OG10333-L

Behind the Face—Tips and Tricks in AutoCAD Plant 3D

Bernd Gerstenberger
Autodesk

Learning Objectives

- Discover several, maybe surprising examples of how you can configure your project and your specs
- Learn some insights into AutoCAD Plant 3D—learn it by doing
- Discover how to work with databases and configuration files
- Learn about the configuration behind the user interface

Description

You can do more than you think! The configuration of AutoCAD Plant 3D software will not even done via user interface but also with databases, *xml*-files, and other files. In this hands-on class you'll learn some tips and tricks for how to configure your project, your spec, and your model to your needs. Sometimes you think that some stuff is not possible—but maybe it is. Learn some interesting insights into AutoCAD Plant 3D software.

Your AU Expert

Bernd Gerstenberger *works for Autodesk support since 2010. The focus switched from plain AutoCAD and Installation & Licensing to AutoCAD Plant 3D / AutoCAD P&ID. In this role he takes care for the questions of customers and partners about this topic since 5 years. For an expanded audience he writes technical articles for the Autodesk Knowledge Network and is co-author of the blog "In the Pipes".*

Before his time at Autodesk he gained experiences in different areas of the IT for many years: CAD administration, network administration, database development, plot management, programming, project management, PDM administration, GIS applications and workflow systems of the many different products.

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Instruments: From the catalog over the spec until the bill of material in the isometric drawing

If you try to create an instrument in the catalog via „Create new component“, you note that this isn't possible. There is no piping component „Instrument“ listed in the selection list.

Is there a different way to create an instrument for a catalog and to add this later to a spec?

The solution we have here is the “Catalog Builder”. Using this workflow it is possible to create an instrument for a catalog and to provide it for the specs afterwards.

Using the Catalog Builder to add an instrument to a catalog

- In Spec Editor select “Tools – Launch Catalog Builder…”
- In section “Catalog Templates” select “Create new”
- Select a path and type a name for the template. Determine if you want to work in British or in metric units

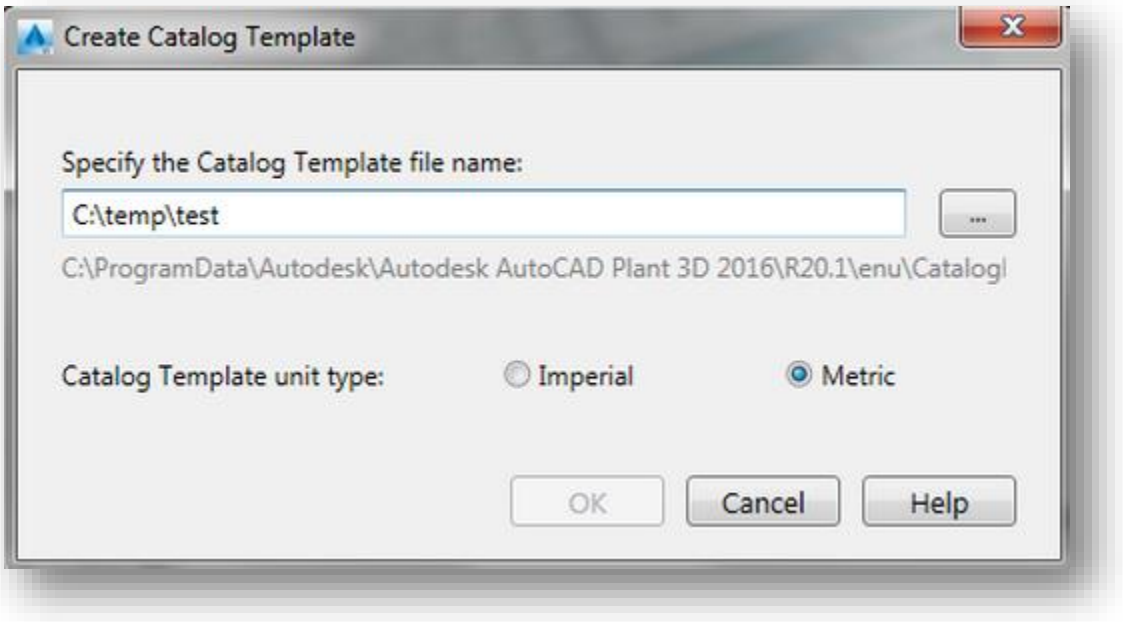


Figure 1: New Catalog Template

- Create a new valve

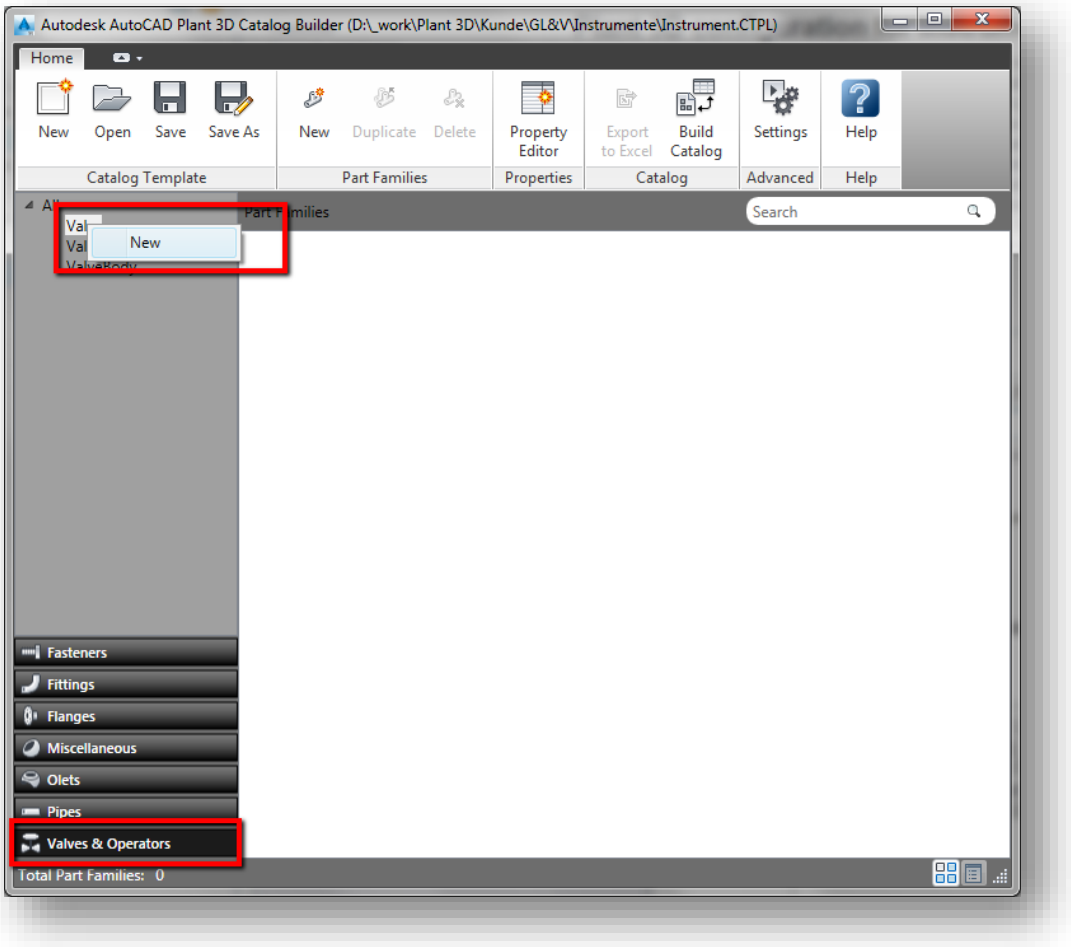


Figure 2: New component in the Catalog Builder

- Select a parametric graphic of your choice and fill the specific fields. Leave for “Piping Component” the value “Valve”. We will change it later
- Save
- Click “Export to Excel”
- Open the Excel-file
- Select all columns and choose from context menu “Unhide”
    - **Note:** Select also the last empty column because between this column and the last filled column are still some columns hidden

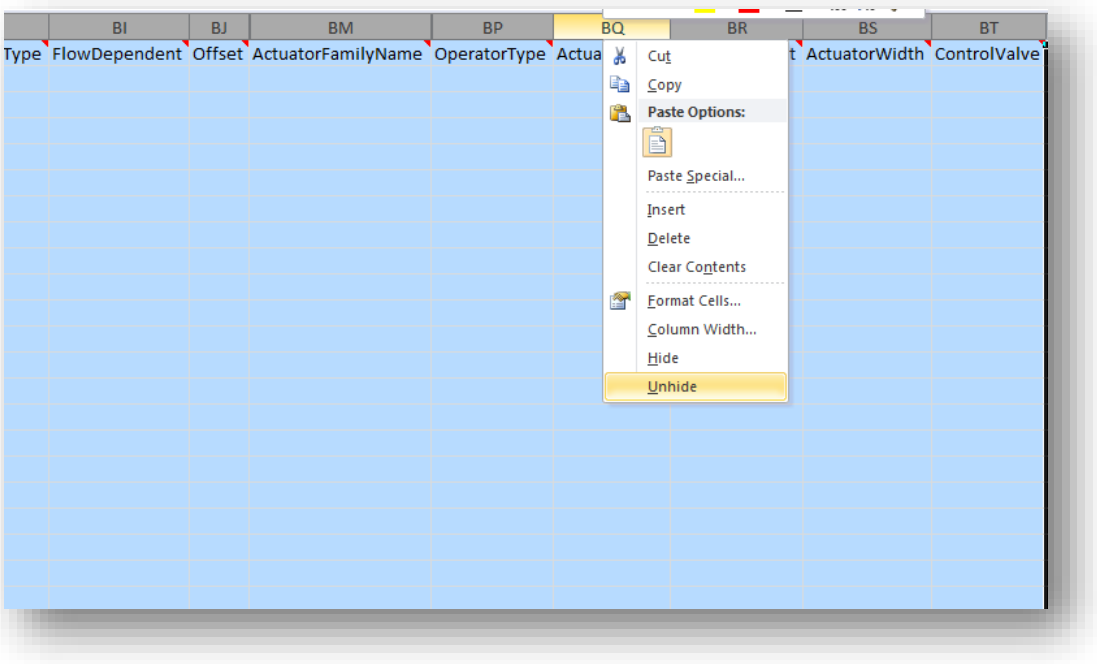


Figure 3: Unhide the hidden columns in Excel

- Switch to tab “Review” and click “Unprotect Sheet”

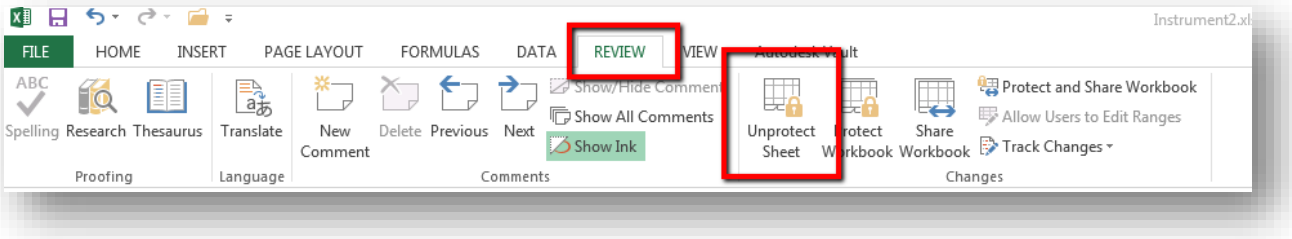


Figure 4: Unprotect the sheet

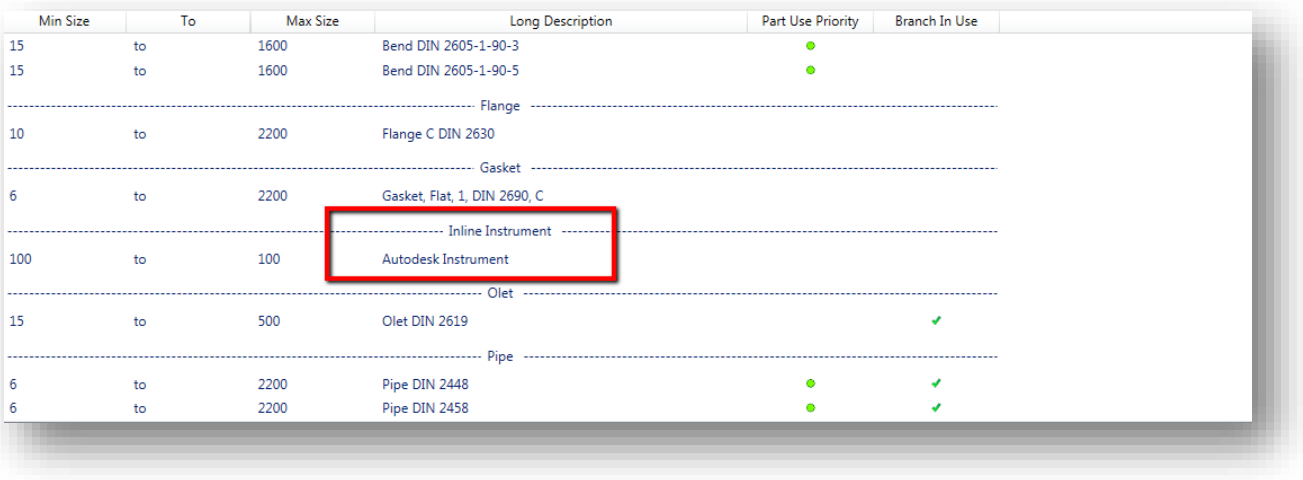
- Search for the column “PartCategory” and replace there the value “Valves” with “Instrument”
- Search for the column “PnPClassName” and replace there the value “Valve” with “InlineInstrument”
- Save
- In Catalog Builder click “Build Catalog”
  - You will be asked for an Excel-file. Select the just modified Excel-file in the browser and click “Open”
- In the dialog “Build Catalog” click “Save as new”
  - Alternatively you can use an already existing catalog and add the instrument to this catalog. In this case click “Add to existing”
- Enter a new name for the catalog and click “Save”

The catalog with the instrument will be created and can now be opened in the Catalog Editor. Now we add this instrument to a spec.

Adding the instrument to a spec

- Open a spec of your choice of the current Plant 3D project
- Open the just created catalog
- For the following isometric exercise type for the ISO symbol type the value “INSTRUMENT” and for the SKEY the value “IIBG”. For “BG” you can also use a different string combination
- Click “Save in Catalog”
- Switch to the tab “Spec Editor”
- Select in the bottom frame the instrument and click “Add to Spec”

The instrument will be added as an instrument to the spec and automatically assigned to the category “Inline instrument”.



Min Size	To	Max Size	Long Description	Part Use Priority	Branch In Use
15	to	1600	Bend DIN 2605-1-90-3	●	
15	to	1600	Bend DIN 2605-1-90-5	●	
			Flange		
10	to	2200	Flange C DIN 2630		
			Gasket		
6	to	2200	Gasket, Flat, 1, DIN 2690, C		
			Inline Instrument		
100	to	100	Autodesk Instrument		
			Olet		
15	to	500	Olet DIN 2619		✓
			Pipe		
6	to	2200	Pipe DIN 2448	●	✓
6	to	2200	Pipe DIN 2458	●	✓

Figure 5: The instrument is categorized correctly in the spec

If the project will be opened with the modified spec set as current, then the dynamic tool palette shows the instrument categorized.

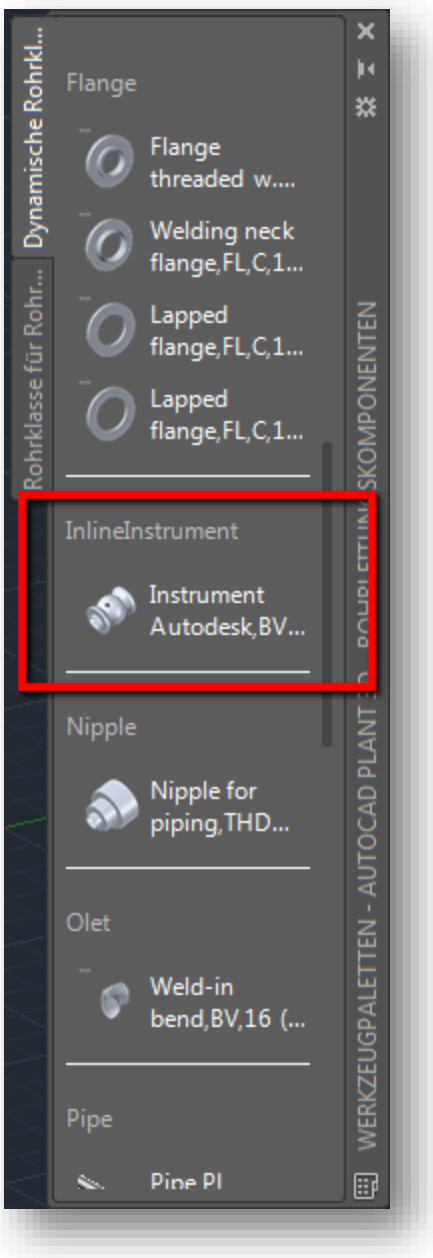


Figure 6: The instrument is categorized correctly in the tool palette

Using the instrument for an isometric drawing

- Create a new project with a new drawing
- If the modified spec was not saved in the content folder then copy it (**.pspx* and **.pspc*) directly into the path *<project folder>\Spec Sheets*
- Draw a pipe and insert the instrument onto this pipe

- Save
- Open the *isoconfig.xml*-file of the used iso style with a xml editor like XML Notepad
- Switch to the node „Data – AggregatedLists – AggregateList (name = Materials) – Groups“
- Copy a group and paste it into the same hierarchy level
- Change the following values:
    - Name = „Instrument“
    - Label = „instrument“
    - Filter = „Instrument“
- It should now look like:

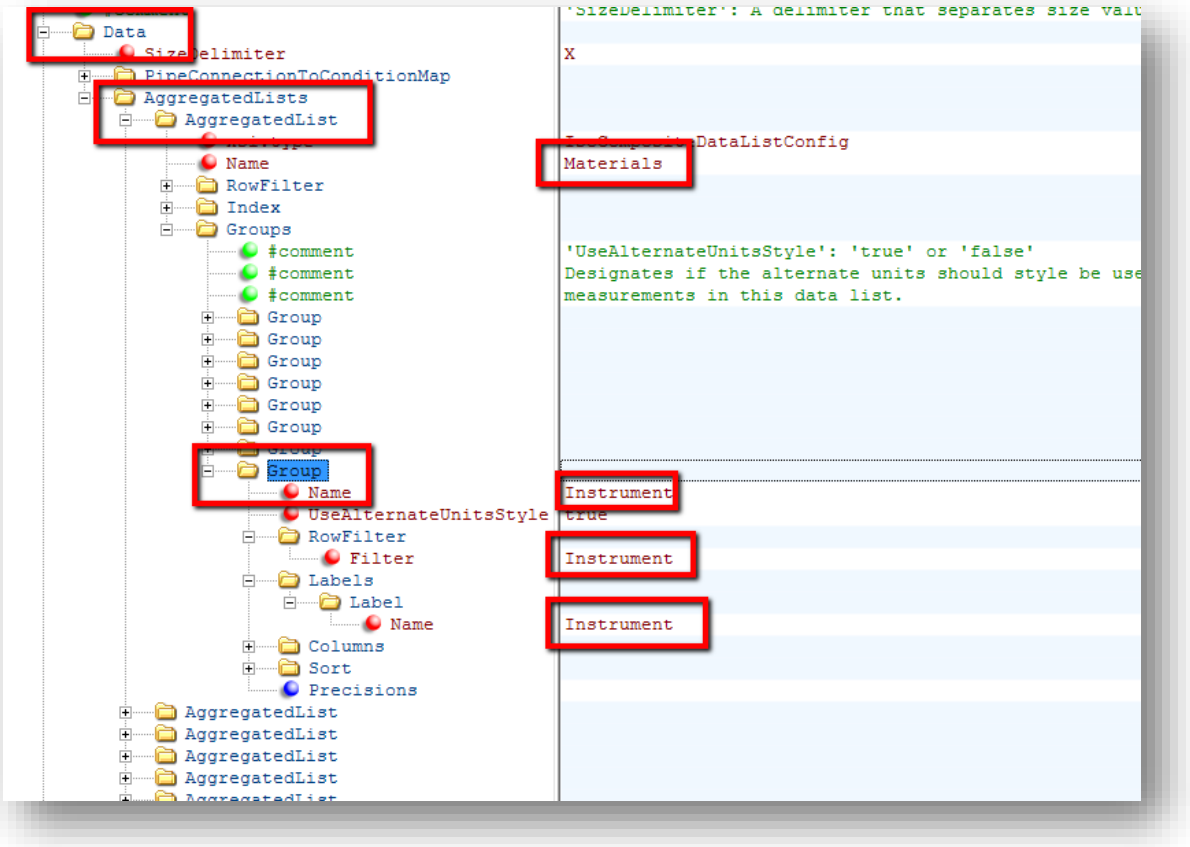


Figure 7: New group "Instrument" for the BOM of the isometric drawing

- Save the file
- Open the project setup of AutoCAD Plant 3D
- Switch to the node “Isometric DWG Settings – Title Block and Setup”
- Click “Setup Title Block…”
    - The *iso.dwt* of the specific iso style will be opened
- Click “Table Setup”
- In the dialog “Table Setup” choose from the selection list “BOM Layout Template” the template “Grouped with category titles”

- Click “Ok”
  - The BOM table will be displayed as a grouped BOM in the *iso.dwt*
- Rename the two rows of a category, e.g. Valves:
  - Rename the name outside of the squared brackets in „INSTRUMENTS“, inside the brackets in „instrument“
  - **Note:** The value inside the squared brackets corresponds to the Label-value of the *isoconfig.xml* and has to be mandatory written as the same

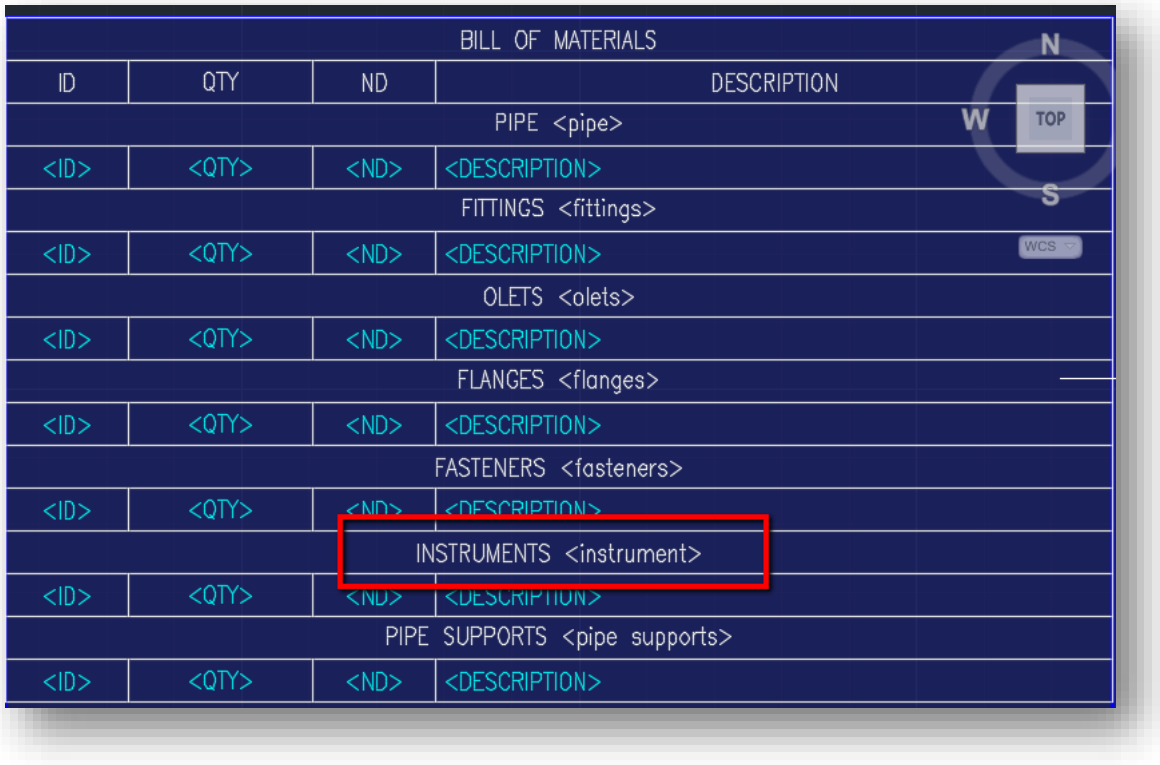
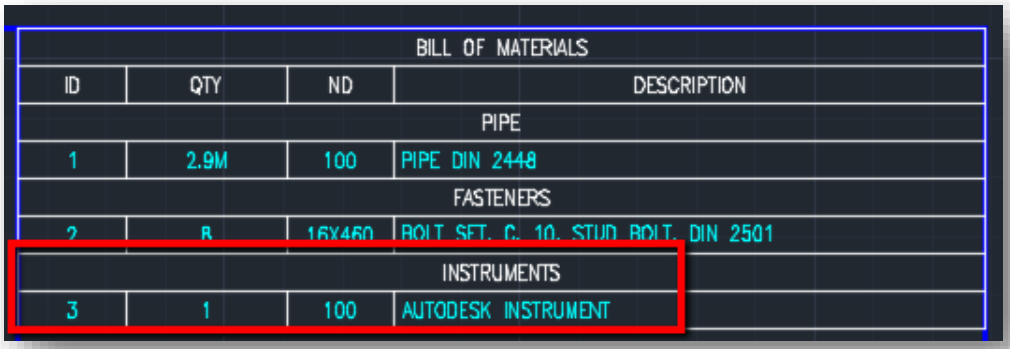


Figure 8: Configuration of the iso.dwt

- Save and close the *iso.dwt* and the project setup
- Create now an isometric drawing

The results looks like that:



BILL OF MATERIALS			
ID	QTY	ND	DESCRIPTION
PIPE			
1	2.9M	100	PIPE DIN 2448
FASTENERS			
2	8	16X460	BOLT SET, C, 10, STUD BOLT, DIN 2501
INSTRUMENTS			
3	1	100	AUTODESK INSTRUMENT

Figure 9: Result: The instrument wil be shown in the BOM

Activation of the editing mode of dimensions of inserted spec components

Maybe you have already noted that for components which are created via PLANTCUSTOMPARTS it is possible to edit their dimensions. But it isn't possible of components which were inserted via a spec.

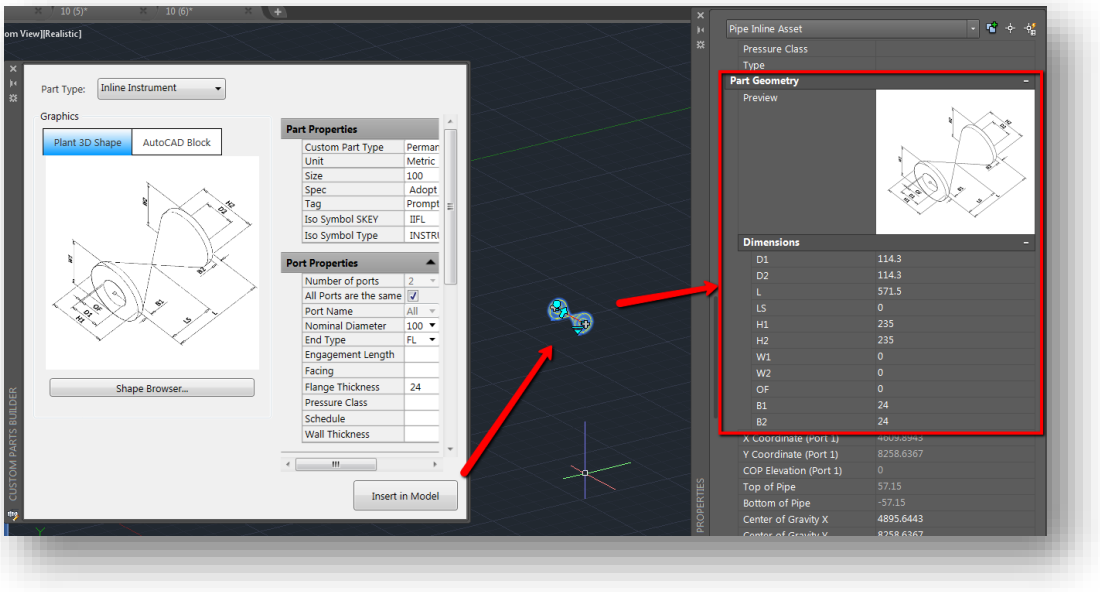


Figure 10: Editable dimensions for user-defined components

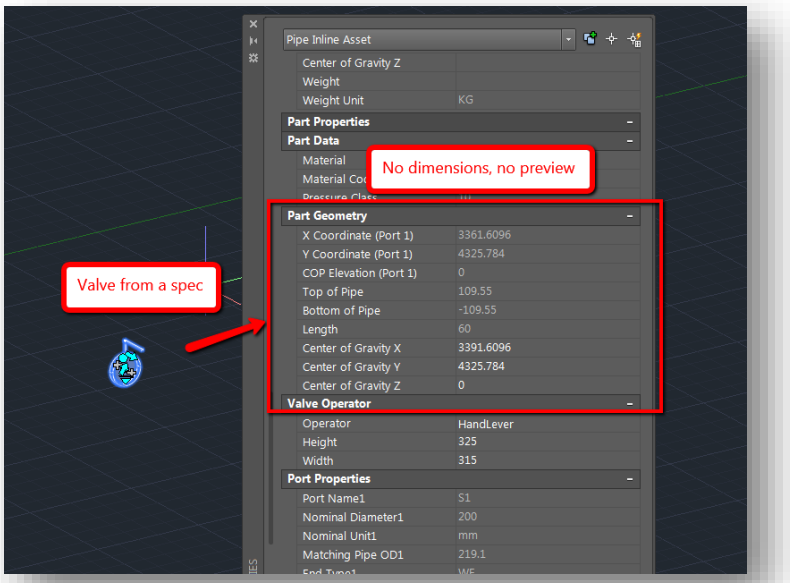


Figure 11: Valve of a spec

That certainly has in principle justified, because the components of a pipe spec are in stock and have fixed dimensions, which simply cannot be changed.

But there are still situations in which it is useful to have this possibility also for pipe class components. And it is possible!

The behavior will be set by one property. This property has the name “Component Designation”. This property can be set in the spec and in the catalog. Enter here “Custom” and the dimension properties will be enabled for this component.

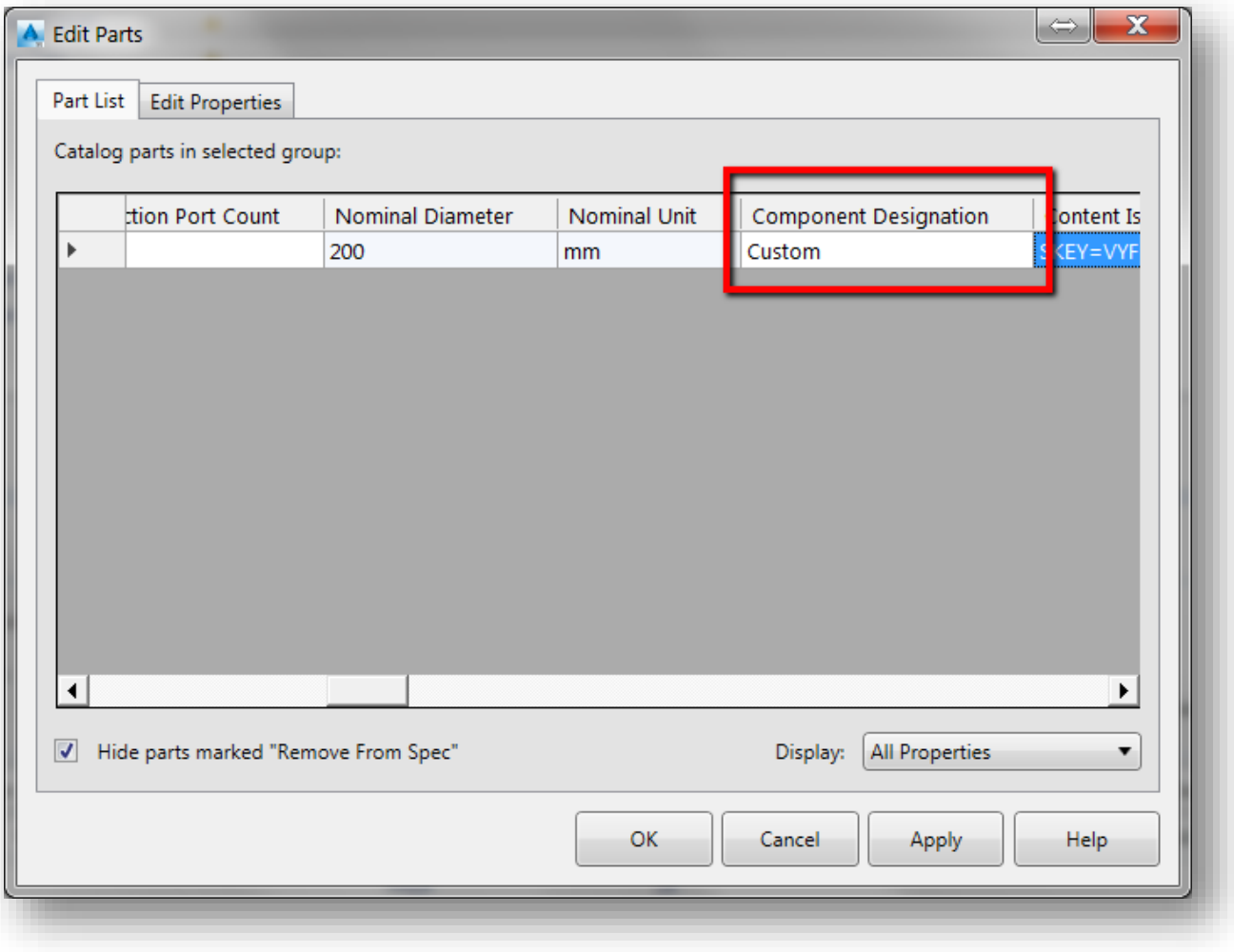


Figure 12: Component Designation: Custom

The result looks like that:

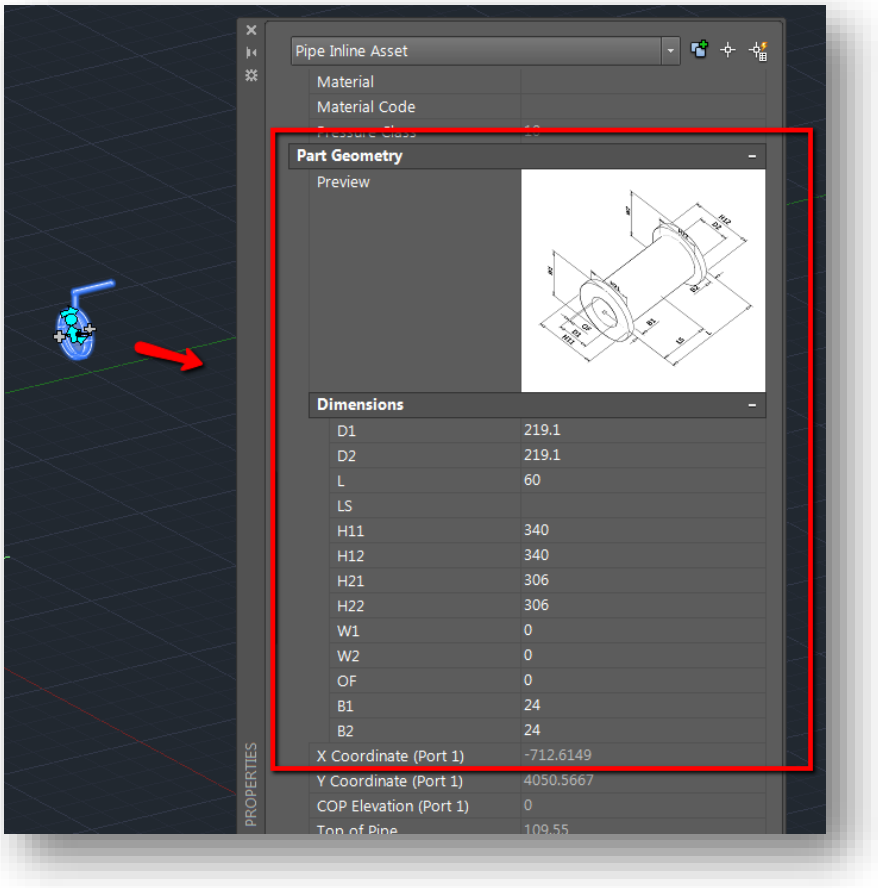


Figure 13: Result: Dimensions of the spec valve are editable

Note: This method works with the most component types but not for pipes.

While you can make changes in the spec directly in the user interface of the Spec Editor, this is not possible for the catalogs. If you want to change this behavior already in the catalog then you have to open catalog with a SQLite browser like SQL Expert Personal.

Note: The following steps are for experienced users only. You can corrupt the whole catalog or the whole spec. Make always a backup of your catalog and spec before.

You will find the column “ComponentDesignation” in the table “EngineeringItems”.

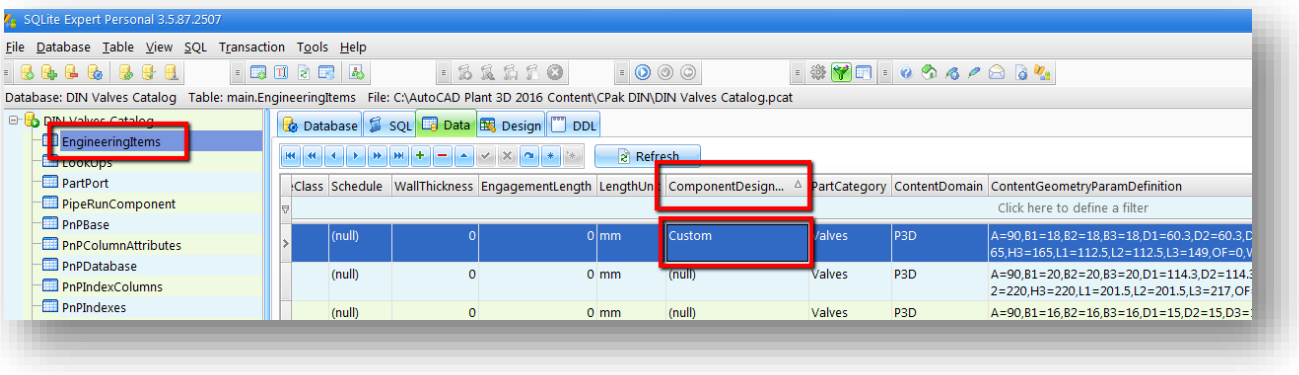


Figure 14: Changing the "ComponentDesignation" in the catalog database

Best practice is to update the table with a SQL statement.

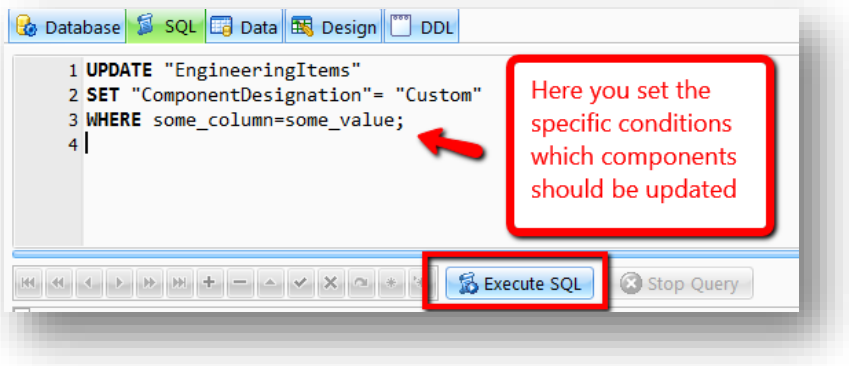


Figure 15: SQL statement to update the table "EngineeringItems"

Because using a SQL statement is comfortable and you can update a whole table at once, you might want to do the same steps for the spec, too rather than to use the “Edit parts”-interface of the spec editor.

The steps for a spec are the same:

- Open the spec with the SQLite browser
- The column “ComponentDesignation” is also defined in the table “EngineeringItems”
- Use the similar SQL statement as shown above for the catalog

Export of specific class properties to a PCF-file

You need *pcf*-files for the data exchange with different applications. For example some applications are using *pcf*-files for analysis of pipeline systems, e.g. Rohr2. By default specific class properties will be already saved as information to a *pcf*-file when creating an isometric drawing, like material and pressure class. You can also save different properties to the *pcf*-file. How to do this is described here using the example of the wall thickness.

Therefore we have to modify the *iso.atr*-file of the used iso style. This file is saved in *<project folder>**Isometric**<Iso Style>*. It is a simple text file and can be opened with Notepad.

You note here two sections: ATTRIBUTES and BOM-ATTRIBUTES. The section ATTRIBUTES is for more general properties. These are precisely properties of the project, of the drawing, LTD-properties and pipeline **group** properties. All other properties, this means all class properties with the exception of the pipeline group, will be set in the section BOM-ATTRIBUTES.

The WallThickness is a property of the class „Piping and Equipment“. This class will be named in the *iso.atr* as “EngineeringItems”. The most classes are named in *iso.atr* like they are name in the project setup, e.g. WallThickness for WallThickness. There are two exceptions: “General” for project properties and “EngineeringItems” for “Piping and Equipment”.

For this example we have to add the row “EngineeringItems.WallThickness” in the section BOM-ATTRIBUTES.

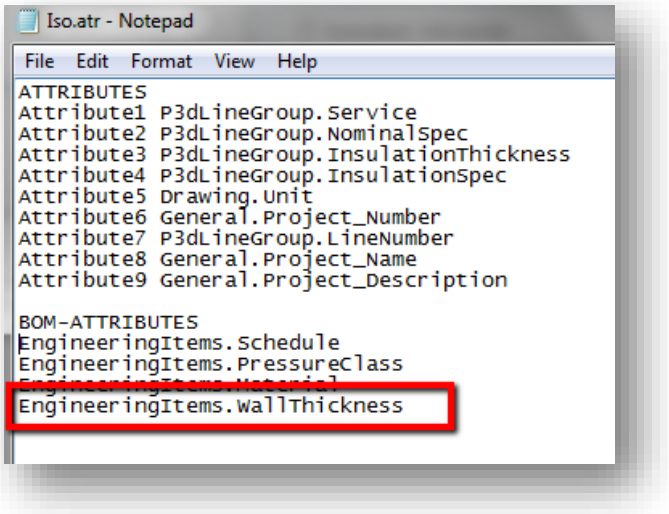


Figure 16: Modification of the iso.atr

Now if you create a *pcf*-file via creation of a new isometric drawing, then the information of the wall thickness of the model is saved in the *pcf*-file.

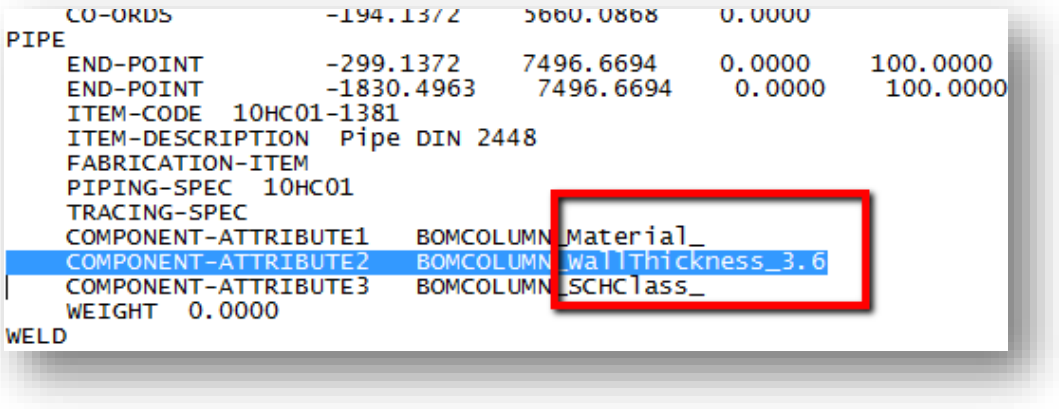


Figure 17: WallThickness in the pcf-file

Searching in the project setup

If you've got a strong customized project with many, many class definitions, it can be very challenging to find the right class in the project setup. There is a simple trick to find the classes which are starting by some specific letters.

- Open project setup and select, for example P&ID DWG Settings

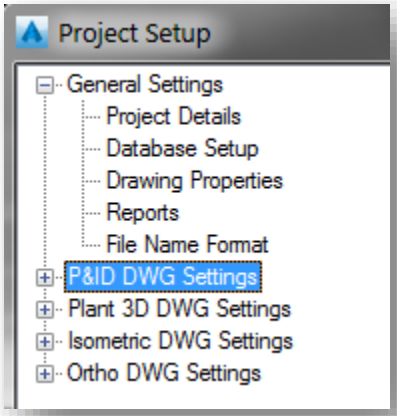


Figure 18: Select the main node "P&ID DWG Settings"

- Expand the tree pressing SHIFT + the * from the NumPad

*Figure 19: SHIFT + the * from the NumPad*

- Now type whatever you are looking for, you will jump in the configuration to this class. For example type “check” and you will jump to the “Check Valve “-class.

Note: There is a limitation here: You are not able to use the space bar for the searching.

Shortcuts:

- SHIFT + “*”: Expands the selected node and all sub-nodes
- SHIFT + “+”: Expands the selected node
- SHIFT + “-“: Collapse the selected node
- Arrow down: Switch to next class below the current class
- Arrow up: Switch to the next class above the current class