

**Autodesk® Topobase™ :**  
**Best Practices for Working**  
**with DWG™**

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The contents of this guide were created for use with Autodesk® Topobase™ 2010 with Update 2 plus an extra DWG Export Hotfix installed; the DWG Export Hotfix can be found on Topobase Services & Support section of Autodesk.com. This guide is not intended for use with other versions of Autodesk® Topobase™.

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# BEST PRACTICES FOR EXPORTING TO DWG FROM TOPOBASE

## 1 Introduction

Autodesk® Topobase™ 2010 offers the possibility to export features displayed in a map to DWG. This export can be performed using the command `tbexportdwg`.

This document describes recommendations, tips, and limitations of the Topobase export functionality. Note that the `tbexportdwg` command is **not** equivalent to the AutoCAD® Map 3D DWG export command (`mapexportcurrentmaptodwg`).

The document assumes that you are working with Topobase 2010 Update 2 plus a DWG Export Hotfix (or a later version), found on Autodesk.com. Information about changes in later versions will be covered to the extent that the information is currently available.

## 2 Display Models

### 2.1 Overview

The purpose of Topobase Export to DWG is to support feature attributes and geometry accuracy. Essentially, the application enriches the exported DWG with attribute information about features and feature geometry is mapped to equivalent AutoCAD entities. Given that there are several limitations in AutoCAD® compared to the map stylization engine found in Topobase, the export functionality has not been developed to provide 100% visual fidelity with all possible map definitions.

Generally speaking, in order to obtain visual fidelity in the export, the display model should be based on AutoCAD stylization and adapted to AutoCAD capabilities. This section explains the general recommendations that should be considered when creating a display model.

### 2.2 Size Context: Map Units vs. Device Units

When displaying symbols or text, you have the following options for the Size Context:

#### 2.2.1 Device space

Here, the “device” is ordinarily a computer screen or printer. On your computer, device space units are absolute screen units. This ensures that the size of a symbol or text display is always the same size on the screen - regardless of the zoom level of the Map 3D drawing area. If you use Device space with a symbol size equal to 0.1 × 0.1 inches, this means that the symbol size is always 0.1 × 0.1 inches on the computer screen.

The device space Size Context is specifically valuable when you are working on a drawing that is zoomed in at high magnification. Under these circumstances, with Map space sizing, the symbols could potentially appear so large that they interfere with accurate work and visualization. However, Device space sizing leads to unexpected results for most applications. It often requires many display manager

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rules, involving different symbologies at different scales to get things to look right. For example, if you zoom far out on a map, symbols with device space sizing will inevitably start to overlap (unless you formulate rules to prevent this).

## 2.2.2 Map space

Map space units are proportional to map units. This ensures that the size of the symbol bears a fixed relationship to the map it is in. If a drawing is zoomed 2X, then the symbols will *appear* twice as large on the screen - just like the rest of the map.

The map space Size Context is generally preferable for plotting purposes and for dense layers with many symbols. It is a more controllable context to work in, improves visibility, and prevents cluttering of the screen.

## 2.2.3 Recommendation: Size Context

AutoCAD does not support Device space; it is therefore the general recommendation that you configure your stylization with Map space as Size Context information.

## 2.3 Scale ranges

AutoCAD also does not support scale dependent stylization; the export only considers the visible features from the current scale and with the corresponding style at that scale. This is an important limitation of AutoCAD because it leads to the fact that TBCustomizeDWG exports only the data which is configured for the current zoom level. To illustrate, imagine that you use the TBCustomizeDWG functionality when the current zoom scale has a value of 499 and that you have a feature class which has the following two scale ranges:

- 1 – 501
- 501 – 1000

The case shown would only export the features which are visible at the scale 499 and where the first scale range (1 – 501) would be evaluated.

*Because AutoCAD does not support scale dependent stylization, make sure to zoom in to the desired scale before you execute the export. You can use the custom scale option in the bottom left part of your map and introduce the desired scale. In the example shown, all visible features at scale 1:499 will be exported.*



Figure 1. Setting the map scale

## 2.4 AutoCAD styles

The stylization engine found in Topobase and Map 3D is more sophisticated than AutoCAD's style engine. Therefore, the main rule for creating a display model which you want to export is: "Create a stylization based on styles which are supported by AutoCAD."

For more information, please refer to [section 3.2 Map 3D/Topobase vs AutoCAD stylization](#).

## 3 Mapping of Styles and Objects

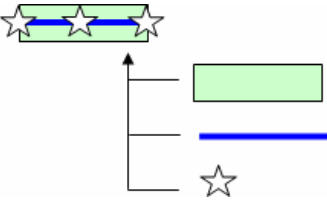
### 3.1 Mapping of feature classes

The following table shows how Topobase feature classes are mapped into AutoCAD objects during export:

Source feature class	Exported AutoCAD object
Point	Block reference
Linestring	Polyline
Polygon	Border as polyline Interior as hatch
Label	Text
3D Linestring	3DPolyline
Collection	Depends on the type of geometry. If the geometry is a point, it is exported as block reference; if it is a line, it is exported as a polyline...and so on. See above.

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## 3.2 Map3D/Topobase stylization vs. AutoCAD stylization

Category	Map 3D/Topobase	AutoCAD
Scales	Scale ranges	AutoCAD does not recognize scale dependent stylization.
Size Context	Map space and Device space	AutoCAD does not support Device space.
Composite styles	<p>Map 3D/Topobase’s engine allows creating the so-called composite styles.</p> <p>They provide the capability to generate sophisticated user-defined styles by overlaying multiple style components.</p> <p>You can use composite styles for points, lines, polygon, and collection features.</p> 	AutoCAD does not support composite styles.
Custom symbols based on XML	Supported	AutoCAD does not support XML symbols.
Dynamic Labelling	Dynamic labels are supported in Standard and Enhanced Stylization	AutoCAD does not support Dynamic Labelling.
Line Feature Configuration	The Line Type engine provides support for end caps, line joins, Start/End Symbols, Transparency, Offset line styles, etc.	AutoCAD's line type engine is less sophisticated than Map 3D/Topobase’s engine. Patterns are stored in *.lin files, but not everything can be supported which is available in Map/Topobase.



Category	Map 3D/Topobase	AutoCAD
Polygon Feature Configuration	The engine provides support for transparency, hatch orientation, area boundary styles, and images for hatches.	AutoCAD area fills are less sophisticated than Map 3D/Topobase's engine. Not all configurations from Map 3D/Topobase can be supported.  <b>Note:</b> AutoCAD 2011 supports hatch transparency.
Entity types		AutoCAD support entities which are not supported by Map 3D/Topobase: Examples: Solid, Hatch, Helix, Dimension, etc.
Text size interpretation	The height value is equivalent to the font height.	The height value is equivalent to the text height
Complex lines with Text and Symbols	There is no limitation in this respect.	AutoCAD does not support thickened symbols inside line definitions.
Multi lines	This can be achieved through composite lines; there is no limitation regarding arcs.	AutoCAD uses the MLine Type in order to provide functionality for multi lines. MLine entities do not support lines with arcs.
Layer	Display Manager layers have a feature source, feature class, and possibly a filter and hence represent a slice through the data. The layer has rich stylization for all aspects of onscreen representation, including rules and formulas for the application of styles. Such a layer has no relation to an AutoCAD layer. This means that adding a layer in the display manager will not create an AutoCAD layer which can be manipulated with the corresponding AutoCAD tools.	AutoCAD layers have rudimentary stylization such as color, linetype, linetype scale etc.  Each entity has only one layer, which can be considered an attribute of the entity that is (or at least can be) used to stylize the onscreen representation.

## 4 Symbolizing Data

This section shows the possibilities for symbolizing data and the considerations that can be taken into account to improve export to DWG.

Topbase Client has the capability to add layers into the Display Manager with standard or enhanced stylization. In the Data Connect window, select the layers that you want to add to the map. If you choose the option **Add to Map**, the layer is added with standard stylization. If you choose the option **Add to Map using Enhanced Styles**, the layer is added with enhanced stylization.

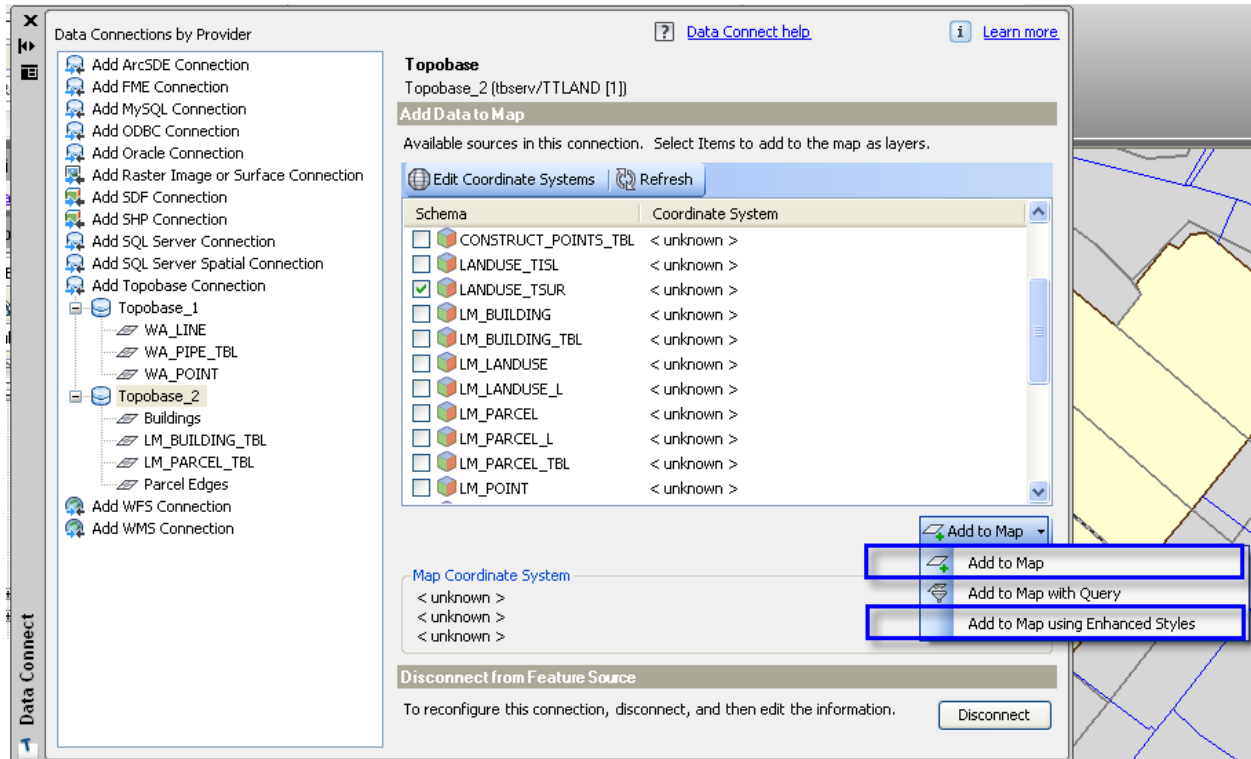


Figure 2. Adding layers to the map

Enhanced stylization provides more capabilities for assigning styles to the feature classes.

Once the layer is loaded in the Display Manager, you can access the Map 3D Style Editor by double-clicking it.

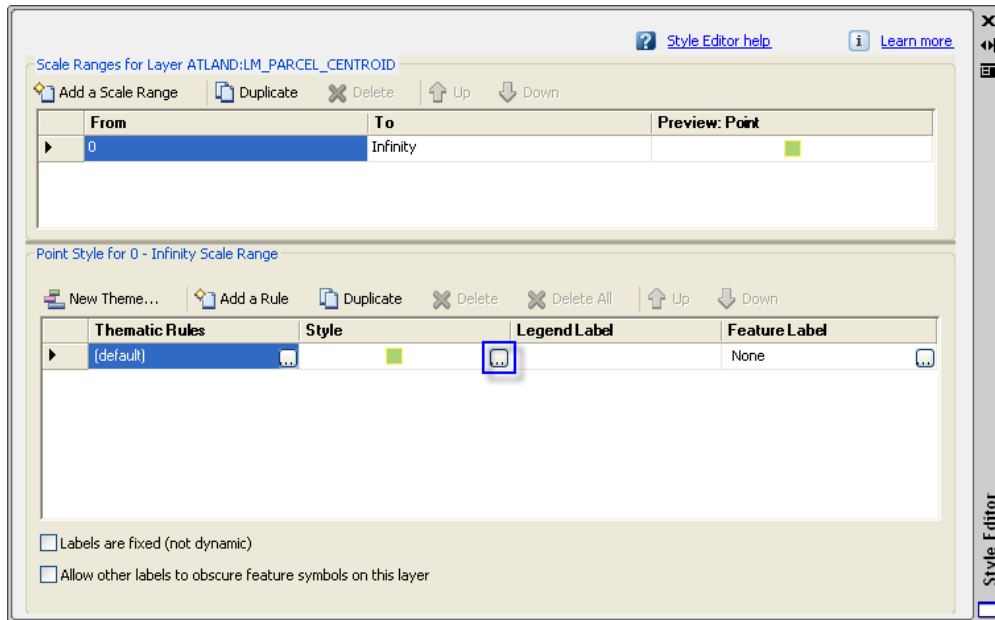



Figure 3. The Style Editor window displaying the Point Style pane

Depending on the type of feature layer (point, line, polygon, collection), the Style Editor will show different window properties. In order to open the Style Point, Style Area, or Style Line window, click the () icon for the Style and the corresponding window will open, depending on the type of feature class. In the sections that follow, each of these windows is shown.

#### 4.1 Style Point

The Style Point window is used to symbolize a point feature class. In the Style Point window, you may specify the symbol, size context, size, fill color, edge color, and rotation for point features.

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## 4.1.1 Standard stylization

The figure below shows the properties for standard stylization:

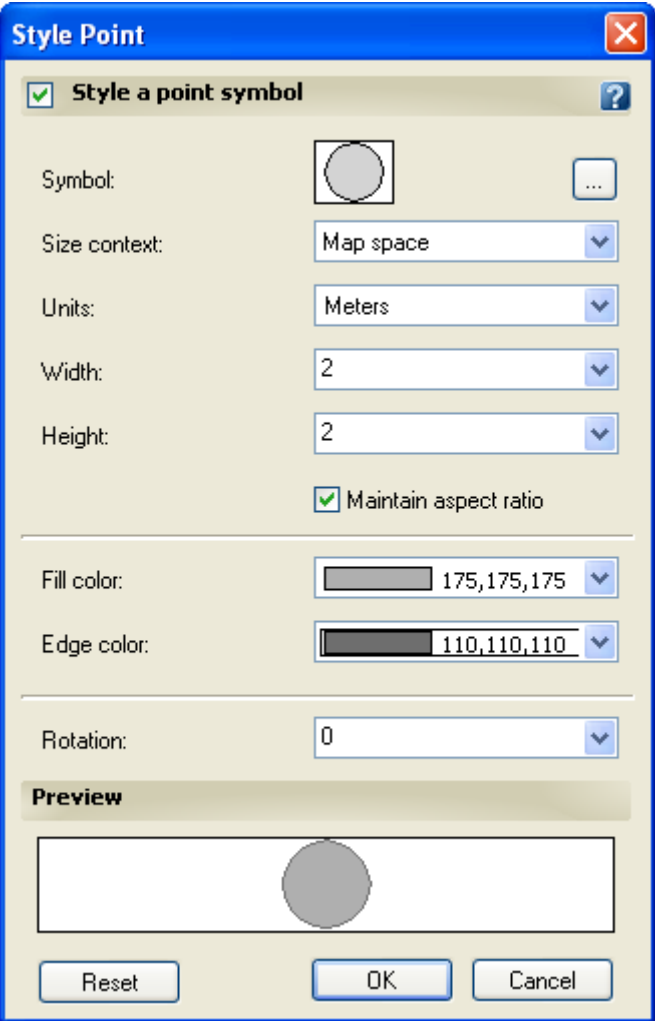
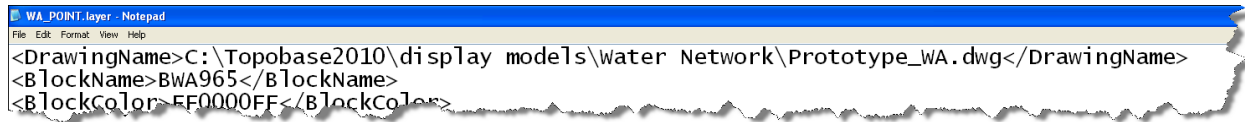


Figure 4. Style Point – Standard stylization

If the point references a symbol (block reference) in a DWG, the path to the DWG is saved in the layer file (in the tag <DrawingName>). The figure below shows the *WA\_POINT.layer* which references the block *BWA965* in the *Prototype\_WA.dwg*.



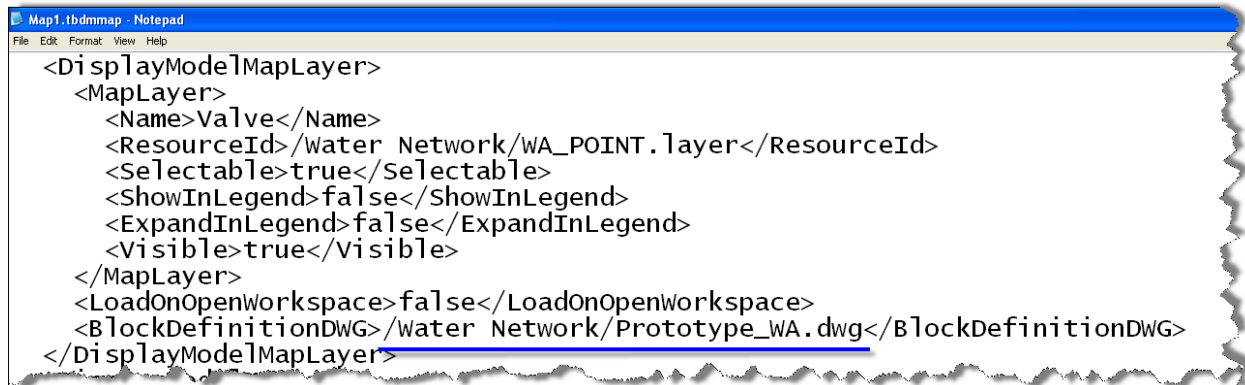
```

WA_POINT.layer - Notepad
File Edit Format View Help
<DrawingName>C:\Topobase2010\display models\water Network\Prototype_WA.dwg</DrawingName>
<BlockName>BWA965</BlockName>
<BlockColor>FF000FF</BlockColor>

```

Figure 5. The layer file referencing a block

Another way to reference a drawing is from the *\*.tbmmap* file. For the layer, there is one line (in the tag <BlockDefinitionDWG>), containing the path referencing the drawing. The <DrawingName> in the *\*.layer* files remains empty. The figure below shows how the drawing is referenced in the *\*.tbmmap* file for the *WA\_POINT.layer* file. In the *WA\_POINT.layer* file, only the name of the block will be stored - but not the drawing name.



```

Map1.tbmmap - Notepad
File Edit Format View Help
<DisplayModelMapLayer>
  <MapLayer>
    <Name>Valve</Name>
    <ResourceId>/water Network/WA_POINT.layer</ResourceId>
    <Selectable>true</Selectable>
    <ShowInLegend>false</ShowInLegend>
    <ExpandInLegend>false</ExpandInLegend>
    <Visible>true</Visible>
  </MapLayer>
  <LoadOnOpenWorkspace>false</LoadOnOpenWorkspace>
  <BlockDefinitionDWG>/water Network/Prototype_WA.dwg</BlockDefinitionDWG>
</DisplayModelMapLayer>

```

Figure 6. The *\*.tbmmap* file referencing a drawing

The blocks are exported properly whether the DWG is referenced in the layer file or in the *\*.tbmmap* file. Note that during the export, the blocks are **not** loaded from the *.dwg* file but are taken from the repository.

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## 4.1.2 Enhanced stylization

The figure below shows the properties for enhanced stylization:

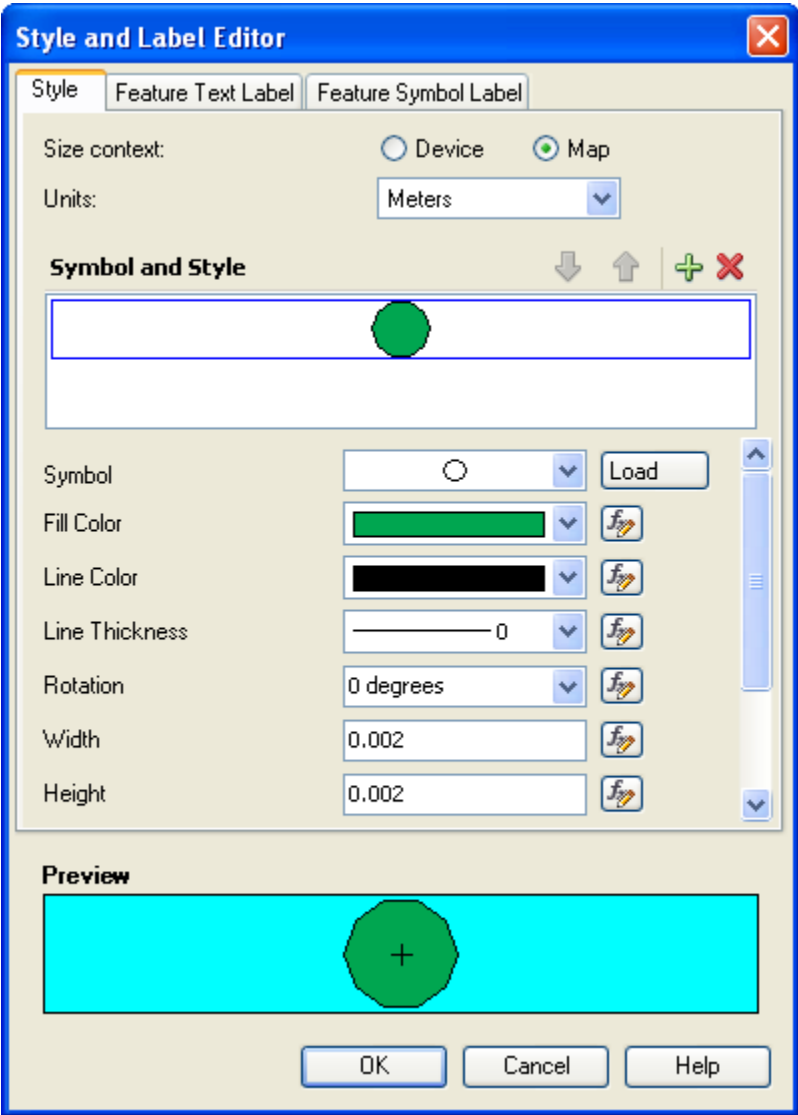
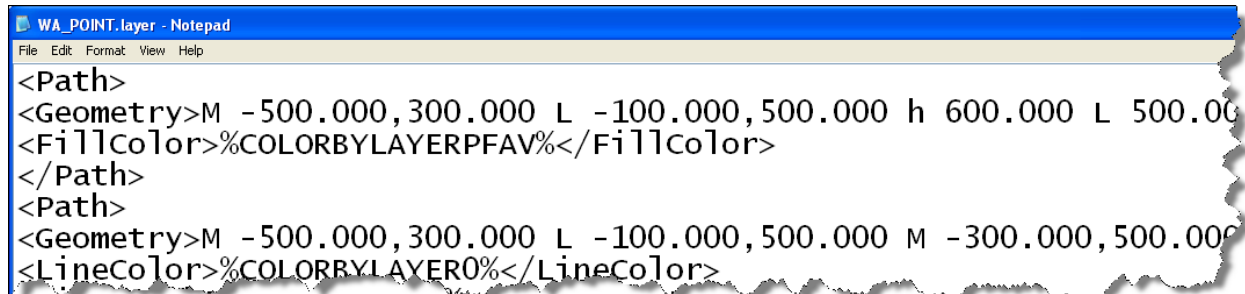


Figure 7. Style Point – Enhanced stylization

With enhanced stylization, the symbol has an XML description directly in the \*.layer file without pointing to a block reference in a DWG. In other words, suppose you have a symbol coming from a DWG; the description of the symbol is stored in the \*.layer file as an XML definition.

In the figure below, the XML definition is shown.



```

WA_POINT.layer - Notepad
File Edit Format View Help
<Path>
<Geometry>M -500.000,300.000 L -100.000,500.000 h 600.000 L 500.000
<FillColor>%COLORBYLAYERPFAV%</FillColor>
</Path>
<Path>
<Geometry>M -500.000,300.000 L -100.000,500.000 M -300.000,500.000
<LineColor>%COLORBYLAYER0%</LineColor>

```

Figure 8. Point layer with enhanced stylization

The export converts the XML symbol representation as a block. The block in the output DWG will be created with a name like “Symbol1\_x”.

### 4.1.3 Summary recommendations

#### *Standard vs. Enhanced stylization*

The use of standard stylization for points is recommended.

If you use enhanced stylization, please keep in mind that the AutoCAD blocks that you use for symbolization are translated into symbols and stored in the layer definition. When you export to DWG, the AutoCAD blocks will be recreated from the symbols. There may be some differences between the original AutoCAD block and the recreated version.

Please consider that enhanced stylization allows configuring Feature Text Labels and Feature Text Symbols (2<sup>nd</sup> and 3<sup>rd</sup> tab on the editor – [see Figure 7](#)). The enhanced capabilities won’t be considered in the export process, because they rely on stylization which can’t be adequately mapped to AutoCAD.

#### *Size Context*

It is recommended to work with **Map space** as Size Context. This is true for enhanced and standard stylization.

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## 4.2 Style Line

### 4.2.1 Standard stylization

In the Style Line window, you can specify the line thickness, color, and pattern for line features.

The figure below shows the properties for standard stylization. Note that in this case, the thickness of lines is always specified in Device space.

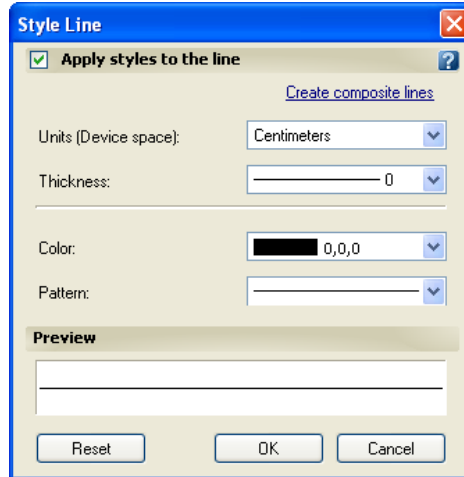


Figure 9. Style Line – Standard Stylization

#### 4.2.1.1 Line Pattern

Display Manager: Line Pattern

The line patterns shown in the **Pattern** combo box of the Style Line dialog are fixed patterns. These are similar to (but not necessarily exactly the same as) the AutoCAD line types in the *acad.lin* file.

Note that changing the linetype patterns which are included in *acad.lin* file won't change the way the lines are displayed in the Display Manager layers of Map 3D/Topobase. This is because Map 3D/Topobase uses a more sophisticated line type engine where the linetype patterns have another definition than the line type definitions of AutoCAD's linetype engine. Both engines are independent of each other, and this is the reason that changes of one line type definition will not impact the definition of the other engine.

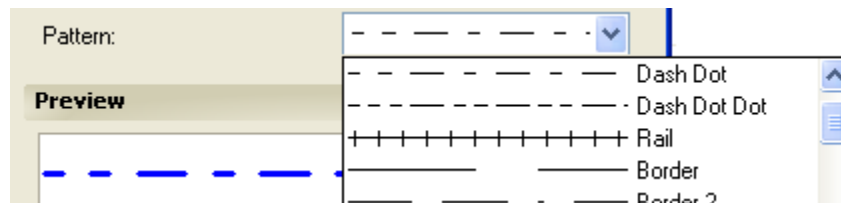


Figure 10. Display Manager - Pattern



Let's take the Dash Dot pattern as an example. In the Pattern combo box, the definition is shown as in the figure above. Let's say you assign this pattern to a line layer in the display manager. The line appears as shown in the figure below:

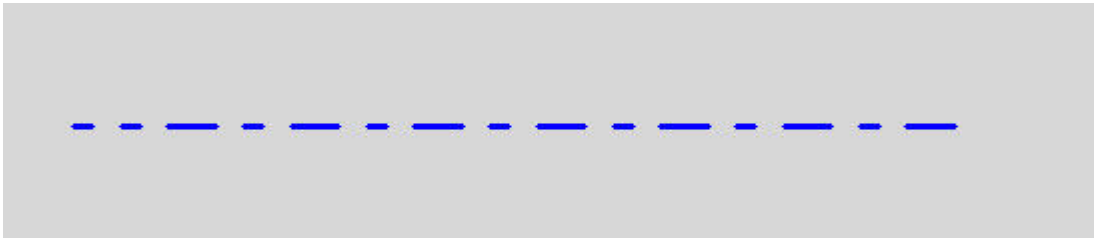


Figure 11. Line displayed with Dash Dot pattern

### AutoCAD: Line type

Now you execute the command **tbexportdwg** to export the line to DWG. During the export, a polyline is created from the line and it has a Linetype = DASHDOT. The line is displayed as shown in the figure below:



Figure 12. Polyline with DASHDOT line type

There is a slight difference between both displays. This is because the DWG has its styles based exactly on the *acad.lin* file definition and, as explained before, the display manager line patterns are generated programmatically.

In the *acad.lin* file, the definition for **Dash Dot** is described like this:

```
*DASHDOT, Dash dot  _ . _ . _ . _ . _ . _ . _ . _
A, .5, -.25, 0, -.25
```

where:

The first line represents the pattern name and the description that should be displayed.

The second line is a series of codes separated by commas, starting with an 'A':

- A** = forces the line to align between two endpoints
- .5** = a positive number represents a dash of the length specified
- .25** = a negative number represents a space of the length specified
- 0** = a zero represents a dot

The pattern is: a dash (0.5 units long), a space (0.25 units long), a dot, a space (0.25 units long).

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## 4.2.1.2 Composite line styles

A composite line style is created by superimposing lines. This type of line can be created by selecting the **Create composite lines** option in the Style Line dialog.

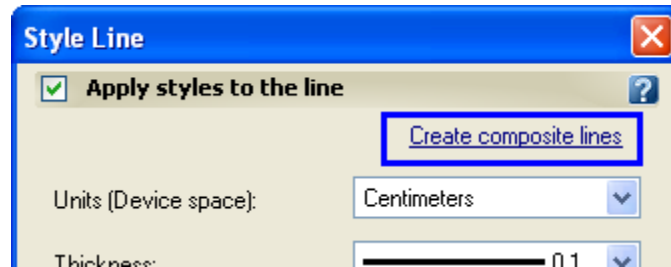


Figure 13. Create composite line styles

An example of two superimposed lines is shown below.

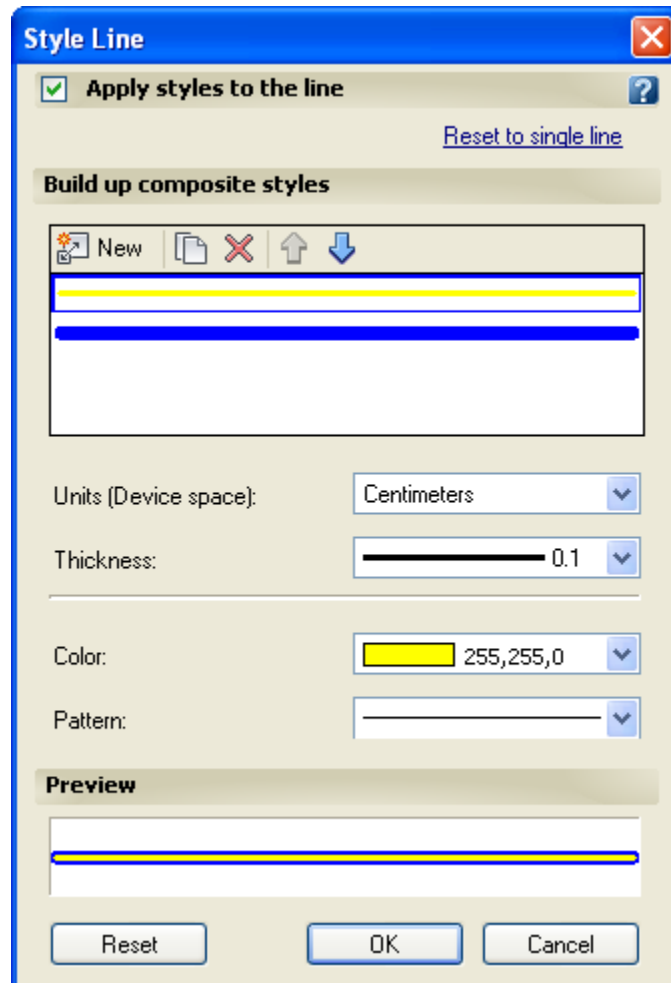


Figure 14. Composite line styles

The export to DWG of a line with standard stylization and composite line styles generates as output as many polylines as were defined in the composite line. In the example above, the output would be two polylines to maintain the visual fidelity.

The AutoCAD MLine object does not support arcs, therefore the composite lines are exported as Polylines not MLines.

#### 4.2.2 Enhanced stylization

In the Style Line window, you can specify the line pattern, color, thickness, width, and height for line features. One of the main advantages of enhanced stylization vs. standard stylization is the fact that you can also set the Size Context to Map units. Device Size Context does not exist in AutoCAD and this is why the export's result will provide better visual fidelity when you choose Map Space as Size Context. This is also one of the reasons enhanced stylization is recommended.

The figure below shows the properties for enhanced stylization.

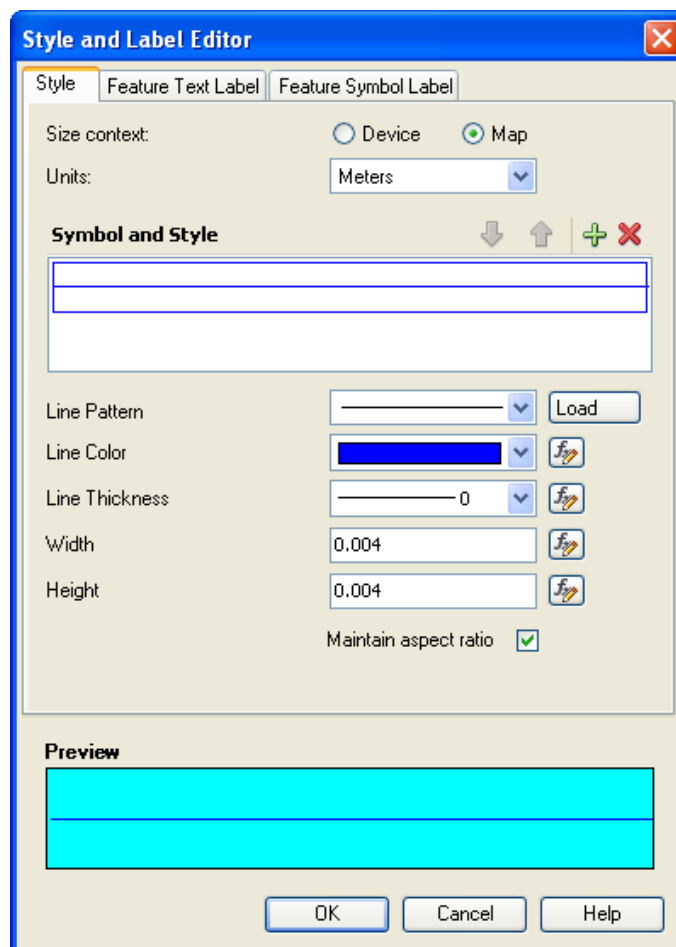


Figure 15. Style Line – Enhanced stylization

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## 4.2.2.1 Size Context

It is recommended to use Map Space for lines. Device space is not supported by AutoCAD.

## 4.2.2.2 Line Pattern

As explained before for standard stylization, the Line Pattern combo box shows the list of available patterns that are equivalent to the ones listed in the *acad.lin* file. The main difference with standard stylization is that you could load new patterns coming from a line style file (*\*.lin*), a symbol library (*\*.layer*), or a vector symbol (*\*.xml*). For export to DWG, only styles loaded from a *\*.lin* file are applied.

### Load \*.lin file

This section explains how to import line patterns from a *\*.lin* file. You could add new patterns in the *acad.lin* file or in a manually created *\*.lin* file.

The *\*.lin* files are normally stored under *C:\Documents and Settings\username\Application Data\Autodesk\Autodesk Topobase Client 2010\R18.0\enu\Support*.

Let's say you manually created a *test.lin* file with one pattern *DASH3DOT*. The contents of the file are shown below:

```
;; [CODE_PAGE] ANSI_1252  
*DASH3DOT,Dash 3dot ___...___...___...___...___...___...  
A, .5, -.25, 0, -.25, 0, -.25, 0, -.25
```

In the **Style and Label Editor** window, click **Load**. Then click **Import** in the **Select a Symbol in the Repository** window. Browse to the path where the *test.lin* file is stored and select it. The line styles are loaded. Select *DASH3DOT* and click **Open**.

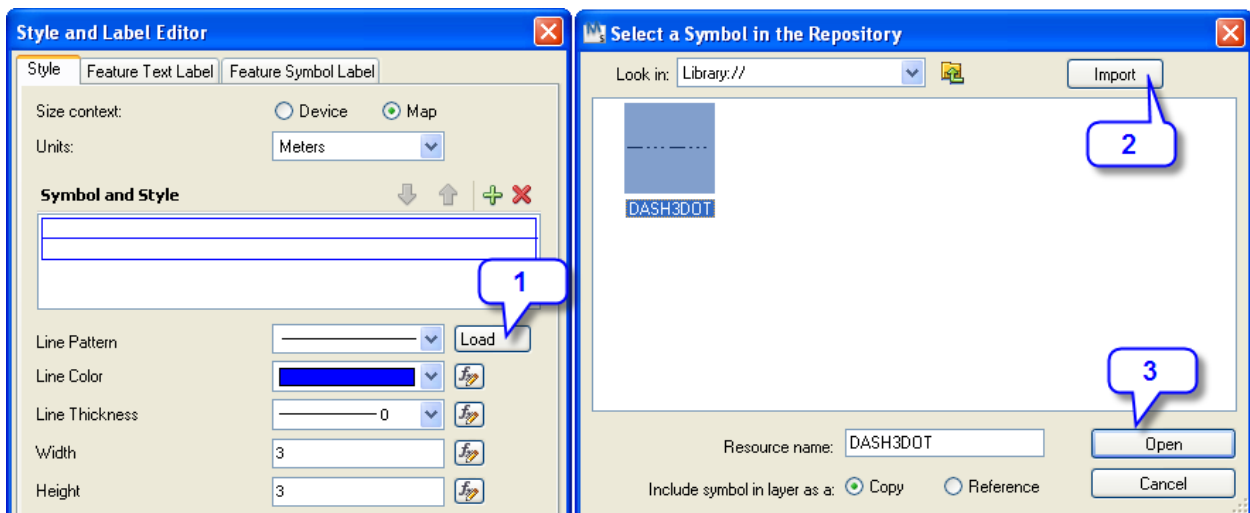


Figure 16. Load \*.lin file

The new pattern is assigned to the line in the Display Manager. Once you save the display model, the path of the *test.lin* file is stored in the *\*.layer* file. During the export, the corresponding line pattern is loaded from this *\*.lin* file and assigned to the Linetype property of the Polyline.

Another way to add new patterns is to directly modify the *acad.lin* file by adding the new line styles at the end of the file. Note that the display manager patterns are fixed; therefore you would have to follow the same procedure described above and load the *acad.lin* file to be able to see the new customized line styles.

### AutoCAD Complex Line types

A complex line type includes text characters or embedded shapes in the line pattern. On the left side of the figure below, the display in Map 3D of the HOT\_WATER\_SUPPLY line pattern that has an embedded text is shown. On the right side, you can see the resulting DWG.



Figure 17. Line types with embedded texts

As seen in the figure, the AutoCAD stylization does not render the embedded text at the same width as the line. This is because Map 3D and AutoCAD have a different interpretation of the texts.

For more information on how AutoCAD complex line types are defined in the *acad.lin* file, see the [Appendix](#).

#### 4.2.2.3 Line thickness

It is recommended to use enhanced stylization and Size Context Map Space. In this case, Topobase 2010 Update 2 plus the DWG Export Hotfix map the Map's line thickness to the polyline width value.

#### 4.2.2.4 Width and Height

You get the best visual fidelity results if you keep “Maintain aspect ratio” enabled all the time. See the figure *Style Line – Enhanced stylization* (Figure 15).

### 4.2.3 Summary recommendations

#### *Standard vs. Enhanced stylization*

Working with enhanced stylization is recommended, because standard stylization supports only device space which is not available in AutoCAD.

#### *Size Context*

It is recommended to use Map space for lines.

#### *Line pattern, Width, and Height*

The exported DWG file will always use the line type definition as described in the *acad.lin* file. Therefore, to be sure about how lines are displayed in a DWG, always refer to this file.

For enhanced stylization, it is possible to load line patterns from a *\*.lin* file in the Display Manager. The pattern is applied when exporting to DWG.

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Topobase 2010 Update 2 plus the DWG Export Hotfix has improved how the line patterns are applied using enhanced stylization and Map Space for Size Context.

Additionally, do not change the aspect ratio of line patterns; keep the “Maintain aspect ratio” checkbox on the Style tab enabled.

## Linetype generation

If you want the line pattern to be evenly distributed along the polyline, you need to set the property **Linetype generation** to **Enabled** in the polyline properties. Using Topobase 2010 Update 2 plus the DWG Export Hotfix, this property is always set to **Enabled** by default for all polylines.

Note that the *plinegen* system variable does not affect the behaviour of the export to DWG application. Therefore, the Linetype generation property is always set to **Enabled** regardless of the *plinegen* value.

For more information on the visual effects of the Linetype generation, see the [Appendix](#).

## 4.3 Style Polygon

### 4.3.1 Standard stylization

In the Style Polygon window, you can specify the fill pattern, transparency, foreground, and background color of polygon features, as well as setting the line pattern, thickness, and color of their boundaries.

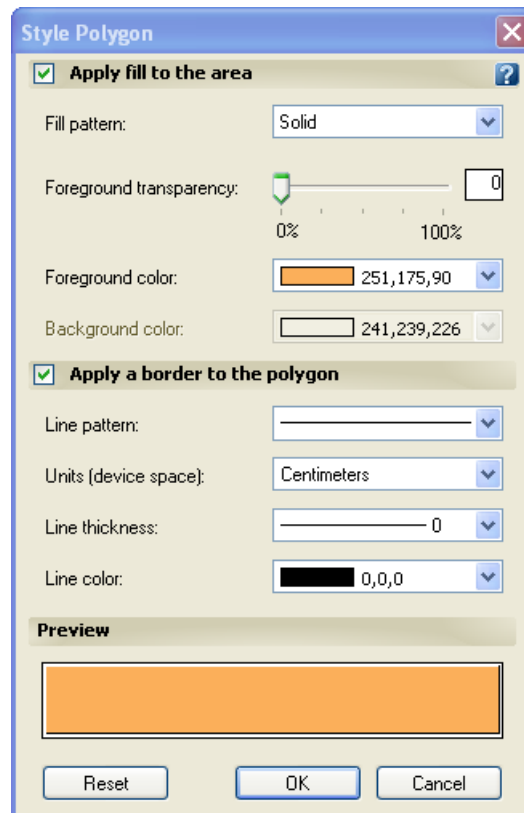


Figure 18. Setting parameters in the Style Polygon window

Note that, while it is reasonable that the areas themselves are always displayed in Map space, the thickness of their boundary lines are always specified in Device space.

#### 4.3.1.1 Fill pattern

As with line patterns, the fill pattern of the hatch in the DWG corresponds to the patterns defined in the *acad.pat* file. Therefore, the polygons will be displayed as defined in this file.

#### 4.3.1.2 Foreground transparency

Since transparency is not supported by AutoCAD 2010, the transparency is ignored during the export.

Note that AutoCAD 2011 supports transparency; therefore the Topobase export to DWG considers the polygon fill transparency as well.

### 4.3.2 Enhanced stylization

In the Style and Label Editor window, you can specify the properties of the polygon boundary and the fill pattern. For the boundary line, you can specify pattern, color, thickness, width, and height. For the fill, you can set the pattern, color, width, and height.

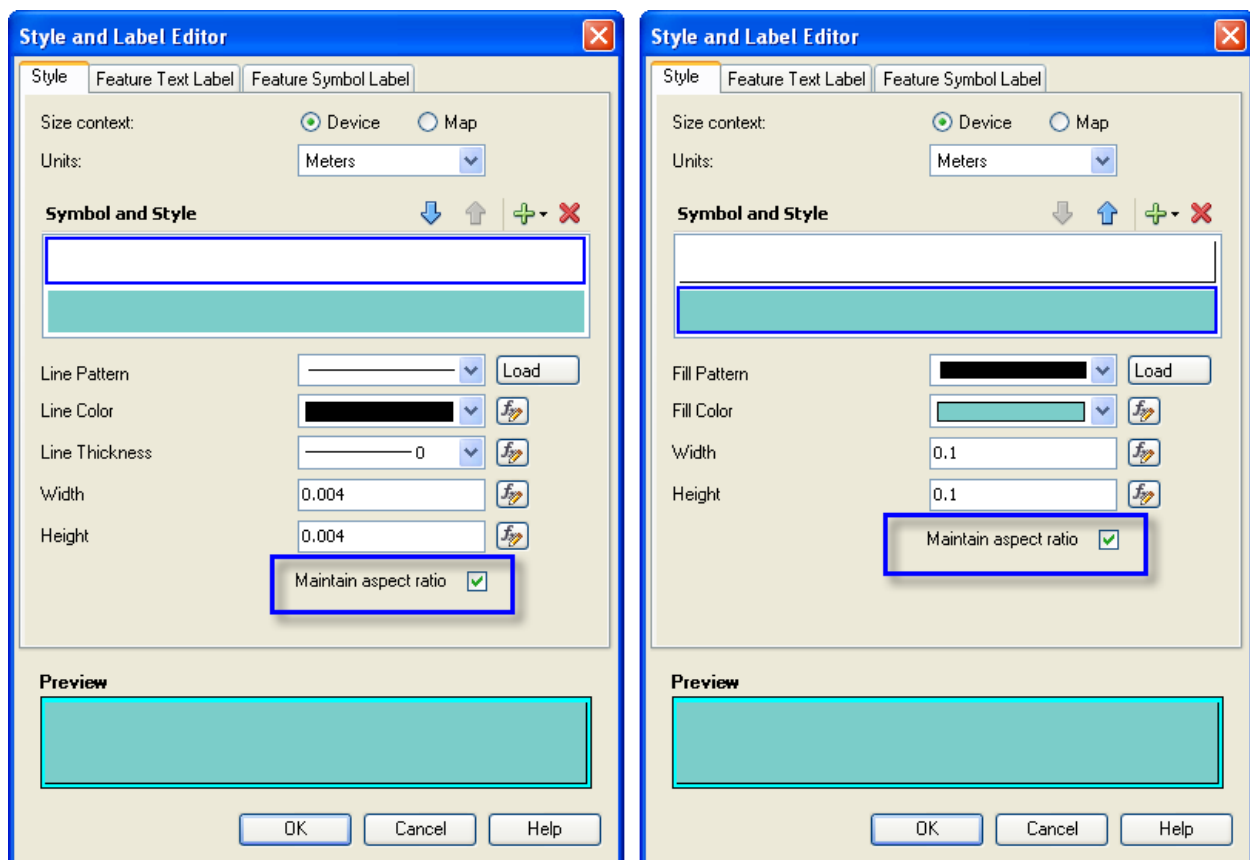


Figure 19. Style Polygon – Enhanced Stylization

#### 4.3.2.1 Size Context

It is recommended to use Map Space for both the border and fill area of the polygon.

# Autodesk

## 4.3.2.2 Width and height

You obtain the best visual fidelity results if you keep “Maintain aspect ratio” enabled all the time. See the previous figure. This applies to the line pattern which represents the polygon border and to the fill pattern itself.

## 4.3.2.3 Fill pattern

Area fill patterns can be imported from a \*.pat file. The path of this file is stored in the .layer files. In the same way as with line patterns, the corresponding area fill patterns are loaded from the \*.pat file during the export.

It is recommended to use enhanced stylization and, as mentioned before, Map Space for Size Context. In this case, Topobase 2010 Update 2 plus the DWG Export Hotfix properly exports the hatch pattern scale.

Using enhanced stylization, it is possible to create more than one fill pattern for polygons. For example, a polygon can have a solid fill and a hatch pattern. In this version, it is not recommended to use enhanced stylization with multiple fill patterns.

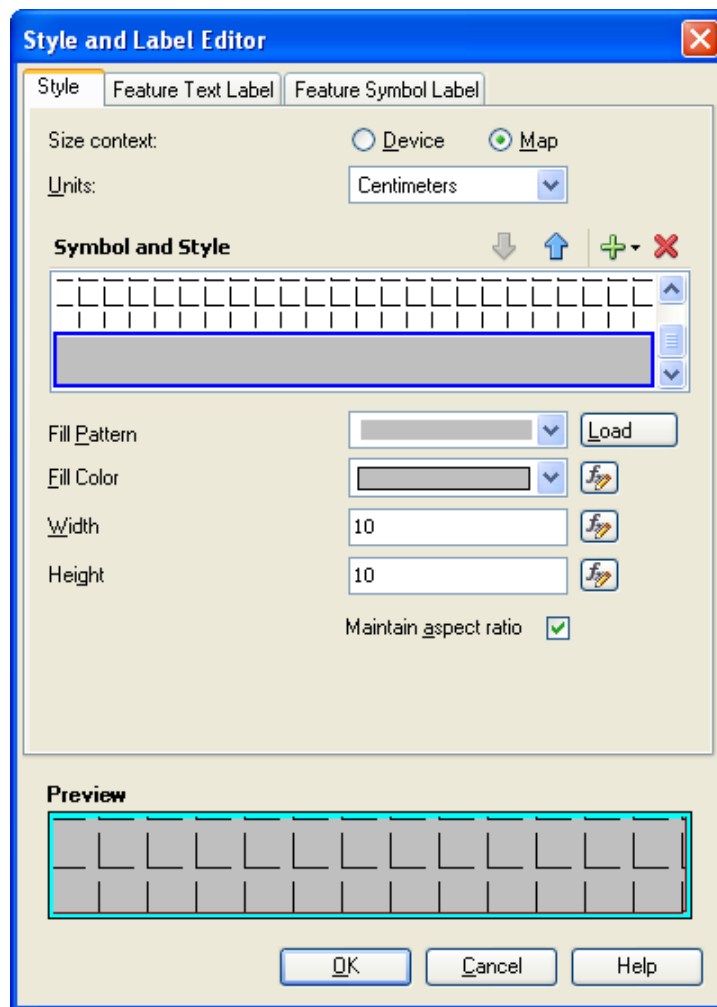


Figure 20. Style Polygon – More than one fill pattern



### 4.3.3 Summary recommendations

#### ***Standard vs. Enhanced stylization***

Use Enhanced Stylization.

#### ***Size Context***

Use Map Space for both the border and fill area of the polygon.

#### ***Width and Height***

Make sure that the “Maintain aspect ratio” checkbox is always enabled when you configure the border style (line) and the fill style (polygon).

#### ***Fill Pattern***

The fill pattern of the hatch in the DWG corresponds to the patterns defined in the *acad.pat* file. Therefore, the polygons will be displayed as defined in this file.

For Enhanced Stylization, area fill patterns can be imported from a *\*.pat* file. During the export, the corresponding Area Fill Patterns are loaded from the *\*.pat* file and assigned to the resulting hatch.

Using enhanced stylization and Map Space for Size Context, Topobase 2010 Update 2 plus the DWG Export Hotfix properly exports the hatch pattern scale.

## 4.4 Style label

### 4.4.1 Annotation layers vs. dynamic labeling/enhanced feature labels


Map 3D includes the option to create dynamic labels on any layer. These labels are generated based on the scale and number of features displayed on the map. Therefore, the position of the labels in the map is adjusted according to the space, and sometimes the labels may not be rendered due to lack of space.

Conversely, Topobase labels are stored as point features containing the text to be displayed as an attribute. When these feature classes are added to the Display Manager, they should be added as annotation layers.

In general, it is recommended to use Annotation layers in Topobase when you work with Topobase Label Features. The same recommendation is true for the export to DWG functionality.

# Autodesk

## Annotation layers

Autodesk Topobase stores labels as special point feature classes which store not only the text to be displayed but also its orientation and offset relative to the feature being labeled. These labels are added to the Display Manager as Annotation layers. You can verify in the Display Manager that a label has been loaded as an Annotation layer by looking at the icon displayed next to the label layer (  ).

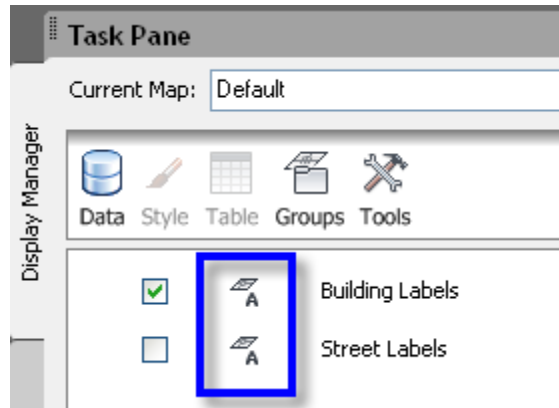


Figure 21. Annotation layer in the Display Manager

Note that if the label feature class name has the suffix `_TBL` (e.g. `LM_BUILDING_TBL`), the feature class is recognized as a Topobase label and loaded as an Annotation layer. Otherwise, the layer is loaded as a point layer.

The window below shows the properties that can be defined for a Topobase label:

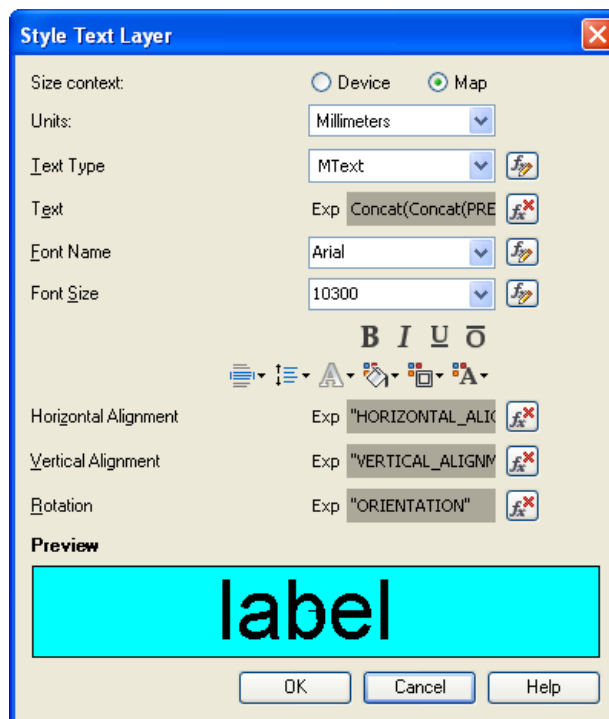


Figure 22. Setting parameters in the Style Text Layer window

## Size Context

It is recommended to use Map space.

## Text Type: Plain Vs Mtext

The output object of a label in the exported DWG is always a **Text**, not **MText** (even if in the display manager it was defined as **Mtext**). If the Text is wrapped over several lines, a Text entity is created for each line of text.

## Text Style

The export to DWG engine creates as many styles as there are different Annotation layers in the Display Manager, and assigns this to the **Style** property of the Text object.

## Font Size

Note that in the Display Manager the font size is equivalent to the font height. In AutoCAD, however, the height value is equivalent to the text height.


## Ghosting color

Ghosting color is not supported by AutoCAD. It is therefore not recommended to use it for export purposes.

## Frames

When you export a label with frame, the output will be a Text and a Hatch representing the frame. If the frame has a border, it is exported as a Polyline.

## ***Dynamic labels (Standard stylization)***

You can access Map 3D dynamic labels in the Style Editor window of a point, line, or polygon by clicking the icon (  ) under Feature Label.

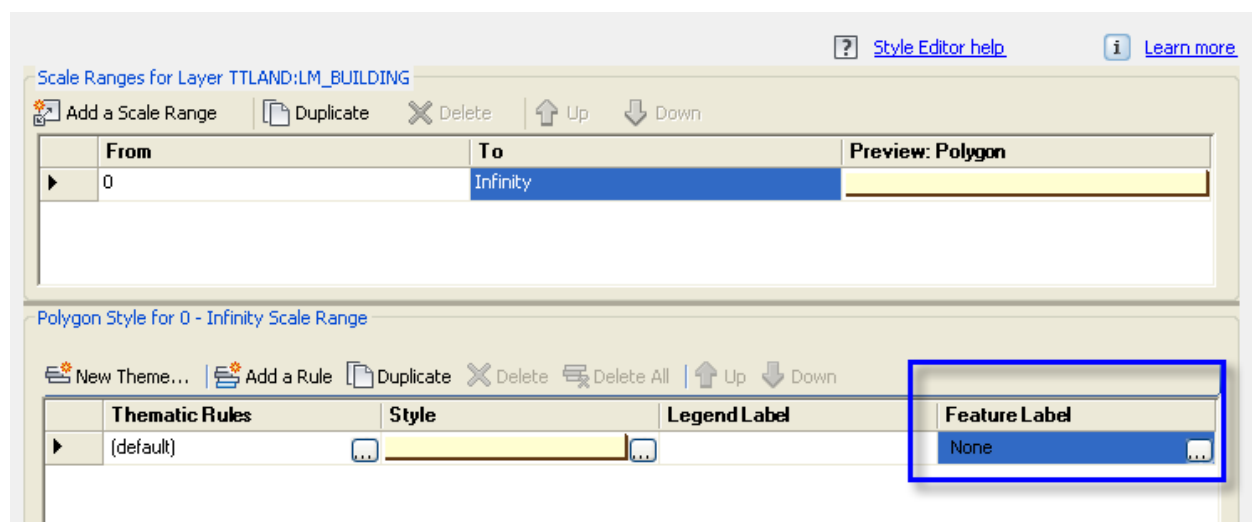


Figure 23. Dynamic labeling – Standard Stylization

# Autodesk

The Style Label window is shown in the figure below. The **Property to display** is the attribute that will be shown as label.

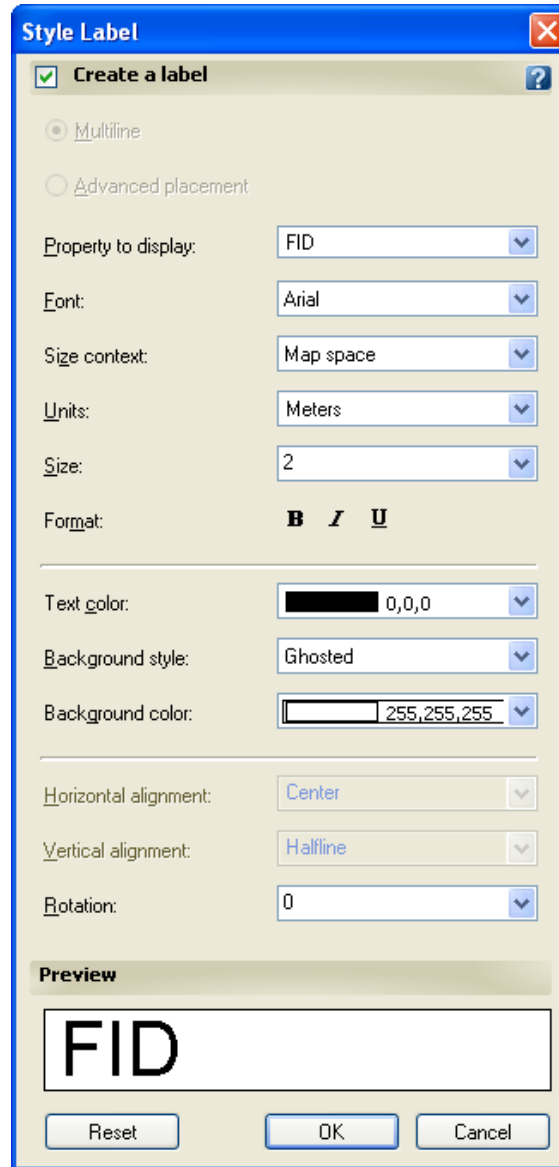


Figure 24. Dynamic labeling - Style Label window

Use of this type of label is not recommended for the export to DWG because Map 3D has a threshold of 2000 labels for the generation of labels. Therefore, if you have a larger number of labels, they will not be included in the exported DWG.

For more information about the threshold, visit <http://support.autodesk.com/getdoc.asp?id=TS1077666>.

#### 4.4.2 Enhanced stylization labeling

Topobase's enhanced stylization provides additional options for labelling: Feature Text Labels and Feature Symbol Labels. These labels are available as additional tabs in any of the style windows for enhanced stylization of points, lines, or polygons. The figure below shows the **Feature Text Label** tab of a Point layer.

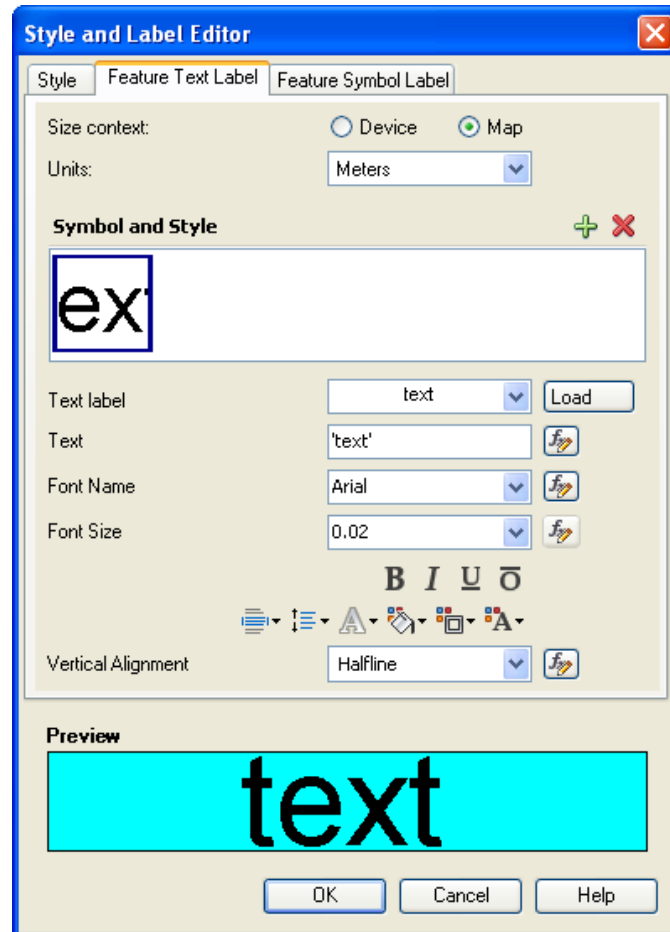


Figure 25. Enhanced stylization labeling – Feature Text Label window

Feature Text Labels are very similar to dynamic labels, and their use is therefore not recommended. Feature Symbol Labels are also dynamically created and placed, and their use is similarly not recommended.

#### 4.4.3 Summary recommendations

##### **Size Context**

It is recommended to use Map space for labels.

# Autodesk

## *Annotation layers vs. Dynamic labeling*

It is recommended to use Annotation layers because:

- The position of the label on the drawing is the same as the stored geometry of the label
- You can select them without having the need to display the point as a symbol (general advantage)
- You can configure frame fill, border color, frame fill color, etc.
- You do not have the threshold limitation on the number of labels
- You do not have overposting when you plot, as whitespace is managed manually for non-autogenerated labels
- You can use Mtext opcodes for your labels, for example, allowing multi-line labels
- You can use sophisticated SQL queries (including related features) to compose the label text
- Label text can have individual prefix and suffix values per label
- There can be multiple labels per feature – even point features
- Labels can easily be turned off by turning off the layer

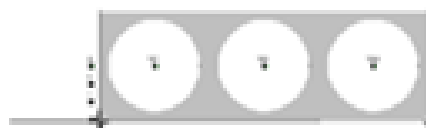
## *Enhanced stylization labeling*

Enhanced styles labelling is not supported by export to DWG.

### **4.5 Collection feature classes**

A collection feature class can comprise points, lines and/or polygons. An example is the EL\_CS\_DECORATION feature class from the Electric data model that is used to represent the cross sections.

In the figure below, the EL\_CS\_DECORATION feature class is used to represent the lines and the polygon of the cross section.



*Figure 26. Collection feature class*

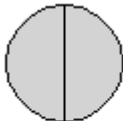
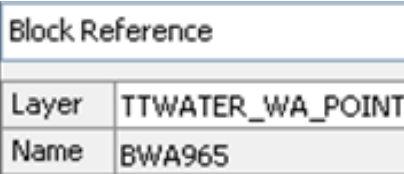
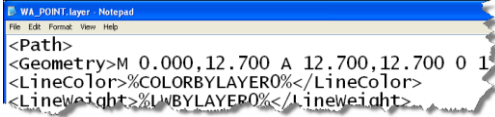
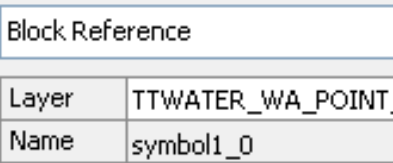
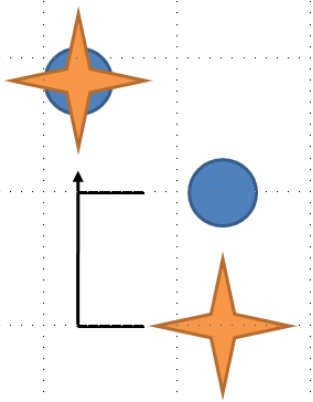
#### **4.5.1 Summary recommendations**

Topobase 2010 Update 2 and earlier versions do not completely export collection feature classes using enhanced stylization. It is therefore recommended to work with standard stylization for collection feature classes in these versions.

Topobase 2010 Update 2 plus the DWG Export Hotfix addresses this problem, allowing the export of collection feature classes with enhanced stylization.

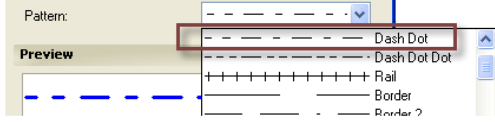
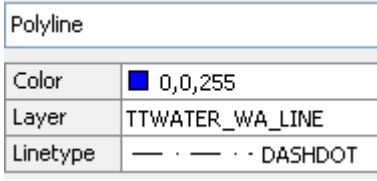


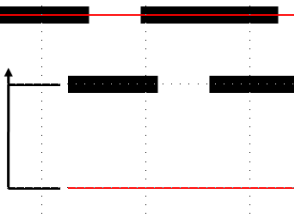
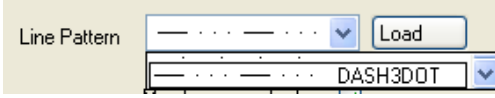
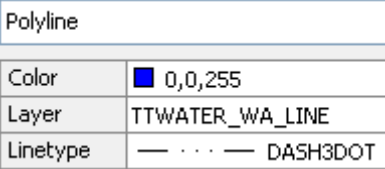
4.6 Summary export result

4.6.1 Points

Points		
Display manager		Export result
Stylization	Layer type	AutoCAD object
Standard	Point layer with Block Reference  BWA965	Block Reference 
Enhanced	Point layer with block as XML definition 	Block Reference 
Enhanced	Multiple symbols. i.e: Two combined point symbols 	Multiple Block References


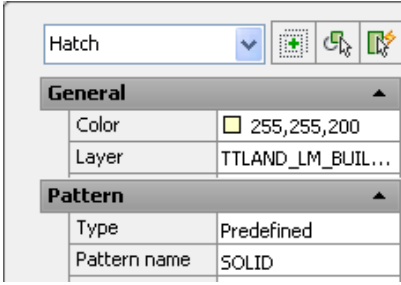
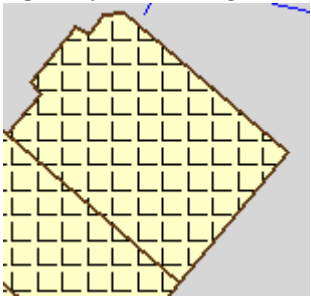
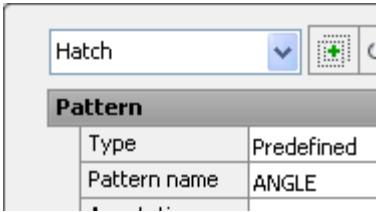
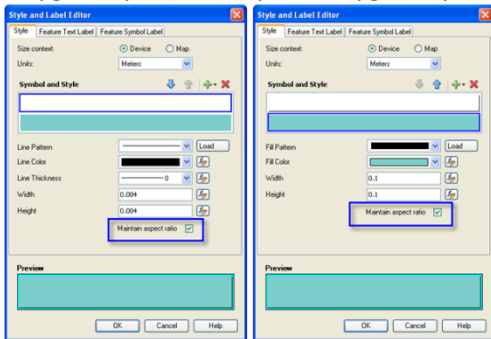
# Autodesk

## 4.6.2 Lines

Lines		
Display manager		Export result
Stylization	Layer type	AutoCAD object
Standard/ Enhanced	Line layer with existing line pattern  i.e Pattern= <i>Dash Dot</i>  	Polyline  
Standard/ Enhanced	Line pattern with embedded texts  	Polyline    AutoCAD does not support thickened symbols inside line definitions.
Standard	Composite Line style (e.g. 2 lines)  	2 Polylines
Enhanced	Line Layer with pattern loaded from external *.lin file  e.g. Line Pattern = <i>DASH3DOT</i>  	Polyline  






4.6.3 Polygons

Polygons		
Stylization	Display manager	Export result
	Layer type	AutoCAD object
Standard	Polygon layer e.g. Fill pattern= <i>Solid</i> 	Polyline + Hatch 
Standard	Polygon layer e.g. Fill pattern= <i>Angle</i> 	1 Polyline + 2 Hatch (SOLID and ANGLE) 
Standard	Polygon layer e.g. Fill pattern with transparency	Polyline + Hatch Transparency is lost; not supported by AutoCAD 2010
Enhanced	Polygon layer (Line Style + Polygon style) 	Polyline + Hatch

# Autodesk

## 4.6.4 Labels

Labels		
Display manager		Export result
Stylization	Layer type	AutoCAD object
Standard/ Enhanced	Map 3D Dynamic labeling	Text  (Map3D has a threshold of 2000 labels for the generation of labels.)
Standard/ Enhanced	Annotation layers  	Text  The export to DWG engine creates as many text styles as there are different Annotation layers in the Display Manager.  If the Text is wrapped over several lines, a Text entity is created for each row.
Standard/ Enhanced	Annotation layer with Frame without border  	Text + Hatch

Labels		
Display manager		Export result
Stylization	Layer type	AutoCAD object
Standard/ Enhanced	Annotation layer with Frame with border 	Text + Hatch + Polyline for border
Enhanced	Feature Text Labels/ Feature Symbol labels	Not supported

## 5 Miscellaneous

### 5.1 XData

The Topobase export is designed to export feature attributes as XData. XData can be listed in AutoCAD using the command `xclist`.

### 5.2 3D features

The Topobase export is designed to also export 3D data. This means that lines are exported as 3DPolylines and points are exported with Z information.

## 6 Summary Recommendations

### 6.1 General information

General Info	
Property/ Functionality	Recommendation
Size Context	AutoCAD does not support Device space; hence it is generally recommended that you configure your stylization with Map Space as Size Context information.
Scale ranges	AutoCAD also does not support scale dependent stylization; therefore the export only considers the visible features from the current scale and with the corresponding style at that scale.
AutoCAD styles	Topobase/Map 3D's stylization engine is more sophisticated than AutoCAD's style engine. Therefore, the main rule for creating a display model which you want to export is: "Create a stylization based on styles which are supported by AutoCAD."

### 6.2 Point style

Point Style		
Stylization	Property/ Functionality	Recommendation
Standard vs. Enhanced		Using standard stylization for points is recommended. If you use enhanced stylization, you have to keep in mind that the AutoCAD blocks that you use for symbolization are translated into Symbols and stored in the layer definition. When you export to DWG, the AutoCAD blocks will be recreated from the Symbols. There may be some differences between the original AutoCAD block and the recreated version.
Standard/ Enhanced	Size Context	Use Map Space.
Enhanced	Feature Text Labels/ Feature Text Symbols	The enhanced capabilities will not be considered in the export process, because they rely on stylization which can't be adequately mapped to AutoCAD.

### 6.3 Line style

Line Style		
Stylization	Property/ Functionality	Recommendation
Standard vs. Enhanced		It is recommended to work with enhanced stylization, because standard stylization only supports Device space - which is not available in AutoCAD.
Enhanced	Size Context	Use Map Space.
Enhanced	Line Thickness	The Map's line thickness is mapped to the polyline width value when using Map Space for Size Context.

# Autodesk

Line Style		
Stylization	Property/ Functionality	Recommendation
Standard/ Enhanced	Line Pattern	The exported DWG file will always use the line type definition as described in the acad.lin file; therefore to be sure about how lines are displayed in a DWG always refer to this file.
Enhanced	Line Pattern	<p>It is possible to load line patterns from a *.lin file in the Display Manager. The pattern is applied when exporting to DWG.</p> <p>Do not change the aspect ratio of line patterns; keep the "Maintain aspect ratio" checkbox on the Style tab enabled.</p> <p>Note that Topobase 2010 Update 2 plus the DWG Export Hotfix has improved how the line patterns are applied using enhanced stylization and Map Space for Size Context.</p>

## 6.4 Polygon style

Polygon Style		
Stylization	Property/ Functionality	Recommendation
Standard vs. Enhanced		It is recommended to use Enhanced Stylization.
Enhanced	Size Context	Use Map Space for both the border and the fill area of the polygon.
Standard/ Enhanced	Fill Pattern	The fill pattern of the hatch in the DWG corresponds to the patterns defined in the acad.pat file.
Enhanced	Fill Pattern	<p>Area fill patterns can be imported from a *.pat file. During the export the corresponding Area Fill Patterns are loaded from the *.pat file and assigned to the resulting hatch.</p> <p>Using enhanced stylization and Map Space for Size Context, Topobase2010 SP2 plus the DWG Export Hotfix properly exports the hatch pattern scale.</p>
Enhanced	Width and Height	Make sure that the "Maintain aspect ratio" checkbox is always enabled when you configure the border style (line) and the fill style (polygon).
Standard/ Enhanced	Foreground transparency	Since transparency is not supported by AutoCAD 2010, the transparency is ignored during the export.
Enhanced	More than one	The use of more than one fill pattern with enhanced stylization is not

	fill pattern	recommended.
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## 6.4 Label style

Label Style		
Stylization	Property/ Functionality	Recommendation
Standard/ Enhanced	Size Context	Use Map Space.
Standard/ Enhanced	Annotation layers vs. Dynamic labeling	<p>The use of Annotation layers is recommended because:</p> <ul style="list-style-type: none"> <li>• The position of the label on the drawing is the same as the stored geometry of the label</li> <li>• You can select them without having the need to display the point as a symbol (general advantage)</li> <li>• You can configure frame fill, border color, frame fill color, etc.</li> <li>• You do not have the limitation with the threshold on number of labels</li> <li>• You do not have overposting when you plot since whitespace is managed manually for non-autogenerated labels</li> <li>• You can use Mtext opcodes for your labels allowing multi-line labels</li> <li>• You can use sophisticated SQL queries (including related features) to compose the label text</li> <li>• Label text can have prefix and suffix values individually per label</li> <li>• There can be multiple labels per feature – even point features</li> <li>• Labels can easily be turned off by turning off the layer</li> </ul>
Enhanced	Feature Text labels and Feature Symbol labels	Enhanced styles labeling is not supported by export to DWG.

# Autodesk

## 7 Appendix

### 7.1 AutoCAD complex line types

A complex line type includes text characters or embedded shapes.

Let's take two examples: the `FENCELINE1` line type with an embedded shape, and the `HOT_WATER_SUPPLY` with an embedded text.

In the `acad.lin` file, the definitions are described as follows:

```
*FENCELINE1,Fenceline circle ----0-----0-----0-----0-----0-----0---  
A, .25, -.1, [CIRC1,ltypeshp.shx,x=-.1,s=.1],-.1,1  
*HOT_WATER_SUPPLY,Hot water supply ---- HW ---- HW ---- HW ----  
A, .5, -.2, ["HW",STANDARD,S=.1,R=0.0,X=-0.1,Y=-.05],-.2
```

where:

- The first line represents the pattern name and the description that should be displayed.
- The second line is a series of codes separated by commas, starting with an 'A':

**A** = forces the line to align between two endpoints  
**.25** = a positive number represents a dash of the length specified  
**-.1** = a negative number represents a space of the length specified  
**CIRC1** = is the shape definition stored in the `ltypeshp.shx` file (this is a circle)  
**x, y** = offset of the text from the linetype definition vertex  
**s** = text scale factor  
**r** = text rotation relative to the line

### 7.2 Line generation for line types

When AutoCAD applies a line type, given the length and scale factor, it centers the pattern so it looks even at both ends. In the case of polylines that have several vertices, AutoCAD re-starts the pattern at each vertex.



The figure below shows an example for the DASHDOT linestyle. The polyline has three vertices, and the pattern has been re-started at the second vertex. In this case, the polyline corner looks like a continuous line.

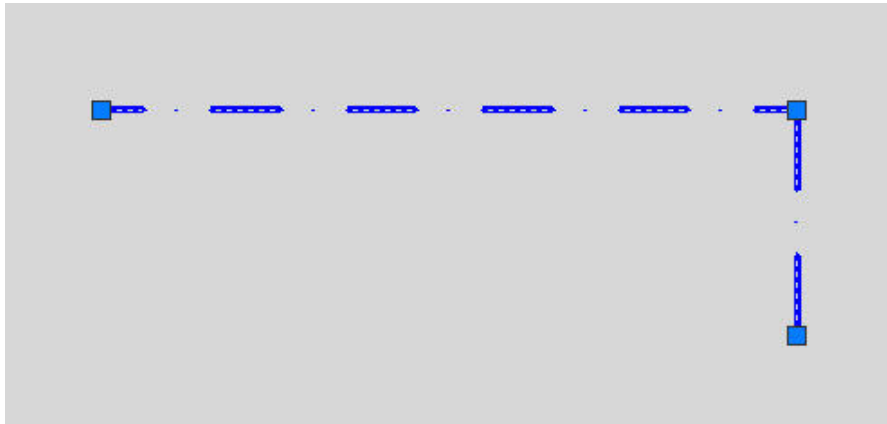


Figure 27. Example for the DASHDOT linestyle

It is possible to change this behaviour by changing the property **Linetype generation** of the polyline to **Enabled**.

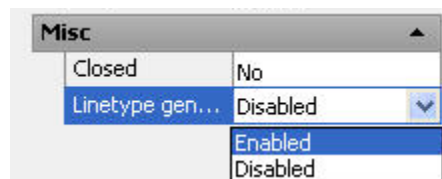


Figure 28. The property Linetype generation of the polyline is Enabled

In this case, AutoCAD applies the pattern from one end of the polyline to the other end.

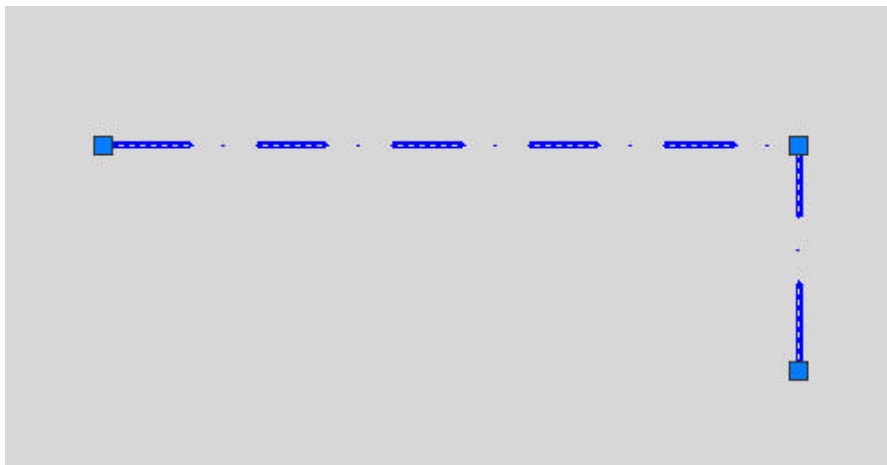


Figure 29. Example of DASHDOT linestyle with Linetype generation Enabled

Enabling the linetype generation can have a positive impact regarding visual fidelity. Topobase 2010 Update 2 plus the DWG Export Hotfix and later versions enable this property by default. If you work with Topobase 2010 Update 2, then the property is disabled.