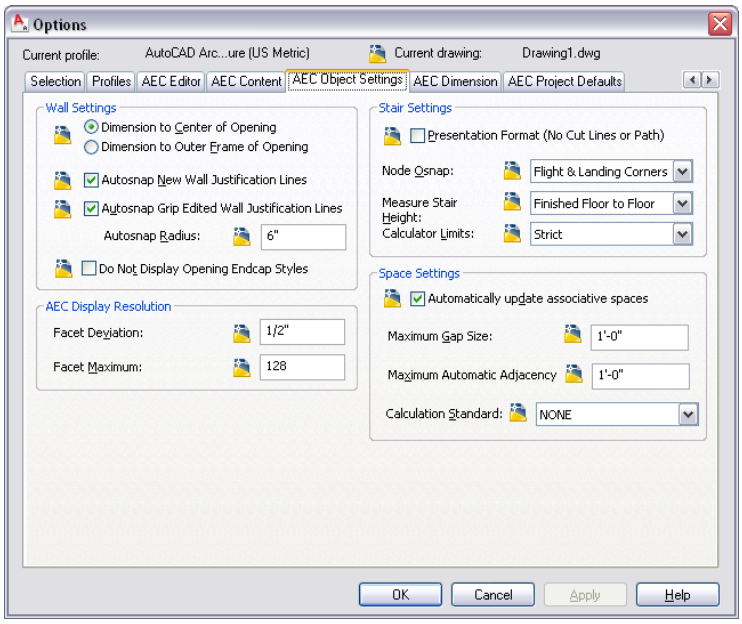
AutoCAD Architecture ships with a number of predefined area calculation standards based on the rules of these country-specific standards:

- BOMA standard (USA)
- DIN-277 standard (Germany)
- SIS standard (Sweden)
- Basic standard (Generic standard)

NOTE An area calculation standard can be used only for associative spaces. The boundaries of non-associative spaces can only be calculated in the space style or modified manually.

1 Click ➤ Options.

2 Click the AEC Object Settings tab.



3 For Calculation Standard, select the area calculation standard you want to use when generating spaces from your floor plan.

4 Click OK.

TIP Alternatively, you can set the area calculation standard on the command line by entering **AecSpaceCalculationStandard**.

Classifying a Space According to an Area Calculation Standard

If you have generated a space that has its boundaries calculated by an area calculation standard, you may need to classify the space according to the selected standard, in order to provide the standard with the necessary information to calculate the boundaries. For example, the BOMA standard requires classifying spaces according to their space type, as the space type is relevant for determining boundary offsets.

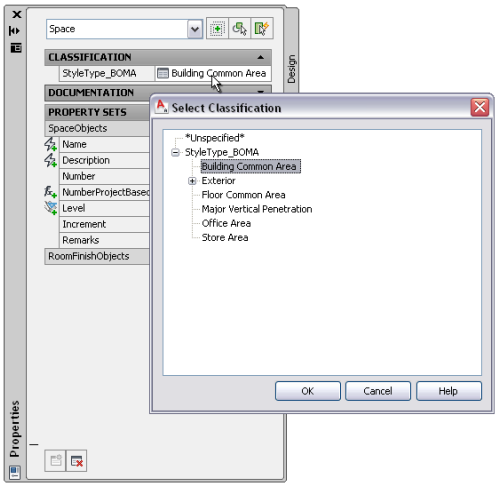
1 Select a space that has its boundary calculation defined by an area calculation standard.

2 On the Properties palette, click the Extended Data tab.

3 For Classification, the classification definition belonging to the area calculation standard defined for this drawing is displayed.

For example, if you have selected the BOMA area calculation standard for your drawing, the BOMA classification definition is displayed.

4 Click the setting for the required classification type, and select a classification in the Select Classification worksheet.



5 Click OK.

Changing the Area Calculation Standard for Existing Spaces

If you have created a number of spaces in your drawing with an area calculation standard, and then change the area calculation standard for the drawing, the spaces get recalculated according to the rules of the new standard. The classification definition for the new area calculation standard is inserted in the drawing, but the space might need to get re-classified according to the new standard. For example, if you calculate your spaces according to the SIS standard, and classify a space as “Shaft”, and then re-calculate the spaces according to the BOMA standard, then the initial BOMA classification is set to “Unspecified.” You need to select a corresponding BOMA classification, like for example “Major Vertical Penetration.”

For more information, see Specifying an Area Calculation Standard for a Drawing on page 1960 and Classifying a Space According to an Area Calculation Standard on page 1961.

When a new area calculation standard is selected for the drawing, the classification definition for the previously used standard is not removed, but remains in the drawing. This can be helpful if you need to switch back and forth between different standards, and do not want to lose the classifications of the currently not active standard every time you switch.

If you know that you will not be using a certain standard anymore, you can delete its classification definition from Style Manager. To delete a classification definition, it must not be referenced by any objects. To remove the references to the classification standard, change all spaces that use a classification from this definition to *Unspecified*.

Working with Drawings with Different Area Calculation Standards

When you exchange drawings that contain spaces with boundary offsets calculated by an area calculation standard, the recipient of the drawing must have the same area calculation standard available in their version

of AutoCAD Architecture. If you try to open the drawing in a version of AutoCAD Architecture where you cannot select that standard in the AEC Options page - meaning that this standard is not installed - all spaces will be drawn with a solution tip icon. To remedy this, copy the DLL for the necessary standard into *\\Autodesk AutoCAD Architecture 2010\Space Calculation Standards* folder. In AutoCAD Architecture DLLs for these 4 standards are included: Basic, BOMA, SIS, and DIN-277. The Basic standard is located directly in the application folder and should not be moved or deleted.

If you are working with spaces in external references, each space will use the boundary offsets and area calculation standard defined in its containing drawing. This can cause different boundary offsets to be used across a project, so you should verify that each drawing uses the same boundary offsets and area calculation standard.

User-Defined Area Calculation Standards

Each area calculation standard is written in a separate module using .NET. Each .NET module includes the space calculation method as well as generating the space classification. In AutoCAD Architecture there are 4 standards included: Basic, BOMA, SIS, and DIN-277. The .NET modules for BOMA, SIS, and SIN are in the folder *\\AutoCAD Architecture 2010\Space Calculation Standards* . The Basic standard .NET module is located directly in the application folder and should not be moved or deleted. Users can create and use their own standards. For more information, see Appendix 3: Implementing an Area Calculation Standard Plug-in with the AutoCAD Architecture .NET API on page 2101.

Editing Space Boundaries

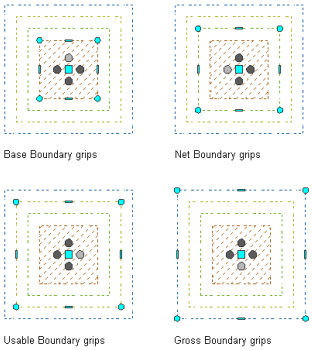
Spaces have 4 boundaries.

Depending on which type of space you have created and which boundary offset type you use, different boundaries can be edited with grips:

Space Type	Boundary Offset Type	Editable Boundaries
Associative	Manual	Net, Usable, Gross
Associative	By Style	None
Non-Associative 2D or extruded 3D	Manual	Base, Net, Usable, Gross
Non-Associative 2D or extruded 3D	By Style	Base
Non-Associative 3D Freeform	Manual	Net, Usable, Gross
Non-Associative 3D Freeform	By Style	None

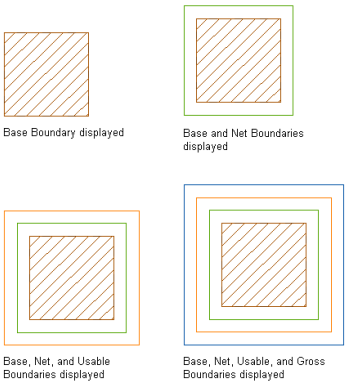
IMPORTANT The net, usable, and gross boundaries of a space can only be displayed in plan views. In model views, only the base boundary and the base body of the space are displayed.

Editable boundaries of a space with manual offsets



Displaying Space Boundaries

By default, only the base boundary of a space is displayed. If you want to display or edit the net, usable, and gross boundaries, you need to make their display components visible.



For instructions on how to display the additional space boundaries in the space style, see Specifying the Display Properties of a Space Style on page 2024.

Activating Manual Space Boundaries

After making the net, usable, and gross boundaries visible, you need to activate them in order to be able to grip-edit them.

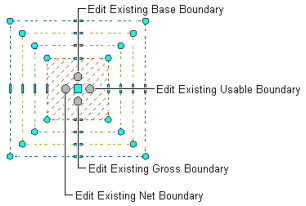
NOTE Activating a boundary is a precondition for any operation you want to perform on the boundary, like grip-editing or boolean operations.

1. If necessary, switch to a Plan view.

   The net, usable, and gross boundaries of a space can only be activated and displayed in Plan views.

2. Select a space for which you want to display a boundary.

Activated boundary grips



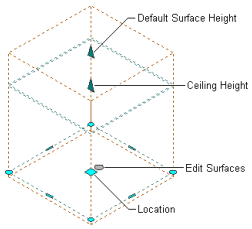
3 Verify that Offset Boundaries in the Properties palette is set to Manual.

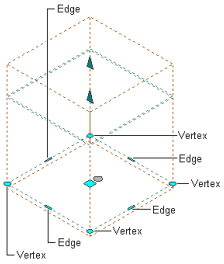
4 Use the trigger grip for the appropriate boundary to activate and deactivate the grip set.

Alternatively, you can right-click a space, click Edit Boundary on the context menu, and then select a boundary from the submenu to activate or deactivate.

Grip-Editing Space Boundaries

Use this procedure to edit a space using grips.

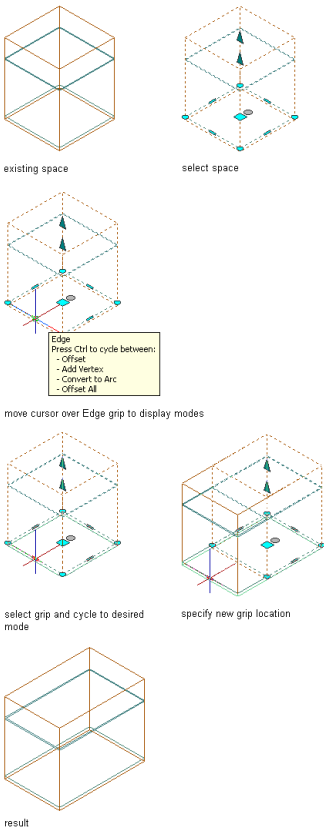




The Edge grip has 4 edit modes:

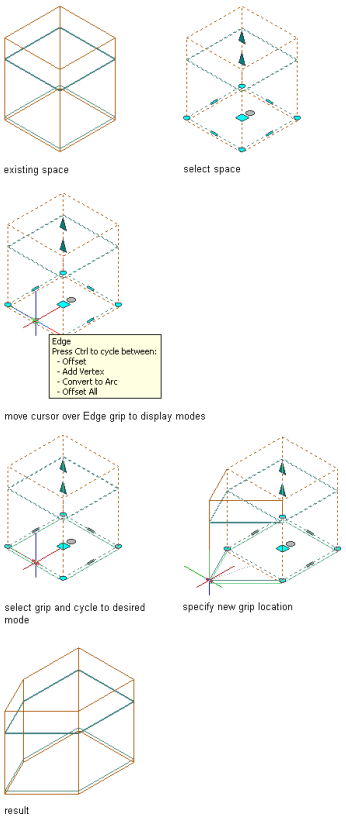
- Offset: This is the default. Use it to offset the selected edge in a direction perpendicular to the midpoint of the edge. Depending on the shape of the boundary and the edge, neighboring lines are extended or trimmed, and new lines are added as necessary.

Offsetting the edge of a space boundary using the Edge grip



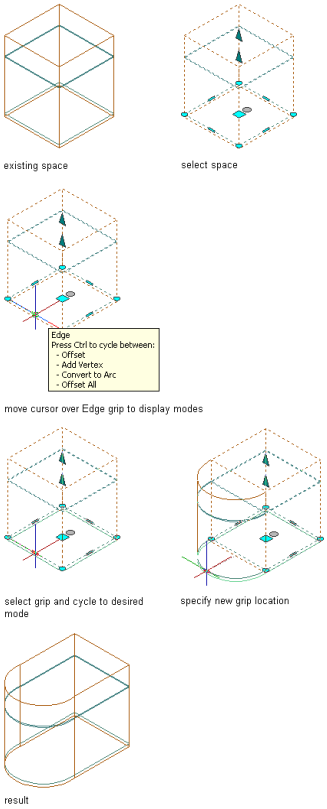
- Add Vertex: Use this edit mode to add a vertex to the selected edge, and create a new edge. If the selected edge is an arc, the new edge is also an arc.

Adding a vertex to the edge of a space boundary using the Edge grip



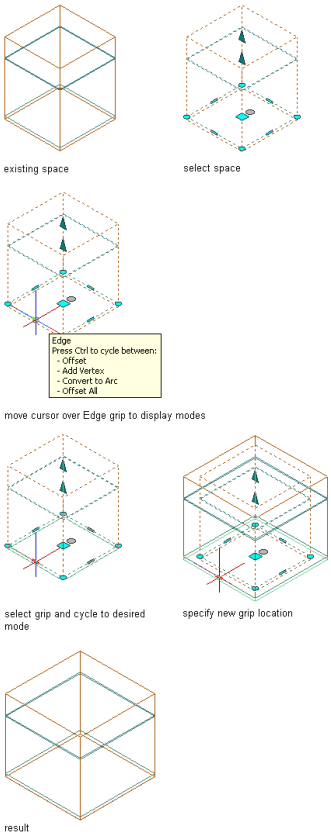
- Convert to Arc: Use this edit mode to convert the selected edge to an arc and stretch the midpoint of the arc. The edge grip for an arc also has a Stretch mode. You can use it to stretch the midpoint of the arc, thus increasing the size of the arc.

Converting the edge of a space boundary to an arc using the Edge grip



- Offset all: Use this option to move all edges of a space boundary an identical distance. When you drag one edge, all other edges are repositioned accordingly. This option is very useful for regular resizing operations, like scaling a space boundary.

Offsetting all edges of a space boundary using the Edge grip



Changing the edge of a space boundary

1 Activate the boundary where you want to change an edge.

2 Select the Edge grip for the edge you want to change.

3 Specify the new edge location:

If you want to…	Then…
offset the edge	move the edge to the desired location and click, or enter a value and press *ENTER*.
add a vertex and create an edge	press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location and click, or enter a value and press *ENTER*.
change a selected edge to an arc/change a selected arc to a line	press *CTRL* twice to switch to the Convert to Arc/Convert to Line edit mode. Stretch the midpoint to the desired location and click, or enter a value and press *ENTER*.
offset all edges at an identical distance	press *CTRL* 3 times to switch to the Offset All edit mode. Move the selected edge to the desired location for all edges and click, or enter a value and press *ENTER*.

4 Right-click, and click Deselect All to turn off grips.

Changing the vertex of a space boundary

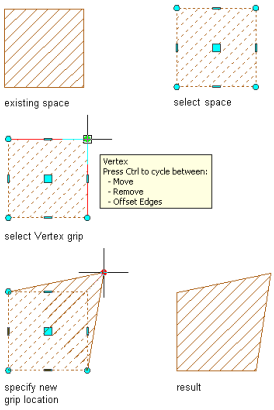
1 Activate the boundary where you want to change a vertex.

2 Select the Vertex grip for the vertex you want to change.

The Vertex grip has 3 edit modes:

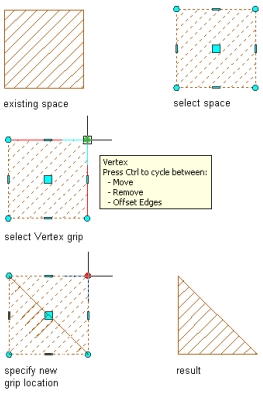
- Move: This is the default. Use it to move the selected vertex in any direction. The neighboring segments are stretched if necessary.

  Moving the vertex of a space boundary using the Vertex grip



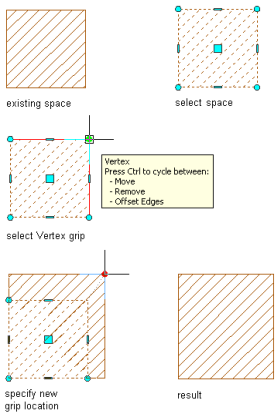
- Remove: Use this edit mode to remove a vertex. The neighboring segments are replaced with a line.

  Removing the vertex of a space boundary using the Vertex grip



- Offset Edges: Use this edit mode to move a vertex and the adjacent edges of the space boundary with it.

Offsetting edges of a space boundary using the Vertex grip



3 Edit the vertex as necessary:

If you want to…	Then…
move the vertex	move the vertex to the desired location and click; or enter a value, and press *ENTER*.
remove the vertex	press *CTRL* to switch to the Remove Vertex edit mode, and click to confirm the removal.
move the vertex and the adjacent edges	press *CTRL* twice to switch to the Offset Edges edit mode. Move the vertex to the desired location, and click; or enter a value, and press *ENTER*.

4 Right-click, and click Deselect All to turn off grips.

Resetting Manual Space Boundaries

Use this procedure to cancel all changes made by grip-editing the net, usable, or gross boundaries of a space. The boundaries will revert back to the geometry of the base boundary.

1 Select the space the boundaries of which you want to reset.

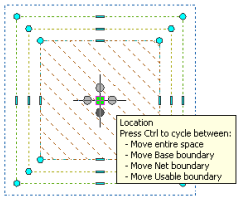
2 Click Space tab ➤ Boundary panel ➤ Reset All .

Changing the Location of a Space Boundary

Use this procedure to move an individual space boundary to a different location with grips. You can move individual boundaries only if you have selected Manual for Offset boundaries.

For associative spaces, only the net, usable, and gross boundaries can be moved. The base boundary is tied to the boundary objects.

For information about moving a space with the location worksheet, see Changing the Location of a Space on page 1952.



1 Select the space for which you want to move an individual boundary.

2 Move a boundary as necessary:

If you want to…	Then…
move the entire space	move space to the desired location and click to release it.
move the base boundary of the space	click and hold the location grip, and press CTRL to switch to Move base boundary mode. Then move the base boundary to the desired location, and click to release it.
move the net boundary of the space	click and hold the location grip, and press CTRL twice to switch to Move net boundary mode. Then move the net boundary to the desired location, and click to release it.
move the usable boundary of the space	click and hold the location grip, and press CTRL 3 times to switch to Move usable boundary mode. Then move the usable boundary to the desired location, and click to release it.
move the gross boundary of the space	click and hold the location grip, and press CTRL 4 times to switch to Move gross boundary mode. Then move the gross boundary to the desired location, and click to release it.

Changing the Type of a Space

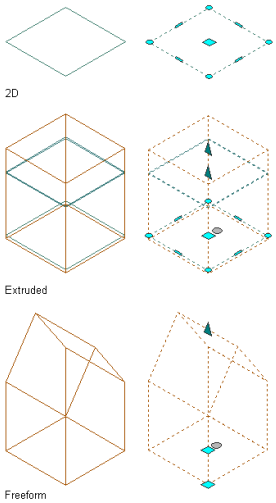
You can change an extruded 3D space to a 2D space, or to a 3D freeform space, and vice versa. You can also make a non-associative space associative to boundary objects or disconnect an associative space from its boundary objects. Each of these operations will change editable properties of the space and the user interaction. The following table shows the results of changing a space from one geometry type to another.

Original Geometry Type	New Geometry Type	Result
Non-associative 2D	Non-associative extruded 3D	■ Editable properties for the space height and space justification are added. The insertion point and justification of the space will be set to the top of the floor. ■ Surface editing is enabled.

Original Geometry Type	New Geometry Type	Result
Non-associative 2D	Non-associative 3D freeform	■ Editable properties for a subset of the space height are added. ■ Editable properties for calculation cut planes are added. ■ Surface editing is enabled. ■ Length and width properties become non-editable.
Non-associative 2D	Associative 2D	■ Length, width, rotation, and elevation become dependent on the boundary objects and are not editable anymore. ■ Base boundary becomes dependent on boundary objects and is not grip-editable anymore.
Non-associative 2D	Associative extruded 3D	■ Length, width, rotation, and elevation become dependent on the boundary objects and are not editable anymore. ■ The insertion point and justification of the space will be set to the top of the floor. ■ Editable properties for the space height and space justification are added. ■ Base boundary becomes dependent on boundary objects and is not grip-editable anymore.
Non-associative 2D	Associative 3D freeform	■ Length, width, rotation, and elevation become dependent on the boundary objects and are not editable anymore. ■ Editable properties for a subset of the space height are added. ■ Editable properties for calculation cut planes are added. ■ Base boundary becomes dependent on boundary objects and is not grip-editable anymore.
Non-Associative Extruded 3D	Non-Associative 3D Freeform	■ Overall space height property can only be edited by in-place editing the space geometry. Properties for Default surface height and space justification are not available. ■ Length and width properties can only be edited by in-place editing of space geometry. ■ Editable properties for calculation cut planes are added.
Non-Associative Extruded 3D	Associative extruded 3D	■ Length, width, rotation, and elevation become dependent on boundary objects and are not editable anymore. ■ Surface editing is disabled. ■ Base boundary becomes dependent on boundary objects and is not grip-editable anymore.
Non-Associative Extruded 3D	Associative 3D Freeform	■ Overall space height, length, width, rotation, and elevation become dependent on boundary objects and are not edit-

Original Geometry Type	New Geometry Type	Result
		able anymore. Properties for Default surface height and space justification are not available. ■ Editable properties for calculation cut planes are added. ■ Surface editing is disabled. ■ Base boundary becomes dependent on boundary objects and is not grip-editable anymore.
Non-Associative 3D freeform	Associative 3D Freeform	■ Rotation and elevation become dependent on boundary objects and are not editable anymore. ■ Surface editing is disabled.

Space types with grips



Use this procedure to change the type of a space.

1. Select the space for which you want to change the geometry type, and double-click to display the Properties palette.
2. Expand Basic, and expand Component Dimensions.
3. For Geometry type, select the desired geometry.
4. For information on changing the associativity of a space, see Making a Space Associative or Non-Associative on page 1936.

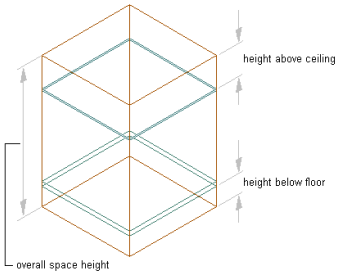
Changing the Space Height

Depending on the geometry type of a space various of its height properties can be edited.

Changing the Height of Extruded 3D Spaces

Use this procedure to change the height of an extruded 3D space. An extruded space is not constrained in the z-direction, and all height components are user-definable. The sum of all components' heights is the overall space height.

NOTE This procedure is valid for associative and non-associative spaces.



1 Double-click the space for which you want to change a height component.

2 On the Properties palette, expand Basic, and expand Component Dimensions.

3 Modify the height of the space:

If you want to…	Then…
specify the overall height of the space, including floor to ceiling height, ceiling and floor thickness, and space above ceiling and below floor	enter a value for Overall space height.
specify the ceiling height of the space	enter a height value. The value you enter here is applied uniformly to the space.
specify a floor thickness	enter a value for Floor thickness.
specify a ceiling thickness	enter a value for Ceiling thickness.
specify the distance between the top of the space ceiling to the top of the space	enter the appropriate value for Height above ceiling.
specify the distance between the bottom of the space floor and the bottom of the space	enter the appropriate value for Height below floor.
specify the combined height of ceiling height, ceiling thickness, and height above ceiling	enter a value for Default surface height.

Changing the Height of 3D Freeform Spaces

In a 3D freeform space, the overall space height is determined either by the boundary objects in an associative space, or by the height of the 3D geometry in a non-associative space. Within the overall space height, you can change the height of individual components, but they will not add or subtract from the overall space height. For example, if you increase the height above the ceiling, then the ceiling height is lowered in return.

These additional restrictions apply to changing the height of a 3D freeform space:

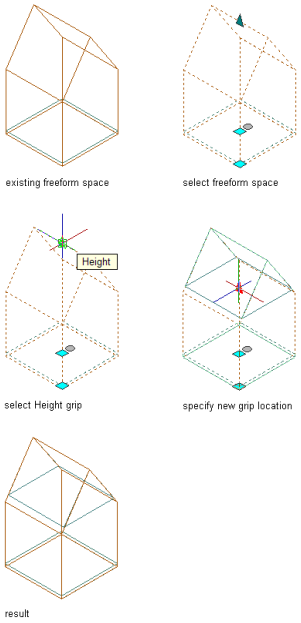
- You can change the ceiling thickness and the height above the ceiling. However, if the ceiling thickness is set to 0, the height above ceiling is 0 and read-only.
- You can change the floor thickness and the height below the floor. However, if the floor thickness is set to 0, the height below floor is 0 and read-only.
- If both ceiling thickness and floor thickness are 0, the ceiling height is read-only.
- The justification of a 3D freeform space is always set to Top of Floor.

- If you put the bottom of the ceiling to the same height as the top of the space, then the ceiling is situated above the actual bounded volume, and will not be drawn. You cannot, however put the bottom of the ceiling above the top of the space.
- If you put the top of the floor to the same height as the bottom of the space, then the floor is situated below the actual bounded volume, and will not be drawn. You cannot, however put the top of the floor below the bottom of the space.
- The ceiling height of a 3D freeform space ranges from the bottom of the ceiling to the top of the floor. In cases where the ceiling and floor are set to 0, the ceiling height ranges from the top of the space to the bottom of the space.

Changing the overall height of a 3D freeform space

This procedure is valid only for non-associative spaces.

1. Select a 3D freeform space for which you want to change the overall height.
2. Click Space tab ➤ Modify panel ➤ Edit In Place .
3. Select the surface grip for the top surface, and drag it to the desired height.
4. **Changing the height of a 3D freeform space**



5. To save the changes to the space height, click Edit in Place tab ➤ Edits panel ➤ Finish .

Changing the height of individual components of a 3D space

This procedure is valid for associative and non-associative spaces.

1. Select the 3D freeform space for which you want to change individual height components.
2. On the Properties palette, expand Basic, and expand Component Dimensions.
3. Modify the height components of the space:

If you want to…	Then…
specify the ceiling height of the space	enter a height value. The value you enter here is applied uniformly to the space.

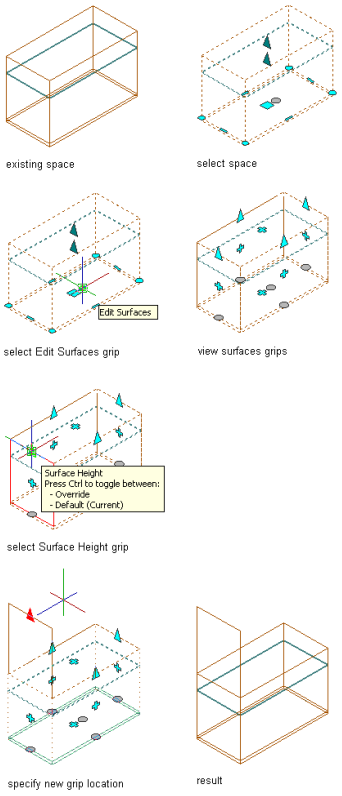
If you want to…	Then…
specify a floor thickness	enter a value for Floor thickness.
specify a ceiling thickness	enter a value for Ceiling thickness.
specify the distance between the top of the space ceiling to the top of the space	enter the appropriate value for Height above ceiling.
specify the distance between the bottom of the space floor and the bottom of the space	enter the appropriate value for Height below floor.

Changing the Height of Space Surfaces (Extruded 3D Spaces)

Use this procedure to grip-edit the height of an individual surface of an extruded 3D space.

NOTE This procedure is valid for associative and non-associative spaces.

1. Verify that you are working in a 3D isometric view.
2. Select the extruded 3D space for which you want to change the height of a surface, and click the Edit Surfaces grip.
3. Select the Surface Height grip for the surface you want to edit, and drag it to the desired height or enter a value for the height.



TIP If you can move the height grip for a surface, but do not see the resulting changed surface, the Surfaces display component might have been turned off either in the space style or in the object display properties. For information about making the component visible, see Specifying the Display Properties of a Space Style on page 2024.

Boolean Operations for Extruded 3D Spaces

There are a number of boolean operations to change the geometry of an extruded 3D space.

Creating Interference Conditions for Spaces

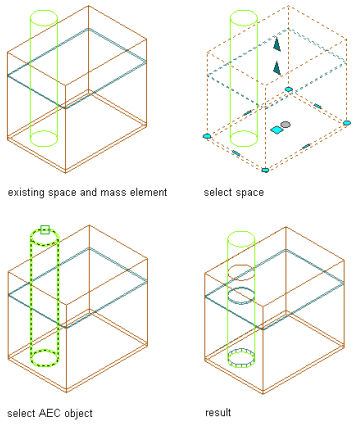
Use this procedure to place objects such as mass elements in a space in order to create custom openings or cutouts. For example, a column grid structure might have columns within the space. Once defined as interference conditions, the columns cut out an area at the floor and ceiling of the space.

NOTE This procedure is valid for associative and non-associative spaces.

Any AEC object that has a 3D geometry can be used as an interference condition, as can AutoCAD polylines.

NOTE Interference conditions are deducted from the base volume of a space. You can add the automatic property Base Area Minus Interference to schedule the value of the area with without the interference condition.

When another object, such as a ceiling grid, is attached to a space object, it recognizes the interference condition. For example, if you add a column to the space as an interference condition, as long as the ceiling grid is anchored to the space object, the ceiling grid is cut. If you move the column, the ceiling grid is updated with the new column location.



Adding an interference condition to a space

1. Place the object you want to use as the interference condition in a location intersecting the space as needed.
2. Select the space to which you want to add the interference condition.
3. Click Space tab ➤ Modify panel ➤ Interference drop-down ➤ Add .
4. Select the objects intersecting the space as the interference condition, and press *ENTER*.

Removing Interference Conditions from Spaces

Use this procedure to remove interference conditions from spaces.

NOTE This procedure is valid for associative and non-associative spaces.

1 Select the space with the interference condition.

2 Click Space tab ➤ Modify panel ➤ Interference drop-down ➤ Remove .

3 Select the object(s) functioning as the interference condition, and press *ENTER*.

Merging Extruded 3D Spaces

Use this procedure to merge 2 or more 3D spaces in a drawing. When you merge spaces that overlap each other, their boundaries are combined to form the boundaries of the merged space.

NOTE This procedure is valid for non-associative spaces.

You can merge a non-associative 3D freeform space into a 2D space or extruded 3D space. In that case, the base profile of the 3D freeform space is used for the merge. You cannot merge a 2D or extruded 3D space into a 3D freeform space.

The following properties of the first selected space are applied to subsequent spaces merged into it:

- Name
- Description
- Layer
- Style
- Tag
- Calculation modifiers
- Zone attachments
- Space height
- Floor thickness
- Ceiling thickness
- Height above ceiling
- Height below floor
- Default Surface height
- Justification
- Boundary offset type
- Rotation
- Display properties
- Schedule properties

Merging Spaces with Manual Boundary Offsets

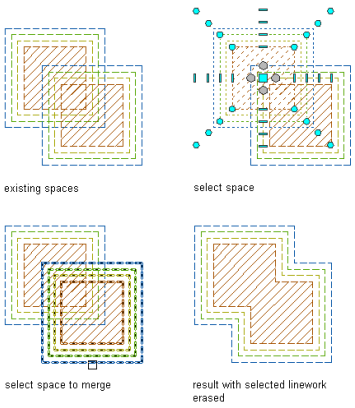
If you merge spaces that have manual boundary offsets, each activated boundary on the first space is merged with the corresponding boundary on the other space (base with base, net with net, and so on).

If a manual space boundary on the first space is not activated (displaying its grips), it is not included in the merge operation. Whether the boundaries on the second space are activated is not relevant for the merge. They are merged if their corresponding boundary on the first space is activated. If a boundary on the first space is not activated, the existing boundary on the first space will remain as it is, and the corresponding boundary on the second space will be deleted. This can result in irregular space boundaries. To avoid this, make sure that on the first space all relevant boundaries are activated, and can be merged.

For information on activating manual space boundaries, see Activating Manual Space Boundaries on page 1964.

The display properties of the boundaries of the first selected space are applied to the resulting merged boundary. For example, if the net boundary of the first space is red with a lineweight of 0.18 mm, the net boundary of the resulting merged space will be red with a lineweight of 0.18 mm.

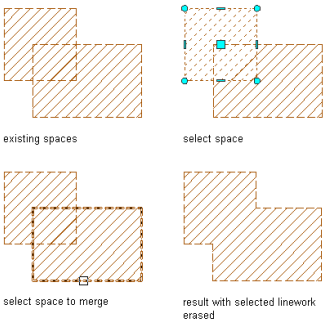
Merging spaces with manual boundaries



Merging Spaces with Style-Defined Boundary Offsets

If you merge spaces with style-defined boundary offsets, the base boundaries of both spaces are merged, and the boundary offsets defined in the style of the first space are applied to the resulting merged space.

Merging spaces with style-defined boundaries

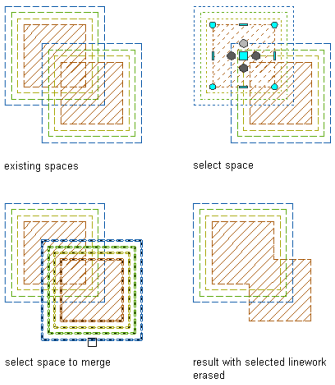


Merging Spaces with Different Boundary Offsets

If the space boundaries of the merging spaces are determined by different methods, the method used for the first selected space is used for the resulting space.

Example 1: The boundaries of the first space are offset by style, and the style defines an offset between boundaries of 0.25 m. The boundaries of the second space are offset manually, and have 0 offset between the individual boundaries. If the first space is merged with the second space, the boundaries previously belonging to the second space are recalculated by the style of the first space, and offset from each other by 0.25 m.

Merging spaces with different boundary offset types



Example 2: The boundaries of space 1 are offset manually, and have 0.3 offset between the individual boundaries. The boundaries of space 2 are offset by style, and the style defines an offset between boundaries of 0.25 m. If space 1 is merged with space 2, the value of the Offset boundaries property for the resulting space will be Manual. Since the net, usable, and gross boundaries of a space with style-based offsets are not grip-editable, only the base boundaries of both spaces will be merged. The boundaries of the second space are deleted from the drawing.

1 Select one of the spaces to be merged right-click, and click AEC Modify Tools ➤ Merge .

2 Select the space to merge with the first space.

NOTE You can merge only those spaces that lie on the same *Z*-plane. Spaces with different *Z*-positions in the same coordinate system cannot be merged.

3 Enter **y** (Yes) to erase the second space or **n** (No) to leave the space in the drawing.

Dividing Extruded 3D Spaces

Use this procedure to divide an extruded 3D space into smaller spaces by using a divide line. The space is split at the line.

NOTE This procedure is valid for non-associative spaces only.

All properties - like for example property data, calculation modifiers, or boundary offset types - will be applied to both resulting spaces.

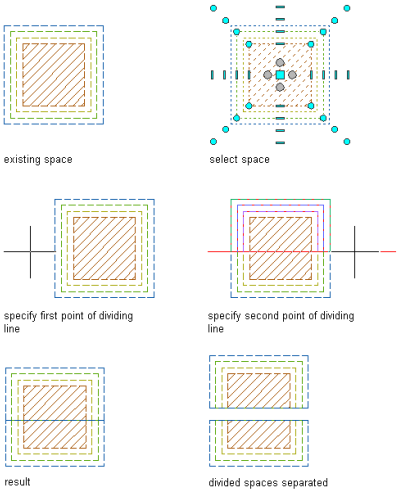
IMPORTANT If you are dividing a space with manual boundary offsets, verify that the all boundaries are activated. Boundaries that are not activated are not divided. For information about activating manual boundaries, see Activating Manual Space Boundaries on page 1964.

1 Select a space to divide, right-click, and click AEC Modify Tools ➤ Divide .

2 Specify the divide line start point.

3 Specify the divide line endpoint.

Depending on the boundary offset type, the divide line will create different results for the net, usable, and gross, boundaries.



Creating Holes in Extruded 3D Spaces

Use this procedure to subtract extruded 3D spaces from one another in order to create a hole in a space.

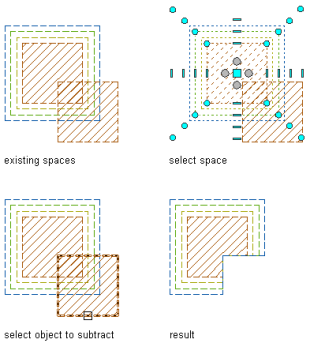
NOTE This procedure is valid for non-associative spaces only.

To create a hole, you need to select spaces that intersect one another. Alternatively, you can select a closed polyline as the shape to subtract. You can choose whether to keep the subtracted space or polyline in the drawing as a separate unit. For example, you may want to keep the space if you need to subtract the same shape from other spaces.

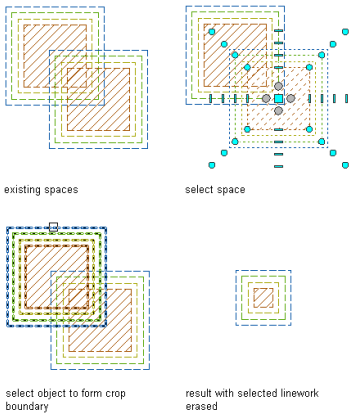
When you subtract one space from another, the base boundary of the subtracted space is subtracted from all boundaries of the first space. The other boundaries of the subtracted space are just deleted without interacting with the first space. Depending on whether the first space has style-defined offsets or manual offsets, the boundaries around the hole are either re-calculated according to the style offsets or cut off at the intersection.

IMPORTANT Before subtracting a space from another space with manual boundary offsets, verify that all boundaries you want to be cut are activated. If a boundary is not activated, the hole will not cut through it. For information about activating manual boundaries, see Activating Manual Space Boundaries on page 1964.

Subtracting spaces with style-defined boundary offsets



Subtracting spaces with manual boundary offsets



1 Create a space in which to create a hole.

2 Create a second, smaller space to be subtracted from the larger space.

You can draw the second space within or overlapping the first space, or you can draw it in another location and then move it onto the larger space.

Alternatively, you can select a closed polyline to subtract from the space.

3 Select the larger space, right-click, and click AEC Modify Tools ➤ Subtract .

4 Select the smaller space to subtract from the larger space.

5 Enter **y** (Yes) to erase the subtracted space, or **n** (No) to leave the space in the drawing.

Creating Spaces from the Intersection of Other Spaces

Use this procedure to create a new extruded 3D space from the overlapping portion of 2 intersecting extruded 3D spaces. You can choose whether to retain the original geometry after creating the new intersection space.

NOTE This procedure is valid for non-associative spaces only.

When a space is created from 2 intersecting spaces, the following properties of the first selected space are applied to the resulting intersection space:

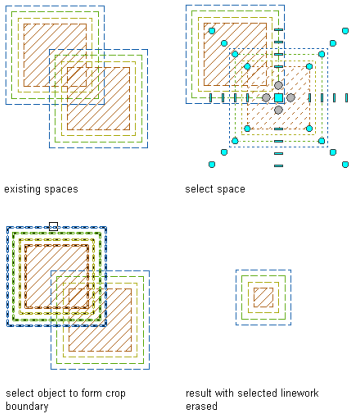
- Name
- Description
- Layer
- Style
- Tag
- Calculation Modifiers
- Zone attachments
- Space height
- Floor thickness
- Ceiling thickness
- Height above ceiling

- Height below floor
- Default surface height
- Justification
- Boundary offset type
- Rotation
- Display properties
- Schedule properties

Intersecting Spaces with Manual Boundary Offsets

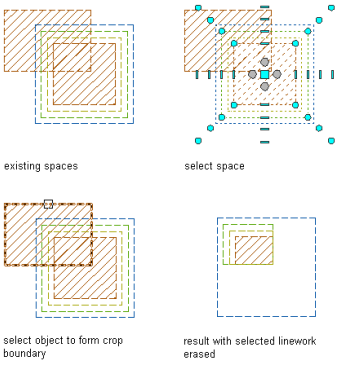
If you intersect spaces with manual boundary offsets, each activated space boundary is intersected with the corresponding space boundary on the other space (base to base, net to net, and so on.)

Intersecting spaces with all boundaries activated



If a manual space boundary on the first space is not activated (displaying its grips), it is not included in the intersecting operation. This will effect the existing boundary on the first space to remain as it is, and the corresponding boundary on the second space to be deleted. This can result in irregular space boundaries. To avoid this, make sure that all relevant boundaries on the first space are activated.

Intersecting spaces with only base boundary activated



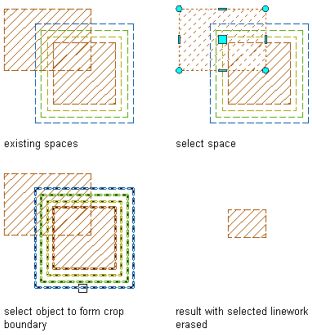
For information on activating manual space boundaries, see Activating Manual Space Boundaries on page 1964.

The display properties of the boundaries of the first selected space are applied to the resulting intersection boundary. For example, if the net boundary of space 1 is red with a lineweight of 0.18 mm, the net boundary of the resulting space will be red with a lineweight of 0.18 mm.

Intersecting Spaces with Style-Defined Boundary Offsets

If you intersect spaces with style-defined boundary offsets, the base boundaries of both spaces are intersected with each other, and the boundary offsets defined in the style of the first space are applied to the resulting intersection space.

Intersecting spaces with style-defined boundary offsets

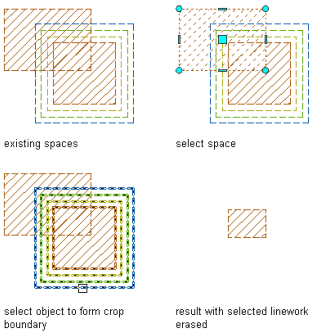


Intersecting Spaces with Different Boundary Offsets

If the space boundaries of the 2 spaces are calculated with different offset types, the method used by the first selected space is also used for the resulting space.

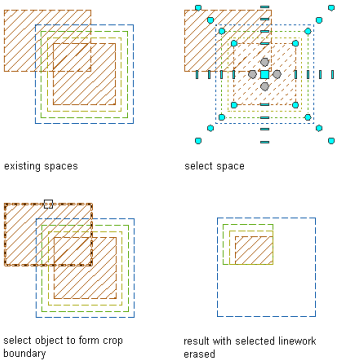
Example 1: The boundaries of space 1 are offset by style, and the style defines an offset between boundaries of 0.25 m. The boundaries of space 2 are offset manually, and have 0 offset between the individual boundaries. If space 1 is intersected with space 2, the base boundaries of the 2 spaces are intersected with each other, and the remaining boundaries are recalculated by the offsets of the style of space 1, and offset from each other by 0.25 m.

Intersecting style-based boundaries (left) with manual boundaries (right)



Example 2: The boundaries of space 1 are offset manually, and have 0.3 offset between the individual boundaries. The boundaries of space 2 are offset by style, and the style defines an offset between boundaries of 0.25 m. If space 1 is merged with space 2, the value of the Offset boundaries property for the resulting space will be Manual. Since the net, usable, and gross boundaries of a space with style-based offsets are not grip-editable, only the base boundaries of both spaces will be intersected. The boundaries of the second space are deleted from the drawing.

Intersecting manual boundaries (left) with style-based boundaries (right)



1 Create 2 overlapping spaces.

2 Select the first overlapping space, right-click, and click AEC Modify Tools ➤ Crop .

3 Select the second overlapping space.

4 Enter **y** (Yes) to erase the original spaces, or **n** (No) to leave the spaces in the drawing.

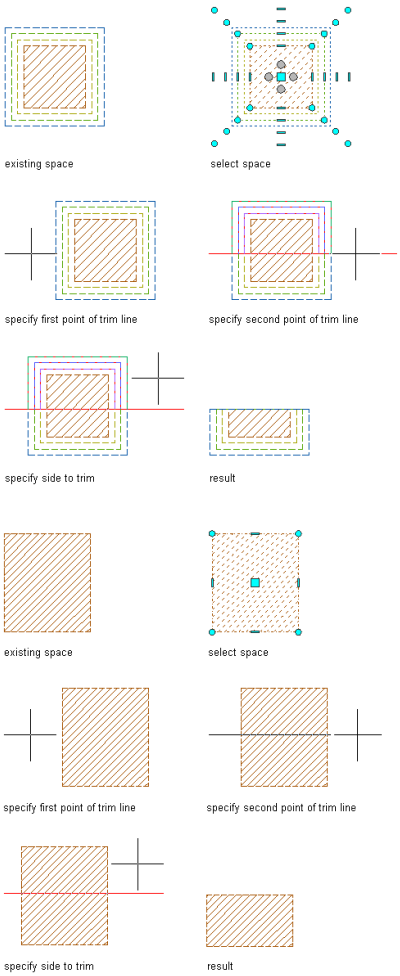
Trimming an Extruded 3D Space

Use this procedure to trim an extruded 3D space with a trim line.

NOTE This procedure is valid for non-associative spaces only.

IMPORTANT If you are trimming a space with manual boundary offsets, verify that the all boundaries are activated. Boundaries that are not activated are not trimmed. For information about activating manual boundaries, see Activating Manual Space Boundaries on page 1964.

Trimming spaces with different boundary offset types



1 Select the space to be trimmed, right-click, and click AEC Modify Tools ➤ Trim .

2 Specify a start point for the trim line.

3 Specify an endpoint for the trim line.

4 Select the side of the space to be trimmed.

Removing Voids from Spaces

Use this procedure to remove individual voids from a space with multiple rings.

NOTE This procedure is valid for non-associative 2D and extruded 3D spaces only.

Voids can be created in the following cases:

- You cut a hole in a space as described in Creating Holes in Extruded 3D Spaces on page 1982.
- You generate a space from boundary objects that have interference objects within their boundaries. For example, you can generate a space for a room with a row of columns in it. In that case, the boundaries for the room would be defined as the outer space ring and the columns would be deducted as holes from the generated room. If you deactivate the associativity of the space, you can remove the resulting space rings.

- A legacy multi-ring area is converted to a space using the current software.

1 Select a space with voids.

2 Click Space tab ➤ Modify panel ➤ Remove Void .

3 Select the void you want to remove from the space.
The void is removed.

4 Press *ENTER*.

Reversing Space Rings

Use this procedure to reverse the value of an individual space ring, so that a positive ring (space) can be transformed into a negative ring (hole), or a negative ring back into a positive ring.

NOTE This procedure is valid for non-associative 2D and extruded 3D spaces only.

Multi-level space rings are most likely to occur in legacy area objects that have been converted to spaces.

1 Select a space of which you want to reverse a ring.

2 On the command line, enter **SpaceReverseRing**.

3 Select the space ring you want to reverse.

Reversing All Rings in a Space

Use this procedure to reverse all rings of a space at once.

NOTE This procedure is valid for non-associative 2D and extruded 3D spaces only.

When you reverse the space rings, all positive rings are transformed into negative rings and all negative rings are transformed into positive rings.

Reversing the value of all space rings may be desirable for legacy area objects that have been converted to spaces.

1 Select the space you want to reverse.

2 On the command line, enter **SpaceReverseProfile**.

3 Select further spaces for reversing.

4 Press *ENTER* to end your selection.

Boolean Operations for 3D Freeform Spaces

You can change the shape of a 3D freeform space by in-place editing the surfaces of the space.

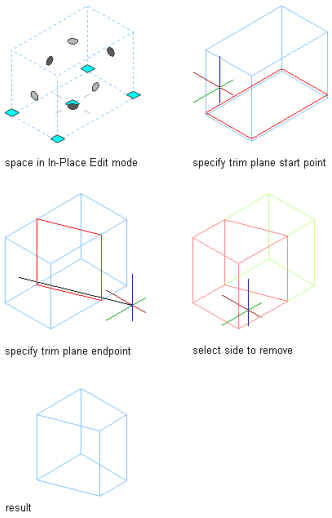
NOTE When you start an in-place edit operation on an extruded 3D space, it is automatically converted to a 3D freeform space. You can convert it back to an extruded 3D space once you have finished editing it, but you will loose any geometry changes that are not compatible with extruded 3D spaces.

Trimming 3D Freeform Spaces

You can trim a part of an existing 3D freeform space by trimming one of its surfaces.

NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

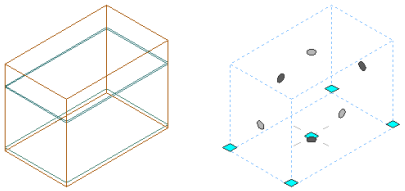
Trimming a 3D space



1 Verify that you are working in a 3D isometric view.

2 Select the space you want to trim along the horizontal or vertical plane.

3D space (left) in in-place editing mode (right)



3 Click Space tab ➤ Modify panel ➤ Edit In Place .

4 Click Edit In Place tab ➤ Modify panel ➤ Trim By Plane .

5 Specify the trim plane either on screen or by entering 3 points on the command line.

TIP Use a Front view to generate a horizontal trim plane and a Plan view to generate a vertical trim plane.

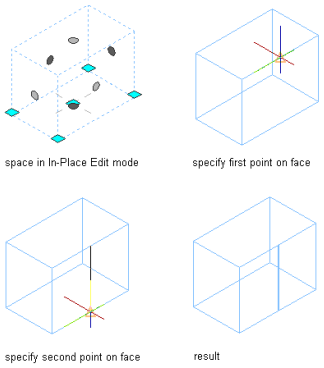
6 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Splitting Surfaces of 3D Freeform Spaces

You can split a surface of a 3D freeform space. This is useful when you need to change the geometry of only one part of a space surface, as when creating a cable channel in a space ceiling.

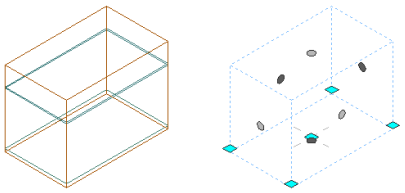
NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

Splitting a surface



1 Select the space where you want to split a surface.

3D space (left) in in-place editing mode (right)



2 Click Space tab ➤ Modify panel ➤ Edit In Place .

3 Click Edit In Place tab ➤ Modify panel ➤ Split Face .

4 Select the start point of the splitting line.

5 Select the endpoint of the splitting line.

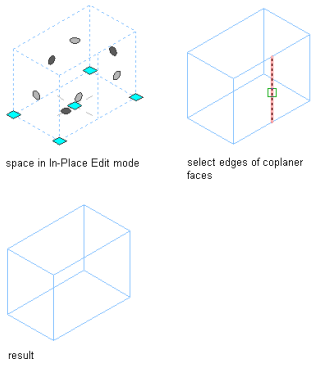
6 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Joining Surfaces of 3D Freeform Spaces

Use this procedure to join 2 previously split surfaces of a 3D freeform space.

NOTE This procedure is valid for non-associative spaces only.

Joining 2 space surfaces

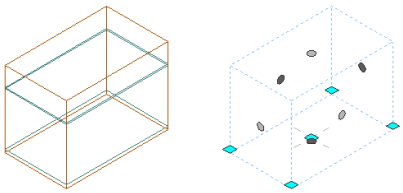


1 Verify that you are working in a 3D isometric view.

2 Select the space where you want to join 2 surfaces.

3 Click Space tab ➤ Modify panel ➤ Edit In Place .

3D space (left) in in-place editing mode (right)



4 Click Edit In Place tab ➤ Modify panel ➤ Join Faces .

5 Select the edge separating the 2 surfaces, and press ENTER.

6 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Merging 3D Freeform Spaces with AEC Objects

Use this procedure to merge a 3D freeform space with a space or other AEC object. You can merge a 3D freeform space with all AEC objects that have a 3D geometry.

NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

1 Switch to a 3D isometric view.

2 Select the 3D freeform space you want to merge with another object.

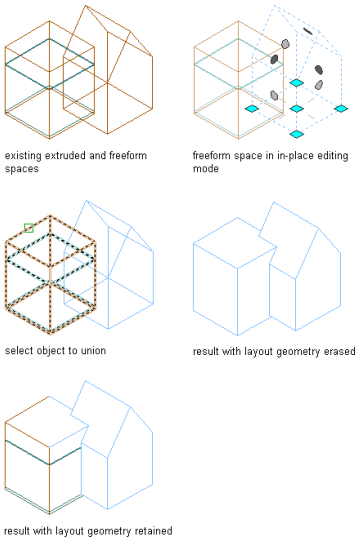
3 Click Space tab ➤ Modify panel ➤ Edit In Place .

4 Click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Union.

5 Select the AEC object you want to merge with the 3D freeform space, and press Enter.

6 Enter **y** (Yes) to erase the merged-in object, or **n** (No) to leave the object in the drawing.

Merging an extruded space to a freeform space



7 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Subtracting AEC Objects from 3D Freeform Spaces

Use this procedure to subtract a space or other AEC object from a 3D freeform space. You can subtract any AEC object that has a 3D geometry from a space.

NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

1 Switch to a 3D isometric view.

2 Select the 3D freeform space from which you want to subtract an object.

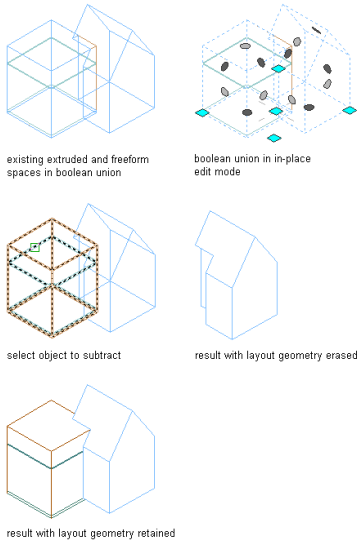
3 Click Space tab ➤ Modify panel ➤ Edit In Place .

4 Click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Subtract.

5 Select the AEC object you want to subtract from the 3D freeform space, and press Enter.

6 Enter **y** (Yes) to erase the subtracted object, or **n** (No) to leave the object in the drawing.

Subtracting an extruded space from a freeform space



7 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Intersecting 3D Freeform Spaces with AEC Objects

User this procedure to intersect a 3D freeform space with a space or other AEC object. You can intersect a 3D freeform space with all AEC objects that have a 3D geometry.

NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

1 Switch to a 3D isometric view.

2 Select the 3D freeform space that you want to intersect with an AEC object.

3 Click Space tab ➤ Modify panel ➤ Edit In Place .

4 Click Edit In Place tab ➤ Modify panel ➤ Boolean drop-down ➤ Intersect.

5 Select the AEC object you want to intersect with the 3D freeform space, and press Enter.

6 Enter **y** (Yes) to erase the object, or **n** (No) to leave the object in the drawing.

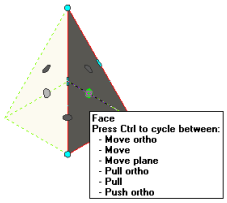
7 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Grip-Editing the Surfaces of 3D Freeform Spaces

Use this procedure to grip-edit individual surfaces of a 3D freeform space.

NOTE This procedure is valid for non-associative spaces only. If you perform it on an associative space, it will loose associativity after exiting the in-place edit mode.

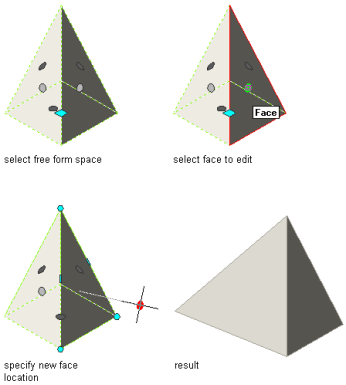
You have 6 different options for grip-editing a space surface.



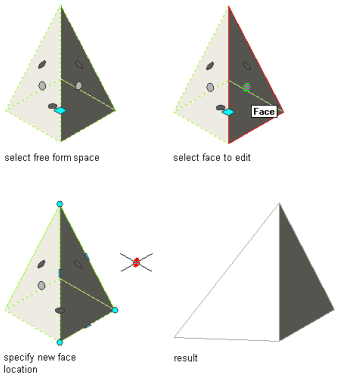
As you cycle through the options by pressing *CTRL*, the tooltip advances sequentially to indicate the current option. Pressing *CTRL* more than 5 times returns you to the first option, allowing you to continue cycling through the edit choices.

The cursor is constrained when you choose an orthogonal option and unconstrained when you choose a free option.

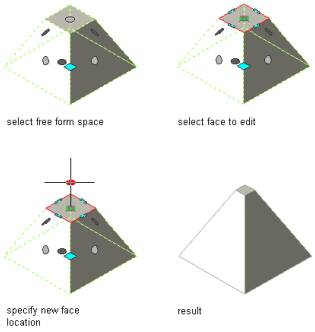
Moving a space surface orthogonally while stretching adjacent surfaces



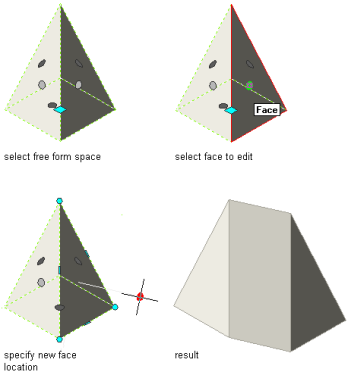
Moving a space surface freely while stretching adjacent surfaces



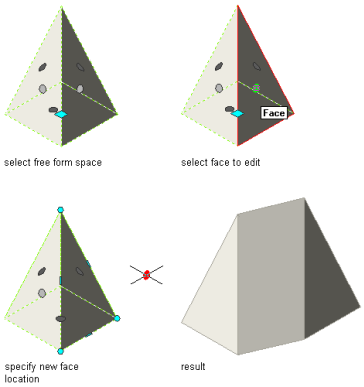
Moving a space surface orthogonally while maintaining the planes of adjacent surfaces



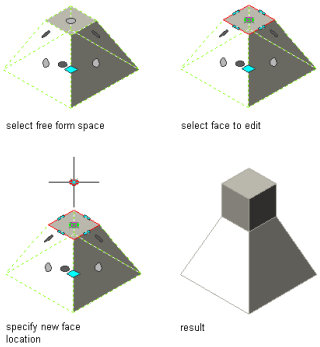
Pulling a space surface orthogonally while adding adjacent surfaces



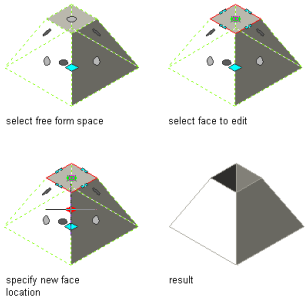
Pulling a space surface freely while adding adjacent surfaces



Pulling a space surface orthogonally while adding adjacent surfaces



Pushing a space surface orthogonally to create a hole



1 Verify that you are working in a 3D isometric view.

2 Select the space you want to edit.

3 Click Space tab ➤ Modify panel ➤ Edit In Place .

4 Select the surface grip to edit.

The tooltip displays the available edit operations:

5 Select the grip edit operation you want to perform:

If you want to…	Then…
move the space surface orthogonally while stretching adjacent surfaces	click the surface grip. Then, move it to the new position.
move the space surface freely while stretching adjacent surfaces	click and hold the surface grip, press CTRL once, and specify the new location.
move the space surface orthogonally while maintaining the planes of adjacent surfaces	click and hold the surface grip, press CTRL twice, and specify the new location.
pull the space surface orthogonally while adding adjacent surfaces	click and hold the surface grip, press CTRL 3 times, and specify the new location.
pull the space surface freely while adding adjacent surfaces	click and hold the surface grip, press CTRL 4 times, and specify the new location **NOTE** The location of the current UCS is temporarily moved to coincide with the original position of the surface grip that you select when you are working with this option. Only the UCS origin is changed, not its orientation.

If you want to…	Then…
push or pull the space surface orthogonally while either adding adjacent surfaces or creating a hole	click and hold the surface grip, press CTRL five times, and specify the new location. Push into the space to create a hole, or pull out of the space to add adjacent faces.

NOTE You cannot pull the space surface at such an angle, either horizontally or vertically, that the adjacent surfaces become non-planar. If this distorted condition occurs, the space surface automatically returns to its original position and an error message is displayed on the command line.

6 To save the changes to the space, click Edit in Place tab ➤ Edits panel ➤ Finish .

Editing Space Surface Properties

You can edit the properties of 3D space surfaces with the Space/Zone Manager worksheet.

Space surfaces can be assigned a number of properties important for processing spaces in a downstream engineering or facility management application. You can define these properties in the architectural plan, and later export the plan or open it in an engineering application to perform calculations, such as determining the heating/cooling load on a building.

Use this procedure to edit any of the following surface properties for a non-associative 3D space:

- Surface name
- Surface type
- Surface style
- Surface height (extruded 3D spaces only)
- Surface openings
- Opening name
- Opening type
- Opening style
- Opening dimensions
- Opening area
- Opening reported area (3D freeform spaces only)

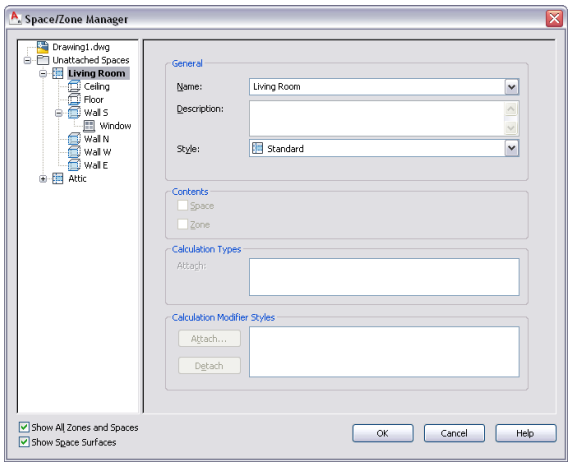
IMPORTANT For the surfaces of an associative space, only the surface name, the surface type, and the ceiling and floor style as can be edited. All other surface properties, including the properties for associative surface openings, are read-only.

Opening the Space/Zone Manager

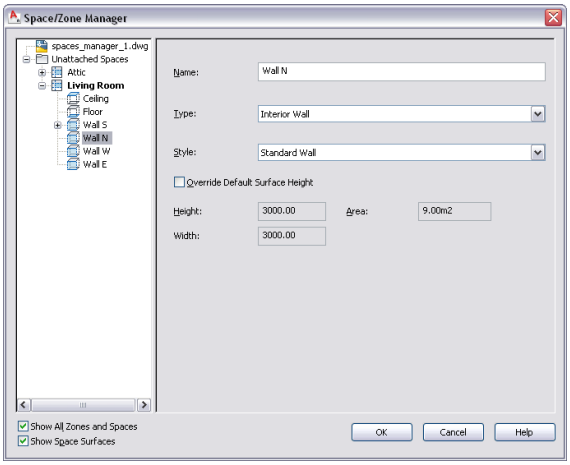
Use this procedure to open the Space/Zone Manager.

➤ Select a space, and click Space tab ➤ Helpers panel ➤ Space/Zone Manager .

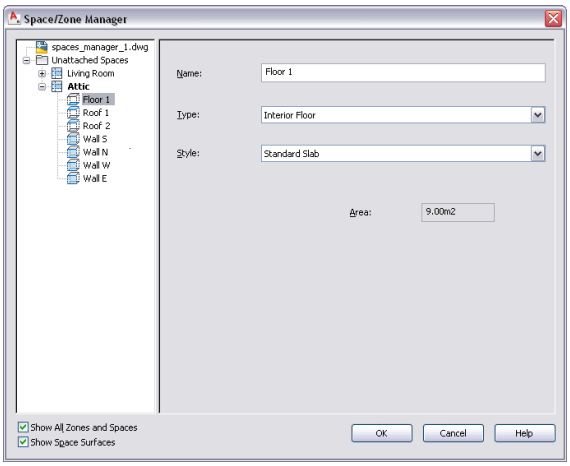
To see all spaces in the drawing, as well as their surfaces and surface openings, verify that the settings for Show all Zones and Spaces and Show Space Surfaces are selected.



- Non-associative extruded 3D spaces only: Select a space, click the Edit Surfaces grip, and then click the Edit Surface Properties grip.
  To see all spaces in the drawing, as well as their surfaces and surface openings, verify that both settings for Show all Zones and Spaces and Show Space Surfaces are selected.



- Non-associative 3D freeform spaces only: Select a space, click the Edit Surfaces grip, and then click the Edit Surface grip on one surface. Then click the Edit Surface Properties grip for that surface.
  To see all spaces in the drawing, as well as their surfaces and surface openings, verify that both settings for Show all Zones and Spaces and Show Space Surfaces are selected.



In the tree view on the left, all spaces are listed either under their containing zone or under the Unattached Spaces folder. The surfaces of a space are listed under the space. Surface openings are listed under the surface that contains them. To access a space, surface or zone, you may need to expand the tree until you reach the desired item.

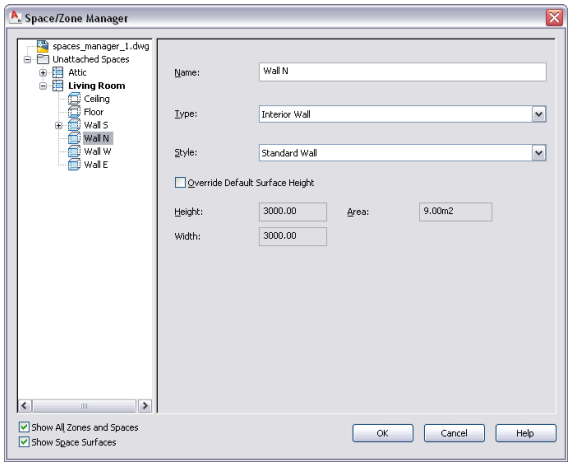
Editing Surface Properties

Use this procedure to edit the properties of a space surface.

1 Open the Space/Zone Manager with one of the instructions described in Opening the Space/Zone Manager on page 1996.

2 Verify that Show Space Surfaces is selected.

3 If necessary expand the tree view to display the surface you want to edit.



4 Select the surface in the tree view and change its properties on the right:

Property	Options
Name	enter a new value for Name.
Surface type (3D freeform only)	■ Ceiling ■ Floor ■ Surface

Property	Options
	This setting can be useful for complex freeform shapes, where the ceiling or the floor of the space can be represented by more than one surface.
Type	for Type, select one of the following: ■ Interior Wall ■ Exterior Wall ■ Shade ■ Air ■ Underground Wall
Style	all available wall and curtain wall styles in the drawing
Height/Area (extruded 3D spaces only)	select Override Default Surface Height, and enter a new value for either Height or Area. Both of these fields change only the height of the surface.

5 Click OK.

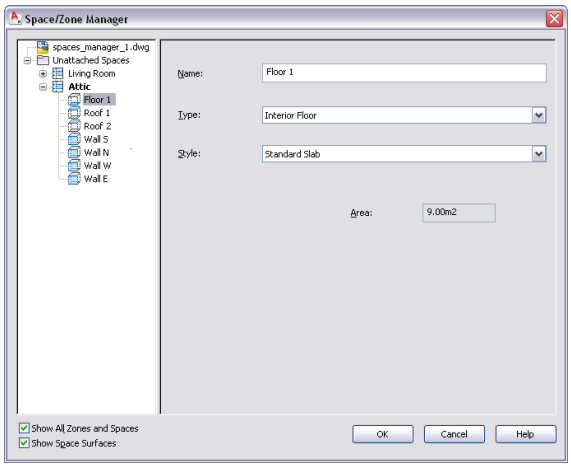
Editing Ceiling and Floor Surfaces

Use this procedure to edit the ceiling and floor surfaces of a space.

1 Open the Space/Zone Manager with one of the instructions described in Opening the Space/Zone Manager on page 1996.

2 Verify that Show Space Surfaces is selected.

3 If necessary expand the tree view to display the ceiling and floor surfaces you want to edit.



4 Select the ceiling surface of a space in the tree view, and make the necessary changes on the right:

If you want to…	Then…
change the name of the ceiling	enter a new value for Name.
change the ceiling type	for Type, select one of the following: ■ Ceiling ■ Roof

If you want to…	Then…
	■ Underground ceiling
change the assigned roof slab style of the ceiling	for Style, select a slab or roof slab style from the drop-down list.

5 Select the floor of a space in the tree view, and make the necessary changes on the right:

If you want to…	Then…
change the name of the floor	enter a new value for Name.
change the floor type	for Type, select one of the following: ■ Interior Floor ■ Raised Floor ■ Slab on Grade ■ Underground Slab
change the assigned slab style of the floor	for Style, select a slab style from the drop-down list.

6 To add an opening to a ceiling or floor, select the ceiling or floor in the tree view, right-click, and click Add Opening.

7 To remove an opening from a ceiling or floor, select the opening in the tree view, right-click, and click Remove Opening.

8 Click OK.

Working with Surface Openings

Openings on space surfaces can be important for building systems calculations when the drawing is used in AutoCAD MEP or other building applications.

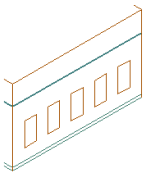
You can add openings to the surfaces of extruded 3D spaces and 3D freeform spaces. Depending on the geometry type of the space, the openings have different features. For example, on a 3D freeform space, you can edit the opening profile into any shape; however, on an extruded 3D space surface, the openings are limited to rectangular shapes.

Surface openings can have properties like opening name, opening type and opening dimensions attached to them. For more information, see Editing Space Surface Properties on page 1996.

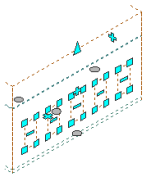
NOTE You can add openings only to non-associative spaces. The openings in an associative space are determined by the openings in the boundary objects.

Adding Openings to Extruded 3D Space Surfaces

Use this procedure to add an opening to the surface of an extruded 3D space. Openings can be added to flat surfaces or curved surfaces (like a cylinder surface).



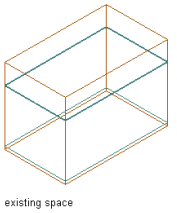
Openings displayed



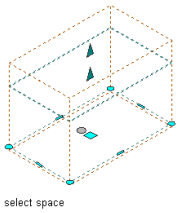
Opening grips displayed

You can use grips or the Space/Zone Manager to add openings to a space surface. For more information about working with the Space/Zone Manager, see Editing Space Surface Properties on page 1996.

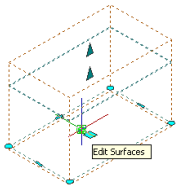
1. Select the space to which you want to add a surface opening, and click the Edit Surfaces grip.
2. Click the Add Window grip on the surface to which you want to add an opening. By default, a window opening is created.



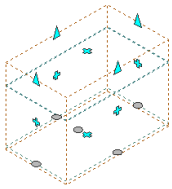
existing space



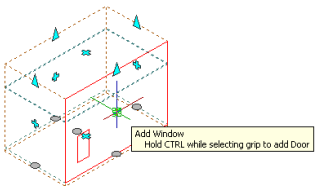
select space



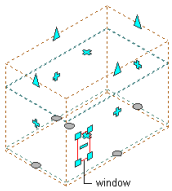
select Edit Surfaces grip



view surfaces grips

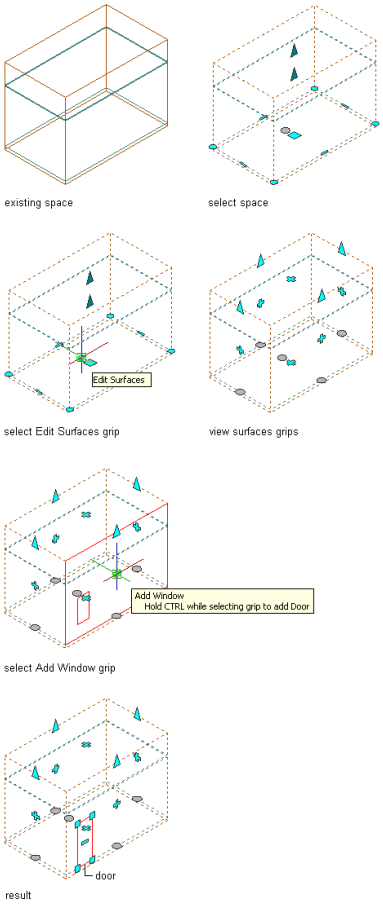


select Add Window grip



result

To add a door, hold down CTRL while clicking the Add Window grip. Note that doors are positioned at the top of the floor surface.



3 When you are finished, click the Exit Editing Surfaces grip.

NOTE If an opening is added to the ceiling or floor surface of an extruded 3D space, it is always created on the bottom or top surface of the space geometry. The position of the opening is not affected by the justification of the space.

NOTE If the openings are not displayed after you exit the surface editing mode, then the Surface components display component in the space style or the space object display properties has not been activated. For more information, see Specifying the Display Properties of a Space Style on page 2024.

Editing Openings in Extruded 3D Space Surfaces

Use this procedure to stretch, move, or copy a surface opening in an extruded 3D space.

1 Select the space where you want to edit a surface opening, and click the Edit surfaces grip.

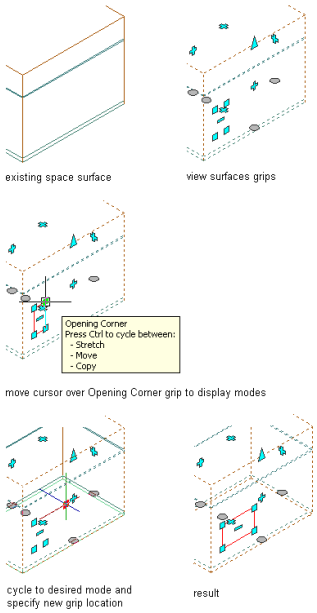
2 Select one of the corner grips of the surface opening.

3 Edit the opening:

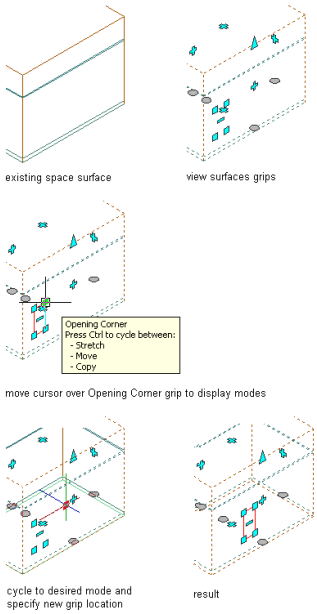
If you want to…	Then…
stretch an edge of the opening	move the corner grip to the desired position.

If you want to…	Then…
move the opening to a new position on the surface	press CTRL, and move the opening to the desired position.
copy the opening on the surface	press CTRL twice, and copy the opening to the desired position.

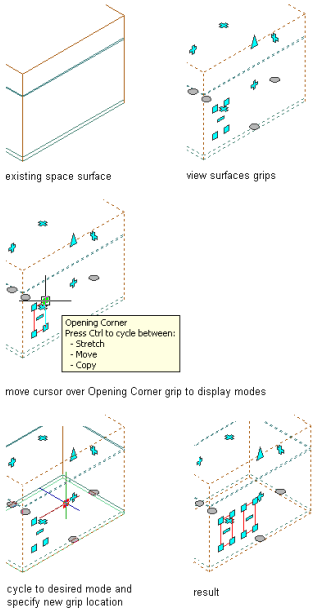
Stretching a surface opening



Moving a surface opening



Copying a surface opening



4 When you are finished, click the Exit Editing Surfaces grip.

Adding Openings to 3D Freeform Space Surfaces

Use this procedure to add an opening to the surface of a 3D freeform space. Openings can be added to flat surfaces or curved surfaces (like a cylinder surface).

NOTE Openings cannot be added to dome- and sphere-shaped surfaces.

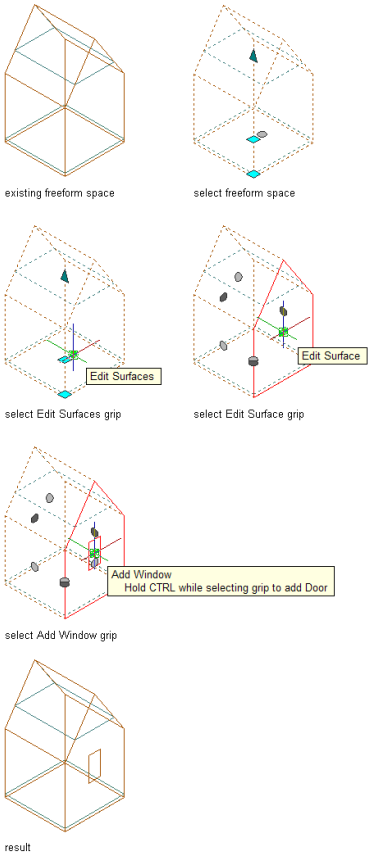
---

1 Select the space to which you want to add a surface opening, and click the Edit Surfaces grip.

2 Click the surface grip for the surface to which you want to add an opening.

3 Click the Add Window grip on the activated surface.

Adding a window opening to a freeform space surface



To add a door, hold down CTRL while clicking the Add Window grip. Note that doors are positioned at the bottom of the selected surface.

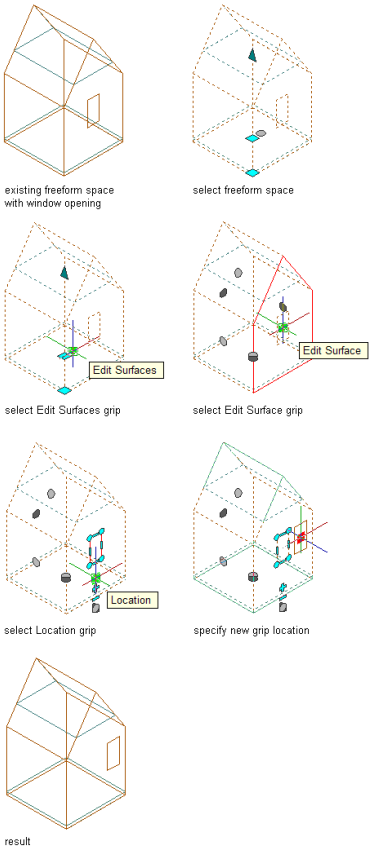
NOTE If the openings are not displayed after you exit the surface editing mode, then the Surface components display component in the space style or the space object display properties has not been activated. For more information, see Specifying the Display Properties of a Space Style on page 2024.

Moving 3D Freeform Space Openings

Use this procedure to move an opening in a 3D freeform space surface.

1. Select the space on which you want to move a surface opening, and click the Edit Surfaces grip.
2. Click the grip for the surface with the opening you want to move.
3. Select the Location grip for the opening you want to move, and move it to another location on the surface.

Moving a window opening on a freeform space surface



NOTE Moving the opening onto another surface or outside the space will result in the opening area being reported as zero.

4 To exit the surface editing mode, click the Exit Editing Surfaces grip.

Editing the Shape of 3D Freeform Space Openings

Use this procedure to edit the shape of a 3D freeform space opening.

3D freeform space surface openings can be edited like any profile-based boundary in AutoCAD Architecture. The opening boundary has vertex and edge grips to generate the desired shape.

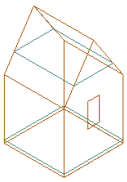
Changing the edge of a space surface opening

1 Select the space on which you want to edit the edge of a surface opening, and click the Edit Surfaces grip.

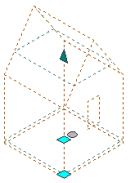
2 Click the grip for the surface with the opening you want to edit.

3 Select the Edge grip for the edge you want to change.

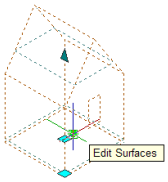
Offsetting the edge of a window opening on a freeform space surface



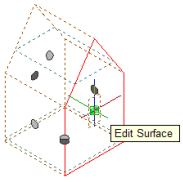
existing freeform space
with window opening



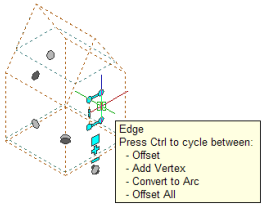
select freeform space



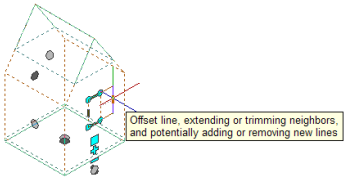
select Edit Surfaces grip



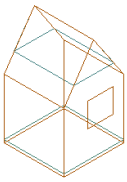
select Edit Surface grip



move cursor over Edge grip to display modes

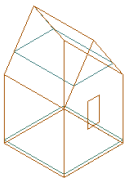


cycle to desired mode and specify new grip location

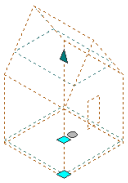


result

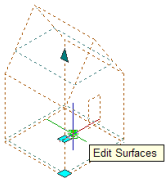
Adding a vertex to the edge of a window opening on a freeform space surface



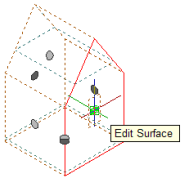
existing freeform space
with window opening



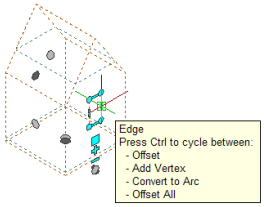
select freeform space



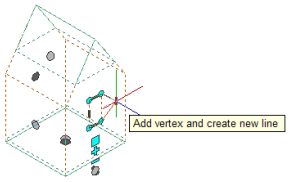
select Edit Surfaces grip



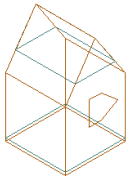
select Edit Surface grip



move cursor over Edge grip to display modes

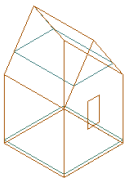


cycle to desired mode and specify new grip location

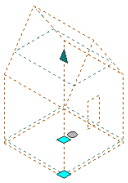


result

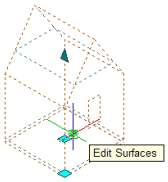
Converting the edge of a window opening to arc on a freeform space surface



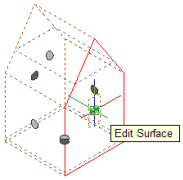
existing freeform space
with window opening



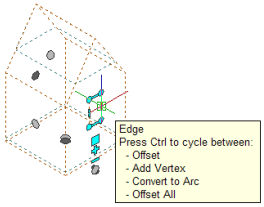
select freeform space



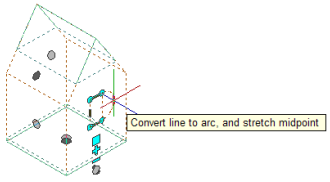
select Edit Surfaces grip



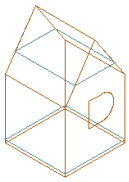
select Edit Surface grip



move cursor over Edge grip to display modes

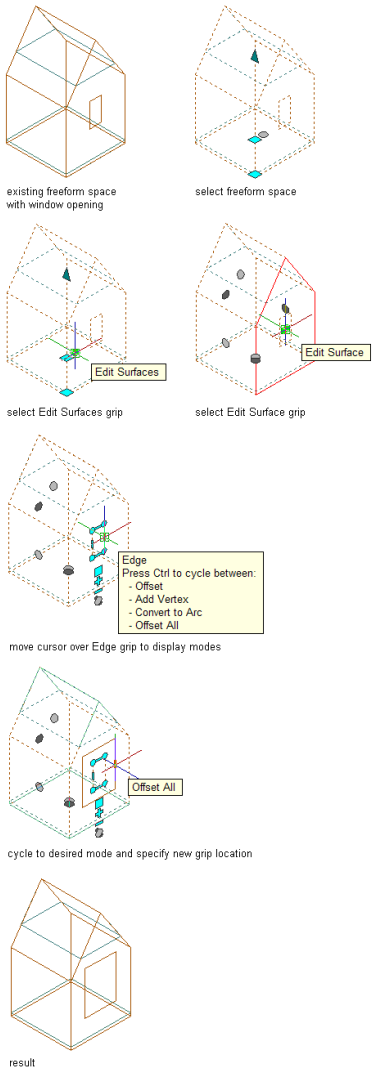


cycle to desired mode and specify new grip location



result

Offsetting all edges of a window opening on a freeform space surface



4 Specify the new edge location:

If you want to…	Then…
offset the edge	move the edge to the desired location, and click; or enter a value, and press *ENTER*.
add a vertex and create an edge	press *CTRL* to switch to the Add Vertex edit mode. Move the edge to the desired location, and click; or enter a value, and press *ENTER*.
change a selected edge to an arc/change a selected arc to a line	press *CTRL* twice to switch to the Convert to Arc/Convert to Line edit mode. Stretch the midpoint to the desired location, and click; or enter a value, and press *ENTER*.
offset all edges at an identical distance	press *CTRL* 3 times to switch to the Offset All edit mode. Move the selected edge to the desired location for all edges, and click; or enter a value, and press *ENTER*.

5 To exit the surface editing mode, click the Exit Editing Surfaces grip.

Changing a vertex of a space surface opening

1 Select the space on which you want to edit an opening vertex, and click the Edit Surfaces grip.

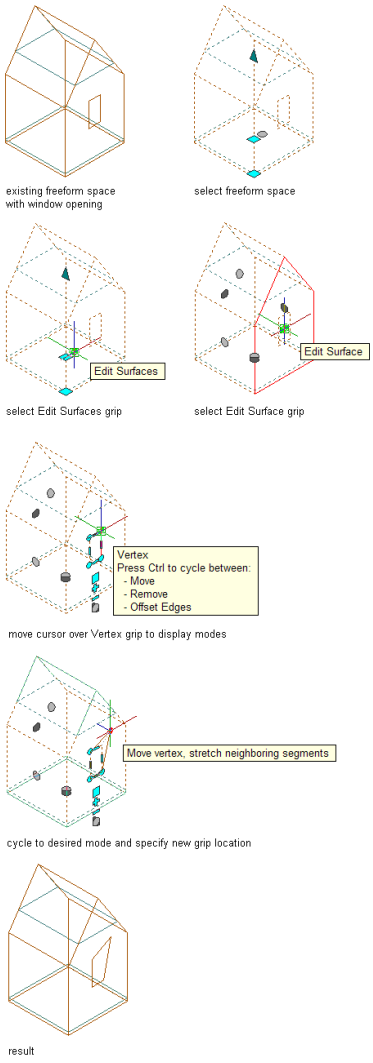
2 Click the grip for the surface with the opening you want to edit.

3 Select the Vertex grip for the vertex you want to change.

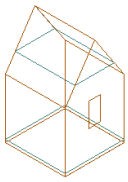
The Vertex grip has 3 edit modes:

- Move: This is the default. Use it to move the selected vertex in any direction. The neighboring segments are stretched if necessary.
- Remove: Use this edit mode to remove a vertex. The neighboring segments are replaced with a line.
- Offset Edges: Use this edit mode to move a vertex and the adjacent edges of the space boundary with it.

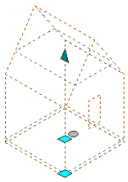
Moving the vertex of a window opening on a freeform space surface



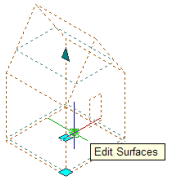
Removing the vertex of a window opening on a freeform space surface



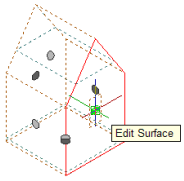
existing freeform space
with window opening



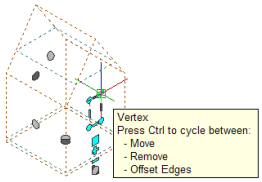
select freeform space



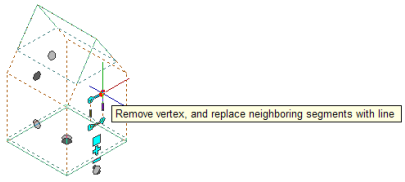
select Edit Surfaces grip



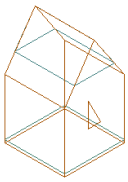
select Edit Surface grip



move cursor over Vertex grip to display modes

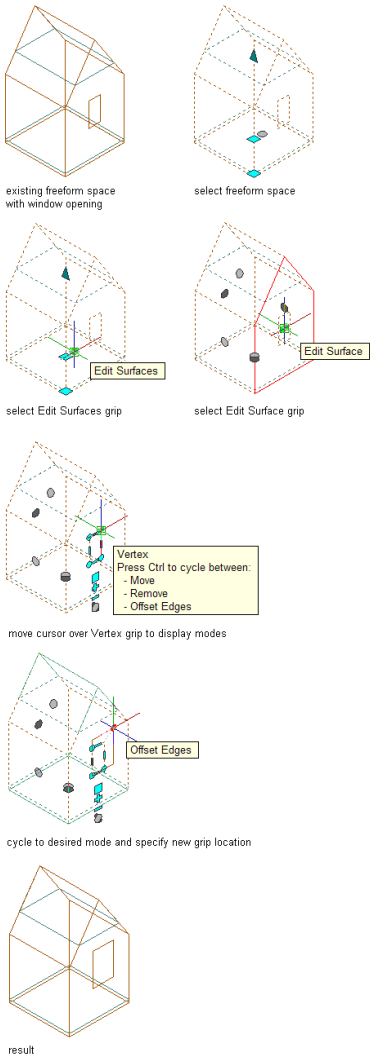


cycle to desired mode and specify new grip location



result

Offsetting the edges of a window opening on a freeform space surface



4 Edit the vertex as necessary:

If you want to…	Then…
move the vertex	move the vertex to the desired location, and click; or enter a value, and press *ENTER*.
remove the vertex	press *CTRL* to switch to the Remove Vertex edit mode, and click to confirm the removal.
move the vertex and the adjacent edges	press *CTRL* twice to switch to the Offset Edges edit mode. Move the vertex to the desired location, and click; or enter a value, and press *ENTER*.

5 To exit the surface editing mode, click the Exit Editing Surfaces grip.

NOTE You cannot create non-rectangular shaped openings on extruded 3D spaces. If you need a different surface opening shape, convert the extruded 3D space to a 3D freeform space first as described in Changing the Type of a Space on page 1972.

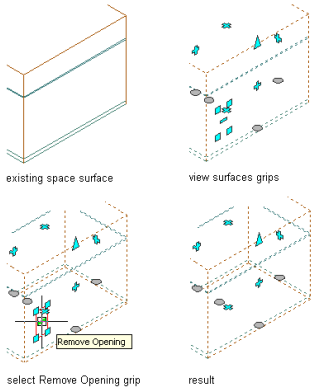
Removing Openings from Extruded 3D and 3D Freeform Space Surfaces

Use this procedure to remove an opening from the surface of a 3D space.

1 Select the space from which you want to remove a surface opening and display the grips for the surface openings in one of these ways:

- If you have selected an extruded 3D space, click the Edit Surfaces grip. All surface opening grips on the space are displayed.
- If you have selected a 3D freeform space, click the Edit Surfaces grip, and then select the Edit Surface grip for the surface containing the opening you want to remove. The grips for the openings on this surface are displayed.

2 Click the Remove Opening grip for the opening you want to remove.



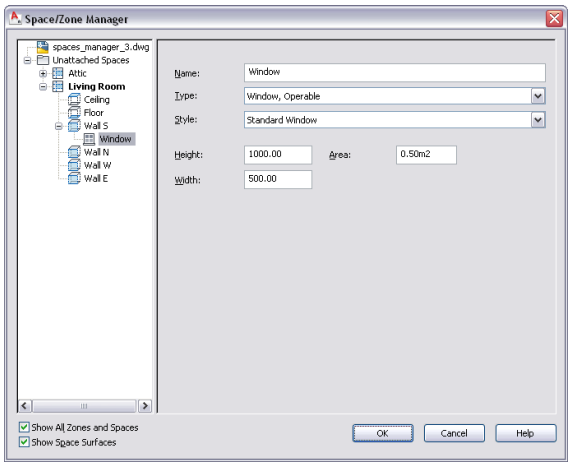
Editing Surface Openings in Space/Zone Manager

Use this procedure to edit surface openings.

1 Open the Space/Zone Manager with one of the instructions described in Opening the Space/Zone Manager on page 1996.

2 Verify that Show Space Surfaces is selected.

3 If necessary expand the tree view to display the surface and the opening you want to edit.



4 To add a new opening to a surface, select the surface in the tree view, right-click, and click Add Opening.

The new opening is inserted with default properties.

5 To change the properties of an opening, select the opening in the tree view, and make the desired changes on the right:

If you want to…	Then…
change the opening name	enter a new value for Name.
change the opening type	for Type, select a new type from the drop-down list. Depending on whether the opening is a door or window opening, different types are available: ■ Fixed Window ■ Operable Window ■ Fixed Skylight ■ Operable Skylight ■ Non sliding Door ■ Sliding Door ■ Air
change the assigned window or door/window assembly style of the opening	select a window style, door style, or door/window assembly style from the list. The list contains all styles available in the drawing.
change the area of a surface opening	enter values for Area, Height, or Width of the opening. **NOTE** For a 3D freeform space opening, you cannot edit the height or width on this worksheet. You can change the width and height of a 3D freeform surface opening using grips, as described in Editing the Shape of 3D Freeform Space Openings on page 2006. For openings in 3D freeform spaces, the reported area is displayed alongside the overall area. The reported area can differ from the overall area in cases where an opening is only partly on the surface, and the rest is either on a different surface or outside the space. In this case, the reported area displays the part of the opening that is on the surface. The value for reported area is read-only.

6 To remove an opening from a surface, select the opening, right-click, and click Remove Opening.

7 Click OK.

How Changing the Space Geometry Affects Surface Openings

When you change the geometry of a space, it can have different results for openings attached to the space surfaces.

Changing the Shape of a 3D Freeform Space

3D freeform spaces have a large number of possible geometries, such as a box, a pyramid, or an irregular freeform shape. Changing the geometry of the space can affect openings in space surfaces in the following ways:

- When a surface is deleted or moved so that it is no longer coplanar to an opening it contains, the opening will be deleted.
- When a surface is edited in a way that does not affect the opening, the opening is retained unchanged.
- When a surface is split and an opening crosses the split line, the opening is split into 2 openings.

NOTE If the space geometry is changed in any way that changes the total number of surfaces, then openings may be deleted or may occasionally move from one surface to another.

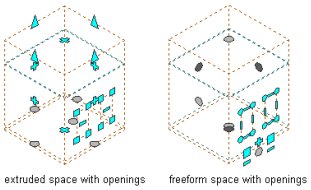
Changing the Geometry Type

You can convert a 3D freeform space to an extruded 3D space, and vice versa. This will affect contained openings in different ways.

To change the geometry type of a space, see Changing the Type of a Space on page 1972.

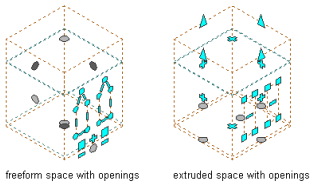
- When an extruded 3D space is converted to a 3D freeform space, all openings will be retained with the same location, shape, and area. The opening grips change to the grips of an extruded 3D space surface opening.

  Viewing Extruded and Freeform space surface openings



- When a 3D freeform space is converted to an extruded 3D space, the openings on the horizontal roof or floor surfaces will be kept on the roof or floor of the extruded 3D space. The openings on the surfaces that intersect with the base profile will be retained on the respective edge surfaces. All other openings will be lost. The openings that are retained will change to rectangles, and the area of the opening will remain the same.

  Viewing Freeform and Extruded space surface openings



- When an extruded 3D space or a 3D freeform space is changed to a 2D space, all surface openings are lost.

Changing the Associativity

You can convert associative spaces to non-associative spaces, and vice versa. This will affect contained openings in different ways.

To change the associativity of spaces, see Making a Space Associative or Non-Associative on page 1936.

The openings in associative spaces are generated by any openings that are in the boundary walls. For example, if a boundary wall has a window and a door, openings with the shape of the window and door are inserted in the space.

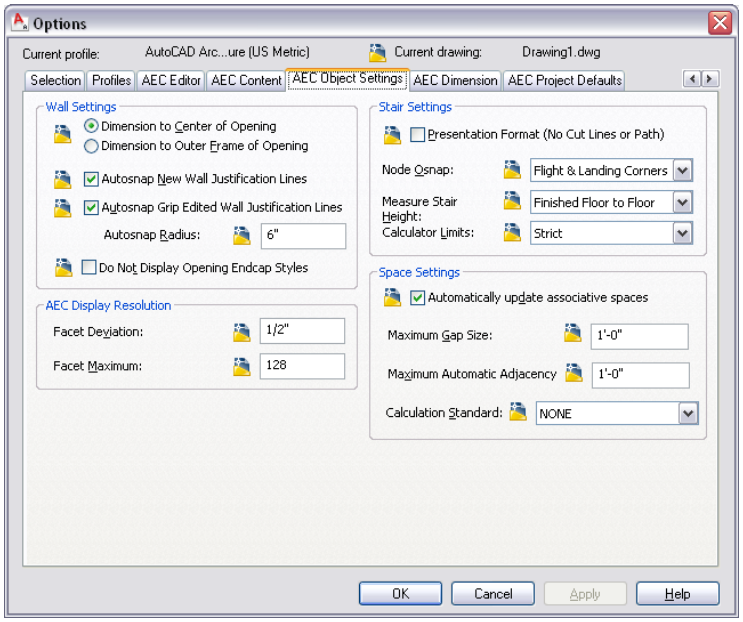
- If an associative extruded 3D space is converted to a non-associative extruded 3D space, all openings will be retained in their original position, but will now have editing grips. If the shape of the original opening is not rectangular, the opening shape will change to a rectangle identical in area to the original shape.
- If an associative 3D freeform space is converted to a non-associative 3D freeform space, all openings will be retained with identical location, size, and shape, and will have editing grips.

Setting Up Adjacency Relations between Space Surfaces

Spaces can detect adjacencies between surfaces of neighboring spaces. This is important for processing a building plan in an engineering application like AutoCAD MEP. You can define the maximum allowed adjacency distance between space surfaces.

1 Click ➤ Options.

2 Click the AEC Object Settings tab.



3 For Maximum Automatic Adjacency select the maximum allowed distance between 2 surfaces that should be considered adjacent to each other.

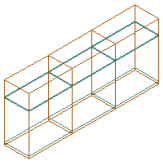
4 Click OK.

TIP Alternatively, you can set the maximum automatic adjacency between space surfaces on the command line by entering **AecSpaceMaxAutoAdjacency**.

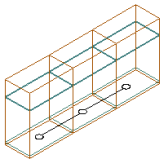
Displaying Adjacency Relations between Space Surfaces

In most cases, adjacency relations between space surfaces are important for exporting and processing building plans to an engineering application. If you need to check the status of adjacency relations within AutoCAD Architecture, you can make the adjacency relations visible in the drawing.

Displaying surface adjacencies



existing adjacent spaces



space adjacencies displayed

1. On the command line, enter **AecShowSpaceAdjacencies**.
2. Adjacent space surfaces are displayed with lines.
3. To hide the surface adjacency lines, press ENTER.

Space Styles

A space style is a set of parameters that determines the appearance and other characteristics of the space object to which it is assigned. Depending on the scope of the drawing, you may want to create different space styles to represent different types of spaces, such as different room types in an office building.

Within the space style you can set up the space decomposition. Decomposition geometrically divides an existing space into triangular or trapezoid subparts. In some countries, such as Germany and Japan, the visual decomposition of spaces into subdivisions is needed for the space proof that must be presented to the building administration for approval.

You can use styles for controlling the following aspects of spaces:

- Boundary offsets: You can specify the distance that a space's net, usable, and gross boundaries will be offset from its base boundary. Each boundary has its own display components that you can set according to your needs.
- Name lists: You can select a list of allowed names for spaces of a particular style. This helps you to maintain consistent naming schemes across a building project.
- Target dimensions: You can define a target area, length, and width for spaces inserted with a specific style. This is helpful when you have upper and lower space limits for a type of room that you want to insert.
- Displaying different space types: You can draw construction spaces, demolition spaces, and traffic spaces with different display properties. For example, you might draw all construction areas in green and hatched, and the traffic areas in blue with a solid fill.
- Displaying different decomposition methods: You can specify how spaces are decomposed (trapezoid or triangular). If you are not working with space decomposition extensively, you will probably set it up in the drawing default. For information about space decomposition, see Space Decomposition on page 2069.

Creating a Space Style

Use this procedure to create a space style. You can start by using the default style or you can copy an existing style to use as your template. You then edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and expand Space Styles.

3 Create a space style:

If you want to…	Then…
create a style with default properties	right-click Space Styles, and click New.
create a style from an existing style	right-click the space style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new space style, and press *ENTER*.

5 Edit the new space style:

If you want to…	Then…
define target dimensions for the space base boundary	see Specifying Target Dimensions for the Space on page 2020.
specify style-based offsets for the net, usable, and gross boundaries	see Specifying Space Boundary Offsets in a Space Style on page 2020.
add a list definition to the style	see Attaching a List Definition to a Space Style on page 2021.
specify materials for space components	see Specifying the Materials of a Space Style on page 2022.
add a classification to the style	see Specifying Classifications for a Space Style on page 2021.
set the display of space boundaries and calculation cut planes	see Specifying the Display Properties of a Space Style on page 2024.
define the hatching of the space	see Specifying the Hatching for Components of a Space Style on page 2026.
define the cut plane for the space	see Setting the Object Cut Plane of a Space Style on page 2027.
attach notes and files to the style	see Attaching Notes and Files to a Space Style on page 2028.
specify a space decomposition view	see Space Decomposition on page 2069.

6 When you finish specifying properties, click OK.

Specifying Target Dimensions for the Space

Use this procedure to specify a target area for the space in the space style. Target dimensions can be useful when dimension requirements for a space are already known and cannot be exceeded. If the area, length, or width of a space you insert falls outside the sizes specified in the style, the dimension is truncated to the target size, and a solution tip icon displays.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style that you want to change.

4 Click the Design Rules tab.

5 Specify the target dimensions for the space style:

If you want to…	Then…
specify a different area	enter a new value for Target Area, Min Area, or Max Area.
specify a different length	enter a new value for Target Length, Min Length, or Max Length.
specify a different width	enter a new value for Target Width, Min Width, or Max Width.

Target values must fall between the set minimum and maximum values.

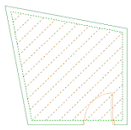
6 Click OK twice.

Specifying Space Boundary Offsets in a Space Style

Use this procedure to define the offsets of the net, usable, and gross boundaries of a space from the base boundary in the space style. Space boundary offsets can also be set manually. When the net, usable, and gross boundaries of a space are determined manually, they can be grip-edited. When they are determined from the space style, they cannot be grip-edited.

For information about applying style-based offsets to a space, see Specifying Space Boundary Offsets in a Space Style on page 2020.

Space boundaries by style



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style that you want to change.

4 Click the Design Rules tab.

5 Specify the distance to offset the net, usable, and gross boundaries from the base boundary:

If you want to…	Then…
offset the net boundary from the base boundary	enter a value for Net Offset. **NOTE** In many calculations, the net boundary is identical to the base boundary. If you enter 0 for the Net Offset, the net boundary is not offset from the base boundary.
offset the usable boundary from the base boundary	enter a value for Usable Offset.
offset the gross boundary from the base boundary	enter a value for Gross Offset.

6 Click OK.

Attaching a List Definition to a Space Style

Use this procedure to attach a list definition to a space style so that spaces using the style are named consistently according to a defined list of names. List definitions can be created according to government standards, company standards, or any other naming system you want to implement. For information about creating list definitions, see List Definitions on page 2030.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style that you want to change.

4 Click the Design Rules tab.

5 For Space Names, select a list definition from the drop-down list.

NOTE The drop-down list displays only list definitions that apply to spaces. For more information, see Specifying the Application for a List Definition on page 2031.

6 Click OK.

When you change the name list in the space style, it is possible that the new space style has a different name list. In this case, the space name can interact with the new list definition in the following ways:

- The name of an existing space is also included in the new list definition. In this case, no change to the name is made.
- The name of an existing space is not included in the new list definition, but the list definition allows individual names to differ from the list. In this case, the existing name is retained as a non-standard name.
- The name of an existing space is not included in the new list definition, and the list definition does not allow individual names to differ from the list. In this case, the existing name is removed and the space name defaults to the first name in the new list definition.

Specifying Classifications for a Space Style

Use this procedure to specify classifications for any classification definition applied to a space style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Space Styles.
3 Select the space style that you want to change.
4 Click the Classifications tab.

   By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to space styles.

5 For each classification definition, select the classification you want to apply to the current space style.
6 Click OK.

Specifying the Materials of a Space Style

A space consists of a number of components whose display properties can be determined by the materials assigned to each component.

When you assign materials to a space style, you assign one material to each physical component of the space. For example, you assign a wood material to the floor and a ceiling tile material to the ceiling.

If you want to use the display properties of the space style, you can turn off the material assignments in the display properties of the space style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework in plan view. The Surface Hatch component is used to hatch all object surfaces in 3 dimensional (3D) model views and in elevations.

Space Materials and Display Components

The following table lists space components and the material components that determine them in specific views.

Display Representation	Space Component	Material Component
Plan, Plan High Detail, Plan Low Detail, Plan Presentation, Plan Screened, Reflected, Reflected Screened		
	Base Boundary	Plan Linework
	Base Hatch	Plan Hatch
	Net Boundary	No material
	Net Hatch	No material
	Usable Boundary	No material
	Usable Hatch	No material
	Gross Boundary	No material
	Gross Hatch	No material

Display Representation	Space Component	Material Component
	Cut Plane	No material
	Cut Plane Hatch	No material
	Above Cut Plane	No material
	Below Cut Plane	No material
	Calculation Plane 1	No material
	Calculation Plane 1 Hatch	No material
	Calculation Plane	No material
	Calculation Plane Hatch	No material
Model		
	Floor	3D Body
	Ceiling	3D Body
	Net Volume	No material
	Surfaces	No material
	Surface Components	No material
	Usable Volume	No material
	Gross Volume	No material

Assigning Materials to a Space Style

Use this procedure to assign materials to individual components of a space style. The component may use the display properties of the material instead of the style display properties.

You can assign a material to any physical component of the space. Custom components and components that are only symbolic graphics do not use materials for their display properties. For example, the floor and ceiling are physical components. The gross boundary is a symbolic component.

NOTE If a material assignment does not determine the display properties of a space component, you can change the display properties of the space style as described in Specifying the Display Properties of a Space Style on page 2024.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style that you want to change.

4 Click the Materials tab.

5 Select the component you want to change, and select a different material definition.

You can select any material definition in the current drawing, or click to create a new material definition and assign it to a component.

WARNING Any changes you make to the material definition in this dialog will apply to all objects that are assigned the material.

6 Click the Display Properties tab.

7 Select the display representation where you want the changes to appear, and select Style Override.

8 If necessary, click .

9 Click the Layer/Color/Linetype tab.

10 Select By Material for any component to which you want to assign a material, and click OK.

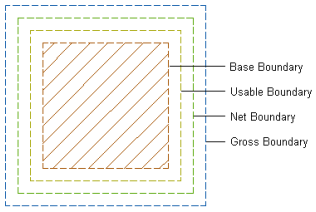
If the setting for By Material is not available, the display of this component cannot be determined by a material.

11 Click OK.

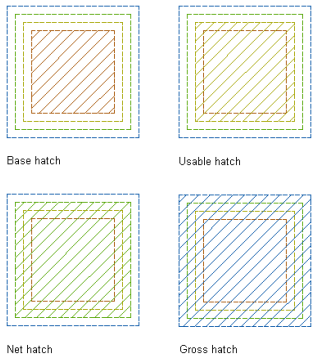
Specifying the Display Properties of a Space Style

Use this procedure to define any of the following display components of a space in the style:

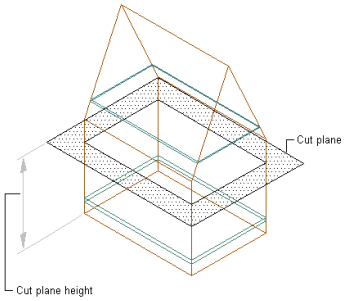
- Space boundaries (Plan views): You can set the display of the base, net, usable, and gross boundaries. If boundaries are offset from each other, it is a good idea to differentiate them by color, linetype, or lineweight. If you do not need boundary offsets, you could also hide the net, usable, and gross boundaries and their respective hatches, so as not to clutter the drawing.



- Boundary hatches (Plan views): Each space boundary has an associated hatch that you can display.



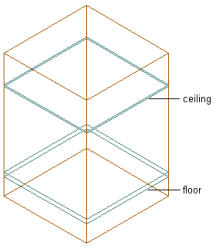
- Above and Below Cut Plane components (Plan views): If the space is cut by an object cut plane, you can define different visuals for the parts that lie above the cut plane and below the cut plane.



- Calculation cut planes and hatches (Plan views): For 3D freeform spaces, 2 calculation cut planes can be set. This helps to create evaluations of non-uniform space heights. For each of the calculation cut planes, you can set a boundary display and a hatch.
- Floor and ceiling components (Model views): 3D spaces can have floors and ceilings with a user-specified thickness. You can display them in a model view.

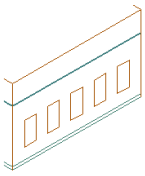
NOTE If the thickness of the ceiling or floor component is set to 0, it does not display in the drawing.

Floor and ceiling components in Model view

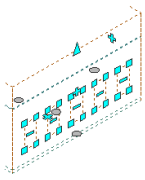


- Surfaces and surface components (Model views): 3D freeform spaces are composed of individual surfaces, which can have additional components like door and window openings.

Space surface with surface openings



Openings displayed



Opening grips displayed

NOTE If a material assignment determines the display properties of components in the space style, you can change the properties of the display component by clearing By Material. You can also override the material assignment with a different material. For more information, see Specifying the Materials of a Space Style on page 2022.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Space Styles.
3 Select the space style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 Click the Layer/Color/Linetype tab.
7 Select the space component to change, and change the following settings:
   - Material: If you select By Material, all display settings are taken from the assigned material. Components that cannot be set by material have the check box deactivated.
   - Visibility
   - Layer
   - Color
   - Linetype/Lineweight/Linetype Scale
   - Plot Style
8 Click OK.

Specifying the Hatching for Components of a Space Style

Use this procedure to specify the hatching for display components of a space style. Space hatching is displayed only in display representations that represent a Plan view.

The following hatch components are available for spaces:

- Base hatch: the hatch component for the base boundary of a space.
- Net hatch: the hatch component for the net boundary of a space.
- Usable hatch: the hatch component for the usable boundary of a space.
- Gross hatch: the hatch component for the gross boundary of a space.
- Cut Plane hatch: the hatch for the object cut plane. This cut plane is different from the calculation cut planes you can set for 3D freeform spaces.
- Calculation Cut Plane Hatch (1 and 2): If you define calculation cut planes for a 3D freeform space, you can add a hatch to the calculation cut plane boundary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Space Styles.
3 Select the space style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and click Style Override.
   The display representation in bold is the current display representation.
6 Click the Hatching tab.

7 Select a display component, and click the setting for Pattern.

8 Select the hatching for the display component:

If you want	Then…
a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
single hatching	select User-defined for Type, and clear Double Hatch.
double hatching	select User-defined for Type, and select Double Hatch.
solid fill	select Solid Fill for Type.

9 Click OK.

10 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.

11 Click Angle, and enter the angle for the selected pattern.

12 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

13 Click OK.

Setting the Object Cut Plane of a Space Style

Use this procedure to set the object cut plane of a space style.

The object cut plane of a space is used to display the space in Plan views at a defined cut height. It is unrelated to the calculation cut planes you can set for 3D freeform spaces. The object cut plane cannot, for example, be used in scheduling properties or in a space calculation. In most cases the cut plane of a space is determined by the cut plane of the display configuration of the current view. You can set up a different cut plane for individual spaces, if necessary.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style that you want to change.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and click Style Override.

The display representation in bold is the current display representation.

6 Click the Other tab.

7 To use the cut plane defined in the display configuration, verify that Override Display Configuration Cut Plane is cleared.

8 To define a cut plane differing from the cut plane of the display configuration, select Override Display Configuration Cut Plane, and enter the desired height for Cut Plane Height.

9 Click OK.

Attaching Notes and Files to a Space Style

Use this procedure to enter notes and attach reference files to a space style. You can also edit notes and edit or detach reference files from a space style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Space Styles.
3 Select the space style that you want to change.
4 Click the General tab.
5 To add a description to the space style, enter it for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Converting Area Styles to Space Styles

If you open a drawing from a previous version of AutoCAD Architecture that has area styles in it, the area styles will be automatically converted to space styles. The following settings will be converted:

Area style property	Space style property	Value/Default value
Name	Name	Existing value
Description	Description	Existing value
Keynote	Keynote	Existing value
Notes/Reference Docs	Notes/Reference Docs	Existing notes and attached documents
Property Sets	Property Sets	Area property sets are converted to space property sets and attached to the converted space style

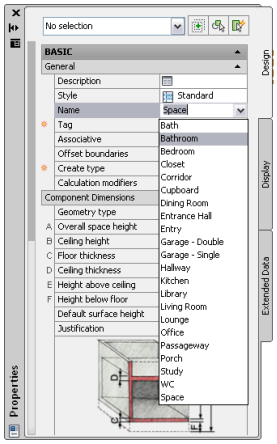
Area style property	Space style property	Value/Default value
N/A	List Definition	Standard **NOTE** In older versions of AutoCAD Architecture, list definitions were attached to area groups or area group templates. Now, list definitions are attached either to the space style or to the zone style.
N/A	Target Area	Default
N/A	Target Length	Default
N/A	Target With	Default
N/A	Net Offset	0
N/A	Usable Offset	0
N/A	Gross Offset	0
N/A	Floor Material	Standard
N/A	Ceiling Material	Standard
Classifications	Classifications	Existing classification values. **NOTE** Area classification definitions from older versions of AutoCAD Architecture are converted to space classification definitions and applied to converted space styles.
Display Representations		
N/A	Model	Drawing Default
Plan	Plan	Existing settings
Plan High Detail	Plan High Detail	Existing settings
Plan Low Detail	Plan Low Detail	Existing settings
N/A	Plan Presentation	Drawing Default
N/A	Plan Screened	Drawing Default
N/A	Reflected	Drawing Default
N/A	Reflected Screened	Drawing Default
N/A	Volume	Drawing Default
Decomposed	Decomposed	Existing settings

List Definitions

A list definition is a list of names that may be used as allowed names for spaces or zones. List definitions can be attached to a space style or a zone style, so that the list of names is available on the Properties palette when you create or edit a space or zone with that style.

For more information see Attaching a List Definition to a Space Style on page 2021 and Attaching a List Definition to a Zone Style on page 2050.

List definition for a space



For a description of the typical workflow for list definitions, see Working with List Definitions - Overview on page 1904.

List definitions are useful when you create spaces according to government or company standards.

When you change the name list in a space or zone style, a space or zone name can interact with the new list definition in the following ways:

- The existing name is also included in the new list definition. In this case, no change to the space name is made.
- The existing name is not included in the new list definition, but the list definition allows individual names to differ from the list. In this case, the existing name is retained as a non-standard name.
- The existing name is not included in the new list definition, and the list definition does not allow individual names to differ from the list. In this case, the existing name is removed and the name defaults to the first name in the new list definition.

Creating a List Definition

Use this procedure to create a list definition that can be attached to a space or zone style to specify the allowable values for the name property.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Multi-Purpose Objects, and expand List Definitions.
3. Create a new list definition:

If you want to…	Then…
create a new list definition with default properties	right-click List Definitions, and click New.

If you want to…	Then…
create a new list definition from an existing list definition	right-click the list you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the list definition, and press *ENTER*.

5 Edit the properties of your new list:

If you want to…	Then…
define the objects the list definition applies to	see Specifying the Application for a List Definition on page 2031.
edit the list definition	see Editing a List Definition on page 2031.
add notes or files to the definition	see Attaching Notes and Files to a List Definition on page 2032.

6 Click OK.

Specifying the Application for a List Definition

You can create list definitions that apply to spaces names, to zone names, or that can be used as drop-down lists for manual scheduling properties. For information on manual scheduling properties, see Entering Manual Properties and Fields for Objects on page 2502.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand List Definitions.

3 Select the definition you want to edit.

4 Click the Applies to tab.

5 Select one or more of the following options:

- Spaces: (If you want the list to be available for space names)
- Zones: (If you want the list to be available for zone names)
- Manual Property Definition: (If you want the list to be available for manual schedule properties)

6 Click OK.

Editing a List Definition

Use this procedure to edit a list definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand List Definitions.

3 Select the list you want to edit.

4 Click the Items tab.

5 Add, delete, or rename entries in the list definition:

If you want to…	Then…
add a new entry to the list	click Add, and enter the name of the entry.

If you want to…	Then…
delete an entry from the list	select the entry, and click Remove.
rename an entry in the list	select the entry, and enter the new name.

6 If you want users to have the alternative of entering a non-list name for the space or zone, select Allow individual property values to vary from this list.

7 Click OK.

Attaching Notes and Files to a List Definition

Use this procedure to attach text notes and files to a list definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand List Definitions.

3 Select the list definition for which you want to add a note or file.

4 Click the General tab.

5 To add a description to the list, enter the description for Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Close the application when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

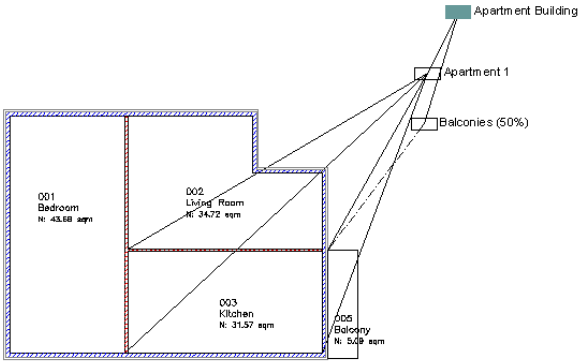
9 Click OK.

Zones

In AutoCAD Architecture, a zone is a container in which you can group spaces and other zones. You need zones to create an evaluation of your floor plan. With zones, you structure spaces into various groups, according to different schemes. For example, you can have functional zones (construction, traffic, and so on) or zones for building units (Apartment 1 Ground Floor, Apartment 2 Ground Floor, and so on.)

Spaces can be contained in more than one zone. For example, you can attach a balcony space to both the Construction Spaces group and the Apartment 1 Ground Floor group. You can set up a restriction in the zone style, so that a space can only be attached to one zone of a specific style.

Spaces attached to zones



A zone can have list definitions and calculation modifiers attached. List definitions are attached through the zone style, whereas calculation modifiers are attached directly to the zone.

Zone Templates

Zones can be connected and nested into complex structures. A zone structure for a building, for example, may have one top-level zone named "Building." Below that zone would a be a number of zones for apartments— the apartment 1 zone, the apartment 2 zone, and so on. The individual apartment zones can contain other zones like a construction areas zone, a 50% deduction zone, or spaces like the living room, the bedroom, and so on.

When you often need a complex zone structure, you can create a zone template that defines the necessary zones and their grouping. For example, when designing a new building, you can insert a zone structure based on a Building zone template, which would contain the main building zone plus all subordinate zones. A number of predefined zone templates are provided with the software.

Zones in the Space Evaluation

When you create a space evaluation of the floor plan, you can specify which zones are included.

For example, if you wanted to create a space evaluation for a single apartment in a building to determine the area and set the rent accordingly, you would select the zone representing that apartment. Within the same drawing you might also want to create an evaluation that contains only bathrooms, to determine how many tiles to order from a supplier. To do this you would first create a bathrooms zone, add all bathrooms from all apartments to it, and then evaluate the overall area of that zone.

For information about space evaluations of the floor plan, see Space Evaluation on page 2073.

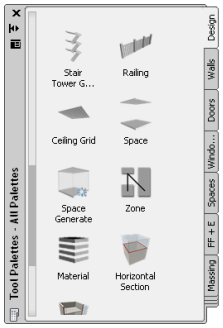
Zone Attachments Across External References

You can attach spaces or zones from an external reference to a zone in the current drawing. You cannot however, attach spaces and zones in the current drawing to zones in an external reference. If you detach an external reference from which spaces or zones have been attached to a zone in the current drawing, those spaces or zones are also detached. If you re-attach the external reference to the current drawing, you would need to manually re-attach the spaces and zones from the external reference, if desired.

Using Zone Tools to Create Zones

Tools provided with AutoCAD Architecture let you quickly place zones by selecting a zone tool with a specific zone style and other predefined properties. When you place zones using zone tools, you can use the default settings of the tool, or you can change settings for the zone properties. You can also use zone tools to apply the settings of a zone tool to existing zones.

Tool palettes containing zone tools



The default tool palettes in the workspace contain sample zone tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain zone tools that you can add to your tool palettes:

- Stock Tool catalog
- Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain zone tools with zone styles and properties that are customized for your projects or office standards.

Zone Properties

In AutoCAD Architecture, a zone is a documentation object that is used to group and organize spaces. The following table describes the properties that are displayed for a zone in the Properties palette.

Zone Property	Description
General Category	
Description	User-specified description of the zone object
Layer	Specifies the layer on which the zone is placed. By default, the layer assignment is defined in the zone style.
Style	Specifies the zone style. The style defined in the zone tool is the default.
Name	The name of the zone. If a list definition has been specified in the zone style, the list is available as a drop-down list. For more information, see Attaching a List Definition to a Zone Style on page 2050.
Tag	Specifies a zone tag to be inserted when adding the zone. Zone tags are available in the sample drawings shipped with the software. You can also create your own zone tags. **NOTE** This property is available only during adding a zone.
Calculation Modifiers	Identifies any calculation modifiers for the zone. A calculation modifier is a formula that modifies selected values of spaces attached to the zone. For more information, see Calculation Modifiers on page 2065.

Zone Property	Description
Number of Spaces	Displays the number of spaces that are directly attached to the zone.
Total number of spaces	Displays the number of spaces that are directly attached to the zone plus the number of spaces that are attached indirectly through subzones of the zone.
Number of Zones	Displays the number of zones that are directly attached to the zone.
Total number of zones	Displays the number of zones that are attached directly to the zone plus the number of zones that are attached through subzones of the zone.
Space/Zone Manager	An icon providing access to the Space/Zone Manager worksheet where you can rename zones, attach spaces and zones, define the content model of the zone, and attach calculation modifiers.
Dimensions Category	
Base area	Displays the combined base area of all spaces attached to the zone.
Calculated area	Displays the base area of all spaces attached to the zone processed with any calculation modifiers attached to the zone.
Base perimeter	Displays the combined base perimeter of all spaces attached directly or indirectly to the zone.
Calculated perimeter	Displays the base perimeter of all spaces attached to the zone processed with any calculation modifiers attached to the zone.
Base volume	Displays the combined base volume of all spaces attached directly or indirectly to the zone.
Zone Boundary Offset	Specifies the offset distance for the zone boundary that is drawn around any space attached to the zone to show the space/zones relationship.
Calculation Category	
Calculate area	Specifies whether the area of spaces that are attached to the zone will be calculated using any applicable calculation modifiers.
Calculate perimeter	Specifies whether the perimeter of spaces that are attached to the zone will be calculated using any applicable calculation modifiers.
Content	
Can contain spaces	This property defines that the zone is allowed to have spaces directly attached.

Zone Property	Description
Can contain zones	This property defines that the zone is allowed to have zones attached. **NOTE** If you select both content options, the zone can contain spaces and zones.
Location	
Rotation	Specifies the rotation of the zone.
Elevation	Specifies the elevation of the zone.
Additional Information	Specifies the location and coordinate system of the zone.

Creating a Zone

Use this procedure to add a new a zone that has the properties specified in the zone tool that you select. To specify settings when you add a zone, see Creating Zones with User-Specified Settings on page 2036.

1 Open the tool palette that contains the Zone tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Zone .

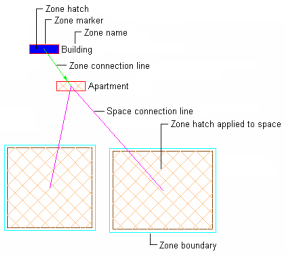
2 Specify the insertion point of the zone.

You can move or hide the Properties palette to expose more of the drawing area.

3 Continue adding zones as needed, and then press *ENTER*.

Creating Zones with User-Specified Settings

Use this procedure to add a zone with settings that you specify.



1 Open the tool palette that contains the Zone tool you want to use, and select it.

NOTE Alternatively, you can click Home tab ➤ Build panel ➤ Space drop-down ➤ Zone .

2 On the Properties palette, expand Basic, and expand General.

3 Enter a name for the zone.

If you have assigned a list definition to the zone style, you can select a name from the drop-down list.

4 Select a style.

5 Select a tag for the zone.

NOTE If no zone tags are contained in the list, you can drag a tag into the drawing from the Content Browser. You can also create your own tags from multi-view blocks.

6 To add a calculation modifier to the zone, click the setting for Calculation Modifiers, and select one or more calculation modifiers for the zone.

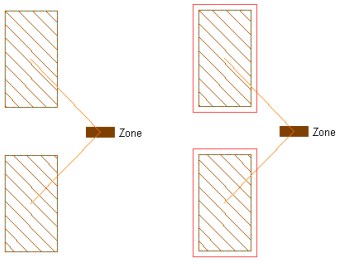
If you assign a calculation modifier to a zone, the area and perimeter values of spaces attached to the zone will be modified with the calculation modifier. For information about calculation modifiers, see Calculation Modifiers on page 2065.

7 Expand Dimensions.

8 For Zone boundary offset, enter a value to specify the distance you want between the zone boundary and the base boundary of any attached space.

If you select 0 offset, the zone boundary is identical to the base boundary of the space.

Zone boundary offset at 0 (left) and at an offset value (right)



TIP If you cannot see the zone boundary, the display component for the zone boundary may not be activated in the zone style. For more information, see Specifying the Layer, Color, and Linetype Properties of a Zone Style on page 2052.

9 Expand Calculation.

10 Specify which space values should be calculated in the zone:

If you want to …	Then…
calculate the area values of attached spaces including any applicable calculation modifiers	select Yes for Calculate Area.
calculate the perimeter values of attached spaces including any applicable calculation modifiers	select Yes for Calculate Perimeter.

For information about space evaluations, see Space Evaluation on page 2073.

11 Expand Content.

12 Define the content allowed in the zone:

If you want to …	Then…
allow spaces to be attached to the zone	select Yes for Can Contain Spaces.
allow zones to be attached to the zone	select Yes for Can Contain Zones.

13 In the drawing area, specify the insertion point of the zone.

You can move or hide the Properties palette to expose more of the drawing area.

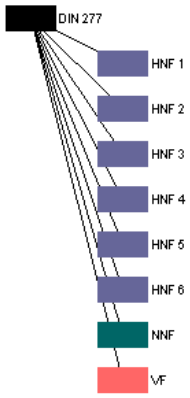
14 Continue adding zones as needed, and then press *ENTER*.

Creating Zone Structures from a Zone Template

Use this procedure to create zone structures based on a zone template. This procedure is recommended if you use the same zone structure frequently.

When you add a zone structure, all zones that are connected in that structure are inserted in the drawing. Depending on the style settings for the zone template, you can display individual zones with different color and hatch. You can also display zone connection lines. Below is an example for a zone structure representing the DIN 277 building norm.

Zones according to DIN277 zone template



For information about creating zone templates, see Zone Templates on page 2057.

1 Open the tool palette that contains the Zone from Template tool you want to use, and select it. (You may have to scroll to display the desired tool.)

2 On the Properties palette, expand Basic, and expand General.

3 Select the zone template you want to create a structure of zones from.

4 Define the offsets between individual zones in the structure:

If you want to…	Then…
define the offset between rows of the zone structure	enter a value for Row Offset.
define the offset between columns of the zone structure	enter a value for Column Offset.

5 In the drawing area, specify the insertion point of the zone structure.

You can move or hide the Properties palette to expose more of the drawing area.

6 Continue adding zone structures from the template as needed, and then press *ENTER*.

Creating a Zone Tool

Use this procedure to create a zone tool and add it to a tool palette. You may want to create your own zone tools if you are placing multiple zones with specific properties that you want to be the same for each instance.

For example, if you are creating an office floor plan with different calculation types for zones, you can create a zone tool for each calculation type.

1 Open the tool palette where you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a zone in the drawing	select the zone, and drag it to the tool palette.
create a tool from an zone style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3 Right-click the new zone tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand Basic, and expand General.

7 Click the setting for Description, enter a description of the zone created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select a zone style.

10 Select the drawing file containing the style used for this zone tool.

11 Select a tag for the zone.

12 Select the drawing file containing the tag used for this zone tool.

13 Expand Dimensions.

14 Enter the distance you want the zone boundary to be offset from attached spaces.

15 Expand Calculation.

16 Specify which values will be calculated for zones created from this tool:

If you want to …	Then…
calculate the area of attached spaces	select Yes for Calculate Area.
calculate the perimeter of attached spaces	select Yes for Calculate Perimeter.

17 Expand Content.

18 Define the allowed content in the zone tool:

If you want to …	Then…
allow spaces to be attached to zones created from this tool	select Yes for Can contain spaces.
allow zones to be attached to zones created from this tool	select Yes for Can contain zones.

For information about zone content, see Changing the Content Rules of a Zone on page 2044.

19 Click OK.

Converting Area Groups to Zones

Area groups in legacy drawings are automatically converted to zones when you open the drawing in the current version of AutoCAD Architecture. The following table maps area group properties to zone properties:

Legacy area group property	New zone property	Value/Default Value
Name	Name	Existing value **NOTE** Name lists that were attached to the area group are not re-attached to the zone. To use a converted legacy name list, you must attach it to the zone style.
Description	Description	Existing value
Layer	Layer	Existing layer
Style	Style	Area group style is converted to zone style. Properties are matched where possible; new properties have default values. For more information, see Converting Area Group Styles to Zone Styles on page 2056.
Calculation modifiers	Calculation modifiers	Existing modifier
N/A	Number of spaces	Existing value
N/A	Total number of spaces	Existing value
N/A	Number of zones	Existing value
N/A	Total number of zones	Existing value
Net area	Base area	Existing value
Calculated area	Calculated area	Existing value
Net perimeter	Base perimeter	Existing value
Calculated perimeter	Calculated perimeter	Existing value
N/A	Base volume	0

Legacy area group property	New zone property	Value/Default Value
N/A	Zone boundary offset	Default value
Calculate area	Calculate area	Existing value
Calculate perimeter	Calculate perimeter	Existing value
Can contain areas	Can contain spaces	Existing value
Can contain area groups	Can contain zones	Existing value
Rotation	Rotation	Existing value
Elevation	Elevation	Existing value
Additional information (Location)	Additional information (Location)	Existing values

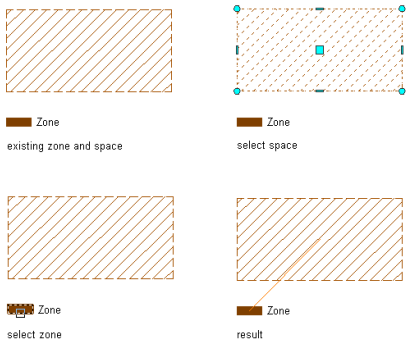
NOTE If you are converting a legacy zone structure, and connections between zones are not converted correctly, it is possible that the source drawing contained an error in the content rules for the parent zone. In cases like this, verify that the content rules of the parent zone allow attaching zones, as described in Changing the Content Rules of a Zone on page 2044, and then re-attach the lost zones as described in Attaching Spaces and Zones to Zones on page 2041.

Zones and Spaces

Zones are used to group spaces and subordinate zones.

Attaching Spaces and Zones to Zones

Use this procedure to attach spaces and zones to a selected zone.



NOTE You can attach spaces and zones to zones inside blocks, or attach spaces or zones inside a block to a zone outside the block, but if the blocks are exploded the attachments will be removed.

Connections of spaces and zones are not unique. You can attach a space or a zone to any number of different zones, unless you place restrictions on space/zone and zone/zone attachments in the zone, style:

- You can specify that a space can only be attached to one zone of the same style. That would prevent a space from being calculated multiple times, as in a case where you do not want the same room to be attached to multiple apartment zones.

- You can specify that zones of this style can only be attached to other zones of the same style. This would be useful for Building Systems applications where you want to generate HVAC and Lighting zones, but do not want to allow a zone of one kind to be attached to a zone of the other kind.

For more information, see Restricting the Content of a Zone Based on the Zone Style on page 2051.

In the properties of a zone, you can restrict the type of objects can be attached to the zone, allowing only spaces or only zones. For more information, see Changing the Content Rules of a Zone on page 2044.

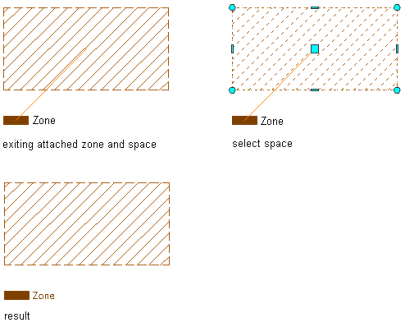
When you attach a zone to another zone, it is attached as a subzone to the first zone.

1. Select the zone to which you want to attach a space or zone.
2. Attach the space or zone to the selected zone in one of the following ways:
   - Click the Add (Plus) grip on the zone, and select spaces and zones to attach.
   - Click Zone tab ➤ Modify panel ➤ Attach .
3. Press ENTER.

Detaching Spaces and Zones from Zones

Use this procedure to detach spaces and zones from a zone.

You can detach only directly attached spaces or zones.



1. Select the zone from which you want to detach a space or zone.
2. Detach the space or zone in one of the following ways:
   - Click the Detach (Minus) grip on the connection line to the attached space or zone.
   - Click Zone tab ➤ Modify panel ➤ Detach . Then, select the space or zone you want to detach from the zone, and press *ENTER*.

Selecting Spaces and Zones Attached to a Zone

Use this procedure to select the spaces and zones that are attached to a zone.

1. Select a zone that has zones or spaces attached to it.
2. Click Zone tab ➤ Modify panel ➤ Select Attached .
   The spaces and zones that are attached to the zone are selected in the drawing.

NOTE Spaces and zones that are located in an external reference will be highlighted, but not selected.

Editing Zones

You can use either of the following methods to change zone properties such as the ones that control the allowed content for the zone, the types of calculation performed, and the calculation modifiers applied:

- You can change zone settings on the Properties palette.
- You can select editing commands from the context menu for a selected zone.

Renaming a Zone

Use this procedure to rename a zone.

If a list definition has been attached to the zone style, you can choose a name from the list. A list definition can either be restrictive and allow only names selected from the list, or it can allow you to enter a name of your choice. For more information, see List Definitions on page 2030.

1. Double-click the zone you want to rename.
2. On the Properties palette, expand Basic, and expand General.
3. For Name, do one of the following:
   - Select a name from the list.
   - Enter a name.

Changing the Zone Style

Use this procedure to change the style associated with a zone. Zone styles contain information about the content rules of the zone and the display of the zone and its attached zones and spaces. You can also add classifications here. For information about how to define zone styles, see Zone Styles on page 2049.

1. Select one or more zones, and double-click one of them.
2. Expand Basic, and expand General.
3. Select a new zone style.

When you change the zone style, it is possible that the new zone style has a different name list definition. In this case, the zone name can interact with the new list definition in the following ways:

- The existing name of the zone is also included in the new list definition. In this case, no change to the zone name is made.
- The existing name of the zone is not included in the new list definition, but the list definition allows individual names to differ from the list. In this case, the existing zone name is retained as a non-standard name.
- The existing name of the zone is not included in the new list definition, and the list definition does not allow individual names to differ from the list. In this case, the existing zone name is removed and the zone name defaults to the first name in the new list definition.

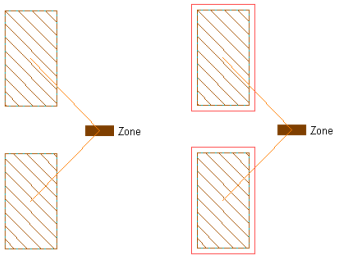
For more information about list definitions, see List Definitions on page 2030.

Changing the Zone Boundary Offset

Use this procedure to redefine the offset of the zone boundary from its attached spaces.

The zone boundary is a boundary around a space attached to a zone. It helps to display the connections between spaces and zones. You can use it in addition to the zone connection line, or instead of it. For information on displaying and hiding the zone connection line and the zone boundary, see Specifying the Layer, Color, and Linetype Properties of a Zone Style on page 2052.

Zone boundary offset at 0 (left) and at an offset value (right)



If you define a zone boundary offset at 0, the boundary is drawn on top of the space base boundary. Depending on the draw order, it is possible that the zone boundary is invisible because it is underneath the space base boundary. To avoid this effect, define an offset greater than 0.

1. Select one or more zones, and double-click one of them.
2. Expand Dimensions.
3. For Zone boundary offset, enter the desired offset from the base boundary of the attached spaces.

TIP If you cannot see the zone boundary, the display component for the zone boundary may not be activated in the zone style. For more information, see Specifying the Layer, Color, and Linetype Properties of a Zone Style on page 2052.

Changing the Content Rules of a Zone

Use this procedure to redefine the allowed content for the zone as spaces only, zones only, or both types of object.

NOTE You can set additional content restrictions in the zone style. For more information, see Restricting the Content of a Zone Based on the Zone Style on page 2051.

1. Select one or more zones, and double-click one of them.
2. Expand Content.
3. Define the allowed content in the zone:

If you want to …	Then…
allow spaces to be attached to the zone	select Yes for Can Contain Spaces.
allow zones to be attached to the zone	select Yes for Can Contain Zones.

Changing the Calculation Type of a Zone

Use this procedure to change the type of calculation (area, perimeter, or both) to be performed for spaces attached to a zone.

When you create zones from a zone template, the calculation type for each zone is predefined in the zone template. For more information, see Zone Templates on page 2057.

1 Select one or more zones, and double-click one of them.

2 Expand Calculation.

3 Specify the types of calculation to be performed for this zone:

If you want to …	Then…
calculate the base area values of attached spaces	select Yes for Calculate Area.
calculate the base perimeter values of attached spaces	select Yes for Calculate Perimeter.

4 Click Close.

Changing Calculation Modifiers for a Zone

Use this procedure to add, remove, or sort calculation modifiers for a zone.

By default, a calculation modifier is applied only to the base area and base perimeter of spaces attached to a zone. To apply the modifier to the net, usable, and gross boundaries of an attached space, you need to create and apply a property set definition that contains properties for the calculated area and perimeter values of these 3 boundaries. For more information, see Property Set Definitions on page 2510

For information about creating calculation modifiers, see Calculation Modifiers on page 2065.

1 Select the zones you want to change, and double-click one of them.

2 Expand Basic, and expand General.

3 Click the setting for Calculation modifiers.

NOTE This setting can be edited for multiple zones only if these zones have the same modifiers attached in the same order.

4 Attach or detach calculation modifiers:

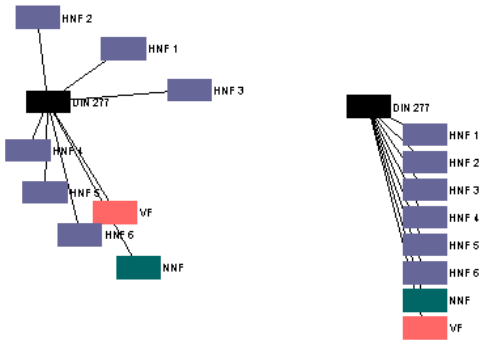
If you want to…	Then …
attach a calculation modifier style	for Available, select the desired calculation modifier style, and click .
detach a calculation modifier style	for Attached, select the desired calculation modifier style, and click .
rearrange the order of attached calculation modifier styles	for Attached, select the calculation modifier style to move to a different position. Click to move the calculation modifier style up in the list, or click to move the calculation modifier style down in the list.

5 Click OK.

Ordering Zone Structures

Use this procedure to sort zones according to their hierarchy when you have a complex zone structure with many levels, and it has become difficult to recognize the hierarchy of the zones. To sort the zones according to their hierarchical positions, AutoCAD Architecture offers you an easy-to-use command.

Ordering zone structures



1 Select the top node of the zone structure you want to sort.

2 Click Zone tab ➤ Modify panel ➤ Zone Layout .

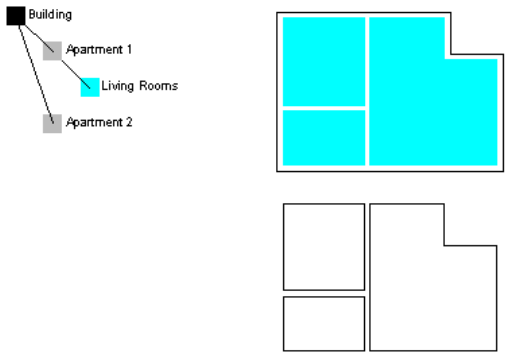
3 Specify the vertical (column) and horizontal (row) distance between the entries in the zone structure, and press *ENTER*.

Creating Polylines from Zones

Use this procedure to create polylines from a zone, in cases such as the following:

- You want to export the floor plan to an application that can process only polylines.
- You need the space profile for other operations.

Creating polylines from zones



After converting spaces to polylines, you can convert the polylines back to spaces, as described in Converting Polylines, Profiles, and Object Outlines to Spaces on page 1947.

NOTE If the net, usable, and gross boundaries are offset from the base boundary, a polyline is created for each boundary.

1 Select the zone containing spaces you want to convert to polylines.

2 Click Zone tab ➤ Modify panel ➤ Create Polyline .

3 Specify the source of the polylines:

- To create polylines only from directly attached spaces, enter **D** (Directly Attached Spaces) on the command line.
- To create polylines from all attached spaces, regardless of whether they are attached directly or through subzones, press *ENTER*.

Polylines are created on top of the specified spaces. You can edit them as any other polyline.

TIP When polylines lie above spaces, it can be difficult to select the space without the polyline. Try one of the following:

- Press *CTRL*, and click the boundary. Then click until the space is highlighted.
- If the space hatch is displayed, click the hatch.
- Enter **qselect** on the command line and filter for spaces.

Specifying Additional Display Properties for a Zone

Use this procedure to specify the text style, zone marker size, and zone connection line arrow for a selected zone. You can also specify whether the zone hatch is used only for directly attached spaces of for those attached through subzones as well.

1 Double-click the zone.

2 On the Properties palette, click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

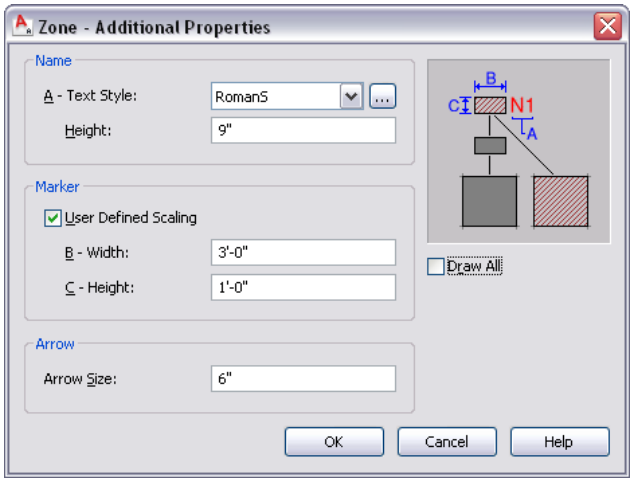
4 For Display controlled by, select This object.

NOTE To apply your changes to all zones in the drawing, select Drawing default setting. To apply changes to all zones of this style, select Zone Style:<style name>. For more information on styles, see Zone Styles on page 2049.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced.

7 Click Additional properties.



8 Under Name, for Text Style, select a style for the zone name from the drop-down list, or click the worksheet button, and create a new text style, which will then be selectable from the list. For more information, see "Text Style Dialog Box" in AutoCAD Help.

9 For Height, enter the desired value.

10 Under Marker, specify whether you want to define the scaling for the zone marker:

If you want to display the marker at…	Then…
1/50 of the screen size	clear User Defined Scaling.
the scale you specify	select User Defined Scaling, and enter the desired values for Width and Height.

11 Under Arrow, enter the desired value for Arrow Size.

12 Specify which spaces will inherit the hatch of the zone:

If you want to…	Then…
use the zone hatch only for directly attached spaces	clear Draw All.
use the zone hatch for all directly attached spaces and all spaces attached through another zone	select Draw All.

13 Click OK.

You can also access these option through the zone's context menu, as follows:

1 Select the zone, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.
The current display representation is displayed in bold.

3 Select the display representation where you want the changes to appear, and select Object Override. If Object Override is already selected, click at the upper-right corner of the tab.

4 In the Display Properties dialog, click the Other tab, and then specify these options as desired.

5 Click OK twice.

Attaching Hyperlinks, Notes, or Files to a Zone

Use this procedure to attach hyperlinks, text notes, or files to a zone.

1 Double-click the zone you want to attach information to.

2 Click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information about adding hyperlinks, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

4 Click the setting for Notes, and add a note. Then click OK.

5 Click the setting for Reference Documents.

6 Attach or detach reference files:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text for Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

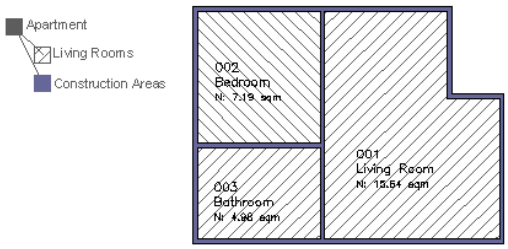
7 Click OK.

Zone Styles

The zone style can be used to control the display of the zone object, the zone and space connection lines, the zone boundary, and the zone hatch. If you add a hatch to a zone, the hatch is also displayed in spaces attached to the zone to indicate the relationship.

You can use zone styles to create zones with different display properties for construction spaces, rentable rooms, traffic spaces, or other space types. For example, you might draw and hatch all spaces in the construction zone, create the traffic zone in blue with a solid fill, and so on.

Living rooms and construction spaces with different styles



Properties in the zone style can also be used to set content restrictions for zones.

Zones are very useful for determining what is included or excluded when space evaluations are performed.

Creating a Zone Style

Use this procedure to create a zone style. You can start by using the default style or you can copy an existing style to use as your template. You then edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Zone Styles.

3 Create a new zone style:

If you want to…	Then…
create a new style with default properties	right-click Zone Styles, and click New.
create a new style from an existing style	right-click the zone style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new zone style, and press *ENTER*.

5 Edit the style properties of your new zone style:

If you want to…	Then…
enter a description of the style	click the General tab, and enter a description.
attach a list definition to the style	see Attaching a List Definition to a Zone Style on page 2050
restrict the allowed content of the style	see Restricting the Content of a Zone Based on the Zone Style on page 2051.
add classifications to the style	see Specifying Classifications for a Zone Style on page 2051.
change the display of the zone	see Specifying the Display Properties of a Zone Style on page 2052.
add notes, files, or documents to the style	see Attaching Notes or Files to a Zone Style on page 2055

6 If you want to assign the style to a zone tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating a Zone Tool on page 2038.

7 Click OK.

Attaching a List Definition to a Zone Style

Use this procedure to attach a list definition to a zone style, so that zones using that style are named consistently according to a user-defined list of names. List definitions can be created according to government or company standards or other systematics. For information about creating list definitions, see List Definitions on page 2030.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Zone Styles.

3 Select the zone style that you want to change.

4 Click the Design Rules tab.

5 For Zone Names, select a list definition from the drop-down list.

NOTE Only those list definitions that apply to zone names will appear here. For more information, see Specifying the Application for a List Definition on page 2031.

6 Click OK.

Restricting the Content of a Zone Based on the Zone Style

You can set content restrictions for zones based on the zone style. Content restrictions can help you to ensure that only valid zone structures are built.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Zone Styles.

3 Select the zone style that you want to change.

4 Click the Design Rules tab.

5 For Exclusivity, select either or both of the following options:

- Space Exclusive: Define that spaces can be attached only to one zone of the style. This would be useful for zones that represent real-world space compounds, like for example a zone style for apartments. In that case, you need to prevent that individual spaces can be attached to multiple zones of that style and be calculated more than once.
  If you attach a space to a second zone of the same style, it is disconnected from the first zone.
- Zone Exclusive: Define that zones of the style can only be attached to other zones of the same style. This would be useful for Building Systems applications where you want to generate HVAC and Lighting zones and want to ensure that an HVAC zone only can get attached to another HVAC zone, and a Lighting zone only to another Lighting zone.
  If you try to attach a zone of the style to a zone with another style the connection is not created, and an error message is displayed on the command line.

  IMPORTANT Zone content restrictions are observed in external references.

6 Click OK.

Specifying Classifications for a Zone Style

Use this procedure to specify classifications for any classification definition applied to a zone style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Zone Styles.

3 Select the zone style that you want to change.

4 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to zone styles.

5 For each classification definition, select the classification you want to apply to the current zone style.

6 Click OK.

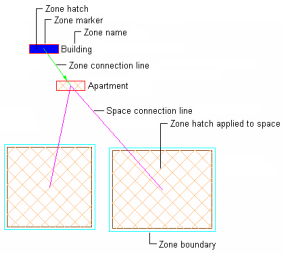
Specifying the Display Properties of a Zone Style

You can change the display of zones and their attached spaces in the zone style.

Specifying the Layer, Color, and Linetype Properties of a Zone Style

You can specify these display properties for the following display components of a zone in the style:

Display components in plan views	
Component	**Description**
Zone boundary	The boundary around any spaces attached to the zone
Hatch	Hatch component of the zone symbol and of any spaces connected to the zone. The zone hatch is drawn on top of the space hatch if both are visible.
Name	Zone label
Marker	Zone symbol
Zone Connection Line	Connecting line between the zone and any attached zones
Space Connection Line	Connecting line between the zone and any attached spaces



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Zone Styles.
3 Select the zone style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 Click the Layer/Color/Linetype tab.
7 Select the zone component to change, and change the following settings:
- Visibility
- Layer
- Color
- Linetype/Lineweight/Linetype Scale

- Plot Style

8 Click OK.

Specifying the Hatching of a Zone Style

Use this procedure to specify the hatch settings of a zone style. The specified hatch is applied to the zone symbol and to any spaces attached to the zone, allowing you to easily detect the structure in your drawing if you have many spaces and zones. The hatch is also important if you want to create a coding legend from the zone.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Zone Styles.
3 Select the zone style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Hatching tab.
8 Select a component, and click the setting for Pattern.
9 Select the hatching for the component:

If you want to…	Then…
select a hatching pattern that is available in the software	select Predefined for Type, and then select a pattern.
select a custom pattern	select Custom for Type, and then enter the name of the custom pattern. If necessary, click Browse, and navigate to the folder where the custom pattern file is located.
select single hatching	select User-defined for Type, and clear Double Hatch.
select double hatching	select User-defined for Type, and select Double Hatch.
select solid fill	select Solid Fill for Type.

10 Click OK.
11 Click Scale/Spacing, and enter a value that determines how the selected pattern is repeated.
12 Click Angle, and enter the angle for the selected pattern.
13 Click Orientation, and specify how the hatching is oriented:

If you want to…	Then…
orient the hatching to the object, regardless of the object rotation	select Object.
orient the hatching to the World Coordinate System	select Global.

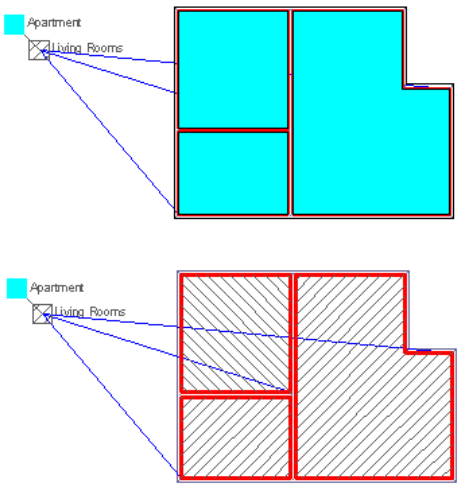
14 Click OK twice.

Inheriting the Zone Hatch to Different Levels of Attached Spaces

Use this procedure to specify to which level of attached spaces the hatch of the zone should be inherited.

The zone hatch can either be inherited only to the directly attached spaces, or it can be inherited to all attached spaces, directly or indirectly through subzones.

Inheriting zone hatch to all attached spaces (top) or only to directly attached spaces (bottom)



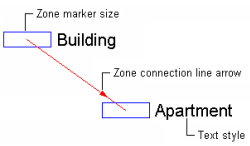
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Zone Styles.
3. Select the zone style that you want to change.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Other tab.
8. Specify whether the hatch of the zone should be used only for directly attached spaces, or for all spaces:

If you want to…	Then…
use the zone hatch only for directly attached spaces	clear Draw All.
use the zone hatch for all directly attached spaces and all spaces attached through another zone	select Draw All.

9. Click OK.

Specifying Text Style, Marker Size, and Arrow of a Zone Style

Use this procedure to define the text style, zone marker size, and the zone connection line arrow of a zone.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Zone Styles.
3 Select the zone style that you want to change.
4 Click the Display Properties tab.
5 Select the display representation where you want the changes to appear, and select Style Override.
6 If necessary, click .
7 Click the Other tab.
8 Change the width and height of the zone marker by selecting User Defined Scaling and then entering a width and height.

   To display the zone marker always in 1/50 of the screen size, clear User Defined Scaling.
9 Change the appearance of the zone name.

If you want to…	Then…
change the height of the zone name	enter a new height.
change the text style of the zone name	either select a text style from the list, or click the Browse button and create a new text style. For more information, see "Text Style Dialog Box" in AutoCAD Help.

10 Click OK twice.

Attaching Notes or Files to a Zone Style

Use this procedure to attach text notes and files to a zone style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Zone Styles.
3 Select the zone style that you want to change.
4 Click the General tab.
5 To add a description to the zone style, enter it for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Close the application when you are done editing.
detach a reference file	select the file name, and click Delete.

9 Click OK twice.

Converting Area Group Styles to Zone Styles

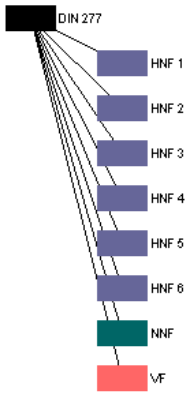
If you open a drawing from a previous version of AutoCAD Architecture that has area group styles in it, the area group styles will be automatically converted to zone styles. The following table maps area group style properties to zone style properties:

Area group style property	Zone style property	Value/Default value
Name	Name	Existing value
Description	Description	Existing value
Keynote	Keynote	Existing value
Notes/Reference Docs	Notes/Reference Docs	Existing notes and attached documents
Property Sets	Property Sets	Area group property sets are converted to zone property sets and attached to the converted zone style
N/A	List Definition	Standard **NOTE** In previous versions of AutoCAD Architecture, list definitions were attached to zones or zone templates. They are now attached to the space style or the zone style.
Exclusivity		
N/A	Allow a space to only be attached to one zone of this style	Not selected
N/A	'Allow a zone of this style to only be attached to other zones of this style	Not selected
Classifications	Classifications	Existing classification values. **NOTE** Area group classification definitions from legacy drawings are converted to zone classification definitions and applied to converted zone styles.
Display Representations		
Plan	Plan	Existing settings
Plan High Detail	Plan High Detail	Existing settings
Plan Low Detail	Plan Low Detail	Existing settings
N/A	Plan Presentation	Drawing Default
N/A	Plan Screened	Drawing Default

Zone Templates

A zone template is a structure definition for zones with multiple hierarchical levels. You define the zone template as a hierarchy with certain properties, and use it to create the zone structure in the drawing.

Zones according to DIN277



You use a zone template only to insert a zone structure. Later changes to the zone template are not copied to existing zones based on this template.

Similarly, when you change a zone structure that is based on a zone template, those changes do not affect the template.

You can create zone templates for structures you need frequently, and make them available through AutoCAD Architecture style drawings.

NOTE Area group templates from legacy drawings are automatically converted to zone templates when the drawings are opened in with the current version of the software. Area name definitions that were attached to an area group template will be disconnected from the zone template, as name definitions are now attached to the space style or the zone style rather than the zone template. For information about attaching list definitions to a zone style, see Attaching a List Definition to a Zone Style on page 2050.

Creating a Zone Template

Use this procedure to create a zone template. You can start by using the default template or you can copy an existing template and modify it.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Zone Templates.

3 Create a new zone template:

If you want to…	Then…
create a new template with default properties	right-click Zone Templates, and click New.
create a new template from an existing template	right-click the template you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new zone template, and press *ENTER*.

5 Edit the style properties of your new zone template:

If you want to…	Then…
define the content of the zone template	see Building the Structure of a Zone Template on page 2058.
add notes or files to the zone template	see Attaching Notes and Files to a Zone Template on page 2059.

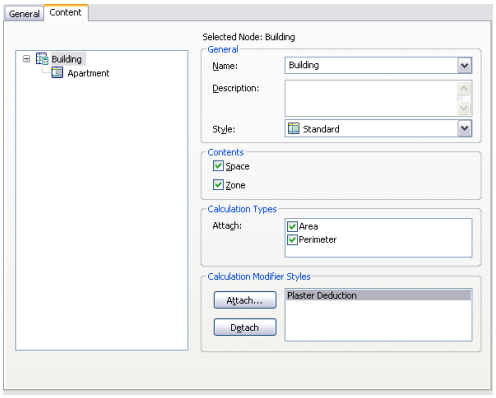
6 Click OK.

Building the Structure of a Zone Template

When you create a zone template, you set the following properties:

- structure of contained zones
- zone style (for each contained zone)
- zone content (for each contained zone)
- zone calculation type (for each contained zone)
- calculation modifier styles (for each contained zone)

For information about creating zones from a zone template, see Creating Zone Structures from a Zone Template on page 2038.



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Zone Templates.

3 Select the template you want to edit.

4 Click the Content tab.

In the left pane of the Content tab, a tree structure displays the structure of the zone template with all zones and subzones. If you are creating a new zone template, only the top level zone node is present. All other subzones are yet to be inserted.

5 Add the desired subzones to your zone template.

If you want to…	Then…
add a subzone to the template	select the zone that will contain the subzone, right-click, and click New.

If you want to…	Then…
rename a zone	select the zone, right-click, and click Rename.
delete a zone	select the zone, right-click, and click Delete.

NOTE To rearrange zones within the structure, drag-and-drop them within the tree.

6 Select a zone.

7 Enter a description for the zone.

8 Select a style for the zone. For information about zone styles, see Zone Styles on page 2049.

TIP If you select a style that requires zone exclusivity, you will be able to add only subzones that are of the same style. If you try to attach a subzone of a different style, you will receive an error message. For information on setting exclusivity rules for zone styles, see Restricting the Content of a Zone Based on the Zone Style on page 2051.

9 Specify the types of objects that can be attached to the zone (spaces, zones, or both.)

10 Select the types of calculations performed for the zone in the evaluation of the floor plan.

For example, you might want to have a Carpet zone node to calculate how much carpet you need and Base board zone node to calculate how much baseboard you need. For the Carpet zone node, you would select Yes for Calculate area. For the Baseboard zone node, you would select Yes for Calculate perimeter.

You can select both calculation types if you want both values to appear in the evaluation.

11 Select one or more calculation modifiers to apply to the zone.

For example, if you have a Balconies zone node, you can attach a calculation modifier that reduces all calculated space values in this zone by 50 percent.

NOTE By default, a calculation modifier is applied only to the base area and base perimeter of spaces attached to the zone. To apply the modifier to the net, usable, and gross boundaries of spaces attached to a zone, you need to create and apply a property set definition that contains properties for the calculated area and perimeter values of these 3 boundaries.

Calculation modifiers are applied accumulatively. If you attach a 50 percent calculation modifier to a space directly, and then attach the space to a zone that also has a 50 percent calculation modifier, the resulting space value is 25 percent, because both calculation modifiers are applied.

Calculation modifiers are processed top-down, with the first style in the list processed first, the second style after that, and so on. Depending on your calculation formulas, you can receive different result values. To change the order of calculation modifiers, drag them to the correct positions within the list. For an example of how the order of calculation modifiers can affect the calculation results, see Calculation Modifiers on page 2065.

12 Click Attach.

13 In the Select a Space Calculation Modifier Style worksheet, select a calculation modifier to attach to the zone node, and click OK.

14 To detach a calculation modifier, select it, and click Detach.

15 Click OK.

Attaching Notes and Files to a Zone Template

Use this procedure to attach text notes and files to a zone template.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Documentation Objects, and expand Zone Templates.
3 Select the template for which you want to add a note or file.
4 Click the General tab.
5 To add a description to the zone template, enter the description for Description.
6 Click Notes.
7 To add a note, click the Notes tab, and enter the note.
8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Close the application when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK twice.

Converting Area Group Templates to Zone Templates

If you open a drawing from a previous version of AutoCAD Architecture that has area group templates in it, the area group templates will be automatically converted to zone templates. The following table maps area group template properties to zone template properties:

Area group template property	Zone template property	Value/Default value
Name	Name	Existing value
Description	Description	Existing value
Notes/Reference Docs	Notes/Reference Docs	Existing notes and attached documents
List Definition	N/A	**NOTE** In previous versions of the software, name definitions could be attached to zone templates. Now, list definitions are attached to the space style or the zone style.
Style	Style	Area group styles from legacy drawings are automatically converted to zone styles and attached to the corresponding node in the zone template.
Content	Content	Existing content permissions. Area permissions are now space permissions, and area group permissions are zone permissions.
Calculation types	Calculation types	Existing values

Area group template property	Zone template property	Value/Default value
Calculation Modifier Styles	Calculation Modifier Styles	Existing calculation modifiers

Working with Space Data

Spaces can have a number of different data types attached to them:

- Geometric data belonging to the space: This is data inherent to the space like its height or width. This data can be displayed in the Properties palette or used in schedule tables and space tags. For more information, see Schedule Properties of Spaces on page 2061.
- Modified and calculated data derived from the space: this is data derived from the geometric data by applying calculation modifier styles, boundary offset calculation formulas, or formula properties. For more information, see Calculation Modifiers on page 2065, Working with Space Boundaries on page 1957 and Adding a Formula Property Definition to a Property Set Definition on page 2514. Schedule properties exist for values created by calculation modifiers, boundary offsets, and formulas, so that they can be displayed in the Properties palette and used in a schedule table, too.
- Data generated by a geometric decomposition of the space area. For more information, see Space Decomposition on page 2069.
- Space surface properties: Data attached to the surfaces of a space. For more information, see Editing Space Surface Properties on page 1996.
- User-defined information sets: you can define any set of relevant property set data for spaces, like for example, floor finish, ceiling material etc. This data can be displayed in the Properties palette and used in schedule tables and space tags. For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523.

Schedule Properties of Spaces

There are a large number of schedule properties you can attach to a space. Property data is placed in a property set definition and attached to a space or space style. You can display it in the Properties palette or use it to create schedule tables. For information about how to create a property set definition containing schedule properties, see Creating a Property Set Definition on page 2521 and Adding an Automatic Property Definition to a Property Set Definition on page 2526.

The following schedule properties are available as automatic properties directly derived from a space:

Property	Description
Base Area	Area bounded by the base boundary
Base Area Minus Interferences	Area bounded by base boundary minus the area deducted by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Base Ceiling Area	Area bounded by the ceiling boundary. The ceiling boundary is always derived from the base boundary of the space. In an extruded 3D space, the base ceiling area is identical to the base area; in a 3D freeform space the base ceiling area can differ from the base area.
Base Perimeter	Perimeter of the base boundary

Property	Description
Base Perimeter Including Interferences	Perimeter of the base boundary including the length created by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Base Surface Area	The sum of surface areas on a space, calculated from the base volume of the space
Base Volume	Volume of the space as calculated from the base boundary
Calculated Area	Base area of a space after applying calculation modifiers. For more information, see Calculation Modifiers on page 2065.
Calculated Perimeter	Base perimeter of a space after applying calculation modifiers
Calculation Modifier	List of all calculation modifiers applied to the space
Calculation Plane 1 Area Calculation Plane 2 Area	Space area at the height of calculation cut planes 1 and 2. This property should be used for 3D freeform spaces only; in an extruded 3D space the calculation cut plane area is identical at each cut plane. For more information, see Setting Calculation Cut Planes for 3D Freeform Spaces on page 2069.
Calculation Plane 1 Height Calculation Plane 2 Height	Height of calculation cut planes 1 and 2.
Calculation Plane 1 Perimeter Calculation Plane 2 Perimeter	Perimeter of calculation cut planes 1 and 2.
Ceiling Thickness	Thickness of the ceiling boundary. For more information, see Changing the Height of Extruded 3D Spaces on page 1974 and Changing the Height of 3D Freeform Spaces on page 1975.
Color	Color assigned to the space in the AutoCAD properties
Color - Text	Color of text
Description	Description added to the space
Description from Style	Description added to the space style
Documents	List of all documents attached to the space. For more information, see Attaching Hyperlinks, Notes, or Files to a Space on page 1956.
Documents from Style	List of all documents added to the space style. For more information, see Attaching Notes and Files to a Space Style on page 2028.
Drawing Fingerprint GUID	System value used in export to Building Systems applications
Floor Thickness	Thickness of the floor boundary. For more information, see Changing the Height of Extruded 3D Spaces on page 1974 and Changing the Height of 3D Freeform Spaces on page 1975.
Gross Area	Area bounded by the gross boundary

Property	Description
Gross Area Minus Interferences	Area bounded by gross boundary minus the area deducted by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Gross Calculated Area	Area bounded by the gross boundary after applying calculation modifiers
Gross Calculated Perimeter	Perimeter of the gross boundary after applying calculation modifiers
Gross Perimeter	Perimeter of the gross boundary
Gross Perimeter Including Interferences	Perimeter of the gross boundary including the length created by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Handle	Internal ID of space
Has Net, Usable, and Gross Boundaries	Legacy value from Autodesk Architectural Desktop 2006
Height	Ceiling height of the space.
Hyperlink	Lists all hyperlinks you have attached to the space. For more information, see Attaching Hyperlinks, Notes, or Files to a Space on page 1956.
Layer	Layer of the space
Length	Length of the space
Linetype	AutoCAD linetype of the space
Maximum Area/Length/Width	Maximum values for area, length, and width of spaces that have target dimensions defined in the space style. For more information, see Specifying Target Dimensions for the Space on page 2020.
Minimum Area/Length/Width	Minimum values for area, length, and width of spaces that have target dimensions defined in the space style. For more information, see Specifying Target Dimensions for the Space on page 2020.
Name	Name of the space
Net Area	Area bounded by the net boundary
Net Area Minus Interferences	Area bounded by net boundary minus the area deducted by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Net Calculated Area	Area bounded by the net boundary after applying calculation modifiers
Net Calculated Perimeter	Perimeter of the net boundary after applying calculation modifiers
Net Perimeter	Perimeter of the net boundary

Property	Description
Net Perimeter Including Interferences	Perimeter of the net boundary including the length created by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Net to Gross Offset	Offset of net boundary from gross boundary
Notes	Notes attached to the space
Notes from Style	Notes attached to the space style
Object ID	Internal ID
Object type	AEC object type. For spaces, this property is always set to SPACE.
Space Above Ceiling	Space above the ceiling boundary. For more information, see Changing the Height of Extruded 3D Spaces on page 1974 and Changing the Height of 3D Freeform Spaces on page 1975.
Style	The style of the space
Target Area/Length/Width	Target values for area, length, and width of spaces that have target dimensions defined in the space style. For more information, see Specifying Target Dimensions for the Space on page 2020.
Usable Area	Area bounded by the usable boundary
Usable Area Minus Interferences	Area bounded by usable boundary minus the area deducted by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Usable Calculated Area	Area bounded by the usable boundary after applying calculation modifiers
Usable Calculated Perimeter	Perimeter of the usable boundary after applying calculation modifiers
Usable Perimeter	Perimeter of the usable boundary
Usable Perimeter Including Interferences	Perimeter of the usable boundary including the length created by interference conditions. For more information, see Creating Interference Conditions for Spaces on page 1978.
Volume Above Ceiling	Volume of the space above the ceiling boundary. All volumes are calculated from the base volume.
Volume Below Floor	Volume of the space below the floor boundary.
Volume Overall	Overall volume of the space including ceiling and floor boundaries, and the volume above the ceiling and below the floor.
Wall Area	The area of the wall sides. Used for example in paint and plaster calculations.
Width	Width of the space

Calculation Modifiers

A calculation modifier is a formula that you can apply to a space to change the calculated results of its associated area or perimeter values. Calculation modifiers can also be applied to a zone to change the calculated results of all spaces attached to that zone. You might want to change calculated results for number of purposes; for example, to account for plaster deductions or the tiling in a bathroom.

By default, a calculation modifier is applied only to the base area and base perimeter of the space. To apply the modifier to the net, usable, and gross boundaries of a space, you need to create and apply a property set definition that contains properties for the calculated area and perimeter values of the those boundaries. For more information, see Property Set Definitions on page 2510.

Calculation modifiers work cumulatively. When you apply several different modifiers to a space or a zone, they are all applied. Therefore, it is important to define the order in which they are used.

Example: You have a space area of 25 square meters. You want to apply 2 different calculation modifiers to it. Calculation modifier A deducts a value of 0.3 square meters for a column. Calculation modifier B divides the space by 2 (in some international calculation schemes, this is used for calculating balconies).

- If you apply the plaster deduction first and the division second, you get the following result:
  Calculation Modifier A: 25 m^2 - 0.3 m^2 = 24.7 m^2
  Calculation Modifier B: 24.7 m^2 / 2 = 12.35 m^2
- If you apply the division first and the plaster deduction second, you get the following result:
  Calculation Modifier B: 25 m^2 / 2 = 12.5 m^2
  Calculation Modifier A: 12.5 m^2 - 0.3 m^2 = 12.2 m^2

You can set the order of calculation modifiers in the properties of the space. For information about ordering calculation modifiers, see Adding and Removing Calculation Modifiers for Spaces on page 2065.

Adding and Removing Calculation Modifiers for Spaces

Use this procedure to attach, detach, or sort calculation modifiers for spaces.

Calculation modifiers are values and formulas that can be applied to the area and perimeter values of a space to modify them. By default, a calculation modifier is applied only to the base area and base perimeter of a space. To apply the modifier to the net, usable, and gross boundaries of a space, you need to create and apply a property set definition that includes properties for these boundaries. For more information, see Property Set Definitions on page 2510

1. Select the spaces you want to attach a calculation modifier to, and double-click one of them.

   NOTE This procedure can be applied to multiple spaces only when they all have the same modifiers attached in exactly the same order.

2. On the Properties palette, expand Basic, and expand General.
3. Click the setting for Calculation modifiers.
4. Attach or detach calculation modifiers:

If you want to…	Then …
attach a calculation modifier	for Available, select the desired calculation modifier, and click .

If you want to…	Then …
detach a calculation modifier	for Name, select the desired calculation modifier, and click .
rearrange the order of attached calculation modifiers	for Name, select the calculation modifier you want to move to a different position. Click to move the calculation modifier up in the list, or click to move the calculation modifier down in the list. **NOTE** Calculation modifiers are processed in the same top-down order in which they are listed on this worksheet.

5 Click OK.

Creating a Calculation Modifier Style

Use this procedure to create a calculation modifier style. You can start by using the default style or you can copy an existing style to use as your template. You then edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Calculation Modifier Styles.

3 Create a new calculation modifier style:

If you want to…	Then…
create a new modifier style with default properties	right-click Calculation Modifier Styles, and click New.
create a new modifier style from an existing style	right-click the calculation modifier you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new calculation modifier style, and press *ENTER*.

5 Edit the properties of your new calculation modifier style:

If you want to…	Then…
define the calculation type of the modifier style	see Specifying the Application for a Calculation Modifier Style on page 2067.
define the formula of the modifier style	see Defining the Formula for a Calculation Modifier on page 2067.
add notes, files, or documents to the modifier style	see Attaching Notes and Files to a Calculation Modifier Style on page 2068.

6 Click OK.

Specifying the Application for a Calculation Modifier Style

A space contains 2 values that can be affected by a calculation modifier: the area and the perimeter. You can choose to have a calculation modifier apply to either or both of these calculations.

For example you might want to set up a modifier that reduces the calculated base area by 50 percent. (This is obligatory for several space types in various international architectural standards.)

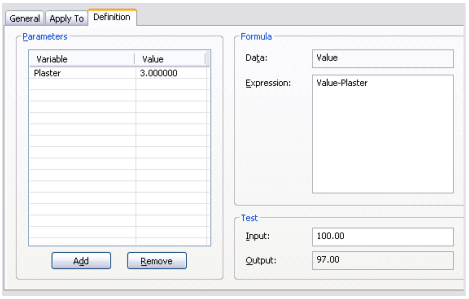
Or you might want a modifier that deducts length from the perimeter of a room for openings and stairs. This would be helpful in calculating the amount of baseboard material needed for this room.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and expand Calculation Modifier Styles.
3. Select the modifier for which you want to set the calculation type.
4. Click the Apply To tab.
5. Select whether you want to apply the modifier to the (base) area or (base) perimeter of the space. You can also select both values here.
6. Click OK.

Defining the Formula for a Calculation Modifier

Use this procedure to define or edit the formula for a calculation modifier style.

Variable and formula for modifier



1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and expand Calculation Modifier Styles.
3. Select the modifier for which you want to define a formula.
4. Click the Definition tab.
5. Add a variable to the calculation modifier.

   A variable consists of the variable name and its value. For example, to create a plaster deduction of 3 percent, click Add, and enter Plaster_Deduction for Variable and 0.97 for Value.

   You should use a descriptive name as a variable name to add transparency to your formulas.

   To set up formulas, you can also enter direct mathematical values.

   The following characters and words are not allowed:

   - Special characters such as ?()*- (You may, however use an underscore).
   - Spaces
   - Accent marks such as ä, ö, ü, ê, è, å
   - Key words from Visual Basic®.

For information about Visual Basic key words, refer to the Visual Basic Reference.

One of the following values is displayed for Data depending on current selections on the Apply To tab:

- AreaValue (if Area is selected)
- PerimeterValue (if Perimeter is selected)
- Value (if both Area and Perimeter are selected)

You cannot edit this value; if you want to change it, click the Apply To tab and change the current selections there as desired.

6 For Expression, enter the formula for calculating the modifier.

You can enter direct mathematical values and operators, variables you have created, and Visual Basic key words, such as Mod, Exp, or Log.

For example, if you want to set up a plaster deduction of 3 percent, and you have defined a variable called Plaster_Deduction with a value of 0.97, enter AreaValue * Plaster_Deduction.

NOTE It is important to enter the variable names AreaValue and PerimeterValue exactly as they are displayed in the Data field. Alternative spellings such as "Area Value" or "perimetervalue" are not recognized.

7 To test your formula, enter a sample value for Input, press *ENTER*, and check the result for Output.

8 Click OK.

Attaching Notes and Files to a Calculation Modifier Style

Use this procedure to enter notes and attach reference files to a calculation modifier style. You can also edit reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Calculation Modifier Styles.

3 Select the modifier to which you want to attach notes or files.

4 Click the General tab.

5 To add a description to the modifier, enter it for Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click Open.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Close the application when you are done editing.
detach a reference file	select the file name, and click Delete.

9 Click OK.

Setting Calculation Cut Planes for 3D Freeform Spaces

Use this procedure to set calculation either or both of the cut planes available for 3D freeform spaces. These can be useful for rooms under a roof where the space area can be calculated only for the parts of a space with a specific height. Calculation planes can be automatically scheduled.

1. Select the spaces for which you want to define the 2 calculation cut planes, and double-click one of them.
2. Expand Basic, and expand Advanced Dimensions.
3. For Calculation plane height 1 and Calculation plane height 2, enter the desired values for the calculation cut plane height.

TIP You can activate display components for the calculation cut planes and the calculation cut plane hatches in Plan view. For more information, see Specifying the Display Properties of a Space Style on page 2024.

Generating Output Data and Exporting Space Data

Space data can be displayed and delivered in various output formats. Depending on your needs, you should choose one of the methods below to deliver and communicate space data:

- Schedule table (DWG): When you create a schedule table within a drawing file, the space property data is available for every user that has a version of AutoCAD Architecture, or any software that can read DWG files, like AutoCAD. For information on creating schedule tables, see Basic Schedules on page 2461.
- DWF: You can export a drawing file with property data to a DWF file. For more information, see Publishing Drawings to DWF and DWFx on page 181.
- Database (XLS/CSV/TXT): You can export space property data to XLS (Microsoft Excel), CSV, and TXT formats which are readable by a number of spreadsheet calculation and database applications. For more information, see Exporting a Schedule on page 2489 and Exporting Schedule Data for Selected Objects on page 2490.
- Space evaluation (XLS/TXT): When you generate a space evaluation document, selected properties of spaces are exported to either an XLS or TXT document. Space evaluations display only a subset of space properties. You need a space evaluation for example if you want to export space decomposition data. For more information, see Space Decomposition on page 2069 and Space Evaluation on page 2073.
- Autodesk MapGuide: you can export space property set data to Autodesk MapGuide. For more information, see Publishing Drawing Files to Autodesk MapGuide on page 176.
- Database (MDB): You can export space property data to a Microsoft Access MDB file. For more information, see Exporting Property Set Data to an MDB on page 181.

NOTE If you previously used the SpaceInfo command to generate MDB data from spaces, you would now use the **AecExportPropertyData** command.

Space Decomposition

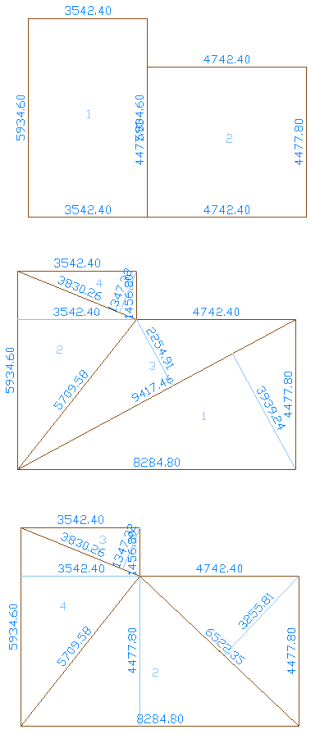
In some countries, such as Germany and Japan, an important part of space evaluation is the visual decomposition of spaces into subdivisions for the proof that must be approved by the cognizant administrative authority.

A space decomposition is a Plan display representation in which the spaces are displayed as triangles or trapezoids, depending on the decomposition method. Additionally, the decomposition shows height lines as well as edge and height dimensions. Architects need space decomposition for calculation proof.

Decomposition is set in the display properties of the space object, the space style, or in the drawing defaults.

With styles, you can control how the decomposition is displayed, the decomposition method used, color settings for decomposition components, and tags.

Different space decomposition methods



Displaying the Space Decomposition

In the Plan High Detail and Plan Low Detail display configurations, the space decomposition is displayed by default in the bottom view direction.

If the space decomposition is not displayed in the desired display configuration, use the following steps to display it:

1. Click Manage tab ➤ Style & Display panel ➤ Display Manager .
2. Select the display configuration where you want to display the space decomposition.
3. Expand the display configuration.
4. Select the display set in which you want to display the space decomposition.
5. Click the Display Representation Control tab.
6. Scroll through the list of objects until you reach the Space object.
7. Select the check box for the Decomposed display representation.
8. Click OK.

Specifying Layer/Color/Linetype Settings of the Space Decomposition

Use this procedure to change the properties of the display components of the space decomposition view for a space style.

The following decomposition display components are available:

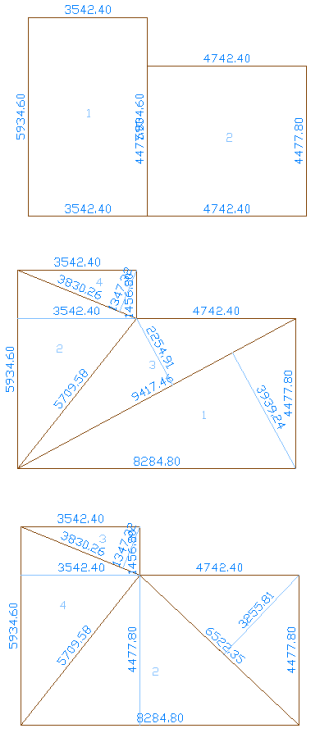
Component	Description
Additive Edge	Decomposition lines of a space with a positive value, such as a room
Subtractive Edge	Decomposition lines of a space with a negative value, or a hole
Additive Tag	Tag for a space subdivision with a positive value
Subtractive Tag	Tag for a space subdivision with a negative value
Additive Height	Height lines of a space subdivision with a positive value
Subtractive Height	Height lines of a space subdivision with a negative value
Edge Dimension Text	Label for a space edge displaying its length
Height Dimensions	Label for a height line displaying its length

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Architectural Objects, and expand Space Styles.
3. Select the space style where you want to change decomposition settings.
4. Click the Display Properties tab.
5. Select the Decomposed display representation, and select either Style Override or Drawing Default, depending on which display source you want for the decomposition.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select the space decomposition component to change, and change the following settings:
   - Visibility
   - Layer
   - Color
   - Linetype/Lineweight/Linetype Scale
   - Plot Style
9. Click OK twice.

Specifying the Type of Space Decomposition

In the decomposition view of the space style, you specify the type of subentities into which the space will be decomposed (trapezoid or triangulated) and the AutoCAD entities the decomposed space is converted to when exploded (lines or closed polyline faces).

Trapezoid and triangulated space decompositions



1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Architectural Objects, and expand Space Styles.

3 Select the space style where you want to change decomposition settings.

4 Click the Display Properties tab.

5 Select the Decomposed display representation, and select either Style Override or Drawing Default, depending on which display source you want for the decomposition.

6 If necessary, click .

7 Click the Decomposition tab.

8 Under Decomposition Type, select an option for Type:

If you want to…	Then…
display a trapezoid decomposition	select Trapezoid.
display a triangular decomposition without overlapping triangles	select Triangle.
display a triangular decomposition with overlapping triangles	select Triangle (overlap).

9 Under Explode Result, select an option:

If you want to…	Then…
change the decomposed space into single lines after exploding	select Lines.

If you want to…	Then…
change the decomposed space into closed polylines for each decomposed part	select Faces.

10 Click OK twice.

Specifying Text Settings for Space Decomposition

Use this procedure to modify the numbers of the space subdivisions as well as the edge and height annotations.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Architectural Objects, and expand Space Styles.
3 Select the space style where you want to change decomposition settings.
4 Click the Display Properties tab.
5 Select the Decomposed display representation, and select either Style Override or Drawing Default, depending on which display source you want for the decomposition.
6 If necessary, click .
7 Click the Proof tab.
8 Define the prefix settings:

If you want to…	Then…
display a prefix for the numbers of the space subdivisions	enter a prefix.
change the style of the numbers of the space subdivisions	either select a text style from the list or click the Browse button and create a new text style. For more information, see "Text Style Dialog Box" in AutoCAD Help.
change the height of the numbers in the space subdivisions	enter a value for Height.

9 Define the edge dimension settings:

If you want to…	Then…
change the style of the edge dimensions	either select a text style from the list or click the Browse button and create a new text style. For more information, see "Text Style Dialog Box" in AutoCAD Help.
change the height of the edge dimensions	enter a value for Height.

10 Click OK twice.

Space Evaluation

The space evaluation is a documentation feature that calculates and evaluates the space information of your finished floor plan. This information is stored in a separate file that you can export to a spreadsheet or word

processing application. Evaluation templates ensure that the information is formatted and arranged in a consistent, structured way.

Examples for Using the Space Evaluation

Architects need the space evaluation feature for submitting floor plans to the building plan approval authorities and to customers. Space evaluation can also be used for performing cost estimates, assigning jobs to contractors, or organizing facility management.

You can create evaluations for

- Selected spaces and zones in the current drawing
- Selected spaces and zones from multiple open drawings
- All spaces and zones in a drawing
- All spaces and zones from all open drawings
- Spaces and zones from external references

Transitioning from Area Evaluation to Space Evaluation

In previous versions of the software, areas and area groups could be evaluated with the area evaluation feature. Areas are now converted to spaces, area groups to zones, and the area evaluation has been converted to the space evaluation. If you attempt to use a legacy tool or run a legacy command to start the area evaluation, the following message will appear:

If you click Run Space Evaluation, the space evaluation will be started instead. You should remove area evaluation tools from your palettes and exchange area evaluation commands for space evaluation commands in your scripts. For a listing of obsolete commands and their corresponding new commands, see Appendix 1: Command Changes for Spaces and Areas on page 2087.

Preparing the Space Evaluation

Before you create an evaluation file, you select the spaces and zones to include, and you set a number of options that control the output for export.

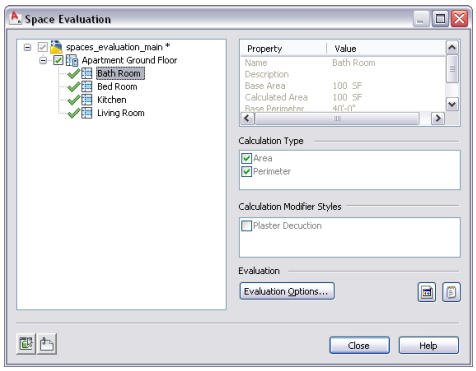
Selecting Spaces and Zones for Evaluation

Use this procedure to select spaces and zones to include in the evaluation.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ▾ ➤ Space Evaluation .

Selecting space and zones for an evaluation



In the left pane, all open drawings are listed with spaces and zones in a tree structure.

When you highlight one of the spaces or zones, the following information is displayed on the right side:

- Name
- Description
- Base Area
- Calculated Area (base space after application of calculation modifiers)
- Base Perimeter
- Calculated Perimeter (base perimeter after application of calculation modifiers)
- Calculation Type (Area or Perimeter)
- Calculation Modifier Styles

2 To include spaces and zones from external references in the list view, click .

NOTE Spaces and zones from external references are displayed with the External References icon ( ). You can select them in the same way as spaces and zones from open drawings.

3 Select the spaces and zones you want to include in the evaluation of the floor plan by selecting their check boxes.

There are different colors for the check box marks:

- A black check mark means that you have selected this space or zone directly for evaluation. You can clear that mark directly.
- A gray check mark means that you have selected a space or zone contained in the gray-marked zone. This does not mean that the gray-marked zone is included in the evaluation; if you want to include it, select it directly.
- A blue check mark on a space or zone means that you have selected the zone these items are contained in. These zones and spaces are included in the evaluation because their containing zone is included.

NOTE There is one exception to this rule. If you want to run a Space Evaluation on a drawing that contains a zone, but the zone's associated spaces are located in an xref, the referenced spaces need to be explicitly checked (black) in the Evaluation dialog in order to be included in the evaluation.

Evaluation Content

Use this procedure to specify which of the following components to include in the evaluation file. You select components for spaces and zones separately.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ➤ Space Evaluation .

2 Click Evaluation Options.

3 Click the Evaluation tab.

4 Select Space for Select.

5 In the list displayed, select the components you want to appear in the evaluation file.

You can choose these components:

Component	Description
Name	Name of the space or zone
Description	Description of the space or zone
Overview Image	Graphic image of the space or zone in bitmap format
Base Area Label	Fixed prefix for the base area value of the space or zone
Base Area Result	Base area value of space or zone without calculation modifiers applied
Calculated Area Label	Fixed prefix for the area of the space or zone after applying calculation modifiers
Calculated Area Result	Area value of the space or zone with calculation modifier styles applied
(Area) Modifier Label	Prefix showing the name of a modifier applied to space area
(Area) Modifier Expression	Formula of calculation modifier applied to the space area
(Area) Modifier Result	Resulting value of applied calculation modifier
(Area) Proof Label - Spaces only	Number of the space subdivisions plus any prefixes you may have set
(Area) Proof Expression - Spaces only	Formula of the decomposition method applied to the space
(Area) Proof Result - Spaces only	Result of the space decomposition
(Area) Decomposed Image - Spaces only	Preview image of the space decomposition
Base Perimeter Label	Fixed prefix for the space or zone base perimeter value

Component	Description
Base Perimeter Result	Base value of the space or zone perimeter without calculation modifier styles applied
Calculated Perimeter Label	Fixed prefix for the base perimeter of the space or zone after calculation modifiers are applied
Calculated Perimeter Result	Perimeter value of the space or zone after calculation modifiers are applied
(Perimeter) Modifier Label	Prefix showing the name of perimeter modifier
(Perimeter) Modifier Expression	Formula of calculation modifier applied to perimeter
(Perimeter) Modifier Result	Resulting value of any applied perimeter calculation modifiers

6 If necessary, repeat the component selection for zones.

7 Click OK.

Image Display Properties

Use this procedure to specify display settings for any preview images you want to include in your evaluation file.

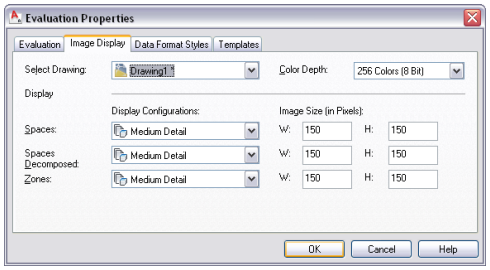
1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ➤ Space Evaluation .

2 Click Evaluation Options.

3 Click the Image Display tab.

Image display for space evaluation document



4 Select the drawing for which you want to set image properties.

NOTE If you want to create include several open drawings in the evaluation, you need to set the image properties for each open drawing separately.

5 Choose the desired color depth for the images in the evaluation file. Not that a high resolution enhances the quality of the images but also enlarges the file size.

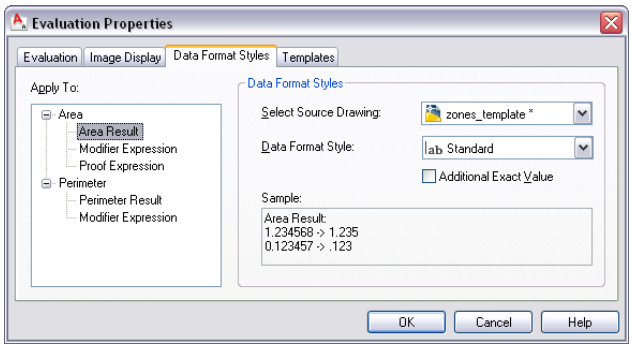
6 For each object category (Spaces, Spaces Decomposed, and Zones) select the desired display configuration, and specify the desired width and height for the image size:

NOTE In the list, you will see only those display configurations in which display representations for spaces, zones, or decomposed spaces are turned on.

7 Click OK.

Data Format Style Properties

You can set different data format styles for different components of the evaluation file.



NOTE For information about creating data format styles, see Property Data Formats on page 2496.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ▾ ➤ Space Evaluation .

2 Click Evaluation Options.

3 Click the Data Format Styles tab.

4 In the tree view under Apply To, select the element to which you want to assign a data format style. You can choose from these elements:

- Area Result
- (Area) Modifier Expression
- (Area) Proof Expression
- Perimeter Result
- (Perimeter) Modifier Expression

5 Select the drawing from which you want to take a data format style.

6 Select the desired data format style.

7 For Area Result and Perimeter Result, if you want to include the exact, unrounded values as additional information in the evaluation file, select Additional Exact value.

The area or perimeter result will then displays with the precision set in the data format style and, in an extra column, with their exact precision without rounding.

Example:

Calculated Perimeter = 33.778 m	Exact Calculated Perimeter = 33.777692 m
Calculated Area = 88.532 m^2	Exact Calculated Area = 88.5321423 m^2

8 Click OK.

Setting the Default Templates

An evaluation document is saved as a spreadsheet (XLS) file or as an ASCII text format (TXT) file. To create an XLS file, you need an XLT template, and to create a TXT document, you need a TXT template.

AutoCAD Architecture includes preset templates for both formats. You can use those templates as provided or you can modify them according to your needs.

You can also create your own XLT and TXT templates in Microsoft® Excel or any word processor, like NotePad or Microsoft® Word.

After a default template is set, it is used for all evaluations until you change the default settings again. If no default template has been set, you are prompted for a template each time you create an evaluation.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

2 Click Evaluation Options.

3 Click the Templates tab.

4 Set a default template for evaluations:

If you want to…	Then…
set a default template for XLS evaluation files	enter a file name and directory path for Excel Template File.
To set a default template for TXT evaluation files	enter a file name and directory path for Text Template File.

NOTE The evaluation templates shipped with the software are located under *C:\ProgramData\Autodesk\ACA 2010\enu\Template\Evaluation Templates*.

5 Click OK.

Creating the Space Evaluation Document

When you perform a space evaluation, a separate file that contains the space information from the specified drawing files. This file is saved as an XLS file or a TXT file, depending on your settings.

Creating an XLS Evaluation Document

Use this procedure to export a space evaluation to an Excel spreadsheet.

One of the most frequently used formats for space evaluation documents is XLS, the native file format of Microsoft® Excel. It is a powerful spreadsheet file format with numerous calculation and formatting abilities. You can easily export data from Excel to formats like HTML, XML, CSV (comma-delimited) or DBF (dBase).

You can export text (results, modifier expressions, and labels) and images (bitmap previews of spaces and zones). For a detailed list of elements that can be exported, see Evaluation Content on page 2076.

You can create your own XLT templates into which the evaluation is integrated. For more information, see Creating XLT Templates on page 2080.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ➤ Space Evaluation .

2 Prepare the space evaluation as described in Preparing the Space Evaluation on page 2074.

3 In the Space Evaluation dialog box, click .

If you did not select a default XLT template in the Evaluation Properties dialog box, you are prompted to select a template now.

4 Select a file directory, and enter a name for the XLS evaluation file.

5 Click Save.

6 When the export is finished, click Close.

The space evaluation file is saved to the specified directory. You can open it with Microsoft Excel or any other spreadsheet application that can read XLS.

Creating a TXT Evaluation Document

Use this procedure to export a space evaluation to a text file.

NOTE In TXT format, you can export text (results, modifier expressions, and labels), but not images. If you need to export images in the evaluation, use XLS format instead.

You can create your own TXT templates into which the evaluation is then integrated.

1 Open the Scheduling tool palette, and select the Space Evaluation tool.

NOTE Alternatively, you can click Home tab ➤ Inquiry panel ➤ ➤ Space Evaluation .

2 Prepare the evaluation as described in Preparing the Space Evaluation on page 2074.

3 In the Space Evaluation dialog box, click .

If you did not select a default TXT template in the Evaluation Properties dialog box, you are prompted to select a template now.

4 Select a file directory, and enter a name for the space evaluation file.

5 Click Save.

6 When the export is finished, click Close.

The space evaluation file is saved to the specified file directory. You can open it with any word processor.

Creating XLT Templates

Use this procedure to create the XSLT template file needed for exporting a space evaluation to an Excel spreadsheet.

You can use the following predefined field settings to format your XLT templates:

Field name	Description
AREA_EVALUATION_BEGIN	The row in which the space evaluation begins
AREA_COLUMN_IMAGE	The column in which the exported space images are placed
AREA_COLUMN_LABEL	The column in which the space labels and descriptions are placed

Field name	Description
AREA_COLUMN_EXPRESSION	The column in which the space decomposition expressions and modifier formulas are placed
AREA_COLUMN_RESULT	The column in which all space results are placed
AREA_COLUMN_EXACT_VALUE	The column in which the unrounded space results are placed

1. Open Microsoft Excel.
2. Select the table cell in which you want to place a special type of information, such as pictures or results.
3. Click the name box in the upper-left corner of the Excel sheet, and enter the desired field definition.
4. Repeat steps 2 and 3 for all field settings you want to place.
5. Define additional settings for your template. Settings in an XLT file include
   - Header and footer information
   - Company logos
   - Company fonts
   - Special cell formatting (borders, colors)
6. Save the resulting file with the extension XLT (Excel Template) to the default directory you are using for templates.

   The template is then available for selection next time you create a space evaluation.

Using Spaces for Load Analysis

You can use spaces and zones to aid in calculating the heating and cooling loads for a building plan.

After you create spaces and zones, you can assign to them engineering data necessary for calculating loads and airflows. You export the engineering and building information in Green Building XML (gbXML) format. You can use gbXML files in external analysis tools. After you analyze the file, you can import the results into your drawing. You can view the calculated loads and airflows for the spaces and zones, and design your duct systems accordingly.

Configuring Space Styles

You can configure space styles for the different room types in the building plan. For example, if you are designing an HVAC system for a manufacturing facility, you can create space styles for offices, manufacturing areas, and warehouse areas.

Regarding load calculations, the most important setting for a space style is its classification. When you define a classification for a space style, the occupant density and outside air flow requirements are automatically set. These values are included in the software, and are based on the appropriate mechanical standard or code. For more information, see Viewing Classification Settings on page 2082.

If multiple rooms use the same density of lighting and equipment, you can add property sets to the style that enable you to specify lighting and equipment loads per area. This alleviates the need to manually enter lighting and equipment loads for each individual space. If you need to change the lighting and equipment load for a space, you can override these values using the Properties palette.

To specify a lighting and equipment load per area in the space style

1. Create a new space style, as described in Creating a Space Style on page 2019.
2. In the right pane, click the General tab.
3. At the bottom of the pane, click Property Sets.
4. In the Edit Property Sets Data dialog, click (Add property sets).
5. In the Add Property Sets dialog, select SpaceEngineeringStyles, and click OK.

   NOTE If this property set is not available, you can copy and paste it from the Aecb Model drawing template using Style Manager. In Style Manager, it is located in Documentation Objects ➤ Property Set Definitions.

6. In the Edit Property Sets Data dialog, enter the area lighting and equipment loads.

   You can also specify a gbXML space type override if you want to restrict this style to a specific space type. If you use this setting, it overrides any classification you specify for the space style as shown in the following steps.

7. Click OK.

To specify a classification

8. Click the Classifications tab.
9. For Space Occupancy, click [...].
10. In the Select Classification dialog, expand the directories under the desired standard, select a space type, and click OK.
11. Use the previous steps to create additional space styles.
12. To modify the display of spaces with the selected style, click the Display Properties tab, and modify the display settings as desired.

    NOTE You must assign a classification to use the gbXML export feature. You can assign a classification to the space style, or you can specify a classification override in the space style property set. You can also manually specify a classification on the Extended Data tab of the Properties palette.

13. Click OK.

Viewing Classification Settings

You can view the occupant densities and air flows configured for classification types.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. In Style Manager, click Space Occupancy.
3. In the right pane, click the Classifications tab.
4. Expand the classifications under Space Occupancy, and select the space type you want to view.
5. On the right side of Style Manager, click Property Sets.

   The Edit Property Set Data dialog displays the values for the classification.

Configuring Zone Styles

You can create zone styles to specify the display and design rules for zones. In regard to load calculations, however, zone styles have no relevant settings that you need to configure. Zone styles are located in Style Manager under the Documentation Objects. For complete information, see Zone Styles on page 2049.

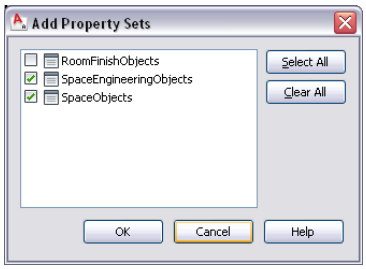
Adding Engineering Data to Spaces

For load calculation purposes, you must add a SpaceEngineeringObjects, ThermalProperties, andZoneEngineeringObjects styles property sets to all spaces that you want to analyze. From the Style Manager, copy property set definitions from the gbxml Property Set Definitions drawing into your current drawing. Once you have assigned these property set definitions to the spaces and zones in your drawing, you can edit the engineering data to model the appropriate environmental conditions. You are then ready export this data in gbXML format for use in various analysis software programs.

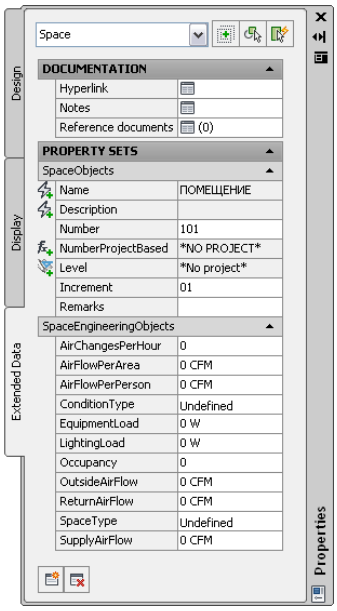
1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. In the Style Manager, click File menu ➤ Open Drawing.
3. In the Open Drawing dialog, click Content.
4. Navigate to the Styles/Imperial folder.
5. Select the gbxml Property Set Definitions (Imperial) drawing and click Open.
6. Expand the gbxml Property Set Definitions Documentation Objects folder.
7. Select Property Set Definitions.

   The SpaceEngineeringObjects, ThermalProperties, and ZoneEngineeringObjects styles comprise this property set.
8. Copy the Property Set Definitions to your current drawing, and then click OK.

   The engineering data styles are ready to be applied the spaces and zones in your drawing.
9. Select the spaces to which you want to add the property set data.
10. On the Properties palette, click the Extended Data tab, and then click (Add property sets).
11. In the Add Property Sets dialog, select SpaceEngineeringObjects and SpaceObjects, and then click OK.



The property set is added to the selected spaces, and it can be viewed on the Extended Data tab.



12 Under Property Sets, you can specify values for the following properties:

Property	Description
ConditionType	Specify how to condition the room.
LightingLoad	Enter the lighting load for the room. If you specified lighting load per area in the style, the DefaultLightingLoad property set calculates the lighting load based on the room area. You can override that value by entering a value for LightingLoad here.
EquipmentLoad	Enter the equipment load for the room. If you specified equipment load per area in the style, the DefaultEquipmentLoad property set calculates the equipment load based on the room area. You can override that value by entering a value for EquipmentLoad here.
OutsideAirFlow	Enter outside airflow value.
SupplyAirFlow and ReturnAirFlow	Enter supply and return airflow values for your reference. These values are for the flow rate for the room, not for the flow per unit area or per person.

Attaching Property Sets to Zones

Before exporting space data to gbXML, you must assign all spaces to a zone. You configure a zone for analysis by specifying the heating and cooling temperatures for the zone.

To attach property sets to a zone

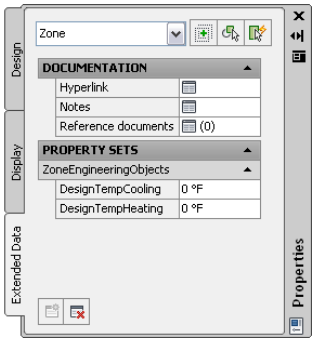
1 Create zones, as described in Creating a Zone Style on page 2050.

2 Select all zones.

3 On the Extended Data tab of the Properties palette, click (Add property sets).

4 In the Add Property Sets dialog, select ZoneEngineeringObjects, and click OK.

The property set is added to the selected zone, and it can be viewed on the Extended Data tab.



5 Under Property Sets, specify the appropriate values for design heating and cooling temperatures.

Attaching Spaces to Zones

For load calculation purposes, you must assign all spaces to one or more zones. You can also attach zones to other zones. This is useful for exporting zone data through reference drawings.

1 Select a zone.

2 Click the Add (Plus) grip or click Zone tab ➤ Modify panel ➤ Attach .

3 Select the spaces or zones to attach to the zone.

You can attach spaces or zones in reference drawings to a zone in the current drawing.

4 Continue attaching spaces to zones using the previous steps.

IMPORTANT Zones in reference drawings cannot be exported to gbXML unless they are attached to a zone in the current drawing.

TIP You can use the Space/Zone Manager to review the zone hierarchy, and to review space information such as surface and opening type. For more information, see Opening the Space/Zone Manager on page 1996 and Editing Surface Properties on page 1998.

Exporting Zones for Load Analysis

After you have configured spaces with property set values, and have attached spaces to zones, you can export the engineering and building information in gbXML format.

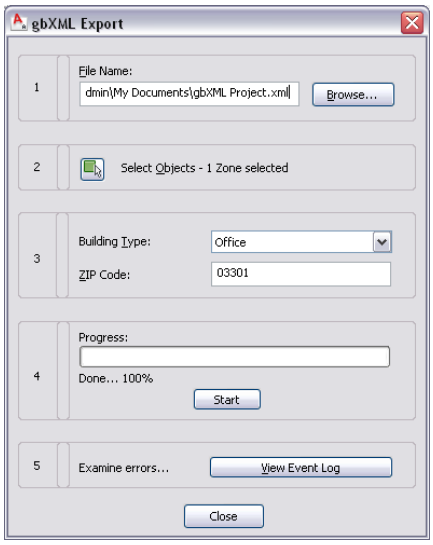
1 Open the drawing that contains the zone data you want to analyze.

NOTE You can analyze a complete building by attaching zones and spaces in xref drawings to zones in a current drawing. The adjacent spaces and space surface types are automatically detected for all spaces at export.

2 Click ➤ Export ➤ gbXML.

3 In the Export to gbXML dialog, specify the export settings:

- File name: Specify a file name and location.
- Select Objects: The dialog automatically detects all zones in the current drawing. Zones in reference drawings cannot be exported unless they are attached to a zone in the current drawing. If the dialog does not detect all zones, click Select Objects and select the desired zones.
- Building Type: Specify a building type and postal ZIP code that may be used by the external analysis program.
- Progress: Click Start to run the export.
- Success: If any errors occur during export, click View Event Log to view error messages.



4 Click Close.

The gbXML file can now be used in various analysis software programs.

Conversion of Space Boundaries to Walls and Spaces

Space boundaries from previous versions of the software will not persist as independent objects in AutoCAD Architecture. When a legacy drawing is opened in the current version of the software, any legacy space boundaries will be converted to walls. If the legacy space boundary manages contained spaces, these will be converted to spaces associative to the converted walls.

All legacy space boundary edges are converted to walls. Edges of the boundary type Separation or edges of the boundary type Solid with 0 width are converted to 0 width walls. If the legacy space boundary manages contained spaces, those spaces are associative to the converted walls.

Legacy property set definitions that apply to legacy space boundaries will automatically be migrated to property set definitions that apply to walls. Legacy property data attached to space boundaries will be attached to the walls that are optionally created from the space boundary during drawing migration.

Appendix 1: Command Changes for Spaces and Areas

Since the merge of areas and spaces, a number of commands have become obsolete or have been changed to other names.

Area Commands

The following area-related commands are obsolete. Corresponding current space commands are listed where applicable:

Previous command	New command
AecSpaceConvertArea	N/A
AecAreaAdd	AecSpaceAdd
AecAreaConvert	N/A
AecAreaDetect	AecSpaceAutoGenerate
AecAreaStyle	AecSpaceStyle
AecNameDef	AecListDefinition
AecArea	AecSpace
AecAreaAddSelected	AecSpaceAddSelected
AecAreaAttach	AecSpaceAttach
AecAreaCreatePline	AecSpaceCreatePline
AecAreaDetach	AecSpaceDetach
AecAreaDivide	AecLineworkDivide
AecAreaEvaluation	AecSpaceEvaluation
AecAreaOpIntersect	AecLineworkCrop

Previous command	New command
AecAreaOpJoin	AecLineworkMerge
AecAreaOpSubtract	AecLineworkSubtract
AecAreaProps	AecSpaceProps
N/A	AecSpaceProperties
AecAreaRemoveRing	AecSpaceRemoveVoid
AecAreaReverseProfile	AecSpaceReverseProfile
AecAreaReverseRing	AecSpaceReverseRing
AecAreaStyle	AecSpaceStyle
AecAreaStyleEdit	AecSpaceStyleEdit
AecAreaToolToAutoDetection	N/A
AecAreaToolToLinework	N/A
AecAreaTrim	AecLineworkTrim
AecAreaVertexModify	AecSpaceVertexModify
AecSlabConvertArea	AecSlabConvertSpace

Area Group Commands

The following area group-related commands are obsolete. Corresponding current zone commands are listed where applicable:

Previous command	New command
AecAreaGroupAdd	AecZoneAdd
AecAreaGroupStyle	AecZoneStyle
AecGroupCreateFromTemplate	AecZoneCreateFromTemplate
AecGroupTemplate	AecZoneTemplate
AecAreaGroup	AecZone
AecAreaGroupAddSelected	AecZoneAddSelected
AecAreaGroupAttach	AecZoneAttach
AecAreaGroupCreatePline	AecZoneCreatePline
AecAreaGroupDetach	AecZoneDetach

Previous command	New command
AecAreaGroupLayout	AecZoneLayout
AecAreaGroupProps	AecZoneProps
N/A	AecZoneProperties
AecAreaGroupStyleEdit	AecZoneStyleEdit

Space Boundary Commands

The following space boundary commands are now obsolete:

Previous command	New command
AecSpaceBoundary	AecWall
AecSpaceBoundaryAdd	AecWallAdd
AecSpaceBoundaryConvert	N/A
AecSpaceBoundarySplit	N/A
AecSpaceBoundaryProps	N/A
AecSpaceBoundaryAddEdges	N/A
AecSpaceBoundaryRemoveEdges	N/A
AecSpaceBoundaryConvertEdges	N/A
AecSpaceBoundaryInsertJoint	N/A
AecSpaceBoundaryMerge	N/A
AecSpaceBoundaryMergeSpace	N/A
AecSpaceBoundaryGenerateWalls	N/A
AecSpaceBoundaryEdge	N/A
-AecSpaceBoundaryModify	N/A
AecSpaceBoundaryConvertSpace	N/A
AecSpaceBoundaryConvertSlice	N/A
AecSpaceBoundaryConvertEdge	N/A
AecSpaceBdyToolToEdges	N/A
AecSpaceBdyToolToSpace	N/A
AecSpaceBdyToolToSlice	N/A

Previous command	New command
AecSpaceBoundaryAddSelected	N/A

Appendix 2: Predefined Area Calculation Standards

You can calculate the offsets of space boundaries according to an area calculation standard defined for a drawing. Area calculation standards usually contain country or organization specific rules by which space boundaries must be set up. AutoCAD Architecture provides 3 predefined area calculation standards based on the rules of the BOMA, DIN-277, and SIS standards. In addition, a generic Basic standard is supplied. The following sections outline the rules of these standards that have been implemented in the software. For more detailed information, use a regulation book for the desired standard.

For information about applying an area calculation standard to a drawing, see Working with Space Boundaries on page 1957.

For information about creating your own area calculation standard, see Appendix 3: Implementing an Area Calculation Standard Plug-in with the AutoCAD Architecture 2010 .NET API on page 2101.

Calculating Spaces Based on the Basic Area Calculation Standard

The Basic area calculation standard supplied with AutoCAD Architecture provides a rule for the general practice of measuring gross and net area as accepted by most building inspectors and zoning officials in the US.

Space Boundary Type	Classification	boundary Objects	Wall Type	Boundary
Net	N/A	Door	Wall with adjacent spaces	Measured to centerline of door panel
Net	N/A	Opening	Wall with adjacent spaces	Measured to centerline of opening frame
Net	N/A	Walls	Wall	Measured to adjacent face
Gross	N/A	Walls	Wall without adjacent spaces	Measured to opposite face
Gross	N/A	Walls	Wall with adjacent spaces	Measured to centerline of wall

Calculation Rules for AutoCAD Objects

You can use AutoCAD objects like closed polylines or rectangles to generate a space that is deducted from an associative space (see Deducting Spaces from an Associative Space on page 1935.) You could do this for example to represent construction spaces or otherwise unavailable areas. Since AutoCAD objects cannot be classified to control their behavior, the following standard behavior is applied to enclosed deducted spaces formed by AutoCAD objects in the Basic standard:

- Net area: the area enclosed by AutoCAD linework is deducted from the net area.
- Gross area: the area enclosed by AutoCAD linework is not deducted from the gross area.

Calculating Spaces Based on the DIN 277 Standard

DIN 277 is the area calculation standard for Germany and German-speaking countries. The DIN 277 standard included in AutoCAD Architecture includes the subset of DIN 277 rules described in the following sections:

Space Classifications in DIN 277

The space type classifications in DIN 277 are the following:

Space Type_DIN	Definition
A	■ has roof ■ fully enclosed by walls or curtain walls on all sides ■ the wall or curtain wall is as high or higher than the space=full height enclosure
B	■ has roof ■ partially enclosed by walls or curtain walls ■ at least one wall or curtain wall is lower than the space=partial height enclosure
C	■ no roof
Exterior	■ exterior space

The net area type classifications in DIN 277 are the following:

NetArea Type_DIN	Use
Utilized	Living, office, production, craft, experiments, storage, sale, education, culture, health care, other uses
Technical	Operations, mechanical room, water supply, heating room, electrical room, etc.
Circulation	Halls, corridors, stairs, elevators, etc.

Calculation Rules for AutoCAD Objects

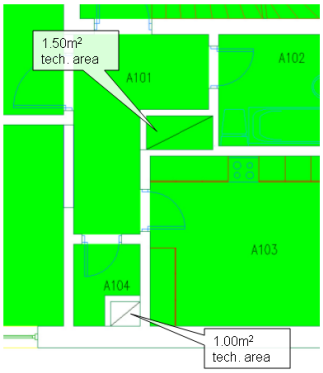
You can use AutoCAD objects like closed polylines or rectangles to generate a space that is deducted from an associative space (see Deducting Spaces from an Associative Space on page 1935.) You could do this for example to represent construction spaces or otherwise unavailable areas. Since AutoCAD objects cannot be classified to control their behavior, the following standard behavior is applied to enclosed deducted spaces formed by AutoCAD objects in the DIN 277 standard:

- Net area: the enclosed area is deducted from the net area.
- Gross area: the enclosed area in not deducted from the gross area.

Net Area Calculations

The net boundaries are created on the inside of the walls.

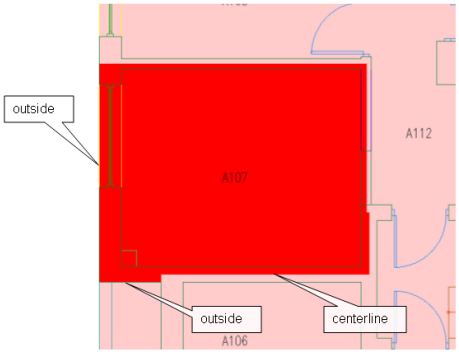
Technical spaces: When the area of a technical space is larger than or equal to 1 m^2, the net boundary will be calculated to the inside of the wall. When the area of a technical space is smaller than 1 m^2, the space will not have a net boundary, and the area will be calculated as constructive area.



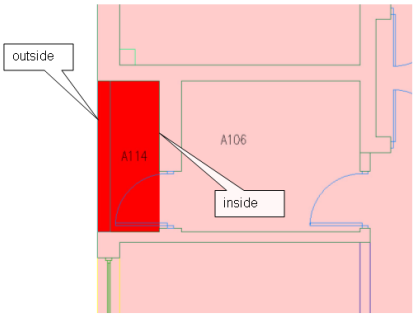
Gross Area Calculations

The gross boundaries are created according to the following rules:

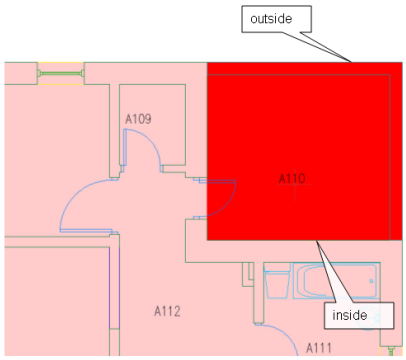
Gross Area (Space Type_DIN A)	
Adjacent Space	**Boundary**
Space Type_DIN A	Measured from centerline of wall
Space Type_DIN B or C, or no adjacent space	Measured from outside face of wall
Adjacent space not classified (unspecified)	Measured from outside face of wall



Gross Area (Space Type_DIN B)	
Adjacent Spaces	**Boundary**
Space Type_DIN A	Measured from inside face of wall
Space Type_DIN B	Measured from centerline of wall
Space Type_DIN C or no adjacent space	Measured from outside face of wall
Adjacent space not classified (unspecified)	Measured from outside face of wall



Gross Area (SpaceType_DIN C)	
Adjacent Spaces	**Boundary**
Space Type_DIN A or B	Measured from inside face of wall
Space Type_DIN C	Measured from centerline of wall
No adjacent space	Measure from outside face of wall
Adjacent space not classified (unspecified)	Measured from outside face of wall



Calculating Spaces Based on the SIS Standard

SIS is the area calculation standard for Sweden and is used with some variations across all Scandinavian countries. The SIS standard included in AutoCAD Architecture includes the subset of SIS rules described in the following sections:

Tenants/Units

When selecting the SIS area calculation standard in AutoCAD Architecture, the zone style Unit Usage_SIS will automatically be created. This zone style can be used to specify the usage of the spaces in the drawing. The calculation of the usable boundary is dependent on whether the adjacent spaces are in the same unit or not. The usable boundaries are created to the interior side of the wall when the adjacent space is attached to another zone. If the adjacent space is attached to the same zone, the usable boundary is offset 0.15m into the wall.

Shafts

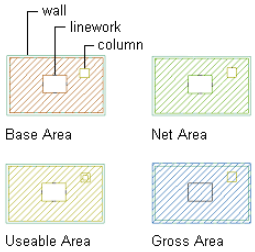
Shafts need to be classified as Shaft. (For more information, see Classifying a Space According to an Area Calculation Standard on page 1961.) Shaft spaces do not have usable boundaries. The usable area will report N/A. When a shaft is in the same zone as its adjacent spaces, the usable boundaries of the adjacent spaces are measured 0.15m into the shaft. The distance is measured from the inside of the wall and into the shaft. When a shaft is not in the same zone as its adjacent spaces, the usable boundaries of the adjacent spaces are measured to the inside of the wall.

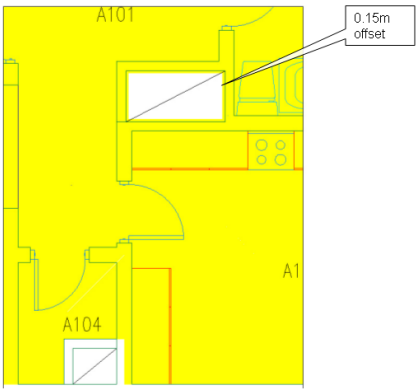
NOTE The interaction between the spaces and zones will only work as described if the zones are in the same drawing as the attached spaces.

Calculation Rules for AutoCAD Objects

You can use AutoCAD objects like closed polylines or rectangles to generate a space that is deducted from an associative space (see Deducting Spaces from an Associative Space on page 1935.) You could do this for example to represent construction spaces or otherwise unavailable areas. Since AutoCAD objects cannot be classified to control their behavior, the following standard behavior is applied to enclosed deducted spaces formed by AutoCAD objects in SIS:

- Net area: the enclosed area is deducted from the net area.
- Usable area: the enclosed area is deducted from the usable area.
- Gross area: the enclosed area is not deducted from the gross area.

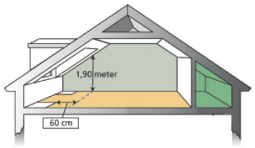




Room Height

According to the SIS standard, a space should have a room height of at least 1.90 meter with a width of at least 0.6 meter to be counted as measurable area. The SIS calculation standard delivered with this software is automatically checking the height of each space to make sure the space height conditions are met. Otherwise, the boundaries for Net area (NTA) and Usable Area (BRA) are offset according to the SIS standard rules.

The room height rule is applied only to associative 3D freeform spaces. For extruded 3D spaces the user-defined space height is used uniformly on the space.



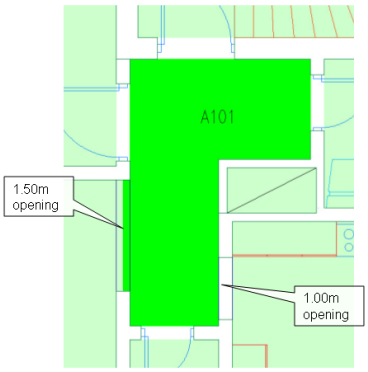
NOTE The calculation of the room height for SIS is new to AutoCAD Architecture 2010. In previous versions the room height was not automatically calculated for the SIS standard. If you have legacy drawings from earlier versions, SIS-calculated spaces might change their boundaries when opening the drawing in AutoCAD Architecture 2010.

Net Area (NTA)

The following rules apply to the generation of net boundaries with the SIS standard:

- The net boundaries are measured to the inside of the wall.

- If wall openings have a width larger than or equal to 1.50m, the net boundaries are offset to the center of the wall.
- If doors have a width larger than or equal to 1.50m, the net boundaries are offset to the inside of the door frame.
- If wall openings have a width smaller than 1.50m, the net boundaries are measured to the inside of the wall.

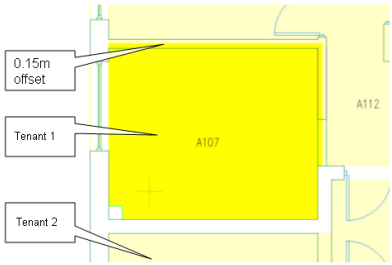


- If columns are set to bound spaces, as described in Setting the Bound Spaces Property in the Object Style on page 1920 and Setting the Bound Spaces Property in the Properties Palette on page 1920, the area of the column will be subtracted from the net area.

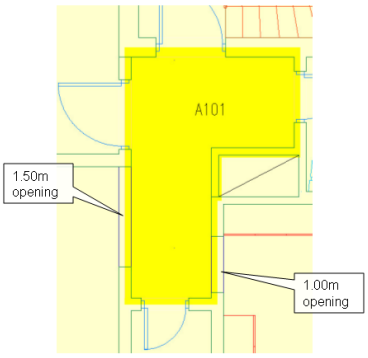
Usable Area (BRA)

The following rules apply to the generation of usable boundaries with the SIS standard:

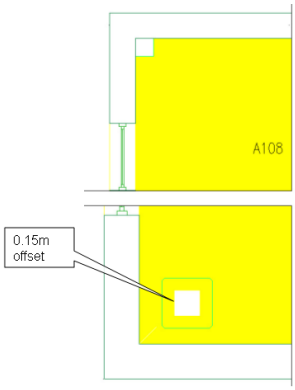
- The usable boundaries of a space are offset 0.15m into the wall if the space has an adjacent space. If the width of the wall is less then 0.30m the offset will be to the center of the wall. If there is no adjacent space, the usable boundaries are measured to the inside of the wall.



- If wall openings have a width larger than or equal to 1.50m, the usable boundaries are offset to the center of the wall.
- If doors have a width larger than or equal to 1.50m, the usable boundaries are measured to the inside of the door frame.
- If wall openings have a width smaller than 1.50m, the usable boundaries are offset 0.15m into the wall.



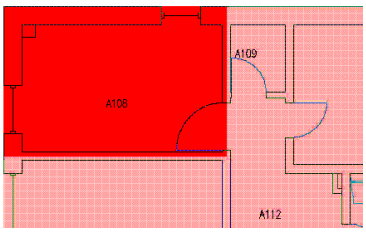
- If columns are set to bound spaces, as described in Setting the Bound Spaces Property in the Object Style on page 1920 and Setting the Bound Spaces Property in the Properties Palette on page 1920 the usable boundary will be offset 0.15m into the column. The rest of the column area will be subtracted from the usable area. Freestanding columns are calculated as an interior wall. The usable boundary is offset 0.15m into the column.



Gross Area

The following rules apply to the generation of gross boundaries with the SIS standard:

- The gross boundaries are measured to the center of the wall if the space has an adjacent space. If there is no adjacent space, the gross boundary is offset to the opposite side of the wall.



- If columns are set to bound spaces, as described in Setting the Bound Spaces Property in the Object Style on page 1920 and Setting the Bound Spaces Property in the Properties Palette on page 1920 the area of the column will not be subtracted from the gross area.

Calculating Spaces Based on the BOMA Standard

BOMA is an area calculation standard used predominantly in the United States. The BOMA standard included in AutoCAD Architecture includes the subset of BOMA rules that are described in the following sections.

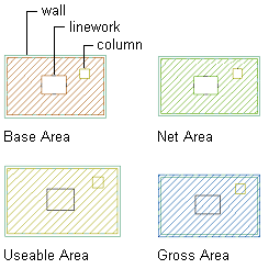
In the BOMA area calculation standard, spaces are classified as follows:

Classification	Space Type
Office Area	Office
Store Area	Store
Major Vertical Penetration (MVP)	Stairs, elevator shafts, flues, pipe shafts, vertical ducts, atria, atrium spaces above the finished floor, light wells, and similar penetrations above the finished floor **NOTE** Not included are vertical penetrations built for the private use of a tenant occupying office area on more than one floor.
Floor Common Area (FCA)	Washrooms, janitorial closets, electrical rooms, telephone rooms, mechanical rooms, elevator lobbies, and public corridors
Building Common Area (BCA)	Lobbies, atrium spaces at the level of the finished floor, concierge area or security desks, conference rooms, lounges or vending areas, food service facilities, health or fitness centers, daycare facilities, locker or shower facilities, mail rooms, fire control rooms, fully enclosed courtyards outside the exterior walls, and building core and service areas such as fully enclosed mechanical or equipment rooms.
Exterior	Exterior spaces
Street frontage	Exterior space of store spaces at street level

Calculation Rules for AutoCAD Objects

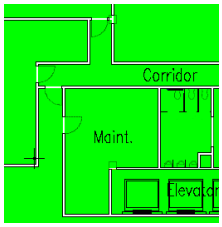
You can use AutoCAD objects like closed polylines or rectangles to generate a space that is deducted from an associative space (see Deducting Spaces from an Associative Space on page 1935.) You could do this for example to represent construction spaces or otherwise unavailable areas. Since AutoCAD objects cannot be classified to control their behavior, the following standard behavior is applied to enclosed deducted spaces formed by AutoCAD objects in BOMA:

- Net area: the enclosed area is deducted from the net area.
- Usable area: the enclosed area is not deducted from the usable area.
- Gross area: the enclosed area in not deducted from the gross area.



Net Area

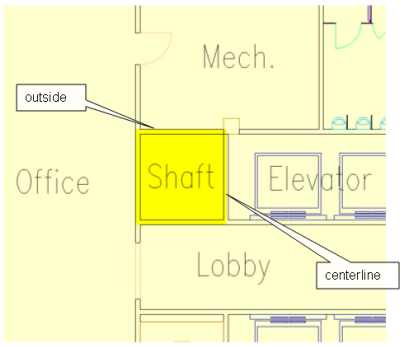
The net boundaries will be created inside of the wall.



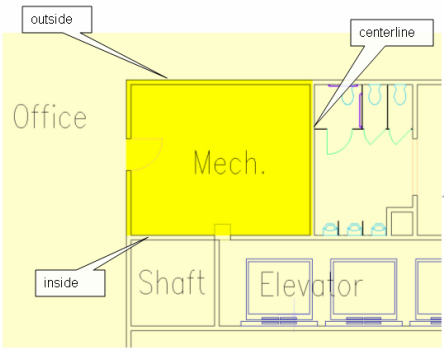
Usable Area

When calculating exterior walls, the usable boundaries will be created inside the window glass if the window height is larger or equal to 50% of the space ceiling height. The usable boundaries will be created inside of the wall if the window height is smaller than 50% of space ceiling height.

Usable Area (Space Type_BOMA: MVP)	
Adjacent Spaces	**Boundary**
Office, Store, BCA, FCA	Measured from outside face of wall
MVP	Measured from centerline of wall

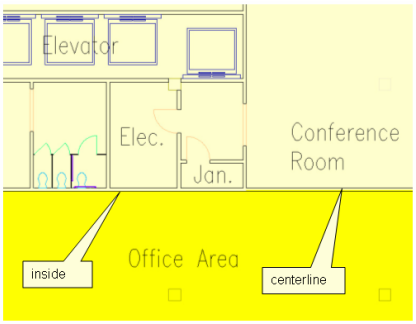


Usable Area (Space Type_BOMA: FCA)	
Adjacent Spaces	**Boundary**
Office, Store, BCA	Measured from outside face of wall
FCA	Measured from centerline of wall
MVP	Measured from inside face of wall

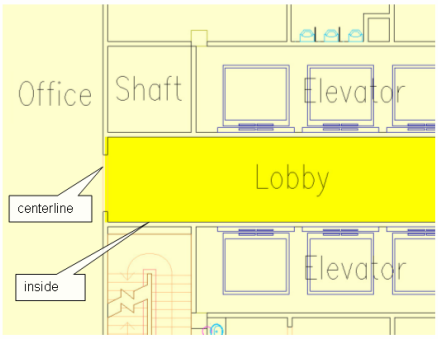


Usable Area (Space Type_BOMA: Store Area)	
Adjacent Spaces	**Boundary**
Street frontage	Measured from outside face of wall
Office, Store, BCA	Measured from centerline of wall
MVP, FCA	Measured from inside face of wall

Usable Area (Space Type_BOMA: Office Area)	
Adjacent Spaces	**Boundary**
FCA, MVP	Measured from inside face of wall
Office, Store, BCA	Measured from centerline of wall



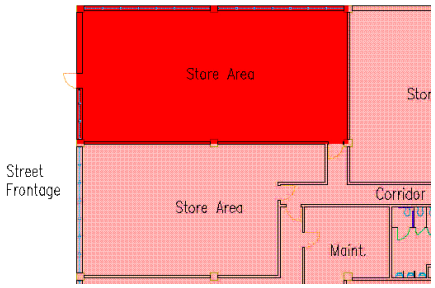
Usable Area (Space Classification: BCA)	
Adjacent Spaces	**Boundary**
FCA, MVP	Measured from inside face of wall
Office, Store, BCA	Measured from centerline of wall



Gross Area

The gross boundaries will be created to the outside face of the wall if there is no adjacent space or the adjacent space is street frontage.

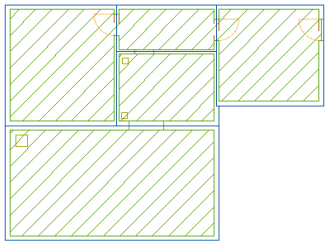
The gross boundaries will be created to the centerline of the wall if there is an adjacent space other than street frontage/exterior.



Appendix 3: Implementing an Area Calculation Standard Plug-in with the AutoCAD Architecture .NET API

Area calculation standards are .NET plug-ins that implement a set of rules to define offsets for the net, usable, and gross boundaries of spaces in AutoCAD Architecture 2010. When a plug-in is loaded into the software, it will be available to be applied to a drawing as described in Specifying an Area Calculation Standard for a Drawing on page 1960. Only one area calculation standard can be applied to a drawing. If the boundary offsets of a space are set to By Standard, the calculation standard that is currently assigned to the drawing will be applied to create the boundary offsets. For more information, see Changing the Area Calculation Standard for Existing Spaces on page 1962.

Boundaries generated by Basic area calculation standard



The API (Application Programming Interface) that is used to implement those plug-ins is available for 3rd party developers as part of the AutoCAD Architecture .NET API. This appendix describes how to implement a custom area calculation standard.

System Requirements

In order to implement a new area calculation standard plug-in, you must have a system with AutoCAD Architecture 2010 installed. You also need a development environment capable of creating assemblies for the .NET Framework 2.0, such as Visual Studio 2005, Visual C# 2005, Visual Basic 2005 or the .NET Framework 2.0 Software Development Kit (SDK).

Implementing an Area Calculation Standard

The following sections describe the .NET API that is used to implement area calculation standards, referencing the sample project that is delivered with AutoCAD Architecture as a C# as well as a VB.NET project. This documentation uses the C# project.

Setting up a New Project

Before you can implement a new standard, you must create a new project from your development environment. Alternatively, you may use the sample project *AecSpaceOffsetStandardSample*.

NOTE An area calculation standard plug-in is implemented as a .NET class library, not a Windows application.

1. Open Microsoft Visual Studio 2005.
2. Select the New tab on the main menu.
3. Click File menu ➤ Project.
4. In the New Project dialog, choose the class library template from one of these locations:
   - Visual Basic ➤ Windows
   - Visual C# ➤ Windows
   - Visual C++ ➤ CLR.

Defining project settings

5. Enter a name for the new project.

   It is recommended to use the prefix *AecAreaCalculationStandard*, for example to create a name like *AecAreaCalculationStandardMyOffsetRules*. This way the naming is consistent with the naming of the plug-ins provided with AutoCAD Architecture (for example *AecAreaCalculationStandardBasic*, *AecAreaCalculationStandardBOMA*, etc.) The software then recognizes that this prefix describes an area calculation plug-in and is able the extract the name from the assembly for diagnostic purposes.

   Before proceeding, verify that you have a .NET class library project set up, so you can start editing the source code and project files.

Setting up required assembly references

6. In order to create an area calculation standard plug-in, the .NET class library created in the previous steps needs to reference the .NET API that AutoCAD Architecture provides. This API is implemented in the *AecSpaceOffsetRuleManager.dll* assembly which you need to reference in your new project.

Adding references to the project

7 If you are working with Microsoft Visual Studio, you can add the assembly reference to *AecSpaceOffsetRuleManager.dll* to your class library project by right-clicking References in the Solution Explorer of the project, and selecting Add Reference.

8 Navigate to the Browse page on the property sheet and search for the *AecSpaceOffsetRuleManager.dll* assembly under *C:\Program Files\AutoCAD Architecture 2010* (or the path you chose during installation).

Referencing the AutoCAD Architecture and AutoCAD .NET API

9 Add references to the following assemblies of your installation:

- *acdbmgd.dll* (AutoCAD .NET API)
- *aecbasemgd.dll* (AutoCAD Architecture base classes)
- *aecarchmgd.dll* (AutoCAD Architecture objects)

These DLLs are found in the same folder as the *AecSpaceOffsetRuleManager.dll* assembly.

10 Right-click each reference in the Solution Explorer tree under References, and click Properties to verify that the Copy Local reference property is set to False for each of the references.

Setting up copying the .dll so that AutoCAD Architecture can reference it

AutoCAD Architecture searches for custom area calculation standard assemblies in *C:\Program Files\AutoCAD Architecture 2010\Space Calculation Standards*, or the path you chose during installation (see Usage of a New Standard on page 2117). Each time you compile the .dll you need to restart AutoCAD Architecture in order to load and test it. Do the following to set up copying the .dll to the appropriate folder each time it is compiled:

11 Select the project in the Solution Explorer.

12 Right-click, and click Properties.

13 Click the Build Events tab.

14 On the Post-build event command line, enter the following:

```
@if exist $(TargetPath) @copy $(TargetPath) "C:\Program Files\AutoCAD Architecture
 2010\Space Calculation Standards\"
@if exist $(TargetDir)$(TargetName).pdb @copy $(TargetDir)$(TargetName).pdb
"C:\Program Files\AutoCAD Architecture 2010\Space Calculation Standards\"
```

Creating a Space Standard Class

You must define a new class derived from *AecSpaceOffsetStandard*. This class will be the framework that manages the individual rules and the entry point that AutoCAD Architecture calls into when loading and applying the standard.

Adding a new class derived from AecSpaceOffsetStandard

1 If you have created a new project, as described in Setting up a New Project on page 2102, the project will include one source file similar to this:

```
using System;
using System.Collections.Generic;
using System.Text;
namespace AecSpaceOffsetStandardSample
{
  public class Class1
  {
  }
```

```
}
```

Add your standard class derived from the abstract base class *Autodesk.Aec.SpaceOffsetRulesManager.AecSpaceOffsetStandard*.

NOTE The *Autodesk.Aec.SpaceOffsetRulesManager* namespace is only available if you have correctly set up the reference to *AecSpaceOffsetRuleManager.dll*.

Including the Autodesk.Aec.SpaceOffsetRulesManager namespace

2 To simplify the creation of the area calculation standard plug-in, it is recommended to add a namespace for all required classes. Add the following code line to your source file:

```
using Autodesk.Aec.SpaceOffsetRulesManager;
```

3 Rename *Class1* to a name describing your standard (for example, *AecSpaceOffsetStandardMyStandard*) and make it a derivation of the *AecSpaceOffsetStandard* abstract base class.

4 Add a parameterless default constructor to the class, which will be needed in the following steps:

```
using System;
using System.Collections.Generic;
using System.Text;
using Autodesk.Aec.SpaceOffsetRulesManager;
namespace AecSpaceOffsetStandardSample
{
  public class AecSpaceOffsetStandardSample : AecSpaceOffsetStandard
  {
    public AecSpaceOffsetStandardSample()
    {
    }
  }
}
```

Implementing the standard interfaces

5 When the new class is set up correctly in your source file, you can start implementing some of the methods that the base class *AecSpaceOffsetStandard* exposes and that AutoCAD Architecture will call into.

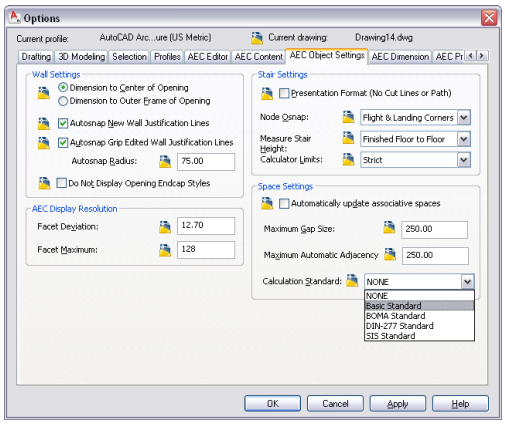
Adding a call to the AecSpaceOffsetStandard.SetName(string name) method

6 The *AecSpaceOffsetStandard.SetName()* method is implemented in the base class and cannot be overridden. It needs to be called to register a name for the standard in the constructor of the class. This is the name that will show up in the list of available area calculation standards in AutoCAD Architecture. For more information, see Specifying an Area Calculation Standard for a Drawing on page 1960.

Add the call to the *SetName()* method in the constructor of your class.

The following example shows the call for the sample project *AecSpaceOffsetStandardSample* which registers itself in the software as the Basic area calculation standard.

```
public class AecSpaceOffsetStandardSample : AecSpaceOffsetStandard
{
  public AecSpaceOffsetStandardSample ()
  {
    SetName("Basic");
  }
}
```



Adding the AecSpaceOffsetStandard.InitRules() method

7 After registering the area calculation standard plug-in name, you must add the new *AecSpaceOffsetStandardSample.InitRules()* method to your class. The method will override the abstract *AecSpaceOffsetStandard.InitRules()* interface. AutoCAD Architecture will call that interface to register all individual offset rules you are going to implement. As this method is abstract, it must be implemented by your custom standard class. See the following example for instructions:

```
public class AecSpaceOffsetStandardSample : AecSpaceOffsetStandard
{
  public AecSpaceOffsetStandardSample ()
  {
    SetName("Basic");
  }
  protected override void InitRules()
  {
    // register rules
  }
}
```

Registering rules with InitRules()

8 The rule objects of the standard must be registered with the 3 different offset boundaries (net, usable, and gross). The *AecSpaceOffsetStandard* base class has 3 containers for these rule sets, which the derived class can add new rule instances to. These containers can be referenced with the following methods:

- *AecSpaceOffsetStandard.NetRules()*
- *AecSpaceOffsetStandard.UsableRules()*
- *AecSpaceOffsetStandard.GrossRules()*

For information about implementing the individual rules in a standard, see Implementing Offset Rules on page 2107.

Each of these calls will return a reference to an object of the *Autodesk.Aec.SpaceOffsetRulesManager.AecSpaceOffsetRuleCollection* class, which exposes functions to register the different rule types. These objects are maintained and used by AutoCAD Architecture. The following example shows how to register rules with the 3 different offset types:

```
public class AecSpaceOffsetStandardSample : AecSpaceOffsetStandard
{
  public AecSpaceOffsetStandardSample ()
  {
    SetName("Basic");
```

```
  }
  protected override void InitRules()
  {
    // Register the rules with this standard, so the
    // offset calculation algorithm can call them
    // for the according boundary type
    NetRules().AppendBoundingOpeningRule(new BoundingOpeningRuleNet());
    // no usable boundary
    UsableRules().SetSpaceRule(new NullSpace());
    GrossRules().AppendBoundingObjectRule(new BoundingObjectRuleGross());
    GrossRules().AppendBoundingAdjacencyRule(new BoundingAdjacencyRuleGross());
  }
}
```

Implementing the AecSpaceOffsetStandard.InitCurrentDatabase() method (Optional)

9 *AecSpaceOffsetStandard* provides another virtual method that your own standard can implement: *AecSpaceOffsetStandard.InitCurrentDatabase()*. Since this is not an abstract method of the base class, it can be implemented, but is not mandatory, as opposed to the *InitRules()* method. It can be used by an area calculation standard to initialize the current drawing with additional data that the rules might require, such as classification definitions or zone styles. If implemented, AutoCAD Architecture will call that implementation every time the standard is assigned to a drawing. The usage of that method is described in an example in Advanced: Using Classifications in Area Calculation Standards on page 2118.

```
public class AecSpaceOffsetStandardSample : AecSpaceOffsetStandard
{
  public AecSpaceOffsetStandardSample ()
  {
    // set the name of the standard
    SetName("Basic");
  }
  // must be overriden
  protected override void InitRules()
  {
  }
  // can be overriden
  protected override void InitDatabase(Database* database)
  {
    // ...init database with classification definitions or zone styles, etc...
  }
}
```

Reference: AecSpaceOffsetStandard Class

The following list shows all members of the *AecSpaceOffsetStandard* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecSpaceOffsetStandard
  {
    protected internal AecSpaceOffsetStandard();
    protected internal void SetName(string str);
    protected internal abstract void InitRules();
    protected internal AecSpaceOffsetRuleCollection NetRules();
    protected internal AecSpaceOffsetRuleCollection UsableRules();
    protected internal AecSpaceOffsetRuleCollection GrossRules();
    protected internal virtual void InitDatabase(Database* database);
    protected internal virtual bool IsStandardStyle(ObjectId idStyle);
  }
}
```

Reference: AecSpaceOffsetRuleCollection Class

The following list shows all members of the *AecSpaceOffsetRuleCollection* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public class AecSpaceOffsetRuleCollection
  {
    public void AppendBoundingAdjacencyRule(AecBoundingAdjacencyRule rule);
    public void AppendBoundingObjectRule(AecBoundingObjectRule rule);
    public void AppendBoundingOpeningRule(AecBoundingOpeningRule rule);
    public void SetSpaceRule(AecSpaceRule rule);
  }
}
```

Implementing Offset Rules

After creating a new standard class, rules must be implemented. The code so far can be compiled and the built assembly can successfully be loaded as an area calculation standard into AutoCAD Architecture and be applied to space objects in a drawing. However, no offsets will be created, because no rules have been set up yet.

There are 4 different types of offset rules that can be combined to define an area calculation standard. A rule can be applied to one or more offset types (net, usable, and gross) in the implementation of *AecSpaceOffsetStandard.InitRules()*. For each rule type there is a base class that the implementation of a custom rule needs to derive from. All of these base classes are derived from one common abstract base class, so it is recommended to view that class first.

AecSpaceOffsetBaseRule Abstract Base Class

The *AecSpaceOffsetBaseRule* public abstract base class is a member of the namespace *Autodesk.Aec.SpaceOffsetRulesManager* and the base class for all rule classes.

Void AecSpaceOffsetBaseRule.RegisterType(System.Type type) Method

The only method the *AecSpaceOffsetBaseRule* base class implements is *void RegisterType(System.Type type)*. This method defines functionality that is required for all specific rule types. This method is used to register object types for which a specific rule implementation needs to be called by AutoCAD Architecture. The following sections contain some examples for the usage of this method. If a rule implementation needs to be called for all object types, you do not need to call the *RegisterType* method for all of them. Instead, you can make one call to *RegisterType(Autodesk.Aec.SpaceOffsetRulesManager.kAllTypes)*.

Reference: AecSpaceOffsetBaseRule Class

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecSpaceOffsetBaseRule
  {
    protected AecSpaceOffsetBaseRule();
    protected void RegisterType(Type type);
  }
}
```

Implementing Specific Offset Rules

Common to all rules is a public abstract *Apply* method, where the return type and arguments are specific to the rule type, which needs to be implemented by each new rule class. The following sections describe the base class of each rule type, and show one example for an implementation of such a rule.

Space Rule (SpaceOffsetRulesManager.AecSpaceRule Base Class)

A space rule is applied to the whole space, as opposed to all other rule types which are more specific. Space rules are the only type of offset rules that can only be registered once for each standard (once for each of the offset types net, usable, and gross.)

Implementing a Space Rule

To implement a space rule, you must add a new class that is derived from the *SpaceOffsetRulesManager.AecSpaceRule* base class. The new class must implement the *Apply* interface of the base class. It need not call the *AecSpaceOffsetRuleBase.RegisterType()* method of the base class since it always applies to space objects. The *Apply* method that each rule needs to implement has the following syntax for the *AecSpaceRule* class:

```
public abstract bool Apply(Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace);)
```

The boolean return value determines if the space has a valid offset boundary. If so, it can be used to deactivate all boundaries of a certain offset type. The following example shows the framework for a new space rule class:

```
namespace AecSpaceOffsetStandardSample
{
  public class SpaceRule: AecSpaceRule
   {
    public SpaceRule()
    {
    }
    public override bool Apply(ObjectId idSpace)
    {
    // return false to switch boundary off
    }
  }
}
```

Sample Space Rule NullSpace

A common use case is that an area calculation standard includes only net and gross offsets, but no usable offset. You can accomplish that by implementing a space rule derived from *AecSpaceRule* that always returns false in the implementation of the *Apply* method. Register one instance of that rule with the usable offset in the standards implementation of *AecSpaceOffsetStandard.InitRules()*.

A more complex space rule might define that all spaces with an area smaller than a certain predefined value do not contribute to a certain offset type. The following example shows the space rule that is part of the sample project and that will invalid all spaces. It is used within the sample standard to switch off the usable boundary:

```
namespace AecSpaceOffsetStandardSample
{
  public class NullSpace: AecSpaceRule
  {
    public SpaceRuleNet()
    {
    }
    public override bool Apply(ObjectId idSpace)
    {
    return false;
    }
  }
}
```

Reference: AecSpaceRule Class

The following list shows all members of the *AecSpaceRule* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecSpaceRule : AecSpaceOffsetBaseRule
  {
    public AecSpaceRule();
    public abstract bool Apply(
      Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
      Autodesk.Aec.Modeler.Body body);
  }
}
```

Bounding Object Rule (SpaceOffsetRulesManager.AecBoundingObjectRule Base Class)

Bounding object rules allow objects that are bounding the base profile of the space, such as structural members, to be marked as non-bounding, so that they will not be processed when creating the offset profile. Each standard can define and apply multiple bounding object rules for each boundary offset type.

Implementation of a Bounding Object Rule

To implement a custom bounding object rule, you need to add a new class that is derived from the *SpaceOffsetRulesManager.AecBoundingObjectRule* base class. The new class needs to implement the *Apply* interface of the base class and register itself for the object types it should be called for in the constructor by calling the *AecSpaceOffsetRuleBase.RegisterType()* base method. The *Apply* method of this rule type has the following syntax:

```
public abstract bool Apply(Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
Autodesk.AutoCAD.DatabaseServices.ObjectId idObject);
```

The first argument is the current space for which the offset boundary profile is to be calculated. The second argument *idObject* is the Object ID of the object that bounds the space. Within the *Apply* method, the space object as well as the bounding object can now be opened and queried for certain properties to decide if this object should contribute to the generated profile. If the method returns false, the boundaries of the object are removed from the offset profile. This implies that the object will not be considered anymore when the

offset rules are applied. The following example shows the framework for a new space rule called *BoundingObjectRuleGross*:

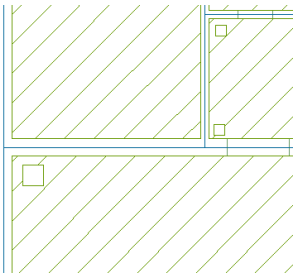
```
namespace AecSpaceOffsetStandardSample
{
  public class BoundingObjectRuleBasic: AecBoundingObjectRule
  {
    public BoundingObjectRuleGross()
    {
      RegisterType(typeof(kAllTypes));
    }
    public override bool Apply(ObjectId idSpace, ObjectId idObject)
    {
      //return false to mark object as non-contributing
    }
  }
}
```

Sample Bounding Object Rule BoundingObjectRuleGross

The following example shows the bounding object rule implementation used for the gross profile of the sample project. This rule removes all segments from the profile that are bound by a structural member. This is a common case for defining the gross area of a space, where structural members are not considered, even if they are bounding the base profile of the space.

```
public class BoundingObjectRuleGross : AecBoundingObjectRule
{
  public BoundingObjectRuleGross()
  {
    RegisterType(typeof(kAllTypes));
  }
  public override bool Apply(ObjectId idSpace, ObjectId idObject)
  {
    bool result=true;
    Autodesk.AutoCAD.DatabaseServices.Database db =idObject.Database;
    using (Autodesk.AutoCAD.DatabaseServices.Transaction transaction =db.TransactionMan
    ager.StartTransaction())
    {
      Member member = transaction.GetObject(idObject, OpenMode.ForRead) as Member;
      if ( member == null )
      {
        MemberType memType = member.MemberType;
        if ( memType == MemberType.Column )
        {
        result = false;
        }
      }
    transaction.Commit();
    }
    return result;
  }
}
```

The figure below shows an example of applying this rule, where the net boundary (green) includes the columns, while the gross boundary (blue) ignores them



Reference: AecBoundingObjectRule Class

The following list shows all members of the *AecBoundingObjectRule* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecBoundingObjectRule : AecSpaceOffsetBaseRule
  {
    public AecBoundingObjectRule();
    public abstract bool Apply(
      Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idObject);
  }
}
```

Bounding Adjacency Rule (SpaceOffsetRulesManager.AecBoundingAdjacencyRule Base Class)

Bounding adjacency rules define an offset for segments of the space base profile depending on the space that is adjacent to this segment. A common use case for gross offset profiles is that bounding adjacency rules define that the boundary should be offset to the center of the bounding object at interior walls and to the outside of the bounding object at exterior walls.

Implementation of a Bounding Adjacency Rule

To implement a bounding adjacency rule, you need to add a new class that is derived from *SpaceOffsetRulesManager.AecBoundingAdjacencyRule*. As with all previously described offset types, the new class needs to implement the *Apply* interface of this base class and register itself for the object types it should be called for in the constructor by calling the base method *AecSpaceOffsetRuleBase.RegisterType()*. The *Apply* method each rule needs to implement has the following form in *AecBoundingAdjacencyRule*:

```
public abstract bool Apply(Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
Autodesk.AutoCAD.DatabaseServices.ObjectId idObject,
Autodesk.AutoCAD.DatabaseServices.ObjectId idAdjSpace);
```

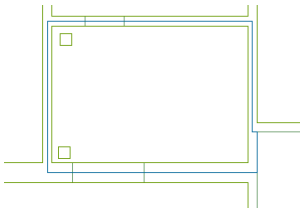
The first *ObjectId* argument is the current space for which the offset boundary is to be calculated. The second *ObjectId* is the bounding object between the space from the first argument and the adjacent space. The third argument is the *ObjectId* of the adjacent space. When there is no adjacent space, which is the case at exterior walls, the value of this argument will be *ObjectId.Null*. The following example shows the frame for a new space rule called *BoundingAdjacencyRuleGross*:

```
namespace AecSpaceOffsetStandardSample
{
  public class BoundingAdjacencyRuleGross : AecBoundingAdjacencyRule
  {
    public BoundingAdjacencyRuleGross()
    {
    }
    public override AecSpaceOffsetInfo Apply(ObjectId idSpace, ObjectId idObject, ObjectId
    idAdjSpace)
    {
      //
    }
  }
}
```

Sample Bounding Adjacency Rule BoundingAdjacencyRuleGross

The following example shows the implementation of a bounding adjacency rule that is used in the sample project. It defines an offset to the center of the bounding object for 2 spaces at interior walls and an offset to the outside of the wall if there is no adjacent space.

```
public class BoundingAdjacencyRuleGross : AecBoundingAdjacencyRule
{
  public BoundingAdjacencyRuleGross()
  {
  }
  public override AecSpaceOffsetInfo Apply(ObjectId idSpace, ObjectId idObject, ObjectId
  idAdjSpace)
  {
    if (idAdjSpace.IsNull)
    {
      // If there is no adjacent space (exterior wall), keep the 'Opposite' offset
       return new AecSpaceOffsetInfo(AecSpaceOffsetType.Opposite);
    }
    else
    {
      // If there is an adjacent space (interior wall), its center
      return new AecSpaceOffsetInfo(AecSpaceOffsetType.Center);
    }
  }
}
```



Reference: AecBoundingAdjacencyRule Class

The following list shows all members of the *AecBoundingAdjacencyRule* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecBoundingAdjacencyRule : AecSpaceOffsetBaseRule
   {
    public AecBoundingAdjacencyRule();
    public abstract AecSpaceOffsetInfo Apply(
      Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idObject,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idAdjSpace);
  }
}
```

Bounding Openings (SpaceOffsetRulesManager.AecBoundingOpeningRule Base Class)

A bounding opening rule can be used to define an offset at the openings in walls that are bounding a space, such as doors and windows. For example, the net offset profile cannot be defined by offsetting the profile only from the bounding walls. Usually, the wall is cut at doors and windows too. This rule type can be used to describe this in the offset profile calculated by the area calculation standard.

Implementation of a Bounding Opening Rule

To implement a bounding opening rule, you need to add a new class that is derived from *SpaceOffsetRulesManager.AecBoundingOpeningRule*. The new class needs to implement one or more of the *Apply* interfaces of the base class and register itself for the object types it should be called for in the constructor by calling the *AecSpaceOffsetRuleBase.RegisterType() base method*. Note that this rule can only be applied to the following classes:

- Openings
- Doors
- Windows
- Door and Window Assemblies

Registering this rule for other object types will not have any result. The *Apply* method of that class that each rule needs to implement has the following syntax in *AecBoundingOpeningRule*:

```
public abstract AecSpaceOffsetOpeningInfo*
Apply(Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
Autodesk.AutoCAD.DatabaseServices.ObjectId idAdjSpace,
Autodesk.AutoCAD.DatabaseServices.ObjectId idObject,
Autodesk.AutoCAD.DatabaseServices.ObjectId idOpening);
```

The first argument is the *ObjectId* of the current space for which the boundary offset is to be calculated. The second argument is the *ObjectId* of the adjacent space. When there is no adjacent space, which is the case at exterior walls, the value of this argument will be *ObjectId.Null*. The third argument is the *ObjectId* of the object the opening is anchored to, which usually is a wall that bounds the space and owns the opening. The fourth parameter is the *ObjectId* of the opening that is under investigation. The following example shows the framework for a new opening rule called *BoundingOpeningRuleNet*:

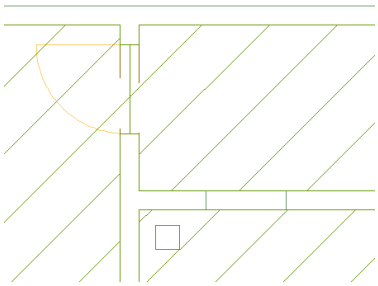
```
namespace AecSpaceOffsetStandardSample
{
  public class BoundingOpeningRuleNet : AecBoundingOpeningRule
  {
    public BoundingOpeningRuleNet ()
    {
      RegisterType(typeof(Door));
    }
    public override AecSpaceOffsetInfo* Apply(ObjectId idSpace, ObjectId idAdjSpace, ObjectId
     idObject, ObjectId idOpening)
    {
    }
  }
}
```

Sample Bounding Opening Rule BoundingOpeningRuleNet

The following example shows a simple bounding opening rule, where an offset is defined for doors. To make sure the rule is not applied to windows, it is only registered for the Door object, so that AutoCAD Architecture will not call it for any other openings. This rule is used in the sample project *AecSpaceOffsetStandardSample*. The offset is defined to go to the inside of the door panel.

```
namespace AecSpaceOffsetStandardSample
{
  public class BoundingOpeningRuleNet : AecBoundingOpeningRule
   {
    public BoundingOpeningRuleNet()
    {
    RegisterType(typeof(Door));
    }
    public override AecSpaceOffsetOpeningInfo* Apply(ObjectId idSpace, ObjectId idAdjSpace,
     ObjectId idObject, ObjectId idOpening)
    {
      return new AecSpaceOffsetOpeningInfo(AecSpaceOffsetOpeningType.PanelAdjacent);
    }
    return new AecSpaceOffsetInfo(AecSpaceOffsetType.NoChange);
    }
  }
}
```

Net boundary and net hatch are offset to the center of the door, but not offset at the wall opening



Reference: AecBoundingOpeningRule Class

The following list shows all members of the *AecBoundingOpeningRule* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
  public abstract class AecBoundingOpeningRule : AecSpaceOffsetBaseRule
  {
  public AecBoundingOpeningRule();
    public AecSpaceOffsetOpeningInfo* Apply(
      Autodesk.AutoCAD.DatabaseServices.ObjectId idSpace,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idAdjSpace,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idObject,
      Autodesk.AutoCAD.DatabaseServices.ObjectId idOpening
      );
  }
}
```

AecSpaceOffsetInfo Class

The *AecSpaceOffsetInfo* class is used to describe an offset as a result of the application of a bounding adjacency rule. It is returned by the implementation of the *Apply* methods of that class that is called by AutoCAD Architecture when the software needs to calculate the boundary offsets of a space according to the standard this rule is assigned to.

You define an offset with 2 properties, the type and the value. The type defines where on the bounding object the offset is to align, such as the adjacent face of the wall. The value defines an additional offset distance from that alignment, where positive is away from the space under consideration. For example, you can define an offset that is aligned with the center of the wall, which is then offset an additional 1" toward the opposite face.

Reference: AecSpaceOffsetInfo Class

The following list shows all members of the *AecSpaceOffsetInfo* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
   public class AecSpaceOffsetInfo
  {
    public static AecSpaceOffsetInfo kNoChange;
    public static AecSpaceOffsetInfo kOffsetToAdjacent;
    public static AecSpaceOffsetInfo kOffsetToCenter;
    public static AecSpaceOffsetInfo kOffsetToOpposite;
    public AecSpaceOffsetInfo(AecSpaceOffsetType type);
    public AecSpaceOffsetInfo(AecSpaceOffsetType type, double value);
    public AecSpaceOffsetType OffsetType { get; set; }
    public double OffsetValue { get; set; }
    }
  }
}
```

The *Autodesk.Aec.SpaceOffsetRulesManager.AecSpaceOffsetType* enumeration type can be one of the following values:

Value	Description
Adjacent	Defines an offset to the inside of the bounding object (usually this equals no offset at all)
Center	Defines an offset to the center of the bounding object

Value	Description
Opposite	Defines an offset to the opposite side of the bounding object
NoChange	Will not change any offsets already applied

AecSpaceOffsetOpeningInfo Class

The *AecSpaceOffsetOpeningInfo* class is used to describe an offset as a result of the application of a bounding opening rule. It is returned by the implementation of the *Apply* methods of that class that is called by AutoCAD Architecture when the software needs to calculate the boundary offsets of a space according to the standard this rule is assigned to.

You define an offset with two properties, the type and the value. The type defines where on the bounding object the offset is to align, such as the adjacent face of the wall or the center of the door panel. The value defines an additional offset distance from that alignment, where positive is away from the space under consideration. For example, you can define an offset that is aligned with the adjacent frame, which is then offset an additional 1" toward the opposite face.

Reference: AecSpaceOffsetOpeningInfo Class

The following list shows a list of all members of the *AecSpaceOffsetOpeningInfo* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
   public class AecSpaceOffsetOpeningInfo
  {
    public AecSpaceOffsetOpeningInfo(AecSpaceOffsetOpeningType type);
    public AecSpaceOffsetOpeningInfo(AecSpaceOffsetOpeningType type, double value);
    public AecSpaceOffsetOpeningType OffsetType { get; set; }
    public double OffsetValue { get; set; }
    }
  }
}
```

The *Autodesk.Aec.SpaceOffsetRulesManager.AecSpaceOffsetOpeningType* enumeration type can be one of the following values:

Value	Description
WallAdjacent	Defines an offset to the inside of the bounding object (usually this equals no offset at all)
WallCenter	Defines an offset to the center of the bounding object
WallOpposite	Defines an offset to the opposite side of the bounding object
FrameAdjacent	Defines an offset to the inside of the frame of the bounding opening
FrameCenter	Defines an offset to the center of the frame of the bounding opening
FrameOpposite	Defines an offset to the opposite side of the frame of the bounding opening

Value	Description
PanelAdjacent	Defines an offset to the inside of the panel of the bounding opening
PanelCenter	Defines an offset to the center of the panel of the bounding opening
PanelOpposite	Defines an offset to the opposite side of the panel of the bounding opening
OpeningOwner	Defines an offset to be whatever the offset is for the bounding object that owns the opening. No additional defined rules will be applied.
OpeningBaseCurve	Defines an offset to align with the base curve of the bounding opening
NotApplicable	Defines no offset. Additional defined rules will continue to be applied until an offset is defined.

NOTE Currently, door and window assemblies do not support the Frame and Panel options, which will be converted to OpeningBaseCurve.

Usage of a New Standard

Installation

When the required rules are implemented and the plug-in assembly has been successfully built, you need to test the results in AutoCAD Architecture. In order to apply the new standard, it must be moved or copied into the AutoCAD Architecture area calculation standards plug-ins subfolder under *\\Program Files\AutoCAD Architecture 2010\Space Calculation Standards* where the predefined standards that are delivered with the software also located. Note that if you copy the assembly into the plug-in folder while AutoCAD Architecture is running, you will need to restart it in order for the standard to be loaded.

Application

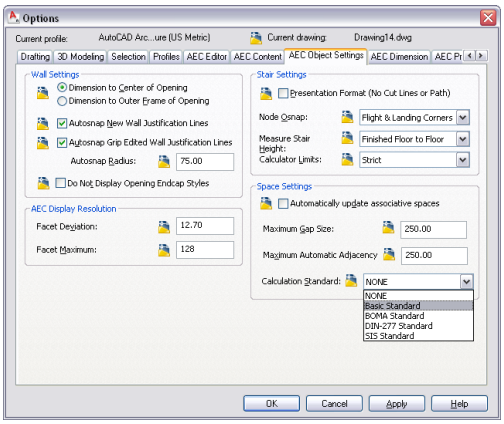
When you start AutoCAD Architecture after copying the new standard plug-in into the folder specified above, the software will automatically find and load the standard together with all other standards located in the same folder. If the standard is correctly implemented, it will show up with its name and can be selected to be applied to the current drawing.

1 Start AutoCAD Architecture.

2 Click ➤ Options.

3 Click the AEC Object Settings tab.

4 Under Calculation Standards, select your standard.



Advanced: Using Classifications in Area Calculation Standards

A common way of implementing a standard is to define offsets between spaces depending on their classifications. Even though you can do this with the area calculation standard API described in the previous sections and through usage of the available .NET API from AutoCAD Architecture, the *Autodesk.Aec.SpaceOffsetRulesManager.AecSpaceOffsetClassification* class provides some functionality to make the handling of classifications for offset calculations easier.

Definition of Classifications in Resource Assembly

Since classification names are displayed to the user in AutoCAD Architecture, their names should be localized. The API to use classifications within area calculations pays respect to that through the usage of resources to define the classification names of the classification set of a standard. Before your can apply and use classifications in your custom area calculation standard, you need to define them in a resource file that you need to add to your existing project (alternatively, you could create a resource-only assembly that is referenced). Please refer to the help of your development environment or the MSDN Online Library for information about creating string resources. It is assumed that the reader of this appendix is able to create and build a project that contains localized strings. Within this example, a resource file that implements one string table is assumed that defines the following global/local string pairs:

Name	Value
Office	Office Area
Exterior	Street Frontage

Adding Classification Support to the Standard

If you want your standard to work with classifications, you need to add an object of the type *AecSpaceOffsetClassification* to the standard after creating a resource set for the classification names. This class will handle all the classification-related functionality for the standard and within the implementation of the rule.

Initializing the Database with Classifications

The following example shows the required steps to populate the drawing the standard is applied to with the classification definitions. This must occur within the standard's *AecSpaceOffsetStandard.InitDatabase* virtual base class method, because the classifications need to be added to each new drawing that uses this standard.

The following example shows how a new *AecSpaceOffsetClassification* object is created and initialized into the currently active database:

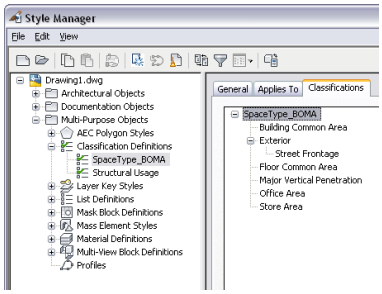
```
namespace AecSpaceOffsetStandardISA
{
  public class AecSpaceOffsetStandardISA: AecSpaceOffsetStandard
  {
    public AecSpaceOffsetClassification classification
    public AecSpaceOffsetStandardISA()
    {
    }
    protected override void InitDatabase(Database database)
    {
      classification = new AecSpaceOffsetClassification();
      classification.Init(
        database,
        Assembly.GetExecutingAssembly(),
        new CultureInfo(SystemObjects.DynamicLinker.ProductLcid, true);
        "AecSpaceOffsetStandardISA.AecSpaceOffsetStandardISAClassifications",
        "Classification Name"
         );
    }
  }
}
```

The *AecSpaceOffsetClassification.Init* method is defined as:

```
public void Init(Database database, Assembly assembly, CultureInfo culture, string
resBaseName, string classificationSetName)
```

The first 3 arguments are usually identical in all cases. The first one is the database to which the classification set needs to be applied. The second argument is the current assembly that implements the standard plug-in. The third argument is the localization for which the classifications are to be set up (in the example, the current setting of AutoCAD Architecture is used, which is the recommended procedure). The fourth argument is the name of the string table within the resources of the assembly. The last argument defines a name for the classification set in AutoCAD Architecture. This should be localized too, because it will be visible to the user. However, this section focuses on classification handling only. When running the standard with the resource file set up correctly, the drawing should now contain classification definitions that apply only to spaces with the names defined in the resource's string-table when the standard is assigned to the drawing.

BOMA classification inserted in drawing



Using Classifications in the Rule Implementation

After adding classifications to the current database, you want to use them within area calculation standard plug-ins. You are in principle able to determine the classification from a space that is passed to a rule with the existing AutoCAD Architecture .NET API. This however could be complex, especially as you always need to use the global name of classifications within your rules, in order to work with all localizations of the

classifications display name. Therefore, the class *AecSpaceOffsetClassification* provides functionality to simplify this.

Reading the Global Classification Name from a Space Object

The *AecSpaceOffsetClassification* class has a method to get the global classification name from a space object so that it can be compared to the names defined by the resource string table to decide how to offset boundaries. The method is the public string *GetClassificationName(Object Id objId)*. The following example shows a bounding adjacency rule that uses the classifications described in the example table above. Because the rule needs to be able to access the *AecSpaceOffsetClassification* object of the standard, the standard is passed through the constructor and assigned to a member of the rule. This means you will need to create the rule in the standard's *InitRules()* implementation with a "this" reference to the current standard.

```
public class BoundingAdjacencyRuleGross : AecBoundingAdjacencyRule
{
  private AecSpaceOffsetStandardISA standard;
  public BoundingAdjacencyRuleGross(AecSpaceOffsetStandardISA standardISA)
  {
    standard = standardISA;
  }
  public override AecSpaceOffsetInfo Apply(ObjectId idSpace, ObjectId idObject, ObjectId
  idAdjSpace)
  {
    String classificationNameThis = "";
    String classificationNameAdjacent = "";
    if (!idSpace.IsNull)
    {
      classificationNameThis = standard.Classification.GetClassificationName(idSpace);
    }
    if (!idAdjSpace.IsNull)
    {
      classificationNameAdjacent = standard.Classification.GetClassificationName(idAdjSpace);
    }
    if (idAdjSpace.IsNull || classificationNameAdjacent =="Exterior")
    {
      return new AecSpaceOffsetInfo(AecSpaceOffsetType.Opposite);
    }
    if (!idAdjSpace.IsNull && classificationNameThis == "Exterior")
    {
      return new AecSpaceOffsetInfo(AecSpaceOffsetType.Adjacent);
    }
    if (classificationNameThis == "Office")
    {
      return new AecSpaceOffsetInfo(AecSpaceOffsetType.Adjacent);
    }
    // for the rest
    return new AecSpaceOffsetInfo(AecSpaceOffsetType.Center);
  }
}
```

Reference: AecSpaceOffsetClassification Class

The following list shows all members of the *AecSpaceOffsetClassification* base class:

```
namespace Autodesk.Aec.SpaceOffsetRulesManager
{
   public class AecSpaceOffsetClassification
  {
    public AecSpaceOffsetClassification();
    public ObjectId ClassificationDefinitionID { get; }
    public string GetClassificationName(ObjectId objId);
    public void Init(Database database, Assembly assembly, CultureInfo culture, string res
    BaseName, string classificationSetName);
  }
}
```

Sections

39

A section represents a building model as if the model were cut vertically to show interior detail. You can create two-dimensional (2D) or three-dimensional (3D) section objects, or a live section view of the model. You can control the size and shape of the section you generate and assign materials to the section for an optimal visual representation of the sectioned objects. Section objects remain linked to the building model that you used to create them, unless you explode the section. Because of this link between the section and the building model, any changes to the building model can be reflected in the section as well.

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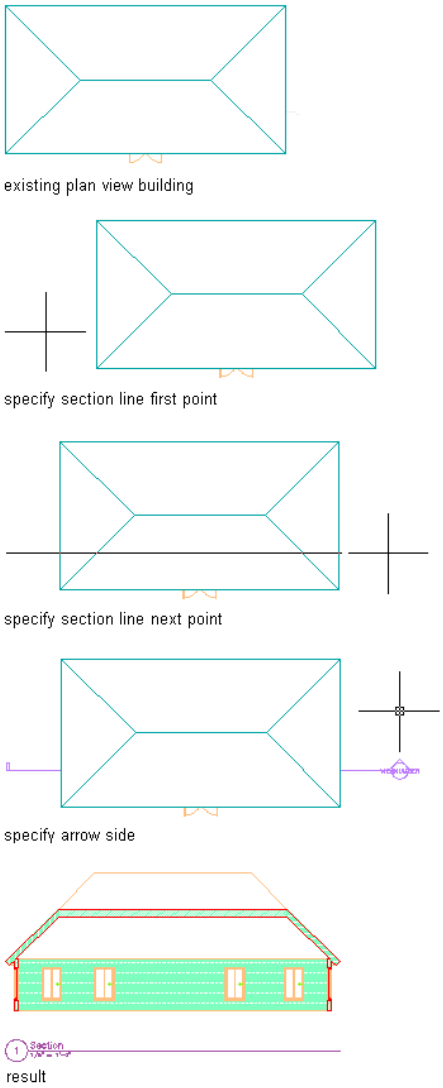
Section Line and Marks

The section line defines the extents of the section that you extract from the building model. Sections lines can be straight or jogged. You can also specify the length and the height of the area defined by the section line. Section marks, which typically contain a letter or number and indicate the direction of the section, appear at each end of the section line.

After you draw the section line, you can create a section object or a live section view from the line.

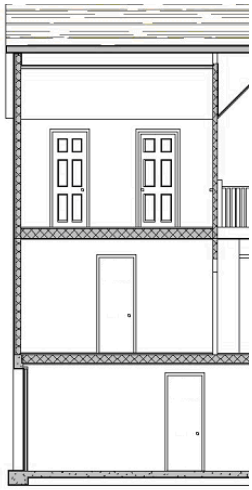
Creating a Section



2D Sections

2D sections are created by cutting a number of objects with a section line and then creating a 2D section object from them. The section object is drawn without hidden and overlapping lines. You can edit a 2D section by changing its object display properties or its style display properties. The 2D section style lets you add display components to the display representation of the section and create rules that assign different parts of the section to different display components. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each component. You can also choose whether materials, such as brick or concrete hatches, are used to display individual components of the section object or the 2D section style. Furthermore, you can use linework editing commands to assign individual lines in a 2D section to different display components, and merge geometry into a 2D section. You can dimension 2D sections.

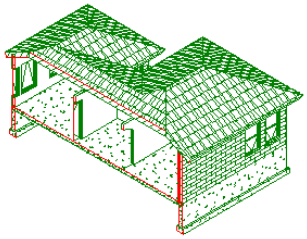
2D section with surface and shrinkwrap hatch detail



3D Sections

3D sections are created by cutting a number of objects with a section line and then creating a 3D isometric section object from them. 3D sections do not use styles. However, you can control the display of subdivisions within 3D sections. Using the Hidden Line Projection command, you can create 2D hidden line projections of any view of the 3D section that you can explode and edit or hatch. For more information about using this command, see Creating a Hidden Line Projection on page 2215.

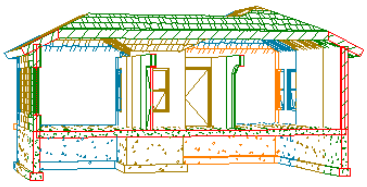
3D section in 3D view



Section Subdivisions

A 2D or 3D section object can have a number of subdivisions partitioning the section object. This feature is useful when you want to create a view of the object in which the parts that are closer to the viewer are drawn with darker and stronger lines, and parts that are farther off are drawn lighter.

3D section with subdivisions and assigned colors in perspective view



Live Section View

A live section view is a special view of a 3D section where the objects that are sectioned are not converted to a 3D section object. Instead, the existing model objects are displayed as a 3D section. The parts of the objects within the bounding box of the section line keep their individual display components while the parts of the objects outside of the section line can optionally be displayed or hidden. To control the appearance

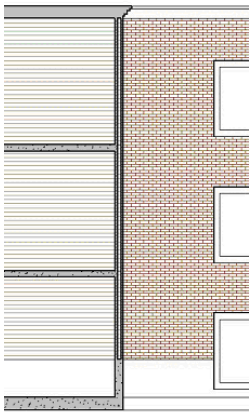
of the object parts outside of the section line, you need to assign a material to the sectioned objects. When you render a live section, you can show the outside part as a half-transparent addition, for example.

For more information, see Creating and Editing a Live Section View on page 2140.

Materials in Sections

In AutoCAD Architecture, you can assign materials to different components of an object. These materials are displayed when you create a 2D or 3D section object or a live section view. Materials have specific settings for sections, such as a 2D section hatch setting and a sectioned boundary for live section views. In a 2D or 3D section object, you can specify whether to use the display properties of the materials or the display properties of the section object.

2D section with different surface hatches

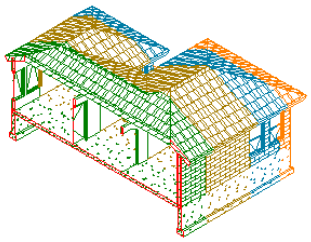


AutoCAD Architecture provides a large number of predefined materials for all common design purposes. You can use these predefined materials, or modify them to your special designs. You can also create your own materials from scratch. For more information, see About 2D and 3D Section Display Components and Materials on page 2160.

Subdivisions in 2D Section Styles and Materials

When you create subdivisions in your style, you usually want the objects in them to be visually distinct from other subdivisions. When you assign materials to the objects, you can set the 2D section style so that it uses the hatch pattern from the material, but uses the color and linetype from the subdivision display properties.

3D section with subdivisions and assigned colors in 3D view



For more information see Use Subdivision Properties and Materials in 2D Section Styles on page 2165.

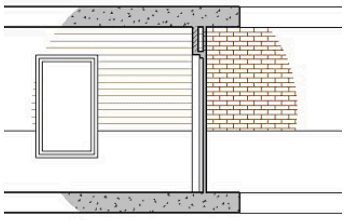
Material Boundaries in 2D Sections

Material boundaries allow you to erase or limit portions of a 2D section or elevation. For example, you might do the following:

- Limit the amount of hatching to produce cleaner construction documents.

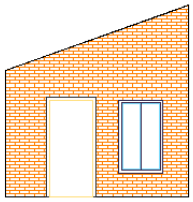
- Highlight a region in an elevation or section.

  2D section with highlighted hatching region detail



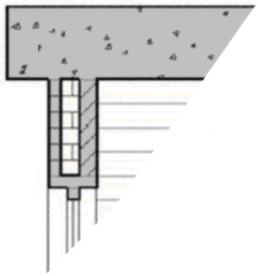
- Mask out a portion of a section so that more detail can be drawn.

  2D section with hatch masked



- Crop an irregular-shaped portion of a section or elevation.

  2D section with cropped material display detail



For more information, see Creating a Material Boundary in a 2D Section on page 2146.

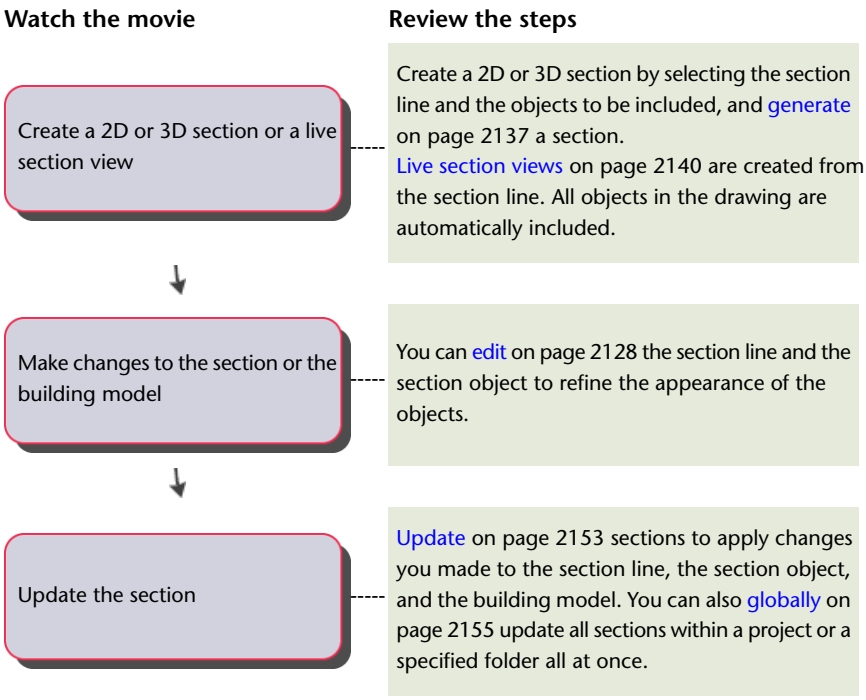
Workflow to Create a 2D or 3D Section or a Live Section View

Watch the movie

Review the steps

Draw a section line and mark

The section line on page 2129 defines the extents of the section (its width, height, and length) to extract from the building model for 2D, 3D, and live section views.



Drawing and Editing Section Lines

The first step in creating a section is to draw a section line through the building model. The section line defines the extents of the section to extract from the building model.

NOTE You can create vertical sections and horizontal sections.

Creating a Section Object from a Section Line

When you generate a section from a section line, you specify the type of section object that is created.

When you create…	The result is…
a 2D section object	an orthographic projection from the building model.
a 3D section object or a live section	the area of the building model defined in the section line.

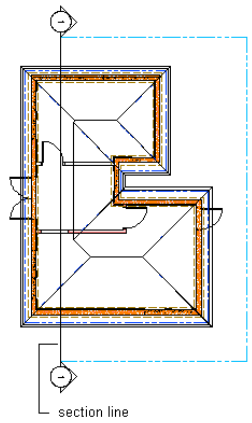
Creating a Live Section View from a Section Line

When you create a live section view from a section line, you do not create a new section object but instead switch to a special view of the 3D building model. You do not select objects to include in the section; the live section view includes all objects in the drawing. The section line controls how objects are displayed in a live section view. Objects or parts of objects that are within the bounding box of the section line retain their original display properties. Objects or parts of objects that are outside of the section line are either not displayed at all or are displayed with a special display component for the sectioned body.

Viewing the Section Line

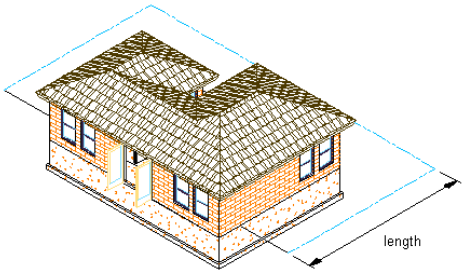
In plan view, the section line is displayed as you would expect on a construction document. The section marks point in the direction that the section is cut.

Viewing the section line and mark in plan view



In an isometric view, the same section line is displayed with a boundary that defines the extents of the section.

Viewing a section line in isometric view



Changing the Section Line

You can change the section line to control the section that you create. Using the section line, you can change the height and shape of the section. You can also add a lower extension to the section and create section subdivisions.

You can change section line properties before or after you create a section. After changing section line properties, you can apply the changes to a section that you previously created with the section line. For information about updating existing sections, see Updating a 2D or 3D Section on page 2153.

For information about updating existing live section views, see Updating a Live Section View on page 2141.

Using Subdivisions in Sections

You can set up graphic subdivisions in section line properties. These subdivisions are added to the 2D or 3D section you create. Subdivisions are specified at distances from the cutting plane of the section line. You can control the lineweight and other display properties of subdivisions to add levels of depth to sections. For example, you can display one subdivision with a heavy lineweight and another subdivision with a lighter lineweight to suggest that the first subdivision is in front of the second subdivision.

You can use the display properties of a subdivision together with the display properties of a material. For more information, see Use Subdivision Properties and Materials in 2D Section Styles on page 2165.

Drawing a Section Line and Marks

Use this procedure to draw a section line with a section mark at each end. You draw a section line by specifying a start point, an endpoint, a length, and a height for the section. You can specify additional points

between the start point and the endpoint to create jogs in the section. The section line acts as a cutting plane, slicing a section from the building model.

NOTE If you are working with a drawing set where several xrefs are linked to a main drawing, draw the section line in the main drawing.

TIP You can also create sections with Callout tools. For more information, see Placing Section Callouts on page 2435.

1 On the default tool palette set, click the Design tab, and then click the Vertical Section tool.

If necessary, scroll the palette to display the tool that you need.

NOTE Alternatively, click Home tab ➤ Section & Elevation panel ➤ Section Line .

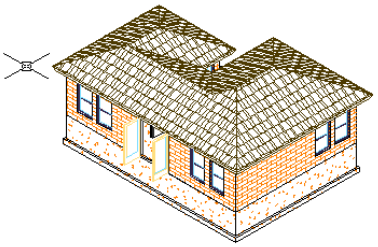
2 Specify the start point of the section line.

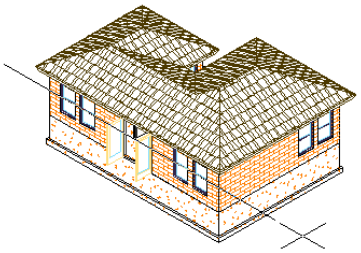
3 Continue to specify points to define the section line, if needed.

You can create jogs in the section line to cut through portions of the building model that you want to show in the section, but which are not along a single straight path.

4 Specify the endpoint of the section line, and press *ENTER*.

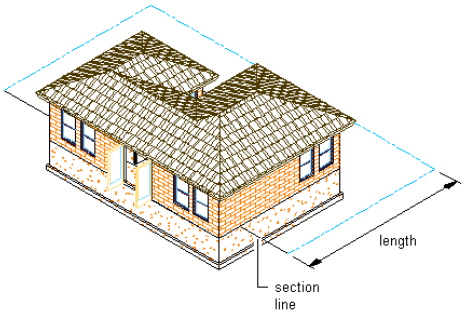
Specifying section line start and end points in 3D view





5 Specify the length of the section, or press *ENTER* to accept the length taken from the endpoints of the line.

The section line is displayed in the drawing. Depending on the direction in which you drew the section line, the section marks point in the direction of the section.



The section marks are multi-view blocks, anchored to the section line. You can edit the section marks to change the information displayed in the bubbles. For more information, see Changing Section Mark Attributes on page 2135.

The height of the section line is set to the extents of the selected objects. You can change the properties of the line to change the height and depth of the section, add a lower extension, or add subdivisions. For more information, see Changing the Height of a Section Using Grips on page 2131.

Changing the Height of a Section Using Grips

Use this procedure to change the height of any section connected to the section line. You can change the height of the section line before or after you create a connected section. If you change the height after creating the section, you need to update the section to show the changes.

You can also change the height of a section using the Properties palette.

1 Click View tab ➤ Appearance panel ➤ Views ➤ SW Isometric .

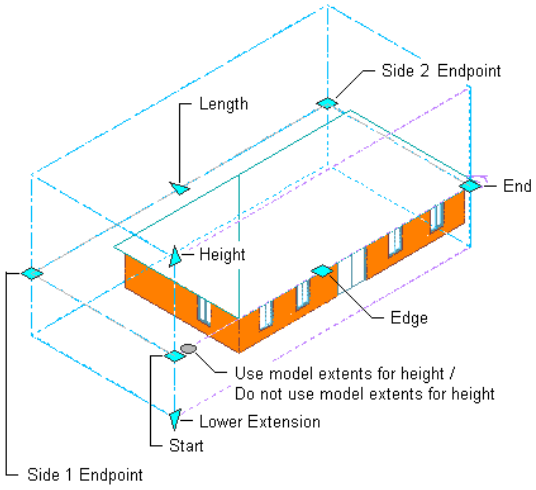
2 Select the section line you want to change.

3 Select the Model Extents grip to turn off use of model extents for section height.

4 Select the Height grip.

NOTE If you use model extents for height mode, the height of the section is determined by the height of the objects in the section and is not available to modify dynamically.

Viewing Section Grips in 3D View



5 Move the grip until the height value you want is displayed, and click once; or enter a value.

The objects are cut at this height when you create or update a section.

6 Right-click, and click Deselect All to turn off grips.

To update a 2D or 3D section created from this section line, see Updating a 2D or 3D Section on page 2153.

Changing the Lower Extension of a Section Using Grips

Use this procedure to change the lower extension of any section connected to the section line. You can change the lower extension of the section line before or after you create a connected section. If you change the lower extension after creating the section, you need to update the section to show the changes.

You can also change the lower extension of a section using the Properties palette.

1 Click View tab ➤ Appearance panel ➤ Views ➤ SW Isometric .

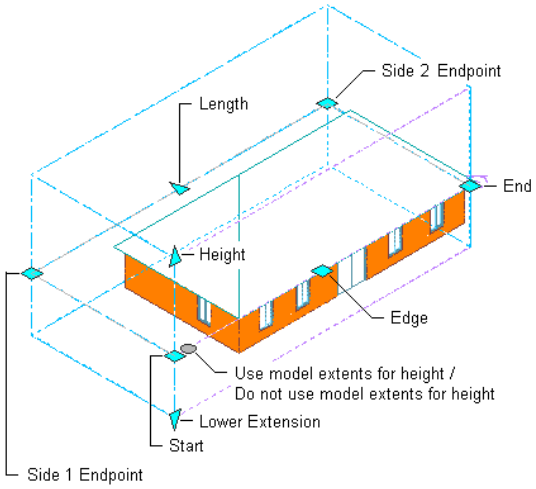
2 Select the section line you want to change.

3 Select the Model Extents grip to turn off model extents for height.

4 Select the Lower Extension grip.

NOTE If you turn off model extents, the default for the lower section is 1 foot below the *XY* plane.

Viewing Section Grips in 3D View



5 Move the grip until the lower extension value you want is displayed, and click once; or enter a value.

6 Right-click, and click Deselect All to turn off grips.

To update a 2D or 3D section created from this section line, see Updating a 2D or 3D Section on page 2153.

Changing the Length of a Section Using Grips

Use this procedure to change the length of any section boundary connected to the section line. You can change the length of the section as a whole, or you can change the length of the sides of the section boundary individually.

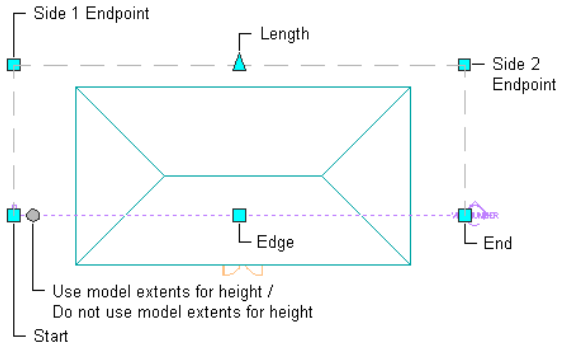
You can change the length of the section boundary before or after you create a connected section. If you change the length after creating the section, you need to update the section to show the changes.

You can also define the depth of a section (its length) by changing the length of the sides of a section boundary on the Properties palette.

1 Select the section line you want to change.

2 Select the Length grip.

Viewing Section Grips in Plan View



3 Move the grip until the length value you want is displayed, and click once.

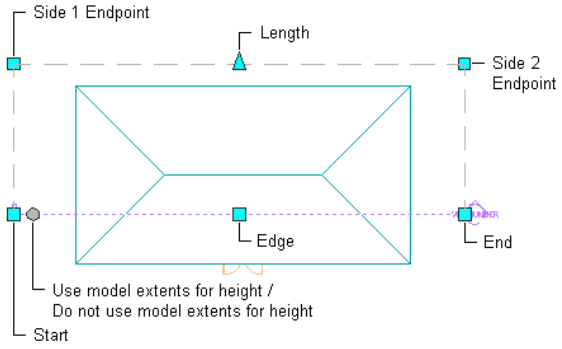
The entire section boundary length is updated.

4 To change the length of side 1 of the section boundary, click the Side 1 Endpoint grip.

Side 1 starts from the first point specified for the section line.

5 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

Viewing Section Grips in Plan View



6 To change the length of side 2 of the section boundary, click the Side 2 Endpoint grip.

Side 2 starts from the endpoint of the section line.

7 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

8 Right-click, and click Deselect All to turn off grips.

To update a 2D or 3D section created from this section line, see Updating a 2D or 3D Section on page 2153.

Changing the Angle Dimensions of a Section

Use this procedure to change the angle of the sides of the building section boundary. You can change the angle dimensions before or after you create a connected section. If you change the angles after creating the section, you need to update the section to show the changes.

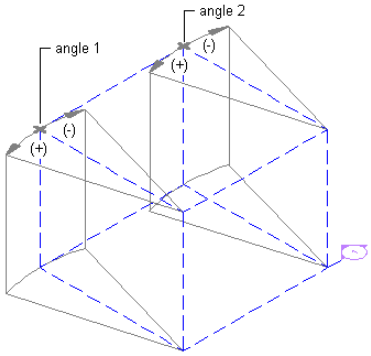
1 Double-click the section line you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand Component Dimensions.

3 Specify values for Angle 1 and Angle 2.

These values define the angles of the two sides from the section line to create the section box. The apex of Angle 1 is the start point of the section line. The apex of Angle 2 is the endpoint of the section line. Values for these angles must be between 0 and 90 degrees.

Specifying section angle parameters



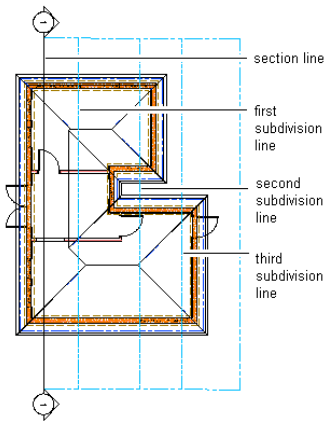
4 Right-click, and click Deselect All to turn off grips.

To update a 2D or 3D section created from this section line, see Updating a 2D or 3D Section on page 2153.

Creating Graphic Subdivisions for 2D and 3D Sections

Use this procedure to define subdivisions that are created when you generate a section. Each subdivision is specified as a distance from the cutting plane of the section line.

A section line with graphic subdivisions



You can control the lineweight and other display properties of the subdivisions to add different levels of depth to sections.

You can use the display properties of a subdivision together with the display properties of a material. For more information, see Workflow to Create a 2D or 3D Section or a Live Section View on page 2127 and Use Subdivision Properties and Materials in 2D Section Styles on page 2165.

1 Double-click the section line you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand Dimensions.

3 Click the setting for Subdivisions, and then add or modify subdivisions:

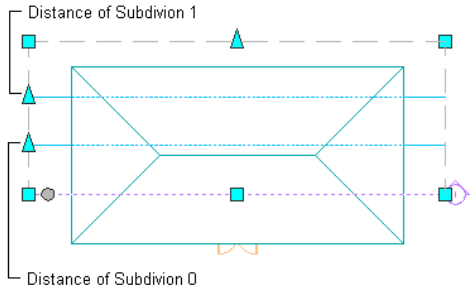
If you want to…	Then…
create a subdivision	click . To change the default distance from the section line, select the subdivision, click the value, and enter a new one.
change the length of a subdivision	select the subdivision, click its value, and enter a new one.
delete a subdivision	select the subdivision, and click .

4 Click OK.

Changing a Subdivision Using Grips

Use this procedure to change the distance of a subdivision, as measured from the section line. You can drag the constrained grip to the desired distance, or you can enter a specific value for the distance measurement.

Viewing Section Subdivision Grips



1 Select the section line you want to change.

2 Select the Distance grip for the subdivision you want to modify.

3 Move the grip until the distance value you want is displayed, and click once; or enter a value.

4 Right-click, and click Deselect All to turn off grips.

Changing Section Mark Attributes

Use this procedure to change the information displayed in the section mark. The section mark is a multi-view block.

1 Double-click the section mark you want to change.

2 On the Properties palette, expand Advanced.

3 Click Attributes.

4 Select the existing attribute under Value, and enter the new information to include in the bubble.

5 Click OK.

Changing the Location of a Section Line

Use this procedure to relocate a section line by changing the coordinate values of its insertion point. The section line also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the section line are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the section line by aligning its normal with another axis. You can also rotate the section line on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1. Double-click the section line you want to relocate.
2. On the Properties palette, click the Design tab, expand Basic, and expand Location.
3. Click Additional Information.
4. Specify the location of the section line:

If you want to…	Then…
relocate the section line	enter new coordinate values under Insertion Point.
locate the section line on the *XY* plane	make the normal of the section line parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the section line on the *YZ* plane	make the normal of the section line parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the section line on the *XZ* plane	make the normal of the section line parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the section line	enter a new value for Rotation Angle.

5. Click OK.

To update an existing section created from this section line, see Updating a 2D or 3D Section on page 2153.

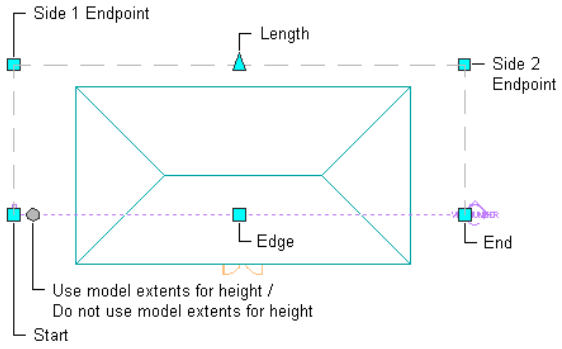
Modifying a Section Line Using Grips

Use this procedure to change the start point, endpoint, edge, or vertex of a section line. You can drag the grip to the desired location, or you can enter a specific value for the measurement.

1. Select the section line you want to change.
2. Select a section line grip, and move it to the desired location.

   You can also move the grip in the desired direction and enter a specific value on the command line.

Viewing Section Grips in Plan View



3 Right-click, and click Deselect All to turn off grips.

Attaching Hyperlinks, Notes, and Files to a Section Line

Use this procedure to add hyperlinks, enter notes, and attach reference files to a section line. You can also edit notes and edit or detach reference files from a section line.

1 Double-click the section line you want to attach notes or files to.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.

4 To add a note, click next to Notes, enter text, and click OK.

5 To attach, detach, or edit a reference file, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Creating a 2D or 3D Section

Use this procedure to create a 2D or 3D section. After you draw a section line, you extract a section from the section line and the objects you select in the building model.

TIP Before you create a section, thaw and turn on all layers containing objects that you want to include in the section. Objects on layers that are off or frozen cannot be part of the selection set for the section. To enhance performance, turn off the layers of the objects that you do not need to include in the section.

WARNING If you want to insert a 2D section in a Plan view, make sure that the display set used for the Plan view does not section objects by display range. In that case, the section result would not be displayed in the Plan view.

To make sure that this is not the case, click Manage tab ➤ Style & Display panel ➤ Display Manager . Select the Plan display set for the currently used display configuration. On the Display Options tab, verify that Section AEC Objects by Display Range defined in Display Configuration is cleared.

1 Draw a section line in the drawing.

For more information, see Drawing a Section Line and Marks on page 2129.

2 Select the section line, and click Building Section Line tab ➤ Modify panel ➤ Generate Section .

3 Select the type of section object you want to create:

If you want to create…	Then…
a 2D section	select 2D Section/Elevation Object with Hidden Line Removal.
a 3D section	select 3D Section/Elevation Object.

4 For Style to Generate, select a style for a 2D section.

If you want to use a particular style, select it from Style to Generate. Otherwise, use the Standard style. For more information, see 2D Section Styles on page 2157.

3D sections do not use styles.

5 Under Selection Set, click (Select Objects), and select the objects that you want to include in the section. Press *ENTER* when you finish selecting objects.

NOTE If you select an object that you do not want to include in the section, hold down *SHIFT* and select the object again to remove it from the selection set.

6 Under Display Set, select a display set for the section object.

The display set controls the representation of the section.

7 Under Placement, select New Object, and specify where to place the section:

If you want to…	Then…
specify a location graphically	click (Pick Point), and specify the location for the new section object in the drawing.
specify the coordinates of the insertion point for the section	enter *X, Y,* and *Z* coordinates for the location of the new section object.

8 Click OK.

A 2D or 3D section is created from the section line properties and the selected objects in the building model. The section is linked to the building model. If you make changes to the building model after you create the section, you can update the section to reflect the changes. For more information, see Updating a 2D or 3D Section on page 2153.

You can edit certain characteristics of the section to control its placement and appearance. For more information, see Editing a 2D or 3D Section on page 2143.

You can also use a 2D section style to control the display of selected objects in a 2D section, and you can control the display of individual lines in a 2D section. For more information, see 2D Section Styles on page 2157 and Editing and Merging Linework in a 2D Section on page 2150.

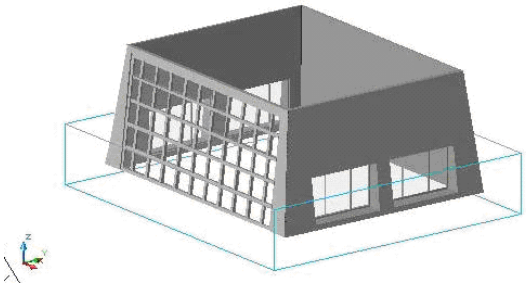
Creating a Horizontal 2D Section

Use this procedure to create a horizontal section or elevation of a plan view.

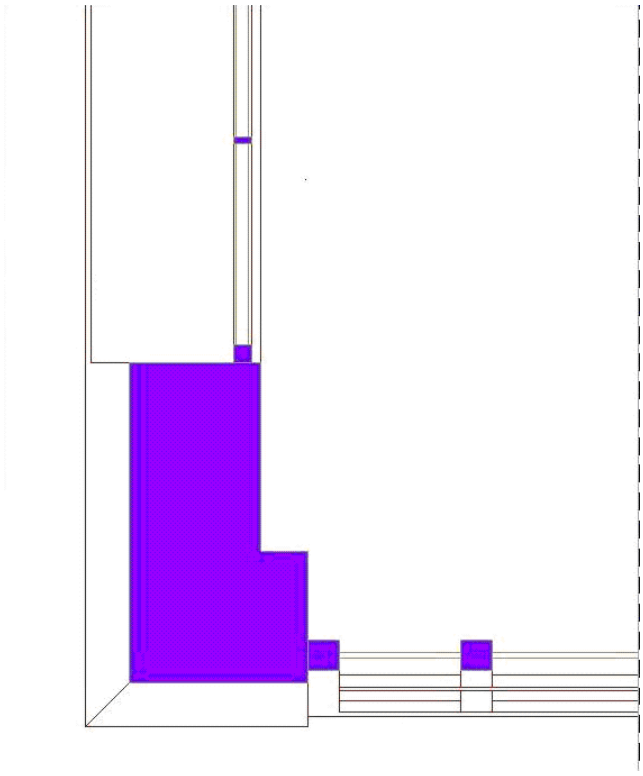
The Hidden Line control available in AutoCAD Architecture makes it possible to create horizontal sections and elevations of Plan views. With a horizontal section or elevation, you can look “down” on the model. Previously, users could achieve that effect only by manually changing the UCS. Now, a tool enables you to create a horizontal section or elevation. This feature could be useful for creating a detailed display of sill components in tapered walls.

The illustration below displays a horizontal section line for an irregularly shaped building.

Horizontal section line



The illustration below displays the section results. Note the sill displays of the tapered walls and the correct representation of the sloped curtain walls.



1 On the default tool palette set, click the Design tab, and then click the Horizontal Section tool.

If necessary, scroll the palette to display the tool that you need.

NOTE Alternatively, click Home tab ➤ Section & Elevation panel ➤ Horizontal Section.

2 Specify the first point of the section plane.

3 Specify the second corner of the section plane.

4 Specify the elevation of the section plane, and press ENTER.

5 Specify the depth of the section, and press ENTER.

6 Proceed with creating the section, as described in Creating a 2D or 3D Section on page 2137.

Creating and Editing a Live Section View

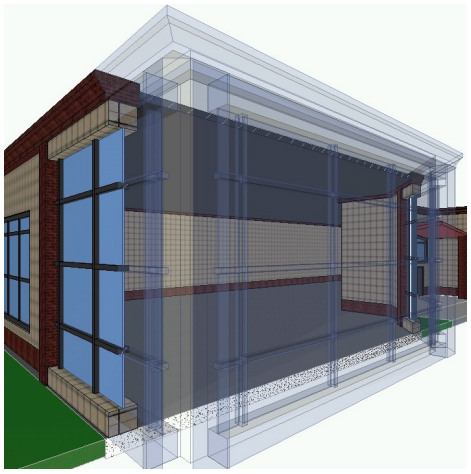
A live section view is a special view of a 3D model section.

A live section view is always applied to all objects in the drawing. Unlike a 2D or 3D section, you do not choose a selection set of objects to be contained in the section. All objects are contained in the live section view. Their display properties are determined by whether or not they are situated within the bounding box of the section line.

The objects contained in the live section view are not converted into a section object, but are retained as objects in the drawing. They keep all of their properties and display components, and can be edited. The area of objects that lie outside of the section line, or objects that lie completely outside of the section line, can be displayed or hidden. The appearance of these objects, and of parts of objects outside of the section line, is controlled by the Sectioned Body component. When you render a live section, you can show the outside part as a half-transparent addition, for example.

The live section view can be turned on and off in a drawing.

Rendered live section view with transparent outside material



NOTE When a live section view contained in a project view drawing is dragged onto a project sheet, and the live section view should be displayed in the sheet view, the external reference of the view needs to be selected in the sheet, and have a display configuration override applied to it, as described in Changing the Display Configuration Used in Xref Drawings on page 545.

Creating a Live Section View

Use this procedure to create a live section view of your building model.

1 Draw a section line through the building model.

For more information, see Drawing a Section Line and Marks on page 2129.

NOTE You do not need to select objects for the live section view. The live section view is created from the whole drawing.

2 Switch to a 3D view, such as SW Isometric.

3 Select the section line, and click Building Section Line tab ➤ Live Section panel ➤ Enable Live Section .

Updating a Live Section View

When you create a live section view, the sectioned objects are not converted into a section object. Instead, the objects remain in the drawing. The objects and object areas which are inside the section line retain their previous display properties. A brick wall inside a section line retains its brick pattern and its dark red linework. The objects and object areas outside of the section line change their display properties, since they are now placed on the Sectioned Body display component and use its display properties.

The live section updates interactively when you change the objects associated with it. If you drag a wall outside of the section line, the wall uses the display properties of the Sectioned Body component. If you drag a wall inside of the section line, the wall uses its own display properties.

When you change the material assignment of an object in a live section view, the new material is automatically used in the live section.

NOTE If you change from a material in which the Sectioned Boundary and Sectioned Body components are turned on, to a material in which these components are turned off, it might look as if objects outside of the section line disappear. You can edit the current material definition to display objects outside of the section line, as described in Displaying the Sectioned Body in a Live Section View on page 2141.

Displaying the Sectioned Body in a Live Section View

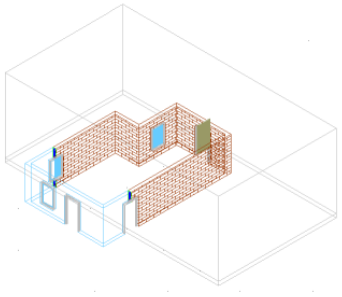
Use this procedure to display the parts of the drawing in a live section view that are outside the section.

Whether objects and areas of objects outside the section line are displayed in the live section view depends on the material settings for each object and object style. The sectioned objects inside the section are displayed with their regular display components and material assignments. For example, a brick wall inside a section displays its regular brick surface hatch.

Objects or object parts that are outside of the section are displayed differently. You can either hide them completely, or display them on the Sectioned Body display component. The Sectioned Body display component is specified in the material assigned to the object.

The sectioned body is often displayed in a lighter, half-transparent color, or as dotted linework.

Live section view with sectioned body displayed as light blue linework



In a material definition, the Sectioned Body and Sectioned Boundary display components influence the display of the live section view. The Sectioned Body includes the objects or object parts outside of the section line. The Sectioned Boundary is the cut line created by the section line.

1. Select the object for which you want to display the sectioned body, right-click and click Edit Object Display.
2. Click the Materials tab.
3. Select the material definition you want to change, and click .
4. Select the display representation of the material, and click .
5. Click the Layer/Color/Linetype tab.
6. Change the display of the sectioned body and sectioned boundary:

If you want to…	Then…
hide the sectioned body	set Visible off for the Sectioned Body and Sectioned Boundary components.
display the sectioned body	set Visible on for the Sectioned Body and Sectioned Boundary components, and assign them display properties as needed.

7. Click OK three times.

NOTE When the Sectioned Body component is set to visible and the material display component is on, you can turn the display of the sectioned body on and off by selecting the section line and clicking Building Section Line tab ➤ Live Section panel ➤ Toggle Body Display.

Removing a Live Section View

Use this procedure to turn off a live section view. You can also remove the live section view by deleting the section line that was used to create it.

1. Select the section line that was used to create the live section view.
2. Click Building Section Line tab ➤ Live Section panel ➤ Disable Live Section .

   After turning off the live section view, you see the regular 3D building model again. You can turn live section view on and off as long as the section line remains in the drawing.

Editing a 2D or 3D Section

After you create a 2D or 3D section, you can edit the section line and the section object to refine the appearance of the section in any of the following ways:

- Add, remove, or modify graphic subdivisions.
- Reverse the section to display a different area of the building.
- Relocate the section.
- Add notes or reference files.
- Select a different style. A section style determines how the linework in a 2D section is displayed.
- Change the display properties of selected linework.
- Add linework and details that are not part of the building model.

In addition, you can continue to modify the building model and then update the section to incorporate the changes.

You can also create and edit material boundaries for 2D sections. For more information, see Creating a Material Boundary in a 2D Section on page 2146.

For information about switching from a view other than a section to a temporary section view to edit objects, see Editing Objects in a Temporary Section View on page 749.

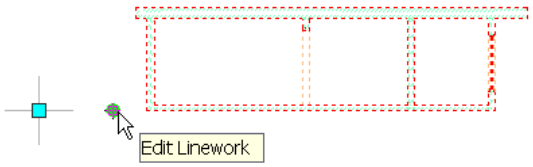
Using Grips to Edit Linework in a 2D Section

Use this procedure to edit linework in a 2D section. You can assign selected linework to fixed display components that determine the display of every section that you generate, or you can assign linework to display components that you have defined.

For information about adding custom display components, see Adding a Display Component to a 2D Section Style on page 2159. After you assign linework to display components, you can change the display properties (visibility, color, layer, lineweight, linetype, and linetype scale) to change the display of lines.

1 Select the section to be changed.

2 Select the Edit Linework grip.



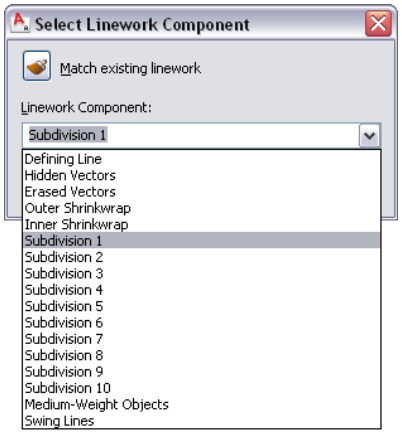
NOTE Alternatively, click 2D Section/Elevation tab ➤ Linework panel ➤ Edit .

The contextual Edit In Place: Linework tab appears on the ribbon.

3 Click Edit in Place: Linework tab ➤ Profile panel ➤ Zoom To to zoom to the section.

4 Select the linework to edit and click Edit In Place ➤ Linework tab ➤ Profile panel ➤ Modify Component .

5 Select the component you want to put the lines on. For example, if you want to make the lines invisible, select Erased Vectors for Linework Component.



You can also click (Match existing linework), and select linework in the elevation whose display component you want to match.

6 Click OK.

7 Exit the linework edit in place mode:

If you want to...	Then click...
save all changes to the linework	Edit in Place tab ➤ Edits panel ➤ Finish.
discard all changes to the linework	Edit in Place tab ➤ Edits panel ➤ Cancel.

Changing the Display of Graphic Subdivisions in a 2D Section

Use this procedure to change the display of subdivisions in a 2D section by changing its display properties.

You create subdivisions by adding them to the section line. You can then change their length using grips or by editing the values in the section line properties. For more information, see Creating Graphic Subdivisions for 2D and 3D Sections on page 2134.

Each subdivision in a 2D section is assigned to a numbered subdivision display component in the display properties of the section or the 2D section style. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each subdivision by changing the display properties of each component. You can apply these changes to the selected section, to the current 2D section/elevation style, or to all 2D sections and elevations in the drawing that do not have a style override.

1 Select the 2D section in the drawing, and do one of the following:

- To change the display for the graphic subdivisions in the 2D section style, click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .
- To change the display for the graphic subdivisions for the selected 2D section object only, right-click, and Edit Object Display. Then, check the Object Override box.

2 Click the Display Properties tab.

3 Select the property source to edit:

- To change the display for the graphic subdivisions in the 2D section style, check the Style Override box.

- To change the display for the graphic subdivisions for the selected 2D section object only, check the Object Override box.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab to list all the components that contribute to the display of the object.

The defining line represents the cutting plane of the section line. The numbered subdivision components correspond to subdivisions added to the section line. For example, the display component Subdivision 1 corresponds to the subdivision closest to, but not on, the cutting plane of the section line.

6 Turn the visibility on or off, and change the layer, color, linetype, lineweight, or linetype scale as needed for each subdivision component.

7 Click the Hatching tab to change the shrinkwrap hatch pattern of the section.

8 Click the Other tab to add a custom display component to the display of the 2D section.

For more information about adding custom display components, see Adding a Display Component to a 2D Section Style on page 2159.

9 Click OK twice.

Changing the Display of Graphic Subdivisions in a 3D Section

Use this procedure to change the display of subdivisions in a 3D section by changing its display properties.

You create the subdivisions by adding them to the section line. You can then change their length using grips or by editing the values in the section line properties. For more information, see Creating Graphic Subdivisions for 2D and 3D Sections on page 2134.

Each subdivision in a 3D section is assigned to a numbered subdivision display component in the display properties of the 3D section. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each subdivision by changing the display properties of each component. You can apply these changes to the selected 3D section or to all 3D sections in the drawing.

1 Select the 3D section in the drawing, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the Sub-divisions display representation.

4 Check the Object Override box.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab to list all the components that contribute to the display of the object.

The defining line represents the cutting plane of the section line. The numbered subdivision components correspond to subdivisions added to the section line. For example, the display component Subdivision 1 corresponds to the subdivision closest to, but not on, the cutting plane of the section line.

7 Turn the visibility on or off, and change the layer, color, linetype, lineweight, or lineweight scale as needed for each subdivision component.

8 Click OK twice.

Reversing a 2D or 3D Section

Use this procedure to reverse the direction of a section by reversing the section line and refreshing the section.

The direction of the section is determined by the direction in which you drew the section line. You can select the section line in plan view to see the bounding box that defines the area of the model included in the section. If the box does not include the area of the model that you intended, you can reverse the section line. If you have already created a section from the section line, update the section after reversing the section line.

1 Select the section line that you used to create the section, and click Building Section Line tab ➤ Modify panel ➤ Reverse .

The section line is mirrored about its own axis, as is the bounding box with its original parameters.

2 Select the existing section.

If you selected…	Then click…
a 2D section	click 2D Section/Elevation tab ➤ Modify panel ➤ Regenerate . **NOTE** If you do not need to respecify the objects to include in the section, you can instead click 2D Section/Elevation tab ➤ Modify panel ➤ Refresh . This immediately updates the section.
a 3D section	click 3D Section/Elevation tab ➤ Modify panel ➤ Regenerate

3 If you want to include different objects in the updated section, click (Reselect Objects), and select the objects. Press *ENTER* when you finish selecting objects.

4 Click OK.

Changing the Style of a 2D Section

Use this procedure to select a different style for a 2D section. A 2D section/elevation style controls the appearance of any 2D section object to which the style is applied.

1 Double-click the section you want to change.

2 On the Properties palette, click the Design tab, expand Basic, and expand General.

3 Select a new style for the section.

Creating a Material Boundary in a 2D Section

Use this procedure to create a material boundary in a 2D section. For more information, see Material Components and Display Properties on page 585.

1 Draw a polyline around the area in the section that you want to mask or to highlight.

2 Select the section, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Add .

3 Select the polyline.

4 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

5 Specify the settings of the material boundary:

If you want to…	Then…
highlight the area inside the polyline	select Limit for Purpose.
mask (erase) the area inside the polyline	select Erase for Purpose.
apply the highlight or mask only to specific parts of the section	select the appropriate parts for Apply to. You can choose Surface and Section Hatching, Section Hatching Only, Surface Hatching Only, Edge Linework Only, and All Linework.
apply the material boundary to all materials used in the section	select All Materials for Material Selection.
apply the material boundary only to selected materials	select Specific Materials for Material Selection and then select the desired materials in the list below.
apply the highlighting or masking within the polyline to the shrinkwrap linework	select Apply to section shrinkwrap linework. For information on section shrinkwrap, see Shrinkwrap on page 2162 and Shrinkwrap Hatch on page 2162.
apply the highlighting or masking within the polyline to the shrinkwrap hatching	select Apply to section shrinkwrap hatching. For information on section shrinkwrap, see Shrinkwrap on page 2162 and Shrinkwrap Hatch on page 2162.

6 Click OK.

Editing a Material Boundary

You can edit existing material boundaries in a number of different ways:

- Change the content within the material boundary. For example, you can determine if you want to see only surface hatching, or both surface and section hatching.
- Change the shape of the material boundary. For example, you can make the boundary bigger or smaller, or add additional rings and vertex points to it.

For more information, see Material Components and Display Properties on page 585.

Editing the Content of a Material Boundary

Use this procedure to change the content of a material boundary. The content includes such settings as materials displayed, hatch types, and boundary type.

1 Select the 2D section with the material boundary, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .

You are now in edit in place mode. The material boundary is highlighted, and the grips are displayed.

2 Click Edit In Place tab ➤ Profile panel ➤ Edit Material Boundary .

3 Specify the content of the material boundary:

If you want to…	Then…
highlight the area inside the boundary	select Limit for Purpose.
mask (erase) the area inside the boundary	select Erase for Purpose.
apply the highlight or mask only to specific parts of the section	select the appropriate parts for Apply to. You can choose Surface and Section Hatching, Section Hatching Only, Surface Hatching Only, Edge Linework Only, and All Linework.
apply the material boundary to all materials used in the section	select All Materials for Material Selection.
apply the material boundary only to selected materials	select Specific Materials for Material Selection, and then select the desired materials from the list below.

4 Click OK.

5 To exit edit in place mode,

if you want to..	then click…
save all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Finish.
discard all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Cancel.

Adding a Vertex to a Material Boundary

Use this procedure to add a vertex to a material boundary.

1 Select the 2D section with the material boundary to change, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .

You are now in edit in place mode. The material boundary is highlighted, and the grips are displayed.

2 Right-click, and click Add Vertex.

3 Specify the point at which to add a vertex.

4 Specify additional vertex points as needed.

5 Press *ENTER*.

6 To exit edit in place mode,

if you want to..	then click…
save all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Finish
discard all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Cancel

Removing a Vertex from a Material Boundary

Use this procedure to remove a vertex from a material boundary.

1 Select the 2D section with the material boundary to change, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .

You are now in edit in place mode. The material boundary is highlighted, and the grips are displayed.

2 Right-click, and click Remove Vertex.

3 Specify the vertex points to remove.

4 Press *ENTER*.

5 To exit edit in place mode,

if you want to..	then click...
save all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Finish.
discard all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Cancel.

Adding a Ring to a Material Boundary

Use this procedure to add a ring to a material boundary.

A material boundary can consist of more than one closed polyline. For example, you could use one polyline to highlight a wall detail and another polyline to highlight a window detail in another location.

1 Draw a polyline for the new material boundary ring.

2 Select the material boundary to add a new ring to, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .

You are now in edit in place mode. The material boundary is highlighted, and the grips are displayed.

3 Click Edit In Place: Material Boundary tab ➤ Profile panel ➤ Add Ring .

4 Select the polyline you drew in Step 1.

5 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

6 To exit edit in place mode,

if you want to..	then click...
save all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Finish
discard all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Cancel

Removing a Ring from a Material Boundary

Use this procedure to remove a ring from a material boundary.

A material boundary can consist of more than one closed ring. You can remove each ring individually.

NOTE You cannot remove the last ring from a material boundary.

1 Select the 2D section with the material boundary to change, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .
You are now in edit in place mode. The material boundary is highlighted and the grips are displayed.

2 Click Edit In Place: Material Boundary tab ➤ Profile panel ➤ Remove Ring .

3 Select the ring you want to remove.

4 To exit edit in place mode,

if you want to..	then click...
save all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Finish
discard all changes	Edit in Place: Material Boundary tab ➤ Edits panel ➤ Cancel

Replacing a Ring from a Material Boundary with Another

Use this procedure to replace a ring from a material boundary with a different ring.

1 Draw the polyline to replace one of the existing material boundary rings.

2 Select the 2D section with the material boundary to change, and click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .
You are now in edit in place mode. The material boundary is highlighted and the grips are displayed.

3 Click Edit In Place: Material Boundary tab ➤ Profile panel ➤ Replace Ring .

4 Select the ring to be replaced.

5 Select the closed polyline you drew in Step 1.

6 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

7 To exit edit in place mode,

if you want to..	then click...
save all changes	Edit in Place tab ➤ Edits panel ➤ Finish
discard all changes	Edit in Place tab ➤ Edits panel ➤ Cancel

Editing and Merging Linework in a 2D Section

After you create a 2D section, you can edit the display of individual lines that make up the section. For example, you may want to assign linework for small details to a display component with a lighter lineweight, so that the details are not obscured when plotted.

You can also merge existing geometry into the section.

Editing Linework in a 2D Section

Use this procedure to edit individual lines in a 2D section by assigning them to display components in the section. For information about the Edit Linework grip, see Using Grips to Edit Linework in a 2D Section on page 2143.

You can assign selected linework to fixed display components that determine the display of every section that you generate, or you can assign linework to display components that you have defined. For information about adding custom display components, see Adding a Display Component to a 2D Section Style on page 2159. After you assign linework to display components, you can change the display properties (visibility, color, layer, lineweight, linetype, and linetype scale) to change the display of lines.

1. Select the section to be changed, and click 2D Section/Elevation tab ➤ Linework panel ➤ Edit .

   The contextual Edit In Place: Linework tab is displayed.

2. Select the lines that you want to assign to a display component, and click Edit In Place ➤ Linework tab ➤ Profile panel ➤ Modify Component .

   A list of available display components is displayed.

3. Select the component on which to put the lines.

   For example, to make the lines invisible, select Erased Vectors for Linework Component.

   You can also click (Match existing linework) and select linework in the section whose display component you want to match.

4. Click OK.
5. If you want to undo an individual component change, enter **Aec2dSectionResultAbortChanges** on the command line, and select the component. This will undo all changes to that component during the edit in place session, and automatically exit the edit in place mode.
6. To finish the linework editing process,

if you want to..	then click...
save all changes	Edit in Place: Linework tab ➤ Edits panel ➤ Finish
discard all changes	Edit in Place: Linework tab ➤ Edits panel ➤ Cancel

Merging Linework into a 2D Section

Use this procedure to merge geometry into a 2D section. When you merge linework into a section, you assign additional linework to a display component of a section. Use this feature to add detail, or to add linework that you did not model.

1. Draw the geometry that you want to merge into a 2D section.
2. Select the 2D section to be changed, and click 2D Section/Elevation tab ➤ Linework panel ➤ Merge .
3. Select the geometry to merge into the section, and press *ENTER*.
4. Select the display component to assign the linework to.

   You can also click (Match existing linework) and select linework in the section whose display component you want to match.

5. Click OK.

The linework is merged into the 2D section. When you select the section, the linework is selected with it.

Changing the Location of a 2D or 3D Section

You can relocate a section by changing the coordinate values of its insertion point. The section also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the section are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the section by aligning its normal with another axis. You can also rotate the section on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use Coordinates and Coordinate Systems" in AutoCAD help.

1. Double-click the section you want to move.
2. On the Properties palette, click the Design tab, expand Basic, and expand Location.
3. Click Additional information.
4. Specify a new location or rotation:

If you want to…	Then…
relocate the section	enter new coordinate values under Insertion Point.
locate the section on the *XY* plane	make the normal of the section parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the section on the *YZ* plane	make the normal of the section parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the section on the *XZ* plane	make the normal of the section parallel to the *Y* axis: under Normal, enter *1* for Y, and enter **0** for X and Z.
change the rotation of the section	enter a new value for Rotation Angle.

5. Click OK.

Attaching Hyperlinks, Notes, and Files to a 2D or 3D Section

Use this procedure to add hyperlinks, enter notes, and attach reference files to a 2D or 3D section. You can also edit notes and edit or detach reference files from a 2D or 3D section.

1. Double-click the 2D or 3D section you want to attach notes or files to.
2. On the Properties palette, click the Extended Data tab.
3. To add a hyperlink, click next to Hyperlink, and specify the link.
4. To add a note, click next to Notes, enter text, and click OK.
5. To attach, detach, or edit a reference file, click next to Reference documents, and then do any of the following:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.

If you want to…	Then…
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Updating a 2D or 3D Section

Use this procedure to update a 2D or 3D section to reflect changes you have made to the building model or to section line properties. For 2D sections, you also update the section to show changes made to the 2D section style. You can update a 2D or 3D section if you have not exploded the section, which destroys the link between the section and the building model.

When you update a section, you can add or remove objects from the section, change the location of the section in the drawing, and change the display set of the section.

If you do not need to change the section definition in any way, you can skip the following procedure. Instead, select the section you want to update, and click 2D Section/Elevation tab ➤ Modify panel ➤ Refresh .

1 Select the section you want to update.

If you selected…	then…
a 2D section object	click 2D Section/Elevation tab ➤ Modify panel ➤ Regenerate .
a 3D section object	click 3D Section/Elevation tab ➤ Modify panel ➤ Regenerate .

2 Select a result type:

If the section is…	Then…
a 2D section object	select 2D Section/Elevation Object with Hidden Line Removal.
a 3D section object	select 3D Section/Elevation Object.

3 To change the style of a 2D section, select a new style for Style to Generate.

4 If you edited linework in the 2D section, select a style in which to save the changes you made that cannot be reapplied. Choose a style that will distinguish the unapplied changes in the section.

5 Under Selection Set, specify the objects that you want to include in the section:

If you want to…	Then…
use the objects in the selection set you specified when you created the section or when you previously updated it	proceed to the next step.

If you want to…	Then…
add new objects to the selection set that you specified when you created the original section	click Select Additional Objects, select the new objects in the drawing, and press *ENTER*.
select a new selection set of objects for the section	click Reselect Objects, select a new selection set of objects for the section, and press *ENTER*.

NOTE If you select an object that you do not want to include in the section, hold down *SHIFT*, and select the object again to remove it from the selection set.

6 Under Display Set, select a display set for the section.

7 Under Placement, locate the section in the drawing:

If you want to…	Then…
create a new section object without overwriting the original object	select New Object, and either click to specify an insertion point in the drawing area, or enter X, Y, and Z coordinates for the new section.
replace the original section with the updated section	select Replace Existing.

8 Click OK.

Globally Updating 2D Sections

AutoCAD Architecture makes it possible for you to globally update all sections and elevations within a project or a specified folder.

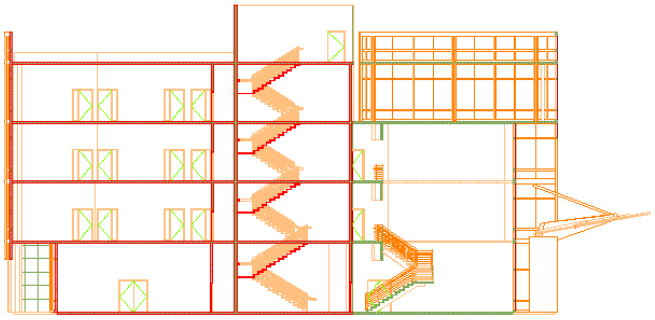
Updating Sections and Elevations in a Project

AutoCAD Architecture includes the Drawing Management feature that allows users to combine their floor plans, section and elevation views, construction sheets, and reusable components in one building project. A project consists of a number of drawings linked together with a powerful external referencing mechanism. You can open a project and update all 2D sections and elevations included in that project in one comfortable workflow. For information on which project file types can be updated, see Supported Project Drawing Types on page 2155.

Updating Sections and Elevations in a Specific Folder

When you are working without a project, you can also globally update sections and elevations by specifying a folder and updating all sections and elevations in that folder. When you select a specific folder for updating, you can also include its subfolders in the update.

Section of a building project



For more information about building projects, see Drawing Management on page 199.

Supported Project Drawing Types

When you are updating a project, you can globally update all 2D sections and elevations within the views and sheets of the project. You cannot globally update elements and constructs, because these project drawings usually contain reusable elements and individual parts of the building project. They normally do not contain sections or elevations.

For more information about project drawing types, see Views on page 297 and Sheets on page 321.

NOTE When you globally update the sections and elevations in a project drawing, all model and paper space layouts are updated.

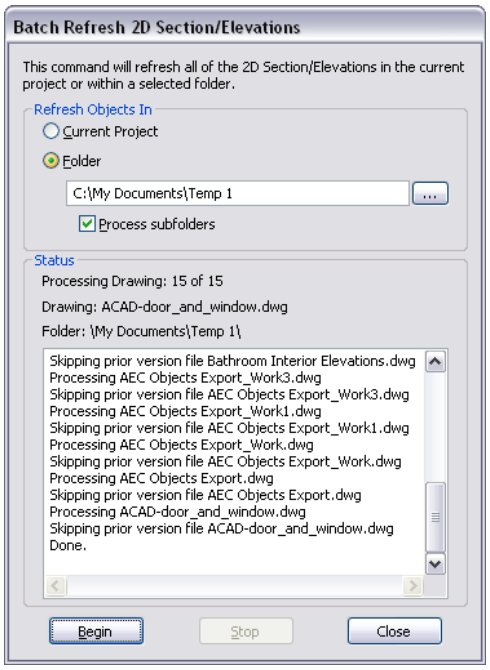
When you are updating a specified folder within a project, or a folder outside of a project, all sections and elevations in that folder are updated regardless of their type. For example, if you choose to update a specific folder within the Constructs category of a project, the sections and elevations in that folder will be updated, even though they are Construct drawings. If you do not specify a folder, but choose to update the whole project, these construct drawings are not updated.

Globally Updating 2D Sections and Elevations in a Project or a Folder

Use this procedure to globally update all 2D sections and elevations in a project or a specified folder.

NOTE To update all 2D sections and elevations in a project, the project must be defined as current. If no project is current, you receive an error message if you try to globally update 2D sections and elevations. For information on setting a project current, see Setting a Project Current on page 215.

1 Click Home tab ➤ Section & Elevation panel ➤ ➤ Batch Refresh .



2 Select if you want to update the 2D sections and elevations in the current project, or only the 2D sections and elevations in a specific folder.

If you want to...	Then...
update the 2D sections and elevations in the current project	select Current Project.
update the 2D sections and elevations in a specific folder	select Folder. Then click the Browse button ..., select the folder containing the files you want to update, and click OK.

3 If you have specified a folder, you can specify whether the subfolders of that folder should be updated as well. To update the subfolders, select Process subfolders.

NOTE When you are working with a large building project, updating all sections and elevations can be a time-consuming process. In this case, you might consider updating only a selected subfolder of your project and thereby improve system performance.

4 Click Begin.

Globally updating all sections and elevations may take a while. A status window lets you know which drawing is currently being updated.

When you start the global update, the Stop button is available. If you want to interrupt the global update, click Stop. When the global update is finished, the Begin button is available.

Updating Legacy Drawings

During the global update of 2D sections and elevations, each drawing in the project or specified folder is opened, updated, and saved again. If you are updating drawings from an earlier version of the software, the drawings are converted to the current version. Before you convert the drawings, a warning message notifies you of the conversion. To update the drawings to the new version, click OK. To cancel the update of all sections and elevations, press *CTRL+BREAK*.

Update Exceptions

There are a number of cases in which a 2D section or elevation cannot be updated with the global update.

- The drawing containing the 2D section or elevation is read-only.
- The 2D section or elevation is placed on a locked layer.
- There have been user edits to a 2D section or elevation that could not be reapplied to the 2D section or elevation.

When a 2D section or elevation cannot be updated, an error message is displayed in the status window.

To fix the problem, you can set the drawing to read/write instead of read-only, you can unlock the section layer, or you can undo a specific user edit to a 2D section or elevation.

2D Section Styles

A 2D section/elevation style is a group of properties assigned to a 2D section or to an elevation that determines the appearance and other characteristics of that object.

Using 2D Section Styles

A 2D section/elevation style controls the linework in a section, using design rules that determine how different parts of the section are displayed. You can apply the style to one or more sections to control their appearance. You can also change the display of individual lines in the section, and save the changes in a 2D section/elevation style.

Display Components and Design Rules

Display components determine the graphical characteristics, such as color and linetype, of linework assigned to each display component. Design rules determine how the linework in a section is assigned to display components.

When you create a design rule, you specify the part of the 2D section to control based on the color of those objects in the building model and their context in the section. You then select the display component to use for linework that meets the criteria you specified. You can assign the linework to a default display component or to a custom display component that you have added to the style. For example, you might define a rule that assigns all objects that are color 150 in the model and that are located along the section line (the defining line) to a custom display component named Darker that you created in the style. Or you might hide a staircase behind a wall using a rule that assigns all blue linework to the Hidden display component.

Managing 2D Section Styles

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

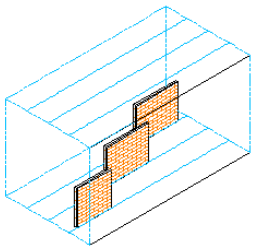
Materials and 2D Section Styles

You can use 2D section styles to specify which section components will have their display controlled by materials and which will not. Custom components cannot use materials.

Subdivisions in 2D Section Styles and Materials

When you are creating subdivisions in your style, you usually want the objects in them to be visually distinct from other subdivisions. When you assign materials to the objects, you can set the 2D section style so that it uses the hatch pattern from the material, but the color and linetype from the subdivision display properties.

Section subdivision surface hatching with color assignments



Three brick walls in different section subdivisions

2D section surface hatch from material, color and linetype from subdivisions

Creating a 2D Section Style

Use this procedure to create a 2D section style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand 2D Section/Elevation Styles.

NOTE Alternatively, select a 2D section in the drawing, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ 2D Section/Elevation Style .

3 Create a 2D section style:

If you want to…	Then…
create a style using default properties	right-click 2D Section/Elevation Styles, and click New. Enter a name for the new 2D section style, and press *ENTER*.
create a style from an existing style	right-click the 2D section style you want to copy, and click Copy. Right-click, and click Paste. Right-click the new style, and click Rename. Enter a name and press *ENTER*.

4 Edit the 2D section style:

If you want to…	Then…
add display components to the style	see Adding a Display Component to a 2D Section Style on page 2159.
remove display components from the style	see Removing a Display Component from a 2D Section Style on page 2160.
use the subdivision properties of the section for the display	see Use Subdivision Properties and Materials in 2D Section Styles on page 2165.

If you want to…	Then…
use the 3D Body component of the material for the section linework	see Use the 3D Body Component of a Material for the 2D Section Linework on page 2165.
add design rules to the style	see Adding a Design Rule to a 2D Section Style on page 2166.
change design rules in the style	see Changing a Design Rule in a 2D Section Style on page 2167.
add classifications to a style	see Adding Classifications to a 2D Section Style on page 2167.
change the display properties of the display components in the style	see Changing the Layer, Color, and Linetype of a 2D Section Style on page 2168.
add notes, files, or documents to the style	see Attaching Notes and Files to a 2D Section Style on page 2168.

5 Click OK.

Adding a Display Component to a 2D Section Style

Use this procedure to add a custom display component to a 2D section style. After you add a component, you assign linework in the section to the new component. To apply these style changes to existing 2D sections, you must update the section.

2D sections include the following default display components: Defining Line, Hidden, Erased, Unknown, and Subdivision.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Components tab.

3 Click Add.

4 Enter a name and a description for the new component.

To enter a name, click Unnamed and enter a new name. To enter a description, click in the Description column next to the name, and enter a description.

5 Click the Display Properties tab.

6 Select the display representation in which to display the changes, and select Style Override.

7 If necessary, click .

8 Click the Layer/Color/Linetype tab.

9 Specify the display properties of the new component.

10 Click OK twice.

To create a design rule that uses the new display component, see Adding a Design Rule to a 2D Section Style on page 2166. To manually assign linework to the display component, see Editing Linework in a 2D Section on page 2151.

Removing a Display Component from a 2D Section Style

Use this procedure to remove a custom display component from a 2D section style. Removing a display component also removes any design rules that use the component. You cannot remove the default display components.

1. Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .
2. Click the Components tab.
3. Select the component that you want to remove, and click Remove.

   If the component is used in a design rule, a dialog box is displayed, warning you that the associated design rule is removed as well.
4. Click OK.
5. Update the section to apply the style changes to the section.

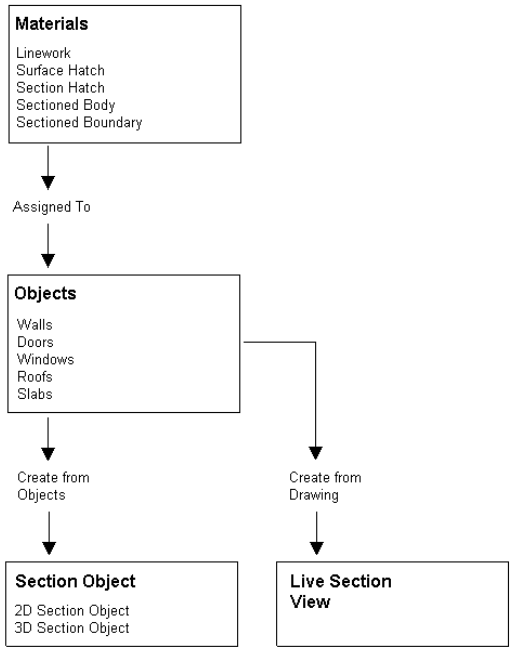
   For more information, see Updating a 2D or 3D Section on page 2153.

About 2D and 3D Section Display Components and Materials

2D and 3D section object consist of a number of display components which can be determined by materials.

When you assign materials to an object, you assign one material to each display component of an object. For example, you assign a wood material to the frame of a window and a glass component to the glass of a window.

When you create a 2D or 3D section object from building objects, the material assignments of the source objects are applied to the section. You do not assign a material directly to a 2D/3D section. The section takes its material assignments from the objects that are sectioned. For example if you create a section through a wall with a window, the section hatch you have defined in the glass, wood, and brick materials of the wall and the window are displayed in the section.



If you do not want to use the material display properties, but instead use those of the 2D or 3D section object, or the 2D section style, you can deactivate the material assignments in the display properties of the section or the section style.

Material Component Assignments

Material definitions consist of display components which correspond to component types of objects. For example, the Linework component of a material is used for all linework of objects in Plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their description, see Material Components and Display Properties on page 585.

The following table lists all section components plus information about the material components that determine them.

NOTE Keep in mind that materials are not assigned directly to 2D section objects, but that the assignment of materials happens indirectly via the sectioned objects. For example, if a brick material has a surface hatch component with a red brick pattern, this surface hatch determines the display of the surface hatch in a brick wall. When you create a 2D section from that wall, the resulting section object will inherit the red brick pattern from the wall. When you change the material of the wall from brick to concrete, and then update the 2D section, it will now display with a grey concrete pattern.

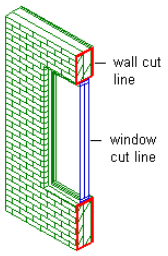
2D Section Component	Material Component
Defining Line	2D Section/Elevation Linework or 3D Body. For information on switching between these material components, see Use the 3D Body Component of a Material for the 2D Section Linework on page 2165.
Outer Shrinkwrap	No Material
Inner Shrinkwrap	No Material
Shrinkwrap Hatch	No Material
Surface Hatch Linework	Surface Hatch
Section Hatch Linework	Section Hatch
Hidden	No Material
Erased	No Material
Subdivision 1-10	2D Section/Elevation Linework or 3D Body. For information on switching between these material components, see Use the 3D Body Component of a Material for the 2D Section Linework on page 2165.

Defining Line

The defining line determines where the section cuts the objects it contains. The material component which controls the display of the Defining Line is the Linework component. The defining line is a display component of both 2D and 3D section objects.

For example, if you cut a brick wall that contains a window, you can specify one uniform color for the defining line, or use different colors where the section line cuts the wall and where it cuts the window. If you want to use a uniform color for the Defining Line component, assign a color to it and do not use the properties of the material. If you want the color of the defining line to be influenced by the objects in the section, use the material properties. In the case of a section through a brick wall with a window, you might use a red defining line where the wall is cut and a blue defining line where the window is cut.

Specifying cut line colors for different materials

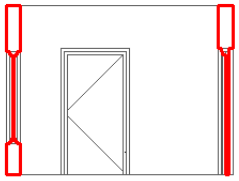


Shrinkwrap

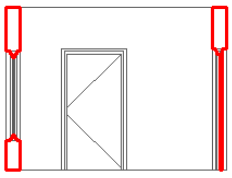
The shrinkwrap displays the union of all object faces cut by the section line. The Outer Shrinkwrap component represents the outline of solid, filled components, such as a wall shrinkwrap. The Inner Shrinkwrap component represents the outline of holes which have been cut, such as a space. These components are specific to 2D sections.

You can exclude individual objects from contributing to the shrinkwrap. For example, you might do this for glass components in windows. For information on excluding objects from the 2D shrinkwrap, see Excluding a Material Definition from 2D Section Shrinkwrap on page 606.

2D section with red outer shrinkwrap



Window glass excluded from shrinkwrap

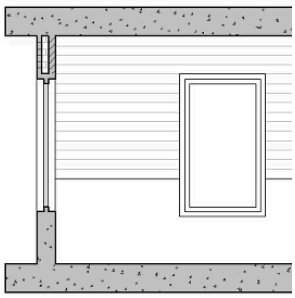


The Outer and Inner Shrinkwrap components cannot be defined by a material component.

Shrinkwrap Hatch

The Shrinkwrap Hatch component hatches the union of all object faces cut by a section line. The Shrinkwrap Hatch is defined by either an outer or an inner shrinkwrap line component. This component is specific to 2D sections.

Shrinkwrap Hatch with glass excluded from shrinkwrap detail



The Shrinkwrap Hatch component cannot be defined by a material component.

NOTE The Shrinkwrap Hatch and Section Hatch components overlap each other. This could result in two different hatches in the same location. To avoid a conflict, either assign a solid hatch for Shrinkwrap Hatch, or do not use the Shrinkwrap and Section Hatch components simultaneously.

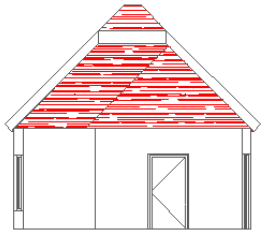
Surface Hatch Linework

The Surface Hatch Linework component draws all linework coming from surface hatches of the objects cut. Surface hatches appear in faces of the section object that are not cut by the section line. This component is specific to 2D sections.

NOTE Surface hatches that you have assigned to objects will display in a 3D section object. However, you cannot set them separately in a 3D section; you can do that only in a 2D section object.

The surface hatch linework component is controlled by the surface hatch component of the material. For information about the surface hatch component of the material, see Surface Hatch Material Component on page 587.

2D section with roof surface hatch

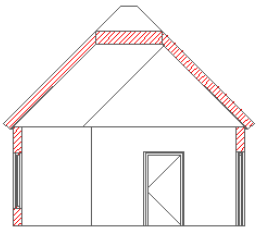


Section Hatch Linework

The Section Hatch Linework component draws all linework coming from section hatches. Section hatches appear on all faces that are cut by the section line. A section hatch is similar to a shrinkwrap hatch. The difference is that in a section hatch the sectioned faces are not merged into one shrinkwrap component. Use either a section hatch or a shrinkwrap hatch on a 2D section. For information on shrinkwrap hatches see Shrinkwrap Hatch on page 2162.

The Section Hatch Linework display component is specific to 2D section.

Section hatches on walls, roof and door



The Section Hatch Linework component is controlled by the Section Hatch component of the material. For information about the Section Hatch component of the material, see Creating a Hidden Line Projection on page 2215.

Hidden Component

The Hidden component contains all linework that is hidden in the 2D projection because other components are in front of it. By default, this component is turned off. You can use design rules to achieve special effects, such as a see-through effect, using the Hidden component. The Hidden component is specific to 2D sections.

The Hidden component cannot be defined by a material component. You can only set it in the display properties of the 2D section. For information on setting the display properties of a 2D section, see Creating a Hidden Line Projection on page 2215.

Erased Component

The Erased component contains linework in the section object that you do not want to see. For example, if you have a section of a multi-story building in which you want to hide the lines between each floor, you can edit the linework of the section and assign the floor lines to the Erased component. Since the Erased component is turned off by default, the floor lines do not display. For information on linework editing of a section, see Editing Linework in a 2D Section on page 2151.

The Erased component is specific to 2D sections.

The Erased component cannot be defined by a material component.

Subdivision Components

The subdivision components partition a section object. They are useful to create perspective effects, where parts closer to the viewer are drawn with darker, stronger lines and parts which are farther from the user are drawn with lighter, thinner lines. Subdivisions can have no individual material assignments. However the display properties of the subdivisions can be used for the surface hatching of the subdivisions by selecting “Use Subdivision Properties for Surface Hatching” in the Other tab of the 2D section display properties. For information on using the subdivision display properties to display the section divisions, see Use Subdivision Properties and Materials in 2D Section Styles on page 2165.

Subdivisions are a display component of both 2D and 3D section objects.

The subdivision components are either controlled by the 2D Section/Elevation Linework component of the material or by the 3D Body component of a material. For information how to switch between these component assignments, see Use the 3D Body Component of a Material for the 2D Section Linework on page 2165.

Use Subdivision Properties and Materials in 2D Section Styles

Use this procedure to use the display properties of materials together with the display properties of section subdivisions.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Display Properties tab.

3 Select the display representation in which to display the changes, and select Style Override.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab.

6 To set a subdivision to use the surface hatch of the material, while using the layer, color, and linetype display properties of the subdivision, perform the following steps:

- Clear By Material.
- Specify the layer, color and linetype settings of the subdivision as desired. For example, the first subdivision could have a darker color and stronger linetype the second subdivision.

7 Click the Other tab.

8 Select Use Subdivision properties for surface hatching.

9 Click OK twice.

For more information, see Updating a 2D or 3D Section on page 2153.

Use the 3D Body Component of a Material for the 2D Section Linework

Use this procedure to use the 3D Body component of a material for the linework in a 2D section.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Display Properties tab.

3 Select the display representation in which to display the changes, and select Style Override.

4 If necessary, click .

5 Click the Other tab.

6 Determine if the 3D body component of the selected material should control the display of the linework in the 2D section:

If you want to…	Then…
control the display of the 2D section linework by the 3D Body component of the material,	select Use 3D Body display component for By Material linework.
control the display of the 2D section linework by the 2D Section/Elevation Linework component of the material,	clear Use 3D Body display component for By Material linework. This is the default behavior.

7 Click OK twice.

For more information, see Updating a 2D or 3D Section on page 2153.

Adding a Design Rule to a 2D Section Style

Use this procedure to add a design rule to a 2D section style. A design rule has four fields of information that identify lines in the section and determine how to display them:

Field	Description
Color	Identifies the color of the objects in the building model represented by lines in the section.
Context	Identifies the context of the lines in the 2D section, such as on the defining line (the cutting plane) or in a graphic subdivision.
Component	Identifies the display component to which the lines are assigned.
Description	Contains a description of the design rule.

For example, a design rule has the color 50, a context of Within Subdivision 2, and a component of New. This rule assigns any lines in the section representing objects that have the color 50 in the building model and that are within subdivision 2 in the section to the user-defined display component, New.

You can also specify that all hidden linework that is not handled by a specific design rule will be assigned to the Hidden display component. You could use this option if you want to generate a section of an object or a set of objects and see all edges, for example, if you are creating foundations and formwork.

NOTE Alternatively, you can define which hidden linework should be displayed by object material. For more information, see Controlling the Display of Hidden Lines by Material on page 606.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Design Rules tab, and click Add.

A new design rule is created with default color, context, and component values.

3 Specify settings for the new design rule:

If you want to…	Then…
specify the color of objects in the building model that are affected by this rule	click the default color, select a new color, and click OK.
specify the context in which the linework for the objects appears in the section	click the default context, and select a new context.
select the display component for the linework	click the default component, and select a new component.
enter a description of the rule	click the Description field, enter a description, and press *ENTER*.

4 To place all hidden linework on the Hidden display component, select Keep all hidden linework.

5 Click OK.

6 Update the section to apply the style changes to the section.

For more information, see Updating a 2D or 3D Section on page 2153.

Changing a Design Rule in a 2D Section Style

Use this procedure to change the settings in the fields that define a design rule.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Design Rules tab.

3 Specify settings for the design rule you want to change:

If you want to…	Then…
specify the color of objects in the building model that are affected by this rule	click the current color, select a new color, and click OK.
specify the context in which the linework for the objects appears in the section	click the current context, and select a new context.
select the display component for the linework	click the current component, and select a new component.
edit the description of the rule	click the description, edit the description, and press *ENTER*.

4 Click OK.

5 Update the section to apply the style changes to the section.

For more information, see Updating a 2D or 3D Section on page 2153.

Removing a Design Rule from a 2D Section Style

Use this procedure to remove a design rule from a 2D section style.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Design Rules tab.

3 Select the rule that you want to remove, and click Remove.

4 Click OK.

5 Update the section to apply the style changes to the section.

For more information, see Updating a 2D or 3D Section on page 2153.

Adding Classifications to a 2D Section Style

Use this procedure to specify classifications for any classification definition applied to a 2D section style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to 2D section styles.

3 For each classification definition, select the classification you want to apply to the current 2D section style.

4 Click OK twice.

Changing the Layer, Color, and Linetype of a 2D Section Style

Use this procedure to change the following display properties of a 2D section style:

- Visibility (component is on or off)
- Display properties by materials
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE The custom display components in the display properties are identical to those listed on the Components tab of the 2D Section/Elevation Styles dialog box. For more information about custom display components, see Adding a Display Component to a 2D Section Style on page 2159.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the Display Properties tab.

3 Select the display representation in which to display the changes, and select Style Override.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab.

6 Select the component to change, and select a different setting for the property.

7 Select By Material for any component that you want to use the display properties of the materials assigned to the sectioned objects.

NOTE Not all display components of a 2D section have an associated material definition. For example, Hidden and Erased cannot be set by material. For a list of all display components and their associated material components, see About 2D and 3D Section Display Components and Materials on page 2160.

8 Click OK twice.

Attaching Notes and Files to a 2D Section Style

Use this procedure to enter notes and attach reference files to a 2D section style. You can also edit reference files attached to the style.

1 Select a section that has the style you want to change, and click 2D Section/Elevation tab ➤ General panel ➤ Edit Style drop-down ➤ Edit Style .

2 Click the General tab.

3 To add a description to the 2D section, enter the description under Description.

4 Click Notes.

5 To add or edit a note, click the Notes tab, and enter the note.

6 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

7 Click OK twice.

Elevations

40

You can create elevations of the building models in your drawings by first drawing an elevation line and mark, and then creating a 2D or 3D elevation based on that line. You can control the size and shape of any elevation that you create, and you can update an existing elevation when the objects included in the elevation are modified. 2D elevations are created with hidden and overlapping lines removed. You can control the appearance of 2D elevations by applying rules that are controlled by the style and display properties of the 2D elevation.

Working With Elevations

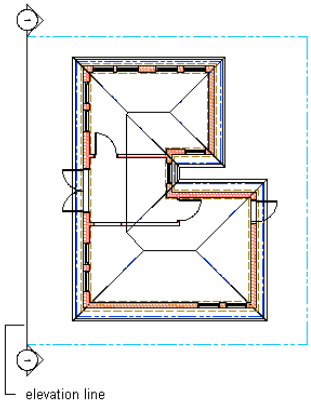
You can create elevations of the building models in your drawings by first drawing an elevation line and mark, and then creating a 2D or 3D elevation based on that line. You can control the size and shape of any elevation that you create, and you can update an existing elevation when the objects included in the elevation are modified. 2D elevations are created with hidden and overlapping lines removed. You can control the appearance of 2D elevations by applying rules that are controlled by the style and display properties of the 2D elevation.

Elevation Line and Marks

The elevation line defines the extents of the elevation view of your building model. Elevation lines can be straight or jogged. You can also specify the length and the height of the area defined by the elevation line. Elevation marks, which typically contain a letter or number and indicate the direction of the elevation, appear at each end of the elevation line.

After you draw the elevation line, you create an elevation object from the line.

Viewing the elevation line and mark



2D Elevations

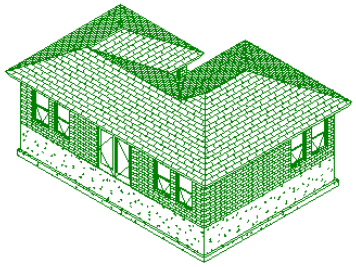
2D elevations are created by drawing an elevation line in front of a number of objects and then creating a 2D elevation object from them. The elevation object is drawn without hidden and overlapping lines. You can edit a 2D elevation by changing its object display properties or its style display properties. The 2D elevation style lets you add display components to the display representation of the elevation and create rules that assign different parts of the elevation to different display components. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each component. You can also assign a material, such as a brick or concrete hatch, to individual components of the object or the style. Furthermore, you can use linework editing commands to assign individual lines in a 2D elevation to different display components, and merge geometry into a 2D elevation. You can dimension 2D elevations.

2D building elevation

3D Elevations

3D elevations are created by drawing an elevation line in front of a number of objects and then creating a 3D isometric elevation object from them. 3D elevations do not use styles. However, you can control the display of subdivisions within 3D elevations. Using the Hidden Line Projection command, you can create 2D hidden line projections of any view of the 3D elevation that you can explode and edit or hatch. For more information about using this command, see Creating a Hidden Line Projection on page 2215.

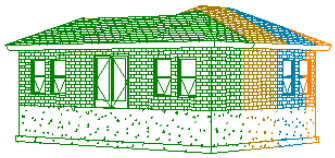
3D elevation in 3D view



Elevation Subdivisions

A 2D or 3D elevation object can have a number of subdivisions partitioning the elevation object. This feature is useful when you want to create a perspective view of the object, in which the parts that are closer to the viewer are drawn with darker and stronger lines, and parts that are farther off are drawn lighter.

3D elevation with subdivisions in perspective view



Live Section View

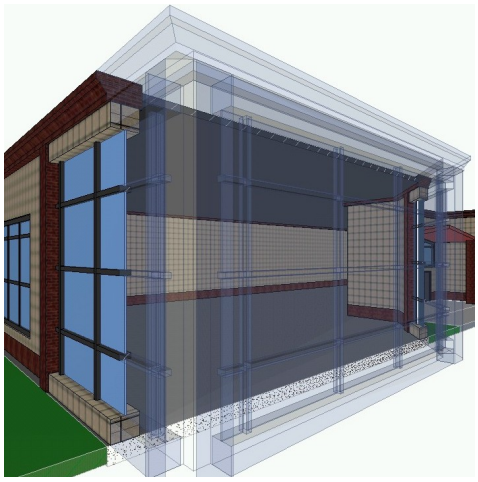
A live section view is a special view of a 3D section where the objects that are sectioned are not converted to a 3D section object, but remain in the drawing as objects. The parts of the objects within the bounding box of the section line keep their individual display components while the parts of the objects outside of the section line can be displayed or hidden. To control the appearance of the object parts outside of the section line, you need to assign a material to the sectioned objects.

When you render a live section, you can show the outside part as a half-transparent addition, for example.

You can use the live section view in an elevation in order to clip out just the region you need momentarily and to focus on that specific area. This can accelerate performance and make working with the building model easier.

For information on creating live section views, see Creating a Live Section View on page 2140.

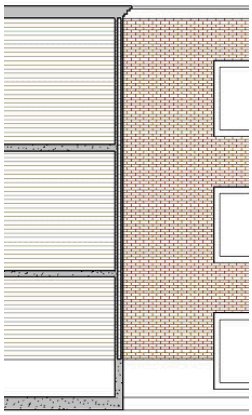
Rendered live section view with transparent body component



Materials in Elevations

In AutoCAD Architecture, you can assign materials to different components of an object. These materials are displayed when you create a 2D or 3D elevation object. You can specify whether to use the display properties of the materials or the display properties of the elevation object.

2D elevation with different surface hatches

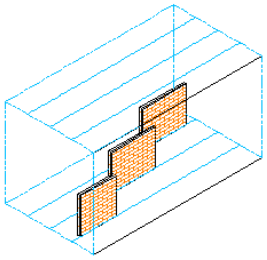


AutoCAD Architecture provides a large number of predefined materials for all common design purposes. You can use these predefined materials or modify them to your special designs. You can also create your own materials. For more information, see About 2D and 3D Elevation Display Components and Materials on page 2206.

Subdivisions in 2D Elevation Styles and Materials

When you are creating subdivisions in your style, you usually want the objects in them to be visually distinct from other subdivisions. When you have assigned materials to the objects, you can set the 2D elevation style so that it uses the hatch pattern from the material, but uses the color and linetype from the subdivision display properties.

Elevation subdivisions with assigned surface hatching



Three brick walls
in different elevation
subdivisions

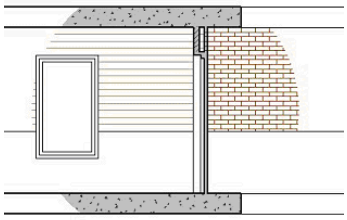
2D elevation surface hatch
from material, color and
linetype from subdivisions

For more information see Use Subdivision Properties and Materials in 2D Elevation Styles on page 2209.

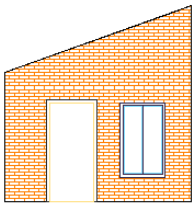
Material Boundaries in 2D Elevations

Material boundaries allow you to erase or limit portions of a 2D elevation:

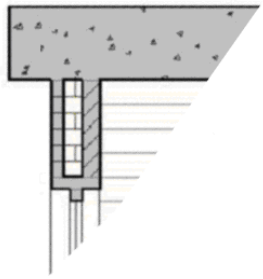
- Limit the amount of hatching to produce cleaner construction documents.
- Highlight a region in an elevation.



- Mask out a portion of an elevation so that more detail can be drawn.

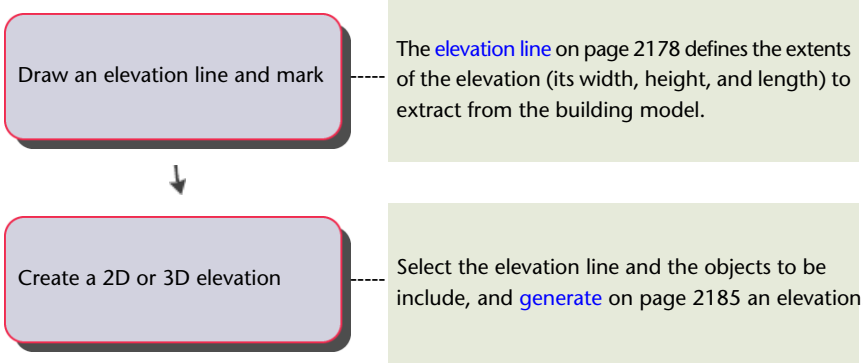


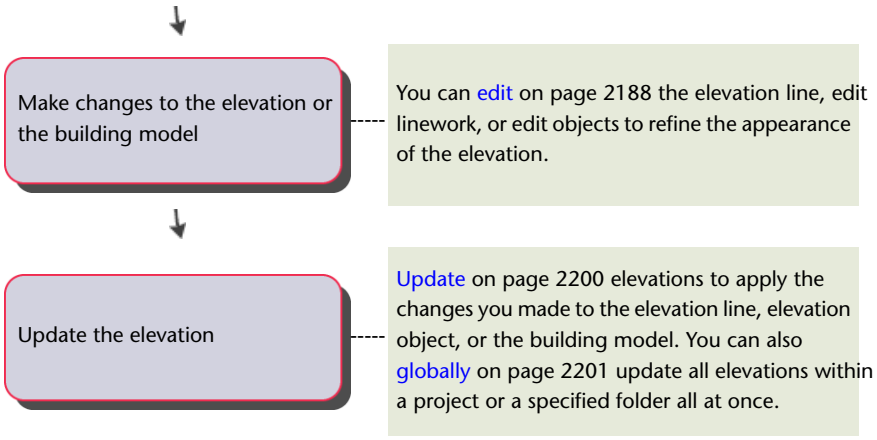
- Crop an irregular-shaped portion of an elevation.



For more information, see Creating a Material Boundary in a 2D Elevation on page 2194.

Workflow to Create a 2D or 3D Elevation





Drawing and Editing Elevation Lines

The first step in creating elevations is to draw an elevation line relative to your building model. The elevation line defines the extents of the elevation view of the building model.

NOTE You can create vertical elevations and horizontal elevations.

Creating an Elevation Object from an Elevation Line

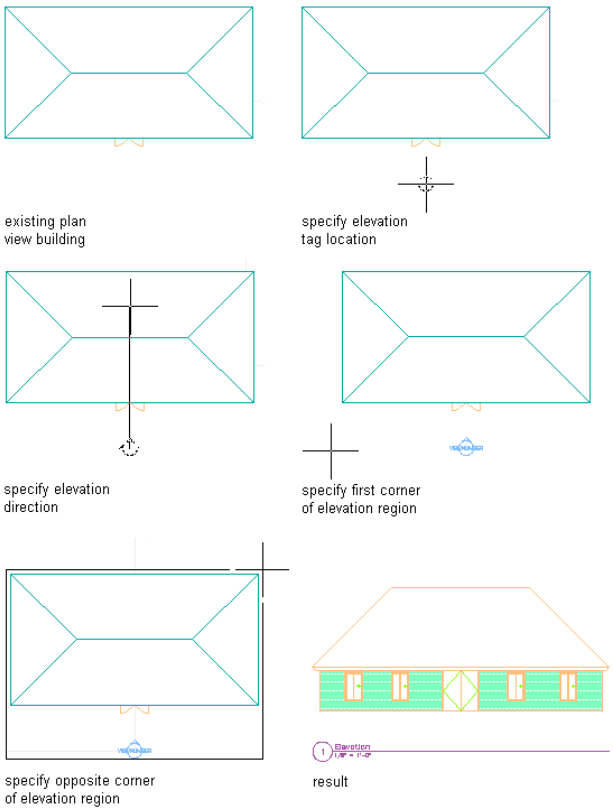
When you generate an elevation from an elevation line, you specify the type of elevation object that is created.

When you create…	The result is…
a 2D elevation object	an orthographic projection from the building model.
a 3D elevation object	the area of the building model defined in the elevation line.

Viewing the Elevation Line

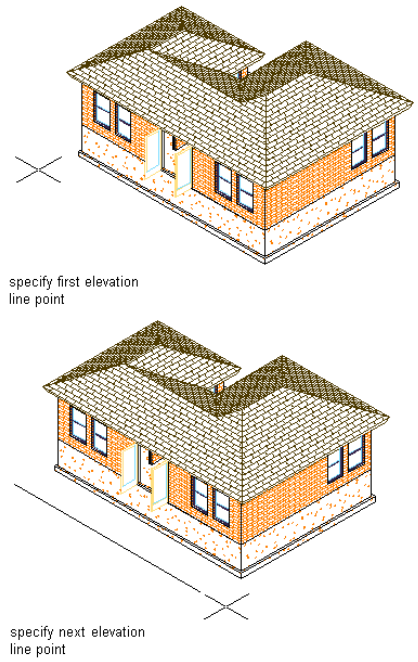
In plan view, the elevation line is displayed as you would expect on a construction document.

Creating an Elevation

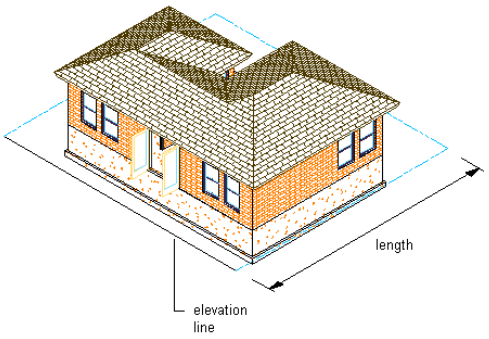


In an isometric view, the same elevation line is displayed with a boundary that defines the depth of elevation view.

Drawing an elevation line in 3D view



Resulting elevation line in 3D view



Changing the Elevation Line

You can change the elevation line to control the elevation that you create. Using the elevation line's grips, you can change the height and shape of the elevation. You can also add a lower extension to the elevation and create elevation subdivisions.

You can change elevation line properties before you create an elevation. You can also change elevation line properties and update an elevation that you have already created. For more information about updating existing elevations, see Updating a 2D or 3D Elevation on page 2200.

Using Subdivisions in Elevations

You can set up graphic subdivisions in elevation line properties. These subdivisions are then added to the 2D or 3D elevation you create. Subdivisions are specified at distances from the elevation line. You can control the lineweight and other display properties of subdivisions to add levels of depth to elevations. For example, you can display one subdivision with a heavy lineweight and another subdivision with a lighter lineweight to suggest that the first subdivision is in front of the second subdivision.

Drawing an Elevation Line and Mark

Use this procedure to draw an elevation line with an elevation mark at each end. You draw an elevation line by specifying a start point and an endpoint for the line in relation to your building model.

NOTE If you are working with a drawing set in which several xrefs are linked to a main drawing, draw your elevation line in the main drawing.

TIP You can also create elevations with Callout tools. For more information, see Placing Elevation Callouts on page 2440.

1 Click Home tab ➤ Section & Elevation panel ➤ Elevation Line .

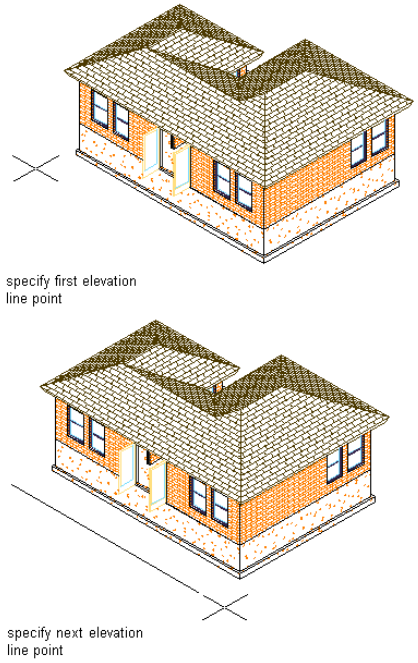
2 Specify the elevation line start point.

NOTE Specify the start point and endpoint for the elevation line so that it extends past the face or segment of your building model view, thus ensuring that all objects are included in the elevation view.

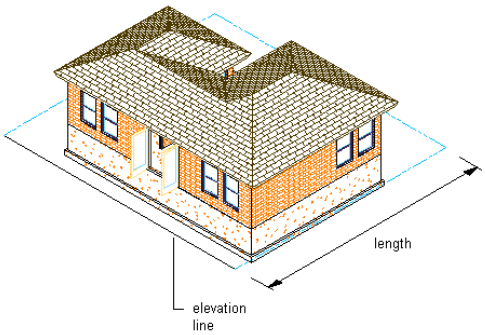
3 Specify the elevation line endpoint.

The elevation line is displayed in your drawing with an elevation mark. The elevation line boundary is drawn using the elevation line as its left side and forming a box with the elevation line. This is the area that defines the elevation.

Drawing an elevation line in 3D view



Drawing an elevation line in 3D view



Depending on the direction in which you drew the elevation line, the elevation mark points in the direction of the elevation view.

The elevation mark is a multi-view block, anchored to the elevation line. You can edit the elevation mark to change the information that is displayed in the bubble. For more information, see Changing Elevation Mark Attributes on page 2183.

Once you have an elevation line in your drawing, you can change the properties of the line to change the elevation.

Changing the Height of an Elevation Using Grips

Use this procedure to change the height of any elevation connected to the elevation line. You can change the height of the elevation line before or after you create a connected elevation. If you change the height after creating the elevation, you need to update the elevation to show the changes.

You can also change the height of an elevation using the Properties palette.

1 On the floating View panel, click View drop-down ➤ SW isometric .

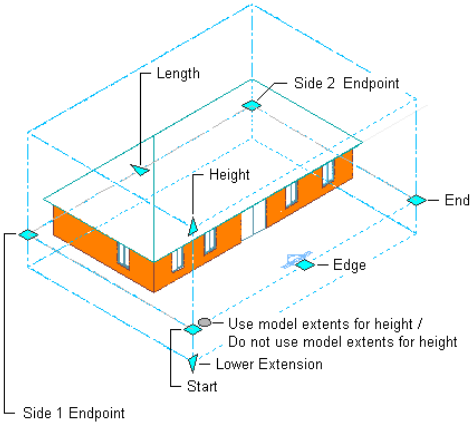
2 Select the elevation line you want to change.

3 Select the Model Extents grip to turn off model extents mode.

If you use model extents for height, the height of the elevation is determined by the height of the objects in the elevation and is not available to modify dynamically.

4 Select the Height grip.

Viewing Elevation Grips in 3D View



5 Move the grip until the height value you want is displayed, and then click once, or enter a value.

The objects are cut at this height when you create or update an elevation.

6 Right-click, and click Deselect All to turn off grips.

To update an elevation created from this elevation line, see Updating a 2D or 3D Elevation on page 2200.

Changing the Lower Extension of an Elevation Using Grips

Use this procedure to change the lower extension of any elevation connected to the elevation line. You can change the lower extension of the elevation line before or after you create a connected elevation. If you change the lower extension after creating the elevation, you need to update the elevation to show the changes.

You can also change the lower extension of an elevation using the Properties palette.

1 On the floating View panel, click View drop-down ➤ SW isometric .

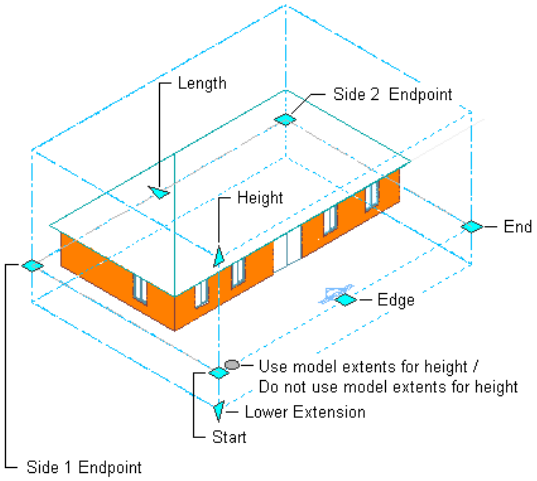
2 Select the elevation line you want to change.

3 Select the Model Extents grip to turn off model extents for height mode.

If you use model extents, the default for the lower elevation is 1 foot below the *XY* plane.

4 Select the Lower Extension grip.

Viewing Elevation Grips in 3D View



5 Move the grip until the lower extension value you want is displayed, and click once; or enter a value.

6 Right-click, and click Deselect All to turn off grips.

To update an elevation created from this elevation line, see Updating a 2D or 3D Elevation on page 2200.

Changing the Length of an Elevation Using Grips

Use this procedure to change the length of any elevation boundary connected to the elevation line. You can change the length of the elevation as a whole, or you can change the length of the sides of the elevation boundary individually.

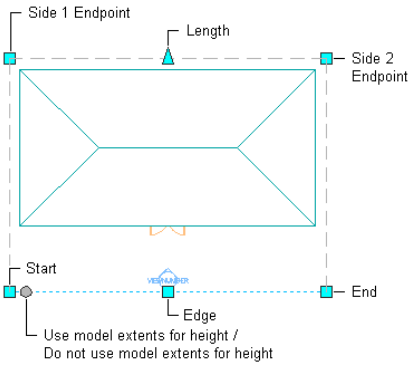
You can change the length of the elevation boundary before or after you create a connected elevation. If you change the length after creating the elevation, you need to update the elevation to show the changes.

You can also define the depth of an elevation (its length) by changing the length of the sides of an elevation boundary on the Properties palette.

1 Select the elevation line you want to change.

2 Select the Length grip.

View Elevation Grips in Plan View



3 Move the grip until the length value you want is displayed, and click once.

The entire elevation boundary length is updated.

4 To change the length of side 1 of the elevation boundary, click the Side 1 Endpoint grip.

   Side 1 starts from the first point specified for the elevation line.

5 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

6 To change the length of side 2 of the elevation boundary, click the Side 2 Endpoint grip.

   Side 2 starts from the endpoint of the elevation line.

7 Move the grip to the desired location, and click once; or enter a value on the command line, and press *ENTER*.

8 Right-click, and click Deselect All to turn off grips.

To update an elevation created from this elevation line, see Updating a 2D or 3D Elevation on page 2200.

Changing the Angle Dimensions of an Elevation

Use this procedure to change the angle of the sides of the building elevation boundary. You can change the angle dimensions before or after you create a connected elevation. If you change the angles after creating the elevation, you need to update the elevation to show the changes.

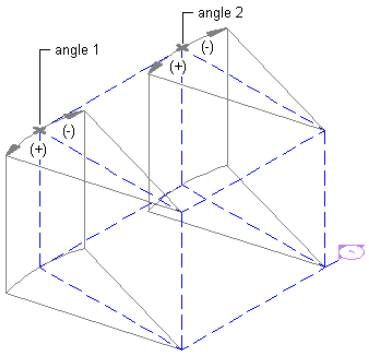
1 Double-click the elevation line you want to change.

2 On the Properties palette, expand Basic, and expand Component Dimensions.

3 Specify values for Angle 1 and Angle 2.

   These values define the angles of the two sides from the elevation line to create the elevation box. The apex of Angle 1 is the start point of the elevation line. The apex of Angle 2 is the endpoint of the elevation line. Values for these angles must be between 0 and 90 degrees.

   Specifying section angle parameters



4 Right-click, and click Deselect All to turn off grips.

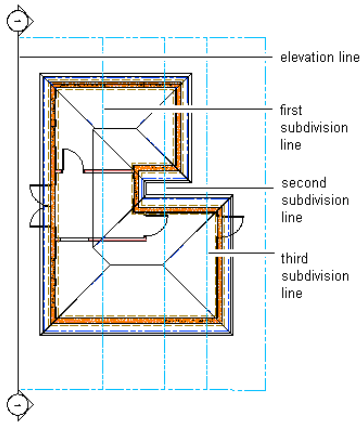
To update an elevation created from this elevation line, see Updating a 2D or 3D Elevation on page 2200.

Creating Graphic Subdivisions for 2D and 3D Elevations

Use this procedure to define subdivisions that are created within the elevation when you generate it. Each subdivision is specified as a distance from elevation line.

You can view the location of a subdivision by viewing the elevation line with its boundary in an isometric view. In this view, you can use grips to relocate a subdivision.

An elevation line with graphic subdivisions



You can control the lineweight and other display properties of the subdivisions to add different levels of depth to elevation.

1. Double-click the elevation line you want to change.
2. On the Properties palette, expand Basic, and expand Dimensions.
3. Click the setting for Subdivisions, and then add or modify subdivisions:

If you want to…	Then…
create a subdivision	click . To change the default distance from the elevation line, select the subdivision, click the value, and enter a new value.
change the length of a subdivision	select the subdivision, click its value, and enter a new value.
delete a subdivision	select the subdivision, and click .

4. Click OK.

Changing Elevation Mark Attributes

Use this procedure to change the information displayed in the elevation mark. The elevation mark is a multi-view block.

1. Double-click the elevation mark you want to change.
2. On the Properties palette, expand Advanced.
3. Click Attributes.
4. Select the existing attribute under Value, and enter the new information to include in the bubble.
5. Click OK.

Changing the Location of an Elevation Line

Use this procedure to relocate an elevation line by changing the coordinate values of its insertion point. The elevation line also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the elevation line are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can

change the orientation of the elevation line by aligning its normal with another axis. You can also rotate the elevation line on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use World and User Coordinate Systems in 3D" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

1. Double-click the elevation line you want to relocate.
2. On the Properties palette, expand Basic, and expand Location.
3. Click Additional Information.
4. Specify the location of the elevation line:

If you want to…	Then…
relocate the elevation line	enter new coordinate values under Insertion Point.
locate the elevation line on the *XY* plane	make the normal of the elevation line parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the elevation line on the *YZ* plane	make the normal of the elevation line parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the elevation line on the *XZ* plane	make the normal of the elevation line parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the elevation line	enter a new value for Rotation Angle.

5. Click OK.

To update an existing elevation created from this elevation line, see Updating a 2D or 3D Elevation on page 2200.

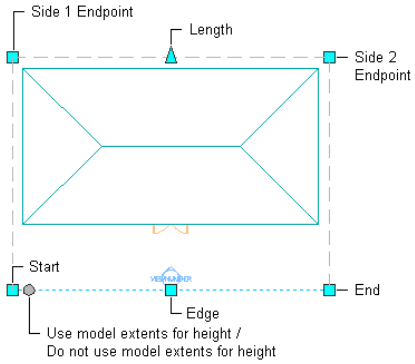
Modifying an Elevation Line Using Grips

Use this procedure to change the start point, end point, or edge of an elevation line. You can drag the grip to the desired location, or you can enter a specific value for the measurement.

1. Select the elevation line you want to change.
2. Select an elevation line grip and move it to the desired location.

   You can also move the grip in the desired direction and enter a specific value on the command line.

View Elevation Grips in Plan View



3 Right-click, and click Deselect All to turn off grips.

Attaching Hyperlinks, Notes and Files to an Elevation Line

Use this procedure to add hyperlinks, enter notes and attach reference files to an elevation line. You can also edit notes and edit or detach reference files from an elevation line.

1 Double-click the elevation line you want to attach notes or files to.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.

4 To add a note, click next to Notes, enter text, and click OK.

5 Click next to Reference documents, and then attach, detach, or edit a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Creating a 2D or 3D Elevation

Use this procedure to create a 2D or 3D elevation. After you draw an elevation line, you extract an elevation from the elevation line and the objects you select in the building model.

When you create a 2D elevation, the object that is created is a 2D Section/Elevation object. Both 2D sections and elevations share the same object type and style.

TIP Before you create an elevation, thaw and turn on all layers of objects in the building model that you want to include in the elevation. Objects on layers that are off or frozen cannot be part of the selection set for the elevation. To speed performance, turn off the layers of the objects that you do not need to include in the elevation.

1 Draw an elevation line in the drawing.

For more information, see Drawing an Elevation Line and Mark on page 2178.

2 Select the elevation line.

3 Click Building Elevation Line tab ➤ Modify panel ➤ Generate Elevation .

4 Select the type of elevation object you want to create:

If you want to create…	Then…
a 2D elevation	select 2D Section/Elevation Object with Hidden Line Removal.
a 3D elevation	select 3D Section/Elevation Object.

5 For Style to Generate, select a style for a 2D elevation.

If you want to use a particular style, select it from Style to Generate. Otherwise, use the Standard style. For more information, see 2D Elevation Styles on page 2203.

3D elevations do not use styles.

6 Under Selection Set, click (Select Objects), select the objects that you want to include in the elevation, and press *ENTER*.

NOTE If you select an object that you do not want to include in the elevation, press and hold *SHIFT* and select the object again to remove it from the selection set.

7 Under Display Set, select a display set for the elevation object.

The display set controls the representation of the elevation.

8 Under Placement, select New Object, and specify where to place the elevation:

If you want to…	Then…
specify a location graphically	click (Pick Point), and specify the location for the new elevation object in the drawing.
specify the coordinates of the insertion point for the elevation	enter *X*, *Y*, and *Z* coordinates for the location of the new elevation object.

9 Click OK.

A 2D or 3D elevation is created from the elevation line properties and the selected objects in the building model. The elevation is linked to the building model. If you make changes to the building model after you create the elevation, you can update the elevation to reflect the changes. For more information, see Updating a 2D or 3D Elevation on page 2200.

You can edit certain characteristics of the elevation to control its placement and appearance. For more information, see Editing a 2D or 3D Elevation on page 2188.

You can also use a 2D section/elevation style to control the display of selected objects in a 2D elevation, and you can control the display of individual lines in a 2D elevation. For more information, see 2D Elevation Styles on page 2203 and Editing and Merging Linework in a 2D Elevation on page 2197.

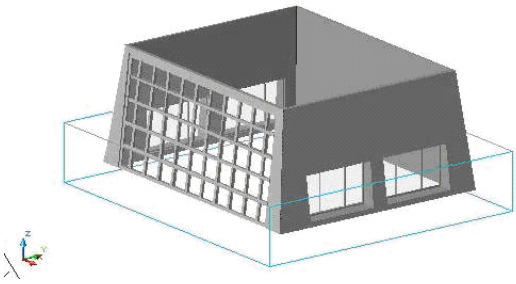
Creating a Horizontal 2D Elevation

Use this procedure to create a horizontal section or elevation of a plan view.

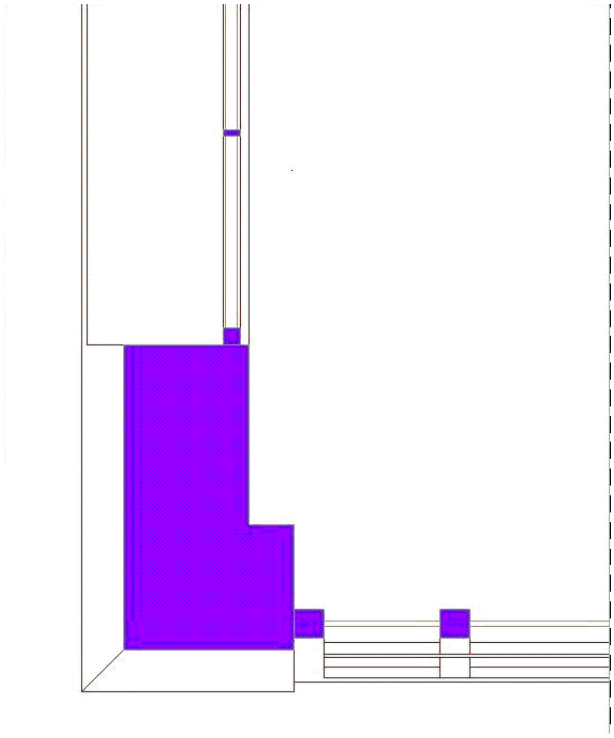
The Hidden Line control available in AutoCAD Architecture makes it possible to create horizontal sections and elevations of Plan views. With a horizontal section or elevation, you can look “down” on the model. Previously, users could achieve that effect only by manually changing the UCS. Now, a tool enables you to create a horizontal section or elevation. This feature could be useful for creating a detailed display of sill components in tapered walls.

The illustration below displays a horizontal section line for an irregularly shaped building.

Horizontal elevation line



The illustration below displays the view results. Note the sill displays of the tapered walls and the correct representation of the sloped curtain walls.



1 Click Home tab ➤ Section & Elevation panel ➤ Horizontal Section .

NOTE Alternatively, on the default tool palette set, click the Design tab, and then click the Horizontal Section tool. If necessary, scroll the palette to display the tool that you need.

2 Specify the first point of the elevation plane.

3 Specify the second corner of the elevation plane.

4 Specify the elevation of the plane, and press ENTER.

5 Specify the depth of the elevation, and press ENTER.

6 Proceed with creating the elevation, as described in Creating a 2D or 3D Elevation on page 2185.

Editing a 2D or 3D Elevation

After you create an elevation, you can edit the elevation line and the elevation object to refine the appearance of the elevation in any of the following ways:

- Edit the elevation line to add, remove, or modify graphic subdivisions.
- Display a different area of the building model by reversing the elevation.
- Place the elevation in a different location in the drawing.
- Add notes or reference files to the elevation.
- Select a different style for 2D elevations. An elevation style determines how the linework in a 2D elevation is displayed.
- Edit a 2D elevation object to change the display properties of selected linework or to add linework and details that are not part of the building model.

In addition, you can continue to modify the building model, updating the elevation later to incorporate the changes.

For information about switching from a view other than an elevation to a temporary elevation view to edit objects, see Editing Objects in a Temporary Elevation View on page 749.

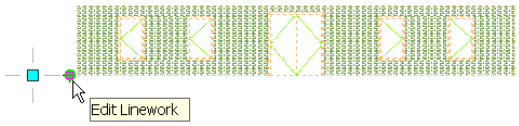
Using Grips to Edit Linework in a 2D Elevation

Use this procedure to edit linework in a 2D elevation. You can assign selected linework to fixed display components that determine the display of every elevation that you generate, or you can assign linework to display components that you have defined. After you assign linework to display components, you can change the display properties (visibility, color, layer, lineweight, linetype, and linetype scale) to change the display of lines.

For information about adding custom display components, see Adding a Display Component to a 2D Elevation Style on page 2205.

1 Select the elevation.

2 Select the Edit Linework grip.



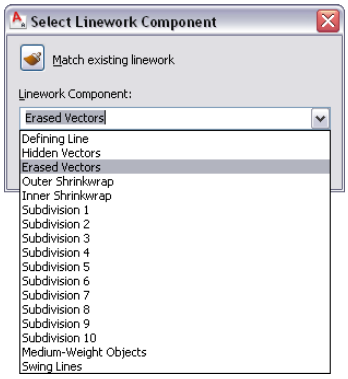
The Edit In Place tab opens.

3 Click Edit In Place tab ➤ Profile panel ➤ Zoom To to zoom to the elevation.

4 Select the linework to edit.

5 Click Edit In Place tab ➤ Profile panel ➤ Modify Component .

6 Select the component you want to put the lines on. For example, if you want to make the lines invisible, select Erased Vectors for Linework Component.



You can also click (Match existing linework), and select linework in the elevation whose display component you want to match.

7 Click OK.

8 To finish the linework editing process, click Edit In Place tab ➤ Edits panel ➤ Finish to save all changes, or click Edit In Place tab ➤ Edits panel ➤ Cancel to discard them and exit the edit-in-place session.

Changing the Display of Graphic Subdivisions in a 2D Elevation

Use this procedure to change the display of subdivisions in a 2D elevation by changing its display properties.

You create subdivisions by adding them to the elevation line. You can then change their length using grips or by editing the values in the elevation line properties. For more information, see Creating Graphic Subdivisions for 2D and 3D Elevations on page 2182.

Each subdivision in a 2D elevation is assigned to a numbered subdivision display component in the display properties of the elevation or the 2D elevation style. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each subdivision by changing the display properties of each component. You can apply these changes to the selected elevation, to the current 2D section/elevation style, or to all 2D sections and elevations in the drawing that do not have a style override.

You can use the display properties of a subdivision together with the display properties of a material. For more information, see Use Subdivision Properties and Materials in 2D Elevation Styles on page 2209.

1 Select the 2D elevation in the drawing, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the property source to edit:

If you want to edit graphic subdivisions…	Then…
for all 2D sections and elevations in the current drawing (except those that have a 2D Section/Elevation Style override)	select Drawing Default.
for all 2D sections and elevations that use the current style	select 2D Section/Elevation Style, and click Object Override.
for the selected 2D elevation	Select 2D Section/Elevation, and click Object Override.

4 If necessary, click .

5 Click the Layer/Color/Linetype tab to list all the components that contribute to the display of the object.

6 Turn the visibility on or off, and change the layer, color, linetype, lineweight, or linetype scale as needed for each subdivision component.

7 Click the Other tab to add a custom display component to the display of the 2D elevation.

For more information about adding custom display components, see Adding a Display Component to a 2D Elevation Style on page 2205.

8 Click OK twice.

Changing the Display of Graphic Subdivisions in a 3D Elevation

Use this procedure to change the display of subdivisions in a 3D elevation by changing its display properties.

You create the subdivisions by adding them to the elevation line. You can then change their length using grips or by editing the values in the elevation line properties. For more information, see Creating Graphic Subdivisions for 2D and 3D Elevations on page 2182.

Each subdivision in a 3D elevation is assigned to a numbered subdivision display component in the display properties of the elevation. You can control the visibility, layer, color, linetype, lineweight, and linetype scale of each subdivision by changing the display properties of each component. You can apply these changes to the selected 3D elevation or to all 3D elevations in the drawing.

1 Select the 3D elevation in the drawing, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the Subdivisions display representation.

4 Select the property source to edit:

If you want to edit graphic subdivisions…	Then…
for all 3D elevations in the current drawing	select Drawing Default.
for the selected 3D elevation	select Bldg Section, and click Object Override.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab to list all the components that contribute to the display of the object.

The defining line represents the cutting plane of the elevation line. The numbered subdivision components correspond to subdivisions added to the elevation line. For example, the display component Subdivision 1 corresponds to the subdivision closest to, but not on, the cutting plane of the elevation line.

7 Turn the visibility on or off, and change the layer, color, linetype, lineweight, or lineweight scale as needed for each subdivision component.

8 Click OK twice.

Reversing a 2D or 3D Elevation

Use this procedure to reverse the direction of an elevation by reversing the elevation line and updating the elevation.

The direction of the elevation is determined by the direction in which you drew the elevation line. You can select the elevation line in plan view to see the bounding box that defines the area of the model included in the elevation. If the box does not include the area of the model that you intended, you can reverse the elevation line. If you have already created an elevation from the elevation line, update the elevation after reversing the elevation line.

1 Select the elevation line that you used to create the elevation.

2 Click Building Elevation Line tab ➤ Modify panel ➤ Reverse .

The elevation line is mirrored about its own axis, as is the bounding box with its original parameters.

3 Select the existing elevation.

4 Click 2D or 3D Section/Elevation tab ➤ Modify panel ➤ Regenerate .

NOTE For a 2D elevation, if you do not need to respecify the objects to include in the elevation, you can click 2D Section/Elevation tab ➤ Modify panel ➤ Refresh instead of Regenerate. This immediately updates the elevation.

5 If you need to include different objects in the updated elevation, click (Reselect Objects), select the objects, and press *ENTER*.

6 Click OK.

Changing the Style of a 2D Elevation

Use this procedure to select a different style for a 2D elevation. A 2D section/elevation style controls the appearance of any 2D elevation object to which the style is applied.

1 Double-click the elevation you want to change.

2 On the Properties palette, expand Basic, and expand General.

3 Select a new style for the elevation.

Adding and Removing Custom Components for an Elevation

Use this procedure to add or remove custom display components for an elevation.

1 Double-click the elevation.

2 On the Properties palette, click the Display tab.

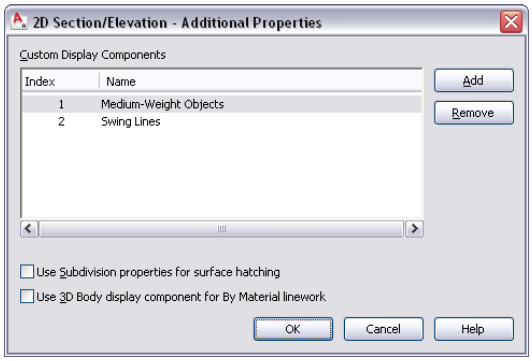
3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all elevations in the drawing, select Drawing default setting. To apply changes to all elevations of this style, select Elevation Style:<style name>. For more information on styles, see 2D Elevation Styles on page 2203.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 Click Additional Properties.



7 Add or remove components or edit component names:

If you want to…	Then…
add a new component	click Add, double-click the Unnamed entry, and enter a name for the new component.
remove an existing component	select the component, and click Remove.
edit the name of an existing component	double-click the component name, and edit it as needed.

8 When you are finished working with the Custom Display Components list, click OK. To specify display properties for a component you have added, click the value (*NONE*) for Display component, select the component, and then adjust the default settings under Component Display Properties as needed.

You can also access and modify these same additional settings through the elevation's context menu, as follows:

1 Select the elevation, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 Select the display representation where you want the changes to appear, and select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 In the Display Properties dialog, click the Other tab, and then change the settings as needed.

6 To specify display properties for any component you add, click the Layer/Color/Linetype tab, select the component, and change the column values as needed.

7 Click OK twice.

Specifying the Display of Surface Hatching for an Elevation Subdivision

Use this procedure to specify whether the surface hatching for an elevation subdivision is determined by the display properties of the subdivision component or those of the Surface Hatch Linework component.

1 Double-click the elevation.

2 On the Properties palette, click the Display tab.

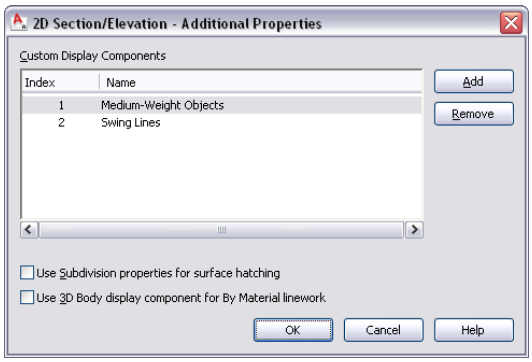
3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all elevations in the drawing, select Drawing default setting. To apply changes to all elevations of this style, select Elevation Style:<style name>. For more information on styles, see 2D Elevation Styles on page 2203.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 Click Additional properties.



7 Specify which properties to use for surface hatching:

If you want to use the display properties of…	Then…
the subdivision component	select Use Subdivision properties for surface hatching.
the Surface Hatching Linework component	clear Use Subdivision properties for surface hatching.

8 Click OK.

9 If you cleared the Use Subdivision properties for surface hatching option, the display is now controlled by the By material property of the Surface Hatching Linework component. To change this setting, click the value (*NONE*) for Display component, select the Surface Hatching Linework component, and then select a different value for By material.

You can also access the Use Subdivision properties for surface hatching option through the elevation's context menu, as follows:

1 Select the elevation, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 For the General display representation, select Object Override.

4 If necessary, click .

5 In the Display Properties dialog, click the Other tab, and then select or deselect this option as desired.

6 Click OK twice.

Specifying the Display of 2D Linework for an Elevation

Use this procedure to specify whether to use the 3D Body display component of a material for the linework in a 2D elevation.

1 Double-click the elevation.

2 On the Properties palette, click the Display tab.

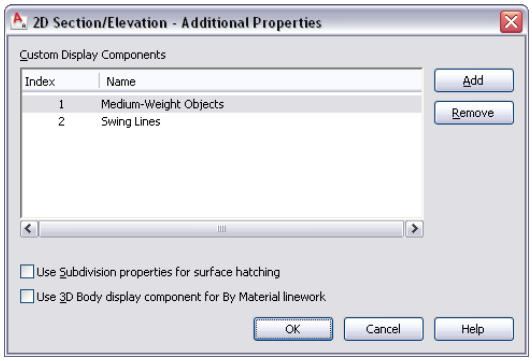
3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all elevations in the drawing, select Drawing default setting. To apply changes to all elevations of this style, select Elevation Style:<style name>. For more information on styles, see 2D Elevation Styles on page 2203.

5 If necessary, expand Object Display Properties ➤ Advanced.

6 Click Additional properties.



7 Select or deselect Use 3D Body display component for By Material linework.

8 Click OK.

You can also access this option through the elevation's context menu, as follows:

1 Select the elevation, right-click, and click Edit Object Display.

2 In the Object Display dialog, click the Display Properties tab.

3 For the General display representation, select Object Override.

4 If necessary, click .

5 In the Display Properties dialog, click the Other tab, and then select or deselect this option as desired.

6 Click OK twice.

Creating a Material Boundary in a 2D Elevation

Use this procedure to create a material boundary in a 2D elevation.

1 Draw a polyline around the area in the elevation that you want to mask or to highlight.

2 Select the elevation.

3 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Add .

4 Select the polyline.

5 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

6 Specify the settings of the material boundary:

If you want to…	Then…
highlight the area inside the polyline	select Limit for Purpose.
mask (erase) the area inside the polyline	select Erase for Purpose.

If you want to…	Then…
apply the highlight or mask only to specific parts of the elevation	select the appropriate parts for Apply to. You can choose Surface Hatch, Edge Linework, and All Linework.
apply the material boundary to all materials used in the elevation	select All Materials for Material Selection.
apply the material boundary only to selected materials	select Specific Materials for Material Selection and then select the appropriate materials in the list below.

7 Click OK.

Editing a Material Boundary

You can edit existing material boundaries in two ways:

- Change the content within the material boundary. For example, you can determine of you want to see only brick hatching, or both brick and glass hatching.
- Change the shape of the material boundary. For example, you can make the boundary bigger or smaller, or add additional rings and vertex points to it.

Editing the Content of a Material Boundary

Use this procedure to change the content of a material boundary. The content includes such settings as materials displayed, hatch types, and boundary type.

1 Select a 2D elevation.

2 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .
The material boundary is highlighted and edit-in-place grips are displayed.

3 Click Edit In Place tab ➤ Profile panel ➤ Edit Material Boundary .

4 Specify the content of the material boundary:

If you want to…	Then…
highlight the area inside the boundary	select Limit for Purpose.
mask (erase) the area inside the boundary	select Erase for Purpose.
apply the highlight or mask only to specific parts of the elevation	select the appropriate parts for Apply to. You can choose Surface Hatch, Edge Linework, and All Linework.
apply the material boundary to all materials used in the elevation	select All Materials for Material Selection.
apply the material boundary only to selected materials	select Specific Materials for Material Selection, and then select the appropriate materials from the list below.

5 Click OK.

6 Click Edit In Place tab ➤ Edits panel ➤ Finish to save the changes you made, or click Edit In Place tab ➤ Edits panel ➤ Cancel to undo them.

Adding a Vertex to a Material Boundary

Use this procedure to add a vertex to a material boundary.

1 Select the elevation to which the material boundary has been assigned.

2 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place.
The material boundary is highlighted and edit-in-place grips are displayed.

3 Right-click, and click Add Vertex.

4 Specify the point at which to add a vertex.

5 Specify additional vertex points.

6 Press *ENTER*.

7 Select the material boundary again, right-click, and click Save Changes to save the changes you made, or click Discard All Changes to undo the changes to the material boundary.

Removing a Vertex from a Material Boundary

Use this procedure to remove a vertex from a material boundary.

1 Select the elevation to which the material boundary has been assigned.

2 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place.
The material boundary is highlighted and edit-in-place grips are displayed.

3 Right-click, and click Remove Vertex.

4 Specify the vertex points to remove.

5 Remove additional vertex points as needed.

6 Press *ENTER*.

7 Select the material boundary again, right-click, and click Save Changes to save the changes you made, or click Discard All Changes to undo the changes to the material boundary.

Adding a Ring to a Material Boundary

Use this procedure to add a ring to a material boundary.

A material boundary can consist of more than one closed polyline. For example, you could use one polyline to highlight a wall detail, and another polyline to highlight a window detail in another location.

1 Draw a polyline for the new material boundary ring.

2 Select a 2D elevation.

3 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place.
The material boundary is highlighted and edit-in-place grips are displayed.

4 Click Edit In Place tab ➤ Profile panel ➤ Edit Material Boundary.

5 Click Edit In Place tab ➤ Profile panel ➤ Add Ring.

6 Select the polyline you drew in step 1.

7 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

8 Click Edit In Place tab ➤ Edits panel ➤ Finish to save the changes you made, or click Edit In Place tab ➤ Edits panel ➤ Cancel to undo the changes to the material boundary.

Removing a Ring from a Material Boundary

Use this procedure to remove a ring from a material boundary.

A material boundary can consist of more than one closed ring. You can individually remove each ring.

NOTE You cannot remove the last ring from a material boundary.

1 Select a 2D elevation.

2 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .
The material boundary is highlighted and edit-in-place grips are displayed.

3 Click Edit In Place tab ➤ Profile panel ➤ Edit Material Boundary .

4 Click Edit In Place tab ➤ Profile panel ➤ Remove Ring .

5 Select the ring you want to remove.

6 Click Edit In Place tab ➤ Edits panel ➤ Finish to save the changes you made, or click Edit In Place tab ➤ Edits panel ➤ Cancel to undo the changes to the material boundary.

Replacing a Ring from a Material Boundary with Another

Use this procedure to replace a ring from a material boundary with a different ring.

1 Draw the polyline to replace one of the existing material boundary rings.

2 Select a 2D elevation.

3 Click 2D Section/Elevation tab ➤ Material Boundary panel ➤ Edit In Place .
The material boundary is highlighted and edit-in-place grips are displayed.

4 Click Edit In Place tab ➤ Profile panel ➤ Edit Material Boundary .

5 Click Edit In Place tab ➤ Profile panel ➤ Replace Ring .

6 Select the ring to be replaced with another ring.

7 Select the closed polyline you drew in step 1.

8 Enter **y** (Yes) to erase the polyline, or **n** (No) to keep the polyline in the drawing.

9 Click Edit In Place tab ➤ Edits panel ➤ Finish to save the changes you made, or click Edit In Place tab ➤ Edits panel ➤ Cancel to undo the changes to the material boundary.

Editing and Merging Linework in a 2D Elevation

After you create a 2D elevation, you can edit the display of individual lines that make up the elevation. For example, you may want to assign linework for small details to a display component with a lighter lineweight, so that the details are not obscured when plotted.

You can also merge existing geometry into the elevation.

Editing Linework in a 2D Elevation

Use this procedure to edit linework in a 2D elevation. You can also edit individual lines in a 2D elevation by assigning them to display components in the elevation. For information about the Edit Linework grip, see Using Grips to Edit Linework in a 2D Elevation on page 2188.

You can assign selected linework to fixed display components that determine the display of every elevation that you generate, or you can assign linework to display components that you have defined. For information about adding custom display components, see Adding a Display Component to a 2D Elevation Style on page 2205. After you assign linework to display components, you can change the display properties (visibility, color, layer, lineweight, linetype, and linetype scale) to change the display of lines.

1. Select the elevation to be changed.
2. Click 2D Section/Elevation tab ➤ Linework panel ➤ Edit .
3. Select the lines that you want to assign to a display component
4. Click Edit In Place ➤ Linework tab ➤ Profile panel ➤ Modify Component .

   A list of available display components is displayed.
5. Select the component you want to put the lines on.

   For example, if you want to make the lines invisible, select Erased Vectors for Linework Component.

   You can also click (Match existing linework), and select linework in the elevation whose display component you want to match.
6. Click OK.
7. To finish the linework editing process, click Edit In Place tab ➤ Edits panel ➤ Finish to save the changes you made, or click Edit In Place tab ➤ Edits panel ➤ Cancel to undo your linework changes.

Merging Linework into a 2D Elevation

Use this procedure to merge geometry into a 2D elevation. When you merge linework into an elevation, you assign additional linework to a display component of an elevation. Use this feature when you want to add detail, or add linework that you did not model.

1. Draw the geometry that you want to merge into a 2D elevation.
2. Select the 2D elevation to be changed.
3. Click 2D Section/Elevation tab ➤ Linework panel ➤ Merge .
4. Select the geometry to merge into the elevation, and press *ENTER*.
5. Select the display component to which you want to assign the linework.

   You can also click (Match existing linework) and select linework in the elevation whose display component you want to match.
6. Click OK.

   The linework is merged into the 2D elevation. When you select the elevation, the linework is selected with it.

Changing the Location of a 2D or 3D Elevation

You can relocate an elevation by changing the coordinate values of its insertion point. The elevation also has an orientation with respect to the WCS or the current UCS. For example, if the top and bottom of the elevation are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the elevation by aligning its normal with another axis. You can also rotate the elevation on its plane by changing the rotation angle.

For information about the world coordinate system (WCS) and the user coordinate system (UCS), see "Use World and User Coordinate Systems in 3D" in AutoCAD Help.

1. Double-click the elevation you want to move.
2. On the Properties palette, expand Basic, and expand Location.
3. Click Additional Information.
4. Specify a new location or rotation:

If you want to…	Then…
relocate the elevation	enter new coordinate values under Insertion Point.
locate the elevation on the *XY* plane	make the normal of the elevation parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the elevation on the *YZ* plane	make the normal of the elevation parallel to the *X* axis: under Normal, enter **1** for X, and enter **0** for Y and Z.
locate the elevation on the *XZ* plane	make the normal of the elevation parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the elevation	enter a new value for Rotation Angle.

5. Click OK.

Attaching Hyperlinks, Notes, and Files to a 2D or 3D Elevation

Use this procedure to add hyperlinks, enter notes, and attach reference files to a 2D or 3D elevation. You can also edit notes and edit or detach reference files from a 2D or 3D elevation.

1. Double-click the 2D or 3D elevation you want to attach notes or files to.
2. On the Properties palette, click the Extended Data tab.
3. To add a hyperlink, click the setting for Hyperlink, and specify the link.
   For more information, see "Add Hyperlinks to a Drawing" in AutoCAD Help.
4. To add a note, click next to Notes, enter text, and click OK.
5. Click next to Reference documents, and then attach, detach, or edit a reference file:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.

If you want to…	Then…
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6 Click OK.

Updating a 2D or 3D Elevation

Use this procedure to regenerate a 2D or 3D elevation to reflect changes you have made to the building model or to elevation line properties. For 2D elevations, you also update the elevation to show changes made to the 2D elevation style. You can update a 2D or 3D elevation if you have not exploded the elevation, which destroys the link between the elevation and the building model.

When you update an elevation, you can add or remove objects from the elevation, change the location of the elevation in the drawing, and change the display set of the elevation.

If you do not need to change the elevation definition in any way, you can skip the following procedure.

Instead, click 2D Section/Elevation tab ➤ Modify panel ➤ Refresh .

1 Select the elevation you want to update.

2 Click 2D or 3D Section/Elevation tab ➤ Modify panel ➤ Regenerate .

3 Select a result type:

If the elevation is…	Then…
a 2D elevation object	select 2D Section/Elevation Object with Hidden Line Removal.
a 3D elevation object	select 3D Section/Elevation Object.

4 To change the style of a 2D elevation, select a new style for Style to Generate.

5 If you edited linework in the 2D elevation, select a style in which to save the changes you made that cannot be reapplied.

Select a style that distinguishes the unapplied changes in the elevation.

6 Under Selection Set, specify the objects that you want to include in the elevation:

If you want to…	Then…
use the objects in the selection set you specified when you created the elevation or when you previously updated it	proceed to the next step.
add new objects to the selection set that you specified when you created the original elevation	click Select Additional Objects, select the new objects in the drawing, and press *ENTER*.
select a new selection set of objects for the elevation	click Reselect Objects, select a new selection set of objects for the elevation, and press *ENTER*.

NOTE If you select an object that you do not want to include in the elevation, press and hold *SHIFT* and select the object again to remove it from the selection set.

7 Under Display Set, select a display set for the elevation.

8 Under Placement, locate the elevation in the drawing:

If you want to…	Then…
create a new elevation object without overwriting the original object	select New Object, and either click to specify an insertion point in the drawing area, or enter X, Y, and Z coordinates for the new elevation.
replace the original elevation with the updated elevation	select Replace Existing.

9 Click OK.

Globally Updating 2D Elevations

AutoCAD Architecture makes it possible for you to globally update all sections and elevations within a project or a specified folder.

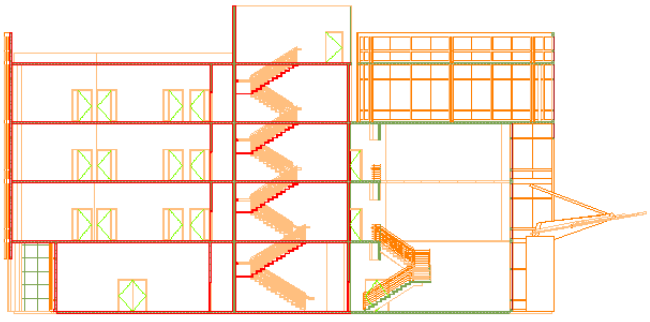
Updating Sections and Elevations in a Project

AutoCAD Architecture includes the Drawing Management feature that allows users to combine their floor plans, section and elevation views, construction sheets, and reusable components in one building project. A project consists of a number of drawings linked together with a powerful external referencing mechanism. AutoCAD Architecture enables you to open a project and update all 2D sections and elevations included in that project in one comfortable workflow. For information on which project file types can be updated, see Supported Project Drawing Types on page 2202.

Updating Sections and Elevations in a Specific Folder

When you are working without a project, you can also globally update sections and elevations by specifying a folder and updating all sections and elevations in that folder. When you select a specific folder for updating, you can also include its subfolders in the update.

Section of a building project



For more information about building projects, see Drawing Management on page 199.

Supported Project Drawing Types

When you are updating a project, you can globally update all 2D sections and elevations within the views and sheets of the project. You cannot globally update elements and constructs, because these project drawings usually contain reusable elements and individual parts of the building project. They normally do not contain sections or elevations.

For more information about project drawing types, see Views on page 297 and Sheets on page 321.

NOTE When you globally update the sections and elevations in a project drawing, all model and paper space layouts are updated.

When you are updating a specified folder within a project, or a folder outside of a project, all sections and elevations in that folder are updated regardless of their type. For example, if you choose to update a specific folder within the Constructs category of a project, the sections and elevations in that folder will be updated, even though they are Construct drawings. If you do not specify a folder, but choose to update the whole project, these construct drawings are not updated.

Globally Updating 2D Sections and Elevations in a Project or a Folder

Use this procedure to globally update all 2D sections and elevations in a project or a specified folder.

NOTE To update all 2D sections and elevations in a project, the project must be defined as current. If no project is current, you receive an error message if you try to globally update 2D sections and elevations. For information on setting a project current, see Setting a Project Current on page 215.

1 Click Home tab ➤ Section & Elevation panel ➤ ➤ Batch Refresh .

2 Select if you want to update the 2D sections and elevations in the current project, or only the 2D sections and elevations in a specific folder.

If you want to...	Then...
update the 2D sections and elevations in the current project	select Current Project.
update the 2D sections and elevations in a specific folder	select Folder. Then click the Browse button , select the folder containing the files you want to update, and click OK.

3 If you have specified a folder, you can specify whether the subfolders of that folder should be updated as well. To update the subfolders, select Process subfolders.

NOTE When you are working with a large building project, updating all sections and elevations can be a time-consuming process. In this case, you might consider updating only a selected subfolder of your project and thereby improve system performance.

4 Click Start.

Globally updating all sections and elevations may take a while. A status window lets you know which drawing is currently being updated.

When you start the global update, the Stop button is available. If you want to interrupt the global update, click Stop. When the global update is finished, the Start button is available.

Updating Legacy Drawings

During the global update of 2D sections and elevations, each drawing in the project or specified folder is opened, updated, and saved again. If you are updating drawings from an earlier version of the software, the drawings are converted to the current version. Before you convert the drawings, a warning message notifies you of the conversion. To update the drawings to the new version, click OK. To cancel the update of all sections and elevations, press *CTRL+BREAK*.

Update Exceptions

There are a number of cases in which a 2D section or elevation cannot be updated with the global update.

- The drawing containing the 2D section or elevation is read-only.
- The 2D section or elevation is placed on a locked layer.
- There have been user edits to a 2D section or elevation that could not be reapplied to the 2D section or elevation.

When a 2D section or elevation cannot be updated, an error message is displayed in the status window.

To fix the problem, you can set the drawing to read/write instead of read-only, you can unlock the section layer, or you can undo a specific user edit to a 2D section or elevation.

2D Elevation Styles

A 2D section/elevation style is a group of properties assigned to a 2D elevation that determines the appearance and other characteristics of that object.

Using 2D Elevation Styles

A 2D section/elevation style controls the linework in an elevation, using design rules that determine how different parts of the elevation are displayed. You can apply the style to one or more elevations to control their appearance. You can also change the display of individual lines in the elevation, and save the changes in a 2D section/elevation style.

Display Components and Design Rules

Display components determine the graphical characteristics, such as color and linetype, of linework assigned to each display component. Design rules determine how the linework in an elevation is assigned to display components.

When you create a design rule, you specify the part of the 2D elevation to control based on the color of those objects in the building model and their context in the elevation. You then select the display component to use for linework that meets the criteria you specified. You can assign the linework to a default display component or to a custom display component that you have added to the style. For example, you might define a rule that assigns all objects that are color 150 in the model and located along the elevation line to a custom display component named Darker that you created in the style. Or you might hide a staircase behind a wall using a rule that assigns all blue linework to the Hidden display component.

Managing 2D Elevation Styles

To create, edit, copy, or purge styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture to work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

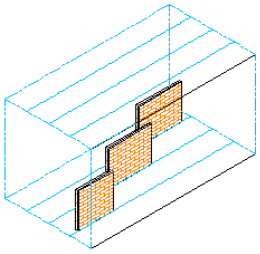
Materials and 2D Elevation Styles

Two-dimensional elevation styles offer an easy way to assign materials to 2D elevation objects. You can specify which section components should have its display controlled by materials and which do not. Custom components cannot have any material assignments.

Subdivisions in 2D Elevation Styles and Materials

When you are creating subdivisions in your style, you usually want the objects in them to be visually distinct from other subdivisions. When you have assigned materials to the objects, you can set the 2D elevation style so that it uses the hatch pattern from the material, but the color and linetype from the subdivision display properties.

Elevation subdivisions with assigned surface hatching



Three brick walls in different elevation subdivisions

2D elevation surface hatch from material, color and linetype from subdivisions

Creating a 2D Elevation Style

Use this procedure to create a 2D elevation style. You can create a style using default style properties or by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand 2D Section/Elevation Styles.

3 Create a new 2D elevation style:

If you want to create a style…	Then…
using default properties	right-click 2D Section/Elevation Styles, and click New.
style from an existing style	right-click the 2D elevation style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new 2D elevation style, and press *ENTER*.

5 Edit the 2D elevation style:

If you want to…	Then…
add display components to the style	see Adding a Display Component to a 2D Elevation Style on page 2205.

If you want to…	Then…
remove display components from the style	see Removing a Display Component from a 2D Elevation Style on page 2206.
use the subdivision properties of the elevation for the display	see Use Subdivision Properties and Materials in 2D Elevation Styles on page 2209.
use the 3D Body component of the material for the elevation linework	see Use the 3D Body Component of a Material for the 2D Elevation Linework on page 2209.
add design rules to the style	see Adding a Design Rule to a 2D Elevation Style on page 2210.
change design rules in the style	see Changing a Design Rule in a 2D Elevation Style on page 2211.
add classifications to a style	see Adding Classifications to a 2D Elevation Style on page 2211.
change the display properties of the display components in the style	see Changing the Layer, Color, and Linetype of a 2D Elevation Style on page 2212.
add notes, files, or documents to the style	see Attaching Notes and Files to a 2D Elevation Style on page 2212.

6 Click OK.

You can click Apply instead of OK to save the changes and continue working in the Style Manager.

Adding a Display Component to a 2D Elevation Style

Use this procedure to add a custom display component to a 2D elevation style. After you add a component, you assign linework in the elevation to the new component. To apply these style changes to existing 2D elevations, you must update the elevation.

2D elevations include the following default display components: Defining Line, Hidden, Erased, Unknown, and Subdivision.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the Components tab.

4 Click Add.

5 Enter a name and a description for the new component.

To enter a name, click Unnamed and enter a new name. To enter a description, click in the Description column next to the name, and enter a description.

6 Click the Display Properties tab.

7 Select 2D Section/Elevation Style for the property source, and click .

8 Click the Layer/Color/Linetype tab.

9 Specify the display properties of the new component.

10 Click OK twice.

To create a design rule that uses the new display component, see Adding a Design Rule to a 2D Elevation Style on page 2210. To manually assign linework to the display component, see Editing Linework in a 2D Elevation on page 2198.

Removing a Display Component from a 2D Elevation Style

Use this procedure to remove a custom display component from a 2D elevation style. Removing a display component also removes any design rules that use the component. You cannot remove the default display components.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the Components tab.

4 Select the component that you want to remove, and click Remove.

If the component is used in a design rule, the associated design rule is removed as well.

5 Click OK.

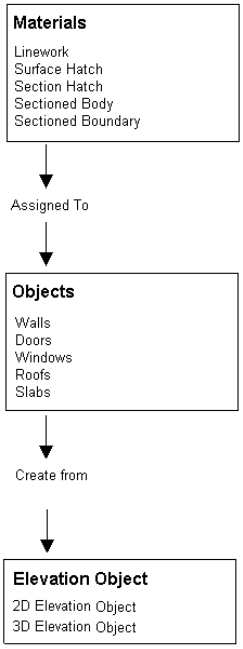
6 Update the elevation to apply the style changes to the elevation.

For more information, see Updating a 2D or 3D Elevation on page 2200.

About 2D and 3D Elevation Display Components and Materials

A 2D or 3D elevation object consists of a number of display components that can be determined by materials. When you assign materials to an object, you assign one material to each display component of the object. For example, you assign a wood material to the frame of a window and a glass component to the glass of a window.

When you create a 2D or 3D elevation object from building objects, the material assignments of the source objects are applied to the elevation. You do not assign a material directly to a 2D/3D elevation. The elevation takes its material assignments from the objects. For example, if you create an elevation of a wall with a window, the surface hatches you have defined in the glass, wood, and brick materials of the wall and the window are displayed in the elevation object.



If you do not want to use the material display properties, but instead use those of the 2D or 3D elevation object or the 2D elevation style, you can deactivate the material assignments in the display properties of the elevation or the elevation style.

Material definitions consist of display components that correspond to component types of objects. For example, the Linework component of a material is used for all linework of objects in Plan view. The Surface Hatch component of a material is used to hatch all object surfaces in 3D model views and elevations.

For a complete list of material components and their description, see Material Components and Display Properties on page 585.

The following table lists elevation components plus information about the material components that determine them.

NOTE An elevation is technically the same object as a section, and has the same display components as a section. The following topics describe the display components most relevant to elevations. For a complete list of all section and elevation components, see About 2D and 3D Section Display Components and Materials on page 2160.

2D Elevation Component	Material Component
Surface Hatch Linework	Surface Hatch
HIdden	No Material
Erased	No Material
Subdivision 1-10	2D Section/Elevation Linework or 3D Body. For information on switching between these material components, see Use the 3D Body Component of a Material for the 2D Elevation Linework on page 2209.

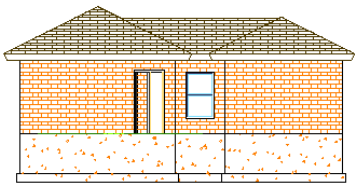
Surface Hatch Linework in Elevations

The Surface Hatch Linework component draws all linework coming from surface hatches of the objects in the elevation. This component is specific to 2D elevations.

NOTE Surface hatches you have assigned to objects display in a 3D elevation object. However, you cannot set them separately in a 3D elevation; you can do that only in a 2D elevation object.

The surface hatch linework component is controlled by the surface hatch component of the material. For information about the surface hatch component of the material, see Surface Hatch Material Component on page 587.

2D elevation with building roof, wall, and foundation surface hatching



Hidden Component

The Hidden component contains all linework that is hidden in the 2D projection because other components are in front of it. By default, this component is turned off. You can use design rules to achieve special effects, such as a see-through effect, using the Hidden component. The Hidden component is specific to 2D elevations.

The Hidden component cannot be defined by a material component. You can only set it in the display properties of the 2D elevation. For information on setting the display properties of a 2D elevation, see Changing the Layer, Color, and Linetype of a 2D Elevation Style on page 2212.

Erased Component

The Erased component contains linework in the elevation object that you do not want to see. For example, if you have an elevation of a window front with three windows, but you want to display only one (for a higher level of abstraction), edit the linework of the elevation and assign the linework of the remaining two windows to the Erased component. Because the Erased component is turned off by default, the two windows do not display. For information on linework editing of an elevation, see Creating a Hidden Line Projection on page 2215.

The hidden component is specific to 2D elevations, and cannot be defined by a material component.

Subdivision Components

The subdivision components partition an elevation object. They are useful to create perspective effects, where parts closer to the viewer are drawn with darker, stronger lines and parts farther from the user are drawn with lighter, thinner lines. Subdivisions can have no individual material assignments. However the display properties of the subdivisions can be used for the surface hatching of the subdivisions by selecting Use Subdivision Properties for Surface Hatching in the Other tab of the 2D elevation display properties. For information on using the subdivision display properties to display the elevation divisions, see Use Subdivision Properties and Materials in 2D Elevation Styles on page 2209.

Subdivisions are a display component of both 2D and 3D elevation objects.

The subdivision components are either controlled by the 2D Section/Elevation Linework component of the material or by the 3D Body component of a material. For information on how to switch between these component assignments, see Use the 3D Body Component of a Material for the 2D Elevation Linework on page 2209.

Use Subdivision Properties and Materials in 2D Elevation Styles

Use this procedure to use the display properties of materials together with the display properties of elevation subdivisions.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.
3. Click the Display Properties tab.
4. Select 2D Section/Elevation Style for the property source, and click Style Override.
5. If necessary, click .
6. Click the Layer/Color/Linetype tab.
7. To set a subdivision to use the surface hatch of the material, while using the layer, color, and linetype display properties of the subdivision, clear By Material, and specify the layer, color and linetype settings of the subdivision.

   For example, the first subdivision could have a darker color and stronger linetype than the second subdivision.
8. Click the Other tab.
9. Select Use Subdivison Properties for Surface Hatching.
10. Click OK twice.

Use the 3D Body Component of a Material for the 2D Elevation Linework

Use this procedure to use the 3D Body component of a material for the linework in a 2D elevation.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.
3. Click the Display Properties tab.
4. Select 2D Section/Elevation Style for the property source, and click Style Override.
5. If necessary, click .
6. Click the Other tab.
7. Specify whether the 3D body component of the selected material should control the display of the linework in the 2D elevation:

If you want to control the display…	Then…
of the 2D elevation linework by the 3D Body component of the material	select Use 3D Body Display Component for By Material Linework.
of the 2D elevation linework by the 2D Section/Elevation Linework component of the material	deselect Use 3D Body Display Component for By Material Linework. This is the default behavior.

8. Click OK twice.

Adding a Design Rule to a 2D Elevation Style

Use this procedure to add a design rule to a 2D elevation style. A design rule has four fields of information that identify lines in the elevation and determine how to display them:

Field	Description
Color	Identifies the color of the objects in the building model presented by the lines in the elevation
Context	Identifies the context of the lines in the elevation, such as in a graphic subdivision
Component	Identifies the display component to which the lines are assigned
Description	Contains a description of the design rule

For example, a design rule has the color 50, a context of Within Subdivision 2, and a component of New. This rule assigns any lines in the elevation representing objects that have the color 50 in the building model and that are within subdivision 2 in the elevation to the user-defined display component, New.

On the Design Rules tab, you can also specify that all hidden linework that is not handled by a specific design rule will be assigned to the Hidden display component. You could use this option if you want to generate an elevation of an object or a set of objects and see all edges, for example, if you are creating foundations and form work.

NOTE Alternatively, you can define which hidden linework should be displayed by object material. For more information, see Controlling the Display of Hidden Lines by Material on page 606.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the Design Rules tab, and click Add.

A new design rule is created with default color, context, and component values.

4 Specify settings for the new design rule:

If you want to…	Then…
specify the color of objects in the building model that are affected by this rule	click the default color, select a new color, and click OK.
specify the context in which the linework for the objects appears in the elevation	click the default context, and select a new context.
select the display component for the linework	click the default component, and select a new component.
enter a description of the rule	click the Description field, enter a description, and press *ENTER*.

5 Click OK.

6 Update the elevation to apply the style changes to the elevation.

For more information, see Updating a 2D or 3D Elevation on page 2200.

Changing a Design Rule in a 2D Elevation Style

Use this procedure to change the settings in the fields that define a design rule.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.
3 Click the Design Rules tab.
4 Specify settings for the design rule you want to change:

If you want to…	Then…
specify the color of objects in the building model that are affected by this rule	click the current color, select a new color, and click OK.
specify the context in which the linework for the objects appears in the elevation	click the current context, and select a new context.
select the display component for the linework	click the current component, and select a new component.
edit the description of the rule	click the description, edit the description, and press *ENTER*.

5 Click OK.
6 Update the elevation to apply the style changes to the elevation.
For more information, see Updating a 2D or 3D Elevation on page 2200.

Removing a Design Rule from a 2D Elevation Style

Use this procedure to remove a design rule from a 2D elevation style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.
3 Click the Design Rules tab.
4 Select the rule that you want to remove, and click Remove.
5 Click OK.
6 Update the elevation to apply the style changes to the elevation.
For more information, see Updating a 2D or 3D Elevation on page 2200.

Adding Classifications to a 2D Elevation Style

Use this procedure to specify classifications for any classification definition applied to a 2D elevation style.

For more information about creating and applying classification definitions, see Classification Definitions on page 2540.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the Classifications tab.

By default, the classification for all classification definitions is Unspecified. If no classification definitions are listed, none are applied to 2D elevation styles.

4 For each classification definition, select the classification you want to apply to the current 2D elevation style.

5 Click OK twice.

Changing the Layer, Color, and Linetype of a 2D Elevation Style

Use this procedure to change the following display properties of a 2D elevation style:

- Visibility (component is on or off)
- Display properties by materials
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

NOTE The custom display components in the display properties are identical to those listed on the Components tab of the 2D Section/Elevation Styles dialog box. For more information about custom display components, see Adding a Display Component to a 2D Elevation Style on page 2205.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the Display Properties tab.

4 Select 2D Section/Elevation Style for the property source, and click Style Override.

5 If necessary, click .

6 Click the Layer/Color/Linetype tab.

7 Select the component to change, and select a different setting for the property.

8 Select By Material for any component that you want to use the display properties of the materials assigned to the elevation objects.

NOTE Not all display components of a 2D elevation have an associated material definition. For example, Hidden and Erased cannot be set by material. For a list of all display components and their associated material components, see About 2D and 3D Elevation Display Components and Materials on page 2206.

9 Click OK twice.

Attaching Notes and Files to a 2D Elevation Style

Use this procedure to enter notes and attach reference files to a 2D elevation style. You can also edit notes and edit or detach reference files attached to the style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, expand 2D Section/Elevation Styles, and select the style you want to change.

3 Click the General tab.

4 To add a description to the 2D elevation, enter the description under Description.

5 Click Notes.

6 To add or edit a note, click the Notes tab, and enter the note.

7 To attach, edit, or detach a reference file, click the Reference Docs tab:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

8 Click OK twice.

Hidden Line Projection

41

You can create flat 2D projections with hidden background lines from a 3D view of objects in your drawing. The Hidden Line Projection command produces quick sections and elevations of objects in your drawings that are not updated automatically when you make changes to your 3D model.

Hidden Line Projection

You can create flat 2D projections with hidden background lines from a 3D view of objects in your drawing. The Hidden Line Projection command produces quick sections and elevations of objects in your drawings that are not updated automatically when you make changes to your 3D model.

Creating a Hidden Line Projection

Use this procedure to create a 2D graphic from a 3D view of one or more objects in your drawing. The 2D graphic that you create is a flattened representation of the objects in the current 3D view, with hidden background lines. Use the Hidden Line Projection command to create quick 2D elevations and sections.

After you create an elevation or section hidden line projection, you can hatch or shade the cut areas. You can also use hidden line projections to create detail drawings. For more information about creating elevations and sections, see Working With Elevations on page 2171 and Sections on page 2123.

When you create hidden line projections, the 3D objects that you select are copied and collected into an unnamed (also called anonymous) 2D block. The unnamed block can be placed in your drawing in the current 3D view, or placed parallel to the *XY* plane to be viewed in plan view. You can edit or explode the inserted block. If you want to insert the block in another drawing as a named block, define the block. For more information about inserting blocks, see “Insert Blocks” in AutoCAD help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

NOTE Your 2D hidden line projections are not dynamically linked to the objects in the 3D view. Therefore, if you edit the original object or objects in 3D view, the 2D graphic does not change. You must edit or re-create the 2D hidden line projection to reflect any changes that you make to the original objects.

1 Open the tool palette that you want to use, and select a hidden line projection tool.

A hidden line projection tool is located with the Helper Tools in the Stock Tool Catalog. For more information, see Content Browser Overview on page 97.

Alternatively, you can click Home tab ➤ Section & Elevation panel ➤ ➤ Hidden Line Projection .

2 In a 3D view select one or more objects that you want to use to create your hidden line projection, and press *ENTER*.

3 Specify an insertion point in your current drawing for the 2D hidden line projection.

4 Specify the insertion point for the 2D hidden line projection into your drawing:

- Press *ENTER* to insert the 2D block in plan view.
- Enter **n** (No) to insert the 2D block in the current view.

AEC Dimensions

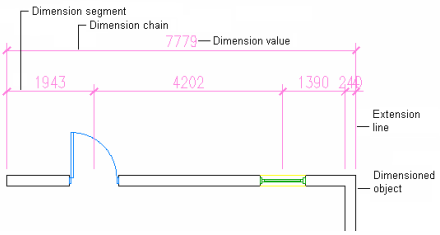
42

AEC dimensions are associative annotation objects used to display the relevant measurements of a building object, like the width of a wall or the length of a beam. The appearance of dimensions is controlled through styles and can be adjusted for different drawing views or to accommodate the standards of a particular company or country.

AEC Dimensions

AutoCAD Architecture offers different ways of dimensioning objects and points in a drawing. AEC dimensions can be associative to objects or be used to dimension user-specified points in the drawing. If you create an associative dimension, the dimension value changes when the object changes its measurements.

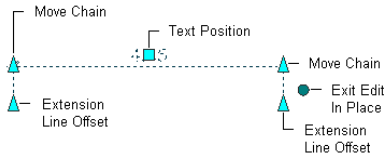
Components of an AEC dimension



Using Grips to Modify AEC Dimensions

When you select an AEC dimension, various grips are displayed. You can use the grips to add and remove dimension points, move dimension chains, change the offset of extension lines, and override wall component dimensions.

AEC dimension grips

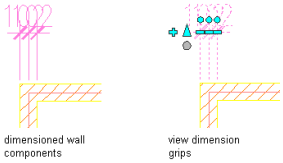


Dimensioning Wall Components

When dimensioning wall components, you have the option of using the center of the component or either side as the dimension point. For example, you can dimension a wall component from its center or from one of its edges. You can also dimension wall components according to their structural function.

Grips for the individual component dimension points allow you to override style-defined dimension points on walls to accommodate special cases.

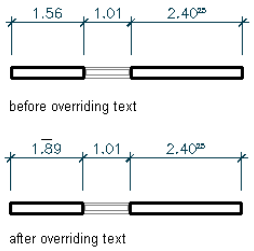
Wall component dimension grips



Overriding Dimension Values

The dimension values in an AEC dimension are calculated from the actual current dimensions of associated objects. You can override a value with a manually inserted value. For detailed information, see Overriding Dimension Values and Hiding Dimension Segments on page 2255.

Overriding dimension text with a new value



Dimension Options and Uses

In AutoCAD Architecture, you can dimension object points specified in the AEC dimension style, points on objects picked in the drawing, or user-specified points in the drawing. AEC dimensions associated with objects update when the object changes. User-specified points are not associative and have to be changed manually, if necessary. In addition to AEC dimensions, you can also use AutoCAD dimensions. The following table lists the differences between the different dimension methods:

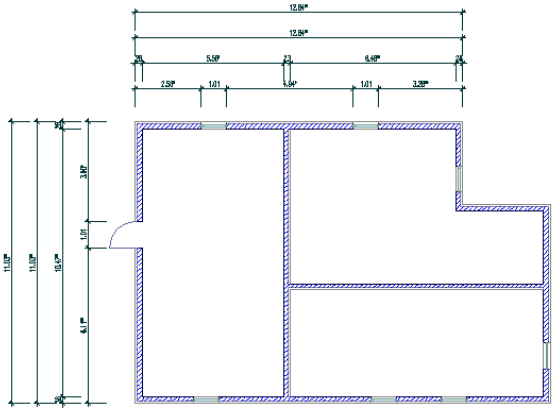
An AEC dimension can contain both associative and non-associative points. For example, you can create an AEC dimension that dimensions a wall, a multi-view block representing a floor drain, and user-specified points selected anywhere in the drawing.

Associative Dimensions from Selecting Objects

Associative AEC dimensions are style-based annotation objects that update automatically when the associated object changes. The AEC dimension style defines the dimension points that determine which measurements are displayed for each object that the style can be used to dimension.

In the example below, walls lengths, opening widths, and wall intersections are set as the dimensioned points in the style. If a door is made wider, the dimensions update to reflect the new measurements.

Associative wall dimensions



You can define styles for specific object types. For example, one AEC dimension style might specify that for walls, dimensions will be displayed for lengths, maximum opening widths of windows in walls, and wall intersections. Another AEC dimension style for mass elements might specify the mass element edges and center as dimension points.

For a complete list of objects for which you can specify dimension points in AEC dimension styles, see Associative Dimensions from Objects on page 2221.

NOTE AEC objects can be associatively dimensioned in external references, even when they are nested multiple levels deep. This is useful for large drawing projects, where the parts of the building are distributed over various drawing files.

You can also define different dimension points for different views. For example, in Plan Low Detail, you might want to dimension only the outer boundaries of a building, whereas in Plan High Detail you might want to dimension wall lengths and openings in walls as well.

In the AEC dimension style, you can define up to ten dimension chains, each with different dimension points. For example, the first chain can dimension wall lengths and openings in walls, while the second chain dimensions structural components of multi-component walls.

In the AEC dimension style, you can also specify whether to use superscripting in dimensions, and whether the extension line length is fixed or variable.

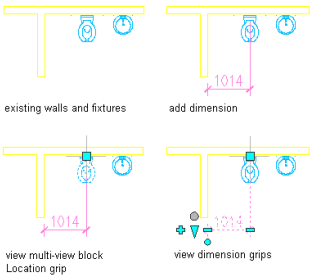
Associative Dimensions from Picked Points

When you use an AEC dimension tool, the Pick points option lets you select the base point and OSNAP points on an AEC object to create an associative dimension. In addition, you can define an offset from a selected point, so that virtually any point on an object can be dimensioned. This option lets you dimension AEC objects for which dimension points cannot be set in the AEC dimension style, like multi-view blocks or 2D building sections, or objects for which the dimension point you need is not settable in the style. For example, you cannot dimension the location of a pilaster in a wall in the AEC dimension style, but you can pick an endpoint on the wall, and then offset it so that becomes a dimension point for the pilaster location.

Because a dimension generated by picking points on objects is associative, if you move the object, the dimension points are updated accordingly, observing any offsets you have specified.

For a list of objects that can only be dimensioned associatively by picking points on them, see Associative Dimensions From Picked Points on page 2227.

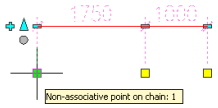
Picking associative points to dimension



Non-Associative Dimensions from Picked Points

You can create non-associative dimensions from points you pick anywhere in the drawing. For each point you pick, a location point is generated and dimensioned. If the point is used to dimension an object, and the object is moved, the non-associative point is not updated. You have to manually move the non-associative point to reflect the change.

Non-associative grip points on AEC dimension



You can convert AutoCAD dimensions to non-associative AEC dimensions. The AutoCAD dimension points are converted to location points on the AEC dimension. For more information, see Converting an AutoCAD Dimension to an AEC Dimension on page 2238.

AutoCAD Dimensions

AutoCAD dimensions can be associated with AutoCAD objects like polylines. Additionally you can create non-associative AutoCAD dimensions.

Associative AutoCAD dimensions are turned on by default in AutoCAD Architecture. To work with traditional non-associative AutoCAD dimensions, set the system variable DIMASSOC to 1 (Non-Associative Dimensions). To create AutoCAD object dimensions, set DIMASSOC to 2 (Associative Dimensions).

For more information about AutoCAD dimensions, see “Dimensions and Tolerances” in AutoCAD Help.

Process Overview: Creating AEC Dimensions

An AEC dimension consists of a number of components and settings to make it the optimal tool for dimensioning objects.

TIP AutoCAD Architecture ships with predefined dimension tools for many uses. Before you create a new tool or AEC or AutoCAD dimension style, look through the templates to find an existing tool or style that contains most or all of your desired settings. You can then modify it for your purposes, if necessary.

The general process for creating AEC dimensions involves the following steps:

1. Specify the drawing options for the AEC dimension, as described in Specifying AEC Dimension Preferences on page 2228.

   Important settings include the dimension unit, superscripting preferences, and the automatic scaling of AutoCAD dimension styles.

2 Verify that there is an AutoCAD dimension style that has the settings you need. If necessary, create a new AutoCAD dimension style that defines the color of the dimension lines, size and font of the dimension text, arrows, unit format, and unit precision.

   For more information, see "Use Dimension Styles" in the AutoCAD help.

3 If you are dimensioning walls, create or modify a wall style with dimension settings for wall components.

   For more information, see Defining the Dimension Settings for Wall Components on page 856.

4 Create an AEC dimension style that specifies the desired values for the following settings:
   - number of dimension chains
   - object types to be dimensioned (for example, walls or mass elements)
   - object points to be dimensioned (for example, wall components and wall intersections)
   - underlying AutoCAD dimension style

   For more information, see AEC Dimension Styles on page 2261.

5 Use a dimension tool and dimension objects and points in the drawing.

   For more information, see Creating an AEC Dimension with User-Specified Settings on page 2231.

Associative Dimensions from Objects

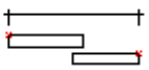
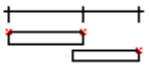
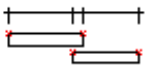
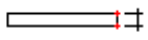
The AEC dimension style defines the dimension points that determine which measurements are displayed for each type of object to which the AEC dimension can be applied. You can either create a dimension style that defines dimension points for multiple object types, or you can create separate styles for individual object types.

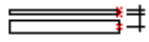
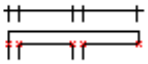
For information about how to define dimension points in AEC dimension styles, see Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

Dimension Points for Walls

The following wall dimension points can be specified in the AEC dimension style:

Wall Dimension Points

Selection	Description	Examples
Overall	Dimensions the two outer points of all dimensioned walls.	
Length of Wall: Outer Boundaries	Dimensions the outer boundaries of every selected wall. When wall boundaries overlap, only those facing the dimension direction are dimensioned.	
Length of Wall: Wall Length	Dimensions the length of each wall in the selection set.	
Wall Width: Overall	Dimensions the overall width of a wall.	

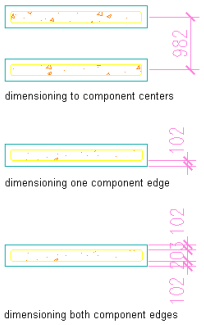
Wall Dimension Points		
Selection	**Description**	**Examples**
Wall Width: All Components	Dimensions the width of each component in a wall.	
Wall Width: Center	Dimensions the center line of a single-component or multi-component wall	
Wall Width: From Style	Dimensions the wall components according to the settings in the wall style. For more information, see Defining the Dimension Settings for Wall Components on page 856.	
Wall Width: Structural from Style	Dimensions the structural wall components according to the settings in the wall style. For more information, see Defining the Dimension Settings for Wall Components on page 856.	
Wall Intersections	Dimensions the intersection points of walls that are connected to the selected walls.	

Dimension Points for Wall Components

The dimensioning of wall components can be specified in 2 different locations: in the wall style and in the AEC dimension style.

In the wall style, you can set following information that is relevant to the dimension:

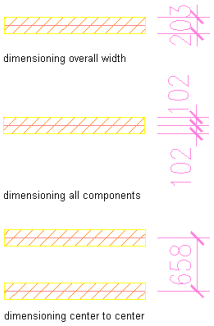
- Component side to dimension: In the wall style, you can define for each wall component whether it should be dimensioned to its positive or negative side, or to the center of the component. The positive and negative sides of a wall are determined by the direction in which the wall is drawn: if you draw a wall from left to right, the positive side is the left (top). If you draw a wall from the right side to the left, then the positive side is the right (bottom). If you determine that a wall component is only dimensioned to one side, you can select either the positive or negative side of the wall.



- Structural function: You can define a wall component as structural or non-structural. When you set up the AEC dimension style you can define that only structural wall components, or all wall components should be dimensioned.

In the AEC dimension style you can define the following additional or overriding settings for dimensioning wall components:

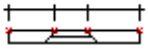
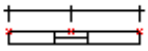
- By Style: the dimension points selected in the wall style are used to dimension the wall components width.
- Structural by Style: the dimension points specified for the structural components of the wall style are used.
- All Components: each component of the wall is dimensioned.
- Overall: the overall width of the wall is dimensioned.
- Center: the center of the wall is dimensioned.



Dimension Points for Wall Openings

The following wall opening dimension points can be specified in the AEC dimension style:

Window, Door, and Opening Dimension Points

Selection	Description	Examples
Opening Max. Width	Dimensions the maximum width of a window, door or opening in a wall.	
Opening Min. Width	Dimensions the minimum width of a window, door, or opening in a wall.	
Center of Opening	Dimensions the center point of a window, door, or opening in a wall.	

NOTE If you click ➤ Options, and then click AEC Object Settings, there are two options under Wall settings: Dimension to Center of Opening and Dimension to Outer Frame of Opening. These settings have no influence on how openings are dimensioned in AEC dimensions.

Dimension Points for Grids

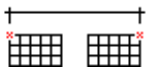
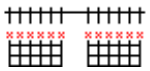
You can set dimension points for the following grid types in the AEC dimension style:

- Column grids
- Ceiling grids
- 2D layout grids

NOTE 3D layout volumes have no style-based associative dimension points.

The following grid dimension points can be specified in the AEC dimension style:

Grid Dimension Points

Selection	Description	Examples
Overall	Dimensions the two outermost grid lines of all selected grids	
Outer Grid Lines	Dimensions the outer grid lines of selected grids	
All Grid Lines	Dimensions all grid lines in selected grids	

Dimension Points for Other Object Types

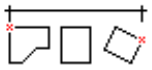
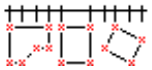
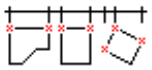
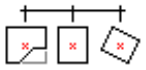
The same set of dimension points can be specified individually in the AEC dimension style for these objects:

- Mass elements/mass groups
- Curtain walls
- Window assemblies
- Structural members (columns/braces/beams)
- Standalone windows/doors/openings
- Others
  - Stairs
  - Railings
  - Spaces
  - Roofs/roof slabs/slabs

TIP If you need different dimension points for individual items from the Other group, it is recommended that you create different dimension styles containing the varying settings. For example, you can create an AEC dimension style for stairs where you dimension the bounding box only, and another dimension style for spaces that dimensions the space edges.

The following dimensions points an be specified in the AEC dimension style for the objects in this category:

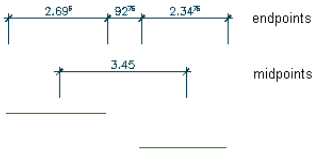
Other Building Object Dimension Points

Selection	Description	Examples
Overall	Dimensions the two outer points of selected objects	
Bounding Box	Dimensions the bounding box of each object in the selection set	
Edges: All Edges	Dimensions all edges in an object	
Edges: Facing Edges	Dimensions the edges of the object that are visible from the direction of the dimension line	
Center	Dimensions the center point of an object	

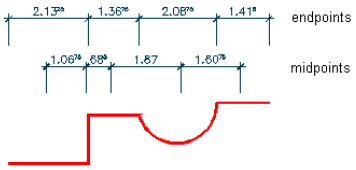
AutoCAD Dimension Points

You can define points for most AutoCAD linework objects in the AEC dimension style.

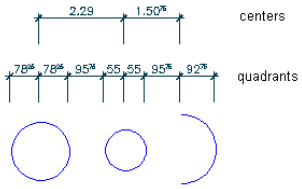
Dimensioning line endpoints and midpoints example



Dimensioning polyline endpoints and midpoints example



Dimensioning circle centers and quadrants example



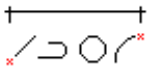
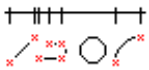
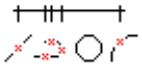
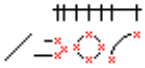
Use an AEC dimension style to dimension the following AutoCAD linework objects:

- Lines

- Arcs
- Circles
- Open and closed polylines
- AutoCAD polygons
- Rectangles

The following AutoCAD points can be associatively dimensioned in the AEC dimension style:

AutoCAD Linework Dimension Points

Selection	Description	Examples
Extents	Dimensions the two overall outer points of all selected objects.	
Endpoints	Dimensions the endpoints of selected objects. If you selected a polyline with multiple segments, the endpoints of each segment are measured. Endpoints can be measured for all AutoCAD linework objects listed above except circles.	
Midpoints	Measures the midpoints of all segments of the selected object that are lying in the direction of the dimensions. Midpoints can be measured for all AutoCAD linework objects listed above except circles.	
Center	Measures the center of the curve of circular objects. Centers can be measured for circles, arcs, and curved polyline segments.	
Quadrant	Measures the quadrants of circles, arcs, and curved polylines segments.	

AutoCAD linework objects include line-based objects, such as lines and open polylines, as well as non-linear geometry, such as closed polylines and circles. The results of using AEC dimensions to dimension these objects can be quite different. For example, for a single line, the options Overall, Bounding Box, All Edges, and Facing Edges return exactly the same dimension points. Some objects, like circles, have no edges to dimension.

TIP The best way to handle the different dimension points for AutoCAD linework is to create a number of AEC dimension styles for the individual objects. For example, you can create a style named "Line," which has only one dimension chain for dimensioning line edges, or a dimension style named "Circle," which dimensions only circle centers and circle quadrants. For more information on creating AEC dimension styles, see AEC Dimension Styles on page 2261.

You cannot define associative dimension points for the following AutoCAD linework objects in the AEC dimension style:

- Multilines
- Splines
- Ellipses

- Blocks
- AutoCAD dimensions
- Leaders
- Text
- Surfaces
- Images
- OLE frames
- Proxies
- Solids

Associative Dimensions in External References

You can associatively dimension objects from external references in the following cases:

- Attach an external reference drawing to a host drawing, and dimension objects from the external reference and the host drawing in the host drawing.
- Attach a nested external reference drawing to a host drawing, and dimension objects from the external reference, its nested external reference and from the host drawing in the host drawing.

Objects from external references are dimensioned in the same way and with the same dimension points as objects from the host drawing.

You can create any level of nesting inside the external reference and still dimension all nested referenced objects.

You will need the ability to dimension external references often when you are working in a project environment. For detailed information on using dimensions in a project, see Workflow for Annotating a Project on page 352.

Associative Dimensions From Picked Points

For AEC objects that cannot have associative dimension points specified in the AEC dimension style, you can pick points on the object in the drawing to generate an associative dimension; points that are picked on the object remain associative to the object.

You can pick either the base point of an object to dimension or any of its OSNAP points. For each point, you can additionally define an offset from the picked point to the dimension point, so that you can dimension virtually any point on an object.

You can also pick a point on an object that can be set in the dimension style, in case you want to dimension a point that is not included in the style-based points. For example, if you want to dimension a recess in a wall with an individual dimension point, you can pick a point on the desired location on the wall.

NOTE You cannot pick associative points on AutoCAD objects.

The following AEC objects can be dimensioned associatively only by picking points on them:

- Multi-view blocks

NOTE You cannot dimension multi-view blocks that have Xdata attached to them.

- Curtain wall units
- AEC polygons
- Mask blocks
- 2D Sections/Elevations
- Entity references
- Layout curves
- 3D layout volumes

Specifying AEC Dimension Preferences

Use this procedure to specify dimension preferences before you add AEC dimensions to your drawing.

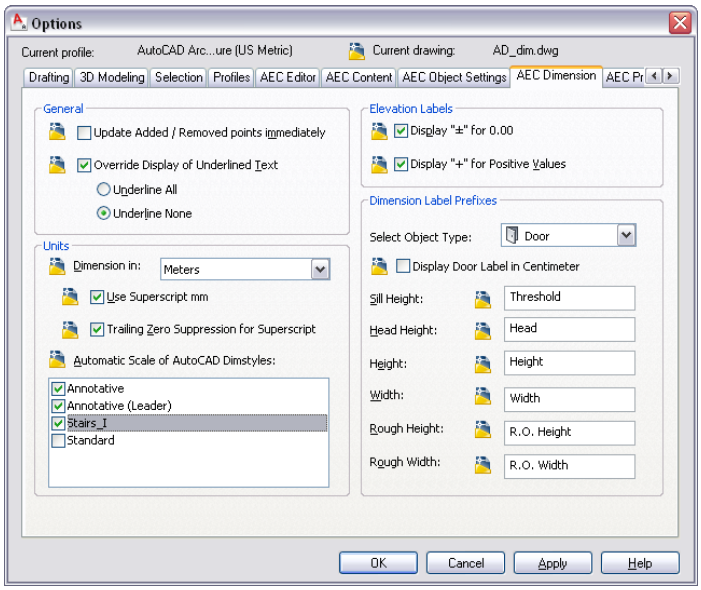
Settings for AEC dimensions include the following:

- Superscript for millimeters
- Dimension display unit
- Automatic rescale of existing AutoCAD dimension styles
- Update behavior of points added or removed

1 Click ➤ Options.

2 Click the AEC Dimension tab.

Settings for AEC dimensions



3 Specify how dimension chains are updated when you remove or add dimension points:

If you want to…	Then…
update the display after every point you remove from or add to a dimension chain	select Update Added / Removed Points Immediately.
update the display only after you have finished removing or adding dimension points	clear Update Added / Removed Points Immediately.

For more information, see Adding Non-Associative Dimensions from Picked Points to an AEC Dimension on page 2244 and Removing Object Points Set in the AEC Dimension Style on page 2245.

4 Set the global behavior of manually overridden dimension values:

If you want to…	Then…
have an automatic underline for each manually overridden dimension value	select Override Display of Underlined Text, and then select Underline All.
have no underline for any overridden dimension value	select Override Display of Underlined Text, and then select Underline None.
set underlines for each overridden dimension value manually	clear Override Display of Underlined Text.

For more information, see Overriding Dimension Values and Hiding Dimension Segments on page 2255.

5 Under Units, for Dimension in, select the unit in which dimensions are to be displayed.

This unit can differ from the drawing unit. For example, you can create a drawing in meters, but have the dimensions displayed in centimeters.

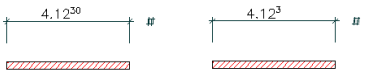
6 If meters or centimeters are your drawing units, and you want to display the millimeters as superscripted text, select Use Superscript mm.

Millimeters superscripted (left) and millimeters not superscripted (right)

7 If you do not want zeros at the end of superscripted numbers, select Trailing Zeros Suppression for Superscript.

You can select this option only if you have selected Use Superscript mm.

Trailing zeros not suppressed (left) and suppressed (right)



8 Under Automatic Scale of AutoCAD Dimstyles, select the AutoCAD dimension styles to be rescaled when you change the drawing units.

For example, you change the drawing units from meters to millimeters. The following settings in your AutoCAD dimension style are rescaled:

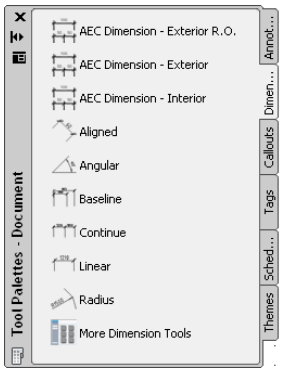
:

Description	Variable	AutoCAD Dim-style	
		Meters	Millimeters
Dimension line spacing	DIMDLI	0.5000	500.0000
Dimension line extension	DIMDLE	0.1250	125.0000
Extension line length	DIMEXE	0.1250	125.0000
Text offset from dimension line	DIMGAP	0.1000	100.0000
Dimension text height	DIMTXT	0.2000	200.0000

Creating AEC Dimensions Using AEC Dimension Tools

Tool palettes provided with AutoCAD Architecture let you quickly place AEC dimensions by selecting an AEC dimension tool with a specific AEC dimension style and other predefined properties. You can also use the AEC dimension tools to convert AutoCAD dimensions to AEC dimensions and to apply the settings of an AEC dimension tool to an existing AEC dimension.

Tool palette containing AEC dimension tools



The default tool palettes in the workspace contain sample AEC dimension tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain AEC dimension tools that you can add to your tool palettes:

- AutoCAD Architecture Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog

Custom palettes created by your CAD manager or other users may also contain AEC dimension tools with AEC dimension styles and properties that are customized for your projects or office standards.

Creating an AEC Dimension

Use this procedure to add a new AEC dimension that has the properties specified in the AEC dimension tool that you select. To specify settings when you add an AEC dimension, see Creating an AEC Dimension with User-Specified Settings on page 2231.

1 Open the tool palette that you want to use, and select the tool.

NOTE Alternatively, you can click Home tab ➤ Annotation panel ➤ Dimension drop-down ➤ AEC Dimension or Annotate tab ➤ Dimensions panel, and select one of the available dimension tools there.

2 Select the objects or points you want to dimension, and press *ENTER*.
You can move or hide the Properties palette to expose more of the drawing area.

3 Click where you want to insert the AEC dimension.

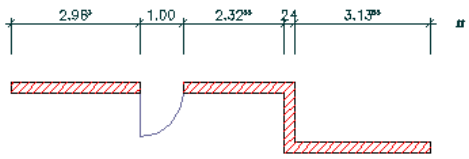
Creating an AEC Dimension with User-Specified Settings

Use this procedure to create an AEC dimension with the settings that you specify.

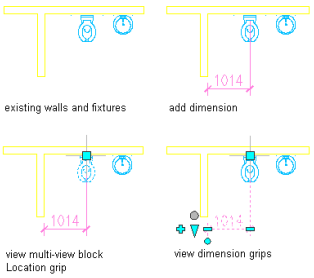
TIP To ensure that the Properties palette is displayed before you select a tool, right-click in the drawing area, and click Properties.

An AEC dimension can include associative dimensions from objects, associative dimensions from picked points on objects, and non-associative dimensions from points anywhere in the drawing.

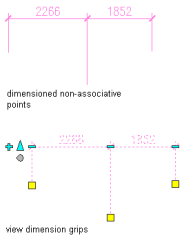
Associative wall dimensions



Associative dimension picked on multi-view block



Non-associative dimension



1 Open the tool palette that you want to use, and select an AEC dimension tool.

NOTE Alternatively, you can click Home tab ➤ Annotation panel ➤ Dimension drop-down ➤ AEC Dimension or Annotate tab ➤ Dimensions panel, and select one of the available dimension tools there.

2 On the Properties palette, expand Basic, and expand General.

3 Select a style.

4 Specify which objects or points to dimension:

If you want to…	Then…
dimension objects specified in the AEC dimension style (creates an associative dimension)	select objects in the drawing that have been specified in the AEC dimension style.
dimension the base point of objects that cannot be set in the AEC dimension style (creates an associative dimension)	select multiple objects of the object list in Associative Dimensions From Picked Points on page 2227.
dimension OSNAP points on objects (creates an associative dimension)	verify that OSNAP is turned on. Enter **p** (Pick Points) on the command line, and select points on objects by snapping to them.
dimension non-associative points in the drawing (creates a non-associative dimension)	verify that OSNAP is turned off. Enter **p** (Pick Points) on the command line, and specify points in the drawing.

NOTE During adding an AEC dimension, you cannot select objects specified in the style and non-associative points in the same command. You can however, once a dimension is added to the drawing, attach objects and points as necessary. For more information, see Adding Points to an AEC Dimension on page 2241.

5 Press *ENTER*.

6 Specify the style, position, rotation, and direction of the new dimension:

If you want to…	Then…
change the style of the AEC dimension	enter **s** (Style) on the command line, and press *ENTER*; then, enter the style name and press *ENTER* again.
insert the AEC dimension parallel or perpendicular to the dimensioned object	drag the cursor in the desired direction, and click at the desired insertion point. **NOTE** If your selection set contains objects with different directions, the direction of the first selected object defines the parallel and perpendicular directions.
insert the AEC dimension at a specified rotation	enter **r** (Rotation) on the command line, and press *ENTER*.Then, enter a rotation angle, either by clicking in the drawing or by entering it on the command line. Press *ENTER*, and click at the desired insertion point. Alternatively, pressing the *SPACE* bar rotates the dimension by 90°. **NOTE** If your selection set contains objects with different directions, the rotation is calculated with reference to the first selected object.

If you want to…	Then…
insert the AEC dimension parallel to an object other than the dimensioned object in the drawing	enter **a** (Align) on the command line, and press *ENTER*. Then, select the object to which to align the AEC dimension. Press *ENTER*, and click in the drawing at the desired insertion point. **NOTE** The direction of the AEC dimension is dependent on the rotation of the chosen object. The drawing direction of the object has no influence on the AEC dimension direction.

Use Cases for AEC Dimensions

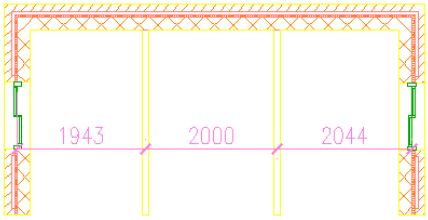
AEC dimensions give you the freedom to dimension your model according to your needs. The following sections outline some frequently used use cases for your work with AEC dimensions.

Creating an Interior Dimension

Use this procedure to create an interior wall dimension.

When you are dimensioning a set of interior walls and want to place the dimension inside the walls, you need a dimension without extension lines, as shown in the graphic below.

Dimension string without extension lines



1. Create a single-component wall style for interior walls and define in the wall style that only one side of the wall component should be dimensioned. For detailed information, see Specifying the Components of a Wall Style on page 849.
2. Create an AEC dimension style that has the following settings:
   - Single dimension chain: For detailed information, see Changing the Number of Chains in an AEC Dimension Style on page 2264.
   - Wall width dimension "By Style:" This setting ensures that wall components will be dimensioned according to the points you have set in the wall style. For more information, see Dimension Points for Walls on page 2221 and Specifying Object Dimension Points in AEC Dimension Styles on page 2266.
   - Extension line length of 0. For detailed information, see Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles on page 2268.
3. Use the AEC dimension style to dimension a set of interior walls in your plan, as described in Creating an AEC Dimension with User-Specified Settings on page 2231.

   Use the preview graphic to place the AEC dimension within the walls as desired.

   NOTE You can reposition the AEC dimension later with grips.

Dimensioning the Overall Building Length for Multiple Walls

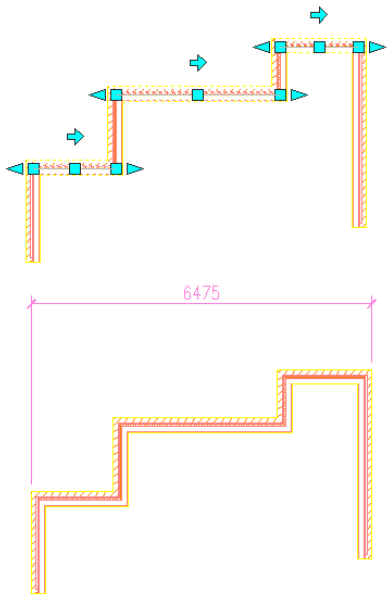
You can use any of the following methods to dimension the overall length of a building consisting of multiple walls.

- You can use an AEC dimension style that is designed to create an associative dimension for the overall length of a building.
- You can pick the outside points of the two outermost walls by snapping to them, and create an associative AEC dimension.
- You can manually specify two points representing the outermost extents of the building and create a non-associative dimension to these points.

Dimensioning the outer length of a building with an AEC dimension style

1. Create an AEC dimension style that dimensions the outer length of all selected walls.

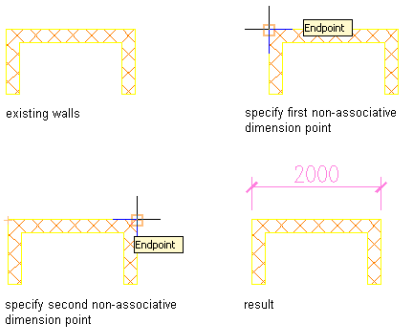
   For more information, see Dimension Points for Walls on page 2221 and Specifying Object Dimension Points in AEC Dimension Styles on page 2266.
2. Select an AEC dimension tool with the style created in the previous step.
3. Select only those walls facing the direction where you want to create the AEC dimension, and insert the dimension in the drawing.



TIP Do not select any walls that are perpendicular to the dimension. This creates additional unwanted dimension points.

Dimensioning the outer length of a building with points picked on the walls

1. Select an AEC dimension tool, and verify that OSNAP is turned on.
2. Enter **p** (Pick Points) on the command line and press ENTER.
3. Select the two outermost snap points on the building you want to dimension.
4. Place the AEC dimension in the drawing.

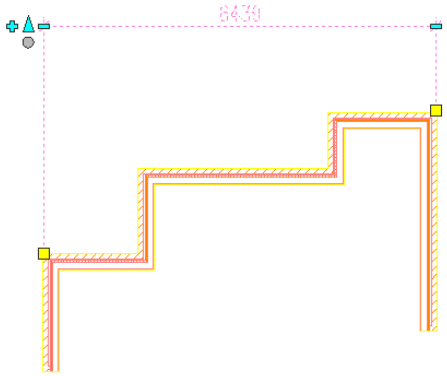


TIP You can select the associative dimension points later and offset them from their original position on the wall.

Dimensioning the outer length of a building with non-associative points

1. Select an AEC dimension tool, and verify that OSNAP is turned off.
2. Enter **p** (Pick Points) on the command line and press ENTER.
3. Specify two points in the drawing you want to dimension, press ENTER, and place the AEC dimension.

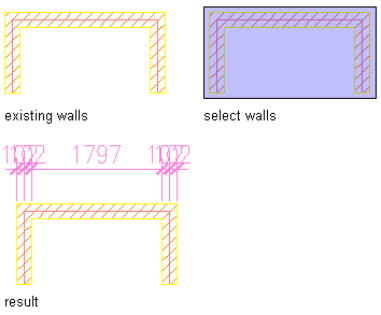
   The points you selected are not associative to the walls in the building. If you move the walls, you have to move the location points accordingly to bring the dimension up to date.



Dimensioning Wall Components in the Wall Length

Wall components are a part of the wall width, not the wall length. To generate an AEC dimension that displays wall components in the wall length, you have to select the walls vertically intersecting the wall for which you want to dimension the components in the length.

Dimensioning wall components on wall length



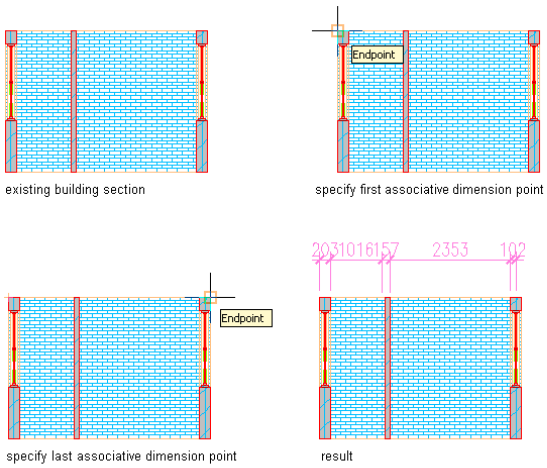
Creating Dimensions to OSNAP Points

When you are using an AEC dimension tool with the OSNAP setting turned on, and select ia point that snaps to an AEC object, you create a dimension point that is associated with the selected point on the object. For example, if you pick an Endpoint, then an associative dimension to the Endpoint of the object is generated. This allows you to create an AEC dimension that dimensions multiple associative points on one object.

Example: Dimensioning a 2D Building Section

A 2D building section is one of the objects for which dimension points can not be specified in the AEC dimension style. When you start an AEC dimension tool, and select a building section, its base point is the default dimension point. However, because you need at least 2 points to dimension you need to select 2 or more OSNAP points on the 2D section.

Dimensioning a 2D building section



1. Verify that OSNAP is turned on.
2. Select an AEC dimension tool.
3. On the command line, enter **P** (Pick Points).
4. Select the snap points on the 2D building section you want to dimension.
5. Press ENTER to create the dimension.

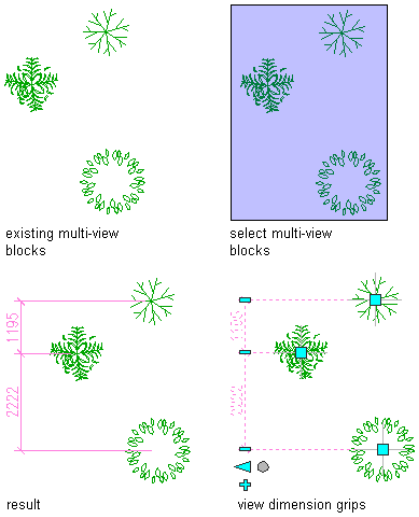
   The OSNAP points you selected on the section object are inserted as associative points on the dimension.

Creating Dimensions Associated with the Object Base Point

When you create associative dimensions for points on objects for which dimension points cannot be set in the AEC dimension style, one associative point is created for each object you select. The point is placed at the base point of the object.

Example: Dimensioning Multi-View Blocks

Associative dimensions for multi-view blocks



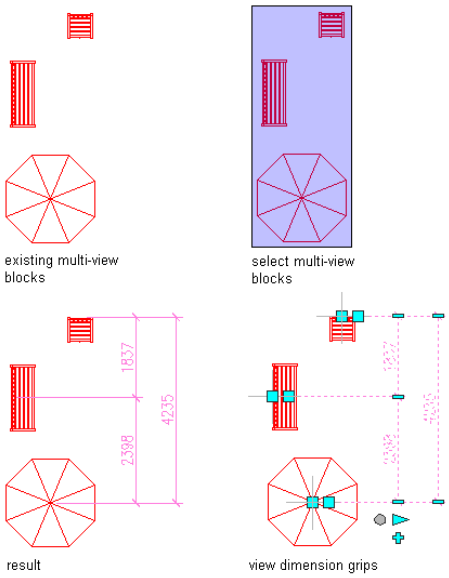
1. Verify that OSNAP is turned off.
2. Select an AEC dimension tool.
3. Select at least 2 multi-view blocks. If you select only one, the dimension will display as a defect marker.
4. Insert the dimension in the drawing.
   For each selected object, an associative dimension point is inserted at the base point of the object.

Dimensioning Points in Multi-Chain Dimensions

When you create a multi-chain dimension for which you select points in the drawing, the same points are included in every chain on the dimension.

This may be the desired behavior in a case where you are dimensioning a point of reference that should appear on every chain. If you need a particular point on one chain only, you can do either of the following:

Dimension multi-view blocks with a two-chain dimension



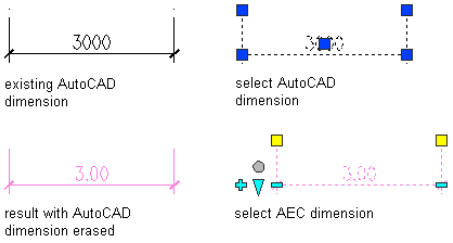
- Delete the superfluous points by clicking their Remove grips.
- Add points to individual dimension chains, as described in Adding Associative Dimensions from Picked Points to an AEC Dimension on page 2243 and Adding Non-Associative Dimensions from Picked Points to an AEC Dimension on page 2244.

Converting an AutoCAD Dimension to an AEC Dimension

Use this procedure to create an AEC dimension from an AutoCAD dimension. For each AutoCAD dimension point, a non-associative AEC dimension point is created. The resulting AEC dimension has the properties of the AEC dimension tool you select. You can edit these properties after creating the AEC dimension.

For detailed information about non-associative AEC dimension points, see Non-Associative Dimensions from Picked Points on page 2220.

Converting an AutoCAD dimension to an AEC dimension



1 Open the tool palette that you want to use.

2 Right-click an AEC dimension tool, and click Apply Tool Properties to ➤ AutoCAD Dimension.

3 Select the AutoCAD dimensions, and press *ENTER*.

4 Do one of the following:

- If you selected one AutoCAD dimension to convert, proceed to Step 7.
- If you selected multiple AutoCAD dimensions to convert, proceed to Step 5.

5 Specify the position of the AEC dimension by clicking the desired position in the drawing. The AEC dimension can, for example, be placed above or below the object.

6 Do any of the following:

- Drag the mouse to set the direction of the dimension. The extension lines are drawn into the opposite direction.
- To place the AEC dimension perpendicular to a point in the drawing, enter **perp** (Perpendicular) on the command line, and specify the point the dimension is perpendicular to.
- To set a user-specified angle for the AEC dimension, enter the desired angle on the command line.

NOTE The angle you specify here is calculated in relation to the UCS, and not to the dimensioned object.

7 When prompted to erase the original AutoCAD dimension, press *ENTER* to keep the AutoCAD dimension, or enter **y** (Yes) to erase it.

The resulting AEC dimension is displayed as follows:

If…	Then…
you selected only one AutoCAD dimension	the new AEC dimension is inserted at the same position as the AutoCAD dimension. If you did not erase the original AutoCAD dimension, the AEC dimension is placed on top of it.
you selected more than one AutoCAD dimension	the new AEC dimension is inserted according to your specifications from steps 6 and 7. If you did not erase the original AutoCAD dimensions, they remain in their original positions.

Copying Properties of AEC Dimensions to AutoCAD Dimensions

Use this procedure to copy the display properties of an AEC dimension to an AutoCAD dimension without converting the AutoCAD dimension. In this case, a number of display attributes are changed while the functionality and behavior of the AutoCAD dimension are not changed.

NOTE When you copy the properties of an AEC dimension to an AutoCAD object dimension (DIMASSOC = 2), the associativity of the resulting AutoCAD dimension is lost. Therefore, copy properties to an associative AutoCAD dimension only as the last step in your drawing process, or use traditional, non-associative AutoCAD dimensions (DIMASSOC = 1).

The following dimension display properties are copied from the AEC dimension to the AutoCAD dimension:

- **AutoCAD dimension style:** AEC dimensions have an underlying AutoCAD dimension style, defining settings for the dimension not explicitly set in the AEC dimension style.
  When you copy the properties of an AEC dimension to an AutoCAD dimension, the underlying AutoCAD dimension style of the AEC dimension is applied to the AutoCAD dimension.

  For detailed information about the connection between AutoCAD dimension styles and AEC dimension styles, see AEC Dimension Styles and AutoCAD Dimension Styles on page 2262.
- **Superscript settings:** If you have specified superscripted millimeters for AEC dimensions, this is applied to the AutoCAD dimension.

For more information about superscripts, see Specifying AEC Dimension Preferences on page 2228.

- **Extension line length:** The extension length you have specified for your AEC dimension is applied to the AutoCAD dimension.
  When you copy the properties of an AEC dimension to an AutoCAD dimension that has a different extension line length, the definition points of the AutoCAD dimension are adjusted to the new length.

The AutoCAD dimension style and length of the extension lines are view-dependent settings. When you copy the properties of an AEC dimension to an AutoCAD dimension, the settings for the current view are applied.

1. On the command line, enter **AecDimMatch**.
2. Select the AEC dimension to copy properties from.
3. Select the AutoCAD dimensions to copy properties to.
4. Press *ENTER*.

Creating an AEC Dimension Tool

Use this procedure to create an AEC dimension tool and add it to a tool palette. You may want to create your own AEC dimension tools if you are placing multiple AEC dimensions of specific styles with additional AEC dimension properties that you want to be the same each time you add an AEC dimension of that type.

1. Open the tool palette where you want to create a tool.
2. Create the tool:

If you want to…	Then…
create a tool from an AEC dimension in the drawing	select the AEC dimension, and drag it to the tool palette.
create a tool from an AEC dimension style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	right-click the tool, and click Copy. Open the other palette, and click Paste.
copy a tool from a tool catalog	click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser . Locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

3. Right-click the new tool, and click Properties.
4. Enter a name for the tool.
5. Click the setting for Description, enter a description of the tool, and click OK.
6. Expand Basic, and expand General.
7. Click the setting for Description, enter a description of the AEC dimension created from this tool, and click OK.

8 Specify a layer key and any layer key overrides if you do not want to use the layer assignments specified in the layer key style used in the drawing.

9 Select an AEC dimension style.

10 Select the drawing file containing the style used for this AEC dimension tool.

11 Click OK.

Editing AEC Dimensions

You can change the attributes of an AEC dimension, such as the objects and points dimensioned or the dimension display. You can add dimension points to an AEC dimension. You can reverse the dimension direction and manually change the length of extension lines. You can also move individual dimension text in crowded plans and override dimension values with "false" values.

AutoCAD Architecture offers several methods for editing AEC Dimensions:

- You can directly edit AEC dimensions using grips.
- You can change AEC dimension settings on the Properties palette.
- You can select editing commands from the context menu for the selected AEC dimension.

Adding Points to an AEC Dimension

You can add points to an AEC dimension in the following ways:

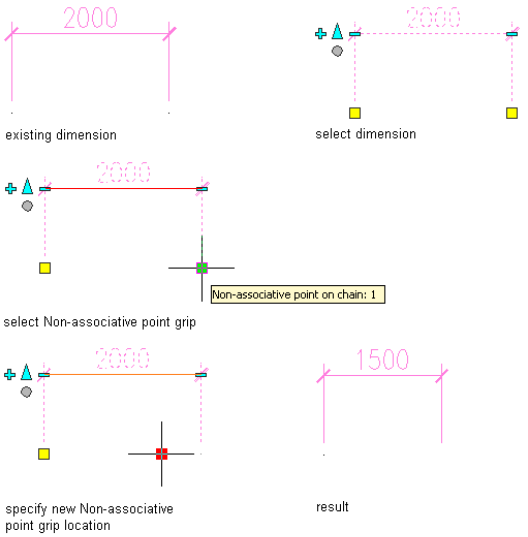
- You can attach a new object to the dimension; if dimension points have been defined for that object type in the dimension style, corresponding associative points are added to the dimension.
- You can add associative points to the dimension by picking base points or OSNAP points on AEC objects.
- You can add non-associative points to the dimension by picking points selected anywhere in the drawing. These points are not connected to objects and are therefore not associative. To change their position, you need to move the location grips generated on the dimension.

When you attach an object for which dimension points have been specified in the AEC dimension style, the points are dimensioned and added to the appropriate dimension chains. For example, if you add a wall to an AEC dimension that has style settings for wall components in 2 chains, component dimensions are added to these 2 chains.

If an object is not specified in the AEC dimension style, you can either dimension the base point of the object or pick any of its OSNAP points as dimension points. These dimension points can be manually offset while retaining the associativity to the object. For example, you can dimension the base point of a multi-view block and offset the dimension from the base point. If the multi-view block is moved or rotated, the dimension moves and rotates with it while observing the offset.

To add non-associative dimension points in a drawing, you specify points, which are added as location grips, and are dimensioned on the selected dimension chain. When the location grip is moved, the dimension point is updated accordingly. Non-associative dimension points can be useful if you want to dimension a component not represented by an AEC object, like a property line, or AutoCAD objects like blocks.

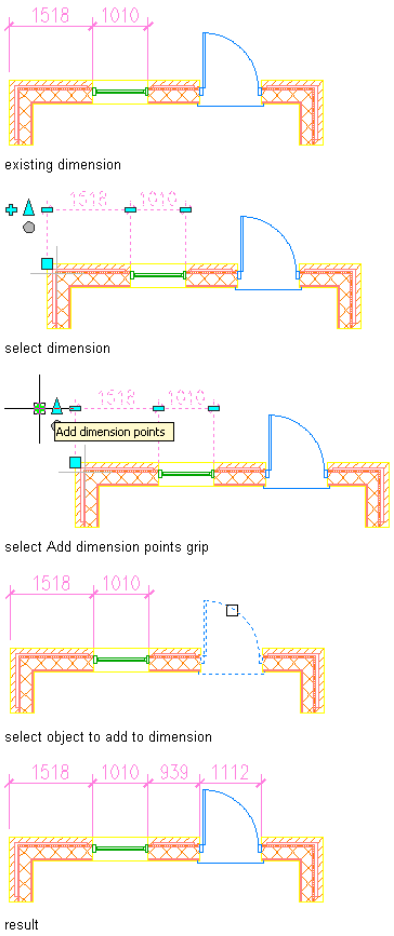
Moving a non-associative location point and updating an AEC dimension



Adding Associative Dimensions to Objects Defined in the AEC Dimension Style

Use this procedure to add associative dimensions by attaching an object for which dimension points have been defined in the AEC dimension style.

Attaching objects to an AEC dimension



You can also attach AEC objects for which dimension points are not specified in the AEC dimension style. In that case, the base point of the selected object is added as a dimension point.

1. Select the AEC dimension to which you want to attach objects, and click the Add grip ( ) or click AEC Dimension tab ➤ Modify panel ➤ Add Objects .
2. Select the objects for which you want dimension points to be added to the AEC dimension, and press *ENTER*.

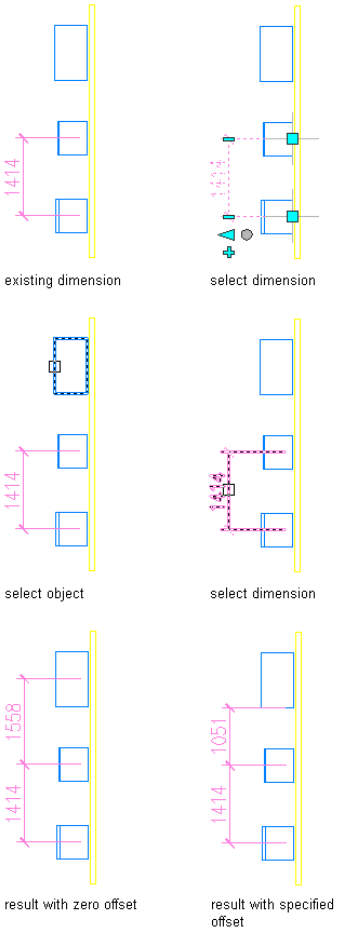
   Any dimension points specified in the style for the selected objects are added to the chains of the AEC dimension.

   If a selected object has no dimension points specified in the AEC dimension style, a dimension point is added at the base point of the object.
3. If you want to offset a dimension point from an object not specified in the AEC dimension style, select its location grip on the dimension, and move it to the desired location.

Adding Associative Dimensions from Picked Points to an AEC Dimension

Use this procedure to add associative dimensions to an AEC dimension by picking OSNAP points on an AEC object.

Adding and offsetting non-style defined dimension point to an AEC dimension



1 Verify that OSNAP is turned on.

2 Select the AEC dimension to which you want to add associative points, and click AEC Dimension tab ➤ Modify panel ➤ Add Extension Lines .

3 Select the AEC object OSNAP points you want to dimension.

NOTE OSNAP points on AutoCAD objects will be filtered out of the dimension.

4 Press ENTER.

5 Select the AEC dimension chain to which the points should be added.

Adding Non-Associative Dimensions from Picked Points to an AEC Dimension

Use this procedure to add non-associative points picked in the drawing to an AEC dimension.

1 Select the AEC dimension to which you want to add points, and click AEC Dimension tab ➤ Modify panel ➤ Add Extension Lines .

2 Select the points in the drawing that you want to dimension, and press *ENTER*.

3 Select the dimension chain to which the points should be added.

For each added point, a location grip is added at the end of the extension line, and the dimensions on the chain are updated.

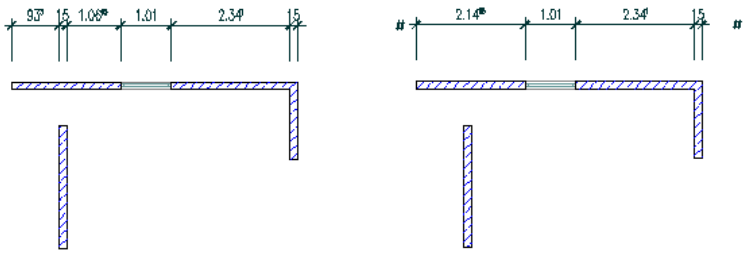
Detaching Dimension Points from an AEC Dimension

You can detach dimension points from an AEC dimension.

Detaching Objects from an AEC Dimension

Use this procedure to detach objects from an AEC dimension. When you detach the object, all style-specified dimension points for the object are removed from the dimension.

Detaching objects from a dimension



1. Select the AEC dimension from which you want to detach objects, and click AEC Dimension tab ➤ Modify panel ➤ Remove Objects .
2. Select the objects to detach from the AEC dimension.
3. Press *ENTER*.

The dimension points belonging to the selected objects are removed from the AEC dimension.

Removing Object Points Set in the AEC Dimension Style

Use this procedure to remove object points set in the AEC dimension style from an AEC dimension.

Removing these dimension points creates an override to the AEC dimension style.

IMPORTANT Removing points from an object dimension is not identical to detaching an object from an AEC dimension. Even if you remove all extension lines pointing to dimensioned points on an object, the object is still invisibly attached to the dimension through the AEC dimension style. If you turn on the display component Removed Points Marker in the AEC dimension style, you can see that the object points still exist and can be restored. If you want to detach an object from an AEC dimension completely, use the procedure in Detaching Objects from an AEC Dimension on page 2245.

1. Select the AEC dimension from which you want to remove style-defined points.
2. Click the Remove grip ( ) on the extension line of the point you want to remove, or click AEC Dimension tab ➤ Modify panel ➤ Remove Ext. Lines .
3. Proceed to remove points.

NOTE Make sure to select only extension lines referring to objects that are specified in the AEC dimension style. Only these points can be restored later.

If you remove object points using the context menu, the behavior of the removal can differ according to your preference settings:

- If the Update Added/Removed Points Immediately setting is selected, the selected points are deleted immediately.
- If the Update Added/Removed Points Immediately setting is cleared, the selected points are deleted after you end the command.

For more information, see Specifying AEC Dimension Preferences on page 2228.

NOTE If the deleted points are still visible as a crossed circle, the display component Removed Points Marker is turned on. If you do not want the removed points marker to appear, turn off the component. For more information, see Restoring Object Points Set in the AEC Dimension Style on page 2246.

When you remove multiple points, some removed points may reappear. This can happen when you have selected the option Update Added/Removed Points Immediately, and the entity display component Removed Points Marker is turned off. The reason for this behavior is that during your current removal operation, you accidentally selected an invisible removed point marker for a dimension point already removed. Removing an already removed point restores it. To avoid this effect, turn on the Removed Points Marker component in the entity display. For more information about turning components on and off, see Changing the AEC Dimension Display Components on page 2264.

Restoring Object Points Set in the AEC Dimension Style

Use this procedure to restore dimension points that have been removed from an AEC dimension and that are set in the AEC dimension style. Because the object points are set in the AEC dimension style, information about the type and position of the removed point is still present in the AEC dimension style.

1. Select the dimension chain on which to restore a removed object point.
2. Verify that the removed point is visible:

If…	Then…
the point removed is still visible as a crossed circle	proceed to step 9.
the point removed is not visible as a crossed circle	make it visible by following steps 3 through 9.

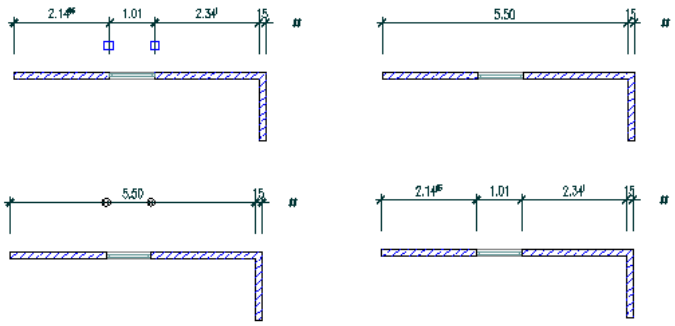
3. Right-click, and click Object Display.
4. Click the Display Properties tab.
5. Select the display representation on which the changes should appear, and select Object Override.
   The display representation in bold is the current one.
6. If necessary, click .
7. Click the Layer/Color/Linetype tab.
8. Select the Removed Points Marker component, and turn on the setting for Visibility.
9. Click OK twice.
   The removed dimension point on the dimension chain is now visible as a crossed circle.
10. If necessary, select the AEC dimension again, and click AEC Dimension tab ➤ Modify panel ➤ Remove Ext. Lines .

11 Click the center of the circle for the dimension points to restore.

- If the Update Added/Removed Points Immediately setting is selected, the selected points are deleted immediately.
- If the Update Added/Removed Points Immediately setting is cleared, the selected points are deleted after you end the command.

For more information, see Specifying AEC Dimension Preferences on page 2228.

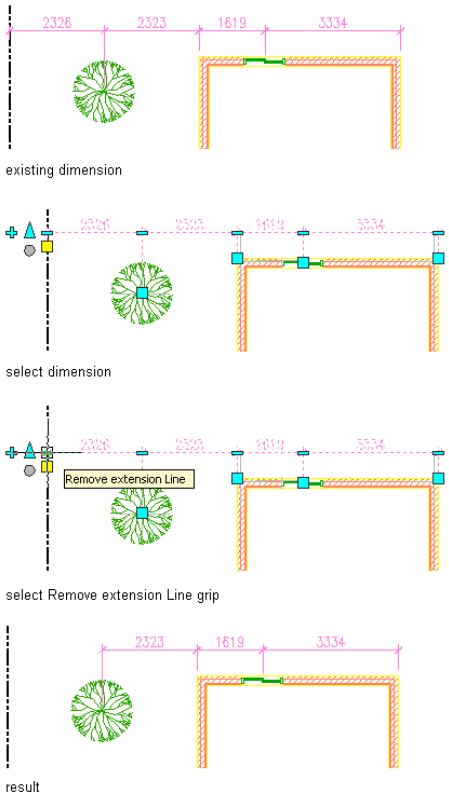
Removing and restoring object points on an AEC dimension



Removing Non-Style Defined Dimension Points

Use this procedure to remove dimension points that are not set in the AEC dimension style from an AEC dimension. These can be points that are generated by picking object OSNAP points or by picking non-object associated points in the drawing. Unlike style-defined dimension points, they cannot be restored once they are deleted, however, you can recreate them if desired.

Removing a point from an AEC dimension



1 Select the AEC dimension from which to remove dimension points.

2 Click the Remove grip( ) on the extension line of each point to remove, or click AEC Dimension tab ➤ Modify panel ➤ Remove Ext. Lines .

Reversing the Direction of an AEC Wall Dimension

You can reverse the direction of an AEC dimension that is associated with walls. Reversing the dimension direction can change the points on the wall that are dimensioned.

For an AEC dimension to be reversible, these conditions must be met:

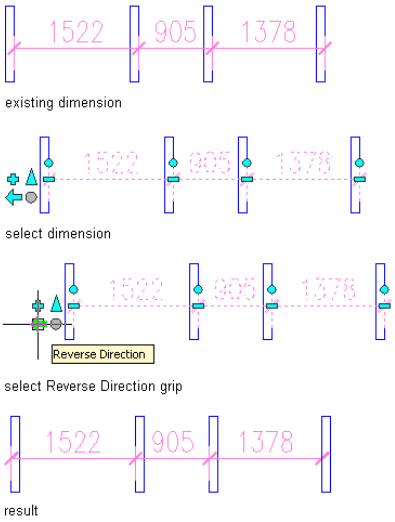
- The dimensioned wall has either two interior or two exterior sides.

  TIP If you want to reverse the dimensioned points on a wall with an interior and exterior side, you need to reverse the wall direction.

- Wall components must be dimensioned on only one side, either on the positive or the negative side.

For example, if you dimension one side of a wall component of a wall that has two interior or two exterior sides, reversing the dimension direction will dimension the opposite side of the component. For information on defining the dimensioning of wall components, see Defining the Dimension Settings for Wall Components on page 856 and Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

Reversing an AEC dimension



➤ Select the dimension for which you want to reverse the direction, and click , or click AEC Dimension tab ➤ Modify panel ➤ Reverse .

Flip Text Position for AEC Dimensions

AutoCAD is introducing two new text settings for the AutoCAD dimension style:

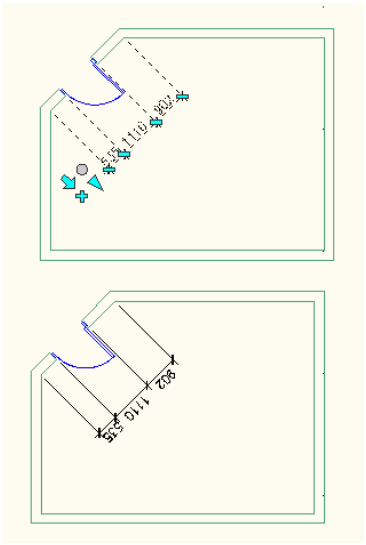
- Vertical text position: controls the vertical placement of text in relation to the dimension line. Possible settings are above the dimension line, below the dimension line, centered between extension lines, outside the dimension line, and according to JIS (Japanese Industrial Standard).
- Text view direction: Specifies the reading direction of dimension text. Possible settings are left-to-right and right-to-left.
  For more information, see "Control the Location of Dimension Text" in the AutoCAD Help.

When vertical AEC dimensions are rotated greater than 90 degrees, the dimension text flips sides. In some cases, when dimensions are part of a series of dimensions this is an undesired result.

Using the Text Flip grip addresses this issue by swapping the settings of vertical text position and reading direction so that the dimension displays correctly. In detail, these are the changes that are made:

- The vertical text setting defined in the AutoCAD dimension style will be overridden, and be set to the Below setting.
- The reading direction will be swapped from left-to-right to right-to-left or vice versa.
- Any dimension texts that have a positional override will flip in place around their location point.

NOTE You can also perform these changes in the underlying AutoCAD dimension style. This will however, affect all AEC dimensions of that style, whether they are rotated or not. In most cases an override on a specific dimension will work better.



1 Select the rotated dimension.

2 Click the Flip text to opposite side of dimension grip .

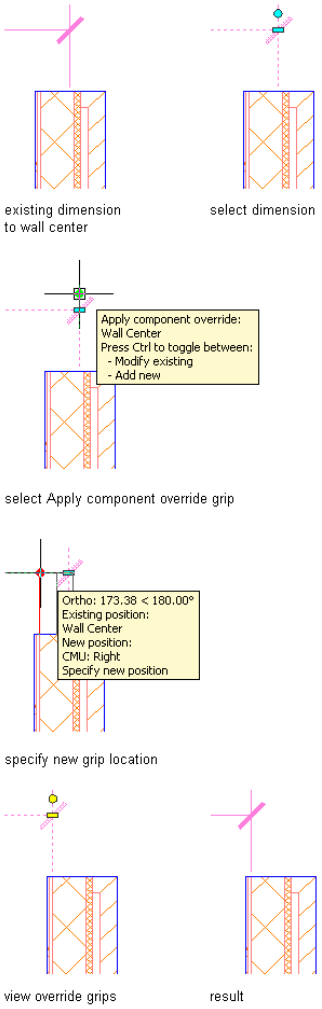
Overriding Associative Wall Component Dimension Points

If you have specified wall component dimension points in the AEC dimension style, you can override individual component dimension points on the dimension so that they override their style settings.

You can make the following overrides to a wall component dimension point:

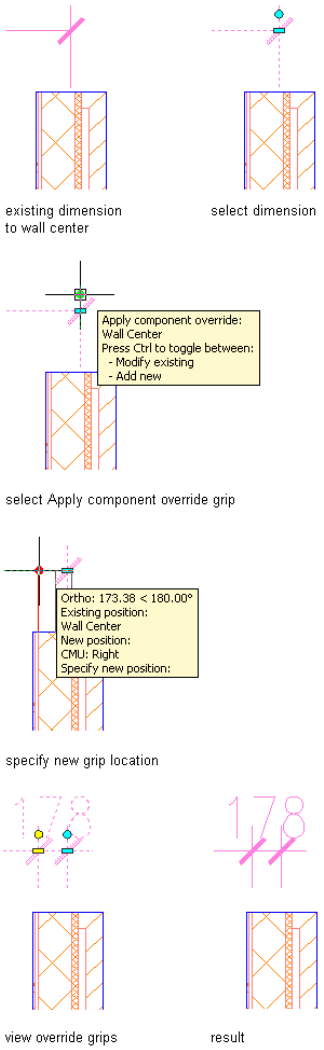
- Move a dimension point from one location on the component to another: For example, you can move a dimension point from the center of the component to the left side or to the right side.

Modify an existing wall component dimension



- Move a dimension point from one component to another: For example, you can move a dimension point from the stud component to the gyp board component on the same wall.
- Add a new dimension point for a component: You can add a dimension point to the edges or to the center of the selected component, in a case where this dimension point is not specified in the AEC dimension style or wall style.

Adding wall component dimension point



- Remove overrides and revert back to the component dimension settings specified in the style.

Overriding a component dimension

1. Select the AEC dimension on which you want to override a wall component dimension point.
2. Select the Override grip ( ) for the desired component.
   When you select the Override grip, the associated component is highlighted in the drawing.
3. Move the grip to the desired position on the component, or onto another component.
   A red temporary line shows you the position on the component.

Add a new dimension point for a component

1. Select the AEC dimension to which you want to add a wall component dimension point.
2. While pressing control, click the Override grip ( ) for the desired component, and drag the new point to the desired location.

You can add a dimension point in 3 locations on a component: the positive edge, the negative edge, and the center.

Modifying an overridden component dimension

1. Select the AEC dimension on which you want to modify a wall component override.
2. Select an overridden component dimension.

   When a component dimension point is overridden, it is marked with a yellow grip ( ).
3. Drag the grip to the desired position.

Remove overrides from a component dimension

1. Select the AEC dimension from which you want to remove a wall component dimension override.
2. Do one of the following:

If you want to…	Then…
move a component back to its style-defined position	drag the override grip ( ) to the original position on the component. When you release and re-select the grip its color changes to cyan ( ).
remove a component you have added through an override	click the Remove Extension line grip ( ).
reset all overrides	click AEC Dimension tab ➤ Modify panel ➤ Remove Override drop-down ➤ All Components .

Repositioning Dimension Texts, Extension Lines, and Dimension Chains

Use this procedure to reposition individual dimension texts, extension lines, and dimension chains on an AEC dimension.

The length of extension lines and the distance between dimension chains are set in the AEC dimension style, and are identical for all chains and all extension lines in the dimension. In some cases, you need to override those settings, and display varying extension lines or chain distances. Also, you might need to move individual dimension texts to a different location.

Viewing AEC Dimension Move All Chains and Edit in Place grips

AEC dimensions offer you the ability to change the display of a dimension with direct editing via grips.

NOTE You can only display and move the in-place grips of an AEC dimension if the underlying AutoCAD dimension style has the correct text placement settings. To ensure this, select the AEC dimension, right-click, and click AEC Dimension Style. Then, select the display representation where you want the changes to appear, and select Style Override. If necessary, click , and click the Other tab. Click Edit, and in the Dimension Style Manager click Modify. Click the Fit tab, and select Over the dimension line, without a leader for Text Placement.

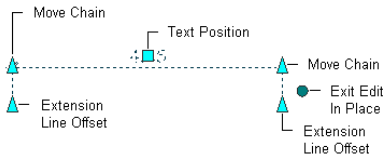
1. Select the AEC dimension on which to reposition individual texts, extension lines or dimension chains, and click its Edit In Place grip.

NOTE Alternatively, you can click AEC Dimension tab ➤ Modify panel ➤ Edit in Place .

The dimension now displays grip points for

- individual texts
- individual extension lines
- individual dimension chains

Viewing AEC Dimension Edit In Place grips

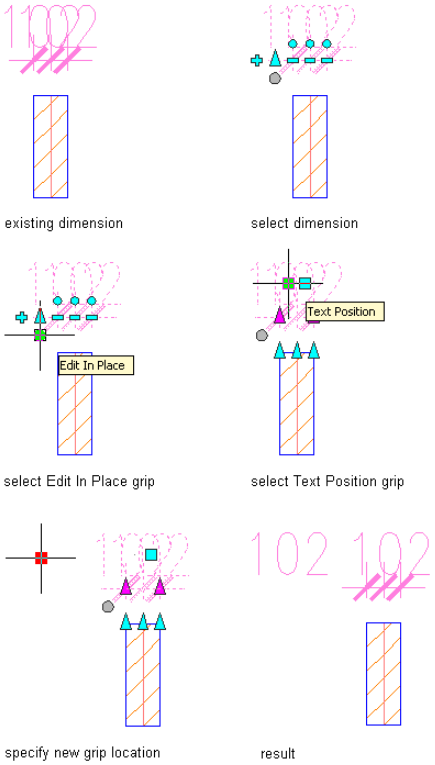


2 Use the grips to reposition dimension texts, lengthen or shorten extension lines, and reposition dimension chains.

Resetting Repositioned Dimension Texts, Extension Lines and Dimension Chains

Use this procedure to reset repositioned dimension texts, extension lines and dimension chains.

Repositioning text in a dimension



NOTE You can only reset those dimension texts that you have manually moved to a different place. If dimension texts are offset from their positions because they do not, for example, fit on the appropriate dimension segment, you cannot automatically reset them here. To make sure that your dimension texts are always placed on the dimension segment, set this in the underlying AutoCAD dimension style. Select the AEC dimension, right-click, and click AEC Dimension Style. Then, select the display representation where you want the changes to appear, and select Style Override. If necessary, click , and click the Other tab. Click Edit, and in the Dimension Style Manager click Modify. Click the Fit tab, and select Always keep text between ext lines under Fit Options.

1 Select the AEC dimension with repositioned components to be reset.

2 Set the components to their original positions:

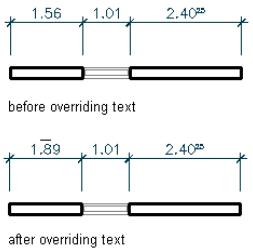
If you want to…	Then…
set the extension lines to their style settings	click AEC Dimension tab ➤ Modify panel ➤ Remove Override drop-down ➤ All Extension Lines .
set the text strings to their original position	click AEC Dimension tab ➤ Modify panel ➤ Remove Override drop-down ➤ All Text Positions .

NOTE To reset the distance between dimension chains, set the distance between chains to the original value in the AEC dimension style. For information, see Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles on page 2268.

Overriding Dimension Values and Hiding Dimension Segments

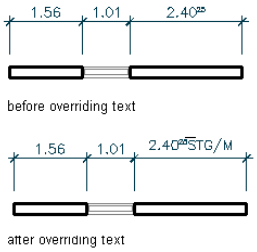
The dimension values in an AEC dimension are the real-life calculated values taken from the objects that are dimensioned. When the dimensioned object is updated, the dimension value is updated accordingly. In some cases you might want to override that value and exchange it for a manually inserted value.

Overriding dimension text with a new value



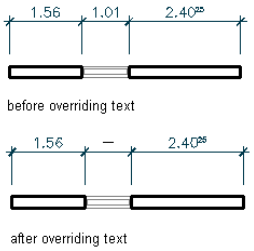
In other cases, you might want to retain the original value, but supplement it with a prefix or suffix.

Overriding dimension text with a suffix



Sometimes, you need to hide a dimension text or a whole dimension segment.

Overriding dimension text by hiding text



Overridden dimension values can be marked in different ways:

- Each manually overridden value, hidden text, or prefixed/suffixed value, is marked by a short overline. For information on how to hide the overline, see Hiding the Overline of Overridden Dimension Values on page 2258.
- You can add an underline to each overridden value. For information, see Hiding the Overline of Overridden Dimension Values on page 2258.
- You can specify in the drawing setup to underline each override automatically. For information, see Global Underline Options for Overrides on page 2257.

When you manually override a dimension value, the correct automatic value still exists. You can remove the override, and restore the correct value again.

Overriding Dimension Values

Use this procedure to exchange an automatic dimension value for a manually inserted one, to add prefixes and suffixes to dimension values, and to hide dimension texts and segments.

1 Select the dimension on which to override a dimension value, and click AEC Dimension tab ➤ Modify panel ➤ Override Text & Lines .

2 Click the value to override.

3 Specify the value override:

If you want to…	Then…
hide the selected dimension text	select Hide Text.
hide the selected dimension segment	select Hide Text and Lines.
override the dimension value	enter a value for Text. **NOTE** You can enter all alphanumeric characters here.
mark an overridden value with an underline	select Underline Text.
add a prefix to a dimension value	enter one for Prefix.
add a suffix to a dimension value	enter one for Suffix.

4 Click OK.

Removing Overrides from Dimension Values

Use this procedure to remove overrides from dimension values.

The results of removing overrides are as follows:

- Overridden values are reset to their correct value.
- Underlines and overlines are removed.
- Prefixes and suffixes are removed.
- Hidden text and hidden segments are redisplayed.

1. Select the dimension from which to remove an override, and click AEC Dimension tab ➤ Modify panel ➤ Override Text & Lines .
2. Click the value or segment from which to remove an override.
3. Click Remove Override.
4. Click OK.

Global Underline Options for Overrides

Use this procedure to set the underlines of overridden dimension values globally in the drawing.

Documentation guidelines of a company or regional office may require underlining all overridden dimension values. It would be cumbersome to underline each overridden value individually. AutoCAD Architecture offers you the ability to set underlining of overridden values as the default behavior. This means that whenever you override a dimension value, it is automatically underlined.

Similarly, you might need a quick way to remove all underlines from a plan; for example, to create a preview sheet from a not-yet-finished plan.

In this case, you can set global underlining instead of underlining or removing underlines from individual overrides.

NOTE The global underline setting is applied to existing overrides and new overrides.

1. Click ➤ Options.
2. Click the AEC Dimension tab.
3. Select Override Display of Dimensioned Text.
4. Set the global underline behavior:

If you want to…	Then…
underline all overridden dimension values in the drawing, regardless of individual settings	Select Underline All.
remove the underline from all overridden dimension values in the drawing, regardless of individual settings	Select Underline None.

Hiding the Overline of Overridden Dimension Values

Use this procedure to hide the overline of overridden dimension values.

When you create an override for a dimension value—entering a different value, hiding a text or a segment, adding a prefix/suffix—the override is marked by a small overline above the changed value. The overline is useful for seeing at a glance which values have been overridden.It is also useful when you have hidden texts and segments, to select the hidden segment.

In some cases, however, you might want to hide the overline. The overline is placed on the DEFPOINTS layer, and by default is not plotted. If you want to hide it in the AutoCAD Architecture session as well, you need to hide the DEFPOINTS layer.

1 In the Layer Properties toolbar, select the DEFPOINTS layer.

2 Click the light bulb icon to hide the layer.

NOTE Alternatively, you can hide the DEFPOINTS layer in the Layer Manager.

Changing the AEC Dimension Style

Use this procedure to change the style of an AEC dimension. AEC dimension styles contain information about the objects to dimension, the number of chains, and the display of the dimension. For information about how to define AEC dimension styles, see AEC Dimension Styles on page 2261.

1 Select one or more AEC dimensions and double-click one of them.

2 Expand Basic, and expand General.

3 Select an AEC dimension style.

Specifying Object Dimension Points for an AEC Dimension

Use this procedure to specify the objects and points to be dimensioned associatively for an AEC dimension in a particular display representation.

1 Double-click the window.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all AEC dimensions in the drawing, select Drawing default setting. To apply changes to all AEC dimensions of this style, select AEC Dimension Style:<style name>. For more information on styles, see AEC Dimension Styles on page 2261.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Contents.

7 For Apply To, select the type of object you want to dimension.

Example: In the first chain, you want to dimension the length of walls and wall intersections. For Apply To, you select Wall.

8 Under Chains, select the chain on which the dimension points appear.

Example: In the first chain, you want to dimension the length of walls. In the previous step, you selected Wall. Now, you select Chain 1.

NOTE Selecting in this context means highlighting the desired chain, and not selecting the check mark. The check mark is set automatically depending on whether dimension points for this chain are selected. Example: If you clear all possible dimension points for a chain, its check is automatically cleared.

9 On the right side, select the points to include in the highlighted chain.

Example: In the first chain, you want to dimension the length of walls and wall intersections. In the previous steps, you selected Walls and highlighted Chain1. Now, you select the check box for Length of Wall and choose Wall Length. Then, you select the check mark for Wall Intersections.

NOTE Under Wall Width, you have two settings that override the AEC dimension style settings for the dimensioning of wall components: From Style and Structural from Style. If you select From Style, the dimensioning of wall components is done according to the settings in the wall style. If you select Structural from Style, the dimensioning of wall components is done according to the settings in the wall style, but takes into account only components that have been marked as Structural in the wall style. For information on setting the dimensioning of wall components in the wall style, see Defining the Dimension Settings for Wall Components on page 856.

10 Repeat steps 7–9 until your dimension contains all objects and points you want to dimension.

11 Click OK.

You can also access and modify AEC dimension contents through the AEC dimension's context menu, as follows:

1 Select the AEC dimension you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 For the desired display representation, select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Contents tab.

6 Adjust the settings as desired, and click OK twice.

Specifying the AutoCAD Style and Other Properties for an AEC Dimension

Use this procedure to specify the AutoCAD dimension style underlying the current AEC dimension style and to specify other display settings for an AEC dimension in a particular display representation. These settings include:

- Distance between dimension chains
- Length of extension lines
- Dimension layer
- Display of height of openings

1 Double-click the AEC dimension.

2 Click the Display tab.

3 Under the General category, for Display component, verify that *NONE* is selected.

4 For Display controlled by, select This object.

NOTE To apply your changes to all AEC dimensions in the drawing, select Drawing default setting. To apply changes to all AEC dimensions of this style, select AEC Dimension Style:<style name>. For more information on styles, see AEC Dimension Styles on page 2261.

5 For Display representation, verify that the desired display representation is selected.

6 If necessary, expand Object Display Properties ➤ Advanced, and click Dimension settings.

7 To change the underlying AutoCAD dimension style of the AEC dimension style, select an AutoCAD dimension style.

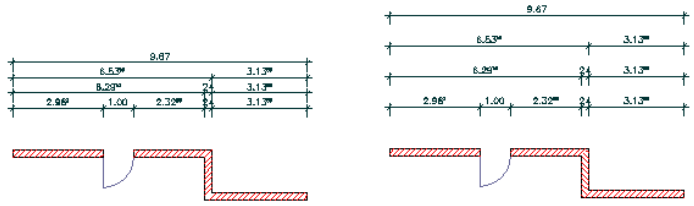
8 To edit the AutoCAD dimension style, click Edit.

For more information about AutoCAD dimension styles, see AEC Dimension Styles and AutoCAD Dimension Styles on page 2262.

9 When you are finished editing the selected style, click OK.

10 Under AEC Dimension Settings, for Distance Between Chains, enter the desired distance between the single dimension chains in the AEC dimension.

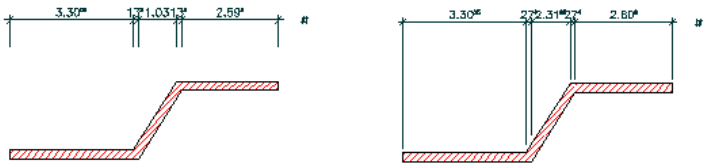
Different distances between dimension chains



11 Specify whether you want fixed or variable extension lines.

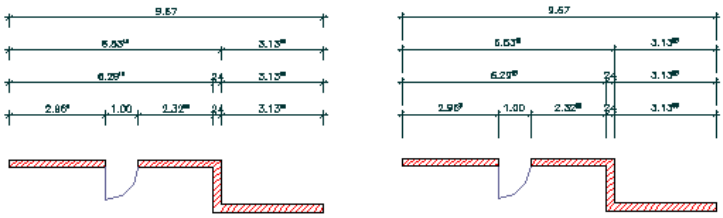
Fixed extension lines have the same length. Variable extension lines adapt to the outline of the object they dimension. AutoCAD dimensions use variable extension lines by default.

Fixed extension lines (left) and variable extension lines (right)



12 If you selected Use Fixed Length Extension Lines, enter the length of the extension lines.

Different lengths of extension lines



13 Specify whether to display the height of openings.

NOTE This opening dimension is used specifically for European working plans, where you need a detailed description of measurements.

14 Click Layer to select the layer on which to place the AEC dimension.

15 Click OK twice.

You can also access and modify these same settings through the AEC dimension's context menu, as follows:

1 Select the AEC dimension you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 For the desired display representation, select Object Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 Click the Other tab.

6 Adjust the settings as desired, and click OK twice.

Attaching Hyperlinks, Notes, and Files to an AEC Dimension

Use this procedure to attach hyperlinks, text notes, and files to an AEC dimension.

1 Double-click the AEC dimension to which to attach information.

2 Click the Extended Data tab.

3 To add a hyperlink, click the setting for Hyperlink, and specify the link.

For more information about adding Hyperlinks, see "Add Hyperlinks to a Drawing" the AutoCAD help.

4 Click the setting for Notes, and add a note. Then, click OK.

5 Click the setting for Reference Documents.

6 Attach or detach reference files:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

7 Click OK.

AEC Dimension Styles

The AEC dimension style defines objects to dimension in the AEC dimension, and the display of the AEC dimension.

You can create and edit AEC dimension styles, import and export AEC dimension styles between drawings, and purge AEC dimension styles that are not in use. When you create, purge, import, export, or edit styles, you access the Style Manager. The Style Manager provides a central location in AutoCAD Architecture where

you can work with styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

You can create an AEC dimension tool from any AEC dimension style. You can drag the style from the Style Manager onto a tool palette. You can then specify default settings for any AEC dimensions created from the tool. For more information, see Creating an AEC Dimension Tool on page 2240.

AEC Dimension Styles and AutoCAD Dimension Styles

Every AEC dimension style has an underlying AutoCAD dimension style, which controls settings that are not set directly in the AEC dimension style.

The AutoCAD dimension style defines the following properties:

- Color of dimension lines and extension lines
- Lineweight of dimension lines and extension lines
- Shape and size of dimension arrowheads
- Dimension text height and color
- Units, precision, and decimal separator symbol

The AEC dimension style defines the following properties:

- Number of dimension chains
- Dimensioned objects
- Distance between dimension chains
- Fixed or variable extension lines
- Display of opening height dimensions

The AEC Dimension Style Wizard

There are two ways of editing a dimension style:

- You can edit the dimension style in the Style Manager. The advantage of this method is that you can edit all AEC dimension style settings here.
- You can edit the dimension style with the AEC Dimension Style Wizard. The advantage of this method is that you can edit the most important display settings of the style in a fast and uncomplicated way. However, you can not change all settings here; for example, the number of chains and the objects to dimension can be edited only with the AEC Dimension Styles Properties dialog box. For more information about the AEC Dimension Style Wizard, see Changing Style Properties with the AEC Dimension Style Wizard on page 2269.

Creating AutoCAD Dimension Styles

You need to create an underlying AutoCAD dimension style before you create an AEC dimension style.

AutoCAD Architecture comes with a number of preset AutoCAD dimension styles specifically designed for use in AEC dimensions. To save time, look at these, to see if you can use them directly or with modifications.

To create an AutoCAD dimension style for use with AEC dimension styles, be sure to specify the following settings:

- Dimension line and extension line settings
- Arrowhead settings
- Text display settings
- Unit settings

1. Click Home tab ➤ Annotation panel ➤ ➤ AEC Dimension Style .
2. In the Dimension Style Manager, click New.
3. Follow the instructions for creating a new AutoCAD dimension style, as described in "Use Dimension Styles" in AutoCAD help.

For more information about connecting the AutoCAD dimension style to an AEC dimension style, see Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles on page 2268.

Creating an AEC Dimension Style

Use this procedure to create an AEC dimension style. You can create a new style with default style properties, or you can create a new style by copying an existing style. After you create the style, you edit the style properties to customize the characteristics of the style.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and expand AEC Dimension Styles.
3. Create a new AEC dimension style:

If you want to…	Then…
create a new style with default properties	right-click AEC Dimension Styles, and click New.
create a new style from an existing style	right-click the AEC dimension style you want to copy, and click Copy. Right-click, and click Paste.

4. Enter a name for the new AEC dimension style, and press *ENTER*.
5. To edit the style properties of your new AEC dimension style, select the style and edit it in the Style Manager tabs:

If you want to…	Then…
change the Layer/Color/Linetype properties	see Changing the AEC Dimension Display Components on page 2264.
change the number of chains in an AEC dimension style	see Changing the Number of Chains in an AEC Dimension Style on page 2264.
specify objects and points to dimension	see Specifying Object Dimension Points in AEC Dimension Styles on page 2266.
change the AutoCAD dimension style and other settings	see Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles on page 2268.

If you want to…	Then…
change an existing AEC dimension style with the AEC Dimension Style Wizard	see Changing Style Properties with the AEC Dimension Style Wizard on page 2269.
add notes, files, or documents to the style	see Attaching Notes and Files to an AEC Dimension Style on page 2272.

6 When you have finished changing the AEC dimension style properties, click OK.

7 If you want to assign the style to an AEC dimension tool, drag the style from the Style Manager to a tool palette.

You can later rename the tool and specify other properties for it as described in Creating an AEC Dimension Tool on page 2240.

8 Click OK.

Changing the Number of Chains in an AEC Dimension Style

Use this procedure to change the number of dimension chains in an AEC dimension style.

To set the contents of chains, see Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand AEC Dimension Styles.

3 Select the style you want to edit.

4 Click the Chains tab.

5 Enter the number of dimension chains to define for this dimension style.

6 Click OK twice.

Changing the AEC Dimension Display Components

Use this procedure to change the properties of the display components of an AEC dimension style.

The following AEC dimension display components are available:

Display components of AEC dimensions

Component	Description
AEC Dimension Group	Use this component only to turn the visibility of an AEC dimension on or off for a specific view. All the other settings, like color, linetype, and lineweight are specified in the underlying AutoCAD dimension style; any changes you enter here are not displayed.
Removed Points Marker	This component shows removed associative dimension points. Make it visible if you want to restore removed dimension points, as described in Restoring Object Points Set in the AEC Dimension Style on page 2246.
AEC Dimension Group Marker	Marker of the dimension base point.
Override Text & Lines Marker	This component is displayed when a dimension segment is hidden or a dimension text hidden or overwritten. For more

Display components of AEC dimensions	
Component	**Description**
	information, see Overriding Dimension Values and Hiding Dimension Segments on page 2255.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand AEC Dimension Styles.

3 Select the style you want to edit.

4 Click the Display Properties tab.

5 Select the display representation where you want the changes to appear, and select Style Override.

6 If necessary, click .

7 Click the Layer/Color/Linetype tab.

8 Select the component to change, and select a different setting for the property.

9 Click OK twice.

Defining Dimensioned Objects in the AEC Dimension Style

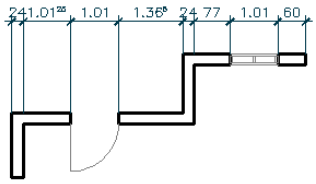
In an AEC dimension style, you can define points on objects that are dimensioned associatively with this AEC dimension style. The points that are available for each object are dependent on the object features. For example, in a wall you can dimension length, width, wall components, and openings in the wall. In a window, you can dimension the maximum and minimum opening widths, and the window center.

For a complete list of objects that can be specified in the AEC dimension style, see Associative Dimensions from Objects on page 2221.

Each AEC dimension can have up to ten dimension chains. Each chain can contain dimension points for the objects specified in the style. For more information, see Changing the Number of Chains in an AEC Dimension Style on page 2264.

Example 1: You create an AEC dimension style that contains only one chain. This chain contains wall lengths and wall intersections and the maximum opening width of openings within the wall.

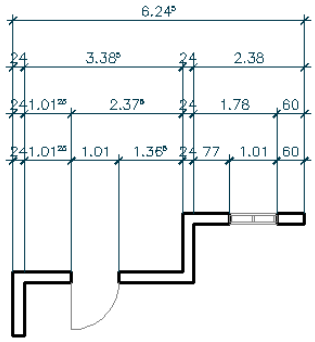
Single AEC dimension chain example



Example 2: You create an AEC dimension style designed exclusively to dimension walls, but the wall dimension points are distributed on four individual chains:

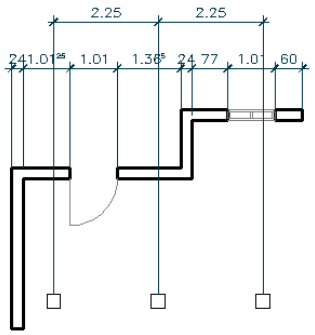
- Chain 1 dimensions the wall lengths and the wall widths.
- Chain 2 dimensions the wall lengths, wall widths and wall intersections.
- Chain 3 dimensions only the wall lengths.
- Chain 4 dimensions the outer boundaries of all selected walls.

Four AEC dimension chains example



Example 3: You create an AEC dimension style that dimensions the length of walls in a building on one chain, and a row of structural columns within the building on a second chain.

Two AEC dimension chains example



The following guidelines can help you to create AEC dimension styles:

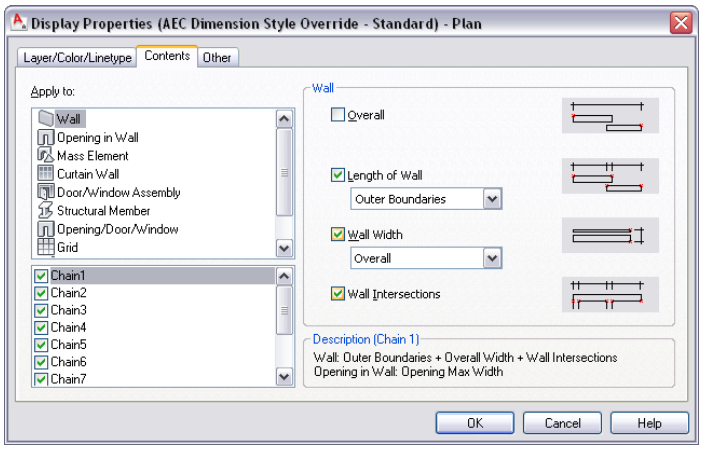
- Create a separate dimension style for each use. For example, create a style that dimensions window assemblies and curtain walls, and another one that dimensions walls and openings in walls.
- Do not include too many dimension points in one dimension chain.
- Do not include too many objects within one dimension style.

Specifying Object Dimension Points in AEC Dimension Styles

Use this procedure to specify the objects and points to be dimensioned associatively in an AEC dimension style.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and expand AEC Dimension Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Contents tab.

Selecting the contents of dimension chains



Under Apply To, you find the list of objects that can be dimensioned associatively.

Refer to Associative Dimensions from Objects on page 2221 for a complete list of objects and their dimension points.

Below the Apply To list, you find the list of available chains in this AEC dimension style.

For information on changing the number of chains, see Changing the Number of Chains in an AEC Dimension Style on page 2264.

8 For Apply To, select a object you want to dimension.

Example: In the first chain, you want to dimension the length of walls and wall intersections. For Apply To, you select Wall.

9 Under Chains, select the chain on which the dimension points appear.

Example: In the first chain, you want to dimension the length of walls. In the previous step, you selected Wall. Now, you select Chain 1.

NOTE "Selecting" in this context means highlighting the desired chain, and not selecting the check mark. The check mark is set automatically depending on whether dimension points for this chain are selected. Example: If you clear all possible dimension points for a chain, its check is automatically cleared.

---

10 On the right side, select the points to include in the highlighted chain.

Example: In the first chain, you want to dimension the length of walls and wall intersections. In the previous steps, you selected Walls and highlighted Chain1. Now, you select the check box for Length of Wall and choose Wall Length. Then, you select the check mark for Wall Intersections.

NOTE Under Wall Width, you have two settings that override the AEC dimension style settings for the dimensioning of wall components: From Style and Structural from Style. If you select From Style, the dimensioning of wall components is done according to the settings in the wall style. If you select Structural from Style, the dimensioning of wall components is done according to the settings in the wall style, but takes into account only components that have been marked as Structural in the wall style. For information on setting the dimensioning of wall components in the wall style, see Defining the Dimension Settings for Wall Components on page 856.

---

11 Repeat steps 7–9 until your dimension contains all objects and points you want to dimension with this style.

12 Click OK three times.

Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles

Use this procedure to select the AutoCAD dimension style underlying the AEC dimension style and these other settings that affect the appearance of the AEC dimension:

- Distance between dimension chains
- Length of extension lines
- Dimension layer
- Display of height of openings

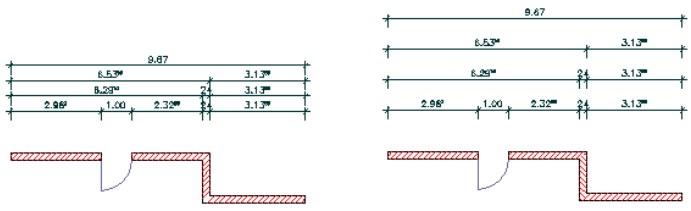
NOTE Activating the display of the opening height takes effect only if you select dimension points for openings in one or more chains of this dimension style. For information on selecting opening dimension points, see Specifying Object Dimension Points in AEC Dimension Styles on page 2266.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Documentation Objects, and expand AEC Dimension Styles.
3. Select the style you want to edit.
4. Click the Display Properties tab.
5. Select the display representation where you want the changes to appear, and select Style Override.
6. If necessary, click .
7. Click the Other tab.
8. To change the underlying AutoCAD dimension style of the AEC dimension style, select an AutoCAD dimension style.
9. To edit the AutoCAD dimension style, click Edit.

   For more information about AutoCAD dimension styles, see AEC Dimension Styles and AutoCAD Dimension Styles on page 2262.

   To return to the Other tab in the Display Properties dialog box, click Close.
10. Specify the distance between the single dimension chains in the AEC dimension.

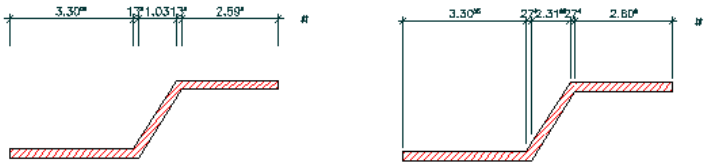
    Different distances between dimension chains



11. Specify whether you want fixed or variable extension lines.

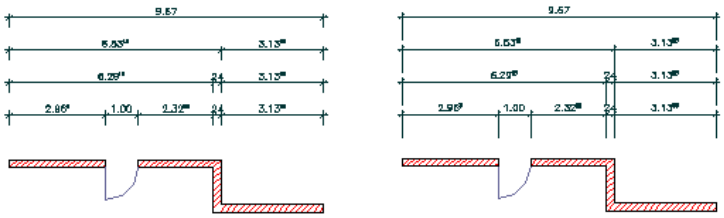
    Fixed extension lines have the same length. Variable extension lines adapt to the outline of the object they dimension. AutoCAD dimensions use variable extension lines by default.

Fixed extension lines (left) and variable extension lines (right)



12 If you select fixed extension lines, enter the length of the extension lines.

Different lengths of extension lines



13 Specify whether to display the height of openings.

NOTE This opening dimension is used specifically for European working plans, where you need a detailed description of measurements.

14 Click Layer to select the layer on which to place the AEC dimension and click OK.

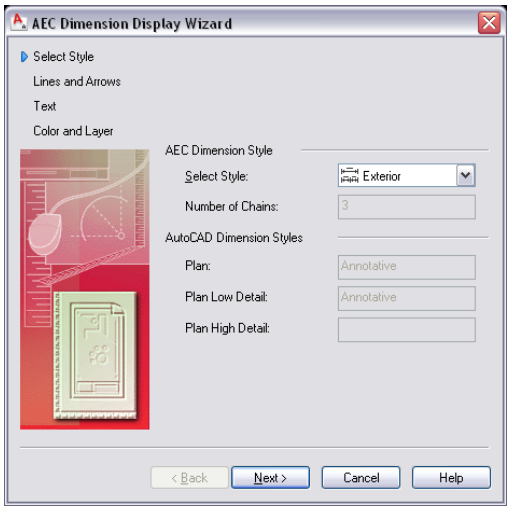
15 Click OK twice.

Changing Style Properties with the AEC Dimension Style Wizard

Use this procedure to change a number of AEC dimension style properties with the help of a wizard. The AEC Dimension Style Wizard offers you a fast way of changing these properties of a style:

- Arrowhead shape and size
- Length and color of extension lines
- Color of dimension lines
- Distance between dimension chains
- Dimension text style, size, and color
- Rounding-off value
- Layer assignment

1 Click Manage tab ➤ Style & Display panel ➤ ▾ ➤ Dimension Style Wizard .



2 Select the AEC dimension style to edit and click Next.

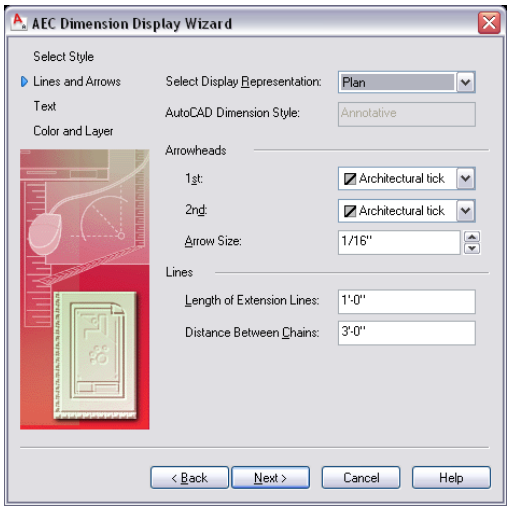
IMPORTANT If you choose a dimension style that has its property source set to System Default, you get a warning message. If you want to edit the style, close the Wizard, open the style in the Style Manager, and set the display property source to a style override. For more information about working with the Style Manager, see Style Manager Overview on page 566.

3 Select the display representation to change.

NOTE If the AEC dimension style you choose to edit is based on the same AutoCAD dimension style for different display representations, the edits you make apply to all display representations. To avoid this, make sure that the AEC dimension style uses different AutoCAD dimension styles for different display representations. For more information about assigning AutoCAD dimension styles to AEC dimension styles, see Selecting the AutoCAD Dimension Styles and Other Properties of AEC Dimension Styles on page 2268.

4 Specify line and arrow settings:

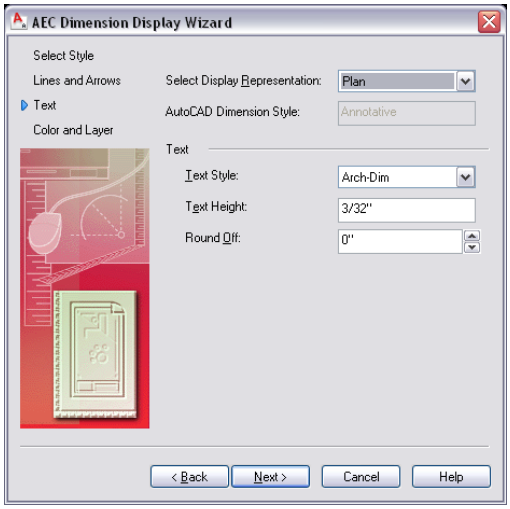
- Select new arrowhead symbols.
- Change the size of the arrowheads.
- Define a new length for the extension lines.
- Define a new distance between the individual dimension chains.



5 Click Next.

6 Specify text settings:

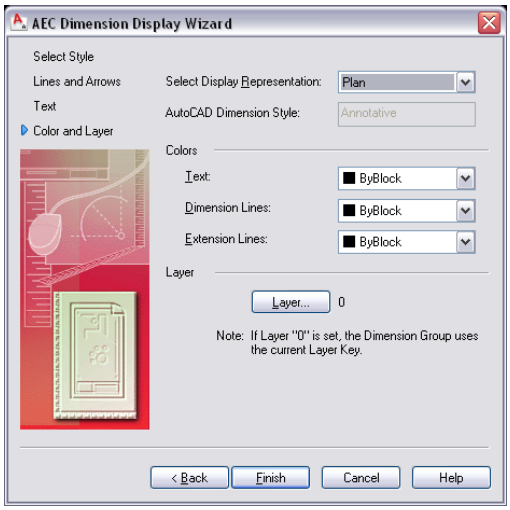
- Select a new text style.
- Enter a new text height.
- Define a new round-off precision for dimension values.



7 Click Next.

8 Specify Color and Layer settings:

- Select a new text color.
- Select a new dimension line color.
- Select a new extension line color.
- Select a new layer for the dimension.



9 Click Finish.

Attaching Notes and Files to an AEC Dimension Style

Use this procedure to attach text notes and files to an AEC dimension style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand AEC Dimension Styles.

3 Select the style you want to edit.

4 Click the General tab.

5 To add a description to the AEC dimension style, enter the description under Description.

6 Click Notes.

7 To add a note, click the Notes tab, and enter the note.

8 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Edit the description, and click OK.
edit a reference file	double-click the reference file name to start its application. Click OK when you are done editing.
detach a reference file	select the file name, click Delete, and click OK.

9 Click OK twice.

Q and A for Working with AEC Dimensions

This topic contains questions and answers that can help you to achieve the results you want when working with AEC dimensions.

Changing Color, Text Size and Arrowheads

How do I change the color, text size, and arrowheads of an AEC dimension?

Those settings are specified in the AutoCAD dimension style that underlies the AEC dimension style. To access them easily, use the AEC Dimension Style Wizard. For more information, see The AEC Dimension Style Wizard on page 2262.

Updating AEC Dimensions On Demand

How can I specify that AEC dimensions are updated only on demand?

If you freeze the layer on which an AEC dimension is placed, the AEC dimension is updated only when the layer is thawed again or if you execute the REGEN command.

When you switch to another view, for example, a three-dimensional (3D) view, and then back to a Plan view, the AEC dimension is not updated. Freezing the dimension layer can enhance drawing performance, especially for big drawings.

You can add new AEC dimensions even when the layer is frozen. However, you can edit them only after the layer has been thawed again.

Changing the Text Height of Superscripted Numbers

How can I change the text height of superscripted numbers in an AEC dimension?

By default, the text height of superscripted numbers in AEC dimensions is set to 50 percent of the text height of the underlying AutoCAD dimension style (DIMTXT). To change this default, you must change the corresponding value in the Registry file.

WARNING Making changes in the Registry file can have far-reaching consequences for the whole application. Before you change anything here, make sure that this is what you really want to do. If you are not sure, consult your CAD manager or IT department.

1. Open the Windows Registry Editor.
2. Navigate to *HKEY_LOCAL_MACHINE\SOFTWARE\Autodesk\AutoCAD\R18.0\ACAD-8004:409\AEC\6.0\AecArchDACHBase60\ObjectDefaults\AEC Dimension\SuperscriptScaleFactor*.
3. Enter the desired value. The value here is relative to the AutoCAD dimension text height (*DIMTXT*).

Fixing the Error Symbol

The AEC dimension for a wall 1 meter high is displayed only with an error symbol. How can I get a correct dimension display?

The cut plane of the AEC dimension is taken from the cut plane of the dimensioned wall in the current display configuration. If the cut plane is set to a higher value, you must change it to include the lower wall into the dimension. For information on setting the wall cut plane, see Specifying the Cut Plane Display of a Wall Style on page 862.

Finding More Dimension Points than Expected

I am dimensioning the intersection points of walls and receive more dimension points than expected on the dimension. How can I check if this dimension is correct?

When you receive more wall intersection dimension points than you expect, it is possible that the walls you are dimensioning intersect with other walls that are not included in this dimension chain. To see if this is so, and if your dimension is correct, you can prolong the extension lines so that they actually meet the point they dimension. You can then verify that the dimension points on your chain are placed correctly.

Elevation Labels

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Elevation labels are used to dimension height values in plan and section views.

Elevation Labels

Elevation labels are used to dimension height values in plan and section views.

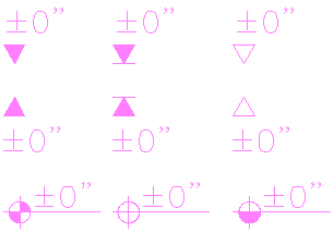
Elevation Labels and Coordinate Systems

Elevation labels are interactive multi-view blocks used for dimensioning heights in a drawing. They are anchored to either the world coordinate system (WCS) or a named user coordinate system (UCS). Elevation labels are used primarily for measuring the heights of building elements like walls or windows, but they can be used to measure every point in your drawing. You can add elevation labels in plan and section views. AutoCAD Architecture offers a number of predefined blocks for commonly used elevation labels. You can also define your own elevation labels.

When elevation labels are moved along the *Z*-axis, their *Z*-values change accordingly. Elevation labels can, however, be anchored only to a named UCS or the WCS; not to any building object. If the object height is changed, the value of the elevation label is not updated automatically.

An elevation label measures the height of a point with relation to the reference height. The reference height can be taken from the *Z*-coordinate of the WCS or the *Z*-coordinate of a named UCS.

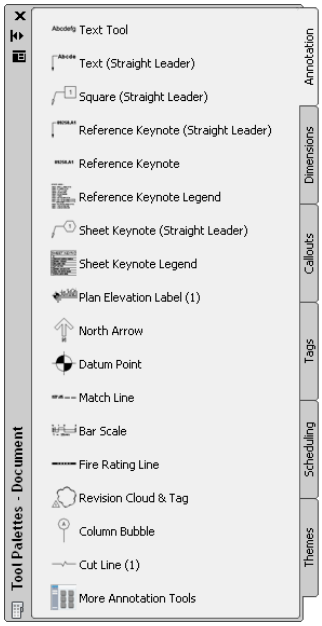
Elevation labels



Using Elevation Label Tools to Create Elevation Labels

Tools provided with AutoCAD Architecture let you quickly place elevation labels using an elevation label tool with specific predefined properties. You can use the default settings of the tool, or you can change the properties.

Tool palette containing elevation label tools



The default tool palettes in the workspace contain sample elevation label tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain elevation label tools that you can add to your tool palettes:

- Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog
- My Tool catalog

Custom palettes created by your CAD manager or other users may also contain elevation label tools with multi-view block definitions and properties that are customized for your projects or office standards.

Creating an Elevation Label

Use this procedure to add a new elevation label that has the properties specified in the elevation label tool that you select. To specify settings when you add an elevation label, see Creating Elevation Labels with User-Specified Settings on page 2276.

1. Click Annotate tab ➤ Tools panel ➤ Annotation Tools .
2. Select an elevation label tool.

   If necessary, scroll to display the tool that you want to use.
3. Specify the insertion point of the elevation label.

   You can move or hide the Properties palette to expose more of the drawing area.
4. Click OK.

Creating Elevation Labels with User-Specified Settings

Use this procedure to add an elevation label with settings that you specify.

1 Click Annotate tab ➤ Tools panel ➤ Annotation Tools .

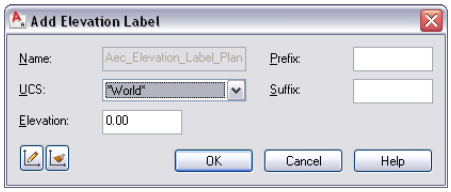
2 Select an elevation label tool.

If necessary, scroll to display the tool that you want to use.

3 In the drawing area, specify the insertion point of the elevation label.

You can move or hide the Properties palette to expose more of the drawing area.

The Add Elevation Label dialog is displayed.



4 Select the coordinate system for the elevation label:

If you want to…	Then…
select an existing coordinate system from the drawing	under UCS, select the coordinate system from the list.
create a new named user coordinate system (UCS)	click (Define UCS), and define the new UCS on screen. For more information about creating user coordinate systems, see "Use Coordinates and Coordinate Systems" in AutoCAD help. **TIP** The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.
use the UCS of an existing elevation label	click (Match UCS) and select the elevation label on screen.

5 Enter the elevation value of your label.

The value you enter here is always calculated in relation to the coordinate system you have selected. When you redefine the coordinate system, the *Z*-value of the elevation label is recalculated accordingly.

For example, you have a UCS named "First Floor," with its *Z*-origin at 3 m. When you insert an elevation label in WCS and set it to 2 m, and then change the coordinate system to "First Floor" the *Z*-value of the elevation label is changed to -1 m.

6 If necessary, enter a prefix and suffix for the elevation label.

7 Click OK.

Creating an Elevation Label Tool

Use this procedure to create an elevation label tool and add it to a tool palette. You may want to create your own elevation label tools if you are placing multiple elevation labels of a specific style and they all have the same properties.

Elevation labels consist of a multi-view block definition connected to a custom AEC command. Therefore, the process of creating an elevation label tool differs from the process of creating a regular object tool, like a door tool.

To create an elevation label tool, you need a multi-view block definition with a custom command that is placed in DesignCenter™. Predefined elevation labels are available in DesignCenter, so check to see if the desired elevation label is already there.

If you find no elevation label meeting your needs, create one, as described in Creating User-Defined Elevation Labels on page 2281, and place it into AutoCAD DesignCenter.

From AutoCAD DesignCenter, you create an elevation label tool.

1 Click Insert tab ➤ Content panel ➤ Content Browser drop-down ➤ Design Center .

2 Navigate to the folder containing the elevation label from which you want to create a tool.

3 Open the tool palette on which you want to add the elevation label tool.

4 Create the tool:

If you want to…	Then…
create a tool from the AutoCAD DesignCenter	drag the desired elevation label from the AutoCAD DesignCenter to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	right-click the tool, and click Copy. Reopen the tool palette where you want to add the tool, right-click, and click Paste.
copy a tool from a tool catalog in the Content Browser	Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser , open the catalog and locate the tool you want to copy. Position the cursor over the i-drop handle, and drag the tool to the tool palette.

5 Right-click the new tool, and click Properties.

6 Enter a name for the tool.

7 Click the setting for Description, enter a description of the tool, and click OK.

Modifying Elevation Labels

You can change the attributes of an elevation label, such as the associated UCS or the scaling factor.

- You can change elevation label settings on the Properties palette.
- You can select editing commands from the contextual ribbon tab and shortcut menu for a selected elevation label.

Changing the Elevation of an Elevation Label

Use this procedure to change the value for the elevation of an elevation label.

The value of an elevation label is always calculated in relation to the coordinate system of the label.

1 Select the elevation label you want to change, right-click, and click Elevation Label Modify.

2 Enter the new elevation value.

3 Click OK.

Changing the Coordinate System of an Elevation Label

Use this procedure to change the coordinate system of an elevation label.

For more information on how elevation labels are dependent on coordinate systems, see Elevation Labels on page 2275.

1 Select the elevation label you want to change, right-click, and click Elevation Label Modify.

2 Select a new coordinate system for the elevation label from the list.

3 Click OK.

Changing the Associated Multi-View Block Definition

Use this procedure to change the multi-view block definition associated to an elevation label. For information about multi-view block definitions and elevation labels, see Creating User-Defined Elevation Labels on page 2281.

1 Select the elevation labels you want to change, and click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .

NOTE Alternatively, right-click and choose Properties.

2 On the Properties palette, expand Basic, and expand General.

3 Select a different multi-view block definition for Definition.

Changing the Scale Factor of an Elevation Label

Use this procedure to change the scale factor of an elevation label.

1 Select the elevation labels you want to change, and click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .

NOTE Alternatively, right-click and choose Properties.

2 On the Properties palette, expand Basic, and expand Scale.

3 Change the scale factor of the elevation label:

If you want to…	Then…
change the *X* scale factor	enter a new value for X.
change the *Y* scale factor	enter a new value for Y.
change the *Z* scale factor	enter a new value for Z.

Changing the Offset of an Elevation Label

Use this procedure to change the offset of the elevation label from its insertion point.

When you add an elevation label to a drawing, the offset value is set to 0. You can change the position of the elevation label in the drawing by offsetting it from its original insertion point.

1 Select the elevation label you want to change and click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .

NOTE Alternatively, right-click and choose Properties.

2 On the Properties palette, expand Advanced.

3 Click next to Insertion Offsets.

4 Select the view block for the appropriate view. For example, to change the offset in Plan 1:100, select a view block to indicate that it belongs to that view (for example, ElevationLabel100).

5 Change the offset of the elevation label from its insertion point:

If you want to…	Then…
change the offset from the *X* insertion point	enter a new value for X offset.
change the offset from the *Y* insertion point	enter a new value for Y offset.
change the offset from the *Z* insertion point	enter a new value for Z offset.

6 Click OK.

Display the View Blocks and Attributes of an Elevation Label

Use this procedure to display the blocks and attributes contained in an elevation label.

An elevation label is created from a multi-view block definition which, in turn, is built from blocks and attributes. You can display the blocks and attributes to understand how the label is structured.

1 Select the elevation label for which to display blocks and attributes, and click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .

NOTE Alternatively, right-click and choose Properties.

2 On the Properties palette, expand Advanced.

3 Click next to Attributes.

In the Multi-view Block Attributes worksheet, the blocks from which your elevation label is composed are displayed.

The list on the right shows the attributes of the blocks and their current values.

For more information about multi-view blocks, blocks, and attributes, see Creating User-Defined Elevation Labels on page 2281.

NOTE Although you can edit the values in the list, those modifications are not applied; your modified values are overwritten by the values the elevation label gets from its coordinate system.

4 Click OK.

Attaching Hyperlinks, Notes, or Files to an Elevation Label

Use this procedure to attach hyperlinks, text notes, and files to an elevation label.

1 Select the elevation label to which you want to attach information, and click Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties .

NOTE Alternatively, right-click and choose Properties.

2 On the Properties palette, click the Extended Data tab.

3 To add a hyperlink, click next to Hyperlink, and specify the link.
For more information, see "Add Hyperlinks to a Drawing" in AutoCAD help.

4 Click next to Notes, add a note, and then click OK.

5 Click next to Reference Documents.

6 Attach or detach reference files:

If you want to…	Then…
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

7 Click OK.

Creating User-Defined Elevation Labels

The AutoCAD Architecture templates provide a number of predefined elevation labels.You may, however, want to create specific labels that are not included in any of the templates.

You can choose attributes for your own elevation labels, combine them into blocks, and create elevation labels from them.

Process Overview: Creating User-Defined Elevation Labels

Creating a user-defined elevation label consists of these basic steps:

1. Determine the location of the property set definition of the custom label.
2. If necessary, create a new property set definition to use in the custom label.
3. Create a graphic symbol.
4. Add attributes from the property set definition to the drawing.

5 Create a block from the attributes.

6 Create a multi-view block from the block.

7 Add the elevation label to DesignCenter™.

Creating a Graphic Symbol

Elevation labels usually consist of a graphic symbol and attributes that define elevation height and other information.

You can create a graphic symbol with any of the drawing commands in AutoCAD, or you can import a symbol from another drawing or from a symbol library.

For information about drawing objects in AutoCAD, see "Create and Use Blocks (Symbols)" in AutoCAD help.

Adding Attributes

Use this procedure to add attributes to an elevation label.

An elevation label usually contains attributes for displaying the elevation, prefixes, and suffixes.

Elevation label attributes come from a property set definition. Predefined attributes are available when you start with one of the templates, or when you start from scratch and drag a predefined elevation label from DesignCenter™ into the drawing.

Elevation label attributes

Attribute/Tag	Description
ELEVATION	Displays the height of an elevation label in relation to the coordinate system chosen.
ELEVATION:MM	Displays the millimeters of the elevation value in superscript. You need this attribute only when working with metric units.
PREFIX	To enter a prefix for the elevation label, you must add this attribute. For more information about entering prefixes, see Creating Elevation Labels with User-Specified Settings on page 2276.
SUFFIX	To enter a suffix for the elevation label, you must add this attribute. For more information about entering suffixes, see Creating Elevation Labels with User-Specified Settings on page 2276.

To use different attributes in elevation labels, create your own Property Set Definition for elevation labels. For more information, see Property Set Definitions on page 2510.

1 Click Insert tab ➤ Attributes panel ➤ Define Attributes .

2 For Tag, enter one of the attributes from the table. For example, to create an attribute for the height of the elevation, enter **-ELEVATION**.

3 Proceed with creating the attribute. For more information, see "Attach Data to Blocks (Block Attributes)" in AutoCAD help.

4 Repeat steps 1–3 for each attribute you want to add to the elevation label.

Creating a Block

Use this procedure to create a block from the attributes you have created.

1. Click Insert tab ➤ Block panel ➤ Create Block .
2. Enter a name for the block.
3. Click Select Objects, and select the graphic symbol and the attributes to include in the elevation label.
4. For Insert Units, select Unitless.
5. Proceed with creating the block as described in "Block Definition Dialog Box" in AutoCAD help.

Creating a Multi-View Block

Use this procedure to create a multi-view block for the elevation label.

For detailed information about multi-view blocks, see Multi-View Blocks on page 1881.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Multi-Purpose Objects, and expand Multi-View Block Definitions.
3. Right-click Multi-View Block Definitions, and click New.
4. Enter a name for the new multi-view block definition.
5. Select the new multi-view block definition.
6. Click the View Blocks tab.
7. Select a display representation for the elevation label.
8. Click Add.
9. Select the block you defined in Creating a Block on page 2283, and click OK.
10. Select the view directions for the block.
11. Repeat steps 6–9 for each display representation where you want the elevation label to display.
12. Click OK.

Adding the Elevation Label to the AutoCAD DesignCenter

Use this procedure to add user-defined elevation labels to DesignCenter.

To add the elevation label to AutoCAD DesignCenter, you need to create a DWG file in the AEC Content Wizard. For a detailed description of the AEC Content Wizard, see Using the AEC Content Wizard on page 2569.

1. On the command line, enter **AecCreateContent**.
2. Select Custom Command.
3. Select the multi-view block you created in Creating a Multi-View Block on page 2283, and click Add to add it to the Content File.
4. For the Command string, enter **AecAnnoScheduleTagAdd**, followed by a space and then the name of the multi-view block, and its parameters. The command is built as follows:

   _AecAnnoScheduleTagAdd <name of the drawing containing the property set definition>.dwg **_SYMBOL** <name of the multi-view block created> **_LEADER** _None **_DIMSTYLE** _Current

   In our example, the custom command could look like this:

   _AecAnnoScheduleTagAdd ElevationLabelPropertySetDefs.dwg **_SYMBOL** ElevationLabelMVBlock **_LEADER** _None **_DIMSTYLE** _Current

5 Click Next.

6 Select Enable AEC Unit Scaling.

7 Select a layer key for the label.

NOTE The default layer key for elevation labels is DIMLINE.

8 Click Next.

9 Enter a file name and a folder for the label.

NOTE Be sure to save the custom label in a folder one level below the used property set definition drawing. If the property set definition drawing is saved in *C:\ProgramData\Autodesk\ACA 2010\enu\AEC Content\Metric\Documentation\Elevation Labels*, then the custom label could be saved in *C:\ProgramData\Autodesk\ACA 2010\enu\AEC Content\Metric\Documentation\Elevation Labels\Custom Labels*.

10 Click Finish.

Fields

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A field is a multiline text object consisting of a field name and a field value which can be automatically updated to show the latest value for data that may change during the lifecycle of the project. Fields enhance the documentation capabilities within a drawing file and add value to the drawing data.

Fields Overview

Fields are updatable data units within an AutoCAD Architecture drawing. Fields can be entered into the drawing as standalone multi-text elements, as components of AutoCAD text elements or table cells, as attribute values or as part of AutoCAD Architecture property set data. You can choose from a number of field types specific to architectural processes and tasks. For a complete list, see AutoCAD Architecture Field Types on page 2296.

You can update field values on demand or specify various automatic update mechanisms, for example updating a field when the drawing is opened or saved.

For detailed information about AutoCAD field types, see “Use Fields in Text” in AutoCAD help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

You can use fields in the following drawing components:

AutoCAD Text Elements

You can insert fields into AutoCAD text, multi-line text, table cells and attributes. When you insert fields in attributes, you can create interactive annotation that displays sheet numbers, project details, and other important information. For an example, see Creating New Callout Tools on page 2450.

Property Set Data

Fields can be inserted in property set data. You can insert a field into a property set definition, thereby adding it to any object or object style to which the property set is attached. You can also insert a field in any manual property attached to an object or style, using the manual property as a placeholder for the field.

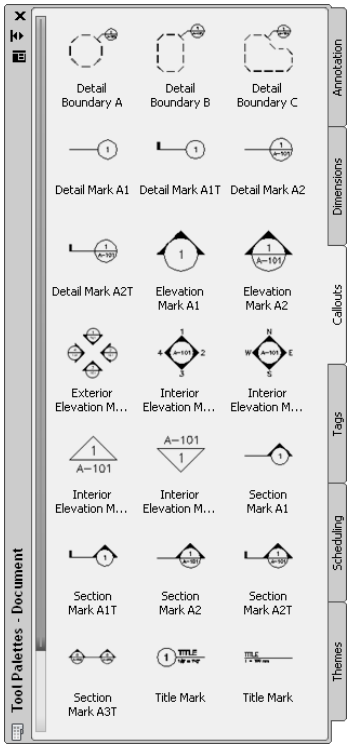
Property set data can be used to create schedule tables of objects and drawings, or to build tags, annotation, and other content. Schedule reports can be placed in an AutoCAD Architecture drawing, or they can be exported to XLS, tab-delimited text, or comma-separated text.

Annotation Tools

AutoCAD Architecture provides a number of predefined annotation tools that use different kinds of fields. For example, keynote tools use keynote fields, while callout tools use sheet set fields.

You can also use fields to create your own annotation tools. For an example, see Creating New Callout Tools on page 2450.

Callout tools in AutoCAD Architecture



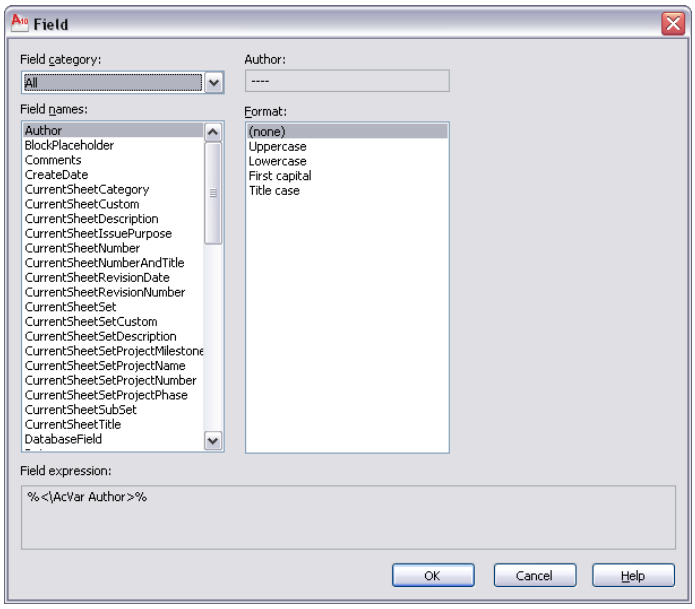
Inserting Fields

Fields can be inserted directly into drawings, or as components of other elements. When a field is inserted directly, it is entered as a multiline text element. You can also insert it in existing text and multiline text, tables cells, attributes, and property set definitions.

Inserting Fields in a Drawing

You can create field anywhere in a drawing. When a field is inserted directly, and not within another element, it is created as a multiline text element.

1 Click Annotate tab ➤ Text panel ➤ ➤ Field.



2 Select a field category to choose from.

3 Select a field, and if necessary, specify additional information regarding this field.

For example, if you want to insert a Plot Date field, you need to specify the date format.

4 Click OK.

5 Insert the field in the drawing.

If you want to…	Then…
insert the field directly	click where the field should be inserted in the drawing area.
change the height of the field	enter h (Height) on the command line and press *Enter*. Enter the new height and press *Enter* again. Then, select the insertion point.
change the orientation of the preview cursor,	enter j (Justify) and press *Enter*. Enter the combination for the desired orientation, and press *Enter*. Then, select the insertion point.

Date field inserted in drawing

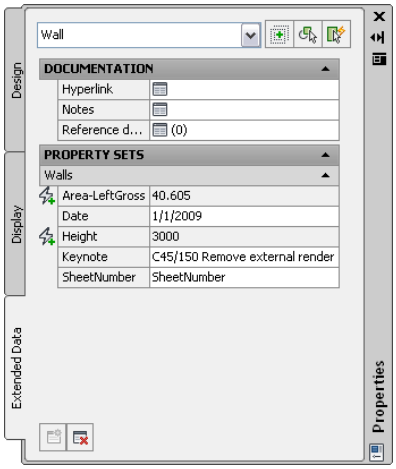
Inserting Fields in Property Set Definitions

Use this procedure to insert a field in a property set definition.

When you insert a field in a property set definition, the field will appear in the properties of any object or object style that has the property set attached.

NOTE Fields are always contained in manual properties.

Wall properties with keynote, date, and sheet number fields

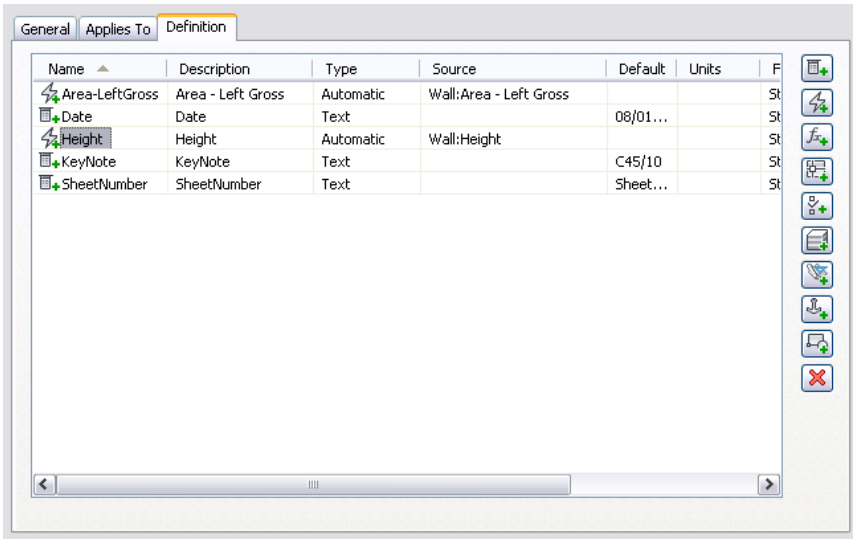


1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 In the Style Manager, expand Documentation Objects, and then expand Property Set Definitions.

3 Either click an existing property set definition, or right-click, and click New.

4 Click the Definition tab.



5 Click to create a manual property.

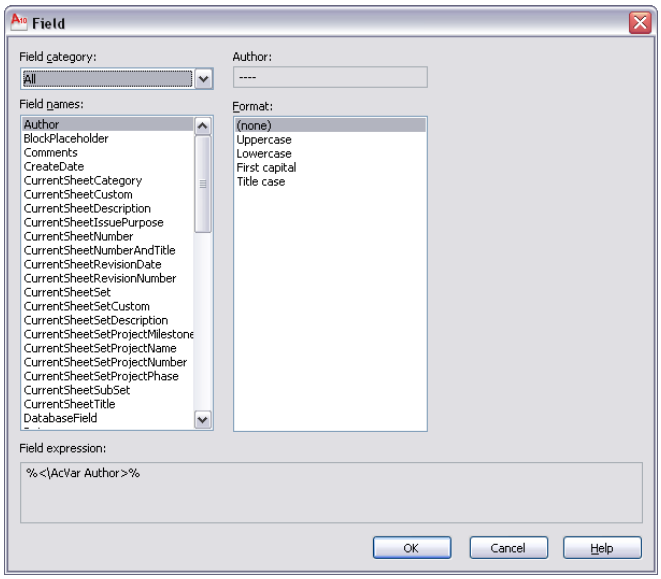
6 Enter a name for the manual property, such as Keynote.

7 Verify that DEFAULT is selected for Start With.

8 Click OK.

9 Verify that Text is selected for Type.

10 Right-click in the Default field, and select Insert Field.



11 Define and insert the field and its format.

If you want to insert a …	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see "Use Fields in Text" in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

Inserting Field Placeholders in Object Properties

Use this procedure to insert a field placeholder in the properties of an individual object.

You can add a field to the properties of an individual object by creating a manual property as a placeholder for the field, to be filled when necessary. This would be useful if you want to add information that is different for each object and needs to be updatable.

Creating the placeholder

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 In the Style Manager, expand Documentation Objects, and then expand Property Set Definitions.

3 Either click an existing property set definition, or right-click, and click New.

4 Click the Definition tab.

5 Click to create a manual property.

6 Enter a name for the manual property, such as LinkedFile.

7 Verify that DEFAULT is selected for Start With.

8 Click OK.

9 Verify that Text is selected for Type.

NOTE Do not enter any text in the Default field.

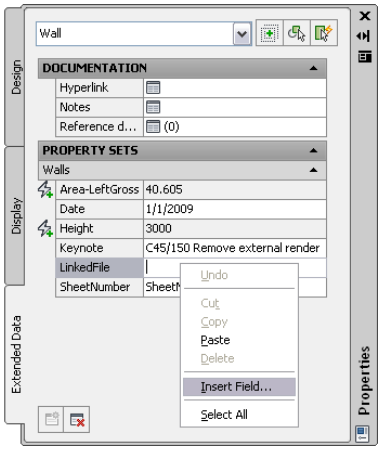
10 Click OK.

Inserting a field in the placeholder

11 Double-click the object in the drawing, and on the Extended Data tab of the Properties palette, click .

12 Select the property set containing the manual property, and click OK.

13 Right-click in the empty manual property, and click Insert Field.



14 Define and insert the field and its format.

If you want to insert a…	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see "Use Fields in Text" in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

15 Define and insert the field and its format.

If you want to…	Then…
insert a date/time, document, hyperlink, object, system variable, Diesel expression, or plot field,	see "Use Fields in Text" in AutoCAD help.
insert a project field	see Selecting a Project Field on page 2297.
insert a sheet set field	see Selecting a Sheet Set Field on page 2300.
insert a keynote field	see Selecting a Keynote Field on page 2302.
insert a database field	see Selecting a Database Field on page 2304.

In this example, you would likely insert a hyperlink to another file. selecting Linked for Field category and then selecting a file as the hyperlink.

Adding Fields to Object Style Properties

Use this procedure to add fields to object style properties.

Once a field has been inserted into a property set, you can add the field to an object style by attaching the property set to the style. All objects of that style will then have the property set attached.

1. Create a property set definition containing the necessary fields, as described in Inserting Fields in Property Set Definitions on page 2287.
2. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
3. In the Style Manager, expand Architectural Objects, and expand the object type for which you want to add a field.
4. Click an existing object style.
5. Click the General tab, and click Property Sets.
6. Click click .
7. Select the property set that contains the field.
8. Click OK three times.

NOTE You can view and edit the style property set data on the object's Properties palette, just like the object property set data. To edit property set data from a style on the Properties palette, click the worksheet button ( ).

Inserting Fields in AutoCAD Text Elements

You can insert fields in the following types of AutoCAD text elements:

- Text
- Multiline text (mtext)
- Attributes
- Table cells

Inserting Fields in AutoCAD Text

Use this procedure to insert fields into AutoCAD text elements.

For information on creating text elements, see "Create Single-Line Text" in AutoCAD help.

1. Select the AutoCAD text in which you want to insert a field.
2. Right-click, and click Text Edit.
3. Right-click at the point within the text where you want to insert a field, and click Insert Field.

4 Define the field and its format.

If you want to insert a …	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see “Use Fields in Text” in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

5 Click OK.

Inserting Fields in AutoCAD Multiline Text

Use this procedure to insert fields into AutoCAD multiline text.

For information on creating Multiline text elements, see “Create Multiline Text” in AutoCAD help.

1 Select the AutoCAD multiline text in which you want to insert a field.

2 Right-click, and click Mtext Edit.

3 In the Multiline Text Editor, right-click within the Text at the point where you want to insert the field, and click Insert Field.

NOTE Alternativly, click within the Text at the point where you want to insert the field, and click Text Editor tab ➤ Insert panel ➤ Field.

4 Define the field and its format.

If you want to insert a …	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see “Use Fields in Text” in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

5 Click OK.

Inserting Fields in AutoCAD Attributes

Use this procedure to insert fields into AutoCAD attributes.

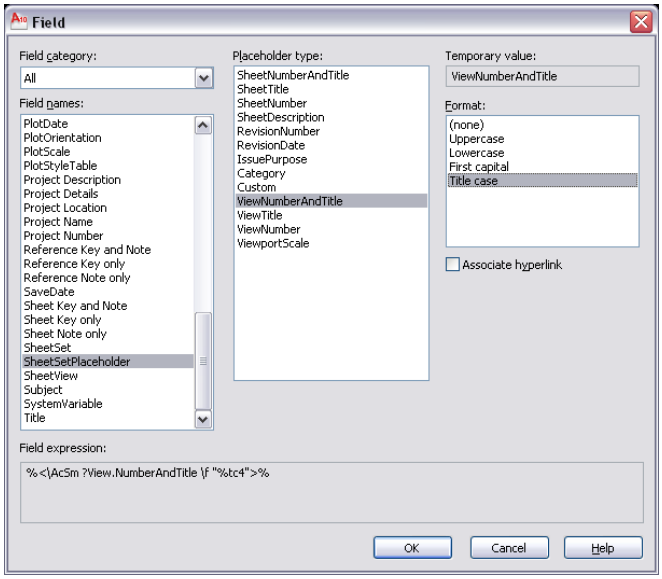
Attributes are often used to provide design and documentation content for tools. When combined with graphics, they can be used as annotation symbols.

Field attributes in callout symbol

1 Click Insert tab ➤ Attributes panel ➤ Define Attributes.

2 Enter a name in the Tag field.

3 Under Value, click .



4 Define the field and its format.

If you want to insert a …	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see “Use Fields in Text” in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

5 Click OK.

Inserting Fields in AutoCAD Table Cells

Use this procedure to insert fields into AutoCAD table cells.

For information on creating AutoCAD tables, see “Create and Modify Tables” in AutoCAD help.

1 Select the AutoCAD table cell in which you want to insert a field, and double-click it.

2 Right-click, and click Insert Field.

NOTE Alternatively, click Table Cell tab ➤ Insert panel ➤ Field.

3 Define the field and its format.

If you want to insert a…	Then…
date/time, document, hyperlink, object, system variable, Diesel expression, or plot field	see "Use Fields in Text" in AutoCAD help.
project field	see Selecting a Project Field on page 2297.
sheet set field	see Selecting a Sheet Set Field on page 2300.
keynote field	see Selecting a Keynote Field on page 2302.
database field	see Selecting a Database Field on page 2304.

4 Click OK.

Editing Fields

Use this procedure to edit a field.

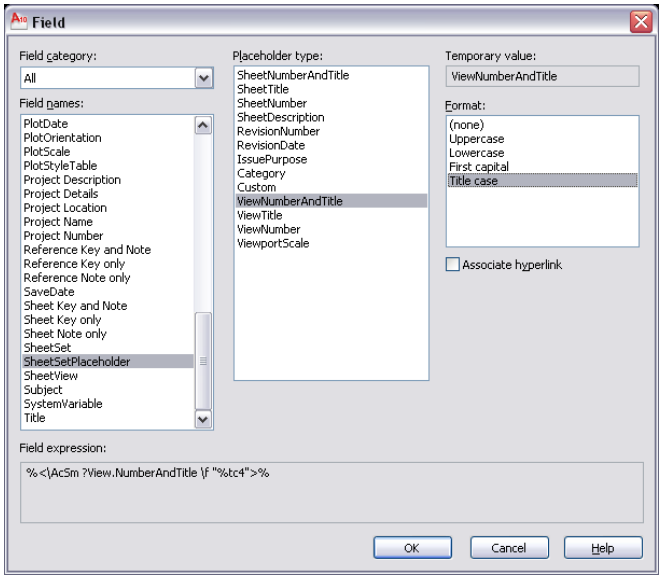
Fields can be contained in AutoCAD text, multiline text (mtext), table cells, attributes, property set definitions, object properties, and object styles. For information on inserting fields, see Inserting Fields on page 2286.

When you edit a field, you can change the field value, the field category, and the field format.

1 Navigate to the field you want to edit.

If you want to…	Then…
edit a field in AutoCAD text	select the text element, right-click, and click Text Edit. Then, select the field, right-click, and click Edit Field.
edit a field in multiline text	select the multiline text element, right-click, and click MText Edit. In the Multiline Text Editor, select the field, right-click, and click Edit Attribute.
edit a field in an attribute	select the tool or block containing the attribute field, right-click, and click Edit Attributes. In the Enhanced Attribute Editor, select the field value, right-click, and click Edit Field.
edit a field in a table cell	select the table cell, and double-click it. Then, right-click the field, and click Edit Field.
edit a field in a property set definition	open the property set definition in Style Manager, and click the Definition tab. Select the field property. Right-click the field value in the Default field, and click Edit field.
edit a field in an object style	open Style Manager and open the style. On the General tab, click Property Sets. In the Edit Property Set Data worksheet, select the field value you want to change, right-click, and click Edit Field.

If you want to…	Then…
edit a field in the properties of an object	select the object and double-click it. In the Properties palette, click the Extended Data tab. Select the field value you want to change, right-click, and click Edit field.



2 Change the field as necessary.

The editable parameters of a field vary depending on the type of field. In date related fields, for example, you can change the date format of the field.

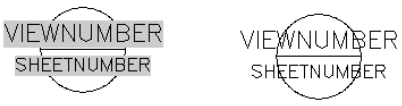
If you want to…	Then…
change the field category	select a new the category under Field category, and then select a new field under Field name.
change the field	select a new field under Field name.
change the field formatting	select a different format under Format.

3 Click OK.

Editing the Field Display

You can choose if you want to display a field in your drawing with a grey background rectangle or with a transparent background. A grey background helps you identify field values within your drawings easily. In some cases however when you want to display the field value just like other text or attribute values, you can turn off the grey background.

Field display with grey background (left) and transparent (right)



1 On the command line, enter FIELDDISPLAY.

2 Select a value for the display of field backgrounds.

- To display the background of a field value in grey, enter 1.
- To display the background of a field value as transparent, enter 0.

TIP By default the field display value is set to 1.

Updating Fields

Use this procedure to update a field manually.

By default fields are updated automatically when the drawing is opened, saved, plotted, regenerated, or sent via e-transmit. For more information, see "Update Fields" in AutoCAD help.

If you have changed that default, or want to update a field without performing any of the operations listed above, you can do so by updating the field manually.

1 Navigate to the field you want to update.

Fields can be contained in AutoCAD text, multiline text (mtext), table cells, attributes, property set definitions, object properties, object styles., and project details. For information about inserting fields in text components, see Inserting Fields on page 2286.

2 Select the field, and double-click the text. Then, select the text, right-click, and click Update Field.

TIP To update all fields in the drawing, click Annotate tab ➤ Text panel ➤ ➤ Update Fields. Then, select the fields to update and press ENTER.

Converting Fields to Text

Use this procedure to convert a field to text.

NOTE This procedure cannot be reversed.

1 Navigate to the field you want to convert to text.

Fields can be contained in AutoCAD text, multiline text (mtext), table cells, attributes, property set definitions, object properties, object styles, and project details. For information about inserting fields in text components, see Inserting Fields on page 2286.

2 Select the field, right-click, and click Convert Field to Text.

AutoCAD Architecture Field Types

There are a number of field types that have been created specifically for AutoCAD Architecture users. These fields are generated by information from AutoCAD Architecture projects, keynotes, and databases connected to an AutoCAD Architecture drawing.

Project Fields

AutoCAD Architecture has a number of fields for project-specific information. You could use project fields for example in title blocks on plotting sheets.

The following project-specific fields are available in AutoCAD Architecture:

- Project Name
- Project Number
- Project Description
- Project Location
- Project Details: When you create a project, you can create user-defined detail categories and details relevant to the project. These details can be inserted as fields into the drawing. For information on creating project details, see Adding Detailed Information to Project Properties on page 222.
- Number of Levels
- Number of Divisions

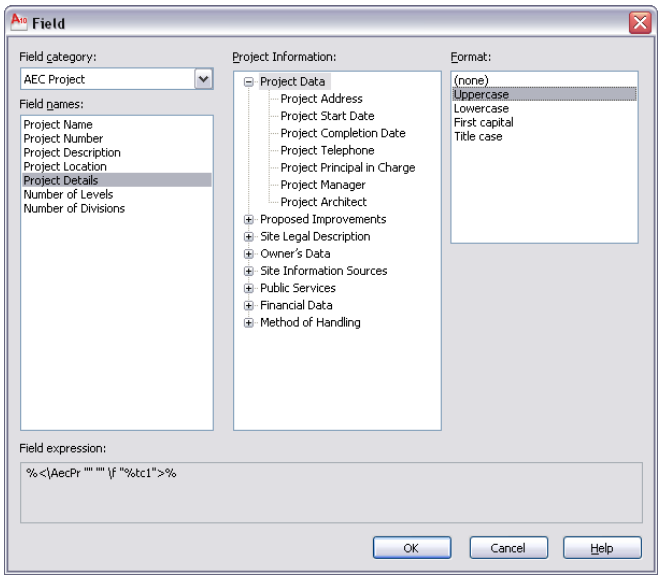
Selecting a Project Field

Use this procedure to select a project field to insert into a drawing.

1 Open the Field dialog box from one of the following components:

If you want to…	Then…
insert a project field into a text element	see Inserting Fields in AutoCAD Text Elements on page 2291.
insert a project field into a multiline text (mtext) element	see Inserting Fields in AutoCAD Multiline Text on page 2292.
insert a project field into an AutoCAD table cell	see Inserting Fields in AutoCAD Table Cells on page 2293.
insert a project field into an attribute definition	see Inserting Fields in AutoCAD Attributes on page 2292.
insert a project field into a property set definition	see Inserting Fields in Property Set Definitions on page 2287.
insert a project field into an object property	see Inserting Field Placeholders in Object Properties on page 2289.
insert a project field into an object style	see Adding Fields to Object Style Properties on page 2291.

2 Under Field Category, select AEC Project.



Under Field Names, all project-related fields are displayed.

3 Select the field you want to insert.

4 If you have selected Project Details, you need to select the detail from the categories listed under Project Information.

5 Under Format, select a text format for the field. You can choose between Uppercase, Lowercase, First Capital, and Title case.

6 Click OK.

Sheet Set Fields

AutoCAD Architecture has a number of fields for sheet set information.

NOTE Sheet set fields can be used for AutoCAD Architecture project sheet sets and for AutoCAD sheet sets. For information about AutoCAD Architecture project sheet sets, see Sheets on page 321. For information about AutoCAD sheet sets, see "Work with Sheets in a Sheet Set" in AutoCAD help.

The following sheet set fields are available:

- Current Sheet Custom: You can select an AutoCAD custom property defined for the current sheet here.

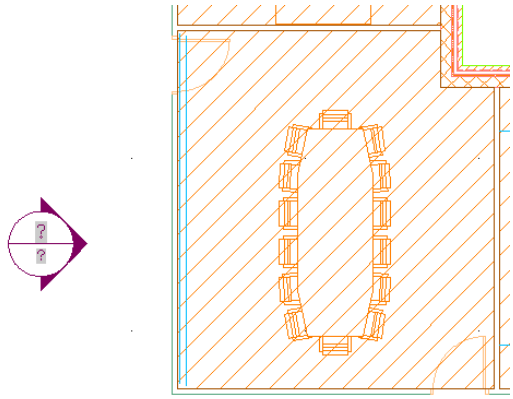
  NOTE When you are working with an AutoCAD Architecture project sheet set, you will in most cases use Project Details instead of Custom Properties.

- Current Sheet Description
- Current Sheet Number
- Current Sheet Number and Title
- Current Sheet Set
- Current Sheet Set Custom: You can select an AutoCAD custom property defined for the current sheet here.
- Current Sheet Set Description

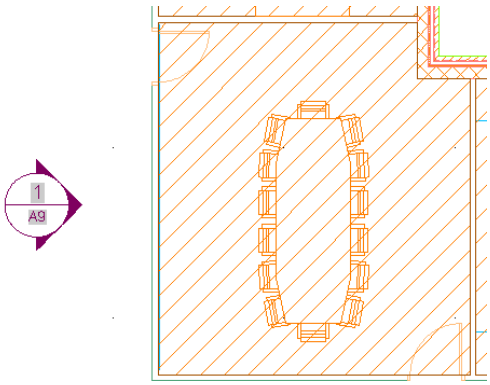
- Current Sheet Subset
- Current Sheet Title
- Sheet Set: You can select any sheet from a sheet set as the field content here. Available sheet properties for display are the sheet title, sheet number and sheet description.
- Sheet Set Placeholder: In the Sheet Set Placeholder field category, you can define a field as a placeholder for sheets and sheet views. You often use that functionality in callouts referenced to model space views, that are later referenced into sheets. The field placeholder in the callout is resolved when the model space view is linked into a sheet. For more information, see Creating New Callout Tools on page 2450. The following fields are available as placeholders:
  - Sheet Number and Title
  - Sheet Title
  - Sheet Number
  - Sheet Description
  - Sheet custom: You can select an AutoCAD custom property defined for the referenced sheet here.
  - (Model Space) View Number and Title
  - (Model Space) View Title
  - (Model Space) View Number
  - (Model Space) Viewport Scale

NOTE The fields for sheet title, sheet number, sheet description, view title, and view number can be associated with a hyperlink that jumps to the sheet or model space view referenced.

Callout symbol with sheet set placeholder



Resolved sheet set placeholders



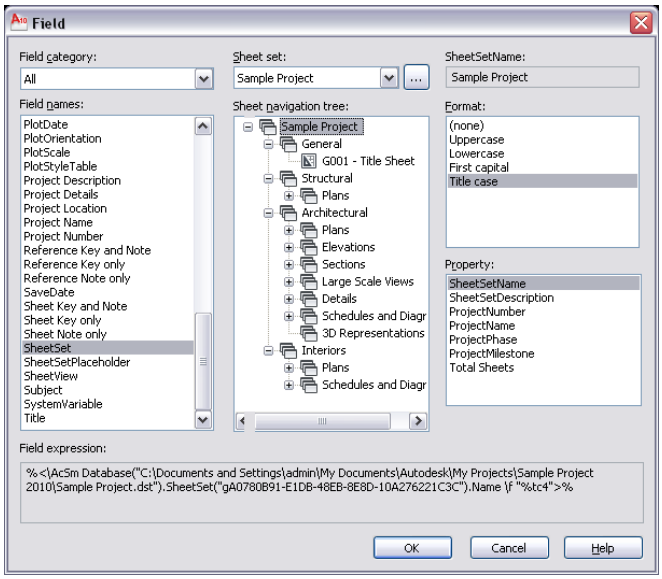
Selecting a Sheet Set Field

Use this procedure to select a sheet set field to insert into a drawing.

1 Open the Field dialog box from one of the following components:

If you want to…	Then…
insert a sheet set field into a text element	see Inserting Fields in AutoCAD Text Elements on page 2291.
insert a sheet set field into a multiline text (mtext) element	see Inserting Fields in AutoCAD Multiline Text on page 2292.
insert a sheet set field into an AutoCAD table cell	see Inserting Fields in AutoCAD Table Cells on page 2293.
insert a sheet set field into an attribute definition	see Inserting Fields in AutoCAD Attributes on page 2292.
insert a sheet set field into a property set definition	see Inserting Fields in Property Set Definitions on page 2287.
insert a sheet set field into an object property	see Inserting Field Placeholders in Object Properties on page 2289.
insert a sheet set field into an object style	see Adding Fields to Object Style Properties on page 2291.

2 Under Field Category, select SheetSet.



Under Field Names, all sheet set-related fields are displayed.

3 Select the field you want to insert.

4 If you have selected CurrentSheetSetCustom or CurrentSheetCustom, select the desired property under Custom property name.

5 If you have selected SheetSet, you can select any sheet set and any sheet to be displayed in the field. You can insert the sheet set or sheet field as a hyperlink, so that clicking on the field in the drawing will open the sheet or sheet set associated to the field.

If necessary, browse to a different sheet set.

6 If you have selected SheetSetPlaceholder, select the correct placeholder under Placeholder Type.

NOTE The fields for sheet title, sheet number, sheet description, view title, and view number can be created as a hyperlink that jumps to the sheet or model space view referenced.

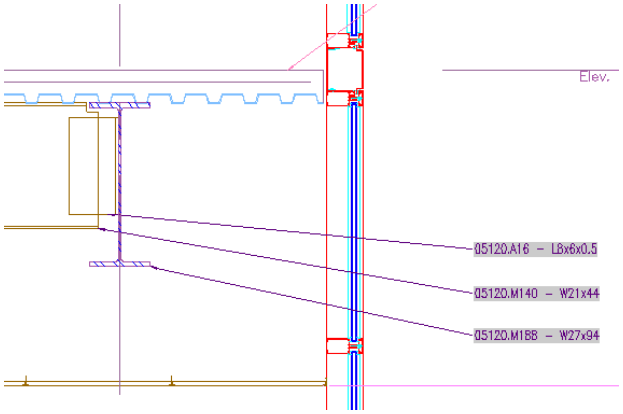
7 Under Format, select a text format or data format for the field.

8 Click OK.

Keynote Fields

Keynoting is a consistent way of annotating the different types of drawings in a set of construction documents to identify building materials or to provide special instructions or explanations. AutoCAD Architecture provides a flexible tool-based method of inserting keynotes that are linked to a keynote database and thus can be modified globally as well as individually. This method supports both reference keynoting (where the keynote key corresponds to a section in an accompanying specification and may appear on different drawings) and sheet keynoting (where keynote keys are sequentially numbered for each drawing). AutoCAD Architecture supplies pre-specified keynotes for its size-specific default detail components and for architectural objects that represent assemblies with multiple components (for example, 8" CMU wall). In cases where no keynotes are pre-specified, you can configure a keynote insertion tool containing a keynote field.

Keynotes with field



The following keynote fields are available in AutoCAD Architecture:

- Reference Key only
- Reference Note only
- Reference Key and Note
- Sheet Key only
- Sheet Note only
- Sheet Key and Note

You can also insert keynote fields as placeholders that are filled in when they are connected to a building object.

For detailed information on keynotes, see Keynoting Tools on page 2368.

Selecting a Keynote Field

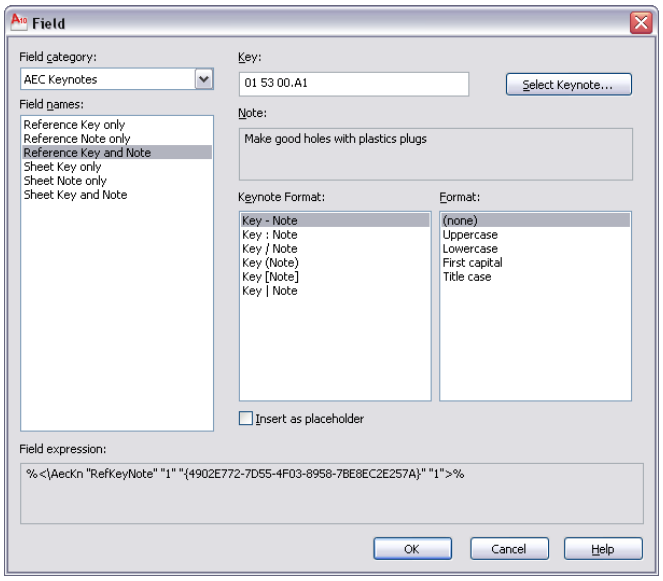
Use this procedure to select a keynote field into a drawing.

1 Open the Field dialog box from one of the following components:

If you want to…	Then…
insert a keynote field into a text element	see Inserting Fields in AutoCAD Text Elements on page 2291.
insert a keynote field into a multiline text (mtext) element	see Inserting Fields in AutoCAD Multiline Text on page 2292.
insert a keynote field into an AutoCAD table cell	see Inserting Fields in AutoCAD Table Cells on page 2293.
insert a keynote field into an attribute definition	see Inserting Fields in AutoCAD Attributes on page 2292.
insert a keynote field into a property set definition	see Inserting Fields in Property Set Definitions on page 2287.
insert a keynote field into an object property	see Inserting Field Placeholders in Object Properties on page 2289.

If you want to…	Then…
insert a keynote field into an object style	see Adding Fields to Object Style Properties on page 2291.

2 Under Field Category, select AEC Keynotes.



Under Field Names, all keynote-related fields are displayed.

3 Under Field Names, select the type of keynote field you want to insert.

4 Click Select Keynote to select a keynote from a database.

5 If you want to insert pre-specified keynotes or prompt for manual keynote selection when the keynote is inserted, select Insert as placeholder.

6 If you have selected Reference Key and Note or Sheet key and Note, select a keynote format.

7 Under Format, select a text format for the keynote field.

8 Click OK.

Database Fields

Database fields allow the user to insert a formatted cell from a database into a drawing. A database field consists of a single field of a query or table in a database. This enables users to work with data in a full database environment, creating reports, queries, links to other databases, and link that data into any drawing.

Supported Data Types

The following data types are supported in AutoCAD Architecture database fields:

- Text
- Memo
- Date/Time
- Integer
- Real
- Boolean

All other data types are ignored and will not display in the drawing.

Supported Database Providers and Data Sources

The following database providers are supported in AutoCAD Architecture:

- Microsoft Jet 4.0 OLE DB Provider (Access)
- Microsoft OLE DB Provider for ODBC Drivers

These database providers let you link to the following data sources:

- Microsoft Access database (MDB)
- Microsoft Excel file (XLS)
- Microsoft Text file (TXT, CSV)

The database fields support secure databases in as far at the Microsoft Data Link feature supports them. They may need to encrypt the connection information so as to prevent the wrong users from inadvertently gaining knowledge of the passwords.

The database fields support multi-user access.

Creating a Database Link to a 64-bit Data Source

If you are using a computer with 64-bit architecture, you can create a link to a database source using the 64-bit model. You can also link to any legacy 32-bit data sources.

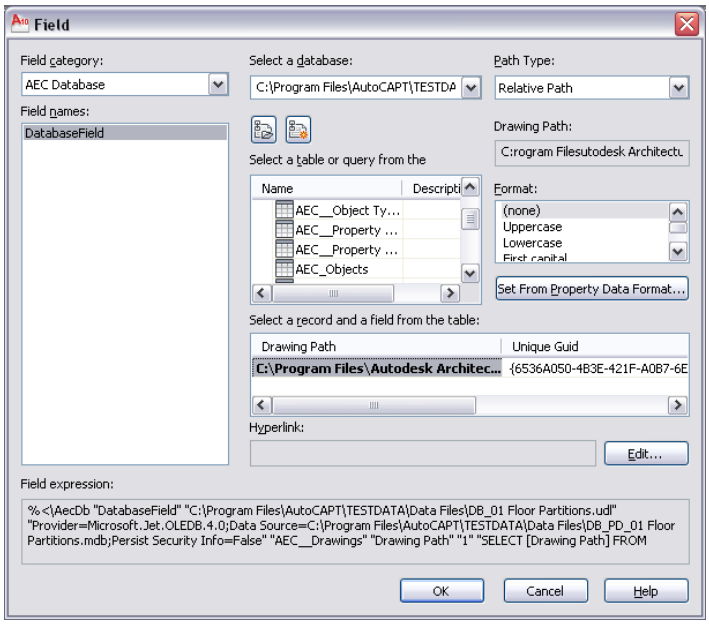
Selecting a Database Field

Use this procedure to select a database field to insert into a drawing.

1 Open the Field dialog box from one of the following components:

If you want to…	Then…
insert a database field into a text element	see Inserting Fields in AutoCAD Text Elements on page 2291.
insert a database field into an multiline text (mtext) element	see Inserting Fields in AutoCAD Multiline Text on page 2292.
insert a database field into an AutoCAD table cell	see Inserting Fields in AutoCAD Table Cells on page 2293.
insert a database field into an attribute definition	see Inserting Fields in AutoCAD Attributes on page 2292.
insert a database field into a property set definition	see Inserting Fields in Property Set Definitions on page 2287.
insert a database field into an object property	see Inserting Field Placeholders in Object Properties on page 2289.
insert a database field into an object style	see Adding Fields to Object Style Properties on page 2291.

2 Under Field Category, select AEC Database.



3 Under Field Names, select DatabaseField.

4 To select an existing database link file (UDL), click .

In the Select Data Link dialog box, browse for the required UDL file.

5 To create a new database link file (UDL), click one of the following buttons:

Button	Description
	Use this button if you want to create a new UDL link on a 32-bit computer.
32-bit	Use this button if you are working on a 64-bit computer, but want to create a link to a 32-bit data source.
64-bit	Use this button if you are working on a 64-bit computer, and want to create a link to a 64-bit data source.

For more information, see Creating a Data Link to an ODBC Source on page 2306.

6 Under Path Type, specify whether you want a full path to the database or a relative path.

7 Under Select a table or query from the database, select a table or query.

- To select a database table, expand Tables and click on the desired table entry.
- To select a database query, expand Queries and click on the desired query.

8 Under Select a record and a field from the table, select the database field you want to insert in the drawing.

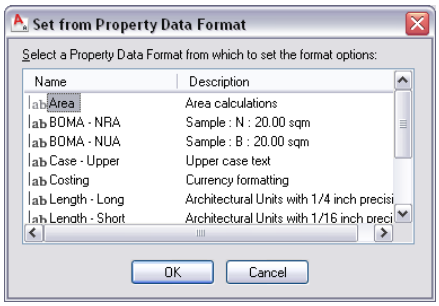
NOTE You can preview the database field value in the static text field on the top right of the Field dialog. You can preview the field expression under Field expression at the bottom of the dialog.

Formatting the field or query

9 Under Format, select a text format.

If you have selected a field or query that does not retrieve a text string, you can format the value with an existing property data format.

10 Click Set From Property Data format.



11 Select a property data format, and click OK.

The settings of the selected property data format are copied to the format codes in the field.

12 Click OK to insert the database field in the drawing.

Creating a Data Link to an ODBC Source

You can link data from a number of data sources to an AutoCAD Architecture drawing. You can use the following database providers for linking to data sources:

- Microsoft Jet 4.0 OLE DB Provider (Access)
- Microsoft OLE DB Provider for ODBC Drivers

These database providers let you link to the following data sources:

- Microsoft Access database (MDB)
- Microsoft Excel file (XLS)
- Microsoft Text file (TXT, CSV)

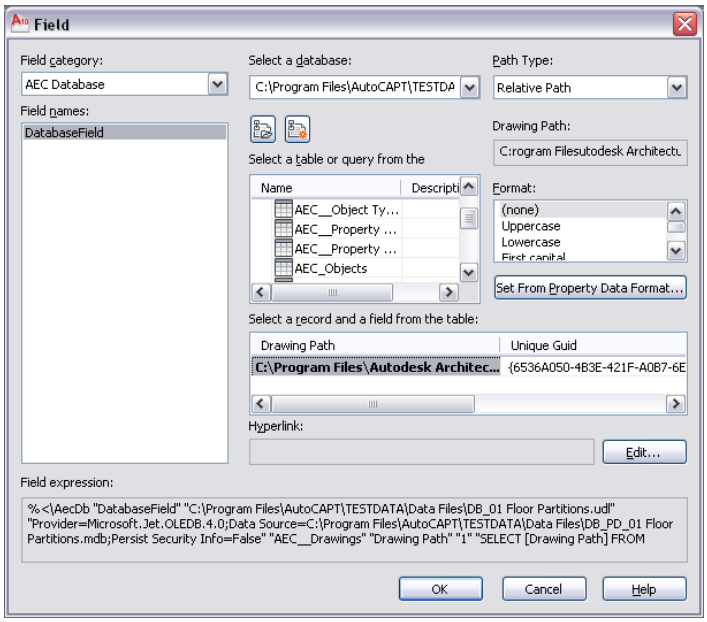
NOTE The instruction below describes the process of creating a link to a data source from a Microsoft Excel file. In the same way, can create data links to Microsoft Access databases, plain ASCII text files, and comma-separated files.

1 Open the Field dialog box from one of the following components:

If you want to…	Then…
insert a database field into a text element	see Inserting Fields in AutoCAD Text Elements on page 2291.
insert a database field into an multiline text (mtext) element	see Inserting Fields in AutoCAD Multiline Text on page 2292.
insert a database field into an AutoCAD table cell	see Inserting Fields in AutoCAD Table Cells on page 2293.

If you want to…	Then…
insert a database field into an attribute definition	see Inserting Fields in AutoCAD Attributes on page 2292.
insert a database field into a property set definition	see Inserting Fields in Property Set Definitions on page 2287.
insert a database field into an object property	see Inserting Field Placeholders in Object Properties on page 2289.
insert a database field into an object style	see Adding Fields to Object Style Properties on page 2291.

2 Under Field Category, select AEC Database.

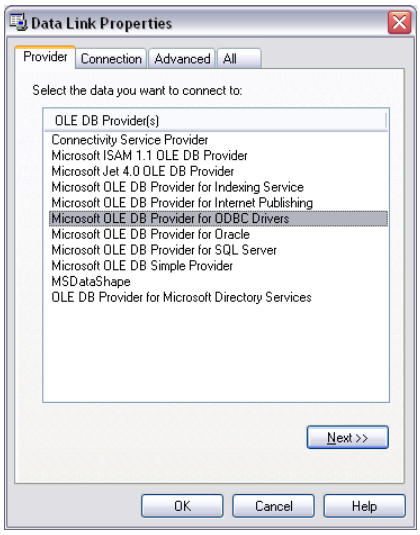


3 Under Field Names, select DatabaseField.

4 Click one of the following buttons:

Button	Description
	Use this button if you want to create a new UDL link on a 32-bit computer.
	Use this button if you are working on a 64-bit computer, but want to create a link to a 32-bit data source.
	Use this button if you are working on a 64-bit computer, and want to create a link to a 64-bit data source.

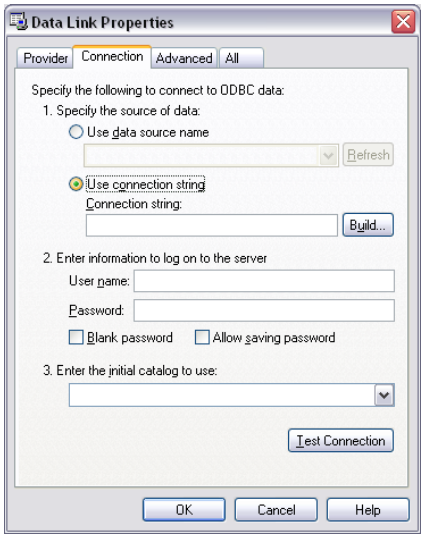
5 Click the Provider tab.



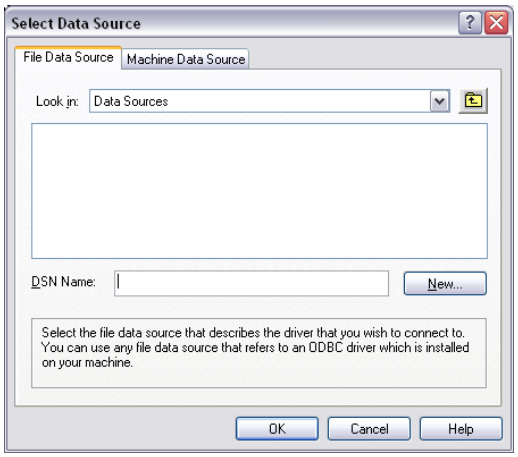
Creating a data link to a Microsoft Excel file

6 Select Microsoft OLE DB Provider for ODBC Drivers, and click Next.

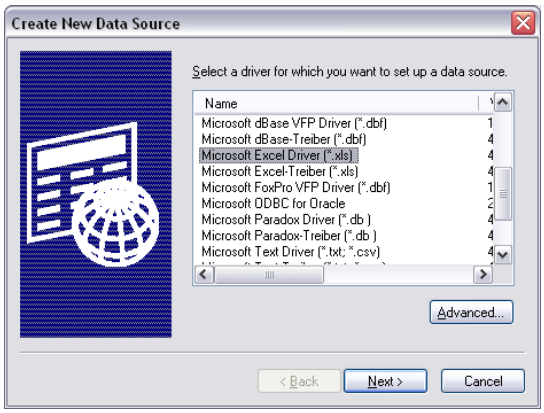
7 In the Connection tab, click Use connection string.



8 Click Build.



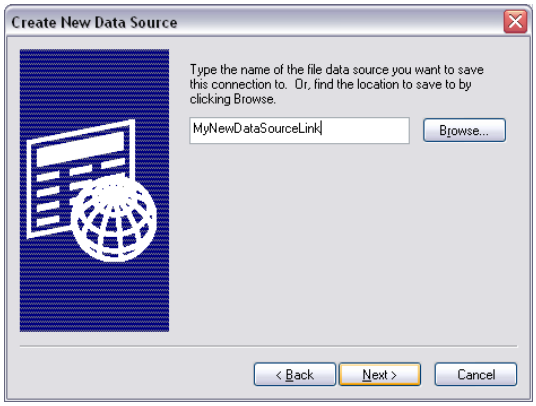
9 Click New to build to a new DSN file.



10 In the Create New Data Source dialog box, select the Microsoft Excel Driver (*.xls).

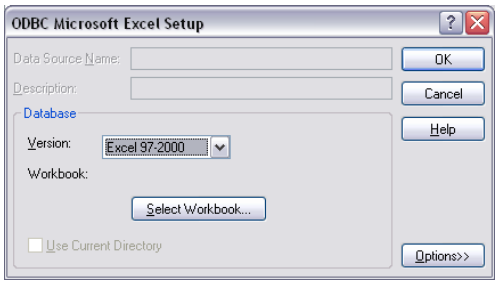
NOTE The other supported drivers here are Microsoft Access Driver (*.mdb) and Microsoft Text Driver (*.txt, *.csv). You can use these to create a link to an Access database, a plain ASCII text file, or a comma-separated file.

11 Click Next.



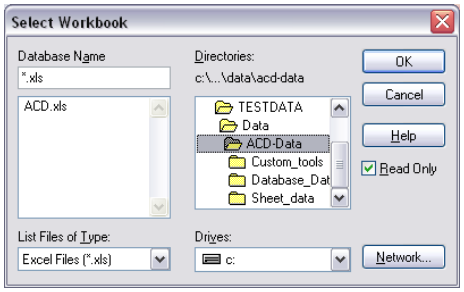
12 Enter a name for the new DSN file, and click Next.

13 Confirm that your data source settings are correct, and click Finish.

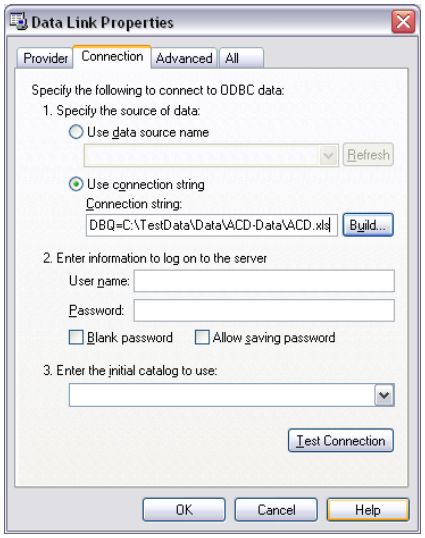


14 In the ODBC Microsoft Excel Setup dialog box, select the version of Microsoft Excel that the DSN file should support.

15 Click Select Workbook.



16 Select an XLS file that should be used as your data source, and click OK three times until you are back in the Connection tab of the Data Link Properties dialog box.



The Microsoft Excel file you have selected as your data source is displayed under Connection String.

17 To verify that the connection to the data source is working correctly, click Test Connection.

18 Enter a user name and optionally a password for the database connection.

19 Under Enter the initial catalog to use, select the Excel file from the drop-down list.

20 Optionally, you can click the Advanced tab to define network and permission settings.

21 If you have selected a data source on a network server, you can define the network settings.

22 Define the access permissions for the data source.

23 Optionally, you can click the All tab to view and edit the OLE DB initialization properties available for the selected OLE DB provider.

24 Click OK.

25 In the Field dialog box, the selected Excel file is displayed as the data source.

You can select data tables and entries as described in Selecting a Database Field on page 2304.

Detail Components

45

AutoCAD Architecture uses a tool-based system for managing the components that make up detail drawings. In addition to the wide selection of pre-configured detail component insertion tools provided on the sample tool palettes and in the Sample Palette Catalog, an extensive database of components can be accessed through the Detail Component Manager. These components can be inserted directly into a drawing, or dragged and dropped onto tool palettes. All tools can be customized and are fully integrated with the keynoting feature. You can also use your own databases.

Understanding Detail Components

Detail components represent specific building materials and products, and are made up of simple two-dimensional (2D) linework entities such as lines, polylines, arcs, circles, and hatches. In most cases, the detail component is a collection of such entities grouped as a block, which can be easily copied or moved like a single entity. The following are examples of detail components that are inserted as blocks:

- Bolt heads
- Fixed-length nails
- Section views of beams and columns
- Most section views of framing members
- Units such as CMUs, bricks, and pavers
- Connectors
- Materials with views generated from interrelating parameters; for example, trusses, precast concrete, and hollow metal frames

Other detail components are inserted as loose linework entities if they represent material of variable length, amorphous shape, or something that would likely be cut or otherwise modified in the field. This is the case for views showing the length of a material, such as framing members, sheathing material, or fasteners, for which the detail component database does not include a fixed-length table.

Detail components are inserted into drawings parametrically, using a tool that prompts you for the information needed to perform the drawing routine associated with a particular component. Once inserted into a drawing, the components are largely static: although they can be rescaled or repositioned using Properties palette settings, they do not have object-like intelligence that allows for parameter modifications to the extent that architectural objects do. You can, however, perform various editing operations on detail components using the tools available on the ribbon and the context menu.

The Detail Component Manager provides a centralized location for storing and accessing detail components. Its filter mechanism lets you quickly locate a particular component in a database. You can then insert the component directly into a drawing, or, if you are likely to use it frequently, you can drag and drop it onto a tool palette for even more convenient access.

Many detail components are also available as tools on the default Detailing tool palettes, which can be transferred to the workspace from the Sample Palette Catalog. You can also create a tool by dragging a detail component from a drawing and dropping it onto a tool palette. Because detail component tools can be moved between tool palettes and tool catalogs, or copied over the Internet using i-drop® functionality, they are easily shared by project team members. Tools can be modified using the associated Tool Properties worksheet. You can also apply detail component tool properties to any linework within a drawing so that it can be reference-keynoted according to the organizational system you are using.

In addition to the database supplied with the software (based on the CSI MasterFormat™ 2004) you can add and access your own detail component databases as needed (see Configuring Detail Component Database Availability on page 2349). The Detail Component Manager includes a wizard that lets advanced users define the drawing routines and other parameters required to add new component tables to a database.

Inserting Detail Components

All detail components are inserted into drawings using the same basic tool, which performs the insertion routine associated with a selected component. Each detail component tool provided on the sample tool palettes represents a different configuration of the basic tool. You can activate the detail component insertion tool in five different ways:

- Select a component in the Detail Component Manager, and click Insert Component (or double-click the component).
- Click a detail component tool icon on a tool palette.
- Drag and drop a detail component tool from a Content Browser tool catalog directly into a drawing.
- Select a component in a drawing, right-click, and click Add Selected. This reruns the tool with the same property settings used to insert the existing component, so that you can quickly insert additional copies of the same component.
- Select a component in a drawing, right-click, and click Replace Selected. This erases the selected component and reruns the tool with the same property settings used to insert the erased component; however, you can modify the tool to insert a different component by changing the Component properties (Category, Type, Description, or View) on the Properties palette.

Once the tool is activated, the procedure for inserting the detail component varies according to the type of material or product the component represents and the viewing direction. Some components are available only in one viewing direction. For example, a backfill component, such as gravel, is always oriented for a section view. On the other hand, a steel beam component is available in elevation view, section view, and plan view. The different drawing routines involve different prompts for user input. When depicting a variable-length material with a repeating pattern, such as corrugated sheet metal, you need to specify the start point and endpoint. In the case of bricks, you have the option of specifying a number of courses. For other products, such as screws or bolts, you may want to flip or rotate the component to change its orientation. The procedures described in the following sections offer examples of the basic insertion routines and options for detail components.

Stamp Components

Use this procedure to insert detail components that may need to be depicted multiple times at a particular orientation, such as nails or screws. In this example, the tool for inserting a steel beam has the View property set to Section.

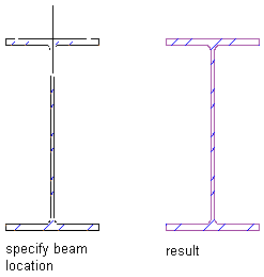
1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

2 Click an insertion point in the drawing area to insert the component at the default orientation, or select one of the following options:

If you want to…	Then…
specify a different base point	enter **b** (for Base point), select the new base point, and press *ENTER* to insert the component using the new base point.
change the default orientation angle of the component	enter **r** (for Rotate), and then either enter the number of degrees to rotate the component in a counterclockwise direction, or manually rotate the component to the desired angle and click to set the new orientation. Click again to insert the component at the specified angle.
flip the component along its *X* axis	enter **x** (for Xflip), and click to insert the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and click to insert the component.

3 Click elsewhere in the drawing area to "stamp" additional copies of the component, either at the default orientation or as specified in Step 2.

Steel beam component inserted at default orientation



Linear Array Components

Use this procedure to insert detail components that consist of a pattern repeated as a linear array, such as shingles or corrugated sheet metal. In this example, the tool for inserting corrugated sheet metal has the View property set to End, but the same user prompts are displayed if the View setting is Side.

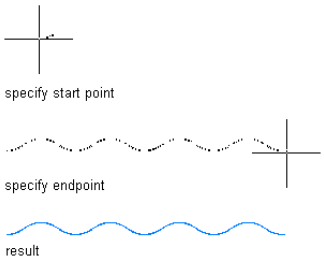
1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

2 Click a start point in the drawing area to insert the component at the default orientation, or select one of the following options:

If you want to…	Then…
flip the component along its *X* axis	enter **x** (for Xflip), and then click to specify the starting point for the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and then click to specify the starting point for the component.
position the component to the left of the baseline when drawn vertically	enter **l** (for Left), and then click to specify the starting point for the component.
position the component to the right of the baseline when drawn vertically	enter **r** (for Right), and then click to specify the starting point for the component.
center the component on the baseline when drawn in any direction	enter **c** (for Center), and then click to specify the starting point for the component.

3 Click the desired endpoint to insert the component.

Corrugated sheet metal in end view



Backfill Components

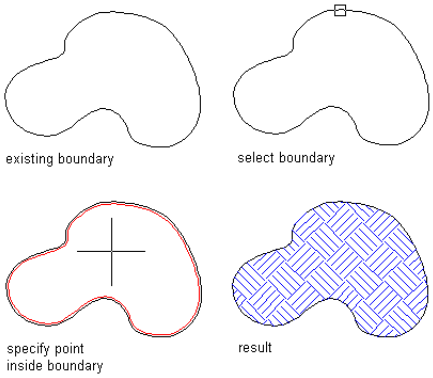
Use this procedure to insert backfill detail components, such as gravel or soil, that are positioned within a boundary provided by existing linework or an existing object. In this example, the tool for inserting Undisturbed Soil has the View property set to Section, which is the only view available for this type of component.

1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

2 Select the object you want to be the boundary for the backfill.

3 Click within the boundary of the selected object to insert the backfill component.

Backfill component inserted within polyline boundary



Bookends Components

Use this procedure to insert detail components, such as louvers and vents, that consist of a pattern repeated as a linear array but bounded by unique items at each end. In this example, the tool for inserting louvers has the View property set to Section, which is the only view available for this type of component.

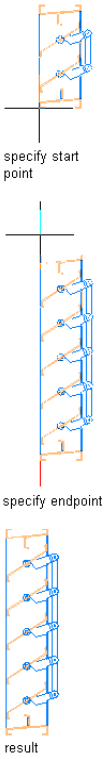
1 Activate the detail component insertion tool for a particular component.

2 Click a start point in the drawing area to insert the component at the default orientation, or select one of the following options:

If you want to…	Then…
flip the component along its *X* axis	enter **x** (for Xflip), and then click to specify the starting point for the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and then click to specify the starting point for the component.

3 Specify the desired endpoint to insert the component.

Bookends component inserted in section view



Countable Linear Array Components

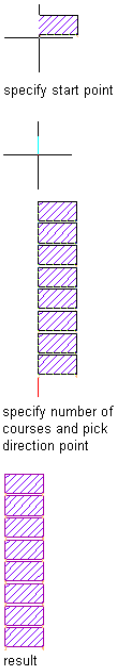
Use this procedure to insert detail components that need to be depicted multiple times in a linear array, such as bricks. In this example, the tool for inserting bricks has the View property set to Section. The same prompts are displayed if the View setting is Plan. If the setting is Elevation, the prompts described under Stamp Components on page 2315 are used. If the setting is Elevation (Pattern), the prompts described under Backfill Components on page 2316 are used.

1. Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.
2. Click an insertion point in the drawing area.
3. Orient the component image, and then click to insert it, or select one of the following options:

If you want to…	Then…
flip the component along its *X* axis	enter **x** (for Xflip), and then click to specify the insertion point for the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and then click to specify the insertion point for the component.
insert a specific number of components	enter **c** (for Count), enter the number of units to insert, and click to specify the starting point for the array. Note that the x and y options are still available at this point.

4. Orient the component or the array of components, and then click to complete the insertion.

Course of bricks inserted in section view



Surface Components

Use this procedure to insert rectangular detail components of a specific depth that have a hatch, such as base courses. In this example, the tool for inserting the base course has the View property set to Section, which is the only view available for this type of component.

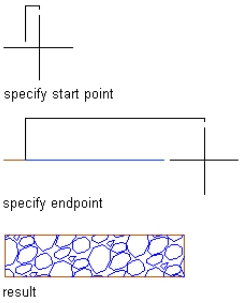
1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

2 Specify a start point in the drawing area to insert the component at the default orientation, or select one of the following options:

If you want to…	Then…
flip the component along its *X* axis	enter **x** (for Xflip), and then click to specify the starting point for the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and then click to specify the starting point for the component.
position the component to the left of the baseline when drawn vertically	enter **l** (for Left), and then click to specify the starting point for the component.
position the component to the right of the baseline when drawn vertically	enter **r** (for Right), and then click to specify the starting point for the component.
center the component on the baseline when drawn in any direction	enter **c** (for Center), and then click to specify the starting point for the component.

3 Click the desired endpoint to insert the component.

Base course inserted in section view



Dynamically Sized Surface Components

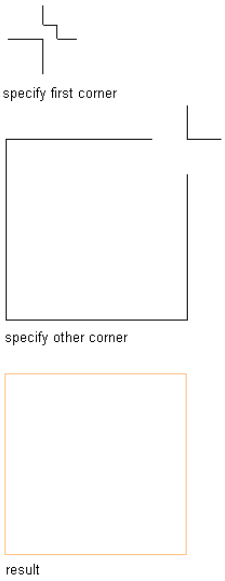
Use this procedure to insert rectangular detail components, such as concrete joists or slabs with metal decking, for which you determine the dimensions. In this example, the tool for inserting a concrete slab with metal decking has the View property set to Plan. If the setting is Section or Elevation, the prompts described under Linear Array Components on page 2315 are used.

1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

2 Specify the first corner of the rectangle.

3 Specify the opposite corner to insert the component.

Concrete slab in plan view



Bolt Components

Use this procedure to insert bolt components when you need to specify the distance between the bolt head and the nut. In this example, the tool for inserting the bolt has the View property set to Side. If the setting is Head or Nut, you are not prompted to perform the first two steps.

1 Activate the detail component insertion tool for the component using any of the methods described under Inserting Detail Components on page 2314.

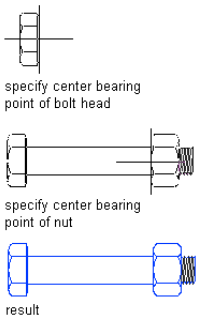
2 Specify the center bearing point for the bolt head.

3 Orient the component image, and then specify the center bearing point for the nut to insert the component.

4 If desired, you can "stamp" additional components into the drawing at the same orientation, or you can change the orientation for subsequent insertions:

If you want to…	Then…
specify a different base point	enter **b** (for Base point), select the new base point, and press *ENTER* to insert the component using the new base point.
change the default orientation angle of the component	enter **r** (for Rotate), and then either enter the number of degrees to rotate the component in a counterclockwise direction, or manually rotate the component to the desired angle and click to set the new orientation. Click again to insert the component at the specified angle.
flip the component along its *X* axis	enter **x** (for Xflip), and click to insert the component.
flip the component along its *Y* axis	enter **y** (for Yflip), and click to insert the component.

Bolt inserted in side view



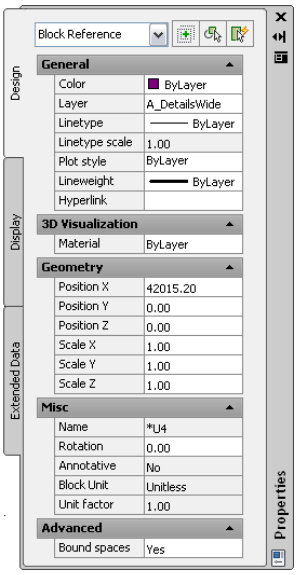
Editing Detail Components in a Drawing

Once a detail component has been inserted into a drawing, you can edit the component using the tools found on the Modify panel of the Home tab, or the AEC Modify Tools option on the detail component's context menu. (For detailed instructions on using these tools, see Detail Drafting Tools on page 1837.) Using these tools on block-based detail components creates unique block definitions for edited inserts, so that the edits will not affect inserts of the same block in other locations. However, if you use the context menu option Edit Block in-place to edit a block definition used in multiple locations, you can use the Copy Block Definition and Assign option (also on the context menu) to create a unique block definition for the block insert you want to edit.

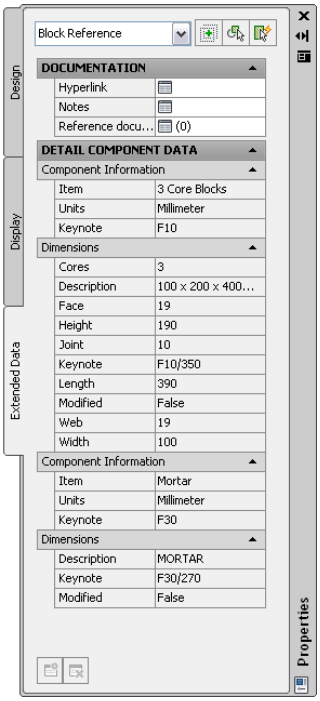
You can view and modify certain properties of a detail component by clicking Home tab ➤ Build panel ➤ Tools drop-down ➤ Properties . The following illustrations show examples of the Design and Extended Data tabs of the Properties palette for a detail component. You can modify many of the settings on the Design tab by inserting text or through an associated drop-down list. On the Extended Data tab, you can specify hyperlinks, insert text notes, or set references using the worksheet icons under Documentation. The Component data is read-only, as it displays live data from the detail components database.

NOTE When either the Add Selected or Replace Selected context menu option is selected, the Component data is displayed on the Design tab of the Properties palette (instead of the Extended Data tab) and is modifiable. For more information on these two options, see Inserting Detail Components on page 2314.

The following image shows the Design tab of the Properties palette for a concrete masonry unit detail block.



The following image shows the Extended Data tab of the Properties palette for a concrete masonry unit detail block.



Using Detail Component Tools

Like other AutoCAD Architecture tools, the tools for inserting detail components offer great flexibility in the ways you can create, customize, store, and apply them. This section includes topics that pertain to the

configuration and management of these tools. For descriptions of the various ways to insert detail components using these tools, refer to Inserting Detail Components on page 2314.

Adding Detail Component Tools to a Tool Palette

Tools for inserting specific detail components can be added to a tool palette from three main sources: the Detail Component Manager, the Content Browser, and linework in a drawing.

Creating Tools from the Detail Component Manager

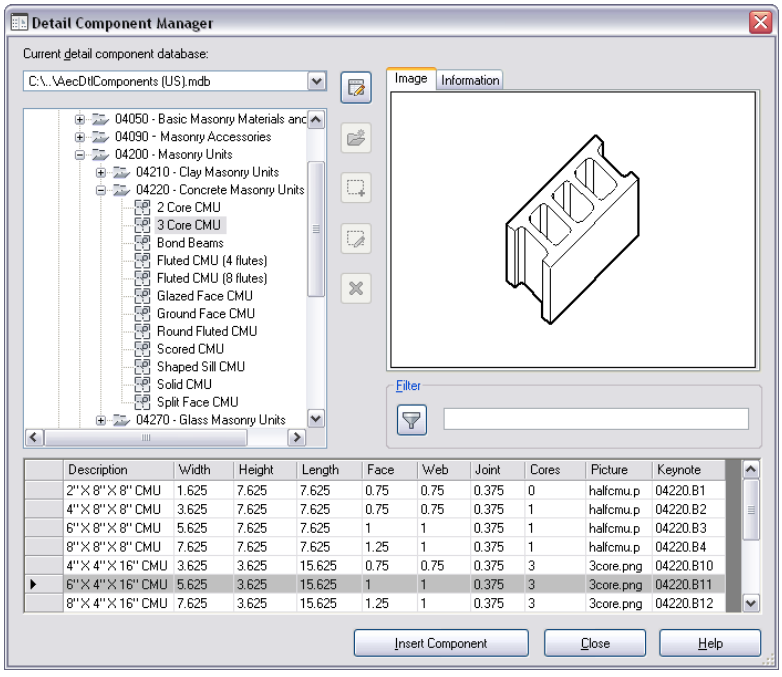
Use this procedure to drag and drop a selected detail component from the Detail Component Manager to a tool palette in the workspace, thus instantiating the basic detail component insertion tool for that component).

1 Open the tool palette to which you which you want to add a detail component tool.

2 Click Home tab ➤ Details panel ➤ Detail Components .

NOTE Alternatively, you can right-click any detail component tool, and click Detail Component Manager.

The Detail Component Manager



3 Navigate the tree view or use the Filter mechanism to display the desired detail component in the table at the bottom of the dialog box. (To view the entire contents of large component tables, you can use the vertical scroll bar to the right of the table.)

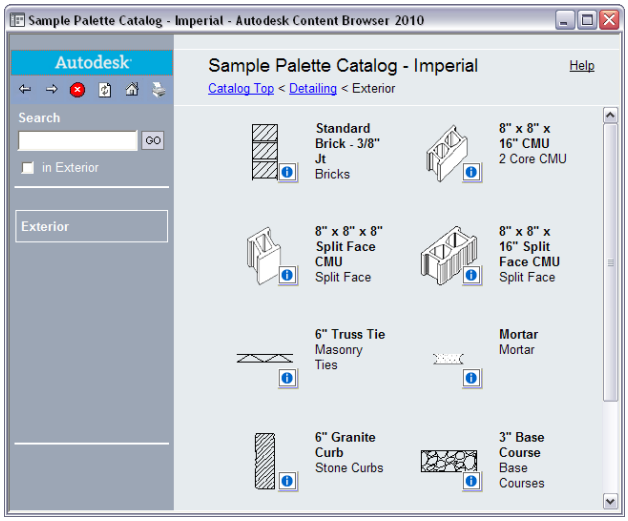
4 Click the selector column to the left of the desired table row, and drag the selected component to the tool palette.

You can now use the tool to insert the component into a drawing. For more information, see Inserting Detail Components on page 2314.

Copying Tools from the Content Browser

Use this procedure to copy a detail component insertion tool or a palette of tools from the Sample Palette Catalog in the Content Browser to your tool palettes set in the workspace. Most of these palettes are also included on the sample tool palettes set available in the workspace, but this catalog in the Content Browser serves as a backup tool repository and a source of tools you can customize without changing tools that are already on a workspace palette. Generally these tools are preset to insert a particular type and size of component, but once they are on a palette in the workspace, they can be customized to insert a different size of component, or even a component in a different category. For more information, see Modifying Detail Component Tools on page 2325. The same basic procedure can be used to copy tools or palettes from catalogs you create to hold tools that are preconfigured and grouped for particular projects.

Content Browser showing Details palettes in Sample Palette Catalog



1 Confirm that your tool palettes set is open in the workspace. If you want to copy a particular tool to a particular palette, make sure that palette is open.

2 Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .

3 Double-click the Sample Palette Catalog in your catalog library.

4 Double-click the *Detailing* folder.

5 Click the i-drop® icon for the palette (or double-click the palette, and click the i-drop icon for a tool on that palette), and then drag the palette or tool onto the open palette in the workspace.

If you are copying an entire palette from the Content Browser, a new palette is added to the set.

Creating Tools from Linework in a Drawing

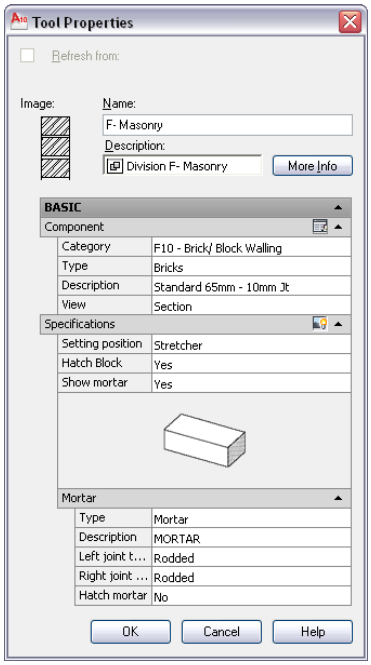
You can create a detail component insertion tool from linework in a drawing simply by dragging and dropping the linework onto a tool palette. The linework can be a detail you have drawn using two-dimensional (2D) AutoCAD commands, or it can be a detail component inserted from a tool or from the Detail Component Manager. Once added to the tool palette, the new tool can be renamed or otherwise modified through its Tool Properties worksheet. For more information, see Modifying Detail Component Tools on page 2325.

Modifying Detail Component Tools

Detail component tools on a tool palette in the workspace can be modified through the Tool Properties worksheet. You access the Tool Properties worksheet by right-clicking the tool and clicking Properties. To modify a tool in a catalog in the Content Browser, you must first copy the tool to a palette in the workspace.

The appearance of the Tool Properties worksheet varies depending on the type of component and the current configuration of property settings. The following illustrations show two configurations of the Tool Properties worksheet for the 04 - Masonry tool that is included on the sample Basic tool palette. The tool is set to add standard 3/8" joint brick in both cases, but the first configuration has the View property set to Section, while the second has this property set to Elevation (Pattern). For detail components that can be oriented differently in different views, the View setting determines the particular drawing routine used to insert the image into the drawing. Note that the different View settings result in different orientation illustrations on the worksheet. Note also that the Mortar specifications are not applicable for the Elevation (Pattern) setting and are not displayed for that configuration. The properties displayed under Specifications may also vary depending on other settings. For example, if the Show Mortar property is No when the View setting is Section, no other Mortar properties are displayed. For some detail components, no Specifications apply, and the heading is not displayed.

Detail component Tool Properties worksheet configurations



The following table describes the Tool Properties worksheet categories and settings that are common to most detail component insertion tools.

Property/Category Name	Description
Image	Displays the image specified for the component in its table in the database. If no image is specified, then the image for the table is displayed. You can right-click the image and click Refresh Image to recall the stock image for the tool from the database, or you can right-click and click Specify Image to browse for a different image.
Name	The name of the tool. This may be the name originally assigned to one of the tools on the sample palettes, or, if you have copied the tool from the Detail Component Manager, it is the name specified in the Description column of its parent size table.

Property/Category Name	Description
	Note that the name is not updated if you change the Category, Type, or Size properties under Component. However, you can edit the name.
Description	This is the tool description used if the tool is published to a catalog. You can change this description by clicking the worksheet icon to open a Description editing box.
Component	Clicking the worksheet icon on this line accesses the Detail Component Manager through the Select Component dialog box and allows you to change the settings for the Description, Description and Type, or Description, Type, and Category. Note that if you change the Category setting, the Name, Description, and Image properties are not updated automatically.
Category	Specifies the group or subgroup that is the parent of the table containing the component specified by the Description property. If other groups or subgroups exist at the same hierarchical level within the same parent group, they are selectable from a drop-down list.
Type	Specifies the table containing the particular component specified by the Description property. A drop-down list lets you select other tables within the same parent group or subgroup.
Description	Specifies a particular component of the specified Type and Category. Other components within the same table can be selected from the drop-down list.
View	Specifies the type of view for which the component is oriented. Possible values are Section, Plan, Elevation, and Elevation (Pattern). For components such as bolts, component-specific terminology is used, such as Head, Side, Bolt, or Nut. A drop-down list is present if more than one view is applicable for the specified component. This setting determines the drawing routine and the command line prompts for the insertion process. For more information, see Inserting Detail Components on page 2314.
Specifications	Clicking the icon on this line displays of an image depicting the orientation at which the detail component will be inserted (determined by the View property). Other properties displayed here provide the top-level parameters required to insert the component with the specified View setting. For components with only one possible View setting, no Specification properties are displayed.

Applying Detail Component Properties to Linework

Linework that you have drawn using two-dimensional (2D) AutoCAD commands can be keynoted using a keynoting tool to select a keynote from the database. If you have multiple occurrences of the linework, and you want them to have the same keynote, you can specify a keynote by applying the properties of the detail component for which the desired keynote is already specified. If a tool for inserting the component already exists, you can apply the tool properties to the linework. If no such tool exists, you can use the **DtlComp** command to select a component from the Detail Component Manager, and its ASsign id command line option to assign its properties to the linework.

Applying Detail Component Properties to Linework from a Tool

Use this procedure to apply the properties of a detail component insertion tool to linework in a drawing so that the linework can be keynoted with the keynote of the component the selected tool inserts.

1 Draw the linework.

2 Right-click a tool on a tool palette, and click Apply Detail Component Data to Linework.

3 Select the linework, and press *ENTER*.

The linework can now be keynoted just as if it were a component inserted using the selected tool.

Applying Detail Component Properties to Linework from the Detail Component Manager

Use this procedure to apply the properties of a selected detail component to linework in a drawing so that the linework can be keynoted with the keynote for that component.

1 Draw the linework.

2 On the command line, enter **DtlComp**.

3 Enter **as** (for ASsign).

4 Select the linework, and press *ENTER*.

5 In the Select Component dialog box, select the component whose properties you want to assign to the linework, and click Select Component. For more information, see Locating a Detail Component on page 2328.

The linework can now be keynoted just as if it were a component inserted directly from the Detail Component Manager.

Using the Detail Component Manager

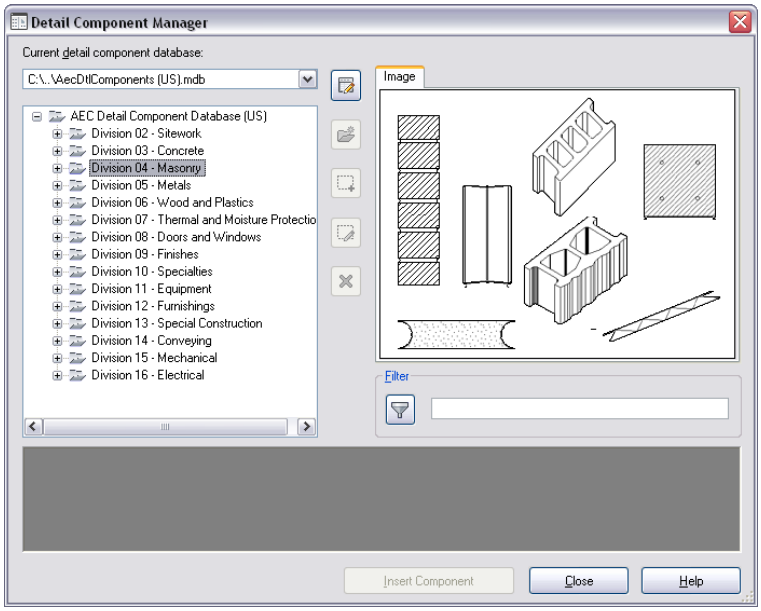
Using the Detail Component Manager dialog box, you can navigate among different detail component databases. A hierarchical tree view and a filter feature make it easy to locate individual components within a database. Once you find the component you need, you can insert it into a drawing, or you can drag and drop it onto a tool palette for repeated use. Note that the five buttons arranged vertically in the middle of the dialog box are unavailable unless you have edit privileges for the selected database. For more information, see Creating and Modifying Detail Component Databases on page 2330.

You can access the Detail Component Manager in the following ways:

- Click Home tab ➤ Details panel ➤ Detail Components .
- Right-click any detail component insertion tool on a tool palette in the workspace, and then click Detail Component Manager.
- On the Tool Properties worksheet for a detail component tool, click the Select a Component icon on the Component line.

NOTE When accessed from the Tool Properties worksheet, the Detail Component Manager is displayed in read-only mode, and the dialog box is titled "Select Component." The hierarchical tree view is expanded to highlight the component currently specified for the tool, and the component table is open at the bottom of the dialog box. Note also that the Insert Component button is replaced by a Select Component button.

The Detail Component Manager dialog



Locating a Detail Component

Use this procedure to locate a detail component.

1 Use any of these methods to open the Detail Component Manager (sometimes also called the Select Component dialog box):

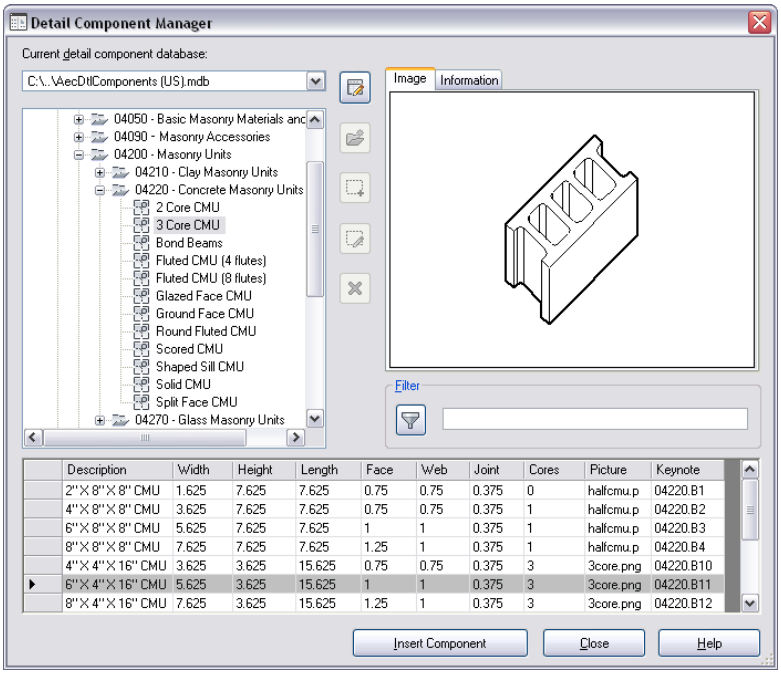
To start the command from...	Then...
the ribbon	click Home tab ➤ Details panel ➤ Detail Components .
a tool on a tool palette	right-click the tool, and choose Detail Component Manager.
a tool properties worksheet	open the Tool Properties worksheet for a tool, and click the Select a Component icon on the Component title bar.
the command line	enter **DtlComp** and then enter **as** (for ASsign).

2 For Current detail component database, select a database from the drop-down list. The database provided with the software is the AEC Detail Component database (*AecDtlComponents(US).mdb*), which is based on the CSI MasterFormat 2004 standard. You may also access other locally installed databases. For more information, see Configuring Detail Component Database Availability on page 2349.

3 Navigate to the detail component table level of the hierarchy for the selected database using either of the following methods:

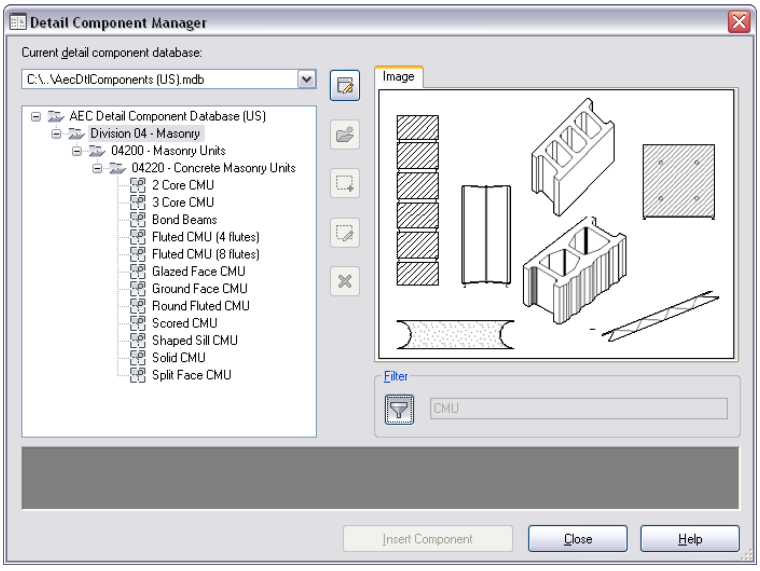
- Expand nodes in the hierarchical tree view until you reach the table level, then select a table name to display its contents in the grid at the bottom of the dialog box.

The Detail Component Manager dialog with concrete mansonry table displayed



- Type a word or character string in the Filter box, and then click , or press *Tab*, or press *ENTER*. This expands all nodes under any node whose name includes the string you entered, and displays the component table for the first table name that contains that string. This is a quick way to navigate to a component whose name you know, but it may expand multiple groups or subgroups in multiple divisions. If you know the division or group containing the component table you want, it is faster to expand the nodes yourself.

Using the Detail Component Manager filter



4 Once the components for the selected table are displayed in the bottom panel of the dialog box, you can use the vertical scroll bar or your mouse scroll wheel to locate a particular component. Clicking anywhere on a row selects that component. Note that the number of column headings

varies from one component table to another. For some tables, you need to expand the window or use the horizontal scroll bar to view all columns.

Creating and Modifying Detail Component Databases

AutoCAD Architecture uses Microsoft® Access for its detail component databases. You can create and modify detail component databases using Microsoft Access directly if you are familiar with that product and with the structure of detail component databases. (For more information, see Customizing and Adding New Content for Detail Components on page 2591.) If you have edit privileges, you can also create and modify detail component databases through the Detail Component Manager, without using Microsoft Access. Nonetheless, before attempting advanced edits using the Detail Component Manager, you should be familiar with the schema for detail component databases, as described in the above-referenced topic.

NOTE If you are working in a multi-user environment, it is recommended that you modify a keynote database only when no other users are accessing it.

Editing Detail Component Database Properties

Use this procedure to edit a component in a detail component database.

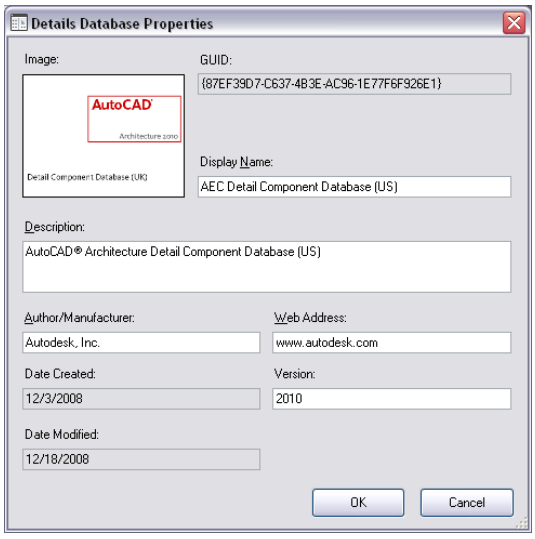
1 Click Home tab ➤ Details panel ➤ Detail Components .

2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 Right-click the root node in the tree view, and click Edit.

The Details Database Properties dialog box is displayed for the selected database.



5 Edit the following database properties as applicable.

Property Name	Description/Instructions
Image	Right-click the Image box, and click Specify Image to browse images available for the selected group in the location specified by its Path Key value. The image you select will be displayed on the Image tab of the Detail Component Manager when the database node is selected. This is an optional field.

Property Name	Description/Instructions
Display Name	The name from the database Fingerprint table.
Description	The description displayed for this database on the Information tab in the Detail Component Manager. This is an optional field.
Author/Manufacturer	The name of the person or other entity responsible for this database. This is an optional field.
Web Address	The URL for the author/manufacturer. This is an optional field.

6 Click OK.

Editing Groups in a Detail Component Database

Use this procedure to edit a component group in a detail component database.

1 Click Home tab ➤ Details panel ➤ Detail Components .

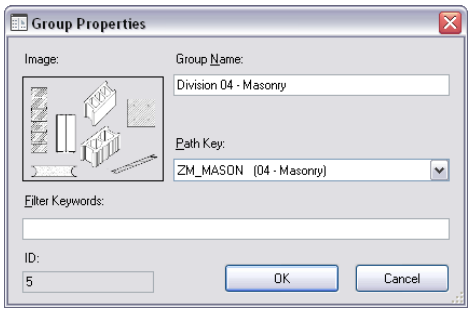
2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 Expand the root node and group/subgroup nodes as necessary to locate the group you want to edit.

5 Right-click the group, and click Edit.

The Group Properties dialog box is displayed.



6 Edit the following properties as applicable:

Property Name	Description/Instructions
Image	The image displayed on the Image tab of the Detail Component Manager when this group is selected. To change the image, right-click the Image box, and click Specify Image to browse images available for the selected group in the location specified by its Path Key value. This is an optional field.
Group Name	The name from the database Groups table displayed for this group in the Detail Component Manager.
Path Key	An entry from the database DirKeys table, this value is a shortcut alias identifying the location of drawing and image files external to the database for this group.

Property Name	Description/Instructions
Filter Keywords	A comma-delimited list of keywords to be used when searching for components within this group in the Detail Component Manager. This is an optional field.

7 Click OK.

Editing Components in a Detail Component Database

Use this procedure to edit the properties of individual components within a detail component database. The properties on the General and Parameters tabs of the Component Properties dialog box are the basis for one or more recipes the software uses to draw the component in different views. Each recipe specifies the type of jig, or drawing routine, for placing the component in a specific view. The recipe may also contain information pertaining to layer and hatch pattern (for more information, see Recipe Specifications on page 2597). You can also use this procedure to customize components in the default imperial and metric detail component databases supplied with the software, or to edit components in databases that you create.

1 Click Home tab ➤ Details panel ➤ Detail Components .

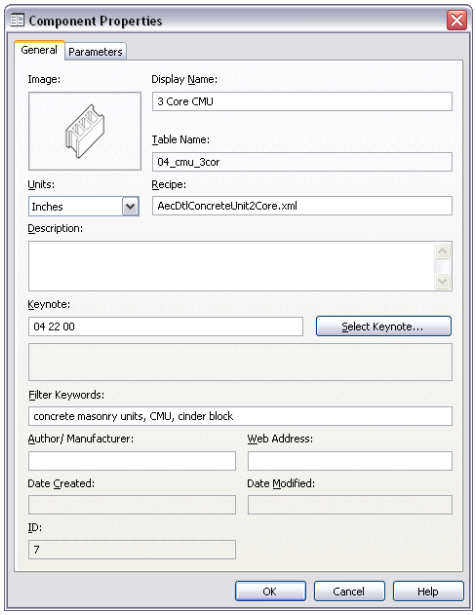
2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 Expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.

5 Right-click the component, and click Edit.

The Component Properties dialog box is displayed. The read-only ID field shows the database identifier for the group to which the component belongs. In most cases, you can edit values on the General tab and the Parameters tab within this dialog box. For components that use a jig other than one of the six supported types (Stamp, Bookends, Linear Array, Surface, Surface Linetype, and Surface Top), no parameters are displayed on the Parameters tab. For information on editing this type of component, see Customizing and Adding New Content for Detail Components on page 2591.

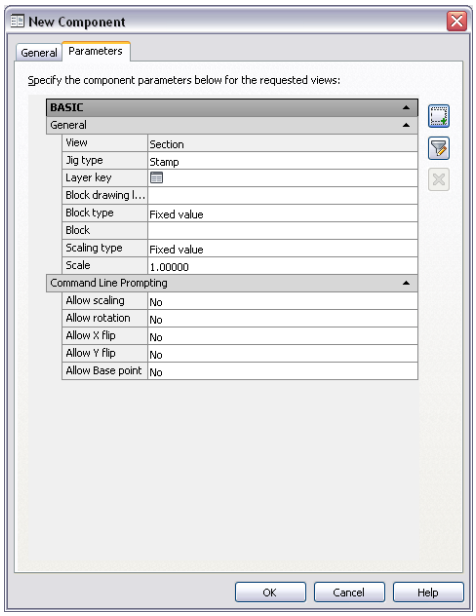


6 On the General tab, edit the following values as applicable:

Property Name	Description/Instructions
Image	The image displayed on the Image tab of the Detail Component Manager when this component is selected. To change the image, right-click the Image box, and click Specify Image to browse images available for the selected group in the location specified by its Path Key value. This is an optional field.
Display Name	The name displayed for this component in the Detail Component Manager.
Table Name	The name of the size table for this component, as specified in the TableName field in the database Components table.
Units	The unit of measurement for this component.
Recipe	The name of the RecipeSpec XML file containing the recipes for drawing this components.
Description	The description displayed for this component on the Information tab in the Detail Component Manager.
Keynote	The default keynote key for this component. Click Select Keynote to browse for or create a different keynote. This is an optional field.
Filter Keywords	A comma-delimited list of keywords to be used in searching for this component. This is an optional field.
Author/Manufacturer	The name of the person or other entity responsible for this component, as specified in the Author field in the database Fingerprint table. This is an optional field.
Web Address	The address specified in the URL field in the Fingerprint table for the database containing this component. This is an optional field.
Date Created	This read-only property shows the creation date for the component if it was created using the Detail Component Manager.
Date Modified	This read-only property shows the date of the last modification for this component if it was modified using the Detail Component Manager.

7 If the Parameters tab is available for the selected component, you can change the jig type, if desired, and then edit parameter values according to the instructions following the illustration below. You can also change the specified view by renaming it (click), or you can create additional views by clicking . Any views you create or rename are then available from the drop-down list.

NOTE You can specify only one jig type for each view.



To define a recipe using this jig type...	See...
Stamp	Parameters for Recipes Using Stamp Jigs on page 2343.
Bookends	Parameters for Recipes Using Bookends Jigs on page 2344.
Linear Array	Parameters for Recipes Using Linear Array Jigs on page 2345.
Surface	Parameters for Recipes Using Surface Jigs on page 2347.
Surface Linetype	Parameters for Recipes Using Surface Linetype Jigs on page 2347.
Surface Top	Parameters for Recipes Using Surface Top Jigs on page 2348.

8 Click OK.

Deleting Groups or Components from a Detail Component Database

Use this procedure to delete a group, subgroup, or component from a detail component database. Note that deleting a group also deletes any subgroups and components within that group.

1 Click Home tab ➤ Details panel ➤ Detail Components .

2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 In the tree view, select the node representing the group, subgroup, or component you want to delete.

5 Click .

The selected node and all its children are deleted from the hierarchical tree view in the Detail Component Manager.

Moving Groups or Components in a Detail Component Database

Use this procedure to move a group, subgroup, or component to a different group or level within the database hierarchy. Note that moving a group also moves any subgroups and components within that group.

1 Click Home tab ➤ Details panel ➤ Detail Components .
2 Select a database from the Current detail component database list.
3 Click to enter edit mode.
4 Select the node (group, subgroup, or component) to move, and drag it to the desired location in the hierarchical tree view.

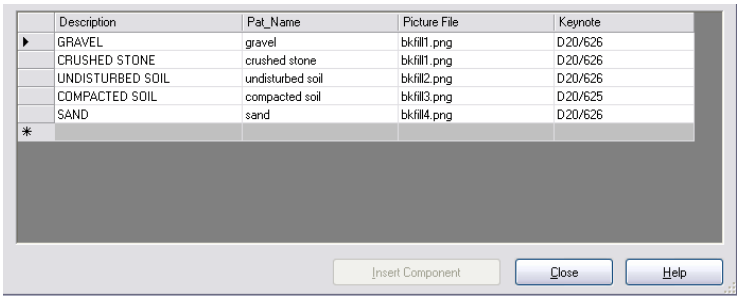
Editing Component Size Tables

A component size table is displayed in the pane at the bottom of the Detail Component Manager whenever a component is selected in the tree view. If you have edit privileges for the currently selected database, you can add rows to the table, remove rows, or edit individual cells. You can also add or remove columns and change column names.

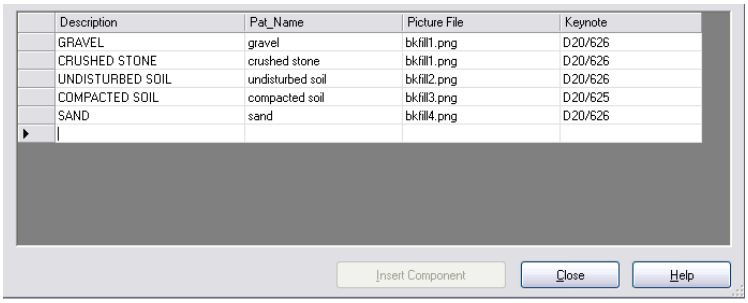
Adding a Row to a Component Size Table

Use this procedure to add a row to the size table for a selected component in the Detail Component Manager.

1 Click Home tab ➤ Details panel ➤ Detail Components .
2 Select a database from the Current detail component database list.
3 Click to enter edit mode.
4 In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.
5 If necessary, scroll to the bottom of the table, and then click anywhere in the blank row that has an asterisk (*) in the first column.

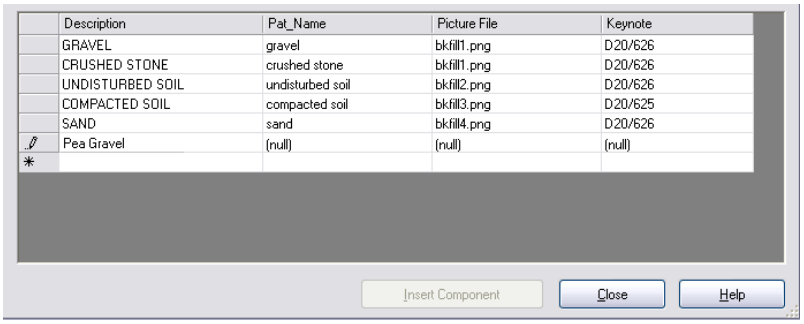


The row is selected.



6 Enter text as required for cells in the row.

As you begin to edit a cell, an edit symbol appears in the first column, and the blank row is displayed again below the row you are editing.



NOTE The Keynote column is not directly editable. Right-click in the cell, and click Edit to open the Select Keynote dialog box. For more information, see Specifying Keynotes for Detail Components on page 2384.

7 Click to leave edit mode (or click Close), and then click OK when prompted to save the changes to the table. If you forgot to enter a required value, you are prompted to go back and enter it.

Removing a Row from a Component Size Table

Use this procedure to remove a row from the size table for a selected component in the Detail Component Manager.

1 Click Home tab ➤ Details panel ➤ Detail Components .

2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.

5 If necessary, resize the window or use the vertical scroll bar to find the row that you want to remove from the table. Then click the gray cell in the first column of the row, and click *DELETE* to remove the row.

6 Click to leave edit mode (or click Close), and then click OK when prompted to save the changes to the table.

Editing Values Within a Component Size Table Row

Use this procedure to edit individual cells in the size table for a selected component in the Detail Component Manager.

1. Click Home tab ➤ Details panel ➤ Detail Components .
2. Select a database from the Current detail component database list.
3. Click to enter edit mode.
4. In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.
5. If necessary, resize the window or use the scroll bars to find the cell that you want to edit in the table. You can add or change existing text within a cell, or you can click a cell and press *Delete* to clear the cell and then add new text.

   NOTE To edit the Keynote column, right-click in the cell, and click Edit to open the Select Keynote dialog box. For more information, see Specifying Keynotes for Detail Components on page 2384.

6. Click to leave edit mode (or click Close), and then click OK when prompted to save the changes to the table. If you forgot to enter a required value, you are prompted to go back and enter it.

Adding a Column to a Component Size Table

Use this procedure to add a column to the size table for a selected component in the Detail Component Manager.

1. Click Home tab ➤ Details panel ➤ Detail Components .
2. Select a database from the Current detail component database list.
3. Click to enter edit mode.
4. In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.
5. In the table, right-click any column title, and click Add Column.
6. In the Add New Column dialog box, enter a name for Field Name. If the name you enter matches one of the GlobalName values in the ColumnDisplay table for this database, the LocalName value associated with that global name will be displayed when you click in the Display Name field. You can use this as the display name for the new column, or you can enter a different name, in which case a new entry will be added to the ColumnDisplay table to reflect the new LocalName value you have created for an existing GlobalName value. (A new ColumnDisplay table entry will also be created if the name you enter for Field Name does not match an existing GlobalName value.)
7. Select a data type (String, Memo, Integer, or Real), specify a length (up to 255 characters), and click OK.

   The specified column is added to the right of any existing columns.

Removing a Column from a Component Size Table

Use this procedure to remove a column from the size table for a selected component in the Detail Component Manager.

1 Click Home tab ➤ Details panel ➤ Detail Components .

2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.

5 In the table, right-click the title of the column you want to remove, and click Delete Column.

6 Click OK when prompted to confirm that you want to delete the column.

Editing a Column in a Component Size Table

Use this procedure to edit the name of a column in the size table for a selected component in the Detail Component Manager.

1 Click Home tab ➤ Details panel ➤ Detail Components .

2 Select a database from the Current detail component database list.

3 Click to enter edit mode.

4 In the hierarchical tree view, expand the root node and group/subgroup nodes as necessary to locate the component you want to edit.

5 In the table, right-click the title of the column you want to edit, and click Rename Column.

6 In the Rename Column dialog box, enter a new name for the column in the Display Name field, and click OK. Note that the Field Name displays the GlobalName value for this column from the ColumnDisplay table for this database. When you change the display name, a new entry is added to the ColumnDisplay table to reflect the new display name you have created for an existing GlobalName value.

Creating a Detail Component Database

Using the Detail Component Manager to create a new detail component database requires the following basic steps:

1 Create a blank Microsoft® Access database by copying and renaming the detail component database template (*AecDtlComponents-Template.mdb*) located in *C:\ProgramData\Autodesk\ACA 2010\enu\Template\Details and Keynotes*.

2 Add the renamed database to the list of available databases. (For detailed instructions, see Adding a Detail Component Database to Available Databases on page 2349.)

3 Using the Detail Component Manager, add groups and subgroups to reflect the major and minor divisions within the detailing scheme. (For detailed instructions, see Adding Groups to a Detail Component Database on page 2339.)

4 Add individual components within groups and subgroups as applicable. (For detailed instructions, see Adding Components to a Detail Component Database on page 2340.)

5 Add rows to the size tables as applicable for each group/subgroup, editing table columns as desired. (For detailed instructions, see Adding a Row to a Component Size Table on page 2335.)

When you exit the Detail Component Manager, the new database is available to other users with access privileges.

Creating a Blank Detail Component Database

Use this procedure to create a blank Microsoft® Access database with all required tables and queries for detail component storage and retrieval. This is the first step in the process of creating a new detail component database using the Detail Component Manager.

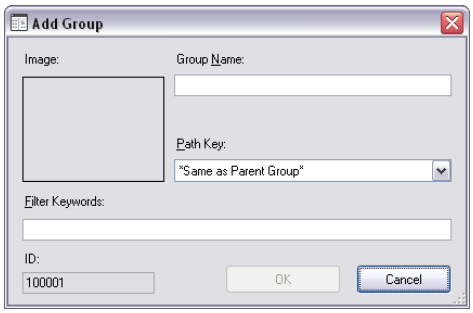
1. Navigate to *C:\ProgramData\Autodesk\ACA 2010\enu\Template\Details and Keynotes*.
2. Copy the file *AecDtlComponents-Template.mdb* and rename it as desired.
3. Add the new blank database to the list of active databases, as described under Adding a Detail Component Database to Available Databases on page 2349.

Adding Groups to a Detail Component Database

Use this procedure to add a group to a detail component database. You can use the same basic procedure to add various subgroups within a group.

1. Click Home tab ➤ Details panel ➤ Detail Components .
2. Click to enter edit mode.
3. Select a database from the Current detail component database list.
4. Select the root node for the selected database if you want to add a top-level group, or expand the root node and group/subgroup nodes as necessary until you can select the node to which you want to add a subgroup.
5. Click .

   The Add Component Group dialog box is displayed with the read-only ID field showing the value assigned to this group in the Groups table in the database.



6. For Group Name, enter the name you want displayed in the Detail Component Manager for this group. This value will be added to the database Groups table entry.
7. If you are using the standard database, select a Path Key from the drop-down list to specify a shortcut alias identifying the location of drawing and image files for this group. Path Key values are retrieved from the database DirKeys table. You can add new key values to this table manually using Microsoft® Access. If you are creating a new database from the template file, no Path Key values will be available for selection in this dialog box unless you have first populated the DirKeys table using Microsoft® Access. For more information, see Customizing and Adding New Content for Detail Components on page 2591.
8. For Filter Keywords, enter a comma-delimited list of keywords to be used when searching for components in this group.
9. Click OK.

   The group or subgroup you have defined is displayed as a new node in the hierarchical tree view.

Adding Components to a Detail Component Database

Use this procedure to add a component to a detail component database and create a blank size table to which you can then add rows representing the sizes in which the component is available. When you add a component, the values you specify on the General and Parameters tabs of the New Component dialog box are used to create one or more recipes for drawing the component in different views. Each recipe specifies the type of jig, or drawing routine, for placing the component in a specific view. The recipe may also contain information pertaining to layer and hatch pattern (for more information, see Recipe Specifications on page 2597). Note that this procedure can be used to add components to the default imperial and metric detail component databases supplied with the software, or to populate databases that you create.

1 Click Home tab ➤ Details panel ➤ Detail Components .

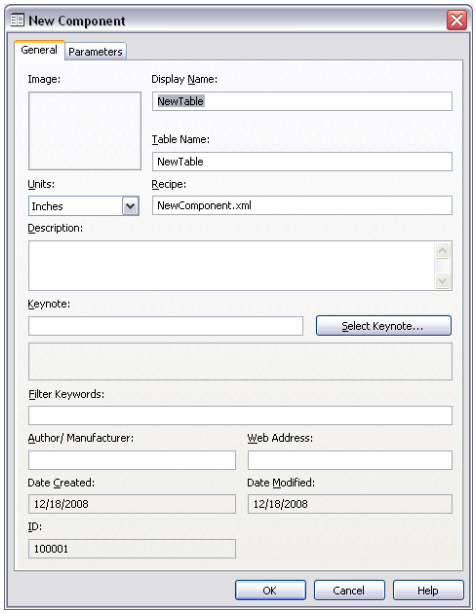
2 Click to enter edit mode.

3 Select a database from the Current detail component database list.

4 Expand the root node and group/subgroup nodes as necessary until you can select the node to which you want to add a component table.

5 Click .

The New Component dialog box is displayed.



6 On the General tab, specify the following values as applicable for the component you are adding:

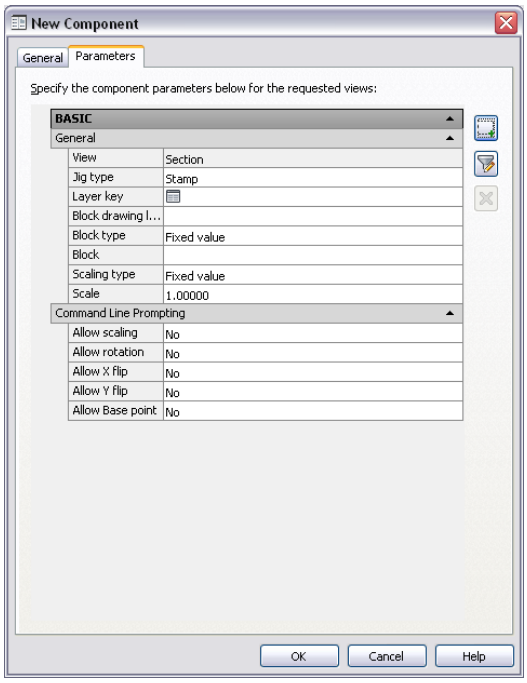
Value Name	Description/Instructions
Image	Right-click the Image box, and click Specify Image to browse images available for the selected group in the location specified by its Path Key value. The image you select will be displayed on the Image tab of the Detail Component Manager when this component is selected.
Display Name	Enter the name you want displayed for this component in Detail Component Manager.
Table Name	Enter the name of the size table for this component.
Units	Select a unit from the drop-down list.

Value Name	Description/Instructions
Recipe	Enter a name for the RecipeSpec XML file to contain the recipes you specify for drawing this component.
Description	Enter the description you want to display for this component on the Information tab in the Detail Component Manager.
Keynote	Click Select Keynote to browse for or create a keynote to be the default for this component.
Filter Keywords	Enter a comma-delimited list of keywords to be used in searching for this component.
Author/Manufacturer	Enter the name of the person or other entity responsible for this component.
Web Address	Enter the URL for the author/manufacturer.

NOTE The ID property on the General tab is a read-only value identifying a particular Groups table in the selected database. These values are assigned automatically as groups are added to a database.

7 On the Parameters tab, if desired, select a jig type other than the default (Stamp) for the default Section view, and then specify parameter values to define the component according to instructions referenced in the table following the illustration below. You can also change the default view by renaming it (click), or you can create additional views by clicking . Any views you create or rename are then available from the drop-down list.

NOTE You can specify only one jig type for each view.



To define a recipe using this jig type...	See...
Stamp	Parameters for Recipes Using Stamp Jigs on page 2343.
Bookends	Parameters for Recipes Using Bookends Jigs on page 2344.
Linear Array	Parameters for Recipes Using Linear Array Jigs on page 2345.
Surface	Parameters for Recipes Using Surface Jigs on page 2347.
Surface Linetype	Parameters for Recipes Using Surface Linetype Jigs on page 2347.
Surface Top	Parameters for Recipes Using Surface Top Jigs on page 2348.

8 Click OK.

You can now add a table row for each available component size. You can also add, edit, or delete columns as needed. For detailed instructions, see Editing Component Size Tables on page 2335.

Parameters for Recipes Using Stamp Jigs

Stamp jigs are used to insert components that consist of a single block. Refer to the following table if you are adding a new detail component (or editing one that was created using the New Component option) and you want to define a recipe that uses a stamp jig to insert the component in the specified view.

Parameter Name	Description/Instructions
Layer key	Specifies the layer key for the layer to which the component will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Block drawing location	The name of the drawing file (a DWG, DWT or DWS file) containing the blocks for the component table.
Block type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter will apply to every row in the size table for this component. If you select Database, a column will be added to the table allowing values to be entered for individual sizes.
Block	Displayed only if Block type is Fixed value, this parameter specifies the block definition to be inserted for this component.
Block field	Displayed only if Block type is Database, this parameter specifies the name of the component table column in which the block to be inserted is specified for each size.
Scaling type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you supply will apply to every row in the size table for this component. If you select Database, a column will be added to the table allowing values to be entered for individual sizes.
Scale	Displayed only if Scaling type is Fixed value, this parameter specifies the scaling value for the block.
Scale field	Displayed only if Scaling type is Database, this parameter specifies the name of the component table column in which the scaling value for the block is specified for each size.
Allow scaling	Specifies whether the command-line option for specifying scaling is displayed for this component.
Allow Rotation	Specifies whether the command-line option for specifying rotation is displayed for this component.
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.
Allow Base point	Specifies whether the command-line option for specifying an alternate base point is displayed for this component.

Parameters for Recipes Using Bookends Jigs

Bookends jigs are used to insert components that consist of a pattern repeated as a linear array but bounded by unique items at each end. Thus, the recipe must define a start block, a repeat block, and an end block. Refer to the following table if you are adding a new detail component (or editing one that was created using the New Component option) and you want to define a recipe that uses a bookends jig to insert the component in the specified view.

NOTE Parameters preceded by an asterisk (*) are specified separately for the start block, the repeat block, and the end block.

Parameter Name	Description/Instructions
Layer key	Specifies the layer key for the layer to which the component will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Block entire component	Specifies whether the blocks comprising the component are inserted as a single block.
Block drawing location	Specifies the drawing file (a DWG, DWT, or DWS file) containing the blocks for the component table.
*Block type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Block parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Block field parameter) will be added to the component table, allowing different block definitions to be specified for individual sizes.
*Block	Displayed only if Block type is Fixed value, this parameter specifies the block definition to be used for all sizes.
*Block field	Displayed only if Block type is Database, this parameter specifies the name of the component table column in which the block definition is specified for each size.
*Layer key	Specifies the layer key for the layer to which the block will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
*Scaling type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Scale parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Scale field parameter) will be added to the component table, allowing values to be entered for individual sizes.
*Scale	Displayed only if Scaling type is Fixed value, this parameter specifies the scaling value for the block.
*Scale field	Displayed only if Scaling type is Database, this parameter specifies the name of the component table column in which the scaling value for the block is specified for each size.

Parameter Name	Description/Instructions
*Width type	A drop-down list lets you specify Fixed value, Database, or Block extents. If you select Fixed value, the value you enter for the corresponding Width parameter will apply to every row in the size table for this component. If you select Database, a column (with the name specified for the corresponding Width field parameter) will be added to the component table, allowing values to be entered for individual sizes. If you select Block extents, then block width is calculated dynamically as the block is inserted.
*Width	Displayed only if Width type is Fixed value, this parameter specifies the width for the block.
*Width field	Displayed only if Width type is Database, this parameter specifies the name of the component table column in which the block width is specified for each size.
Gap	Specifies the distance between repeat blocks. A negative value causes blocks to overlap.
Start prompt	Specifies the string to display for the start point prompt.
End prompt	Specifies the string to display for the endpoint prompt.
Block orientation	Specifies whether the block is oriented along the *X* axis or the *Y* axis.
Jig orientation	Specifies whether the jig is oriented along the *X* axis or the *Y* axis.
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.

Parameters for Recipes Using Linear Array Jigs

Linear Array jigs are used to insert multiple copies of a block in a line along the *X* or *Y* axis. Refer to the following table if you are adding a new detail component (or editing one that was created using the New Component option) and you want to define a recipe that uses a linear array jig to insert the component in the specified view.

Parameter Name	Description
Layer key	Specifies the layer key for the layer to which the component will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Block entire component	Specifies whether the blocks comprising the component are inserted as a single block.
Block drawing location	Specifies the drawing file (a DWG, DWT, or DWS file) containing the blocks for the component table.
Block type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Block parameter will apply to

Parameter Name	Description
	every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Block field parameter) will be added to the component table, allowing different block definitions to be specified for individual sizes.
Block	Displayed only if Block type is Fixed value, this parameter specifies the block definition to be used for all sizes.
Block field	Displayed only if Block type is Database, this parameter specifies the name of the component table column in which the block definition is specified for each size.
Scaling type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Scale parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Scale field parameter) will be added to the component table, allowing values to be entered for individual sizes.
Scale	Displayed only if Scaling type is Fixed value, this parameter specifies the scaling value for the block for all sizes.
Scale field	Displayed only if Scaling type is Database, this parameter specifies the name of the component table column in which the scaling value for the block is specified for each size.
Width type	A drop-down list lets you specify Fixed value, Database, or Block extents. If you select Fixed value, the value you enter for the corresponding Width parameter will apply to every row in the size table for this component. If you select Database, a column (with the name specified for the corresponding Width field parameter) will be added to the component table, allowing values to be entered for individual sizes. If you select Block extents, then block width is calculated dynamically as the block is inserted.
Width	Displayed only if Width type is Fixed value, this parameter specifies the width for the block for all sizes.
Width field	Displayed only if Width type is Database, this parameter specifies the name of the component table column in which the block width is specified for each size.
Gap	Specifies the distance between repeat blocks. A negative value causes blocks to overlap.
Start prompt	Specifies the string to display for the start point prompt.
End prompt	Specifies the string to display for the endpoint prompt.
Display count option	Specifies whether the command-line options for specifying a count are displayed (see Count prompt parameter below).
Count prompt	Displayed only if the Display count option parameter is Yes, this parameter specifies the command-line prompt to be displayed.
Block orientation	Specifies whether the block is oriented along the *X* axis or the *Y* axis.
Jig orientation	Specifies whether the jig is oriented along the *X* axis or the *Y* axis.

Parameter Name	Description
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.

Parameters for Recipes Using Surface Jigs

Surface jigs are used to insert components that have a specified depth and a hatch-filled rectangular boundary with user-specified start points and endpoints. Refer to the following table if you are adding a new detail component (or editing one that was created using the New Component option) and you want to define a recipe that uses a surface jig to insert the component in the specified view.

Parameter Name	Description
Layer key	Specifies the layer key for the layer to which the component boundary will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Layer key (for hatching)	Specifies the layer key for the layer to which the component hatch infill will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Hatching type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Hatch alias parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Hatching parameter) will be added to the component table, allowing values to be entered for individual sizes.
Hatch alias	Displayed only if Hatching type is Fixed value, this parameter specifies the hatch alias (from the Hatches table for this database) for all sizes of the component.
Hatching	Displayed only if Hatching type is Database, this parameter specifies the name of the component table column in which the hatch is specified for each size.
Start prompt	Specifies the string to display for the start point prompt.
End prompt	Specifies the string to display for the endpoint prompt.
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.

Parameters for Recipes Using Surface Linetype Jigs

Surface linetype jigs are similar to surface jigs in that they are used to insert components that have a specified depth and a rectangular boundary with user-specified start points and endpoints. Instead of a hatch-filled boundary, however, the surface linetype jig fills the boundary with a wide polyline of a specified linetype. Refer to the following table if you are adding a new detail component (or editing one that was created using

the New Component option) and you want to define a recipe that uses a surface linetype jig to insert the component in the specified view.

Parameter Name	Description
Layer key	Specifies the layer key for the layer to which the component boundary will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Linetype/Layer key	Specifies the layer key for the layer to which the component infill will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Linetype type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Linetype parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Linetype field parameter) will be added to the component table, allowing values to be entered for individual sizes.
Linetype	Displayed only if Linetype type is Fixed value, this parameter specifies the linetype alias for all sizes of the component.
Linetype field	Displayed only if Linetype type is Database, this parameter specifies the name of the component table column in which the linetype is specified for each size.
Start prompt	Specifies the string to display for the start point prompt.
End prompt	Specifies the string to display for the endpoint prompt.
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.

Parameters for Recipes Using Surface Top Jigs

Surface top jigs are similar to surface jigs in that they are used to insert components with a specified depth and a hatch-filled rectangular boundary. However, the surface top jig is designed for components such as concrete topping that are poured onto or bounded by another entity, which provides the bottom edge of the rectangle. Thus, the surface top jig draws only the top and side edges of the rectangle. Refer to the following table if you are adding a new detail component (or editing one that was created using the New Component option) and you want to define a recipe that uses a surface top jig to insert the component in the specified view.

Parameter Name	Description
Layer key	Specifies the layer key for the layer to which the component boundary will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.

Parameter Name	Description
Layer key (for hatching)	Specifies the layer key for the layer to which the component hatch infill will be assigned in the specified view. To specify a layer key or change the existing one, click the worksheet icon ( ) to access the Select Layer Key dialog box.
Hatching type	A drop-down list lets you specify either Fixed value or Database. If you select Fixed value, the value you enter for the corresponding Hatch alias parameter will apply to every row in this component's size table. If you select Database, a column (with the name specified for the corresponding Hatching parameter) will be added to the component table, allowing values to be entered for individual sizes.
Hatch alias	Displayed only if Hatching type is Fixed value, this parameter specifies the hatch alias (from the Hatches table for this database) for all sizes of the component.
Hatching	Displayed only if Hatching type is Database, this parameter specifies the name of the component table column in which the hatch is specified for each size.
Start prompt	Specifies the string to display for the start point prompt.
End prompt	Specifies the string to display for the endpoint prompt.
Allow X flip	Specifies whether the command-line option for flipping the block on its *X* axis is displayed for this component.
Allow Y flip	Specifies whether the command-line option for flipping the block on its *Y* axis is displayed for this component.

Configuring Detail Component Database Availability

AutoCAD Architecture provides a detail component database (*AecDtlComponents.mdb*), which is based on the CSI MasterFormat 2004 standard. You can add other detail component databases to accommodate your office standards or other project-specific requirements. You can also remove databases from the active list, depending on whether you want them available to a particular project. For a given project, you can also control whether users can see and access all detail component databases or only those associated with the project. For more information, see Specifying the Project Detail Component Databases for a Project on page 226.

Adding a Detail Component Database to Available Databases

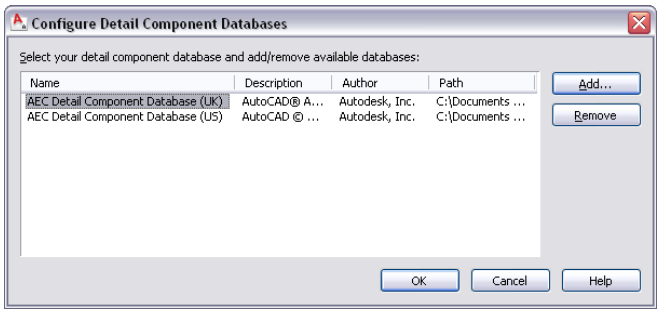
Use this procedure to add a database to the list of active detail component databases from which components can be selected for insertion, copied to a tool palette, or used to modify an existing tool.

1 Click ➤ Options.

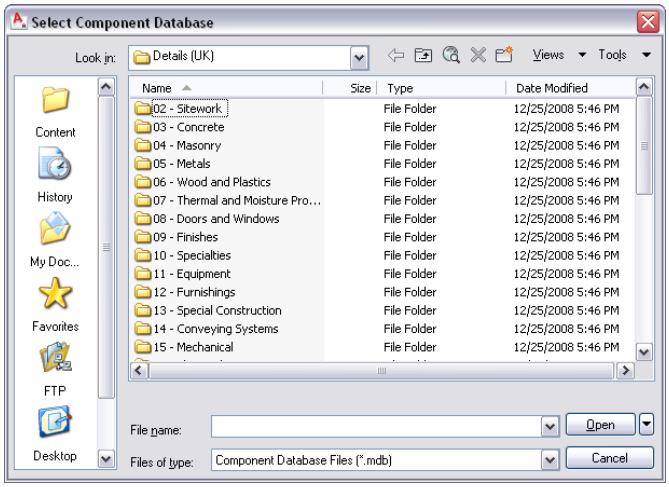
2 In the Options dialog box, click the AEC Content tab.

3 On the AEC Content page, click the Add/Remove button for Detail Component Databases.

4 In the Configure Detail Component Databases dialog box, click Add.



5 In the Select Component Database browser window, locate the database you want to add, and click Open.



The selected database is added to the bottom of the list in the Configure Detail Component Databases dialog box.

6 Click OK twice.

Removing a Detail Component Database from Available Databases

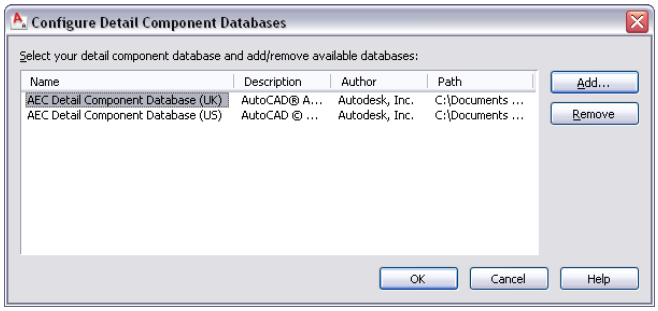
Use this procedure to remove a database from the list of active detail component databases.

1 Click ➤ Options.

2 In the Options dialog box, click the AEC Content tab.

3 On the AEC Content page, click the Add/Remove button for Detail Component Databases.

4 In the Configure Detail Component Databases dialog box, select the database you want to remove from the list, and click Remove.



5 Click OK twice. Note that if you remove the top database in the list, the next database listed becomes the current selection in the Detail Component Manager dialog box.

Setting Detail Component Database Permissions in a Multi-User Environment

If you are working in a multi-user network environment with keynote and detail content on a remote server, you may want to allow some users to edit databases and others to have read-only access. For this to work properly, all users must have write permission to the folder where the databases are installed. Without write permission to the folder, a user will not be able to open any database within the folder, because the necessary lock file cannot be generated on that user's behalf, regardless of whether the user has write permission to the database itself. Once all users have write permission to the folder, permissions for individual databases (*.mdb files) can then be set on a per-user basis. Note, however, that this arrangement allows users to access and edit other content within the folder, such as drawing, image, and XML recipe files, unless you set permissions on these files individually to prevent it. For this reason, you may want to keep the folders containing keynote and detail content separate from other content installed with AutoCAD Architecture so that write permission is not available to all users for all content.

Merging Old and New Detail Component Databases

If you have modified one of the default detail component databases supplied with a previous release of AutoCAD Architecture, and you want to migrate your modifications to the corresponding database in the current release, you can do so using the Detail Component/Keynote Database Migration utility. For detailed instructions, see Migrating Detail Component and Keynote Databases on page 2627.

IMPORTANT Beginning with AutoCAD Architecture 2010, the US detail component and keynote databases supplied with the software use the CSI MasterFormat 2004 standard. Using the Detail Component/Keynote Database Migration utility to migrate your customizations from a database that uses the CSI MasterFormat 95 standard (as in Autodesk Architectural Desktop 2007 and previous releases) is not supported. The utility will not properly migrate custom records from the older database and may errantly overwrite records in the new database with MasterFormat 95 data. If you want to use a MasterFormat 95 database with the current release of AutoCAD Architecture, you can load it as described under Adding a Detail Component Database to Available Databases on page 2349 or Adding a Keynote Database on page 2385. Note that the older database must be located with the previous release content and must maintain that content folder structure to function properly. An older detail component database will not function with 2008 or later US details content. Likewise, an older keynote database will not automatically keynote 2008 or later US details content; it will only keynote detail components inserted using previous version details or details in previous version drawings. The Detail Component/Keynote Database Migration utility can still be used to migrate records from one CSI MasterFormat 95 database to another.

Annotation and Keynoting Tools

46

Annotation tools let you easily insert multiline text annotations with or without leaders, keynotes that scale and layer key automatically, and cut lines with single or double breaks that can mask or trim underlying objects. You can edit multiline attributes used in multi-view blocks. You can create and manipulate many kinds of multiline leaders. Annotation scaling allows you to plot annotation at the same height or size at different specified annotation scales. You can link display configurations to specific annotation scales as well, and carry participating annotation scales from one AEC object to another. The keynote tools support both reference keynoting and sheet keynoting. You can manually select keynotes to insert, or you can apply pre-specified keynotes at various levels: object, object component, two-dimensional (2D) section/elevation linework, or detail component.

The Basic Annotation Tool

AutoCAD Architecture uses the same basic customizable tool for adding the following types of annotations to drawings:

- Multiline text notes with single or multiline leaders
- Symbol-based notes with attributes
- Reference keynotes
- Sheet keynotes
- Break marks

The specific type of annotation, its appearance, and other characteristics are determined by editable values on the Tool Properties worksheet, which is accessed from the context menu of the tool. Annotation objects are created at a scale based on the specified annotation scale.

Several default versions of this annotation tool are provided with the software, each representing a different configuration of the Tool Properties worksheet. Depending on how your system is set up, you may find one or more of these tools (or locally customized versions of them) on the sample Annotation tool palette in the workspace. These tools are also available from the Stock Tools Catalog and the Documentation Tool Catalog in the Content Browser. Using the i-drop® feature, you can copy any of these tools to a tool palette in the workspace and customize it to meet your needs.

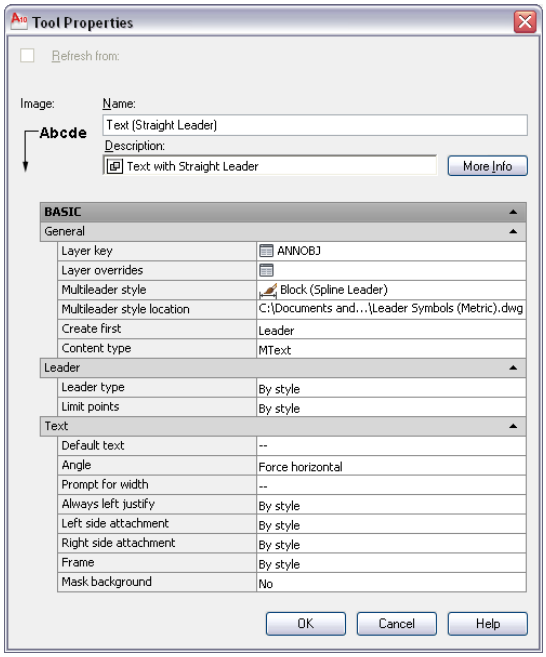
The basic annotation tool lets you insert either text-based or block-based annotations. In both cases, the annotation can be created with or without a leader that connects it visually to a particular object or point

in the drawing. The annotation tool also supports keynoting, where a predefined keynote is retrieved from a database, either through direct selection or automatically, based on a selected object within the drawing. Generally, text-based annotations are used for reference keynoting, and block-based annotations are used for sheet keynoting. However, the annotation tool accommodates many different styles of drawing annotation, such as break marks.

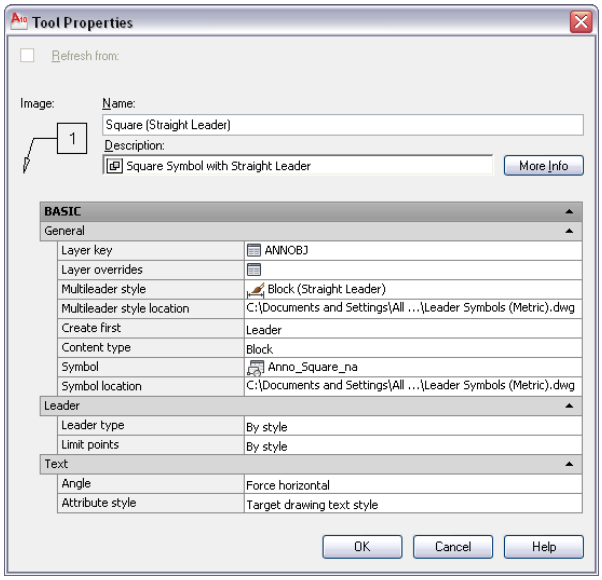
Annotation Tool Properties

The following illustrations show the Tool Properties worksheet settings for two of the default versions of the annotation tool: the text-based Text (Straight Leader) tool and the block-based Square (Straight Leader) tool. Note the different values for Content type under the General category. When the content type is multiline text (Mtext), additional settings are displayed under the Text category. Likewise, when the content type is Block, settings are displayed for Symbol and Symbol location. The settings available under the Leader category also vary based on the current value for Leader type.

MText annotation tool properties



Block annotation tool properties



The following table lists and describes the annotation tool properties that can be configured through the Tool Properties worksheet. Once an annotation is inserted into a drawing, properties of the annotation or its leader can be modified using the associated Properties palette. For more information on modifying the text of an existing annotation, see Editing a Text-Based Annotation on page 2367.

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which annotation is assigned. To change, click the current value (default is ANNOBJ) to access the Select Layer Key dialog box.
General/Layer override	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides dialog box.
Multileader style	Specifies the multileader style for the annotation. Possible styles include Text, Block, and Standard.
General/Content type	Possible values are Mtext (for basic multiline text notes and reference keynotes) or Block (for symbols with attributes and sheet keynotes). When inserting an Mtext object using default settings, you are prompted to specify text width.
General/Symbol	Displayed only if Content type is Block, this property specifies the block-based symbol to be used for the annotation. For sheet keynotes, the block contains an automatically updatable field value that determines keynote format and either specifies a particular keynote or serves as a placeholder. The placeholder value is then replaced by whatever keynote is associated with the selected object or component or by a keynote selected manually during the insertion process. For more information, see Configuring the Annotation Tool for Keynoting on page 2369.
General/Symbol location	The location of the drawing file containing the specified symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed.
Leaders/Leader type	Possible values are None, Straight, or Spline.

Property Category/Name	Description
Leaders/Leader dimension style	By default, this property is unspecified (--), and the dimension style for the current drawing is used. Or you can click the property and select a style from the drop-down list. The style controls the leader arrow head as well as the text options as set on the Text tab of the style.
Leaders/Leader dimension style location	Specifies the location of the dimension style if different from the current drawing dimension style. Click the property and use the Browse option from the drop-down list to locate and enter the path to the selected style. If this property is unspecified (--), then only those styles in the current drawing are used.
Leaders/Limit points	Displayed only if a leader type is specified, this property indicates whether there is a limit to the number of points in the leader. If unspecified (--), the corresponding leader setting for the current drawing is used.
Leaders/Maximum points	Displayed only if the Limit points setting is yes, this property specifies the maximum number of points allowed in the leader before the text or symbol is inserted. If unspecified, the corresponding leader setting for the current drawing is used, if applicable.
Text/Default text	Displayed only if Content type is Mtext. For basic text notes, this value is unspecified (--), and you enter the text upon insertion. For reference keynotes, the value should be a placeholder keynote field. The placeholder value is then replaced by whatever keynote is associated with the selected object or component, or by a keynote selected manually during the insertion process. For more information, see Configuring the Annotation Tool for Keynoting on page 2369.
Text/Angle	Specifies the angle for multiline text or attribute text. The default is Force horizontal. Other drop-down list options are As inserted (which sets text rotation at the angle of the last leader segment) and Right reading (which keeps the text right-side up regardless of rotation angle).
Text/Attribute style	Displayed only if Content type is Block, this property specifies whether attribute text within the symbol uses the target drawing text style or the style defined by the attribute tag.
Text/Prompt for width	Indicates whether you are prompted to specify a width for the annotation. If unspecified (--), the corresponding leader setting for the current drawing is used.
Text/Always left justify	Displayed only if Content type is Mtext and Leader type is other than None, this property specifies whether each word in the annotation text is always left-justified. If unspecified (--), the corresponding leader setting for the current drawing is used.
Text/Left side attachment	Displayed only if Content type is Mtext and Leader type is other than None, this property specifies where text attaches to a leader positioned to its left. This setting can be selected from a drop-down list. If unspecified (--), the corresponding leader setting for the current drawing is used.
Text/Right side attachment	Displayed only if Content type is Mtext and Leader type is other than None, this property specifies where text attaches to a leader positioned to its right. Setting can be selected from drop-down list. If unspecified (--), the corresponding setting for the current drawing is used.

Property Category/Name	Description
Text/Underline bottom line	Displayed only if Content type is Mtext and Leader type is other than None, this property specifies whether a leader attaches to text as an underline below the bottom line of text. If unspecified (--), the corresponding leader setting for the current drawing is used.
Text/Frame	Displayed only if Content type is Mtext and Leader type is other than None, this property specifies whether text is enclosed in a frame. If unspecified (--), the corresponding leader setting for the current drawing is used.
Text/Mask background	Displayed only if Content type is Mtext, this property specifies whether text has an opaque background to mask out objects below it. The default setting is No.

Editing Multiline Attributes in Multi-View Blocks

You can edit multiline attributes in multi-view blocks using grips to reposition or reconfigure text. Change the width and justification of multiline attributes to refine your annotation text layout on your drawings. For example, you can edit a Room tag's attributes to fit text inside a room boundary.

Displaying Edit Attribute Justification Grips

Follow this procedure to display a multiline attribute's width and justification grips, as well as its standard location, rotation, and exit edit grips.

1. Select an existing tag.

   The attribute Location and Edit Attributes grips are displayed.

2. Select the Edit Attributes grip.

   Alternatively, you can click Tag tab ➤ Modify panel ➤ Edit Attributes .

   The attribute Rotation, Width, Edit attribute justification, and Exit Edit Attribute grips are displayed.

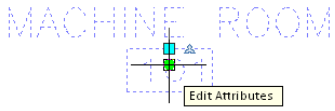
3. Select the Edit attribute justification grip.

   The eight available text box justification and Exit attribute justification grips are displayed.

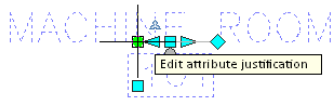
4 After you edit the attribute width or justification, select Exit attribute justification, and then select Exit Edit Attributes to save your changes.

existing Room tag

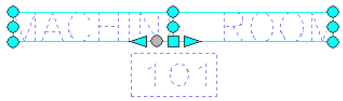
select Room tag



select Edit Attributes grip

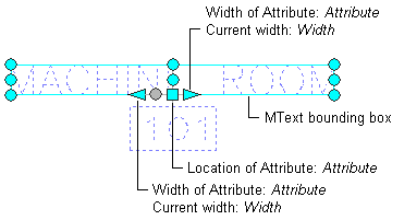


select Edit attribute justification grip

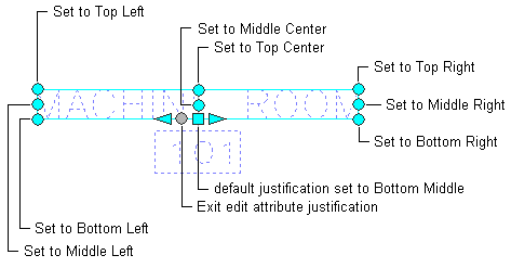


view attribute justification grips

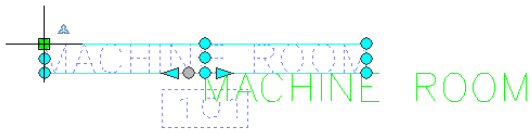
The following illustration shows the attribute Location and Width grips, and well as the multiline attribute's bounding box. By default, the attribution width is 0 (zero). You specify a width value to resize the extents of the bounding box.



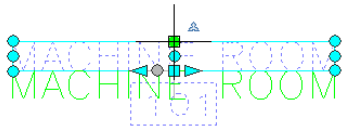
The following illustration shows the available bounding box justification and Exit edit attribute justification grips. By default, the Bottom Middle justification is current.



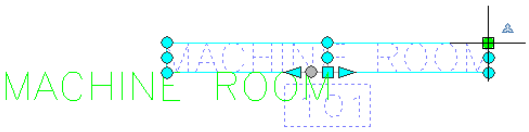
The following illustration shows the results of specifying the 3 top grips as the current multiline attribute justification. The text in green shows how the multiline attribute would be repositioned.



Top Left



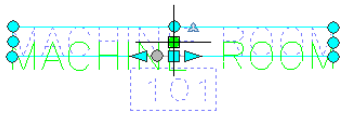
Top Middle



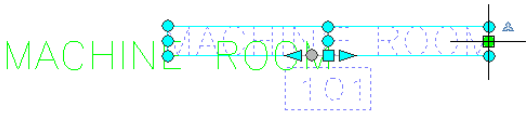
Top Right

The following illustration shows the results of specifying the 3 middle grips as the current multiline attribute justification. The text in green shows how the multiline attribute would be repositioned.

Middle Left



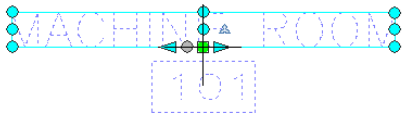
Middle Center



Middle Right

The following illustration shows the results of specifying the 3 bottom grips as the current multiline attribute justification. The text in green shows how the multiline attribute would be repositioned.

Bottom Left



Bottom Center (default)

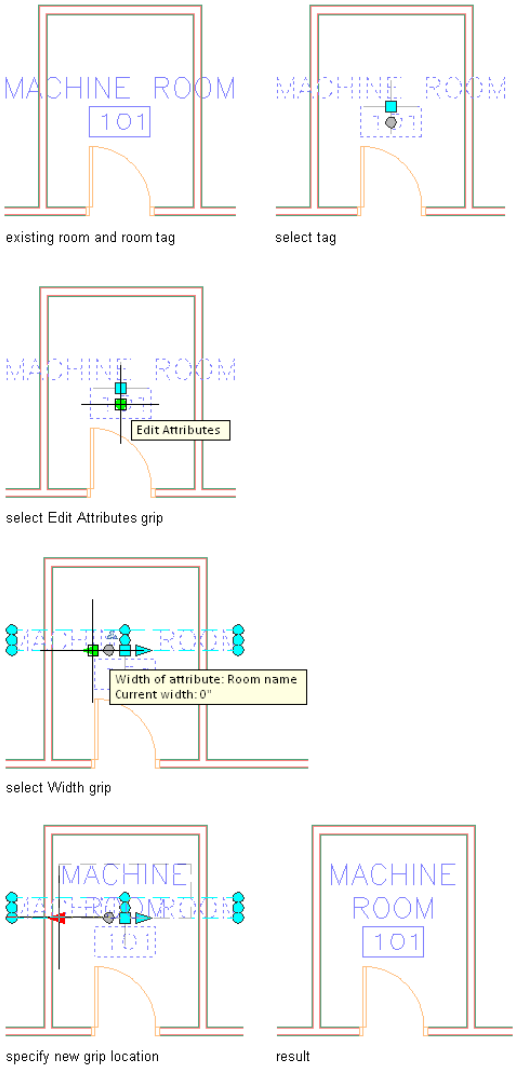
Bottom Right

Editing the Width of a Multiline Attribute

Use this procedure to change the width of a multiline attribute.

1. Select the room tag.
2. Select the Edit Attributes grip.
3. Select one of the Width grips.
4. Specify a new grip location.

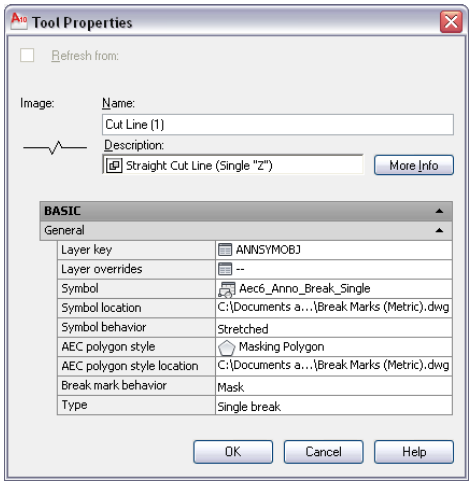
Using grips to change the width of a multiline attribute



Break Mark Tool Properties

Block-based break mark tools are used to mask or trim underlying objects with a polyline and an AEC Polygon. The default break mark tool is the Cut Line tool provided on the Annotation tool palette. Additional types

of break marks are available from the Stock Tool and Documentation Catalogs of the Content Browser. For more information about working with AEC Polygons, see AEC Polygon Styles on page 1208.



The following table lists and describes tool properties for break marks that can be configured through the Tool Properties worksheet. Once a break mark is inserted into a drawing, its properties can be modified using the associated Properties palette.

Property Category/Name	Description
Layer key	Specifies the layer key for the layer to which the break mark is assigned. To change, click the current value (default is ANNSYMOBJ) to access the Select Layer Key dialog box.
Layer override	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides dialog box.
Symbol	Specifies the block-based symbol to be used for the break mark. For sheet keynotes, the block contains an automatically updatable field value that determines keynote format and either specifies a particular keynote or serves as a placeholder. The placeholder value is then replaced by whatever keynote is associated with the selected object or component or by a keynote selected manually during the insertion process. For more information, see Configuring the Annotation Tool for Keynoting on page 2369.
Symbol location	The location of the drawing file containing the specified break mark symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed.
Symbol behavior	Specifies whether the break mark inserts as Scaled or Stretched. If Stretched is selected, the cut line is stretched to correspond with the start point and endpoint, but the graphic of the cut remains the same. If Scaled is selected, the graphic in the cut line is scaled to correspond with the start point and endpoint of the cut line.
AEC Polygon style	Specifies whether the break mark has masking properties. If this property is unspecified (--), the style defaults to the standard style.
AEC Polygon style location	Specifies the location of the drawing file containing the AEC Polygon. Click the property and use the Browse option from the drop-down list to locate and enter

Property Category/Name	Description
	the path to the file. If this property is unspecified (--), then only those AEC Polygons in the current drawing file are listed.
Break mark behavior	Specifies whether the break mark masks or trims the underlying object. An AEC Polygon and a polyline together represent the mask behavior of a break mark and do not modify the underlying object. A polyline represents the trim behavior of a break mark and clips the underlying object.
Type	This property specifies whether the cut line is represented by a single edge of an AEC Polygon (single break) or two parallel edges of an AEC Polygon (dual break).

Creating a Text-Only Annotation

Use this procedure to add a multiline text object (without a leader) anywhere in the drawing area. The annotation does not have to be associated with any object or linework.

NOTE These instructions are based on one of the annotation tool configurations provided with the software. Depending on customization, the same tool may or may not appear on your Annotation tool palette. However, the same basic procedure applies to any annotation tool configuration in which the Content type is set to Mtext, the Leader type is set to None, and the Default text is unspecified (--). A basic Text Tool is also included in the Stock Tool Catalog in your Content Browser.

1. On the Annotation tool palette, click the Text Tool.

   Alternatively, you can click Annotate tab ➤ Text panel ➤ Text.
2. In the drawing area, specify the point where you want the annotation to begin.
3. Press *ENTER* to accept the default width for the annotation, or specify a width either by entering a value or by specifying a second point.
4. Enter the first line of text, and press *ENTER* to indicate the end of the line.
5. Press *ENTER* again to indicate the end of the annotation, or repeat Step 3 for each subsequent line of text.

   Each line of text is displayed on the command line as you enter it. The completed annotation is displayed horizontally in the drawing area when you press *ENTER* twice in succession.

Creating Text with Single Leader Annotation

Use this procedure to add a multiline text object with a single leader that points to any point you specify in the drawing area. Leaders are drawn in the same manner as polylines: you specify two points to insert a straight line segment. Or, depending on the setting for the Limit points property, you can specify additional points to insert an angled leader consisting of two or more segments.

NOTE These instructions are based on one of the annotation tool configurations provided with the software. Depending on customization, the same tool may or may not appear on your Annotation tool palette. However, the same basic procedure applies to any annotation tool configuration in which the Content type is set to Mtext, the Leader type is set to Straight, and the Default text is unspecified (--). Leader properties can be modified on the Tool Properties worksheet of the annotation tool. Any unspecified properties use the leader settings in effect for the current drawing, which can be modified using the Leader Settings dialog box. A basic Text Tool is also included in the Stock Tool Catalog in your Content Browser.

1. On the Annotation tool palette, click the Text (Straight Leader) tool.

Alternatively, you can click Annotate tab ➤ Keynoting panel ➤ Text drop-down ➤ Text (Straight Leader).

2 Specify the starting point for the leader. (This determines where the leader arrow is displayed.)

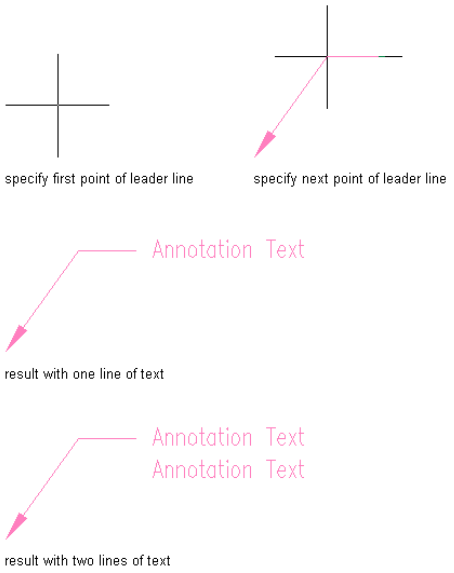
3 Specify one or more additional points to create the desired leader, and then press *ENTER*.

4 Press *ENTER* to accept the default width for the annotation, or specify a width either by entering a value or by specifying a second point.

5 Enter the first line of text, and press *ENTER* to indicate the end of the line.

6 Press *ENTER* again to indicate the end of the annotation, or repeat Step 4 for each subsequent line of text.

Drawing annotation text with leaders



Each line of text is displayed on the command line as you enter it. When you press *ENTER* twice in succession, the completed annotation is displayed in the drawing area.

Adding and Removing Leader Lines from Leaders

Use this procedure to add and remove leader lines from the following Annotation tools:

- Text (Straight Leader)
- Square (Straight Leader)
- Reference Keynote (Straight Leader)
- Sheet Keynote

Adding a Leader Line

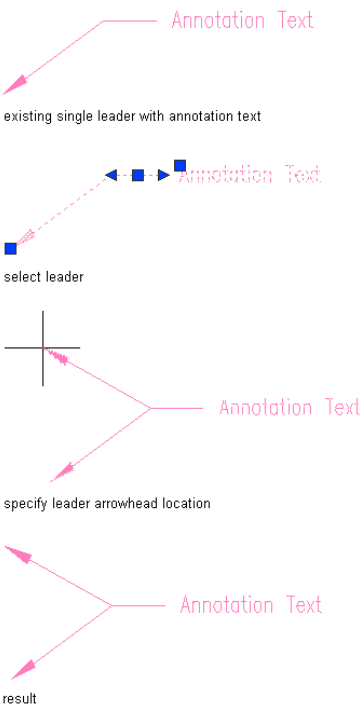
1 Select an existing leader.

2 Right-click and click Add Leader.

A new leader is added starting from the nearest point on the leader line or symbol that you specify.

3 Specify the new leader arrowhead location.

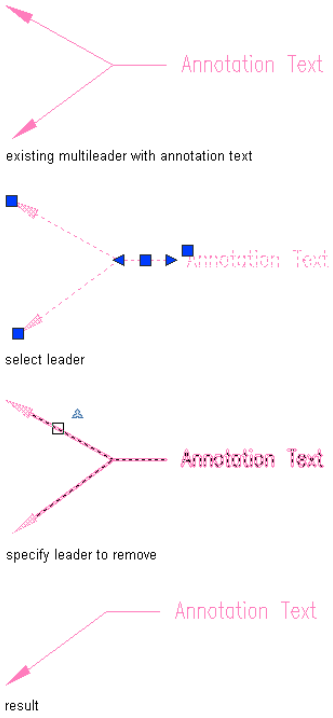
Adding a leader line



Removing Leader Line

1. Select an existing multiline leader.
2. Right-click and click Remove Leader.
3. Select the leader to remove.

Removing a leader line



Creating a Break Mark

Use this procedure to add a new break mark that has the properties specified in the break mark tool that you select.

NOTE These instructions are based on the default Cut Line tool provided with the software. Depending on customization, the same tool may or may not appear on your Annotation tool palette. However, the same basic procedure applies to any break mark tool.

1. On the Annotation tool palette, click the Cut Line Tool.
2. In the drawing area, specify the point where you want the cut line to begin.
3. Specify the point where you want the cut line to end.
4. Specify the extents of the break.

Creating a Block-Based Annotation with a Leader

Use this procedure to add a block-based symbol with a leader that points to any point you specify in the drawing area.

NOTE These instructions are based on one of the annotation tool configurations provided with the software. Depending on customization, the same tool may or may not appear on your Annotation tool palette. However, the same basic procedure applies to any annotation tool configuration in which the Content type is set to Block, the Leader type is set to Straight, and the Symbol and Symbol location properties specify a block-based symbol that is accessible to the tool. Leader properties can be modified on the Tool Properties worksheet of the annotation tool. Any unspecified properties use the leader settings in effect for the current drawing, which can be modified using the Leader Settings dialog box.

1 On the Annotation tool palette, click the Square (Straight Leader) tool.

Click Annotate tab ➤ Keynoting panel ➤ Text drop-down ➤ Square (Straight Leader).

2 Specify the starting point for the leader. (This determines where the leader arrow is displayed.)

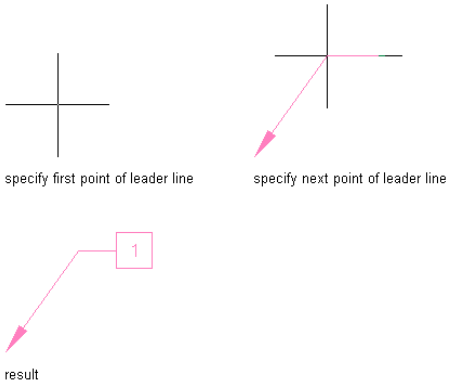
3 Specify one or more additional points to create the desired leader, and then press *ENTER*.

The symbol and its default attribute value are inserted at the end of the leader, and the Edit Attributes dialog box is displayed. (If a limit has been set for the number of leader points, this happens as soon as you specify the last point within the limit.)

4 In the Edit Attributes dialog box, edit the ID attribute text as desired, and then click OK.

The edited attribute text is displayed within the symbol.

Drawing block-based annotation with a leader

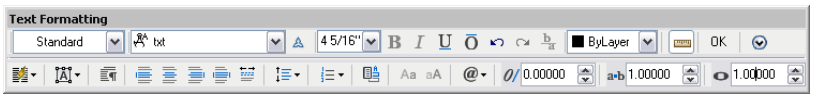


Editing a Text-Based Annotation

Use this procedure to edit a text-based annotation or change its typographical characteristics using the Multiline Text Editor.

1 Double-click the annotation to display the Multiline Text Editor.

Multiline Text Editor dialog box



2 Edit the text as desired in the text editing box, or change the text style, font, height, color, or other characteristics using the drop-down lists and buttons on the toolbar.

3 Click OK on the toolbar or click anywhere in the drawing area to close the Multiline Text Editor and implement your changes.

NOTE The Multiline Text Editor also lets you add automatically updatable fields (such as a date and time stamp or other project information) to an annotation by right-clicking the annotation and clicking Insert Field (or Edit Field, if the annotation already includes such a field). This will display the Field dialog box. For more information, see "Use Fields in Text" in AutoCAD Help.

Editing a Masking Break Mark

Use this procedure to hide or show the boundary of a break mark that masks an underlying object. A masking break mark is defined by an AEC Polygon style and a polyline.

NOTE To see these options you must select the AEC Polygon, not the polyline (which defines the cut line).

➤ Select the break mark.

If you want to…	Then…
show an edge	click AEC Polygon tab ➤ Modify panel ➤ Show Edge . The boundary edge of the break mark (represented by the AEC Polygon) highlights. Select the edge to show, and press *ENTER*.
hide an edge	click AEC Polygon tab ➤ Modify panel ➤ Hide Edge . The boundary edge of the break mark (represented by the AEC Polygon) highlights. Select the edge to hide, and press *ENTER*.

Since the masking behavior of a break mark depends on an AEC Polygon, many of the same editing options available for AEC Polygons can also be applied to masking break marks. For more information, see Editing AEC Polygons on page 1194 and Masking Underlying Objects with AEC Polygons on page 1211.

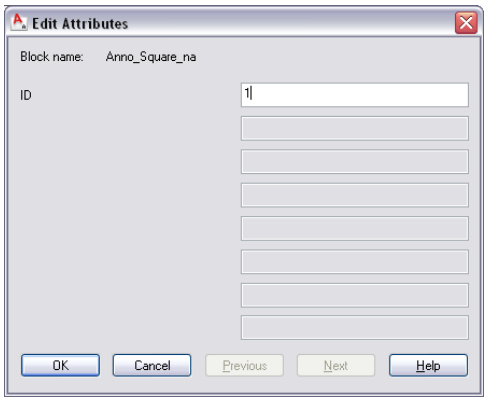
Editing a Block-Based Annotation

Use this procedure to edit a block-based annotation or change its typographical characteristics and other properties using the Edit Attributes dialog.

1 Double-click the annotation to display the Edit Attributes dialog.

NOTE Alternatively, you can click Insert tab ➤ Attributes panel ➤ Edit Attribute drop-down ➤ Single .

Attribute Editor



2 Specify the changes you want to make to the annotation:

3 Click OK to dismiss the Edit Attributes dialog and implement any changes you have made to the annotation.

Keynoting Tools

Keynoting is a consistent way of annotating the different types of drawings in a set of construction documents to identify building materials or to provide special instructions or explanations. AutoCAD Architecture

provides a flexible tool-based method of inserting keynotes that are linked to a keynote database and thus can be modified globally as well as individually. This method supports both reference keynoting (where the keynote key corresponds to a section in an accompanying specification and may appear on different drawings) and sheet keynoting (where keynote keys are sequentially numbered for each drawing).

AutoCAD Architecture supplies pre-specified keynotes for its size-specific default detail components and for architectural objects that represent assemblies with multiple components (for example, 8" CMU wall). For variable-size objects and material definitions, a keynote classification group is pre-specified, and you specify a size when the keynote is inserted. For detail components, these keynotes and groups are based on the widely used MasterFormat 2004 standard maintained by the Construction Specifications Institute (CSI). For assemblies, the CSI Uniformat standard is used. However, because the software accommodates multiple keynote databases, it also supports other common or locally developed keynoting systems, so your localized version of AutoCAD Architecture may vary. Whatever the source of the keynote, you can also associate it with a particular object style or material definition (see Specifying Keynotes on page 2383). This lets you use the keynote insertion tools on individual components of an object or on linework in two-dimensional (2D) sections or elevations. In cases where no keynotes are pre-specified, you select a keynote from the available database(s). You can also configure a keynote insertion tool to insert a particular keynote, regardless of the insertion point (see Inserting or Editing an AEC Keynotes Field on page 2370).

In addition to tools for inserting keynotes (derived from the basic annotation tool), the software includes tools for generating keynote legends that list selected keynotes from one or more drawing sheets and help you to quickly locate all instances of a particular keynote. You can also generate a keynote legend for a drawing prior to inserting keynotes; in this case the legend would include all keynotes that are likely to be used.

Other keynoting features include the ability to toggle the format for all keynotes within a drawing to display keys only, notes only, or both keys and notes. Moving the cursor over a keynote in the drawing lets you view keynote text without having to toggle the format or zoom in.

NOTE The keynoting feature supports automatic updating of keynotes to reflect changes to the corresponding entry in the keynote database. However, automatic updating of a keynote to reflect changes to a keynoted object is not currently supported. Changes in objects can be addressed using the re-keynoting option described in Viewing and Editing Keynotes in a Drawing on page 2380.

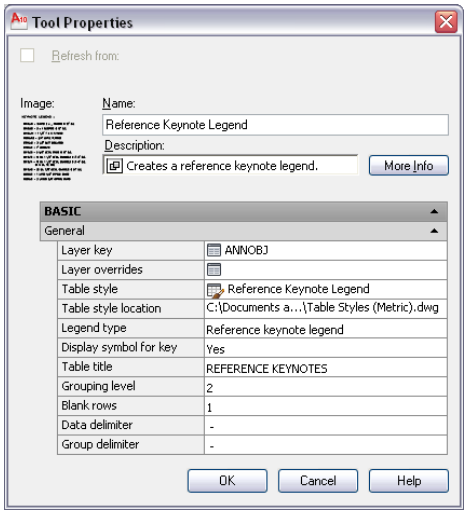
Configuring the Annotation Tool for Keynoting

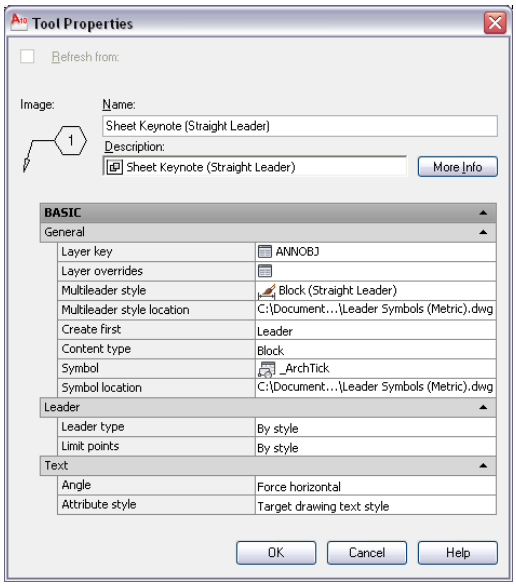
AutoCAD Architecture provides several default tools for inserting keynotes into a drawing. If your software has not been customized locally, these tools can be found on the sample Annotation tool palette. They are also accessible from the Documentation Tool Catalog in the Content Browser and can be copied to any tool palette using the i-drop® feature. These keynote insertion tools are derived from the basic annotation tool and can be further customized through the Tool Properties worksheet available from their context menus.

The mechanism that allows the annotation tool to insert keynotes is the AEC Keynotes field. This is an Mtext object that specifies the type and format of the keynote annotation to be inserted and includes an automatically updatable field value that serves as a placeholder for the actual keynote. The keynote itself is obtained from a database, and can be pre-specified for a selected object or selected manually from the Select Keynote dialog box. For more information, see Using Keynote Insertion Tools on page 2371. In cases where the same keynote needs to be inserted frequently, you can configure the AEC Keynotes field to specify a particular keynote rather than serve as a placeholder.

For reference keynote insertion tools, the AEC Keynotes field value is specified as the Default text property on the Tool Properties worksheet. For a sheet keynote insertion tool, the AEC Keynotes field value is specified as an attribute definition within the block identified by the Symbol and Symbol location properties. In either

case, you can insert an AEC Keynotes field or edit an existing one using the Field dialog box. For specific instructions, see Inserting or Editing an AEC Keynotes Field on page 2370.





Inserting or Editing an AEC Keynotes Field

Use this procedure to insert an AEC Keynotes field or edit an existing one for a reference keynote tool or a sheet keynote tool.

1 Open the Tool Properties palette for the tool.

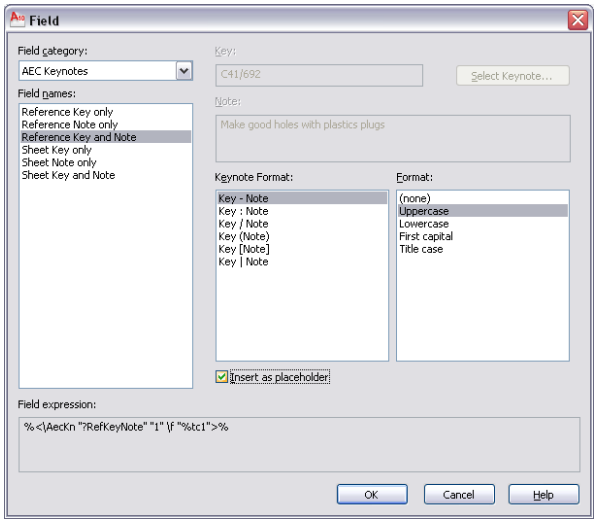
2 Open the Field dialog box:

If...	Then...
the Content type is Mtext	double-click the Default text property. If the property is unspecified, right-click and click Insert Field.
the Content type is Block	open the drawing specified by the Symbol location property and select the symbol. Click Insert tab ➤ Reference panel ➤ ➤ Edit Reference. In the Reference Edit dialog box, click OK. Double-click the KEY tag in the symbol

If…	Then…
	to open the Edit Attributes Definition dialog box, and then double-click the Default value. If the value is not an updatable field, right-click and click Insert Field.

3 In the Field dialog, confirm that the Field category is AEC Keynotes.

Field dialog



4 From the Field names list, select the type and form of keynote you want to insert.

5 If the selected Field name is Reference Key and Note or Sheet Key and Note, select a Keynote Format to determine how the key and the note are separated typographically.

6 Select a Format to determine case and capitalization for the keynote text.

7 Confirm that Insert as placeholder is selected if you want to insert pre-specified keynotes or prompt for manual keynote selection, as applicable. Otherwise, the keynote indicated by the Key and Note values is inserted. You can select a particular keynote by clicking Select Keynote.

8 Click OK to close the Field dialog box and implement the AEC Keynotes field you have specified.

Using Keynote Insertion Tools

The keynote insertion tools provided on the sample Annotation palette (also available from the Documentation Tool Catalog in the Content Browser) represent two basic kinds of keynotes: reference and sheet. The tool for sheet keynotes is configured to let you draw a leader that connects the keynote to the selected object or point. For reference keynotes, two tools are provided: one that inserts a leader and one that inserts only the keynote.

For both sheet and reference keynotes, you have the option of keynoting either a particular object or "nothing" (that is, a point within an empty region of the drawing area). Both tools insert any keynote that is pre-specified for a selected object, unless there is ambiguity, as when keynotes are specified for the components of an object. In that case, you must select a component or use the keynote that is pre-specified for the object as a whole. You can also choose a different keynote from the Select Keynote dialog box. This dialog box is presented if no keynote is pre-specified for a selected object or its components.

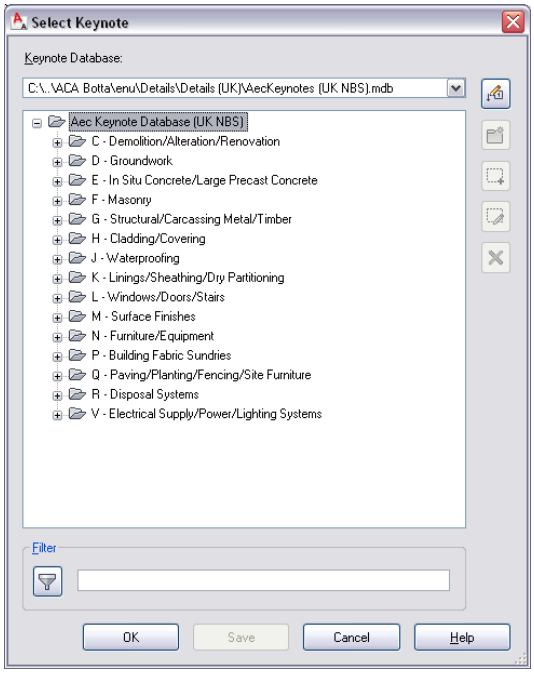
The Select Keynote Dialog Box

The Select Keynote dialog box provides a hierarchical tree view of a keynote database. You can select a keynote to insert into a drawing or to associate with an object style, a material definition, or a detail

component. This dialog box is displayed if you attempt to keynote an object for which no keynote is specified. You can also select it from the Field dialog box and from the dialog boxes used to specify keynotes for architectural objects or their components. When generating a keynote legend, you can access the Select Keynote dialog box during the insertion process by right-clicking and clicking from Database, or by entering **d** (for database) at the command line.

You select a keynote database at the top of the dialog box. The AEC Keynote database is the default for keynoting detail components, while the AecKeynote-Assemblies database is the default for keynoting architectural objects that are assemblies of multiple components.

You can expand nodes in the tree view to find individual components, or you can type text into the Filter box below the tree view. Clicking the Filter button, pressing *TAB*, or pressing *ENTER* expands all nodes under any node whose name includes the text you enter. When a keynote is highlighted, clicking OK completes the selection.



NOTE The Save button at the bottom of the dialog box and the 5 buttons arranged vertically along the right side are displayed only if you have read-write privileges for the currently selected keynote database. These buttons let you modify a database by adding, editing, or deleting keynotes and keynote groups. The buttons function in the same manner as they do in the Keynote Editor dialog box. For detailed information, see Creating and Modifying Keynote Databases on page 2388.

Inserting a Keynote

Use this procedure to annotate a drawing with either a sheet keynote or a reference keynote. If using a tool configured to insert a leader, you can select an object for the leader to point to, or you can specify a point in an empty region of the drawing.

1 On the Annotation tool palette, click the tool for the type of keynote you want to include. The tools included on the sample palette include Reference Keynote, Reference Keynote w/Straight Leader, and Sheet Keynote (which also inserts a leader).

   Alternatively, you can click one of the keynote tools on the Annotate tab ➤ Keynoting panel ➤ Keynotes drop-down.

NOTE The default leader is a straight line. You can change the leader type and other properties using the Tool Properties palette, which is accessed from the context menu of the tool.

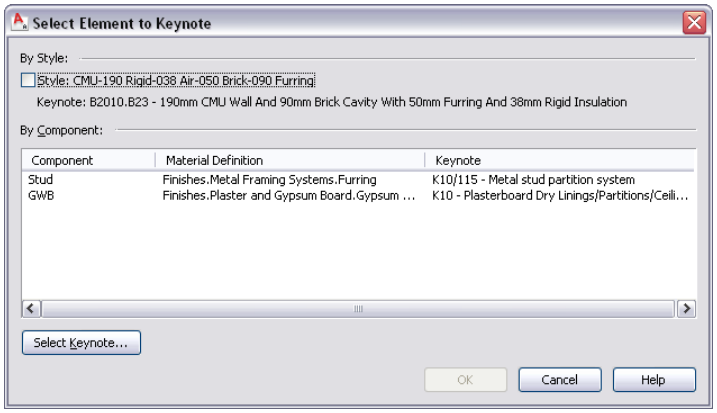
2 Select the object/component/linework you want to keynote, or press *ENTER* and specify a point in the drawing area.

If a keynote is already associated with your selection, you can finish drawing the leader as explained in Step 4. Otherwise, a dialog is displayed.

3 Specify the keynote you want to insert:

If…	Then…
no keynote is associated with the selected object (or if you specified a point rather than selecting an object)	the Select Keynote dialog box is displayed. Make sure the currently selected database is the one you want. Then navigate the hierarchical tree view to find the keynote you want, select it, and click OK.
one or more keynotes are already associated with the object style or with the material definitions of the selected objects components	the Select Element to Keynote dialog box is displayed. ■ If you want to keynote an object component, select it in the Component column, and click OK. ■ If you want to keynote the object as a whole, and a keynote is specified for the object style, select Style, and then click OK. ■ If you do not see the keynote you want, click Select Keynote to display the Select Keynote dialog box. Select a keynote and click OK. The keynote is now displayed in the Select Element to Keynote dialog box. Click OK to complete the selection process.

Select Element to Keynote dialog box

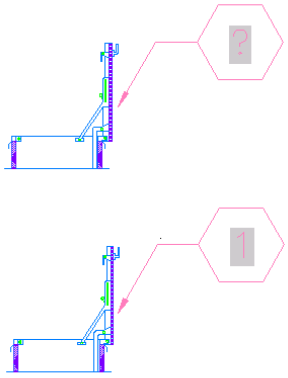


4 To insert a leader, specify one or more additional points to create the desired leader, and then press *ENTER*.

The pre-specified keynote (or the keynote you specified in Step 3) is displayed. If you also inserted a leader, the keynote is attached to the leader.

NOTE Sheet keynotes are not resolved at the time of insertion. The attribute to be displayed inside the symbol is determined when a sheet keynote legend is generated. Until then, sheet keynotes display a question mark as shown in the following illustration. The sequential numbering for resolved keynotes is based on group order and keynote order within the source keynote database.

Sheet keynote before and after sheet keynote legend is generated



Repeating a Keynote Insertion

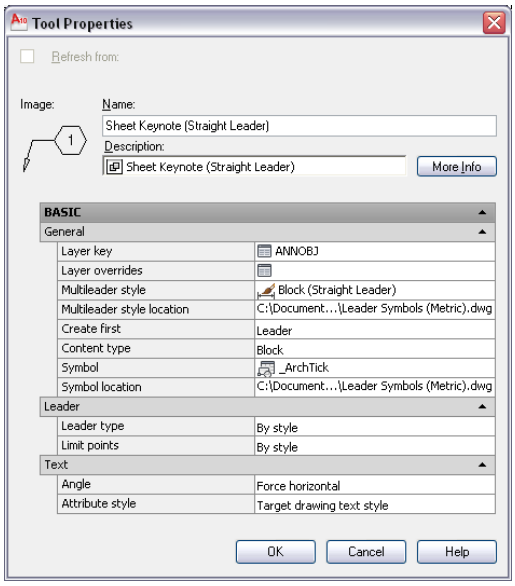
After you have inserted a keynote into a drawing with a keynote insertion tool, you can activate the same tool again by pressing *ENTER*, pressing the spacebar, or right-clicking and clicking Repeat. If you have used other tools since the one you want to repeat, you can activate the tool by right-clicking any keynote it inserted and then clicking Add Selected.

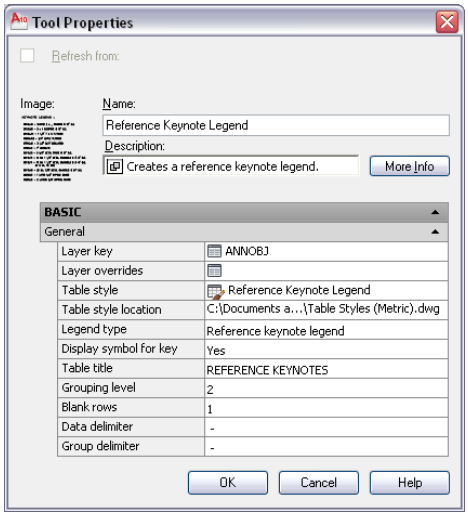
Using Keynote Legends

AutoCAD Architecture lets you insert or view keynotes in three formats: key only, note only, or both key and note. By using keys only, you can reduce the amount of annotation in a drawing. However, keys alone are not likely to be useful unless the reader also has access to the corresponding notes. The keynote legend tool enables you to easily annotate a drawing with a keynote legend that lists keys along with their corresponding notes. All keys and column headings in the keynote legend can be validated at any time through a simple context menu selection. Moreover, when viewing a drawing in model space or paper space, you can select a keynote in the legend and quickly locate all instances of that keynote in the drawing.

Keynote Legend Tool Properties

The following illustrations show the Tool Properties worksheet settings for two versions of the keynote legend tool (sheet and reference) that are included on the sample Annotation tool palette. Under the General category, note the different settings for Table style, Legend type, Table title, Grouping level, and Blank rows.





The following table describes the keynote legend tool properties that can be configured through the Tool Properties worksheet. For information on modifying an existing keynote legend, see Editing a Keynote Legend on page 2377.

Property Name	Description
Layer key	Specifies the layer key for the layer to which the legend is assigned. To change, click the current value (default is ANNOBJ) to access the Select Layer Key dialog box.
Layer override	Specifies one or more layer key overrides. Click the field to access the Select Layer Overrides dialog box.

Property Name	Description
Table style	Specifies the AutoCAD table style for the keynote legend. Possible values are Reference Keynote Legend, Sheet Keynote Legend, and Standard. When this property is unspecified (--), the current table style for the drawing is used.
Table style location	Specifies the location of the drawing file containing the table style. Click the property and use the Browse option from the drop-down list to locate and enter the path to locations other than the default.
Legend type	Possible values are Reference Keynote Legend, Sheet Keynote Legend, and Basic Table.
Display symbol	Specifies whether the symbol inserted for block-based sheet keynotes also appears in the keynote legend. (Not displayed if Legend type is Basic Table).
Table title	The title that appears for keynote legend in the drawing. You can edit the default value as needed.
Grouping level	Specifies the number of keynoting standard organizational levels (such as division, group, and subgroup) for which headings will appear in the legend. For example, if three levels are specified for a legend containing keynotes for metal studs from the Aec Keynote Database, the metal stud keynotes are listed under three headers: DIVISION 9 - FINISHES, 09100 METAL SUPPORT ASSEMBLIES, and 09110 NON-LOADBEARING WALL FRAMING. For the Sheet Keynote Legend tool, the default setting for this property is zero. (Not displayed if Legend type is Basic Table).
Blank rows	Specifies the number of blank rows, if any, to be inserted between headers in the keynote legend. (Not displayed if Legend type is Basic Table).
Data delimiter	Unspecified (--) by default. You can add a delimiter to appear between the name of the group and its description. Use of a delimiter adds a column to the table. (Not displayed if Legend type is Basic Table.)
Group delimiter	Specifies a delimiter to appear between the key and the note. The default for both reference and sheet keynote legends is a dash (-). Use of a delimiter adds a column to the table. (Not displayed if Legend type is Basic Table.)

Generating a Keynote Legend

Use this procedure to generate and position a keynote legend within the current drawing. Keynotes to include in the legend can be selected individually from the current drawing, or you can specify one or more sheets from which all keynotes of the selected type (sheet or reference) will be included. You can also generate a legend containing keynotes that have not yet been inserted. In this case, you select the keynotes from a database.

1 On the Annotation tool palette, click either the Sheet Keynote Legend tool or the Reference Keynote Legend tool.

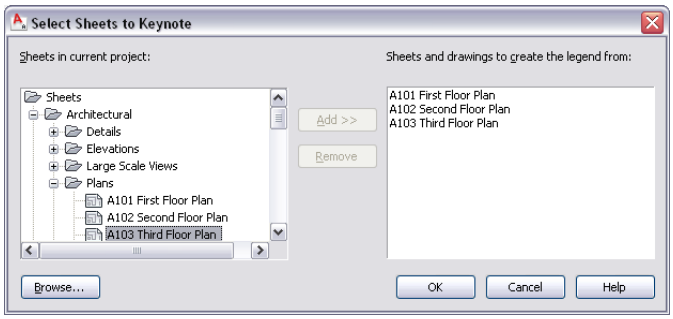
NOTE Alternatively, you can click Annotate tab ➤ Keynoting panel ➤ Sheet Keynote Legend drop-down ➤ Sheet Keynote Legend or Annotate tab ➤ Keynoting panel ➤ Sheet Keynote Legend drop-down ➤ Reference Keynote Legend .

2 Specify the keynotes to be included in the keynote legend:

If you want to…	Then…
include only selected keynotes from the current drawing	select each keynote you want to include, and press *ENTER*.
include all keynotes from other sheets	right-click, and click Sheets to display the Select Sheets for Keynote Legend dialog box. The left pane lists sheets in the current project. Select sheets as desired and move them to the right pane by clicking Add. You can also click Browse to find and retrieve sheets from other projects or drawings that have not been saved as sheets. When the right pane shows all the drawings/sheets from which you want to include keynotes, click OK.
include selected keynotes from a keynote database	right-click, and click from Database to display the Select Keynote dialog box. To select multiple keynotes, press *CTRL* while you click consecutive keynotes. You can repeat this technique in different groups within the hierarchy. When all selections are made, click OK.

NOTE If you select keynotes of a type other than the type specified for the keynote legend, they will be filtered from the resulting keynote legend.

Selecting sheets to include in keynote legend



NOTE If your selections include keynotes from databases that do not share the same group hierarchy, you are prompted to select one database. Only keynotes from that database are included in the resulting legend. To include other keynotes, you can create additional legends by rerunning the keynote legend command and specifying different databases.

3 Specify an insertion point for the upper-left corner of the keynote legend table.

The keynote legend is displayed in the drawing area, automatically layer keyed and scaled to 1:1 in paper space, or to the scale of the current drawing in model space.

Editing a Keynote Legend

Although keynote legends are actually AutoCAD® tables, they are similar to other AutoCAD Architecture schedule tables in that the size, location, color, and other aspects of the keynote legends appearance can be modified using the Properties palette or the Basic Modify Tools option on the context menu. Individual rows, columns, and cells can also be edited through their context menus. The topics in this section describe editing functions that apply to the keynote legend as a whole and are available from its context menu.

Reselecting Keynotes for a Keynote Legend

Use this procedure to regenerate a keynote legend with a different selection of keynotes. You might like this method better than adding or removing keynotes individually, or deleting the legend and generating a new one, especially if you have modified the size, location, or appearance of the existing one.

1 Select the keynote legend, right-click, and click Selection ➤ Reselect.

2 Specify the keynotes to include in the keynote legend.

If you want to…	Then…
include only selected keynotes from the current drawing	select each keynote you want to include, and press *ENTER*.
include all keynotes from other sheets	right click, and click Sheets to display the Select Sheets to Keynote dialog box. The left pane lists sheets in the current project. Select sheets as desired and move them to the right pane by clicking Add. You can also click Browse to find and retrieve sheets from other projects or drawings that have not been saved as sheets. When the right pane shows all the drawings/sheets from which you want to include keynotes, click OK.
include selected keynotes from a keynote database	right-click, and click from Database to display the Select Keynote dialog box. You can select multiple keynotes by pressing *TRL* key while clicking consecutive keynotes. You can repeat this technique in different groups within the hierarchy. When all selections are made, click OK.

The keynote legend is regenerated to include only your new selections. It may be larger or smaller, depending on whether keynotes were added or removed, but the location and other characteristics remain unchanged.

NOTE If your selections include keynotes from databases that do not share the same group hierarchy, you are prompted to select one database. Only keynotes from that database are included in the resulting legend. To include other keynotes, you can create additional legends as necessary by rerunning the keynote legend command and specifying different databases.

Updating a Keynote Legend

Use this procedure to validate a keynote legend against the database on which it was based. (All keynotes in a keynote legend must be from the same database.) Any keynotes not found in the database are invalid and are removed from the keynote legend.

1 Select the keynote legend.

2 Right-click, and click Update Keynote Legend.

The keynote legend is updated to include only valid keynotes, and the number of rows removed is reported on the command line.

Adding Keynotes to a Keynote Legend

Use this procedure to add keynotes to a keynote legend. The procedure is similar to generating a keynote legend, but the prompts vary depending on whether the legend was created from selected drawings/sheets or from selected keynotes.

1 Select the keynote legend, right-click, and click Selection ➤ Add.

2 Specify the keynotes to include in the keynote legend.

If …	Then…
the keynote legend was based on keynotes selected only from the current drawing	select each keynote you want to include, and press *ENTER*.
the keynote legend was based on keynotes from other sheets	right-click, and click Sheets to display the Select Sheets to Keynote dialog box. The left pane lists sheets in the current project. Select sheets as desired and move them to the right pane by clicking Add. You can also click Browse to find and retrieve sheets from other projects or drawings that have not been saved as sheets. When the right pane shows all the drawings/sheets from which you want to include keynotes, click OK.
the keynote legend was based on keynotes selected from a database.	right-click, and click from Database to display the Select Keynote dialog box. To select multiple keynotes, press *CTRL* while you click consecutive keynotes. You can repeat this technique in different groups within the hierarchy. When all selections are made, click OK.

NOTE If your selections include keynotes from databases that do not share the same group hierarchy, you are prompted to select one database. Only keynotes from that database are included in the resulting legend. To include other keynotes, you can create additional legends by rerunning the keynote legend command and specifying different databases.

Removing Keynotes from a Keynote Legend

You can remove keynotes from a keynote legend simply by selecting them and pressing *DELETE*. Likewise, you can select and delete the rows/cells that contain keynote division and group names.

Using a Keynote Legend to Locate Keynotes

Use this procedure to locate all instances of a selected sheet or reference keynote in a drawing for which a keynote legend has been generated.

1 Select the keynote legend, right-click, and click Selection ➤ Show.

2 Hover the cursor above the row containing the keynote you want to locate.

All instances of the selected keynote are highlighted in the drawing and a tooltip displays the total number of instances. Only those keynotes of the same type as the selected keynote legend (sheet or reference) are highlighted or included in the count.

Alternatively, press *CTRL* and click a row in the legend to zoom to a magnification that bounds all instances of the selected keynote.

Editing Keynote Legend Table Styles

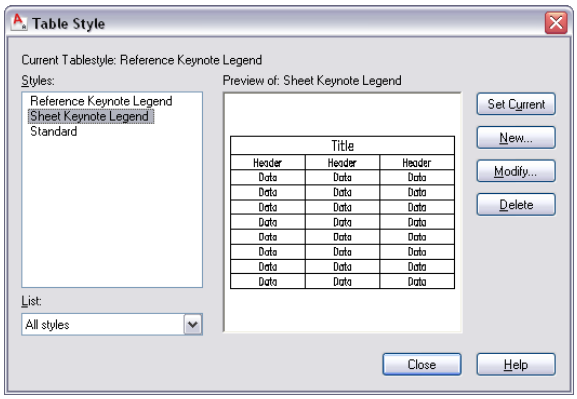
Keynote legends use AutoCAD table styles. Use this procedure to modify the available table styles.

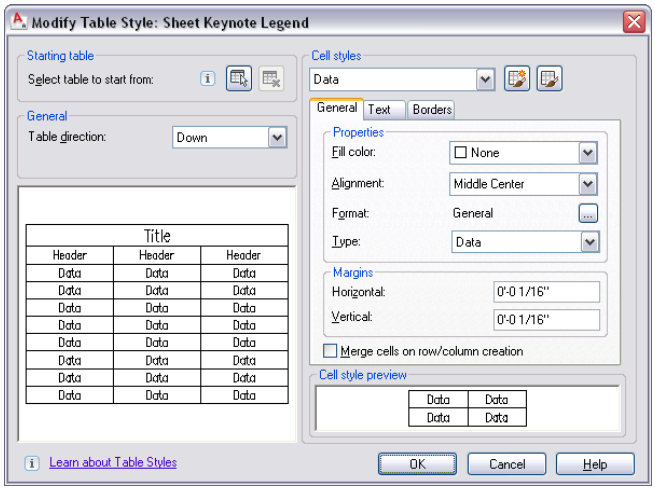
1 Click Home tab ➤ Annotation panel ➤ ➤ Table Style.

2 In the Styles list, select the style you want to modify, and then click Modify.

3 Adjust the settings under the Data, Column Heads, and Title tabs as desired, and then click OK. For more detailed explanations of style settings, see “New and Modify Table Style Dialogs” in AutoCAD help.

Table Style and Modify Table Style dialogs





Viewing and Editing Keynotes in a Drawing

This section describes editing operations that can be performed on keynotes once they have been inserted in a drawing.

Re-Keynoting

Use this procedure to change a keynote so that it references a different keynote. The new keynote can be from the same database as the original or from a different one.

1 Select the keynote, right-click, and click Re-Keynote.

2 Select the keynoted object, or press *ENTER* if the keynote does not apply to a specific object.

3 In the Select Keynote dialog box, select the keynote you want to use, and then click OK.

The new keynote is added to the drawing in place of the old one. Note that the change is not reflected in keynote legends that include the original keynote. If the new keynote is from the same database as the original one, you can update any associated keynote legends by adding and deleting individual entries. However, if different databases are involved, you must regenerate keynote legends for each of them. In any case, if you have performed more than a few

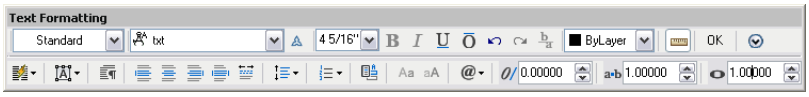
re-keynotings, it may be preferable to use the Reselect option on the keynote legend context menu, or to regenerate the keynote legend. See Generating a Keynote Legend on page 2376 and Reselecting Keynotes for a Keynote Legend on page 2378.

Editing Keynotes

Use the following procedure to edit a keynote after it has been inserted into a drawing. You cannot directly edit the key or the note, but you can add text before or after the keynote using the Multiline Text Editor, and you can change the keynote or its format using the Field dialog box.

1 Double-click the keynote to display the Multiline Text Editor.

Multiline Text Editor



2 Add text before or after the keynote, or double-click the keynote to change the format or specify a different keynote using the Field dialog box (see Inserting or Editing an AEC Keynotes Field on page 2370).

3 Click OK to close the Field dialog box, if necessary.

4 Click OK on the toolbar or click anywhere in the drawing area to close the Multiline Text Editor and implement your changes.

NOTE You can also add automatically updatable fields (such as a date and time stamp or other project information) before or after the keynote by right-clicking and clicking Insert Field.

Changing Keynote Formats

Keynotes can be displayed in three formats: key only, note only, or both key and note. When using both keys and notes, you can also specify the typographical device used to separate the key from the note (for example, key - note as opposed to key:note).

You can change keynote formats individually or globally within a single drawing. For example, you may want to display both keys and notes while you are keynoting a drawing, but display only keys when you finish.

Changing Individual Keynote Formats

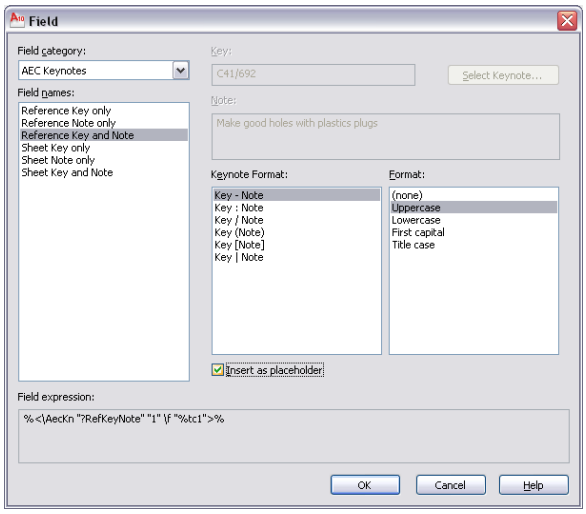
Use this procedure to change the format of a keynote that has been inserted in a drawing.

1 Double-click the keynote to display the Multiline Text Editor.

2 In the Text Formatting box, right-click the selected keynote.

3 In the Field dialog box, make sure the current Field category is Aec Keynotes, and then select a keynote format under Field names. If one of the key-and-note options is selected, you can select an option under Keynote Format. You can also change the setting under Format, if desired.

Keynote format options in the Field dialog box



4 Click OK twice.

The selected keynote is reformatted.

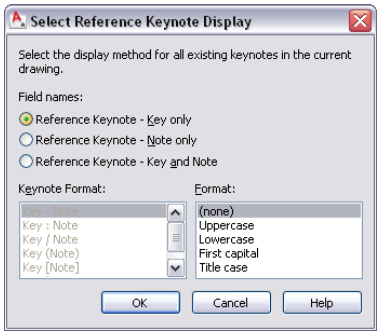
Globally Changing Keynote Formats

Use this procedure to change the format of all keynotes of a given type (reference or sheet) within a drawing.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Reference Keynote Display . or click Annotate tab ➤ Keynoting panel ➤ ➤ Sheet Keynote Display .

2 In the Select Reference Keynote Display or Select Sheet Keynote Display dialog box, select an option for Field names. If you select the Key and Note option, you can also select an option for Keynote Formats. You can change the Format setting regardless of the Field name selection.

Select Reference Keynote Display dialog (identical for sheet keynotes)



3 Click OK to implement the format changes for all keynotes of the selected type within the drawing.

Changing Databases for Existing Keynotes

AutoCAD Architecture keynoting functionality includes a tool that lets you globally change database references for existing keynotes within a drawing, provided the same keys exist in both the currently

referenced database and the one you want to use instead. When you run the tool, it identifies all currently referenced databases for selected keynotes in the drawing, and then prompts you to identify the database you want to switch from and the database you want to switch to. This capability is useful in situations where it is discovered that project team members have inadvertently used two different databases to keynote a drawing, or when you decide to switch from an office standard keynote database to a project standard keynote database. The tool can be run from the command line by entering **AecKeynoteDatabaseReselect**, or you can set it up as a menu selection, as in the following procedure.

1. Click Annotate tab ➤ Keynoting panel ➤ ▾ ➤ Select Database .
2. Select the keynotes you want to run the tool against and press *ENTER*.

   All databases referenced by the selected keynotes are listed on the command line.
3. Enter the full path or the Globally Unique ID (GUID) for the database currently referenced by the keynotes you want to change.
4. Enter the full path or the Globally Unique ID (GUID) for the database you want to be referenced.

   The number of keynotes updated by the tool is displayed on the command line.

Specifying Keynotes

AutoCAD Architecture provides pre-specified keynotes for detail components and many architectural objects that are included with the software. You can change these associations to specify different keynotes from either the AecKeynotes or AecKeynotes-Assemblies databases or from a database that you have loaded. You can also specify keynotes for individual components of architectural objects by associating keynotes with material definitions. Because material definitions supplied with the software are not size-specific, individual keynotes are not pre-specified. Instead, each material definition is pre-associated with a particular group from the MasterFormat 2004 scheme. This streamlines the process of locating the appropriate keynote when you want to specify one for the material.

The method used to specify a keynote depends on the type of object. For architectural objects and their components, you associate keynotes with individual styles and material definitions using the Style or Material Definition Properties dialog box, which can be accessed through the Style Manager or from the context menu of the object. For detail components, you use the Detail Component Manager to access and edit the Keynote field values.

Specifying Keynotes for Object Styles

Use this procedure to specify a keynote for an architectural object by associating the keynote with the object style. The same procedure applies whether you are specifying a keynote association for the first time or changing an existing one. Note, however, that if you change the keynote association for an object style, it does not affect previously inserted keynotes for objects created using that style. Those objects must be re-keynoted if you want them to reflect the newly specified keynote.

If you are establishing keynote associations for a number of the object styles that are included with AutoCAD Architecture, you may find it most efficient to work from the Styles drawing files (located at *C:\ProgramData\Autodesk\ACA 2010\enu\Styles*).

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. In the left pane of the Style Manager, expand Architectural Objects and any subcategories as necessary to locate the object style for which you want to specify a keynote.
3. Select the desired object style.
4. On the General tab of the Style Properties dialog box, click Select Keynote.

5 In the Select Keynote dialog box, make sure the correct database is displayed in the Keynote Database field (if you are using the default keynote databases, it should be AecKeynote-Assemblies), and then select the desired keynote from the hierarchical tree view.

6 Click OK twice.

The keynote is specified for the selected object style and will be used for subsequent keynote insertions for objects using that style.

Specifying Keynotes for Object Components

Use this procedure to specify a keynote for a particular component of an architectural object by associating the keynote with the material definition for that component. The same procedure applies, whether you are specifying a keynote association for the first time or changing an existing one. Note, however, that if you change the keynote association for a material definition, it does not affect previously inserted keynotes for object components using that material definition. Those object components must be re-keynoted if you want them to reflect the newly specified keynote.

If you are establishing keynote associations for a number of material definitions that are included with AutoCAD Architecture, you may find it most efficient to work from the material definitions drawing file (located at *C:\ProgramData\Autodesk\ACA 2010\enu\Styles*).

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 In the left pane of the Style Manager, expand Multi-Purpose Objects, and expand Material Definitions. Locate the material definition for which you want to specify a keynote.

3 Select the desired material definition.

4 On the General tab of the Material Definition Properties dialog box, click Select Keynote.

5 In the Select Keynote dialog box, make sure the correct database is displayed in the Keynote Database field (if you are using the default keynote databases, it should be Aec Keynote), and then select the desired keynote from the hierarchical tree view.

6 Click OK twice.

The keynote is specified for the selected material definition and will be used for subsequent keynote insertions for object components with that material definition.

Specifying Keynotes for Detail Components

Use this procedure to specify a keynote for a detail component. The same procedure applies, whether you are specifying a keynote association for the first time or changing an existing one. Note, however, that if you change the keynote association for a detail component, it does not affect previously inserted keynotes for that detail component. Those detail components must be re-keynoted if you want them to reflect the newly specified keynote.

1 Click Home tab ➤ Details panel ➤ Detail Components .

2 In the Detail Component Manager, make sure the Current detail component database field displays the correct database.

3 In the hierarchical tree view, select the group that contains the detail component for which you want to specify a keynote, and then select the detail component in the size table at the bottom of the window.

4 Resize the Detail Component Manager window, or use the scroll bar at the bottom of the window as necessary so that the Keynote column is visible.

5 Select the Keynote field for the selected detail component, right-click, and click Edit.

6 In the Select Keynote dialog box, make sure the correct database is displayed in the Keynote Database field, and then select the desired keynote from the hierarchical tree view.

7 Click OK.

The key for the selected keynote is displayed in the Keynote field.

8 Click Close, and click Yes when prompted to save changes.

The keynote is specified for the selected detail component and will be used for subsequent keynote insertions for that component.

NOTE If no keynote is specified for the detail component, the Select Keynote dialog box is displayed. If a keynote is specified for the components table or group to which the detail component belongs, the node representing that group is highlighted within the tree view. Keynotes cannot be specified at the table level using AutoCAD Architecture functionality. This requires customization of the detail component database using Microsoft® Access.

Working with Keynote Databases

Keynotes used in AutoCAD Architecture are stored in Microsoft® Access databases. There are two default keynote databases:

- **AecKeynotes**: This database is used for keynoting individual detail components and materials according to the Construction Specifications Institute (CSI) MasterFormat 2004 standard.
- **AecKeynotes-Assemblies**: This database is used for keynoting architectural objects that are assemblies of multiple components. These keynotes are based on the CSI Uniformat standard.

To accommodate proprietary office standards and other project-specific keynoting schemes, you can modify the default databases or you can create your own databases using either Microsoft® Access or the editing functionality provided with the software. You can also configure keynote databases to control which ones are available for assigning to individual projects and to specify the order in which they are searched.

Configuring Keynote Databases

AutoCAD Architecture supports multiple keynote databases, which you can assign to individual projects (see Specifying the Project Detail Component Databases for a Project on page 226). When you are working within a given project, only those databases assigned to that project are accessible through the Select Keynote dialog box.

Before a database can be assigned to a project, however, it must be on the list of available databases. Both keynote databases provided with the software (AecKeynotes and AecKeynotes-Assemblies) are included on this list by default. You can add databases to the list or remove them. If a particular keynote exists in multiple databases, you can specify the order in which the databases are searched to find a keynote that has been specified for an object. (Only the key is stored with the object style; the corresponding note must be retrieved from a database at the time of insertion.)

Adding a Keynote Database

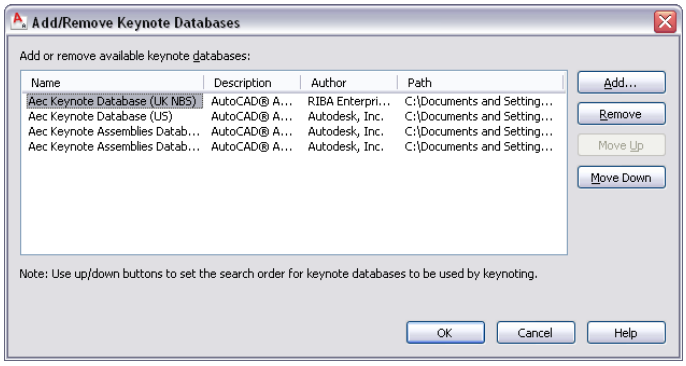
Use this procedure to add a database to the list of available keynote databases.

1 Click ➤ Options.

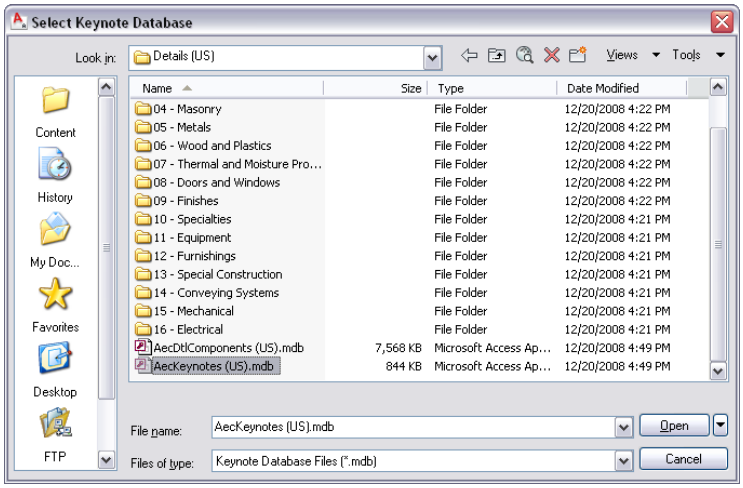
2 In the Options dialog box, click the AEC Content tab.

3 On the AEC Content page, click the Add/Remove button for Keynote Databases.

4 In the Add/Remove Keynote Databases dialog box, click Add.



5 In the Select Component Database browser window, locate the database you want to add, and click Open.



The selected database is added to the bottom of the list in the Add/Remove Keynote Databases dialog box. You can specify the order in which databases are searched by clicking the Move Up and Move Down buttons to change the position of a selected database within the list. Moving a database to the top of the list makes it the default selection for the Select Keynote dialog box.

6 Click OK twice.

Removing a Keynote Database

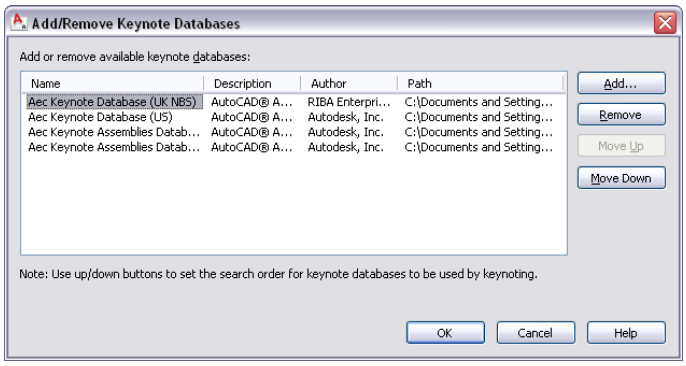
Use this procedure to remove a database from the list of available keynote databases.

1 Click ➤ Options.

2 In the Options dialog box, click the AEC Content tab.

3 On the AEC Content page, click the Add/Remove button for Keynote Databases.

4 In the Add/Remove Keynote Databases dialog box, select the database you want to remove from the list, and click Remove.



5 Click OK twice. Note that if you remove the top database in the list, the next database listed becomes the default selection in the Select Keynote dialog box.

Merging Old and New Keynote Databases

If you have modified one of the default keynote databases supplied with a previous release of AutoCAD Architecture, and you want to migrate your modifications to the corresponding database in the current release, you can do so using the Detail Component/Keynote Database Migration utility. For detailed instructions, see Migrating Detail Component and Keynote Databases on page 2627.

IMPORTANT Beginning with AutoCAD Architecture 2010, the US detail component and keynote databases supplied with the software use the CSI MasterFormat 2004 standard. Using the Detail Component/Keynote Database Migration utility to migrate your customizations from a database that uses the CSI MasterFormat 95 standard (as in Autodesk Architectural Desktop 2007 and previous releases) is not supported. The utility will not properly migrate custom records from the older database and may errantly overwrite records in the new database with MasterFormat 95 data. If you want to use a MasterFormat 95 database with the current release of AutoCAD Architecture, you can load it as described under Adding a Detail Component Database to Available Databases on page 2349 or Adding a Keynote Database on page 2385. Note that the older database must be located with the previous release content and must maintain that content folder structure to function properly. An older detail component database will not function with 2008 or later US details content. Likewise, an older keynote database will not automatically keynote 2008 or later US details content; it will only keynote detail components inserted using previous version details or details in previous version drawings. The Detail Component/Keynote Database Migration utility can still be used to migrate records from one CSI MasterFormat 95 database to another.

Setting Keynote Database Permissions in a Multi-User Environment

If you are working in a multi-user network environment with keynote and detail content on a remote server, you may want to allow some users to edit databases and others to have read-only access. For this to work properly, all users must have write permission to the folder where the databases are installed. Without write permission to the folder, a user will not be able to open any database within the folder, because the necessary lock file cannot be generated on that user's behalf, regardless of whether the user has write permission to the database itself. Once all users have write permission to the folder, permissions for individual databases (*.mdb files) can then be set on a per-user basis. Note, however, that this arrangement allows users to access and edit other content within the folder, such as drawing, image, and XML recipe files, unless you set permissions on these files individually to prevent it. For this reason, you may want to keep the folders containing keynote and detail content separate from other content installed with AutoCAD Architecture so that write permission is not available to all users for all content.

Creating and Modifying Keynote Databases

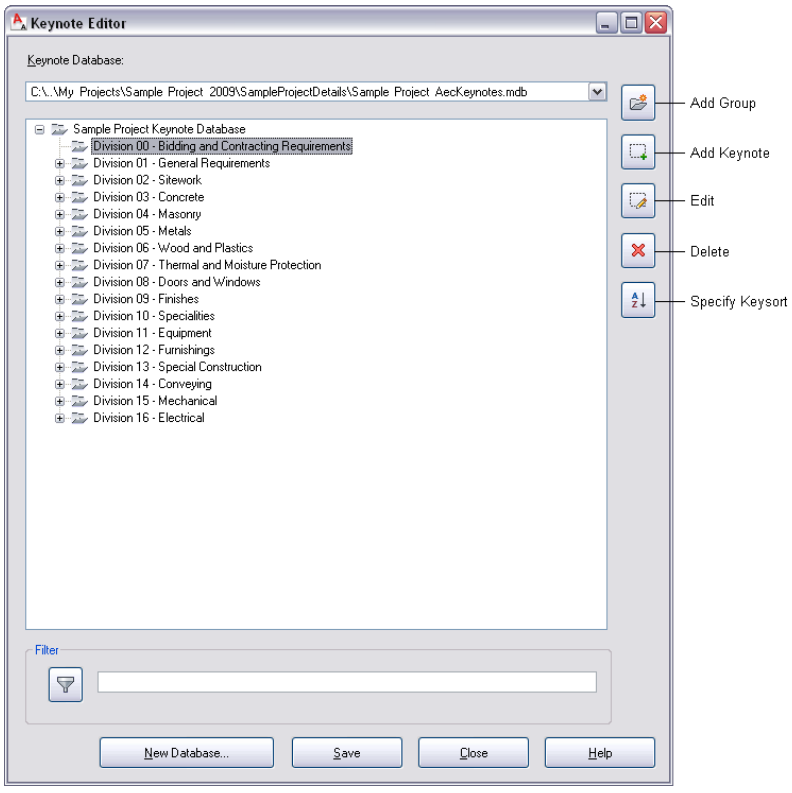
You can create and modify keynote databases using Microsoft® Access directly if you are familiar with that product and with the structure of keynote databases in AutoCAD Architecture (for more information, see Keynote Database Schema on page 2394). However, the preferred method is to use the Keynote Editor provided with the software. For databases to which you have read/write access, most of the Keynote Editor functions are also available from the Select Keynote dialog box.

NOTE If you are working in a multi-user environment, it is recommended that you modify a keynote database only when no other users are accessing it.

The Keynote Editor

The Keynote Editor is a standalone application that lets you create and modify keynote databases. Accessed from the CAD Manager menu, the Keynote Editor dialog box provides a hierarchical tree view of the currently selected database, which displays as a root node. For an existing database, you can expand the root node to display groups, and then expand group nodes to display sub-groups or individual keynotes. Alternatively, you can enter text into the Filter box below the tree view. Clicking the Filter button, pressing *TAB*, or pressing *ENTER* expands all nodes under any node whose name includes the text you enter.

If you are creating a new database, you add the root node using the New Database button, and then add groups and keynotes using the buttons along the right side of the dialog box. These buttons (Add Group, Delete, Add Keynote, Edit, and Specify Keysort) are also available from the Select Keynote dialog box for databases to which you have read-write access.



Creating a Keynote Database

Using the Keynote Editor to create a new keynote database entails the following basic steps:

1 Create a blank database by specifying a name and location. (For detailed instructions, see Creating a Blank Keynote Database on page 2389.)

2 Add groups and subgroups to reflect the major and minor divisions within the keynoting scheme. (For detailed instructions, see Adding Groups to a Keynote Database on page 2390.)

3 Add individual keynotes within groups and subgroups as applicable. (For detailed instructions, see Adding Keynotes to a Keynote Database on page 2391.)

4 Save the new database.

After saving the new database, you can add it to the list of available databases (see Adding a Keynote Database on page 2385) and assign it to projects (see Specifying the Project Detail Component Databases for a Project on page 226).

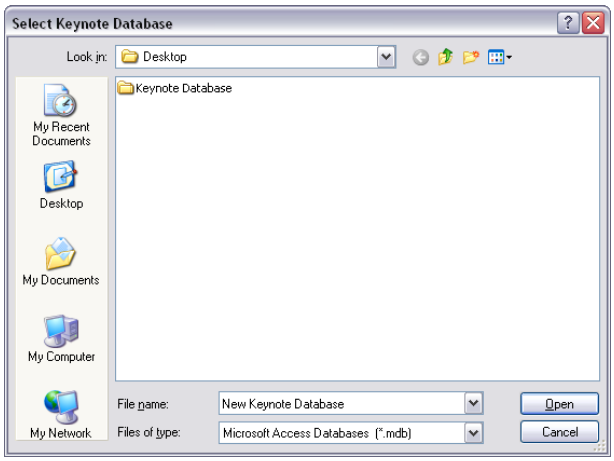
Creating a Blank Keynote Database

Use this procedure to create a blank Microsoft® Access database with all required tables and queries for keynote storage and retrieval. This is the first step in creating a new keynote database using the Keynote Editor.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

2 At the bottom of the Keynote Editor dialog box, click New Database.

The Create a new keynote database browser window is displayed.



3 In the browser window, navigate to the location for the new database.

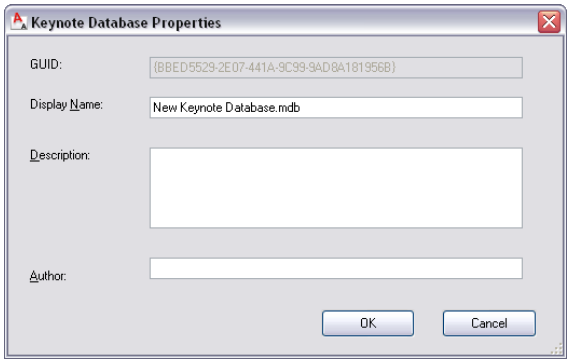
4 Enter a name for the new database in the File name field.

5 Click Save.

A node named New Keynote Database is displayed in the Keynote Editor.

6 Select the new database node, and click .

7 In the Keynote Database Properties dialog box, enter the Display Name, Description, and Author for the new database, and click OK.



A blank Microsoft® Access database is created with all required tables and queries for keynote storage and retrieval. The new database has the global unique identifier shown in the GUID field and is displayed in the Keynote Editor as a root node with the display name you provided.

8 Click Save.

You can now begin populating the database by using the Keynote Editor to add groups and individual keynotes.

Adding Groups to a Keynote Database

Use this procedure to add a group to a keynote database. You can use the same basic procedure to add as many levels of subgroups as you want within a group.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

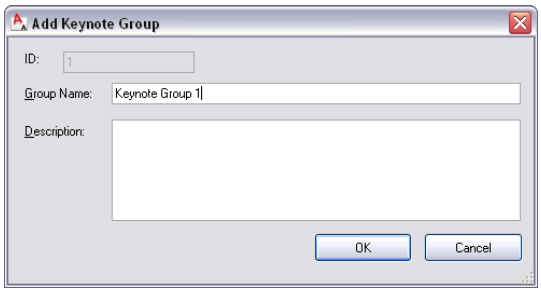
NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Select the root node for the database if you want to add a top-level group, or expand the root node and group/subgroup nodes as necessary until you can select the node to which you want to add a subgroup.

4 Click .

The Add Group dialog box is displayed with the read-only ID field showing the database identifier for the group you are adding.



5 Enter a Group Name and a Description, and click OK.

The group or subgroup you have defined is displayed as a new node in the hierarchical tree view.

Adding Keynotes to a Keynote Database

Use this procedure to add a keynote to a group or subgroup within a keynote database.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

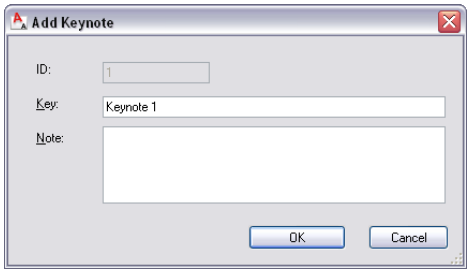
NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Expand the root node and group/subgroup nodes as necessary until you can select the node to which you want to add a keynote.

4 Click .

The Add Keynote dialog box is displayed with the read-only ID field showing the database identifier for the keynote you are adding.



5 Enter a key and a note, and click OK.

The keynote you have defined is displayed as a new node in the hierarchical tree view.

TIP If you need to add a series of keynotes within a group or subgroup, you can save time by adding the first keynote, right-clicking it, and clicking Copy Series. You then specify the number of copies to make and click OK. The specified number of sequentially numbered keys are added to the group. For example, if you create key A1001 and then use the Copy Series option to add 10 copies, keys A1002 through A1011 are added. You can then edit keynote nodes individually to add the notes, as explained under Adding Components to a Detail Component Database on page 2340.

Editing Groups in a Keynote Database

Use this procedure to change the name or description of a group within a keynote database.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

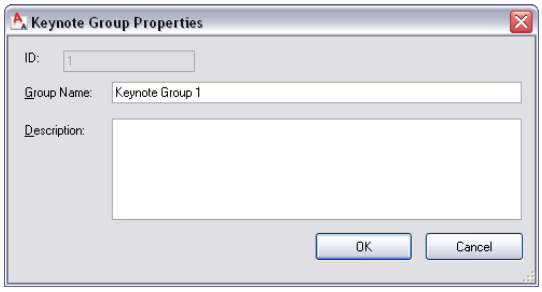
NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Expand the root node and group/subgroup nodes as necessary, and select the group/subgroup you want to edit.

4 Click .

The Group Properties dialog box is displayed with the read-only ID field showing the database identifier for the group you are editing.



5 Edit the Group Name and Description values as desired, and click OK.

Editing Keynotes in a Keynote Database

Use this procedure to change the key or the note for a keynote within a database.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

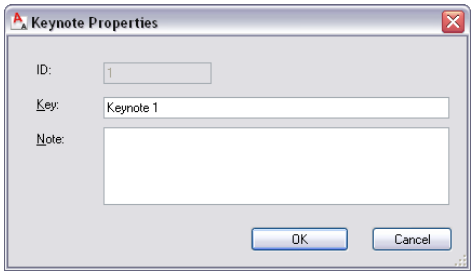
NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Expand the root node and group/subgroup nodes as necessary, and select the keynote you want to edit.

4 Click .

The Keynote Properties dialog box is displayed with the read-only ID field showing the database identifier for the keynote you are editing.



5 Edit the Key and Note values as desired, and click OK.

Deleting Keynotes or Groups from a Keynote Database

Use this procedure to delete one or more groups, subgroups, or keynotes from a keynote database. Note that deleting a group also deletes any subgroups and keynotes within that group.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Select the nodes representing keynote groups, subgroups or keynotes you want to delete.

TIP To select multiple nodes, hold down the *CTRL* key while clicking the nodes.

4 Click .

The selected nodes are deleted from the hierarchical tree view in the Keynote Editor.

Moving Keynotes or Groups in a Keynote Database

Use this procedure to move a keynote, group, or subgroup to a different group or level within the database hierarchy. Note that moving a group also moves any subgroups and keynotes within that group.

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

NOTE The rest of this procedure can also be performed from the Select Keynote dialog box.

2 Select a database from the Keynote Database list.

3 Select the node (group, subgroup, or keynote) to move and drag it to the desired location in the hierarchical tree view.

Specifying Sort Order for Keynotes

Use this procedure to specify the order in which keynotes in a given database are listed when displayed in the Keynote Editor, the Select Keynote dialog box, or keynote legends. To specify the sort order, you enter one or more masks that correspond to the patterns used for keys in the database. Keynotes are sorted on a field-by-field basis within each pattern. In other words, all keynotes having the same key pattern as the first mask you enter will be listed before any keynotes having the second pattern you enter.

When entering a mask, use the following conventions to represent the fields, characters, and delimiters that comprise the key pattern:

- Enclose sortable fields in brackets [ ] and delimiters in curly brackets { }. Example: [field]{delimiter}[field].
- Delimiters can be any character except a backslash (\) or any character string that does not begin with a backslash. (The backslash is reserved for system use.)
- Use a pound sign (#) to indicate a numeric character and a question mark (?) to indicate an alphanumeric character (digit, letter, or punctuation mark).
- For fixed-length fields, use the specified number of characters. Example: [###] indicates a 3-digit fixed-length field.
- Use [#...#] to indicate a variable-length numeric field, and [?...?] for a variable-length alphanumeric field.
- A variable-length field is always followed by a delimiter unless it is the final field in the mask.

As an example, the AecKeynotes database uses keys that consist of a 5-digit field, followed by a delimiter (.), a 1-character alphanumeric field, and a variable-length numeric field (for example, 09250.A101). The mask representing this pattern would be [#####]{.}[?][#...#]

1 Click Annotate tab ➤ Keynoting panel ➤ ➤ Keynote Editor .

2 Select a database from the Keynote Database list.

3 Click to display the Specify Key Sort dialog box.

4 In the Specify Key Sort dialog box, enter a key sort mask for each key pattern in the selected database. Use a different line for each mask.

5 Click OK.

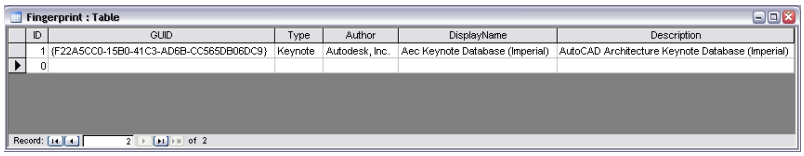
Keynote Database Schema

To create or modify a keynote database by using Microsoft® Access (rather than using the Keynote Editor), you need to be familiar with the database schema used in AutoCAD Architecture.

A keynote database contains four tables:

- Fingerprint
- Groups
- Keynotes
- KeySort

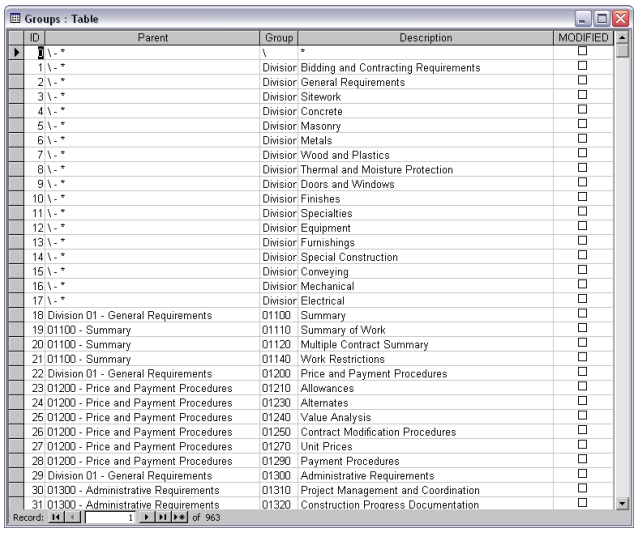
Fingerprint Table



The Fingerprint table uniquely identifies a keynote database and contains the following fields:

- **GUID:** The GUID is the global unique identifier for a particular keynote database. When you insert an AEC Keynotes field to specify a keynote, a link to the keynote database is established using this GUID and the row ID of the keynote in the Keynotes table. If you leave this field empty when creating a database, a GUID is generated when the database is loaded using the Add/Remove Keynote Databases dialog box.
- **Type:** For a keynote database, this field must contain the string “Keynote.” (For a detail component database, the string must be “Component.”)
- **Author, Display Name, and Description:** The values for these fields are displayed in the corresponding fields in the Add/Remove Keynote Databases dialog box.

Groups Table



Groups : Table

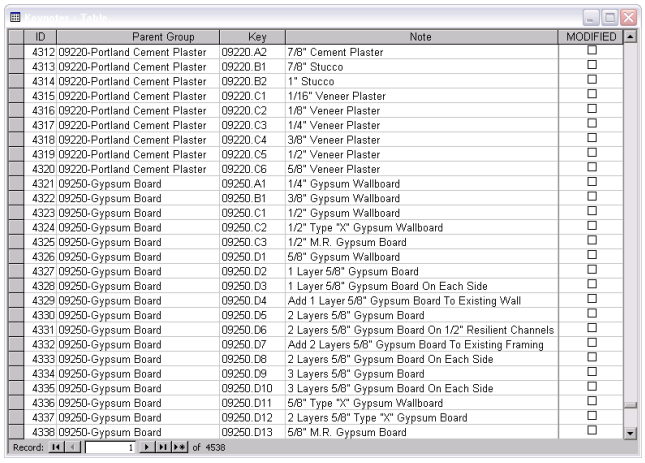
ID	Parent	Group	Description	MODIFIED
0	\ - *	\	*	☐
1	\ - *	Division	Bidding and Contracting Requirements	☐
2	\ - *	Division	General Requirements	☐
3	\ - *	Division	Sitework	☐
4	\ - *	Division	Concrete	☐
5	\ - *	Division	Masonry	☐
6	\ - *	Division	Metals	☐
7	\ - *	Division	Wood and Plastics	☐
8	\ - *	Division	Thermal and Moisture Protection	☐
9	\ - *	Division	Doors and Windows	☐
10	\ - *	Division	Finishes	☐
11	\ - *	Division	Specialties	☐
12	\ - *	Division	Equipment	☐
13	\ - *	Division	Furnishings	☐
14	\ - *	Division	Special Construction	☐
15	\ - *	Division	Conveying	☐
16	\ - *	Division	Mechanical	☐
17	\ - *	Division	Electrical	☐
18	Division 01 - General Requirements	01100	Summary	☐
19	01100 - Summary	01110	Summary of Work	☐
20	01100 - Summary	01120	Multiple Contract Summary	☐
21	01100 - Summary	01140	Work Restrictions	☐
22	Division 01 - General Requirements	01200	Price and Payment Procedures	☐
23	01200 - Price and Payment Procedures	01210	Allowances	☐
24	01200 - Price and Payment Procedures	01230	Alternates	☐
25	01200 - Price and Payment Procedures	01240	Value Analysis	☐
26	01200 - Price and Payment Procedures	01250	Contract Modification Procedures	☐
27	01200 - Price and Payment Procedures	01270	Unit Prices	☐
28	01200 - Price and Payment Procedures	01290	Payment Procedures	☐
29	Division 01 - General Requirements	01300	Administrative Requirements	☐
30	01300 - Administrative Requirements	01310	Project Management and Coordination	☐
31	01300 - Administrative Requirements	01320	Construction Progress Documentation	☐

Record: 1 of 963

The Groups table defines the hierarchical organization of keynotes within the database. This hierarchy determines the order in which divisions, groups, subgroups and individual keynotes are displayed in the Keynote Editor, the Select Keynote dialog box, and keynote legends. The following fields apply to each row in the table:

- **ID:** A sequential number identifying a particular row in the table. This number should never change.
- **Parent:** Identifies the parent of the group identified in the Group field.
- **Group:** Identifies a particular division, group, or subgroup. Note that the root parent group (\-*) is special and its ID is zero.
- **Description:** Provides the descriptive name of the group.
- **Modified:** When the box is checked, it indicates that the row has been modified and prevents the row from being overwritten if the database is migrated when new content is released by Autodesk. You must click the box to enable this protection for any row you modify.

Keynotes Table



Keynotes : Table

ID	Parent Group	Key	Note	MODIFIED
4312	09220-Portland Cement Plaster	09220.A2	7/8" Cement Plaster	☐
4313	09220-Portland Cement Plaster	09220.B1	7/8" Stucco	☐
4314	09220-Portland Cement Plaster	09220.B2	1" Stucco	☐
4315	09220-Portland Cement Plaster	09220.C1	1/16" Veneer Plaster	☐
4316	09220-Portland Cement Plaster	09220.C2	1/8" Veneer Plaster	☐
4317	09220-Portland Cement Plaster	09220.C3	1/4" Veneer Plaster	☐
4318	09220-Portland Cement Plaster	09220.C4	3/8" Veneer Plaster	☐
4319	09220-Portland Cement Plaster	09220.C5	1/2" Veneer Plaster	☐
4320	09220-Portland Cement Plaster	09220.C6	5/8" Veneer Plaster	☐
4321	09250-Gypsum Board	09250.A1	1/4" Gypsum Wallboard	☐
4322	09250-Gypsum Board	09250.B1	3/8" Gypsum Wallboard	☐
4323	09250-Gypsum Board	09250.C1	1/2" Gypsum Wallboard	☐
4324	09250-Gypsum Board	09250.C2	1/2" Type "X" Gypsum Wallboard	☐
4325	09250-Gypsum Board	09250.C3	1/2" M.R. Gypsum Board	☐
4326	09250-Gypsum Board	09250.D1	5/8" Gypsum Wallboard	☐
4327	09250-Gypsum Board	09250.D2	1 Layer 5/8" Gypsum Board	☐
4328	09250-Gypsum Board	09250.D3	1 Layer 5/8" Gypsum Board On Each Side	☐
4329	09250-Gypsum Board	09250.D4	Add 1 Layer 5/8" Gypsum Board To Existing Wall	☐
4330	09250-Gypsum Board	09250.D5	2 Layers 5/8" Gypsum Board	☐
4331	09250-Gypsum Board	09250.D6	2 Layers 5/8" Gypsum Board On 1/2" Resilient Channels	☐
4332	09250-Gypsum Board	09250.D7	Add 2 Layers 5/8" Gypsum Board To Existing Framing	☐
4333	09250-Gypsum Board	09250.D8	2 Layers 5/8" Gypsum Board On Each Side	☐
4334	09250-Gypsum Board	09250.D9	3 Layers 5/8" Gypsum Board	☐
4335	09250-Gypsum Board	09250.D10	3 Layers 5/8" Gypsum Board On Each Side	☐
4336	09250-Gypsum Board	09250.D11	5/8" Type "X" Gypsum Wallboard	☐
4337	09250-Gypsum Board	09250.D12	2 Layers 5/8" Type "X" Gypsum Board	☐
4338	09250-Gypsum Board	09250.D13	5/8" M.R. Gypsum Board	☐

Record: 1 of 4538

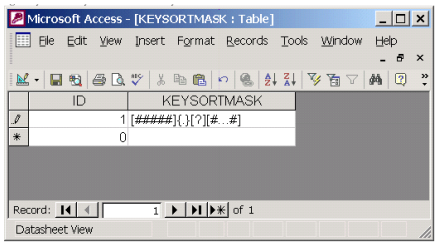
This table defines the individual keynotes for all the groups identified in the Groups table. The following fields are included:

- **ID:** A sequential number identifying a particular row in the table. This number should never change. This ID, combined with the GUID of the database, is tracked by the AEC Keynotes field when you insert a keynote into a drawing. This enables keynotes in a drawing to be updated when changes are made to the keynote database.
- **Parent Group:** Identifies the parent of the keynote, displaying the Group and Description field values from the Groups table.

  TIP If you want a flat (non-hierarchical) keynote list, you can assign the root parent group (\-*) to all keynotes in this table.

- **Key:** Specifies the key for the keynote. If you are creating a database and have already created the Groups table, this field displays the value from the Group field. The delimiter and suffix are user-definable.
- **Note:** Provides the note for the specified key.
- **Modified:** When the box is checked, it indicates that the row has been modified and prevents the row from being overwritten if the database is migrated when new content is released by Autodesk. You must click the box to enable this protection for any row you modify. For more information on database migration, see Migrating Detail Component and Keynote Databases on page 2627.

KeySort Table



This table contains key sort masks that represent the different key patterns used in the database. The order in which the masks are listed in this table determines the order in which key patterns are listed in the Keynote Editor, the Select Keynote dialog box, and keynote legends; that is, all keynotes with keys using the pattern identified by the mask in record 1 are listed before keynotes with key patterns identified by subsequent records in the table. The illustration above shows the key sort mask for the AecKeynotes database provided with AutoCAD Architecture. The following conventions are used for key sort masks:

- Enclose sortable fields in brackets [ ] and delimiters in curly brackets { }. Example: [field]{delimiter}[field].
- Delimiters can be any character except a backslash (\) or any character string that does not begin with a backslash. (The backslash is reserved for system use.)
- Use a pound sign (#) to indicate a numeric character and a question mark (?) to indicate an alphanumeric character (digit, letter, or punctuation mark).
- For fixed-length fields, use the specified number of characters. Example: [###] indicates a 3-digit fixed-length field.
- Use [#...#] to indicate a variable-length numeric field, and [?...?] for a variable-length alphanumeric field.
- A variable-length field is always followed by a delimiter unless it is the final field in the mask.

Examples of keys using the pattern defined by the [#####]{.}[?][#...#] mask in the illustration above would include 03250.A1, 07250.B102, and 09250.C1007.

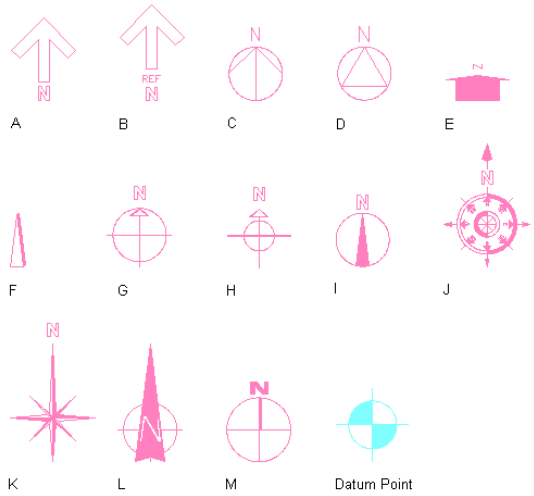
You can also specify key sort masks using the Keynote Editor, as explained in Specifying Sort Order for Keynotes on page 2393.

North Arrow and Datum Point Tools

North arrow and datum point annotations are used for defining directions in a drawing. Formerly available as content blocks in DesignCenter, these annotations are now available through tools on the tool palettes and in Content Browser.

In this release of AutoCAD Architecture, north arrows and datum points are converted from DesignCenter content blocks to true tools with tool properties.

North arrow and datum point symbols



By default, all north arrow and datum point tools are set to be annotative, which means that the annotations you insert with these tools are controlled by annotative scaling. For more information, see Annotation Scaling on page 2411.

IMPORTANT If you have legacy drawings with old DesignCenter-based annotation symbols in them, then the old block definition will continue to be used for new tool-based blocks if the blocks are identically named. (This is the case for the datum point tool, but not the north arrow tools which have been renamed.) In such a case, either change the Annotative setting manually by using BEDIT, or rename the old block before inserting new tool-based annotation symbols into the drawing.

You can find north arrow tools and a datum point tool in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette
- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Miscellaneous

TIP You can also search for these types of tools by name in Content Browser.

These properties of north arrow and datum point tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the north arrow or datum point is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer key for north arrows is ANNOBJ; the default value for the datum point is ANNSYMOBJ.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Symbol	Specifies the block-based symbol to be used for the north arrow or datum point.
General/Symbol location	The location of the drawing file containing the specified north arrow or datum point symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed. Symbol blocks shipped with AutoCAD Architecture are by default located in %AECCONTENT_DIR%\Styles\Imperial\AEC Annotation Symbols (Imperial).dwg or %AECCONTENT_DIR%\Styles\Metric\AEC Annotation Symbols (Metric).dwg.
Text/Attribute text style	This property specifies whether attribute text within the symbol uses the text style of the current drawing (Target drawing text style) or the style defined by the attribute tag (As defined by content).
Text/Attribute text angle	Specifies the angle for attribute text. The choices are Right reading (which keeps the text right-side up regardless of rotation angle), As inserted (which sets text rotation at the angle of the last leader segment), and Force horizontal (which keeps the text horizontal regardless of the match line rotation angle.) **NOTE** The north arrow and datum point tools shipped with AutoCAD Architecture do not have attributes in their block definitions, so that these settings are set to Undefined (--).

Inserting a North Arrow or Datum Point in the Drawing

Use this procedure to insert a north arrow or datum point into the drawing.

1. Select a north arrow or datum point tool on a tool palette.
   (A north arrow tool and a datum point tool are located on the Annotation palette.)
2. Specify the insertion point of the north arrow or datum point in the drawing area.
3. Specify the rotation.

For information about editing the properties of north arrows and datum points in the drawing, see Editing Block-Based Annotation Symbols on page 2407.

NOTE North arrows and datum points that have been inserted with a north arrow or datum point tool can be modified in the drawing and saved back as a tool on a tool palette. By default, a north arrow or datum point tool created that way will have the same layer key, layer overrides, and symbol as the original tool that was used to create the annotation symbol in the drawing. The symbol location will be the current drawing.

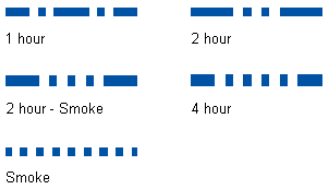
Fire Rating Line Tools

Fire rating annotations are used for adding fire rating information a drawing. Formerly available as content blocks in DesignCenter, these annotations are now available through tools on the tool palettes and in Content Browser.

In this release of AutoCAD Architecture, fire rating lines are converted from DesignCenter content blocks to true tools with tool properties.

Fire rating lines are polylines and are not controlled by annotative scaling.

Fire rating line tools



You can find fire rating line tools in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette
- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Miscellaneous\Fire Rating

TIP You can also search for these types of tools by name in Content Browser.

These properties of Fire Rating Line tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the fire rating line is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer key is WALLFIRE.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Line width	Specifies the line width of the fire rating polyline.
General/Linetype	Specifies the linetype of the fire rating line. In the fire rating line tools shipped with AutoCAD Architecture there is a specific linetype for each fire rating level - for example, the 1 Hr fire rating line tool has the Aec_Rating_1Hr linetype specified. The linetypes for rating line tools have been added to the acad.lin and acadISO.lin files.

Inserting a Fire Rating Line in the Drawing

Use this procedure to insert a fire rating line into the drawing.

1 Select a fire rating line tool on a tool palette.

(A fire rating line tool is located on the Annotation palette.)

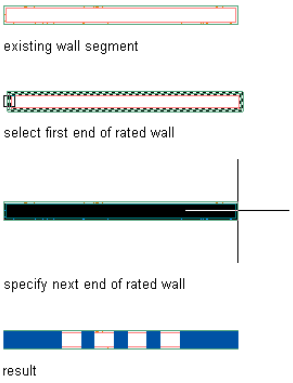
2 Specify the start point of the wall you want to annotate with a fire rating line.

3 Specify the wall endpoint in the direction you want the line to be drawn.

4 Continue specifying wall points to extend the line as needed.

5 Press ENTER to end the command.

Adding a fire rating line to a wall segment



For information about editing the properties of fire rating lines in the drawing, see Editing Polyline-Based Annotation Symbols on page 2409.

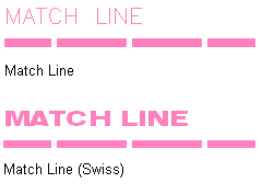
NOTE Fire rating lines that have been inserted with fire rating tools can be modified in the drawing and saved back as tools on a tool palette. By default, a fire rating line tool created that way will have the same layer key, layer overrides, linetype, and line width as the original tool that was used to create the annotation symbol in the drawing.

Match Line Tools

Match line annotations are used for annotating a drawing. Formerly available as content blocks in DesignCenter, these annotations are now available through tools on the tool palettes and in Content Browser.

In this release of AutoCAD Architecture, match lines are converted from DesignCenter content blocks to true tools with tool properties.

Match line tools



By default, all match line tools are set to be annotative, which means that the annotations you insert with these tools are controlled by annotative scaling. For more information, see Annotation Scaling on page 2411.

IMPORTANT If you have legacy drawings with old DesignCenter-based annotation symbols in them, then the old block definition will continue to be used for new tool-based blocks if the blocks are identically named. In such a case, either change the Annotative setting manually by using BEDIT, or rename the old block before inserting new tool-based annotation symbols into the drawing.

You can find match line tools in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette
- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Miscellaneous\Match Lines

TIP You can also search for these types of tools by name in Content Browser.

These properties of match line tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the match line is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer key is ANNOBJ.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Symbol	Specifies the block-based symbol to be used for the match line.
General/Symbol location	The location of the drawing file containing the specified match line symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed. Symbol blocks shipped with AutoCAD Architecture are by default located in %AECCONTENT_DIR%\Styles\Imperial\AEC Annotation Symbols (Imperial).dwg or %AECCONTENT_DIR%\Styles\Metric\AEC Annotation Symbols (Metric).dwg.
General/Line width	Specifies the line width of the match line. **NOTE** This setting uses paper size, not model size.
General/Linetype	Specifies the linetype of the match line. For the match line tools shipped with AutoCAD Architecture, linetype Aec_Match_Line is specified. This linetype has been added to the acad.lin and acadISO.lin files.
Text/Attribute text style	This property specifies whether attribute text within the symbol uses the text style of the current drawing (Target drawing text style) or the style defined by the attribute tag (As defined by content).
Text/Attribute text angle	Specifies the angle for attribute text. The choices are Right reading (which keeps the text right-side up regardless of rotation angle), As inserted (which sets text rotation at the angle of the last leader segment), and Force horizontal (which keeps the text horizontal regardless of the match line rotation angle.)

Inserting a Match Line in the Drawing

Use this procedure to insert a match line into the drawing.

1 Select a match line tool on a tool palette.

(A match line tool is located on the Annotation palette.)

2 Specify the first point of the match line in the drawing area.

3 Specify the next points of the match line, and press ENTER when the line is complete.

4 In the Edit Attributes dialog, enter the text you want displayed on the match line, and click OK.

For information about editing the properties of match lines in the drawing, see Editing Block-Based Annotation Symbols on page 2407 and Editing Polyline-Based Annotation Symbols on page 2409.

NOTE Match lines that have been inserted with match line tools can be modified in the drawing and saved back as tools on a tool palette. By default, a match line tool created that way will have the same layer key, layer overrides, symbol, line width, linetype, attribute text style, and attribute text angle as the original tool that was used to create the annotation symbol in the drawing. The symbol location will be the current drawing.

Revision Cloud Tools

Revision cloud annotations are used for marking up to-be-revised areas in a drawing. Formerly available as content blocks in DesignCenter, these annotations are now available through tools on the tool palettes and in Content Browser.

In this release of AutoCAD Architecture, revision clouds are converted from DesignCenter content blocks to true tools with tool properties.

Revision cloud tools

If a revision cloud has a tag, the tag symbol is a block reference which can be controlled by annotative scaling. The polyline representing the cloud shape does not participate in annotation scaling. For more information, see Annotation Scaling on page 2411.

IMPORTANT If you have legacy drawings with old DesignCenter-based annotation symbols in them, then the old block definition will continue to be used for new tool-based blocks if the blocks are identically named. In such a case, either change the Annotative setting manually by using BEDIT, or rename the old block before inserting new tool-based annotation symbols into the drawing.

You can find revision cloud tools in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette

- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Revision Clouds

TIP You can also search for these types of tools by name in Content Browser.

These properties of Revision Cloud tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the revision cloud is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer key is ANNREV.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Symbol	If the revision cloud tool contains a tag, this line specifies the block-based symbol to be used for the tag. If the revision cloud tool does not contain a tag, the symbol is undefined.
General/Symbol location	The location of the drawing file containing the specified tag symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed. Symbol blocks shipped with AutoCAD Architecture are by default located in %AECCONTENT_DIR%\Styles\Imperial\AEC Annotation Symbols (Imperial).dwg or %AECCONTENT_DIR%\Styles\Metric\AEC Annotation Symbols (Metric).dwg.
General/Line width	Specifies the line width of the cloud polyline. **NOTE** This setting uses paper size, not model size.
General/Arc length	Specifies the arc length of each cloud segment. **NOTE** This value is in paper space units.
Text/Attribute text style	This property specifies whether attribute text within the symbol uses the text style of the current drawing (Target drawing text style) or the style defined by the attribute tag (As defined by content).
Text/Attribute text angle	Specifies the angle for attribute text. The choices are Right reading (which keeps the text right-side up regardless of rotation angle), As inserted (which sets text rotation at the angle of the last leader segment), and Force horizontal (which keeps the text horizontal regardless of the match line rotation angle.)

Inserting a Revision Cloud in the Drawing

Use this procedure to insert a revision cloud into the drawing.

1 Select a revision cloud tool on a tool palette.

(A revision cloud tool with a tag symbol is located on the Annotation palette.)

2 Specify the first point of the cloud shape in the drawing area.

NOTE Revision clouds are drawn counter-clockwise.

3 Specify the cloud shape, and click once when the cloud is closed.

If the revision cloud tool contains a tag, the Edit Attributes dialog opens.

4 Enter the text you want displayed in the tag, and click OK.

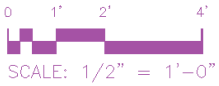
For information about editing the properties of revision clouds in the drawing, see Editing Block-Based Annotation Symbols on page 2407 and Editing Polyline-Based Annotation Symbols on page 2409.

NOTE Revision clouds that have been inserted with revision cloud tools can be modified in the drawing and saved back as tools on a tool palette. By default, a revision cloud tool created that way will have the same layer key, layer overrides, symbol, line width, arc length, attribute text style, and attribute text angle as the original tool that was used to create the annotation symbol in the drawing. The symbol location will be the current drawing.

Bar Scale Tools

Bar scale annotations are used for annotating a drawing. These annotations are now available through tools on the tool palettes and in Content Browser.

Bar scale tool



By default, all bar scale tools are set to be non-annotative, which means that the annotations you insert with these tools are not controlled by annotative scaling. You can make them annotative if desired. For more information, see Annotation Scaling on page 2411.

IMPORTANT If you have legacy drawings with old DesignCenter-based annotation symbols in them, then the old block definition will continue to be used for new tool-based blocks if the blocks are identically named. In such a case, either change the Annotative setting manually by using BEDIT, or rename the old block before inserting new tool-based annotation symbols into the drawing.

IMPORTANT The bar scale tool has been set to be non-annotative by default because the numerical values created on insertion are static and will not update automatically when the annotation scale of the symbol is changed.

You can find a bar scale tool in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette
- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Miscellaneous

TIP You can also search for these types of tools by name in Content Browser.

These properties of bar scale tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the bar scale is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer key is TITTEXT.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Symbol	Specifies the block-based symbol to be used for the bar scale.
General/Symbol location	The location of the drawing file containing the specified symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed. Symbol blocks shipped with AutoCAD Architecture are by default located in %AECCONTENT_DIR%\Styles\Imperial\AEC Annotation Symbols (Imperial).dwg or %AECCONTENT_DIR%\Styles\Metric\AEC Annotation Symbols (Metric).dwg.
Text/Attribute text style	This property specifies whether attribute text within the symbol uses the text style of the current drawing (Target drawing text style) or the style defined by the attribute tag (As defined by content).
Text/Attribute text angle	Specifies the angle for attribute text. The choices are Right reading (which keeps the text right-side up regardless of rotation angle), As inserted (which sets text rotation at the angle of the last leader segment), and Force horizontal (which keeps the text horizontal regardless of the match line rotation angle.)

Inserting a Bar Scale in the Drawing

Use this procedure to insert a bar scale into the drawing.

1. Select a bar scale tool on a tool palette.
   (A bar scale tool is located on the Annotation palette.)
2. Specify the insertion point of the bar scale.
3. Specify the rotation of the bar scale.

For information about editing the properties of bar scales in the drawing, see Editing Block-Based Annotation Symbols on page 2407.

NOTE Bar scales that have been inserted with a bar scale tool can be modified in the drawing and saved back as a tool on a tool palette. By default, a bar scale tool created that way will have the same layer key, layer overrides, symbol, attribute text style, and attribute text angle as the original tool that was used to create the annotation symbol in the drawing. The symbol location will be the current drawing.

Column Grid Bubble Tools

Column grid bubble annotations are used for annotating column grids in a drawing. These annotations are available through tools on the tool palettes and in Content Browser. The column grid bubble is a true tool with tool properties.

Column grid bubble tool

The default column grid bubble tool is set to be annotative, which means that the annotations you insert with the tool are controlled by annotative scaling. For more information, see Annotation Scaling on page 2411.

IMPORTANT If you have legacy drawings with old DesignCenter-based annotation symbols in them, then the old block definition will continue to be used for new tool-based blocks if the blocks are identically named. In such a case, either change the Annotative setting manually by using BEDIT, or rename the old block before inserting new tool-based annotation symbols into the drawing.

The column grid bubble tool is based on a multi-view block. To make changes to the annotative behavior, you must change the referenced block within the multi-view block with BEDIT.

You can find a column grid bubble tool in these locations in a default US install of AutoCAD Architecture:

- In the Annotation tool palette
- In Content Browser in these catalogs:
  - Stock Tool Catalog
  - Sample Palette Catalog (Imperial or Metric), under \Document\Annotation
  - Documentation Tool Catalog (Imperial or Metric), under \Miscellaneous

TIP You can also search for these types of tools by name in Content Browser.

These properties of Column Grid Bubble tools can be customized:

Property Category/Name	Description
General/Layer key	Specifies the layer key for the layer to which the column grid bubble is assigned. To change, click the current value to access the Select Layer Key worksheet. The default layer is GRIDBUB.
General/Layer overrides	Specifies one or more layer key overrides. Click the worksheet icon to access the Select Layer Overrides worksheet.
General/Symbol	Specifies the block-based symbol to be used for the column grid bubble.
General/Symbol location	The location of the drawing file containing the specified symbol. Click the property and use the Browse option from the drop-down list to locate and enter the path to the file. If this property is unspecified (--), then only those blocks in the current drawing file are listed. Symbol blocks shipped with AutoCAD Architecture are by default located in %AECCONTENT_DIR%\Styles\Imperial\AEC Annotation Symbols (Imperial).dwg or %AECCONTENT_DIR%\Styles\Metric\AEC Annotation Symbols (Metric).dwg.
Label prefix	Specifies the default bubble text. The last character of the prefix will be incremented if multiple column grid bubbles are inserted within one command sequence. For example, if the label prefix is A1, then subsequent bubbles will be named A2, A3, and so on. **NOTE** When the command is ended, and later the tool is started again, it will start incrementing from 1 again.

Property Category/Name	Description
Label both ends	Specifies whether a bubble is applied to only the selected node (No) or to the node on the opposite end of the grid as well (Yes).
Extension length	Specifies the length of the extension line from the column grid node to the bubble. **NOTE** These values are defined in model space units.
Text/Attribute text style	This property specifies whether attribute text within the symbol uses the text style of the current drawing (Target drawing text style) or the style defined by the attribute tag (As defined by content).
Text/Attribute text angle	Specifies the angle for attribute text. The choices are Right reading (which keeps the text right-side up regardless of rotation angle), As inserted (which sets text rotation at the angle of the last leader segment), and Force horizontal (which keeps the text horizontal regardless of the match line rotation angle.)

Inserting a Column Grid Bubble in the Drawing

Use this procedure to add a column grid bubble to a column grid in the drawing.

1. Select a column grid bubble tool on a tool palette.

   (A column grid bubble tool is located on the Annotation palette.)
2. Select the desired node on the column grid you want to label.
3. In the Create Grid Bubble dialog, you can either choose to confirm the tool settings for label prefix, extension line length, and one- or two-sided labelling, or you can overwrite them. Click OK when the settings are according to your wishes.
4. To label more nodes on the column grid, select them and repeat the previous step.
5. To end the bubble creation, press ENTER.

The column grid bubble tool shipped with AutoCAD Architecture is a multi-view block referencing a bubble definition in a block. To edit the block, you must run the BEDIT command.

NOTE Column grid bubbles that have been inserted with a column grid bubble tool can be modified in the drawing and saved back as a tool on a tool palette. By default, a column grid bubble tool created that way will have the same layer key, layer overrides, symbol, label prefix, extension line length, attribute text style, and attribute text angle as the original tool that was used to create the annotation symbol in the drawing. The symbol location will be the current drawing.

Editing Annotation Symbols in the Drawing

Depending on whether you are using a block-based or polyline-based annotation tool, different properties of the inserted annotation symbols can be edited.

Editing Block-Based Annotation Symbols

The annotation symbols for north arrows, datum points, match lines, bar scales, and revision clouds (with tag) contain block references. To edit the properties of the block, select the desired tool in the drawing, and change the following properties on the Properties palette:

TIP Match lines and revision clouds with tags are composed of a block reference and a polyline. To confirm that you have selected the block reference part of the symbol, verify that the drop-down list in the Properties palette reads "Block Reference."

Category/Property	Description
General/Color	The default color of an annotation symbol is defined by the layer the symbol is inserted on. You can manually select a different color.
General/Layer	The layer of an annotation symbol is defined by the layer key of the tool. You can manually select a different layer.
General/Linetype	The default linetype of an annotation symbol is defined by the layer the tool is inserted on. You can manually select a different linetype.
General/Linetype scale	The linetype scale of a block-based annotation symbol is set in the block referenced by the tool. To change the linetype scale of the block, you must run BEDIT. **NOTE** Changing the linetype scale of the block will affect all tools and symbols referencing that block.
General/Plot style	The plot style is controlled by the plot style table defined for the drawing. To change the plot style, you must select a different plot style table.
General/Lineweight	The default lineweight of an annotation symbol is defined by the layer the symbol is inserted on. You can manually select a different lineweight.
General/Hyperlink	You can attach a hyperlink to an annotation symbol in the drawing.
3D Visualization/Material	The default material used when displaying the drawing in a 3D visualization style is defined by the layer the symbol is on. In most cases material settings do not affect annotation symbols, as they typically do not appear in rendered views of the drawing.
Geometry/Position X/Y/Z	The position of the symbol is initially defined by the location at which it is inserted in the drawing. You can change the position either by dragging the symbol to a different location or by entering different position coordinates in the Properties palette.
Geometry/Scale X/Y/Z	The scale of the symbol when inserted is defined by the Annotation plot size defined for the drawing. You can manually change the scale. The values for X, Y, and Z are always proportional; changing the X scale changes the Y and Z scales, too. For information about annotation plot size, see Creating Annotation Scales and Assigning them to Display Configurations on page 134.
Misc/Name	The name of the block that is referenced by the symbol.

Category/Property	Description
Misc/Rotation	The rotation is specified by the user when inserting the symbol. You can change the rotation by entering a different angle on the Properties palette.
Misc/Annotative	Indicates whether the symbol is participating in annotation scaling. To change the annotative behavior, you must change the annotative behavior of the referenced block by running BEDIT.
Misc/Annotative scale	The currently active annotation scale (visible only for symbols that are controlled by annotation scaling.)
Misc/Match orientation to layout	Indicates whether the symbol is aligned to the spatial orientation of the drawing layout. The default setting is No. To change the orientation behavior, you must change the orientation of the referenced block by running BEDIT.
Misc/Block Unit	Specifies the insertion units. To change this setting, you must change the insertion units of the referenced block by running BEDIT.
Misc/Unit factor	Specifies the conversion factor between block units and drawing units. To change this value, you must change the unit factor of the referenced block by running BEDIT.
Attributes/<Attribute Name>	If the block reference of the annotation symbol contains one or more editable attributes, you can directly edit them in the Properties palette. By default, match lines and bar scales contain editable attributes.

Editing Polyline-Based Annotation Symbols

The annotation symbols for fire rating lines, match lines, and revision clouds contain polylines. To edit the properties of the polyline, select the desired tool in the drawing, and change the following properties on the Properties palette:

TIP Match lines and revision clouds with tags are composed of a block reference and a polyline. To confirm that you have selected the polyline, verify that the drop-down list in the Properties palette reads "Polyline."

Category/Property	Description
General/Color	By default, the color of a polyline in an annotation symbol is defined by the layer the symbol is inserted on. You can manually select a different color.
General/Layer	The layer of an annotation symbol is defined by the layer key of the tool. You can manually select a different layer.
General/Linetype	By default, the linetype of a polyline in an annotation symbol is defined by the linetype setting in the tool. You can manually select a different linetype.

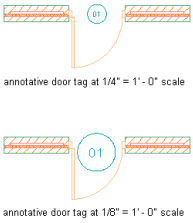
Category/Property	Description
General/Linetype scale	By default, the linetype scale of a polyline in an annotation symbol is defined by the layer the symbol is inserted on. You can manually select a different linetype scale.
General/Plot style	The plotstyle is defined by the plot style table defined for the drawing. To change the plot style, you must select a different plot style table.
General/Lineweight	By default, the lineweight of an annotation symbol is defined by the layer the symbol is inserted on. You can manually select a different lineweight.
General/Hyperlink	You can attach a hyperlink to a polyline in the drawing.
General/Thickness	The thickness setting lets you add a 3D thickness to a 2D polyline. By default this is set to 0 as annotation symbols and their linework components normally do not require a 3D extrusion.
3D Visualization/Material	By default, the material used when displaying the drawing in a 3D visualization style is defined by the layer the symbol is on. Normally this setting does not need to be changed, as annotation symbols are rarely used in rendered views of a drawing.
Geometry/Vertex	The Vertex option displays the number of the vertex that is currently editable. Use the arrows to scroll between vertices.
Geometry/Vertex X/Y	Here, you can edit the vertex coordinates of the vertex selected in the line above.
Geometry/Start segment width	This setting defines the width of the polyline segment at the start of the selected vertex.
Geometry/End segment width	This setting defines the width of the polyline segment at the end of the selected vertex.
Geometry/Global width	Here, you can enter a global width for the overall polyline. By default the line width setting defined in the tool is used.
Geometry/Elevation	This setting specifies the elevation of the polyline relative to the z-axis of the polyline's object coordinate system. Annotation symbols are by default inserted at elevation 0.
Geometry/Area	This value is set only if the polyline has been set to have a width.
Geometry/Length	This value displays the overall length of the polyline.
Misc/Closed	This setting displays whether the polyline in the annotation symbol is closed or open. Typically, fire rating lines and match lines are open polylines; a revision cloud is a closed polyline.

Category/Property	Description
Misc/Linetype generation	This setting allows you to use a smaller linetype scale than the regular selected linetype scale on very short polyline segments. This can be useful when the linetype has a pattern (for example dashed) and certain segments are too short to display the pattern. In this case, enabling linetype generation generates the pattern on those segments with a scale small enough to display.

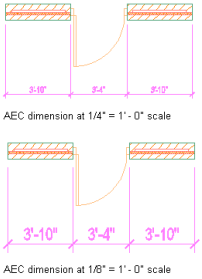
Annotation Scaling

Annotation scaling allows you to plot annotation at the same height or size regardless of the viewport zoom scale. Annotation scales can be associated with annotative objects in AutoCAD Architecture so that these objects can be sized properly for specific annotation scales in model space and displayed correctly in paper space. You can also toggle on or off the display of annotation objects that do not participate in the current annotation scale.

The following illustration shows a door tag displayed at two different annotation scales. The door tag was created in the drawing at the first annotation scale, then the annotation scale was changed.



The following illustration shows an AEC dimension displayed at two different annotation scales. The AEC dimension was created in the drawing at the first annotation scale, then the annotation scale was changed.



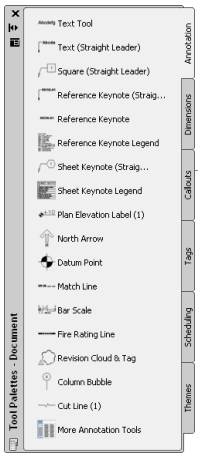
Annotation Tools with Annotative Properties

Use annotation tools to create annotation objects that respond to specific annotation scales. An annotation tool is a customizable AutoCAD Architecture tool for adding the following types of annotations to drawings:

- Multi-line text notes
- Symbol-based notes with attributes
- Reference keynotes
- Sheet notes

- Callouts

The annotation tools appear on the Annotation tab of the Document tool palette:



For more information about working with annotation tools, see The Basic Annotation Tool on page 2353.

NOTE DesignCenter tools do not generate objects that respond to annotation scaling.

An annotation object is any object that participates in annotation scaling. The following are annotation objects created by AutoCAD Architecture:

- Multi-view blocks
- AEC dimensions

Multi-view blocks derive their annotative properties from their block definition. AEC dimensions derive their annotative properties from their dimension style. For more information, refer to AutoCAD help.

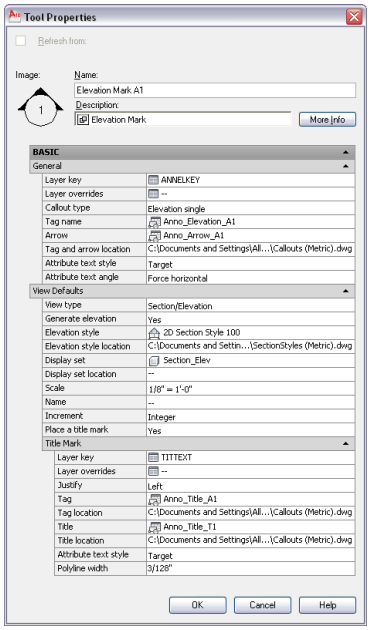
The following are annotation objects created by AutoCAD:

- Text
- MText
- Dimensions
- Leaders
- Block References
- Hatches

The following AutoCAD styles are also annotative:

- Text
- Dimensions
- Block Definitions
- MLeaders

The specific type of annotation, its appearance, and other characteristics are determined by user-editable values on the Tool Properties worksheet, which is accessed from the context menu of the particular tool.

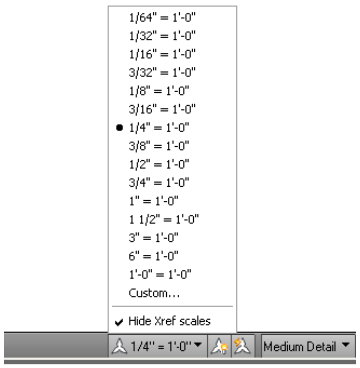


Specifying Annotation Scale

When you use AutoCAD Architecture tools to generate AutoCAD objects such as leaders and callouts, these objects become annotative objects that respond to annotation scaling. When you generate Multi-view blocks and AEC dimensions, these objects are also annotative and respond to annotation scaling with respect to scale and location based on the current annotation scale.

The annotation scale is a setting associated with the model tab and paper space viewports and is also saved with model views. It is controlled by the CANNOSCALE system variable value which sets the current annotation scale. Different annotation scales can be assigned to model views and paper space viewports.

Specify the current annotation scale by selecting one from the Annotation Scale flyout menu.



Annotation Scales and Viewports

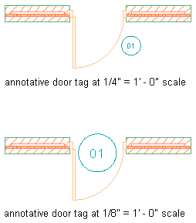
When working in a paper space viewport, the annotation scale of the viewport controls the scale of the annotative objects created in the viewport. If multiple scale representations are supported, the annotative

objects in the viewport are drawn and scaled based on the annotation scale without affecting the scale or display in the model tab or in other paper space viewports.

The viewport and annotation scales are synchronized when the annotation scaling controls are used. For example, when you change the viewport scale, the annotation scale updates to match the new viewport scale. However, as you zoom in or out of a viewport with your mouse wheel or by using the Zoom commands, the viewport scale updates while the annotation scale will remain unchanged.

Scale representations allow for the display of the same annotative object differently in different paper space viewports at the same time. Scale representations allow annotative objects to be drawn at different sizes based on the annotation scale. Each scale representation may also have different values for positional properties, such as a text string base point. The properties that can vary per scale representation depend on the object type.

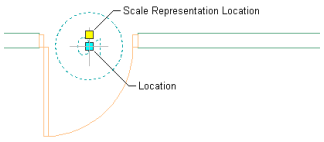
The following illustration shows a door tag shown at two different annotation scales and different locations based on the annotation scale and base point.



Whenever an annotation object is identified as annotative as you add it to a drawing, the current annotation scale is added to the object as a participatory scale. AutoCAD Architecture objects identified as annotative will scale to match the current annotation scale. The scale point is the insertion point of the block definition.

NOTE Any annotation settings within all nested text or dimension styles referred to by an AutoCAD Architecture object, such as materials or component hatching, schedule tables, or stairs, will be ignored. Display properties for these objects do not respect annotation scaling.

Annotative objects such as door tags now have a Scale Representation Location Grip. Use this grip to relocate the current scale representation instance. Use the Location grip to relocate all of the scale representations at once. If there is only one scale representation supported for a particular tag, only the Location grip is displayed.



The model space or paper space text height is the height at which text will be plotted for a given scale. The following formula determines object scaling:

Object Height x **Annotation Scale** x **Annotation Plot Size** = **Model Space or Paper Space Height**

For example, the model space text height for a text string when displayed in a viewport scaled to 1/4" = 1' - 0" is 12". Assuming an object height of 1 unit, the formula applies as follows:

1 x **48** x **1/4"** = **12"**

Blocks used by AutoCAD Architecture callouts, title marks, and other kinds of annotation must be created relative to a single AutoCAD unit (either an inch or a millimeter, depending upon whether your working in imperial or metric units). Documentation content files, regardless of whether they are based on blocks or multi-view blocks have the additional requirement that they be inserted at a scale relative to your anticipated plot scale, and taking into account the "Annotation Plot Size" setting in the drawing setup dialog box. As a baseline, you can use one AutoCAD unit, and anything in the content file that is one unit in size

will be the annotation plot size when plotted at the specified annotation scale. Everything in the block, including geometry and text, must be created relative to the single AutoCAD unit. The entire block is scaled proportionally.

Updating Legacy Annotative Objects

When you are working with previous versions of Architectural Desktop, you can update appropriate objects in AutoCAD Architecture so that they are annotative. This sections outlines the procedure for updating three types of objects: AutoCAD objects (text, dimensions, and hatching, for example), AutoCAD Architecture blocks, and AutoCAD Architecture multi-view blocks and AEC dimensions.

If you choose only one occurrence of an object to make annotative, only that instance of the object will be annotative. To apply an annotative property to all of the objects in a particular style, edit that style and assign an annotative property to all instances of that style. You can also enter ANNOUPDATE on the Command line to update the selected text objects. Leaders, MText, dimensions, and other objects are assigned an annotative property by this same procedure.

Updating Legacy AutoCAD Text to Annotative

Use this procedure to edit a legacy AutoCAD text style and add an annotative property. You can also use this procedure to update AutoCAD dimensions.

1. Open the legacy Architectural Desktop drawing in AutoCAD Architecture.
2. Specify the same annotation scale in the new AutoCAD Architecture drawing as in the legacy Architectural Desktop drawing.
3. From the Format menu, click Text Style.
4. In the Text Style dialog, from the Styles list, select the appropriate text style.
5. Under Size, select Annotative.

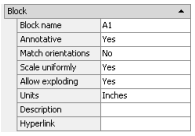
6. Click Apply.
7. On the Command Line, enter **ANNOUPDATE** to update all annotative objects.

Any text strings of the selected text style are now annotative.

Updating Legacy Architectural Desktop Blocks to Annotative

Use this procedure to edit legacy Architectural Desktop blocks, such as callouts or titlemarks, and add an annotative property.

1. Open the legacy Architectural Desktop drawing in AutoCAD Architecture.
2. Specify the same annotation scale in the new AutoCAD Architecture drawing as in the legacy Architectural Desktop drawing.
3. Click Insert tab ➤ Block panel ➤ Edit Block.
4. In the Edit Block Definition dialog, select the block to edit, and then click OK.
5. On the Properties Palette, under Block, select Yes for Annotative.



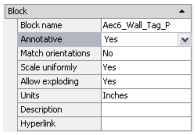
6. On the Block Editor toolbar, click Close Block Editor and then save your changes.

Any blocks of the selected block style are now annotative.

Updating Legacy Architectural Desktop Multi-view Blocks to Annotative

Use this procedure to edit a legacy Architectural Desktop multi-view block and add an annotative property to each block for each view. You can also use this procedure to update legacy AEC dimensions.

1. Open the legacy Architectural Desktop drawing in AutoCAD Architecture.
2. Specify the same annotation scale in the new AutoCAD Architecture drawing as in the legacy Architectural Desktop drawing.
3. Click Insert tab ➤ Block panel ➤ Edit Block.
4. In the Edit Block Definition dialog, select the first block to edit, and then click OK.
5. On the Properties Palette, under Block, select Yes for Annotative.



6. On the Block Editor toolbar, click Close Block Editor and then save your changes.
7. Repeat these steps for the remaining blocks of the remaining views of the multi-view block.
8. On the Command Line, enter **ANNOUPDATE** to update the selected blocks.

The selected blocks now have an annotative property.

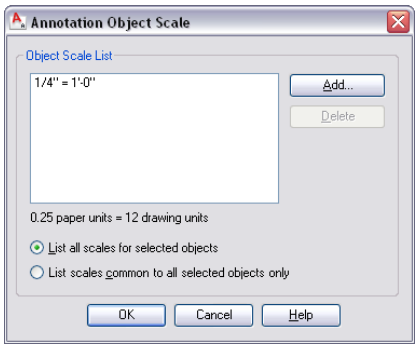
Copying Participating Annotation Scales from One AEC Object to Another

You can copy annotation scales from annotative multi-view blocks and AEC dimensions as source AEC objects to other AEC objects. A prerequisite is that your drawing must contain an annotative AEC object that participates in at least 2 annotation scales. For example, you can copy annotation scales from one door tag to another.

1. Add 2 doors to your drawing.
2. Add a door tag to the first door.

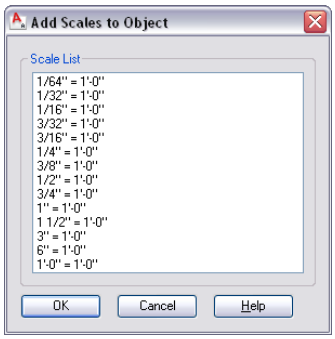
   This is the source object.

3. Select the door tag, and click Annotate tab ➤ Annotation Scaling panel ➤ Add/Delete Scales.



You can also specify a new current annotation scale by selecting one from the Annotation Scale flyout menu.

4 In the Annotation Object Scale dialog, click Add.



5 Select additional scales to add to the source object and click OK.

6 Verify the new scales added to the source object in the Annotation Object Scale dialog, and click OK.

7 Select the door tag, right-click and click Add Selected.

8 Select the second door.

9 Add the new door tag to your drawing.

10 Select the new door tag, and click Annotate tab ➤ Annotation Scaling panel ➤ Add/Delete Scales.

11 In the Annotation Object Scale dialog, verify that the new door tag has the same assigned scales as the source door tag.

Linking Display Configurations to Annotation Scales

You can specify which display configuration is associated with a particular annotation scale in your drawing. For example, you can link a Low Detail Reflected Ceiling Plan display configuration with a 1/8″ = 1′-0″ annotation scale and a Medium Detail Reflected Ceiling Plan display configuration with a 1/4″ = 1′-0″ annotation scale.

This relationship exists for the following display configuration conditions:

Model Tab: Annotation scale and display configuration changes

Current Paper Space Viewport: Annotation scale changes, zoom scale changes, and display configuration changes

Selected Paper Space Viewports: Annotation scale changes for all unlocked viewports, zoom scale changes for all unlocked viewports, and display configuration changes for all unlocked viewports

Derivation of Annotative Properties

The following table lists objects, their associated AutoCAD Architecture tool that creates them, and the source of their annotative properties, if any.

Object	AutoCAD Architecture Tool	Annotative Property Derivation
MText*	Annotation	Leader Dimension Style tool properties
Blocks*	Annotation/Callout/Detail Mark/Title Mark	Block Style definition
Leaders*	Annotation/Callout/Detail Mark/Title Mark	Leader Dimension Style tool properties

Object	AutoCAD Architecture Tool	Annotative Property Derivation
Multi-view Blocks	Multi-view Block Tool/Schedule Tag Tool	Block Style definition
Multi-view Blocks	DesignCenter Content Tool/DesignCenter Command Tool/	None; Annotative property can be assigned to view blocks
AEC Dimensions	Dimension Tool	AutoCAD Dimension Style specified in the AEC Dimension display properties

* AutoCAD object created by AutoCAD Architecture tool

Callouts

47

Details, sections, and elevations are views of the building model and part of the construction documentation. They can be created with callouts. Callout tools create a callout that is referenced to a model space view containing a user-defined part of the building model, such as a section, an elevation or a detail. They are coordinated across the complete construction document set with the help of projects and sheet sets.

Working with Callouts

Callout tools allow you to define portions of the building model as details, sections, and elevations. These portions are placed in model space views created for the callout.

A model space view is a portion of a view drawing that may be displayed in its own viewport on a layout tab of a drawing. A model space view has its own name, description, display configuration, layer snapshot, drawing scale, layer state, and view direction. Model space views are an evolution of the Named Views concept of AutoCAD, but as opposed to Named Views, model spaces views have a defined boundary.

You can place a model space view containing a detail, section, or elevation in the current view drawing, an existing project view drawing, or a new project view drawing.

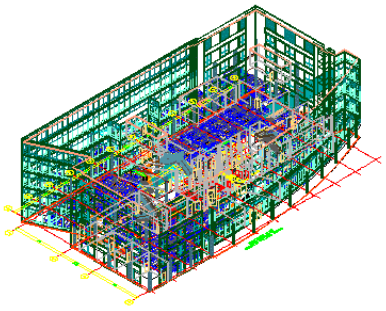
The New View Drawing Types

View drawings have been enhanced for AutoCAD Architecture. In addition to the existing general view drawings, users may now access some specialized drawing types designed for saving details, sections, and elevations in a project. All of these view types are organized in the Project Navigator.

These are the types of view drawings in the Drawing Management feature:

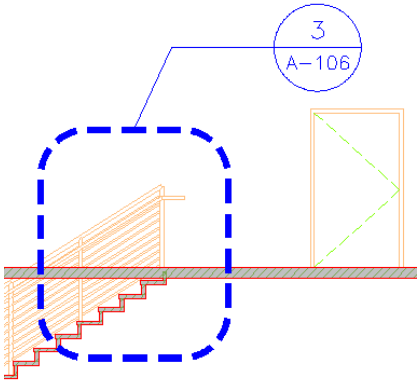
- *General view drawings:* A general view drawing contains referenced constructs from the project, representing a specific view on the building model. General view drawings are based on the general view template defined in the project settings.

3D view of entire building



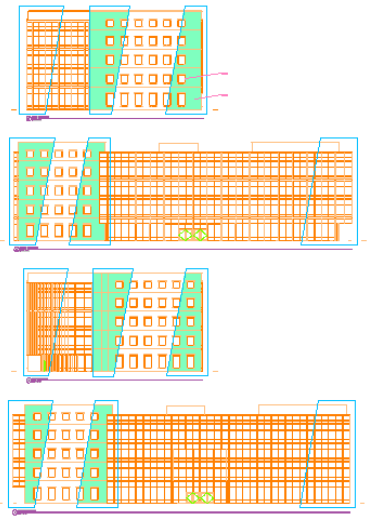
- *Detail view drawings:* A detail view drawing can contain one or more model space views that show a defined portion of the building model. This could be a detail or an enlarged part of a plan. You can specify the level of detail with the help of the display configuration and the 2D Section/elevation style. A model space view containing a detail can be created with a callout. Detail view drawings are based on the detail view template defined in the project settings.

Detail view in callout



- *Section/Elevation view drawings:* A section/elevation view drawing can contain one or more model space views that show a section/elevation of the building model. A model space view containing a section or elevation can be created with a callout. Specific callout tools have been added to make the creation of four-way exterior and interior elevations easier and better. Section/elevation view drawings are based on the section/elevation view template defined in the project settings.

4 model space exterior elevations



For more information on the view system in AutoCAD Architecture, see Views on page 297.

Using Fields in Callout Tools

Fields enhance the documentation capabilities within a drawing file. A field is updatable text that is set up to display data that may change during the life cycle of the drawing. When the field is updated, the latest value of the field is displayed. Fields can be inserted into attribute definitions and can be used to create callout tools.

For more information, see Fields on page 2285 and Creating New Callout Tools on page 2450.

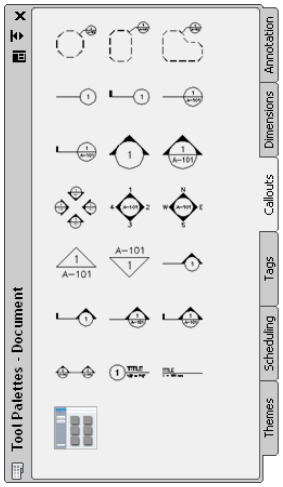
Callouts and Projects

Callouts and their referenced model space views are closely linked to projects in the Drawing Management feature. Although you can use callouts to some degree outside a project, to use them optimally, you need to be working within a project. For information on working outside a project, see Working with Callouts Outside a Project on page 2448.

Callout Tools

Plans, sections, elevations, and details are typically referenced to a callout. AutoCAD Architecture provides a number of predefined callout tools for the various view types. You can also place a callout that is not referenced to a view, and reference it later.

Callout tools in AutoCAD Architecture



The default tool palettes in the workspace contain sample callout tools that you can use and customize as needed. In addition, the following catalogs provided with the software contain callout tools that you can add to your tool palettes:

- Stock Tool catalog
- AutoCAD Architecture Sample Palette catalog
- Documentation Tool Catalog

Custom palettes created by your CAD manager or other users may also contain callout tools with properties that are customized for your projects or office standards.

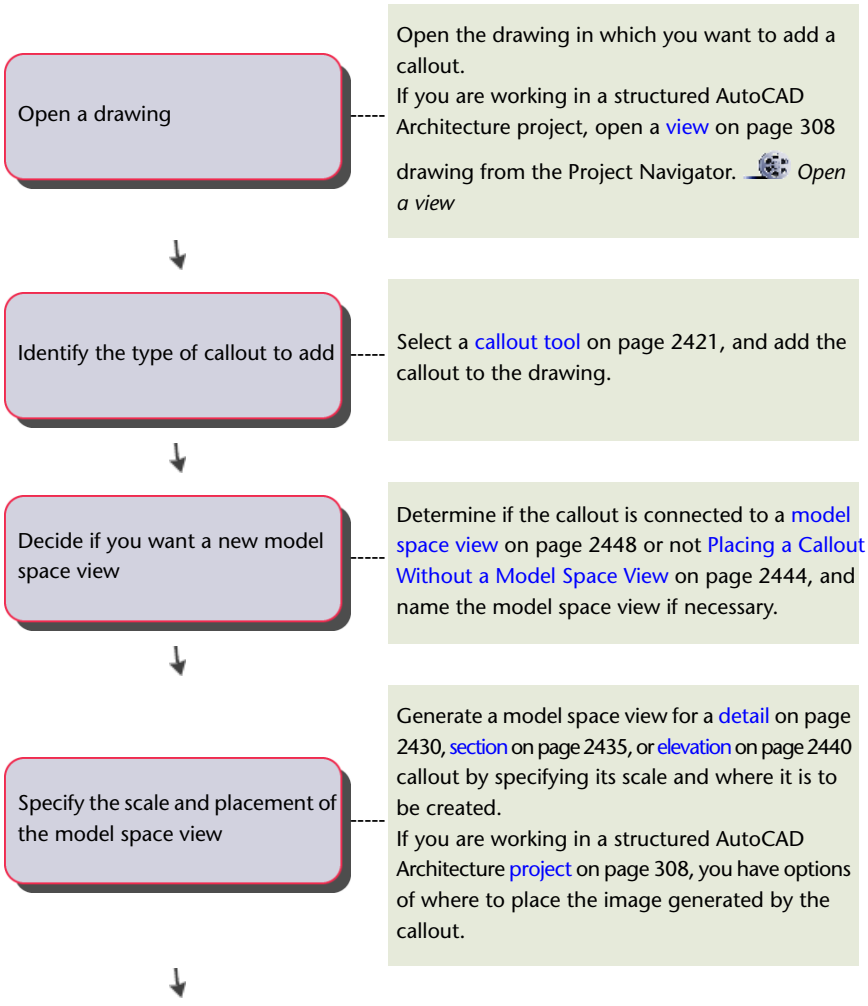
The following callout tools are provided with the software:

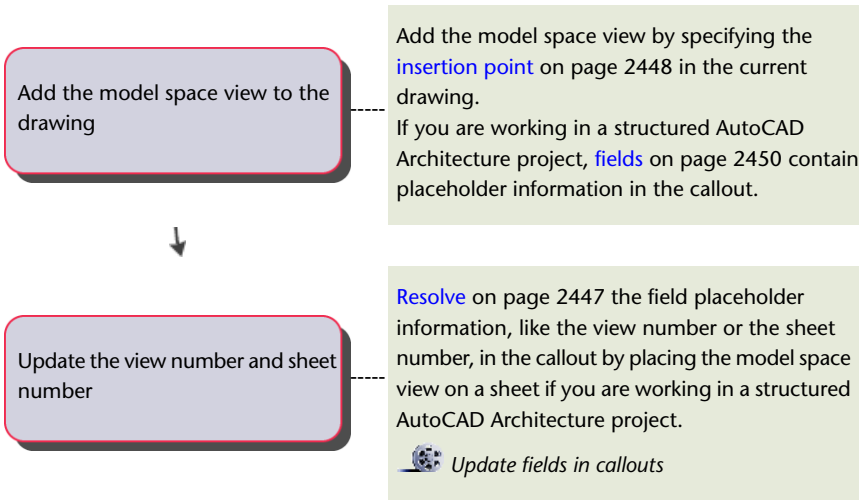
Tool	Description
	A detail callout tool with a circular boundary that can optionally insert a title mark. The callout symbol has field placeholders for the sheet number and the detail number, which are resolved when the detail is placed on a sheet.
	A detail callout tool with a rectangular boundary that can optionally insert a title mark. The callout symbol has field placeholders for the sheet number and the detail number, which are resolved when the detail is placed on a sheet.
	A detail callout tool with a freeform boundary that can optionally insert a title mark. The callout symbol has field placeholders for the sheet number and the detail number, which are resolved when the detail is placed on a sheet.
	A detail tool with a leader line. The callout symbol has a field placeholder for the detail number that gets resolved when the detail is placed on a sheet.
	A detail tool with a leader line and a tail. The callout symbol has a field placeholder for the detail number that gets resolved when the detail is placed on a sheet.
	A detail tool with a leader line. The callout symbol has field placeholders for the detail number and the sheet number that get resolved when the detail is placed on a sheet.

Tool	Description
	A detail tool with a leader line and a tail. The callout symbol has field placeholders for the detail number and the sheet number that get resolved when the detail is placed on a sheet.
	A single elevation mark tool. The elevation mark has a field placeholder for the elevation number that gets resolved when the elevation is placed on a sheet. **NOTE** This tool is just a variation of the other single elevation mark tools, using a different symbol style.
	A single elevation mark tool. The elevation mark has field placeholders for the elevation number and the sheet number that get resolved when the elevation is placed on a sheet. **NOTE** This tool is just a variation of the other single elevation mark tools, using a different symbol style.
	A four-way interior elevation mark tool in the format 1/2/3/4. The elevation marks contain a field placeholder for the sheet number that gets resolved when the elevation are placed on a sheet.
	A four-way interior elevation mark tool in the format N/S/E/W. The elevation marks contain a field placeholder for the sheet number that gets resolved when the elevation are placed on a sheet.
	A four-way exterior elevation mark tool. The elevation marks contain a field placeholder for the sheet number that get resolved when the elevation are placed on a sheet.
	A single interior elevation mark tool. The elevation mark contains field placeholders for the sheet number and the elevation number that get resolved when the elevation is placed on a sheet.
	A single interior elevation mark tool with inverted text. The elevation mark contains field placeholders for the sheet number and the elevation number that get resolved when the elevation is placed on a sheet.
	A single section mark tool with a leader line. The section mark contains a field placeholder for the section number that gets resolved when the section is placed on a sheet.
	A single section mark tool with a leader line and a tail. The section mark contains a field placeholder for the section number that gets resolved when the section is placed on a sheet.
	A single section mark tool with a leader line. The section mark contains field placeholders for the section number and the sheet number that get resolved when the section is placed on a sheet.
	A single section mark tool with a leader line and a tail. The section mark contains field placeholders for the section number and the sheet number that get resolved when the section is placed on a sheet.

Tool	Description
	A double section mark tool with a section line. The section marks contain field placeholders for the section number and the sheet number that get resolved when the section is placed on a sheet.
	A title mark with fields for view title, viewport scale and view number.
	A title mark with fields for view title and viewport scale.

Workflow for Annotating Drawings with Callouts

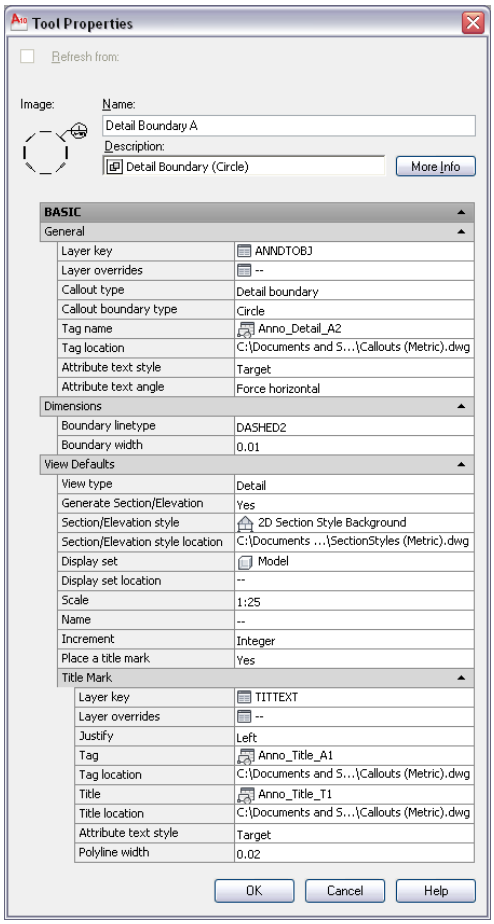




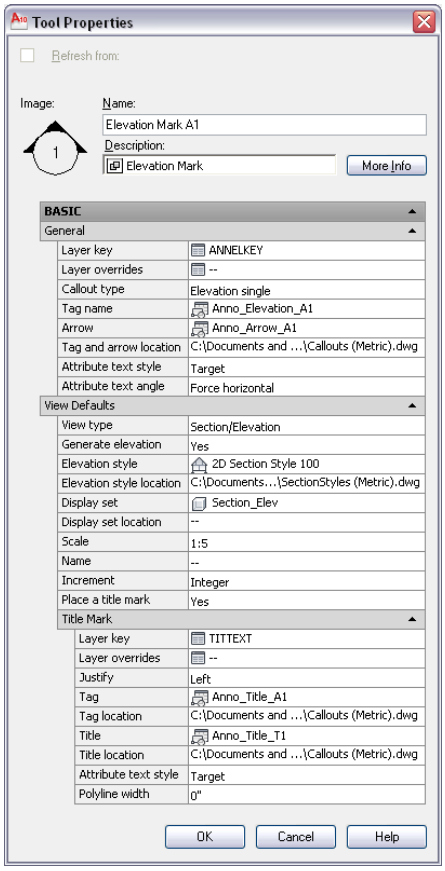
The Properties of a Callout Tool

You can use callout tools to create section views, elevation views, and detail views that are referenced to a callout. Depending on the view type you want to create, you need to set different options in the callout tool.

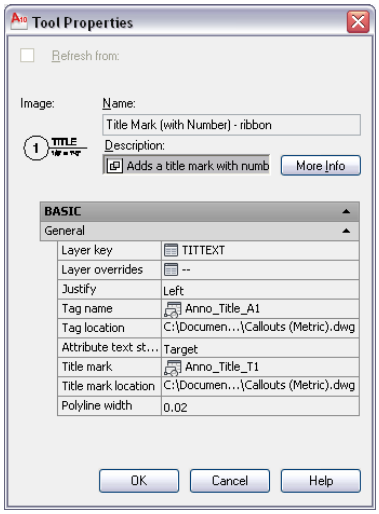
Properties of a detail callout



Properties of an elevation callout



Properties of a title mark tool



The following table lists the properties you can set for the individual tool types.

Property	Tool Type	Description
General Category		
Layer Key	General (all callout types)	Here, you specify the layer key in which the callout symbol should be inserted.

Property	Tool Type	Description
Layer Overrides	General	If necessary, you can specify a layer key override for the callout symbol here.
Callout type	General	Here, you define the type of callout tool you want to insert. You can choose between these types: ■ Detail Boundary: a tool consisting of a detail boundary and a detail mark ■ Detail Mark: a tool consisting of only a detail mark ■ Elevation Single: a tool consisting of a single elevation mark ■ Elevation Four-Way: a tool consisting of four elevation marks and lines ■ Section Tag and Tail: a tool consisting of a section line with a tag and a tail ■ Section Tag and Tag: a tool consisting of a section line with two tags on start and end
Callout boundary type	Detail Boundary	You can choose the shape of the detail boundary. Available options are circular, rectangular, and freeform.
Four way elevation type	Elevation Four Way	You can select the type of four-way elevation the tool should create. Available options are interior and exterior elevations. **NOTE** For an interior elevation, you can select spaces as the elevation region.
Tag name	General	Here, you define the block that is used as the callout tag.
Tag and arrow location	General	Defines the location of the available callout symbol tags, and, if applicable, the location of the available tag arrows.
Arrow	Section/ Elevation	Define the block for the section/elevation mark arrow.
Attribute text style	General	Here you select if the text style for attributes in the callout should be the text style of the callout tag (Content) or the current text style of the drawing (Target).
Attribute text angle	General	Here, you select the text angle of the attribute text. You can choose to insert the attribute text at the same angle as the callout symbol (As Inserted), horizontal in the drawing (Horizontal), or to be read from the right side (Right Reading).
Dimensions Category		
Corner Radius	Detail Boundary	Defines the corner radius of rectangular and freeform detail boundaries.
Boundary linetype	Detail Boundary	Defines the linetype of the detail boundary.
Boundary width	Detail Boundary	Defines the line width of the boundary lines.
View Defaults Category		

Property	Tool Type	Description
View Type	General	This setting determines the type of view generated by the callout tool. You can choose between the following: ■ Detail View: If you have selected Detail View for type, and create a model space view in a new drawing, the Detail View template set in the project will be used for the new drawing. ■ Section/Elevation View: If you have selected Section/Elevation View for type, and create a model space view in a new drawing, the Section/Elevation View template set in the project will be used for the new drawing. ■ General View: If you have selected General View for type, and create a model space view in a new drawing, the General View template set in the project will be used for the new drawing.
Generate Section/Elevation	General	Here, you can choose if the tool should create a 2D section elevation.
Section/Elevation style	General	If you have selected to generate a 2D section/elevation from the tool, you need to set a 2D section/elevation style.
Section/Elevation style location	General	Sets the drawing or template file from in which the available 2D section/elevation styles reside.
Display set	General	If you have selected to generate a 2D section/elevation from the tool, you need to set a display set for the 2D section/elevation here.
Display set location	General	Sets the drawing or template file from in which the available display sets reside.
Scale	General	In this setting, you define the scale of the model space view generated from the tool, as well as the scale of sheet views generated from the model space view. **NOTE** You can override the scale set in the tool during insertion of the callout in the drawing.
Name	General	Sets a default name for model space views that are created by this tool. You can override the name set in the tool when inserting a callout in the drawing.
Increment	General	Sets a default incrementing method for naming multiple model space views created with this callout tool. Available options are Integer and Character.
Place a title mark	General	Here, you can select if a title mark should be attached to model space views created with this tool.
Title mark Category		
Layer Key	General	By default, a title mark that is associated to a callout tool is inserted on the same layer as the model space view generated. You

Property	Tool Type	Description
		can however define a different layer for the title mark by selecting a different layer key here.
Layer Overrides	General	If necessary, you can specify a layer key override for the title mark here.
Justify	General	This setting specifies the justification of the title mark in relation to the title mark line. Available options are Left and Right.
Tag	General	In this list, you select the block used for the title mark symbol.
Tag location	General	Sets the drawing or template file from in which the available blocks reside.
Title	General	Here, you define the title symbol.
Title location	General	Sets the drawing or template file from in which the available title symbols reside.
Attribute Text Style	General	Here you select if the text style for attributes in the title should be the text style of the title tag (Content) or the current text style of the drawing (Target).
Polyline width	General	This setting specifies the width of the polyline separator. The value is measured in plotting units and scaled appropriately based on the current annotation scale.

Setting the Properties of a Callout Tool

Use this procedure to set the properties of a callout tool.

1 On the Tool Palettes, click (Properties), and click Document.

2 Click the Callouts palette.

3 Select the callout tool for which you want to change properties, right-click, and click Properties.

4 Change the properties as necessary. For a description of the available properties, see The Properties of a Callout Tool on page 2425.

5 Click OK.

Placing Title Marks

You can place title marks in a drawing. A title mark can contain fields for information about model space views and sheet views. A title mark cannot be used to create a model space view, but it can be connected to an existing one. This is useful when working with legacy drawings or when annotating drawings at a later stage. You can connect title marks to any type of model space view, like details, sections, and elevations.

Placing a Title Mark

Use this procedure to place a title mark in a drawing.

NOTE The title marks shipped with AutoCAD Architecture contain fields for (model) view number, (model) view title, and (model) viewport scale. To display that information, they need to be associated with a model space view.

1 Open the view drawing containing the model space view to which you want to add the title mark.

2 On the Tool Palettes, click (Properties), and click Document.

3 Click the Callouts palette.

4 Select a title mark tool.

Alternatively you can click Annotate tab ➤ Callouts panel ➤ Title drop-down ➤ Title .

5 Select the model space view you want to associate the title mark to.

NOTE When you hover over the a model space view, its boundaries are highlighted.

6 Click to place the start point of the title mark.

7 Click to specify the end point of the title mark.

The title mark is inserted with the view fields filled in. If your title mark contains fields for sheet information, the model space view might need to be associated with a sheet before resolving these fields.

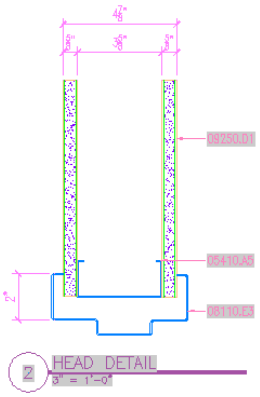
Title mark

Placing Detail Callouts

You can use callouts to create specific, enlarged views of the building model. Typically, you detail components to a detail to call out items that are not included as part of the building model, like bolts and connectors, or detailed brick hatches. You can also use callouts to generate sections or elevations of an existing section or elevation. For example, you could create a section of the building model, and then create an enlarged detail from part of the section. To that detail, you could then add detail components for the construction document.

For more information about detail components, see Detail Components on page 2313.

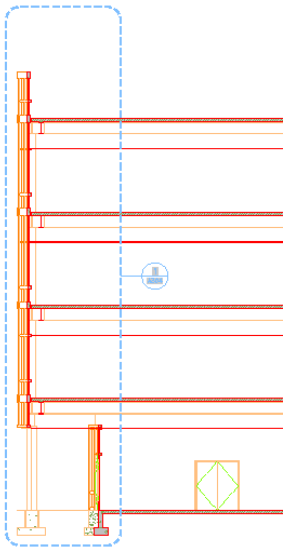
Door head detail example



Creating a Detail in the Current View Drawing

Use this procedure to place a callout that creates a detail in the current view drawing.

Viewing building section detail boundary



1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place the detail callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

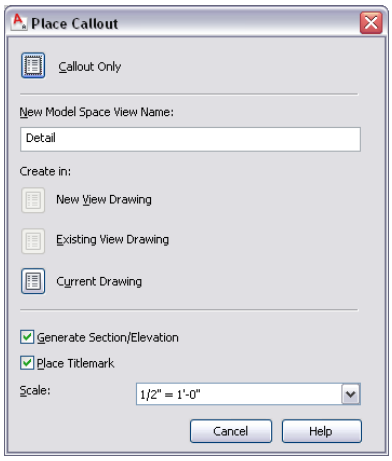
6 Select a detail callout tool.

If you want to …	Then …
create a callout with a detail boundary and a detail mark	select one of the detail boundary tools. AutoCAD Architecture provides tools for circular, rectangular, and freeform detail boundaries.
create a callout without a detail boundary	select one of the detail mark tools. AutoCAD Architecture provides tools for regular detail marks, detail marks with a tail, and detail marks with a sheet number attribute.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ ➤ Detail Boundary drop-down for callouts with a detail boundary, or Annotate tab ➤ Callouts panel ➤ ➤ Detail drop-down for callouts without a detail boundary.

7 If you selected a detail boundary tool, specify the extents of the detail boundary.

8 Specify the detail leader line, and press ENTER.



9 Under New Model Space View Name, enter a name for the new model space view containing the detail.

10 If necessary, select Generate Section/Elevation.

11 If you want to add a title mark to the model space view, select Place Titlemark.

12 Select the scale for the model space view.

13 Click Current Drawing.

14 If you selected to create a detail with a section/elevation, specify the insertion point of the 2D section/elevation result.

15 If you selected to create a detail without a section/elevation, specify the extents of the model space view containing the area being detailed.

The extents of the model space view will dictate the default sheet view size, so if the model space boundary is too small, you may have problems placing annotations in it.

Once the model space view has been placed in the drawing, the field placeholders in the callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

The model space view is displayed in the Project Navigator under the view drawing in which you have created it.

Creating a Detail in an Existing Drawing

Use this procedure to place a callout that creates a detail in an existing project view drawing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place the detail callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

6 Select a detail callout tool:

If you want to…	Then…
create a callout with a detail boundary and a detail mark	select one of the detail boundary tools. AutoCAD Architecture provides tools for circular, rectangular, and freeform detail boundaries.
create a callout without a detail boundary	select one of the detail mark tools. AutoCAD Architecture provides tools for regular detail marks, detail marks with a tail, and detail marks with a sheet number attribute.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ ➤ Detail Boundary drop-down for callouts with a detail boundary, or Annotate tab ➤ Callouts panel ➤ ➤ Detail drop-down for callouts without a detail boundary.

7 If you selected a detail boundary tool, specify the extents of the detail boundary.

8 Specify the detail leader line, and press ENTER.

9 Under New Model Space View Name, enter a name for the new model space view containing the detail.

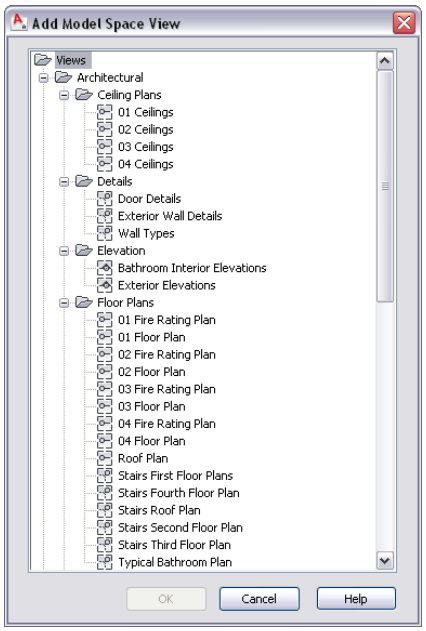
10 If necessary, select Generate Section/Elevation.

11 If you want to add a title mark to the new model space view, select Place Titlemark.

12 Select the scale for the model space view.

13 Click Existing View Drawing.

Select a drawing to place the detail



14 Select the project view drawing in which to place the model space view, and click OK.

15 If you selected to create a detail with a section/elevation, specify the insertion point of the 2D section/elevation result.

16 If you selected to create a detail without a section/elevation, specify the extents of the model space view containing the area being detailed.

The extents of the model space view will dictate the default sheet view size, so if the model space boundary is too small, you may have problems placing annotations in it.

Once the model space view has been placed in the drawing, the field placeholders in the callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

17 To display the model space view in the Project Navigator, navigate to the target drawing, and expand it.

The model space view is listed under the drawing.

For information on opening the model space view, see Opening a Model Space View on page 2446.

Creating a Detail in a New Drawing

Use this procedure to place a callout that creates a detail in a new project view drawing.

You can place each detail in its own detail drawing. The Detail View template set in the project is used to create the new drawing. For more information, see Creating a New Project on page 216.

When you create a new drawing for a detail, it contains by default the same constructs, levels, and divisions as the drawing from which the detail is taken. You can change that assignment, if necessary.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place a detail callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

6 Select a detail callout tool:

If you want to…	Then…
create a callout with a detail boundary and a detail mark	select one of the detail boundary tools. AutoCAD Architecture provides tools for circular, rectangular, and freeform detail boundaries.
create a callout without a detail boundary	select one of the detail mark tools. AutoCAD Architecture provides tools for regular detail marks, detail marks with a tail, and detail marks with a sheet number attribute.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ ➤ Detail Boundary drop-down for callouts with a detail boundary, or Annotate tab ➤ Callouts panel ➤ ➤ Detail drop-down for callouts without a detail boundary.

7 If you selected a detail boundary tool, specify the extents of the detail boundary.

8 Specify the detail leader line, and press ENTER.

9 Under New Model Space View Name, enter a name for the new model space view containing the detail.

10 If necessary, select Generate Section/Elevation.

11 If you want to add a title mark to the new model space view, select Place Titlemark.

12 Select the scale for the model space view.

13 Click New View Drawing.

14 Define the properties of the new view drawing, as described in Creating a New View Drawing on page 302.

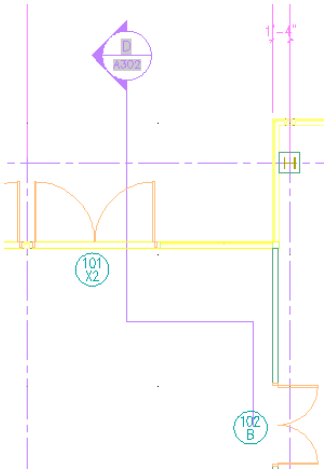
15 Click Finish.

Once the model space view has been placed in the new view drawing, the field placeholders in the callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

Placing Section Callouts

You can use callouts to create sections of the building model. A section can be used as the basis for a detail, containing information about components such as insulation, materials, and finishes.

Viewing a wall section mark



Creating a Section in the Current Drawing

Use this procedure to place a callout that creates a 2D section in the current project view drawing.

NOTE The 2D section style and the display set for the model space view containing the section are set in the callout tool. For more information, see Setting the Properties of a Callout Tool on page 2429.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place the section callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

6 Select a section callout tool.

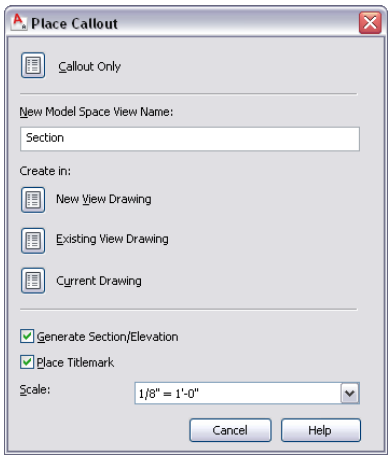
For a description of the section callout tools included with the software, see Callout Tools in AutoCAD Architecture on page 2421.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Sections drop-down, and select one of the section tools.

7 In the drawing area, specify the first point of the section line.

8 Continue to add points to the section line. When you have finished the shape of the section line, press ENTER.

9 Specify the direction of the section mark arrow.



10 Under New Model Space View Name, enter a name for the new model space view containing the section.

11 Verify that Generate Section/Elevation is selected.

12 If you want to add a title mark to the new model space view, select Place Titlemark.

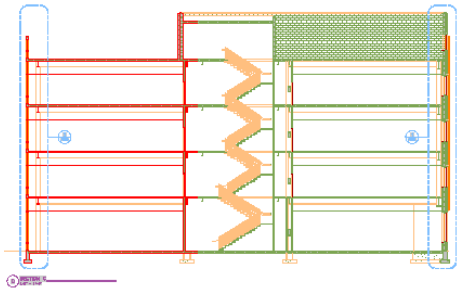
13 Select the scale for the model space view.

14 Click Current Drawing.

15 In the drawing area, select the insertion point for the model space view.

Once the model space view has been placed, the field placeholders in the section callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

Building section view



Creating a Section in an Existing Drawing

Use this procedure to place a callout that creates a 2D section in an existing project view drawing.

Sections are often placed into a designated section drawing. Whenever a new section is created, it is added to that drawing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place a section callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

6 Select a section callout tool.

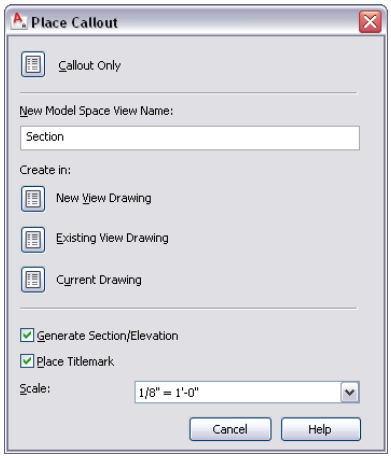
For a description of the section mark tools included with the software, see Callout Tools in AutoCAD Architecture on page 2421.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Sections drop-down, and select one of the section tools.

7 In the drawing area, specify the first point of the section line.

8 Continue to add points to the section line. When you have finished the shape of the section line, press ENTER.

9 Specify the direction of the section mark arrow.



10 Under New Model Space View Name, enter a name for the new model space view containing the section.

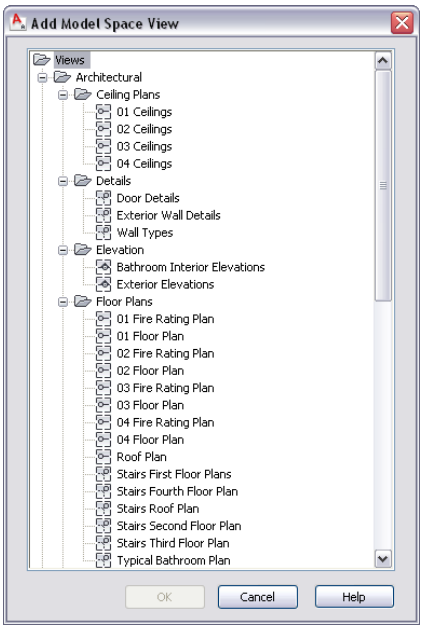
11 Verify that Generate Section/Elevation is selected.

12 If you want to add a title mark to new model space view, select Place Titlemark.

13 Select the scale for the model space view.

14 Click Existing View Drawing.

Select a drawing to place the section



15 In the Add Model Space View dialog, select the project view drawing in which the model space view should be placed, and click OK.

16 In the drawing area, select the insertion point of the generated section.

NOTE Although you select the insertion point in the current drawing, it will be used in the target drawing where the section result is placed. That way, you have control over the insertion point of the 2D section without opening the target drawing. You can change the location of the 2D section later, when you open the drawing in which the 2D section was placed, and change it there.

Once the model space view has been placed, the field placeholders in the section callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

17 To display the section view in the Project Navigator, navigate to the target drawing, and expand it.

The model space view is listed under the drawing.

For information on opening the model space view, see Opening a Model Space View on page 2446.

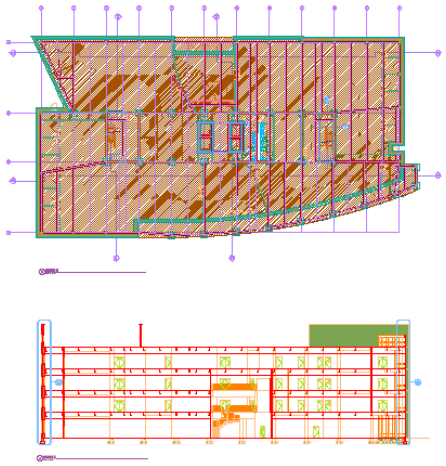
Creating a Section in a New Drawing

Use this procedure to place a callout that creates a 2D section in a new project view drawing.

When you create a section view in a new drawing, the building model is referenced into the new drawing. A 2D section is based on the geometry of the objects cut by the section line. If you place a callout in your *First Floor Plan* view drawing, and create a 2D section in that drawing, then the section will only contain the first floor geometry - only those building model objects that are present either as drawing objects or external references it the current drawing. When you create a new section view drawing for the 2D section, you can control which levels, divisions, and constructs are included in the section. This affords you enhanced control over what objects will be included in the section. You could, for example, deselect the Furniture construct from the *First Floor Plan* view drawing, to avoid cluttering up the section with unnecessary building

components. In the same way, you can add constructs, levels or divisions not present in the current view drawing, for example, to create background graphics.

Floor plan (top) and building section (bottom)



1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place a section callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

5 Click the Callouts palette.

6 Select a section mark tool.

For a description of the section mark tools provided with the software, see Callout Tools in AutoCAD Architecture on page 2421.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Sections drop-down, and select one of the section tools.

7 In the drawing area, specify the first point of the section line.

8 Continue to add points to the section line. When you have finished the shape of the section line, press ENTER.

9 Specify the direction of the section mark arrow.

10 Under New Model Space View Name, enter a name for the new model space view containing the section.

11 Verify that Generate Section/Elevation is selected.

12 If you want to add a title mark to the new model space view, select Place Titlemark.

13 Select the scale for the model space view.

14 Define the properties of the new view drawing, as described in Creating a New View Drawing on page 302.

NOTE By default, all constructs, levels, and divisions are preselected here.

15 Click Finish.

16 In the drawing area, select the insertion point of the generated section.

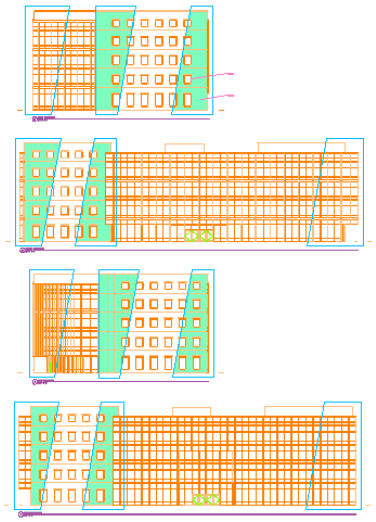
NOTE Although you select the insertion point in the current drawing, it will be used in the target drawing where the section result is placed. That way, you have control over the insertion point of the 2D section without opening the target drawing. You can change the location of the 2D section later, when you open the drawing in which the 2D section was placed, and change it there.

Once the model space view has been placed in the new view drawing, the field placeholders in the section callout change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

Placing Elevation Callouts

You can use callouts to create elevations of the building model. With the callout tools of AutoCAD Architecture, you can create interior and exterior elevations. When you create an interior elevation, you can select spaces as the elevation boundary.

4 model space exterior elevations



AutoCAD Architecture comes with a number of predefined elevation callout symbols. For a list, see Callout Tools in AutoCAD Architecture on page 2421.

Placing a Single Elevation Callout

Use this procedure to place a callout that creates a single elevation.

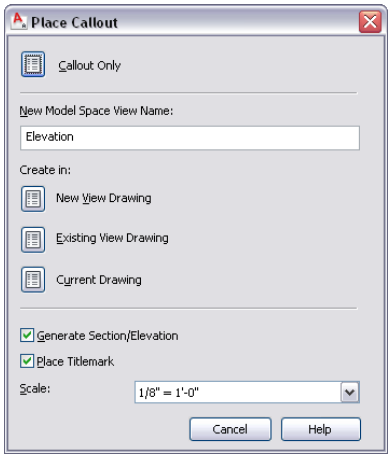
NOTE The 2D section/elevation style and the display set for the model space view containing the elevation are set in the elevation callout tool. For more information, see Setting the Properties of a Callout Tool on page 2429.

1. On the Quick Access toolbar, click Project Navigator .
2. Click the Views tab.
3. Select the view drawing in which you want to place an elevation callout, right-click, and click Open.
4. On the Tool Palettes, click (Properties), and click Document.
5. Click the Callouts palette.
6. Select a single elevation callout tool.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Elevations drop-down ➤ Elevation (Single) , or Annotate tab ➤ Callouts panel ➤ Elevations drop-down ➤ Elevation (Single, Inverted Text) .

7 Select the location for the elevation mark in the drawing.

8 Specify the direction of the elevation.



9 Under New Model Space View Name, enter a name for the new model space view containing the elevation.

10 Verify that Generate Section/Elevation is selected.

11 If you want to add a title mark to the new model space view, select Place Titlemark.

12 Select the scale for the model space view.

13 Select where to place the elevation:

If you want to…	Then…
place the elevation in the view drawing in which you placed the callout	click Current Drawing.
place the elevation in an existing elevation view drawing	click Existing View Drawing and follow the instructions in Creating a Section in an Existing Drawing on page 2436.
place the elevation in a new elevation drawing	click New View Drawing and follow the instructions in Creating a Section in a New Drawing on page 2438.

14 In the drawing, select the first corner of the elevation region.

15 Select the opposite corner of the elevation region.

16 Define the insertion point of the elevation result.

NOTE If you chose to place the elevation in a different drawing, you still select the insertion point in the current drawing. The elevation view however, will be inserted in the drawing you have specified.

Once the model space view has been placed, the field placeholders in the elevation tool change to a question mark. To resolve them, the model space view needs to be placed onto a sheet, as described in Resolving Fields in Callout Symbols on page 2447.

Placing a Four-Way Interior Elevation Callout

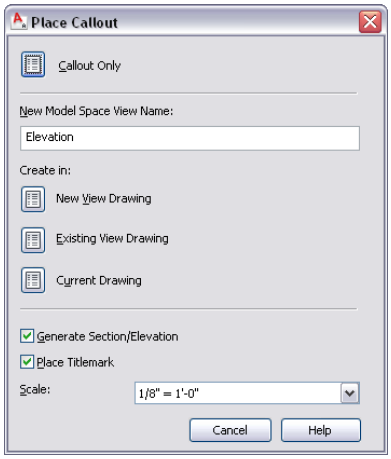
Use this procedure to place a callout that creates a four-way interior elevation.

When you create a four-way interior elevation, you can define the elevation region either by specifying its corner points in the drawing, or by selecting spaces as the elevation boundary.

NOTE The 2D section/elevation style and the display set for the model space views containing the elevations are set in the elevation callout tool. For more information, see Setting the Properties of a Callout Tool on page 2429.

1. On the Quick Access toolbar, click Project Navigator .
2. Click the Views tab.
3. Select the view drawing in which you want to place an elevation callout, right-click, and click Open.
4. On the Tool Palettes, click (Properties), and click Document.
5. Click the Callouts palette.
6. Select a four-way interior elevation callout tool.

   Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Elevations drop-down ➤ Elevation (Interior. 1, 2, 3, 4) or Annotate tab ➤ Callouts panel ➤ Elevations drop-down ➤ Elevation (Interior. N, S, E, W) .
7. Select the location for the elevation mark in the drawing.
8. Specify the direction of the first elevation number.



9. Under New Model Space View Name, enter a name for the model space view containing the first of the four elevations.
10. Verify that Generate Section/Elevation is selected.
11. If you want to add a title mark to the new model space view, select Place Titlemark.
12. Select the scale for the model space view.
13. Select where to place the elevation:

If you want to…	Then…
place the elevation in the view drawing in which you placed the callout	click Current Drawing.

If you want to…	Then…
place the elevation in an existing elevation view drawing	click Existing View Drawing and follow the instructions in Creating a Section in an Existing Drawing on page 2436.
place the elevation in a new elevation drawing	click New View Drawing and follow the instructions in Creating a Section in a New Drawing on page 2438.

14 In the drawing, select the elevation region:

If you want to…	Then…
define the elevation region with a space	select the space, and press ENTER.
define the elevation region by picking two boundary points	press ENTER. Then, select the two boundary points of the elevation region.

15 Specify the depth of the elevations.

16 Specify the height of the elevations.

17 Specify the insertion point of the elevations.

NOTE If you chose to place the elevations in a different drawing, you still select the insertion point in the current drawing. The elevations, however, will be inserted in the drawing you specified.

18 Specify the distance between the elevations and their orientation.

Once the model space views have been placed, the field placeholders in the elevation callouts change to a question mark. To resolve them, the model space views need to be placed onto sheets, as described in Resolving Fields in Callout Symbols on page 2447.

Placing a Four-Way Exterior Elevation Callout

Use this procedure to place a callout that creates a four-way exterior elevation.

NOTE The 2D section/elevation style and the display set for the model space views containing the elevations are set in the elevation mark tool. For more information, see Setting the Properties of a Callout Tool on page 2429.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place an elevation callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

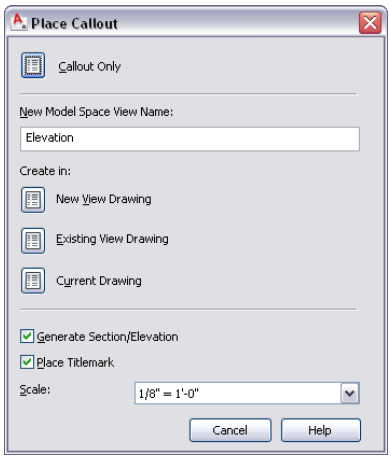
5 Click the Callouts palette.

6 Select a four-way exterior elevation callout tool.

Alternatively, you can click Annotate tab ➤ Callouts panel ➤ Elevations drop-down ➤ Elevation (Exterior) .

7 Specify the first corner of the elevation region.

8 Specify the opposite corner of the elevation region.



9 Under New Model Space View Name, enter a name for the model space view containing the first elevation.

10 Verify that Generate Section/Elevation is selected.

11 If you want to add a title mark to the new model space views, select Place Titlemark.

12 Select the scale for the model space view.

13 Select where to place the elevation:

If you want to…	Then…
place the elevation in the view drawing in which you placed the callout in	click Current Drawing.
place the elevation in an existing elevation view drawing	click Existing View Drawing and follow the instructions in Creating a Section in an Existing Drawing on page 2436.
place the elevation in a new elevation drawing	click New View Drawing and follow the instructions in Creating a Section in a New Drawing on page 2438.

14 Specify the height of the elevations.

15 Specify the insertion point of the elevations.

NOTE If you chose to place the elevations in a different drawing, you still select the insertion point in the current drawing. The elevations however, will be inserted in the drawing you specified.

16 Specify the distance between the elevations and their orientation.

Once the model space views have been placed, the field placeholders in the callout change to a question mark. To resolve them, the model space views need to be placed onto sheets, as described in Resolving Fields in Callout Symbols on page 2447.

Placing a Callout Without a Model Space View

Use this procedure to place a callout that is not connected to a model space view.

Placing a callout that is not referenced to a model space view might be useful if you have legacy view drawings that are not yet referenced to a callout. You can create a standalone callout in a building model, and then reference it to an existing model space view or sheet view in the project.

When you insert a callout without a referenced model space view in a drawing, the field placeholders in the callout are not connected to a view. Therefore, the field placeholders are displayed in the callout by their names; for example “Viewnumber,” or “Sheetnumber.”

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing in which you want to place a callout, right-click, and click Open.

4 On the Tool Palettes, click (Properties), and click Document.

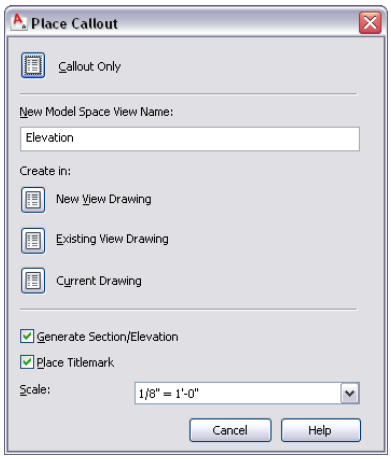
5 Click the Callouts palette.

6 Select a callout tool.

For a description of the callout tools shipped with AutoCAD Architecture, see Callout Tools in AutoCAD Architecture on page 2421.

Alternatively, you can click Annotate tab ➤ Callouts panel, and select a callout tool.

7 Add the callout tool to the drawing, following the instructions for the type of tool you selected.



8 Click Callout Only.

An unconnected callout symbol is inserted in the drawing.

Referencing a Callout to an Existing View

Use this procedure to reference a callout to an existing model space view or to an existing sheet view in the project. For information on creating model space views, see Creating a Model Space View on page 313. For information on creating sheet views, see Creating a Sheet View on page 332.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing that contains the callout, right-click, and click Open.

4 Select the callout.

5 In the Project Navigator, navigate to the model space view or sheet view you want to reference to the callout:

If you want to…	Then…
reference the callout to an existing model space view	click the Views tab, and navigate to the view drawing containing the model space view. Then, expand the view drawing.

If you want to…	Then…
reference the callout to an existing sheet view	click the Sheets tab, and click . Navigate to the sheet containing the sheet view, and expand the sheet. **NOTE** If a sheet view already exists, you can reference the callout to either the sheet view or the model space view.

6 Drag the callout from the drawing onto the model space view or the sheet view in the Project Navigator.

If you referenced the callout to a model space view, the field placeholders in the callout change to question marks. For information on resolving field placeholders in callouts, see Resolving Fields in Callout Symbols on page 2447.

If you have connected the callout to a sheet view, the field placeholders in the callout are resolved with the sheet information.

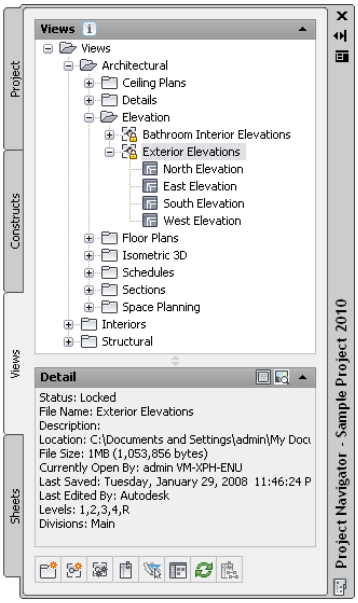
Opening a Model Space View

Use this procedure to open a model space view.

When you create a model space view that is referenced to a callout, the model space view can be placed in the drawing in which the callout was placed, into an existing project view drawing, or in a new project view drawing.

Model space views are displayed and opened in the Views tab of the Project Navigator.

Exterior elevation model space views in Project Navigator



1 On the Quick Access toolbar, click Project Navigator .

2 In the Project Navigator, navigate to the view drawing containing the model space view.

It is not important whether the drawing is already open.

3 If necessary, expand the view drawing to display the model space views contained in it.

4 Select the model space view you want to open, and double-click it.

Alternatively, you can select the model space view in the Project Navigator, right-click, and click Open.

Deleting a Model Space View

Use this procedure to delete a model space view.

When you delete a model space view, any callout symbols and title marks associated with the view are not deleted automatically. After deleting the model space view, you need to manually delete the callout symbol and title mark from the source drawing.

1 On the Quick Access toolbar, click Project Navigator .

2 Click the Views tab.

3 Select the view drawing that contains the model space view you want to delete, and expand it.

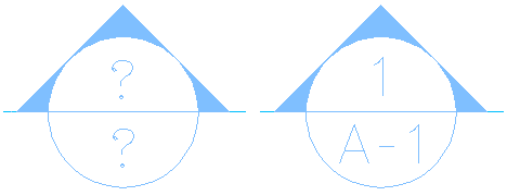
4 Select the model space view to delete, right-click, and click Delete.

Resolving Fields in Callout Symbols

Use this procedure to place a model space view on a sheet and resolve its field placeholders.

The predefined callout tools in AutoCAD Architecture contain field placeholder information about the sheet number and the view number. This information can be resolved only when the model space view created by the callout is referenced into a sheet. As long as the model space view is not placed on a sheet, the information is unresolved, and a question mark is displayed.

Unresolved (left) and resolved (right) elevation callout symbols



Once the model space view is placed on a sheet, and the sheet information in the callout is resolved, a link is created between the field information in the model space view and the sheet on which it is placed. When you CTRL-click the sheet number, the corresponding sheet drawing is opened.

1 Create a model space view referenced to a callout, as described in Placing Detail Callouts on page 2430, Placing Section Callouts on page 2435, or Placing Elevation Callouts on page 2440.

2 In the Project Navigator, click the Sheets tab, and click .

3 In the Sheet Set View, locate the sheet onto which you want to place the model space view.

4 Open the sheet in one of these ways:

- Select the sheet, right-click, and click Open.
- Double-click the sheet.

The drawing containing the sheet is opened in the drawing area of AutoCAD Architecture. The sheet you selected is the active layout.

5 In the Project Navigator, click the Views tab.

6 Select the model space view you want to place onto the sheet, and place it in one of these ways:

- Select the model space view, and drag it from the Project Navigator to the drawing area of the sheet.
- Select the model space view, right-click, and click Place on Sheet. Then, select an insertion point on the sheet.

When you open the model space view, you can see that the sheet information has been updated.

Working with Callouts Outside a Project

Model space views are based on the concepts of the Drawing Management feature. A model space view normally is created from a project view drawing and referenced into a project sheet drawing.

You can use a part of the callout functionality outside a project, in a standalone DWG file, with the following limitations:

- You can place model space views only within the current drawing.
- You can access model space views only from the Named Views dialog of AutoCAD.
- You cannot templates for details, sections, or elevations.
- Field placeholders containing information about views and sheets are not automatically resolved. You must enter values manually.

Placing a Callout in a Non-Project Drawing File

Use this procedure to place a callout in a drawing that does not belong to a Drawing Management project.

1 On the Tool Palettes, click (Properties), and click Document.

2 Click the Callouts palette.

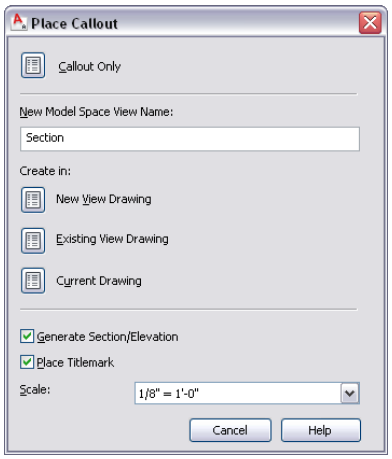
3 Select a callout tool.

Alternatively, you can click Annotate tab ➤ Callouts panel, and select a callout tool.

4 Insert the callout into the drawing.

If you want to…	Then…
place a detail callout	insert the tool as described in Creating a Detail in the Current View Drawing on page 2431.
place a section callout	insert the tool as described in Creating a Section in the Current Drawing on page 2435.
place a single elevation callout	insert the tool as described in Placing a Single Elevation Callout on page 2440.
place a four-way interior elevation callout	insert the tool as described in Placing a Four-Way Interior Elevation Callout on page 2442.

If you want to…	Then…
place a four-way exterior elevation callout	insert the tool as described in Placing a Four-Way Exterior Elevation Callout on page 2443.



5 Under New Model Space View Name, enter a name for the new model space view.

6 If you want to add a title mark to your model space view, select Place Titlemark.

7 Select the scale for the model space view.

8 Under Create in, select Current Drawing.

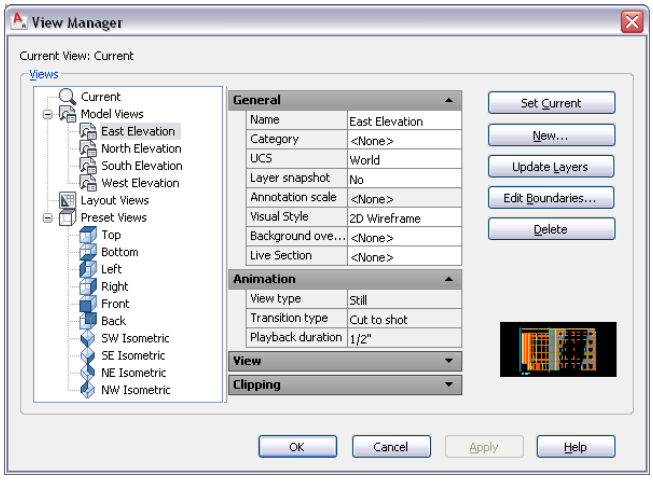
A model space view is placed in the current drawing.

Opening Model Space Views in a Non-Project Drawing File

Use this procedure to open a model space view in a drawing that does not belong to a Drawing Management project.

1 Place a callout in the drawing, as described in Placing a Callout in a Non-Project Drawing File on page 2448.

2 Click View tab ➤ Appearance panel ➤ Views drop-down ➤ View Manager.



In the View Manager, the model space view you created is listed under Views.

3 Select the model space view you want to open, and click Set Current.

4 Click OK.

Deleting Model Space Views in a Non-Project Drawing File

Use this procedure to delete a model space view from a drawing that does not belong to a Drawing Management project.

1 Open the drawing containing the model space view you want to delete.

2 On the command line, enter **view**.

The model space views contained in the drawing are listed under Model Views.

3 Select the model space view you want to delete, right-click, and click Delete.

4 Click OK.

Creating New Callout Tools

AutoCAD Architecture provides a number of predefined callout tools. You can also create callout symbols with user-defined visuals and content.

Using Fields in Callout Tools

Fields enhance the documentation capabilities within a drawing file. A field is updatable text that is set up to display data that may change during the life cycle of the drawing. When the field is updated, the latest value of the field is displayed. Usually, you use property set data for this type of updatable information about the building model. However, property set data can be used only in MV-blocks. Fields can be inserted into manual properties in property set definitions, text, MText, attribute definitions and AutoCAD table cells.

For detailed information about fields, see “Use Fields in Text” in AutoCAD Help.

There are a number of predefined fields for sheet set information. Most of the fields refer to the current sheet, and should be inserted only in a sheet drawing.

When you are creating a callout tool, you will often use a field from the Sheet Set Placeholder category: These fields let you define a field as a placeholder in a callout for a referenced sheet. The fields are resolved when the callout is referenced into a sheet. For more information, see Resolving Fields in Callout Symbols on page 2447.

- Current Sheet Custom: You can select an AutoCAD custom property defined for the current sheet here.
- Current Sheet Description
- Current Sheet Number
- Current Sheet Number and Title
- Current Sheet Set
- Current Sheet Set Custom: You can select an AutoCAD custom property defined for the current sheet here.
- Current Sheet Set Description
- Current Sheet Subset
- Current Sheet Title

- Sheet Set: You can select any sheet from a sheet set as the field content; available properties are sheet title, sheet number and sheet description.
- Sheet Set Placeholder: You can insert a placeholder representing information of a sheet. This placeholder is resolved when the callout is referenced into a sheet. The following fields are available as placeholders:
  - Sheet Number and Title
  - Sheet Title
  - Sheet Number
  - Sheet Description
  - Sheet custom: You can select an AutoCAD custom property defined for the referenced sheet here.
  - (Model Space) View Number and Title
  - (Model Space) View Title
  - (Model Space) View Number
  - (Model Space) Viewport Scale

  NOTE The fields for sheet title, sheet number, sheet description, view title, and view number can be associated with a hyperlink that jumps to the sheet or model space view referenced.

- Sheet View: You can select any sheet view from a sheet set as the field content here; available properties are sheet view number, sheet view title, and sheet view viewport scale.

  NOTE The fields for sheet view number and sheet view title can be associated with a hyperlink that jumps to the sheet view referenced.

Creating a Callout Tool

You can create callout tools that display information specific to the sheet set. Callouts can be referenced to model space views and can contain fields that point to a sheet or sheet view. When the model space view is placed onto into a sheet, the field is resolved and displays the sheet information.

For a list of available project and sheet set related fields, see Using Fields in Callout Tools on page 2450.

Process Overview: Creating a Callout Tool

Creating a callout tool consists of these basic steps:

1. Open the drawing in which you want to store the callout block.

   NOTE By default, callout blocks are placed in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial\Callouts (Imperial).dwg*. You can save your callout blocks there, or create your own callout drawings.

2. Add callout attributes to the drawing.
3. Create a block from the attributes.
4. Create a callout tool on a tool palette.

Adding Callout Attributes

Use this procedure to create attributes for a callout tool.

1 Click Insert tab ➤ Attributes panel ➤ Define Attributes.

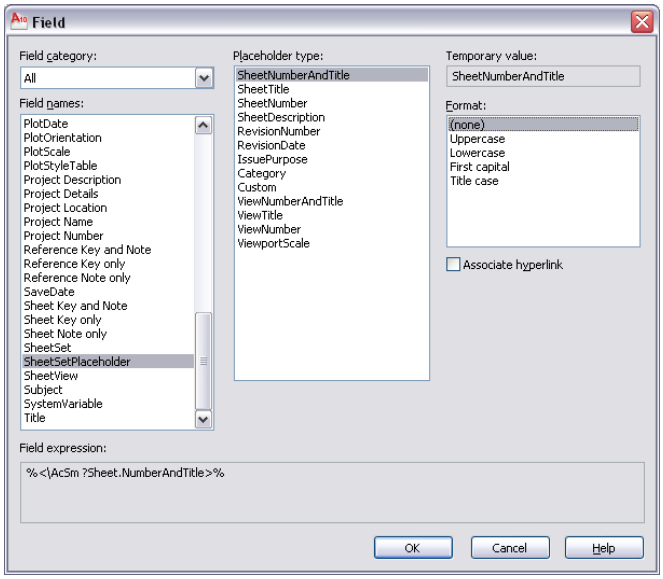
2 Define the first attribute for the callout tool.

3 Enter a name in the Tag field.

4 Under Value, click .

5 Under Field category, select the desired category.

TIP The Sheet Set category contains fields for views and sheets.



6 Under Field names, select the field you want to insert.

Some fields require additional information, like a file name or property information.

7 Select the text format for the field text.

8 Click OK.

9 Proceed to adding the attribute as described in "Attribute Definition Dialog Box" in AutoCAD help.

NOTE An attribute can contain only one sheet set field. If you want to create a callout line that reads, for example, *View Number - View Title*, you must define two separate attributes.

10 Repeat steps 1–3 for each attribute to add to the callout tool.

11 Complete the attribute block with lines, borders, and other desired components.

The result is have a number of attributes and graphic elements in your drawing. Your callout attributes might look like this:

Callout attribute block

Creating a Callout Block

Use this procedure to create a block that contains the attributes you added in the previous step.

1. Click Insert tab ➤ Block panel ➤ Create Block .
2. Enter a name for the block.
3. Click Select Objects, and select the attributes and additional graphics to include in the title block.
4. From the Drag-and-drop units list, select Unitless.
5. Proceed to creating the block as described in "Block Definition Dialog Box" in AutoCAD help.
6. Save the drawing containing the callout block.

NOTE If you are creating a callout tool that will be used by multiple users, make sure that the drawing is located in a folder all users have access to. Otherwise, the tool won't be able to be used by all users.

Creating a Callout Tool on a Tool Palette

Use this procedure to create the callout tool on a tool palette.

1. On the Tool Palettes, click (Properties), and click Document.
2. Click the Callouts palette.
3. Select the callout tool most similar to the tool you want to create.
   For example, if you want to create a detail tool, select one of the existing detail tools.
4. Right-click, and click Copy. Then, right-click, and click Paste.
   A copy of the selected tool is placed on the Callouts palette.
5. Select the copied tool, right-click, and click Properties.
6. Rename the tool as desired.
7. Under Tag location, select the drawing you have saved the callout block in.
8. Under Tag name, select the block you created.
9. Change other properties as needed; for example, add a new title mark or change the 2D section/elevation style.
10. Click OK.

Schedules and Display Themes

48

Schedules can be inserted in your drawings to display information about selected components in your building. The information is extracted from objects in the drawing based on information attached to objects and object styles.

Display themes provide another way to present data by using color, fills, and hatches. For example, you can specify that all 2-hour fire-rated walls appear with a red fill. A display theme legend identifies the correlation.

Data for display themes is also extracted from information attached to objects or object styles. Display themes and schedule tables are style-based annotation objects, for which styles can be created and modified in the Style Manager. For more information, see Style Manager Overview on page 566.

Schedules

Schedules are tables you can insert in drawings to list information about selected objects in your building model. Objects are made up of properties that contain data. Schedule tags provide an efficient tool of collecting the property data attached to the objects for display in a schedule table. You can create schedules with varying levels of detail by defining and attaching sets of properties to object styles or to individual objects and then extracting and displaying the data in a schedule table.

You can produce basic schedule tables using the default tools provided with the software. Before you perform more complex tasks such as creating your own schedule tables, classifications, or working with formulas in your project, it is important to understand how property data, property sets, and property set definitions interact. We recommend the following topics:

- Property Sets and Property Set Definitions on page 2458
- Property Data Formats on page 2496
- Property Set Data on page 2502
- Property Set Definitions on page 2510

If you want to add simple tags and schedules for common objects like doors using one of the default tools, refer to the following topics:

- Basic Schedules on page 2461
- Schedule Tags on page 2465

If you want to manage the format and other display properties of schedules, refer to the following topics about schedule table styles:

- Working with Schedule Table Styles on page 2475
- Specifying the Display Properties of a Schedule on page 2490

If you want to work with more advanced scheduling tasks, such as adding classifications and formulas, refer to the following topics for information about identifying and collecting detailed information from your objects:

- Property Set Data on page 2502
- Understanding Formulas on page 2514
- Classification Definitions on page 2540

Each section gives you conceptual as well as procedural information for the tasks you want to accomplish. Cross-references to additional supporting information are provided throughout. For answers to various questions about working with schedules, see Troubleshooting Schedule Tables on page 2558 and Troubleshooting Schedule Table Styles on page 2560.

Schedule Table Terminology in AutoCAD Architecture

You can add basic schedules to your drawings using tools provided with the software. These tools have predefined styles and properties. You can schedule additional details about objects, such as door hardware, by customizing an existing schedule table style or creating a new style. The following terms apply to creating and managing schedules:

Schedule Tags

You can use project-based or standard schedule tags in your drawings to graphically display the property data of an object. By linking the schedule tag to a property in a property set, such as the width of a door, you report property data of the object, such as 3'-0". When you anchor the tag to an object to which the property set is applied, the value of the property displays in the tag. The information in the tag is updated if the object or property change. For more information, see Schedule Tags on page 2465.

Schedule Tools

The software provides default tools for project-based and standard wall, door, and window schedules on the Scheduling tool palette and in the Content Browser. Selecting one of these tools that has a style and other properties predefined, lets you quickly place a schedule table in your drawing. You can also apply the properties of a schedule table tool to existing schedule tables. You can create schedule table tools from schedule table styles. For more information, see Adding Schedules Using Schedule Table Tools on page 2461.

Schedule Styles

A schedule table style specifies the properties that can be included in a table for a particular object type. The style also controls the table formatting, such as text height and spacing, columns, and headers. Display properties in the style control the visibility, layer, color, linetype, lineweight, and linetype scale of table components. For more information, see Working with Schedule Table Styles on page 2475.

Options in schedule table styles let you create both regular and matrix schedules (also called dot schedules). You can also specify a matrix format for individual columns in a regular schedule.

Property Data

Property data is information about properties of an object. For example, width and height are typical properties of a door. The data collected on these properties might reflect 3'-0" for width and 7'-0" for height. This property data is contained within a property set. For more information, see Property Sets and Property Set Definitions on page 2458.

NOTE Property data values are not contained in the schedule or schedule tag, but on the object itself. The schedule and schedule tag simply displays values retrieved directly from the object to which it is anchored.

Property Sets

A property set is a user-definable group of related object properties. When you attach a property set to an object or a style, the property set becomes the container for the property data associated with the object. Property sets are specified using property set definitions (see below). For more information, see Property Set Definitions on page 2510 and Property Set Data on page 2502.

Property Set Definitions

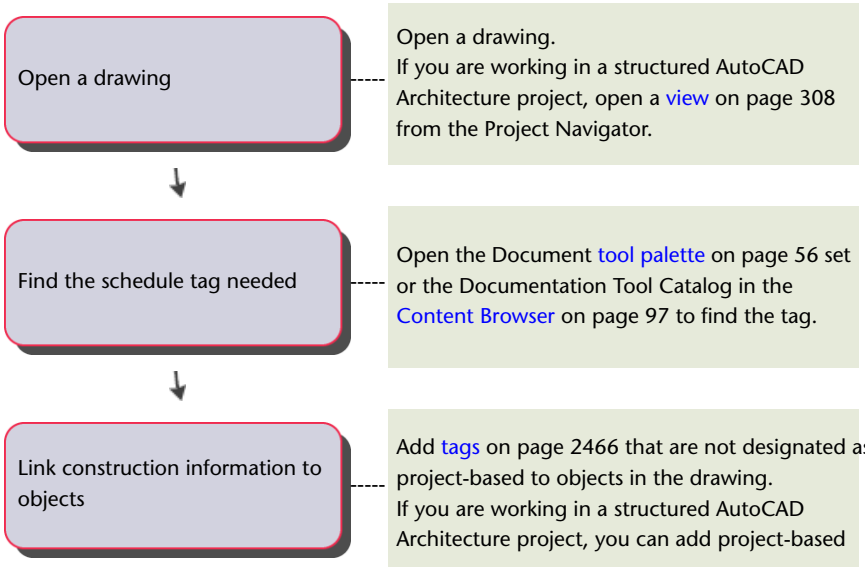
A property set definition is a documentation object that specifies the characteristics of a group of properties that can be tracked with an object or style. For example, you could create a property set definition named DoorProps that contains property definitions for DoorNumber, DoorWidth, and FireRating. Each property has a name, description, data type, data format, and default value. For more information, see Property Set Definitions on page 2510.

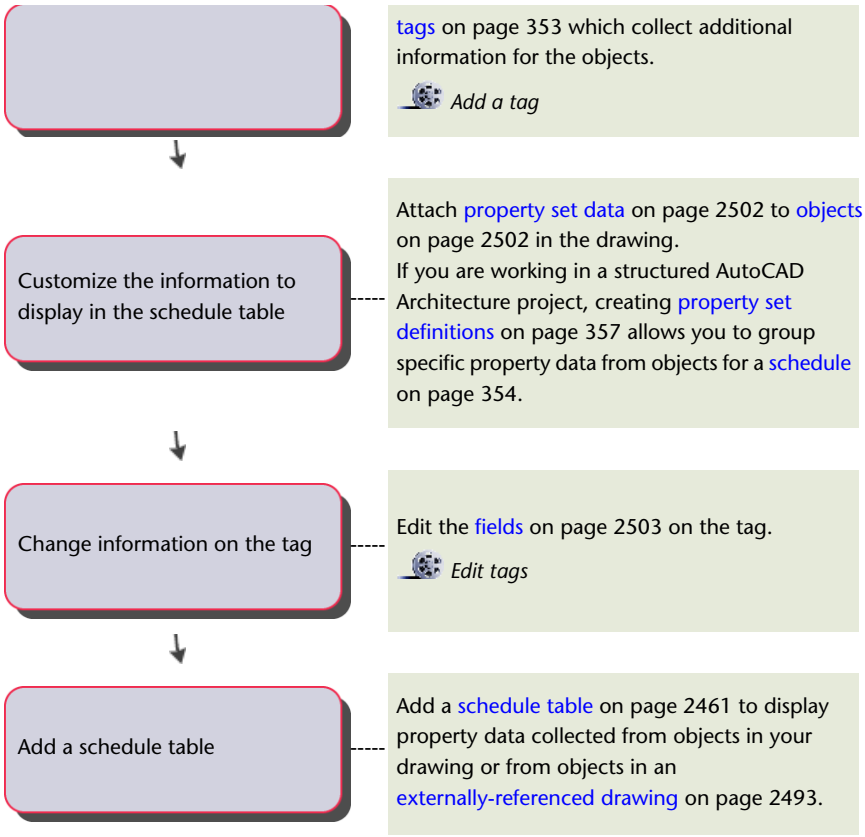
Property Data Formats

A property data format is specified for each property definition within a property set definition to control how the data for that property displays in a schedule table, in a schedule tag, or on the property palette. For example, you can use property data formats to display a door that is three feet wide, with a raw value of 36 units in a drawing, with inch units as 3'-0", or 3', or 3 ft. Property set definitions and schedule table styles use property data formats to control the display format of values for each property. For more information, see Property Data Formats on page 2496.

Workflow to Annotate Drawings with Tags and Schedules

If you use the annotation tools provided with the software, the definitions and formats are already created for you.





Property Sets and Property Set Definitions

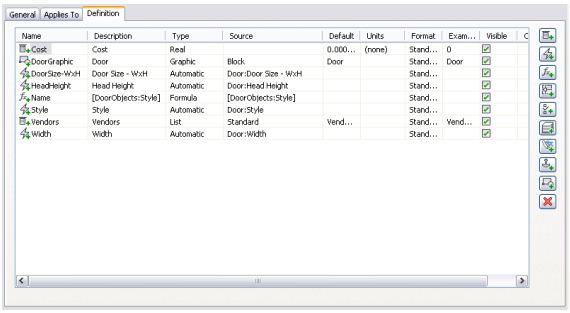
The data reported in a schedule table is collected from property sets that you attach to the objects or object styles you are scheduling. The properties contained in a property set are determined by the property set definition, which also specifies the object type, style, and definition to which the property set can be applied.

NOTE If you are using both AutoCAD Architecture and Revit MEP, locks may appear on some property set definitions and property definitions when you open legacy engineering drawings. Data that is programmatically set cannot be modified and is protected and identified by locks:

- selections on the Applies To tab and names for property set definitions
- anything that affects the value of underlying data and names for property definitions

A property set definition is a group of related properties of the objects and object styles to be reported in the schedule. Once attached to an object or its style, a property set becomes the container for the property data associated with the object. Values for properties are obtained directly from the object or are entered manually for the object or the style.

A property set definition for a door object



Automatic and Manual Properties

Properties for AEC object types fall into two categories:

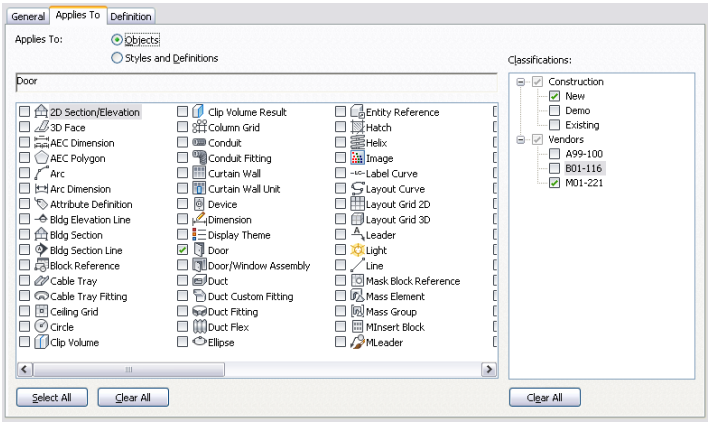
- Automatic properties are built into objects and styles when you create the object. Examples are width, length, height, and data retrieved from other sources, such as the project or the object's material. For more information, see Understanding Automatic Properties on page 2511.
- Manual properties are those that you enter explicitly, such as fire rating, manufacturer, or finish. For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523.

Automatic properties are available to include in your property set definitions. You create and enter values for manual properties.

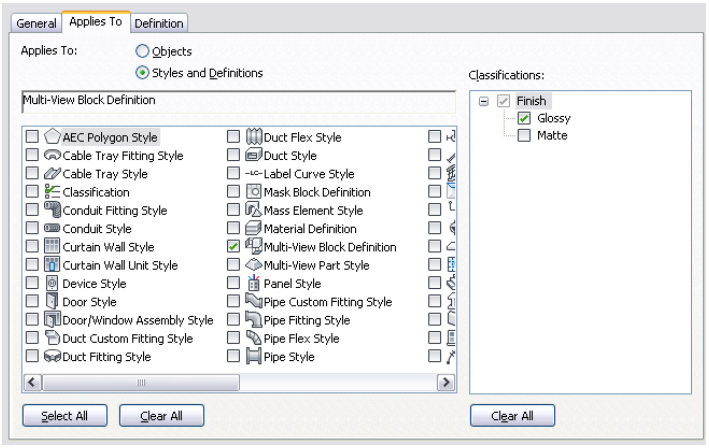
Applying Property Set Definitions to Objects and Styles

You can create a property set definition for either objects or styles and definitions (like multi-view block definitions). Manual properties that are likely to be different for each instance of an object belong in an object-based property set definition that is applied by object.

Property set definition that applies to door objects



Manual properties that will be the same for all instances of a style belong in a style-based property set definition that is applied to a style (such as a wall style) or a definition (such as a multi-view block definition).



Property set definition that applies to multi-view block definition

Automatic properties are dynamically retrieved from the object. Most automatic properties should be put in a style-based property set definition, even if values may vary for each instance of the object. For example, the properties "Door Width" and "Door Height" are extracted automatically from door objects. Placing these properties in a style-based property set definition provides a value for each door object of that style, and is more efficient than putting them in an object-based property set definition that you then attach to each door.

NOTE A mismatch of data can occur if, after you create a schedule table with property set data added, you change from an object-based property set definition to a style-based definition. To correct this, remove the property sets and update the schedule table. For more information, see Removing Property Set Data from an Object on page 2504 and Removing Property Set Data from a Style or Definition on page 2508.

Fields in Property Set Data

You can enter AutoCAD fields in a manual property attached to an object or style. Fields enhance the documentation capabilities within a drawing file because the values they display update whenever the associated property changes. Fields can also be associated with hyperlinks. For example, if you insert a field pointing to a drawing using a hyperlink in a manual property, and create a schedule table that contains that property, you can jump from the table cell with the field property in it to the drawing to which it is linked.

For more information, see Entering Manual Properties and Fields for Objects on page 2502 and Adding a Field to a Property Set Definition on page 2525.

Lists in Property Set Data

List items are created in a list definition and are attached to a manual property definition. With a predefined list of valid items, you can select an item from the list for a manual property either in the property set definition or on the Extended Data tab of the Properties palette. This reduces the redundancy of entering values that are commonly used. For more information, see Creating a List Definition for a Manual Property Definition on page 2538 and Adding a Field to a Property Set Definition on page 2525.

Predefined Content for Schedules

There are predefined styles and properties for schedule table tools, schedule tag tools, and property set definitions provided with the software. The tools are located on the Scheduling tool palette in the Document tool palette set, and the property set definitions are in Style Manager under Documentation Objects.

You can also access default schedule table styles, schedule tags, and property set definitions in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>\Schedule Tables.dwg*. You can use any of this content to create additional schedules or as the basis for creating custom schedules, tags, and property set definitions.

Basic Schedules

You have everything you need to add schedule tables and perform common documentation tasks, such as tagging objects, when you open the software. Schedule tables are objects. As with other objects in your drawing, properties of schedule tables are displayed on the Properties palette when you add a schedule or if you select a schedule. For more information, see The Properties Palette on page 82.

Schedule table tools with predefined styles and properties are provided with the software. Using these tools you can add door, window, space, and room schedules to your drawing. They are located on the Scheduling tool palette in the Document tool palette set.

Additional schedule table tools are located in the Documentation Tool Catalog in the Content Browser. You can add tools from the Content Browser to any tool palette. For more information, see Content Browser on page 97.

IMPORTANT The contextual tab for schedule tables includes a Convert to Table option, which creates a copy of your AutoCAD Architecture schedule table that can be inserted as an AutoCAD® table. AutoCAD Architecture commands, such as Update or Add All Property Sets cannot be used on the converted table. Also be aware that you may get unexpected results if you use special characters in your schedule headings, such as equal signs (=). Avoid this problem by adding an apostrophe (') in front of the character before doing the conversion. For more information about working with AutoCAD® tables, see "Create and Modify Tables" in AutoCAD Help.

Adding Schedules Using Schedule Table Tools

Use this procedure to add a schedule table to a drawing with a schedule table tool. You can specify properties on the Properties palette when you add a schedule table, or you can modify the schedule table later.

When you use default tools, it is not necessary to make changes to the style before you begin to capture data in your drawing. Property set data is already attached to objects. For more information, see Working with Schedule Table Styles on page 2475 and Property Set Data on page 2502.

1. Open the tool palette that contains the schedule table tool you want to use, and select the tool.

   Alternatively, you can click Annotate tab ➤ Scheduling panel, and select one of the schedule table tools there.

2. Select the objects to include in the schedule table, or press *ENTER* to schedule an external drawing.

   For more information, see Changing External Source Properties of a Schedule on page 2493.

   You can use a selection window or a crossing window to select objects. Objects that are not of the type specified for the schedule table are filtered out.

3. In the drawing area, specify the insertion point for the upper-left corner of the schedule table.
4. Specify the lower-right corner of the table, or press *ENTER* to scale the schedule table to the current drawing scale.
   - If the schedule table contains question marks in any cells, the property set containing that property is not attached to an object or style.
   - Empty cells or dashes in cells indicate that the property set is attached, but data is not available or is not entered for that object or style.

   For more information about attaching property sets for property set data, see Property Set Data on page 2502.

Creating a Schedule Table Tool

Use this procedure to create a schedule table tool and add it to a tool palette. You may want to create your own schedule table tools if you are placing multiple schedule tables of specific styles that have the same properties.

1 Open the tool palette on which you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a schedule table in the drawing	select the object, and drag it to the tool palette.
create a tool from a schedule table style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3 Right-click the new tool, and click Properties.

4 Enter a name for the tool.

5 Click the setting for Description, enter a description of the tool, and click OK.

6 Expand General, and specify general properties for the schedule table:

If you want to…	Then…
add a description	enter text for Description.
specify the layer key	select Layer Key.
specify layer overrides	select Layer Overrides.
specify the schedule table style	select Style.
specify an external drawing file source for the style	select Style Location or Browse to specify a location.
change the schedule table scale	enter a value for Scale.
automatically update the schedule table when data in the drawing changes	select Yes for Update automatically.
manually update the schedule table when the drawing changes	select No for Update automatically.

NOTE Turning on the automatic update feature may slow drawing performance, especially in large drawings. For information about updating schedules manually, see Property Set Data on page 2502.

7 Expand Selection, and specify how to add objects to the schedule table:

If you want to…	Then…
automatically add new objects to the schedule table as they are added to the drawing	select Yes for Add new objects automatically.
manually add new objects to the schedule table	select No for Add new objects automatically.
include objects from xref drawings in the schedule table	select Yes for Scan xrefs.
exclude objects from xref drawings in the schedule table	select No for Scan xrefs.
include objects from block references in the schedule table	select Yes for Scan block references.
exclude objects from block references in the schedule table	select No for Scan block references.
apply a layer filter to the table	specify a layer wild card.

NOTE When adding a schedule table that must scan xrefs or blocks, use a layer filter that includes both the name of the layer that contains the xref or block and the name of the layer of the object inside the xref or block. You can separate multiple layer wild cards with a comma. You cannot select individual objects within an xref drawing or a block reference. For more information, see Working with Layer Groups on page 475.

8 Click OK.

Adding Objects to a Schedule

Use this procedure to add objects to an existing schedule table.

1 Select the schedule.

2 Click Schedule Table tab ➤ Scheduled Objects panel ➤ Add .

3 In the drawing, select the objects to add to the schedule, and press *ENTER*.

Use a window or a crossing window to select multiple objects. Objects that are already in the table are not added.

NOTE You cannot add objects to a schedule table through RefEdit. Although the command appears to work during the RefEdit session, as soon as changes are saved back, the rows disappear from the schedule table. This is because you are actually selecting temporary copies of the objects in the file. In order to have objects that are in an xref or block display in a schedule table, select the xref. To include only selected objects from the xref or block, use a layer filter with the schedule table. For more information, see Editing Style-Based Property Sets Attached to Objects in External References on page 2506.

Removing Objects from a Schedule

Use this procedure to remove objects from a schedule table.

1 Select the schedule table.

2 Click Schedule Table tab ➤ Scheduled Objects panel ➤ Remove .

3 In the drawing, select the objects to remove from the table, and press *ENTER*.

Reselecting Objects for a Schedule

Use this procedure to reselect objects to include in a schedule table. After reselection, the table contains only the newly-selected objects.

1 Select the schedule table.

2 Click Schedule Table tab ➤ Scheduled Objects panel ➤ Reselect .

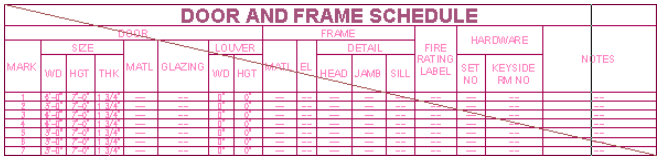
3 In the drawing, select the objects to include in the table, and press *ENTER*.

Turning Off the Out-of-Date Marker

Use this procedure if you do not want the out-of-date marker to display when an object, object style, or attached property set data has changed but the schedule is not updated. This appears by default.

With the out-of-date marker display component turned on in the General schedule display representation of your drawing, a line is drawn through the schedule to indicate that the information tracked by the schedule has changed. For example, a line is drawn through the schedule if an object tracked in the schedule is moved or deleted, or if its dimensions are edited. The line is removed when you update the schedule. For more information about display components, see Display System Structure on page 519.

Displaying an out-of-date schedule



NOTE If this display component is on, it can slow drawing performance, especially in large drawings.

1 Select the schedule table, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the General display representation.

4 If necessary, click .

5 Scroll to display the Out-of-Date Marker component, and click Visible.

6 Click OK twice.

Updating a Schedule Manually

You can update a schedule table at any time by selecting it, and clicking Schedule Table tab ➤ Modify panel ➤ Update . This updates the values in a schedule table when the automatic update option is turned off. Always update schedule tables before plotting the drawings that contain them.

When you update a table manually, the table is refreshed to reflect any changes to objects or to property set data attached to objects or object styles. Objects added to the drawing after creating the schedule table are not included in the table unless Add Objects Automatically is specified in the table properties. To add objects manually, see Adding Objects to a Schedule on page 2463. To change the numbering in a schedule table, see Renumbering Property Set Data on page 2472. To ensure that the table contains accurate information,

close and re-open your drawing before plotting schedule tables. Certain changes to drawings, such as reference editing, are reflected in schedule tables only when a drawing is reopened.

NOTE You can specify that a schedule table updates automatically whenever changes are made to data for scheduled objects. This is managed on the Properties palette. For more information, see Changing General Schedule Properties on page 2491.

Locating and Viewing Scheduled Objects in a Drawing

Use this procedure to highlight objects in the drawing that are included in a schedule table.

1 Select the schedule table.

2 Click Schedule Table tab ➤ Scheduled Objects panel ➤ Show .

3 Select the border of the schedule table to show all the objects in the table, or select a specific cell to show only the object contained on that row.

The selected objects are highlighted in the drawing.

Schedule Tags

Schedule tags are symbols that connect building objects with lines of data in a schedule table. Schedule tags display data about the objects to which they are attached. There are schedule tag tools with predefined properties provided with the software on the Scheduling tool palette in the Document tool palette set and in the Documentation Tool Catalog in the Content Browser. For more information, see Tools on page 67 and Content Browser on page 97.

You can also create schedule tags to display specific property set data for objects in the building. After you create a schedule tag, you can drag it to any tool palette to create a schedule tag tool. For more information, see Creating a Schedule Tag on page 2467 and Creating a Schedule Tag Tool on page 2469.

Tags in an AutoCAD Architecture Project Environment

It is recommended that you tag objects in view drawings if you are working in a project environment. You can use one of the default project-based schedule tags, or you can create project-specific tags that display the project information you define. A project-based schedule tag recognizes the location of the object (the level in the building project). A standard schedule tag does not. When you want this additional information captured, work in a project environment and use a project-based schedule tag. For more information about working in AutoCAD Architecture projects, see Workflow for a Project Environment on page 199.

Tags as Multi-View Block Definitions

Tag tools have predefined properties. Each tag is a multi-view block with attributes. Values from the property set data of the object can be transferred to the tag attributes if, when the tag is added, the tag attributes include the names of the property set definition and the property definition. An example of an attribute definition tag for a door is DoorStyles:DoorHeight. Attribute definition tags cannot have extended names (names that contain spaces). If you use extended names for your property set or property definitions, you cannot display those objects automatically through the use of a tag anchor.

Because tag attributes are linked to property set data, the tag attributes change when the property set data changes. For example, the number displayed in a door tag associated with a door is updated when the number property of the door is renumbered. To edit the information that displays in the tag, edit the property set data. For more information, see Entering Manual Properties and Fields for Objects on page 2502.

Schedule tags are organized as multi-view block definitions under Multi-Purpose Objects in the Style Manager. For more information, see Style Manager Overview on page 566.

Connection Between Tags and Objects

Tags are constrained (anchored) to objects by default. This is controlled in the properties for the tag tool. It is possible to turn on the graphic that displays the connection between tags and objects. The Anchor Tag To Entity graphic controls the display for tags that are not constrained to objects, and the Anchor Extended Tag to Entity graphic controls the display for tags that are constrained to objects. For more information, see Viewing the Connection Between Tags and Objects on page 2472 .

Tags for Multiple Objects

Select one object at a time when using the multiple tag option in order to control the numbering sequence of the tags. The sequence of auto-incrementing is undefined if you use a crossing window or another multiple selection tool.

When you use the same schedule tag tool to tag multiple objects, it ensures that the same property set is attached to each object. When adding schedule tags to objects in an external reference (xref), you can avoid broken links by selecting Attach as the Reference Type instead of Overlay. For more information, see “Reference Other Drawing Files” in AutoCAD Help.

Placement and Position of Tags

When you are tagging multiple objects, tag a single object first. The placement of the first tag relative to the object you are tagging is used to determine the placement of subsequent tags. Tags are positioned relative to the objects being tagged.

- For walls, the tag (or the end of its leader) is positioned relative to the midpoint of the wall.
- For spaces, the tag (or the end of its leader) is positioned relative to the center of the geometric extents of the space.
- For all other objects, a tag with a leader is placed with the end of the leader at the geometric center of the object. Tags without leaders are placed at the same distance and direction as the first tag, relative to the center of the object.

Adding Tags Using Schedule Tag Tools

One of the most frequent uses of annotation in a project is tagging the individual objects. Adding schedule tags to your drawings can be done simply and quickly with schedule tag tools that are provided with the software.

NOTE When you insert schedule tags into drawings, use the appropriate base units for the tag to match the drawing scale properly. For more information, see Units in Property Data Formats on page 2497.

Adding Tags to Objects

Use this procedure to add schedule tags to objects, a block reference, or a multi-view block reference, such as equipment or furniture. You can use one of the predefined tag tools provided with the software, or you can create a new tool for a tag you define. For more information, see Creating a Schedule Tag on page 2467.

If you are working in a structured project environment in AutoCAD Architecture, project-based tags recognize additional information about the objects if you tag objects in view drawings. There are predefined, project-based tags provided.

1. Open the tool palette that contains the tag tool you want to use, and select it.

   Alternatively, you can click Annotate tab ➤ Scheduling panel, and select one of the tag tools there.

Additional predefined tag tools are located in the Documentation Catalog in the Content Browser. You can add these tools to any tool palette.

2 Select the object to which to attach the tag.

3 Specify the location of the tag.

NOTE Different object tags may have different prompts. The steps below may not correspond exactly to those for the object tag you are placing.

4 If prompted, enter property set data on the Edit Property Set Data worksheet, and click OK.

For information about preventing the worksheet from displaying each time you add a tag, see Turning Off the Edit Property Set Data Worksheet on page 2467.

If property set data is not yet attached to the object, you can attach an appropriate property set from the current drawing or the Schedule Tables.dwg file in *C:\ProgramData\Autodesk\ACA 2010\enu\Styles\<Imperial or Metric>* For more information about property sets, see Property Set Definitions on page 2510.

5 Enter **m**, press *ENTER*, and select multiple objects to tag.

6 Alternatively, press *ENTER*, and add schedule tags one at a time.

Turning Off the Edit Property Set Data Worksheet

Use this procedure to prevent the Edit Property Set Data worksheet from displaying each time you add a schedule tag.

Depending on the property set definitions that are attached to the object, you can edit or enter new property set data when this worksheet displays. This option is turned on in the software by default. If you are adding tags that contain only automatic properties, it is more efficient to turn off this option. For more information, see Turning Off the Edit Property Set Data Worksheet on page 2467.

1 Click ➤ Options.

2 Click the AEC Content tab.

3 Clear Display Edit Property Data Dialog During Tag Insertion, and click OK.

Creating a Schedule Tag

Use this procedure to create a schedule tag that captures and displays property set data for a particular object in your drawing.

The property set attached to the object must contain the property or properties for the information that you want to display in the tag. For more information, see Property Set Data on page 2502.

You can create the schedule tag by drawing a symbol and adding text as a placeholder for attributes or by exploding and customizing an existing schedule tag. When you create a schedule tag, each attribute is assigned a unique name (called an attribute tag), which is formed by combining the names of the associated property set definition and property definition. When the schedule tag is anchored to objects to which the property set definition applies, the tag displays the value of the property identified by the attribute tag.

For example, you have a property set definition named DoorProps, which contains a property definition named FireRating. The FireRating property contains fire rating information for door objects. To create a door tag that displays the fire rating of a door to which the tag is anchored, you must first create a schedule tag that contains an attribute definition whose attribute tag is DoorProps:FireRating.

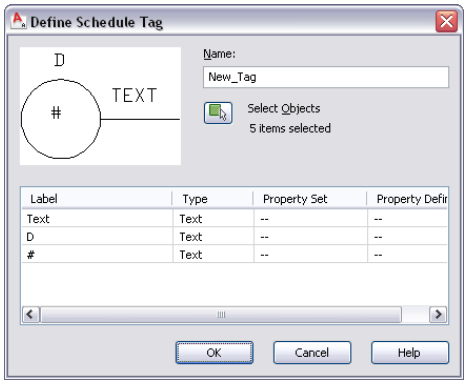
1 Draw a symbol for the tag, and add text as necessary to designate the property data you want displayed as an attribute of the tag.

Tags may have multiple attributes and be linked to multiple property definitions.

2 Create the schedule tag:

If you want to…	Then…
create a schedule tag from your custom graphic and text	click Annotate tab ➤ Scheduling panel ➤ ➤ Create Tag. Select the objects from which to create the tag, and press *ENTER*.
create a schedule tag from an existing tag	click Home tab ➤ Modify panel ➤ Explode. Select the object, and press *ENTER*. Repeat until all nested blocks are exploded, and click Annotate tab ➤ Scheduling panel ➤ ➤ Create Tag. Select the objects from which to create the tag, and press *ENTER*.

3 On the Define Schedule Tag worksheet, enter a name to identify the new tag.

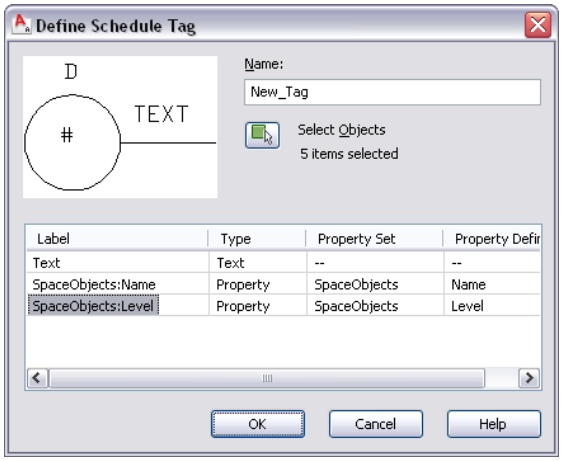


4 Click to select additional objects.

5 Select the attributes of the tag:

If you want the label to…	Then…
collect property data from the objects tagged	select Property for Type, select a Property Set and a Property Definition, and click OK.

If you want the label to…	Then…
display as the text you entered	select Text for Type and click OK.



6 Specify a point on the tag as the insertion point.

Creating a Schedule Tag Tool

Use this procedure to create a schedule tag tool and add it to a tool palette. You may want to create tools that display different information as attributes for different types of objects.

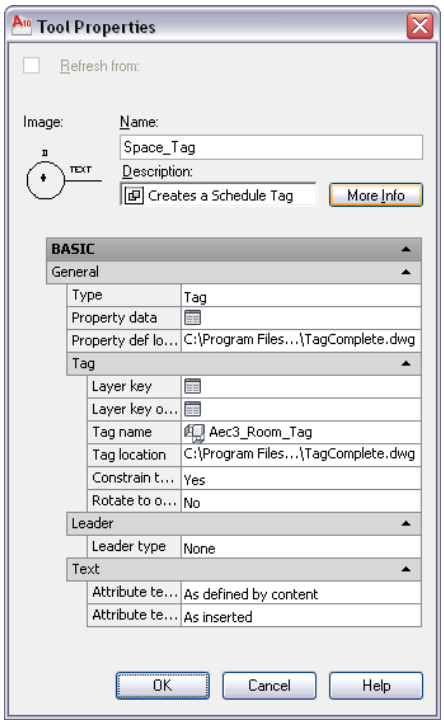
For example, your floor plan has space allocated to specific functions. To efficiently view the total area of space used by the different functions, you can create a schedule tag that displays the property data of the base area of each space. For more information, see Property Sets and Property Set Definitions on page 2458.

1 Open the tool palette on which you want to create a tool.

2 Create the tool:

If you want to…	Then…
create a tool from a schedule tag in the drawing	select the schedule tag, and drag it to the tool palette.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other tool palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3 Right-click the new tool, and click Properties.



4 Enter a name for the tool.

5 Click the value for Description, enter a description of the tool, and click OK.

6 Click More Info to add keywords for the tool, and click OK.

7 Expand General, and specify general properties for the schedule tag:

If you want to…	Then…
identify the type of tool	click Type, and select Tag to identify the tool as a schedule tag, or select Property set data to specify that the tool attaches property data without displaying a tag. When property set data is attached to an object, properties display in the schedule and on the Properties palette without displaying a tag on the object.
attach property set data	click the value for Property Data, select the property set definitions, and click OK.
specify an external drawing file source for the property definition location	select Property def location, and Browse to specify a location.

8 If you selected Tag as the tool type, expand Tag to edit the tag properties.

If you want to…	Then…
specify an alternative layer key	click the value for Layer key, select the layer key, and click OK.
specify layer key overrides	click the value for Layer key overrides, select overrides, and click OK.
select a different name for the schedule tag	click Tag name, and select the name.

If you want to…	Then…
specify a source file location from which to import the property set definition	select Tag location, and Browse to specify a location.
specify that the tag moves with the object to which it is anchored	select Yes for Constrain to object.
specify that the tag does not move when the object to which it is anchored moves	select No for Constrain to object.
specify that the rotation of the tag is oriented to the object to which it is anchored	select Yes for Rotate to object.
specify that the rotation of the tag is not oriented to the object to which it is anchored	select No for Rotate to object.

9 If you selected Tag as the tool type, expand Leader to edit the leader properties.

If you want to…	Then…
add the schedule tag without a leader	click Leader type, and select None.
add the schedule tag using a straight line as the leader	click Leader type, and select Straight.
add the schedule tag using a spline as the leader	click Leader type, and select Spline.

10 If you selected Tag as the tool type, expand Text to edit the text properties.

If you want to…	Then…
add text in the schedule tag as defined in the source drawing	click Attribute text style, and select As defined by content.
add text in the schedule tag as it is defined in the target drawing	click Attribute text style, and select Target drawing text style.
determine the angle of the text when you insert the schedule tag	click Attribute text angle, and select As inserted.
consistently display the text in the schedule tag horizontally	click Attribute text angle, and select Force horizontal.
consistently display the text in the schedule tag right justified	click Attribute text angle, and select Right reading.

11 Click OK.

Anchoring an Existing Schedule Tag to an Object

Use this procedure to anchor an existing schedule tag to an object or re-anchor a tag to a new object.

If you copy a tag from one object to another, the tag remains anchored to the original object. Use this procedure to re-anchor the tag to the new object.

NOTE You can view the current relationship between schedule tags and objects. For more information, see Viewing the Connection Between Tags and Objects on page 2472.

1 Select the tag.

2 Click Tag tab ➤ Anchor panel ➤ Set .

3 Select an object to which to anchor the tag.

Releasing an Anchored Schedule Tag

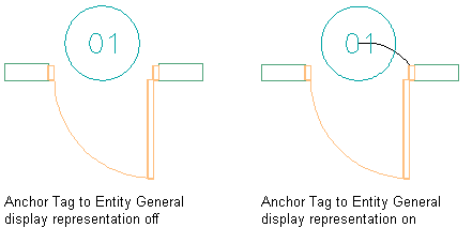
Use this procedure to release a tag that is anchored to an object. After you release the tag, you can anchor it to another object.

1 Select the tag.

2 Click Tag tab ➤ Anchor panel ➤ Release .

Viewing the Connection Between Tags and Objects

Use this procedure to view the current link between a schedule tag and an object. If you have many tags and are not sure how they are attached, it is useful to see this link displayed. This procedure turns on the General display representation for Anchor Tag To Entity and Anchor Extended Tag to Entity in the current view.



1 Click Manage tab ➤ Style & Display panel ➤ Display Manager .

2 Expand Sets.

3 Select the current display set, which appears in bold in the list under Sets.

4 Click the Display Representation Control tab.

5 In the Objects list, locate Anchor Tag To Entity and Anchor Extended Tag to Entity, and select the General display representation for both.

6 Click OK.

7 Regenerate the drawing, if necessary.

The link between the schedule tag and the object is displayed as an arc. The tag and object are attached from insertion point to insertion point.

Renumbering Property Set Data

Use this procedure to renumber objects that are included in a schedule or linked to schedule tags. You may want to do this if you moved them in the building model or if you have deleted objects. Only those property definitions with a Type of Auto Increment—Integer or Auto Increment—Character can be renumbered with this procedure. For more information, see Adding Tags Using Schedule Tag Tools on page 2466.

1 Open the tool palette that you want to use, and select the Renumber Data tool.

A Renumber Data tool is located with the Scheduling and Reporting Tools in the Stock Tool Catalog. You can add this tool to any tool palette. For more information, see Content Browser on page 97.

2 In the Data Renumber dialog, select the property set to renumber.

You select the property set that contains the number property. For example, if you renumber doors, you select the DoorObjects property set.

3 Select the start number.

4 Select an increment value.

Each number in the drawing is increased by this amount in the drawing when the property set data is renumbered. For example, if the start number is 1 and the increment is 3, the sequence would number 1, 4, 7, 10, and so on.

5 Select Attach New Property Set to add a new property set to the numbering sequence.

6 Click OK.

7 Select the object or schedule tag to which you want to assign the new start number, continue renumbering, and press *ENTER*.

NOTE Under certain circumstances, such as after Renumber Data during RefEdit, you may see duplicate property set definition names. For example, the property set definition name may be preceded by "1." Modify these property set definitions by opening the attached drawing and making the changes. For more information, see "Edit Selected Objects in Referenced Drawings and Blocks" in AutoCAD Help.

Managing Schedule Tables

You can customize the content and appearance of schedule tables. You can also export schedule table data.

IMPORTANT The contextual tab for schedule tables includes a Convert to Table option, which creates a copy of your AutoCAD Architecture schedule table that can be inserted as an AutoCAD® table. AutoCAD Architecture commands, such as Update or Add All Property Sets cannot be used on the converted table. Also be aware that you may get unexpected results if you use special characters in your schedule headings, such as equal signs (=). Avoid this problem by adding an apostrophe (') in front of the character before doing the conversion. For more information about working with AutoCAD® tables, see "Create and Modify Tables" in AutoCAD Help.

Using Schedule Table Styles

Schedule table styles control the content and appearance of schedule tables. A drawing must contain a schedule table style for the type of schedule table you want to create. When you copy a schedule table style into a drawing, property set definitions and data formats specified in the style are also copied. For more information, see Working with Schedule Table Styles on page 2475.

Updating Schedules

Because the property set data is attached to objects and styles, you can create and update schedules at any stage of a project. Rather than waiting until the end of a project to create schedules, you can create preliminary schedules and update them to reflect changes in your drawings. For more information, see Updating a Schedule Manually on page 2464.

Attaching Property Set Data

Before creating schedule tables, you attach the property sets referenced in the schedule table style to the objects and object styles. The attached property sets become the containers for data. For more information, see Property Set Data on page 2502.

NOTE A schedule table extracts data from objects and displays the data in the table. No data is saved in the table itself.

Updating Property Set Data

When you add a schedule table to a drawing, you specify whether new objects are added to the table as they are added to the drawing and whether the data in the schedule table is updated when objects or styles are modified. If you do not select these automatic updating options, you can update a schedule manually at any time. For more information, see Adding Property Set Data to All Objects on page 2496.

You can also directly edit the data in individual cells and columns for any manual properties included in the table. After you add, remove, or change objects in a schedule, you can renumber the objects and their schedule tags. For more information, see Renumbering Property Set Data on page 2472.

Exporting Property Set Data

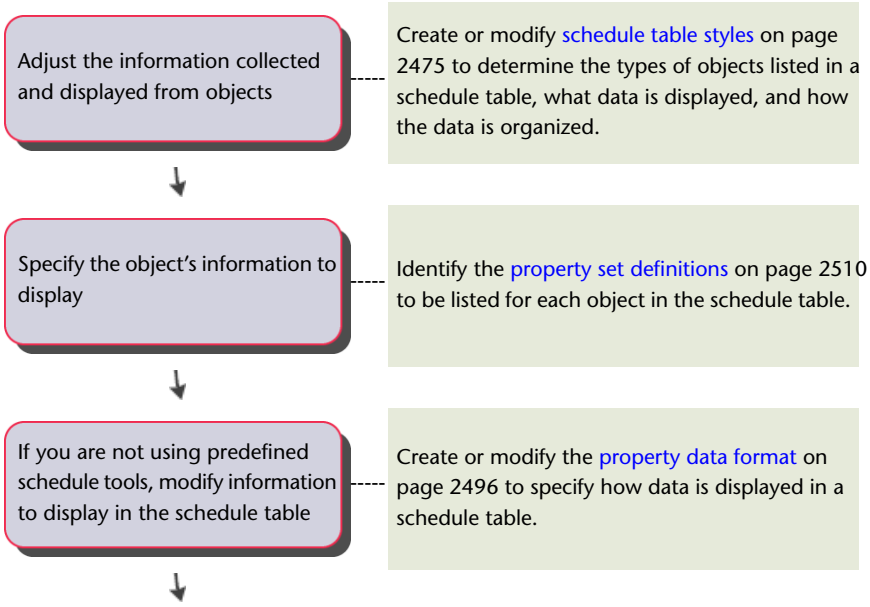
You can export data directly to external files in the following formats:

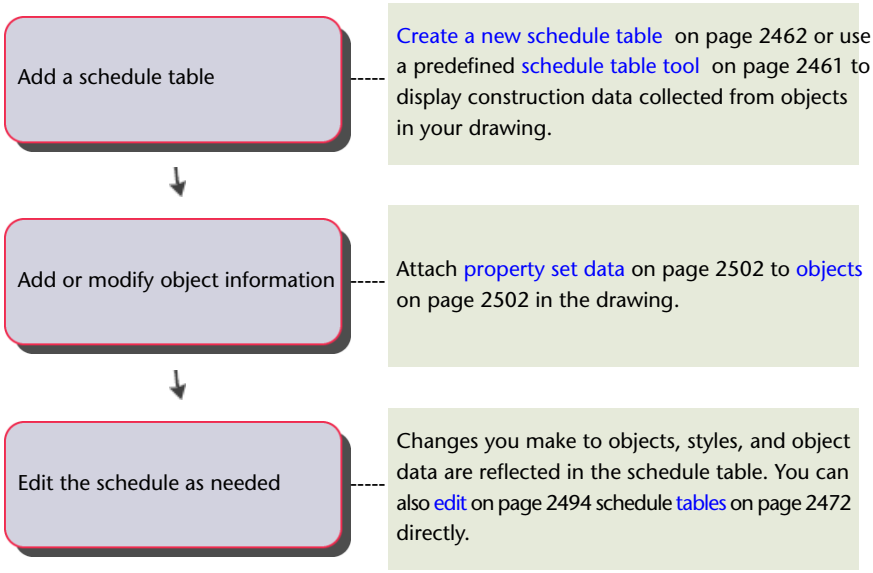
- Microsoft® Excel spreadsheet (XLS) files (2 formats)
- Comma-separated values (CSV) files
- Tab-delimited text (TXT) files

For more information, see Exporting a Schedule on page 2489 and Exporting Schedule Data for Selected Objects on page 2490.

Workflow to Customize Schedule Tables

You can specify property set definitions and property data formats to customize the information collected from objects and how it displays in the schedule. You can also create schedule tables with the schedule tools that are provided. For more information, see Basic Schedules on page 2461.





Working with Schedule Table Styles

Schedule table styles determine the content and appearance of schedule tables you add to drawings. You can customize a schedule table by adding headings, organizing columns, or specifying the sort order. The schedule table tools provided with the software have predefined styles and properties. You can customize these styles or create new ones.

Content and Format of Schedule Tables

Use schedule table styles to specify the following characteristics of schedule tables:

- Objects that can be included
- Property data to be tracked
- Sequence and format of columns
- Property data format of schedule values
- Format of table titles, column headers, and table cells
- Sorting sequence of rows
- Display properties of tables

Flagging Out-of-Date Schedules

In a schedule table style, you can specify whether a schedule is updated when objects included in the schedule change. If you turn off the automatic update option, you can still determine whether data in the schedule reflects changes in the drawing. The display properties of the schedule style include an out-of-date marker. When this marker is turned on, a diagonal slash is drawn through the table when the schedule has not been updated. Updating the schedule removes the out-of-date marker.

NOTE You should always update your schedules before plotting and not rely completely on the out-of-date-marker.

What You Need to Create a Schedule Table Style

Your drawings must contain the following information for you to create a new schedule table style:

- Property set definitions for any property data to be included in the tables created from the style. Each column in a schedule table corresponds to one property in a property set for an object or an object style. For more information, see Property Set Definitions on page 2510.
- Property data formats to control the format of values in each column of a schedule table. Typically, you use the same data format specified in property set definitions. However, you can override those formats in the schedule table style. For more information, see Property Data Formats on page 2496.

The content and tools include schedule table styles for typical schedules, such as door and window schedules or room finish schedules. You can customize these styles for your projects.

Creating Styles for Matrix Schedules

In AutoCAD Architecture, a matrix schedule is a table in which column headings identify object properties. A symbol, such as a dot or a cross, is displayed in cells to indicate that an object has the property identified. Matrix schedules are also called dot schedules.

You can define schedule table styles to include matrix columns for specific properties. In addition, you can control the following characteristics of matrix schedules or matrix columns in regular schedules:

- The symbol used in each cell containing the property listed in the column header
- The maximum number of columns for each matrix property. If the unique property values in the column exceed this maximum number, the column is displayed as a normal column.

If the property data displayed in a matrix column is a string containing a semicolon-delimited list of values, each value in the list will be displayed separately. You can use this format to assign multiple values to the same property, such as multiple floor materials in the same space.

Creating Tools from Schedule Table Styles

You can create a schedule table tool from a schedule table style by dragging the style from the Style Manager onto a tool palette. You can then specify settings for the tool properties. For more information, see Creating a Schedule Table Tool on page 2462.

Managing Schedule Table Styles

To create, edit, copy, or purge schedule table styles, you access the Style Manager. The Style Manager provides a central location for working with styles from multiple drawings and templates. For more information, see Style Manager Overview on page 566.

Creating a Schedule Table Style

Use this procedure to create a schedule table style. You can either use the default style properties or copy an existing style and then customize the properties. After creating the style, you can create a schedule table tool, and use the tool to add the schedule to your drawing. For more information, see Adding Schedules Using Schedule Table Tools on page 2461.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Documentation Objects, and expand Schedule Table Styles.

3 Create a new schedule table style:

If you want to…	Then…
create a style with default properties	right-click Schedule Table Styles, and click New.
create a style from an existing style	right-click the schedule table style you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new style, and press *ENTER*.

5 Click the General tab, and enter a description.

6 Edit the options for the new schedule table style:

If you want to…	Then…
change the default format for the style	see Specifying the Default Format of a Schedule Table Style on page 2477.
specify the objects to be tracked in schedules using this style	see Specifying Objects for a Schedule Table Style on page 2479.
use classifications to filter the objects in a schedule	see Filtering Scheduled Objects by Classification in a Schedule Table Style on page 2479.
add columns for properties to be reported for tracked objects	see Adding Columns to a Schedule on page 2480.
add formula columns to display calculations	see Including a Formula Column in a Schedule Table on page 2483.
add headings that span columns	see Spanning Schedule Table Columns with a Heading on page 2485.
edit column placement settings and formats for column data	see Editing Columns in a Schedule Table on page 2485.
specify the sort order of rows	see Specifying the Sort Order in a Schedule Table Style on page 2487.
specify the formats of the table title, column headings, and matrix column headings	see Specifying Title Formats in a Schedule Table Style on page 2487.
specify visibility, layer, linetype, and other display properties	see Specifying Display Properties in a Schedule Table Style on page 2488.
enter notes and attach, edit, or delete reference files	see Attaching Notes and Files to a Schedule Table Style on page 2489.

7 Click OK.

Specifying the Default Format of a Schedule Table Style

Use this procedure to specify the default text format and placement for table columns and their contents. You can also specify the default symbol used in matrix schedules and for true/false values in regular schedules.

If necessary, you can override these settings for individual columns and table titles.

NOTE Most schedule table styles provided by AutoCAD Architecture have overrides applied to their titles and column headers. You can access these settings on the Layout tab in the Schedule Table Style Properties dialog.

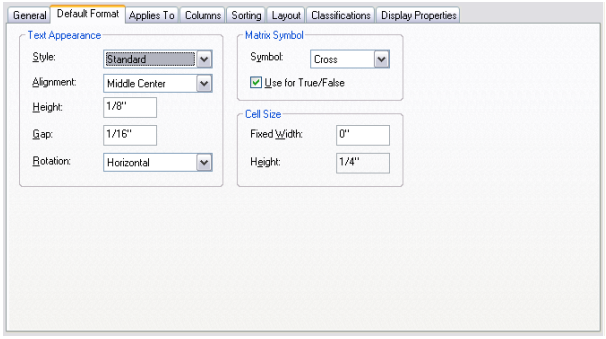
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

3 Select the schedule table style that you want to change.

4 Click the Default Format tab.



5 For Text Appearance, specify the following:

- For Style, select an AutoCAD® text style already defined in the drawing. To use a font other than those available from the drop-down list, you must first define an AutoCAD text style that uses the font. For more information, see "Overview of Text Styles" in AutoCAD Help.
- For Alignment, select positioning for the text. For more information about aligning text using the Multiline Text Editor, see "Justify Multiline Text" in AutoCAD Help.
- For Height, enter the text height that you want. Height is normally specified as the size you want to use when plotting the drawing containing the schedule.
- For Gap, enter the space between the text and the schedule table lines that you want. Gap is normally specified as the size you want to use when plotting the drawing containing the schedule table.
- For Rotation, select the desired orientation for text within cells. For the table title and group titles, Rotation also controls the orientation of these cells relative to the rest of the table.

6 Select a symbol (Check, Dot, Cross, or Slash) for use in matrix columns and, optionally, for true/false values.

7 Select or clear Use for True/False to control whether matrix symbols or the text in the property data format is used for true/false values.

8 Enter a fixed width for all columns, or enter **0.0** if you want columns to adjust to fit the data within them.

Fixed Width is normally specified as the size you want to use when plotting the drawing containing the schedule table.

NOTE Cell Size Height is a read-only field. Its value is calculated from the Height and Gap values.

9 Click OK.

Specifying Objects for a Schedule Table Style

Use this procedure to specify which objects to track in schedules created from a schedule table style. You can specify more than one object type. For example, you can create a schedule table style for windows that tracks both individual windows and window assemblies.

The property sets must apply to all object types specified in the style. For example, in a schedule table style for windows and window assemblies, the window assembly styles property set is not available because it does not apply to windows. In addition, limiting the number of object types in a schedule table style improves drawing performance.

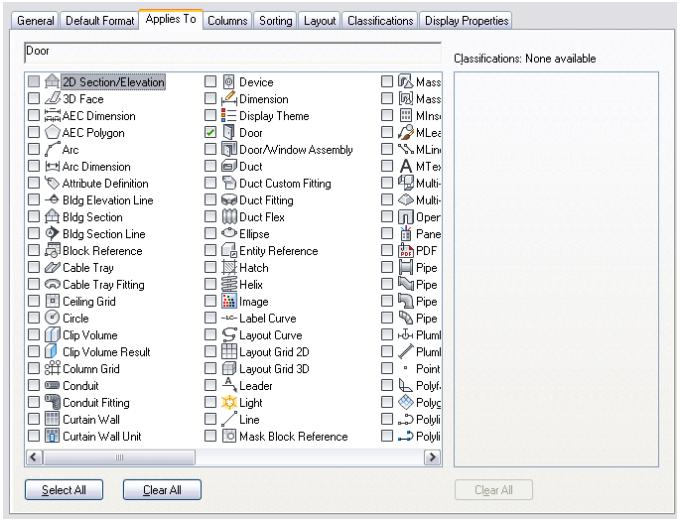
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

3 Select the schedule table style that you want to change.

4 Click the Applies To tab.



5 Select the object types to be tracked for schedule tables using this style.

You can select any objects on the list. The area above the list displays the objects that are currently selected. If you click Select All or Clear All, you can include any object in this schedule table style.

The right pane lists all classification definitions that apply to any of the selected object types. You can select multiple classifications in multiple classification definitions. If classifications are selected, schedule tables of this style can include objects selected on the left only if they have been classified with the selected classifications. For more information, see Classification Definitions on page 2540 and Filtering Scheduled Objects by Classification in a Schedule Table Style on page 2479.

6 Click OK.

Filtering Scheduled Objects by Classification in a Schedule Table Style

Use this procedure to specify the classification criteria that an object must satisfy to be included in schedules created from a schedule table style. You can specify more than one classification for an object type.

For example, if you want to schedule only doors with a New construction classification and a vendor with preferred classification, you can specify those criteria in the schedule table style. Only doors that meet both

criteria can be included in the schedule table. For more information, see A Classification Use Case on page 2542.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Schedule Table Styles.

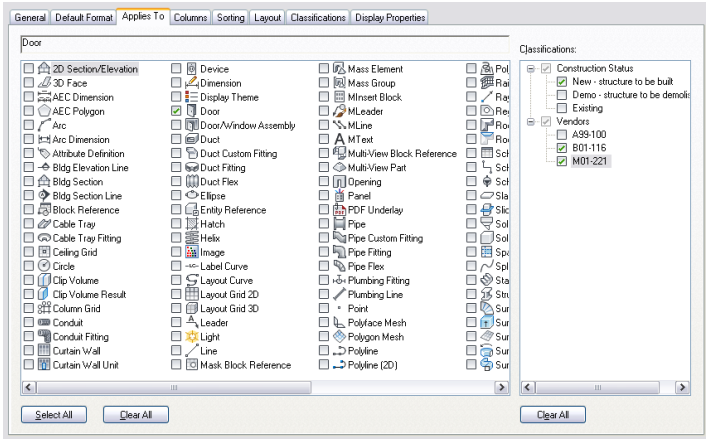
3 Select the schedule table style that you want to change.

4 Click the Applies To tab, and select the object types to be tracked for schedule tables using this style.

5 To specify classification criteria, expand a classification definition, and select one or more classifications.

For example, you can select a construction classification of New and 2 preferred vendors. For an object to be included in schedules of this style, its object style must specify New for the construction classification, and the classification for Vendor must be 1 of the 2 vendors selected.

Specifying multiple classification criteria in a schedule table style



6 Click OK.

Adding Columns to a Schedule

Use this procedure to add columns for each property to be reported in schedule tables created from a schedule table style.

Each column contains the values for one property in a property set. The property set definitions for the properties you specify must exist in the drawing before you can create columns for them. For more information, see Property Set Definitions on page 2510.

You must also specify the objects that the schedule table style applies to before you add columns. For more information, see Specifying Objects for a Schedule Table Style on page 2479.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

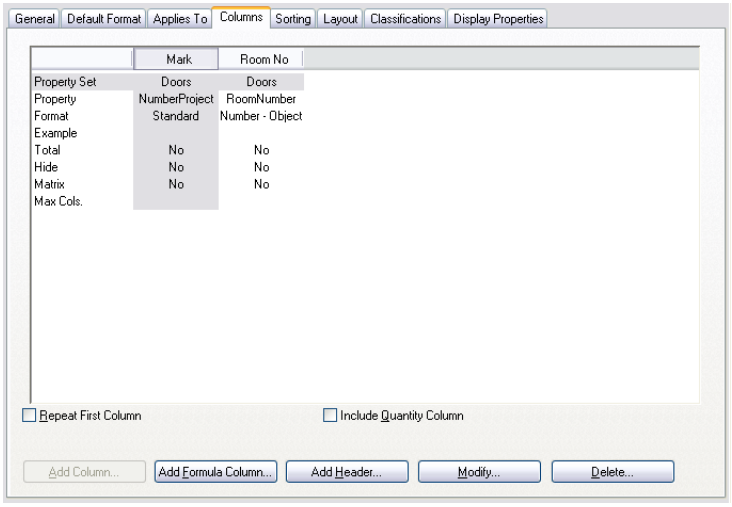
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

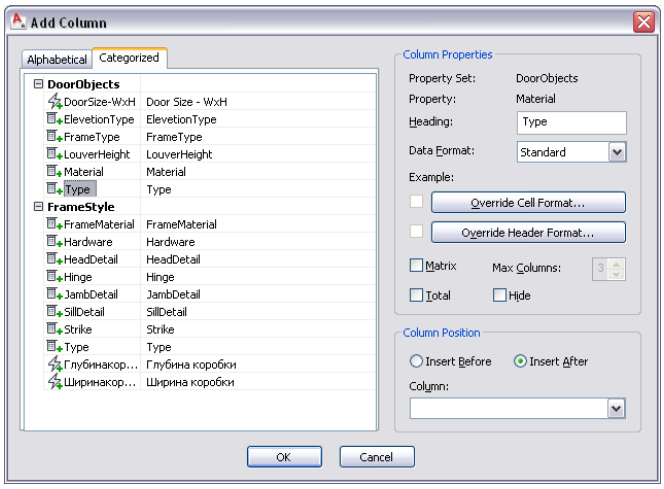
3 Select the schedule table style that you want to change.

4 Click the Columns tab.

5 Click Add Column to add a column to the right of the last column.

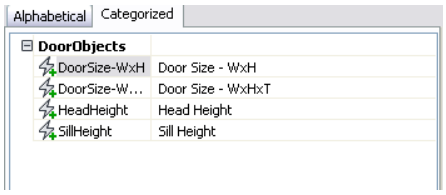


The Add Column worksheet opens.



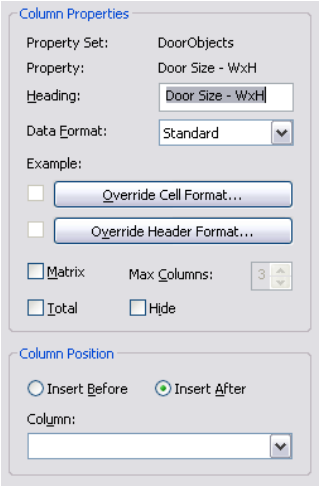
6 Select the property to track for the new column from the pane on the left.

Properties that have already been designated for another column are unavailable in the properties list.



7 Enter the heading for the column.

The property description is the default text for the column header.



8 Select the property data format, or use the default format from the property set definition.

The data format selected here takes precedence if it does not match the format specified in the property set definition for this property, and any formatted value stored in the property set definition is converted to display in the data format selected for this column. For more information, see Property Data Formats on page 2496.

9 Specify additional settings for the column:

If you want to...	Then...
specify a format and orientation for cells in this column	click Override Cell Format, and specify format settings that apply only to data cells in this column.
specify a format and orientation for the column heading	click Override Header Format, and specify format settings that apply only to data cells in this column.
use a matrix format for the values in the column	select Matrix, and enter the maximum number of columns used to report the values for the selected property.
report a total value from all the values in this column	select Total.
hide the column from view in the drawing	select Hide.

When you edit property data to be displayed in a matrix column, you can assign multiple values by using a text data type and separating the values with semicolons. Each value is displayed in a separate column in the matrix column.

10 Specify the placement of the new column relative to existing columns.

You can change the location of a column by dragging it to a new location in the schedule table. For more information, see Editing Columns in a Schedule Table on page 2485

11 Click OK twice.

Including a Quantity Column in a Schedule

Use this procedure to include a quantity column in schedules created from a schedule table style. If you include a quantity column, the objects in the table with the same values in every column are displayed in one row, with the number of objects displayed in the Quantity column. Quantity columns are inserted as the first column in the schedule table by default. For more information, see Adding Columns to a Schedule

on page 2480. For information about repositioning quantity columns, see Editing Columns in a Schedule Table on page 2485.

Include Quantity Column must be selected if you want to use quantities in a formula column. For more information, see Including a Formula Column in a Schedule Table on page 2483.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2 Expand Documentation Objects, and expand Schedule Table Styles.
3 Select the schedule table style that you want to change.
4 Click the Columns tab, and select Include Quantity Column.
   The Quantity column is inserted as the first column in your schedule table style.
5 Click OK.

Repeating the First Column of a Schedule

Use this procedure to insert a copy of the first column in a schedule as the last column in the schedule table style. This is helpful if you have a very wide schedule table, and you want the information in the first column repeated at the end for ease of use. For more information, see Adding Columns to a Schedule on page 2480.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2 Expand Documentation Objects, and expand Schedule Table Styles.
3 Select the schedule table style that you want to change.
4 Click the Columns tab, and select Repeat First Column.
5 Click OK.

Including a Formula Column in a Schedule Table

Use this procedure to include a formula column in schedules created from a schedule table style. Property definitions in the formula dialog are limited to the objects or styles to which the schedule table applies. For more information, see Adding Columns to a Schedule on page 2480 and Understanding Formulas on page 2514.

Use the formula column to create an expression based on the quantity or any other property set definition included in the schedule table style. For example, you can use a formula column to multiply a unit cost for an object by the number of objects to get a total cost. For more information, see Understanding Formulas on page 2514.

NOTE There is no conversion made between units for a formula result.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2 Expand Documentation Objects, and expand Schedule Table Styles.
3 Select the schedule table style that you want to change.
4 Click the Columns tab, and click Include Quantity Column if you want to insert quantities in your formula column.
5 Click Add Formula Column.

6 On the Add Formula Column worksheet, specify properties for the formula:

If you want to…	Then…
identify the formula column with a heading	enter text for Heading.
specify a data format for the formula result	select a data format.
change the format and orientation for cells in the column	click Override Cell Format, and specify format settings that apply only to data cells in this column.
change the format and orientation for the column heading	click Override Header Format, and specify format settings that apply only to data cells in this column.
report a total value from all the values in this column	select Total.
hide the column from view in the drawing	select Hide.
create a formula that calculates a total using property data from all columns	click Apply Formula to Total.

NOTE Hiding a column does not change the data displayed in it or any other column in the table. It only affects the display of the data.

7 Enter the formula:

If you want to…	Then…
use a value that you supply	click in the Formula pane, and enter the value.
use the value of another property definition in the formula	locate and double-click (or right-click and click Insert) the definition in the Insert Property Definitions list. You can also select the definition, and press *INSERT*.
use a VBScript function	locate and double-click (or right-click and click Insert) the function in the Insert VBScript code list. You can also select the function, and press *INSERT*.
evaluate the formula as a VBScript function	enter **RESULT** anywhere in the formula.

The property definitions available for use in the formula must be applied to the same objects as the property set definition containing the formula.

The names of property definitions used in the formula are displayed within brackets, such as [Width]. If a property definition belongs to a property set definition other than the one containing the formula, that name is displayed as well, such as [DoorObjects:Height].

The formula property definition cannot be used in the formula it defines, as indicated by the and the addition of [Self] after its name. Property definitions that end up using the value of the formula cannot be used in the formula, as indicated by the and the addition of [Circular Reference] after their names.

NOTE If you enter the name of a property definition directly in the formula string, or copy and paste between formulas, the property definition is displayed as normal text. For property values of property definitions to be inserted correctly, they must be selected from the list in the Insert Property Definitions pane.

For more information, see Adding a Formula Property Definition to a Property Set Definition on page 2514 and Use Case for the Formula Property Definition Worksheet on page 2517.

8 Enter a value in the Enter Sample Values pane.

The property value you enter displays in the current format specified.

9 Select a property data format to specify how the property value is formatted in the formula.

The format you select becomes the default format in a formula when this property is added to a schedule table style. It can be changed at any time. The Example column on the Definition tab shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

10 Click OK.

Spanning Schedule Table Columns with a Heading

Use this procedure to add a heading that spans multiple adjacent columns in a schedule table style. For example, you can create a Hardware heading to span the columns for hinges, handles, and locks in a door schedule.

You can also remove a heading that spans multiple columns.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

3 Select the schedule table style that you want to change.

4 Click the Columns tab.

5 Select the first column you want to include under a heading, and press *CTRL* while you select the other columns.

Columns must be adjacent.

6 Click Add Header.

7 Enter a title for the heading, and press *ENTER*.

8 To remove a heading, select it, and click Delete.

9 Click OK twice.

Editing Columns in a Schedule Table

Use this procedure to change placement and formats for columns in schedule tables created from a schedule table style. You can also delete a column. When you modify columns within a schedule table style, changes apply to all schedule tables of the same style and override the default format settings.

To change the format of all column headings, see Specifying Title Formats in a Schedule Table Style on page 2487.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

3 Select the schedule table style that you want to change.

4 Click the Columns tab.

5 Select a column, and click Modify.

6 Specify properties for the column:

If you want to…	Then…
change the column heading	enter the new column heading for Heading.
change the format and orientation for cells in the column	click Override Cell Format, and specify format settings that apply only to data cells in this column.
change the format and orientation for the column heading	click Override Header Format, and specify format settings that apply only to data cells in this column.
use a matrix format for the values in this column	select Matrix, and enter the maximum number of columns used to report the values for the selected property.
report a total value from all the values in this column	select Total.
hide the column from view in the drawing	select Hide.

NOTE Hiding a column does not change the data displayed in it or any other column in the table. It only affects the display of the data.

7 Click OK.

8 Change the order of columns:

If you want to…	Then…
move an individual column	select the column heading, and drag the column to a new location.
move a group of columns that have a common heading that spans the columns	select the common heading, and drag the column group to a new location.
remove a column from a column group	select the heading for the column group, and click Delete. Hold down *SHIFT* or *CTRL* to select multiple columns. In the Remove Columns/Headers dialog, select the columns or headers to be deleted, and click OK.
add a column in a column group	Select the columns to include in the column group, and click Add Header. Hold down *SHIFT* or *CTRL* to select multiple columns. In the Add Header dialog, enter the heading name. If you want to change the header format, click Override Header Format. For more information, see Specifying Title Formats in a Schedule Table Style on page 2487.

9 To delete a column, select the column, and click Delete.

10 To use a different property in a column, delete the column, and add a new column with the property you want to use.

11 Click OK.

NOTE Property data format styles, property set definitions, and schedule table styles cannot be changed through RefEdit. Changes seem to work, but will revert to the previous settings when saved back to the xref file. Open the xref drawing directly, and make the changes there.

Specifying the Sort Order in a Schedule Table Style

Use this procedure to specify the sort order of rows in a schedule table style. You can sort rows in ascending or descending order of the values in one or more columns.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Documentation Objects, and expand Schedule Table Styles.
3. Select the schedule table style that you want to change.
4. Click the Sorting tab.
5. Specify the sort order of the rows:

If you want to…	Then…
add a property to sort by	click Add, select a property to sort by, and click OK. The Select Property dialog lists all properties defined on the Columns tab but not already selected for sorting.
specify the sorting method for a property	select the property, and select Ascending or Descending for Sort Order.
remove a property from the sorting list	select the property, and click Remove.
change the location of a property in the sort order	select the property, and click Move Up or Move Down, as needed.

6. Click OK.

Specifying Title Formats in a Schedule Table Style

Use this procedure to enter the title of a schedule table, and to specify the formats of the table title, column headings, and matrix column headings. The formats that you specify in this procedure for regular and matrix column headings override the default format settings. Value overrides display in red in the Cell Format Override dialog.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Documentation Objects, and expand Schedule Table Styles.
3. Select the schedule table style that you want to change.
4. Click the Layout tab.
5. Enter the title of the schedule table for Table Title.
6. Select Override Cell Format next to the type of title format you want to change.
7. In the Cell Format Override dialog, select a text style.
   For Style, select an AutoCAD® text style already defined in the drawing. To use a font other than those available from the drop-down list, you must first define an AutoCAD text style that uses the font. For more information, see "Overview of Text Styles" in AutoCAD Help.
8. For Alignment, select positioning for the text. For more information about aligning text using the Multiline Text Editor, see "Justify Multiline Text" in AutoCAD Help.

9 For Height, enter the text height that you want. Height is normally specified as the size you want to use when plotting the drawing containing the schedule table.

10 For Gap, enter the space between the text and the schedule table lines that you want. Gap is normally specified as the size you want to use when plotting the drawing containing the schedule table.

11 For Rotation, select the desired orientation for text within cells. For the table title and group titles, Rotation also controls the orientation of these cells relative to the rest of the table.

For the table title and group titles, this option also controls the location of the cell relative to the rest of the table.

NOTE Cell Size Height is a read-only field. Its value is calculated from the Height and Gap values.

12 Click OK.

13 To remove an override, clear the check box next to the title format you want to restore to the default format.

14 Click OK.

Specifying Display Properties in a Schedule Table Style

Use this procedure to change the following properties of the display components in a schedule table style:

- Visibility (display component is on or off)
- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

You can specify display properties for the table outer frame, lines between rows and columns, the table title, column headers, and the data in table cells.

You can also turn on an out-of-date marker that indicates when the data in a schedule table created from the schedule table style does not show the latest changes. This component is turned off by default. Turning it on can slow drawing performance, especially in large drawings.

1 Select the schedule table style you want to change, right-click, and click Edit Object Display.

2 Click the Display Properties tab.

3 Select the display representation on which to display the changes, and select Style Override.

The display representation in bold is the current display representation.

4 If necessary, click .

5 On the Layer/Color/Linetype tab, select the component to change, and select a different setting for the property.

Use Data Major Row Lines for every fifth row and Data Minor Row Lines for all other rows to control the display properties for lines separating each row of data. This is useful for long schedule tables.

6 Click OK twice.

Attaching Notes and Files to a Schedule Table Style

Use this procedure to enter notes and attach reference files to a schedule table style. You can also edit notes and edit or detach reference files from a schedule table style.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Schedule Table Styles.

3 Select the schedule table style that you want to change.

4 Click the General tab.

5 Click Notes.

6 To add a note, click the Notes tab, and enter the note.

7 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK.

Exporting a Schedule

Use this procedure to export the contents of a schedule table to a separate file. You can export the data in the following file formats:

- Microsoft® Excel spreadsheet (XLS) files (2 formats)
- Comma-separated values (CSV) files
- Tab-delimited text (TXT) files

NOTE You must have Microsoft Excel installed to export a file to Excel format.

1 Open the drawing file that includes the table you want to export.

2 Select the schedule table.

3 Click Schedule Table tab ➤ Modify panel ➤ Export .
The Export Schedule Table dialog opens.

4 Select a file type to Save As.

5 Enter a name for the file, or click Browse to select a file, and click OK.
The Format dialog opens if you selected an XLS file type for Save As Type.

6 Convert the schedule values in the exported file by selecting Use Unformatted Decimal Value or Convert to Formatted Text.

The format of values does not change in the drawing file. Selecting Convert to Formatted Text displays the architectural format (6'-0") in Microsoft Excel.

7 Click OK to format columns one at a time, or select Apply to All Columns, and click OK.

If a file already exists with the name you specified, a warning is displayed. Overwrite the existing file, specify a unique name, or cancel the export command.

Exporting Schedule Data for Selected Objects

Use this procedure to export selected property set data from a schedule table to a separate file. You can export the data in the following file formats:

- Microsoft® Excel spreadsheet (XLS) files (2 formats)
- Comma-separated values (CSV) files
- Tab-delimited text (TXT) files

NOTE You must have Microsoft Excel installed to export a file to Excel format.

Using this procedure, you can create a file with property set data for selected objects even if the schedule table does not exist in the drawing. To export all the data in a schedule table, see Exporting a Schedule on page 2489.

1 On the command line enter **AecScheduleExport**.

The Export Schedule Table dialog opens.

2 Select a file type to Save As.

3 Enter a name for the file, or click Browse to select a file.

4 Clear Use Existing Table.

5 Select the table style to use in the exported file.

Columns included in the schedule table style determine the property set data that is exported for the objects. For more information, see Creating a Schedule Table Style on page 2476.

6 Select the layer wild card to use as a filter in the exported file.

7 Specify whether to scan for xrefs or block references, and click OK.

8 Select the objects to include in the exported table, and press *ENTER*.

The Format dialog opens if you selected an XLS file type for Save As Type.

9 Convert the schedule values in the exported file by selecting Use Unformatted Decimal Value or Convert to Formatted Text.

The format of values does not change in the drawing file. Selecting Convert to Formatted Text displays the architectural format (6'-0") in Microsoft Excel.

10 Click OK to format columns one at a time, or select Apply to All Columns, and click OK.

If a file already exists with the name you specified, a warning is displayed. Overwrite the existing file, specify a unique name, or cancel the export command.

Specifying the Display Properties of a Schedule

Use this procedure to change the following properties of display components for a schedule table:

- Visibility (display component is on or off)

- Layer
- Color
- Linetype
- Lineweight
- Linetype scale

To change these display properties for all schedule tables of the same style, and to see additional information about schedule table style display components, see Specifying Display Properties in a Schedule Table Style on page 2488.

1 Select the schedule table you want to change, right-click, and click Edit Object Display.
2 Click the Display Properties tab.
3 Select the display representation on which to display the changes, and select Style Override.
The display representation in bold is the current one.
4 If necessary, click .
5 Click the Layer/Color/Linetype tab.
6 Select the component to change, and select a different setting for the property.
7 Click OK twice.

Changing General Schedule Properties

Use this procedure to change general properties of basic schedule table settings for a specific schedule table on the Design tab of the Properties palette.

1 Double-click the schedule table you want to change.
2 On the Properties palette, expand Basic, and expand General.
3 Specify general properties for the schedule table:

If you want to…	Then…
change the description	enter text for Description.
change the layer	click Layer, and select a layer from the drop-down list.
change the schedule table style	click Style, and select a style from the drop-down list.
change the schedule title	click Title, and enter new text for Title.
change the schedule table scale	click Scale, and enter a value for Scale.
automatically update the schedule table when data in the drawing changes	select Yes for Update automatically.
manually update the schedule table when the drawing changes	select No for Update automatically.

NOTE Turning on the automatic update feature may slow drawing performance, especially in large drawings. For information about updating schedules manually, see Updating a Schedule Manually on page 2464.

Changing the Selection Criteria for a Schedule

Use this procedure to change how objects are added to the schedule table.

1. Double-click the schedule table you want to change.
2. On the Properties palette, expand Basic, and expand Selection.
3. Change how objects are added to the schedule table:

If you want to…	Then…
automatically add new objects to the schedule table as they are added to the drawing	select Yes for Add new objects automatically.
manually add new objects to the schedule table	select No for Add new objects automatically.
include objects from xref drawings in the schedule table	select Yes for Scan xrefs.
exclude objects from xref drawings in the schedule table	select No for Scan xrefs.
include objects from block references in the schedule table	select Yes for Scan block references.
exclude objects from block references in the schedule table	select No for Scan block references.
apply a layer filter to the table	specify a layer wild card.

NOTE When adding a schedule table that must scan xrefs or blocks, use a layer filter that includes both the name of the layer that contains the xref or block, and the name of the layer of the object inside the xref or block. You can separate multiple layer wild cards with a comma.

Changing the Location of a Schedule Using Grips

Use this procedure to relocate a schedule table using the Location grip. For schedule tables, the Location grip is restricted to movement in the XY plane. You can enter specific values for distance for both the X and Y dimensions.

You can also change the location of a schedule table using the Properties palette.

1. Select the schedule table you want to change.
2. Select the Location grip.
3. Move the schedule table to the desired location, and click; or enter a value, and press *ENTER*.

   If you want to enter a specific value for the second direction in any edit mode (for example, in the Y direction when editing along the XY plane), press *TAB* to cycle to the second direction.

   You can also lock the movement of the schedule table along a specific direction. If you enter a value for either of the dimension directions in the current edit mode and then press *TAB*, the movement of the schedule table is constrained to the second dimension direction. When editing along the XY plane, for example, you can enter a value for the X dimension, and then press *TAB*. The X dimension is locked at that value, and movement of the schedule table is constrained to the Y dimension direction.
4. Right-click, and click Deselect All to turn off grips.

Changing External Source Properties of a Schedule

Use this procedure to create a schedule table that contains property data from an external drawing such as a project drawing.

Schedule tables can contain information from external references and block references if it exists in the same drawing as the schedule table. Optionally, schedule tables can specify an external drawing. The information is scheduled as if it were an external reference in the same drawing as the table. The advantage is that the graphics of the external drawing do not need to be generated in order to fill out the data in the table.

1. Double-click the schedule table you want to change.
2. On the Properties palette, expand Advanced, and expand External Source.
3. Specify the external drawing you want to schedule:

If you want to…	Then…
schedule an external drawing	select Yes for Schedule external drawing. The External drawing property is displayed.
not schedule an external drawing	select No for Schedule external drawing. The External drawing property is hidden.
specify the external drawing to schedule	click the value for External drawing, select a drawing, or click Browse, and in the Select a drawing file dialog, browse to select a drawing, and click OK.

The External drawing property is displayed with a drop-down list containing all drawings in the View directory of the current project. Each drawing corresponds to a view defined in the project. If no project is active, the list contains all drawings in the last directory browsed.

TIP If you want to schedule the entire project, you can set up one drawing as a container file, and xref in all project drawings. Then select the name of this drawing for the external drawing source.

Adding Table Breaks to a Schedule

Use this procedure to split long tables into a series of shorter pages.

1. Double-click the schedule table you want to change.
2. On the Properties palette, expand Advanced, and expand Table Breaks.
3. Specify how you want to display the pages of tables:

If you want to…	Then…
display pages horizontally to the right of one another	select Right for Direction.
display pages vertically below one another	select Down for Direction.
display the title on each page	select Yes for Repeat title.
display the column headers on each page	select Yes for Repeat Headers.
hide the column headers on each page	select No for Repeat Headers.
control the height of each page individually	select Yes for Manual heights.
have all pages approximately the same height	select No for Manual heights.

If you want to…	Then…
specify the maximum height of each page when Manual heights is No	enter a value for Maximum height, or select and drag the Maximum Page Height grip at the bottom of the table.
specify the distance between each page	enter a value for Spacing.

You can control the height of all pages by setting one value if Manual heights is set to No. If the table contains more than one object, select and drag the Maximum Page Height grip at the bottom of the table.

You can control the height of each page individually if Manual heights is set to Yes. If the table contains more than one object, it will have one Insert Page grip at the bottom of the last page and one Page Height grip at the bottom of all other pages. Select the Insert Page grip, and drag it up to insert a new page. Select a Page Height grip, and drag it up or down to set the height of that page. Continuing to drag a Page Height grip down reduces the height of the last page, and could possibly remove it.

Adding Documentation Information to a Schedule

Use this procedure to add hyperlinks, notes, and reference documents to the schedule table.

1. Double-click the schedule table to which to add documentation.
2. On the Properties palette, expand Documentation.
3. Specify documentation information:

If you want to…	Then…
add a hyperlink	click . Select the file, and click Open.
edit notes	click , and enter text.
change an attached reference document	click . Click Add, and select a file. Click Open, and click OK.
edit the reference document attached	click . Select the document, right-click, and click Edit. Select a new document, click Open, and click OK.
edit the description of a reference file	click . Select the description, enter the new description, and click OK.
detach a reference file	click . Select the file name, and click Remove.

Editing Table Cell Data

Use this procedure to highlight scheduled objects in a drawing and edit manual property set data in a schedule table.

Automatic property set data cannot be edited in a schedule table. You must edit the object, style, or other data to change the values of automatic property data. For more information about property set data, see Property Set Data on page 2502.

You can use this procedure to troubleshoot problems between a table cell and a source object. If the object is not currently visible in your drawing area, press *CTRL* while selecting the cell to zoom to display the source object. The changes you make to the manual property set data in the table cell are saved with the object. If the schedule table cell references several objects in a quantity cell, making your selection while pressing *CTRL* displays an area that includes all the source objects. Holding the cursor over a quantity cell highlights the objects counted by that cell.

If you are working in a table that schedules a drawing from an external source, you cannot edit table cells.

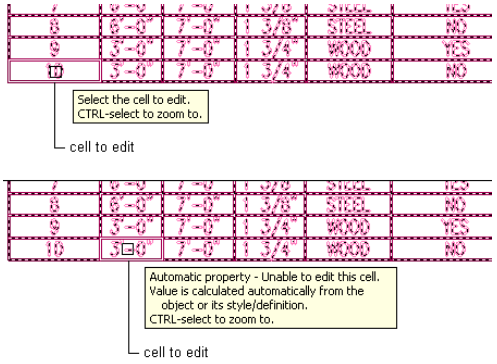
1 Select the schedule table.

2 Click Schedule Table tab ➤ Modify panel ➤ Edit Table Cell .

3 Position the cursor over the cell.

The source object is highlighted if it is visible. A tooltip is displayed regardless of whether the cell can be edited, what type of data is presented in the table cell, or any potential problems with the data in that cell.

Viewing tooltips for editing table cell objects



An external reference icon is displayed if the cell data is from an object in an externally referenced drawing. If you edit this cell, the externally referenced drawing is modified. If the drawing is locked by another user, you cannot edit it.

4 Identify the different views:

If you want to…	Then…
view all source objects associated with the schedule table cell	press *CTRL*, and select the data in the schedule table cell. The drawing changes to show the source objects associated with the cell.
restore the previous view	click Zoom Previous.

5 Edit the data in the schedule table:

If you want to…	Then…
edit the value in an individual table cell	select the individual cell, and enter a new value on the Edit Referenced Property Set Data worksheet.
edit the value for all instances of a property	select the border of the schedule table, and enter a value for the selected property on the Edit Referenced Property Set Data worksheet.

NOTE Cells that display property set data attached to styles may affect multiple objects. Editing one cell changes the value for all objects of that style in the schedule table.

Adding Property Set Data to All Objects

Use this procedure to add property set data to all objects for which a question mark (?) in a schedule table cell is displayed. This symbol indicates that the property set containing that required property data has not been attached to the object. You can attach these property sets individually, as described in Editing Table Cell Data on page 2494, or you can attach the property sets to all of the objects at once.

1 Select the schedule table.

2 Click Schedule Table tab ➤ Modify panel ➤ Add All Property Sets .

NOTE If you are working in a table that schedules an external drawing, you cannot add property sets to those objects. For more information, see Changing External Source Properties of a Schedule on page 2493.

Property Data Formats

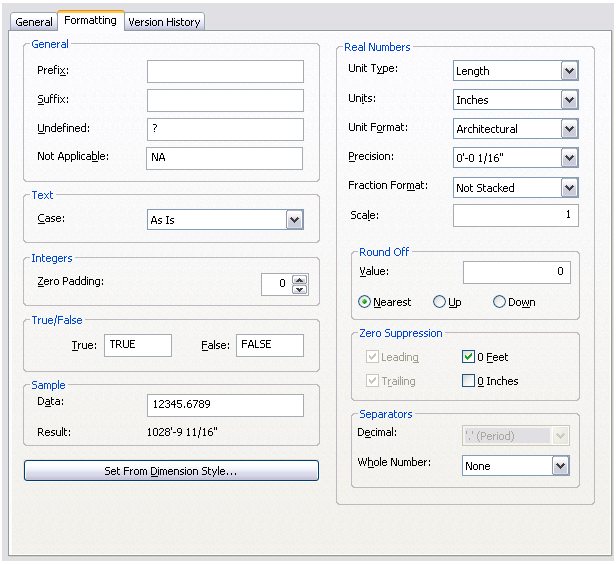
Property data formats are style-based documentation objects that control how data is displayed in schedule tables, schedule tags, the Edit Property Set Data worksheet, and on the Properties palette. Property data formats are created and modified using the Style Manager. For information about overriding a format, see Units in Property Data Formats on page 2497.

Data Types

Each property data format contains separate settings for formatting each of the following data types:

- Text
- True/False values
- Integers
- Real numbers

When you apply a data format to schedule data, the value for each property is displayed using the specified settings for that property's data type. For example, the same schedule data format can specify that a dimension value uses the real number settings, while a remark uses the settings for text.



Using Different Data Formats

You can specify different data formats for the same property in property set definitions, schedule table styles, and schedule tags. This enables you to display the same value differently in different contexts. For example, you may want to use a data format with greater precision for real numbers in a property set, and display fewer digits in a schedule table.

Managing Data Formats

To create, edit, copy, or purge data formats, you access the Style Manager. The Style Manager provides a central location for working with data formats from multiple drawings and templates. For more information, see Style Manager Overview on page 566.

Applying Property Data Formats

Property data is retrieved from an object as raw, unformatted values. Property set definitions, schedule table styles, schedule tags, and the Properties palette use data formats to display property data as formatted values. The Edit Property Set Data worksheet uses the data formats from property set definitions to format values.

You typically apply the same data format to similar properties and then select a data format that is appropriate for each property, such as the width, height, and thickness of a door. The software includes several default data formats. You can customize one of these, or you can create new data formats, to display units in a specific manner. For example, when you want to show the length of a wall in feet, you can select Length for Type, Feet for Units, and Architectural for Format. Real numbers for costing properties, however, require a monetary format. You can create different property data formats for these situations.

The data formats available for property set definitions, schedule table styles, and tags are those stored in the current drawing. When you copy property set definitions or schedule table styles into a drawing, data formats used in the definitions and styles are also copied into the drawing.

If you modify a data format, the display of the property data is affected in any property set, schedule table, or schedule tag that uses the format.

Units in Property Data Formats

Property data formats control how units display in schedule tables, schedule tags, the Edit Property Set Data worksheet, and on the Properties palette. Units behave differently with real numbers in manual properties

than they do with automatic properties. For more information, see Applying Property Data Formats on page 2497.

Units for Automatic Properties

Units for automatic properties are collected directly from the objects. An automatic property, such as width, uses the units specified on the Units tab in the Drawing Setup dialog by default. Using different property data formats allows you to override the default format.

When you use a property data format, the AutoCAD units are converted to display as defined in the property data format. You can specify a property data format on the Definition tab of a property set definition.

Units for Manual Properties

Units specified for manual properties in the property set definition control what is stored in the drawing. The Extended Data tab of the Properties palette displays the units as defined in the property data format. When the type of unit is Real, you can select a format and type of unit in the property set definition to override the property data format when entering units. For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523.

Creating a Property Data Format

Use this procedure to create a property data format. You can create a format using default properties or by copying an existing data format. You can then edit the properties to customize the characteristics of the new data format.

NOTE Certain automatic properties cannot be formatted with property data formats because their values are formatted from within the automatic query.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Data Formats.

3 Right-click Property Data Formats, and click New.

4 Enter a name for the new property data format, and press *ENTER*.

5 Select the new property data format.

6 On the Formatting tab, specify general formatting values:

If you want to…	Then…
specify a prefix	enter a string to be placed in front of data for Prefix. For example, tolerances might require a preceding plus/minus symbol; a tolerance of 10 could be displayed as +10. A currency string could be prefixed with a dollar sign.
specify a suffix	enter a string to be placed after data for Suffix. For example, a door leaf thickness of 35 could have a millimeter suffix (35mm). **NOTE** If you override the unit type in a manual property set definition, change the suffix here to display the units correctly.

If you want to…	Then…
specify text for a property that is undefined	enter a text string to be displayed when the requested property has not been attached to an object for Undefined. A typical undefined string is "?."
specify text for a property that is not applicable	enter a text string to be displayed when the requested property does not apply to an object for Undefined. For example, the rise property does not apply to a door with a rectangular opening, but it does apply to one with an arched opening. A typical not applicable string is "NA."

7 Specify the case for the schedule text:

If you want to…	Then…
use no case formatting	select As Is for Case.
convert all text to uppercase	select Upper for Case.
convert all text to lowercase	select Lower for Case.
capitalize the first letter of the first word	select Sentence for Case.
capitalize the first letter of each word	select Title for Case.

8 Enter the maximum number of digits, including leading zeroes, for integers.

Zero padding is the expansion of integer values to include leading zeros. The value entered specifies the maximum length of a numeric value after it has been padded with leading zeros. For example, with Zero Padding at 3, the number 6 would become 006. This option primarily is intended for identity numbers, such as those used by door and window tags. For example, to number doors as D01 through to D99, the raw value of the data would be saved as a simple integer, but the prefix would be D and Zero Padding would be 2. Entering zero for Zero Padding applies no zero padding.

9 Enter the values for True and False.

For example, you can specify Yes for True and No for False.

10 Enter data to display a sample of your current settings for Result.

11 For formatting that can be specified by dimension style, click Set from Dimension Style, select a dimension style, and click OK.

Undefined, Not Applicable, Case, Zero Padding, and True/False are not defined by dimension styles.

12 Select the unit type, format, numerical precision, fraction format, and scale for real numbers. Definitions of these items are as follows:

- **Unit Type:** The format in which to display the type of units, such as length, area, and volume.
- **Units:** The drawing units in which the unit is stored. For example, if you select Volume for Unit Type, options to select from include cubic inches, cubic feet, cubic millimeters, cubic centimeters, and cubic meters.
- **Unit Format:** The drawing unit format in which the value is displayed. The AutoCAD® conversion units (Architectural, Scientific, Decimal, Engineering, and Fractional) are used

when converting numeric values into strings. For example, a value of 14.25 is displayed as 1'–2 1/4" in architectural units.

- **Precision:** The number of decimal places used to display floating point numbers (for example, 0, 0.0, 0.00, and so on).
- **Fraction Format:** If the unit format is Architectural or Fractional, set the format used to display fractions (Horizontal, Diagonal, or Not Stacked). Note that all fonts do not support all fraction formats.
- **Scale:** The value by which the real number is scaled before it is displayed. For example, if the current drawing units are inches, a scale of 2.54 converts a dimension to centimeters.

13 Select the Round Off value for real numbers:

If you want to…	Then…
round to the nearest value	select Nearest.
round to the nearest greater value	select Up.
round to the nearest lesser value	select Down.

If you enter a value of 0.25, all numeric values are rounded to the nearest 0.25 unit. Similarly, if you enter a value of 1.0, all numeric values are rounded to the nearest integer. The number of digits displayed after the decimal point depends on the precision specified. No round-off occurs for a value of 0.0.

14 Specify the rules for suppression of leading and trailing zeros, and feet and inches of floating point numbers:

If you want to…	Then…
suppress leading zeros in all decimal numeric values	select Leading for Zero Suppression. For example, 0.5000 becomes .5000.
suppress trailing zeros in all decimal numeric values	select Trailing for Zero Suppression. For example, 12.5000 becomes 12.5.
suppress the feet portion of a feet-and-inches numeric value when the value is less than one foot	select 0 Feet for Zero Suppression. For example, 0'–6 1/2" becomes 6 1/2".
suppress the inches portion of a feet-and-inches numeric value when the value is an integral number of feet	select 0 Inches for Zero Suppression. For example, 2'–0" becomes 2'.

For more information, see “New, Modify, and Override Dimension Style Dialog Boxes” in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture 2010 Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

15 Select the decimal separator.

16 Select the whole number separator.

17 Click OK.

Attaching Notes and Reference Files to a Property Data Format

Use this procedure to enter notes and attach reference files to a property data format. You can also edit notes and edit or detach reference files from a property data format.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Data Formats.

3 Select the property data format that you want to change.

4 Click the General tab.

5 To add a description to the property data format, enter it for Description.

6 To add a note, click the Notes tab, and enter the note.

7 Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, click Open, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK.

Expanding the Scope of Scheduled Data

The data that can be collected and graphically presented in a schedule table is extensive. To effectively customize schedule tables to meet your needs, you need to understand the following elements which control how data is displayed and which data is collected.

- Property set data
- Property set definitions
- Automatic properties
- Manual properties
- Formula definitions
- Classification definitions
- Material definitions
- Project definitions
- Anchor definitions
- Graphic definitions

Property Set Data

Objects to be included in schedule tables or linked to tags must have property set data attached to them. Schedule tables and tags do not store any data, but extract and display property set data from the associated objects.

Property set data is collected from one or more property sets attached to an object or a style. Some property data, such as a dimension, comes from automatic properties of the object or the object style and cannot be manually entered, such as dimensions. Other property data consists of manual properties for which you must enter values for each object or object style, such as manufacturer's name.

IMPORTANT If an entity or style containing a property set is copied from a source drawing into a target drawing that already contains a property set with the same name, the property set in the target drawing does not change. There is a potential for a loss of data in this case. For example, assume a property set in one drawing has a number of manual properties defined and is attached to a door style with manual property values set. This door style is then copied into another drawing that contains a duplicate property set that does not have the same manual properties defined. In the target drawing the door style will contain the target drawing's property set, not the source drawing's property set. Any data values associated with the source drawing's manual properties will be lost.

Attaching Property Set Data to Objects

Use this procedure to attach property set data to objects that you want to include in a schedule table or link to schedule tags.

You attach property set data to objects by attaching one or more property sets, defined by a property set definition. After property sets are attached, the values for automatic properties are determined from the object, and you can enter values for the manual properties.

For information about attaching property set data to an object style, see Attaching Property Set Data to Styles and Definitions on page 2504. For information about property sets and external references, see Attaching Property Sets to Objects from External References on page 358.

1. Double-click the object(s) for which you want to attach property set data.

   NOTE If you select more than one type of object, you can attach only the property set definitions that apply to all the selected objects. For example, if you select doors and windows, you can attach only those property sets that apply to both doors and windows.

2. On the Properties Palette, click the Extended Data tab.
3. Click .
4. Select the property set you want to attach, and click OK.

Entering Manual Properties and Fields for Objects

Use this procedure to enter values for manual properties for one or more objects. For example, to enter a remark that applies to several doors in a drawing, you can select the doors and enter the remark as data for Notes.

You can insert fields into manual properties. Fields enhance the documentation capabilities within a drawing file because the values they display update whenever the associated property changes. You can also enter AutoCAD fields into manual properties attached to objects or styles.

NOTE Fields can be associated with hyperlinks. For example, if you insert a field pointing to a drawing using a hyperlink in a manual property, and create a schedule table that contains that property, you can jump from the table cell with the field property in it to the drawing to which it is linked. For detailed information about fields, see "Use Fields in Text" in AutoCAD Help.

1 Select the object(s) for which you want to add a manual property or field, right-click, and click Properties.

2 On the Properties palette, click the Extended Data tab.

NOTE If no property set data appears, no property sets are attached to the objects. To attach property sets, see Attaching Property Set Data to Objects on page 2502.

3 Enter a value for a manual property.

If you want to…	Then
specify an alphanumeric value	select the property, and enter the value.
insert a field	right-click in the current value for the property, and click Insert Field. Select a field from one of the available categories, specify the desired format, and click OK.

NOTE You can also define a default field for the manual property in the property set definition. For example, if you want all walls to have a field that displays the last save date of the drawing, you can enter the "SaveDate" field in the property set definition, so that it will be displayed for each object connected to the property set. For more information, see Adding a Field to a Property Set Definition on page 2525.

Editing or Updating Fields in Manual Properties

Use this procedure to update or edit field values in a manual property. When you edit a field, you can change the field formatting and other settings. For more information, see Entering Manual Properties and Fields for Objects on page 2502.

1 Double-click the object(s) for which you want to edit the fields.

2 On the Properties palette, click the Extended Data tab.

3 Place the cursor in the row containing the field to update.

If you want to…	Then…
update the field value	right-click, and click Update Field.
change the field format or other settings	right-click, and click Edit Field.

Converting Fields in Manual Properties to Text

Use this procedure to convert fields in manual properties to text. When you convert a field to text, it loses its connection to the referenced information. For example, if the field had a hyperlink to a drawing, the hyperlink to the drawing will be lost. For more information, see Entering Manual Properties and Fields for Objects on page 2502.

1. Double-click the object(s) for which you want to convert field properties to text.
2. On the Properties palette, click the Extended Data tab.
3. Place the cursor in the row containing the field you want to convert to text, right-click, and click Convert Field to Text.

Removing Property Set Data from an Object

Use this procedure to remove one or more property sets from an object. If an object is included in a schedule table, any data in the table obtained from the removed property set displays question marks in the table.

1. Double-click the objects from which to remove property set data.
2. On the Properties Palette, click the Extended Data tab.
3. Click .
4. Select property sets to remove, and clear any property sets to remain attached to the object.
5. Click OK.

Attaching Property Set Data to Styles and Definitions

Use this procedure to attach data to object styles and definitions, such as space styles, curtain wall styles, door styles, and multi-view block definitions.

You attach data to a style or a definition by attaching one or more property sets to it. Objects that use the style or definition inherit its property set data. The values for automatic properties, which may be different for each instance of the style, are determined from the objects, and you can enter values for manual properties. For more information, see Property Set Data on page 2502. For information about attaching property set data to individual objects, see Attaching Property Set Data to Objects on page 2502.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Architectural Objects, and locate the style or definition to which to attach property set data.
3. Select the style or definition.
4. Click the General tab, and click Property Sets.
5. Click .
6. Select the property sets that you want to attach.
7. Click OK twice.

Entering Manual Properties and Fields for Styles and Definitions

Use this procedure to enter values for manual properties in the property set data for a style or definition. The values you enter apply to all instances of objects associated with the style or definition.

You can insert fields into manual properties. Fields enhance the documentation capabilities within a drawing file because the values they display update whenever the associated property changes. You can also enter AutoCAD fields into manual properties attached to objects or styles.

NOTE Fields can be associated with hyperlinks. For example, if you insert a field pointing to a drawing using a hyperlink in a manual property, and create a schedule table that contains that property, you can jump from the table cell with the field property in it to the drawing to which it is linked. For detailed information about fields, see "Use Fields in Text" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture 2010 Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

If the property you want to edit is not listed in the property set data for the style or definition, it may be in a property set attached directly to the objects. To enter values for manual properties attached to objects, see Entering Manual Properties and Fields for Objects on page 2502.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and locate the style or definition for which to add manual properties.

3 Select the style or definition.

4 Click the General tab, and click Property Sets.

NOTE If no data appears, no property sets are attached to the style or definition. To attach property sets, see Attaching Property Set Data to Styles and Definitions on page 2504.

5 Enter a value for a manual property.

If you want to…	Then…
specify a alphanumerical value	select the property, and enter the value.
insert a field	right-click the current value for the property, and click Insert Field. Select a field from one of the available categories, specify the desired format, and click OK.

NOTE You can also define a default field for the manual property in the property set definition. For example, if you want all walls of a specific style to have a field that displays the last save date of the drawing, you can enter the SaveDate field in the property set definition, so that it will be displayed for each wall of that style. For more information, see Adding a Field to a Property Set Definition on page 2525.

6 Click OK twice.

Editing Style-Based Property Sets

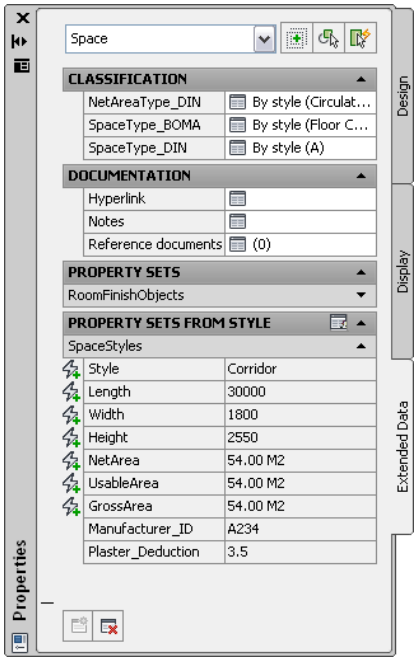
Use this procedure to edit values of manual, style-based property set data attached to objects in your drawing. For more information, see Attaching Property Set Data to Styles and Definitions on page 2504.

1 Double-click the object for which you want to edit property set data.

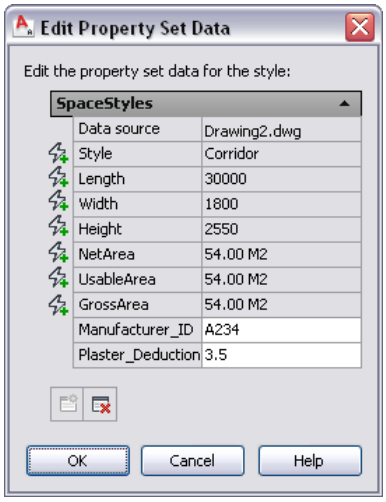
2 On the Properties palette, click the Extended Data tab.

If object-based and style-based property sets are attached to the object, both display on the Extended Data tab.

3 Click (Edit style property set data) next to Property Sets From Style.



4 On the Edit Property Set Data worksheet, enter new values for the property set data and click OK.

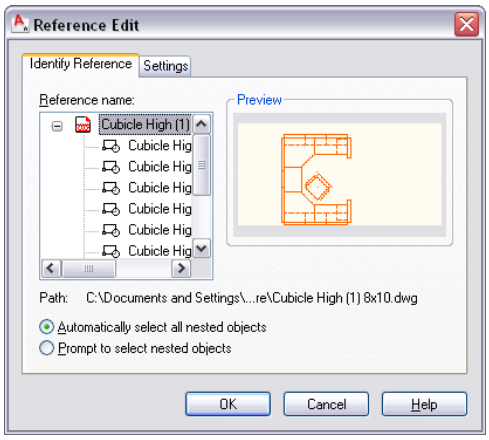


5 Click OK.

Editing Style-Based Property Sets Attached to Objects in External References

Use this procedure to edit values of manual, style-based property set data attached to objects that are referenced externally (xrefs) in your drawing. For more information on attaching property data across xrefs, see Attaching Property Sets to Objects from External References on page 358.

1 Double-click the xref in your drawing.



2 In the Reference Edit dialog, on the Identify Reference tab, select Prompt to select nested objects, and click OK.

3 Select the object in the xref, and press *ENTER*.

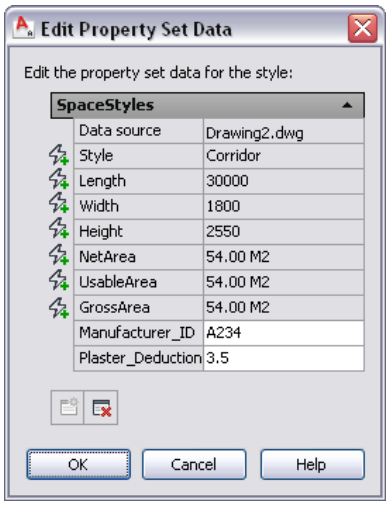
4 Double-click the object to make changes to the property set data.

5 On the Properties palette, click the Extended Data tab.

If object-based and style-based property sets are attached to the object, both display on the Extended Data tab.

6 Next to Property Sets From Style, click (Edit style property set data).

7 On the Edit Property Set Data worksheet, enter new values for the property set data, and click OK.



8 Click Multiple Objects tab ➤ Edit Reference panel ➤ Save Changes or Multiple Objects tab ➤ Edit Reference panel ➤ Discard Changes.

9 Click OK to verify your selection.

Removing Property Set Data from a Style or Definition

Use this procedure to remove one or more property sets from a style or definition. If objects using the style or definition are included in a schedule table, the cells for data obtained from the removed property set display questions marks.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Architectural Objects, and locate the style or definition from which to remove property set data.

3 Select the style or definition.

4 Click the General tab, and click Property Sets.

5 Click .

6 Select property sets to remove, and clear any property sets that should remain attached.

7 Click OK three times.

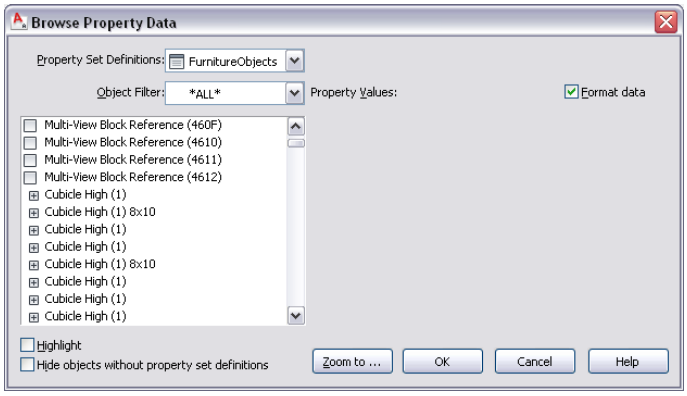
Browsing Property Data

Use this procedure to access and view the data for all property sets in a drawing.

For more information about browsing property sets attached to objects scheduled from external references, or to override property sets for those objects, see Attaching Property Sets to Objects from External References on page 358.

1 Open the tool palette that contains the Browse Property Data tool, and select it.

This tool is located with the Scheduling and Reporting Tools in the Stock Tool Catalog. You can add this tool to any tool palette. For more information, see Content Browser on page 97.



2 Specify view options:

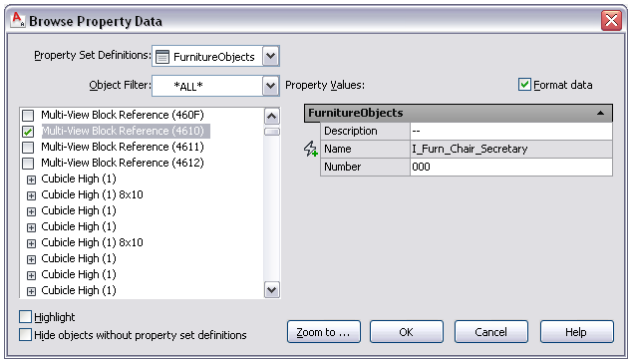
If you want to…	Then…
allow an object to be highlighted in the drawing when you select a property set that is attached to the object or its style	select Highlight.
prevent an object from being highlighted in the drawing when you select a property set that is attached to the object or its style	clear Highlight.

If you want to…	Then…
display objects in the left pane regardless of whether the selected property set definition is attached	clear Hide objects without property set definitions.
display only objects that have the selected property set definition attached	select Hide objects without property set definitions.
view the raw, unformatted data in the property set	clear Format data.

3 View property sets and the objects or styles to which they are assigned:

If you want to…	Then…
view the object or style type to which a property set applies	select the property set. The right pane lists the property values, if available, and the objects or the styles to which the property set can be attached.
view the list of objects or styles to which a property set is attached	apply the object filter to the property set. The left pane lists objects or styles to which the property set is attached. If Highlight is selected, any objects to which the property set is attached (directly or through a style) are highlighted in the drawing.
view the property values for a specific property set and a specific object or style	under the property set, select the object or style. The right pane shows the values for the selected object or style.

Viewing property values for objects with property sets attached



4 Select the object or style from the left pane to edit property sets and values, and click OK.

5 Remove property sets from objects or styles:

WARNING If you detach a property set from an object or style, any manually entered values are lost. If you mistakenly detach a property set, click OK, and then immediately click Undo on the Quick Access Toolbar.

If you want to…	Then…
detach a property set from a object or style	clear the selection of the object or style.
add a property set to objects or styles	select the object or style.

6 Click Zoom to to view the selected object in the drawing

7 Click OK.

Property Set Definitions

A property set definition specifies the characteristics of a group of properties that can be tracked with an object. For example, you could create a property set definition named DoorProps that contains property definitions for DoorNumber, DoorWidth, and FireRating. Each property has a name, description, data type, data format, and default value.

Property Sets and Property Data

A property set is an object created from a property set definition. It contains a user-definable group of related object properties. When you attach a property set to an object or a style, the property set becomes the container for the property data associated with the object.

Creating Property Set Definitions for Objects or Styles

When you create a property set definition, you specify whether the property set can be attached to objects or to styles, depending on which of the following kinds of properties you want to track:

- Automatic properties generally belong in style-based definitions. Automatic properties, even when attached to a style, can vary for each instance of the object. It is more efficient to include automatic properties in a style-based definition because the properties are immediately associated with any object that uses the style.
- Manual properties can belong to either style-based or object-based definitions. The value of a manual property associated with a style is the same for every object. For example, a Manufacturer property will probably be the same for every instance of a particular door style, so it should be in a style-based property. However, a Door Number property is different for each instance of a door, so it should be in an object-based property.
- Fields enhance the documentation capabilities within a drawing file. A field is updatable text that is set up to display data that may change during the life cycle of the drawing. When the field is updated, the latest value of the field is displayed. You can insert fields in a manual property in the property set definition or in a property attached to an object or style.

NOTE Fields can be associated with hyperlinks. For example, if you insert a field pointing to a drawing in a manual property, and create a schedule table that contains that property, you can jump from the table cell with the field property in it to the drawing it is linked to. For detailed information about fields, see "Use Fields in Text" in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic referenced in AutoCAD Architecture 2010 Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.

Automatic and Manual Properties

Property sets, whether attached to objects or to styles, can include both manual and automatic properties.

- Automatic properties cannot be edited directly because they are obtained from the object or other source. For example, the physical characteristics of an object, such as its dimensions or material, are automatic properties. To change the value of an automatic property, you must modify its source. The change then appears in the property set data for the object.
- Manual properties must be edited in the property set data for the object or style. For example, object numbers (for tagging) and notes or remarks are manual properties. The value entered for a manual

property in an object-based property set is saved with the object. The value entered for a manual property in a style-based property set is saved with the style and is available to all objects using that style.

- Fields are used with manual properties and are selected from a list of available fields in the software. Fields contain values that update when the value changes and can also contain hyperlinks to other drawings or other files. For detailed information about fields, see "Use Fields in Text" in AutoCAD Help.

Using Property Data Formats in Property Set Definitions

Property data formats control how values for numbers and text display. Both property set definitions and schedule table styles use property data formats. For more information about creating property data formats, see Property Data Formats on page 2496.

Managing Property Set Definitions

To create, edit, copy, or purge property set definitions, you access the Style Manager. The Style Manager provides a central location where you can work with definitions and styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

WARNING If you overwrite one property set definition with another, you may lose data. For example, a drawing might contain a property set definition with a number of manual properties. The property set is attached to doors with the manual properties entered, and is included in a schedule table. If you overwrite this property set definition with one that does not have the same properties, the values entered for the manual properties are lost. In addition, any columns in the schedule table that reference these manual properties are flagged as invalid. Changes to the schedule table that result from changes to the property set definition are displayed the next time the table is updated manually or automatically.

Understanding Automatic Properties

The data in an automatic property is obtained from individual objects or their styles and is not entered manually. For example, a number of doors might have the same style but different widths. The automatic property Width may be different for each door. However, those doors have the same thickness, because thickness is a property of the style. The automatic property Thickness has the same value for all doors of the same style. For more information, see Adding an Automatic Property Definition to a Property Set Definition on page 2526.

More than a 1,000 automatic properties are available in AutoCAD Architecture 2010. Most are self-explanatory, but a few need additional explanation.

Wall Area Properties

The following 4 automatic properties provide data for wall area calculations:

- Area—Right Gross
- Area—Right Net
- Area—Left Gross
- Area—Left Net

The right and left sides of a wall are determined as if you were standing on the start point of the wall and facing the endpoint. Gross area is the area of one side without allowing for holes for openings such as doors and windows. Net Area is the area of one side of a wall after holes are cut for openings. Gross Area might be used to determine the quantity of gypsum board needed for a wall, while Net Area might be used to determine the quantity of brick.

WARNING The area of a wall is determined by adding the union of the wall components (not including body modifiers or interferences) to the area of all faces that point to the right (for right areas) or the left (for left areas). If a particular wall style has multiple components with air space between them, the wall area may not be reported as expected. For example, a wall typically used in construction has a brick exterior, an air space, and a CMU interior. A style defined for this wall might have a component for the brick and a component for the CMU, but no component for the air space. If the wall was drawn with the brick on the left side, the wall area computed for the right side would include the right face of the CMU as well as the right face of the brick. The area reported would be twice the actual area. To avoid this situation, create components for interior air spaces in wall styles, so that no interior faces exist when the wall components are unioned.

The shape of a wall can be modified by adding or subtracting body modifiers. Automatically calculating appropriate areas for every possible wall shape is practically impossible. Because of this, body modifiers and interferences are not currently included in wall area calculations. Wall areas for unusually shaped walls must be computed manually.

Wall Volume Properties

The following 4 automatic properties provide data for wall volume calculations:

- Volume—Gross
- Volume—Net
- Volume—Gross With Mods
- Volume—Net With Mods

Gross volume is the volume of wall components without allowing for holes for openings such as doors or windows. Net volume is the volume after holes are cut for openings.

You can obtain the wall volume with or without wall body modifiers.

- Gross and net show the volume of the wall components as if no body modifiers exist.
- Gross With Mods and Net With Mods include body modifiers.

Wall Length Property

Like wall area, wall length is practically impossible to calculate automatically when body modifiers are present. Because of this, the Wall Length property returns only the distance between the start point and endpoint of the wall. To get a more accurate report for the length of a wall, you may have to reposition the endpoint of the wall.

The visible length of a wall may differ from the distance between the endpoints due to wall cleanups.

Slab and Roof Slab Volume Properties

Volumes for slabs and roof slabs do not include the volumes of fascias or soffits.

Slab and Roof Slab Elevation Properties

Slabs and roof slabs have the following elevation properties:

- Elevation—High

- Elevation—Low

These properties provide the highest and lowest elevation value of all slab and roof slab vertices, including fascias and soffits.

Door Size Properties

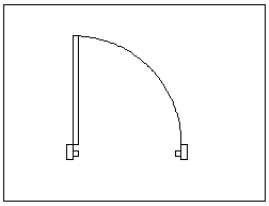
Values for the dimension properties of Width, Height, and Thickness can be combined in 3 additional Door Size properties. The table below shows how these properties appear for a number of different doors, each with a width of 3'-0", a height of 6'-8", and a thickness of 2", but differing in the number and size of individual door panels.

Property	Single Door	Double Door	Uneven Door
Door Size - W x H	3'-0"x6'-8"	3'-0"x6'-8"	3'-0"x6'-8"
Door Size - 2 @ W x H	3'-0"x6'-8"	2@1'-6"x6'-8"	2'-0"(1'-0")x6'-8"
Door Size - PR W x H	3'-0"x6'-8"	PR 1'-6"x6'-8"	2'-0"(1'-0")x6'-8"

NOTE Try using a formula property definition if you need more control in formatting multiple door size properties. For more information, see Adding a Formula Property Definition to a Property Set Definition on page 2514.

Door Swing Direction Properties

Different countries have different conventions for specifying the swing direction of a door. For example, the door shown below is considered a left-swinging door in the United States and Great Britain, but a right-swinging door in Australia, Russia, and most of Europe. To accommodate these differences, AutoCAD Architecture includes a property called Swing Direction - Reverse. You can select the door swing property you want to use when you create or modify a property set definition.



Structural Member Properties

The length of a structural member is its logical length—the length between its grip points—rather than the actual length, which can be difficult to compute. To get the actual length, you can add the Length along Baseline property, which projects all parts of the member to its baseline for measurement. This property will give the actual length for members to which trim planes or offsets are applied or when interference conditions or body modifiers affect the overall length. Such members give a visible length that is different from the logical length.

The location properties of a structural member (X, Y, Z) give information about the coordinates on which a structural member has been inserted. This is important for downstream applications in the structural engineering field.

Understanding Formulas

Formulas are user-defined equations for calculating the value of a property. You can use a formula to add data about a selected group of objects or object styles to a schedule table after you define the formula property set definition. and then add the formula property definition to a property set definition. For more information about property sets and property set definitions, see Property Sets and Property Set Definitions on page 2458.

The worksheet you use to specify the formula also lets you evaluate sample results. Formulas can contain variables, operators, and functions allowed in VBScript. For more detailed information about VBScript, go to *http://msdn.microsoft.com* and search for "VBScript Language Reference." Additionally, in the Formula Property Definition worksheet, links to online Help are available from the Insert VBScript code and Formula context menus for VBScript items used in the formula.

Adding a Formula Property Definition to a Property Set Definition

Use this procedure to add a formula property definition to a property set definition. Formula property values can be computed based on the values of other property data. (For more information about how a formula is evaluated, see Formula Evaluation on page 2517.) For example, width and height are automatic door properties, which you can use to compute the perimeter of the door. Defining (2 * [Width]) + (2 * [Height]) as a formula for a 36" x 84" door results in a value of 240. A formula property definition is a type of automatic property, because the value it displays is determined automatically, based on its definition, and cannot be edited directly.

NOTE There is no conversion made between units for a formula result.

Formulas can be simple mathematical expressions, such as 2+2. They can also contain variables, operators, and functions allowed in VBScript, as shown in the examples below.

Statements			
Call Statement	For Each...Next Statement	Property Get Statement	Set Statement
Class Statement	For...Next Statement	Property Let Statement	Sub Statement
Const Statement	Function Statement	Property Set Statement	While...Wend Statement
Dim Statement	If...Then...Else Statement	Public Statement	Set Statement
Do...Loop Statement	On Error Statement	Randomize Statement	With Statement
Erase Statement	Option Explicit Statement	ReDim Statement	
Execute Statement	Private Statement	Select Case Statement	

Functions			
Abs	Escape	LBound	ScriptEngineMinorVersion
Array	Eval	LCase	Second
Asc	Exp	Left	SetLocale
Atn	Filter	Len	Sgn
CBool	FormatCurrency	LoadPicture	Sin

Functions			
CByte	FormatDateTime	Log	Space
CCur	FormatNumber	LTrim	Split
CDate	FormatPercent	Maths	Sqr
CDbl	GetLocale	Mid	StrComp
Chr	GetObject	Minute	String
CInt	GetRef	Month	Tan
CLng	Hex	MonthName	Time
Conversions	Hour	MsgBox	Timer
Cos	InputBox	Now	TimeSerial
CreateObject	InStr	Oct	TimeValue
CSng	InStrRev	Replace	Trim
Date	Int, Fix	RGB	TypeName
DateAdd	IsArray	RTrim	UBound
DateDiff	IsDate	Right	UCase
DatePart	IsEmpty	Rnd	Unescape
DateSerial	IsNull	Round	VarType
DateValue	IsNumeric	ScriptEngine	Weekday
Day	IsObject	ScriptEngineBuildVersion	WeekdayName
Derived Math	Join	ScriptEngineMajorVersion	Year

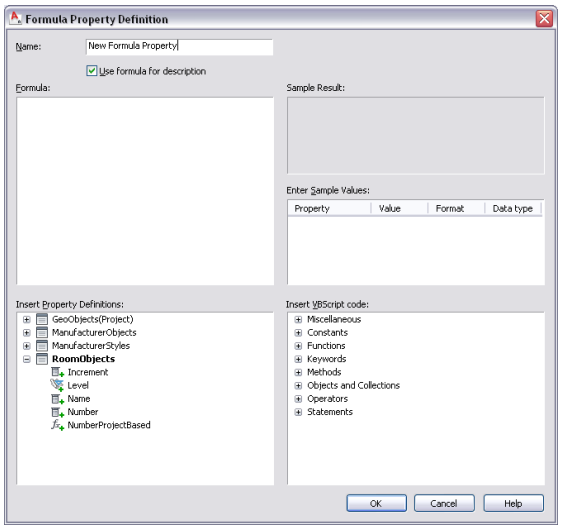
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition to change.

4 On the Definition tab, click .

5 On the Formula Property Definition worksheet, enter a name for the formula property.



6 If you do not want to use the formula as the description of the property, clear Use formula for description.

7 Enter the formula:

If you want to…	Then…
use a value that you supply	click in the Formula pane, and enter the value.
use the value of another property definition in the formula	locate and double-click (or right-click, and click Insert) the definition in the Insert Property Definitions list. You can also select the definition, and press *INSERT*.
use a VBScript function	locate and double-click (or right-click, and click Insert) the function in the Insert VBScript code list. You can also select the function, and press *INSERT*.
evaluate the formula as a VBScript function	enter **RESULT** anywhere in the formula.

The property definitions available for use in the formula must be applied to the same objects as the property set definition containing the formula.

The names of property definitions used in the formula are displayed within brackets, such as [Width]. If a property definition belongs to a property set definition other than the one containing the formula, that name is displayed as well, such as [DoorObjects:Height].

The formula property definition cannot be used in the formula it defines, as indicated by the and the addition of [Self] after its name. Property definitions that end up using the value of the formula cannot be used in the formula, as indicated by the and the addition of [Circular Reference] after their names.

NOTE If you enter the name of a property definition directly in the formula string, or copy and paste between formulas, the property definition is displayed as normal text. For property values of property definitions to be inserted correctly, they must be selected from the list in the Insert Property Definitions pane.

8 In the Enter Sample Values pane, enter a value.

The property value you enter displays with the current format specified in the Sample Result pane.

9 In the Enter Sample Values pane, select a property data format.

The format you select effects how the data in the Value column displays in the Sample Result pane and how the formula evaluates in the in the schedule table. It can be changed at any time. For more information, see Property Data Formats on page 2496.

10 Click OK twice.

Formula Evaluation

Use this procedure to evaluate the result of a formula. After you complete the formula property definition and add the property set to objects, you can use the result of the formula in schedule tables and schedule tags.

1 Confirm that for each property definition in the formula, the value of the property is:

retrieved from the object or style.
formatted using the property data format defined in the sample value format.
inserted into the formula in place of the property definition name and the brackets surrounding it.

2 Evaluate the formula string:

If the formula string…	Then…
contains the word "RESULT"	it is evaluated as a VBScript function, and the value displayed for the property is the result of that evaluation.
does not contain the word "RESULT"	it is evaluated as a mathematical expression.

NOTE Make sure that all property sets used in the formula have been applied to the object or style. Otherwise, a question mark (?) is displayed in the schedule table.

For more information, see Adding a Formula Property Definition to a Property Set Definition on page 2514. There is access to online Help for VBScript code from the context menu in the Formula Property Definitions worksheet.

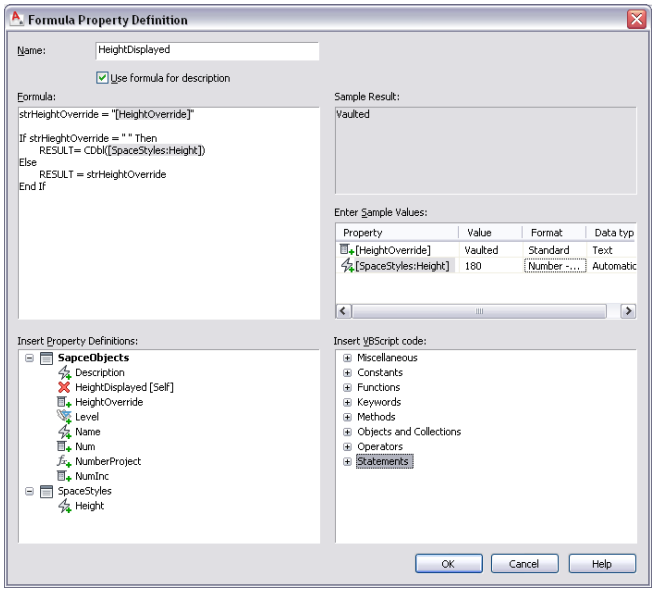
Use Case for the Formula Property Definition Worksheet

Creating a formula that returns valid data can be a complex task. As the following example shows, you can simplify the process by using the Formula Property Definition worksheet to construct the formula with VBScript Code. You then insert sample values into the formula and evaluate the result.

Example of Completed Formula

The space object has a single numeric value for its height, which is adequate for the majority of spaces in a room schedule. However, to get more control over how space heights are displayed for rooms without flat

ceilings, you can create a formula that returns a text override, such as “Vaulted” for a cathedral ceiling, or return the actual height. The completed worksheet for such a formula is shown below.



Process Used to Complete Example

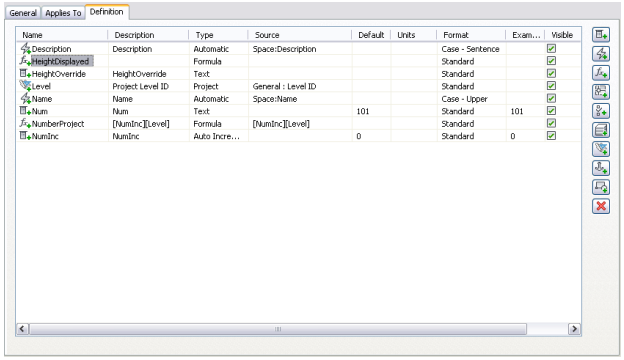
Using primarily the default property set definitions in the Style Manager, the following process was completed.

Added SpaceStyles as a new property set definition

- Imported space styles from schedule table styles drawing.

On the Definition tab for the SpaceObjects property set definition

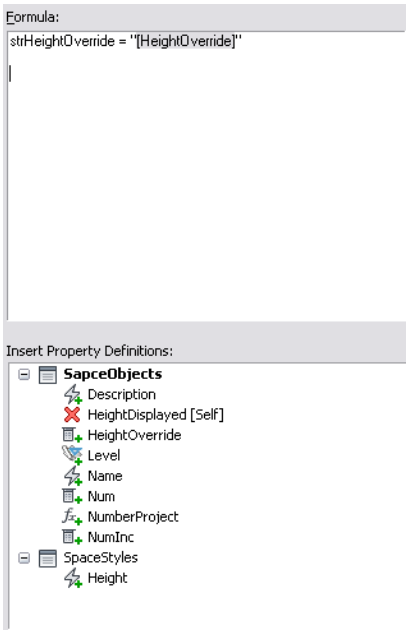
- Added a manual text property definition called HeightOverride.
- Added a formula property definition called HeightDisplayed.



Edited the HeightDisplayed formula property definition on the Formula Property Definition worksheet

- On the first line under Formula, entered strHeightOverride = "".
  As you make changes to the formula, you can view a sample result. For example, entering the formula “2+3” displays “5” in the Sample Result pane. This lets you correct a formula that fails to evaluate as expected.

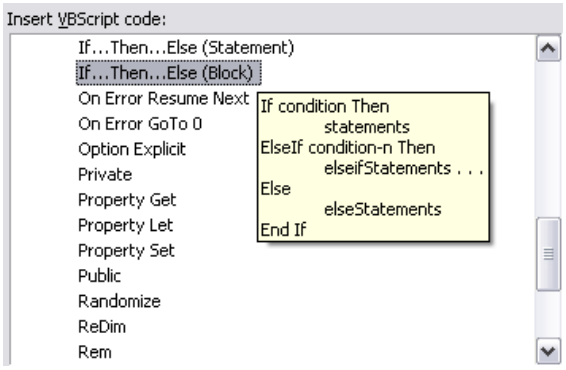
- Under SpaceObjects with the cursor between the double quotes, selected HeightOverride.



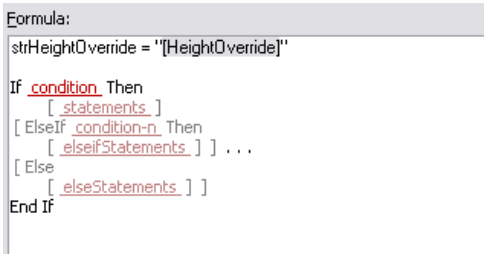
When a property definition is first inserted in a formula, its sample value is taken from an object in the current drawing that uses the formula's property set definition or from a default object.

- With the cursor after the second quotation mark, pressed *ENTER* twice to insert 2 lines.

- From Statements under Insert VBScript code, added If…Then..Else (Block).
When you move the cursor over an item, a tooltip displays the text that appears in the formula when it is inserted.



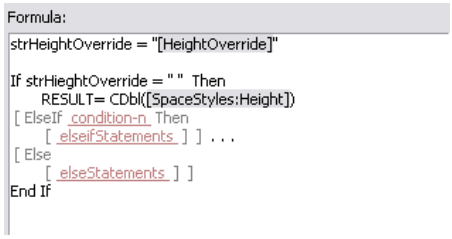
After you add VBScript code to the formula, red or gray text may be inserted to help construct the formula. Red indicates fields where additional code must be added. To remove a red field, select it, and enter text, insert a property definition, or insert other VBScript code.



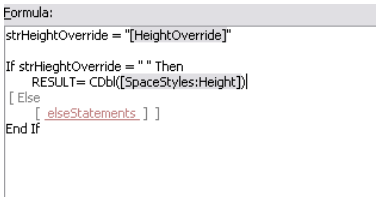
Gray fields surrounded by brackets indicate optional fields. Typing anywhere within the gray brackets, or deleting one bracket, will remove the brackets and convert the code from optional to required.

You can save a formula containing red and gray fields for future editing, but a warning dialog displays because the formula will not be evaluated correctly. You can access online Help for VBScript code in the formula for more information on its proper usage.

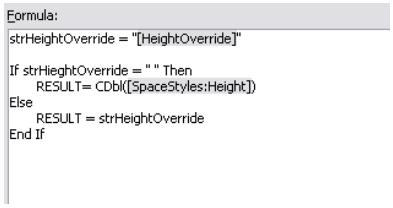
- Selected red condition field, and entered strHeightOverride = "".
- Selected red statements field, and entered RESULT = CDbl( ).
- With the cursor between the parentheses, selected Height under SpaceStyles.



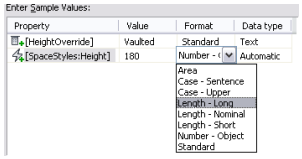
- Deleted the ElseIf line and the line below it.



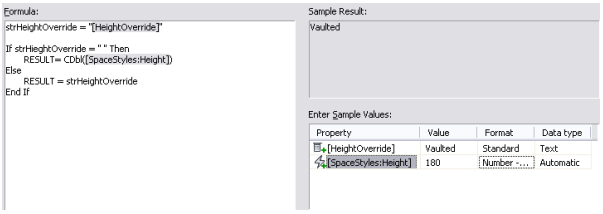
- Selected red “elseStatements” field, and entered RESULT = strHeightOverride.



- Entered Vaulted for sample value of HeightOverride.
  Every time a sample value is changed a new sample result displays.
- Entered 108 for sample value of SpaceStyles:Height.
- Selected Length - Long for Format.



Sample values are formatted and inserted into the formula in place of the corresponding property definition names with brackets surrounding them. The entire sample formula is evaluated, and the result displays in the Sample Result pane.



Because this formula contains the word RESULT, it is evaluated as a function instead of an expression, and the value of the formula property is the last value assigned to RESULT. The result of this valid formula is Vaulted.

Creating a Property Set Definition

Use this procedure to create a property set definition. You can create a new property set definition by copying an existing definition. You then edit the definition properties to customize the characteristics of the definition. For more information, see Editing a Property Set Definition on page 2535.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Create a property set definition:

If you want to…	Then…
create an empty property set definition with default properties	right-click the style or definition, and click New. Enter a name for the new property set definition, and press *ENTER*.
create a property set definition from an existing property set definition	right-click the property set definition to copy, and click Copy. Right-click, and click Paste. Right-click the new property set definition, and click Rename. Enter a name, and press *ENTER*.

NOTE If this property set definition will be used with schedule tags, do not enter spaces in the name.

4 Click OK.

Attaching Notes or Reference Files to a Property Set Definition

Use this procedure to enter notes and attach reference files to a property set definition. You can also edit notes and edit or detach reference files from a property set definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition to which you want to attach notes or reference files.

4 Click the General tab.

5 To add a description to the property set definition, enter it for Description.

6 To add a note, click Notes, click the Notes tab, and enter the note.

7 Click Notes, click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

8 Click OK twice.

Specifying How the Property Set Definition is Applied

Use this procedure to specify whether a property set definition applies to objects or to styles and definitions. You also select the objects or the styles and definitions that can use the property sets created from this definition.

If the property set that you define contains properties that are the same for all objects created using a specific style, select a style-based property set. This eliminates the need to attach data for each instance of the object that you create. Objects created using the style with the property set assigned have access to the associated style-based property set.

In general, use automatic properties only within property set definitions that are applied to styles or definitions.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 Click the Applies To tab.

5 Specify how the property set definition is applied:

If you want to apply it to…	Then…
objects	select Objects. The list of objects becomes available.
styles and definitions	select Styles and Definitions. The list of styles and definitions becomes available.

6 Select the objects or the styles and definitions to which the property set applies.

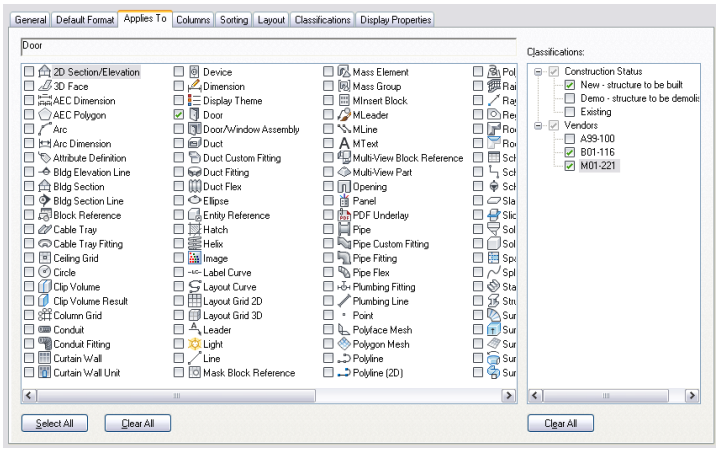
If you want to…	Then…
define an object-based property set definition	select the objects from the list in the left pane.
define a style- or definition-based property set definition	select the styles or definitions from the list in the left pane.
select all objects or style and definitions	click Select All.
clear the current selection	click Clear All.

If all the objects or none of the objects are selected, your property set definition can be added to any object or style. The area above the list displays the objects that are currently selected.

7 To specify classification criteria, expand a classification definition, and select one or more classifications.

For example, you can select a construction status of New and two preferred vendors. To meet the criteria, the classification in the object style must be New for construction status and the Vendor classification must be one of the two vendors selected.

Specifying multiple classification criteria in a property set definition



All classification definitions that apply to the same objects to which the property set definition applies are displayed on the right with a list of their classifications. If classifications are selected, the property set definition can be applied only to those objects or styles and definitions selected on the left that have all the classifications selected on the right.

8 Click OK.

Adding a Manual Property Definition to a Property Set Definition

Use this procedure to add a manual property definition to a property set definition. Manual properties are those that must be entered rather than obtained directly from the object. You can define a list of manual property values to use in property definitions. For example, you could predefine the values for paint color or manufacturer to avoid repeatedly typing the information. For more information, see Creating a List Definition for a Manual Property Definition on page 2538.

When you use real numbers for Type in manual property definitions, you specify only how units are entered and stored for properties of the object or style. How units are displayed is controlled by the property data format. For more information, see Property Data Formats on page 2496.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition for which to add a manual property.

4 On the Definition tab, click .

5 Enter the Name for the property.

NOTE If this property is for use with schedule tags, do not enter spaces in the property name.

6 To define a property by using existing properties, select a property from the Start With list.

7 Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.

8 Enter a description of the property, and click OK.

The default description is the same as the property definition name. This text is for a column header in a schedule table that uses this property.

NOTE The description does not change if you edit the property name. Edit the description separately.

9 Specify the type of data the property contains.

Select List to associate a list definition with this manual property. For more information, see Creating a List Definition for a Manual Property Definition on page 2538.

Changing the data type of a definition for property data already stored in the drawing will set the data to the default value, possibly removing data previously edited.

For property definitions to be displayed in a matrix column in a schedule table, you can assign multiple values to the same property by using a text data type and separating the values with semicolons. Each value will be displayed in a separate matrix column.

10 Select a property data format to specify how the data included in the property set definition is displayed.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format.

11 Select how units are entered.

If you assign a type of unit other than the default for Format, an override is applied to the property data format. The type of units specifies how they are stored in the drawing. on the Extended Data tab of the Properties Palette.

12 Enter a default value.

Values for Default are used in the example fields and as example data for schedule table columns. The Extended Data tab of the Properties palette displays units in the same format as they appear for Example.

NOTE If you create a manual property, it is helpful to enter neutral characters, such as "--," as the default value. When you create a schedule table, the characters fill the cells for which you have not entered values. You can edit the characters in each cell later. If you leave the default value blank in the property set definition, the corresponding cells are blank. You cannot select and edit blank cells.

13 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

14 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

15 Click OK.

NOTE When you attach property set data to an xref drawing or block using RefEdit and the property set includes Auto Increment—Integer or Auto Increment—Character, then you must set the default value to the first number to be used in the xref or block to avoid creating duplicate numbers.

Adding a Field to a Property Set Definition

Use this procedure to add a field to a property set definition. Fields contain updatable values or hyperlinks, and are selected from a list.

You can create a manual property as a placeholder for a field. In that case, you enter the field in the property once it is attached to an object or style. If you enter a field as a default value for a manual property in the definition, all objects or styles that have the property attached already contain the field.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition to which you want to add a field.

4 On the Definition tab, click .

5 Enter the name for the property.

NOTE If this property will be used with schedule tags, do not enter spaces in the property name.

6 Select *DEFAULT* for Start with.

7 Click OK.

8 Enter a short description of the property.

The default description is the same as the property definition name. This text is for a column header in a schedule table that uses this property.

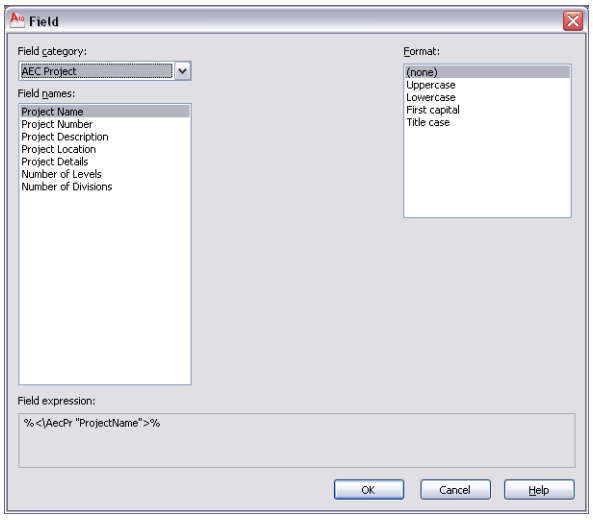
NOTE The description does not change if you edit the property name. You can edit the description.

9 Under Type, select Text.

10 If you want to create a field placeholder property that can be filled when the property set is attached to an object or style, do not enter a value for Default.

For information about adding fields to properties attached to objects, see Entering Manual Properties and Fields for Objects on page 2502.

11 If you want to set a default field used for every object or style attached to the property set, right-click the Default column, and click Insert Field.



12 Under Field Category, select the desired category.

13 Under Field names, select the field you want to enter.

Some field names require additional information, like a file name or field property information.

14 Select the text format of the field text.

15 Click OK.

Adding an Automatic Property Definition to a Property Set Definition

Use this procedure to add an automatic property definition to a property set definition. The values for automatic properties are obtained directly from an object or its style. Selecting a format for this property definition controls how these values display. For general information about automatic properties and additional explanation about some properties for walls, slabs, roof slabs, doors, and structural members, see Understanding Automatic Properties on page 2511.

NOTE Ensure that the property data formats you want to use are stored in the current drawing. For more information, see Property Data Formats on page 2496.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition to which to add the automatic property.

4 Click the Definition tab.

5 Click .

6 Select one property for each object to which the property set definition applies.

For example, if the definition applies to windows and window assemblies, you can select the Width property for windows and the Width property for window assemblies. A warning is displayed if you select different properties from different object types.

NOTE If the property set definition applies to only one object, you can create multiple automatic property definitions at the same time by selecting multiple items on the Automatic Property Source worksheet. If the property set definition applies to more than one object, you can only create one property definition at a time. Typically, you would like to select items with the same name for every object the property set definition applies to. Selecting or clearing an item for one object selects or clears items with the same name for all other objects. You can control the selection of individual items by pressing *CTRL*.

7 Click OK.

8 Click on the value for Description, enter a short description of the property definition, and click OK.

The default description is the same as the property definition name. This is the default text for a column header in a schedule table that uses this property.

NOTE The description does not change if you edit the property name.

9 Select a format to specify the how the data displays.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

10 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

11 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

12 Click OK.

Adding a Location Property Definition to a Property Set Definition

Use this procedure to add a location property definition to a property set definition. Location property values are obtained from property data on AEC polygons or spaces in or near an object. When a selected object has a property set that contains a location property, a Data Location grip is displayed along with its other grips. If the location property is defined to retrieve property data from a space object, for example, and the property data comes from the space underneath the grip, then the grip moves when the object is moved. If an MvBlock representing a piece of furniture is moved from one space to another, it has access to the space's property data, which might include the occupant of a room.

A location property definition is a type of automatic property, because the value it displays is determined automatically, based on its definition, and cannot be edited directly. To create a location property definition, you select a property definition contained in a property set definition that can be applied to AEC polygons or space objects.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 On the Definition tab, click .

5 Enter a name for the location property.

6 Clear Use property name for description if you do not want to use the location property as the description of the property.

7 Expand AEC Polygon or Space.

8 Expand a property set definition.

9 Select the property data you wish to retrieve.

10 Click OK.

To change the name of the property definition, click Name and double-click the property definition in the table, or select Edit Location. If Use property name for description is not set, edit the description.

11 Select a property data format to specify the method used to display the data included in the definition.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format.

12 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

13 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

14 Click OK.

Adding a Classification Property Definition to a Property Set Definition

Use this procedure to add a classification property definition or its properties to a property set definition. Including classifications or classification properties in a property set definition for schedules enables you to report classification data for the objects in a schedule table.

For example, if you have a classification definition for vendors, you can specify the vendor for different object types. You can then include the vendor classification or its properties in a property set definition and use the classification properties in a schedule table for the objects. For more information, see Attaching Property Set Definitions to a Classification Definition on page 2546.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Click the property set definition that you want to change.

For example, if you want to include classifications in a door schedule, select a property set definition that applies to door styles.

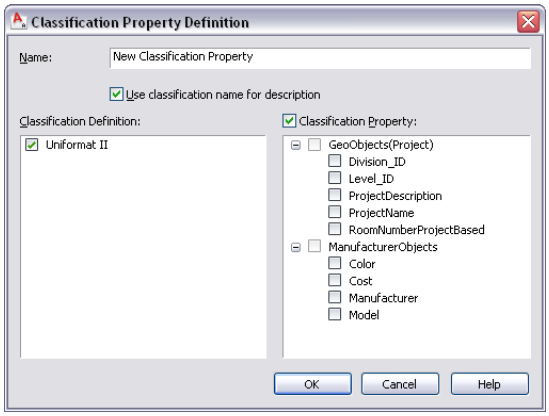
4 Click the Definition tab.

5 Click .

The Classification Property Definition dialog is displayed. The pane on the left lists classification definitions that apply to the object style for the current property set definition. For example, if the current property set definition applies to door styles, the Classification pane lists all the classification definitions that apply to door styles.

The pane on the right lists all the properties that apply to the classification definitions.

Example of the Classification Property Definition dialog



6 Enter a name for the property.

The name identifies the property in the property set definition.

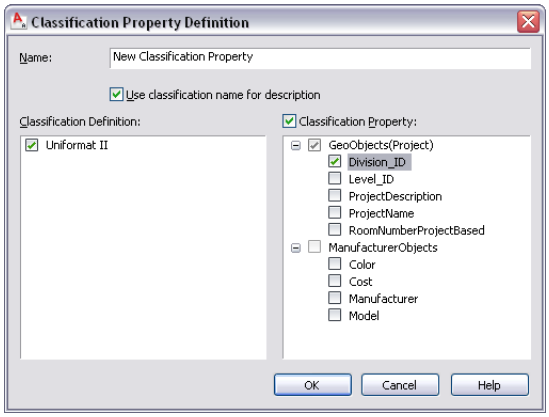
7 Clear Use classification name for description if you do not want to use the classification name for the description of the property.

By default, schedule table styles use the description for the column heading. The default description for classification properties comprises the names of the classification definition, the property set definition, and the property (such as Vendor - Vendor Class - Delivery Date).

8 Select the classification or the classification property to add to the property set:

If you want to…	Then…
include the value specified for each object for a classification definition	in the left pane, select the classification definition.
include the value of a property that is attached to a classification	in the left pane, select the classification definition. In the right pane, select Classification Property, expand the property set, and select the property.

Selecting a classification property



9 Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.

10 If Use classification name for description was not selected, enter a description for the new property by selecting the empty value, entering text for Description, and clicking OK.

To change the name of the property definition, double-click the value for Name.

11 Select a format to specify the how the data displays.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

12 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

13 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

14 Click OK.

Adding a Material Property Definition to a Property Set Definition

Use this procedure to add a material property definition to a property set definition. Material property values are obtained from an object's component materials or from property data specified for an object's component materials.

A material property definition is a type of automatic property, because the value it displays is determined automatically, based on its definition, and cannot be edited directly.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

   The Style Manager is displayed with the current drawing expanded in the tree view.

2. Expand Documentation Objects, and expand Property Set Definitions.
3. Select the property set definition that you want to change.
4. On the Definition tab, click .
5. Enter a name for the material property.
6. Clear Use material name for description if you do not want to use the material property as the description of the property.
7. Select a material:

If you want to…	Then…
retrieve the name of a material specified for a component on an object or style	select a Material in the left pane.
retrieve property data for the material specified for a component on an object or style	select Material Property in the right pane.

8. Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.
9. If Use material name for description was not selected, enter a description for the new property by selecting the empty value, entering text for Description, and clicking OK.

   To change the name of the property definition, double-click the value for Name.

10. Select a format to specify the how the data displays.

    The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

11. Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

    For more information, see Hiding Properties on page 2534.

12. Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

    For more information, see Sequencing Property Definitions on page 2534.

13. Click OK.

Adding a Project Property Definition to a Property Set Definition

Use this procedure to add a project property definition to a property set definition. Project property values are obtained from the drawing management project in which an object is located. Project properties let you collect and display specific project details in a schedule table, such as:

- mobile, fax, and telephone numbers of the project principal, manager, and architect
- contact information for public services
- sources for site information

A project property definition is a type of automatic property. The values displayed are determined by the information previously entered in the project and cannot be edited directly in the property definition. If, while working in the project, you modify project details that are included in the property definition and a schedule, the schedule displays the out-of-date marker. For more information, see Turning Off the Out-of-Date Marker on page 2464.

In order for a project property definition to return correct project data, a drawing management project must be currently open, and the drawing containing the object must be part of that project. Not meeting either of these conditions has the following consequences:

- The data on the Extended Data tab of the Properties palette and on similar dialogs is displayed as "No Project."
- Attributes of schedule tags that display project data are not updated. Attributes display data as updated from the last time the conditions were met and the drawing was saved. In this case, the data displayed may not be accurate.
- Schedule tables that display project data in one or more cells are not updated. Schedule tables display data as updated from the last time the conditions were met and the drawing was saved. In this case, the data displayed may not be accurate.

These conditions allow drawings that contain project data to be viewed and plotted when drawing management is not available.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .

   The Style Manager is displayed with the current drawing expanded in the tree view.
2. Expand Documentation Objects, and expand Property Set Definitions.
3. Select the property set definition that you want to change.
4. On the Definition tab, click .
5. Enter a name for the project property.
6. Clear Use project information for description if you do not want to use the project property as the description of the property.
7. Select the project information to include in the property definition.
8. Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.
9. If Use project information name for description was not selected, enter a description for the new property by selecting the empty value, entering text for Description, and clicking OK.

   To change the name of the property definition, double-click the value for Name.
10. Select a format to specify the how the data displays.

    The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the

default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

11 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

12 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

13 Click OK.

Adding an Anchor Property Definition to a Property Set Definition

Use this procedure to add an anchor property definition to a property set definition. Anchor property definitions allow one object to get data from another object to which it is anchored. For example, an anchor property of a door in a 2-hour fire-rated wall could display the 2-hour fire-rating of the wall with an anchor property definition specified. The information displayed cannot be edited directly.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 On the Definition tab, click .

5 Enter a name for the anchor property.

6 If you do not want to use the property name for the description, clear Use property name for description.

7 Select the property definition to be associated with this property set.

8 Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.

9 If Use property name for description was not selected, enter a description for the new property by selecting the empty value, entering text for Description, and clicking OK.

To change the name of the property definition, double-click the value for Name.

10 Select a format to specify the how the data displays.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

11 Clear Visible if you do not want this property definition to appear on the Extended Data tab of the Properties palette.

For more information, see Hiding Properties on page 2534.

12 Enter a number for Order if you want this property definition to appear on the Extended Data tab in a particular order.

For more information, see Sequencing Property Definitions on page 2534.

13 Click OK.

Adding a Graphic Property Definition to a Property Set Definition

Use this procedure to add a graphic property definition to a property set definition. Graphic property values can be blocks in the current drawing or image files, such as BMP, GIF, JPG, PNG, or TIF. The image displayed cannot be edited directly.

Schedules display blocks as graphic properties only if the blocks exist in the current drawing and if the block is not annotative. If you copy a schedule or a schedule table style to a new drawing, make sure that you also copy all blocks.

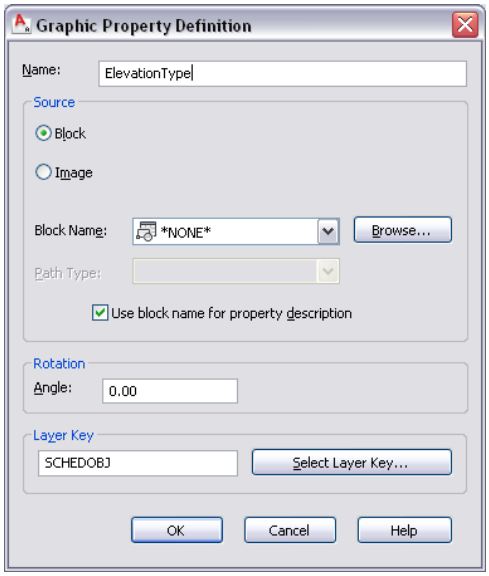
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 On the Definition tab, click .

5 Enter a name for the graphic property.



6 Specify a source for the graphic property:

If you want to…	Then…
select a block from the current drawing	select Block, and select the block name from the drop-down list.
select a block from outside of the current drawing	select Block, click Browse, select a block, and click Open.
select a drawing file	select Block, click Browse, select a drawing, and click Open.
select an image file	select Image, and click Browse. In the Select Image File dialog, browse to select the image, and click Open. Select the path type from the drop-down list. Using relative paths makes your project more portable.

7 If you want to enter a new description in the property set definition, clear Use block or image name for property description.

8 For Rotation, enter an angle for the graphic.

9 If you want to change the layer key, click Select Layer Key.

10 Click OK, and continue working on the property set definition on the Definition tab of the Property Set Definition dialog.

11 If Use graphic name for description was not selected, enter a description for the new property by selecting the empty value, entering text for Description, and clicking OK.

To change the name of the property definition, double-click the value for Name.

12 Select a format to specify the how the data displays.

The format you select becomes the default format of a column when this property is added to a schedule table style. It can be changed at any time. The Example column shows how the default value is displayed using the selected format. For more information, see Property Data Formats on page 2496.

NOTE Images and blocks are uniformly scaled to fit within the table cell. The cell dimension is determined by the row height and column width.

13 If you do not want this property definition to appear on the Extended Data tab of the Properties palette, clear Visible.

For more information, see Hiding Properties on page 2534.

14 If you want this property definition to appear on the Extended Data tab in a particular order, enter a number for Order.

For more information, see Sequencing Property Definitions on page 2534.

15 Click OK.

Sequencing Property Definitions

Use this procedure to specify the order in which properties are listed on the Extended Data tab of the Properties palette. When you have many object properties in a property set definition, it can be helpful to see the most important properties first rather than the default alphabetical order. Items with numbers appear before items without numbers.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 On the Definition tab, select the property, and enter a number value for Order to specify the sequence in which the property is to appear on the Properties palette.

5 Click OK.

Hiding Properties

Use this procedure to prevent properties from being listed on the Extended Data tab of the Properties palette. If the object has many properties associated with it, it could be helpful to exclude some of the less important properties from displaying on the Properties palette.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Documentation Objects, and expand Property Set Definitions.

3 Select the property set definition that you want to change.

4 Click the Definition tab, select the property, and clear Visible if you do not want the property to display on the Properties palette.

5 Enter a name for the graphic property.

6 Click OK.

Editing a Property Set Definition

Use this procedure to perform any of the following edits on a property set definition.

- change the objects or styles to which the property set can be attached.
- add and remove properties.
- change the name, description, and format of properties.
- change additional items for each type of property definition.
- change the visibility and the display order on the Properties palette.

Changes are immediately applied to any objects or styles attached to the property set that was created from the definition. If automatic update is specified for a schedule table, the changes also appear in the schedule table. If automatic update is not specified, you need to update the table.

NOTE If you remove a property that is used in a schedule table, INVALID is displayed for value in the table.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, and expand Property Set Definitions.

3 To change how the property set is applied, click the Applies To tab, and specify objects or styles:

If you want to…	Then…
apply the property set created from this definition to objects	select Objects, and select the objects to which the property set can be attached. For more information, see Specifying How the Property Set Definition is Applied on page 2522.
apply the property set created from this definition to styles or definitions	select Styles and Definitions, and select the styles and definitions to which the property set can be attached.

4 Click the Definition tab.

5 Edit the characteristics for each property definition:

If you want to…	Then…
edit the name of a manual property definition	click Name. Enter a new name, and press *ENTER*. For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523.
edit a manual property definition description	select the description, enter new text, and click OK.
edit the type of data, default value, format, visibility, or order of a manual property definition	select type, default, format, visibility, or order and make your changes. If a property definition is not visible, you cannot enter a value for Order.

If you want to…	Then…
edit how the units display for a manual property definition	after the format is assigned, select a new value for Units.
edit an automatic property definition	select definition, source, format, visibility or order and make your changes. You cannot change the data type or default value of automatic properties.For more information, see Adding an Automatic Property Definition to a Property Set Definition on page 2526.
edit a formula property definition	double-click the formula property definition. Change the name, clear or select Use formula for description, and modify the formula by entering data or selecting property definitions. Click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding a Formula Property Definition to a Property Set Definition on page 2514.
edit a location property definition	double-click the location property definition. Change the name, clear or select Use property name for description, and select a property definition. Click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding a Location Property Definition to a Property Set Definition on page 2527.
edit a classification property definition	double-click the classification property definition. Change the name, clear or select Use classification name for description, select from the classification definitions available in the left pane, and select a classification property from the right pane with Classification Property selected. Click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding a Classification Property Definition to a Property Set Definition on page 2528.
edit a material property definition	double-click the material property definition. Change the name, clear or select Use material name for description, select from the materials available in the left pane, and select a material property from the right pane with Material Property selected. Click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding a Material Property Definition to a Property Set Definition on page 2530.
edit a project property definition	double-click the project property definition. Change the name, clear or select Use project information name for description, select from the project information available, and click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding a Project Property Definition to a Property Set Definition on page 2531.

If you want to…	Then…
edit an anchor property definition	double-click the anchor property definition. Change the name, clear or select Use property name for description, select a property definition, and click OK. Select the source, format, visibility, or order and make your changes. For more information, see Adding an Anchor Property Definition to a Property Set Definition on page 2532.
edit a graphic property definition	double-click the graphic property definition. Change the name, select a new block or image for Source, clear or select Use block (or image) name for description, change the scale and rotation, and click OK. Select the format, visibility, or order and make your changes. For more information, see Adding a Graphic Property Definition to a Property Set Definition on page 2533.
remove a property from the property set definition	select a property, and click . For more information, see Removing All Property Sets from Objects and Styles on page 2537.

6 Click OK.

NOTE Property data format styles, property set definitions, and schedule table styles cannot be changed through RefEdit. Changes seem to work, but will revert to the previous settings when saved back to the xref file. Open the xref drawing directly, and make the changes there.

Removing All Property Sets from Objects and Styles

Use this procedure to remove a property set that no longer applies to the objects and object styles to which it is attached.

If you remove an object or style from the Applies To list in a property set definition after the property set based on the definition is attached to the object, the property set is not automatically removed. This allows you to retrieve data that might have been entered for manual properties.

1 On the command line, enter **PropertySetClean**, and press *ENTER*.
2 Enter the name of the property set that you want to remove, or press *ENTER* to remove all the property sets from all objects or styles.

Merging Property Set Definitions

Use this procedure to replace one property set definition with another for all objects or object styles.

1 On the command line, enter **PropertySetDefMerge**, and press *ENTER*.
2 Enter the name of the property set definition that you want to keep, and press *ENTER*.
3 Enter the name of the property set definition that you want to merge, and press *ENTER*.
4 Specify whether to purge the merged property set definition:

If you want to…	Then…
purge the property set definition that you merged	enter **y** (yes), and press *ENTER*.

If you want to…	Then…
keep the merged property set definition in the drawing	press *ENTER*.

If you keep the merged property set definition in the drawing, it is not attached to any objects.

5 Specify whether to remove property sets:

If you want to…	Then…
remove the property sets that do not apply after the merge	enter **y** (yes), and press *ENTER*.
keep the property sets attached to objects and styles even though they may not apply	press *ENTER*.

List Definitions

A list definition is a multi-purpose object that lets you create a list of items to use in a manual property definition. After you create a list definition, values can be selected from the list without having to enter them manually each time.

For example, if you create a predefined list of acceptable values for paint color or manufacturers, you remove the risk of forgetting a correct name or making a typographical error when setting up manual properties. Create the list once, copy it into the appropriate project files as needed, and then you can easily select values for manual properties when you add them to property definitions. For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523.

Creating a List Definition for a Manual Property Definition

Use this procedure to create a list definition with a list of items that can be used for manual properties.

NOTE List definitions can also be created for space and zone names. For more information, see Creating a List Definition on page 2030.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, right-click List Definitions, and click New.

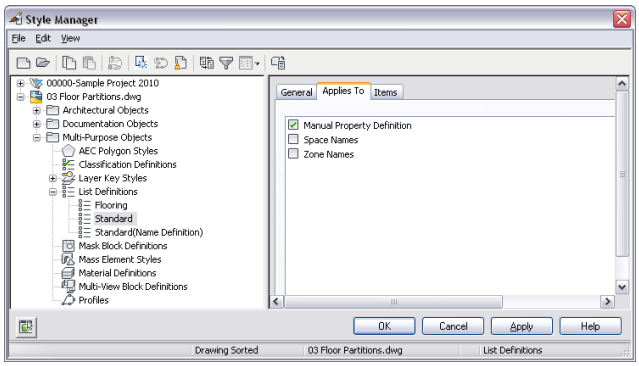
3 Create a list definition:

If you want to…	Then…
create a definition with default properties	right-click List Definitions, and click New.
create a definition from an existing definition	right-click the list definition you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new list definition, and press *ENTER*.

5 On the General tab, enter a description for the list definition under Description.

6 Click the Applies To tab, and select Manual Property Definition.

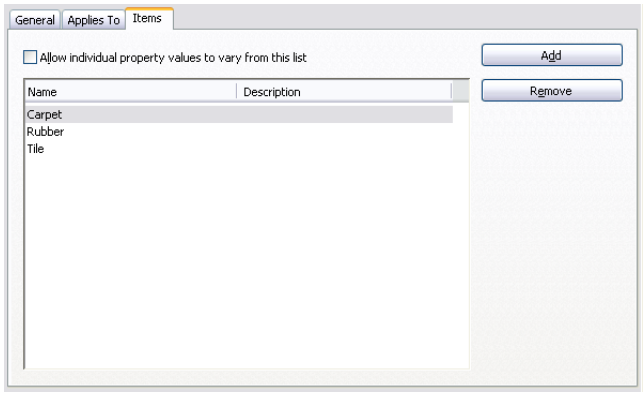


You can clear the list definition from applying to a manual property definition only if it is not in use.

7 Click the Items tab.

8 Select Allow individual property values to vary from this list if you want to allow values other than those specified here to be displayed on the Properties palette.

9 Click Add, and enter a value for Name.



10 Enter a value for Description.

11 Continue to add values to this list definition.

12 Click OK.

Editing List Definitions

Use this procedure to edit or remove items in a list definition. You can remove only those items that are not currently in use.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand List Definitions.

3 Select the list definition.

4 Click the Items tab, and edit the list:

If you want to…	Then…
edit the name of the property	select the property and edit the text under Name.
edit the property description	select the property and edit the text under Description.

5 Click OK.

6 To remove an item from the list definition, select the item, and click Remove.

If the Remove button is unavailable, you cannot delete the property because it is currently assigned to an object, or it is in a property set definition that is in use.

7 Click OK.

Changing the List Item for an Object

Use this procedure to change a list item on the Properties palette for an object. If you specified that property values for the item could vary from the list, you can enter a new value on the Properties palette.

1 Double-click the object to select a different list item.

2 On the Properties palette, click the Extended Data tab.

3 Select a different list item, or enter a new value.

If entering a new value is not an option on the Properties palette, open the list definition and select Allow individual property values to vary from this list. For more information, see Creating a List Definition for a Manual Property Definition on page 2538.

Attaching Notes or Reference Files to a List Definition

Use this procedure to enter notes and attach reference files to a list definition. You can also edit notes and edit or detach reference files from a list definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Multi-Purpose Objects, and expand List Definitions.

3 Select the list definition to which to attach notes or reference files.

4 On the General tab, enter a description for the list definition under Description

5 To add a note, click Notes, click the Notes tab, and enter the note.

6 Click Notes, click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

7 Click OK twice.

Classification Definitions

A classification definition is a group of named properties or characteristics that you can assign to building objects such as walls and doors. Classifications enable you to track objects by construction status, project phase, building element, vendor, or other criteria. A classification definition is applied to an object type.

The definition contains classification names and descriptions. Each classification can have property sets attached to it.

Classifications and Schedule Tables

Classifications provide additional control over the content of schedule tables. You can include:

- only those objects that meet the classification criteria.
- classification definitions as columns.
- additional information from property sets you create and attach to individual classifications.

Uses for Classifications

Here are some examples of classification definitions:

- Classifications for multi-view blocks enable you to distinguish among blocks to use for furniture, appliances, fixtures, and equipment
- Classifications for project phases can call out changes specified for new or demolition work and existing structure to remain
- Classifications for door types let you filter partition doors in bathrooms from door schedules

Classifications and the Display System

You can modify display sets in a display configuration to show or hide objects based on their classification. For more information, see Displaying Objects by Classification on page 545.

Managing Classification Definitions

Classifications are organized in a hierarchical view in the Style Manager. Classification names must be unique within classification property definitions. To create, edit, copy, or purge classification definitions, you access the Style Manager. The Style Manager provides a central location for working with definitions and styles from multiple drawings and templates. For more information about using the Style Manager, see Style Manager Overview on page 566.

After classifications are applied to objects in the classification definition, they display on the Extended Data tab of the Properties palette when the object is selected. You can change the classification for an object from the Extended Data tab in the Select Classification worksheet. If the classification change results in an object not displaying in your drawing window, a warning dialog displays. You can also open the object style in the Style Manager and make changes on the Classifications tab. For more information, see Changing the Classification of an Object on page 2548.

Process Overview: Including Classification Data in Schedules

The process of including classification data for objects in a schedule table has the following major steps:

1. Create a classification definition, and specify the object type to which it is applied. For more information, see Creating a Classification Definition on page 2544.
2. Create and attach property sets to the classifications in the classification definition. For more information, see Attaching Property Set Definitions to a Classification Definition on page 2546.
3. Specify the classification for each object type that you want to schedule. For more information, see Specifying the Object Types for a Classification Definition on page 2545.
4. Add the classification or its properties to a property set definition for the object type. For more information, see Adding a Classification Property Definition to a Property Set Definition on page 2528.

5 Add the classification or its properties as columns in a schedule table style that uses the property set definition you edited in step 4. For more information, see Adding Columns to a Schedule on page 2480.

6 If necessary, specify filtering options for classifications in the schedule table style. For more information, see Filtering Scheduled Objects by Classification in a Schedule Table Style on page 2479.

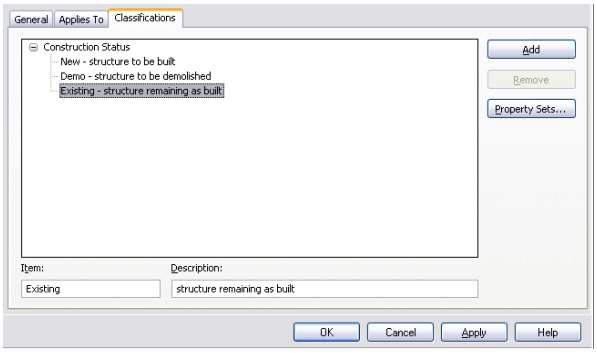
7 Create the schedule table. For more information, see Adding Schedules Using Schedule Table Tools on page 2461.

The classification information for each object is included in the columns you added to the schedule table style.

A Classification Use Case

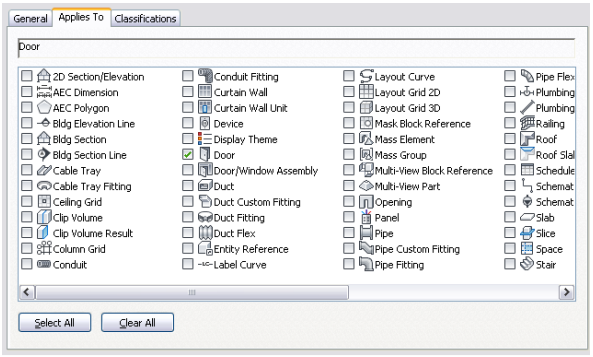
You can create a classification definition that contains a classification for each construction status, such as Existing, Demo, and New.

Creating a classification definition for construction status



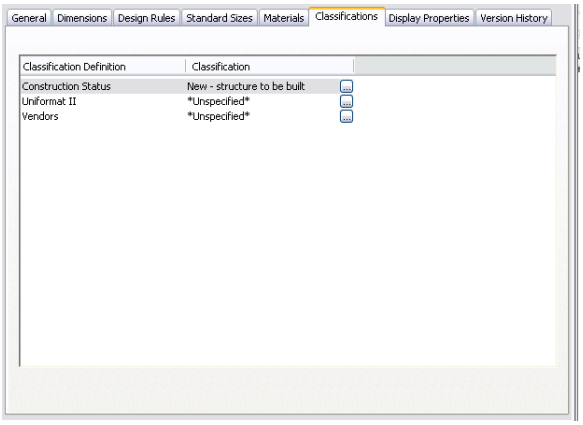
You also specify the objects to which the classification definition applies.

Specifying object types in the classification definition



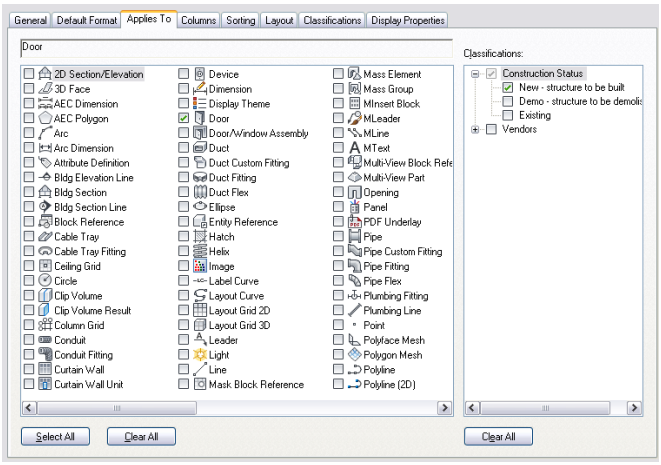
The classification definition is listed on the Classifications tab in the object style properties. You select a classification, such as New, in the object style. For example, your drawing might contain certain door styles for existing doors, and different styles for new construction. All doors created from these styles have the classification specified in their style.

Door style with the classification specified



When you are ready to schedule doors, you can specify in the schedule table style that only those doors with the New classification will be included. Any other doors included in the selection set are filtered from the table.

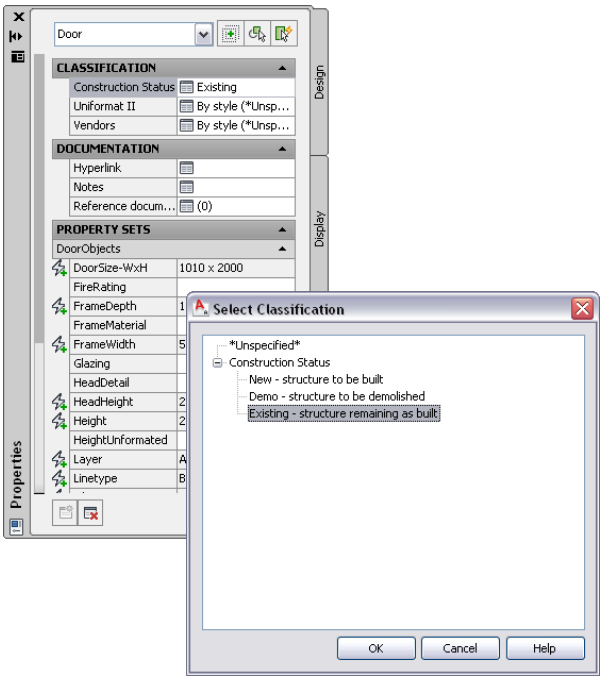
Specifying classification criteria in a schedule table style



You can also include classifications as a column in your schedule tables. You can create and attach property sets to individual classifications to track additional data, and you can include this data in schedule tables. In addition, you can modify settings in the display system to filter the display of objects based on their classification.

You can change the classification of a specific object on the Extended Data tab of the Properties palette. If this change causes an object to not display, a warning dialog appears on your drawing screen.

Changing classification on the Extended Data tab



Creating a Classification Definition

Use this procedure to create a classification definition. You can create a definition using default properties or by copying an existing definition.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Classification Definitions.

3 Create a classification definition:

If you want to...	Then...
create a definition with default properties	right-click Classification Definitions, and click New.
create a definition from an existing definition	right-click the classification definition you want to copy, and click Copy. Right-click, and click Paste.

4 Enter a name for the new classification definition, and press *ENTER*.

5 Edit the classification definition:

If you want to...	Then...
enter a description of the classification definition	click the General tab, and enter the description.
specify the object types to which the definition applies	see Specifying the Object Types for a Classification Definition on page 2545.
enter classifications	see Adding Classifications to a Classification Definition on page 2545.
attach property sets to the individual classifications in the definition	see Attaching Property Set Definitions to a Classification Definition on page 2546.

If you want to…	Then…
add notes or files to the definition	see Attaching Notes and Files to a Classification on page 2549.

6 Click OK.

Specifying the Object Types for a Classification Definition

Use this procedure to specify the object types to which a classification definition applies. The classification will be listed on the style's Classification tab for all object types you specify.

For example, if you specify that a classification definition applies to doors and windows, the classification is listed on the Classifications tab for all door and window styles in the drawing. You can also select an individual classification appropriate for each door and window object on the Extended Data tab of the Properties palette. For more information about specifying a classification for a particular type of object, see the topic for that object type in the online Help and Displaying Objects by Classification on page 545.

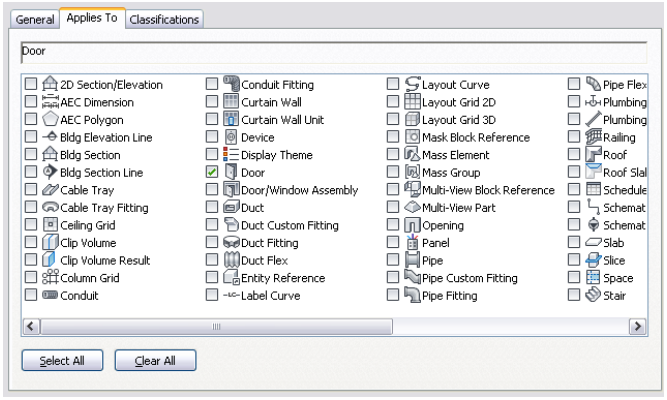
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Classification Definitions.

3 Select the classification definition.

4 On the Applies To tab, select the object types to which the classification definition will apply.

5 **Selecting object types to which a classification definition applies**



6 Click OK.

Adding Classifications to a Classification Definition

Use this procedure to add classifications to an existing classification definition. Classifications are individual entries organized hierarchically within a classification definition. For example, a classification definition for construction status may contain the classifications existing, demo, and new. Lower-level classifications can be added to each of these classifications.

NOTE Be sure to specify the object types to which the classification definition applies. The classifications are not available until you specify the object types in the classification definition. For more information, see Specifying the Object Types for a Classification Definition on page 2545.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Classification Definitions.

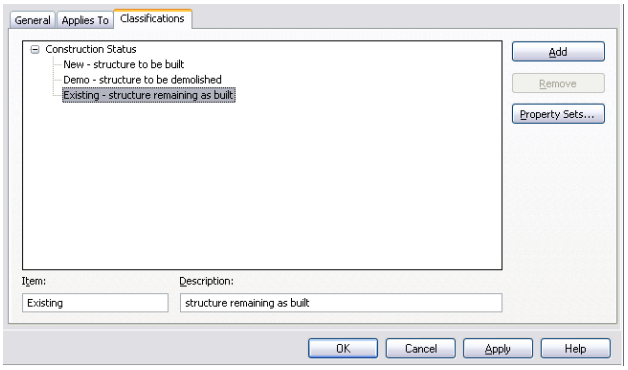
3 Select the classification definition.

4 On the Classifications tab, click Add.

5 Select the new classification, and enter a name under Item.

6 Under Description, enter a description of the classification.

Adding classifications to a classification definition



7 Continue adding classifications.

8 Select any of the classifications added, and drag and drop them to organize the hierarchy as desired.

9 Click OK.

Attaching Property Set Definitions to a Classification Definition

Use this procedure to add property set definitions to individual classifications in a classification definition. When you add property set definitions, you can track additional information.

For example, if you create a classification definition for vendors, you can attach a property set to each vendor classification. The property sets can contain any properties that you specify, such as a vendor–specific part number. The properties are then associated with each object to which the classification is applied. These properties can then be included in the schedule table when the objects are scheduled.

For more information about creating property sets, see Property Set Definitions on page 2510. For more information about adding classification property data to property set definitions, see Adding a Classification Property Definition to a Property Set Definition on page 2528.

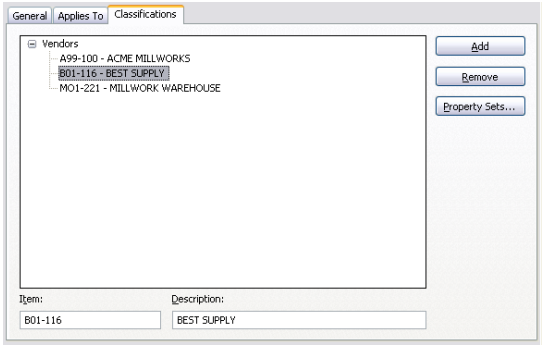
1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Classification Definitions.

3 Select the classification definition.

4 On the Classifications tab, select one or more classifications, and click Property Sets.

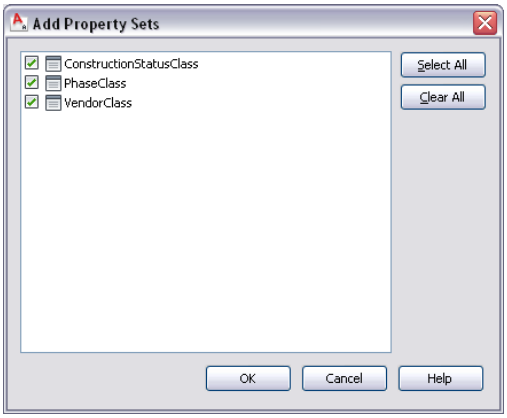
Selecting a classification to which you attach property sets



5 Click .

6 Clear property sets that you do not want to attach to the classification, and click OK.

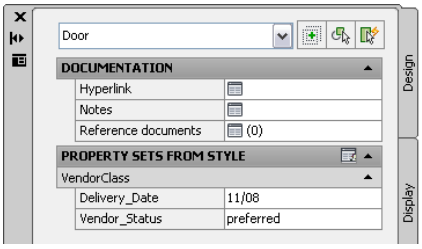
Clearing property sets you do not want to attach to classifications



7 Enter values for the property data, and click OK.

You can enter or edit values later, if necessary.

Entering data for a property set attached to a classification



8 Continue attaching property sets to other classifications.

9 Click OK.

Editing a Classification Definition

Use this procedure to edit or remove classifications in a classification definition, to add or edit data in property sets attached to classifications, and to detach property sets from classifications.

NOTE You can remove only those classifications not currently applied to an object type. You cannot delete classifications that are in use.

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .

2 Expand Multi-Purpose Objects, and expand Classification Definitions.

3 Select the classification definition.

4 On the Classifications tab, edit classifications:

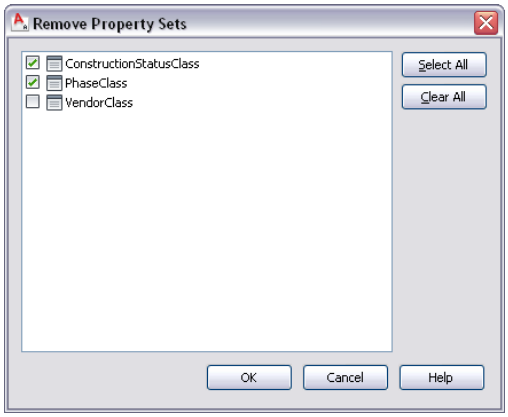
If you want to…	Then…
edit the classification name	select the classification, edit the text under Item, and click OK.
edit the classification description	select the classification, edit the text under Description, and click OK.
add or edit property set data in property sets already attached to a classification	select the classification, and click Property Sets. Enter or edit property data, and click OK.

5 To detach property sets from a classification, select the classification, and click Property Sets.

6 Click .

7 Clear the property sets you do not want to remove, and click OK.

Removing property sets from a classification



8 Click OK.

9 To remove a classification, select the classification, and click Remove.

If the Remove button is unavailable, you cannot delete the classification because it is currently assigned to an object type.

10 Click OK.

Changing the Classification of an Object

Use this procedure to change the classification of an object in your drawing. Only classifications defined for and applied to that specific object are available for selection. For more information, see Creating a Classification Definition on page 2544.

Classifications, but not their descriptions, are listed for objects and styles on the Classifications tab in the Style Manager. If descriptions have been entered, you can view them in the classification definition under Multi-Purpose Objects in the Style Manager.

1. Double-click the object for which you want to change a classification.
2. On the Properties palette, click the Extended Data tab.
3. Select the classification you want to change.
4. On the Select Classification worksheet, select a different classification, and click OK.

Attaching Notes and Files to a Classification

Use this procedure to enter notes and attach reference files to a classification definition. You can also edit notes and edit or detach reference files from a definition.

1. Click Manage tab ➤ Style & Display panel ➤ Style Manager .
2. Expand Multi-Purpose Objects, and expand Classification Definitions.
3. Select the classification definition that you want to change.
4. Click the General tab.
5. To add a description to the definition, enter it for Description.
6. Click Notes.
7. Enter the note on the Notes tab.
8. Click the Reference Docs tab, and attach, edit, or detach a reference file:

If you want to…	Then…
attach a reference file	click Add, select a file, and click OK.
edit the description of a reference file	select the file, and click Edit. Enter the description, and click OK.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click Delete.

9. When you finish making changes to the classification definition, click OK.

Display Themes

Display themes use color, fills, and hatches to present data that is not typically visible in a drawing. For example, you can specify that all 2-hour fire-rated walls appear with a red fill. The display theme legend activates the display theme in the drawing and identifies the meaning of the different colors, fills, or hatches used in the theme.

The data for display theme legends is collected from the property set data attached to the objects or object styles. Styles for display themes are specified in the Style Manager under Documentation Objects.

Process Overview: Creating Display Themes

Typically, manual properties of an object—such as a wall's fire rating or a door's manufacturer—are not visible in a drawing. Display themes let you incorporate such non-graphic data in your drawing by using certain colors, fills, or hatches to highlight objects that meet criteria (theme rules) you establish in a display

theme style. For example, you might define a property named Function for room objects, and then set up a theme rule specifying that rooms with a Function value equal to “storage” will be displayed with a solid yellow fill.

You activate a display theme in a drawing by using a display theme tool to insert a display theme legend, which explains the meaning of color, fills, or hatches specified in the theme.

If you use display theme styles provided with AutoCAD Architecture 2010, the property set definitions and property data formats for the style are already created for you. You can begin the process of creating a display theme from Step 4.

Create and implement a display theme by following these basic steps:

1. Create property data formats (or modify existing ones as necessary) to specify formats for properties you want to include in the theme. For more information, see Creating a Property Data Format on page 2498.

   These formats determine how data is displayed in the display theme legend.

2. Create or modify property set definitions for objects or object styles incorporating formats from Step 1. For more information, see Creating a Property Set Definition on page 2521.

3. Create or modify a display theme style. For more information, see Creating a Display Theme Style on page 2556.

   The legend is a key that incorporates the property set definitions from Step 2 to specify which visual indicator will be applied to which objects in the drawing and what the content of the display theme legend will be.

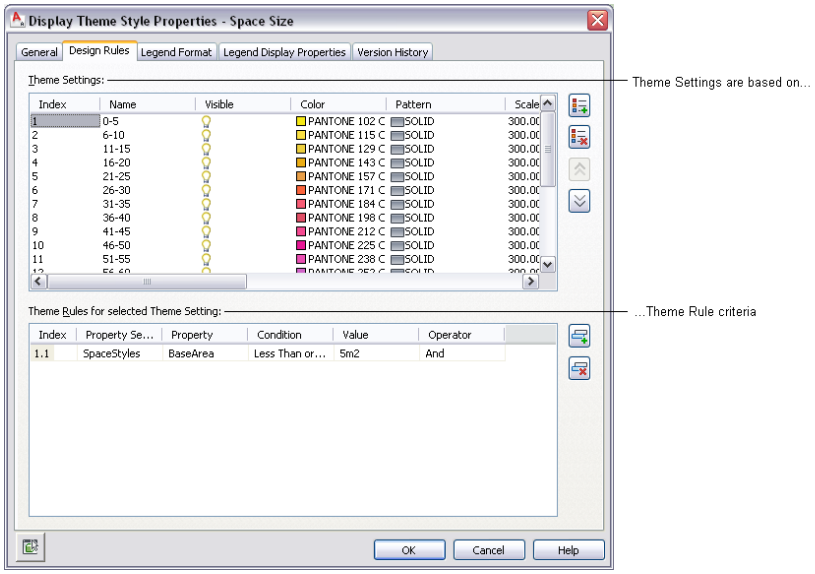
4. Attach property set data to the objects and object styles to be included in your display theme. For more information, see Attaching Property Set Data to Objects on page 2502.

5. Activate the display theme by adding the display theme legend to the drawing or activating an existing legend. For more information, see Adding a Display Theme to a Drawing on page 2553.

Creating and Editing Display Themes

When you use a display theme in a drawing, you can show data that is not typically visible. For example, you can use different hatches to designate different functional areas within a building. Typically, manual properties of an object—such as a wall’s fire rating or a door’s manufacturer—are not visible in a drawing. Display themes let you incorporate such non-graphic data in your drawing by using certain colors, fills, or hatches to highlight objects that meet criteria (theme rules) you establish in a display theme style. For example, you might define a property named Function for room objects, and then set up a theme rule specifying that rooms with a Function value equal to “storage” will be displayed with a solid yellow fill.

You activate a display theme in a drawing by using a display theme tool to insert a display theme legend or by activating an existing legend. The legend explains the meaning of color, fills, or hatches specified in the theme.



Display themes are an effective way to present information during the conceptual design phase of a project, or when working with construction documents. With display themes you can identify changes to a project that are not in the contract, identify the staging of a project, and identify objects that meet or do not meet specific standards. For example, you may choose to specify that all fire-rated walls are displayed with red fills.

The criteria for the display theme are based on the property data attached to the objects or object styles. The property data overrides the display properties to produce the visual effects produced by inserting a display theme. For more information about how objects display and their property data, see Display Configurations on page 525 and Property Sets and Property Set Definitions on page 2458.

If you use the drawing as an external reference (xref) in a project, the display theme is imported into the host drawing by default. If the host drawing already contains a display theme, then the display theme in the host drawing overrides the display theme in the xref. A marker appears over the disabled display theme legend.

Attaching Property Set Data

Before applying a display theme to a drawing, the property sets referenced in the display theme style must be attached to the objects or object styles in the drawing. The attached property sets are the source of the data for the display theme. For more information, see Property Sets and Property Set Definitions on page 2458.

Using Display Theme Styles

Display theme styles control the visual change to the objects as well as the content and appearance of the display theme legend in the drawing. A drawing must contain a display theme style to effect the visual changes or to add a display theme legend. When you copy a display theme style into a drawing, property set definitions and data formats specified in the style are also copied. For more information, see Display Theme Styles on page 2555.

Creating a Display Theme Legend Using Display Theme Tools

A display theme legend provides a key to the display theme, mapping specific colors, fills, or hatches to properties of objects in a drawing. You insert a display theme legend into a drawing to activate a display theme and visually change the appearance of objects by overriding the current display properties.

The tools provided let you quickly place display theme legends by selecting a display theme tool with a specific display theme style and other predefined properties. When you place display theme legends using display theme tools, you can use the default settings of the tool, or you can change settings for the display theme properties. You can also use display theme tools to apply the settings of a display theme tool to existing display themes.

The default Scheduling palette in the Tool palette set contains three sample display theme tools that you can use and customize as needed. Custom palettes created by your CAD manager or other users may also contain display theme tools with display theme styles and properties that are customized for your projects or office standards.

Creating a Display Theme Tool

Use this procedure to create a display theme tool and add it to a tool palette. You may want to create your own display theme tools if you are creating multiple display themes of specific display theme styles. The display theme is activated when the display theme legend is inserted in the drawing with the display theme tool. For more information, see Creating a Display Theme Style on page 2556.

You can use any of the following methods to create a display theme tool:

- Drag a display theme style from the Style Manager to a tool palette, and then customize the properties of the new tool.
- Copy a tool from another palette to the current palette, and then customize the properties of the new tool.
- Copy an existing tool in the current palette and then customize the properties of the new tool.

1. Open the tool palette on which you want to create a tool.
2. Create the tool:

If you want to…	Then…
create a tool from a display theme style in the Style Manager	click Manage tab ➤ Style & Display panel ➤ Style Manager . Locate the style you want to copy, and drag it to the tool palette. Click OK to close the Style Manager.
copy a tool in the current tool palette	right-click the tool, and click Copy. Right-click, and click Paste.
copy a tool from another tool palette	open the other palette, right-click the tool, and click Copy. Reopen the palette where you want to add the tool, right-click, and click Paste.

3. Right-click the new tool, and click Properties.
4. Enter a name for the tool.
5. Click the setting for Description, enter a description of the tool, and click OK.
6. Expand General.

7 Specify general properties for the display theme:

If you want to…	Then…
add a description	enter text for Description.
specify the layer key	click the setting for Layer key, select a layer key, and click OK.
specify layer overrides	click the setting for Layer overrides. Clear Do not specify Layer Overrides, select an override, and click OK twice.
specify the display theme style	click the setting for Style, and select a style.
specify an external drawing file source for the style	click the setting for Style location, and click Browse to specify a location.
change the scale of the display theme legend	enter a value for Scale.

8 Click OK.

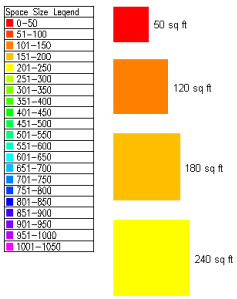
Adding a Display Theme to a Drawing

Use this procedure to add a display theme to a drawing by inserting a display theme legend.

The display theme legend activates the display theme in the viewport and identifies the meaning of the different colors, fills, or hatches used in the theme. The data for the display theme legend is collected from the property set data attached to the objects or object styles, as specified in the display theme style. When you add new objects to a drawing, data is added to the legend if it meets the criteria you specified in the display theme style. For more information, see Display Theme Styles on page 2555.

If you insert a display theme legend while working in paper space, the legend is attached to a viewport. If you insert a display theme legend while working in model space, all model space viewports are affected.

Legend for display theme based on Space Size property



To ensure that the display theme can be implemented, verify that:

- The drawing contains a display theme style that specifies theme settings and establishes conditions (theme rules) for those objects that you wish to display differently. For more information, see Creating a Display Theme Style on page 2556.
- Property set data is attached to the objects or object styles for objects to which you want the display theme style applied. For more information, see Attaching Property Set Data to Objects on page 2502.

1 Open the tool palette containing the Display Theme tool you want to use, and select the tool.

Three sample Display Theme tools are located on the default Scheduling palette in the Tool palette set. There are additional Display Theme tools located in the Documentation Tool Catalog and with the Scheduling and Reporting Tools in the Stock Tool Catalog. You can add this tool to any tool palette. For more information, see Working with Tool Palettes on page 56.

2 In the drawing area, specify the insertion point for the upper-left corner of the display theme legend.

3 Specify the lower-right corner of the legend, or press *ENTER* to scale the display theme legend to the current drawing scale.

The objects affected by the display theme visually change in the drawing as indicated by the legend.

Disabling Display Themes

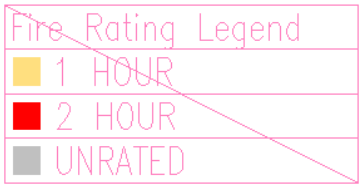
Use this procedure if you want to manually disable a display theme. A disabled display theme is indicated by a marker through the legend. This does not prevent the display theme legend from plotting on your sheet. For more information about display properties for the legend, see Accessing the Default Display Properties of an Object on page 535.

If you attach or overlay a drawing as an external reference (xref) in a project, all display themes in the xref are imported into the host drawing by default. If the host drawing has existing display themes, then the active display theme in the host drawing overrides any active display theme in the xref.

1 Select an active display theme legend.

2 Click Display Theme tab ➤ Modify panel ➤ Disable Display Theme .

Disabled display theme



Activating Display Themes

Use this procedure if you want to activate a different theme. Regardless of how many display themes you add to your drawing, only one theme at a time can be active. If you add a display theme to a drawing that has existing themes, the other themes are disabled. A disabled display theme is indicated by a marker through the legend.

If you attach or overlay a drawing as an external reference (xref) in a project, all display themes in the xref are imported into the host drawing by default. If the host drawing has existing display themes, then the active display theme in the host drawing overrides any active display theme in the xref.

1 Select a disabled display theme legend.

2 Click Display Theme tab ➤ Modify panel ➤ Apply Display Theme .

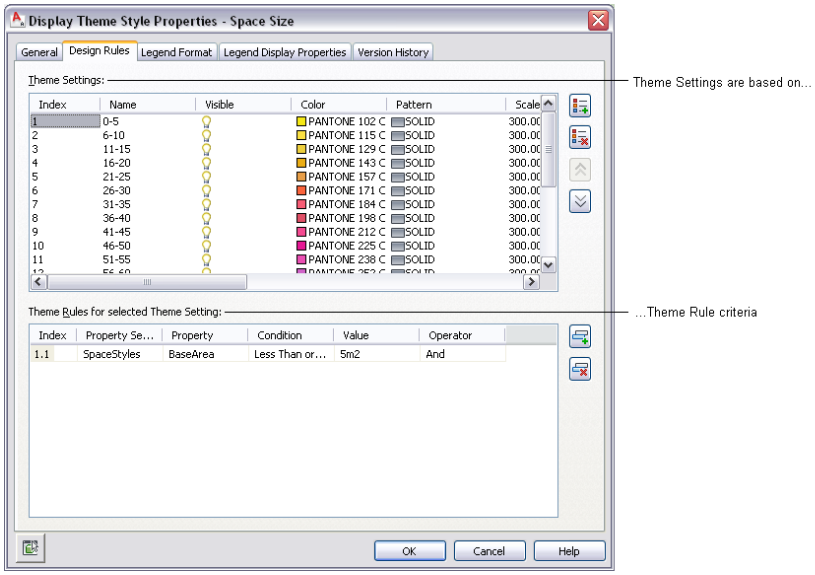
The marker is removed from the selected legend and applied to any others in the drawing.

Active display theme legend

Display Theme Styles

A display theme style defines a particular display theme for incorporating non-graphic data in a drawing by highlighting objects that meet criteria you specify. The type of highlighting is controlled through one or more theme settings, each of which specifies a particular color fill, hatch, or linetype. For each theme setting, there are one or more theme rules that determine which objects will be highlighted using that setting.

The display theme style also specifies the format and display properties for the display theme legend that identifies the data represented by the highlighted objects.



As you work with different display theme styles within a project, you can synchronize the versions with your project standards. For more information, see Synchronizing Selected Styles and Display Settings with AEC Standards on page 425.

What You Need to Create a Display Theme Style

Your drawings must contain the following information to create a new display theme style:

- Property set definitions for any property data to be included in the display theme created from the style. For more information, see Property Set Definitions on page 2510.
- Property data formats to control the format of values of display theme rules. Typically, you use the data format for values that the property set definition uses. However, you can override data formats. For more information, see Property Data Formats on page 2496.

Creating Tools from Display Theme Styles

You can create a display theme tool from a display theme style by dragging the style from the Style Manager onto a tool palette. You can then specify properties for the tool. For more information, see Creating a Display Theme Tool on page 2552.

Creating a Display Theme Style

Use this procedure to create design rules for display theme styles and to specify the format for the legend of the display theme in the Style Manager. A display theme changes how objects or object styles display in your drawing based on the criteria you specify. For more information, see Creating and Editing Display Themes on page 2550. Property set definitions must already be defined in your drawing before you can specify one for a theme rule. For more information, see Property Set Definitions on page 2510.

Specify the design rules for the display theme

1 Click Manage tab ➤ Style & Display panel ➤ Style Manager .
The Style Manager is displayed with the current drawing expanded in the tree view.

2 Expand Documentation Objects, right-click on Display Theme Styles, and click New.

3 Enter a name for the new display theme style and press *ENTER*.

4 To add a description of the display theme style, enter it for Description.

5 Click the Design Rules tab.

6 Click to create a new display theme setting.
An unnamed display theme setting is created with the index number of 1.

7 Create the settings for the display theme.

If you want to…	Then…
specify a name for the display theme	select Unnamed and enter text for Name.
turn off the visibility of the identifying color or hatch for this display theme in the display theme legend	click the light bulb. If the light bulb is yellow, the identifying color or hatch and the name of the display theme are visible in the display theme legend.
add a color to the display theme	click BYBLOCK, and select a color from the Select Color worksheet. For more information, see "Choose Hatch Patterns and Solid Fills" in AutoCAD Help. **TIP** The quickest way to locate and view an AutoCAD topic referenced in Autodesk AutoCAD Architecture Help is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type in the AutoCAD topic name, and click List Topics.
add a hatch pattern to the display theme	click SOLID, select a Type from the Hatch Pattern worksheet, and click OK. For more information, see "Choose Hatch Patterns and Solid Fills" in AutoCAD Help.
scale a hatch pattern for the display theme	enter a value for Scale/Spacing. For more information, see "Hatch Tab (Hatch and Gradient Dialog Box)" in AutoCAD Help.
change the angle of the hatch pattern	enter a value for Angle. For more information, see "Hatch Tab (Hatch and Gradient Dialog Box)" in AutoCAD Help.
specify the orientation of the hatch pattern from global to object	click global.
specify the X offset of the hatch pattern	enter a value for X Offset.

If you want to…	Then…
specify the Y offset of the hatch pattern	enter a value for Y Offset.
specify a Linetype for the hatch pattern	click ByBlock, select a linetype, and click OK. For more information, see "Custom Hatch Patterns" in AutoCAD Help.
specify a Lineweight for the hatch pattern	click ByBlock, select a lineweight, and click OK. For more information, see "Overview of Lineweights" in AutoCAD Help.
specify a Linetype Scale for the hatch pattern	enter a value for Lt Scale. For more information, see "Work with Linetypes" in AutoCAD Help.
specify a Plot Style for the hatch pattern	click ByBlock, select a plot style, and click OK. For more information, see "Use Plot Styles to Control Plotted Objects" in AutoCAD Help.

8 Under Theme Rules for selected Theme Settings, click .

A display theme rule is created with the index number of 1.1. This corresponds with the display theme setting. You can create multiple rules for each display theme.

9 Select a property set definition.

Property set definitions that exist in the drawing appear in the drop-down list.

10 Select a property.

The properties available are contingent upon the property set definition you selected.

11 Select a condition.

The conditions available are contingent upon the property set definition and property you selected.

12 Enter a value appropriate to the condition you selected.

13 Select an operator appropriate to the formula you are creating for the display theme rules.

Specify the format for the design theme legend

14 Click the Legend Format tab.

15 For Title, enter the text you want to appear on the heading of the display theme legend.

16 Select the shape of the symbol for the legend key as either round or square.

17 Select a style for the text in the legend.

18 Enter the height for the text in the legend.

19 Enter the gap between words in the legend.

Specify the display properties for the display theme legend

20 Click the Legend Display Properties tab.

21 Select the display representation on which to display the changes, and select Style Override.

The display representation in bold is the current display representation. For more information, see Display Representations on page 520.

22 If necessary, click .

23 Click the Layer/Color/Linetype tab.

24 Select the component to change, and select a different setting for the property.

25 Click OK twice.

Troubleshooting Schedule Tables

This topic provides answers to some common questions about schedule tables and their data:

Question Marks in Cells

I added a schedule table, but all the cells contain question marks. Why did this happen?
Question marks appear in table cells when property sets are not attached to the objects included in the table, or to the object styles for objects in the table. When attached to an object or a style, a property set becomes the container for the property data. The schedule table stores no data.

For more information about attaching property sets to objects and styles, see Property Set Data on page 2502.

To attach property sets to objects and styles individually, select the table, click Schedule Table tab ➤ Modify panel ➤ Edit Table Cell , and select the cell. For more information, see Editing Table Cell Data on page 2494.

To attach property sets to all objects and styles that need them, select the table, and click Schedule Table tab ➤ Modify panel ➤ Add All Property Sets . For more information, see Adding Property Set Data to All Objects on page 2496.

For more information about attaching property sets to objects and styles, see Attaching Property Set Data to Objects on page 2502 and Attaching Property Set Data to Styles and Definitions on page 2504.

Object not Listed

Why is an object I added to the drawing not listed in the schedule table?
Objects added to a drawing after you add a schedule table are not added to the table unless the Add New Objects Automatically option is selected in the table properties. However, you can manually add objects to a table schedule.

For more information, see Adding Objects to a Schedule on page 2463.

If the schedule table style uses classifications to filter objects, review the troubleshooting information in Troubleshooting Classification Definitions on page 2560.

Which Property Sets to Attach

How do I know which property sets to attach to objects or styles to remove question marks from columns in a schedule table?

You can find this information by viewing the column definitions in the schedule table style used to create the schedule table. Select the schedule table, and click Schedule Table tab ➤ General panel ➤ Edit Style drop-down ➤ Schedule Table Styles . Select the current style, and click the Columns tab. You can view the property assigned to each column and the property set from which the property is obtained. Click Cancel to return to the drawing.

The property sets provided use the words Object and Style in their names to identify how the property set can be attached. For example, you can attach the DoorObjects property set to doors. You can attach the DoorStyles property set to any door style.

To attach property sets to objects and styles individually, select the table, click Schedule Table tab ➤ Modify panel ➤ Edit Table Cell , and select the cell. For more information, see Editing Table Cell Data on page 2494.

To attach property sets to all objects and styles that need them, select the table, and click Schedule Table tab ➤ Modify panel ➤ Add All Property Sets . For more information, see Adding Property Set Data to All Objects on page 2496.

For more information about attaching property sets to objects and styles, see Attaching Property Set Data to Objects on page 2502.

Changing Data in the Schedule Tables

Why doesn't the data in the schedule table show the changes I made to objects in the drawing?
Changes that you make to objects—whether through graphically modifying the object, editing the object properties or style, or editing property data—automatically appear in a schedule table only when the Automatic Update option is specified in the schedule table properties. However, you can manually update a table to reflect the changes.

For more information, see Updating a Schedule Manually on page 2464.

Object Numbers Out of Order

After adding and removing objects, I updated the schedule table. Why are the object numbers still out of order?
Updating a schedule table does not change the numbers assigned to the objects.

To renumber objects in a schedule table, see Renumbering Property Set Data on page 2472.

Locating an Object

Is there an easy way to locate an object that is listed in a schedule table?
Yes. You can select a row in the schedule table to highlight the object that corresponds to the row.

For more information, see Locating and Viewing Scheduled Objects in a Drawing on page 2465.

Selecting an Empty Cell

Why can't I select an empty cell in the schedule table to enter a value for a manual property?
A table cell must contain at least one character for you to be able to select an individual cell. If the property was defined without a default entry and no data for that property was entered before the table was created, the cell is blank.

You can enter the value by accessing the property data directly in the object or the object style, depending on where the property is attached. For more information, see Property Set Data on page 2502.

INVALID in a Table Cell

Why do all the cells of one column in a schedule table show a value of INVALID?
A property value appears as invalid in a schedule table if the property was deleted from a property set that is used in the schedule table.

To edit the schedule table style to remove the property from the table, see Editing Columns in a Schedule Table on page 2485. To edit the property set definition to restore the property, see Adding a Manual Property Definition to a Property Set Definition on page 2523 or Adding an Automatic Property Definition to a Property Set Definition on page 2526.

Troubleshooting Schedule Table Styles

This topic provides answers to the following questions:

Add Column Button Unavailable

Why is the Add Column button unavailable when I try to add columns to a schedule table style?
This button is unavailable if the drawing does not contain any property sets that apply to the same objects or styles that the schedule table style is applied to.

For more information, see Specifying Objects for a Schedule Table Style on page 2479 and Adding Columns to a Schedule on page 2480.

Property Sets Unavailable

Why are the property sets I want to use unavailable when I try to add a column?
Property sets are listed only if property set definitions are stored in the current drawing. Also, only property sets that apply to all the objects you selected on the Applies To tab are available to use in schedule table columns. A property set that applies only to some of the selected objects cannot be included in the schedule table. For example, a window schedule that applies to windows and window assemblies cannot contain columns for properties that apply only to window assemblies.

Quantity Column not Totalling

Why is the Quantity column in my schedule table style not totalling objects that are the same.
Objects that are the same, such as all doors of a certain style with identical dimensions, are not grouped and totaled if values for any cell are different. For example, the objects are not totalled if the table contains object numbers or if some objects have remarks and some do not.

Matrix Column Displaying Data Instead of a Matrix Symbol

Why does the matrix column I formatted for a property show data values instead of the matrix symbol?
If the property specified in the column can have multiple values, you need to add columns to the matrix format to accommodate all possible values. For example, in a finish schedule in which walls may be assigned one of four finishes, you need to enter a number greater than three for Max Columns to create a column for each finish. When you then create a table from the style, the matrix symbol appears in the finish column for the finish value entered in the property data for the walls of each space.

Troubleshooting Classification Definitions

This topic answers the following questions about troubleshooting classification definitions:

Empty Classification Tab in Style Properties

Why does the Classifications tab in the style properties have nothing in it?
The Classifications tab in the object style properties contains no data if no classification definitions are defined for styles of that object type. For example, if the drawing contains no classification definitions that apply to wall styles, the Classifications tab in the Wall Style Properties dialog does not contain any classification information. You specify the object styles to which a classification definition applies when you create the definition.

For more information, see Specifying the Object Types for a Classification Definition on page 2545.

Long Title for a Classification Property

My schedule table contains an extremely long title for a classification property. How can I fix this?
The default column header in schedule table styles is the description of the property selected in the property set definition. The default description for classification properties comprises the names of the classification definition, the classification property set, and the classification. In the schedule table style, you can edit the column header to create a shorter header.

For more information, see Adding Columns to a Schedule on page 2480.

If you clear Use classification name for description when you add or edit a classification property in the property set definition, you can enter a shorter description. For more information, see Adding a Classification Property Definition to a Property Set Definition on page 2528.

Classifications Property to a Property Set Definition

Why are no classification property sets listed when I try to add a classification property to a property set definition?
No classification property sets are listed if there are no classification property sets for the classification definitions that apply to the object or object style specified in the current property set definition.

Including Classifications in a Schedule Table

I want to include classifications in a schedule table. Why do I not see an option for them in the schedule table style?
The schedule table style must use property sets that contain classification properties. The classification properties are then available to include in a schedule table style.

Objects Not Included in the Schedule

Why were numerous objects in my drawing not included in a schedule table?
If you use classification filters in the schedule table style, only objects of the specified type that meet all the classification criteria are included in the schedule table.

For example, if you create a door schedule for doors that are classified new and exterior, only doors that meet both criteria are included in the schedule table. If an object meets only some of the classification criteria, it is not included in the schedule table.

Classifications Selected but Object Not Included

I selected all the classifications for a classification definition in the schedule table style, but many objects were not included in the schedule. Why did this happen?
If a classification was not selected in the object style for the classification definition used in the schedule table style, objects of that style are not included in the schedule. The classification for such objects is Unspecified, and they are filtered from the schedule table. To include all objects in a schedule table, regardless of classification, do not select any classifications on the Applies To tab in the schedule table style.

Troubleshooting Schedule Tags

This topic answers the following questions about troubleshooting schedule tags:

Difference Between Schedule Tags and Project Schedule Tags

When do I select a project-based schedule tag instead of basic schedule tag?
The difference between a standard schedule tag and a project-based schedule tag is that a project-based schedule tag recognizes the level in the project in which the object is located. When you want this additional information captured, use a project-based schedule tag.

For more information, see Adding Tags Using Schedule Tag Tools on page 2466 and Workflow for Annotating a Project on page 352.

Troubleshooting Units

This topic answers the following question about troubleshooting units:

Values on the Extended Data Tab

Why does the display change for the units of a manual property when I select the value on the Extended Data tab?
An override was applied in the property set definition that is attached to the object. Property data formats control how units are edited and displayed. If you assign a type of unit other than the default in the property set definition, an override is applied to the property data format. Units specified in the property set definition controls what is stored in the drawing. The Extended Data tab of the Properties palette displays the units as defined in the property data format.

For example, with units specified as inches and unit format specified as Architectural in the property data format for Length–Long, when you select Length–Long for Format in the property set definition, Inches displays for Units by default. You can select any other type of unit that is identified for Length–Long (such as feet and millimeters). If you select Feet in place of Inches in the property set definition, and select a door with a manual property called HeightOverride, and enter 84 on the Extended Data tab, the value displays 7'-0".

For more information, see Adding a Manual Property Definition to a Property Set Definition on page 2523 and Units in Property Data Formats on page 2497.

AEC Content and DesignCenter

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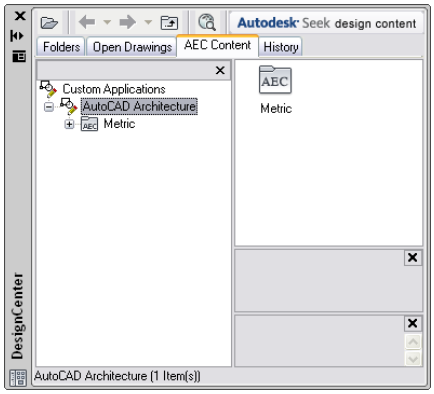
Architectural, engineering and construction (AEC) content consists of drawing files, architectural symbols, object styles, and annotation routines that you add to drawings to design and document your project. Predefined AEC content can be accessed from the Content Browser and from the AEC Content tab in DesignCenter™. You can also create custom content using the AEC Content Wizard.

Overview of AEC Content

AEC (architectural, engineering and construction) content consists of drawing files, architectural symbols, object styles, and annotation routines. You use AEC content to create and annotate your drawings. Doors and windows are examples of design content, while schedule tables and keynotes are examples of documentation content. You can access AEC content from either the Content Browser or the AEC Content tab in DesignCenter™.

DesignCenter AEC Content tab



In some design situations, you may want to create custom content for a unique piece of construction, or you may want to create a custom command to insert AEC content by following a series of procedures. You can make your own content by modifying existing content or by constructing new content using the AEC Content Wizard. For more information, see Creating Custom AEC Content on page 2568.

In addition to AEC content, there are other types of predefined content, including layers, templates, and materials. This content is located in *C:\ProgramData\Autodesk\ACA 2010\enu*.

Predefined AEC Content

With the AEC content provided in the software, you can begin the design process for imperial and metric drawings immediately. You can access AEC content from either the Content Browser or the AEC Content tab in DesignCenter™.

The Content Browser holds a collection of tool catalogs for predefined AEC content and sample object styles. Design, Documentation, and Stock Tool catalogs are available for both metric and imperial tools. The content in DesignCenter supplements AEC content in the Content Browser. In some situations, content such as elevation labels provides alternatives to tools in the Content Browser.

Each method of accessing AEC content is unique and has advantages and disadvantages. Some AEC content appears in both the Content Browser and DesignCenter. For example, there are schedule tag tools in the Content Browser and schedule tags in DesignCenter. For more information, see Adding AEC Content to Drawings on page 2566.

AEC Content in the Content Browser

The Content Browser has a comprehensive collection of content. You store, organize, share, exchange, and insert AEC content into drawings using tools. For example, because windows are governed by styles, the window tool specifies the location of the external drawing file from which to import the style of the window. For more information, see Exploring the Content Browser on page 98.

Tools in the Content Browser are organized within tool catalogs by category. There are imperial and metric Design, Documentation and Stock Tool catalogs in the Content Browser. When you first open the application, a collection of tools appears in the drawing area. The tools are organized on tool palettes by type. For example, the Walls Tool Palette contains a variety of commonly used wall styles. Tools on the tool palettes reference the content organized in the Content Browser. For more information, see Working with Tool Palettes on page 56.

The Content Browser is also the most flexible method of organizing and adding content to your drawing. You can easily customize your own tool palettes by dragging and dropping frequently used tools onto a palette. Because the Content Browser runs independently, you can exchange tools and tool palettes with other Autodesk applications. For more information, see Content Browser Overview on page 97.

AEC Content in DesignCenter

Like the Content Browser, DesignCenter™ also lets you store, organize, share, and exchange AEC content that can be inserted into drawings. Instead of being tool-based, however, AEC content in DesignCenter is organized in a hierarchical tree view, and once you select an AEC content item, you can preview it, edit it, or drag it onto a tool palette or directly into a drawing.

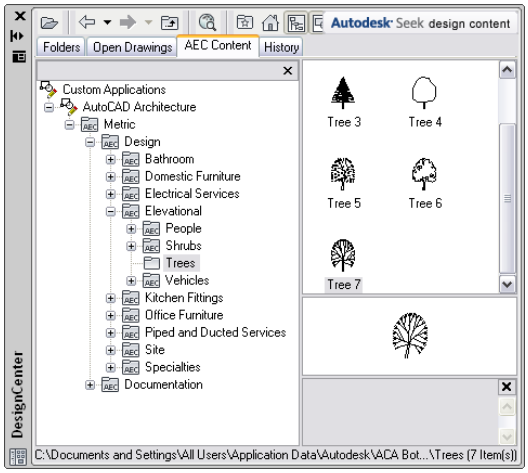
When you open the DesignCenter from the Palettes panel drop-down on the View tab, and click the AEC Content tab, the Custom Applications tree view is displayed in the left pane with AutoCAD Architecture as the root node. Within the Imperial and Metric folders under the root node, there are folders for categories that roughly approximate the CSI MasterFormat 2004 divisions. At the lowest level of the tree view, each folder points to one or more external drawing files, each containing one piece of AEC content. You can toggle the tree view on and off by clicking at the top of the DesignCenter window.

There are 3 panes on the right side of the AEC Content tab.

- The top pane is the content area, which displays the contents of the folder currently selected in the tree view. The Views drop-down list at the upper-right corner of the window provides 4 content display options: Large Icons, Small Icons, List, and Details. The Large Icons option displays an image of the content item. All other options display the generic DWG icon. Regardless of whether the content item is displayed as an image or an icon, it can be dragged and dropped into a drawing or onto a tool palette.

- The middle pane displays a higher resolution preview of the AEC content item currently selected in the top pane and behaves like the Object Viewer. For more information, see Object Viewer on page 731. You can toggle the preview pane on or off by clicking at the top of the window.
- The bottom pane displays a text description of the AEC content item currently selected in the top pane. You can toggle the description on or off by clicking at the top of the window.

The AEC Content tab in DesignCenter



Fixture Layouts in DesignCenter

Fixture layouts are located in the Plumbing Fixtures folder (under Imperial/Design/Mechanical). They are unique because you can drag them into your drawings and then edit the components of the layout by clicking Insert tab ➤ Reference panel ➤ ➤ Edit Reference. For more information, see Adding Fixture Layouts from DesignCenter on page 2567 and Modifying Fixture Layouts on page 2577.

NOTE Fixture layouts are intended to provide samples from which to create your own office standards for restroom design. All the components can be modified to meet project and code requirements, and then added to DesignCenter™ for access. The samples provided do not necessarily meet jurisdictional regulations or ADA (Americans with Disabilities Act) requirements.

The following notes and hints apply when working with the fixture layouts available in DesignCenter. For more information, see Modifying Fixture Layouts on page 2577.

- The layout files are custom content set to the Drawing content type.
- The layout files have no layer key because all objects have hard-coded layers within the file. You can change the layers as required.
- The layout files are not set to Explode on Insert because you can place them at only one rotation and orientation (not mirrored) when you drag them into a drawing, and it is easier to reposition them as unexploded blocks.
- To set rotation and mirroring before insertion, double-click the icon to display the standard AutoCAD Insert dialog box instead of dragging the content.
- The rotation angle and scale (for mirroring) can be set in the Insert dialog box or on the command line. If you use the command line, you can see the result of each option before actually inserting the content.

You can apply multiple settings on the command line, even though the prompt says "Specify insertion point:" after the first one. You can still type another **X**, **Y**, or **R**.

- Use X = -1 or Y = -1 to mirror the content.
- Use the node object snap to position individual stall and urinal layouts next to each other. The toilet partitions and screens are inserted with centered baselines, so the node snap places them correctly.
- After insertion, click Insert tab ➤ Reference panel ➤ ➤ Edit Reference to adjust the layout, extend partitions, or to move doors, fixtures, or grab bars.
- Stall partitions are wall objects placed in the wall group "Toilet_Ptn." They do not clean up with other walls. Urinal screens are in the "Standard" group, but set to "Do Not Cleanup."
- Each lavatory layout consists of a counter, made of a wall object with the cleanup group "Toilet_Counter" with lavatory MV Blocks anchored as follows:
  Lavs (1) Wall anchor; centered along curve

  Lavs (2) - (4) Layout Curve (on counter); even spacing (1'-6" start and end offset)

  Lavs (5) Layout Curve (on counter); repeat at 3'-0" (1'-6" start and end offset)
- Use the endpoint object snap to position a counter against a stall or urinal screen.
- After exploding, the lavatory counters can be trimmed or extended to the restroom walls. The lavatory counters adjust appropriately, depending on the anchoring mode.
- The restroom files are preconfigured assemblies of individual layouts, arranged as typical men's and women's rooms.

For more information, see Detail Components on page 2313 and Layout Curves and Grids on page 1775.

Adding AEC Content to Drawings

You add AEC content to drawings from tools in the Content Browser or from files in the content area of the AEC Content tab in DesignCenter™. Although you can drag and drop content from DesignCenter onto a tool palette to create tools for the content, you cannot drag tools from the Content Browser into DesignCenter.

Adding Content from the Content Browser

Use this procedure to add AEC content to a drawing using tools from the Content Browser. When you drag a tool directly into the drawing area from the Content Browser, the Properties palette opens so that you can enter properties for the new object. Tools can have preset parameters so that you can add an object with one click. There is no need to change properties before placement. For detailed information, see Content Browser Overview on page 97.

1. Click Home tab ➤ Build panel ➤ Tools drop-down ➤ Content Browser .
2. The Content Browser opens in a window outside the drawing area. To see both the drawing and the Content Browser, reduce the size of drawing and the Content Browser on your screen.
3. Click the catalog that contains the category of tools you want to use.
4. Click the category that contains the tool.
5. Drag the i-drop® icon for the tool into the drawing area to add the content to your drawing.
6. Define properties for the content on the Properties palette, if necessary.

   For more information, see Properties Palette on page 38.
7. Press ENTER.

Adding Content from DesignCenter

Use this procedure to add DesignCenter content to a drawing. You can also drag AEC content onto a tool palette for direct access or to create a custom tool. For more information see Moving Content Between DesignCenter and the Content Browser on page 2567.

1 Click Insert tab ➤ Content panel ➤ Content Browser drop-down ➤ Design Center .

2 Click the AEC Content tab.

3 Under Custom Applications, expand AutoCAD Architecture, and expand Imperial or Metric.

4 Expand the folder containing the content you want to place in the drawing.

5 Drag the desired image or file icon from the content area (the top right pane) to the desired location in the drawing area. (Alternatively, you can double-click the content item, or right-click it and click Insert, and then specify a location in the drawing area.)

The content is placed in your drawing using the current display configuration. For more information about display configurations, see Display System Structure on page 519.

Adding Fixture Layouts from DesignCenter

Use this procedure to place fixture layouts in your drawing. For more information, see Fixture Layouts in DesignCenter on page 2565 and Modifying Fixture Layouts on page 2577.

1 Click Insert tab ➤ Content panel drop-down ➤ Design Center .

2 Click the AEC Content tab.

3 Under Custom Applications, expand AutoCAD Architecture, and expand Imperial or Metric.

4 Expand Design, and expand one of the following layouts:

- For imperial content, expand Mechanical\Plumbing Fixtures\Layouts.
- For metric content, expand Bathroom\Layouts.

5 Double-click a layout.

6 Use the Insert dialog box to control the placement of the layout.

7 Specify a rotation angle or a scale to mirror the layout.

Enter **-1** for X or **-1** for Y to mirror the content.

8 Click OK.

9 Specify a location for the fixture layout.

NOTE You can also add the layout by dragging it to the drawing, or by right-clicking and clicking Insert. You have the most control over the insertion if you use the double-click or right-click methods.

Moving Content Between DesignCenter and the Content Browser

When you want to create a tool from AEC content in DesignCenter™, you drag and drop the selected content item from the AEC Content tab in DesignCenter onto a tool palette. From the tool palette, you can drag and drop the newly created tool into a catalog in the Content Browser. You cannot drag AEC content from a DesignCenter folder directly into the Content Browser or drag tools from the Content Browser into DesignCenter.

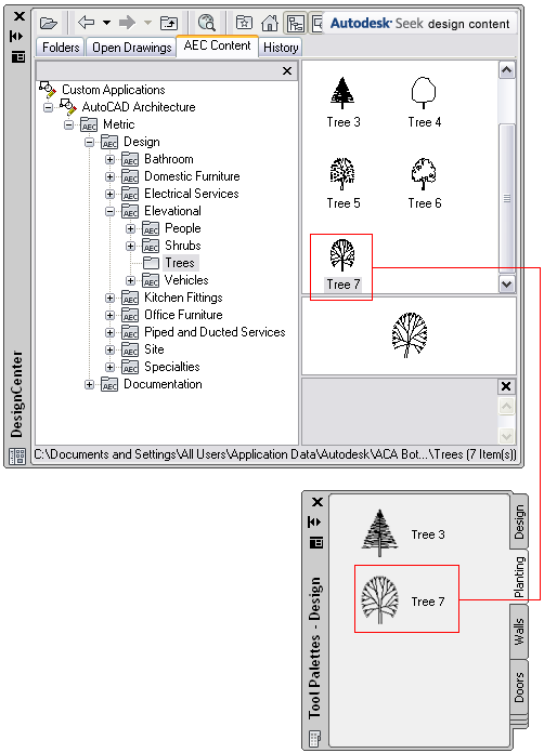
For more information about creating your own tool palettes or working with content in catalogs, see Working with Tool Palettes on page 56.

Creating a Tool from AEC Content in DesignCenter

Use this procedure to create a tool by dragging an AEC content item from DesignCenter™ onto a tool palette.

NOTE You can also create tools from blocks in DesignCenter, but they have slightly different tool options.

Adding AEC DesignCenter content to a tool palette



1 Open the tool palette where you want to add a new tool.

2 Click Insert tab ➤ Content panel drop-down ➤ Design Center .

3 On the AEC Content tab, navigate to the folder for the AEC content from which you want to create a tool.

4 Drag the content onto the tool palette.

A new tool is inserted on the tool palette. To change the icon of the tool, see Changing a Tool Icon on page 70.

5 Define additional properties for the tool, if necessary.

For more information, see Changing the Tool Properties on page 69.

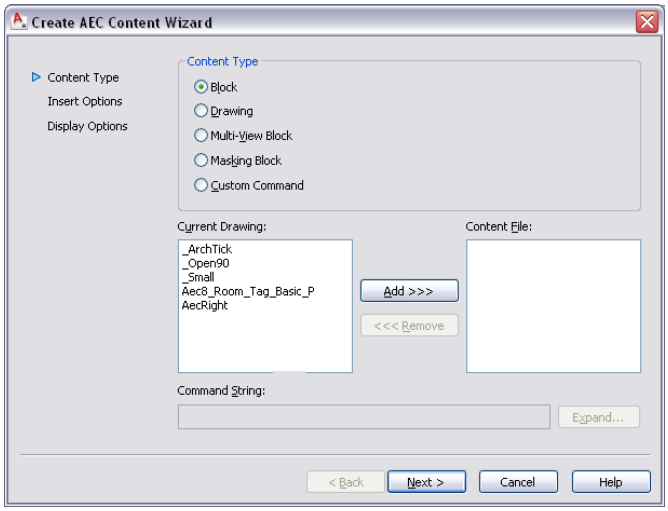
Creating Custom AEC Content

When you want to create custom content to represent unique or frequently used objects that are not currently included in either the Content Browser or DesignCenter™, use the AEC Content Wizard to construct the content. The AEC Content Wizard is designed specifically for working within DesignCenter. After you create the content in DesignCenter, you can move it onto a tool palette. For more information, see Adding AEC Content to Drawings on page 2566.

Using the AEC Content Wizard

The AEC Content Wizard helps you create custom content. You can create blocks, drawings, and commands from data existing in the current drawing.

AEC Content Wizard



To create custom content, you first select the content type. Next, you specify options to be used when content is inserted into a drawing. The final step is to specify the output file and other parameters that control how DesignCenter™ displays the content.

When creating content in an existing AEC file (that is, a drawing generated from the AEC Content Wizard), the default values for each page of the wizard are set to the value used to create the drawing. The default settings provide an easy way for you to make small modifications to existing content files.

Creating an AEC Content Block for DesignCenter

Use this procedure to create an AEC content block and add it to DesignCenter™. You create the new block from an existing block in the current drawing. The block is saved in a new drawing that can be accessed from DesignCenter.

1. On the command line, enter **AecCreateContent**.
2. Select Block for Content Type.

   All the defined blocks in the current drawing are displayed under Current Drawing.
3. Select a block for Current Drawing, and click Add.

   Only one block at a time can be selected for Current Drawing and added to Content File.
4. Click Next.
5. Specify an insertion method for Insert Options:

If you want to…	Then…
explode the block when you add it to your drawing	select Explode on Insert.
have the block remain a block when you add it to your drawing	clear Explode on Insert.
specify an elevation for the block when you add it to your drawing	enter a value for Preset Elevation.

If you want to…	Then…
specify an anchor type to use when you add the block to your drawing	select a type of anchor for Anchor Type.

6 Specify an insertion scale factor for Scale:

If you want to…	Then…
scale the block instance using a coordinate (*X*, *Y*, *Z*) direction	enter values for X, Y, and Z for Scale.
apply no additional scaling method to the block instance	select None for Additional Scaling.
scale the block instance by the annotation scale of the drawing you are adding the block to	select Annotation for Additional Scaling.
scale the block instance by the drawing units of the drawing you are adding the block to	select Drawing for Additional Scaling.
scale the block definition by the drawing units of the drawing you are adding the block to	select Enable AEC Unit Scaling.

7 If the block has attributes, specify a text style for Attribute Text Style:

If you want to…	Then…
use the default text style of content in the current drawing	select As Defined by Content.
use the text style of the target drawing	select Target Drawing Text Style.

8 If the block has attributes, specify an angle for Attribute Text Angle:

If you want to…	Then…
use the rotation angle of the block as the attribute text angle	select As Inserted.
set the angle of the attribute text to zero	select Force Horizontal.
be able to read the attribute text from the right direction	select Right Reading.

9 Click Select Layer Key, select a layer key, and click OK.

You can also enter a layer name for Layer Key.

10 Click Next.

11 Enter a name for File Name, or click Browse.

If you want to save the current drawing as the content file, select Current Drawing.

12 Select an image for Icon to represent the block in DesignCenter:

If you want to…	Then…
specify an existing bitmap image	click New Icon, select an image, and click OK.

If you want to…	Then…
specify the default image of the block itself	click Default Icon.

13 Enter a description for Detailed Description.

14 If you want to save the drawing objects in the content file, select Save Preview Graphics.

15 Click Finish.

Creating an AEC Content Drawing for DesignCenter

Use this procedure to create an AEC content drawing and add it to DesignCenter™. The content drawing can then be inserted into a drawing with all of its content, including styles, blocks, layers, and linetypes.

1 On the command line, enter **AecCreateContent**.

2 Select Drawing for Content Type, and click Next.

3 Specify an insertion method for Insert Options:

If you want to…	Then…
specify an elevation	enter a value for Preset Elevation.
specify an anchor type	select a type of anchor for Anchor Type.

4 Specify an insertion scale factor for Scale:

If you want to…	Then…
scale the drawing instance using a coordinate (*X*, *Y*, *Z*) direction	enter values for X, Y, and Z for Scale.
apply no additional scaling method to the drawing instance	select None for Additional Scaling.
scale the drawing instance by the annotation scale of the drawing you are adding the block to	select Annotation for Additional Scaling.
scale the drawing instance by the drawing units of the drawing you are adding the block to	select Drawing for Additional Scaling.
scale the drawing definition by the drawing units of the drawing you are adding the block to	select Enable AEC Unit Scaling.

5 Specify an angle for Attribute Text Angle:

If you want to…	Then…
assign the angle of the attribute text to be the same as the rotation angle of the drawing	select As Inserted.
set the angle of the attribute text to zero	select Force Horizontal.
be able to read the attribute text from the right direction	select Right Reading.

6 Click Select Layer Key, select a layer key, and click OK.

You can also enter a layer name for Layer Key.

7 Click Next.

8 Enter a name for File Name, or click Browse.

If you want to save the current drawing as the content file, select Current Drawing.

9 Select an image for Icon to represent the drawing in DesignCenter:

If you want to…	Then…
specify an existing bitmap image	click New Icon, select an image, and click OK.
specify the default image of the drawing itself	click Default Icon.

10 Enter a description for Detailed Description.

11 Click Finish.

Creating an AEC Content Multi-View Block for DesignCenter

Use this procedure to create an AEC multi-view block and add it to DesignCenter™. You define the multi-view block from view blocks created in your drawing that represent different views of your custom object. The block is saved in a new drawing that can be accessed from DesignCenter. For more information, see Creating View Blocks on page 1883.

1 On the command line, enter **AecCreateContent**.

2 Select Multi-View Block for Content Type.

All the defined blocks in the current drawing are displayed in Current Drawing.

3 Select a multi-view block under Current Drawing, and click Add.

Only one block at a time can be selected for Current Drawing and added to Content File.

4 Click Next.

5 Specify an insertion method for Insert Options:

If you want to…	Then…
explode the multi-view block when you add it to your drawing	select Explode on Insert.
have the multi-view block remain a block when you add it to your drawing	clear Explode on Insert.
specify an elevation for the multi-view block when you add it to your drawing	enter a value for Preset Elevation.
specify an anchor type to use when you add the multi-view block to your drawing	select a type of anchor for Anchor Type.

6 Specify an insertion scale factor for Scale:

If you want to…	Then…
scale the multi-view block instance using a coordinate (*X*, *Y*, *Z*) direction	enter values for X, Y, and Z for Scale.
apply no additional scaling method to the multi-view block instance	select None for Additional Scaling.

If you want to…	Then…
scale the multi-view block instance by the annotation scale of the drawing you are adding the block to	select Annotation for Additional Scaling.
scale the multi-view block instance by the drawing units of the drawing you are adding the block to	select Drawing for Additional Scaling.
scale the multi-view block definition by the drawing units of the drawing you are adding the block to	select Enable AEC Unit Scaling.

7 If the block has attributes, specify a text style for Attribute Text Style:

If you want to…	Then…
use the default text style of content in the current drawing	select As Defined by Content.
use the text style of the target drawing	select Target Drawing Text Style.

8 If the block has attributes, specify an angle for Attribute Text Angle:

If you want to…	Then…
use the rotation angle of the multi-view block as the attribute text angle	select As Inserted.
set the angle of the attribute text to zero	select Force Horizontal.
be able to read the attribute text from the right direction	select Right Reading.

9 Click Select Layer Key, select a layer key, and click OK.

You can also enter a layer name for Layer Key.

10 Click Next.

11 Enter a name for File Name, or click Browse.

If you want to save the current drawing as the content file, select Current Drawing.

12 Select an image for Icon to represent the multi-view block in DesignCenter:

If you want to…	Then…
specify an existing bitmap image	click New Icon, select an image, and click OK.
specify the default image of the multi-view block itself	click Default Icon.

13 Enter a description for Detailed Description.

14 Click Finish.

Creating an AEC Content Masking Block for DesignCenter

Use this procedure to create a custom AEC masking block that you can add to your drawing using DesignCenter™. You create the new masking block from an existing masking block in the current drawing. The masking block is saved in a new drawing that can be accessed from DesignCenter. For more information about using masking blocks, see Mask Blocks on page 1865.

1 On the command line, enter **AecCreateContent**.

2 Select Masking Block for Content Type.

All the defined blocks in the current drawing are displayed in Current Drawing.

3 Select a masking block for Current Drawing, and click Add.

Only one block at a time can be selected for Current Drawing and added to Content File.

4 Click Next.

5 Specify an insertion method for Insert Options:

If you want to…	Then…
specify an elevation	enter a value for Preset Elevation.
specify an anchor type	select a type of anchor for Anchor Type.

6 Specify an insertion scale factor for Scale:

If you want to…	Then…
scale the masking block instance using a coordinate (*X*, *Y*, *Z*) direction	enter values for X, Y, and Z for Scale.
apply no additional scaling method to the masking block instance	select None for Additional Scaling.
scale the masking block instance by the annotation scale of the drawing you are adding the block to	select Annotation for Additional Scaling.
scale the masking block instance by the drawing units of the drawing you are adding the block to	select Drawing for Additional Scaling.
scale the masking block definition by the drawing units of the drawing you are adding the block to	select Enable AEC Unit Scaling.

7 If the block has attributes, specify a text style for Attribute Text Style:

If you want to…	Then…
use the default text style of content in the current drawing	select As Defined by Content.
use the text style of the target drawing	select Target Drawing Text Style.

8 If the block has attributes, specify an angle for Attribute Text Angle:

If you want to…	Then…
use the rotation angle of the masking block as the attribute text angle	select As Inserted.
set the angle of the attribute text to zero	select Force Horizontal.
be able to read the attribute text from the right direction	select Right Reading.

9 Click Select Layer Key, select a layer key, and click OK.

You can also enter a layer name for Layer Key.

10 Click Next.

11 Enter a name for File Name, or click Browse.

If you want to save the current drawing as the content file, select Current Drawing.

12 Select an image for Icon to represent the masking block in DesignCenter:

If you want to…	Then…
specify an existing bitmap image	click New Icon, select an image, and click OK.
specify the default image of the drawing itself	click Default Icon.

13 Enter a description for Detailed Description.

14 Click Finish.

Creating an AEC Content Custom Command for DesignCenter

Use this procedure to create a custom command that you can add to your drawing environment using DesignCenter™. In the AEC Content Wizard, select one or more content blocks, specify a command string, and save a new drawing that contains all the content of the current drawing. When the custom command is added to a target drawing from DesignCenter, the set of content blocks is copied into the target drawing and the routine is executed, enabling the custom command.

Following is a detailed example of a custom command that you can create in the AEC Content Wizard. This custom command string adds a schedule tag to a room symbol and creates the leader and tag with the desired style. `AecAnnoScheduleTagAdd "C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial\Schedule Tables (Imperial).dwg" _symbol aec3_room_tag _leader _none _dimstyle _current`

The equivalent prompts on the command line are as follows; however, entering text for custom commands on the command line is not recommended. Custom commands should be created with the AEC Content Wizard.

```
AnnoScheduleTagAdd

Property set definitions drawing <C:\ProgramData\Autodesk\ACA 2010\enu\Styles\Imperial\Schedule Tables (Imperial).dwg>

Select object to tag [Symbol/Leader/Dimstyle/Edit/Constrain/Rotation]:Symbol

Enter tag symbol name <>: Aec3_Room_Tag_

Select object to tag [Symbol/Leader/Dimstyle/Edit/Constrain/Rotation]:Leader

Enter leader type [None/STraight/SPline] <None>:None

Select object to tag [Symbol/Leader/Dimstyle/Edit/Constrain/Rotation]:Dimstyle

Enter leader dimstyle CURRENT <Aec-Arch-I-96>: Current

Select object to tag [Symbol/Leader/Dimstyle/Edit]:
```

1 On the command line, enter **AecCreateContent**.

2 Select Custom Command for Content Type.

All the defined blocks in the current drawing, regardless of type, are displayed in Current Drawing.

3 Select one or more blocks for Current Drawing, and click Add.

4 Enter the command string for Custom String.

You can also click Expand to display the Custom Command String dialog box, and enter the command string.

The command string is limited to 255 characters.

5 Click Next.

6 Specify an insertion method for Insert Options:

If you want to…	Then…
specify an elevation	enter a value for Preset Elevation.
specify an anchor type	select a type of anchor for Anchor Type.

7 Specify an insertion scale factor for Scale:

If you want to…	Then…
scale the drawing instance using a coordinate (*X*, *Y*, *Z*) direction	enter values for *X*, *Y*, and *Z* for Scale.
apply no additional scaling method to the drawing instance	select None for Additional Scaling.
scale the drawing instance by the annotation scale of the drawing you are adding the block to	select Annotation for Additional Scaling.
scale the drawing instance by the drawing units of the drawing you are adding the block to	select Drawing for Additional Scaling.
scale the drawing definition by the drawing units of the drawing you are adding the block to	select Enable AEC Unit Scaling.

8 Specify an angle for Attribute Text Angle:

If you want to…	Then…
assign the angle of the attribute text to be the same as the rotation angle of the drawing	select As Inserted.
set the angle of the attribute text to zero	select Force Horizontal.
be able to read the attribute text from the right direction	select Right Reading.

9 Click Select Layer Key, select a layer key, and click OK.

You can also enter a layer name for Layer Key.

10 Click Next.

11 Enter a name for File Name, or click Browse.

If you want to save the current drawing as the content file, select Current Drawing.

12 Select an image for Icon to represent the drawing in DesignCenter:

If you want to…	Then…
specify an existing bitmap image	click New Icon, select an image, and click OK.
specify the default image of the drawing itself	click Default Icon.

13 Enter a description for Detailed Description.

14 Click Finish.

Editing AEC Content

You can edit AEC content that was added to the drawing from DesignCenter™. For information about editing tools in the Content Browser, see Customizing a Tool on page 121.

Modifying DesignCenter Content with the AEC Content Wizard

Use this procedure to edit DesignCenter content with the AEC Content Wizard.

1 Click Insert tab ➤ Content panel drop-down ➤ Design Center .

2 Click the AEC Content tab.

3 Under Custom Applications, expand AutoCAD Architecture, and expand Imperial or Metric.

4 Expand the folder containing the content you want to edit.

5 Select the content item you want to modify, right-click and click Edit.

The AEC Content Wizard opens and the content type is displayed.

6 Follow the screens in AEC Content Wizard to make your modifications.

Modifying Fixture Layouts

Use this procedure to modify the components of fixture layouts with the Edit Block in-place option. This method is more efficient than exploding the layout. For example, if you drop a toilet stall into your drawing and then explode it, the stall walls are wall objects, the door to the stall is a door object, and the toilet is a multi-view block. When you use Edit Block in-place, the layout remains a single piece of content. You can also drag the fixture layouts onto a tool palette to create custom tools.

NOTE After you create your custom fixture layout, save the layout as Custom Design Content for easy placement in future drawings.

For more information about fixture layout content, see Fixture Layouts in DesignCenter on page 2565.

1 Select a layout.

2 click Insert tab ➤ Reference panel ➤ ➤ Edit Reference.

The Reference Edit dialog box opens.

3 Click OK.

The components can now be edited separately.

For more information, see “Reference Edit Dialog Box” in AutoCAD Help.

TIP The quickest way to locate and view an AutoCAD topic is to click the Search tab in the Help window, select the Search titles only option, and then copy and paste or type the AutoCAD topic name, and click List Topics.

Turning Off the Dimension Scale Override

Use this procedure to prevent the software from automatically applying an override to the current dimension scale style in the drawing. This control is on by default, and it overrides the active dimension scale style. With the override on, dimensions added to the drawing are scaled based on the current drawing scale. For more information, see "Set Plot Scale" in AutoCAD Help.

If you want to make the dimension scale match your drawing scale, leave Automatically Create Dimscale Override selected. The override applies a scale factor to the dimension style properties.

WARNING Any time you close the Drawing Setup dialog box by selecting OK or Apply, an override is applied if Automatically Create Dimscale Override is selected, regardless of the tab that was originally opened.

AEC dimensions added with tools are not affected by the dimension scale override because an AEC dimension style depends on which display representation is active. For more information about AEC Dimensions, see Dimension Options and Uses on page 2218.

1 Click ➤ Utilities ➤ Drawing Setup.

2 Click the Scale tab.

3 Clear Automatically Create Dimscale Override.

When you clear this setting, you can adjust the dimension scale independently of the drawing scale.

4 Select Save As Default if you want subsequent drawings to use these settings, or clear Save As Default to save your settings in the current drawing only.

5 Click OK.

Other Utilities

Cameras

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The camera is a visualization tool, modeled after a real camera. It uses a point-and-shoot process to help you view the drawing as if you were standing within the building model. You can add any number of camera views to your drawing and create a video dry run of your design with a camera. For more information about working with cameras, see "Overview of Cameras" in the AutoCAD Help.

You can save perspective views of your drawing using a camera. By adjusting the position of your camera, you can change these views incrementally.

Adjusting the Camera Position

Use this procedure to incrementally change the position of the camera. This changes your views.

1 Click Render tab ➤ Camera panel ➤ ➤ Adjust.

2 Select the camera to adjust.

3 Click the appropriate button to adjust the view.

- Change the Step value: This value controls how far each click of the following buttons moves the camera: Forward, Back, Left, Right, Up, and Down.
- Change the Angle value: This value controls how far each click of the following buttons moves the camera angle: Turn Left, Turn Right, Look Up, and Look Down.
- Change the Zoom percentage: This value controls how far each click of the button zooms the camera for Zoom In and Zoom Out.
- Click Hide to view the drawing with hidden lines removed.

If the view in the drawing wasn't the camera's view, then the first selected button places the drawing into the camera's view.

As you click each button, the view changes in increments determined by values in the Adjustment Increments section. If Auto View is selected, you can see the change after you click each button. If Auto View is cleared, click View to see the changes.

4 Click OK.

Converting Objects to 3D Solids

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You can convert objects to 3D solids when preparing to use CNC machining applications to create a physical building model from a computer-generated building model. You may also want to convert objects to 3D solids if the objects are to interact with other 3D solids.

Converting Objects to 3D Solids

You can convert objects to 3D solids when preparing to use CNC machining applications to create a physical building model from a computer-generated building model. You may also want to convert objects to 3D solids if the objects are to interact with other 3D solids.

You cannot convert the following objects or blocks:

- Objects with no integral 3D presence, such as building grids or cameras
- 3D sections
- Objects in a block or an external reference
- Custom display blocks created from 3D solids

For more information, see "Create 3D Solids" in AutoCAD Help.

Converting Objects to 3D Solid Objects

Use this procedure to convert objects such as walls, doors, and mass elements into three-dimensional (3D) solid AutoCAD objects.

TIP Convert custom display blocks to Free Form mass elements, and then convert the mass elements to 3D solids.

1. Open the tool palette that contains the Convert to 3D Solid tool you want to use, and select the tool.

   A default Convert to 3D Solid tool is located with the Modeling Tools in the AutoCAD Architecture Stock Tools catalog. You can add this tool to any tool palette. For more information, see Content Browser Overview on page 97.

2 Select the objects to convert, and press *ENTER*.

3 Enter **y** (Yes) to erase the selected geometry after conversion, or enter **n** (No) to keep the geometry in the drawing

Any selected objects that cannot be converted are filtered out during the conversion. Highly-faceted objects, such as curved railings and stairs, may take a longer time to convert.

After you convert an object to a solid, you can convert it to a Free Form mass element and modify it using grips or the Properties palette. You can then convert the Free Form mass element back to a 3D solid. For more information, see Using the Model Explorer to Create Mass Models on page 715.

Visual Audit

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Visual Audit is a utility that helps you manage the integrity of your design data by identifying non-AEC objects, such as AutoCAD® objects and exploded AEC objects, in your drawings.

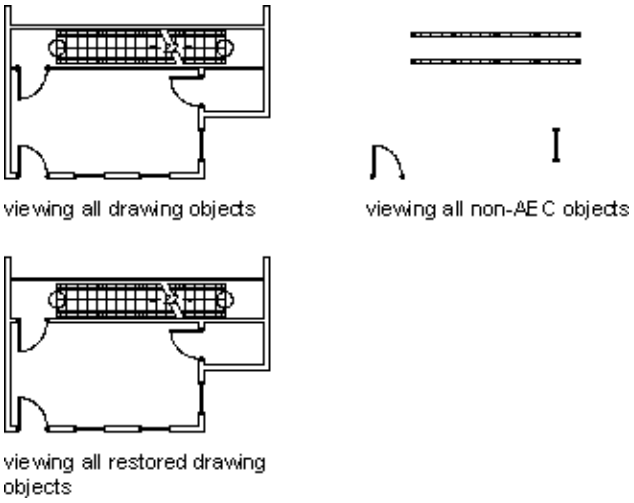
Working with Visual Audit

When you perform a visual audit, all of the AEC objects in the drawing are temporarily removed from the display, leaving only non-AEC objects in view. You can inspect the remaining objects more closely to see if they should be replaced with AEC objects.

To add clarity to the audit, a visual audit also removes single and multi-line text, leaders, and dimension objects from the display. Attribute text remains visible in the drawing. All objects are displayed again when you end the visual audit.

In the following illustration, the railing, door, and the framed opening are exploded AEC objects.

Performing a visual audit with AEC and non-AEC objects in the drawing



Performing a Visual Audit

Use this procedure to perform a visual audit on your drawing.

NOTE For best results, perform a visual audit in a 2D wireframe view.

1 Click Home tab ➤ Inquiry panel ➤ ▾ ➤ Show AutoCAD Entities .

2 All AEC objects are removed from the display. Attribute text remains visible in the drawing.

3 Pan and zoom to inspect the drawing:

If you want to…	Then…
access zoom options	enter '**z** (Zoom). You can use real time zoom or right-click to access additional zoom options.
access pan options	enter '**p** (Pan). You can pan or right-click to access pan options.

4 Press *ENTER*.

All objects are restored to the display.

Reference AEC Objects

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You can create reference copies of objects that are updated automatically when you change the original object. You can add identical objects, such as columns, to your drawing.

Creating an AEC Entity Reference

An AEC entity reference is a reference copy of an object. These entity references update when you change the original object. When you select an object to reference, you must specify a point on the original object as an insertion point for the marker of the entity reference. A reference marker is displayed in the drawing to mark the insertion point.

You can place the entity reference in the drawing at any location or rotation angle. The distance between the entity reference and the reference marker remains equal to the distance between the original object and the insertion point specified. You can change this distance by specifying a new insertion point at a new location in relation to the original object.

When you change the properties of the original object or edit it with grips, the reference object reflects the changes. For example, if you want to add custom-shaped mass elements to a drawing, you can add one mass element and reference it. If you make changes to the original, the entity reference is updated.

Adding a Reference to an Object

Use this procedure to create an entity reference from another object.

1. Open the tool palette that you want to use, and select an AEC entity reference tool.

   An AEC entity reference tool is located in the Helper Tools category of the AutoCAD Architecture 2010 Stock Tool catalog. For more information, see Content Browser Overview on page 97.

2. Enter **ad** (Add), and press *ENTER*.
3. Select the object that you want to reference.
4. Specify a point on the original object to use as the insertion point for the entity reference marker.
5. Specify a location for the entity reference in the drawing.

   The distance between the entity reference and the reference marker is equal to the distance between the original object and the insertion point that you specified.

6. Enter a rotation angle for the entity reference, or press *ENTER* for zero rotation.
7. Press *ENTER*.

The entity reference and reference mark are placed in the drawing at the specified location and rotation angle. If you edit the original object, the same changes are made to the entity reference.

Attaching an Object to an Existing Entity Reference

Use this procedure to attach an object to an existing entity reference.

1. Open the tool palette that you want to use, and select an AEC entity reference tool.

   An AEC entity reference tool is located in the Helper Tools category of the AutoCAD Architecture 2010 Stock Tool catalog. For more information, see Content Browser Overview on page 97.

2. Enter **at** (Attach), and press *ENTER*.
3. Select the reference marker that you want to use.
4. Select the new object that you want to use to replace the entity referenced, and press *ENTER*.

The new entity reference replaces the former entity reference. The original object is unchanged.

Attaching Hyperlinks, Notes, and Files to an Entity Reference

Use this procedure to attach hyperlinks, enter notes, or attach reference files to an entity reference in a drawing. You can also edit notes and edit or detach reference files from an entity reference.

1. Double-click the entity reference to which to attach information.
2. On the Properties palette, click the Extended Data tab.
3. To add a hyperlink, click next to Hyperlink, and specify the link.

   For more information about adding hyperlinks, see "Add Hyperlinks in a Drawing" in AutoCAD Help.

4. To add or edit a note, click next to Notes, enter text, and click OK.
5. Click next to Reference documents, and attach, detach, or edit a reference file:

If you want to …	Then …
attach a reference file	click , select a file, and click Open.
edit the description of a reference file	enter text under Description.
edit a reference file	double-click the reference file name to start its application.
detach a reference file	select the file name, and click .

6. Click OK twice.

Changing the Location of an Entity Reference

Use this procedure to relocate an existing entity reference by changing the coordinate values of its insertion point. The entity reference also has an orientation with respect to the world coordinate system (WCS) or the current user coordinate system (UCS). For example, if the top and bottom of the reference object are parallel to the *XY* plane, its normal is parallel to the *Z* axis. You can change the orientation of the entity

reference by aligning its normal with another axis. You can also rotate the entity reference on its plane by changing the rotation angle.

For more information about the world coordinate system and the user coordinate system, see "Use Coordinates and Coordinate Systems" in AutoCAD Help.

1. Double-click the entity reference you want to relocate or reorient.
2. On the Properties palette, click the Design tab, expand Basic, and expand Location.
3. Click Additional information.
4. Specify the location of the entity reference:

If you want to …	Then …
relocate the entity reference	enter new coordinate values under Insertion Point.
locate the entity reference on the *XY* plane	make the normal of the entity reference parallel to the *Z* axis: under Normal, enter **1** for Z, and enter **0** for X and Y.
locate the entity reference on the *YZ* plane	make the normal of the entity reference parallel to the *X* axis: under Normal, enter **1** for X and enter **0** for Y and Z.
locate the entity reference on the *XZ* plane	make the normal of the entity reference parallel to the *Y* axis: under Normal, enter **1** for Y, and enter **0** for X and Z.
change the rotation of the entity reference	enter a new value for Rotation Angle.

5. Click OK.

Customizing and Adding New Content for Detail Components

54

The details feature in AutoCAD Architecture has a framework for content that can be customized and extended in several different ways. Detail components are stored in Microsoft® Access databases, which end users can modify or even create using the Detail Component Manager, as described under Creating and Modifying Detail Component Databases on page 2330.

Developers may prefer to work on detail component databases using Microsoft Access directly, in which case they will definitely need to refer to the descriptions and code samples in this appendix. However, it is recommended that any user be familiar with this information before attempting to create or customize a detail component database.

Introduction

AutoCAD Architecture detail components are not custom objects in AutoCAD. They are made up of simple entities like line, arc, polyline, block, and hatch. Usually, the various entities that make up a detail component are grouped as an anonymous block so that they can easily be copied or moved like a single entity. But a detail component can also be as simple as a polyline boundary with a hatch interior. This accommodates the type of component for which it is natural to use the STRETCH command. The exact makeup of the component is left to the discretion of the developer.

Each Detail Component is also stamped with "Xdata" (Extended Entity Data) that identifies where it came from in the original database of components. This data can be used later to retrieve additional information or create another component of the same type.

Detail components are integrated with the Property palette and Tool palette systems. However, the details framework handles this interaction automatically, and an author of a new detail component only has to provide a simple description of what type of data should appear.

The details framework includes four main components:

- Database of Components and Sizes
- Recipe Specification
- Recipe Implementation
- Framework Utilities

These framework components are described individually in the following sections.

Database of Components and Sizes

The AEC Detail Component database is a Microsoft® Access database, which contains a size table for each available component, as well as several related tables that support the overall structure of the database. End users can add or modify existing component tables through the user interface provided by the Detail Component Manager dialog box, but more advanced customization requires Microsoft Access.

Recipe Specification

A Recipe Specification (RecipeSpec) is an XML file that describes the different Recipes that can be used to create a particular component in AutoCAD. For each Recipe, it identifies the types of controls (prompts) that should appear in the Properties palette and specifies how to call the function that implements the given Recipe. The RecipeSpec also provides view-specific information such as the layers and hatch patterns to use when creating the component.

Recipe Implementation

A Recipe Implementation is (usually) a small piece of code that creates the component in AutoCAD. The Recipe Implementation can be written in ObjectARX C++, VBA (Visual Basic for Applications), or any Microsoft .NET language (such as C# or Visual Basic .NET). The Recipe can be as easy as a simple block insert, or it can involve more complex operations, such as bringing up a dialog box with many choices.

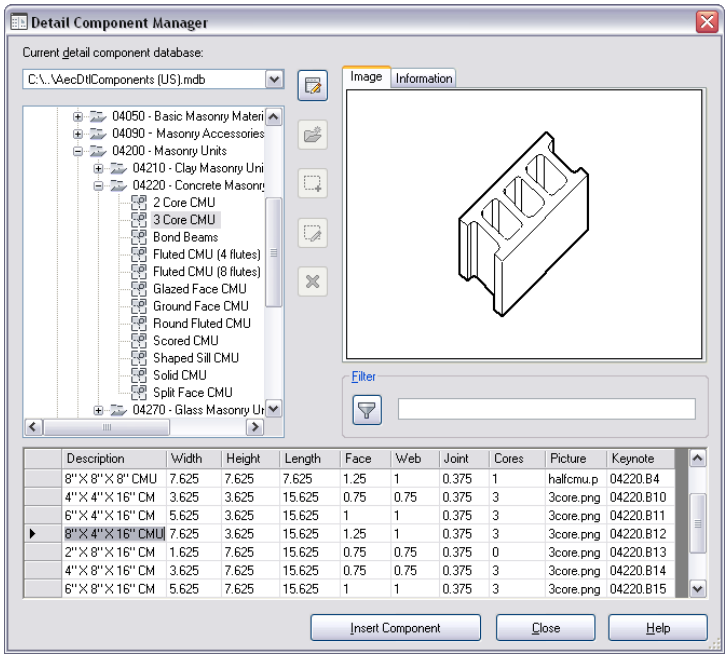
Framework Utilities

The Framework utilities make the job of implementing a Recipe much easier. They provide many of the common functions to look up data from the database and from the user controls that populate the Properties palette. These utilities also provide a number of common "Jigs" that help place the component once it is created. For more information on Jigs, see Jigs and JigEnts on page 2611.

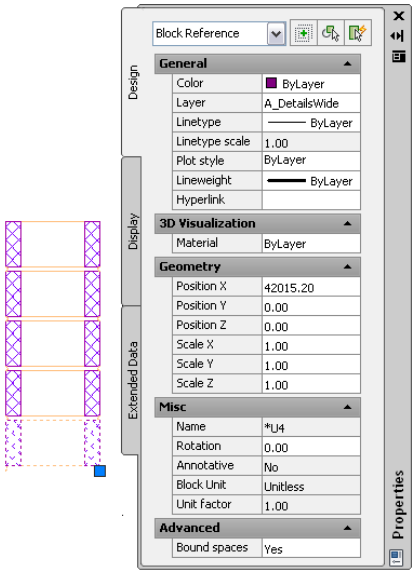
A Walkthrough of the Process

As with a real recipe, the ingredients for a detail component Recipe can come from many places. As the recipe author, you have the freedom to put the ingredients together however you choose. Nonetheless, the following walkthrough of the process the user goes through to insert a detail component in a drawing should help give you a better understanding of how all the pieces fit together.

1 The user chooses a detail component to create, either by selecting one from the Detail Component Manager dialog box, or by clicking on a tool that has been configured to insert that component.



2 The RecipeSpec that is assigned to the selected detail component is read, and the information within it is displayed on the Properties palette, as shown below. The Category, Type, and Description values all come from the user's selection of the component. The Receipe can then retrieve other information it needs directly from the database. The user can change any of the values displayed on the Properties palette to affect the currently running Recipe.



3 The RecipeSpec may have one or more Recipes defined within it, each associated with a different View setting on the Properties palette. By selecting a View (or accepting the default) the user in effect selects the Recipe that is responsible for creating that view of the component. When a particular Recipe is selected, the Recipe Implementation function described in the XML RecipeSpec is called.

The three controls shown under Specifications (Hatch block, Grout fill cores, and Show mortar) are defined by the <Controls> section of the RecipeSpec. Their values can be retrieved by the Recipe function and used to control the basic parameters of the component.

In this example, Mortar is a subcomponent of the CMU component, as specified in its RecipeSpec. Values and options for all mortar components are retrieved from the database and displayed on this section of the Properties palette. The final three controls under Mortar (Left joint type, Right joint type, and Hatch mortar), are specified in the subcomponent's RecipeSpec, and their values can be retrieved by the subcomponent's Recipe function.

4 The Recipe Implementation then does whatever it needs to in order to create the component. It has access to the size data in the database, the data in the RecipeSpec, and user input provided through the Properties palette. It also has access to a host of utility functions that can help create and place the component.

The layering and hatch properties for the component come from the <Data> section of the RecipeSpec. Specific options for the Jig to use come from the <Options> section of the RecipeSpec.

Component Databases

A detail component database contains a size table for each available component and several related tables that support the overall structure of the Microsoft® Access database. A component database has references to external files, such as Recipe Specifications and preview image files. For this reason, it is suggested that the database and all of its external references be located in the same tree structure of the file system. For example:

```
MyContent/
  MyComponentDb.mdb
  MajorComponentGroup1/
    *.xml, *.dwg, *.png, etc. supporting this group of components
  MajorComponentGroup2/
    *.xml, *.dwg, *.png, etc. supporting this group of components
```

Such a structure makes installing or moving the content a much easier task because all of the external content can use relative paths from the main database.

Database Schema

Several tables must be present in order for the Recipe system to function correctly. When creating a new database, you should start with either the standard database (*AecDtlComponents.mdb*) or with the empty template database (*AecDtlComponents-Template.mdb*).

Fingerprint Table

This table uniquely identifies a component (or keynote) database with a Global Unique IDentifier (GUID). It also provides information that can be displayed in the user interface. All detail components placed in a drawing, and all detail component tools used in Tool palettes record this database GUID. If your database changes location in the directory structure, the tools and components can still find the database using the unique GUID.

The Type field should contain either the string "Component" or "Keynote" depending on which type of database you are creating.

To obtain a GUID for your database, simply delete the existing GUID from the database you are using as a template, and a new GUID will be generated automatically.

Groups Table

The Groups table defines the hierarchical organization of components within the database. This hierarchy determines the order in which component groups are displayed in the tree view of the Detail Component Manager dialog box. To set up this table, you simply need to make a Group entry for each collection of like components, and then, for each Group, define its Parent, which is either another Group or the root node (\ - *). The following fields apply to each row in the table:

ID A unique number within the given table that identifies the particular row in the table used to create a component. Once created, this number should never change. Components that have already been placed in the drawing are stamped with this ID and must be able to consistently reference this row in the database.

Parent The group that is the parent of the group identified in the Group field.

Group The text string used to display the name of this group.

PathKey An entry from the DirKeys table (described later in this section). DirKeys tell the system where to find the files external to the database for this given component.

SearchKey A comma-delimited list of keywords used by the Detail Component Manager to search for components. When a keyword is specified for a group, any component within that group is considered a match for a search on that keyword.

MODIFIED A Boolean flag indicating whether this row has been changed since it was originally created. If the user modifies the row using the Detail Component Manager dialog box, this field is marked so that future versions of the database can merge in the changes. The notion of "modified" is relative to the version of the database. For instance, if you are copying an existing database and changing all the values, it would be considered the first version of the new database, and all MODIFIED fields should be set to FALSE.

PICTURE This column allows you to specify a unique picture when this Group node is selected in the Detail Component Manager. It is recommended that you use an image file of type PNG. The location of the image file is usually specified by appending the filename to the path assigned to the DirKey for this Group.

Components Table

The Components table is the main "map" of how all the information about a given component is tied together. The following fields apply to each row in the table:

ID A unique number within this table that identifies the particular component within this database. Once created, this number should never change. Components that have already been placed in the drawing are stamped with this ID and must be able to consistently reference this row in the database.

GroupName The parent Group of this component. This establishes the place of the component in the overall hierarchy of components.

Name The text string used for display purposes in the Detail Component Manager and on the Properties palette.

TableName The name of the size table for this component (Component Size Tables are described in the following section).

Keynote This value references an entry in a keynotes database. This is the default keynote to be used for all sizes of this component, but it can be overridden if a size-specific keynote is defined in the size table.

SubComponentKey This value identifies the component as a valid subcomponent for the context specified. For example, the Recipes for Brick and CMU allow for a subcomponent of mortar. The Recipe system will search for all components in the database that identify themselves as being valid subcomponents for mortar.

RecipeSpec This value specifies the XML file to use as the RecipeSpec for this component. The RecipeSpec has instructions for how to actually create and place the component in the drawing. The RecipeSpec is found by searching in the directory specified by the PathKey for the Group in which this component resides. For more information, see the subsequent section on Recipe Specifications.

SearchKey A comma-delimited list of keywords used by the Detail Component Manager to search for components.

Units This value specifies the unit of measure for the size table for this component.

MODIFIED A Boolean flag indicating whether this row has been changed since it was originally created. If the user modifies the row using the Detail Component Manager, this field is marked so that future versions of the database can merge in the changes. The notion of "modified" is relative to the version of the database. For instance, if you are copying an existing database and changing all the values, it would be considered the first version of the new database, and all MODIFIED fields should be set to FALSE.

PICTURE This column allows you to specify a unique picture to display when this particular row is selected in the Detail Component Manager. If the field is left blank, then the picture specified at the Component level is used. If no picture is specified in the Components table, the picture specified for the component's Group is used.

It is recommended that you use an image file of type PNG.

Component Size Tables

For each component in the database, there should be a corresponding size table. A size table can be named anything you desire, but must include the following columns:

Description A textual description of the item, which is used as a display string in the Properties palette.

ID A unique number within the given table that identifies the particular row in the table used to create a component. Once created, this number should never change. Components that have already been placed in the drawing are stamped with this ID and must be able to consistently reference this row in the database.

MODIFIED A Boolean flag indicating whether this row has been changed since it was originally created. If the user modifies the row using the Detail Component Manager, this field is marked so that future versions of the database can merge in the changes. The notion of "modified" is relative to the version of the database. For instance, if you are copying an existing database and changing all the values, it would be considered the first version of the new database, and all MODIFIED fields should be set to FALSE.

PICTURE This column allows you to specify a unique picture to display when this particular row is selected in the Detail Component Manager. If the field is left blank, then the picture specified at the Component level is used. If no picture is specified in the row of a given size table, the picture specified for the Component in general is used.

It recommended that you use an image file of type PNG.

The location of the image file is usually specified by appending the filename to the path assigned to the DirKey for this component's Group.

If the component is created by doing a simple Block insertion, you can have the preview image created dynamically by drawing the referenced block. For these types of components, set the Picture value to **_blockthumbnail**.

Keynote This value references an entry in a Keynotes database. As with the PICTURE column, if no value is specified here at the Size level, the one specified at the Component level is used.

Units Table

This table defines the units of measure available to assign to individual component size tables. It currently includes only inches and millimeters. However, centimeters, meters, and feet should also work. In the Components table, each entry must specify the unit in which the assigned size table is defined.

DirKeys Table

This table defines directory keys, which are shortcut aliases to use in identifying the directory structure of the user's file system. Typically, there is one directory for each major division in your component hierarchy. You can match the component hierarchy in the database with the external files stored on the file system.

DirKeys are referenced in the PathKey field of the Groups table and from the XML RecipeSpec files. They are intended to allow you to easily reorganize the internal hierarchy, the external hierarchy, or both.

ColumnDisplay Table

Column names used in component size tables cannot be localized in other languages because these names are referenced programmatically. However, these column names also need to appear in the user interface. The ColumnDisplay table serves as a lookup for user interface components, so that user-friendly, localized names for the columns can be displayed.

GlobalName This is the fixed name of the column in a given component size table. It is the lookup key used to find the local name.

LocalName This is the translated, user-friendly display string to use for a column of this global name.

TableId If left blank, then any column with the given GlobalName uses the LocalName for display purposes. In some cases, however, the same column name may have two different translations depending on its context. Specify a size table if the translation only applies to a specific context.

Hidden Some columns, such as ID and MODIFIED, are not intended to be seen by the user in the Detail Component Manager. These can be hidden by checking this box. Note, however, that this only applies when the database is marked as read-only. A database that is being edited from the Detail Component Manager must show all columns so that a valid row can be entered.

Modified A Boolean flag indicating whether this row has been changed since it was originally created.

Hatches Table

This table defines a set of hatch aliases. Individual components that create hatches can reference an alias instead of specifying the pattern, scale, and angle directly. This allows you to standardize the look of certain materials across the entire database. For instance, you can have all components that are made of concrete use the “concrete” alias. If you want to change the look of all concrete components, simply edit the entry in the Hatches table to change the look of any component that references that alias.

NOTE For a description of the database schema for keynotes, see Keynote Database Schema on page 2394.

Recipe Specifications

A Recipe Specification (RecipeSpec) is an XML file that describes which views (section, elevation, and so on) are available for a given detail component and how those views are to be created and placed within the drawing.

Here is a simple example of a RecipeSpec.

```
<?xml version="1.0" encoding="UTF-8"?>
<AecRecipeSpec defaultUnit="in">
  <Recipe idStr="side">
    <Label>Side</Label>
    <Implementation>
      <ObjectARX>
        <AppName>AecDtl50</AppName>
        <RcpFunc>AecDtlRcpColumnCapCCSide</RcpFunc>
      </ObjectARX>
    </Implementation>
    <Data>
      <Item idStr="block">
        <AcadEntityProps>
          <Layer ref="layerKey">THIN</Layer>
        </AcadEntityProps>
      </Item>
      <Item idStr="boundary">
      </Item>
      <Item idStr="holes">
      </Item>
      <Item idStr="hidden">
        <AcadEntityProps>
          <Layer ref="layerKey">FINE</Layer>
          <Linetype>HIDDEN</Linetype>
        </AcadEntityProps>
      </Item>
    </Data>
  </Recipe>
  <Recipe idStr="end">
    <Label>End</Label>
    <Implementation>
      <ObjectARX>
        <AppName>AecDtl50</AppName>
        <RcpFunc>AecDtlRcpColumnCapCCEnd</RcpFunc>
      </ObjectARX>
    </Implementation>
    <Data>
      <Item idStr="block">
        <AcadEntityProps>
          <Layer ref="layerKey">THIN</Layer>
        </AcadEntityProps>
      </Item>
      <Item idStr="boundary">
      </Item>
      <Item idStr="holes">
      </Item>
    </Data>
  </Recipe>
</AecRecipeSpec>
```

A RecipeSpec is composed of one or more Recipes. Each Recipe is responsible for creating a single view of the component. In the example above, the first Recipe creates a side view of the drawing, and the second creates an end view. When the component is inserted in a drawing, the user-configurable View setting on the Properties palette determines which recipe is used.

Each Recipe contains the following four major sections:

- **Implementation:** This section identifies the function to call and includes information specific to the particular language in which it is implemented. In short, it specifies how to call the Recipe function (RcpFunc).
- **Controls:** This section defines controls that will be added to the Properties palette. The control can be defined directly here, or it can reference a globally defined control in the <ControlDefs> section that is part of the overall RecipeSpec.
- **Data:** This section has customization data that the Recipe function can retrieve to help control how the component is drawn, such as layer and hatch pattern information.
- **Options:** This section specifies options for the Jig or JigEnt that is used to place the component.

In short, the <Data> and <Controls> sections help define what the basic component looks like, and the <Options> section helps define how the component is placed. In many cases, you will not need an <Options> section, because the default behavior of the Jig is sufficient.

Each of these sections is described in more detail further on in this section.

Id Strings

Everything in the RecipeSpec that needs to be identifiable programmatically has an idStr attribute. The idStr value should never change and should be unique within the file (or at least within a given element type). The Rcp function will be expecting ID strings with certain values, so when writing a RecipeSpec, you need to know the implied contract from the Rcp function.

NOTE One way to find out the implied contract of the Rcp function is to turn on logging. For more information, see Recipe Logging on page 2617.

Display Strings

Elements with the tag <Label> or <Description> are intended to be translated. These will be displayed in the Properties palette and other user interface constructs, but will never be used to refer to anything and will never be referenced from the code (that is the job of the idStr).

References

Within the Recipe Spec, the value of an item appears between the element tags. It is taken as a literal value unless the ref attribute is specified. In this case, the value between the element tags is considered a lookup value and is used to retrieve the actual value.

ref [Optional]

Specifies that the value between the element tags is to be used as a lookup key. It can have one of the following values:

layerKey	(AutoCAD Architecture LayerKey)
dbTable	(Column in the table from component database)
control	(*idStr* of a <Control>)

NOTE The layerKey reference type is only valid within the element <Layer>.

The dbTable reference will use the value as the column name within the size table for the current component. Consider the following two examples.

```
<Data>
  <Item idStr="block">
    <AcadBlockProps>
      <BlockName dwgLib="dwgs/AecDtlLib_BlockTest.dwg">Jimbo</BlockName>
      <Scale>6.0</Scale>
    </AcadBlockProps>
    <AcadEntityProps>
      <Layer>DOOR</Layer>
    </AcadEntityProps>
  </Item>
</Data>
```

In the first case, the <Scale> and <Layer> values have been specified literally. This component, regardless of what row was selected in the database, will have a scale factor of 6.0. Likewise, regardless of what Layer Key style is current within AutoCAD Architecture, this component will go on the DOOR layer (not the layer assigned to the LayerKey "DOOR").

```
<Data>
  <Item idStr="block">
    <AcadBlockProps>
      <BlockName dwgLib="dwgs/AecDtlLib_BlockTest.dwg">Jimbo</BlockName>
      <Scale ref="dbTable">SCALE</Scale>
    </AcadBlockProps>
    <AcadEntityProps>
      <Layer ref="layerKey">DOOR</Layer>
    </AcadEntityProps>
  </Item>
</Data>
```

In this example, references were used to look up the values dynamically. The <Scale> will be set to the value in the SCALE column of the current row in the component's size table. Likewise, the reference "DOOR" is the Layer Key to use to look up the Layer, not the actual Layer name itself. There is also a reference of type "control," which lets you use the idStr of a control defined within the Recipe. The value of that control is then used as the actual value of the Element.

Units

Each Recipe Spec has a default unit that applies to the entire XML file. Any unit-dependent value that appears within the XML file is automatically converted from the default unit to the current drawing unit when the value is retrieved from XML.

To specify the default unit, use the following syntax in the root node of the RecipeSpec.

```
<?xml version="1.0" encoding="UTF-8"?>
<AecRecipeSpec defaultUnit="mm">
  <Recipe idStr="section">
    <….. omitted ….>
  </Recipe>
</AecRecipeSpec>
```

The defaultUnit attribute must be one of the values: in, ft, mm, cm, dm, or m. If no value is speciifed, "in" is used by default.

In some cases, a simple hard conversion from Metric to Imperial (or vice versa) is not good enough. For instance, the <GapSpacing> between paver bricks should be a logical distance for each measurement system instead of an arbitrary distance created by a hard conversion. You can specify a unit-specific element by including the "unit" attribute, as in the following example.

```
<Data>
  <Item idStr="block">
    <AcadEntityProps>
      <Layer ref="layerKey">THIN</Layer>
    </AcadEntityProps>
  </Item>
  <Item idStr="head">
    <Params>
      <Overhang unit="in">0.25</Overhang>
      <Overhang unit="mm">6.5</Overhang>
      <Depth unit="in">0.375</Depth>
      <Depth unit="mm">10.0</Depth>
    </Params>
  </Item>
  <Item idStr="tip">
    <Params>
      <Depth unit="in">0.0625</Depth>
      <Depth unit="mm">1.5</Depth>
    </Params>
  </Item>
  <Item idStr="shaft"/>
  <Item idStr="hidden">
    <AcadEntityProps>
      <Linetype>HIDDEN2</Linetype>  <!-- override the Linetype for hidden components -->
    </AcadEntityProps>
  </Item>
</Data>
```

In this case, different values are given depending upon whether the current drawing is Imperial or Metric.

NOTE if you have unit-specific values, you must include an element for both Imperial and Metric. You cannot include two entries from the same unit system (for example, "mm" and "cm"). A hard conversion will be done for any units specified within the same unit system.

<Implementation> Section

The Implementation section can look like any of the following examples (<ObjectARX>, <VBA>, and <ManagedDotNet>):

<ObjectARX>

```
<Implementation>
  <ObjectARX>
    <AppName>AecDtl50</AppName>
    <RcpFunc>AecDtlRcpColumnCapCCSide</RcpFunc>
  </ObjectARX>
</Implementation>
```

Where...	Is...
AppName	the logical appname that appears in the Registry for an ObjectARX application.
<RcpFunc>	the name of a Recipe function that is implemented within the ObjectARX module and is registered using the AecRcpBase framework object AecRcpFuncTable. The function signature should take no arguments and must return a value of type RcpStatus

<VBA>

```
<Implementation>
  <VBA projectName="M:/Juneau/bin/TestDtl_VBA.dvb" macroName="DrawRectangle"/>
</Implementation>
```

Where...	Is...
projectName	the pathname of the VBA project file that contains the macro. This can be a full pathname, a partial path relative to the location of the XML file, or it can use the "dirKey" attribute to specify a path from the DirKeys table in the component database.
macroName	The VBA macro name to call. This macro should take no arguments and returns no value. It needs to call the function aecDtlSetRcpReturnStatus()before returning.

<ManagedDotNet>

```
<Implementation>
  <ManagedDotNet moduleName="M:/Juneau//bin/TestDtl_VB.dll" funcRcp="DrawRectangle"/>
</Implementation>
```

Where...	Is...
moduleName	the DLL pathname where the function exists. This can be a full pathname, a partial path relative to the location of the XML file, or it can use the "dirKey" attribute to specify a path from the DirKeys table in the component database.
funcRcp	the name of a Recipe function that is implemented within the ObjectARX module and is registered usingn the AecRcpBase framework object AecRcpFuncTable. The function signature should take no arguments and must return a value of type RcpStatus

<Controls> Section

The Controls section contains a list of control definitions that will be added to the Properties palette, or prompted for on the command line. All controls must have an idStr attribute that the program can use to reference it. It must also have a <Label> element to display in the Properties palette. Optionally, controls can have a <Description> element to use as a "tip" string in the bottom of the Properties palette when this control has focus. If no <Description> element is present, the <Label> element will be used.

Each specific type of control is listed below.

<ComboBox>

This type of control is used to present a list of choices. It is a simple single-selection list.

```
<ComboBox idStr="head">
  <Label>Head type</Label>
  <Description>Head type to use for bolt</Description>
  <ComboBoxValue idStr="blkHeadHex">
    <Label>Hex</Label>
  </ComboBoxValue>
  <ComboBoxValue idStr="blkHeadSq">
    <Label>Square</Label>
  </ComboBoxValue>
  <ComboBoxValue idStr="blkHeadRnd">
    <Label>Round</Label>
  </ComboBoxValue>
  <Default>blkHeadHex</Default>
</ComboBox>
```

A ComboBox has a list of <ComboBoxValue> nodes that simply specify an idStr used to uniquely identify that item in the list. Each <ComboBoxValue> must also have a <Label> element to display within the list.

If the <ComboBox> has a <Default> element, the listed idStr will be used as the default <ComboBoxValue>. If no <Default> element is present, the first <ComboBoxValue> will be used as the default.

<Default> [Optional]

The <ComboBoxValue> idStr to use as the default selection in the list.

<CheckBox>

This type of control is used for Boolean values.

```
<CheckBox idStr="doStagger">
  <Label>Stagger columns</Label>
  <Default>0</Default>
</CheckBox>
```

It can have the following elements:

Element	Description
<Default> [Optional]	The default Boolean value. It can be specified as any of the following values: “1”, “0”, “true”, or “false.”.

<EditBoxAngle>

This type of control corresponds to the AecEditBoxAngle class in AutoCAD Architecture and has the same basic options.

```
<EditBoxAngle idStr="slope">
  <Label>Slope angle</Label>
  <Default>0.0</Default>
  <Validation>range</Validation>
  <RangeLow>-45.0</RangeLow>
  <RangeHigh>45.0</RangeHigh>
</EditBoxAngle>
```

It can have the following elements:

Element	Description
<Default> [Optional]	The default angle value. This value is specified in degrees:

Element	Description
<Validation> [Optional]	Specifies what type of validation rule is used. Possible values are: “Any”, “NoZero”, or “Range”. If not specified, “Any” is used by default.
<RangeLow> [Optional, except when validation="Range"]	The lower end of the range of allowable values.
<RangeHigh> [Optional, except when validation="Range"]	The high end of the range of allowable values.

<EditBoxDistance>

This type of control corresponds to the AecEditBoxDist class in AutoCAD Architecture and has the same basic options.

```
<EditBoxDistance idStr="rowSpacing" unitDep="true">
  <Label>Y-Axis</Label>
  <Description>Spacing between bolts in Y direction</Description>
  <Default>2.0</Default>
  <Validation>NoNeg</Validation>
</EditBoxDistance>
```

It can have the following attributes:

Attribute	Description
unitDep [Optional]	This attribute indicates whether the value of this control needs to be scaled to the current unit in the drawing. A value of “1” or “true” will cause the value to be scaled. A value of “0” or “false” will leave the value as specified

The <EditBoxDistance> control can have the following elements:

Element	Description
<Default> [Optional]	The default distance value.
<Validation> [Optional]	Specifies what type of validation rule is used. Possible values are: “Any”, “NoNeg”, “NoZero”, or “Range”. If not specified, “Any” is used by default.
<RangeLow> [Optional, except when validation="Range”]	The lower end of the range of allowable values.
<RangeHigh> [Optional, except when validation="Range"]	The high end of the range of allowable values.

<EditBoxInt>

This type of control corresponds to the AecEditBoxDist class in AutoCAD Architecture (with precision set to “0”) and has the same basic options.

```
<EditBoxInteger idStr="cols">
  <Label>Columns</Label>
  <Description>Number of bolts in Y direction</Description>
  <Default>2</Default>
  <Validation>NoNegNoZero</Validation>
</EditBoxInteger>
```

It can have the following elements:

Element	Description
<Default> [Optional]	The default integer value.
<Validation> [Optional]	Specifies what type of validation rule is used. Possible values are: “Any”, “NoNeg”, “NoZero”, “NoNegNoZero”, or “Range”. If not specified, “Any” is used by default.
<RangeLow> [Optional, except when validation="Range"]	The lower end of the range of allowable values.
<RangeHigh> [Optional, except when validation="Range"]	The high end of the range of allowable values.

<Picture>

A Picture control is used to display a static image in the Properties palette. It has a list of <PictureValue> elements that may be used to fill the Picture control under certain conditions.

```
<Picture idStr="end_conditions_illustration" rowHeight="5">
  <Label>End conditions illustration</Label>
  <Default>plain_plain</Default>
  <Varies>plain_plain</Varies>
  <PictureValue idStr="regular_regular" idFile="Images/cmu_regular_regular.png">
    <ParentControl idRef="leftEndStyle" idStr="regular"/>
    <ParentControl idRef="rightEndStyle" idStr="regular"/>
  </PictureValue>
  <PictureValue idStr="regular_plain" idFile="Images/cmu_regular_plain.png">
    <ParentControl idRef="leftEndStyle" idStr="regular"/>
    <ParentControl idRef="rightEndStyle" idStr="plain"/>
  </PictureValue>
</Picture>
```

A Picture control can have the following attributes:

Attribute	Description
rowHeight [Optional]	The number of rows that this control should occupy in the Properties palette. The default value is 3.

A Picture control can have the following elements:

Element	Description
<Default> [Optional]	The idStr of the <PictureValue> to show by default.
<Validation> [Optional]	The idStr of the <PictureValue> to show under a multiple selection condition in the Properties palette. If not specified, the <Default> is used.

Specifying Controls

When the same control is used by different Recipes within the same RecipeSpec, you can define them in the <ControlDefs> section and then reference them within the <Controls> section of a specific Recipe.

```
<ControlRef idRef="head"/>
```

Simply use the idRef attribute to refer to the idStr of the Control that is defined in the <ControlDefs> section.

The following example shows a control defined at the <RecipeSpec> level that can be referenced from any <Recipe>. It also shows a control that is defined local to a specific <Recipe>.

```
<?xml version="1.0" encoding="UTF-8"?>
<AecRecipeSpec defaultUnit="in">
  <ControlDefs>
    <CheckBox idStr="hatchBlock">
      <Label>Hatch block</Label>
      <Description>Specifies whether to hatch the block. </Description>
      <Default>1</Default>
    </CheckBox>
  </ControlDefs>
  <Recipe idStr="section">
  <Label>Section</Label>
  <Implementation>
    <ObjectARX>
      <AppName>AecDtl50</AppName>
      <RcpFunc>ConcreteUnit2CoreSection</RcpFunc>
    </ObjectARX>
  </Implementation>
  <Controls>
    <ControlRef idRef="hatchBlock"/>
    <CheckBox idStr="hatchCores">
      <Label>Grout fill cores</Label>
      <Description>Specifies whether to hatch the cores solid with grout.</Description>
      <Default>0</Default>
    </CheckBox>
  </Controls>
```

<Data> Section

This section has customization data that is used by the Rcp function. This includes things like simple Layer/Color/Linetype properties, hatch pattern information, spacing parameters, and so on. It is the Rcp function's responsibility to look back to this section and find any data that may be relevant.

There is an implicit contract between the Rcp function and the RecipeSpec. The Rcp function can decide what is allowed to be in the <Data> section, but it will usually contain a set of commonly seen elements. You can put virtually anything in the <Data> section, but if the Rcp function is not expecting it, it will be ignored.

The data within this section is divided into <Item> sections. Each Item section can contain virtually anything that the Recipe dictates. An Item section usually defines the data for a portion of the overall component, such as "boundary", "infill", and "hidden".

The following standard types of information appear regularly within an Item section:

- <AcadEntityProps>
- <AcadBlockProps>
- <AcadMInsertProps>
- <AcadHatchProps>
- <Params>

These standard information elements are described individually in the following sections.

<AcadEntityProps>

This Element specifies the Layer/Color/Linetype properties of an entity. All the items are optional and are only used if specifically listed. If they are not listed, the Rcp function should use either ByBlock or ByLayer (or whatever the appropriate setting is) as the default. Here are four examples:

```
<AcadEntityProps>
  <Layer ref="layerKey">FINE</Layer>
  <Linetype>HIDDEN</Linetype>
</AcadEntityProps>
<AcadEntityProps>
  <Layer>Jimbo</Layer>
  <ColorIndex>1</ColorIndex>
  <Linetype>DASHED</Linetype>
  <LinetypeScale>3.0</LinetypeScale>
  <Lineweight>53</Lineweight>
</AcadEntityProps>
<AcadEntityProps>
  <Layer>Jimbo</Layer>
  <Color>
    <Red>73</Red>
    <Green>179</Green>
    <Blue>157</Blue>
  </Color>
  <Linetype>DASHED</Linetype>
</AcadEntityProps>
```

The following Elements can be specified within <AcadEntityProps>:

- <Layer> [Optional]
- <ColorIndex> [Optional]
- <Color> [Optional]
- <Linetype> [Optional]
- <LinetypeScale> [Optional]
- <Lineweight> [Optional]

NOTE Either <Color> or <ColorIndex> can appear, but not both. If <Color> is used, it should have <Red>, <Green>, and <Blue> sub-elements, as in the example above.

<AcadBlockProps>

This Element specifies the properties of a block reference. Here are a few examples:

```
<AcadBlockProps>
  <BlockName dwgLib="dwgs/AecDtlLib_BlockTest.dwg"
          remapLayers="true">Jimbo</BlockName>
  <ScaleX ref="dbTable">SCALE_X</ScaleX>
  <ScaleY ref="dbTable">SCALE_Y</ScaleY>
  <ScaleZ ref="dbTable">SCALE_Z</ScaleZ>
</AcadBlockProps>
<AcadBlockProps>
  <BlockName dwgLib="dwgs/AecDtlLib_BlockTest.dwg"
          remapLayers="true">Jimbo</BlockName>
  <Scale>6.0</Scale> <!-- This one uses uniform scale-->
</AcadBlockProps>
<AcadBlockProps>
  <BlockName dwgLib="dwgs/AecDtlLib_TrenchDrains.dwg" remapLayers="true"
          ref="dbTable">R_BLOCK</BlockName>
</AcadBlockProps>
```

The following Elements can be specified within <AcadBlockProps>:

- <BlockName>
- <Scale> [Optional]
- <ScaleX> [Optional]
- <ScaleY> [Optional]
- <ScaleZ> [Optional]
- <Rotation> [Optional]

The <BlockName> element tells the name of the block definition to use and can include the following attributes providing instructions on how to load the block if it is not found in the current drawing:

Attribute	Description
dwgLib [Optional]	The pathname of the library DWG file where the block is defined. If a relative path is specified, it is relative to the XML RecipeSpec's location.
dirKey [Optional]	A directory key to look up in the detail component database. The dwgLib attribute value is then appended to the dirKey value to form the full pathname.
remapLayers [Optional]	A Boolean value specifying whether the layers for entities within the block are to be searched for LayerKeys. If a LayerKey is found as the value of the Layer, the Layer is remapped to that LayerKey. This value should only be specified as true if you know for certain that there are LayerKeys defined within the block.
ref [Optional]	If specified, the block name is a lookup value to find the real block name.

If <Scale> is used, it is a uniform scale for each axis of the block reference.

<AcadMInsertProps>

This element specifies the additional values that an MInsert can have above and beyond a Block Reference. Anything common to both MInserts and Block References will thus appear in the <AcadBlockProps> section.

```
<AcadMInsertProps>
  <Rows>2</Rows>
  <RowSpacing>5.0</RowSpacing>
  <Columns>3</Columns>
  <ColumnSpacing>6.0</ColumnSpacing>
</AcadMInsertProps>
<AcadMInsertProps>
  <Rows ref="dbTable">ROWS</Rows>
  <RowSpacing>5.0</RowSpacing>
  <Columns ref="dbTable">COLUMNS</Columns>
  <ColumnSpacing>6.0</ColumnSpacing>
</AcadMInsertProps>
```

The following Elements can be specified within <AcadMInsertProps>:

- <Scale> [Optional]
- <Rows> [Optional]
- <RowSpacing> [Optional]
- <Columns> [Optional]
- <ColumnSpacing> [Optional]

<AcadHatchProps>

This Element specifies the properties of a hatch. Here are a few examples:

```
<AcadHatchProps>
  <HatchAlias>brick</HatchAlias>
</AcadHatchProps>
<AcadHatchProps>
  <HatchAlias ref="dbTable">PAT_ALIAS</HatchAlias>
</AcadHatchProps>
<AcadHatchProps>
  <PatternName>Escher</PatternName>
  <PatternScale>4.0</PatternScale>
  <PatternAngle>45.0</PatternAngle>
</AcadHatchProps>
```

The following Elements can be specified within < AcadHatchProps >:

Element	Description
<HatchAlias> [Optional]	The name of an Alias from the Detail Component database's Hatches table. This table is used so that you can centrally define the Pattern, Scale, and Angle for representative materials used throughout the database. Most RecipeSpecs will use a Hatch Alias to define all the parameters of the Hatch. However, you can specify these values directly by using the other elements.
<PatternType> [Optional]	Possible values are: "PreDefined" (the default), "User", or "Custom".
<PatternName> [Optional]	If the <PatternName> specified (or indirectly referenced from <HatchAlias>) does not exist, the pattern "ANSI31" is used.
<PatternScale> [Optional]	

Element	Description
<PatternMultiplier> [Optional]	
<PatternAngle> [Optional]	
<PatternDouble> [Optional]	
<PatternSpace> [Optional]	

<Params>

This Element specifies the parameters specific to this particular Recipe. These are typically values that the Recipe needs, but that are not hardwired into the code, and thus are customizable. Here are a few examples:

```
<Item idStr="boundary">
  <Params>
    <Tongue>0.125</Tongue>
    <GrooveSpacing>0.03125</GrooveSpacing>
  </Params>
</Item>
<Item idStr="boundary">
  <Params>
    <Chamfer>0.5</Chamfer>
  </Params>
</Item>
```

The Element names are defined by the Rcp function itself and must be known in advance of editing them in the Recipe Spec.

NOTE One way to find out the implied contract of the Rcp function is to turn on logging. For more information, see Recipe Logging on page 2617.

‹Options› Section

This section provides customization data that is used by the placement phase (Jig) of the Rcp function. In most cases, Recipe functions divide their labor into two phases:

1. Creation of the component
2. Placement of the component

The job of placing the component is usually handled by a standard Jig that may be controlled by elements specified in the <Options> section. You must, of course, have advanced knowledge of which Jig and JigEnt are used by a Recipe function in order to take advantage of this.

The example below is from the Brick Pavers component group. It uses the LinearArrayJig to repeat a row of blocks at a specified spacing.

```
<?xml version="1.0" encoding="UTF-8"?>
<AecRecipeSpec defaultUnit="in">
  <Recipe idStr="section">
    <Label>Section</Label>
    <Implementation>
      <ObjectARX logicalAppname="AecDtl50" funcRcp="AecDtlRcpUnitPaver"/>
    </Implementation>
    <Controls>
      <CheckBox idStr="doHatch">
        <Label>Hatch item</Label>
        <Default>1</Default>
      </CheckBox>
    </Controls>
    <Data>
      <Item idStr="block">
        <AcadEntityProps>
          <Layer ref="layerKey">MED</Layer>
        </AcadEntityProps>
      </Item>
      <Item idStr="boundary">
        <Params>
          <Chamfer>0.0</Chamfer>
        </Params>
      </Item>
      <Item idStr="infill">
        <AcadHatchProps>
          <HatchAlias>brick</HatchAlias>
        </AcadHatchProps>
        <AcadEntityProps>
          <Layer ref="layerKey">HATCH</Layer>
        </AcadEntityProps>
      </Item>
    </Data>
    <Options>
      <JigEnt>
        <GapSpacing>0.25</GapSpacing>
      </JigEnt>
      <Jig>
        <PromptCount>Number of courses</PromptCount>
      </Jig>
    </Options>
  </Recipe>
</AecRecipeSpec>
```

In the <Options> section, it tells the JigEnt to put a ¼" spacing between each paver, and it changes the prompt string for one of the prompts issued by the Jig.

For more information about which options are available for specific Jigs and JigEnts, see Jigs and JigEnts on page 2611.

Jigs and JigEnts

A "Jig" is a programming construct that defines how the user adds objects to the drawing. You can think of it as an "Add" command that gives visual feedback as you are specifying what the object looks like. For instance, the simple Arc Jig in AutoCAD dynamically sketches out the potential arc while you input various values.

A “JigEnt” is the object used to draw the visual feedback. In AutoCAD and AutoCAD Architecture, this is usually the same type of object that is being created (for example, the Wall Jig would use a Wall object). In the Recipe framework, most components are not represented by an object type, but by a collection of AutoCAD primitive objects such as hatch, polyline, and block. In this case, a JigEnt is a temporary in-memory object that is used to draw during the lifetime of the Jig, but is then thrown away when the real objects are added to the drawing.

The Recipe framework uses a system that plugs specific JigEnts into common Jigs. This allows a single Jig that is responsible for linear components (that is, one that prompts for “Start point” and “Endpoint”) to look completely different depending upon the JigEnt being used (for example, a row of bricks vs. a metal joist).

Although development of new Jigs and JigEnts is currently available only to ObjectARX programmers, many aspects of the existing Jigs and JigEnts can be controlled via lightweight customization techniques. In order to understand this, it is helpful to have an idea of how the existing Jigs and JigEnts are programmed.

Hierarchy of Jigs

```
AecEdJigRcp
  AecEdJigCircle
  AecEdJigLine
    AecEdJigLineBlockBased
      AecEdJigLinearArray
      AecEdJigStretch
    AecEdJigLineOriented
      AecEdJigLineExtend
      AecEdJigSurface
    AecEdJigRectangle
  AecEdJigStamp
```

NOTE The level of indentation shows the inheritance. For example, if you want to know the behavior and options for AecEdJigLinearArray, you can see that it inherits all the behavior and options for AecEdJigLineBlockBased, AecEdJigLine, and AecEdJigRcp.

Hierarchy of JigEnts

```
AecEdJigRcp
  AecEdJigEntCircle
  AecEdJigEntLine
    AecEdJigEntLineBlockBased
      AecEdJigEntBookends
      AecEdJigEntLinearArray
      AecEdJigEntStretch
    AecEdJigEntLineOriented
      AecEdJigEntLineExtend
      AecEdJigEntSurface
        AecEdJigEntSurfaceHlines
    AecEdJigEntMeasure
    AecEdJigEntRectangle
```

As you can see, Jigs and JigEnts correspond pretty closely at the upper levels. However, there are extra JigEnts that can re-use the same Jig. The ones listed here are only the common JigEnts. There are many specific JigEnts derived off of these. For example, there is a specific JigEnt for each type of wood and metal joist, all derived off AecEdJigEntLineExtend to get the majority of their behavior. No special Jig is needed for each of these, because they all ask for the same sequence of information. If all the internal programmed objects for detail components were listed, you would see many more JigEnts, but not many more Jigs.

Common Jigs

The common Jigs and JigEnts listed in the hierarchy above have options that can be specified in the <Options> section of the Recipe Spec, and in some cases, they have common Recipes that can be utilized without writing any new code.

Brief descriptions for some of the common Jigs are provided below, along with information on the <Options> or Recipe func that can be used with each one, if applicable.

Stamp Jig

The Stamp Jig is similar to the INSERT command in that it does a basic block insertion (with a few extra controls). Here is an example showing how the Options section is used to control the Jig's behavior.

```
<Options>
  <Jig>
    <AllowScaling>false</AllowScaling>
    <AllowRotation>true</AllowRotation>
    <AllowXFlip>true</AllowXFlip>
    <AllowYFlip>true</AllowYFlip>
    <AllowBasePt>true</AllowBasePt>
  </Jig>
</Options>
```

In each case, the value listed is the default, which would be used if nothing was specified.

The following table lists the options for Stamp Jigs

Option	Comment
<AllowScaling>	
<AllowRotation>	
<AllowXFlip>	
<AllowYFlip>	
<AllowBasePt>	Boolean value specifying whether the common command line options of the Jig are valid options for this Recipe.

To use this Jig directly from a common recipe function, use the following section of RecipeSpec:

```
<Implementation>
  <ObjectARX>
    <AppName>AecRcpBase40</AppName>
    <RcpFunc>Stamp</RcpFunc>
  </ObjectARX>
</Implementation>
```

Linear Array Jig

The Linear Array Jig puts multiple copies of a block reference in a line, oriented in either the X or Y direction, with a specified spacing between each instance. Here is an example showing how the Options section is used to control the Jig's behavior.

```
<Options>
  <Jig>
    <IsOrientedX>true</IsOrientedX>
    <PromptStart>Start point</PromptStart>
    <PromptEnd>End point</PromptEnd>
    <PromptCount>Count</PromptCount>
    <AllowXFlip>true</AllowXFlip>
    <AllowYFlip>true</AllowYFlip>
    <AllowCount>true</AllowCount>
  </Jig>
  <JigEnt>
    <IsOrientedX>true</IsOrientedX>
    <Width>0.0</Width>
    <GapSpacing>0.0</GapSpacing>
  <JigEnt>
</Options>
```

In each case, the value listed is the default and would be used if nothing was specified.

The following table lists the Jig options for Linear Array Jigs

Jig Option	Comment
<IsOrientedX>	Boolean value specifying whether items along the line are oriented in the X direction or the Y direction.
<PromptStart>	Text string to use for the start point prompt.
<PromptEnd>	Text string to use for the endpoint prompt.
<PromptCount>	Text string to use for the count prompt.
<AllowXFlip>	
<AllowYFlip>	
<AllowCount>	Boolean value specifying whether the common command line options of the Jig are valid options for this Recipe.

The following table lists the JigEnt options for Linear Array Jigs

JigEnt Option	Comment
<IsOrientedX>	Boolean value specifying whether items along the line are oriented in the X direction or the Y direction.
<Width>	Specifies the exact width of the Block Reference being arrayed. If you do not know this value and leave this element out, the extents of the block will be dynamically measured. If you know this value, you should specify it, because measuring the extents dynamically can sometimes introduce rounding errors that can affect the overall dimensions of the array.
<GapSpacing>	The distance between each arrayed item. You can use a negative value to get items to overlap.

To use this Jig directly from a common recipe function, use the following section of Recipe Spec.

```
<Implementation>
  <ObjectARX>
    <AppName>AecRcpBase40</AppName>
    <RcpFunc>LinearArray</RcpFunc>
  </ObjectARX>
</Implementation>
```

When using this function, you can also specify an <RcpFunc> directive that will allow you to package all the individual blocks in the array into a single block reference. By default, this value is set to "false" and each item in the array will be its own block reference.

```
<Options>
  <RcpFunc>
    <PackageAsBlock>true</PackageAsBlock>
  </RcpFunc>
</Options>
```

Bookends Jig

The Bookends Jig is similar to the Linear Array Jig, but allows for a different block on each end as well as a block that is arrayed to fill the gap between the two ends. The "start" and "end" blocks are used once, and the "repeat" block is used however many times it needs to be in order to fill the space between. Here is an example usage:

```
<Options>
  <Jig>
    <IsOrientedX>true</IsOrientedX>
    <PromptStart>Start point</PromptStart>
    <PromptEnd>End point</PromptEnd>
    <AllowXFlip>true</AllowXFlip>
    <AllowYFlip>true</AllowYFlip>
  </Jig>
  <JigEnt>
    <IsOrientedX>true</IsOrientedX>
    <WidthStart>0.0</WidthStart>
    <WidthRepeat>0.0</WidthRepeat>
    <WidthEnd>0.0</WidthEnd>
    <GapSpacing>0.0</GapSpacing>
  </JigEnt>
</Options>
```

In each case, the value listed is the default and would be used if nothing was specified.

The following table lists the Jig options for Bookends Jigs

Jig Option	Comment
<IsOrientedX>	Boolean value specifying whether items along the line are oriented in the X direction or the Y direction.
<PromptStart>	Text string to use for the start point prompt.
<PromptEnd>	Text string to use for the endpoint prompt.
<PromptCount>	Text string to use for the count prompt.
<AllowXFlip>	

Jig Option	Comment
<AllowYFlip>	Boolean value specifying whether the common command line options of the Jig are valid options for this Recipe.

The following table lists the JigEnt options for Bookends Jigs

JigEnt Option	Comment
<IsOrientedX>	Boolean value specifying whether items along the line are oriented in the X direction or the Y direction.
<WidthStart>	Specifies the exact width of the Block Reference at the beginning of the array. If you do not know this value and leave this element out, the extents of the block will be dynamically measured. If you know this value, you should specify it, because measuring the extents dynamically can sometimes introduce rounding errors that can affect the overall dimensions of the array.
<WidthEnd>	Same as above, but for the ending block of the array.
<WidthRepeat>	Same as above, but for the repeating block of the array
<GapSpacing>	The distance between each arrayed item.

To use this Jig directly from a common recipe function, use the following section of RecipeSpec.

```
<Implementation>
  <ObjectARX>
    <AppName>AecRcpBase40</AppName>
    <RcpFunc>Bookends</RcpFunc>
  </ObjectARX>
</Implementation>
```

When using this function, you can also specify an <RcpFunc> directive that will allow you to package all the individual blocks in the array into a single block reference. By default, this value is set to "false" and each item in the array will be its own block reference.

```
<Options>
  <RcpFunc>
    <PackageAsBlock>true</PackageAsBlock>
  </RcpFunc>
</Options>
```

Surface Jig

This Jig creates a basic rectangular boundary of a given depth, where the user is asked for an arbitrary start and endpoint (similar to adding Walls in AutoCAD Architecture). Here is an example usage:

```
<Options>
  <Jig>
    <PromptStart>Start point</PromptStart>
    <PromptEnd>End point</PromptEnd>
    <AllowXFlip>true</AllowXFlip>
    <AllowYFlip>true</AllowYFlip>
  </Jig>
</Options>
```

In each case, the value listed is the default and would be used if nothing was specified.

To use this Jig directly from a common recipe function, use the following section of RecipeSpec.

```
<Implementation>
  <ObjectARX>
    <AppName>AecRcpBase40</AppName>
    <RcpFunc>Surface</RcpFunc>
  </ObjectARX>
</Implementation>
```

StampMInsert Jig

The StampMInsert Jig is the same as the Stamp Jig, except that it uses an MInsert instead of a simple Block Reference.

SurfaceBound Jig

The SurfaceBound Jig is the same as the Surface Jig, except that it keeps only the top three edges of the rectangle. It is used for components that are poured onto or bounded by another entity that provides the bottom edge of the rectangle. For an example, see Concrete Topping.

SurfaceLtype Jig

The SurfaceLType Jig is the same as the Surface Jig, except that it fills with a wide polyline of a given linetype, instead of a hatch.

ApplyToLinework Jig

The ApplyToLinework Jig is used when you simply need to "brand" existing linework geometry as a specific component. For example, you could draw a detail using basic AutoCAD commands and then use this Jig to apply the Xdata and keynote for a particular component in the database. It will move the selected geometry to a new layer, if specified, but will not create any geometry of its own.

Recipe Logging

Without knowing the implied contract of a Recipe function, it is hard to know (or debug) where all the values are supposed to come from. In some cases, there may be values for an existing Recipe that you could customize if you just knew they were there (and currently not specified).

Recipe Logging is a mechanism that will print to the command line every piece of data that is being retrieved by the Recipe. It will give the source of the data (for example, the component database, the Recipe Section, the Properties palette prompt), and whether the value was found or not. Using this information, you can reverse-engineer what data is expected by the Recipe.

The following is an example produced by running the 02/Brick Paver Recipe with Recipe Logging turned on.

```
Command: dtlcompmanager
RCP LOG > Source:   Database
    Field: WIDTH
    Type: double
    Required: True
    Found: True
    Value: 4.00000
RCP LOG > Source:   Database
    Field: LENGTH
    Type: double
    Required: True
    Found: True
    Value: 8.00000
RCP LOG > Source:   Database
    Field: THICKNESS
    Type: double
    Required: True
    Found: True
    Value: 1.50000
RCP LOG > Source:   <Data>
    Context: Item[@idStr='boundary']/Params
    Tag: Chamfer
    Type: double
    Required: False
    Found: True
    Value: 0.00000
RCP LOG > Source:   Prompt
    Field: coarseOutline
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   Prompt
    Field: doHatch
    Type: bool
    Required: False
    Found: True
    Value: True
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: HatchAlias
    Type: str
    Required: False
    Found: True
    Value: brick
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: PatternType
    Type: str
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: PatternName
    Type: str
    Required: False
    Found: False
```

```
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: PatternAngle
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: ScaleMultiplier
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadHatchProps
    Tag: PatternScale
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadEntityProps
    Tag: Layer
    Type: str
    Required: False
    Found: True
    Value: A-Detl-Patt
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadEntityProps
    Tag: ColorIndex
    Type: long
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadEntityProps
    Tag: Linetype
    Type: str
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadEntityProps
    Tag: LinetypeScale
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='infill']/AcadEntityProps
    Tag: Lineweight
    Type: long
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='block']/AcadEntityProps
    Tag: Layer
    Type: str
    Required: False
    Found: True
    Value: A-Detl-Medm
```

```
RCP LOG > Source:   <Data>
    Context: Item[@idStr='block']/AcadEntityProps
    Tag: ColorIndex
    Type: long
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='block']/AcadEntityProps
    Tag: Linetype
    Type: str
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='block']/AcadEntityProps
    Tag: LinetypeScale
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Data>
    Context: Item[@idStr='block']/AcadEntityProps
    Tag: Lineweight
    Type: long
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: IsOrientedX
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: PromptStart
    Type: str
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: PromptEnd
    Type: str
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: AllowXFlip
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: AllowYFlip
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   <Options>
```

```
    Context: Jig
    Tag: AllowCount
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: Jig
    Tag: PromptCount
    Type: str
    Required: False
    Found: True
    Value: Number of courses
RCP LOG > Source:   <Options>
    Context: JigEnt
    Tag: IsOrientedX
    Type: bool
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: JigEnt
    Tag: Width
    Type: double
    Required: False
    Found: False
RCP LOG > Source:   <Options>
    Context: JigEnt
    Tag: GapSpacing
    Type: double
    Required: False
    Found: True
    Value: 0.25000
Start point or [Xflip/Yflip/Count]:
End point or [Xflip/Yflip/Count]:  <Ortho on>
Start point or [Xflip/Yflip/Count]:
```

To turn Recipe Logging on, use the REGEDIT program to change a value in the Win32 Registry. The entry can be found in:

```
HKEY_CURRENT_USER\Software\Autodesk\AutoCAD\R17.1\ACAD-XXXX\Profiles\AutoCAD Architecture\Pref
erences\AecRcpBase50\RecipeLog
```

Change this value to "1" to turn it on.

Change this value to "0" to turn it off.

Blocks and Block Libraries

Libraries of block content for detail components should be created and stored according to the following guidelines, each of which is discussed in more detail subsequently.

- Block content should be drawn with the current style of geometry. (See Using Optimal Geometry on page 2622.)
- Blocks should have namespace prefixes. (See Naming Blocks on page 2623.)
- Base points for inserting blocks should be positioned logically. (See Base Points for Blocks on page 2623.)
- Similar blocks should be stored in the same DWG file. (See Collecting Similar Blocks on page 2623.)

- Properties of block entities should be set to ByBlock. (See Block Properties on page 2624.)
- All unnecessary objects should be removed from block library drawings. (See Removing Unnecessary Objects on page 2624.)

Using Optimal Geometry

Many block libraries that were created in legacy versions of AutoCAD contain geometry that is non-optimal in that it can result in performance problems, incorrect snap points, or tolerance discrepancies that cause errors when Aec Modify tools or other AutoCAD editing commands are used. You should avoid using this old-style geometry when creating new blocks, and you should remove or replace it whenever you encounter it in existing block content.

The following sections describe five main areas in which you should strive to use optimal geometry.

Polylines

Prior to AutoCAD Release 14, the polyline entity consisted of multiple vertex entities and was not stored in a compact form. You can identify these old-style polylines by running the LIST command, which identifies them as type POLYLINE. Any such entities should be recreated as new-style polylines by tracing over them manually with the Polyline tool. The LIST command identifies new-style polylines as LWPOLYLINE.

Hatch Patterns

Be sure to use actual hatch entities when creating blocks that require hatch patterns. Prior to AutoCAD Release 14, hatches were anonymous blocks with all of the entities comprising the pattern stored in the drawing. If you run the LIST command on an entity that appears to be a hatch, and the entity is identified as a BLOCK REFERENCE and has a name beginning with *X, then it is an old-style hatch. Remove and replace with a new, equivalent HATCH entity.

NOTE In addition to the old-style hatch patterns described above, some blocks have been found to contain multiple individual line segments repeated so as to simulate an actual hatch. In such cases, the line segments should be erased and replaced with an appropriate hatch at the appropriate scale.

Unjoined Polylines

When the endpoints of line or arc segments that form a boundary coincide, it is vastly more efficient to represent the boundary by using a single polyline. For example, a rectangle made of four separate lines should be converted to a single polyline. To do this, use the following procedure:

1. Run the PEDIT command, and select one of the lines.
2. When prompted to turn the line into a polyline, enter **y** (for Yes).
3. Enter **j** (for Join), select the other three lines, and press *ENTER*. In some cases, the join will fail because the endpoints are not coincident, even though they appear to be. If this occurs, use object snaps to carefully reposition the endpoints so that they do coincide.

Pixelized Line Segments

Some conversion programs create a literal translation of what was on the screen at the time of conversion. This can result in thousands of tiny line segments placed end-to-end, where there should be a single line segment. In such cases, you should trace over the entire course of the end-to-end segments to create a single segment, and then erase all the original pixelized line segments.

Imprecise Geometry

As is the case with unjoined polylines, any endpoints that appear to coincide should actually do so. Small tolerance discrepancies can cause other editing operations to fail. Make sure that geometry that meets visually also meets at a high degree of precision. One way to ensure coincidence is to turn on Nearest, Endpoint, and Midpoint object snap modes, and then adjust the geometry using its grip points.

Naming Blocks

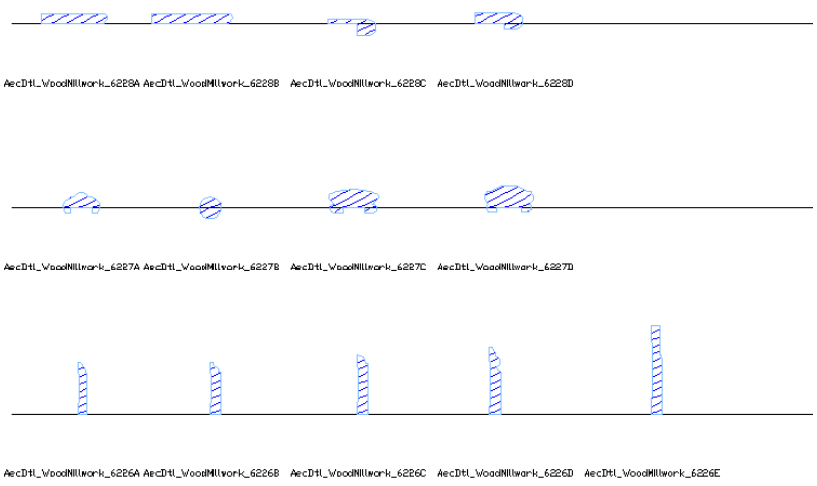
The names of blocks containing detail component content should have a namespace prefix to avoid conflicts with other blocks. For example, all blocks in libraries provided with AutoCAD Architecture use "AecDtl_" as the namespace prefix. If you are creating your own blocks, you should use a unique prefix.

Base Points for Blocks

Each block should have a base point that is logically positioned for inserting the block in relation to other geometry in a drawing; that is, the base point location should allow the user to insert the block using an object snap on some other piece of geometry as an insertion point. If possible, the base point location should also facilitate repeated placement of the item. For example, a block representing a paver should not have the base point in the middle of the block, because you would not likely want the middle of the block inserted at any object snap on existing geometry. Likewise, a base point in the upper-left corner only makes sense if the item is to be placed under some other geometry. However, if the base point is at the lower-left corner, the user can snap to the ground plane, and repeated insertions are easy.

Collecting Similar Blocks

Similar or closely related block definitions should be collected in a single DWG file. For example, in the details block library supplied with AutoCAD Architecture, the block definitions for all the different sizes of nails are collected in a block library drawing file called *AecDtlLib_Nails.dwg*, and all block definitions detailing carpet accessories are in a file called *AecDtlLib_CarpetAcc.dwg*. As shown below, for each block definition, the drawing should include a block reference inserted on a horizontal line to show how the block's base point is used to position the block in relation to other geometry. For each block reference, there should also be a text label containing the name of the block.



Setting up block library drawings this way makes it easy for the user to quickly survey the entire library. It also helps you in the process of cleaning up the drawing, which is explained in a subsequent section (see Removing Unnecessary Objects on page 2624).

Block Properties

In most cases, blocks should be defined to have their component entity properties set as follows:

```
Layer=0
Color=BYBLOCK
Linetype=BYBLOCK
Linetype Scale=1.0
Lineweight=BYBLOCK
```

To accomplish this after a block has been defined, right-click the block reference, and click Set Nested Objects to ByBlock.

Layer Keys

You can use a layer key to map specific entities within a block to a layer in the drawing into which the block is inserted. For example, the millwork blocks depicted earlier (see Collecting Similar Blocks on page 2623) have the hatch entity assigned to the layer "HATCH." If the Recipe Specification (XML file) that references this block library has the attribute "remapLayers" set to true, as shown below, then any layer that matches a layer key in the current drawing will be replaced with the layer that is assigned to that layer key. In the case of a drawing using the standard AutoCAD Architecture template file, in which the HATCH layer key is mapped to the AecDtl-Patt layer, any block library entities that were assigned to the HATCH layer will end up on the AecDtl-Patt layer when inserted into the drawing.

```
<AcadBlockProps>
  <BlockName dwgLib="dwgs/AecDtlLib_WoodMillwork.dwg"
  remapLayers="true">AecDtl_millworkBlk1</BlockName>
  <Scale>6.0</Scale>
</AcadBlockProps>
```

Removing Unnecessary Objects

Once you have ensured that a block library drawing conforms to all the previously explained guidelines, the final step is to remove all unnecessary objects (unused layers, text styles, block definitions, and so on) by performing the following procedure.

1. Use the ZOOM, EXTENTS command to display the extents of the current drawing.
2. Enter **wblock** (for Write Block).
3. In the Write Block dialog box, under Source, select Objects.
4. Under Base point, click the Pick point button, and then select a base point in the lower-left corner of the drawing extents.
5. Under Objects, with Retain selected, click the Select Objects button, specify a crossing window over the entire contents of the drawing, and then press *ENTER*.
6. Under Destination, enter the name of the drawing to be created (for example, enter the name of the current drawing with a "2" appended), and specify the units to be used for automatic scaling when the block is inserted into a drawing that uses different units.
7. Click OK.

8. Close the drawing.
9. Using Windows Explorer, delete the original drawing.
10. Rename the new drawing by removing the "2" you appended.

    The new drawing now contains only the entities you selected and any other entities directly or indirectly referenced by the selected entities. In other words, the drawing contains only the absolute minimum set of objects that it needs.

Migrating Detail Component and Keynote Databases

55

If you have modified one of the default keynote or detail component databases supplied with a previous release of the software, you can migrate your modifications to the corresponding database in the current release using the Detail Component/Keynote Database Migration utility. As explained in the following topics, use of this utility is not supported if the previous and current databases use different versions of the CSI MasterFormat standard.

Migrating Your Database Modifications

AutoCAD Architecture provides default Microsoft® Access databases for detail components and keynotes. If you have modified either of these databases in a previous release (or created your own databases using the same schema), you can migrate your modifications to the corresponding database in the current release using the Detail Component/Keynote Database Migration utility. Accessed from the CAD Manager menu, this utility compares the modified database (the source) with its counterpart in the current release (the target) and updates the current database to reflect your modifications.

IMPORTANT Beginning with AutoCAD Architecture 2010, the US detail component and keynote databases supplied with the software use the CSI MasterFormat 2004 standard. Using the Detail Component/Keynote Database Migration utility to migrate your customizations from a database that uses the CSI MasterFormat 95 standard (as in Autodesk Architectural Desktop 2007 and previous releases) is not supported. The utility will not properly migrate custom records from the older database and may errantly overwrite records in the new database with MasterFormat 95 data. If you want to use a MasterFormat 95 database with the current release of AutoCAD Architecture, you can load it as described under Adding a Detail Component Database to Available Databases on page 2349 or Adding a Keynote Database on page 2385. Note that the older database must be located with the previous release content and must maintain that content folder structure to function properly. An older detail component database will not function with 2008 or later US details content. Likewise, an older keynote database will not automatically keynote 2008 or later US details content; it will only keynote detail components inserted using previous version details or details in previous version drawings. The Detail Component/Keynote Database Migration utility can still be used to migrate records from one CSI MasterFormat 95 database to another. Note also that using the Database Migration utility to update an older database with data from a current-release database is not supported. The utility is designed only for migrating modifications in the other direction; that is, **from** the older database **to** the database in the current release.

The migration utility operates according to the following assumptions and rules:

- Both the source and target databases must be of the same type (either Component or Keynote), as identified by the first record in their Fingerprint tables. (For more information on the tables and records included in these databases, see Customizing and Adding New Content for Detail Components on page 2591 and Keynote Database Schema on page 2394.)
- Both the source and target databases must use the same version of the CSI MasterFormat standard.
- If a table in the source database has no counterpart in the target database, the table and all its records are added to the target database.
- Tables of the same type (as identified by their ID fields) are compared, and source records that differ from their counterparts in the target database (or have no counterparts) are processed as shown in the following matrix.

	Corresponding target record exists	No corresponding target record exists
Modified field in source record = true	source record overwrites target record	source record added to target table
Modified field in source record = false	source record is not migrated; target record is not changed	source record added to target table

NOTE If you have added a detail component size table or keynote of your own in the previous release, and it happens to have the same table name or keynote key as a new table or keynote supplied in the current release, it will not be processed by the migration utility, because its ID will differ from its namesake in the current release. If this scenario seems likely in your case, it is recommended that you check to see if the name you assigned is present in the current release. If so, you should change the name of your table or keynote key before running the migration utility.

- If a source database record has been modified using the Detail Component Manager or the Keynote Editor, its Modified field value is set to true automatically, and the record will overwrite the corresponding record in the target database, or be added to the target database if there is no corresponding record present.
- If a source database record has been modified using Microsoft® Access directly, and the Modified field value was not set to true manually, the record will be added to the target database if there is no corresponding record present.
- The migration utility processes only tables and records as described above; it does not migrate any associated XML or DWG content files, nor does it migrate default values specified for particular fields in tables. Preserving such information requires manually updating the target database.

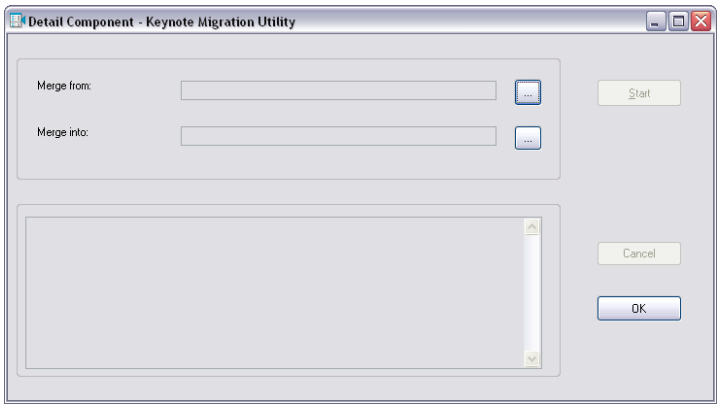
NOTE If migrated records were created using Microsoft® Access directly (rather than through the Detail Component Manager), and they do not have a valid record ID (equal to or greater than 100000), it may result in a conflict with records in the target database.

Running the Detail Component/Keynote Database Migration Utility

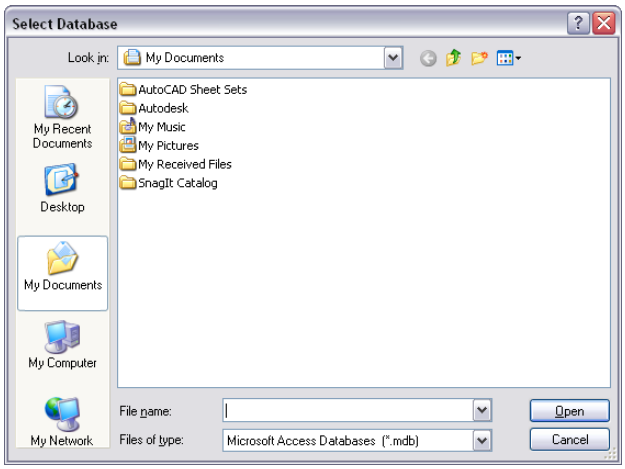
Use this procedure to migrate modifications from a detail component database or keynote database supplied with a previous release of the software to the corresponding database in the current release. Both databases should use the same version of the CSI MasterFormat standard.

NOTE Be sure to create a backup copy of the target database before running the migration utility. If the migration process is terminated before completion, the target database may not be usable.

1 On the Start menu (Windows), click Programs ➤ Autodesk ➤ AutoCAD Architecture 2010 ➤ Detail Component - Keynote Database Migration Utility.



2 For Merge from, click ..., select the modified detail component or keynote database (the source) you want to migrate, and click Open.



3 For Merge into, click ..., select the database to which you want to migrate your modifications (the target), and click Open.

NOTE The target database selected in this step must be the same type (either detail component or keynote) as the source database selected in Step 2.

4 Click OK.

The utility compares the two specified databases and displays the results for each table processed, including which tables have been added and how many records have been modified or added for each table in the target database.

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