Autodesk | Whitepaper

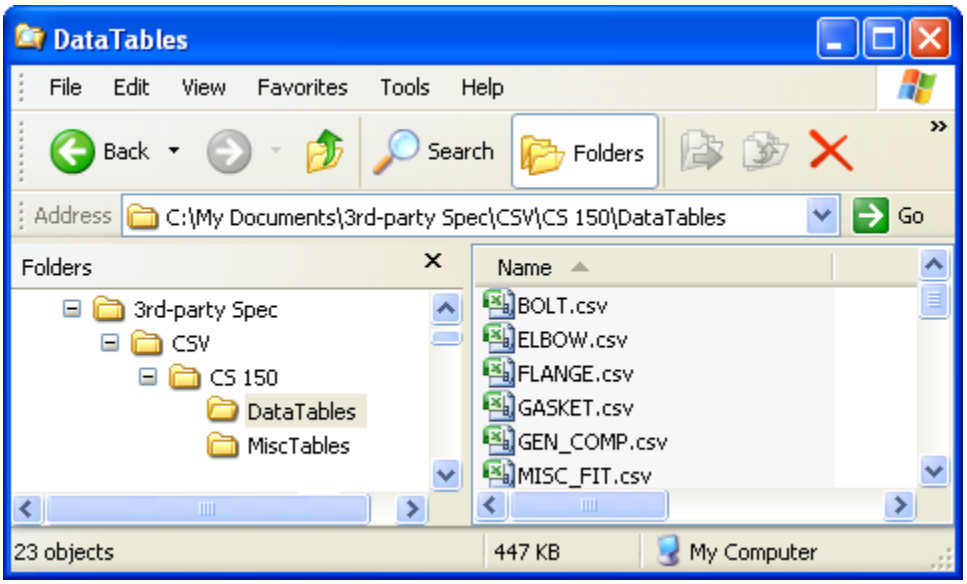
Migrating External Specs to AutoCAD Plant 3D

The workflow for migrating specs from 3rd-party software packages to AutoCAD Plant 3D is as follows:

Set Up the Required Folder Structure

Create a top-level folder with a name that you choose, for example, CS 150. Under this folder, create two subfolders, DataTables and MiscTables.

- DataTables—where CSV files listing all part data will reside
- MiscTables (not currently used—future location of branch table information, and so on)



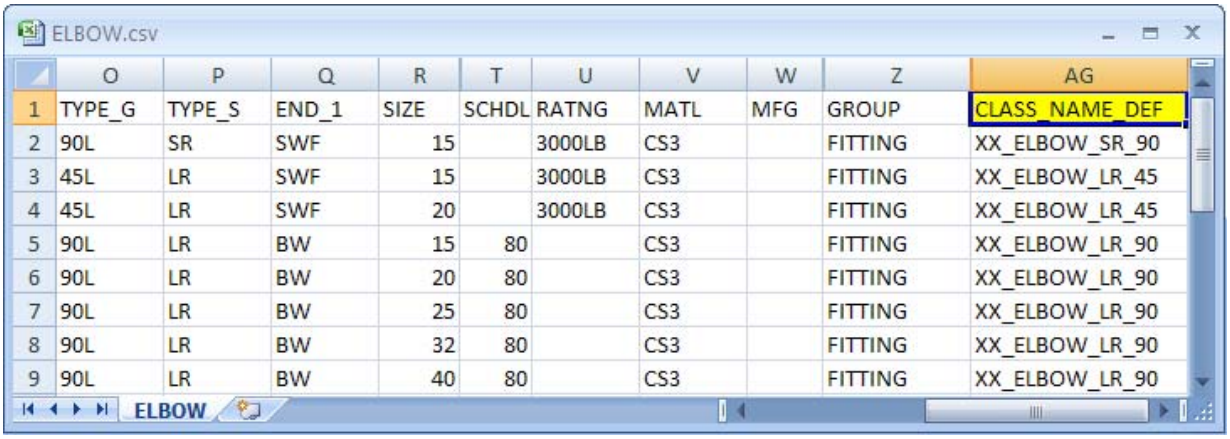
Build CSV Files Containing Part Information

The next task is to build CSV files that contain part and property information. You can build this file manually or write a routine to do so. The only required column heading is the property name CLASS_NAME_DEF.

The value in this required column uniquely identifies the part type and can be a name, a folder name combined with a standard name and a file name, or other combinations, depending on your current conventions. The only requirement is that the value identifies the part type.

The column headers for all other properties are optional; only the column header CLASS_NAME_DEF must be present.

Here is an example of small section of a CSV file containing property information for an elbow.


ELBOW.csv

	O	P	Q	R	T	U	V	W	Z	AG
1	TYPE_G	TYPE_S	END_1	SIZE	SCHDL	RATNG	MATL	MFG	GROUP	CLASS_NAME_DEF
2	90L	SR	SWF	15		3000LB	CS3		FITTING	XX_ELBOW_SR_90
3	45L	LR	SWF	15		3000LB	CS3		FITTING	XX_ELBOW_LR_45
4	45L	LR	SWF	20		3000LB	CS3		FITTING	XX_ELBOW_LR_45
5	90L	LR	BW	15	80		CS3		FITTING	XX_ELBOW_LR_90
6	90L	LR	BW	20	80		CS3		FITTING	XX_ELBOW_LR_90
7	90L	LR	BW	25	80		CS3		FITTING	XX_ELBOW_LR_90
8	90L	LR	BW	32	80		CS3		FITTING	XX_ELBOW_LR_90
9	90L	LR	BW	40	80		CS3		FITTING	XX_ELBOW_LR_90

ELBOW

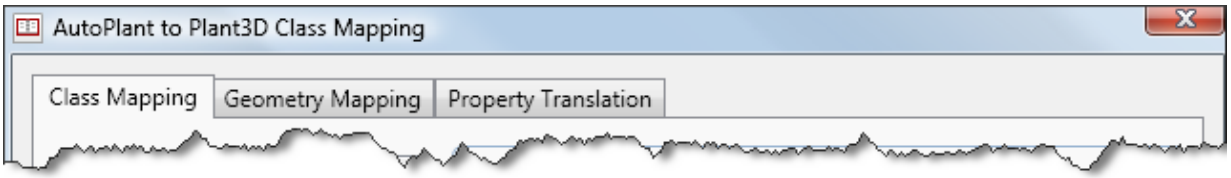
Map External Parts and Properties to Counterparts in Plant 3D

All mapping information is stored in the following files, located in C:\Program Files\Autodesk \AutoCAD Plant 3D *version*:

- Populated automatically as you supply information in the mapping dialog:
  - ATPToP3dClassMapping.xml
  - ATPToP3dGeometryMapping.xml
  - ATPToP3dUtilityMapping.xml

- Populated manually (see the section Build the file ATPToP3dMiscMapping.xml below):
  - ATPToP3dMiscMapping.xml

You can update/edit the first 3 files in the Specs and Catalogs application (File > Convert > Settings). As you enter information on each of the three tabs in the mapping dialog, the corresponding three xml files are updated (class, geometry, and utility/translation files).



However, the last file, ATPTo3dMiscMappings.xml must be edited manually. Before attempting to update these files, you must understand how mapping takes place in AutoCAD Plant 3D.

Overview of Conversion Mapping

In order to convert a spec successfully, you usually must adjust class mappings or add a class to be mapped. When adding classes or adjusting mappings, you must take **all** of the following actions:

- Map classes and properties to Plant 3D classes and properties, including general properties (long description, pressure class, and so on), some of which can be managed globally.
- Map class geometry to Plant 3D geometry (find shapes that are similar). For example, you can identify the number of connection ports and the type of end connection. Each class can have multiple mappings—a separate mapping for each end type, for example.
- Translate property values to make sure they can be understood by Plant 3D. For example, you can specify that Imperial measurements in the external application translate to Plant 3D inches.

Each activity takes place on a separate tab in the Plant 3D Class Mapping dialog box. The adjustments you make on these tabs are stored configuration files.

Note: If external specs include component types that AutoCAD Plant 3D specs do not, those component types, such as nozzles or pipe supports in the case of AutoPLANT, are reported as errors during conversion. To have these items ignored during conversion, you can add them to a configuration file (see Build the file ATPToP3dMiscMapping.xml below).

Understand Global vs Class Properties

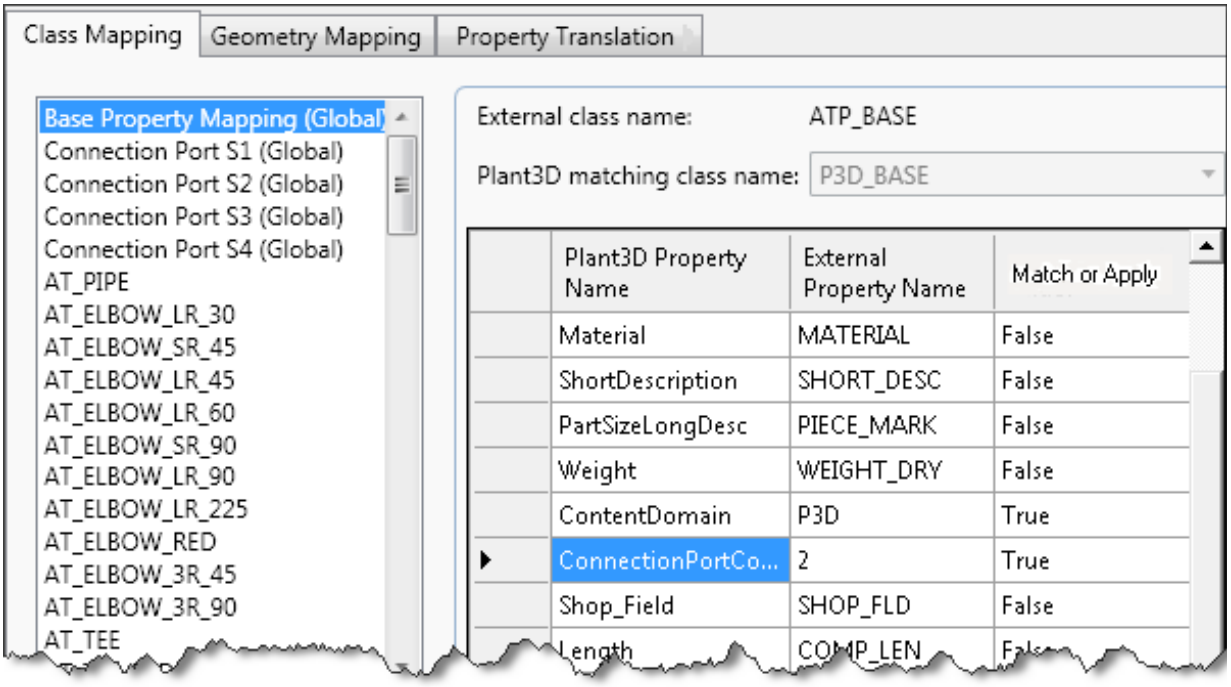
Global properties such as long description, pressure class, schedule, and so on, can be mapped once for all classes. Individual class properties, on the other hand, are mapped one-to-one to corresponding Plant 3D class properties.

Note: If the external spec has more than one property where Plant 3D has only one, you can use the [OR] operator. For example, for the Plant 3D property Engagement Length, you can specify PROPERTYNAMEA [OR] PROPERTYNAMEB. EngagementLength is mapped to whichever property contains a value.

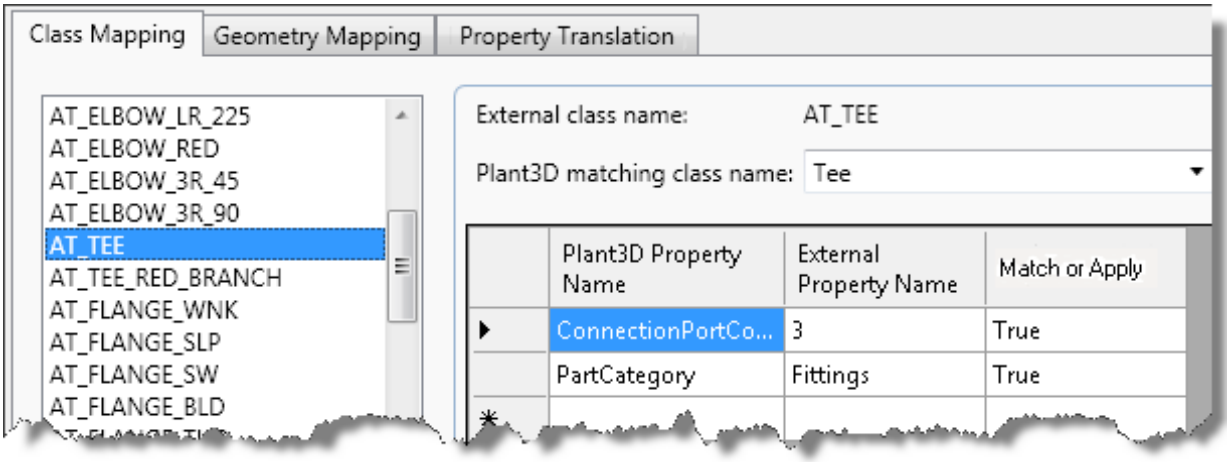
Following is a further explanation of each mapping activity.

Override Global Properties

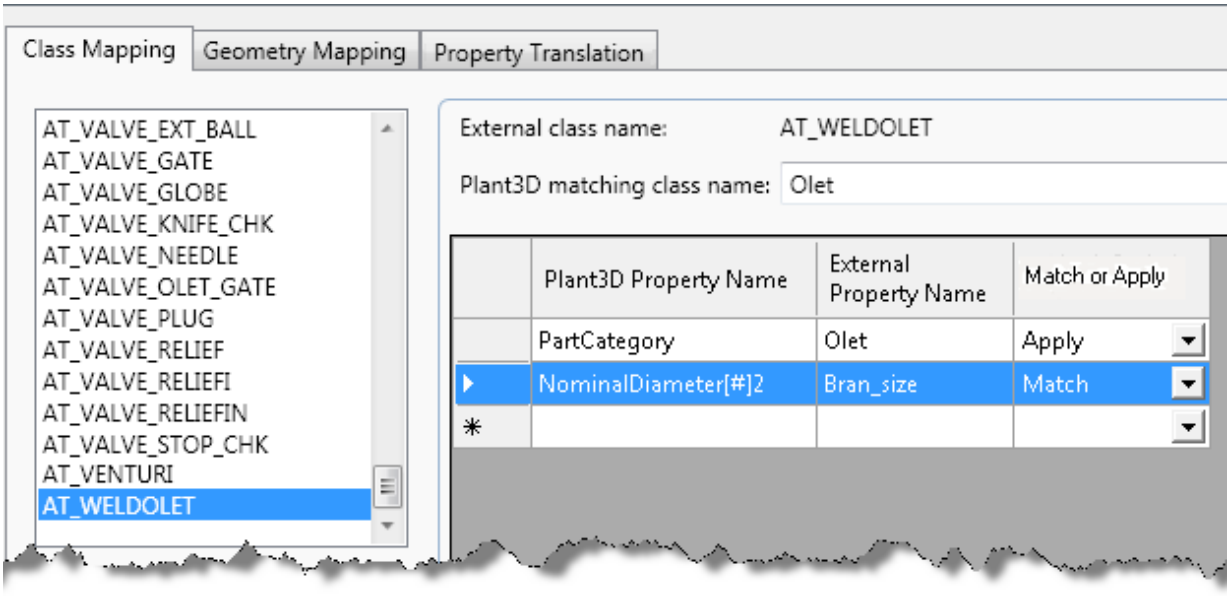
Individual class property mappings take precedence over global mappings. In the Plant 3D Class Mapping dialog box, for example, the global mapping for ConnectionPortCount is 2.



If the AT_TEE also defines this property, its property value is used. For example if the AT_TEE property ConnectionPortCount is set to the value 3, this value overrides that of the global mapping. In this case, all other classes would have the value 2; only AT_TEE would have the value 3.

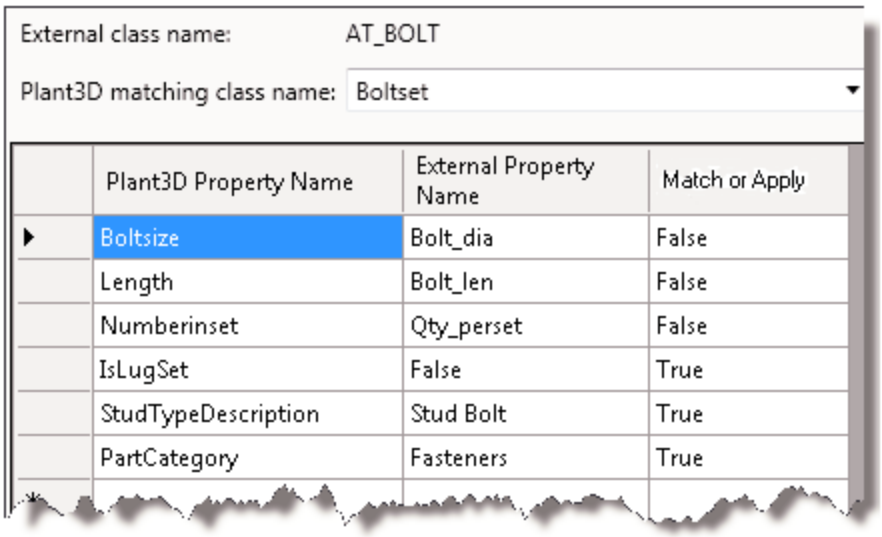


You can use the [#] operator to override the global connection port properties for a specific port number. In the following example, the global mapping for connection port 2 is overridden for Olets. In this case, the property NominalDiameter for port 2 is mapped to Bran_size.



Match or Apply

When you map properties, you can either match them and mirror their values or apply specific constant values. Following are examples of both methods.



The AT-BOLT AutoPLANT bolt-dia property is mapped/matched to the Plant 3D property Boltsize. However, the Plant 3D value “Fasteners” is applied to the PartCategory property. In this example, Bolt-dia is *matched* as a property, but Fasteners is *applied* as a property value.

Map Class Geometry

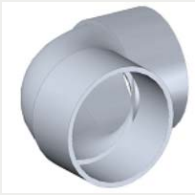
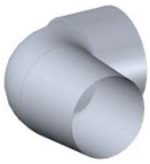
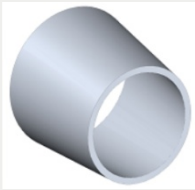
Once you have added a class to the Class Mapping tab, you must also add it to the class list in the geometry tab for conversion to be successful.

You can specify a 3D shape to use and map the parametric dimensions to size it accurately. In other words, you are describing what each class should look like in the model.

Note Some classes such as bolts have no graphics in the model and thus no mapped geometry information. For conversion purposes, such classes must be listed on the Geometry Mapping tab nevertheless.

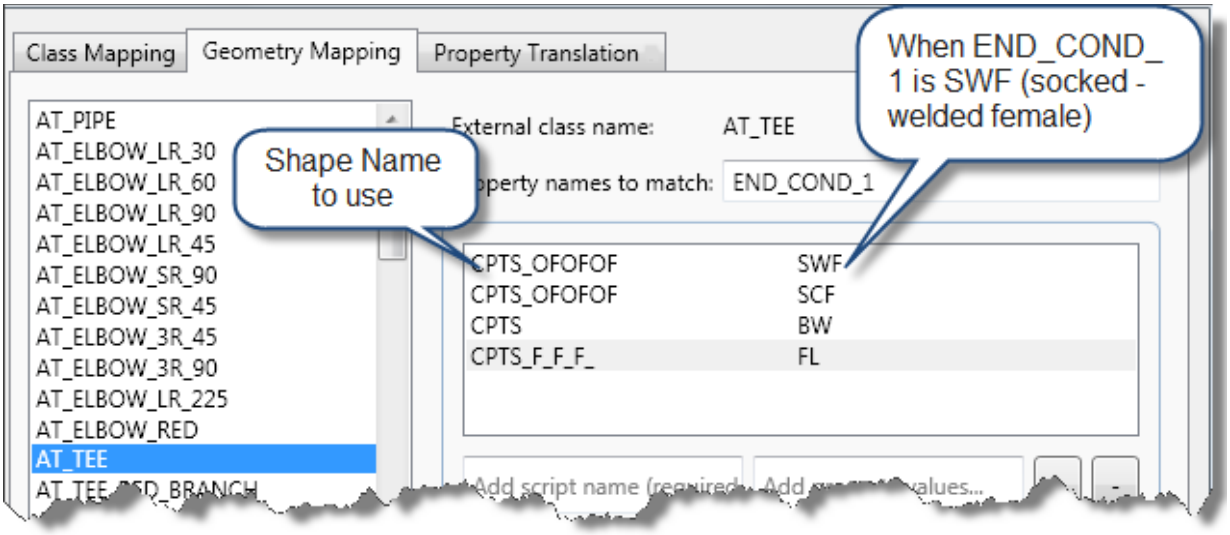
Plant 3D shapes have defined connection ports. They also have names that help identify the end type, and these names are appended to the script name. Shape names without an underscore extension are buttwelded/beveled, and can often accommodate flanges as well. Shape names ending with _OF indicate that the port has threaded female or socketweld female ends. Shape names ending with _OM indicate that the port has threaded male or socketweld male ends.

Following are examples of commonly-used graphic scripts:

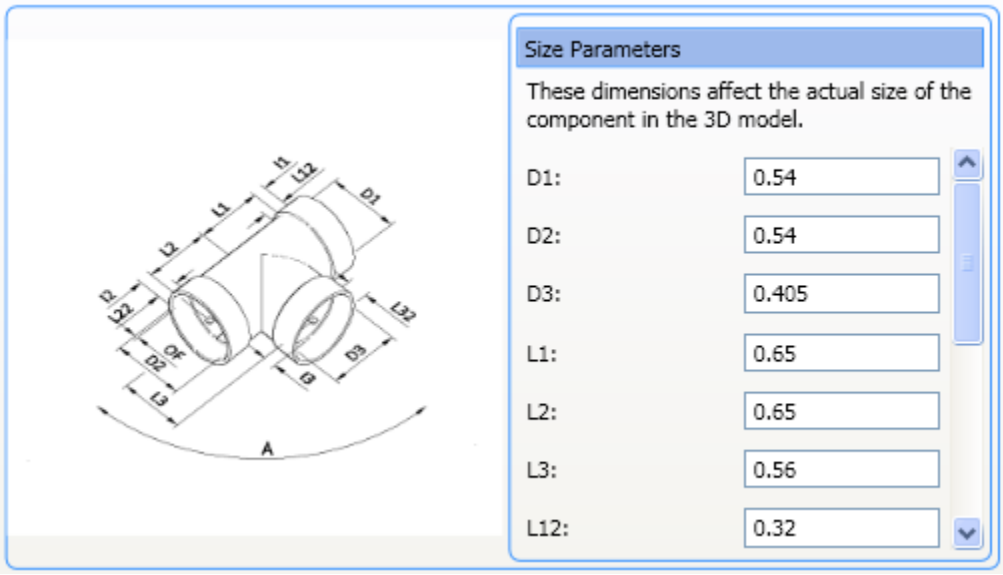
Sample Script name	Sample Descriptions	Sample Image
CPB (names without an underscore extension)	Beveled, buttwelded, or flanged endtypes	
CPB_OFOF	Female socketweld or threaded endtype on each port (_OFOFOFOF indicates a 4-way valve with a female socketweld or threaded endtypes on each port)	
CPB_OMOF	Female socketweld or threaded endtype on one port and male socketweld or threaded endtype on the other port	
CPB_OMOM	Male socketweld or threaded endtype on each port	Identical to CPB_OMOF in the previous example, but with male endtypes on each port
CPJRCL	Concentric reducing component	
CPJREL	Eccentric (offset or center line shift) reducing component	

Each script has associated properties that indicate how the endtypes are to be drawn. AutoPLANT properties are matched to AutoCAD Plant 3D versions. In many cases, you may want a class to have different shapes, depending on context. For example, you may want AT_TEE to have a welded tee, a socked-welded tee, or a flanged tee in different locations. You can specify a property name or names to match as criteria for the graphical shape to be used.

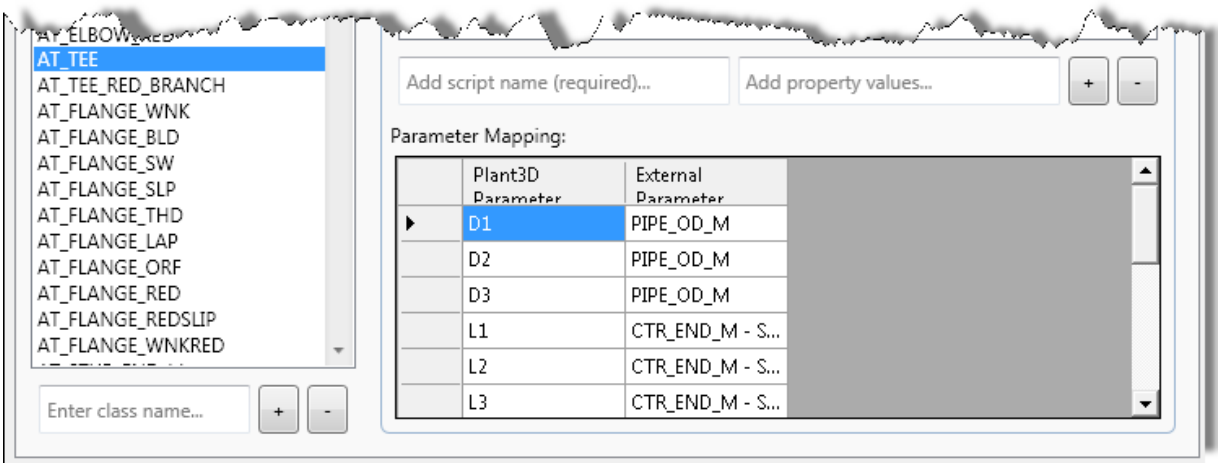
For AT_TEE, for example, you can specify the external property END_COND_1 as the matching criteria to help differentiate when to use the different shapes. Following is an example that specifies using CPTS_OFOFOF when END_CONDITION_1 is SWF or SCF, but using CPTS when END_CONDITION_1 is BW, and so on.



For each geometry mapping, there is also a corresponding set of parameters, and these can vary depending on the shape. The image that follows shows a Plant 3D threaded female tee in the catalog editor (size tab) along with its parameters.

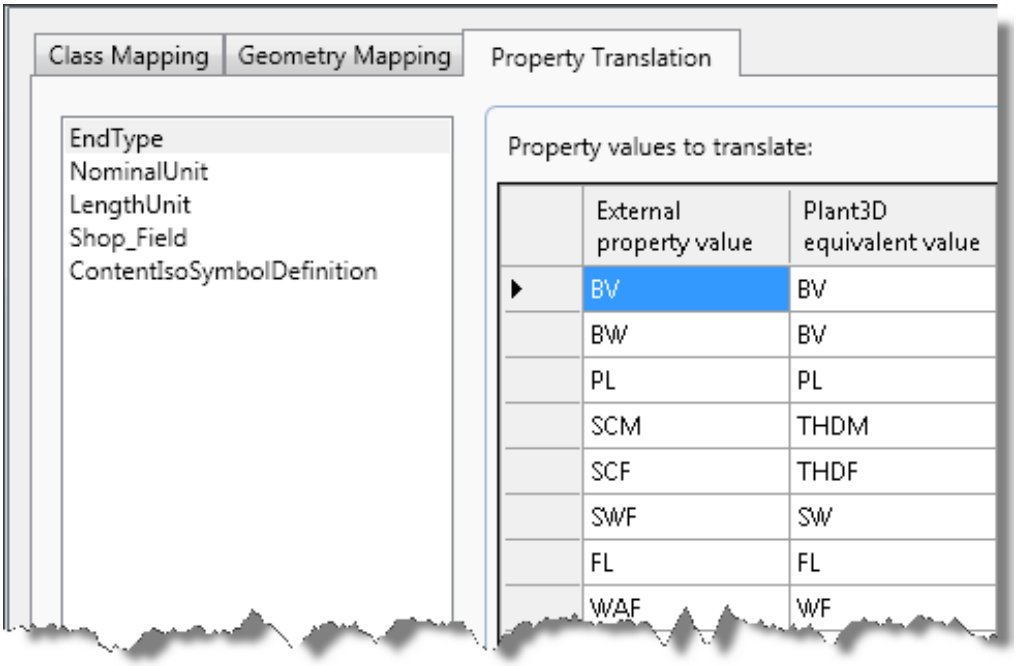


You can enter these parameters in the mapping table in the Plant 3D Parameter Name column and map them to the corresponding AutoPLANT property name (or value).



Translate Class Property Values

On the Property Translation tab, you make sure that values specific to AutoPLANT properties are correctly interpreted during the conversion. For example, the AutoPLANT endtype property value BW maps to (translates to) BV in the language of Plant 3D.



You can add additional properties with specific value translations as needed. The translations affect all classes in a project.

Build the file ATPToP3dMiscMapping.xml

When you complete the mapping tasks using the mapping dialog box, you can edit the file ATPToP3dMiscMapping.xml. Following are the key sections you can modify to reflect your conversion requirements:

- PartSizeIdList
  Lists properties that are used to generate a unique Part-ID for each part

Example: <string>CLASS_NAME</string>

- PartFamilyIdList
  Parts with the same values for all properties listed in this section can be grouped into “families”
  Example: <string>CLASS_NAME</string>

- RunningTextProperty
  Lists property that appears in scrolling text during conversion
  Example: <RunningTextProperty>LONG_DESC</RunningTextProperty>

- ErrorLogPropertyNames
  Lists properties to be reported in the error log
  Example: <string>M_SIZE</string>

- ClassNamesIgnoreList
  Lists classes or part types to be ignored during error reporting
  Example: <string>WELDGAP</string>

Import CSV Files into Plant 3D

To convert CSV files containing spec (or catalog) data

1. On the File menu, click Convert > CSV files.

2. In the Convert External Specs and Catalogs dialog box, click Add.

3. In the Browse For Folder dialog box, navigate to the folder containing the CSV files you want to convert. Click OK.

4. In the Convert External Specs and Catalogs dialog box, do the following:

   - Next to Convert Selected Files To, click AutoCAD Plant 3D Specs or AutoCAD Plant 3D Catalogs, depending on the data contained in the CSV files.

   - Under Select the Folder For the Converted Specs and Catalogs, click the [...] button and browse to the folder where you want to save the converted files. Click OK.

   - Click Convert. A dialog box displays the progress of the conversion.

5. In the Specs and Catalogs - Conversion Complete dialog box, do one of the following:

   - View the Spec Conversion Report dialog that lists the Output Folder, the date of the conversion, and the name of the mdb file or files converted. In this dialog box, you can click the Click Here To View Detailed CSV Format Conversion Report link to display the information in a Microsoft Excel spreadsheet.

   - Open the converted specs folder where you can view log files and converted files.

6. Based on the conversion results, you can edit the source CSV file or files as needed and run the conversion again, or you can open the converted spec and add parts from a Plant 3D catalog.

Convert the Specs

To convert a spec (or catalog)

1. On the File menu, click Convert > Specs and Catalogs.
2. In the Convert External Specs and Catalogs dialog box, click Add.
3. In the Select Specs and Catalogs dialog box, navigate to the folder containing the specs you want to convert. Select one or more specs and click Open.
4. In the Convert External Specs and Catalogs dialog box, under Select the Folder For the Converted Specs and Catalogs, click the [...] button and browse to the folder where you want to save the converted files. Click OK.
5. In the Convert External Specs and Catalogs dialog box, click Convert. A dialog box displays the progress of the conversion.
6. In the Specs and Catalogs - Conversion Complete dialog box, do one of the following:
    - View the Spec Conversion Report dialog that lists the Output Folder, the date of the conversion, and the name of the mdb file converted. In this dialog box, you can click the link Click Here To View Detailed CSV Format Conversion Report to display the information in a Microsoft Excel spreadsheet.
    - Open the converted specs folder where you can view log and converted files.
7. Based on the conversion results, you can either adjust mappings as needed and run the conversion again or open the spec and add parts from a Plant 3D catalog.