# Configuring AutoCAD Plant 3D Isometrics

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**PD6442-L** How to use the isometric configuration files for your needs - with a main focus on the isoconfig.xml.

We are talking about all the configuration files which are available to configure isometric drawings to your needs.

## Learning Objectives (LO)

At the end of this class, you will be able to:

- Have an overview of the configuration files for isometric drawings
- Use user-defined components for isometric drawings
- Configure the isoconfig.xml
- Do additional customization of isometric drawings

## About the Speaker

*Bernd Gerstenberger has worked for Autodesk product support since 2010. His main role quickly moved from supporting vanilla AutoCAD and Install & Licensing to providing technical support for AutoCAD Plant 3D and AutoCAD P&ID for both customers and partners. He writes technical articles for a wide audience on the Autodesk Knowledge Network.*

*Before his time at Autodesk he gained extensive experience over many years working in different sections of the IT industry: CAD-administration, network administration, database development, plot management, programming, project management, PDM-administration, GIS-applications and workflow systems with different products.*

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## Learning Objective 1: Overview of the configuration files for isometric drawings

In every AutoCAD Plant 3D project there is a subfolder called 'Isometrics'. There you will find the following folders and files:

<*project path*>*Isometrics*\.

- Different Iso Styles folders, e.g. '*Check_A2'*
- Files:
  - *BoltSizeMapping.xml*
  - *IsoSkeyAcadBlockMap.xml*
  - *IsoSymbolStyles.dwg*
  - *Plant3DIsoSymbols.dwg*
  - *PropertyTranslationMapping.xml*

In every Iso Style folder in an empty project there are the following files:

…\<Iso Style like '*Check_A2*'>\.

- *Iso.atr*
- *Iso.dwt*
- *IsoConfig.xml*

If the isometric default configuration will be used, then the following subfolders will be created:

- *ProdIsos*
- *QuickIsos*
- *PCFs*

**Note:** The paths for the Production Iso output and for the Quick Iso output can be configured individually via project configuration for each Iso Style separately.

These contain:

*…\ProdIsos\Drawings*

- Via Production Iso created isometric drawings

*…\QuickIsos\Drawwings*

- Via Quick Iso created isometric drawings

*…\PCFs*

- The PCF-files which are created during the creation of isometrics via Production Iso or Quick Iso (PCF: Piping Component File): for data exchange of isometric drawings between different applications.

**Note:** PCF-files can also be created by the command PLANTPCFEXPORT without creating an isometric drawing. Here the file will be saved using a browser. As default value the project path (without subfolders) will be used, which can be manually overwritten.

### Short Overview of the configuration files

#### Isometric Project Files

| | |
|---|---|
| *BoltSizeMappings.xml* | Links Imperial and Metric bolt set sizes<br><br>**See LO 4:** Additional Customization of Isometric Drawings |
| *IsoSkeyAcadBlockMap.xml* | Links the SKEY with the corresponding block<br><br>**See LO 2:** Use of user-defined components for isometric drawings |
| *IsoSymbolStyles.dwg* | Contains the block definitions of the isometric block symbols<br><br>**See LO 2:** Use of user-defined components for isometric drawings |
| *Plant3dIsoSymbols.dwg* | Contains the block definitions of the iso messages and the break point markers. Used by both the 3D model and the isometric drawing<br><br>**See LO 4:** Additional Customization of Isometric Drawings |
| *PropertyTranslationMapping.xml* | Maps property values to display values. For example, Weldolet can be replaced by WOL<br><br>**See LO 4:** Additional Customization of Isometric Drawings |

### Isometric Style Files

| | |
|---|---|
| *IsoConfig.xml* | Contains the configuration settings<br><br>**SeeE LO 3:** Configuration of the isoconfig.xml-file |
| *Iso.dwt* | The isometric drawing template of the title block<br><br>**See LO 4:** Additional Customization of Isometric Drawings |
| *ClientConfig.isf* | Contains miscellaneous settings that are not saved in IsoConfig.xml<br><br>**See LO 4:** Additional Customization of Isometric Drawings |
| *Iso.atr* | Maps properties to title block attributes<br><br>**See LO 4:** Additional Customization of Isometric Drawings **and LO 3:** Configuration of the isoconfig.xml-file |

## Learning Objective 2: Use of user-defined components for isometric drawings

You are able to create user-defined components in the catalog using AutoCAD blocks and adding them to a spec. Afterwards you can add them to the model and create an isometric drawing from them.

For this scenario we will create a user-defined cap.

**Used files:**

- *Catalog-file (*.pcat)*
- *Spec-file (*.pspx, *pspc)*
- *IsoSkeyAcadBlockMap.xml*
- *IsoSymbolStyles.dwg*

**Procedure**

***General***

There are several steps to do to present an AutoCAD block as a pipeline component in an isometric drawing.

- Conversion of an AutoCAD block to a pipeline component
- Creating a new catalog component
- Adding the component to a spec
- Customize the *IsoSkeyAcadBlockMap.xml*
- Customize the *IsoSymbolStyles.dwg*
- Using it in a model and isometric drawing

### Conversion of an AutoCAD block to a pipeline component

With the following steps you create a pipeline component for different sizes.

---

**Task 1: Conversion of an AutoCAD block to a pipeline component**

- *Open a new drawing in AutoCAD® Plant 3D and save it with the name "cap.dwg"*
- *Create two caps with different sizes using AutoCAD commands:*
  - *Command _CYLINDER and _FILLET*
  - *Size 100 (nominal diameter) with outside diameter 114.3*
  - *Size 80 (nominal diameter) with outside diameter 88.9*

- *Create for each cap a separate block with a descriptive name which includes the size of the cap, e.g. Cap80 and Cap100*
- *Run command PLANTPARTCONVERT*
    - *Select one block*

    *A cap has exactly one port. This port will now be added.*

    - *Select "Add"*
    - *Specify on the block where the port should be located (use object snap)*
    - *Specify the port direction (use ortho mode)*
    - *Select "Accept"*
    - *Select "Exit"*

    *Do the same steps for the second block.*

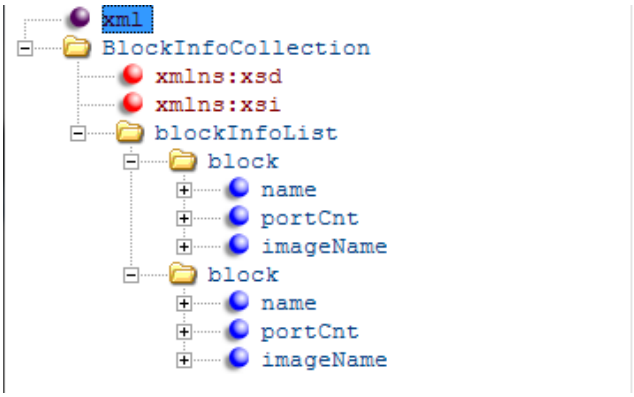
- *Save*

---

The AutoCAD blocks are converted to pipeline components. New files are created and can be seen in Windows Explorer directly in the same path as the drawing was saved:

- *Cap.dwg*
- *Cap.dwg.xml*
- *Cap.dwg_Cap80.png*
- *Cap.dwg_Cap100.png*

The *png*-files are midget pictures of the different blocks of the drawing. The *xml*-file links the blocks with the pictures and saves the count of the created ports for each block.




```
version="1.0" encoding="utf-8"

http://www.w3.org/2001/XMLSchema
http://www.w3.org/2001/XMLSchema-instance


cap100
1
Cap.dwg_cap100.png

cap80
1
Cap.dwg_cap80.png
```

**Creating a new catalog component**

The created component has to be saved in a catalog.

**Task 2: Creating of a new user-defined component in a catalog**

- *Open a metric catalog in the spec editor*
- *Click "Create New Component"*
- *In the dialog select the option "Custom – AutoCAD DWG Block based graphics" and set the count of ports to "1"*
- *Set the following options and close the dialog with "ok" afterwards:*
  - *Component Category:* *Miscellaneous*
  - *Component:* *Cap*
  - *Units:* *Metric*
  - *Short Description:* *Autodesk_CAP*
  - *Primary End Type:* *BV*
  - *Size From:* *80*
  - *Size To:* *100*
- *Set the following fields:*
  - *Long Description (Family):* *Autodesk_CAP*
  - *ISO Symbol Type:* *CAP (more on this later)*
  - *ISO Symbol SKEY:* *AUCAP (more on this later)*
- *Remove all sizes except 80 and 100*
- *Select size "80" and click "Select Model…"*
- *Select the block "Cap80"*
- *Set "Matching Pipe OD" to 88.9*
- *Do the same thing for size "100" with "Matching Pipe OD" of 114.3*
- *Save the component to the catalog*

**Note:** The **ISO Symbol Type** defines which information gets included on the isometric drawing. For example, certain objects like caps get a callout indicating that it closes the end of the pipe line. Any symbol that should receive the closing callout should use the CAP type with whichever symbol key is appropriate.

The ISO Symbol Type is hard coded. Currently it is not possible to create a user-defined ISO Symbol Type. This is a list of all used ISO Symbol Types of all catalogs of the content folder:

BEND
BEND-TEED
BOLT
CAP
CLAMP

COUPLING
CROSS
ELBOW
ELBOW-REDUCING
ELBOW-TEED
FILTER
FLANGE
FLANGE-BLIND
GASKET
INSTRUMENT
INSTRUMENT-3WAY
INSTRUMENT-ANGLE
LAPJOINT-STUBEND
MISC-COMPONENT
OLET
PIPE
PIPE-FIXED
REDUCER
REDUCER-CONCENTRIC
REDUCER-ECCENTRIC
SUPPORT
TEE
TRAP
UNION
VALVE
VALVE-3WAY
VALVE-4WAY
VALVE-ANGLE

**Note:** The ISO Symbol SKEY specifies which symbol block of the component will be shown in the isometric drawing. The mapping of the SKEY to the block will be performed by the file *IsoSkeyAcadBlockMap.xml*. More info here in the sub chapter “Customize the *IsoSkeyAcadBlockMap.xml*”.

### Adding the component to a spec

You have the choice if you want to add the component to a spec which is located in the Content Folder or to a spec which is saved in the current project. The second choice will only affect the specific project. If you change a spec in the Content Folder, this will affect all new projects.

**Task 3: Adding a component to a spec**

- Open a spec in the spec editor
- Select in the bottom window in the selection list at the top right the relevant catalog
- Select the component
- Click “Add to Spec”
- Save the spec

### Customize the IsoSkeyAcadBlockMap.xml

The mapping of the SKEY to the block will be done in the file *IsoSkeyAcadBlockMap.xml*. In the node “SkeyMap” two attributes are specified. The attribute “SKEY” is the SKEY of the component in the model. The attribute “AcadBlock” maps a block of the file “*IsoSymbolStyles.dwg*” to this SKEY.

The last two letters of the SKEY shows which end type should be used but the end type is not determined here. So the end type letters are more for description. Question marks are wildcards for the end type.

If you have one tee with the SKEY “TEBW” and another tee has the SKEY “TEFL”, both tees will find the SkeyMap “TE??” and both are mapped to the block “TEE”. The block “TEE” will be used for the isometric drawing.

Alternatively, if a SkeyMap has the SKEY “TE??” and another SkeyMap has the SKEY “TEFL”, the model component with the SKEY “TEFL” will use those SkeyMap which is defined more on the top in the *IsoSkeyAcadBlockMap.xml*. The *xml*-file will be read top down. The first hit will be used.

The mapping of the end types will be done by the “EndTypeMap”.

The standard end types are:

| Endtype | SKEY | Block | Appearance |
|---|---|---|---|
| Field Weld | WF, WS | FieldWeld | |
| Weld | WW, SO, WN, SJ | Weld | |
| Buttweld | BW, BV | Buttweld | |
| Socket Weld | SW | SocketWeld | |
| Glued | GL | Glued | |
| Threaded | SC | Thread |  |
| Flanged Fitting | FL | FittingFlange |  |
| Flared End | FA, TC | FlareEnd | |
| Clamped | CL | Clamp | |

The mapping of the valves to the specific actuators will be done by the "ValveToSpindleSkeyMap".

Here the block will be mapped again by the SkeyMap for every SpindleSKEY.

The last node-type there is called the "AsymmetricComponent".

This type will be used by default only for flanges and couplings. Components which comply with the specific ISO Symbol Type, with the specific End Type and possibly with the specific SKEY will be recognized and presented accordingly in the isometric, which means that, for example, a flange will match its mating valve's isometric orientation.

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**Task 4: Customize the IsoSkeyAcadBlockMap.xml**

- *Open the IsoSkeyAcadBlockMap.xml*
- *Create a new SKEYMAP*
  - *SKEY: AUCAP*
  - *AcadBlock: AUCap*
- *Save*

---

**Customize the IsoSymbolStyles.dwg**

Just now you have mapped in the *IsoSkeyAcadBlockMap.xml* the SKEY "AUCAP" to the block "AUCap". Actually this block doesn't exist yet. You have to create it.

This you will do in the drawing *IsoSymbolStyles.dwg* of your project. You don't open this drawing directly via "File – Open" but by using the project configuration.

**Task 5: Customize the isometric block**

- *Start AutoCAD Plant 3D and open the training project*
- *Open the project configuration*
- *Switch to the node "Isometric DWG Settings – Title Block and Display" and click "Edit Isometric Symbols…"*

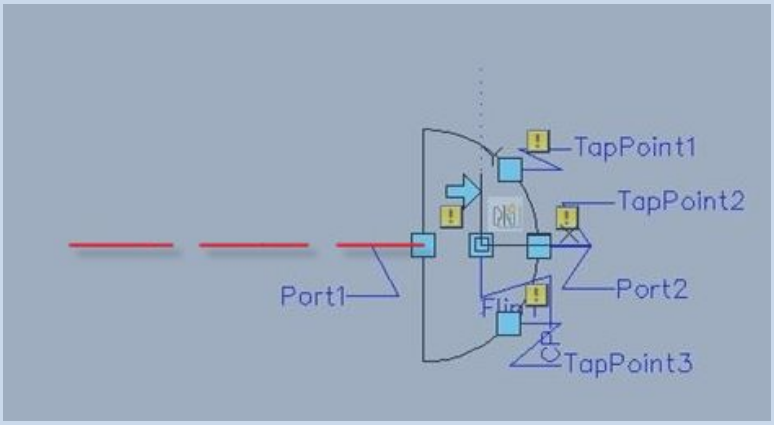
*Look at the headline of Plant 3D. The drawing "IsoSymbolStyles.dwg" is open*

- *In the dialog "Edit Block Definition" select the block "Cap"*
- *Change the geometry of this block: Add an additional line parallel to the flat side of the cap*
- *Use command SAVEAS to save the block with a different name: "AUCap"*

**Note:**

Code of practice for creating isometric symbols:

- The block has to be drawn such that its center point is at the origin (0,0)
- The adding of CP-point parameters to define the midpoint is recommended but not required
- To decide what orientation to draw it in, consider how it will be connected to piping flowing from left to right




The flat side of the cap will be connected with the piping. That is why the flat side is on the left side.

- Add point parameters starting with Port1, Port2, Port3 and so on, for all connection points. Do not use another term or language for “Port”.
- ‘If your block supports tapped connections, you can add point parameters with a sequence TapPoint1, TapPoint2, and so on. You can add any number of tap points. Tap points are chosen by location, not sequence. For example, if the block has 3 TapPoints defined but only one tap is needed during Iso creation, the closest TapPoint is chosen.
- WipeOuts can be added to blocks created for annotations. This is done because annotations can end up on top of skew hatches in the output iso. The wipeouts make the text in the annotation readable by hiding whatever is underneath it.
- Flow dependent blocks like check valves and flow arrows can have a flip parameter (parameter + action) in a dynamic block. This provides a flip grip in the iso drawing. Flip parameters named “FlipX” and “FlipY” are used.
    - A flow-arrow or check-valves sets a FLOW-attribute in the PCF-file which can be orientated using the flip grip. If a component is not flow dependent (has no FLOW attribute in the PCF), it will not flip, even if a flip parameter exists in the block definition
    - Reducers support flips such that the larger or smaller ends match adjacent components. This assumes that reducers are created with the larger side on the left
    - Flanges support flips such that the flanged side faces the flange connection. This assumes that flanges are created with the flanged side on the left
- For valve blocks you can add a point parameter named “Operator” at the operator location

### Creating the model and the isometric drawing

Now we create the model in the AutoCAD Plant 3D project and generate an isometric drawing

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**Task 6: Test the result**

- *Create a new drawing in your project*
- *Set the modified spec to current*
- *Insert a pipe (size = 100)*
- *Add the user-defined cap to the pipe*
- *Create a Quick Iso*

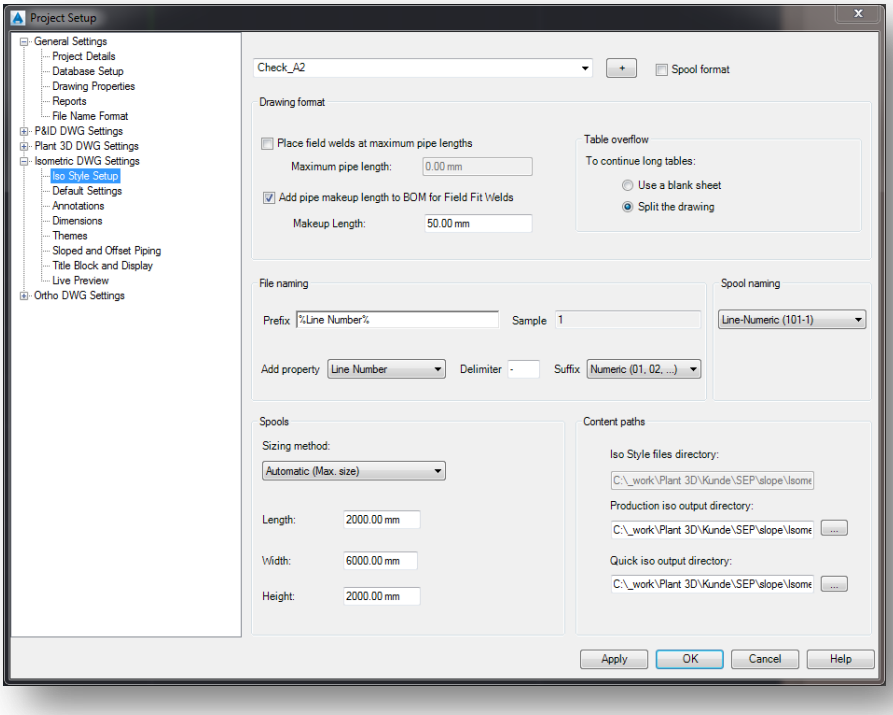
---

**Result:**

The isometric will be created with the custom block “AUCap” for the user-defined cap.

## Learning Objective 3: Configure the *isoconfig.xml*

Many settings for the isometric configuration can be done by the user interface of the project configuration of AutoCAD Plant 3D.



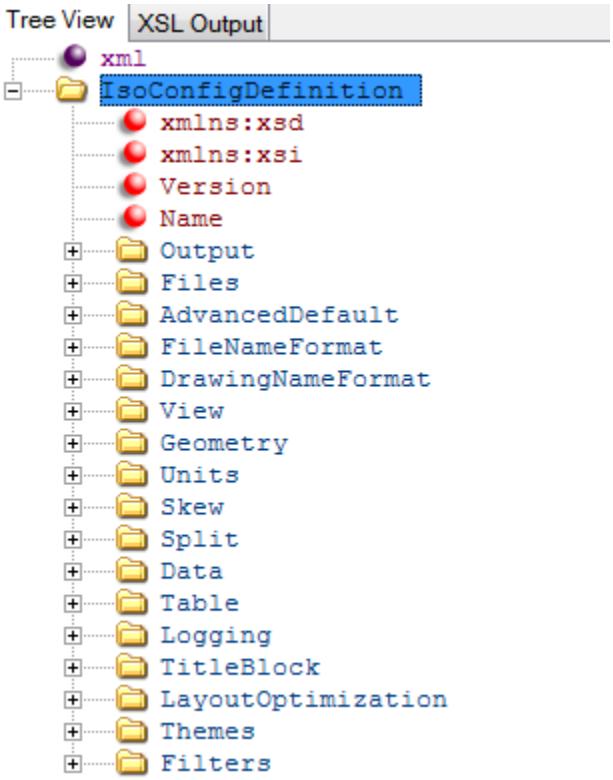

But there are settings which cannot be saved here. These settings will be done by directly editing the *isoconfig.xml*. Each Iso Style gets its own configuration and accordingly has its own *isoconfig.xml*-file.

Storage location of the file: *<project path>\Isometrics\<iso style>*

**Note:** *XML*-files can be open by a normal editor but you will not be lucky if you have bigger *XML*-files. Use for editing of *XML*-files a XML-editor, like XML Notepad or Notepad++. For the images of this hand-out XML Notepad was used.

### Structure of the *isoconfig.xml*

The structure of the isoconfig.xml will be most clearly seen in the tree structure:




In the images you see the main tags of the *XML*-file. Here a short description about the content of each tag:

- ***Output***

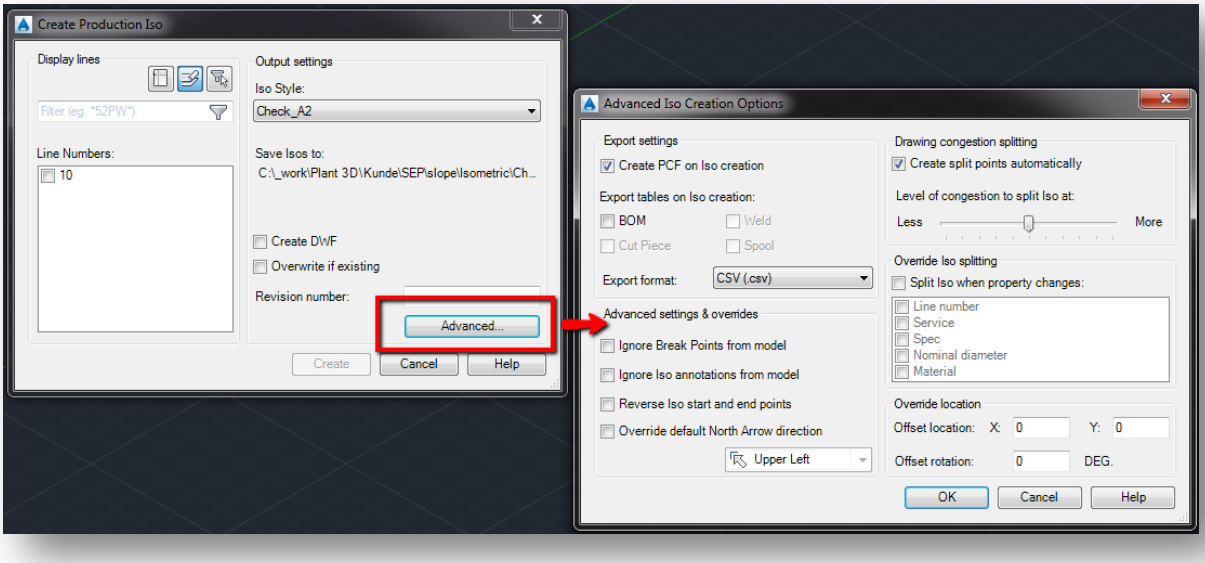
  General settings for the output of isometric drawings, for example the content of the BOM should be written in capital letter or not.

- ***Files***

  This is about paths and files specification of different configuration files.

- ***AdvancedDefault***

  During the creation of an isometric, you are able to specify the Advanced Iso Creation Options.




While these settings are only temporary for this current Iso creation, the most of these options can be set permanently for this project both in the user interface and in the *isoconfig.xml*.

- ***FileNameFormat***

  Here you will do settings for the file name of the created isometric drawing.

- ***DrawingNameFormat***

  These settings are used for the drawing name in the title block.

- ***Geometry***

  Here are some settings about the geometry.

- ***Units***

  Particularly the settings for the precision but also general settings for metric and imperial units will be saved here. These settings will be used for the dimensions.

- ***Skew***

  These settings correspond to the node ‘Sloped and Offset Piping’ in the dialog of the project configuration.

- ***Split***

  Here you adjust by which criteria the isometric drawing should be split.

- ***Data***

  This is about data which will be shown in the tables.

- ***Table***

  The different table formats of the bill of material, the weld list, etc. will be defined here. Also the link to the data will be set.

- ***Logging***

  This section is for formatting the log-file of the isometric creation.

- ***TitleBlock***

  List of the attributes which will be placed in the title block

- ***LayoutOptimization***

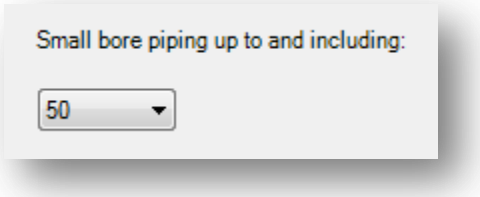
  This section is for optimizing of annotations, dimensions and the splitting of isometric drawings.

- ***Themes***

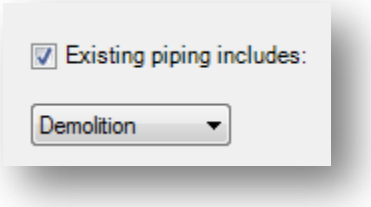
  A theme is a named configuration, especially for dimensions and annotations but also for symbols, insulation and bend/elbows. There is a main theme (name: Default) and some override themes. The override themes will be used if certain criteria are met. Then the settings of the override theme will overwrite the main theme. There are the following override themes:

  - *Small Bore Piping*
    - Use for pipes with a diameter >= 50 (default value)
    - This value can be modified via project configuration:
      - 2015 SP1 and earlier: Node ‘Isometric DWG Settings – Title Block and Display’

- 2015 Extension 1: Node ‘Isometric DWG Settings – Dimensions’




- *Vent/Drain Piping*
  - Sub theme of the Small Bore Piping theme
  - Branch of size < 50 (default value from Small Bore Piping) which starts with a PIPE, PIP_FIXED and OLET and ends with a valve, connected by maximum one pipe segment
- *Offline Instrument Connection*
  - Sub theme of the Small Bore Piping theme
  - Starts with a tee or an olet
  - Ends with an instrument: Type LIKE ‘INSTRUMENT*’
  - Connected by maximum one pipe segment
- *Existing Piping*
  - Depends on the property “Status”
  - Status = “Existing”
  - Since Extension 1: Possibility to add status “Demolition” for this theme



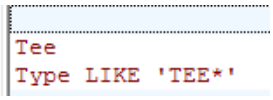

- *Continuation/Connection Piping*
  - Value = “Type LIKE ‘END-*’ OR Type = ‘EndConnection’”
  - To read in the created *PCF*-file
- *FittingToFitting*
  - Following fittings are connected directly together
    - Tee, cross, elbow, cap, plug, reducer, gasket, flange, bolt, coupling, valve, olet, instrument, weld
    - Type like ‘END-POSITION*’

The main settings for these override themes are about dimensions and annotations.

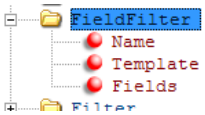
- ***Filters***

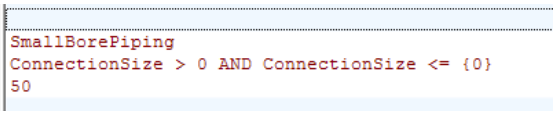
  To identify components which are used from the tags described before, filters are used, e.g. for table data. There are normal filters (simple expression) and FieldFilters, which are looking for a specific property or field for evaluation.

  *(Normal) Filter:*




  *FieldFilter:*



## Tasks for the configuration of isometry via *isoconfig.xml*

### Task 7: BOM format

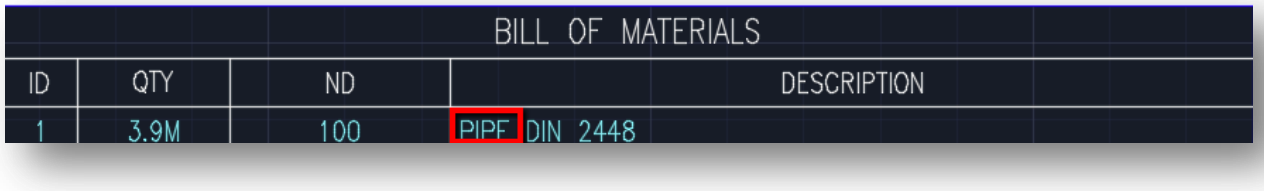
*Modify the format of the BOM to show the text in upper and lower case.*

**Solution:**

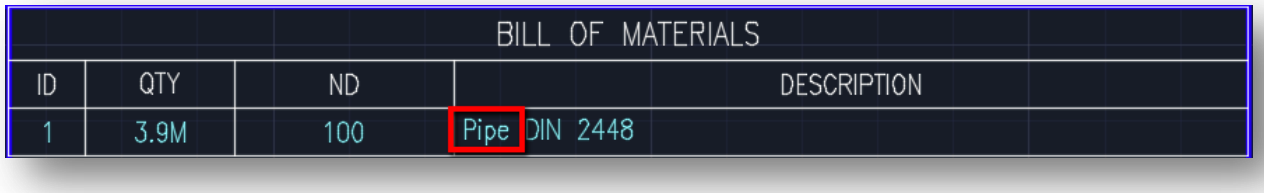
*Set the attribute "ForceUpcase" in tag "Output" to "false".*

**Result:**

*Before:*




*After:*




**Note:** If the component is already written in capital letters in the spec, then it remains in caps even in the parts list.

**Task 8: Modifying the physical file name**

*Change the physical file name of the created isometric from*

*<Line Number Tag>-<ascending number>*

*To*

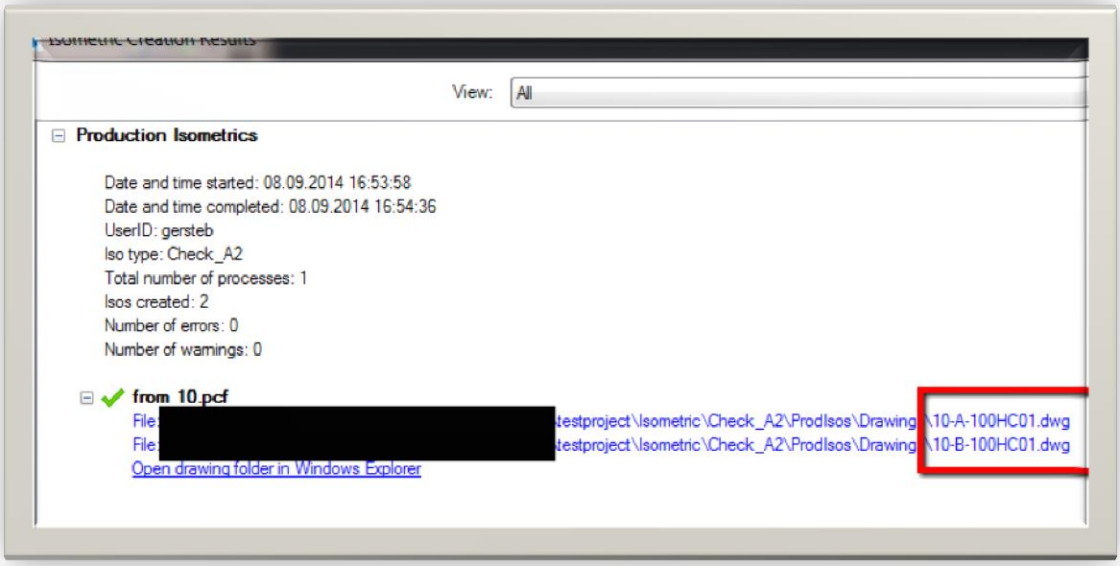
*<Line Number Tag>-<ascending character>-<spec>*

***Remark:** Create therefore a longer pipeline, because the middle section will only be created for an isometric drawing which extends over multiple drawings.*

**Solution:**

*Here you have to modify the attributes in the FileNameFormat-tag:*

**Result:**




---

**Task 9: Changing the north arrow direction**

*By default you look on the isometric drawing from southwest. One of some methods to force isometric drawing to fewer drawings as possible is the change the north arrow direction. Create an isometry which will be viewed from southeast.*

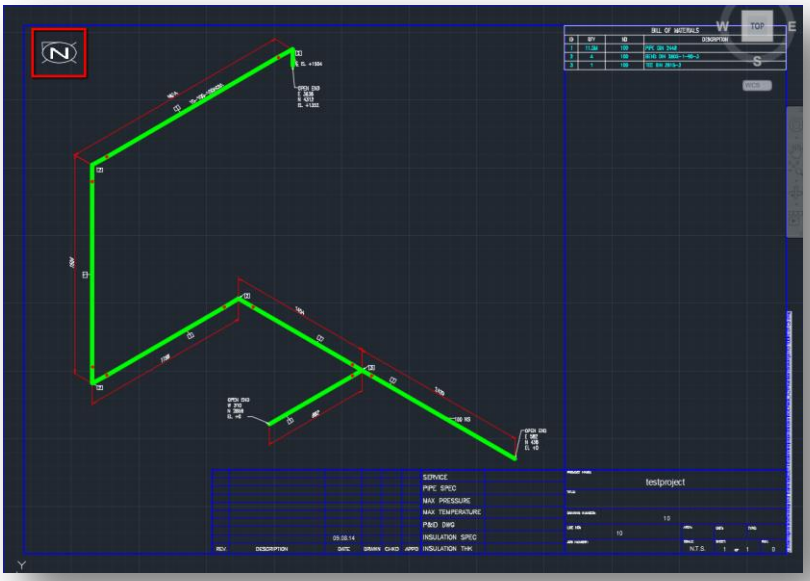
---

**Solution:**

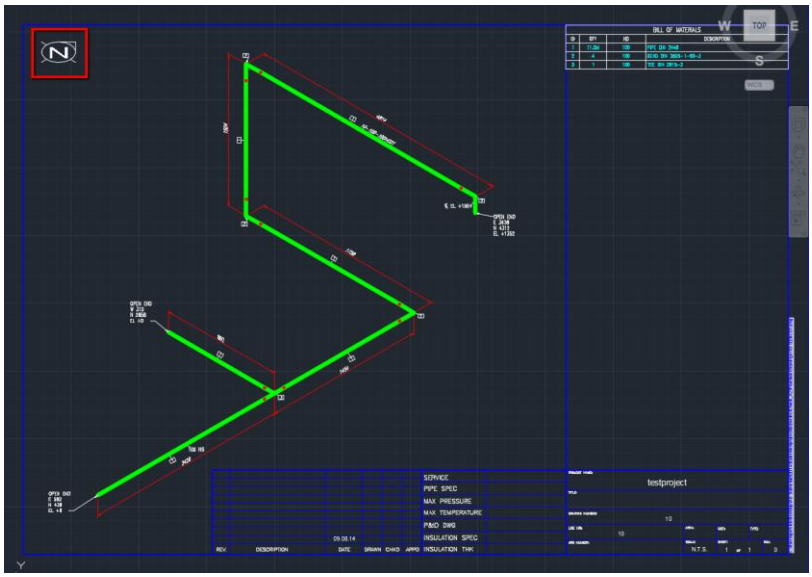
*Set the current scheme of the view to "SEIsometric"*

**Result:**

*Before (southwest):*




*After (southeast))*

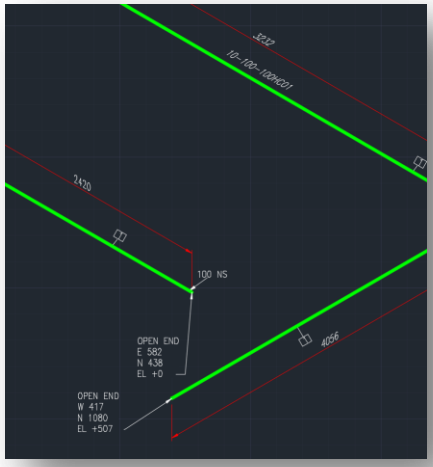


**Task 10: Make intersections visible**

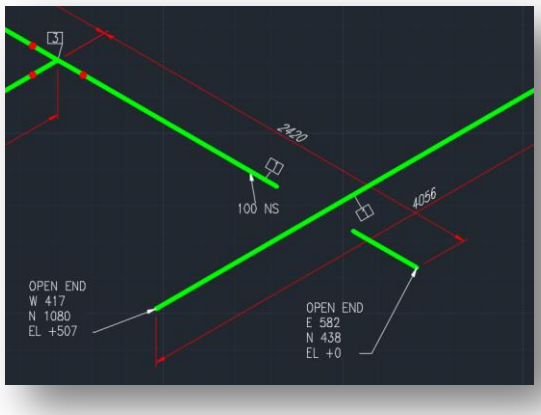
*Open the drawing "Task10.dwg" in the project. You look onto the model from southwest and you note that two pipelines will intersect each other when creating an isometry. By default this will be prohibited by Plant 3D and the isometric drawing will be created in that way that the pipelines will not intersect each other. Try now to configure the isometric that this intersection will be visible. Change also the size of the intersection gap to 20.*

**Solution:**

*Before:*




*After:*



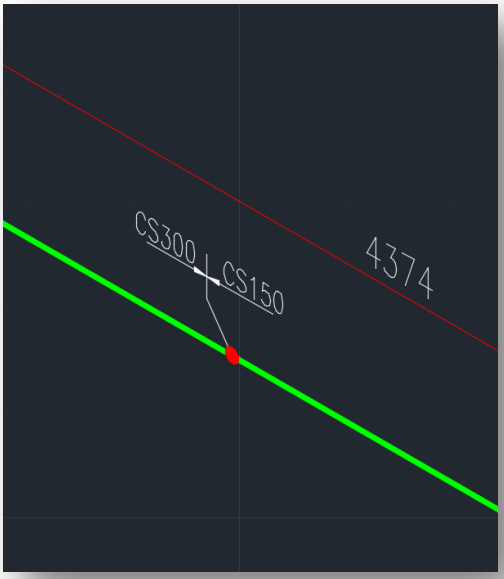
### Task 11: Split by change of spec

*You are using for one line number tag different specs. You want that the isometric drawings to be split by a change of spec. Furthermore you want to show the split by a field weld.*

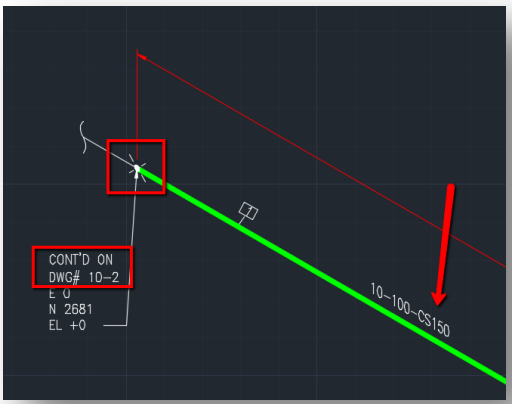
### Solution:

**Result:**

*Before:*



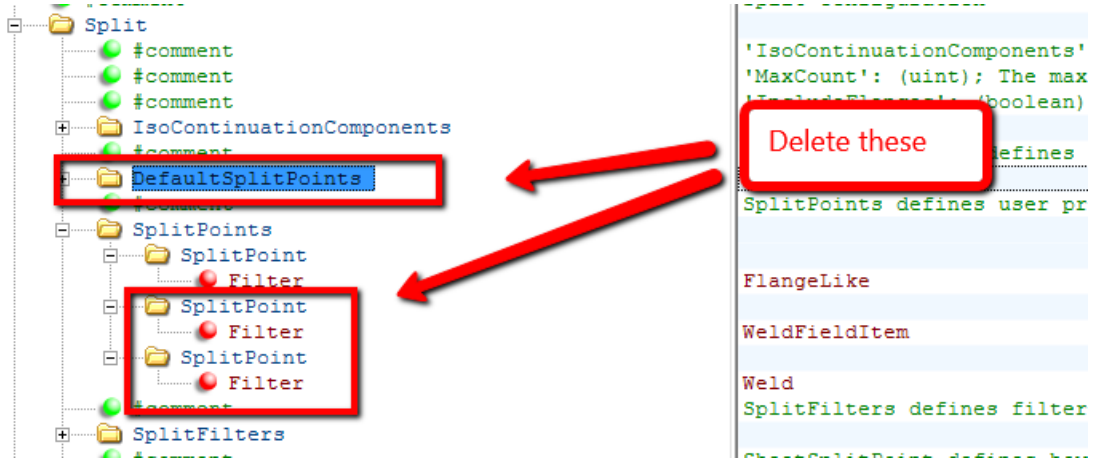

*After:*



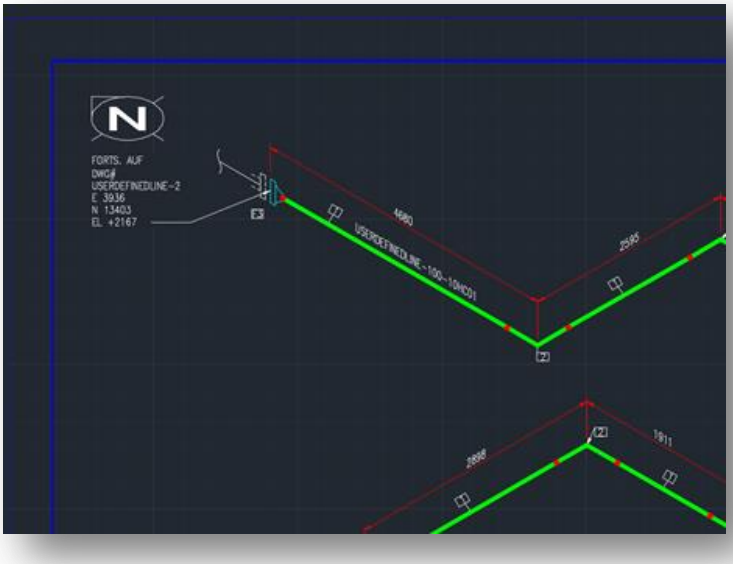
### Task 12: Split by flanges

*Because of the size of the pipeline the "Task12.dwg" will be split to multiple drawings. Configure the isometric drawing so the pipeline will be split only once and will split exactly at the flange.*

**Solution:**




**Result:**



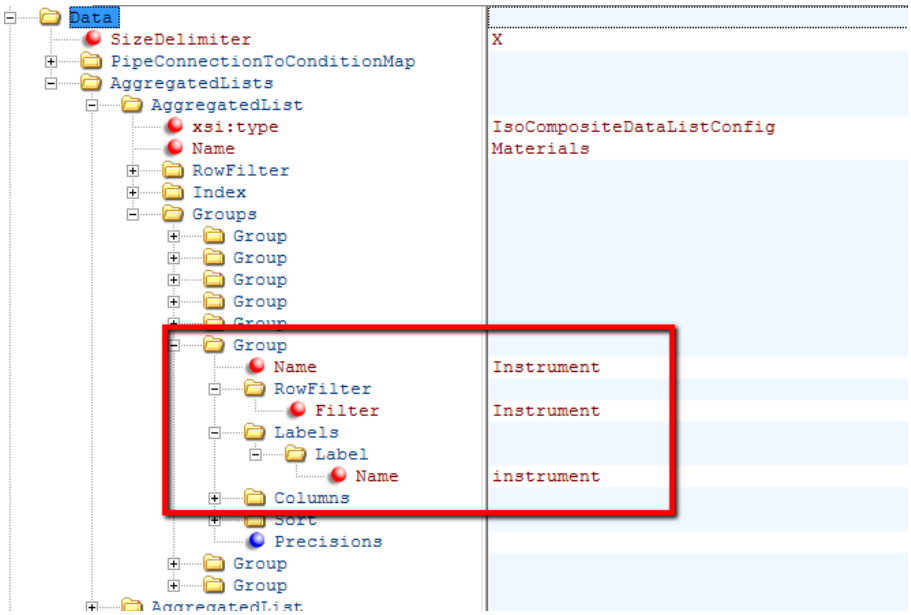
### Task 13: New group “Instrument” in the parts list

*How to add to a grouped parts list a new group “Instrument”?*

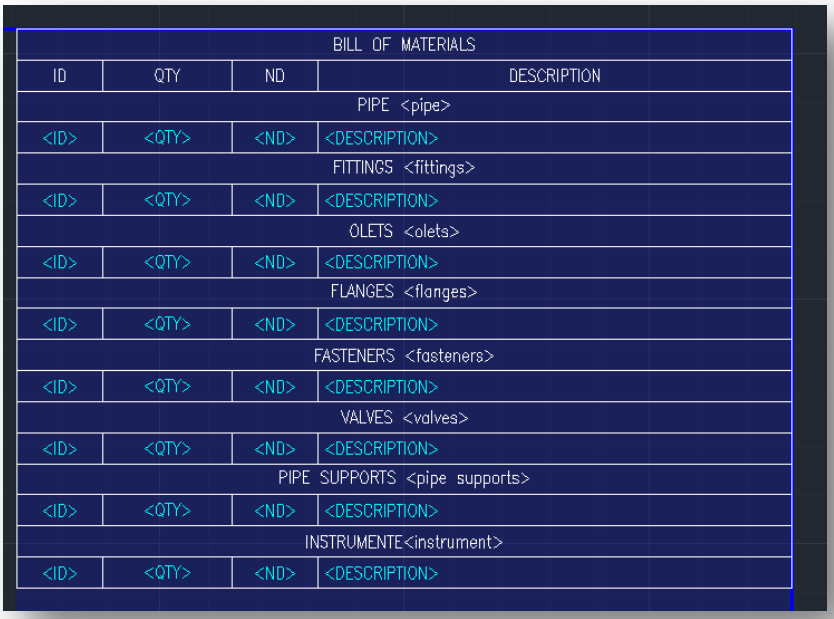
**Solution:**

*Copy a group of the aggregate list “Material” and paste this copy as a new group. Change the following values:*

- *Name = “Instrument”*
- *Label = “Instrument”*
- *Filter = “Instrument”*



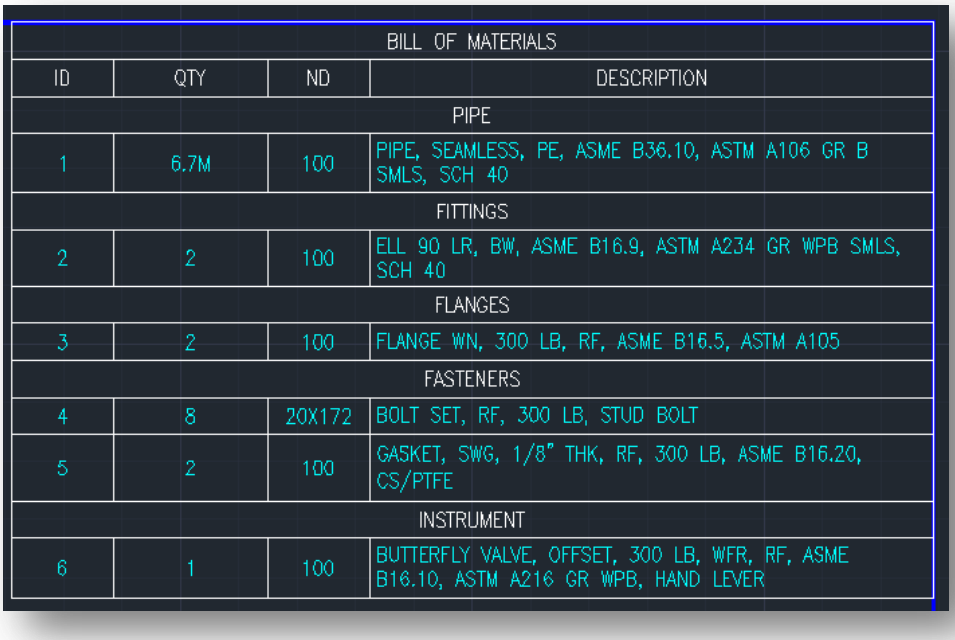

*Adjust the ISO.dwt. Group the BOM via “Table Setup”. Just simple rename the two rows of one category, e.g. Supports. Name the names outside of the brackets in “Instrument” and also inside the brackets. The value inside the brackets corresponds to the label-value and has to be exactly the same as the label in the isoconfig.xml.*



| BILL OF MATERIALS | | | |
|---|---|---|---|
| ID | QTY | ND | DESCRIPTION |
| PIPE <pipe> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| FITTINGS <fittings> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| OLETS <olets> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| FLANGES <flanges> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| FASTENERS <fasteners> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| VALVES <valves> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| PIPE SUPPORTS <pipe supports> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |
| INSTRUMENTE<instrument> | | | |
| <ID> | <QTY> | <ND> | <DESCRIPTION> |

Insert now a valve into your drawing and change in the property palette the ISO Symbol Type to “INSTRUMENT”. Create now an isometric drawing.

**Result:**



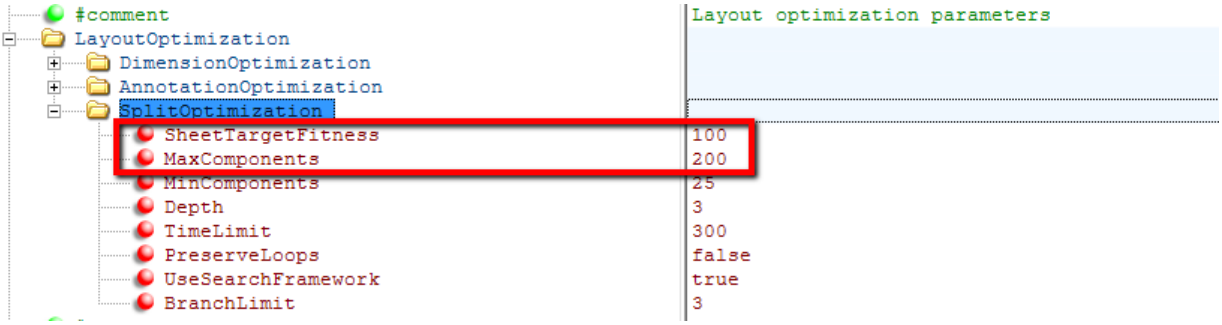
| BILL OF MATERIALS | | | |
|---|---|---|---|
| ID | QTY | ND | DESCRIPTION |
| PIPE | | | |
| 1 | 6.7M | 100 | PIPE, SEAMLESS, PE, ASME B36.10, ASTM A106 GR B SMLS, SCH 40 |
| FITTINGS | | | |
| 2 | 2 | 100 | ELL 90 LR, BW, ASME B16.9, ASTM A234 GR WPB SMLS, SCH 40 |
| FLANGES | | | |
| 3 | 2 | 100 | FLANGE WN, 300 LB, RF, ASME B16.5, ASTM A105 |
| FASTENERS | | | |
| 4 | 8 | 20X172 | BOLT SET, RF, 300 LB, STUD BOLT |
| 5 | 2 | 100 | GASKET, SWG, 1/8" THK, RF, 300 LB, ASME B16.20, CS/PTFE |
| INSTRUMENT | | | |
| 6 | 1 | 100 | BUTTERFLY VALVE, OFFSET, 300 LB, WFR, RF, ASME B16.10, ASTM A216 GR WPB, HAND LEVER |

### Task 14: Reduction of the quantity of isometric drawings

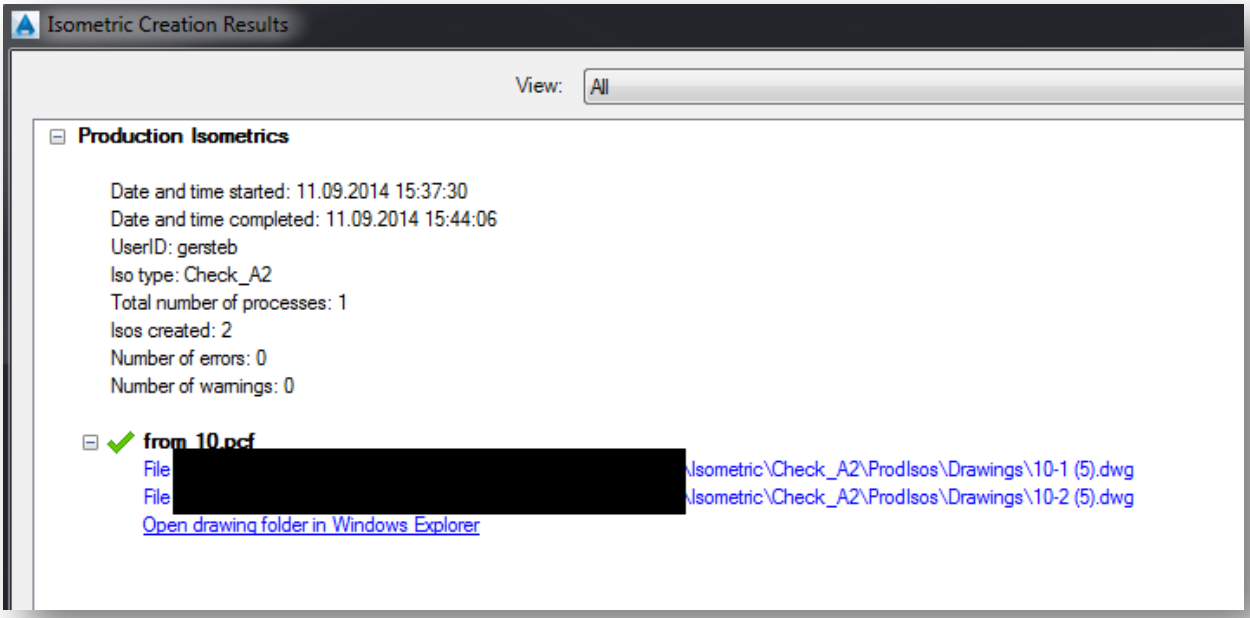
*Create an isometric drawing from drawing "Task14.dwg". Four isometric drawings will be created. Try now to reduce the quantity to only two drawings via LayoutOptimization.*

### Solution:

*Set the values of "SheetTargetFitness" to 100 and "MaxComponents" to 200.*

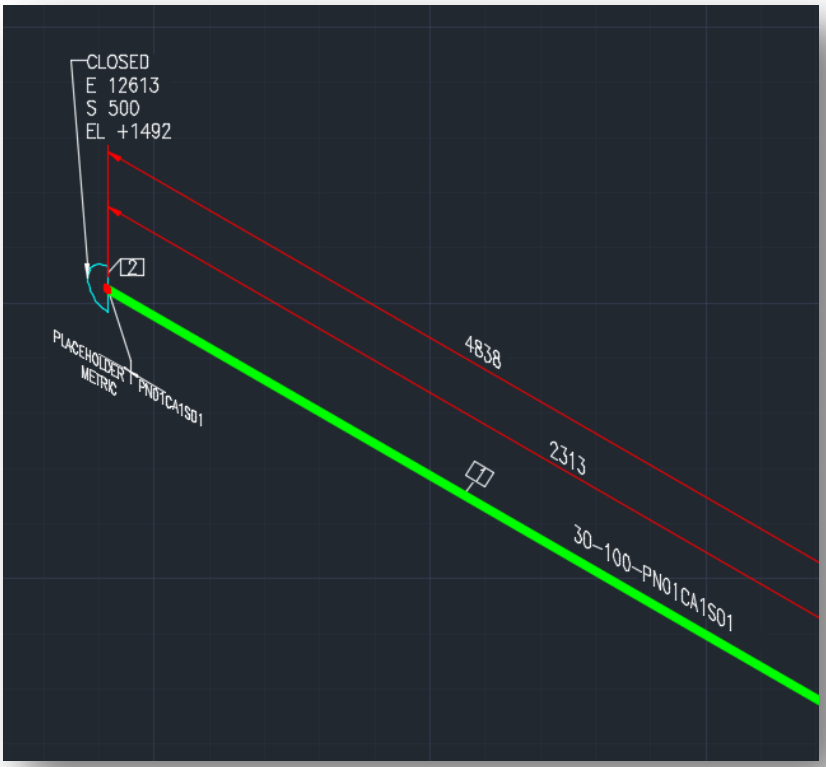



### Result:



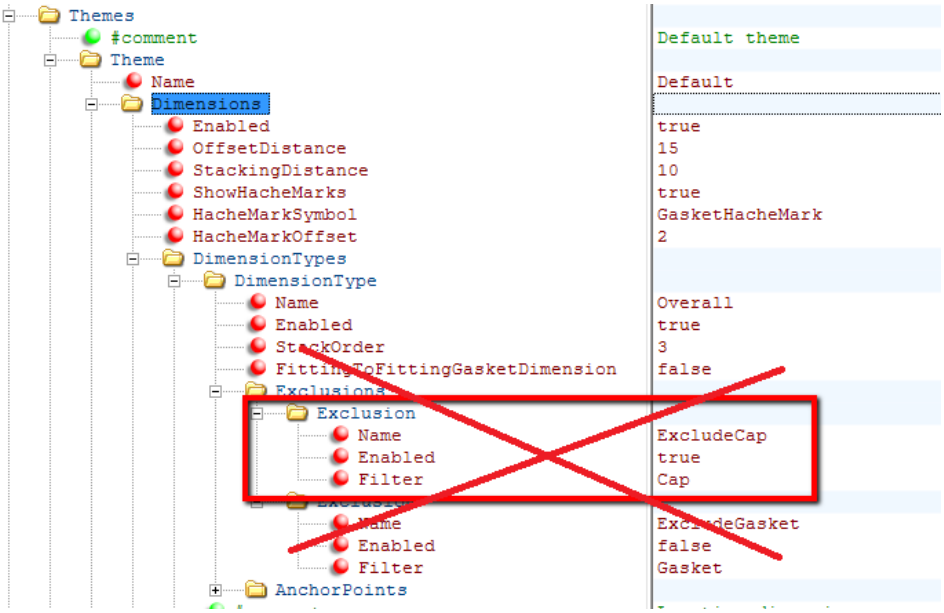
**Task 15: Include caps on dimensions**

*By default caps will not be included on dimensions. But you want them included for an End-to-End-dimension.*

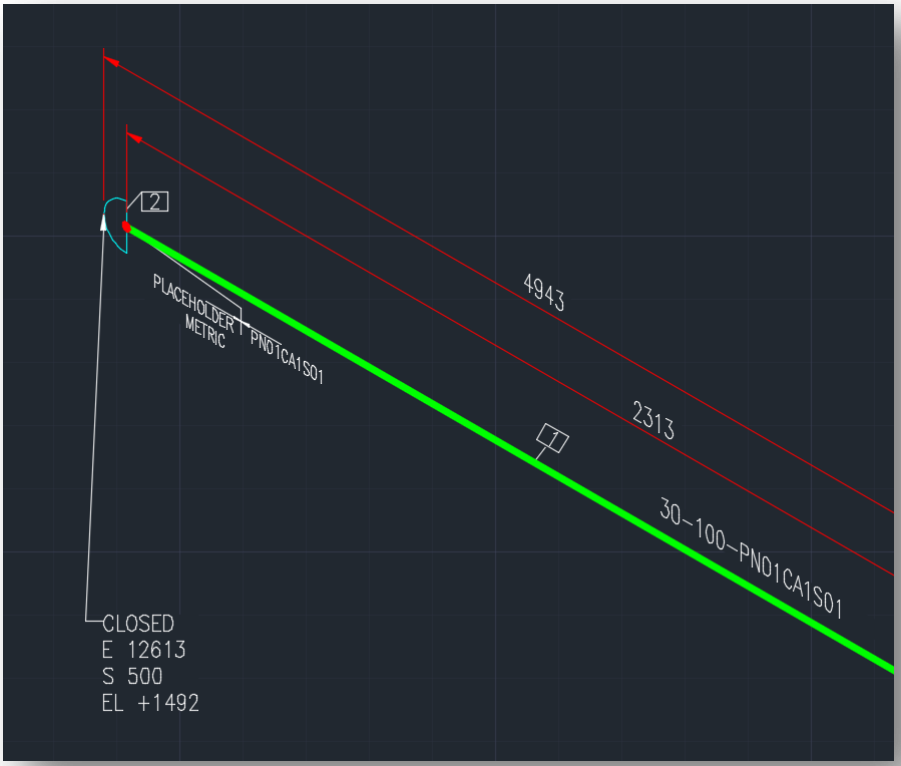



**Solution:**

*Delete in Theme "Default" inside of dimension type "Overall" the exclusion "ExcludeCap".*


Themes
#comment
Default theme
Theme
Name
Default
Dimensions
Enabled
true
OffsetDistance
15
StackingDistance
10
ShowHacheMarks
true
HacheMarkSymbol
GasketHacheMark
HacheMarkOffset
2
DimensionTypes
DimensionType
Name
Overall
Enabled
true
StackOrder
3
FittingToFittingGasketDimension
false
Exclusions
Exclusion
Name
ExcludeCap
Enabled
true
Filter
Cap
Name
ExcludeGasket
Enabled
false
Filter
Gasket
AnchorPoints

**Result:**


2
PLACEHOLDER
METRIC
PN01CA1S01
4943
2313
1
30-100-PN01CA1S01
CLOSED
E 12613
S 500
EL +1492

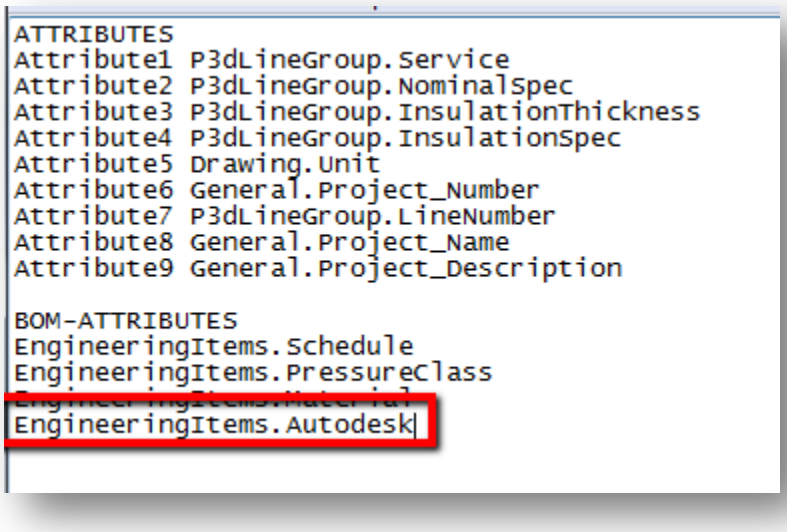
**Task 16: Display of user-defined properties in the isometric drawing**

*In the project configuration you have added a new property to the class "Piping and Equipment" (name = "Autodesk"). How to show it in the isometric drawing?*

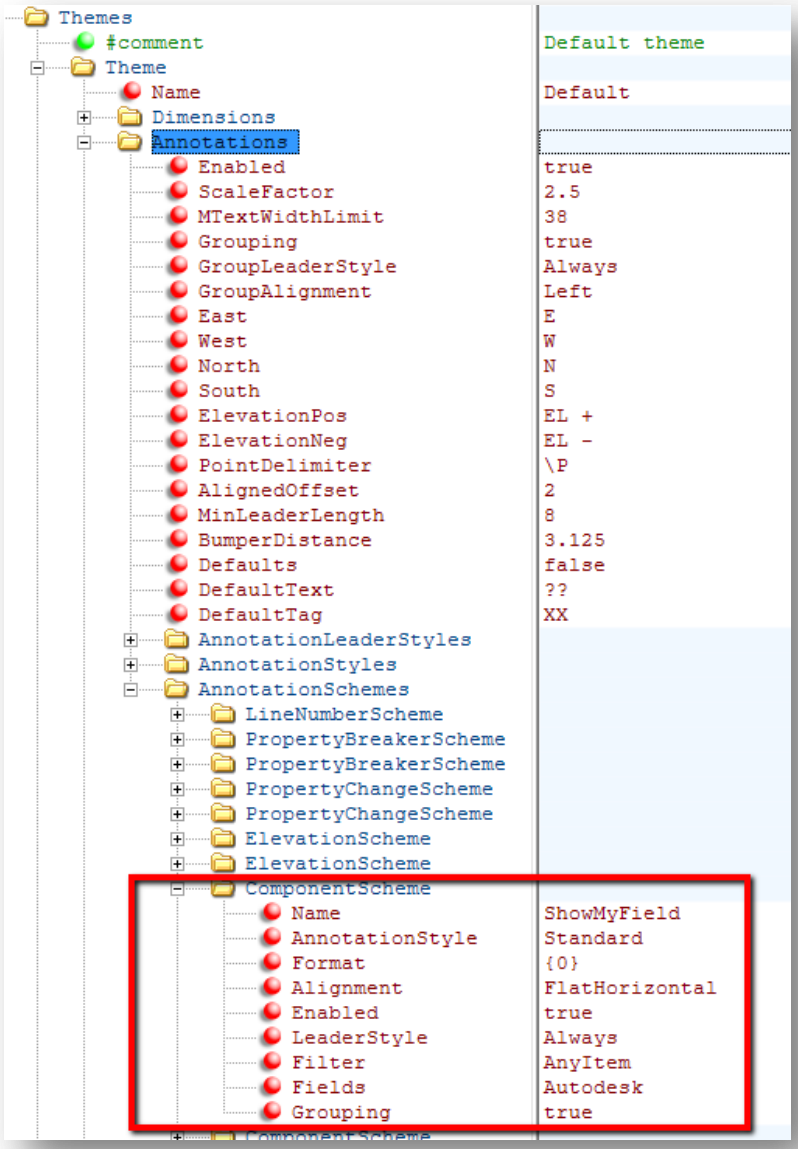
**Solution:**

*For this solution you have to configure the project first.*

- *In the project configuration create a new property, called "Autodesk", for the class "Piping and Equipment". Set the default value of this new property to "AU Las Vegas"*
- *Create a new pipeline in the drawing*
- *Open the iso.atr with an editor and add this row:*

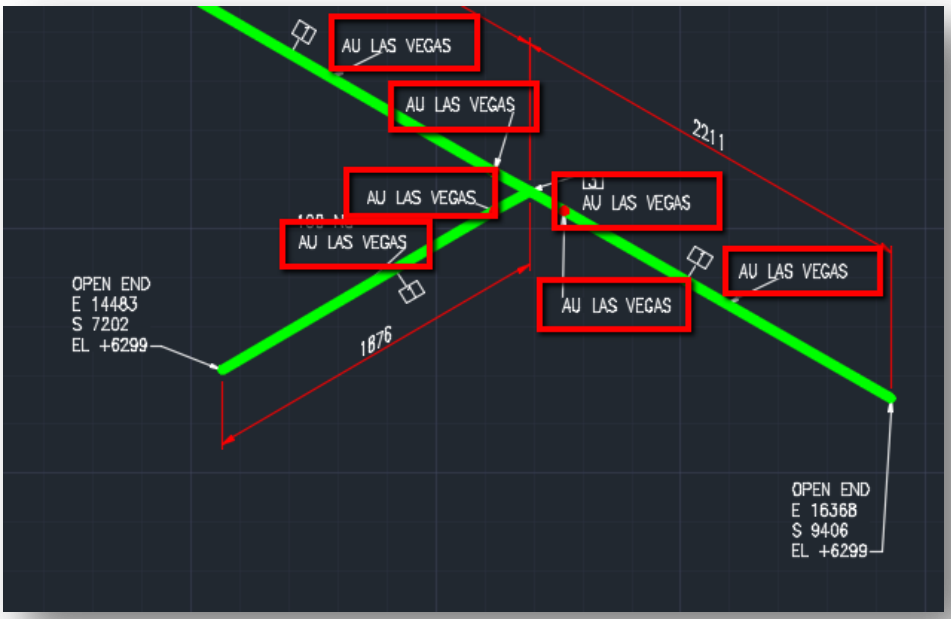



- *Create a new component scheme in the isoconfig.xml*




- *Create now the isometric drawing*

**Result:**




---

**Task 17: Configure the line number**

*Adjust the display of the line number of the isometric drawing. In addition to the pipeline group properties "Line Number" and "Service", the pipeline segment properties "Size" and "Shop_Field" should be specified.*

---

**Solution:**

*Here you have to configure the iso.atr and the isoconfig.xml. Because the property "Service" is a property of the pipeline group, this property will be specified in the section "ATTRIBUTES" of the iso.atr. The property "Shop_Field" however is a property of the class "Pipe Run Component". This property does not belong to the pipeline group, project, drawing or LTD-properties. Therefore this property will not specified in the sector "ATTRIBUTES" but in "BOM-ATTRIBUTES".*

```
ATTRIBUTES
Attribute1 P3dLineGroup.Service
Attribute2 P3dLineGroup.NominalSpec
Attribute3 EngineeringItems.Autodesk
Attribute4 P3dLineGroup.InsulationSpec
Attribute5 Drawing.Unit
Attribute6 General.Project_Number
Attribute7 P3dLineGroup.LineNumber
Attribute8 General.Project_Name
Attribute9 General.Project_Description

BOM-ATTRIBUTES
EngineeringItems.Schedule
EngineeringItems.PressureClass
EngineeringItems.Material
PipeRunComponent.Shop_Field
```

Afterwards you are able to reference to these properties in the LineNumberScheme in the *isoconfig.xml*.

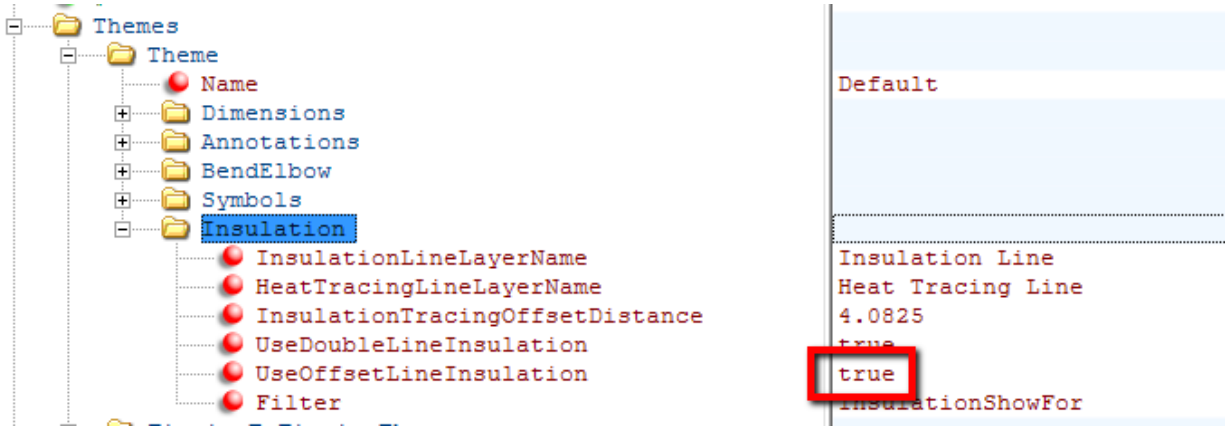
```
AnnotationSchemes
  LineNumberScheme
    Name                LineNumber
    AnnotationStyle     Standard
    Format              {0}-{1}
    Alignment           SkewAligned
    LeaderStyle         AsNeeded
    ComponentFields     Size Shop_Field
    LineFields          PIPELINE-REFERENCE ATTRIBUTE1
    ComponentFormat     {0}-{1}
    LineFormat          {0}-{1}
```

**Result:**

### Task 18: Display of the insulation

*Display the insulation in the isometric drawing.*

**Solution:**




**Note:** Since AutoCAD Plant 3D 2015 Extension 1 you are able to do this setting in the user interface.

**Result:**

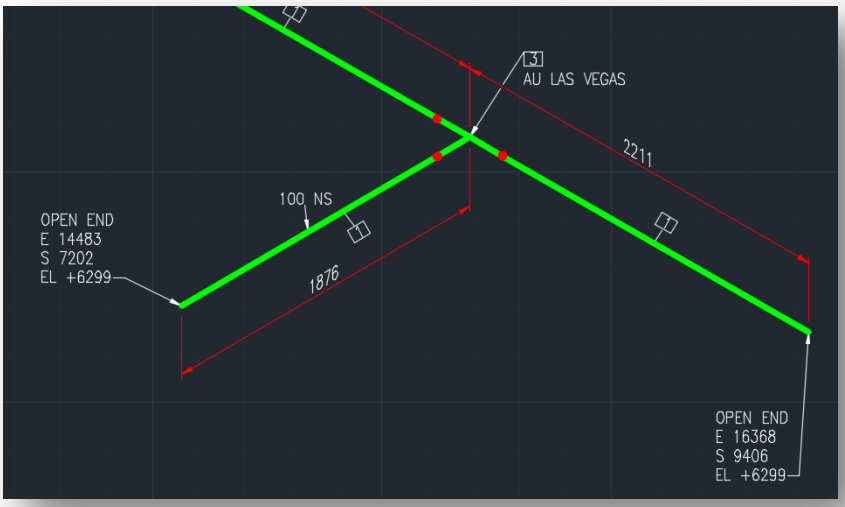
**Task 19: User-defined filter**

*In Task 16 you have used a user-defined property to annotate all components with this property. Change now this component scheme in that way that only crosses and tees will be annotated with this property.*

**Solution:**

- *Add a tee or a cross to your model*
- *Create a new filter in the isoconfig.xml and point in the component scheme "ShowMyField" to this filter*

**Result:**



## Learning Objective 4: Additional customization of isometric drawings

We are talking here about these files:

Isometric project files:

- *BoltSizeMappings.xml*
- *Plant3dIsoSymbols.dwg*
- *PropertyTranslationMapping.xml*

Isometric style files:

- *Iso.dwt*
- *Iso.atr*
- *ClientConfig.isf*

### BoltSizeMapping.xml

This file will be used for two things:

- Mapping between British and metric bolt set sizes
- Setting of the alias names for the direction of the actuator of a valve

---

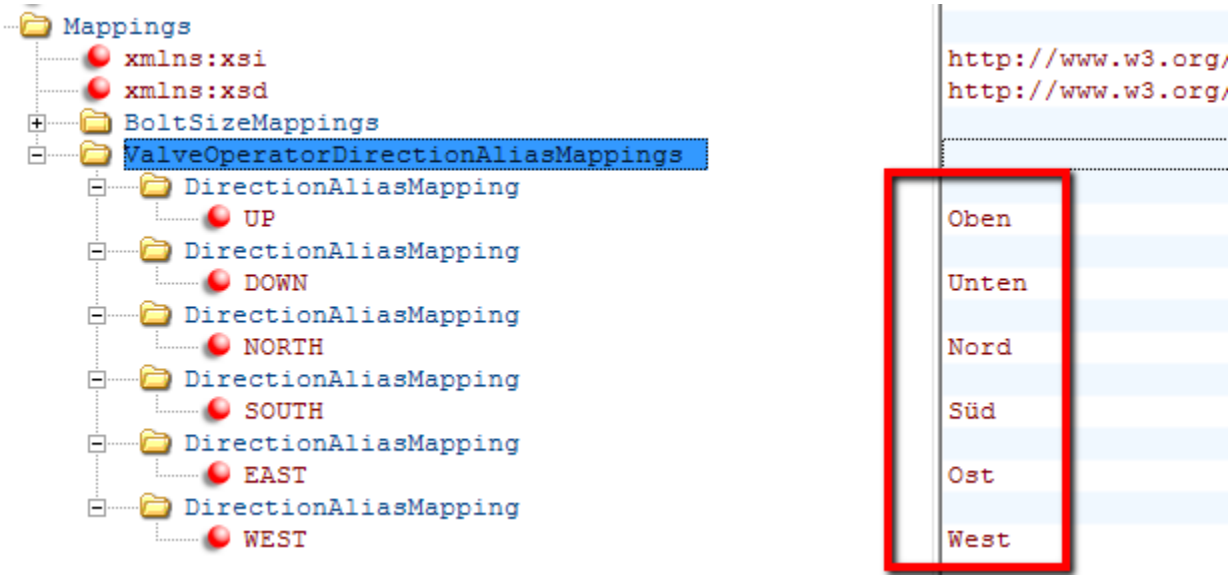
**Task 20: Translation of the direction of the actuators**

*You have a German customer. The actuators will be shown in the isometric drawing by "Operator <direction>. Translate the direction to German*

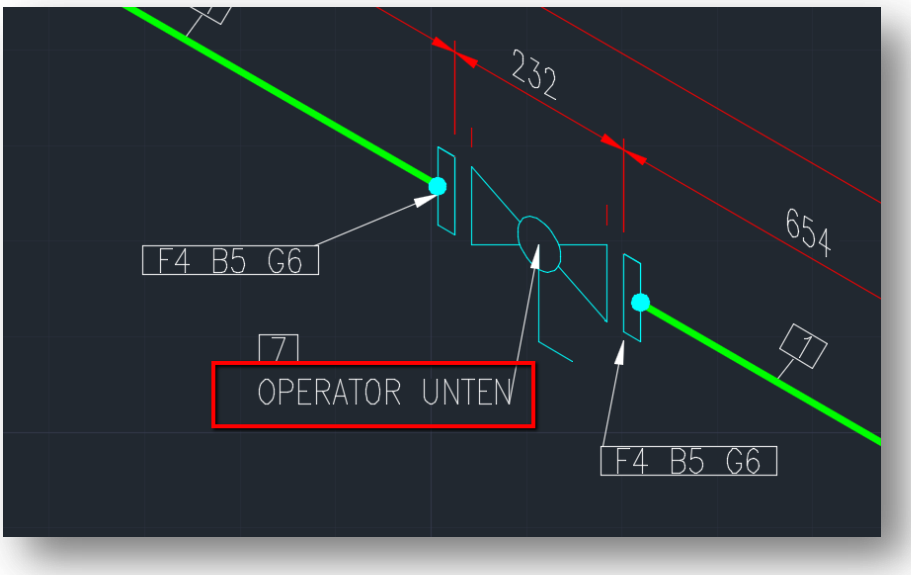
- *North = Nord*
- *West = West*
- *South = Süd (you can also write "Sued")*
- *East = Ost*
- *Up = Oben*
- *Down = Unten*

---

**Solution:**




**Result:**

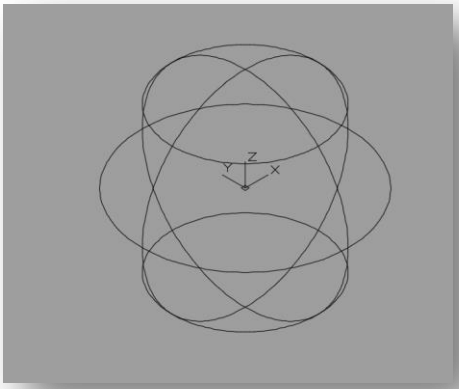



**Plant3dIsoSymbols.dwg**

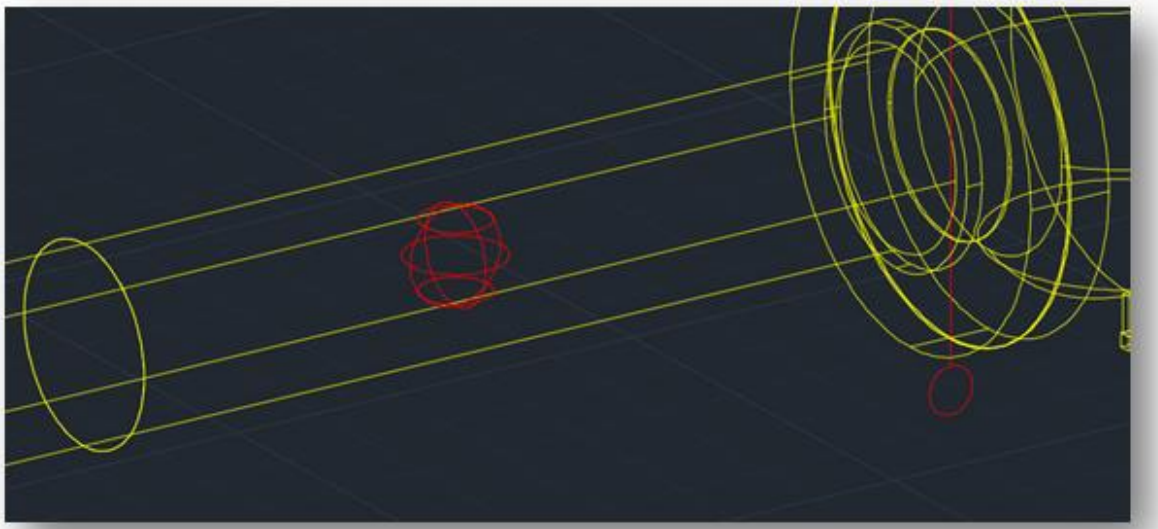
This drawing contains the block definition of Iso messages and break point markers. Used by both the 3D model and the isometric drawing.

Example: P3DIsoSphere, which will be used for the creation of a break point:

Block in the *Plant3DIsoSymbols.dwg*:




Presentation in the model:



**PropertyTranslationMapping.xml**
Maps property values to display values. For example, Weldolet can be replaced by WOL.

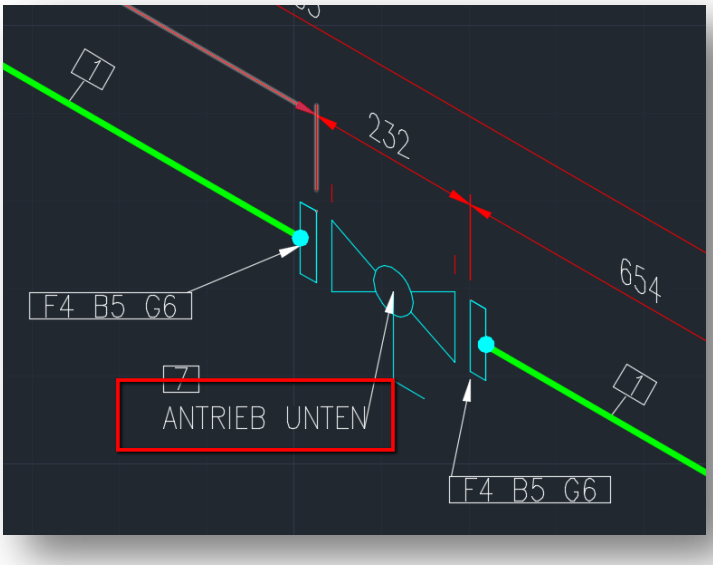
### Task 21: Use of alias names for fix values

*After task 20 the actuator will be displayed with “Operator unten”. The translation for “Operator” to German is “Antrieb”. Configure the project that now “Antrieb unten” will be displayed.*

**Solution:**

```
xml                                  version="1.0"
PropertyTranslationMap
    xmlns:xsi                        http://www.w3.org
    xmlns:xsd                        http://www.w3.org
    Version                          1
    Name                             Default
    #comment                         Property translat
    #comment                         Example:
    #comment                         Uncomment the lir
    Property
        Key                          Operator
        Value                        Antrieb
```

**Result:**



**Iso.dwt**
This is the drawing template for isometric drawings. You open the iso.dwt via project configuration from node “Isometric DWG Settings – Title Block and Display”, Button “Setup Title Block…”.

Beneath the title block the following will be saved here:

- Tables like Bill of Materials or Weld List
- Draw Area and No Draw Area
- North Arrow
- Attribute mapping
- LDT-Setting
- Different styles like table style, text style, etc.
- Layer configuration

---

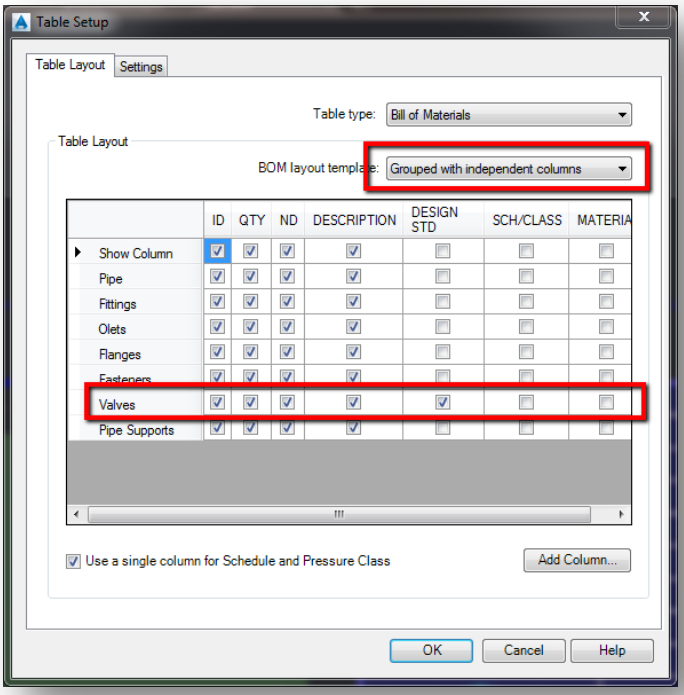
**Task 22: Group the Bill of Materials by independent columns**

*Configure the BOM in that way that for all categories the following columns will be displayed: ID, QTY, ND, Description. For the valves the column “Design Std” should be additionally shown.*

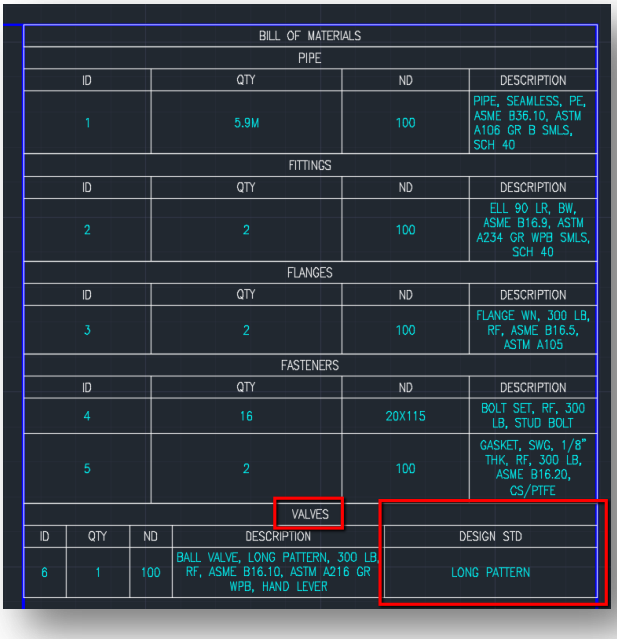
---

**Solution:**

- *After opening the ISO.dwt via project configuration, click “Table Setup…” and select there in the selection list “Grouped with Independent Columns”*
- *Click “Add Column” and select the property “Design Std”*
- *Check for the category “Valves” the column “Design Std”*




## Result:



BILL OF MATERIALS

PIPE

| ID | QTY | ND | DESCRIPTION |
|---|---|---|---|
| 1 | 5.9M | 100 | PIPE, SEAMLESS, PE, ASME B36.10, ASTM A106 GR B SMLS, SCH 40 |

FITTINGS

| ID | QTY | ND | DESCRIPTION |
|---|---|---|---|
| 2 | 2 | 100 | ELL 90 LR, BW, ASME B16.9, ASTM A234 GR WPB SMLS, SCH 40 |

FLANGES

| ID | QTY | ND | DESCRIPTION |
|---|---|---|---|
| 3 | 2 | 100 | FLANGE WN, 300 LB, RF, ASME B16.5, ASTM A105 |

FASTENERS

| ID | QTY | ND | DESCRIPTION |
|---|---|---|---|
| 4 | 16 | 20X115 | BOLT SET, RF, 300 LB, STUD BOLT |
| 5 | 2 | 100 | GASKET, SWG, 1/8" THK, RF, 300 LB, ASME B16.20, CS/PTFE |

VALVES

| ID | QTY | ND | DESCRIPTION | DESIGN STD |
|---|---|---|---|---|
| 6 | 1 | 100 | BALL VALVE, LONG PATTERN, 300 LB, RF, ASME B16.10, ASTM A216 GR WPB, HAND LEVER | LONG PATTERN |

### Iso.atr

The file extension *ATR* stands for Attribute. The *iso.atr* is divided into two halves: The ATTRIBUTES and the BOM-ATTRIBUTES.

```
ATTRIBUTES
Attribute1 P3dLineGroup.Service
Attribute2 P3dLineGroup.NominalSpec
Attribute3 EngineeringItems.Autodesk
Attribute4 P3dLineGroup.InsulationSpec
Attribute5 Drawing.Unit
Attribute6 General.Project_Number
Attribute7 P3dLineGroup.LineNumber
Attribute8 General.Project_Name
Attribute9 General.Project_Description

BOM-ATTRIBUTES
EngineeringItems.Schedule
EngineeringItems.PressureClass
EngineeringItems.Material
```

The title block uses only attributes form the section ATTRIBUTES. Here only properties of the project, the drawing, the pipeline groups and LTD-properties are evaluated. The AnnotationSchemes of the *isoconfig.xml* access throughout the tag “LineField” on these properties.

All other properties have to be specified in the bottom section BOM-ATTRIBUTES for evaluation. On these properties the AnnotationSchemes access throughout the tag “ComponentField”.

**Tasks therefore are the tasks 16 and 17**

### ClientConfig.isf

All other settings that are not set in the *isoconfig.xml* will be set in the *ClientConfig.isf*. Those settings can be all done in the user interface. So this file will normally not be edited.