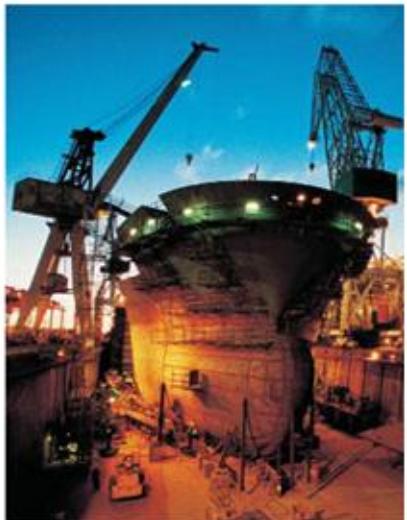
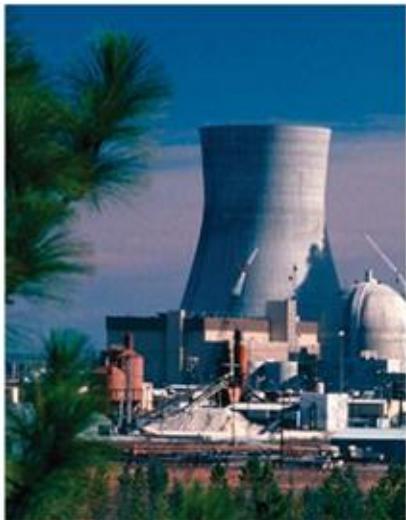


SmartPlant 3D

Isometrics Practice Labs

Process, Power & Marine



Version 2011 SP1

June 2012

DSP3D-TP-100079A

INTERGRAPH

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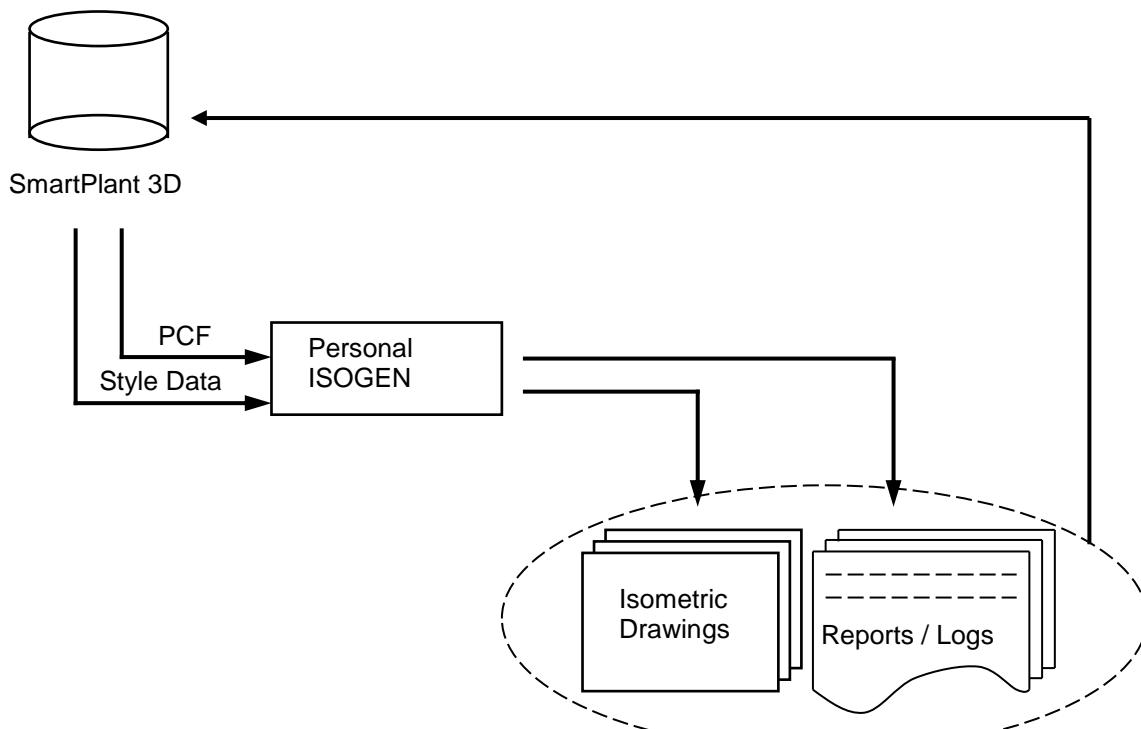
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Introduction

Automated isometric drawing production is naturally expected in 3D plant design and ISOGEN is the undoubted world leader in the production of such drawings.

SmartPlant 3D manages the automatic drawing creation, utilising ISOGEN by generating a PCF (Piping Component File) and by using the 'Options Browser' for controlling the drawing configuration.

The resultant output is stored in the SmartPlant 3D database. The drawing styles are stored in the SmartPlant 3D catalogue and are written to an XML configuration file for processing by ISOGEN.



Workflow:

The workflow in creating an isometric drawing can be considered in two parts:

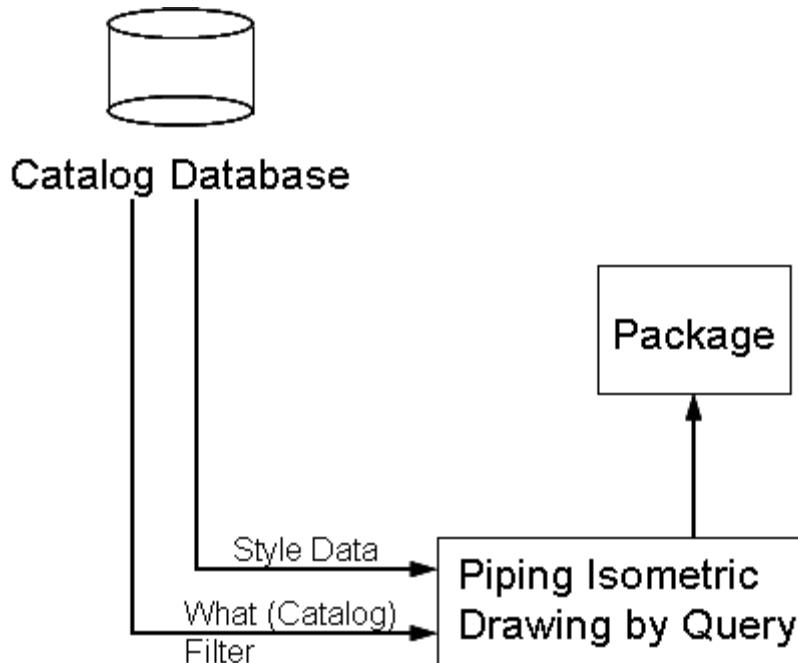
- The Administration Workflow
- The User Workflow

Administration Workflow:

The SmartPlant 3D Administrator will create an isometric style containing a Border file and a set or configuration options, this will be Bulk Loaded into the Catalog.

A '**Piping Isometric Drawing by Query**' component is then created; this is associated to the isometric style to form a '**Package**'. The Package is stored in the 'symbols share' for the project.

The 'Piping Isometric Drawing by Query' component specifies the "what" portion of the query.



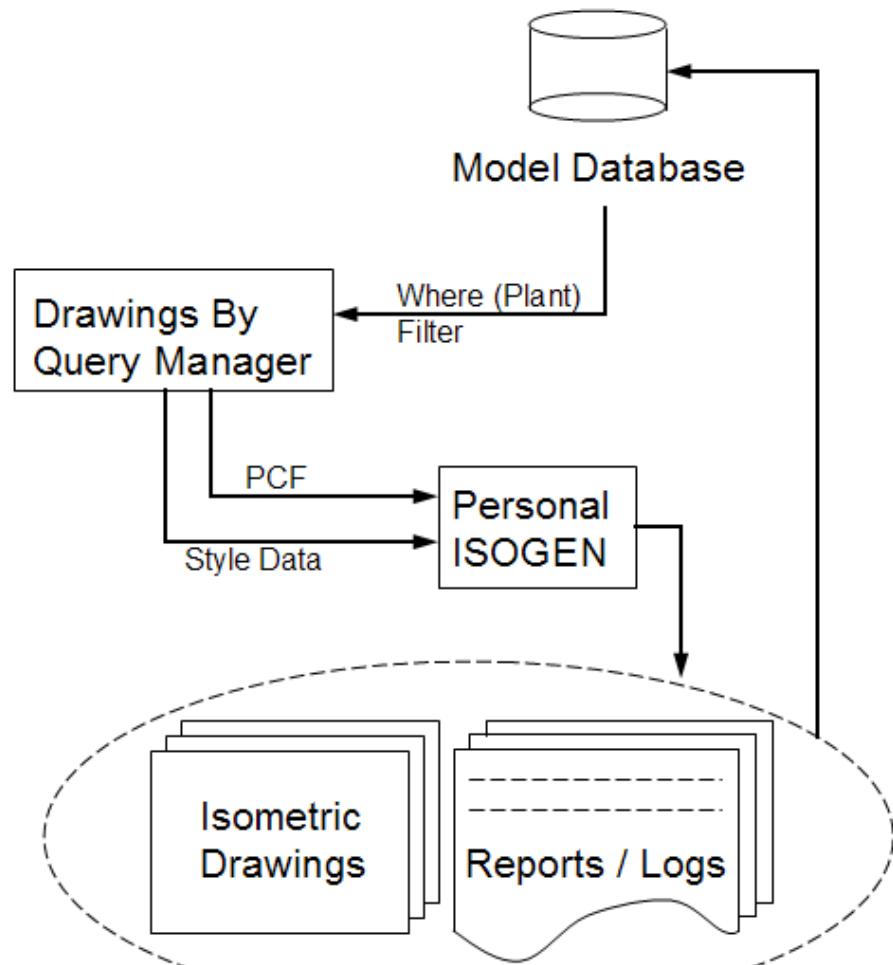
User Workflow:

The SmartPlant 3D user creates a 'Drawings by Query Manager' component to specify the "where" portion of the query.

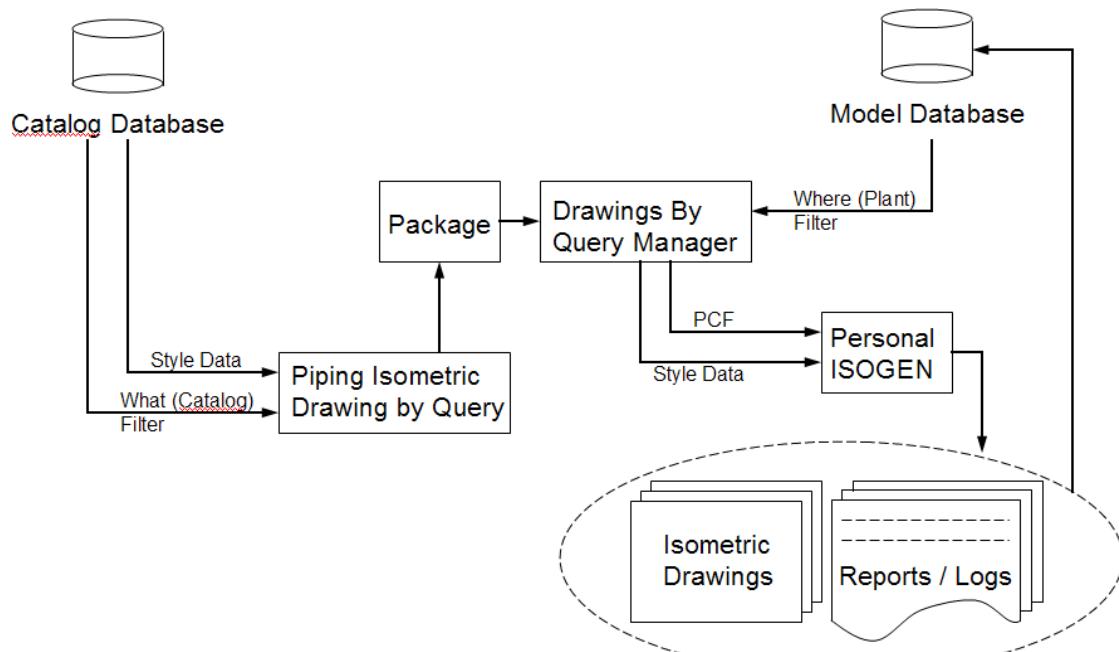
The 'Drawings by Query Manager' component references a **Package** that specifies what items will be extracted and which isometric style will be used.

The basic user workflow for creating Piping Isometric Drawings by Query is as follows:

- Create a 'Drawings by Query Manager' component which specifies where to look for the data (Pipeline, Pipe Run)
- Run the filter-based query
- Create the drawings
- Update the drawings, if necessary
- Publish the drawings to a viewable graphic file; no physical data is published



Total Workflow:



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Delivered Styles:

Each Piping Isometric Drawing by Query component has an associated isometric style. The delivered styles are **Iso_Pipeline**, **Iso_Piperun**, **Iso_PenSpool**, **Iso_Spool**, **Iso_WBS**, and **Iso_Stress**.

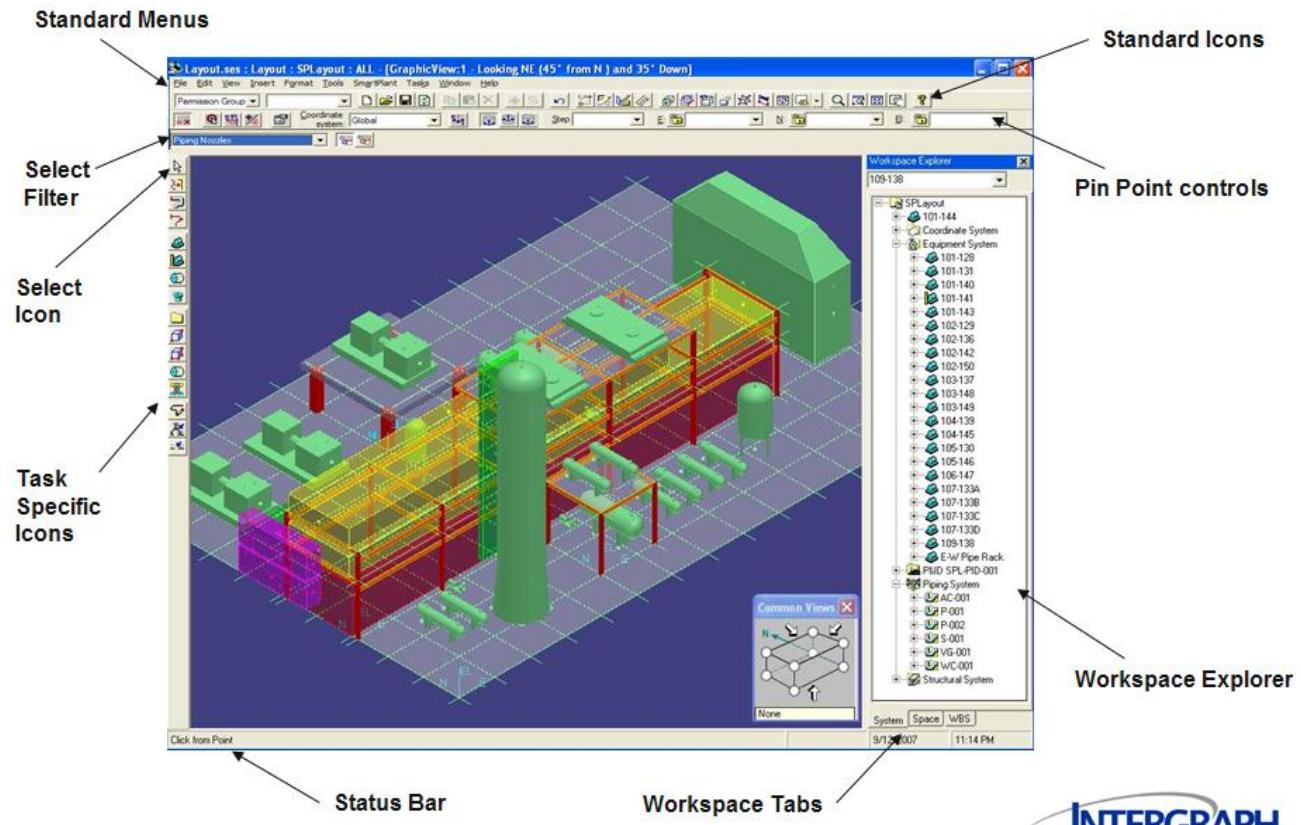
You can open the **Isometric Style Options Browser** from any of the isometric drawing styles by right-clicking the drawing style in the **Console** or in the **Drawings and Reports** task and selecting **Edit Options** on the shortcut menu. The browser allows you to set options for isometric drawing format and content, these changes can be saved to the Catalog or exported to an XML file for use on other projects etc.

After creating the Piping Isometric Drawings, you can open them for viewing, editing, printing, and publishing (if your model has been registered using the SmartPlant Registration Wizard).

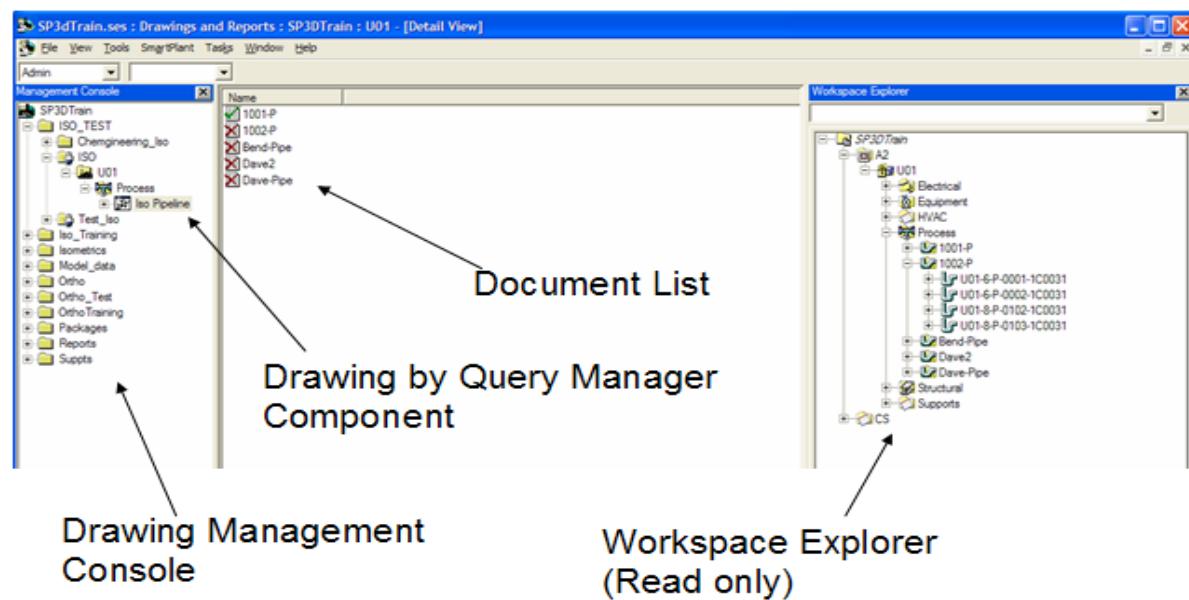
To troubleshoot the drawings, you can use the **View Extraction Data** command to access part and reports information and log files.

SmartPlant 3D User Interface:

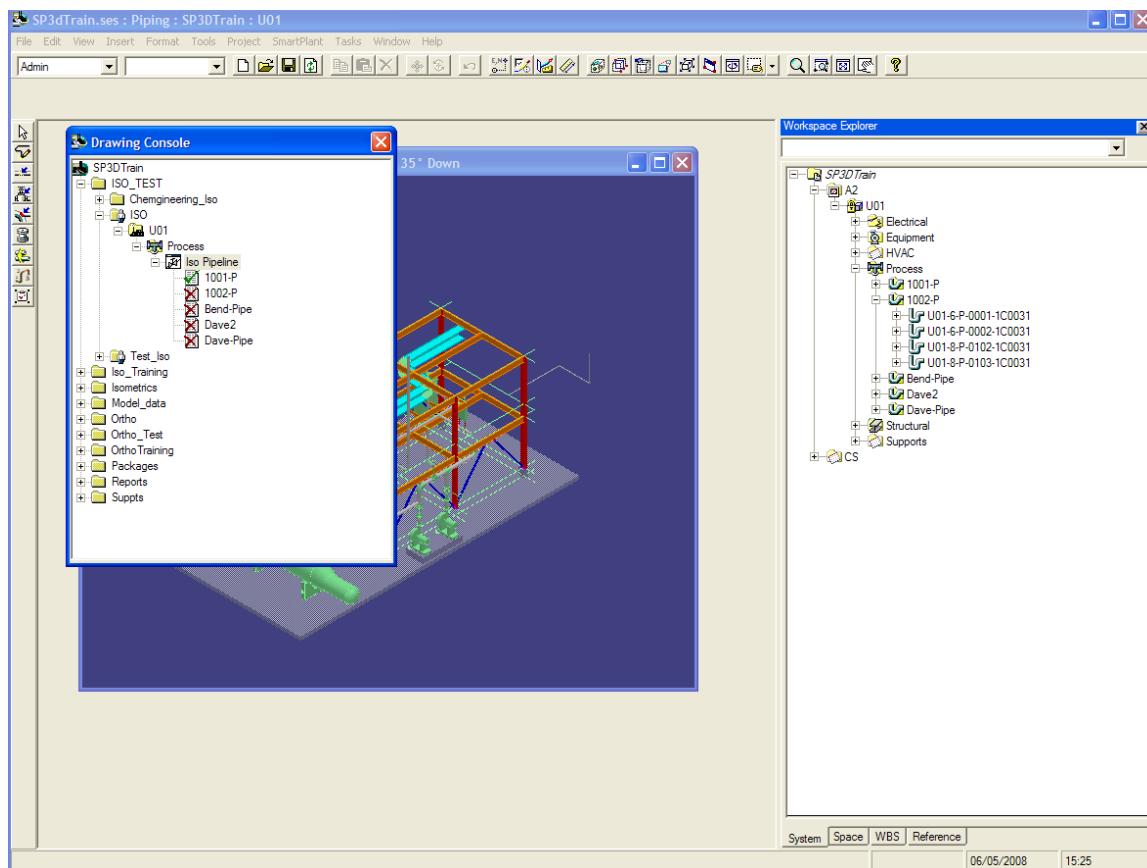
The main user interface when in the SmartPlant 3D is shown below, use these diagrams to located buttons and features mentioned in the labs.



In addition, when in the Drawings and Reports task, the interface is as shown below:



In SmartPlant 3D version 2007, Service Pack 4 and above, the drawing console is available from within all tasks. It is displayed from the Tools -> Drawing Console menu item:



These labs give instructions from the 'Drawings and Reports' task, however, using V2007 Service Pack 4 and above, they can just as easily be performed using the 'Drawing Console'.

Document Icons:



Piping Isometric Drawings by Query Manager



Drawings by Query Manager



Out of Date Document



Up to Date Document



Document with Warning



No Part found in Pipeline

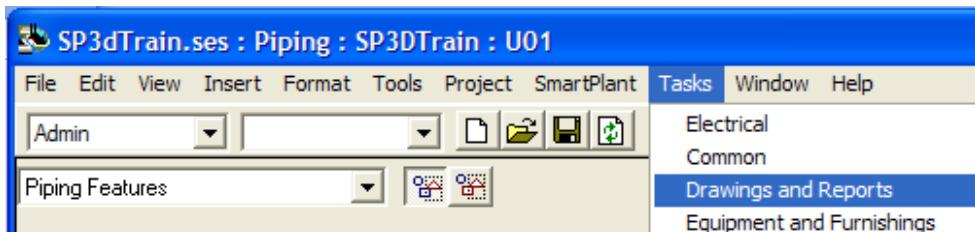
Lab 1: Out of the Box Isometric drawings extraction

Extracting Isometric Drawings using Drawings by Query Manager

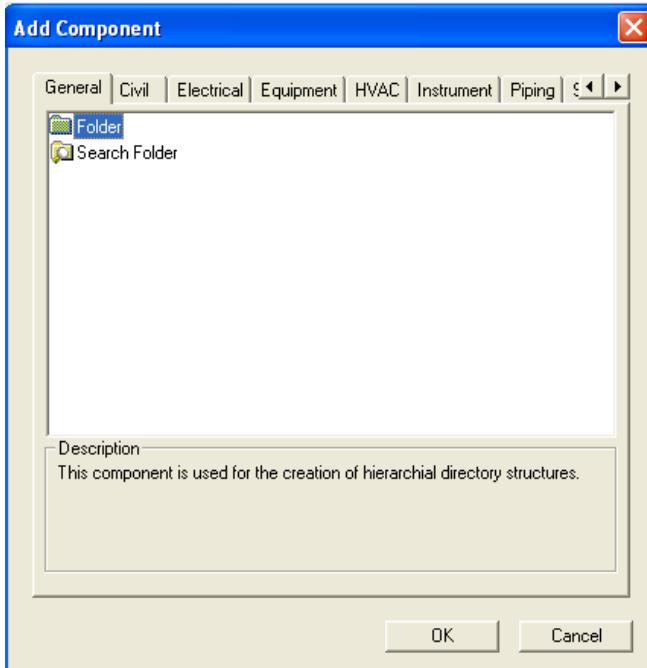
1. In Lab 1, you are going to generate an isometric using the 'out of the box' Iso_Pipeline style:
2. Enter SmartPlant 3D by double clicking the Isometric_Workshop.ses shortcut on the Desktop:



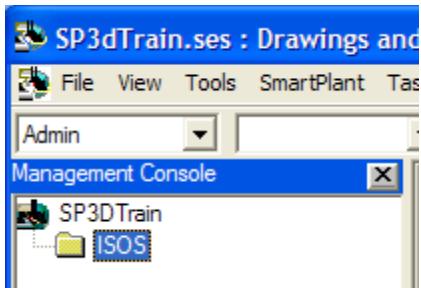
3. Switch to the **Drawings and Reports** task by selecting the Task -> Drawing and Reports menu item:



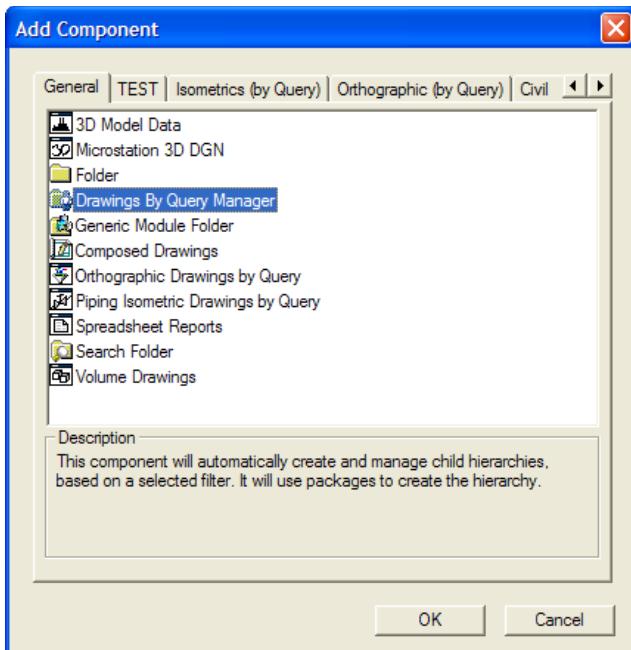
4. Right click on plant **SP3DTrain**, select **New..** to create a Folder, the folder is found on the General Tab:



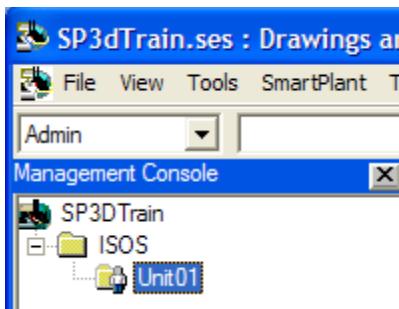
5. Rename the new folder to: **ISOS**



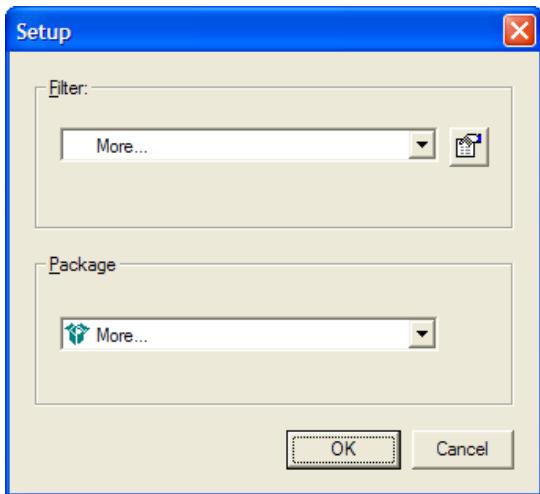
6. Right click on ISOS, select New.. to create a Drawing By Query Manager from the General tab



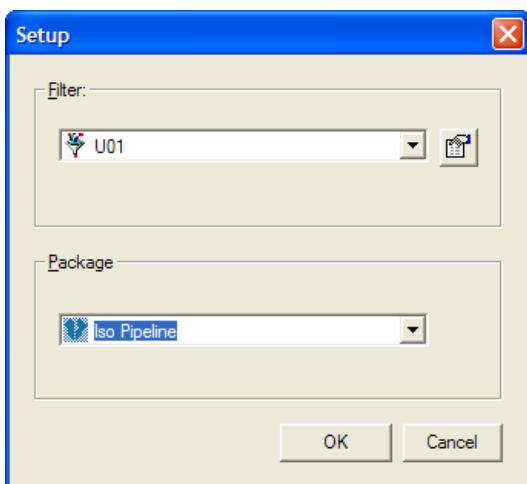
7. Rename the resulting Drawings By Query Manager folder to **Unit01**:



8. Right click Unit01 and select Setup..

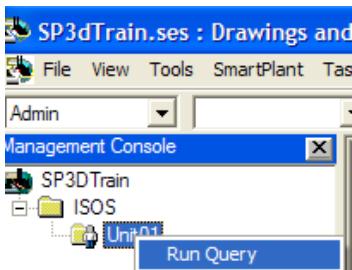


9. Under Filter select More.. and pick Training Filters>U01
Under Packages Select More.. and pick Iso Pipeline

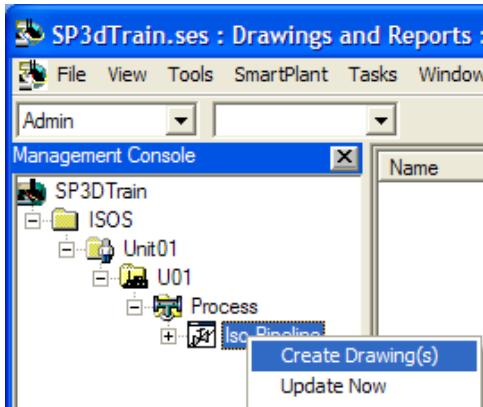


10. Click OK

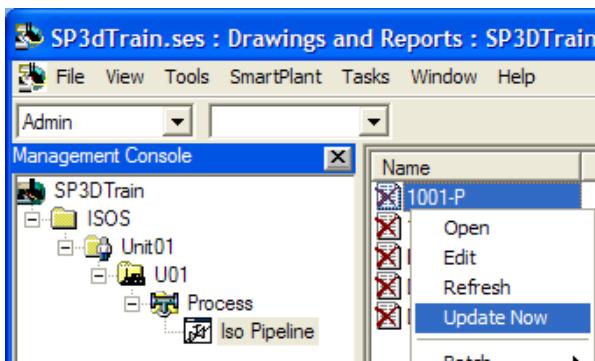
11. Right click Unit01 and select Run Query



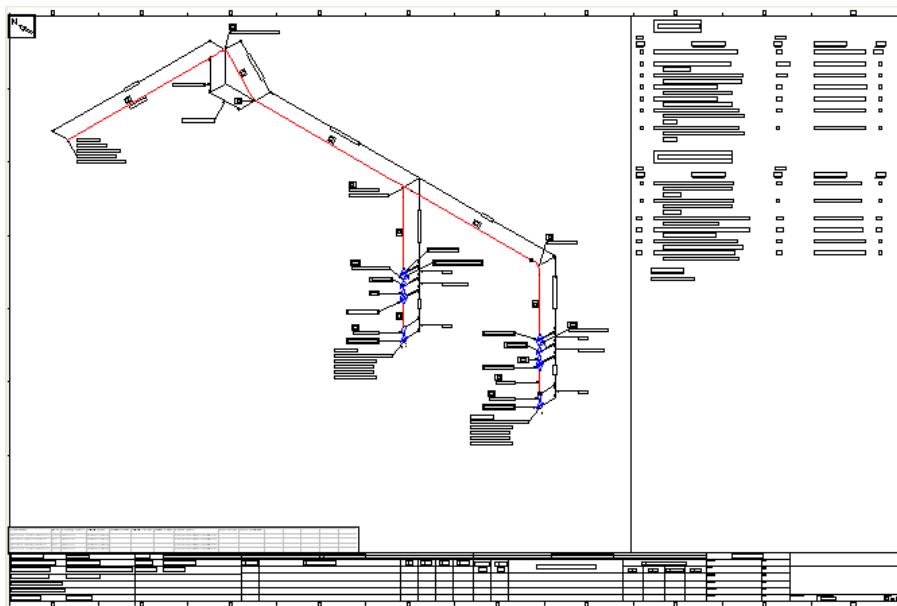
12. Expand the tree structure created and right click Iso Pipeline to launch Create Drawings:



13. Right click iso 1001-P and select Update Now

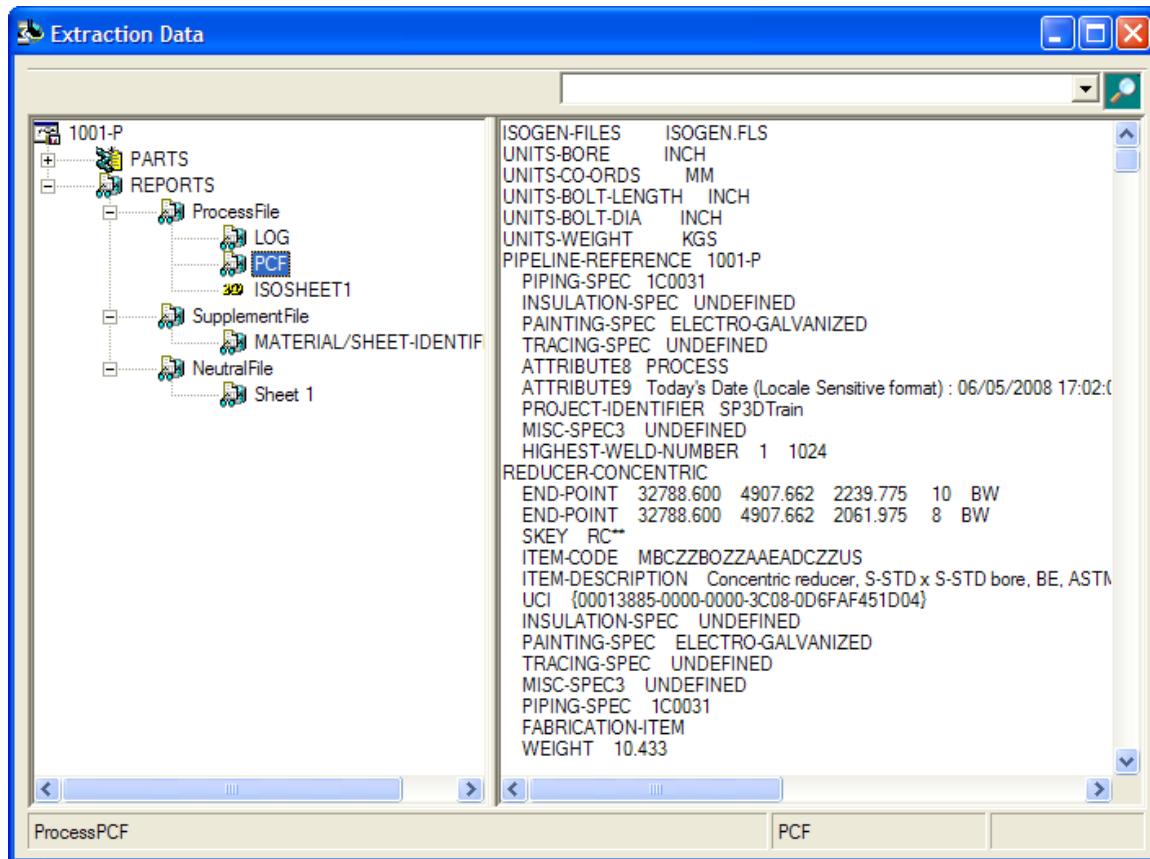


14. Once the green tick appears, double click drawing 1001-P to review the content



15. Click on the Iso Pipeline component in the Drawings console – The view of the isometric will close.

16. Right click drawing 1001-P and select View Extraction Data.. To review log, pcf and drawing files

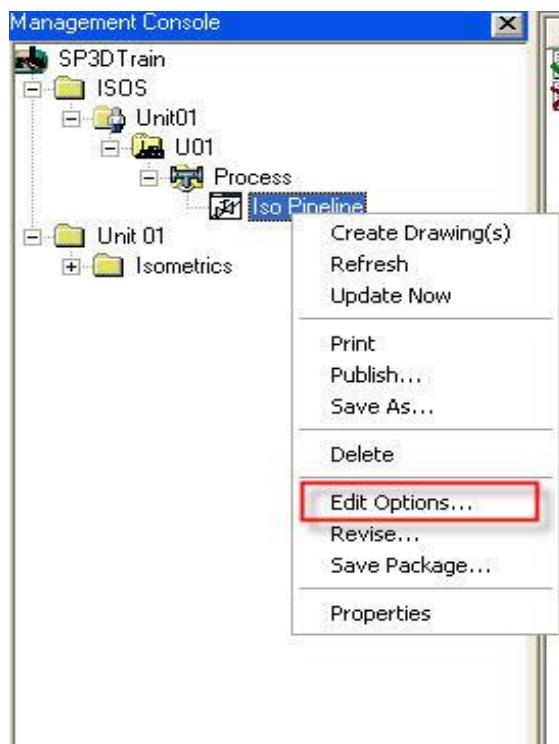


This completes Lab 1.

Lab 2: Overview of Options Browser

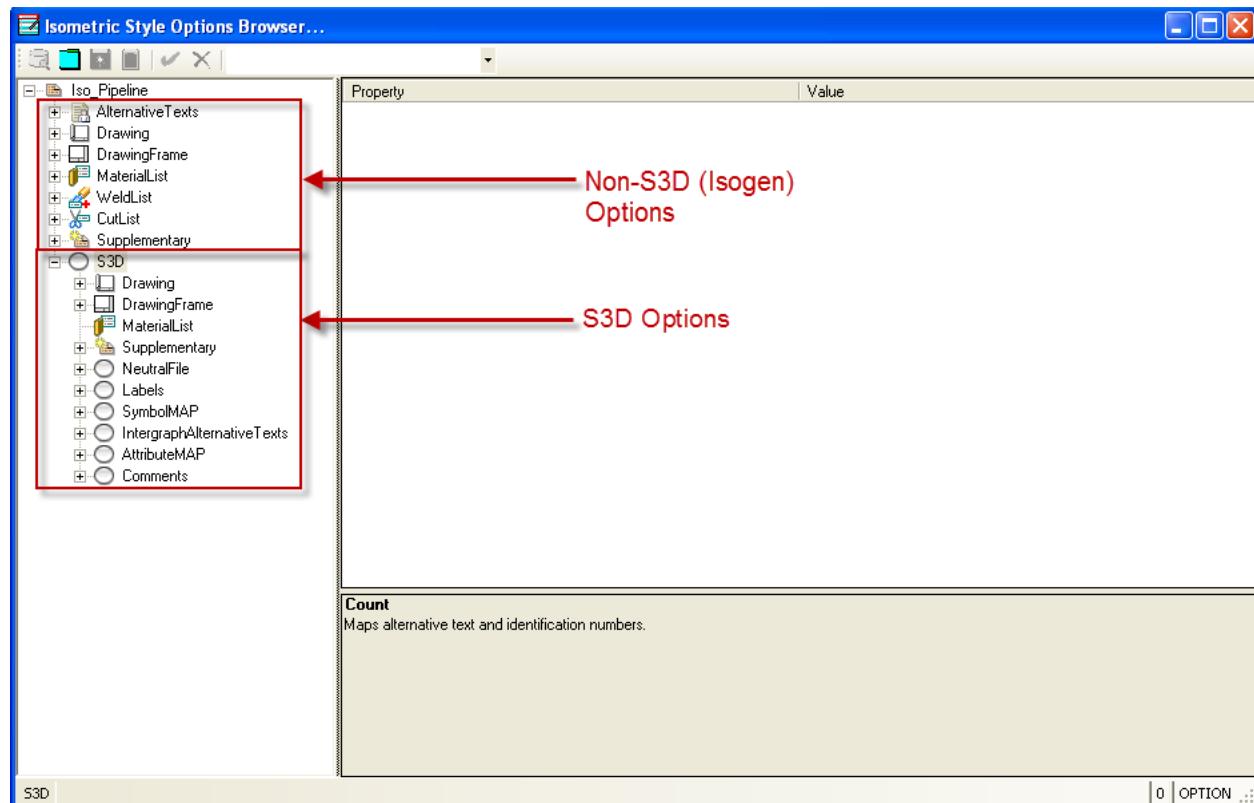
All options to modify the look and feel of isometric are accessed via the Isometric Style Options Browser.

Expand the Iso Pipeline Isometric branch, select Iso Pipeline and Edit Options.

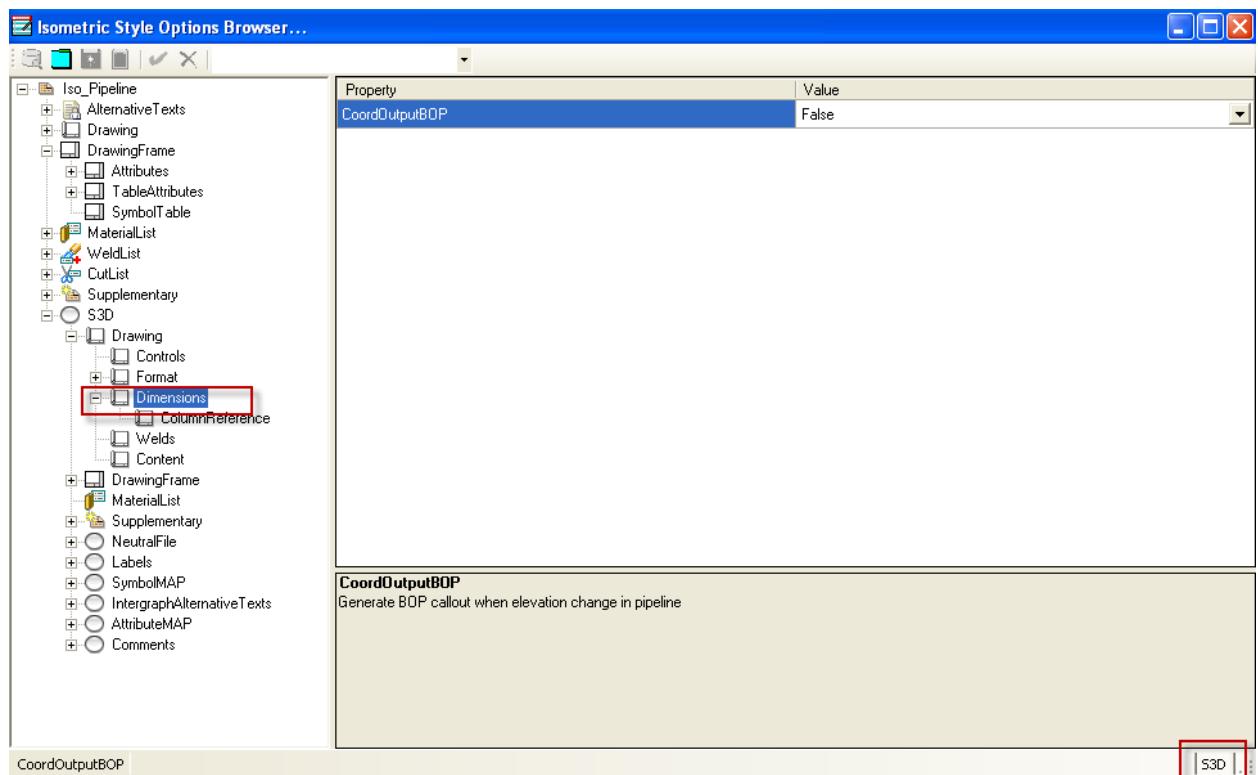


Source of Option

Version SP3DV2011SP1 and above, Isometric Option Browser user interface has been changed. All S3D Options are listed out separately under S3D Node in the Option Browser and all other options above S3D node are the Non-S3D Options (Isogen) options:

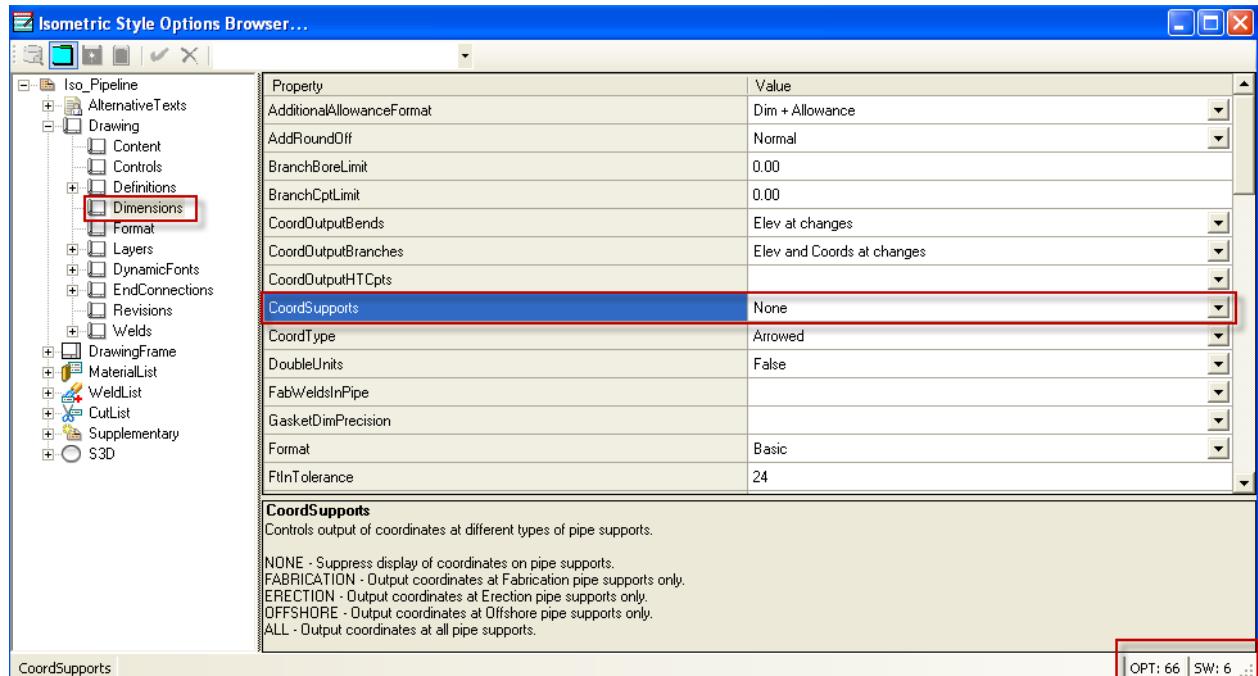


1. Expand and select S3D.Drawing.Dimensions
Select CoordOutputBOP in the right pane.



Notice the bottom right corner says S3D, indicating that this is a S3D option and not the Isogen option. Built-in help explains the possible values of the switches and their effect.

2. Select Drawing.Dimensions.CoordSupports in the right pane.

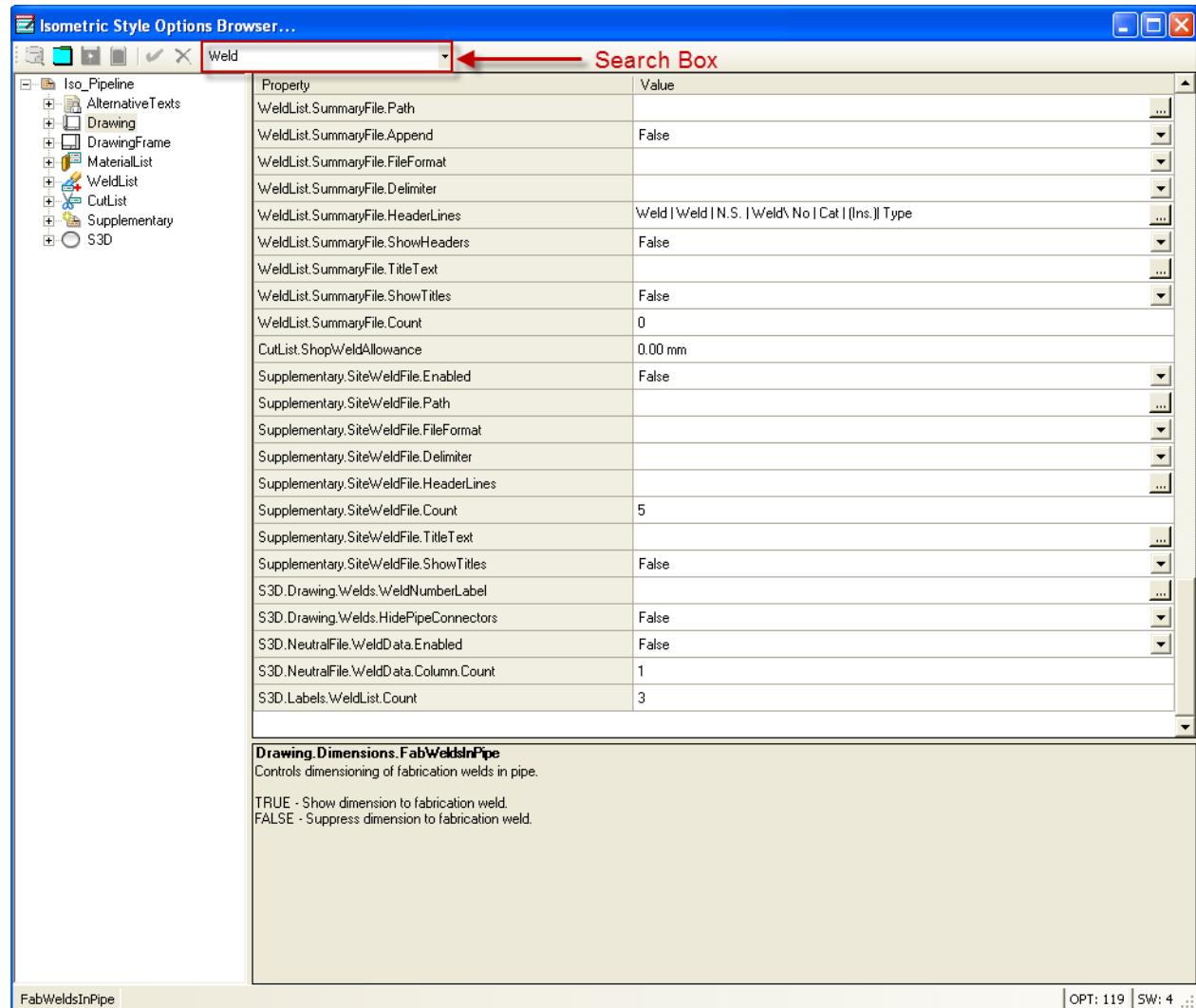


Notice the bottom row now tells us an option (OP) number and a switch (SW) number. This indicates that this is Isogen option with references to Alias Isogen option and switch number. This information is provided to help lookup in the Isogen Option Switches help guide.

Search options

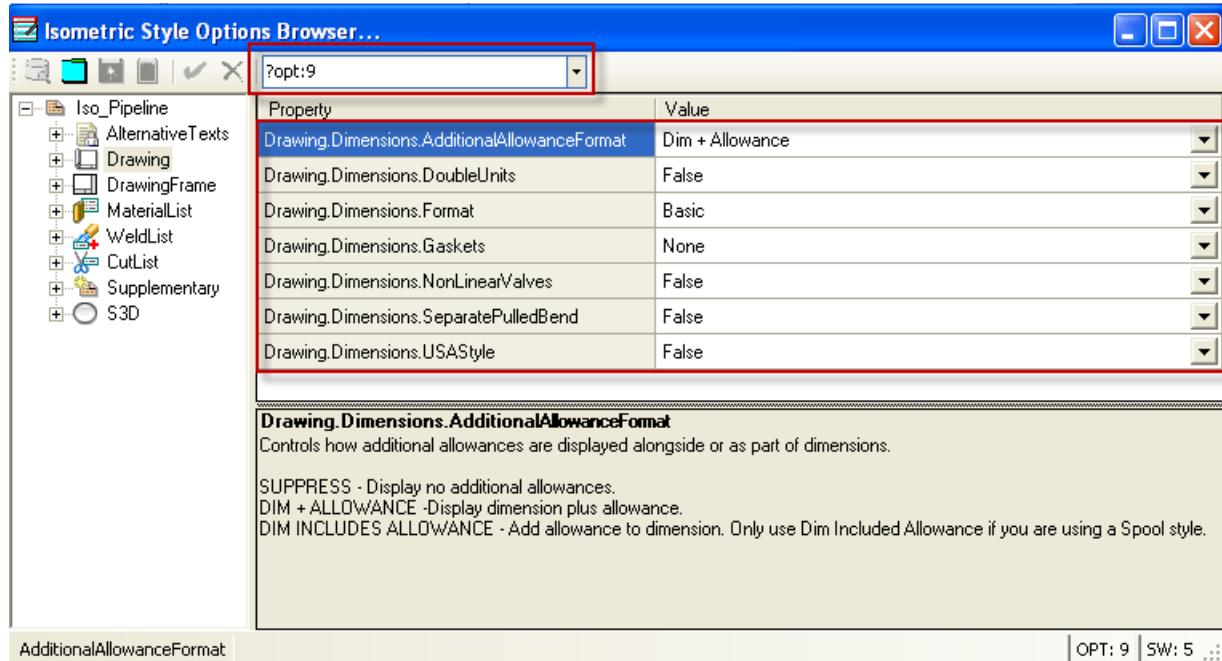
The search box at the top of the browser acts as a substring search for all option names.

1. Type 'Weld' in the search box and press enter. All options with name containing the text 'Weld' are displayed.



The search box also helps search for Alias options by number using the search syntax ?OPT:xx where xx is the option number.

2. Enter ?OPT:9 in the search box and press enter. This displays all SP3D options that used to be various switches on Alias option 9.



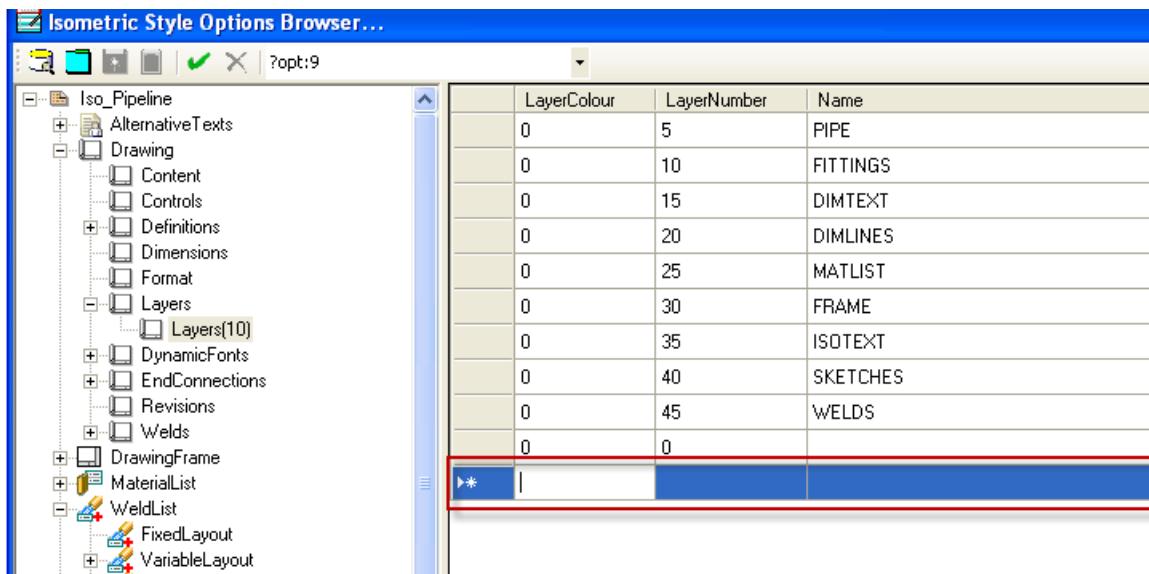
Sorting

1. Clicking on any column heading sorts a column

Inserting and deleting rows

1. There would be a blank row at almost every grid view where user has to add rows. To insert a row just keep on typing in the blank row and new rows would be added automatically if the last one is consumed.

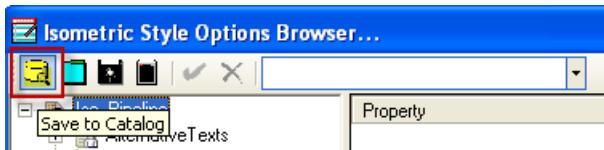
E.g. Expand Drawing.Layers.Layers(10) in tree view and start typing at very last row, observe that new blank row would create as soon as you start typing in the last row.



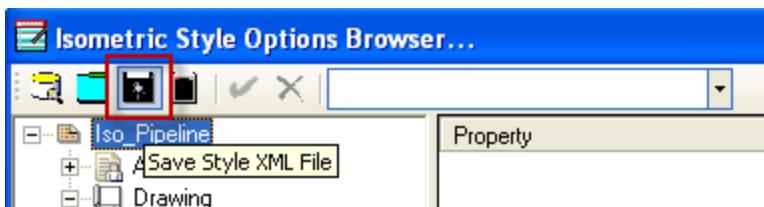
2. To delete a row, you can use the delete row button or delete key on keyboard, if focus is on grid view.

Saving options

1. To save options to catalog, use Save to Catalog button from the toolbar.

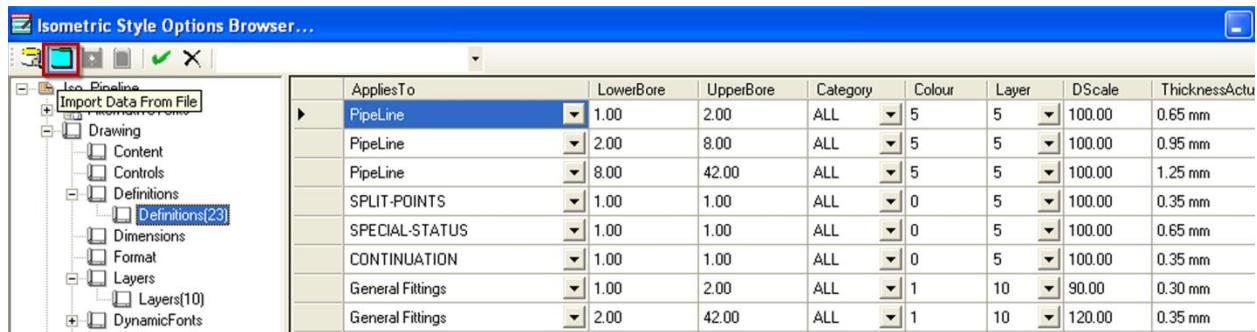


2. To save options to XML file, select the top node of the style and select 'Save Style XML File' button from the toolbar.

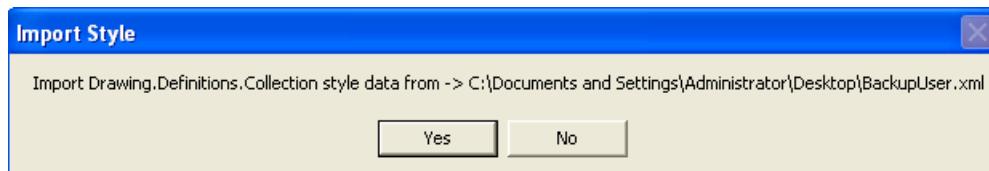


Importing options

3. To import options from a previously saved file, select any node and select the import button, then browse to the saved file. This functionality can be used to update an entire style or portion of style to new options introduced by Intergraph.
e.g. Select AttributeMAP node in the tree and select Import Data from File. Then browse to a XML file and click OK.

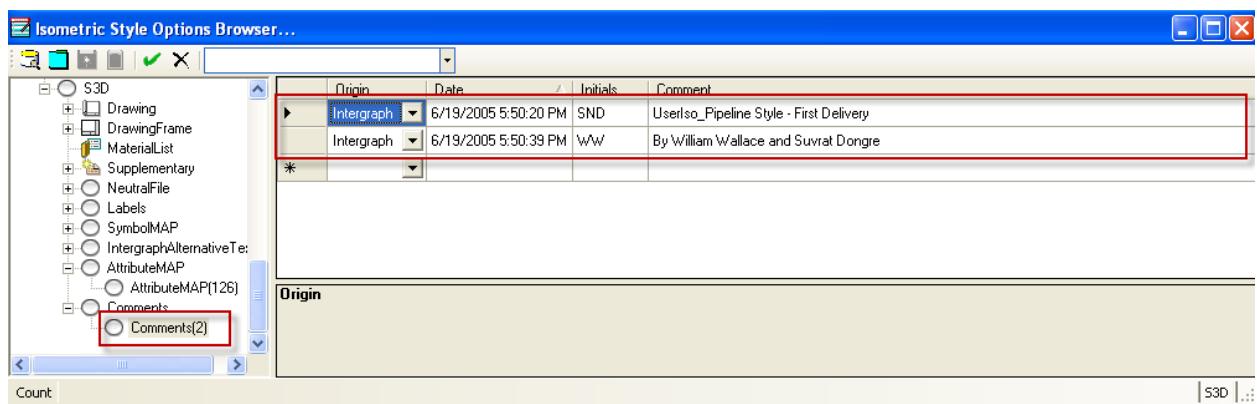


4. A message is shown asking for confirmation.



5. Entering Comments

Users can enter comments in the options browser in the Comments section of the style.



The origin column is a pick list for the users to distinguish their comments from Intergraph comments.

The initials and comments fields are standard text fields for users to enter whatever text they wish.

Lab3: Creating New Style

Creating a new style involves editing/importing a border/template file, copying the XML file with options and bulkloading the new style into the catalog.

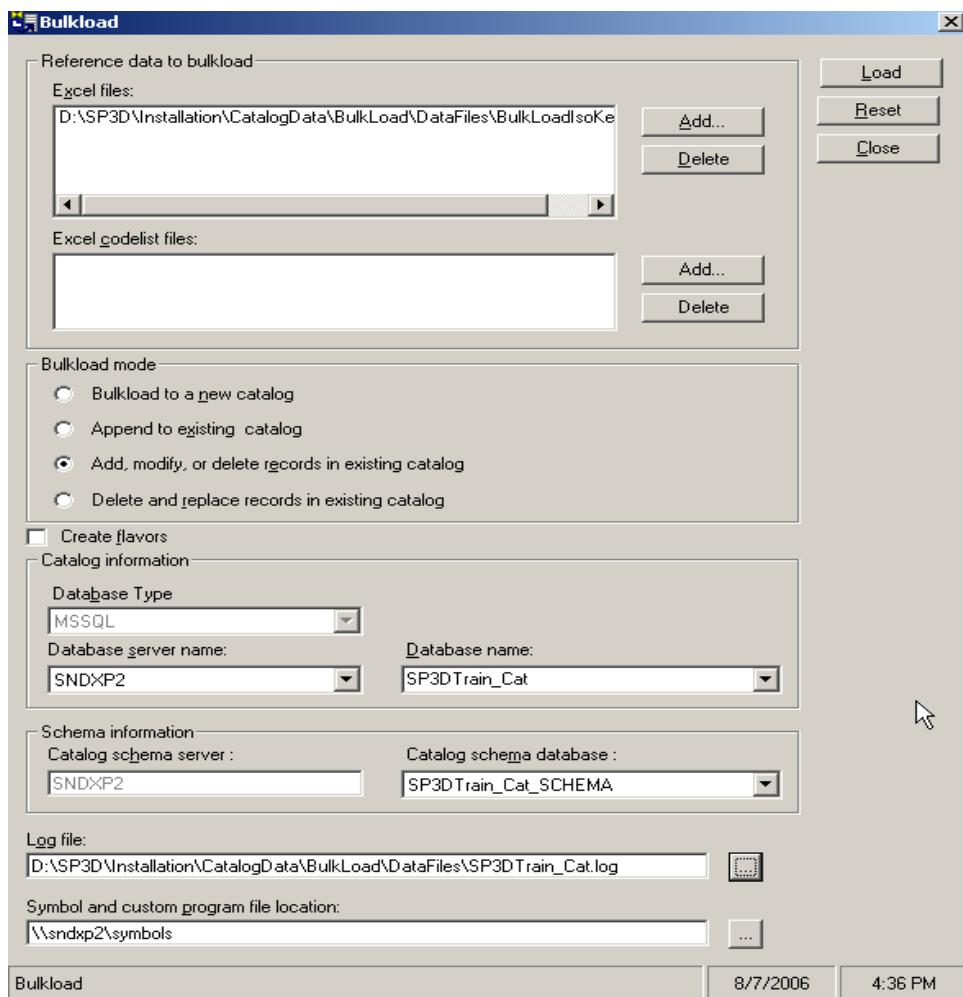
Copying Existing SP3D Border

1. Copy and paste Iso_Pipeline.igr file from the symbol share \\[Server]\Symbols\PmfgIsoStyleData .
2. Rename Copy of Iso_Pipeline.igr to UserIso_Pipeline.sha
3. Open the UserIso_Pipeline.sha file using Drawing Editor.(This step is just for you to see how the border file looks, There is no intelligence added in opening and closing the document)
4. Save the file and exit Drawings Editor
5. Rename UserIso_Pipeline.sha to UserIso_Pipeline.igr

Bulkloading New style

1. Open the file BulkloadIsokeys.xls from [Install Directory]\CatalogData\Bulkload\DataFiles.
2. Select row 6 (Iso_Pipeline) and right-mouse Copy.
3. Select row 11 (End) and right-mouse Insert Copied Cells.
4. Add letter A in column A of row 11
5. Change Iso_Pipeline to UserIso_Pipeline in the IsoNames column
6. Change OutPutIsoDrawingsLocation to IsoDrawings\UserIso_Pipeline
7. Change IsoBackingSheet to PmfgIsoStyleData\UserIso_Pipeline.igr
8. Change IngrOption to PmfgIsoStyleData\UserIso_Pipeline.xml
9. Save the excel spreadsheet and close Excel.
10. Browse to the folder PmfgIsoStyleData in the Symbols share on the server and copy the file, Iso_Pipeline.xml, rename it to be UserIso_Pipeline.xml and uncheck the read only property for the files.
11. Open the UserIso_Pipeline.xml file using a text editor and use the search tool for the word Iso_Pipeline. Change all occurrences of Iso_Pipeline to UserIso_Pipeline
12. Save the file.
13. Start the Bulkload utility using Start → Programs → Intergraph SmartPlant 3D → Database Tools → Bulkload Reference Data
14. Click the Add button and add the BulkloadIsoKeys.xls from \CatalogData\Bulkload\DataFiles
15. Change the bulkload mode to Add/Modify/Delete records
16. Pick the server, catalog and catalog schema name
17. In the log file field, select the ellipsis (...) button and click OK.

18. Click Load to load the new style into the catalog.

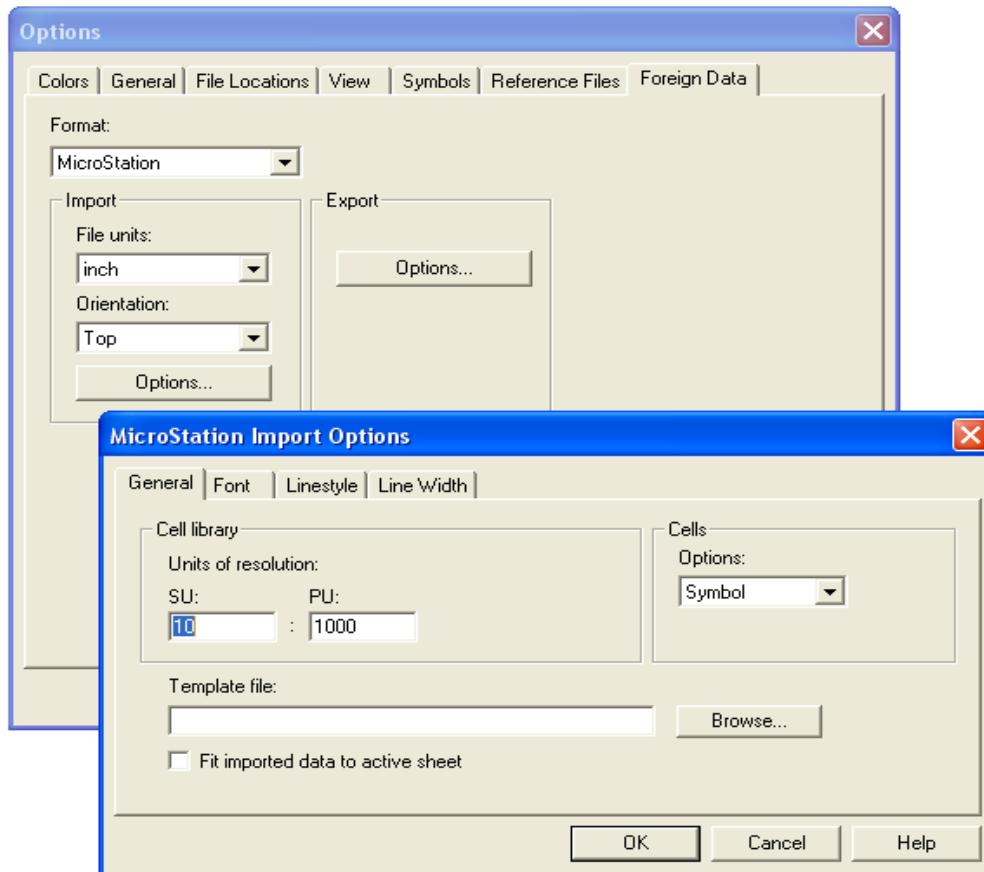


19. Review the log file , it should say
Successfully created the object in row [11]

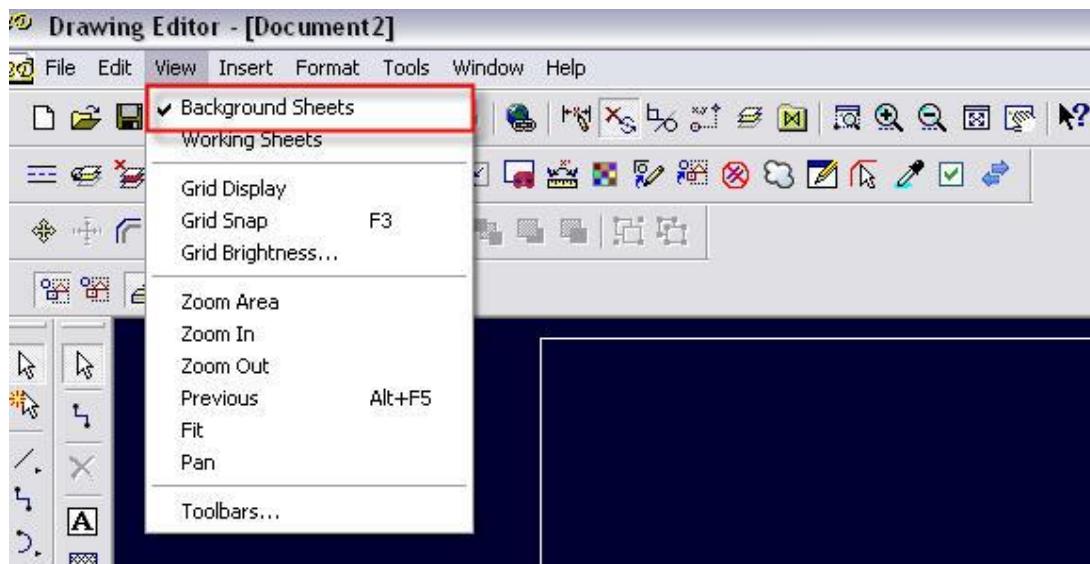
Lab 4: Importing Microstation DGN Border file

Importing existing DGN border/seed file

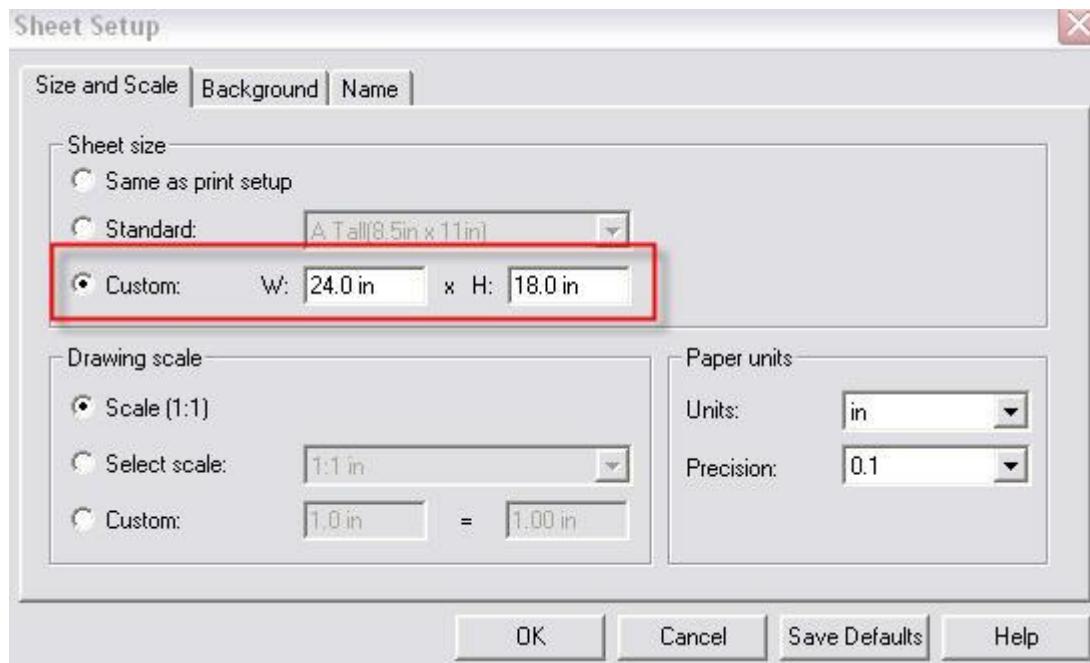
1. If you have an existing DGN or DWG file which is being used as seed/border, it can be re-used for SP3D isometrics.
2. An existing DGN file (UserIso_PipelineDGN.dgn) is available at \\[Server]\Symbols\PmfglIsoStyleData. If using DGN file, first, using MicroStation tools, merge the seed and border file into a single DGN file. However, for this lab we have a ready made DGN file to import in Shape2D.
3. Start Drawing Editor. (shape2dserver.exe can be located at C:\Program Files\SmartPlant\3D\Common2D\Shape2D\Bin)
4. In the Tools – Options – Foreign Data tab, click Options... for the MicroStation format, then, uncheck the 'Fit imported data to active sheet' option.



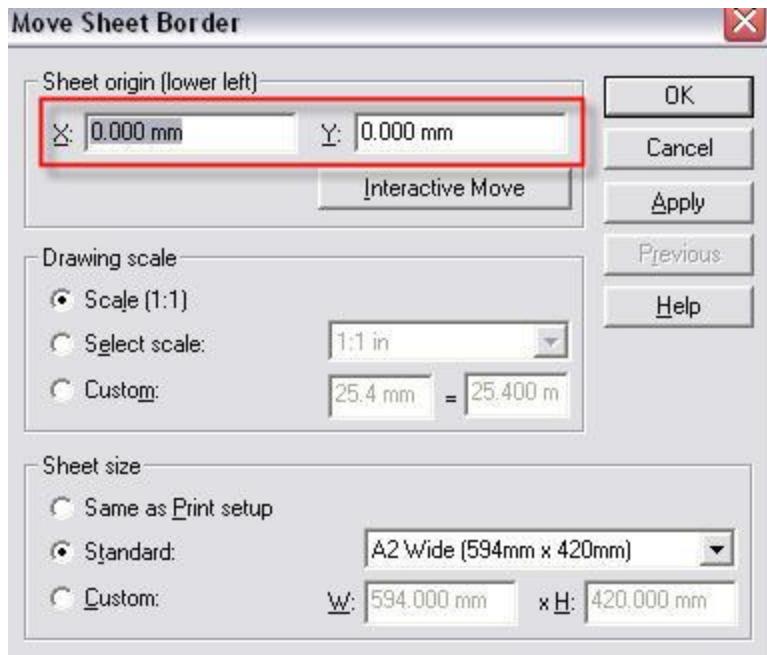
5. File – Open and navigate to the DGN (UserIso_PipelineDGN.dgn) file.
6. Go to File – Sheet Setup and adjust the width and height of sheet with **Standard** or **Custom** size. Make sure that the Border graphics are in **Background** sheet and not in **Working** sheets. Sheet setup needs to be performed for both working as well Background sheet.



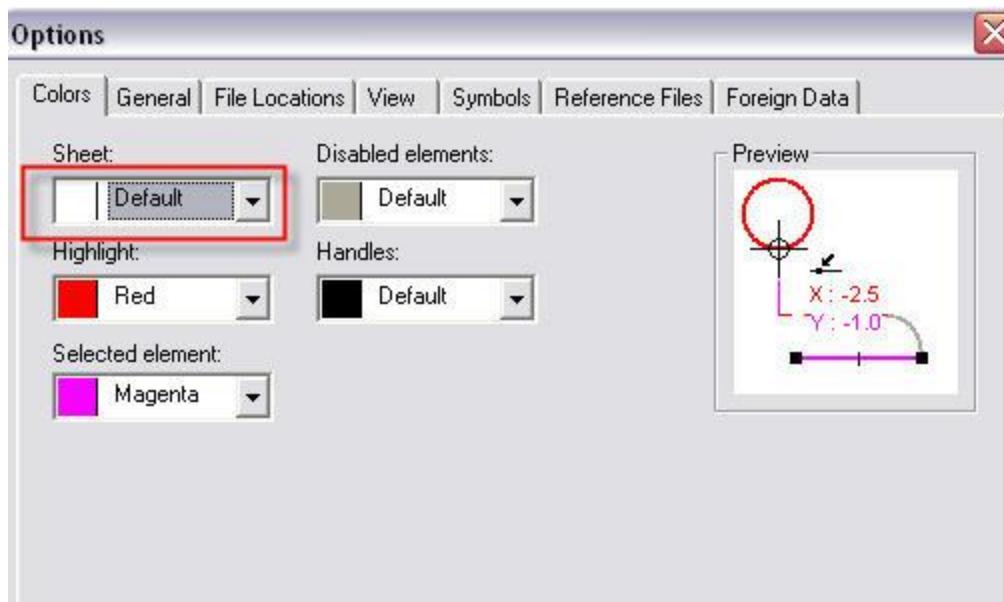
7. Set Custom Width as **24 in** and Height as **18 in** so as to match the size of imported DGN file.



8. File – Move sheet Border. Specify the X and Y origin values as 0 (Zero). The Pin point would refer the setting specified over here. The Drawing Frame labels would be placed referring to Origin settings provided here.



9. Change background color (if necessary) using Tools – Options and make other changes as required.

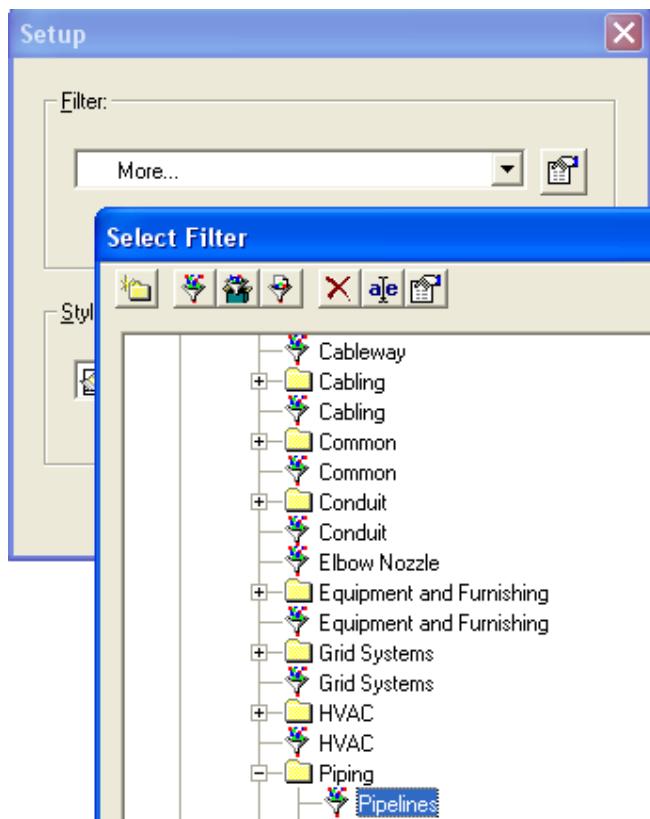


10. Save the file as a UserIso_PipelineDGN.sha
11. Rename the file as UserIso_PipelineDGN.igr
12. This imported DGN file can now be used as a normal border file which can be utilized for creation of a new style.

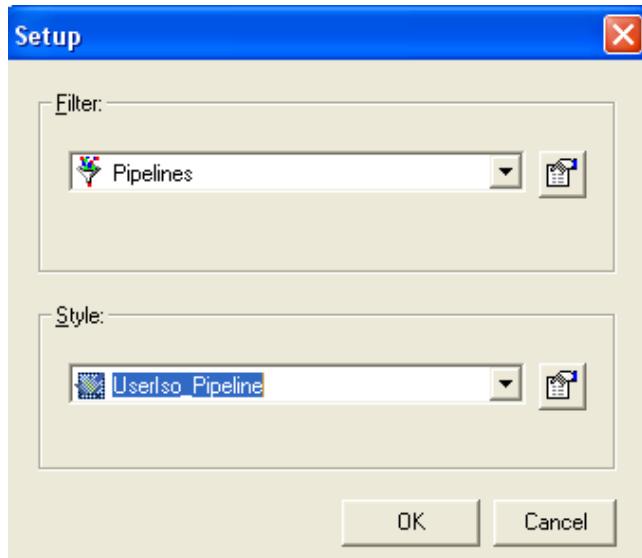
Lab 5: Create Package and Setup Hierarchy

Creating a package

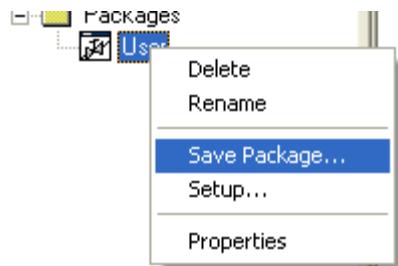
1. Switch to Drawings and Reports task.
2. Add a new folder under the root of the plant called '**Packages**'
3. Right-click on Packages folder and add a new '**Piping Isometric Drawings by Query**' component. Rename the component '**User**'
4. Setup... User and in the filter field select More...
5. Expand the tree till the '**Piping**' folder as shown in the picture and pick the **Pipelines** filter under Catalog Filters->Default Filters->SP3D Object Filters->Object Types-> Piping



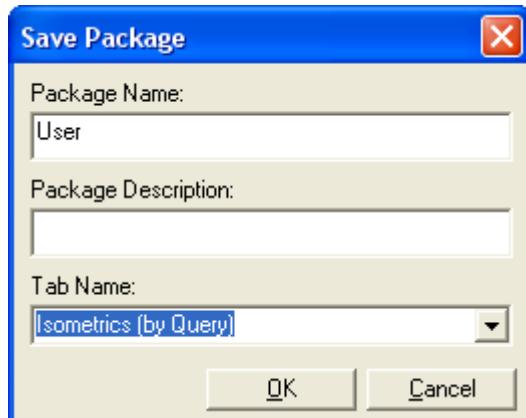
6. In the style field, select the style '**UserIso_Pipeline**' (This style was bulkloaded in earlier lab)



7. Right-mouse User and Save Package...

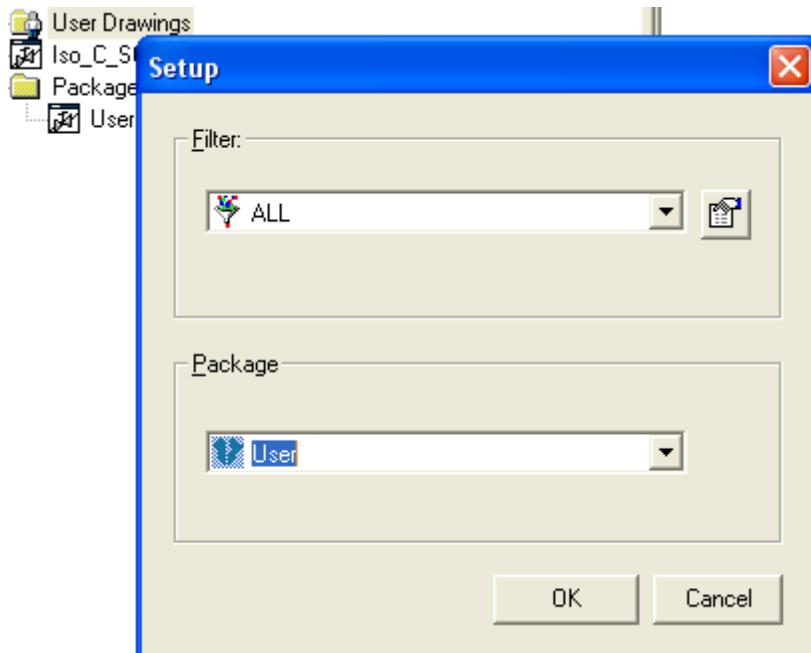


8. Name the Package 'User' and save it in the 'Isometrics (By Query)' folder

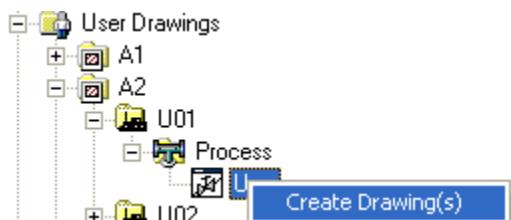


Creating Drawing by Query Manager

1. Right-click '**ISOS**', select New... and add a new '**Drawing by Query Manager**'
2. Rename it to be '**User Drawings**'
3. Select More... in the filter field on the Setup dialog and select the '**Plant Filters\All**' filter
4. Select More... in Packages field and select the '**User**' package



5. Right-mouse 'User Drawings' and pick Run query
6. Expand hierarchy and create drawings for A2 – U01 - Process.

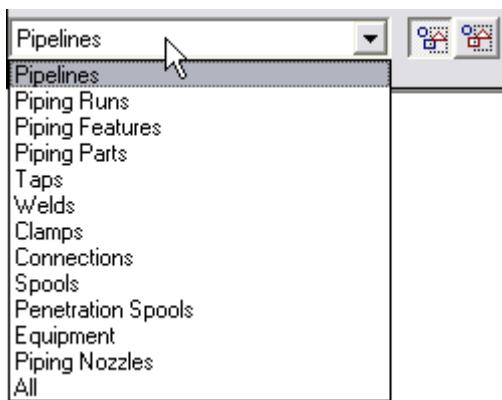


7. Update 1001-P

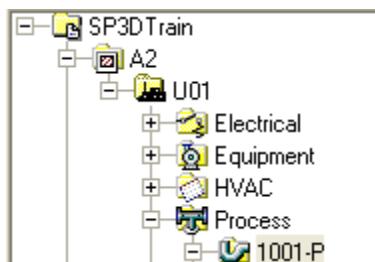
Lab6: Managing Hierarchies

Self-maintaining hierarchies

1. Switch to piping task.
2. Set locate filter to pipelines.



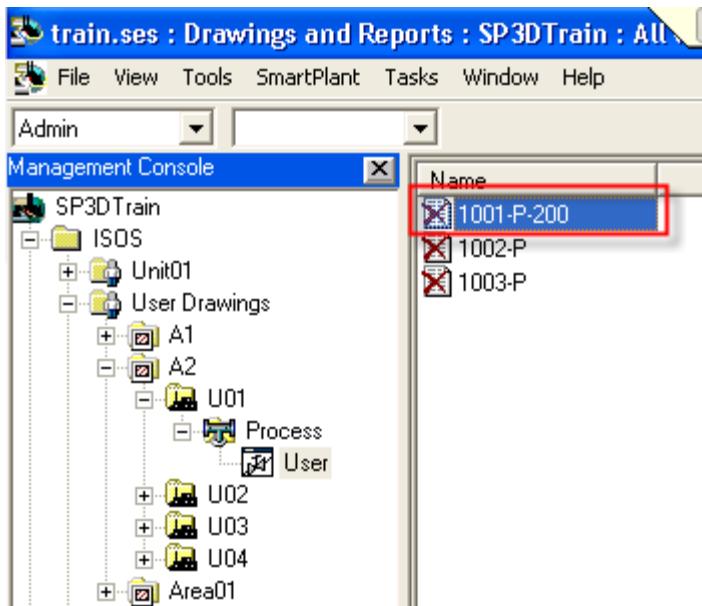
3. Expand workspace explorer till pipeline 1001-P is exposed. Select pipeline 1001-P.



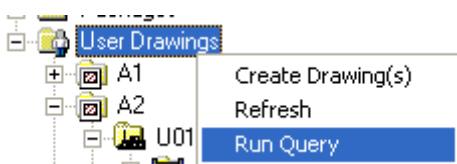
4. In the ribbon bar, change the name of the pipeline from 1001-P to 1001-P-200 and press enter.



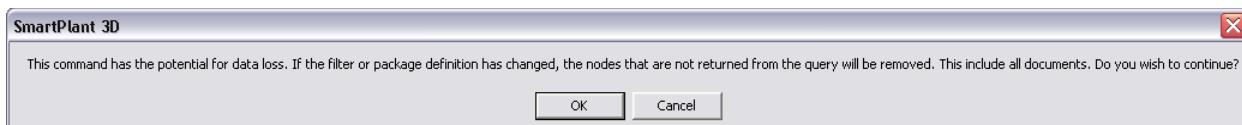
5. Switch to Drawings and Report task. Expand the tree, notice that the name of the pipeline is automatically changed in the detail view.



6. Switch back to piping task.
7. Change locate filter to All and in the workspace explorer, select the piping system '**Process**' under A2 – U01.
8. Change its name to '**Process A2-U01**'
9. Switch to Drawings and Reports task, select 'User Drawings' and Run Query.



10. A warning is shown, OK the warning.



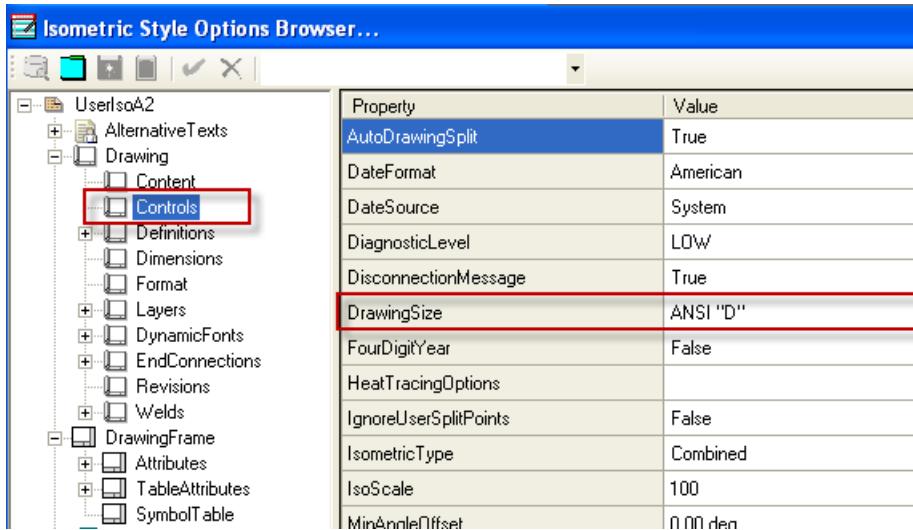
11. After a brief wait, the console hierarchy is updated to match system hierarchy.



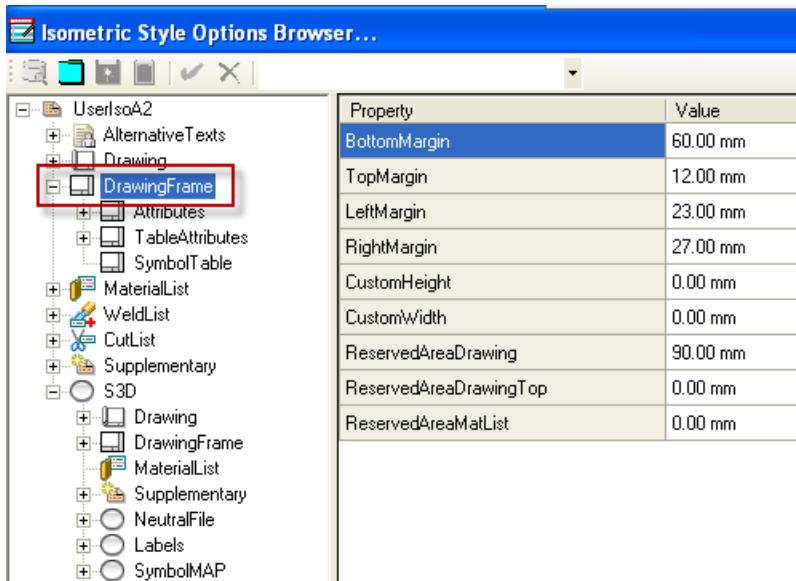
12. Revert changes made to Pipeline and Piping System (1001-P and Process)

Lab 7: Defining Border Size / Margins and Units

In Lab 7, you are going to set the drawing size, units and margins. Normally, the Drawing.Controls.DrawingSize option is used to specify the size of your isometric.



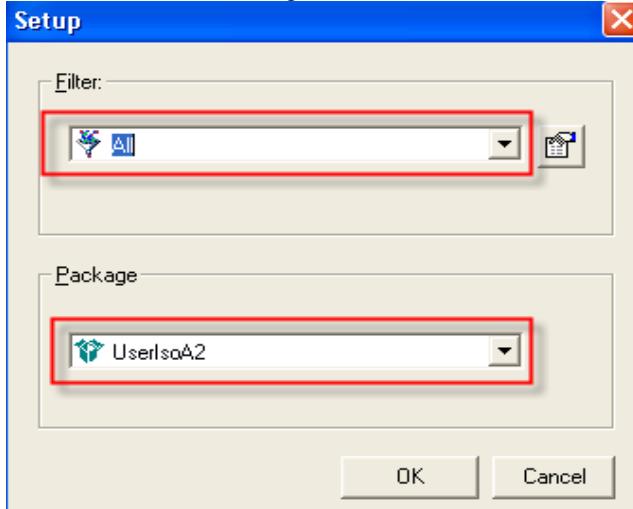
If you have a non-standard drawing size, you will need to set it explicitly in the options. Use the DrawingFrame.CustomWidth and CustomHeight options for this purpose.



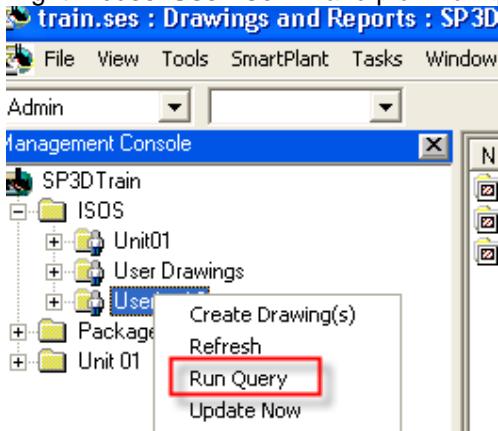
Additional options here allow you to reserve space for Margins and reserved areas in the isometric.

1. Right-click on Packages folder and add a new '**Piping Isometric Drawings by Query**' component. Rename the component '**UserIsoA2**'
2. Setup... Select **UserIsoA2** Style and in the filter field select More...
3. Expand the tree till the '**Piping**' folder as shown in the picture and pick the **Pipelines** filter under Catalog Filters->Default Filters->SP3D Object Filters->Object Types-> Piping
4. Right-mouse **UserIsoA2** and Save Package...

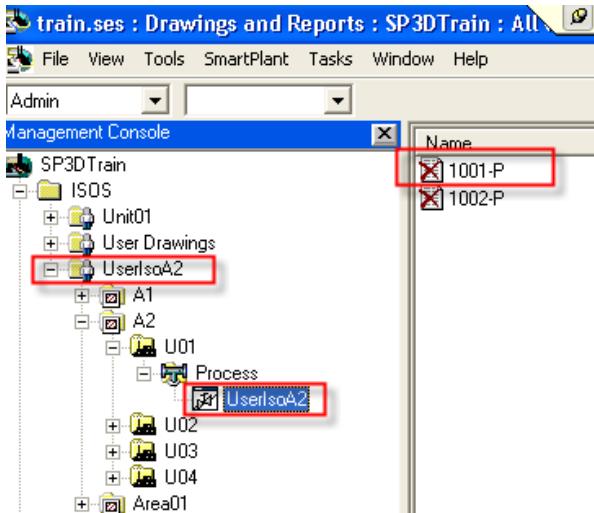
5. Name the Package '**UserIsoA2**' and save it in the 'Isometrics (By Query) folder
6. Right-click '**ISOS**', select New... and add a new '**Drawing by Query Manager**'
7. Rename it to be '**UserIsoA2**'
8. Select More... in the filter field on the Setup dialog and select the '**Plant Filters\All**' filter
9. Select More... in Packages field and select the '**UserIsoA2**' package



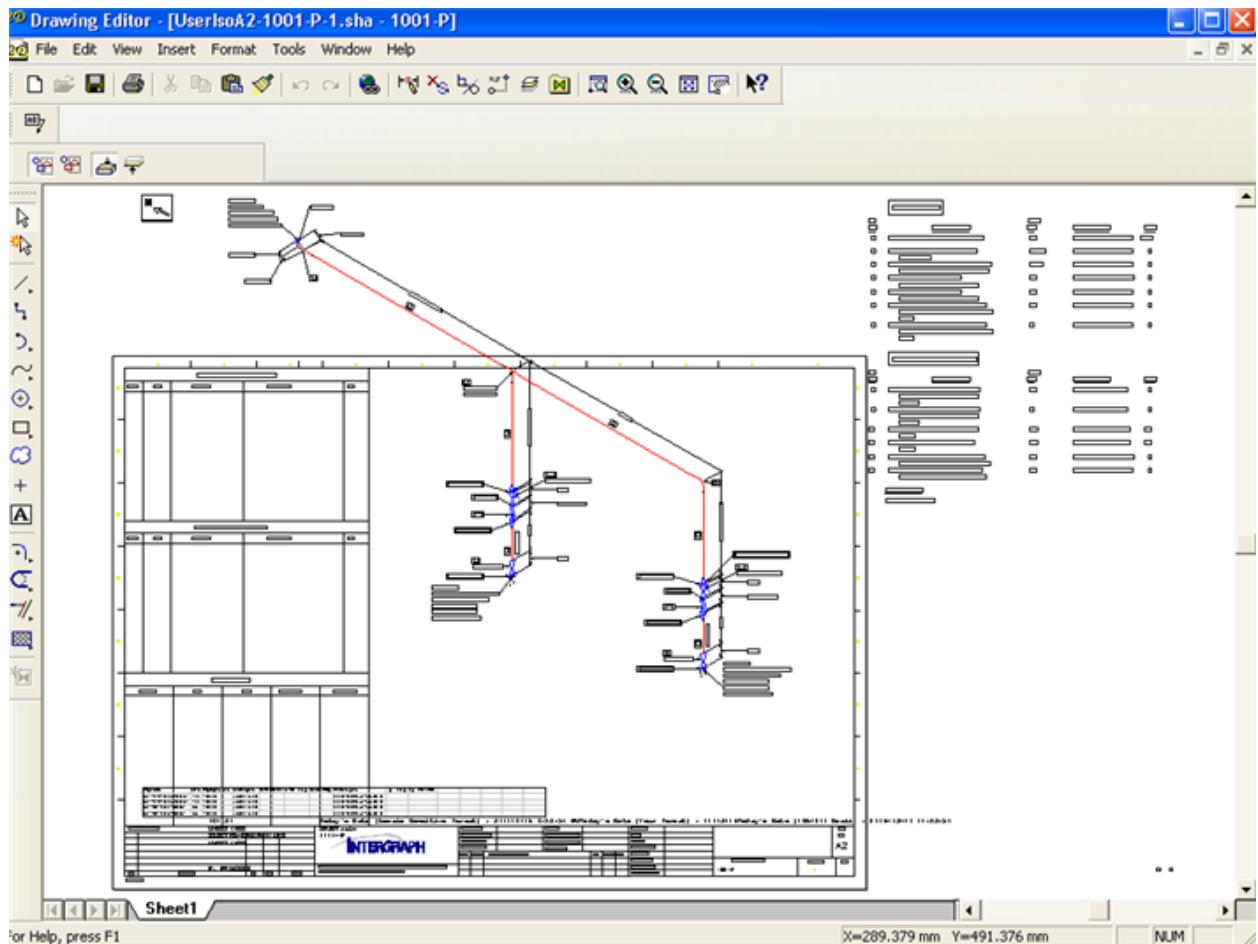
10. Right-mouse 'User IsoA2' and pick Run query



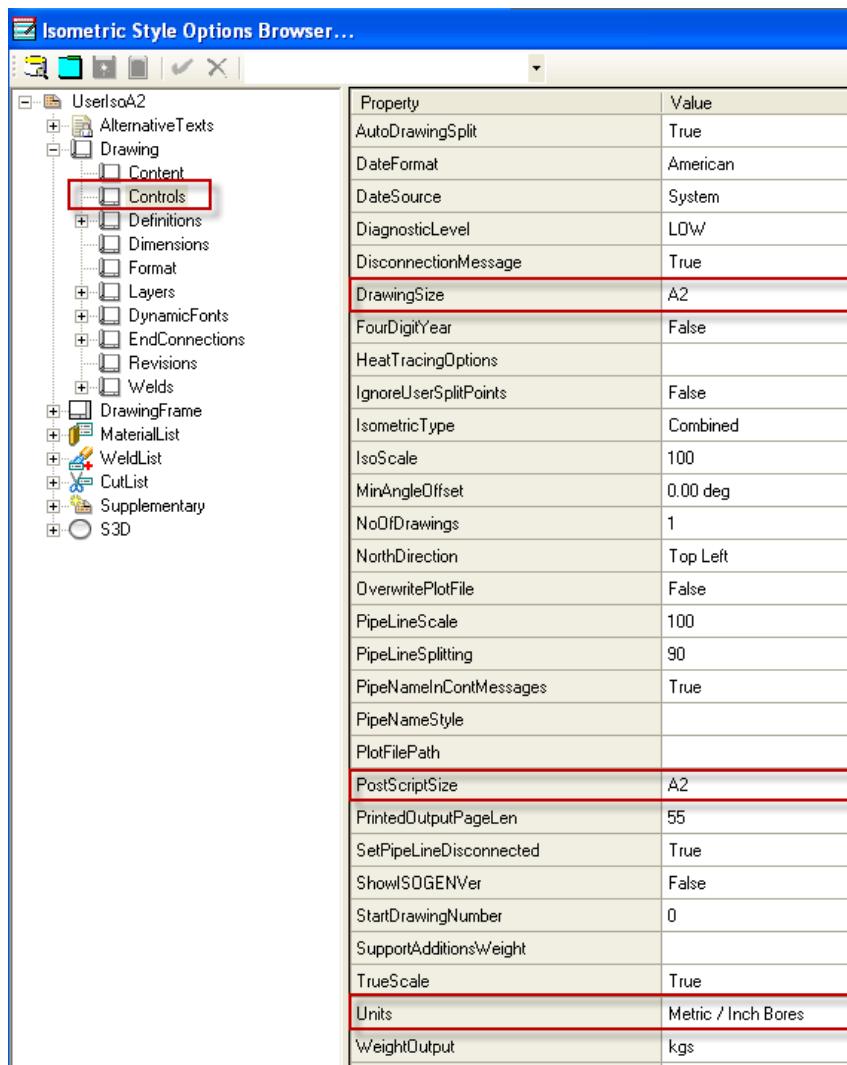
11. Expand hierarchy and create drawings for A2 - U01 - Process.



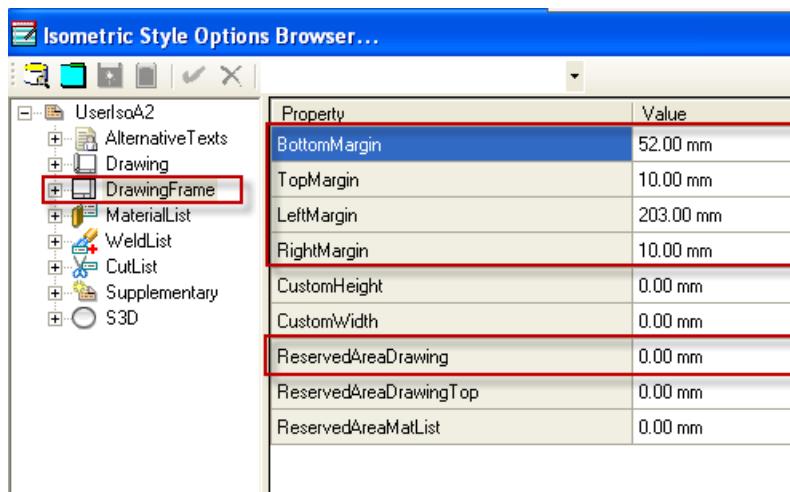
12. Update 1001 – P Drawing.



13. We would be changing the Drawing Size according to the size of Border file which is A2. Select the UserIsoA2 style and using a right mouse click, select 'Edit Options'
14. Select the Drawing.Controls section, and change DrawingSize and PostScriptSize to "A2", change Units to 'Metric / Inch Bores'



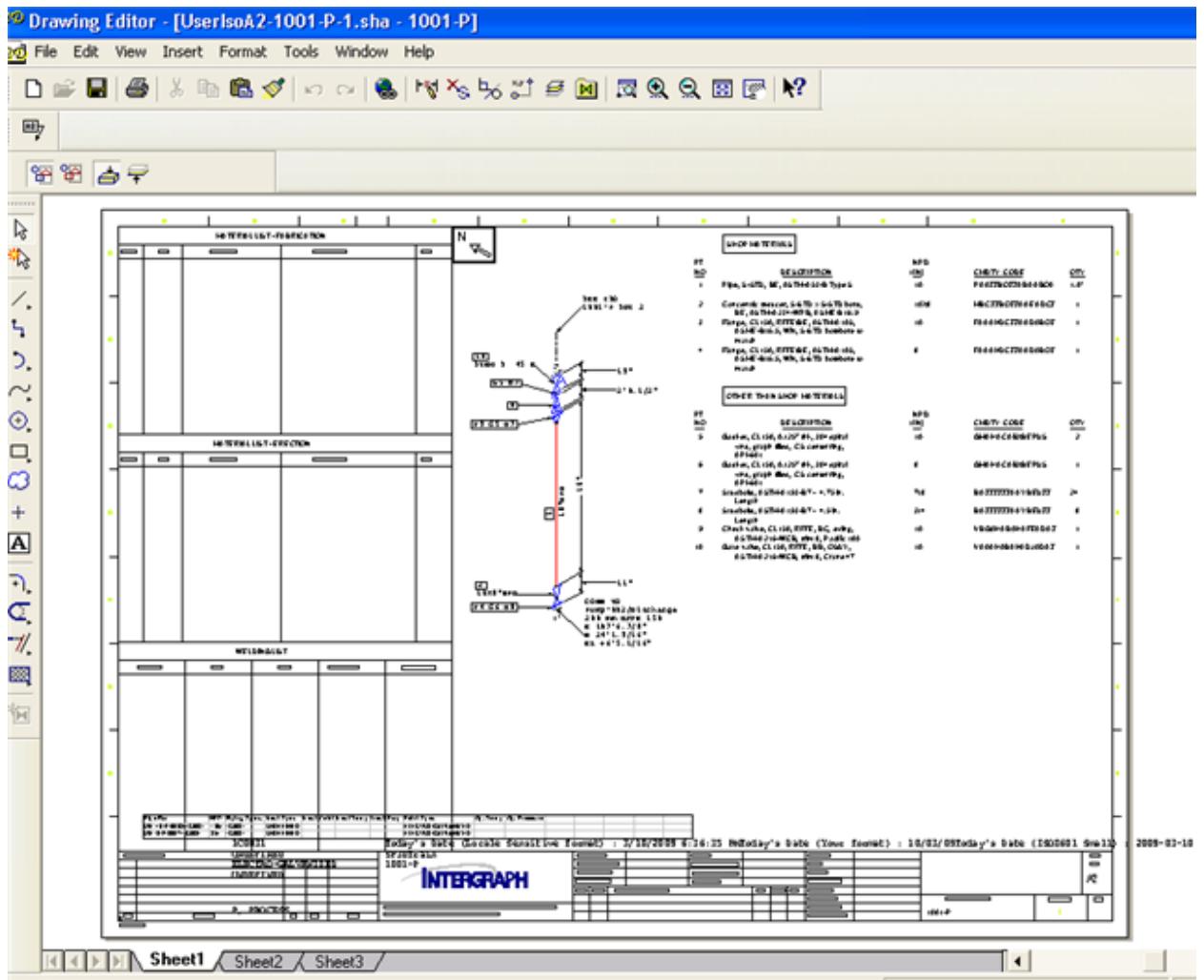
15. Select the DrawingFrame section and change Left Margin = 203, Right Margin = 10 Top margin = 10, Bottom margin = 52, ReservedAreaDrawing = 0



16. Save the changes to the catalog by clicking the 'Save to Catalog' icon: and close the Options Browser.

17. Update drawing 1001-P.

An A2-size multi-sheet drawing is created with the material list in the wrong position:



Tip: If you close the Options Browser, you will be asked if you want to save the changes.

In subsequent labs, we would see how to modify Material Lists.

This completes Lab 7.

Lab8: Drawing Frame

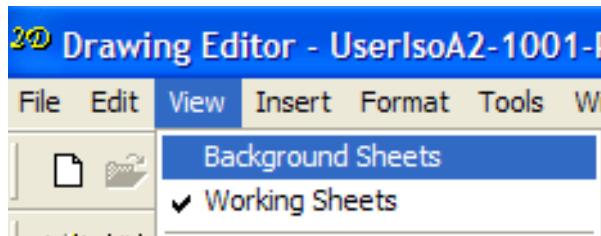
For document properties, these will not be written as attributes in the PCF, instead, they will be linked from the drawing document to the border file.

Document properties can be set at any level in the Management Console, for instance, the project Tile could be set at project level and inherited by all the documents, whilst the Drawn By, Revision, Drawing Title etc. will be set on individual documents.

Placing drawing property Labels

In this Lab, you are going to create a link between a document property value and the border using special Text Boxes with XML linking the property to the box.

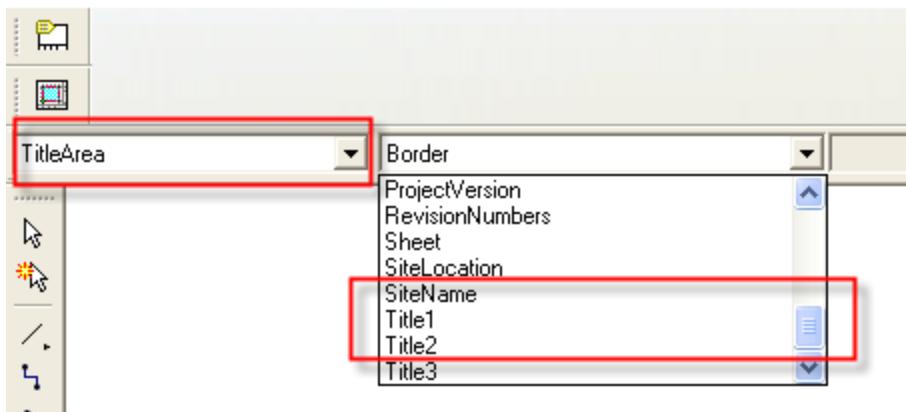
1. Copy the file UserIsoA2.sha from the \\[Server]\Symbols\PmfgIsoStyleData folder to \\[Server]\Symbols\Drawings\Catalog\templates folder
2. Enter the Drawings and Reports Task.
3. Select Tools => Edit Border Template.
4. Select "UserIsoA2.sha"
5. From the View menu, select Background Sheets



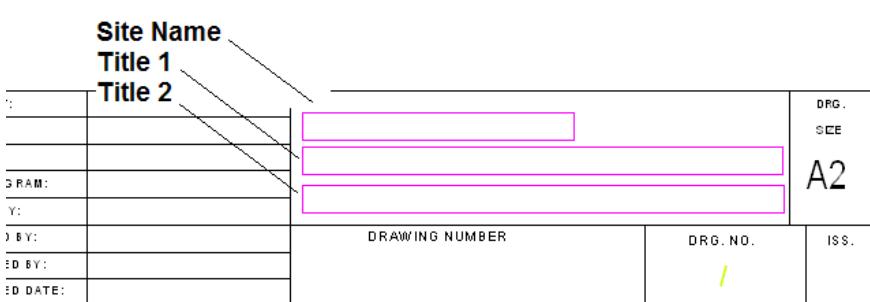
6. Select the Place Drawing Property Label command



7. In the Label Set pull down, pick Title Area
8. In the Field pull down, pick Site Name



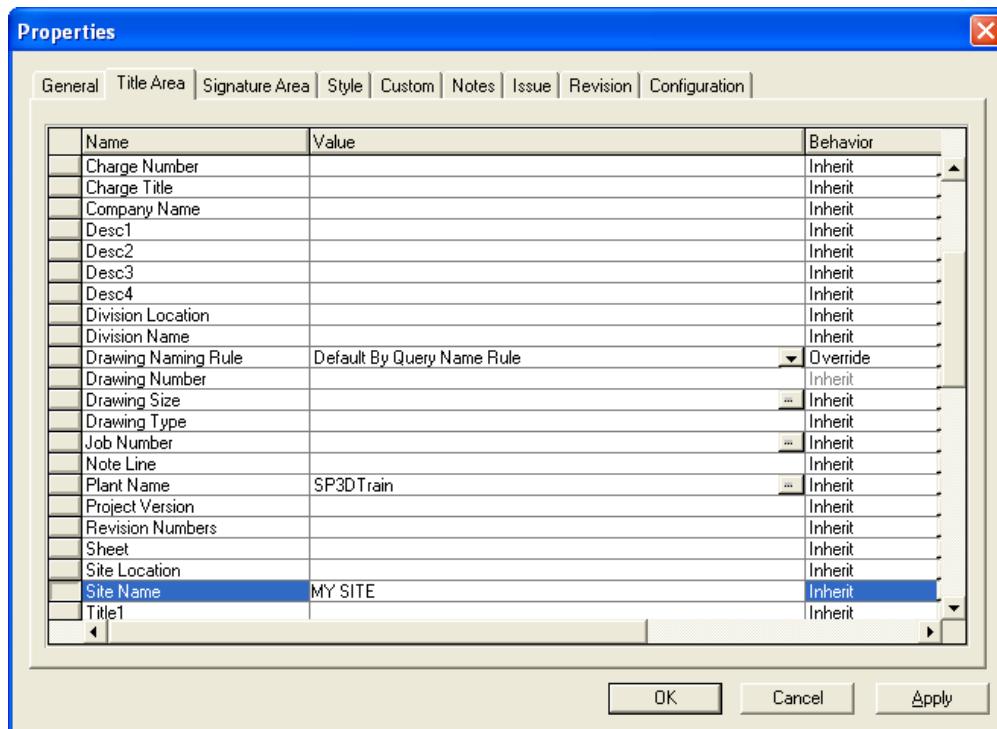
- Click in the title area to the right corner of the sheet to place the label as shown below:



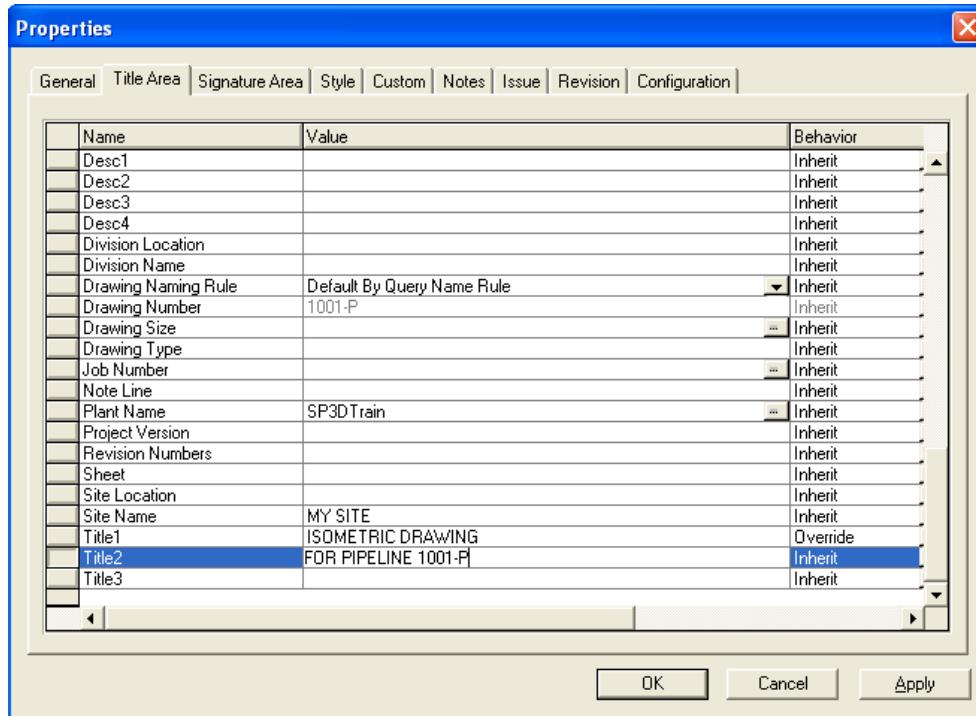
- Similarly pick the Title1 and Title 2 fields from the Title label set and place them as well.
- Tip: By clicking on the two box's you are able to display the placed labels as well as defining Text Height, Font, Justification etc.
- Set the view back to 'Working Sheets', Save the template and exit Drawings Editor.
- Copy the file UserIsoA2.sha back from the \\[Server]\\Symbols\\Drawings\\Catalog\\templates folder to the \\[Server]\\Symbols\\PmfIsoStyleData folder
- Select the UserIsoA2 style and using a right mouse click, select 'Edit Options'
- Whilst the Options Browser is open, Copy and Paste the "UserIsoA2.sha" from the \\[Server]\\Symbols\\PmfIsoStyleData folder to replace the one existing in the windows TEMP folder.
- Save and exit from the options browser.

Setting Document Properties

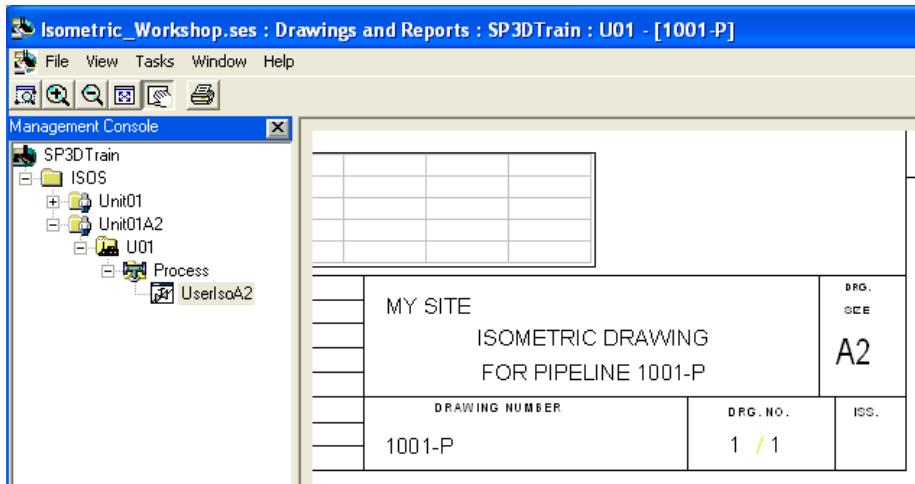
- In this Lab, you are going to set a document property and see how it appears on the border.
- Select the UserIsoA2 style and using a right mouse click, select 'Properties'
- Select The Title Area tab and set the site name to 'MY SITE':



4. Click OK
5. Select the 1001-P document and using a right mouse click, select 'Properties'
6. Select the Title Area tab and set Title1= ISOMETRIC DRAWING and Title 2 = FOR PIPELINE 1001-P as shown:



7. Click OK
8. Notice that the Drawing status changes to Out-of-date  since we changed properties of the drawing.
9. Update the drawing 1001-P and observe the output for the property label on the drawing.



10. This completes Lab 8

Lab 9: Drawing Frame Attributes

Isogen has 99 user definable attributes available for the user to set. These attributes can then be positioned on the sheet (in the area outside the drawings area) by coordinate.

Mapping the attribute is a 3 step process.

Step 1: Use the AttributeMAP section of the style to map External Name (user entered name) to an ISOGEN attribute (choose from ATTRIBUTE11 to ATTRIBUTE99)

Step 2: Use a label to decide what data the chosen Isogen ATTRIBUTE will hold. It is possible to decide at this point the oidtype of the item that the label is evaluated for. The choices are 'Default' which evaluates the label for the object that the iso is being created for (i.e. pipeline for pipeline isos, spool for spool isos etc), or explicit choice of 'PipeRun', which evaluates the label for the 'prime run' (largest NPD run on the pipeline, if there are more than one with the largest NPD, then one of them).

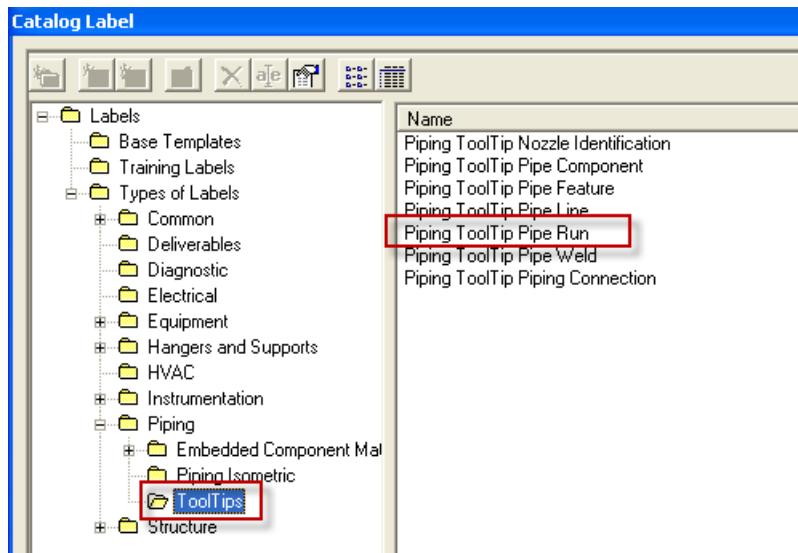
Step 3: Using DrawingFrame.Attributes section of the style, position the label on the sheet at known coordinates, and set the text properties (height, width and font).

Attribute MAP

1. In Drawings & Reports Task expand ISOS>UserDrawings>A2>U01>Process
2. Select and Edit Options for the '**User**' style.
3. Go to 'S3D.AttributeMAP.AttributeMap(127)' section
4. On the last blank row, enter External Name as 'User1' & pick ATTRIBUTE21 for the Isogen Attribute

	ExternalName	Name
	MATERIAL-USER87	-1477
	MATERIAL-USER88	-1478
	MATERIAL-USER89	-1479
	MATERIAL-USER90	-1480
	MATERIAL-USER91	-1481
	MATERIAL-USER92	-1482
	MATERIAL-USER93	-1483
	MATERIAL-USER94	-1484
	MATERIAL-USER95	-1485
	MATERIAL-USER96	-1486
	MATERIAL-USER97	-1487
	MATERIAL-USER98	-1488
	MATERIAL-USER99	-1489
	Spool Prefix	-7
*	User1	ATTRIBUTE21

5. Expand S3D.Labels.DrawingFrame.DrawingFrame(3)
6. On the last blank row, Pick 'User1' for LabelAttribute
7. Pick the catalog label 'Piping Tooltip pipe run' as the LabelName



8. Pick PipeRun as the OidType

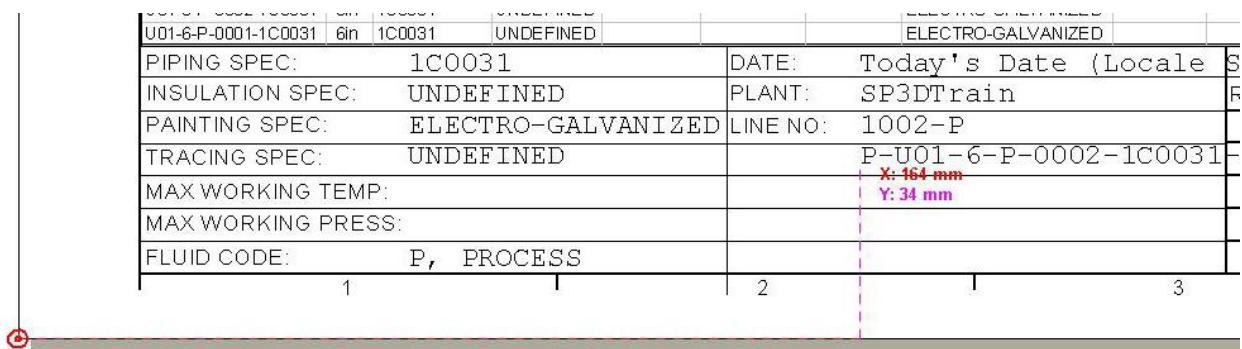
LabelAttribute	LabelName	OidType
ATTRIBUTE15	IsoPipingCommodityCode	PipeRun
Pipeline Reference	Piping Isometric Pipe Line Reference	Default
Extraction Date	Piping Isometric Extraction Date	Default
User1	Piping ToolTip Pipe Run	PipeRun
*		

DrawingFrame.Attributes

1. Expand DrawingFrame.Attributes and add a new row
2. Pick User1 for HostAttribute and specify values as below

AttributeName	CharHeight		XPos	YPos	Font	Barcode
User1	3.2 mm		164 mm	34 mm	Courier New (True Type)	0
CharWidth	Justification	Layer	Colour	RotationAngle	TextWeight	TruncationLength
3.2 mm	Left	30	0	0	0	0

3. Save to catalog
4. Create an isometric for the pipeline 1002-P. Label returned value would be seen at the coordinates specified (Refer following picture).



Add Pipeline List Report

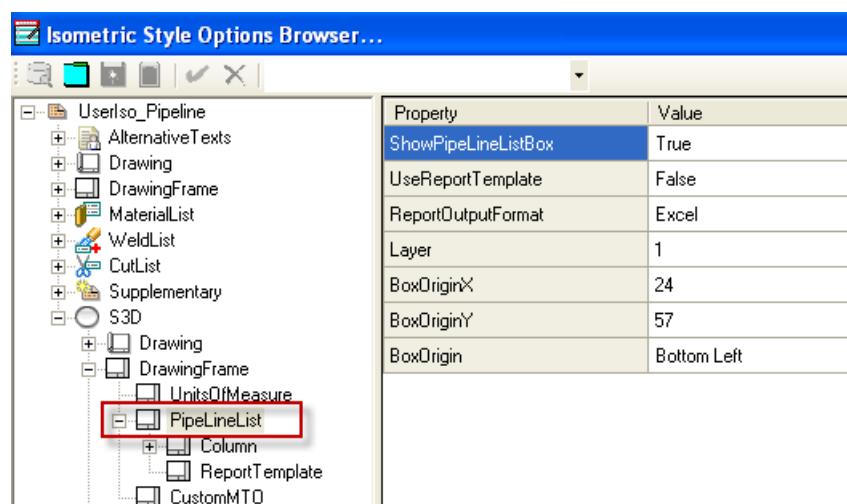
An excel table containing the properties of the runs in the pipeline may be placed on the sheet at the desired coordinates. It is possible to use labels to specify which attributes should be displayed in the excel sheet. The excel position on the drawing sheet can be determined by coordinates.

`DrawingFrame.PipelineList`

'ShowPipelineListBox' controls whether the report is output or not.

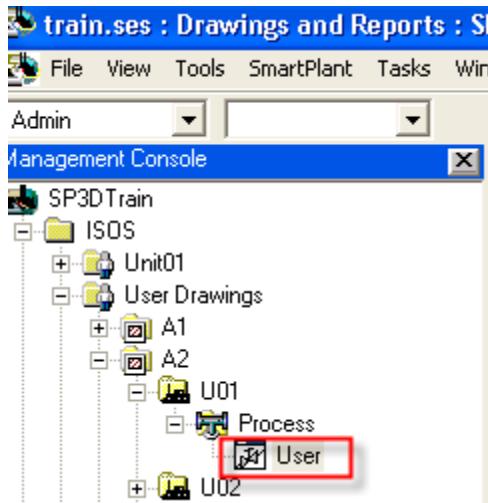
The `UseReportTemplate` option controls whether the new style (report) is used or old style (label driven list) is used.

The `BoxOriginX`, `BoxOriginY` and `BoxOrigin` pick lists can be used to position the Report on the drawing sheet.

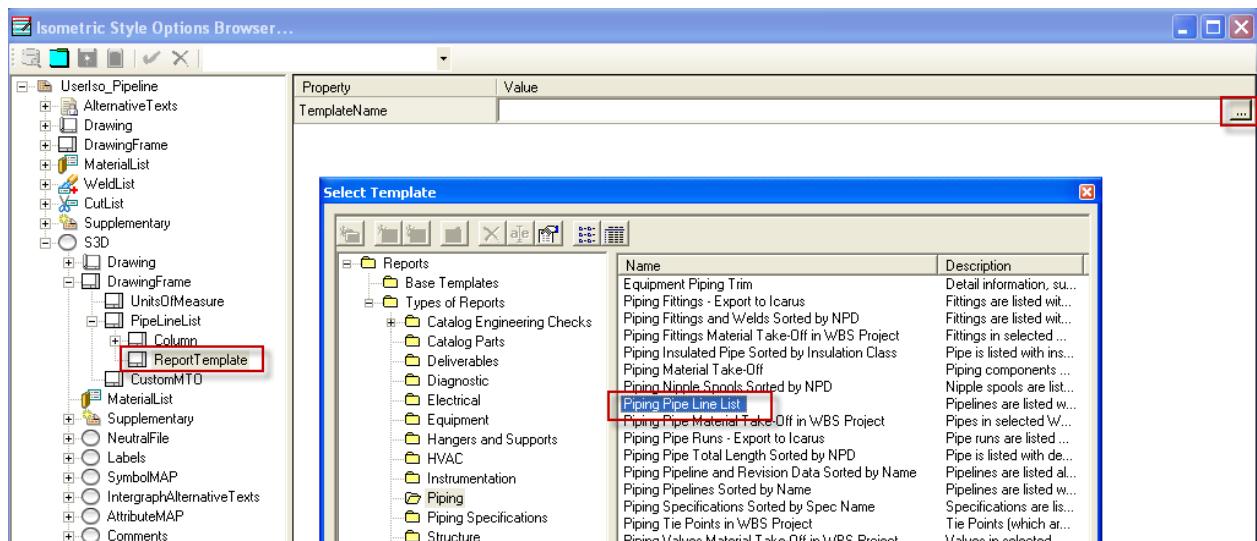


Report Template

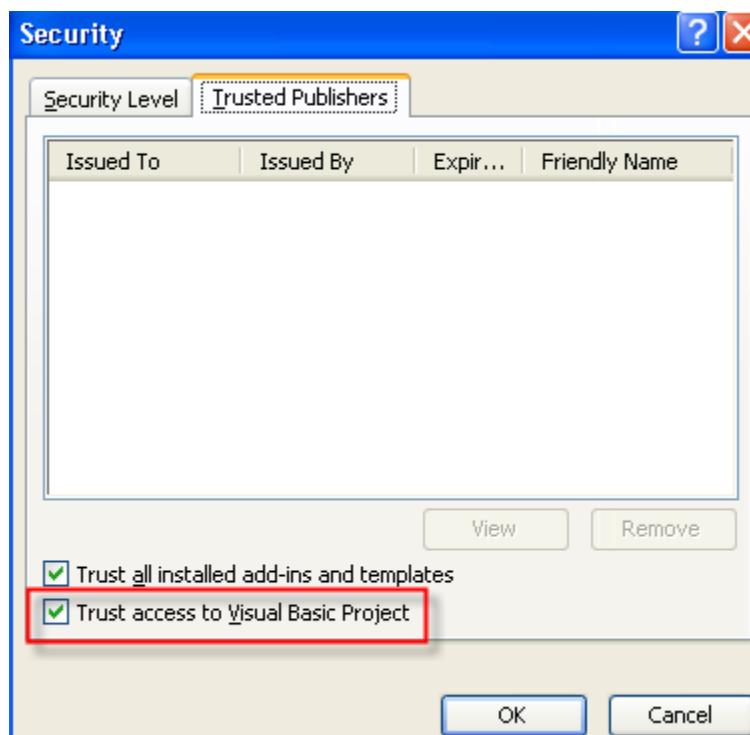
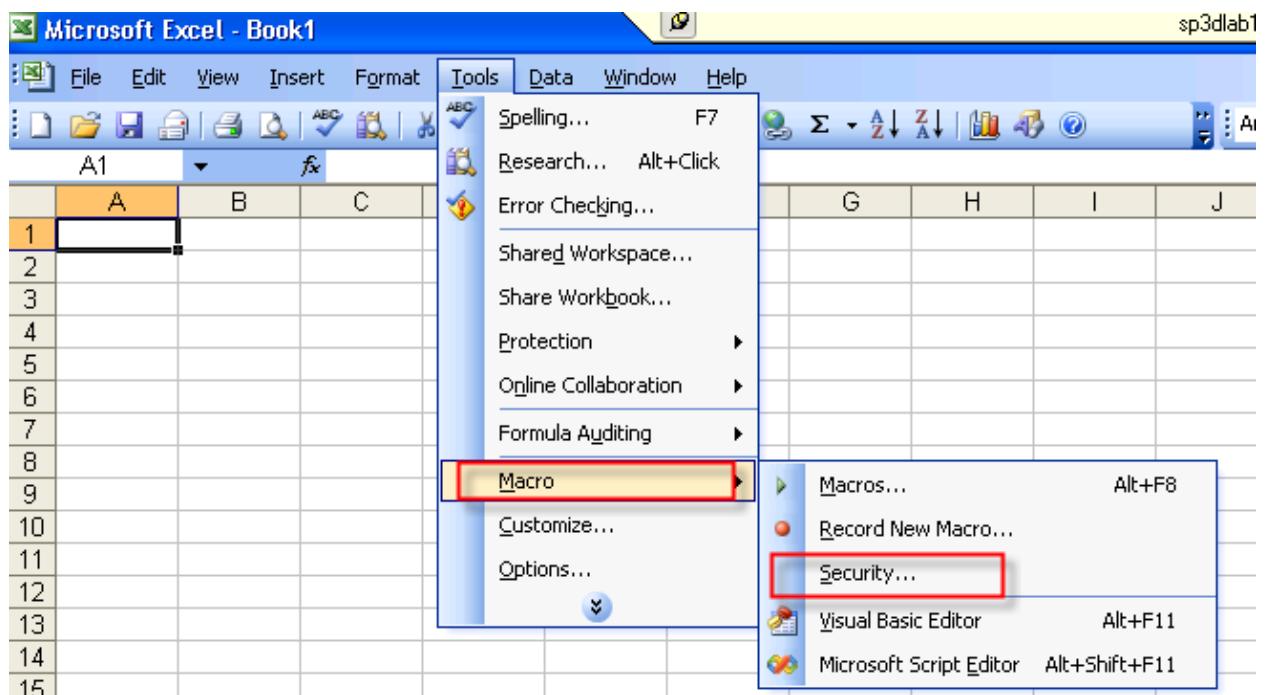
1. Select and Edit Style Options 'User'



2. Set S3D.DrawingFrame.PipeLineList.UseReportTemplate = True
3. For the option S3D.DrawingFrame.PipeLineList.ReportTemplate.TemplateName, pick the ellipsis (...) and select the Report template from Reports – Types of Reports – Piping – Piping Pipe Line List



4. Save to catalog.
5. Make sure that Trust access to Visual Basic Projects is checked in Excel Macros



6. Save to catalog and update 1002-P isometric. Pipeline list Report would be placed at shown below:

Pipeline	PipeRun	NPD	Piping Spec.	Ir
1002-P	U01-6-P-0002-1C0031	6.00 in	1C0031	
1002-P	U01-6-P-0001-1C0031	6.00 in	1C0031	
PIPING SPEC:	1C0031	DATE:	Today's Date (Locale Se	
INSULATION SPEC:	UNDEFINED	PLANT:	SP3DTrain	R
PAINTING SPEC:	ELECTRO-GALVANIZED	LINE NO:	1002-P	
TRACING SPEC:	UNDEFINED		P-U01-6-P-0002-1C0031-6	
MAX WORKING TEMP:				
MAX WORKING PRESS:				
FLUID CODE:	P, PROCESS			

1 1 2 1 3

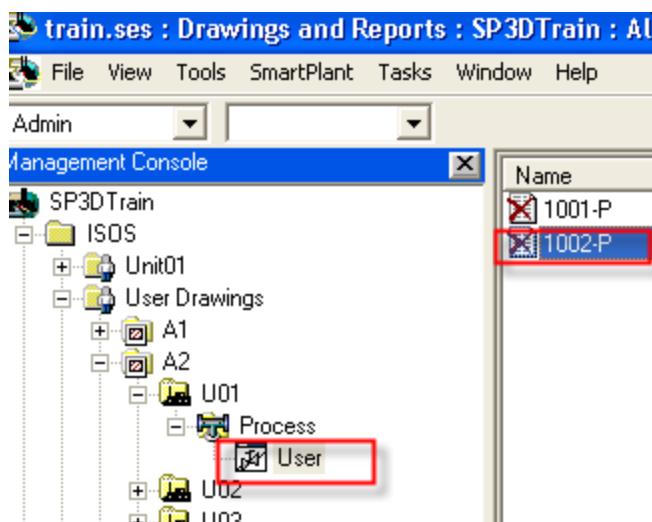
Tip: Only 100% visible columns in Excel Report Template will be displayed inside Isometric Drawing

Lab 10: Drawing Content

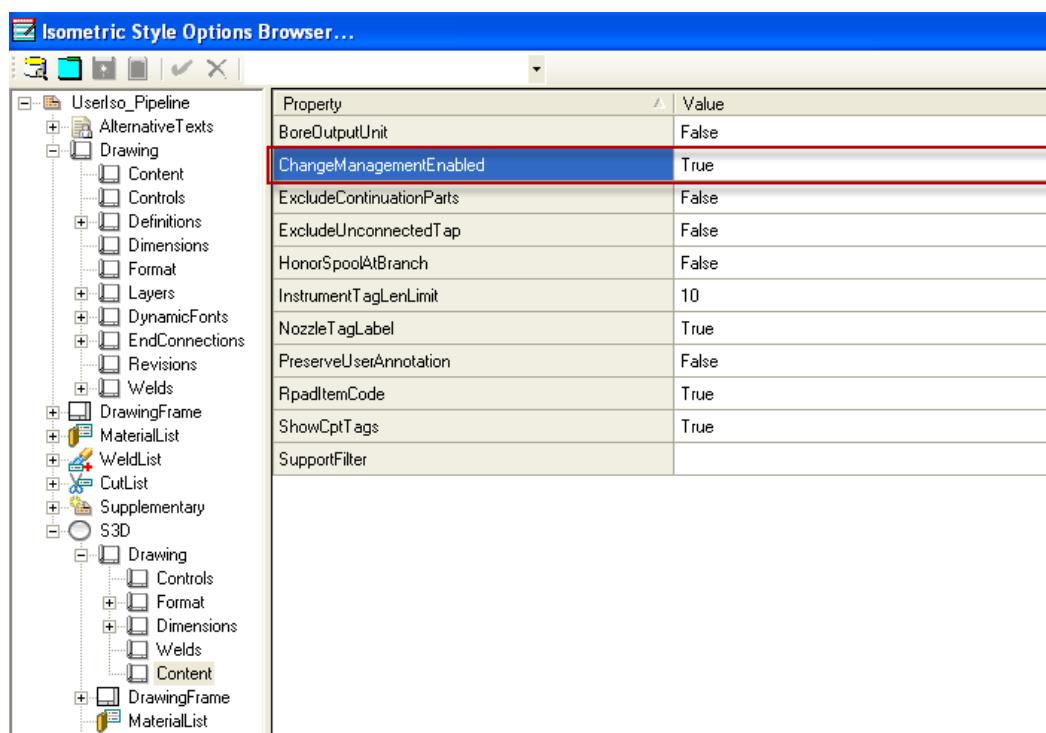
Change Management

Change Management on a piping isometric drawing refers to the fact that the same information needs to appear on the same sheet of an isometric drawing each time you extract the drawing (repeatability).

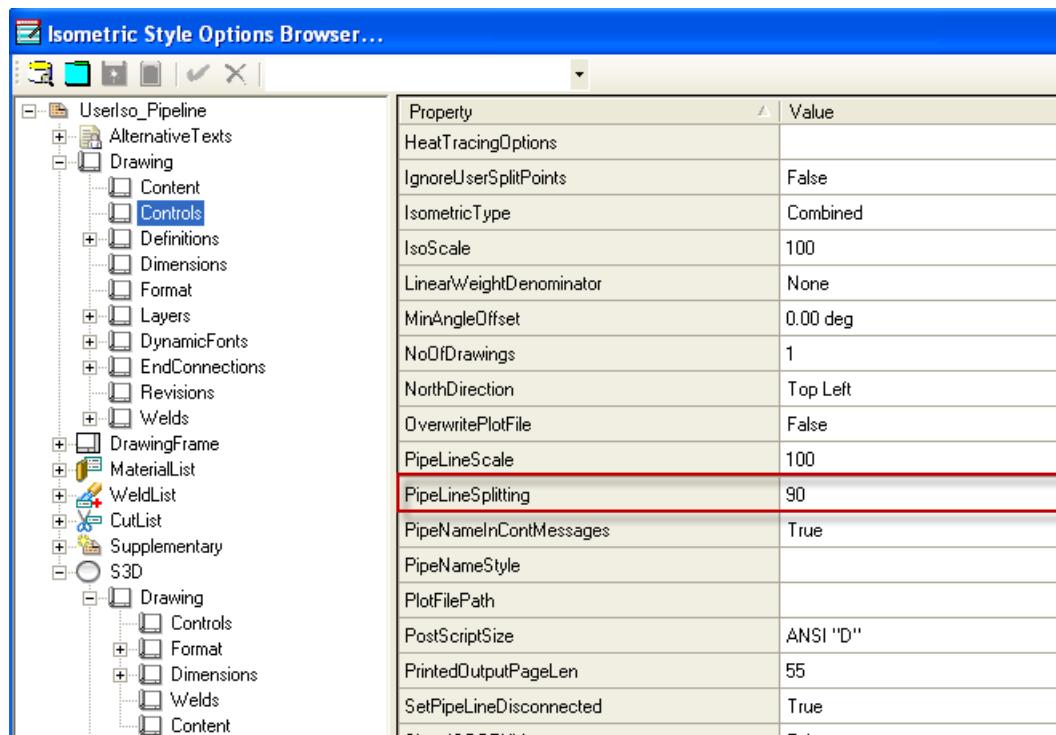
1. Edit Options for 'User' style in U01



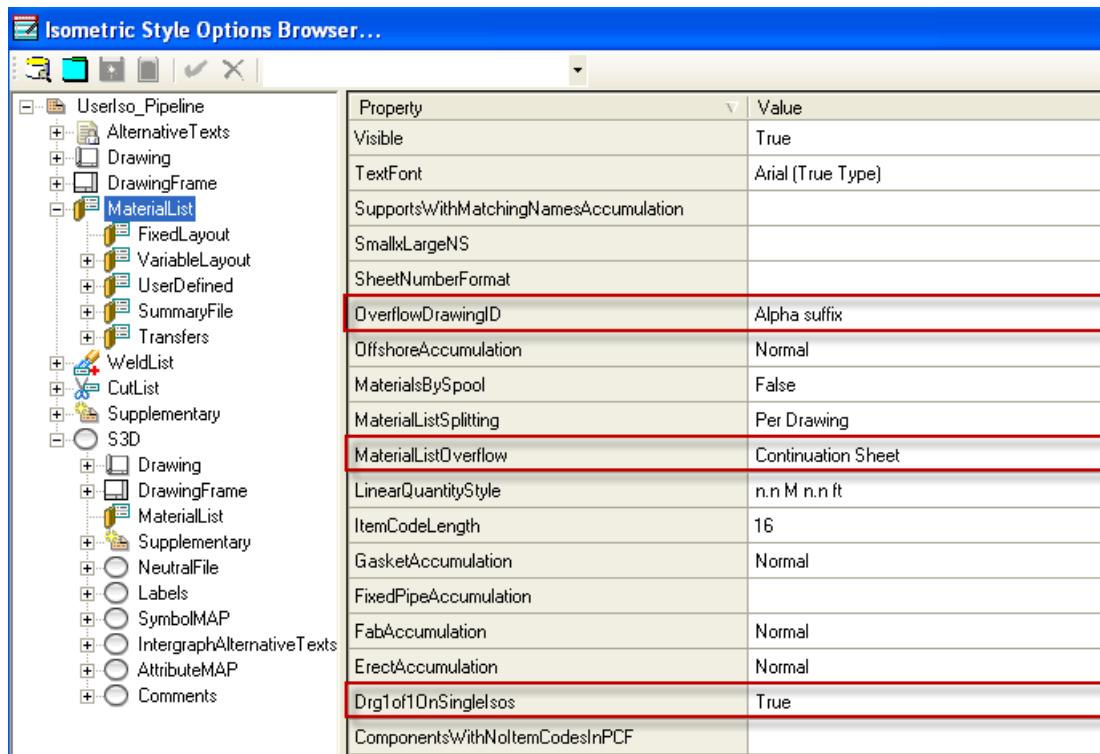
2. Set S3D.Drawing.Content.ChangeManagementEnabled option to True



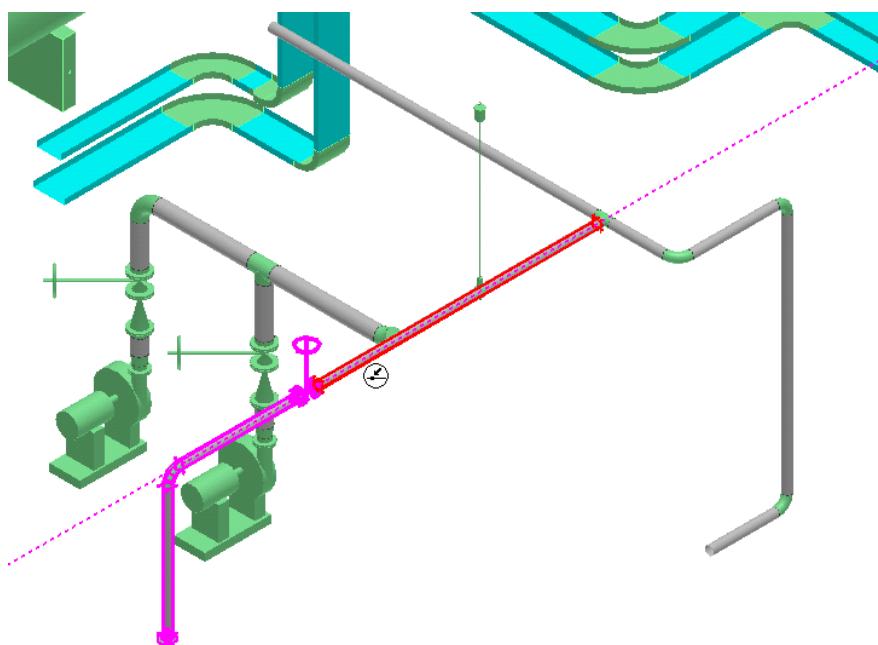
3. Set the Drawing.Controls.PipeLineSplitting option to **90 (%)** to leave room for growth in the drawing content area



4. To handle material list overflows from sheet to sheet without breaking change management, use isometric option settings (these are already set)
5. MaterialList.MaterialListOverflow to Continuation Sheet
6. MaterialList.OverflowDrawingID to Alpha suffix (e.g: 2A, 3A, etc).
7. Set MaterialList.Drg1of1OnSingleIsos to True



8. With this done, part items will remain on the same sheet
9. Extract line 1002-P under U01 and review sheets content. Make screenshots or Save-as to preserve a copy of this rev0 (ignore border size mismatch..)
10. Switch to Piping task and model additional piping on line 1002-P. Under normal conditions this might push old components to different iso sheets



11. Extract line 1002-P under U01 again and compare sheets content with that of rev0
12. All items that were extracted the first time should appear on the same sheet numbers as before
13. New piping items modeled should appear added on existing sheets in previously clear spaces, or in newly created sheets
14. Observe that newly added component receive new part numbers and the ones for existing components are preserved.

SHOP MATERIALS				
<u>PT NO</u>	<u>DESCRIPTION</u>	<u>NPD (IN)</u>	<u>CMDTY CODE</u>	<u>QTY</u>
1	Pipe, S-STD, BE, ASTM-A53-B Type S	6	PAAZZBOZZABAABOA	83.1'
2	Tee, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	6X6	MDJZZBOZZAAEADCZ	1
3	90 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	6	MCMZZBOZZAAEADCZ	4
5	Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match	6	FAAAHDCZZAADABQZ	3

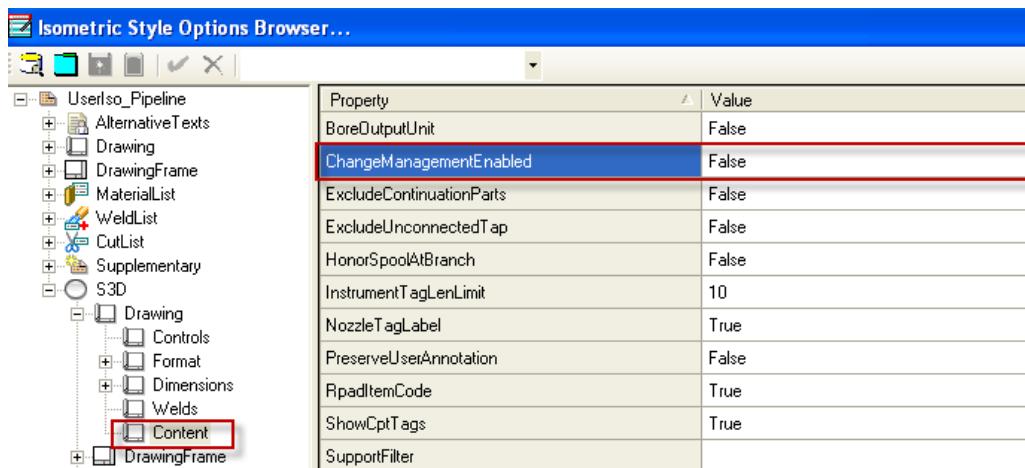
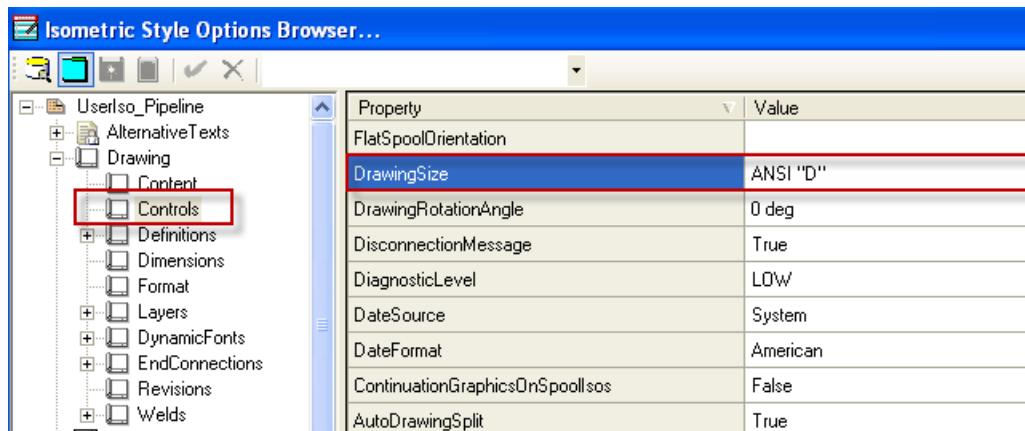
PIPE SUPPORTS				
<u>PT NO</u>	<u>DESCRIPTION</u>	<u>NPD (IN)</u>	<u>CMDTY CODE</u>	<u>QTY</u>
4	Variable Spring with Double Bolt Clamp, TYPE B SPRING, WELDED BEAM ATTACH, STND SPRING, Size:4	6	Assy_VS_SR_DB_11	1

OTHER THAN SHOP MATERIALS				
<u>PT NO</u>	<u>DESCRIPTION</u>	<u>NPD (IN)</u>	<u>CMDTY CODE</u>	<u>QTY</u>
6	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601	6	GMAHACABXBEPUS	2
7	Studbolts, ASTM-A193-B7 - 4.25 in. Length	3/4	BAZZZZZAAYBEUZZ	16
8	Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47	6	VAAAHABAHAJADAZ	1

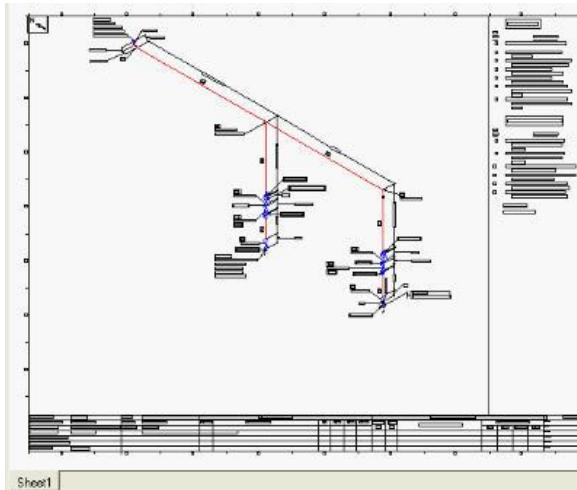
PIECE MARKS				
NO SPOOL FOUND				

Iso Break Control Points

1. The user can force a new drawing sheet for a given pipeline or piperun extraction by inserting a **PipingMFG Limit Point** in the model.
2. Go to the Drawings and Reports task and Edit Options in the '**User**' style in U01 to output on D-size (Drawing.Controls) AND turn off Change Management

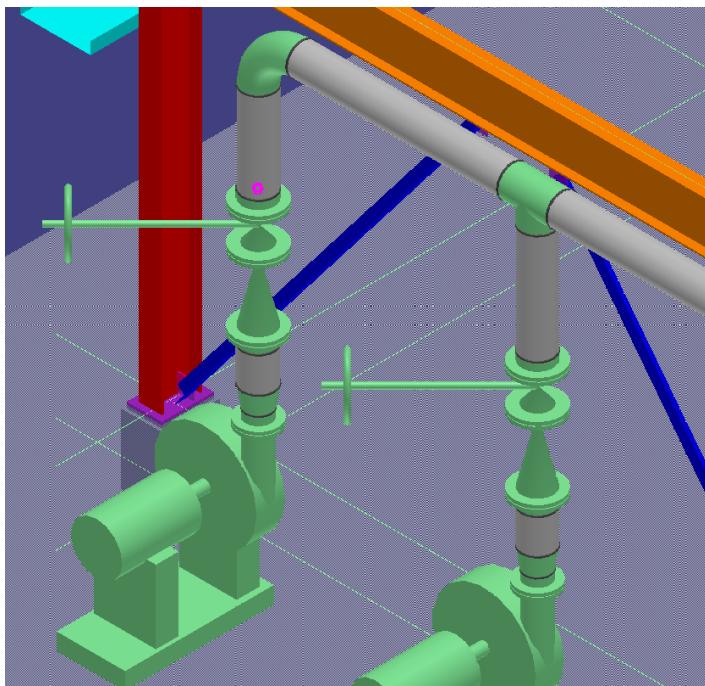
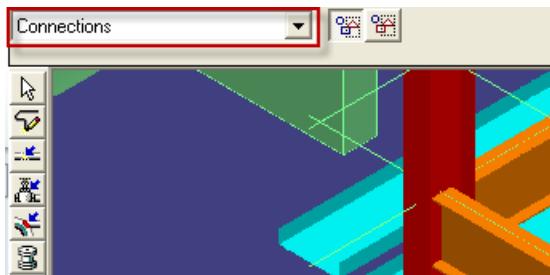


3. Extract iso of 1001-P, it should be one single sheet

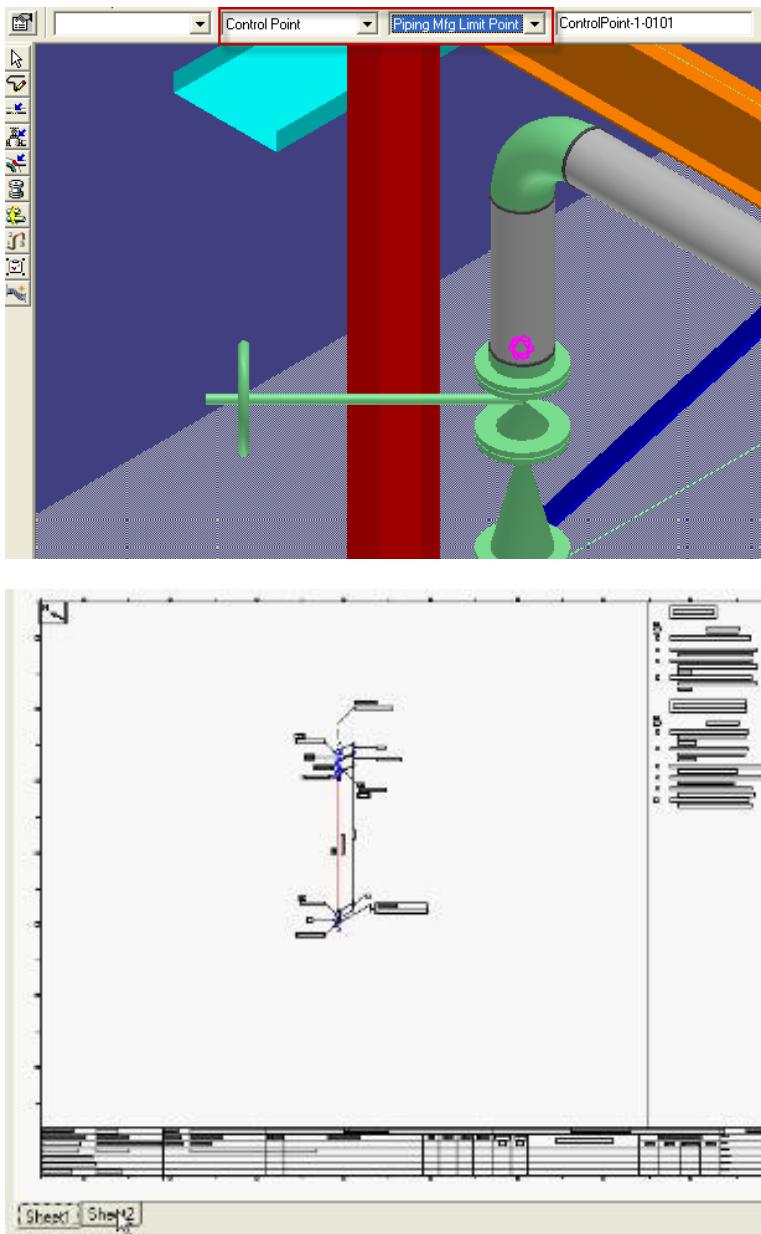


4. Switch to Piping task

5. Choose “Connections” from Locate filter and select a Connection object on the Pipeline 1001-P as shown in the picture below:



6. Select **Insert > Control Point**
7. Position Control Point at the selected Connection Object
8. Set the **Subtype** for the control point to **PipingMfg Limit Point**

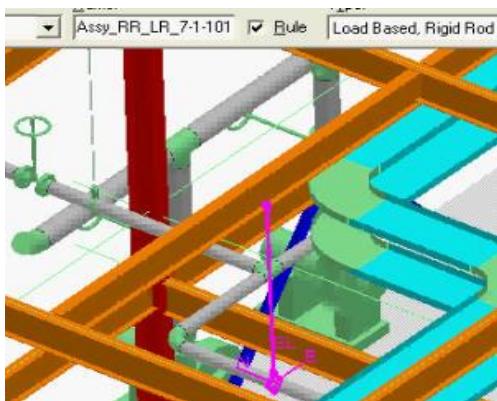


9. Extract iso of 1001-P, the updated drawing should have two sheets
10. The Piping Component File (PCF) should have the line ISO-SPLIT-POINT followed by the X, Y, and Z coordinates of the isometric break control point

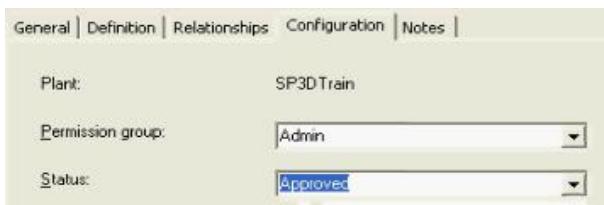
Selective display of Supports

The **S3D.Drawing.Content.SupportFilter** isometric option allows you to specify a filter that determines which supports are included on an isometric drawing. If no filter is specified, all associated supports appear on the iso.

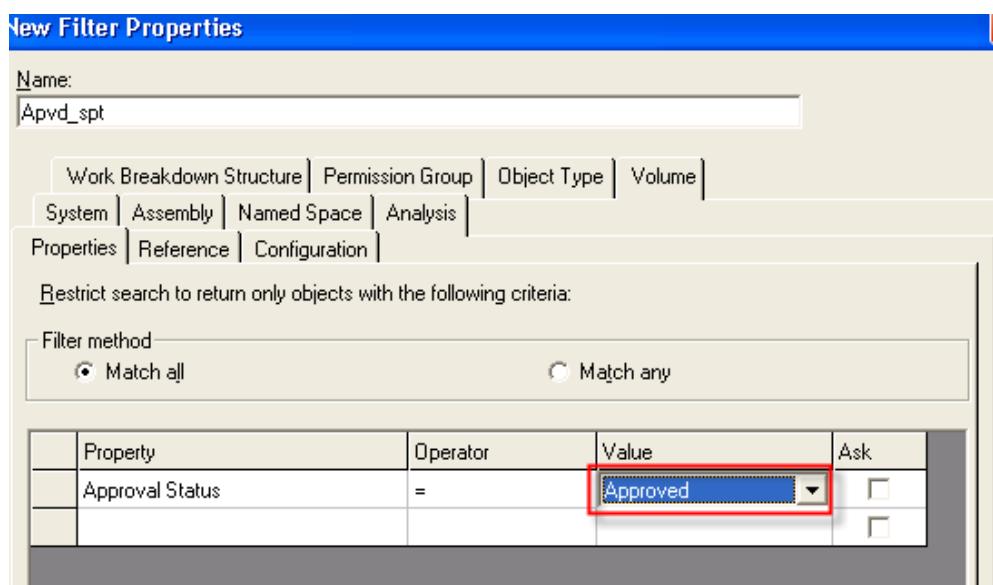
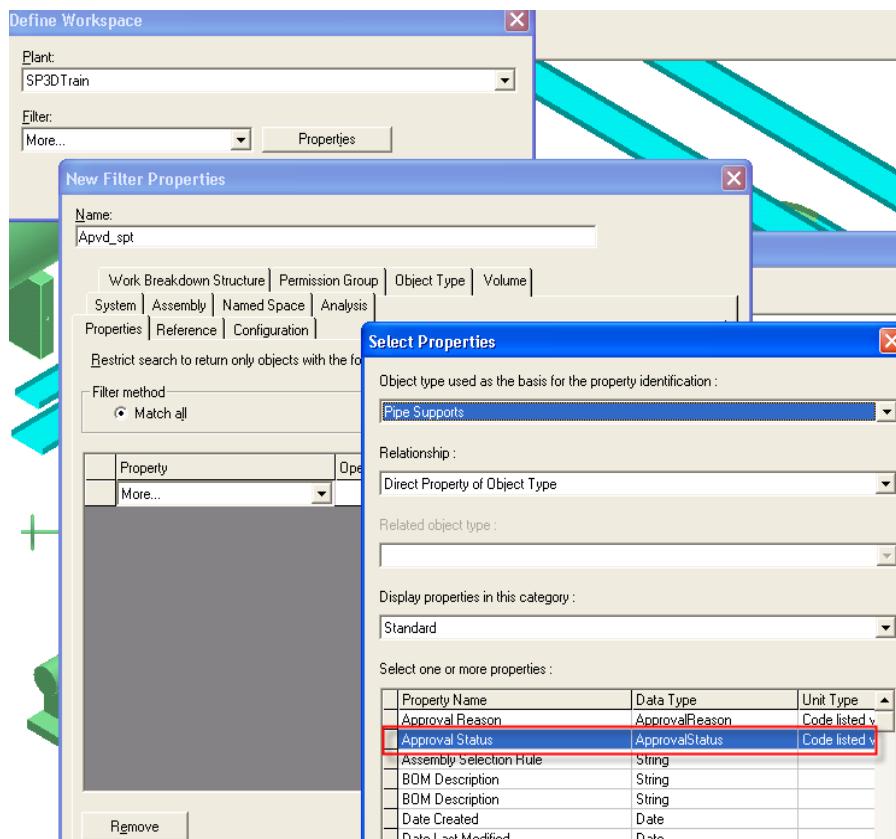
1. In the Piping task, add 2 new hangers by rule on 1002-P



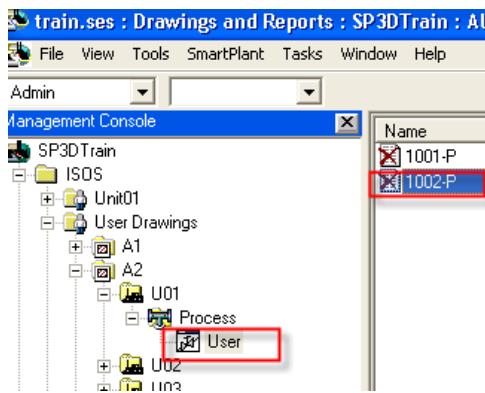
2. Set status to Approved for one of the hangers assembly



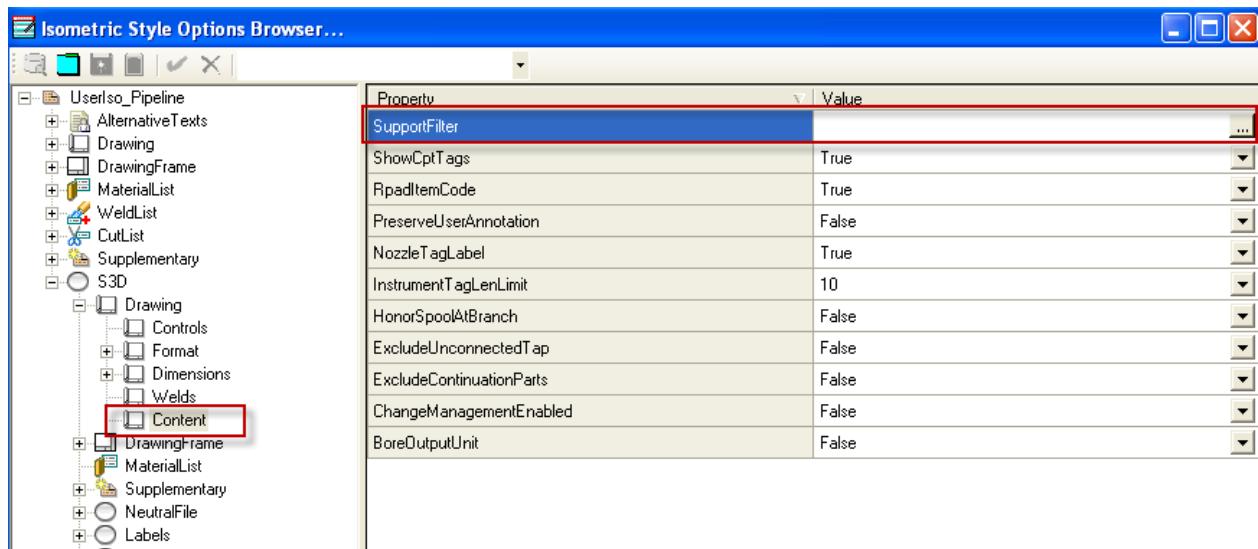
3. Use Tools>Select by Filter to create a Plant filter named **Apvd_Spt** that locates approved piping supports assemblies only



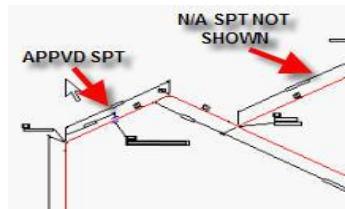
4. Switch to Drawing task and Edit Options for the style in 'User'



5. Expand the tree to Drawing.Content.SupportFilter. Click the ellipsis button in the Value field to display the **Select Filter** dialog box



6. Select Plant filter **Apvd_Spt** and save options
7. Update Iso 1002-P and review the supports.



Lab 11: Drawing Format

Dotted Symbology

DottedSymbology can be setup either using Filters or Labels.

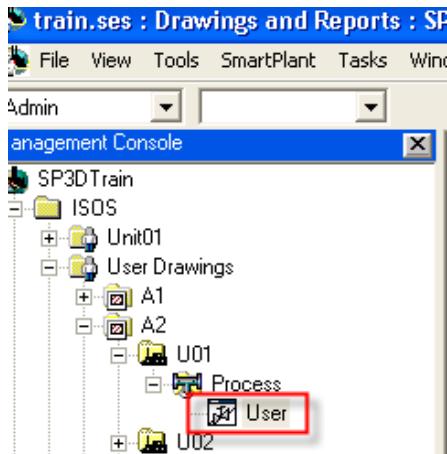
DottedDimensionedFilter/DottedUnDimensionedFilter.enables dotted dimensioned and un dimensioned symbology for parts included in the filter. If both parts connected at a weld are dotted, the weld will be dotted as well. If a part is returned by both the filters, the part will be dimensioned.

You can use DottedDimensionedLabel or DottedUnDimensionedLabel instead of DottedDimensionedFilter or DottedUnDimensionedFilter. If you are using the Filter versions of the options ensure that the Label versions are not set.

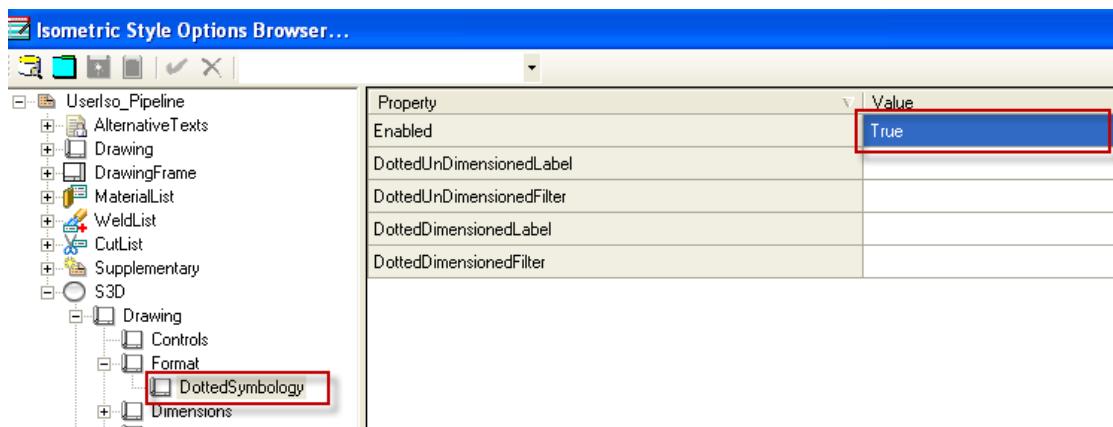
Note: In many cases using a Label will be faster than using a Filter. To speed up generation of isometric drawings try using DottedDimensionedLabel and DottedUnDimensionedLabel instead.

This Lab Demonstrates usage of DottedDimensionedFilter.

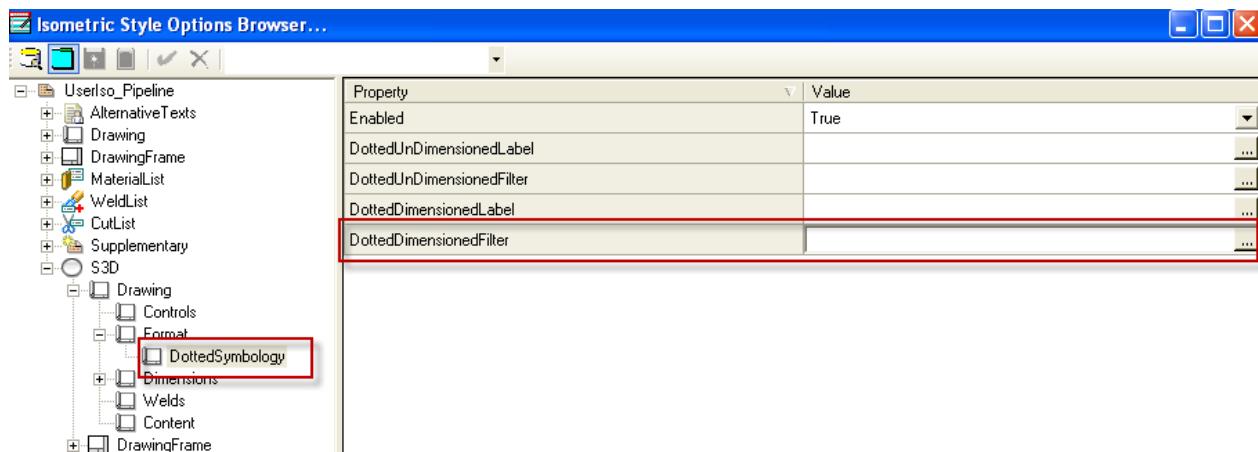
1. Switch to Drawings and Reports Task
2. Select and Edit Options for Style 'User'



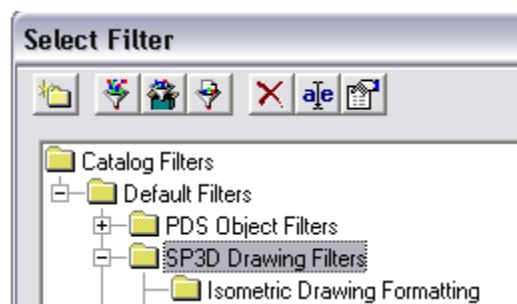
3. Select S3D.Drawing.Format.DottedSymbologyEnable = True



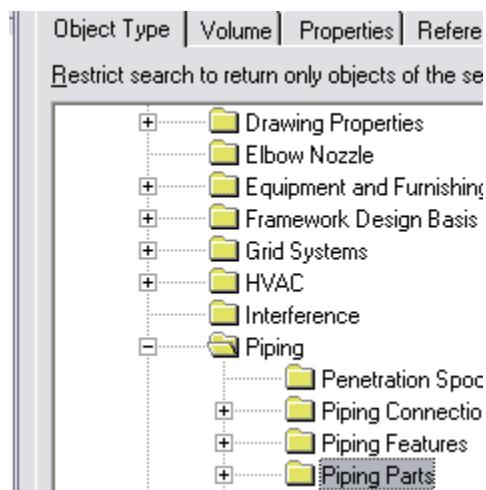
4. Select the ellipsis (...) in the S3D.Drawing.Format.DottedSymbology.DottedDimensionedFilter field to invoke the Select Filter dialog



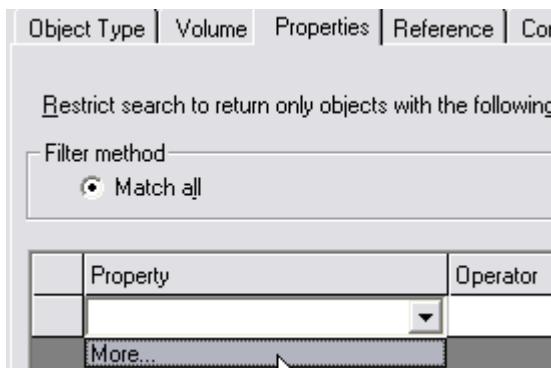
5. Expand Catalog Filters\Default Filters and create a new folder under SP3D Drawing Filters named 'Isometric Drawing Formatting'



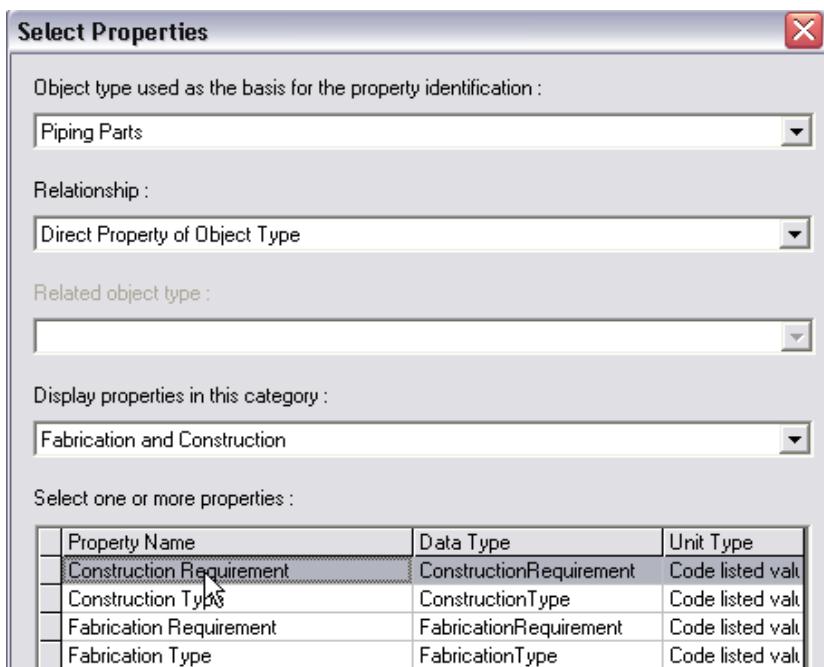
6. In the new folder, create a new filter and name the filter 'Dotted Dimensioned Parts'
7. On the object type tab, select Piping\Piping Parts



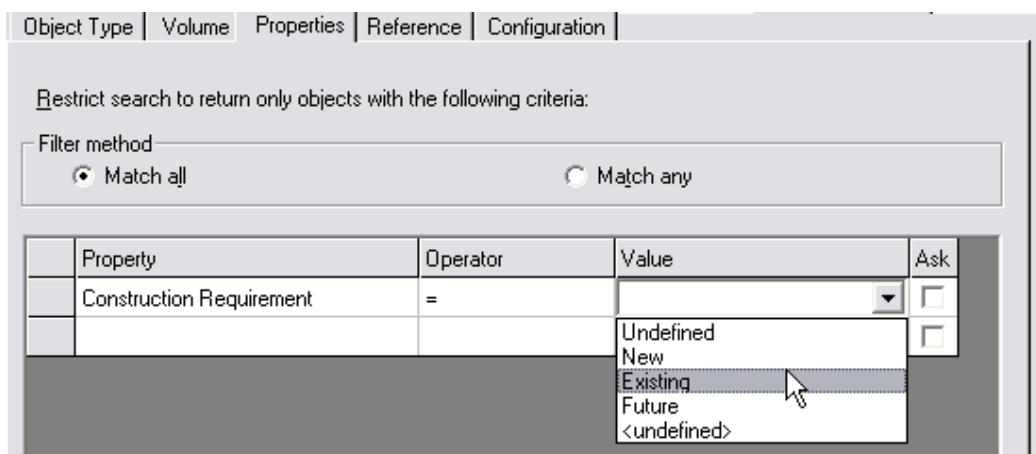
8. On the property tab, select More.. to add a new property.



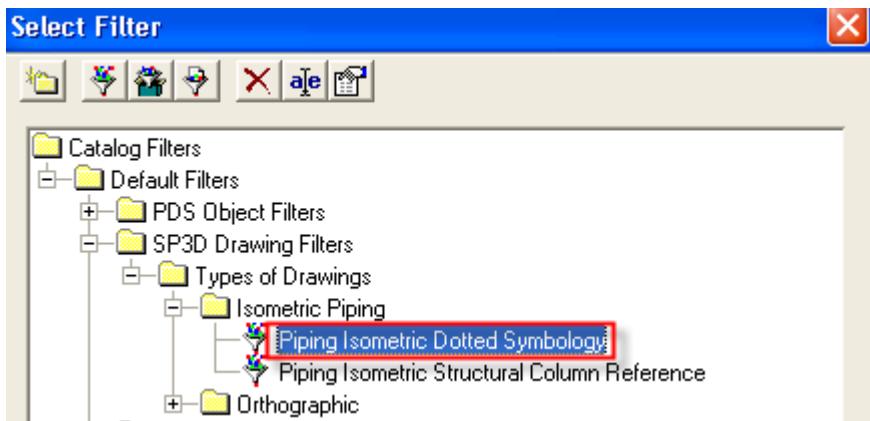
9. In the Select Properties dialog, select the Construction Requirement property as shown



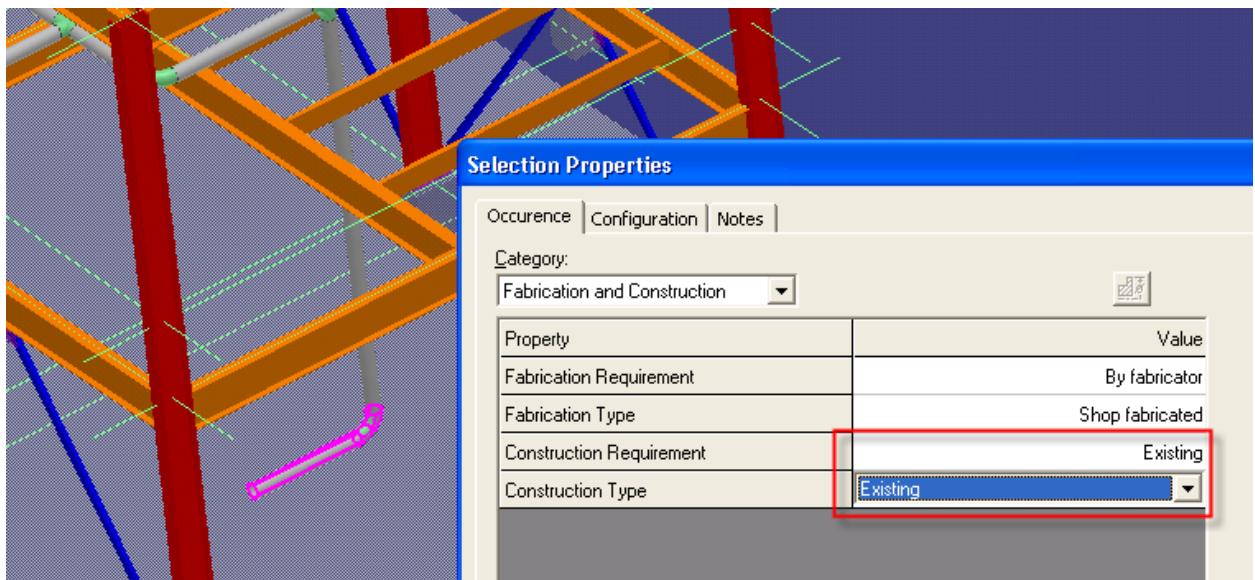
10. Back on the properties tab, select the value 'Existing' from the codelist



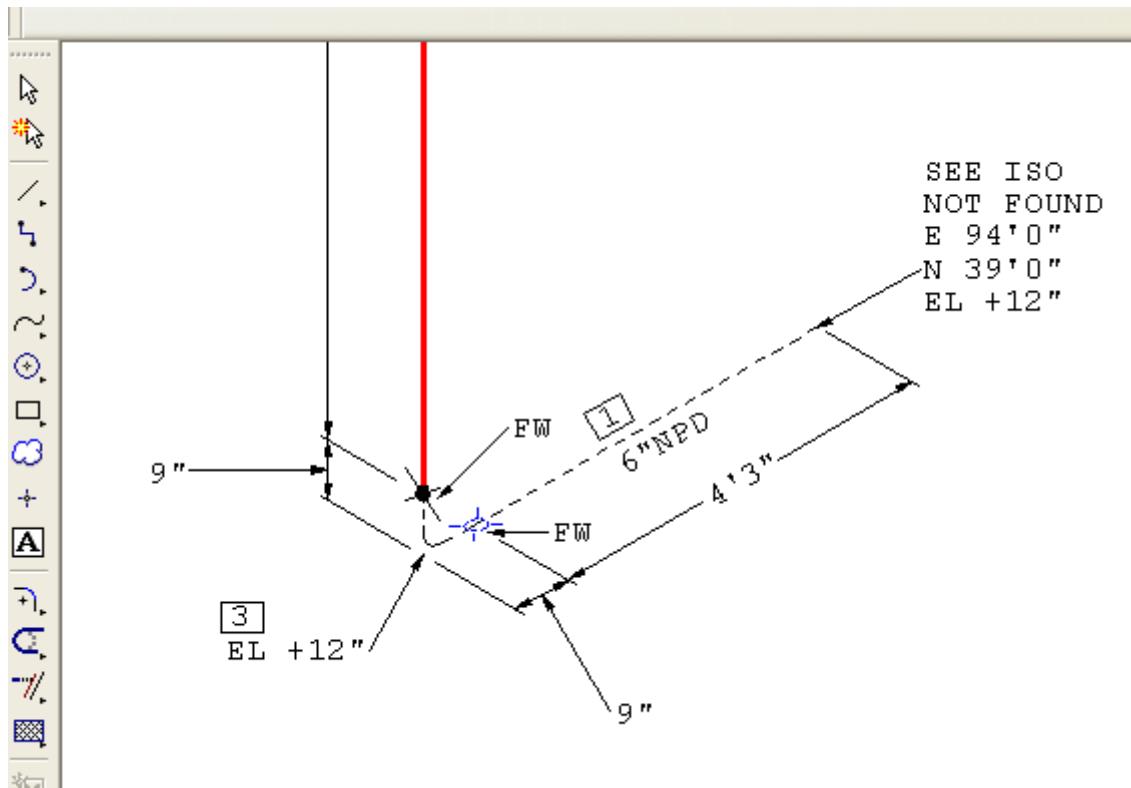
11. Click OK to define the new filter and then select it for the style.
12. A predefined filter '**Piping Isometric Dotted Symbology**' can also be used instead which has identical filter definitions described above.



13. Save Options to catalog.
14. Switch to piping task, select a few parts from the line 1002-P and change their construction requirement to '**Existing**'.



15. Update drawing for 1002-P, you should see that the parts and the welds as dotted.

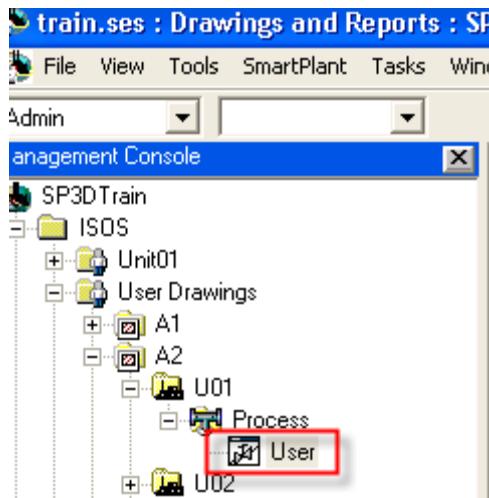


This completes Lab 11

Lab 12: Drawing Definitions

In Lab12, you are going to change the look of the drawing by using drawing definitions.

1. Select the 'User' Style and using a right mouse click, select 'Edit Options'



2. Select Drawing.Definitions.Definitions and you will see the current definitions:

The screenshot shows the 'Isometric Style Options Browser...' dialog box. On the left is a tree view of style categories, including 'UserIso_Pipeline', 'AlternativeTexts', 'Drawing', 'Content', 'Controls', 'Definitions', 'Dimensions', 'Format', 'Layers', 'DynamicFonts', 'EndConnections', 'Revisions', 'Welds', 'DrawingFrame', 'MaterialList', 'WeldList', 'CuList', 'Supplementary', and 'S3D'. The main area is a table titled 'UserIso_Pipeline' with columns: AppliesTo, LowerBore, UpperBore, Category, Colour, Layer, DScale, ThicknessActual, ThicknessLogical, and LineStyle. The table lists various drawing styles like PipeLine, General Fittings, UNDIMENSIONED-BRANCHES, etc., with their respective settings. At the bottom, a tooltip for the 'AppliesTo' column is shown: 'Defines the pipeline, pipeline component or facility, the definition will be applied to. This is set using a list, which includes the allowable settings for this property.' The status bar at the bottom right shows 'OPT: N/A SW:'.

AppliesTo	LowerBore	UpperBore	Category	Colour	Layer	DScale	ThicknessActual	ThicknessLogical	LineStyle
PipeLine	8.00	42.00	ALL	5	5	100.00	1.25 mm	4.00	0
PipeLine	2.00	8.00	ALL	5	5	100.00	0.95 mm	3.00	0
General Fittings	1.00	2.00	ALL	1	10	90.00	0.30 mm	2.00	0
UNDIMENSIONED-BRANCHES	1.00	1.00	ALL	0	10	110.00	0.65 mm	2.00	0
PipeLine	2.00	42.00	ALL	5	5	100.00	0.65 mm	2.00	0
General Fittings	2.00	42.00	ALL	1	10	120.00	0.35 mm	2.00	0
WELDS	1.00	1.00	ALL	0	45	100.00	0.35 mm	1.00	0
CONTINUATION	1.00	1.00	ALL	0	5	100.00	0.35 mm	1.00	0
SPLIT-POINTS	1.00	1.00	ALL	0	5	100.00	0.35 mm	1.00	0
SPECIAL-STATUS	1.00	1.00	ALL	0	5	100.00	0.65 mm	1.00	0
ISO-TEXT	1.00	1.00	ALL	0	35	100.00	0.30 mm	0.00	0
DIMENSION-TEXT	1.00	1.00	ALL	0	15	100.00	0.30 mm	0.00	0
SKEWS	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0
TRACING	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0
HATCHING	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0
FRAME-TEXT	1.00	1.00	ALL	0	30	100.00	0.30 mm	0.00	0
WELD-BOX	1.00	1.00	ALL	0	30	100.00	0.30 mm	0.00	0
FRAME	1.00	1.00	ALL	0	30	100.00	0.30 mm	0.00	0
DIMENSION-LINES	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0
LAGGING	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0
MATERIAL-LIST	1.00	1.00	ALL	0	25	100.00	0.30 mm	0.00	0
NOZZLE	1.00	1.00	ALL	0	50	100.00	0.00 mm	0.00	0
SPEC-BREAKS	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00	0

AppliesTo
Defines the pipeline, pipeline component or facility, the definition will be applied to. This is set using a list, which includes the allowable settings for this property.

3. Tip: The Options browser can be resized to show more columns.

4. Click in a column of the last row for inserting new data.
5. Applies to = Flanges, UpperBore = 1, LowerBore = 1, Category = ALL, Colour = 5, Layer = 10, DScale = 100, , ThicknessActual = 0.35, ThicknessLogical = 2.00, Line Style = 0 as shown:

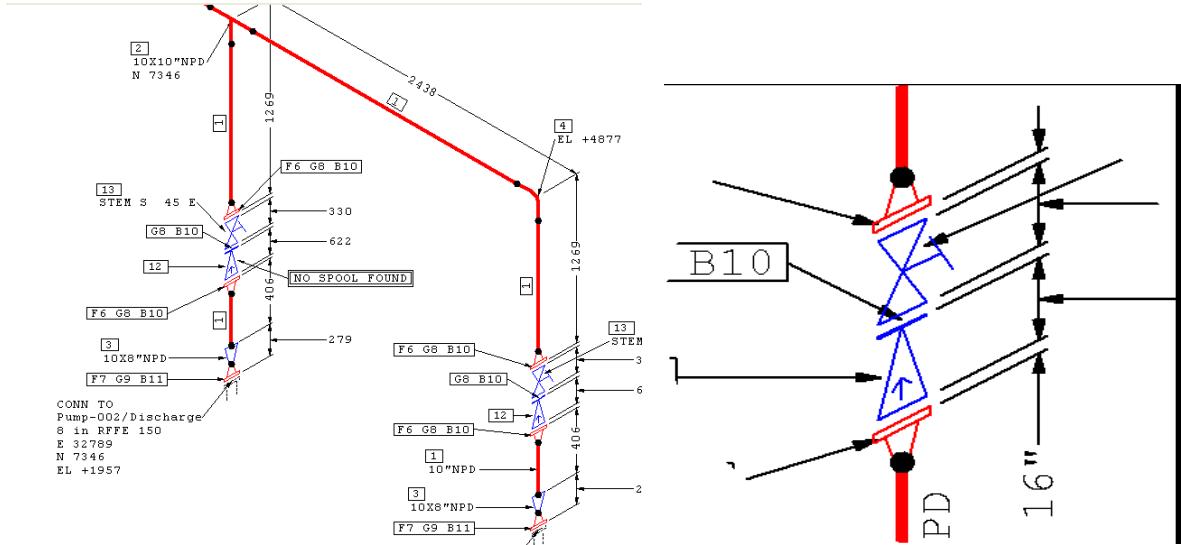
Isometric Style Options Browser...

AppliesTo	LowerBore	UpperBore	Category	Colour	Layer	DScale	ThicknessActual	ThicknessLogical
CONTINUATION	1.00	1.00	ALL	0	5	100.00	0.35 mm	1.00
DIMENSION-LINES	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00
DIMENSION-TEXT	1.00	1.00	ALL	0	15	100.00	0.30 mm	0.00
FLANGES	1.00	1.00	ALL	5	10	100.00	0.35 mm	2.00
FRAME	1.00	1.00	ALL	0	30	100.00	0.30 mm	0.00
FRAME-TEXT	1.00	1.00	ALL	0	30	100.00	0.30 mm	0.00
General Fittings	1.00	2.00	ALL	1	10	90.00	0.30 mm	2.00
General Fittings	2.00	42.00	ALL	1	10	120.00	0.35 mm	2.00
HATCHING	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00
ISO-TEXT	1.00	1.00	ALL	0	35	100.00	0.30 mm	0.00
LAGGING	1.00	1.00	ALL	0	20	100.00	0.30 mm	0.00

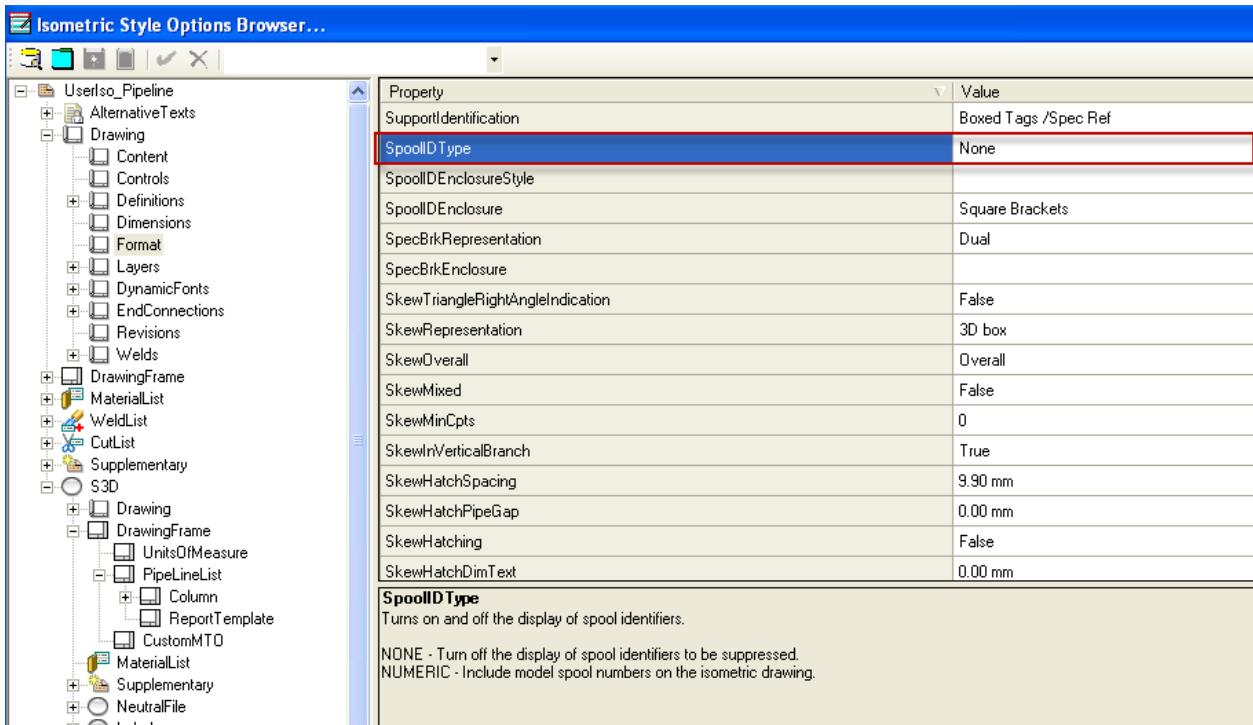
6. In the current drawing, the flanges are being shown in blue, this will change them to be drawn red (the same as the pipe).

Tip: If you change the Drawing units to be Metric Bores then all the bore values in this table will need to be changed to their metric equivalents.

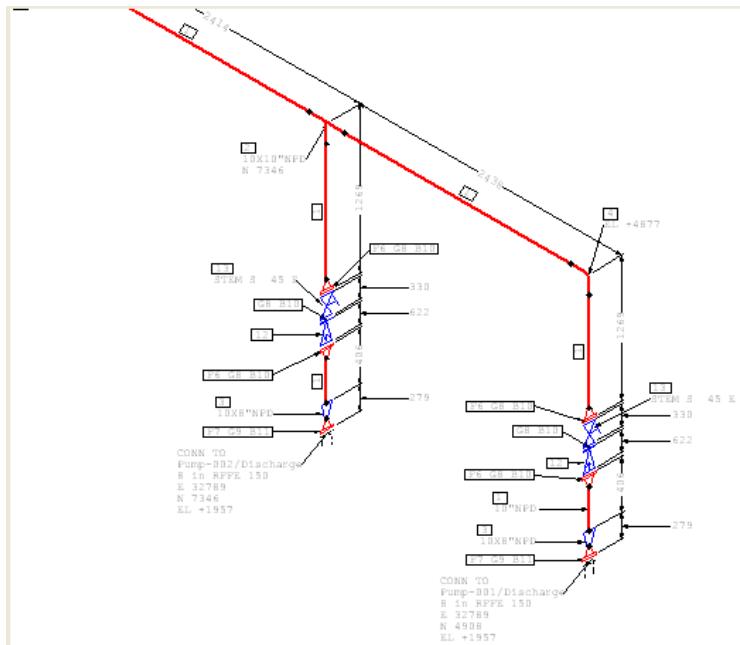
7. Save the changes to the catalog by clicking the 'Save to Catalog' icon: and close the Options Browser.
8. Update the drawing 1001-P under U01.



9. While we are concentrating on the drawing, again open the options browser and Select Drawing.Format. Set the value of SpoolIDType to None



- Save the changes, close the Options Browser and Update the U01 drawing 1001-P.



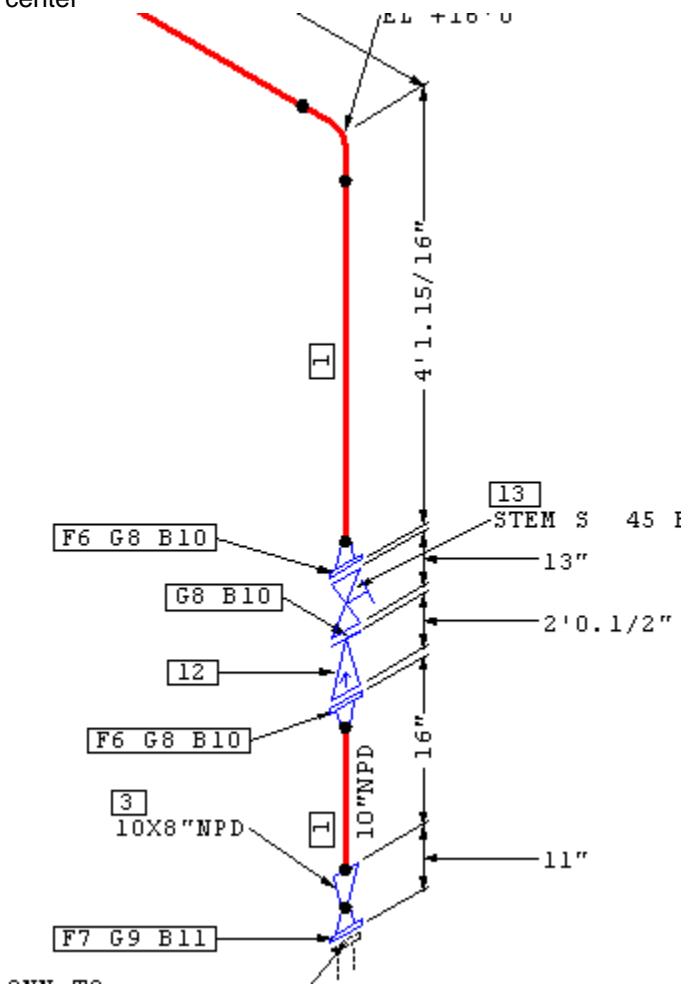
- You will notice the 'NO SPOOL FOUND' message is no longer shown.

This completes Lab12

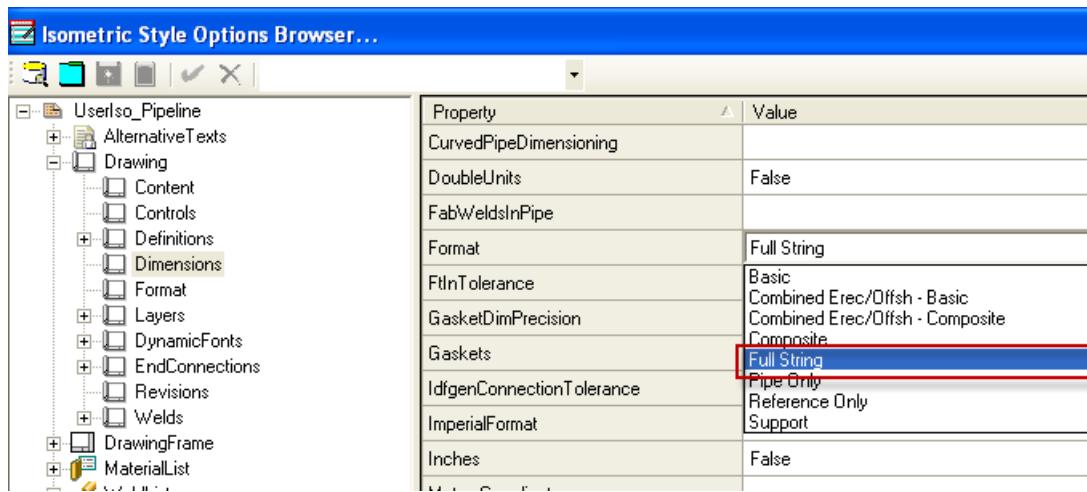
Lab 13: Drawing Dimensioning and Coordinates

Change Dimension Style to Full String

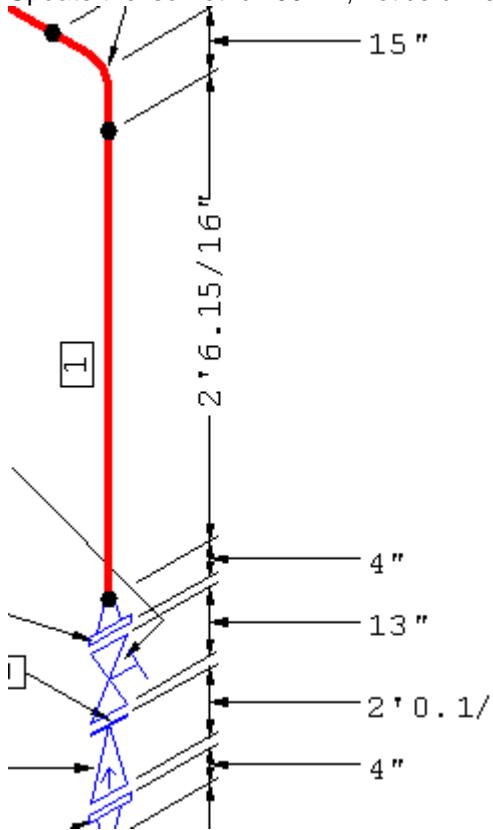
1. Open the isometric 1001-P and notice that the dimensions down the vertical line are center to center



2. Edit options on the 'User' style and go to Drawing.Dimensions.Format
3. Change the type to 'Full String'



4. Save to catalog and exit option browser.
5. Update the isometric 1001-P, notice dimensions

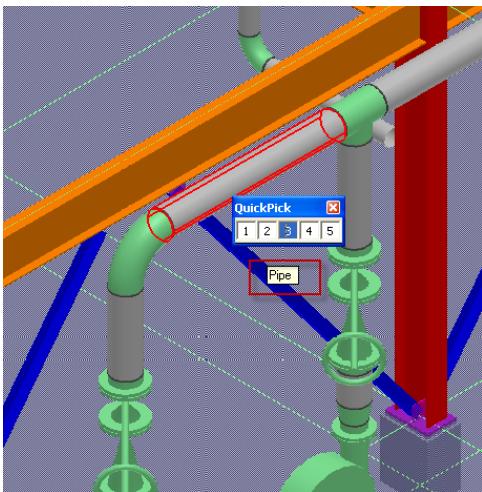


6. Switch format back to Basic for next labs.

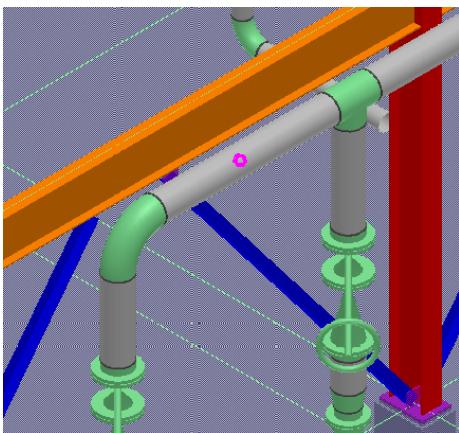
Dimension to Tie-In Points

Dimensioning to tie-in points is achieved by placing a control point as a child of a pipe part, then placing a note on the control point of the type 'Fabrication' and turning the 'Show Dimension' check box of the note on.

1. Switch to piping task and zoom in on 1001-P
2. Insert Control Point and pick the straight pipe between the elbow and the tee in the pipeline 1001-P. Make sure to pick Pipe Part from the Quick Pick and not Pipe Feature.

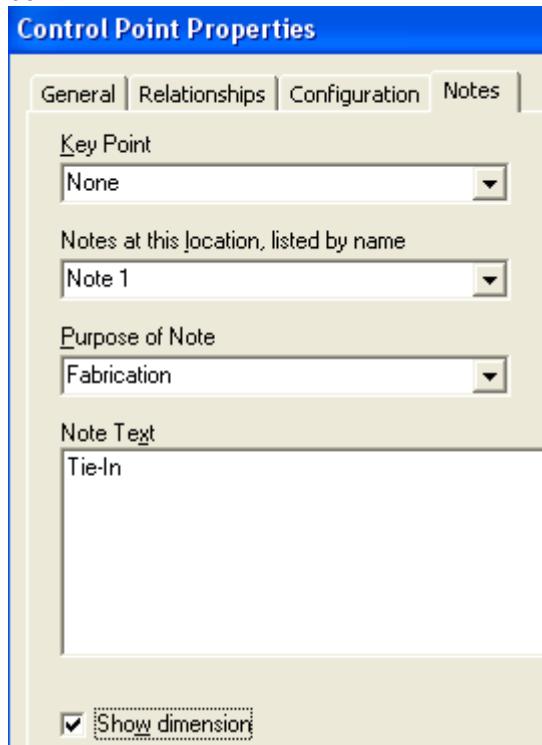


3. Locate the mid point of the pipe and click to place the control point.

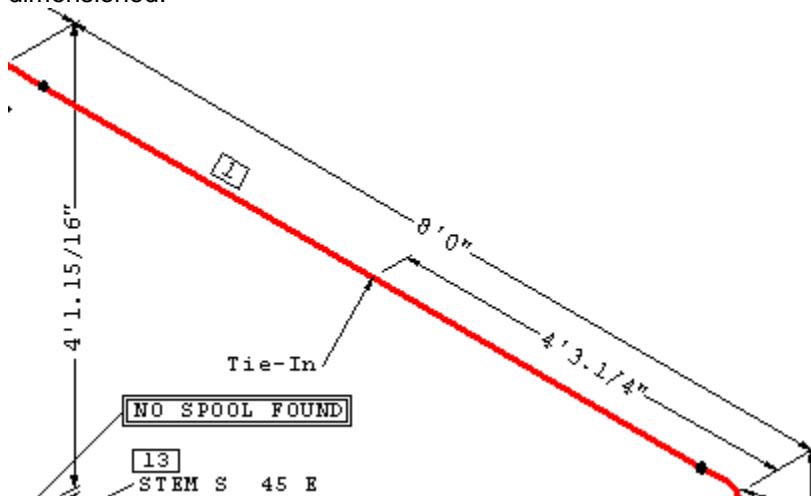


4. With the control point selected, invoke the property page
5. Click the notes tab and click 'New Note'

6. Enter Fabrication as Note type, enter 'Tie-In' as text of the note and check the Show Dimension box.

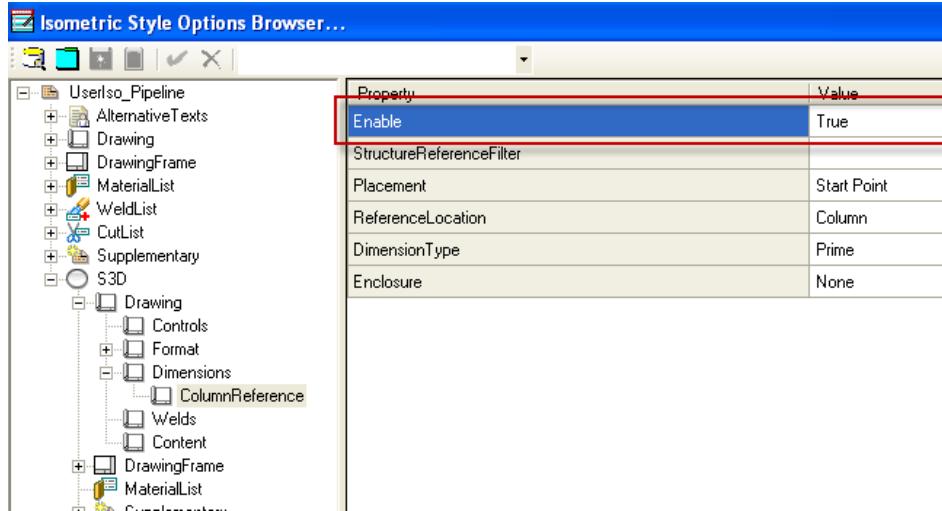


7. Click OK to finish and switch to drawings and update 1001-P. Notice that the tie-in location is dimensioned.

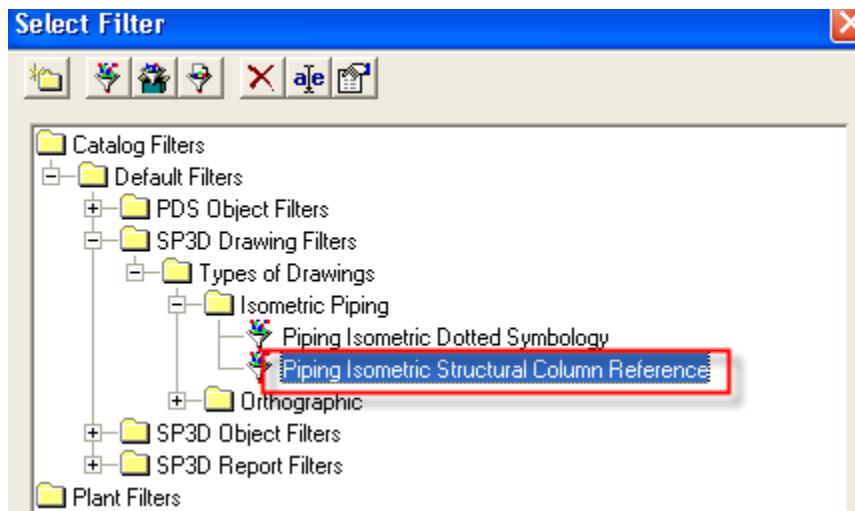


Column/Grid Reference

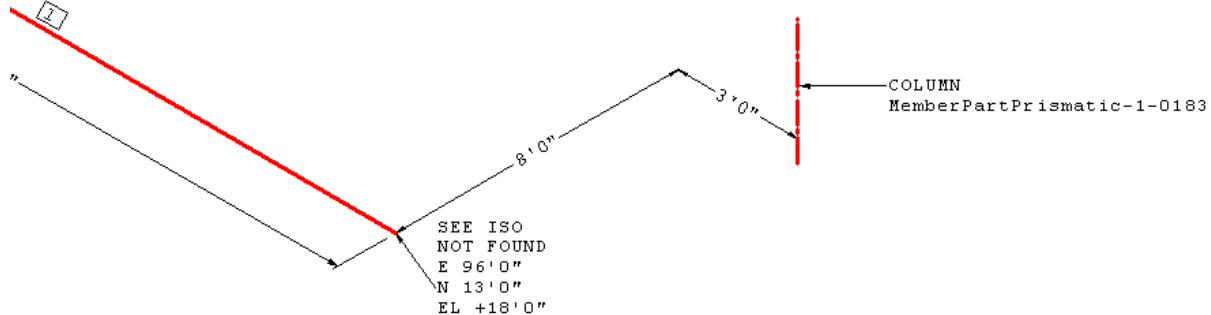
1. Edit Options for the 'User' Style.
2. Select S3D.Drawing.Dimensions.ColumnReference. Set Enable to True



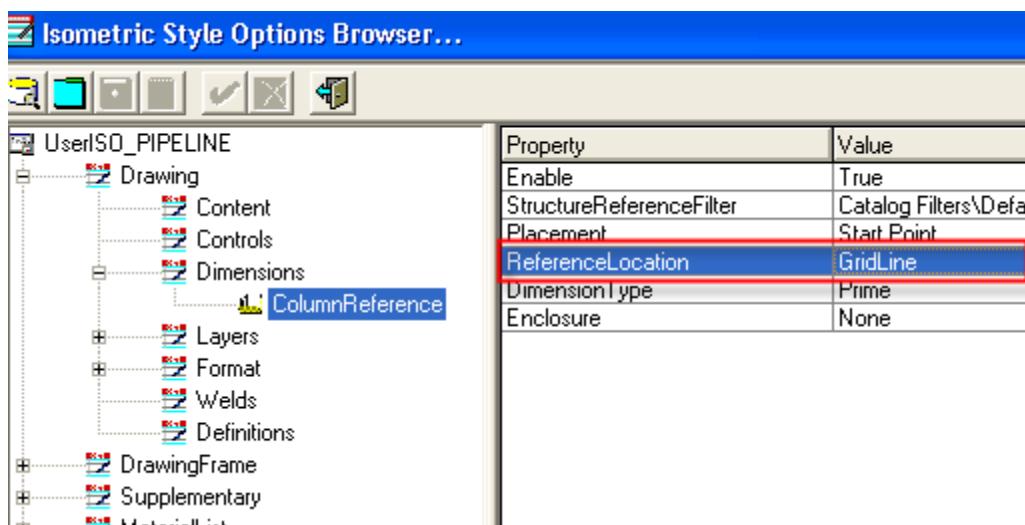
3. In the StructuralReferenceFilter field, select the ellipsis (...), this opens the Select Filter dialog and select filter named '**Piping Isometric Structural Column Reference**' from Catalog Filters>Default Filters>SP3D Drawing Filters>Types of Drawings>Isometric Piping.



4. Select the filter above and click OK.
5. Set S3D.Drawing.Dimensions.ColumnReference.ReferenceLocation = Column
6. Save to Catalog.
7. Extract line 1002-P. You should see structural columns referenced on the iso.



8. Similary, for displaying Grid References, a filter can be defined for Grid Systems and option '**ReferenceLocation**' should be modified to **Grid Lines** instead of **Column**.



Lab14: Labels

S3D.Labels.ComponentNote

This node in the style is used to output notes on the face of the iso. Notes can be output for seven kinds of objects

Object	Object passed to label
Pipe	Pipe part occurrence
Component	Pipe component occurrence
Instrument	Pipe instrument occurrence
Specialty	Pipe specialty occurrence
Valve	Pipe component occurrence
Pipe Support	Hanger assembly
RWELD	Weld

An enclosure style can be specified for the value returned by the label. Valid values are

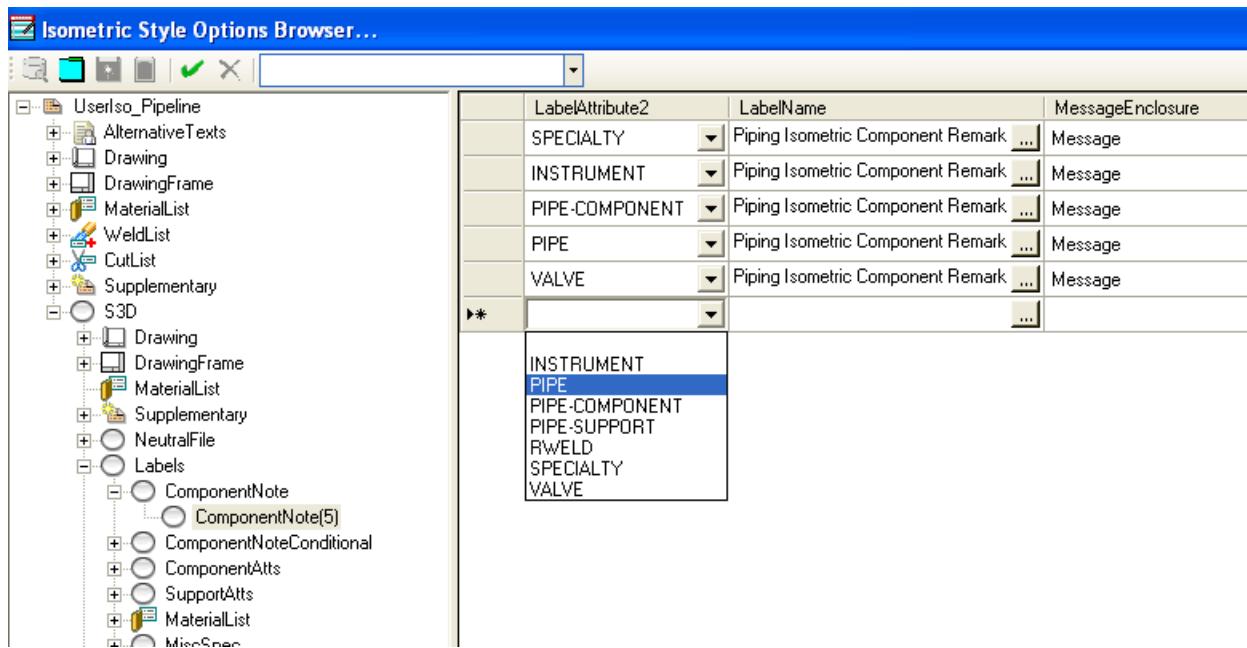
- MESSAGE
- MESSAGE-SQUARE
- MESSAGE-POINTED
- MESSAGE-ROUND

Additionally the values may be used when the label output is limited to 3 characters

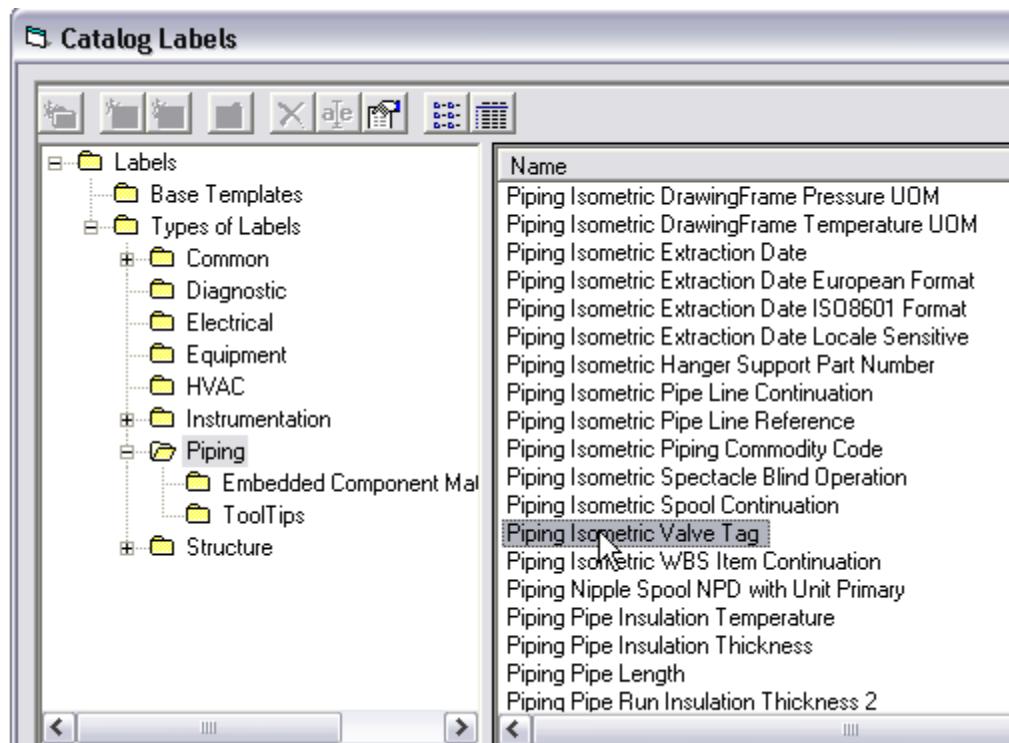
- MESSAGE-TRIANGLE
- MESSAGE-DIAMOND
- MESSAGE-CIRCLE

Let us add a component note label to output the valve tag

1. Edit Options for the 'User' style, expand the tree to find S3D.Labels.ComponentNote.ComponentNote and then click in the last blank row.

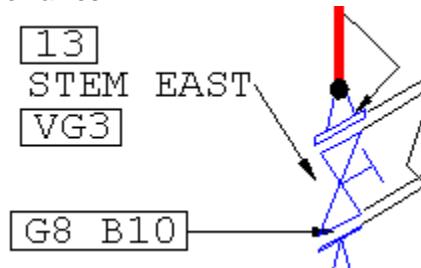


2. In the LabelAttribute2 column, select VALVE, then in the label column, browse to the catalog for the Catalog Labels and pick the Piping> Piping Isometric Valve Tag label



3. In the message enclosure column, pick MESSAGE-SQUARE

4. Save to catalog and update line 1001-P. You should see the valve tags shown on the iso next to the valves.



S3D.Labels.ComponentNoteConditional

Labels.ComponentNote outputs the value returned by the label directly onto the isometric. However sometimes it is desired to output a note on the isometric based on certain criteria. E.g. tag for valves with certain tags are to be output on the iso but for other tags nothing is to be output.

Software evaluates the label specified in TestLabelName and compares the output of the label to each of the | (pipe) separated values in the TestValues column. There is no limit to the number of values but the total length of the TestValues field must not exceed 256 characters. If a match is found, the label specified in the OutputLabelName is evaluated for the object and the result of the output label is written to the PCF file and therefore to the isometric.

1. Edit Options for 'User' style, expand the tree to S3D.Labels.ComponentNoteConditional and insert a row.
2. Set the values for the row as shown

Isometric Style Options Browser...					
	LabelAttribute2	TestLabelName	MessageEnclosure	TestValues	OutputLabelName
SPECIALTY	Piping Isometric Component Tag	Message-Round			Piping Isometric Component Tag
INSTRUMENT	Piping Isometric Component Tag	Message			Piping Isometric Component Tag
VALVE	Piping Isometric Valve Tag	Message-Square	VG3 VC35		Piping Isometric Valve Tag
*					

3. Save to catalog and update drawing 1001-P. You will see that a tag is output for the gate valves but not for the check valves.

S3D.Labels.EndConnection

These are special labels that are evaluated for end connections of an isometric. There are only two valid values for LabelAttribute3 column,

LabelAttribute3	LabelName	MessageEnclosure
END-CONNECTION-EQUIPMENT	Piping Isometric Continuation Label Type A	Message-Square
END-CONNECTION-PIPELINE	Piping Isometric Pipe Line Continuation	Message-Pointed
*		

For evaluating the END-CONNECTION-EQUIPMENT label, the nozzle is passed to the label and the label is responsible for returning the data of interest such as equipment name, nozzle name, and nozzle attributes such as size, end preparation, pressure rating etc.

For the END-CONNECTION-PIPELINE label, the piping part connected to the last object on the current iso line is passed to the label. It is the label which then retrieves the appropriate continuation item based on the kind of isometric being run.

Pipeline isometric	Pipeline that the part belongs to
Spool isometric	Spool if part belongs to spool, or part name if the connected part does not belong to a spool
WBS isometric	WBS Iso Drawing Name if part is assigned to WBS Item of type Iso Drawing, pipeline name if it is not assigned to a WBS Item
Penetration spool isometric	Pipeline that the part belongs to

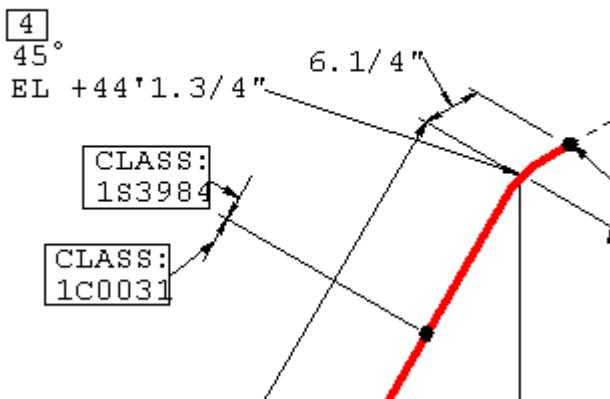
Lab15: Attribute Breaks

Add a new break for cleaning requirement

Functionality is available to output attribute/specification breaks on the iso. This functionality has two parts, setting an AlternativeText and supplying a label to get the data for parts.

Specification attributes are divided into two categories, standard and miscellaneous. The standard attributes are piping specification, insulation specification, tracing specification and painting specification. These are output for every part in the PCF file by default as well as in the header section of the PCF (to establish the baseline for the entire iso).

Whether the breaks are shown on the iso is actually controlled by the AlternativeTEXT values being set or not for each attribute. If the ATEXT value is set to a non-null string, the string is output as a prefix. e.g. For the isometric shown below, ATEXT -289 was set to CLASS:



Item	Value	ATEXT
Piping Specification	Spec Name	-289
Insulation Specification	Short String Value of Insulation Material code list attribute	-290
Tracing Specification	Short String Value of Heat tracing type code list attribute	-291
Painting Specification	Short String Value of Coating type code list attribute	-292

The miscellaneous or user-defined specification attributes are set using labels.

S3D.Labels.MiscSpec

The miscellaneous attributes are functionally identical to the standard attributes, except that the user is able to set the value to whatever attribute is desired. Labels are specified for each of the miscellaneous specifications. The labels are evaluated for each piping part and written into the PCF for each part and into the header.

1. Edit Options for the 'User' style, expand the tree to find S3D.Labels.MiscSpec

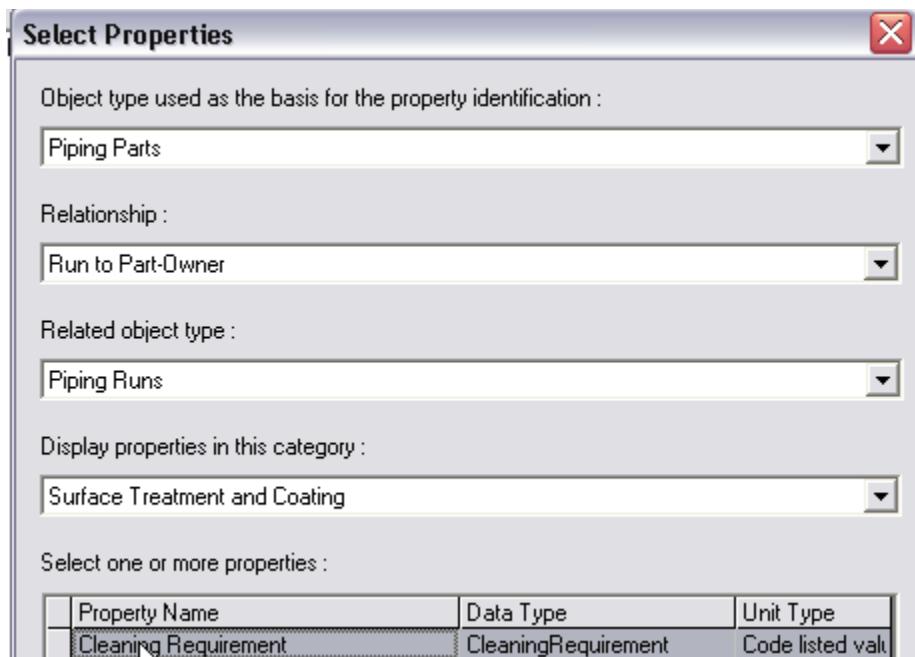
2. Notice that MISC-SPEC-3 is already set to use a label. However, for this Lab we will create this label

In Catalog Task, Create a COM Label named 'Piping Isometric Cleaning Requirement' as shown in picture and map the label created to MISC-SPEC3.

For assistance in creating this Label please check with your Instructor.



The label is defined as below. Navigate to the run from the part and select the cleaning requirement.

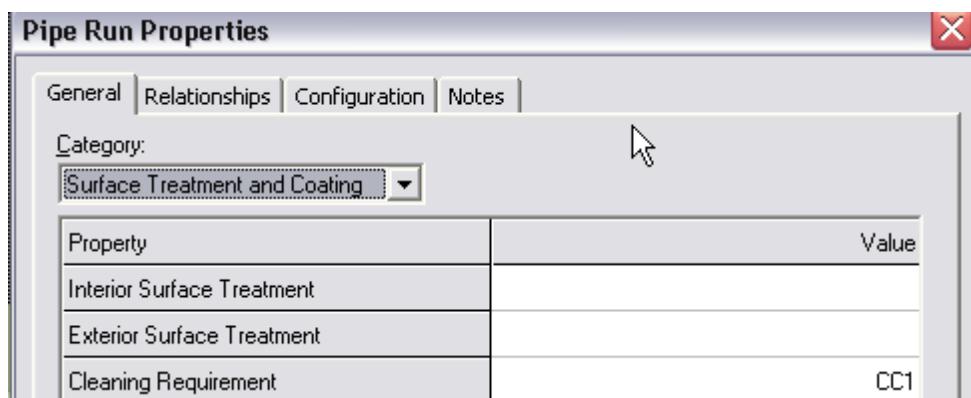


3. The ATEXT corresponding to MISC-SPEC-3 is numbered -295. Expand AlternativeTexts and scroll down to notice that the value for this ATEXT is set to CLEAN:

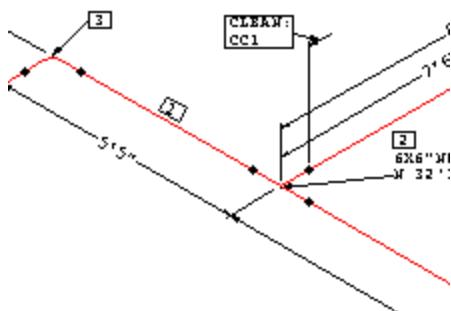
Isometric Style Options Browser...

	AlternateText	ISOGENTextID	DefaultText
		-272	PAINTING SPEC
SEE SHT		-276	CONT. FROM
		-277	ORIFICE FLANGE
		-278	DIAL FACE
		-282	WINDOW
		-284	TEE BEND
ORIENT		-287	ORIENTATION DIRECTION
LINE :		-288	PIPE
CLASS:		-289	MATL
INSUL:		-290	INSUL
TRACE:		-291	TRACE
COAT :		-292	PAINT
CLEAN:		-295	
		-298	TEE ELBOW
CUTTING MATERIALS		299	FABRICATION MATERIALS

4. Switch to Piping task, select the pipe run Unit1-6-P-0102-1C0031 and set its cleaning requirement to 'CC1'



5. Switch back to Drawings and Reports task and update drawing for line 1002-P. Cleaning requirements break is shown as below.



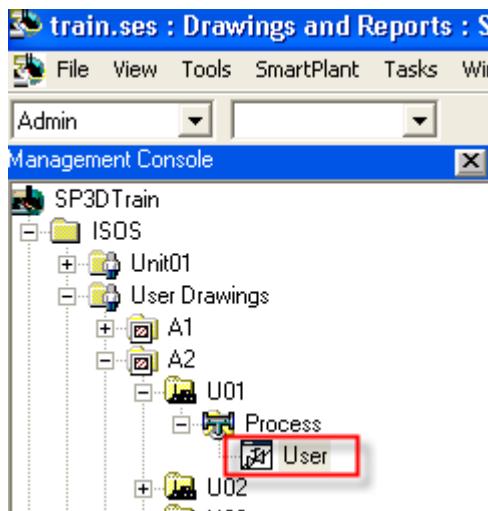
Labels.ComponentAttrs

These labels, if present in the style, are evaluated for each piping part and written to the PCF file. This PCF file can then be read by Stress Analysis software such as CAESAR II.

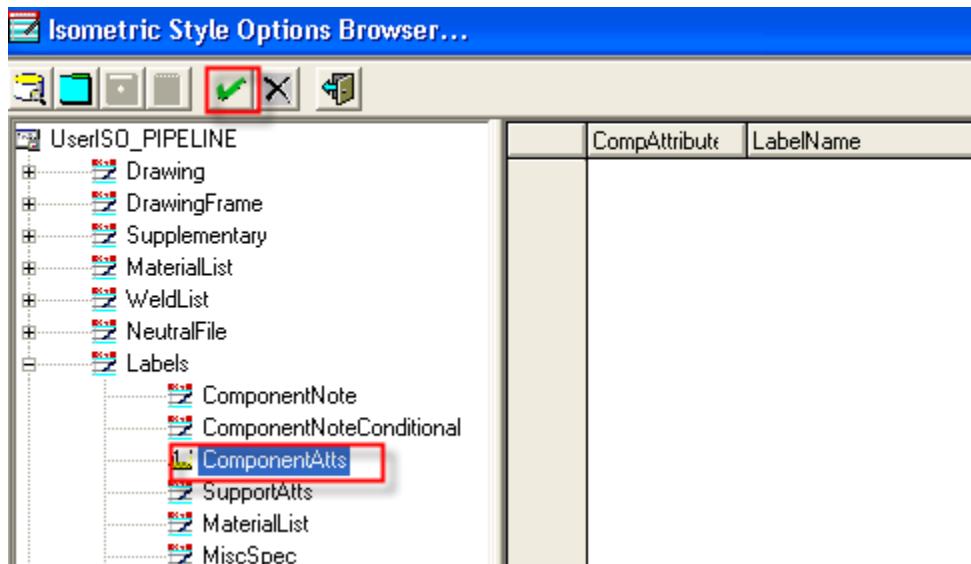
CompAttribute	LabelName
COMPONENT-ATTRIBUTE1	Piping Stress Analysis Operating Pressure
COMPONENT-ATTRIBUTE10	Piping Stress Analysis Test Pressure
COMPONENT-ATTRIBUTE2	Piping Stress Analysis Operating Temperature
COMPONENT-ATTRIBUTE3	Piping Stress Analysis Material Grade
COMPONENT-ATTRIBUTE4	Piping Stress Analysis Wall Thickness (port2)
COMPONENT-ATTRIBUTE5	Piping Stress Analysis Insulation Thickness
COMPONENT-ATTRIBUTE6	Piping Stress Analysis Insulation Density
COMPONENT-ATTRIBUTE7	Piping Stress Analysis Corrosion Allowance
COMPONENT-ATTRIBUTE8	Piping Stress Analysis Dry Weight in lbm
COMPONENT-ATTRIBUTE9	Piping Stress Analysis Fluid Density
*	

Adding Component Properties:

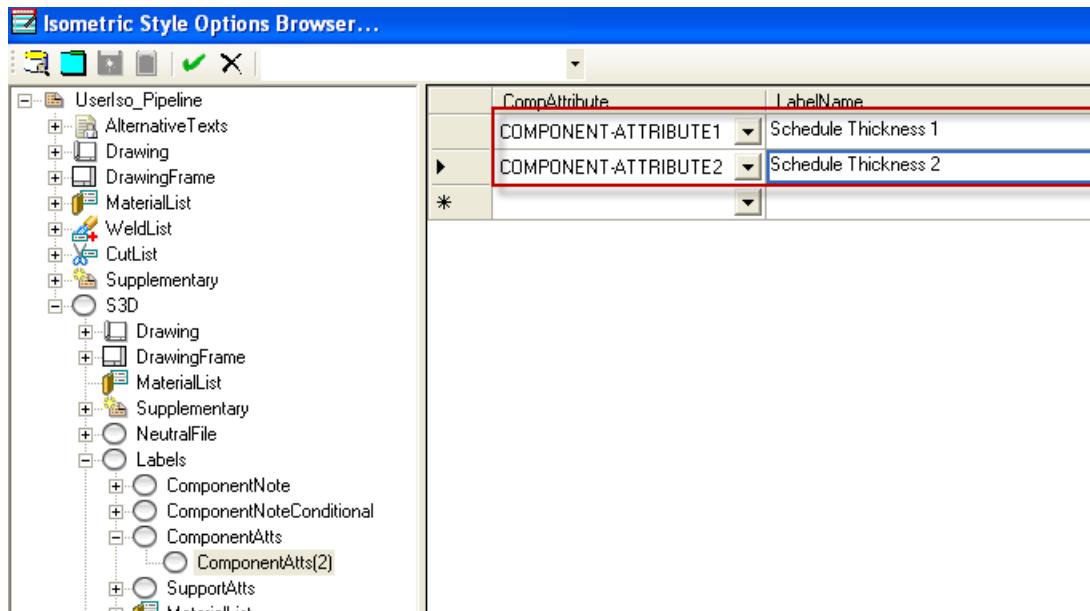
1. In this Lab, you will define additional component properties to be output to the PCF file.
2. Select the 'User' Style and using a right mouse click, select 'Edit Options'



3. Expand the tree to find S3D.Labels.ComponentAttrs and then click the blank row and add Component Attribute = COMPONENT-ATTRIBUTE1 from the drop down list.



4. For Label Name select Labels\Type of Labels\Piping\Embedded Component Material Descriptions\Port Labels\Schedule Thickness 1
5. Add into next row Component Attribute = COMPONENT-ATTRIBUTE2
6. For Label Name against COMPONENT-ATTRIBUTE2 select Labels\Type of Labels\Piping\Embedded Component Material Descriptions\Port Labels\Schedule Thickness 2



7. Save to the catalog and update line 1001-P.
8. Select the document and using a right mouse click, select View extraction data and review the PCF File to see the Schedule thickness added to the components

9. REDUCER-CONCENTRIC
END-POINT 32788.600 4907.662 2239.775 10 BW
END-POINT 32788.600 4907.662 2061.975 8 BW
SKEY RC**
ITEM-CODE MBCZZBOZZAAEADCZZUS
ITEM-DESCRIPTION Concentric reducer, S-STD x S-STD bore, B
COMPONENT-ATTRIBUTE1 S-STD
COMPONENT-ATTRIBUTE2 S-STD
UCI {00013885-0000-0000-3C08-0D6FAF451D04}

Tip: These properties could be placed in the material list, in a material report and may be of use for fabrication and stress analysis.

Lab 16: Material List

Isometric Drawings generation in SP3D has three basic options for configuring the Material List (MTO). These are

- 1) **Fixed** – Little user control over report format. In PDS this was known as a “STYLE1” MTO
- 2) **Variable** – User can specify column headings, content and width – the report layout is character based (PDS = STYLE2)
- 3) **User Defined** – most flexible report, column headings and grid lines are placed in backing sheet and column positions are defined by coordinates. Users are encouraged to use this type of MTO. (PDS STYLE3)

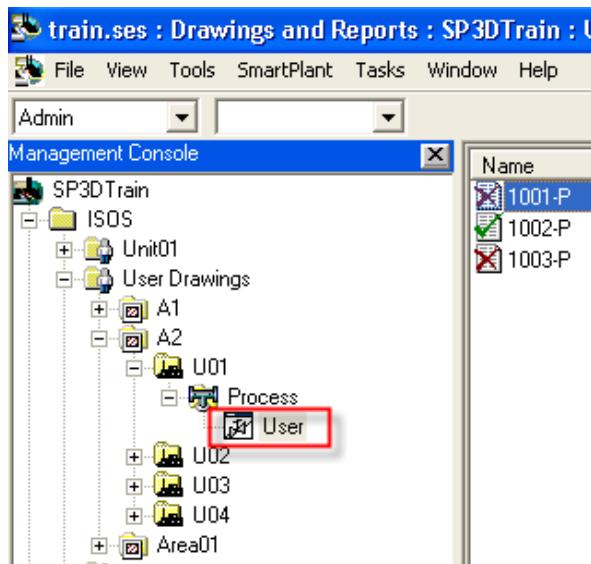
It is also possible to use labels to define attributes. Several AlternativeTexts can be set or unset to modify the column and section headings for the material list as well as to control if certain elements are shown at all.

Material Layout

MaterialList.Fixed

As indicated, for Fixed Layout there is a little user control over report format. However, certain attributes on the material lists can be modified/added such as Header Text, Group Sub heading etc using AlternateTexts (ATEXT)

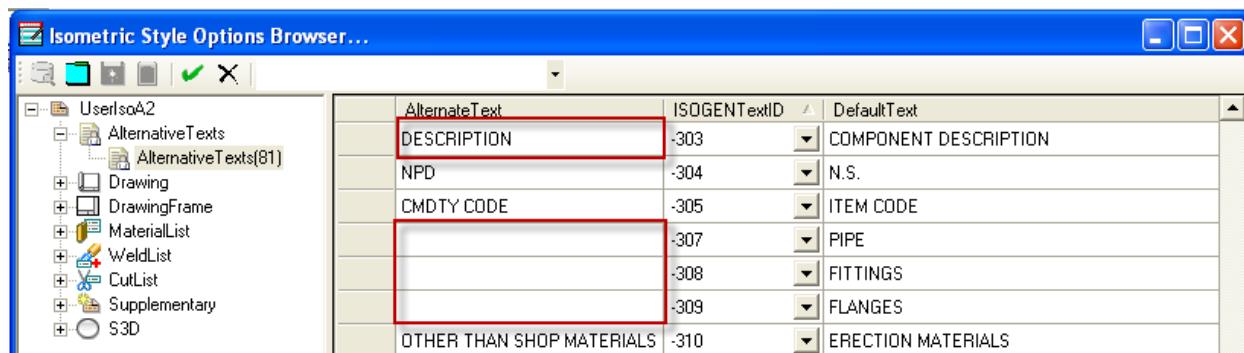
- 1) Open drawing 1001-P (ISOS>User Drawings>A2>U01>Process>User)



- 2) In this lab for this Fixed Layout Material List we will edit Header Text for Description, We will make use of ATEXT -307, -308, -309 to show a group sub-heading under which Pipes, Fittings & Flange are listed.

	8		9		10	
PT NO	DESCRIPTION		NPD (IN)	CMD TY CODE	QTY	
1	Pipe, S-STD, BE, ASTM-A53-B Type S		10	PAAZZBOZZABAABOA	20.5'	A
2	Tee, S-STD, BE, ASTM-A234-WPB, ASME-B16.9		10X10	MDJZZBOZZAAEADCZ	1	
3	Concentric reducer, S-STD x S-STD bore, BE, ASTM-A234-WPB, ASME-B16.9		10X8	MBCZZBOZZAAEADCZ	2	
4	90 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9		10	MCMZZBOZZAAEADCZ	1	
5	45 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9		10	MBXZZBOZZAAEADCZ	1	
6	Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match		10	FAAAHDCZZAADABQZ	4	
7	Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match		8	FAAAHDCZZAADABQZ	2	B
OTHER THAN SHOP MATERIALS						
PT NO	DESCRIPTION		NPD (IN)	CMD TY CODE	QTY	
8	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601		10	GMAHACABXBEPUS	6	
9	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601		8	GMAHACABXBEPUS	2	C
10	Studbolts, ASTM-A193-B7 - 4.75 in. Length		7/8	BAZZZZZZAAYBEUZZ	72	
11	Studbolts, ASTM-A193-B7 - 4.5 in. Length		3/4	BAZZZZZZAAYBEUZZ	16	
12	Check valve, CL150, RFFE, BC, swing, ASTM-A216-WCB, trim 8, Pacific 180		10	VBGAHABAHAFAEADAZ	2	
13	Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47		10	VAAAHABAHAADJADAZ	2	

- 3) Edit Iso_Pipeline style in Option Browser and for Alternative Texts section, modify the ATEXT - 303, -307, -308 & -309 as shown in the image. *TIP: A blank value for ATEXT indicates that that specific ATEXT is suppressed.*



Isometric Style Options Browser...

AlternateText	ISOGENTextID	DefaultText
COMPONENT DESCRIPTION	-303	COMPONENT DESCRIPTION
NPD	-304	N.S.
CMDTY CODE	-305	ITEM CODE
PIPE	-307	PIPE
FITTINGS	-308	FITTINGS
FLANGES	-309	FLANGES
OTHER THAN SHOP MATERIALS	-310	ERCTION MATERIALS

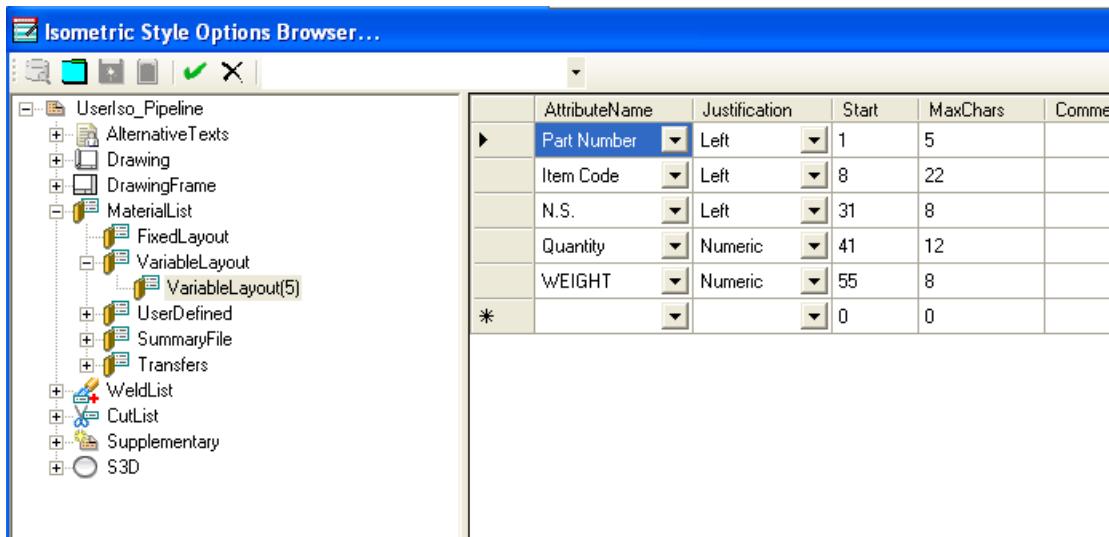
- 4) Update 1001-P and observe that header text for description had been changed and also sub grouping of the components are seen for PIPE, FITTINGS and FLANGES.

SHOP MATERIALS				
PT NO	COMPONENT DESCRIPTION	NPD (IN)	CMD TY CODE	Q.TY
1	PIPE Pipe, S-STD, BE, ASTM-A53-B Type S	10	PAAZZBOZZABAABOA	20.5'
2	FITTINGS Tee, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	10X10	MDJZZBOZZAAEAD CZ	1
3	Concentric reducer, S-STD x S-STD bore, BE, ASTM-A234-WPB, ASME-B16.9	10X8	MBCZZBOZZAAEAD CZ	2
4	90 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	10	MCMZZBOZZAAEAD CZ	1
5	45 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	10	MBXZZBOZZAAEAD CZ	1
6	FLANGES Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match	10	FAAAHD CZZAADABQZ	4
7	Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match	8	FAAAHD CZZAADABQZ	2

MaterialList.VariableLayout

When the style MaterialList.ActiveList = Variable, the Iso Drawing will derive its MTO format from the MaterialList.VariableLayout options.

Each row in the MaterialList.VariableLayout Columns list specifies a column in the MTO. The MaterialList.VariableLayout.HeaderLine text is used for column headings.



When a user formats a VariableLayout MTO, the following guidelines should be honored if well formatted text is to be expected.

Leave one or more free spaces between individual columns.

Each Column entry has a starting position and a width. Adjacent columns should have at least one (1) free space between them. So if your first column begins in position 1 and has a width of 5 characters, the texts for that column will occupy positions 1-5. If we leave a space between this column and the next (position 6), then we would want to start the next column in position 7 or greater.

Use Numeric Justification for columns that display decimal numeric values.

Variable MTO's allow the justification of output. Most commonly Left justification is used, but this causes some problems for data that is in the form of decimal numbers (typically pipe lengths). Alias recommends the use of Numeric justification for columns that display decimal numeric data. Numeric Justification will align the the decimal characters of numbers, for improved readability. WEIGHT is another example of an Attribute that should be formatted as Numeric.

To see WEIGHT data in an MTO, you must set additional Iso Options.

Before WEIGHT can be included in the Material List, the following options must be set.

`MaterialList.ExcludeWeightData = FALSE`

`MaterialList.WeightsStyle = Total or Individual.`

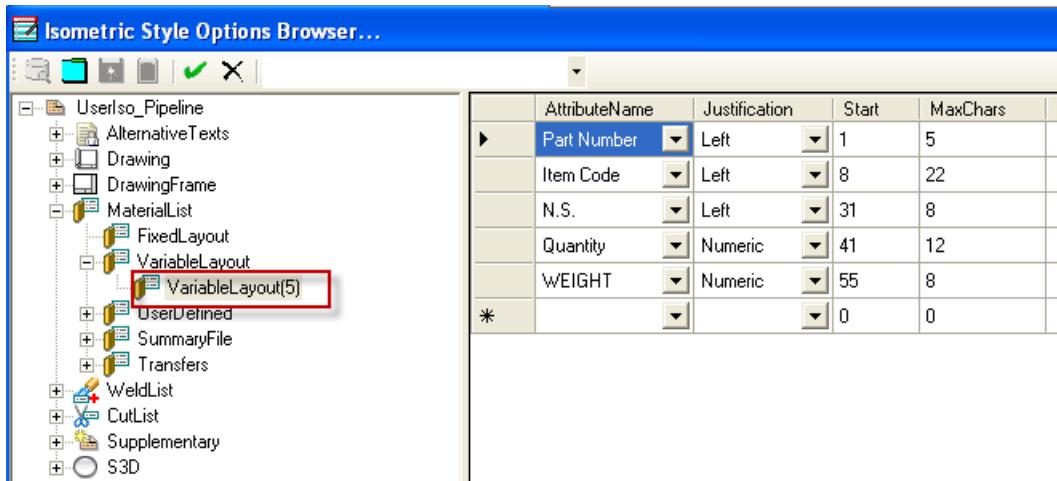
Note: If `MaterialList.ExcludeWeightData` is set to TRUE or if `MaterialList.WeightsStyle` is set to None, no weight will be displayed in the Material List on the Iso Drawing.

Set the HeaderLine text AFTER formatting columns.

The `MaterialList.HeaderLine` option is used to specify the column headings and also to define the TOTAL width (in characters) of the MTO. The number of characters can be controlled by placing a "l" character at the end of the line. Isogen will use the position of this character to control how much space it reserves for the MTO (which can be placed either on the right or left hand side of the drawing, by setting the property `RightSide = True or False`). The drawing area will be automatically reduced to accommodate the width of the list.

It is easiest to create this in an editor using a non-proportional font, such as Courier New. In the text editor, first place an indexing rule to show position numbers ("1234567890" repeated over and over). On the next line enter the text for the Header. Do NOT let the header text for one column overlay the boundary between columns as unexpected results may result.

A typical Header Line example for the following column configuration is shown below:



Now in an editor, with New Courier font, we enter the rule line and then the header text below it as you wish it to appear. If the Header text uses two rows, enter them on separate lines in the text editor, aligned as you would wish to see them in the drawing.

0	1	2	3	4	5	6
1234567890123456789012345678901	23456789012345678901	3456789012345678901	456789012345678901	56789012345678901	6789012345678901	78901234567890123
PT	Component	Size				
No.	Description	(N.S.)	QTY		WT	

Next, we need to join the two lines so that the text can be placed in the Options Browser as the value of the MaterialList.VariableLayout.HeaderLine option. To do this you must place an end-of-line character () followed by a continuation character () in the last position defined on the first row. An end-of-line character is also needed on the second line in the same position as the line above. This is position of the last character of the last column (WEIGHT). In this example that is position 64.

0	1	2	3	4	5	6
1234567890123456789012345678901234	234567890123456789012345678901234	34567890123456789012345678901234	4567890123456789012345678901234	567890123456789012345678901234	67890123456789012345678901234	7890123456789012345678901234
PT	Component	Size				
No.	Description	(N.S.)	QTY		WT	

Join the two lines so that the text can be placed in the Options Browser as the value of the MaterialList.VariableLayout.HeaderLine option. To do this you must place an end-of-line character () followed by a continuation character () in the last position defined on the first row. An end-of-line character is also needed on the second line in the same position as the line above. This is position of the last character of the last column (WEIGHT). In this example that is position 64.

After updating the drawings, the resulting MTO will look as follows.

SHOP MATERIALS

PT No.	Component Description	Size (N.S.)	Q.TY	WT
1	PAAZZBOZZABAABOA	8	16.968'	219.8
2	PAAZZBOZZABAABOA	8	4.000'	51.8
3	FAAAHDCZZAADABQZ	8	1	17.7
4	FAAAHDCZZAADABQZ	8	1	17.7

OTHER THAN SHOP MATERIALS

PT No.	Component Description	Size (N.S.)	Q.TY	WT
5	GMAHACABXBEPUS	8	1	-
6	BAZZZZZZAAYBETZZ	3/4	8	-

PIECE MARKS

1 NO SPOOL FOUND

Note: Isogen has special behavior for the Description attribute. Instead of truncating the text at the specified number of characters, it will wrap the text on to as many lines as needed to display it all.

If no width is specified for the Description field, the property DefaultDescriptionWidth will be used to control the wrapping of text.

For example, with Width = 32 characters

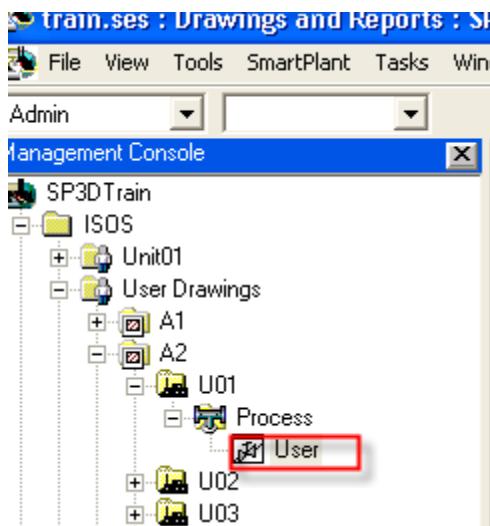
**PIPE, CS API 5L SML, GRD B, STD
WT**

Width = 10 characters

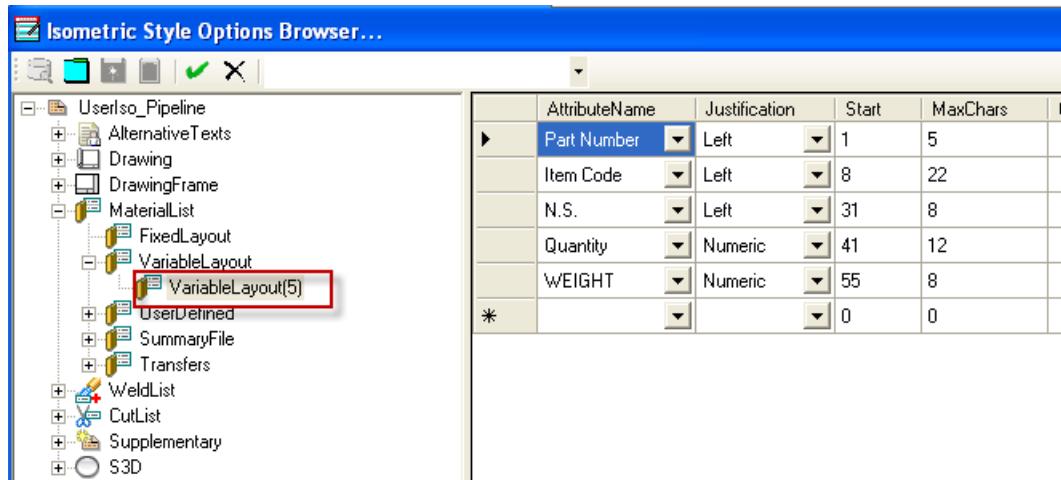
**PIPE, CS
API 5L
SML,
GRD B,
STD WT**

Lab

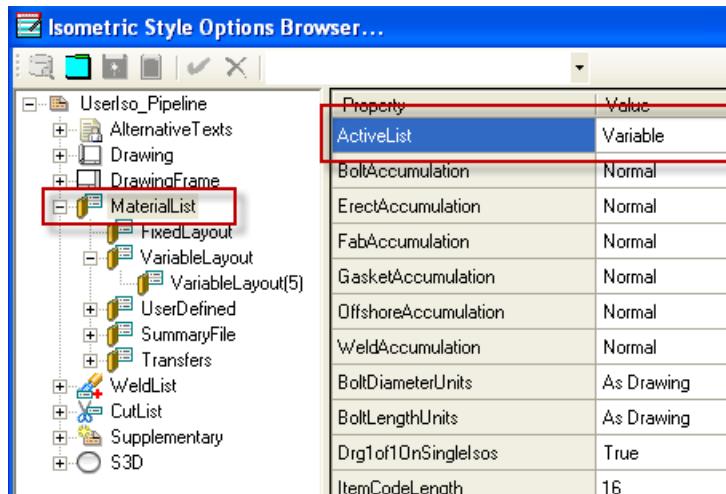
- 1) Edit Option for the 'User' style as shown below.



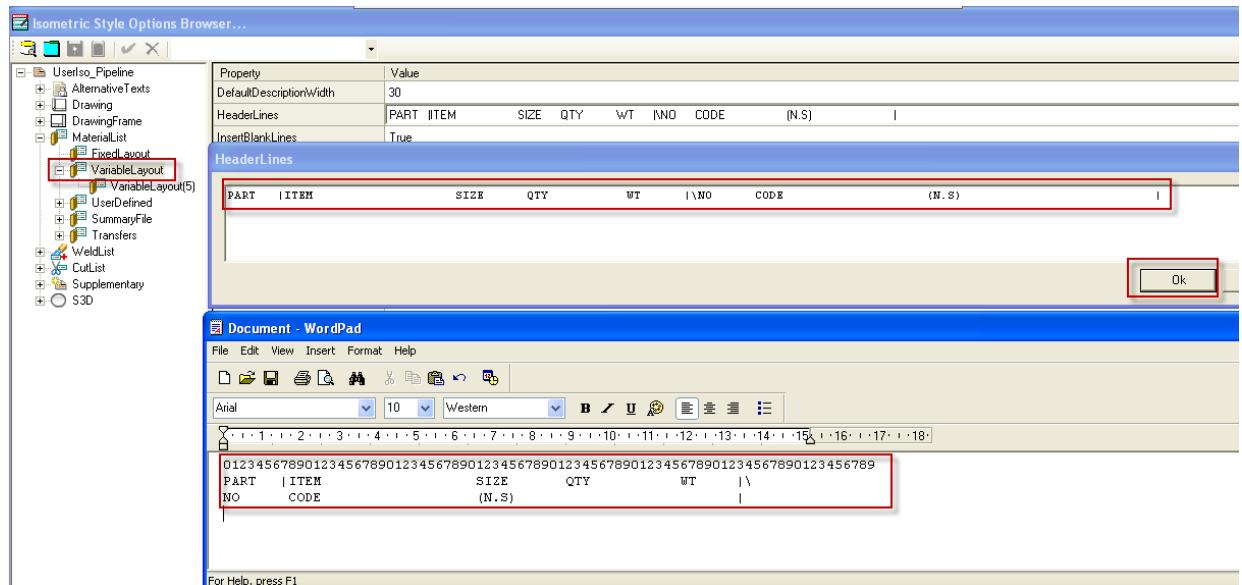
- 2) Expand MaterialList.VariableLayout. Fill in values as below



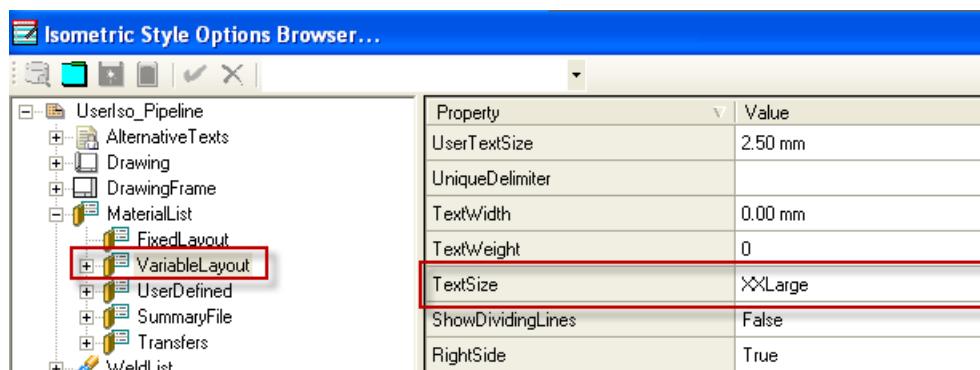
- 3) Set MaterialList.ActiveList to Variable



- 4) Refer the MaterialList.variableLayout formatting guidelines to format Header Line Columns
 Open Word Pad and Type in Column Headers as shown in the image below:

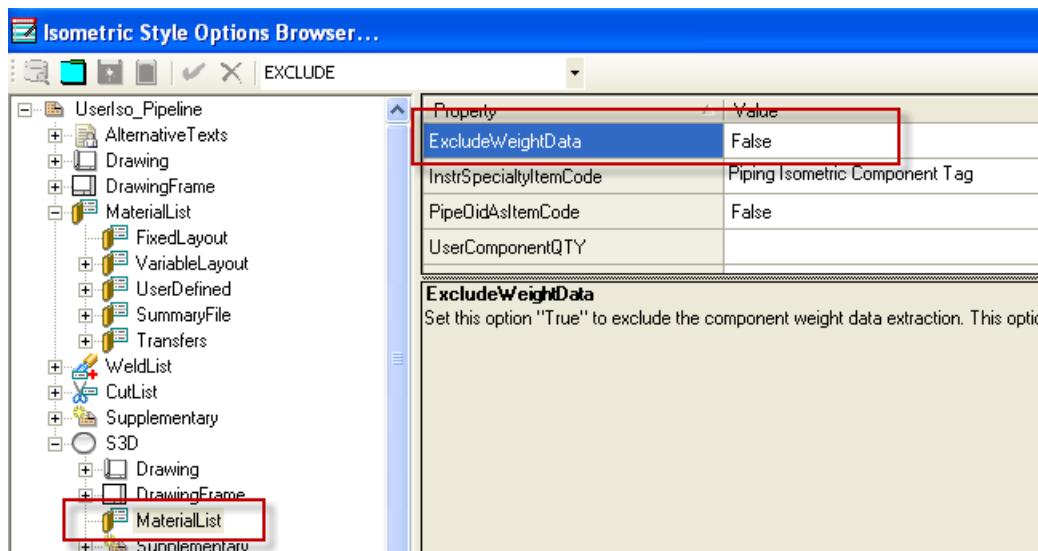


- 5) Set MaterialList.VariableLayout.TextSize to XXLarge

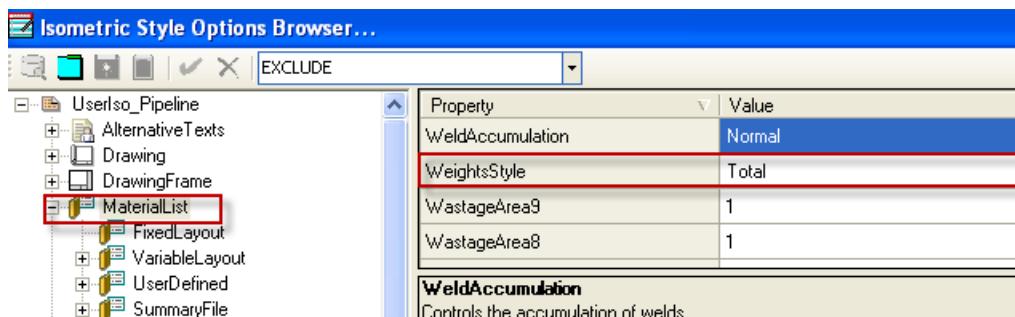


- 6) Set following options to set WeightData

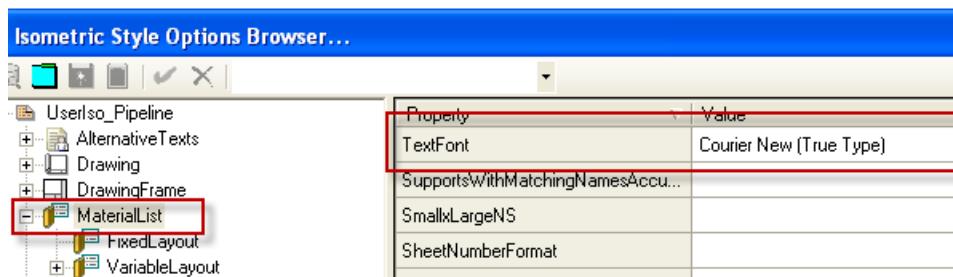
S3D.MaterialList.ExcludeWeightData = FALSE



MaterialList.WeightsStyle = Total or Individual



7) Set MaterialList.TextFont = Courier new (True Type)



8) Update isometric for line 1001-P and observe the Format of Variable Layout

SHOP MATERIALS					
PART NO	ITEM CODE	SIZE (N.S)	QTY	WT	
1	PAAZZBOZZABAABOA	10	19.5'	357.0	
2	MDJZZBOZZAAEADCZ	10X10	1	40.0	
3	MBCZZBOZZAAEADCZ	10X8	1	10.5	
4	MCMZZBOZZAAEADCZ	10	1	37.7	
5	MBXZZBOZZAAEADCZ	10	1	19.1	
6	FAAAHDCZZAADABQZ	10	3	70.8	
7	FAAAHDCZZAADABQZ	8	1	17.7	

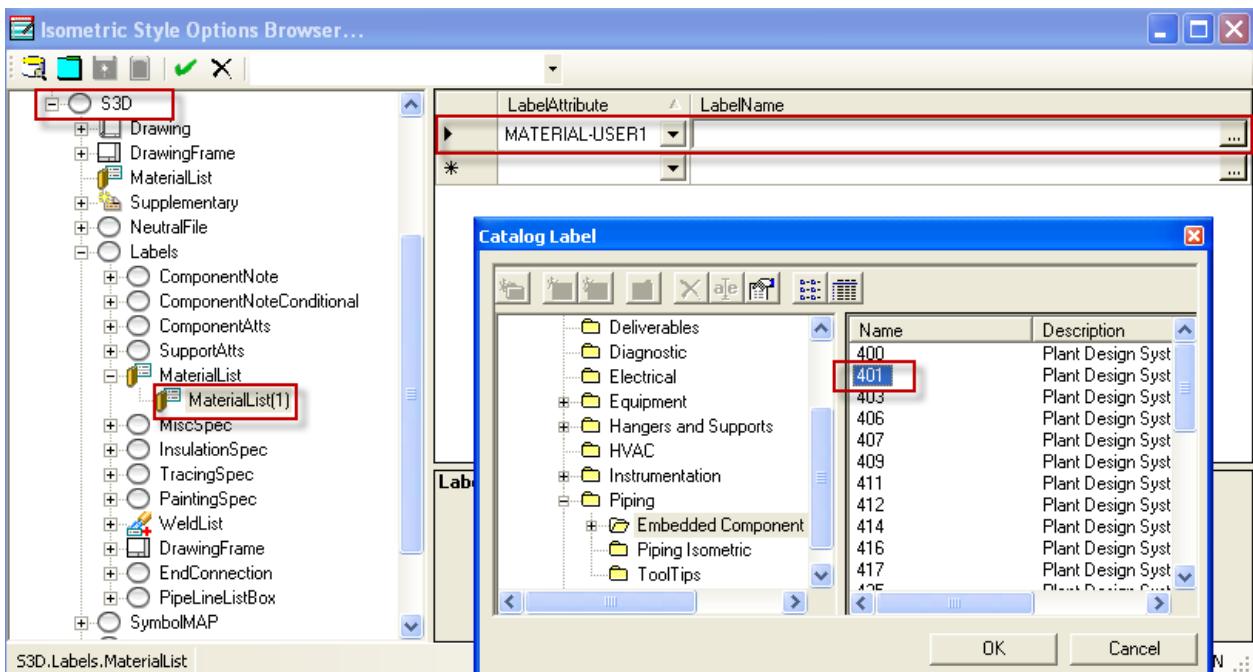
OTHER THAN SHOP MATERIALS					
PART NO	ITEM CODE	SIZE (N.S)	QTY	WT	
8	GMAHACABXBEPUS	10	4	-	
9	GMAHACABXBEPUS	8	1	-	
10	BAZZZZZZAAYBEUZZ	7/8	48	-	
11	BAZZZZZZAAYBEUZZ	3/4	8	-	
12	VGAHABAHAFEDAZ	10	1	235.9	
13	VAAAHAABAHADJADAZ	10	1	206.4	

Labels.MaterialList

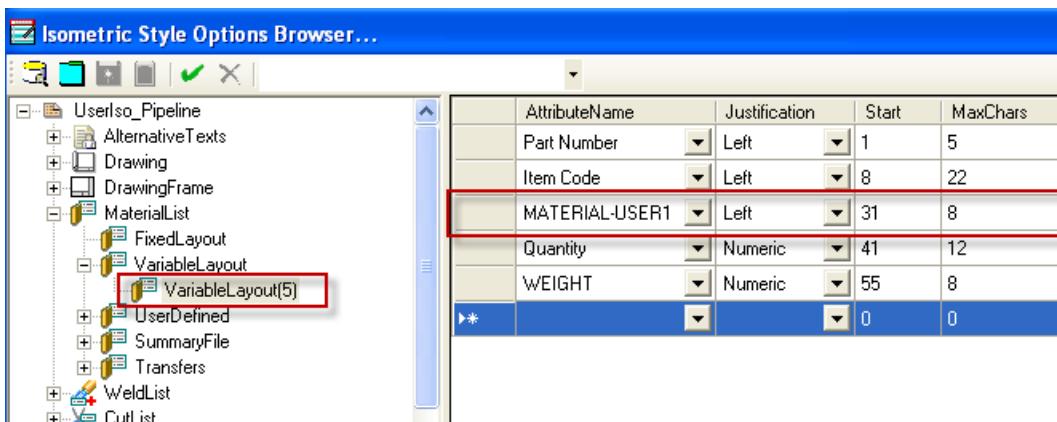
It is possible to add up to 100 user-defined material list attributes. The label specified for each will be evaluated for each piping part and the result of the label will be written into the PCF and thence into the iso.

Lab:

- 1) Expand Labels.MaterialList and add a row
- 2) Select MATERIAL-USER1 as LabelAttribute and Browse for Label 401 as displayed in the picture below:



- 3) Expand MaterialList.VariableLayout
- 4) Replace the column N.S. by MATERIAL-USER1

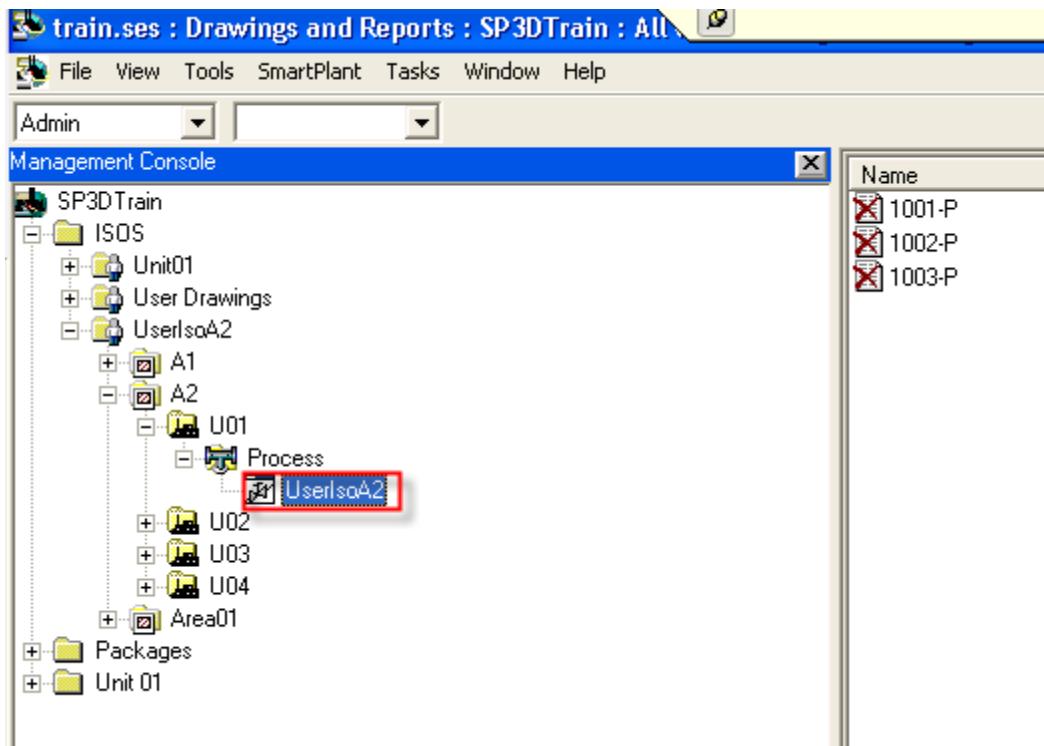


- 5) Save to catalog and update isometric for line 1001-P. Observe that Schedule Thickness values are returned instead of Nominal Size.

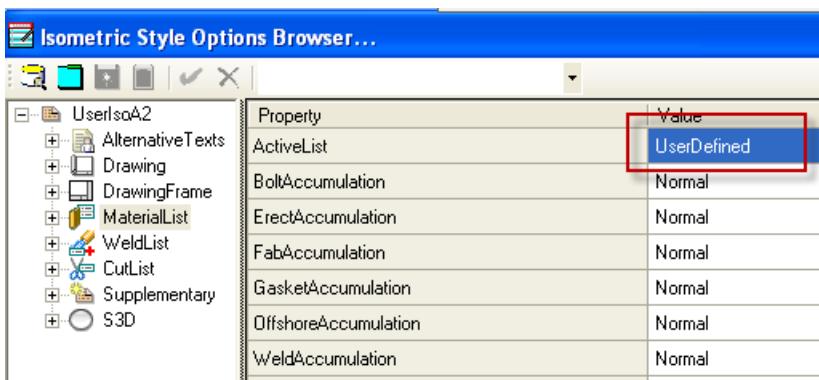
MaterialList.UserDefined

In Lab, you are going to change the fixed format material list to a user defined style, using fonts.

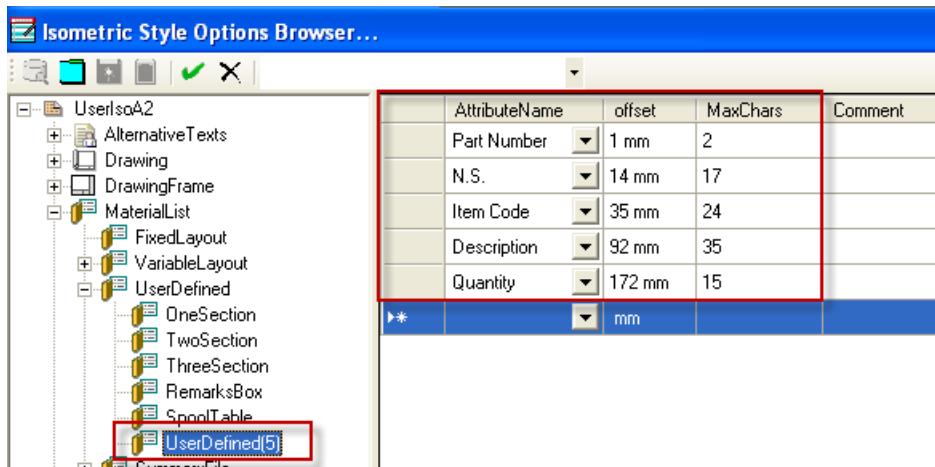
- 1) Select the UserIsoA2  style and using a right mouse click, select 'Edit Options'



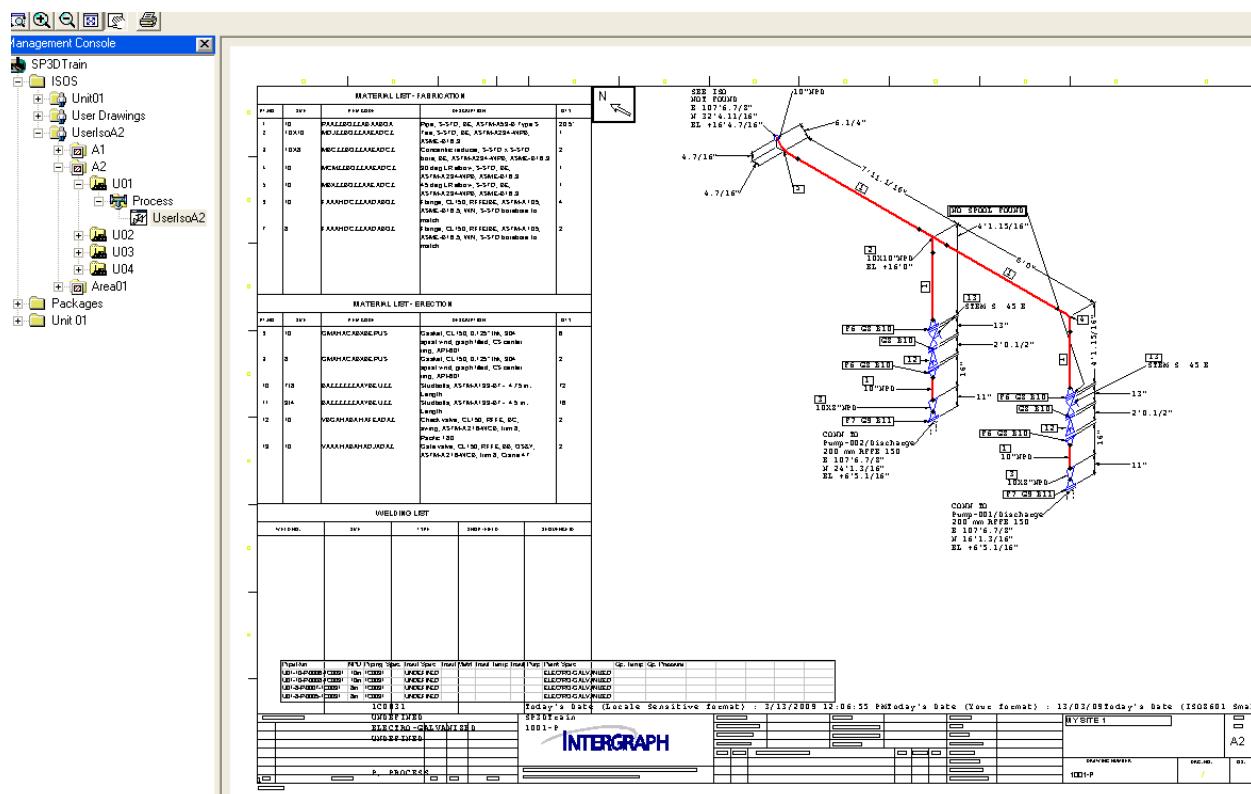
- 2) Select the MaterialList and change the active list to 'User Defined'



- 3) Expand the MaterialList section and Select MaterialList.UserDefined, change StartX = 12, StartY = 387, TextFont = Arial(TrueType).
- 4) Expand the MaterialList.UserDefined section and Select MaterialList.UserDefined.UserDefined, add the following 5 entries:



- 5) Select MaterialList.UserDefined.TwoSection and change Section2YOffset = 120, Section1MaxEntries = 20, Section2MaxEntries = 20
- 6) Save the changes to the catalog by clicking the 'Save to Catalog' icon: and close the Options Browser.
- 7) Update drawing 1001-P and observe User-Defined Layout on left side of the Isometric.

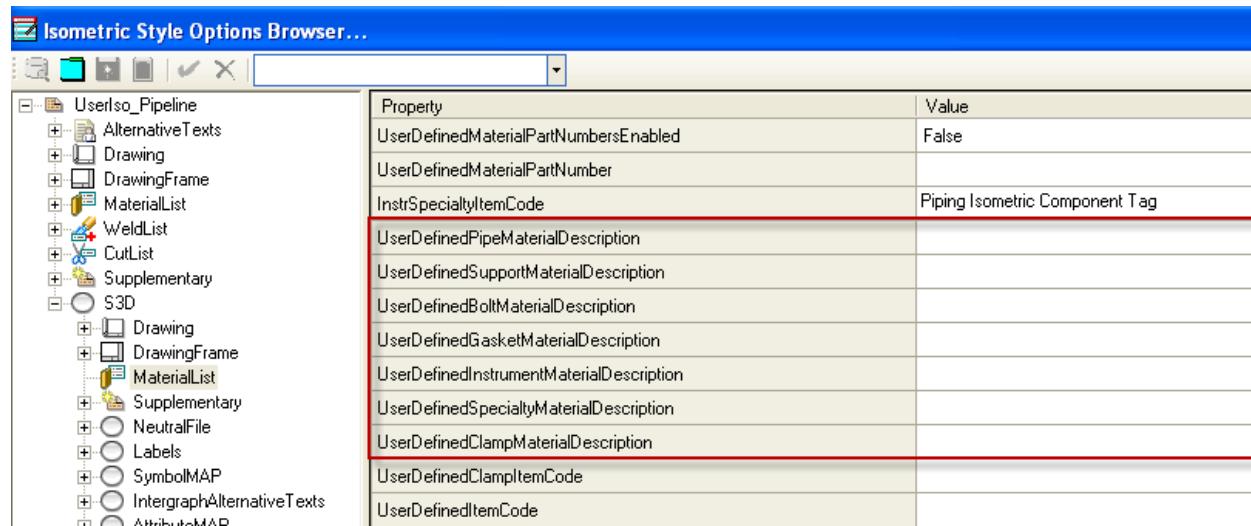


Material Description by Label

Several options are available to set Material Descriptions using labels. The options are:

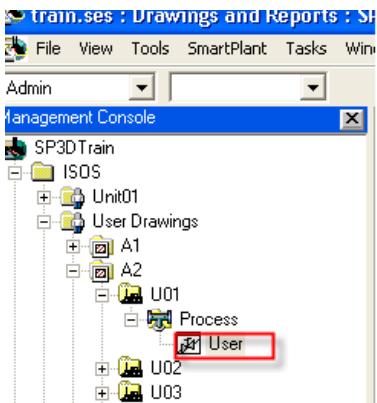
S3D.MaterialList.UserDefinedPipeMaterialDescription
S3D.MaterialList.UserDefinedSupportMaterialDescription
S3D.MaterialList.UserDefinedBoltMaterialDescription
S3D.MaterialList.UserDefinedGasketMaterialDescription
S3D.MaterialList.UserDefinedInstrumentMaterialDescription
S3D.MaterialList.UserDefinedSpecialtyMaterialDescription
S3D.MaterialList.UserDefinedClampMaterialDescription

Each of these options will, if set, report the value returned by the label as the description of the item.

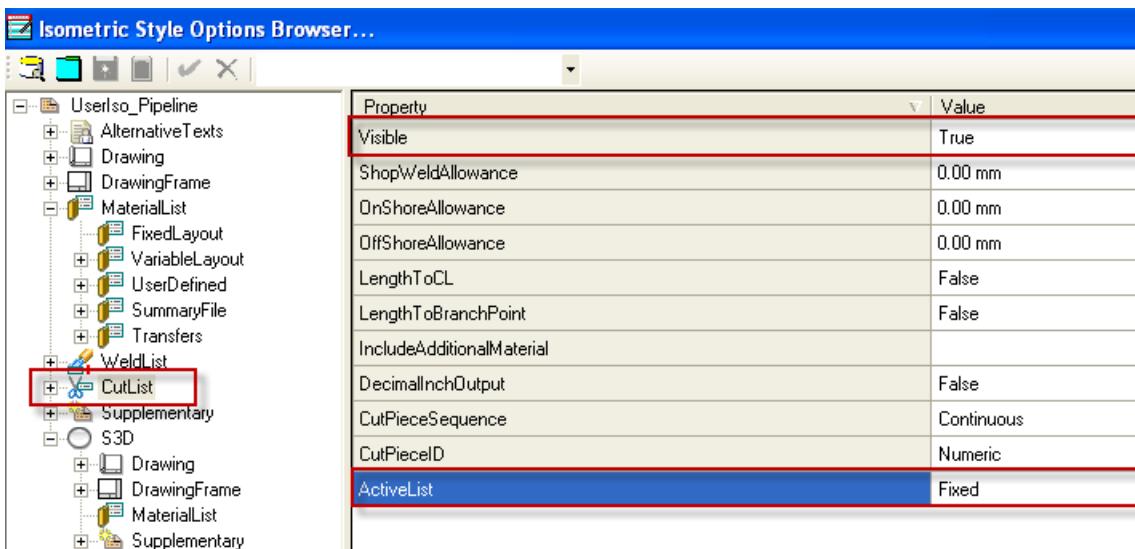


MaterialList.CutList

1) Edit Options for 'User' Style



- 2) Set MaterialList.CutList.Visible to True and Set ActiveList = Fixed,
- 3) Verify MaterialList.ActiveList is set to Fixed



- 4) Update isometric for line 1002-P and Cut List should look as below:

CUT PIPE LENGTH						
PIECE NO	LENGTH (FT-INS)	NPD (IN)	REMARKS	END ONE	END TWO	ITEM CODE
<1>	10' 1.9/16"	6	SQ. CUT	BEVEL		PAAZZBOZZABAABDA
<2>	3' 5.1/2"	6	BEVEL	BEVEL		PAAZZBOZZABAABDA
<3>	5' 6"	6	BEVEL	BEVEL		PAAZZBOZZABAABDA
<4>	15' 6"	6	BEVEL	BEVEL		PAAZZBOZZABAABDA
<5>	4' 3"	6	BEVEL	SQ. CUT		PAAZZBOZZABAABDA
<6>	20' 10. 1/4"	6	BEVEL	SQ. CUT		PAAZZBOZZABAABDA

Lab17: Weld Options

SP3D allows weld numbers to be shown on the isometric. The format for the weld numbers is user-definable as well. However, since SP3D manages welds in the model, some weld related Isogen options may not be applicable.

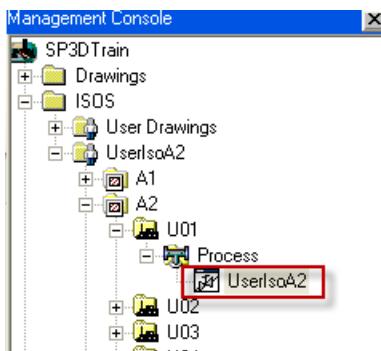
Sequence welds

To turn on weld numbering, first one must sequence the welds in a pipeline. To do this,

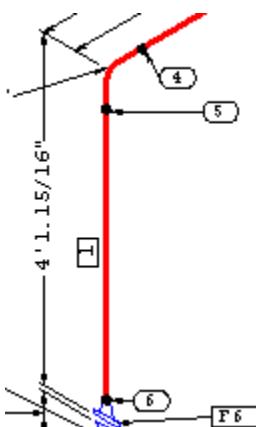
- 1) Switch to the Piping task.
- 2) Select the Sequence Objects command on the vertical toolbar and select the 1001-P pipeline.
- 3) Click OK to sequence welds

Turn on weld numbers

- 1) Switch to Drawings and Reports task
- 2) Edit options on the **UserIsoA2** style

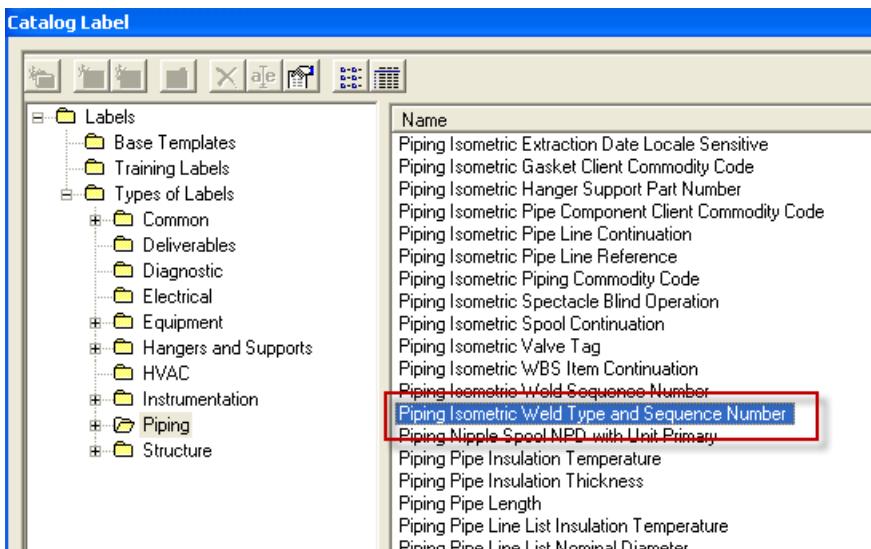


- 3) Search for all weld related options using the word 'Weld' in the search box
- 4) Set Drawings.Welds.ShowWeldNumbers to True
- 5) Update isometric 1001-P and see weld numbers

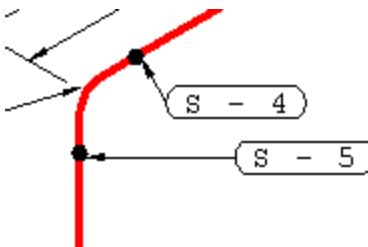


- 6) Change weld numbering format
- 7) Edit Options on **UserIsoA2** style

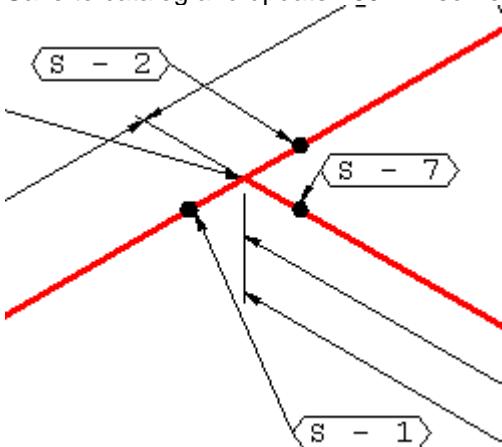
- 8) Select the option **S3D.Drawing.Welds.WeldNumberLabel**
- 9) Browse and assign label 'Piping Isometric Weld Type and Sequence Number'



- 10) Save to catalog and update 1001-P isometric.

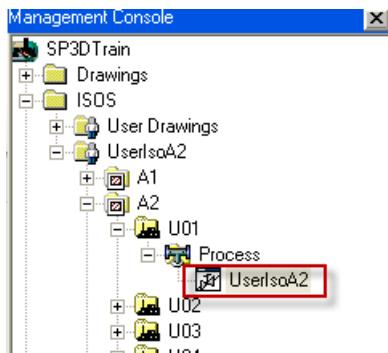


- 11) Change enclosure for welds
- 12) Edit Options on User style
- 13) Select the option Drawing.Welds.FabWeldEnclosure and change to Diamond End
- 14) Save to catalog and update 1002-P isometric.



Weld List

1. Switch to Drawings and Reports task
2. Edit options on the **UserIsoA2** style



3. Map labels under S3D.Labels.WeldListMap section as shown in the picture below:

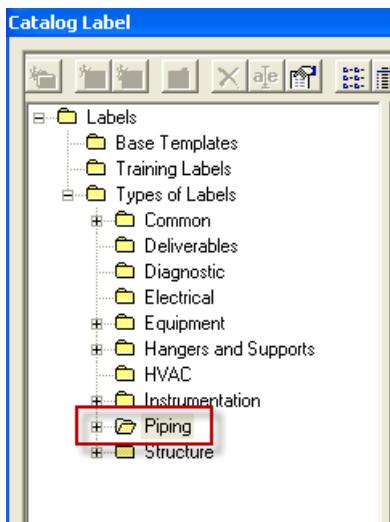
The Isometric Style Options Browser window displays the following mapping table:

LabelAttribute	LabelName
WELD-ATTRIBUTE10	Piping Isometric Weld Type and Sequence Number

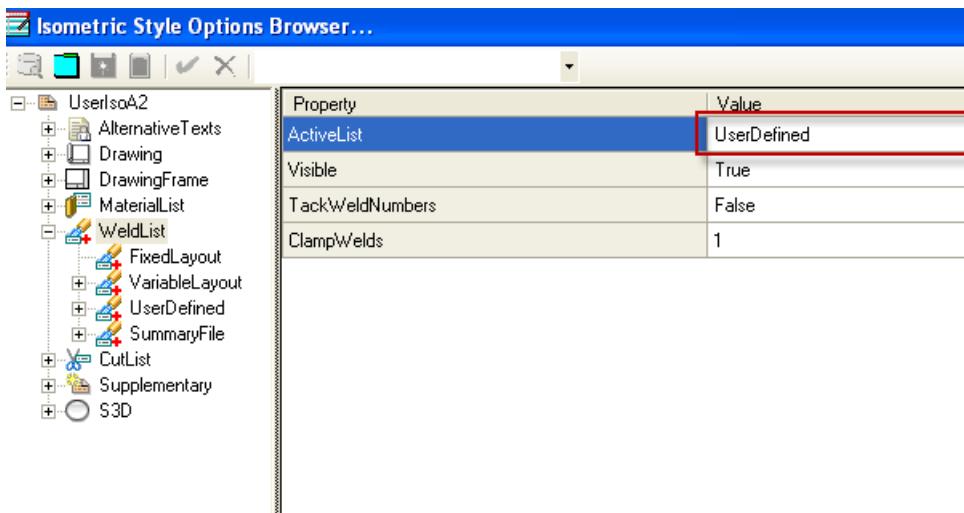
The left pane shows the style hierarchy:

- UserIsoA2
 - AlternativeTexts
 - Drawing
 - DrawingFrame
 - MaterialList
 - WeldList
 - CutList
 - Supplementary
 - S3D
 - Drawing
 - DrawingFrame
 - MaterialList
 - Supplementary
 - NeutralFile
 - Labels
 - ComponentNote
 - ComponentNoteConditional
 - ComponentAtts
 - SupportAtts
 - MaterialList
 - MiscSpec
 - InsulationSpec
 - TracingSpec
 - PaintingSpec
 - WeldList
 - WeldList(1) (highlighted with a red box)
 - DrawingFrame
 - EndConnection
 - PipeLineListBox

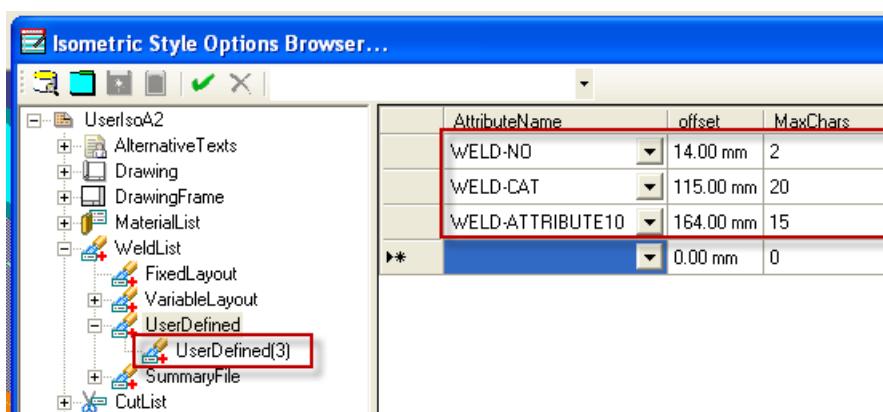
The Label for mapping could be found as seen in the hierarchy below:



4. Select UserDefined list for WeldList.ActiveList



5. Position Weld Attributes under WeldList.UserDefined



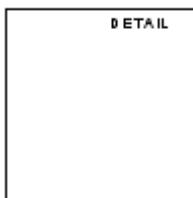
6. Update Isometric 1001-P. It should look as below.

WELD NO.	SIZE	TYPE	SHOP / FIELD	SEQUENCE ID
14			S	S - 14
13			S	S - 13
12			S	S - 12
11			S	S - 11
10			S	S - 10
3			S	S - 3
4			S	S - 4
5			S	S - 5
6			S	S - 6
2			S	S - 2
1			S	S - 1

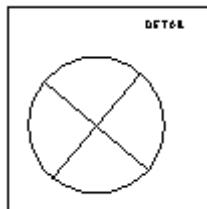
Lab18: Detail Sketch

Functionality to show static detail sketches is available. Depending on the part class of the object selected, a specified label is invoked, if the value returned by the label matches the value specified to check against, the symbol is shown on the isometric.

1. Open the Drawings Editor in \Common2D\Shape2D\Bin\Shape2DServer.exe. You may create a shortcut to this file, name it 'Drawing Editor' and put it on your desktop for future use
2. Start rectangle tool and draw a 50 mm x 50 mm and angle 0 rectangle.
3. Using the text box command, place the word DETAIL using Courier New font at 2 mm text size as shown below at (37, 47) measured from the bottom left corner of the square



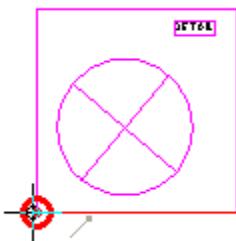
4. Draw your detail sketch graphics in the square. E.g. draw a circle and two lines



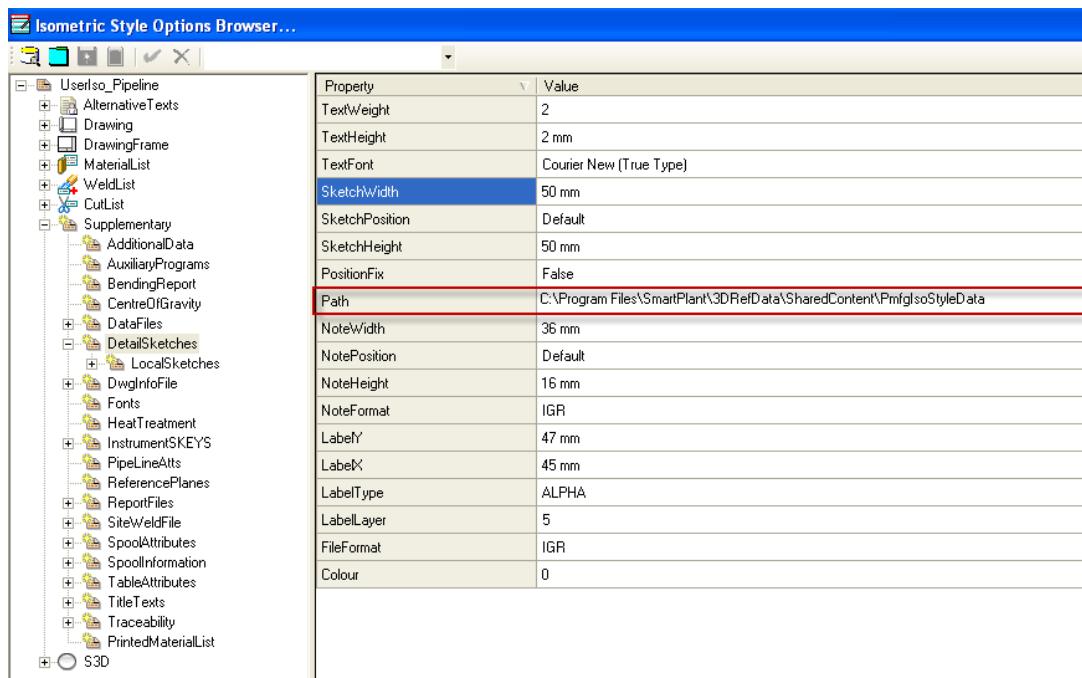
5. Select All graphics using Edit → Select All



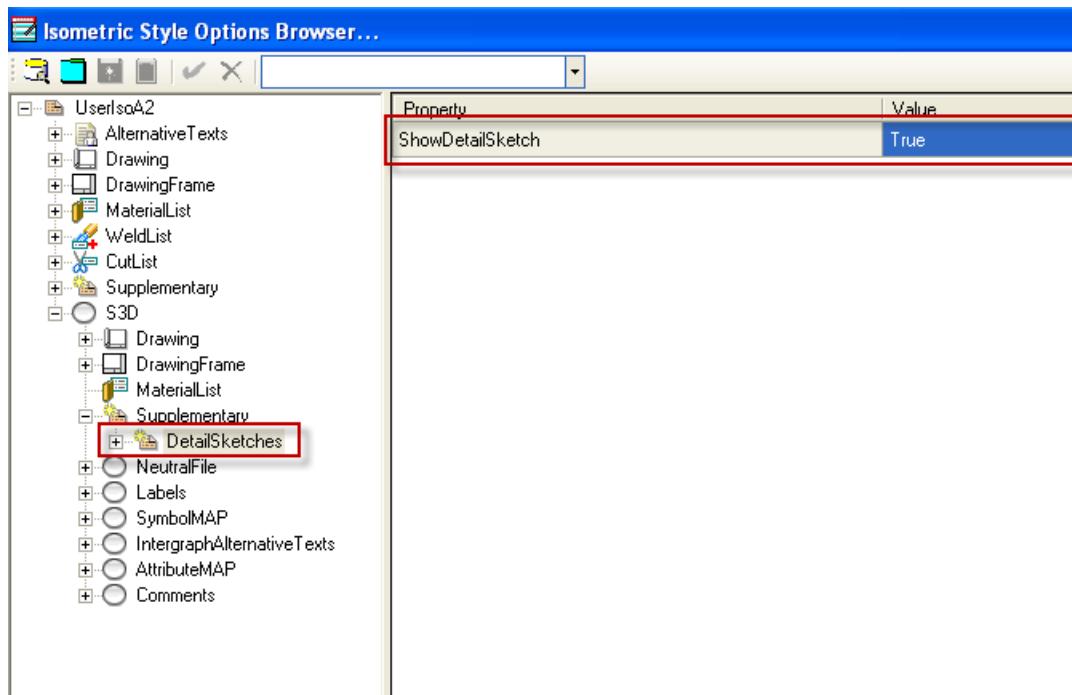
6. Create New Symbol using the Create Symbol command  (draw toolbar).
7. Place the origin of the symbol in the bottom left corner of the rectangle



8. Save symbol to folder C:\Program Files\SmartPlant\3DRefData\Sharedcontent\PmfglIsoStyleData\ with name DETAIL1.SYM. Exit Drawing Editor.
9. Edit options for the 'User' style and change Supplementary.DetailSketches.Path to be C:\Program Files\SmartPlant\3DRefData\Sharedcontent\PmfglIsoStyleData\

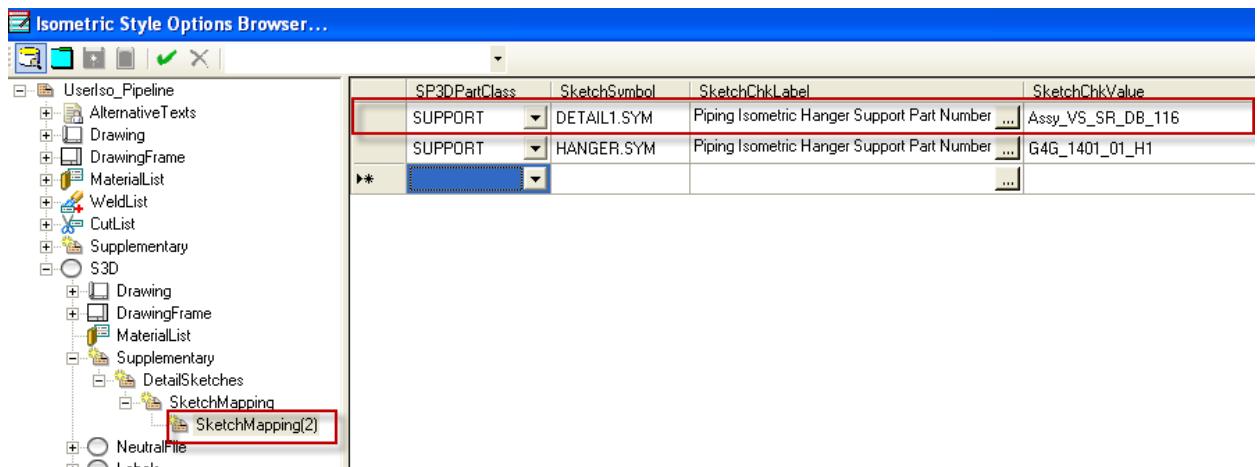


10. Set ShowDetailSketch to True



11. Open S3D.Supplementary.DetailSketches.SketchMapping

12. Change HANGER2.SYM to DETAIL.sym & Change SketchChkValue to Assy_VS_SR_DB_116



13. Save to Catalog and update the line 1002-P. A detail sketch will be shown in the top right corner of the isometric.

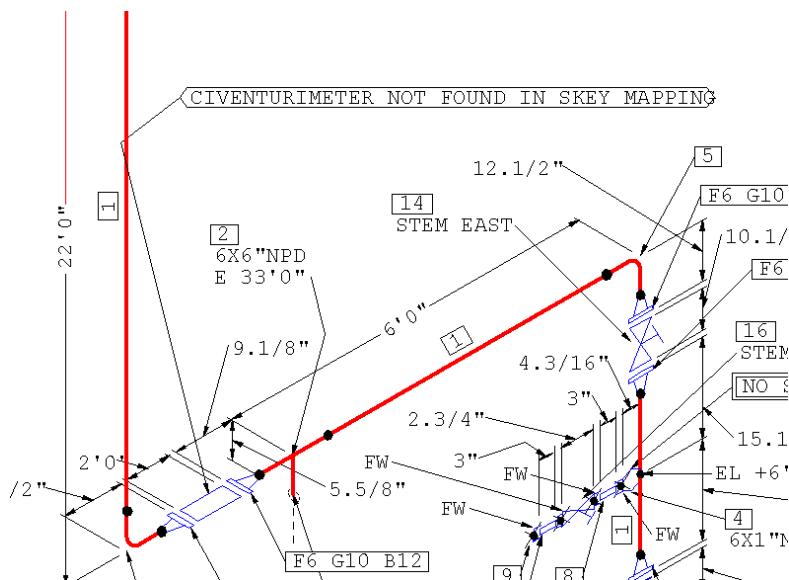
Lab 19: Symbol Mapping

It is possible to map Part classes, Supports, Welds and End conditions to distinct Isogen symbol keys. For part classes, it is possible to specify different symbols for different end conditions. It is also possible to specify that the same SKEY should be output for all end conditions and the end conditions output independently.

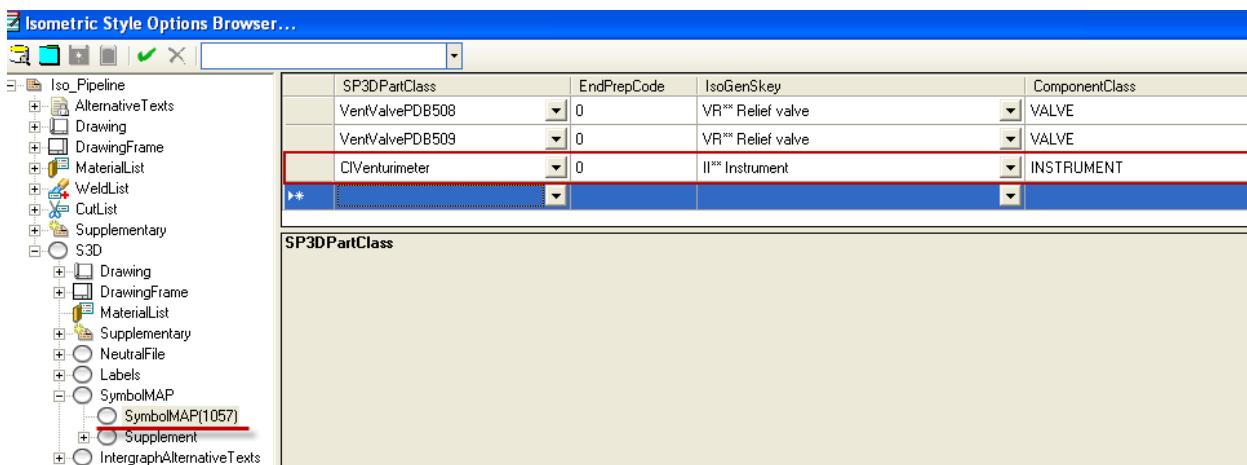
Mapping Symbol Keys for Components

Part classes

- 1) Edit Options in 'User' style
- 2) Select S3D>SymbolMAP>SymbolMap(1057)
- 3) Find Partclass **CIVenturimeter** and delete the row
- 4) Update pipeline ISOS>User Drawings>A2>U02>Process>2003-P
- 5) The error log contains the following entry:
Description: SKEY not Found for CIVenturimeter PartClass Identifier not Found
- 6) The face of the Iso also shows a message to the effect that the SKEY for the CIVenturimeter was not found.



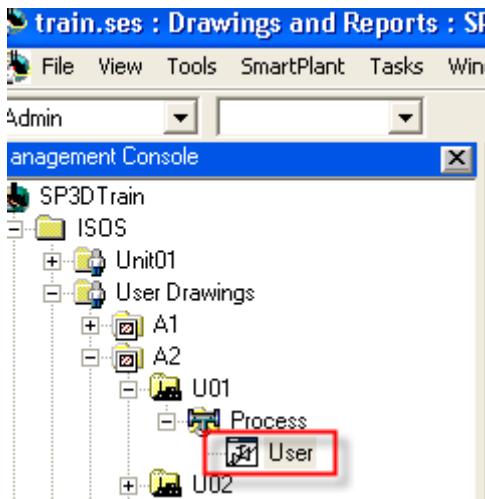
- 7) Edit Options in 'User' style
- 8) Select S3D>SymbolMAP>SymbolMap(1057) and add a new row
- 9) Enter the following values to map the Partclass **CIVenturimeter** to an Isogen SKEY and Component class.



- 10) Save to catalog and re-update 2003-P Isometric. The SKEY error should no longer be reported.

Supports

- 1) Edit Options in the 'User' style.



- 2) Select S3D>SymbolMAP>SymbolMap(1057) and scroll down until SUPPORT is seen in the PartClass column.
- 3) For Hanger and Supports the EndPrepCode corresponds to the CodeListNumber of the HngSupSupportType codelist.

D	E	F	G
SupportsType	ShortDescription	Codelist	
	LongDescription	Number	Sort Order
<i>Note: the textual value, but must not change the numeric value or the meaning of the value.</i>			
Pipe Support		10	
Anchor		11	
Anchor - Rotational		12	
Longitudinal Guide Horizontal		15	
Longitudinal Guide Vertical		21	
Penetration Plate		22	
Wall Penetration		23	
Floor Penetration		24	
Longitudinal Guide Vertical and Horizontal		25	
Travel Stop		30	
Shoe Longitudinal Guide Horizontal		31	
Shoe Longitudinal Guide Vertical		41	
Shoe Longitudinal Guide Vertical and Horizontal		42	
Shoe Travel Stop		43	
Rod Hanger		44	
Rod Hanger Double		45	
Variable Spring		46	
Variable Spring Double		54	
Constant Spring		55	
Constant Spring Double		60	
Variable Spring Base		61	
Constant Spring Base		64	
Dynamic Restraint		68	
Sway Strut		70	
Structural		72	
Riser Clamp		74	
Riser Clamp Variable Spring		80	
Straight Pipe Leg Extension		81	
Elbow Leg Extension		90	
Dummy Leg		91	
		95	
		100	

on **HngSupSupportType** HngSupTypeSelectionRule HvacComponentTypes HVAC

- 4) Change the SKEY in the row that corresponds to EndPrepCode 54 to HANG
(54 codelist value corresponds to Variable Spring in HngSupSupportType codelist)

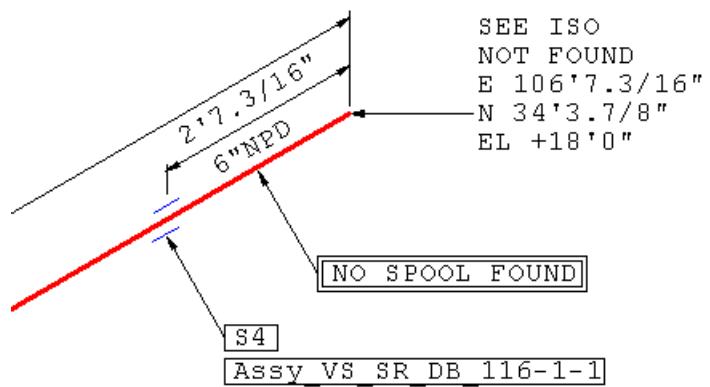
Isoetric Style Options Browser...

SP3DPartClass	EndPrepCode	IsoGenKey	ComponentClass
SUPPORT	95	01HG Default Support	SUPPORT
SUPPORT	72	01HG Default Support	SUPPORT
SUPPORT	74	01HG Default Support	SUPPORT
SUPPORT	12	01HG Default Support	SUPPORT
SUPPORT	60	01HG Default Support	SUPPORT
SUPPORT	21	01HG Default Support	SUPPORT
SUPPORT	54	HANG Support - Hanger	SUPPORT
SUPPORT	30	HANG Support - Hanger	
SUPPORT	44	HC** Half coupling	
SUPPORT	70	HST* Horizontal Steel Work	
SUPPORT	43	HV** Valve - Control Hand Indicator	
SUPPORT	15	IA** Instrument - Angle	
SUPPORT	11	IB** Instrument - Balloon	
SUPPORT	31	ID** Instrument - Dial	
SUPPORT	42	IEPL Instrument - External	

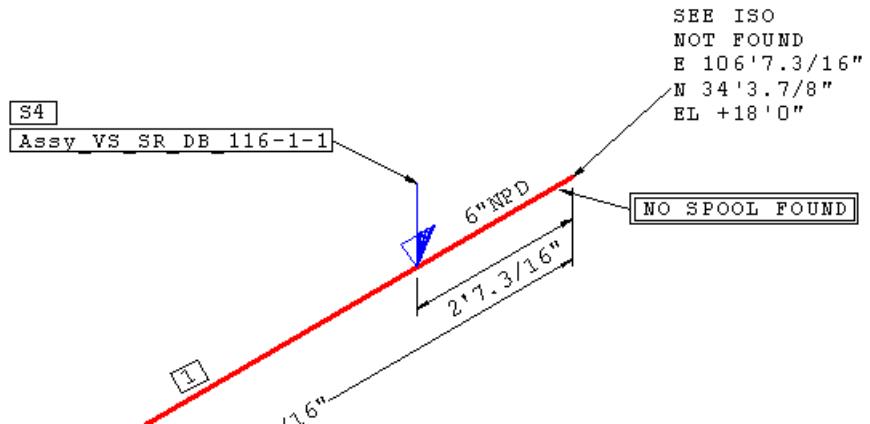
IsoGenKey

- 5) Save to catalog and update line 1002-P.

Before: "Variable Spring" mapped to SKEY "01HG"



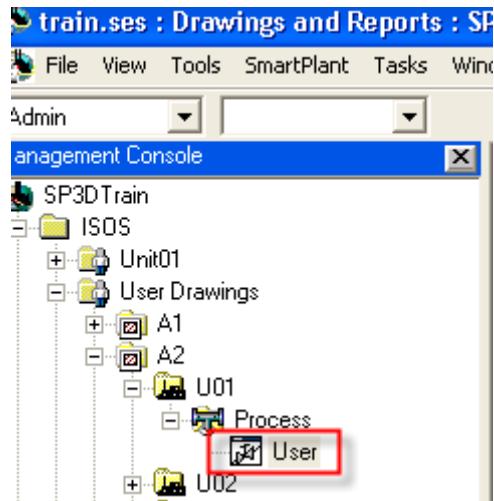
After: "Variable Spring" mapped to SKEY "HANG"



- 6) Make sure to change mapping back to original SKEY (01HG).

Welds

1) Edit Options in the 'User' style



- 2) Select S3D>SymbolMAP>SymbolMap(1057) and scroll down until WELD is seen in the PartClass column.
- 3) For welds the EndPrepCode corresponds to CodeListNumber of the WeldType codelist.

Leave all other numeric values.

	1
Undefined	1
Pipe Connector	2
	5
Shop weld	5
Shop weld at job site fabrication shop	10
Automatic shop weld	15
Miter weld	20
Miter weld at job site fabrication shop	25
Thermal fusion shop weld	65
Thermal fusion shop weld at job site fabrication shop	66
Electrofusion shop weld	67
Electrofusion shop weld at job site fabrication shop	68
Laminated shop weld	69
Laminated shop weld at job site fabrication shop	70
Brazed joint at shop	71
Brazed joint at job site fabrication shop	72
	10
Field weld at assembly site	30
Field weld at job site, including offshore	35
	15
Field weld at job site for loose flange	50
	20
Field fit weld at assembly site	40
Field fit weld at job site, including offshore	45
Field fit weld for nozzle at assembly site	60
Field fit weld for nozzle at job site, including offshore	55
Thermal fusion weld at assembly site	61
Electrofusion weld at assembly site	62
Laminated weld at assembly site	63
Brazed joint at assembly site	64

- 4) Change the SKEY in the row that corresponds to EndPrepCode 5 (Shop Weld) to WWA

Isometric Style Options Browser...

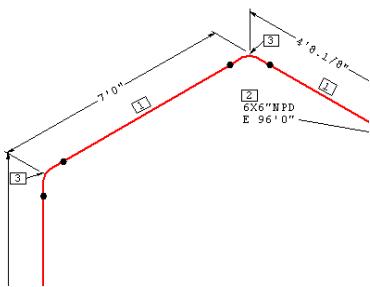
SP3DPartClass	EndPrepCode	IsoGenKey	ComponentClass
WaterFilterPorts90deg	21	FAFL Filter - angle	FILTER
WaterFilterPortsInline	21	FIFL Filter	FILTER
Weld	20	WM Weld - Mitre	Miter Weld
Weld	40	WF Weld - Field Fit	Field Fit Weld at Assembly Site
Weld	30	WS Weld - Site	Field Weld at Assembly Site
Weld	45	WF Weld - Field Fit	Field Fit Weld at Job Site, Including Offshore
Weld	10	WW Weld - Workshop Weld	Shop Weld at Job Site Fabrication Shop
Weld	25	WM Weld - Mitre	Miter Weld At Job Site Fabrication Shop
Weld	15	WWA Weld - Workshop Automatic Weld	Automatic Shop Weld
Weld	50	WFT Weld - Tack for Field Fit	Field Weld at Job Site for Loose Flange
Weld	5	WW Weld - Workshop Weld	Shop Weld
Weld	35	WWA Weld - Workshop Automatic Weld	Automatic Shop Weld at Assembly Site, including Offshore

IsoGenKey

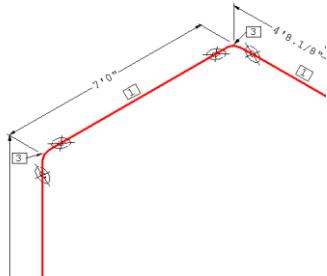
- WW Weld - Dotted Workshop Weld
- WWST Weld - Workshop shop Test
- XAVTM Valve - Angle Pressure Reducing
- XVTM Multiport
- XXX Weld - Site Socket/Screwed/Compression
- XXXD Weld - Site Socket/Screwed/Compression (dotted)

5) Save to catalog and update line 1002-P.

Before: Shop Weld SKEY mapped to WW



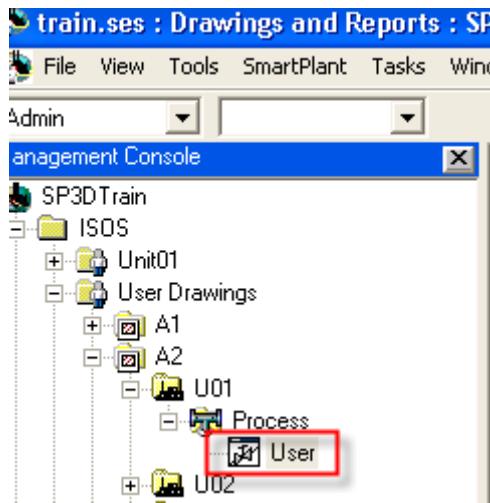
After: Shop Weld SKEY Mapped to WWA



6) Make sure to change mapping back to original SKEY (WW).

SymbolMap.Supplement

- 1) Edit Options in the 'User' style



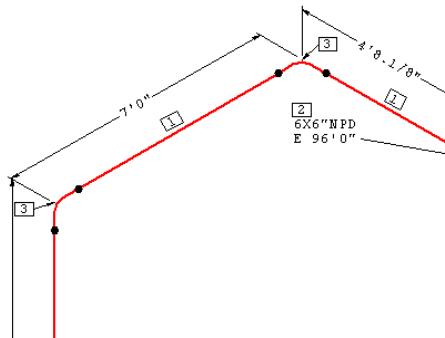
- 2) Explain S3D>SymbolMAP>Supplement>Supplement(63)
- 3) Change the EndPrepMap in the row that corresponds to EndPrepCode 301 from BE (Beveled End) to SW (Socket Welded End)

The screenshot shows the 'Isometric Style Options Browser...' dialog box. The left pane shows a tree view of style options, with 'Supplement(63)' selected and highlighted with a red box. The right pane is a table with the following data:

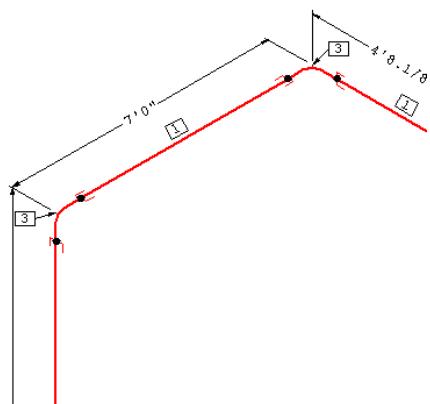
	EndPrep1	EndPrepCode	EndPrepMap	Description
	FFFTBEH	271	FL	Flat-full-face thru-bolted end
▶	BE	301	SW	Beveled end
	MTE	331	SC	Male threaded end
	MGE	341	LC	Male grooved end
	MQCE	351	LC	Male quick connect end
	MFRE	361	CP	Male ferrule end
	MHE	371	PL	Male hose end
	MSE	381	SC	Spigot end
	MBSE	385	BW	Male bevel seat end
	PE	391	PL	Plain end
	SE	401	SW	Socket end
	SWE	421	SW	Socket welded end
	FTE	441	SC	Female threaded end
	FGE	461	LC	Female grooved end
	FQCE	481	LC	Female quick connect end
	FFRE	501	CP	Female ferrule end

- 4) Save to catalog and update line 1002-P. Notice Beveled Ends represented as Socket Welded Ends

Before: 301 EndPrepCode mapped to SKEY (BW)



After: 301 EndPrepCode mapped to SKEY (SW)



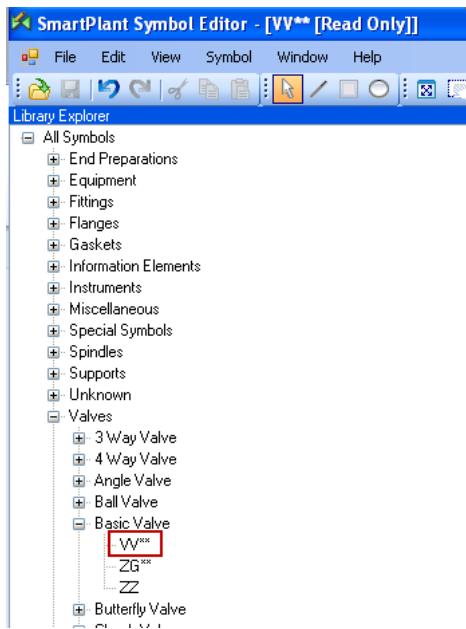
- 5) Make sure to change mapping back to original SKEY (BW).

Create a new symbol key

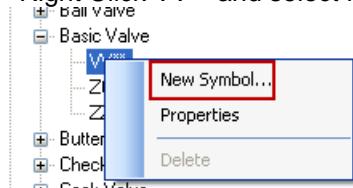
SmartPlant Symbol Editor provides a user-friendly interface in which you can easily create new or modify existing XML-based or ASCII symbol files for use in ISOGEN drawings. The software allows you to graphically define and modify a component, and then export the symbol to an ISOGEN ASCII file so that it can be used in the isometric drawings you generate with SmartPlant 3D

SmartPlant Symbol Editor is delivered on Intergraph eCustomer website.

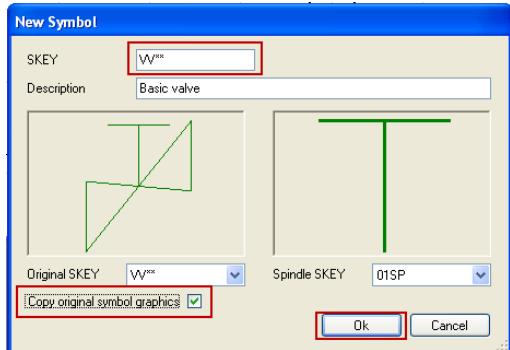
- 1) Click Symbol Editor.exe from desktop to launch the **SmartPlant Symbol Editor**.
- 2) From Library Explorer, expand to All Symbols>Valves>Basic Valve>VV**



- 3) Right Click VV** and select New Symbol

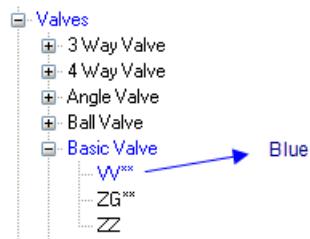


- 4) In New Symbol form, specify SKEY VV**, Turn on the Check Box to Copy original symbol Graphics By Specifying same SKEY VV** in the New Symbol dialog, we are re-defining an existing System Symbol.

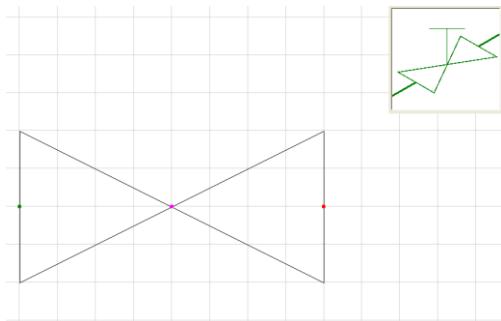


- 5) The **Library Explorer** uses color to distinguish between system symbols (that have not been redefined) and customized symbols. System symbols display in black text, whereas customized symbols display in blue text.

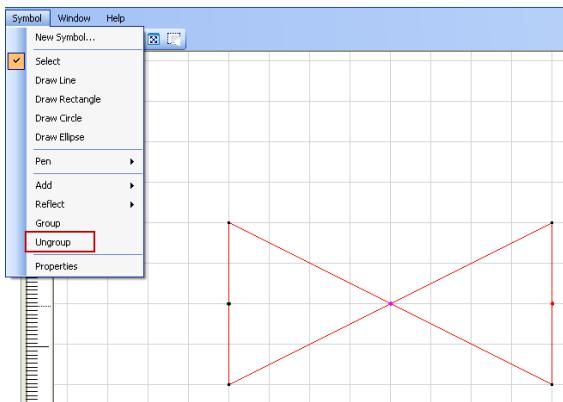
Click OK on the form. Observe that since the System Symbol is being redefined, the color changes to Blue.



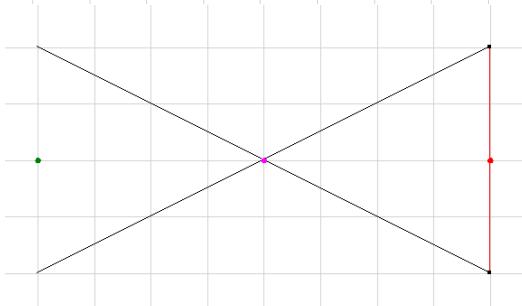
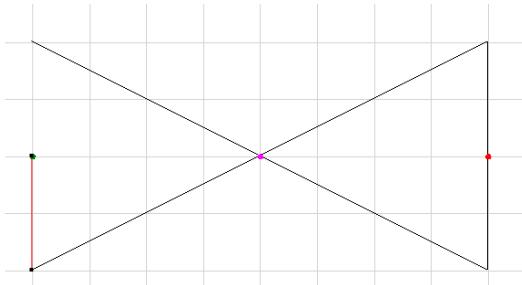
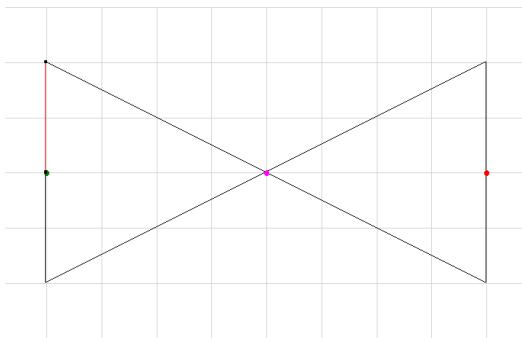
- 6) On the right, Symbol Graphics would be seen as below:



- 7) Now, we will make some changes to the Symbol Graphics
 Select the Valve Symbol and observe that Graphics are all in one Group. So will we ungroup the symbol first. Click the Symbol and from Symbol Menu, select Ungroup command

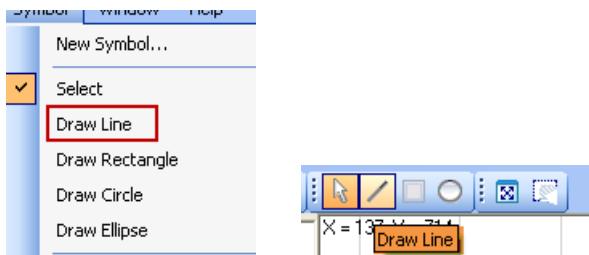


- 8) Select Line Segment and delete the lines (Edit>Delete) as shown in the image below:

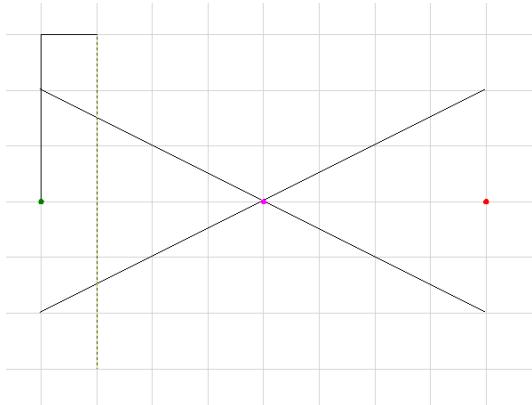
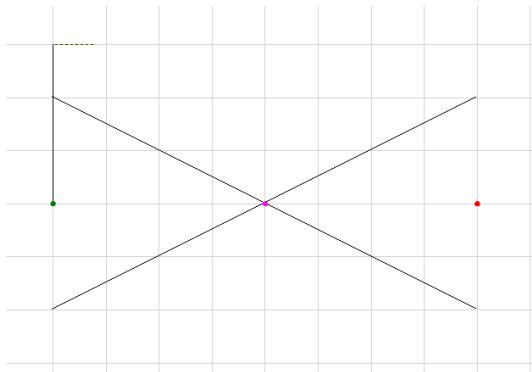


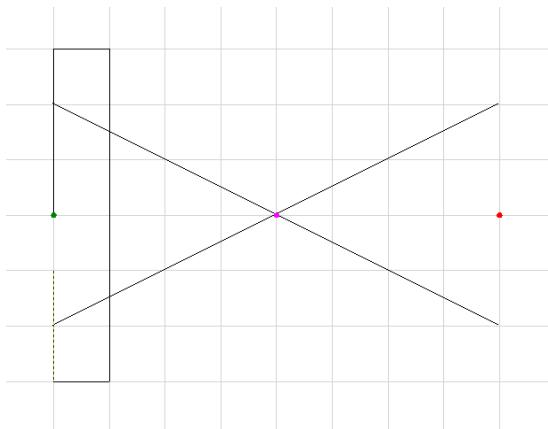
9) Draw some new lines to change the representation of symbol.

Click Symbol>Draw Line or Click from Ribbon Bar>Draw Line

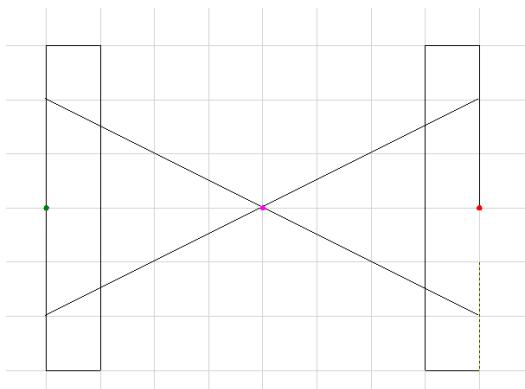
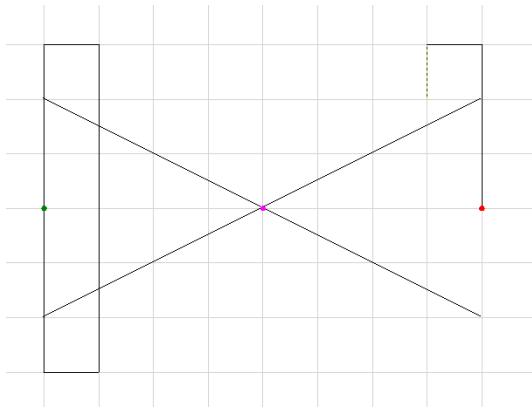


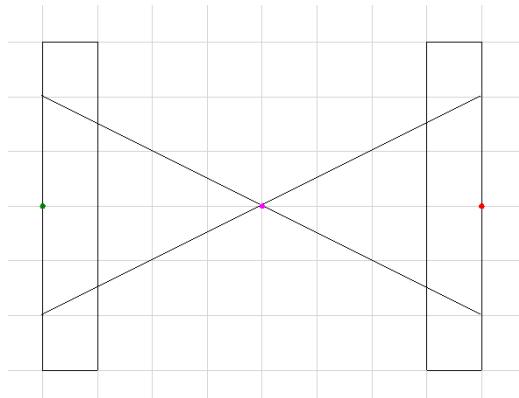
10) Draw new lines from the Start Point (Green Dot) to look like a Flanged End



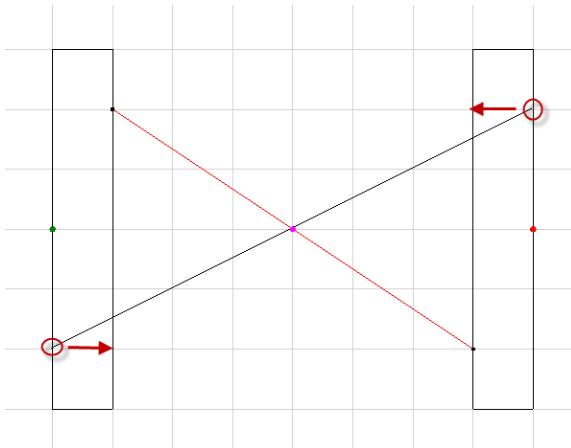
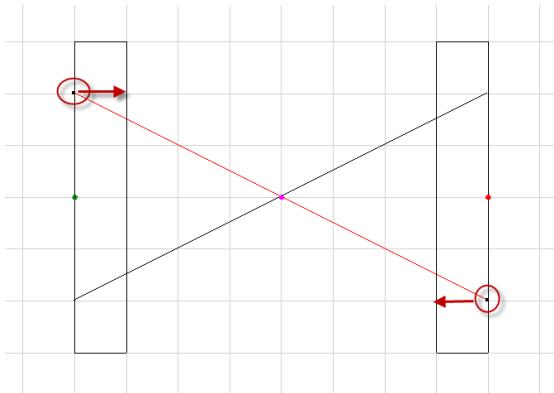


11) Similarly, draw the lines at the End Point (Red Dot)

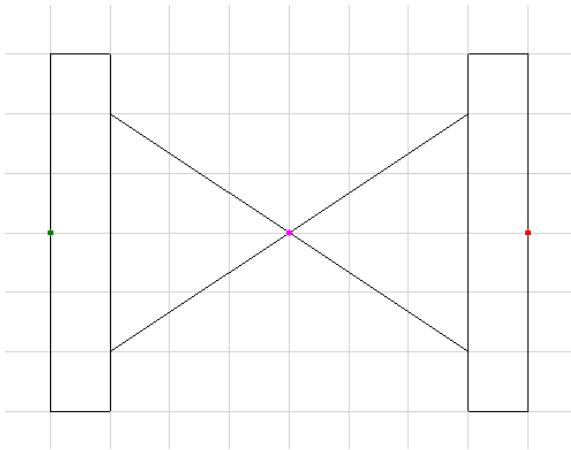




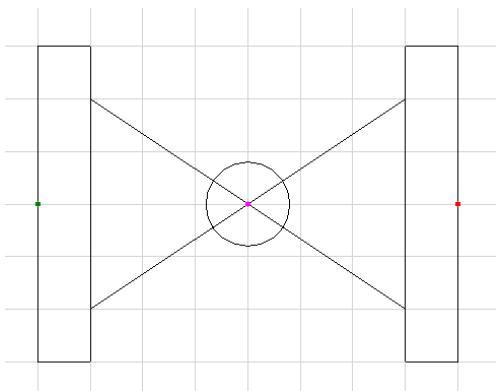
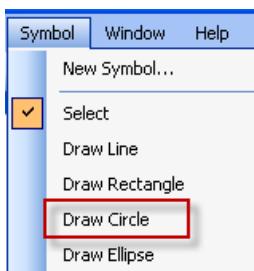
12) Now, Move the end points of the line (highlighted in red) towards the inner edge of the flange



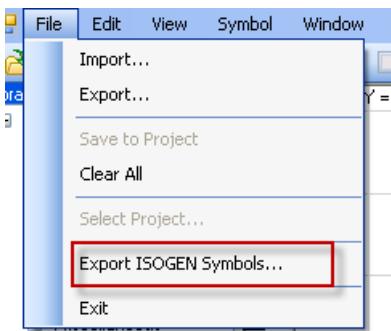
After lines are repositioned, the symbol would look as below:

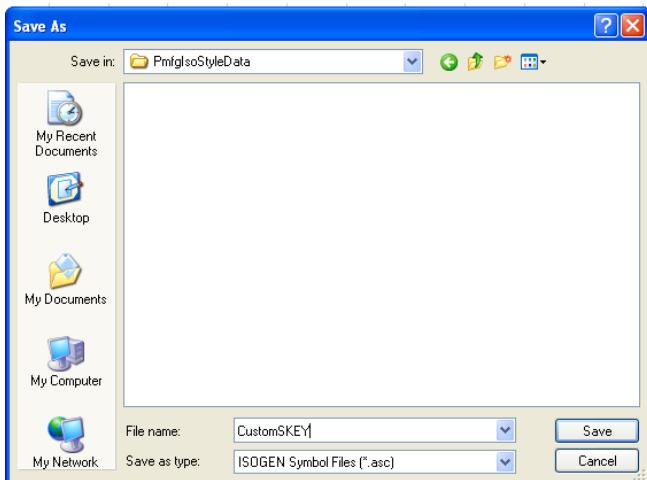


13) Draw a Circle to the center of the Valve Symbol.

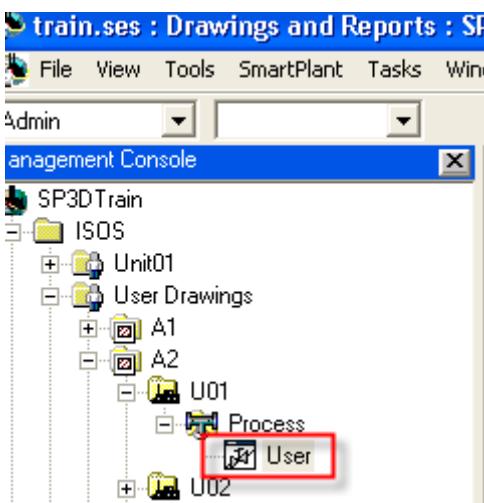


14) Export Symbols ASC to [Training Symbols]\PmfglIsoStyleData

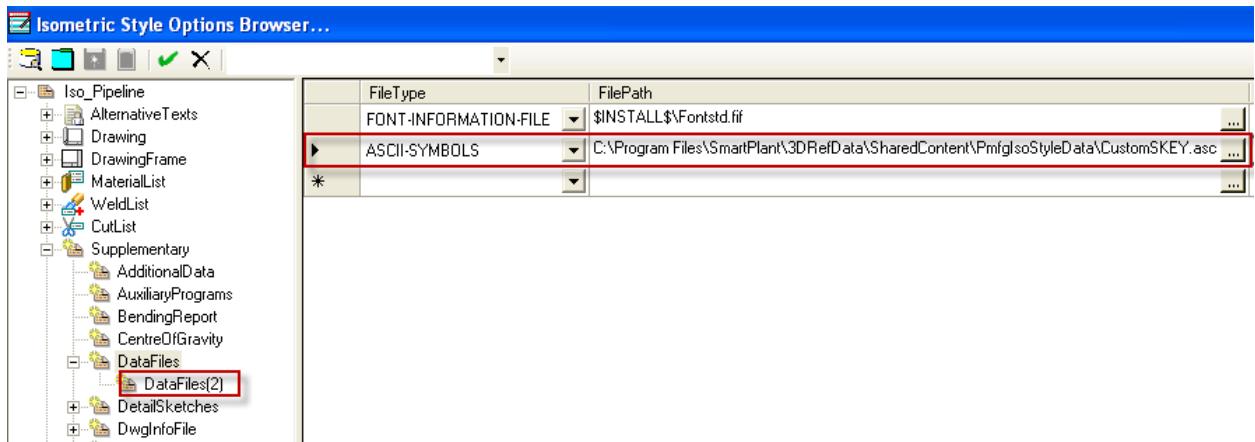




- 15) Exit the Symbol Editor.
- 16) Open S3D Session
- 17) Edit Options in the 'User' style



- 18) In Supplementary.DataFiles.DataFiles(2), add a new row, select ASCII-SYMBOLS from drop down list under FileType column.
For File Path, Browse for CustomSKEY.ASC file that had been saved in step 14



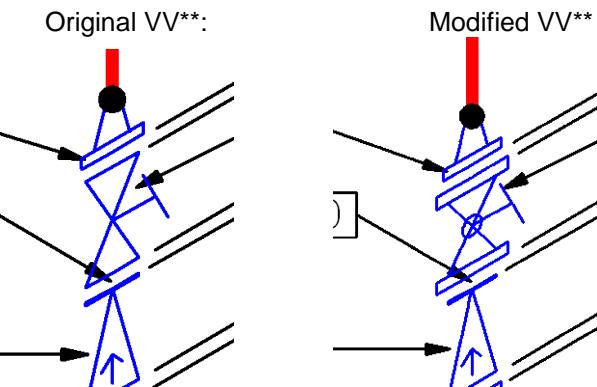
19) GateValve inserted on Pipeline 1001-P is mapped to SKEY VV**

Isometric Style Options Browser...

SP3DPartClass	EndPrepCode	IsoSkey	ComponentClass
GateValve	0	VV** Basic valve	VALVE
GateValve_Asym	0	VT** Gate Valve	VALVE
GateValve_m	0	VT** Gate Valve	VALVE
GateValveAngleOp	0	VT** Gate Valve	VALVE
GateValveAngleOpINTD	0	VT** Gate Valve	INSTRUMENT
GateValveM	0	VV** Basic valve	VALVE
GATF	421	VTSW Gate Valve	VALVE
GATG01	21	VTFL Gate Valve	VALVE
GATG02	21	VTFL Gate Valve	VALVE
GATR	421	VTSW Gate Valve	VALVE
GATRASYM	0	VT** Gate Valve	VALVE
GaugeRootValSingleOut	0	VV** Basic valve	VALVE
GaugeRootValSingleOutR	0	VV** Basic valve	VALVE

Iso_Pipeline
 AlternativeTexts
 Drawing
 DrawingFrame
 MaterialList
 WeldList
 CutList
 Supplementary
 S3D
 SymbolMAP(1057)

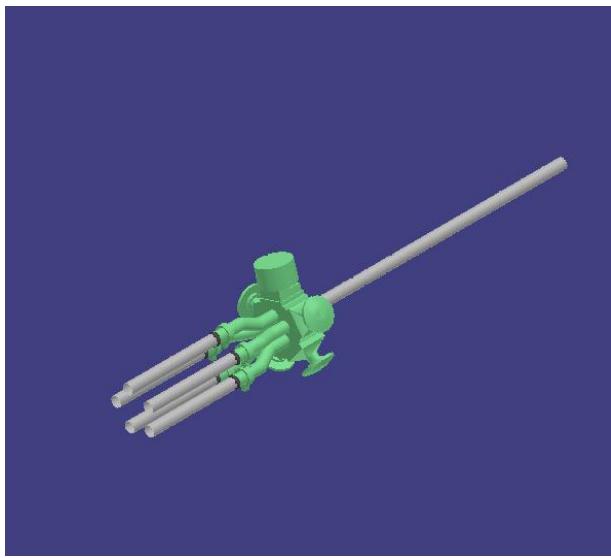
20) Update 1001-P and see if changes made to the SKEY VV** for GateValve is reflected.



Lab 20:Multi-Port Components

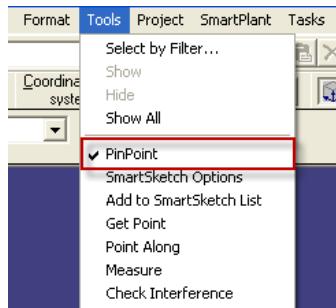
Generating Isometrics for component with multiple ports requires a special SKEY mapping and its configuration. This lab would help in understanding Multi-Port components and its Isometric configuration

A “MultiportDia5WayOptions” valve from Bio Pharm Catalog.xls (delivered as sample data) is used as an example for this lab.

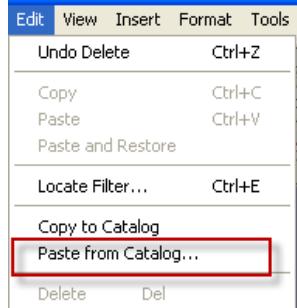


Steps:

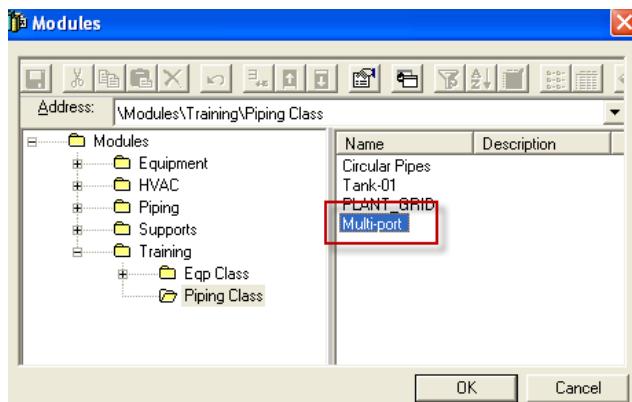
1. Defined Workspace using Filter – Plant Filter>Training Filters>U01
2. Tools Menu – Turn on PinPoint



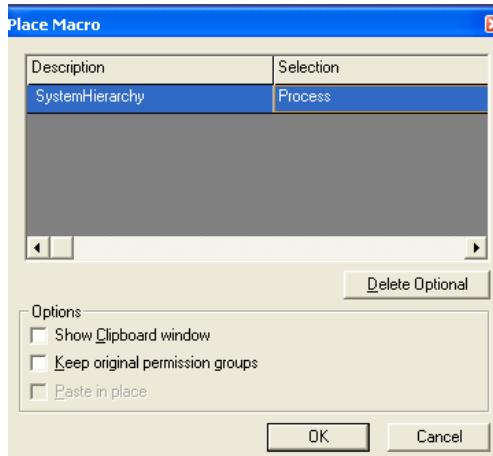
3. Edit Menu – Click Paste from Catalog



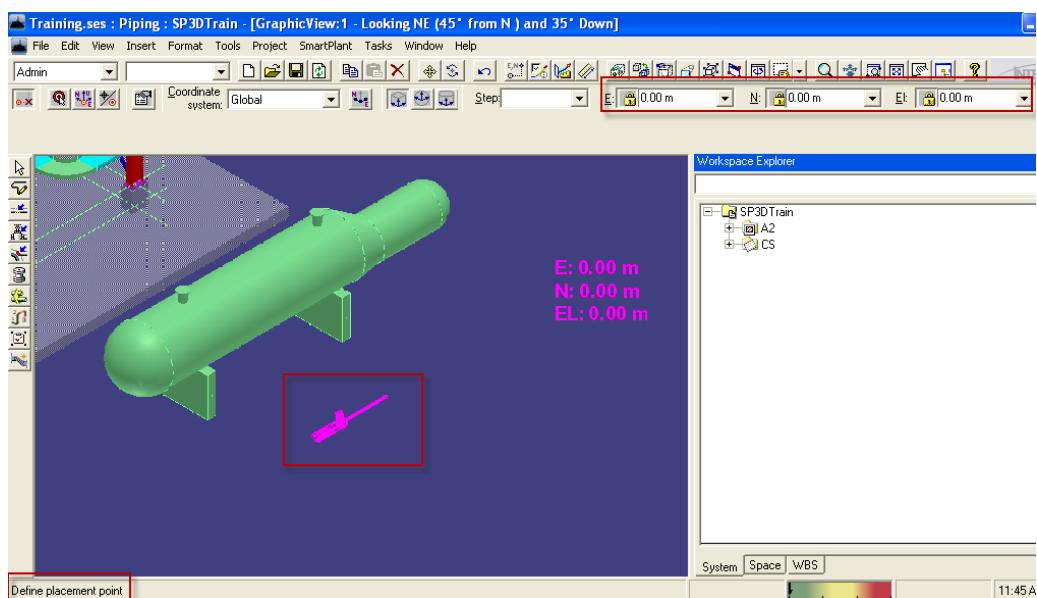
4. Select Multi-port from Modules>Training>Piping Class> and Click OK



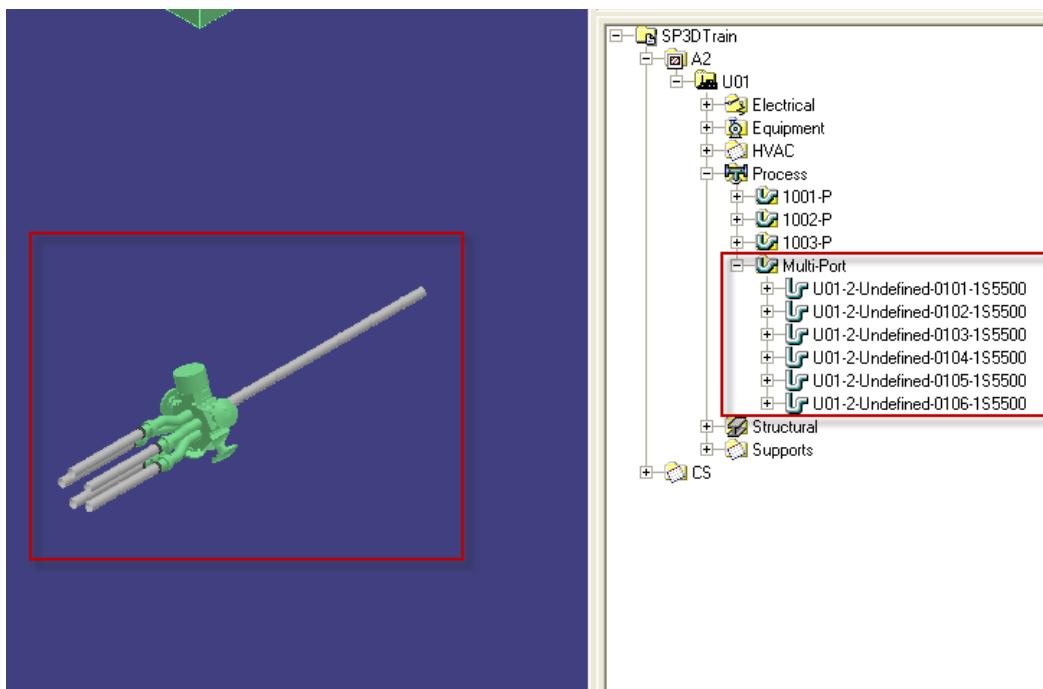
5. Click OK for System Hierarchy selection which should be Process



6. Define a Placement point by keying in E=0, N= 0, EL = 0 on the Pin Point Ribbon bar and select anywhere on the screen to paste the “Multi-port” pipeline from Catalog



7. Multi-port Pipeline should be copied under A2>U01>Process>

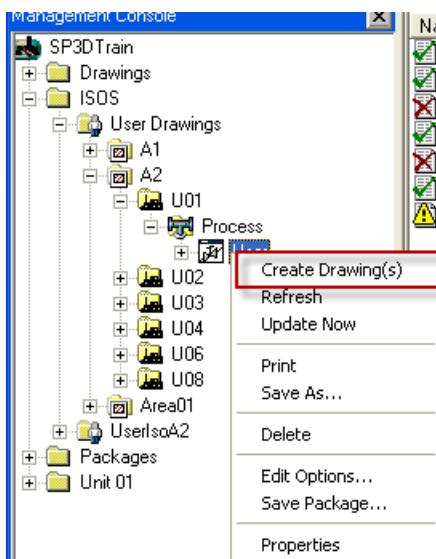


8. Observe the Multi-port component (“MultiportDia5WayOptions”) with 5 Pipe Run on one side and 1 Pipe Run on other side of the component.

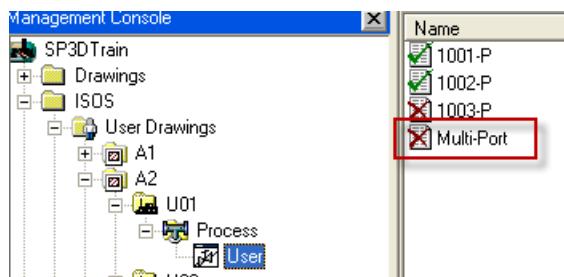
Now, we need to configure Isometric Option by specifying a SKEY for this component – Part Class of the component is “MultiportDia5WayOptions”

9. Switch to Drawings and Report Task.

10. Right Click “User” style under User Drawings>A2>U01>Process>User and Click Create Drawings. The Create Drawing command would create a new Drawing for the Multi-port Pipeline we just created/pasted from catalog in previous steps.



11. Multi-port Drawing would be created as below:



12. Before we update Multi-port Isometric, we need to make changes in Options.
Edit> Option on "User" Style

13. Map S3DPartClass “MultiportDia5WayOptions” to EndPrepCodeSKEY =0, SKEY = XV** and ComponentClass = MULTIPORT-COMPONENT

Tip: Go to the very bottom blank row in SymbolMap and add the information.

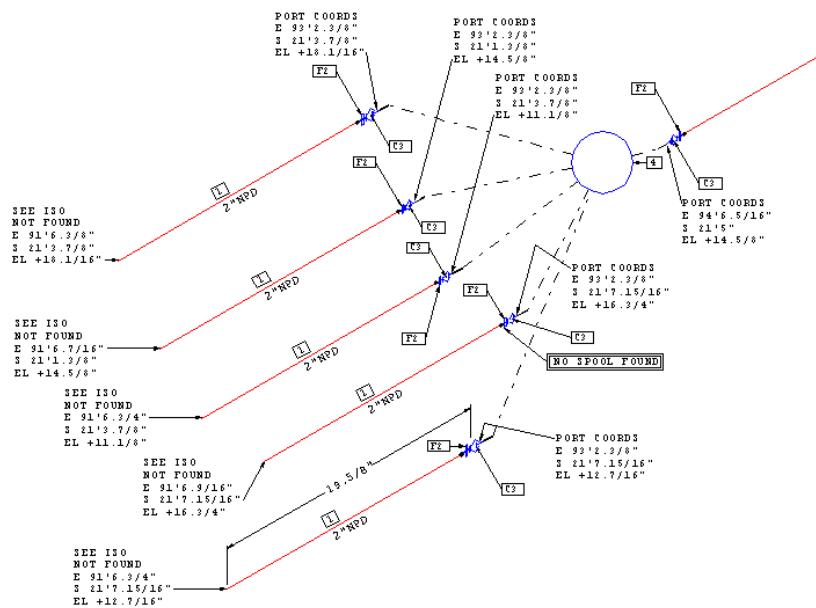
Isometric Style Options Browser...

SP3DPartClass	EndPrepCode	IsoGenSkey	ComponentClass
ThermoDyTrapType2	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoDyTrapType3	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoDyTrapType4	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoStmTrapTy1	0	TA** Trap - Angle	TRAP-ANGLE
ThermoStmTrapTy2	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoStmTrapTy3	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoStmTrapTy4	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoStmTrapTy5	0	TI** Trap - In Line (Straight Through)	TRAP
ThermoStmTrapTy6	0	TA** Trap - Angle	TRAP-ANGLE
ThermoStmTrapTy7	0	TI** Trap - In Line (Straight Through)	TRAP
VentValvePDB508	0	VR** Relief valve	VALVE
VentValvePDB509	0	VR** Relief valve	VALVE
CIVenturiometer	0	II** Instrument	INSTRUMENT
PipeStock	542	FPPF	PIPE-FIXED
MultiportDia5WayOptions	0	XV** Multiport	MULTI-PORT-COMPONENT
*			

14. Save the options to Catalog.



15. Close Option Browser.
16. Update “Multi-Port” Isometric
17. Isometric should look as below:



Lab21: Personal Isogen Pre-Processor

This lab demonstrates, usage of Personal Isogen Pre-Processor program to enhance/modify a PCF after PCF is generated and before PCF is fed to Isogen for further processing.

Isogen Pre-Processor (ISOGENProcessor.exe) at runtime looks for a LST file having path to an exe application named Enhance.exe. Enhance.exe has the logic to add/modify/delete attributes from PCF.

Objective of this Lab is to modify below attributes in the PCF and observe the results on the face of Isometric Drawing:

For a Gate Valve with ITEM-CODE “VAAAHABAHAJADAZZZZUS”

We need SKEY VV** changed to VG**

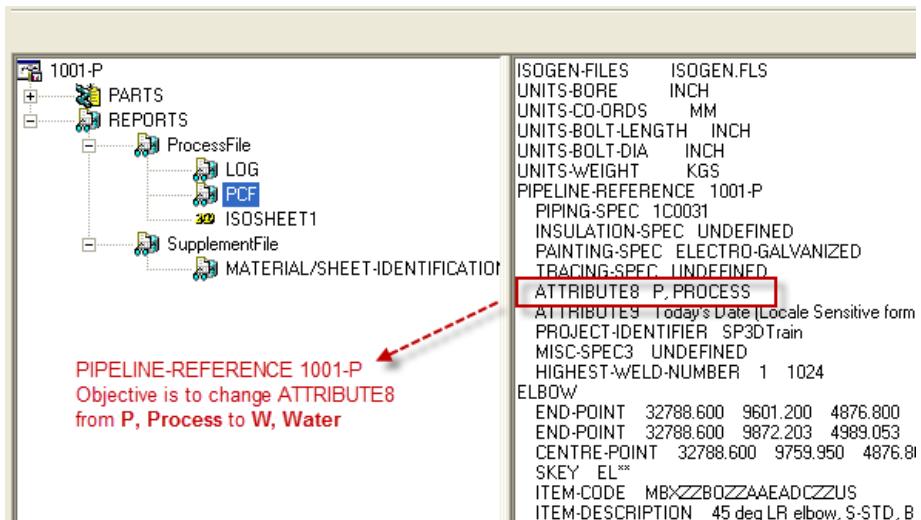


We need ITEM-DESCRIPTION “Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47” changed to "Test Valve"

```
VALVE
END-POINT 32788.600 4907.662 3274.825 10 FL
END-POINT 32788.600 4907.662 3605.025 10 FL
CENTRE-POINT 32788.600 4907.662 3439.925
SKEY VV** -> Intent is to modify SKEY
ITEM-CODE VAAAHABAHAJADAZZZZUS VG** to VG**
ITEM-DESCRIPTION Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47
UCI {00013885-0000-0000-C63C-333B7E493004}
INSULATION-SPEC UNDEFINED
PAINTING-SPEC ELECTRO-GALVANIZED
TRACING-SPEC UNDEFINED
MISC-SPEC3 UNDEFINED
PIPING-SPEC 1C0031
ERCTION-ITEM
WEIGHT 206.385
SPINDLE-DIRECTION EAST
DIRECTION S 45 E
MESSAGE
TEXT VG3
```

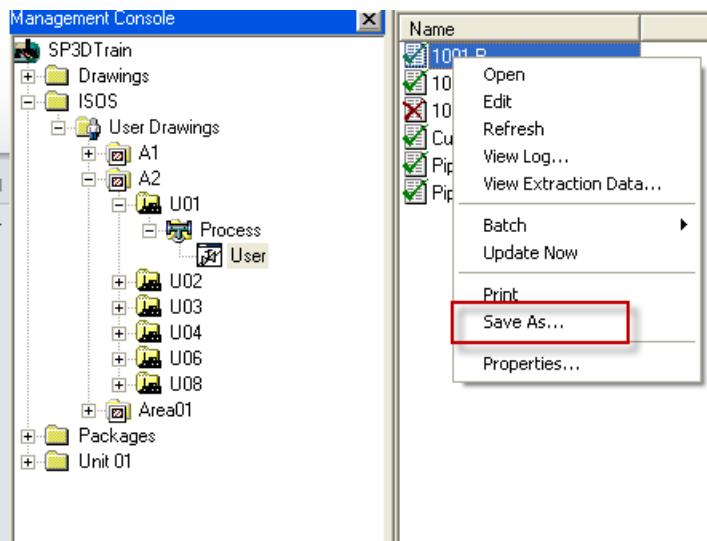
Intent is to Modify ITEM-
DESCRIPTION from
"Gate valve, CL150....." to
"Test Valve"

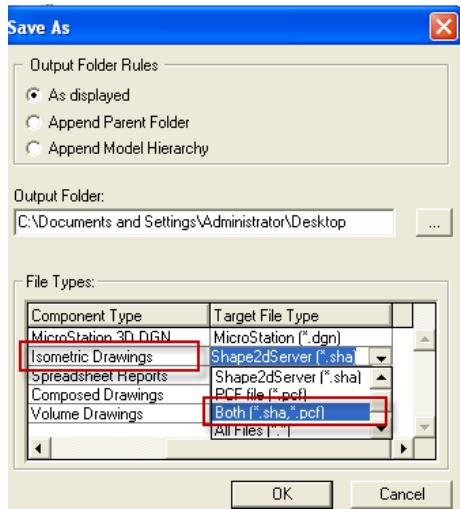
We need Pipeline ATTRIBUTE8 (Fluid Code) P, Process changed to W, Water



Steps:

1. Save Isometric 1001-P (SHA and PCF)





2. Open saved PCF in notepad, and check existing attributes (SKEY and ITEM-DESCRIPTION) for the Gate Valve

```

VALVE
END-POINT 32788.600 4907.662 3274.825 10 FL
END-POINT 32788.600 4907.662 3605.025 10 FL
CENTRE-POINT 32788.600 4907.662 3439.925
SKEY VV** Intent is to modify SKEY
ITEM-CODE VAAAHABAHAJADAZZZZUS VV** to VG**
ITEM-DESCRIPTION Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47
UCI {00013885-0000-0000-C63C-333B7E493004}
INSULATION-SPEC UNDEFINED
PAINTING-SPEC ELECTRO-GALVANIZED
TRACING-SPEC UNDEFINED
MISC-SPEC3 UNDEFINED
PIPING-SPEC 1C0031
ERSECTION-ITEM
WEIGHT 206.385
SPINDLE-DIRECTION EAST Intent is to Modify ITEM-
DIRECTION S 45 E DESCRIPTION from
MESSAGE "Gate valve, CL150....." to
TEXT VG3 "Test Valve"

```

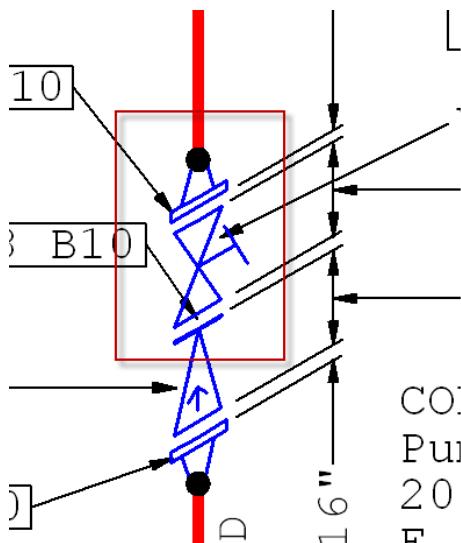
Check Pipeline ATTRIBUTE8 (Fluid Code), it should be P, PROCESS.

```

ISOGEN-FILES ISOGEN.FLS
UNITS-BORE INCH
UNITS-CO-ORDS MM
UNITS-BOLT-LENGTH INCH
UNITS-BOLT-DIA INCH
UNITS-WEIGHT KGS
PIPELINE-REFERENCE 1001-P
PIPING-SPEC 1C0031
INSULATION-SPEC UNDEFINED
PAINTING-SPEC ELECTRO-GALVANIZED
TRACING-SPEC UNDEFINED
ATTRIBUTE8 P, PROCESS
ATTRIBUTE9 Today's Date (Locale Sensitive form)
PROJECT-IDENTIFIER SP3DTraIn
MISC-SPEC3 UNDEFINED
HIGHEST-WELD-NUMBER 1 1024

```

3. Open saved Isometric SHA, and check SKEY representation for the Gate Valve which should look like VV**



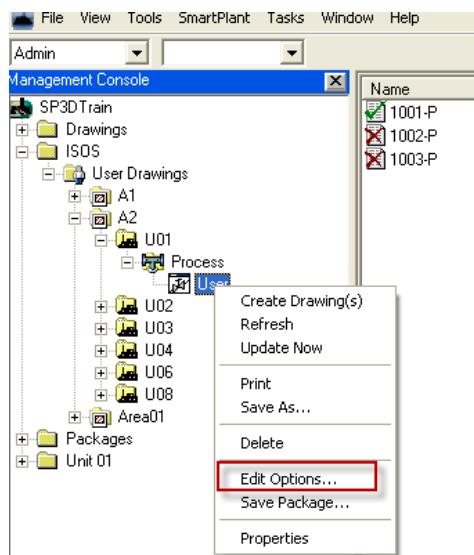
Check existing Gate Valve Description in MTO section.

OTHER THAN SHOP MATERIALS					
PT NO	DESCRIPTION	NPD (IN)	CMDTY CODE	QTY	
8	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601	10	GMAHACABXBEPUS	6	
9	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601	8	GMAHACABXBEPUS	2	
10	Studbolts, ASTM-A193-B7 - 4.75 in. Length	7/8	BAZZZZZAAYBEUZZ	72	
11	Studbolts, ASTM-A193-B7 - 4.5 in. Length	3/4	BAZZZZZAAYBEUZZ	16	
12	Check valve, CL150, RFFE, BC, swing, ASTM-A216-WCB, trim 8, Pacific 180	10	VBGAHABAHAFAEADAZ	2	
13	Gate valve, CL150, RFFE, BB, OS&Y, ASTM-A216-WCB, trim 8, Crane 47	10	VAAAHABAHAJADAZ	2	

Verify Pipeline ATTRIBUTE 8 (Fluid Code) which should be P, Process.

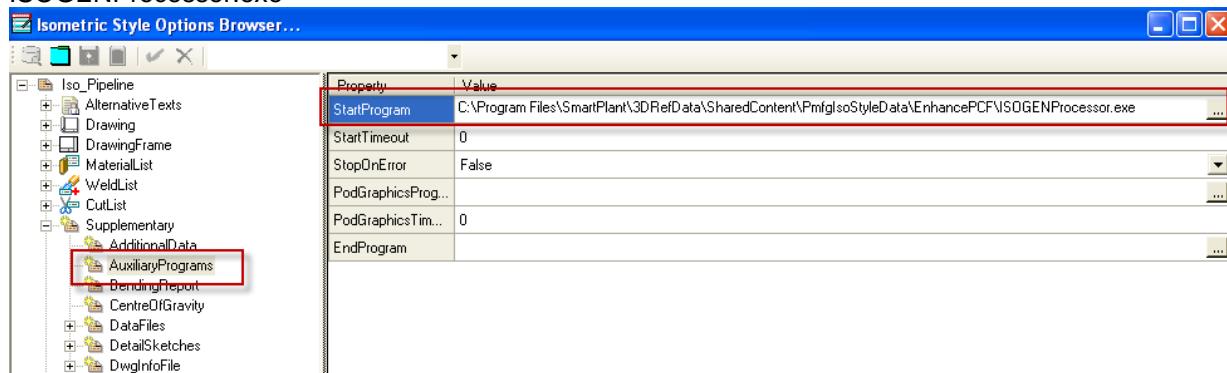
PipeRun	NPD	Piping Spec.	Insul Spec	Insul Matrl	In
U01-10-P-0006-1C0031	10in	1C0031	UNDEFINED		
U01-10-P-0008-1C0031	10in	1C0031	UNDEFINED		
U01-8-P-0007-1C0031	8in	1C0031	UNDEFINED		
U01-8-P-0005-1C0031	8in	1C0031	UNDEFINED		
PIPING SPEC: 1C0031					
INSULATION SPEC: UNDEFINED					
PAINTING SPEC: ELECTRO-GALVANIZED					
TRACING SPEC: UNDEFINED					
MAX WORKING TEMP:					
MAX WORKING PRESS:					
FLUID CODE: P, PROCESS					

4. Right Click on ISOS>UserDrawings>A2>U01>Process>User and Edit to open Isometric Option Browser



5. Go to Options under Iso_Pipeline.Supplementary.AuxiliaryPrograms

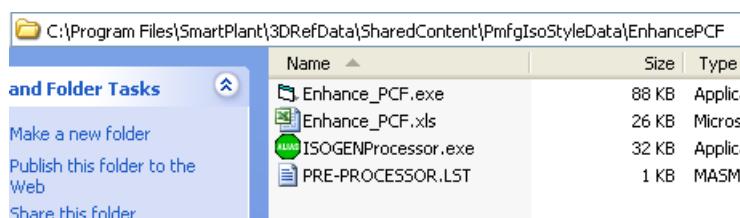
For StartProgram, Browse and map ISOGENProcessor.exe located at C:\Program Files\SmartPlant\3DRefData\SharedContent\PmfgIsoStyleData\EnhancePCF\ISOGENProcessor.exe



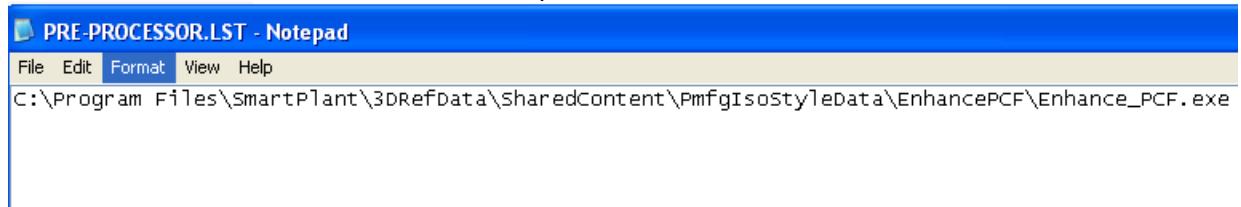
6. Save and close Option Browser.

7. Open folder at C:\Program Files\SmartPlant\3DRefData\SharedContent\PmfgIsoStyleData\EnhancePCF\

Below files should exist in the folder you opened.



8. PRE-PROCESSOR.LST file should have full path to Enhance_PCF.exe



9. Open Enhance_PCF.xls to review attributes that has to be replaced..

Data in **Schema** sheet has a condition for a VALVE with ITEM-CODE that would be evaluated for criteria specified in **Component Properties** Sheet

PCF Type	Match	And/Or	Match	And/Or	Match	And/Or	Match	And/Or	Match
VALVE	ITEM-CODE								

Options
If PCF_Type contains no value, it will match all types - don't use a blank value if any other types are specified as all will override
Match any PCF_Property - use and/or to select
Match columns can be extended as required.
Do not leave blank lines between entries in the table or at the end of the table

Schema Component Properties Pipeline Properties

VALVE with its ITEM-CODE specified in this **Component Properties** Sheet would be matched in PCF at runtime

If there is VALVE with ITEM-CODE “VAAAHABAHAJADJADAZZZUS” found, properties columns such as SKEY, ITEM-DESCRIPTION etc. would be searched for and if these properties are found it would modify or if not found it would add the values from this sheet.

INDEX	PCF_TYPE	ITEM-CODE	ITEM-DESCRIPTION	SKEY
1	VALVE	VAAAHABAHAJADJADAZZZUS	Test Valve	VG**

Notes
The same column headings as defined in the Match, must exist
When a match is found, any columns with values will be added as properties to the PCF
If a property already exists in the PCF, it will be modified with the new value
Use the Keyword DELETE to force a property to be deleted from the PCF
If DELETE is followed by a value i.e. DELETE AIR, the property will only be deleted if the value is AIR
An Item code can be changed by using a column 'CHANGE_CODE' and inserting a value
Do not leave blank lines between entries in the table or at the end of the table

Schema Component Properties Pipeline Properties

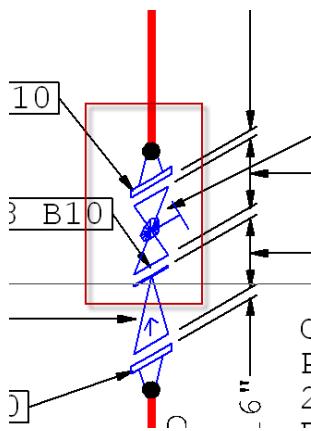
Pipeline Properties sheet: ATTRIBUTE8 for Pipeline 1001-P would be replaced in PCF with W, Water

A	B	C
PIPELINE-REFERENCE	ATTRIBUTE8	
1001-P	W, Water	

Component Properties Pipeline Properties

Close the Enhance_PCF.xls.

10. Update 1001-P. Edit and observe the changes. The changes should see as below:



OTHER THAN SHOP MATERIALS

PT NO	DESCRIPTION	NPD (IN)	CMDTY CODE	QTY
8	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601	10	GMAHACABXBEPUS	6
9	Gasket, CL150, 0.125" thk, 304 spiral wnd, graph filled, CS center ring, API-601	8	GMAHACABXBEPUS	2
10	Studbolts, ASTM-A193-B7 - 4.75 in. Length	7/8	BAZZZZZAAYBEUZZ	72
11	Studbolts, ASTM-A193-B7 - 4.5 in. Length	3/4	BAZZZZZAAYBEUZZ	16
12	Check valve, CL150, RFFE, BC, swing, ASTM-A216-WCB, trim 8, Pacific 180	10	VBGAHABAHAFAEADAZ	2
13	Test Valve	10	VAAAHABAHAJADAZ	2

PIPING SPEC:	1C0031
INSULATION SPEC:	UNDEFINED
PAINTING SPEC:	ELECTRO-GALVAN
TRACING SPEC:	UNDEFINED
MAX WORKING TEMP:	
MAX WORKING PRESS:	
FLUID CODE:	W, WATER

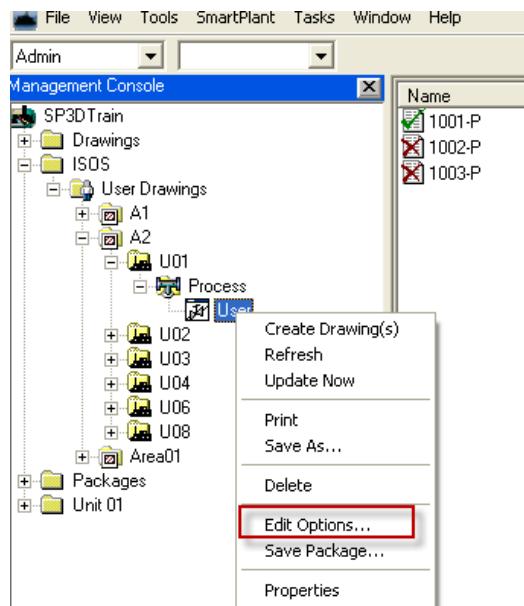
1

Lab22: Reference Planes

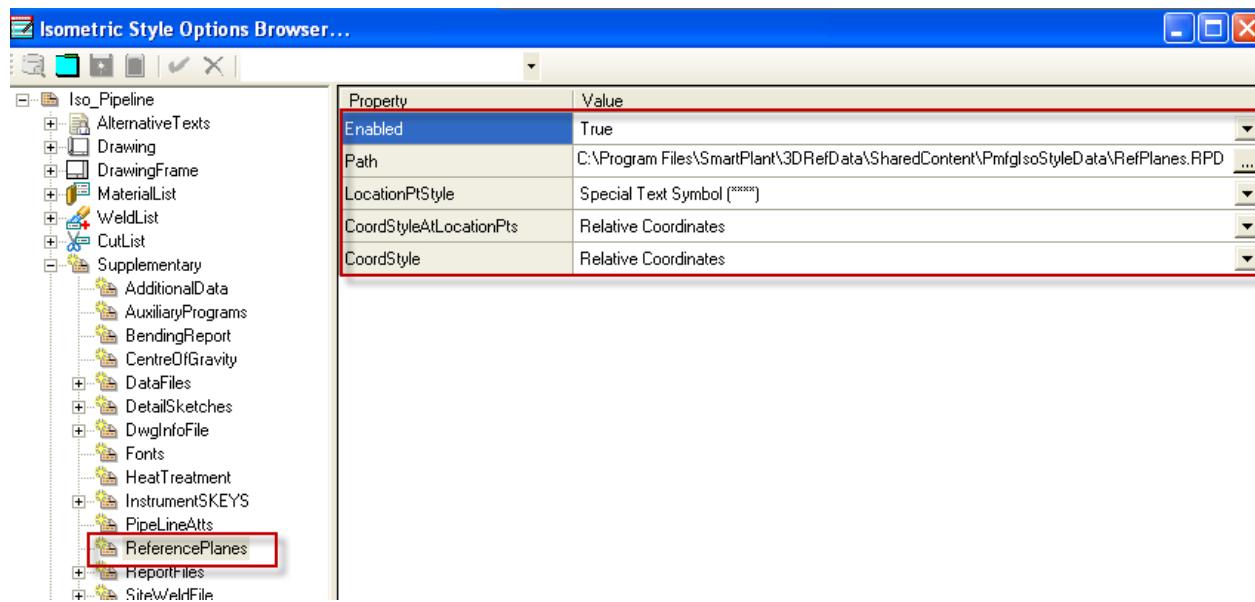
The Reference Planes option provides the ability to reference virtual planes for coordinate callouts on isometric drawings. Definition of the planes is in a file with *.RPD extension

For this Lab, a Reference plane file (RefPlanes.RPD) is already created with some pre-defined volumes and it's X,Y,Z planes.

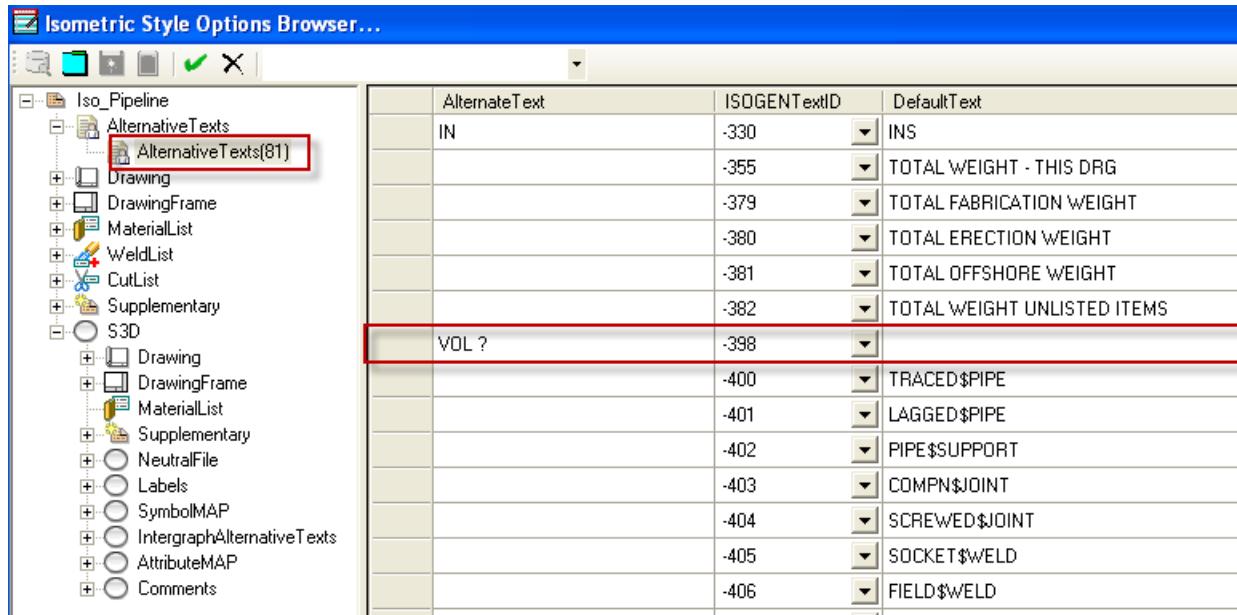
- 1) Right Click on ISOS>UserDrawings>A2>U01>Process>User and Edit to open Isometric Option Browser



- 2) Go to Supplementary.ReferencePlanes option.



- 3) Change “Enabled” value to True.
- 4) For the file Path, point to the [Training Symbols]\PmfglsoStyleData\RefPlanes.RPD.
- 5) Change the CoordStyle and CoordStyleAtLocationPts value to Relative Coordinates.
- 6) Go to Alternative Texts and set AText -398 to VOL ?



- 7) Save changes to the Options Browser and close the browser.
- 8) Update Drawing 1001-P
- 9) Notice that the Volume name (U01) listed in the Refplanes.RPD is now shown in the coordinate readout. Also note that the coordinates are listed as distances from X, Y and Z planes of the relevant volume.

Volume and its Planes for Unit U01 specified in Refplanes.RPD file.

```

VOLUME U01
PRIORITY 1
LIMIT1    22000   500     0
LIMIT2    34000   18000   10000

X-PLANES
X1      E24384
X2      E31699.20

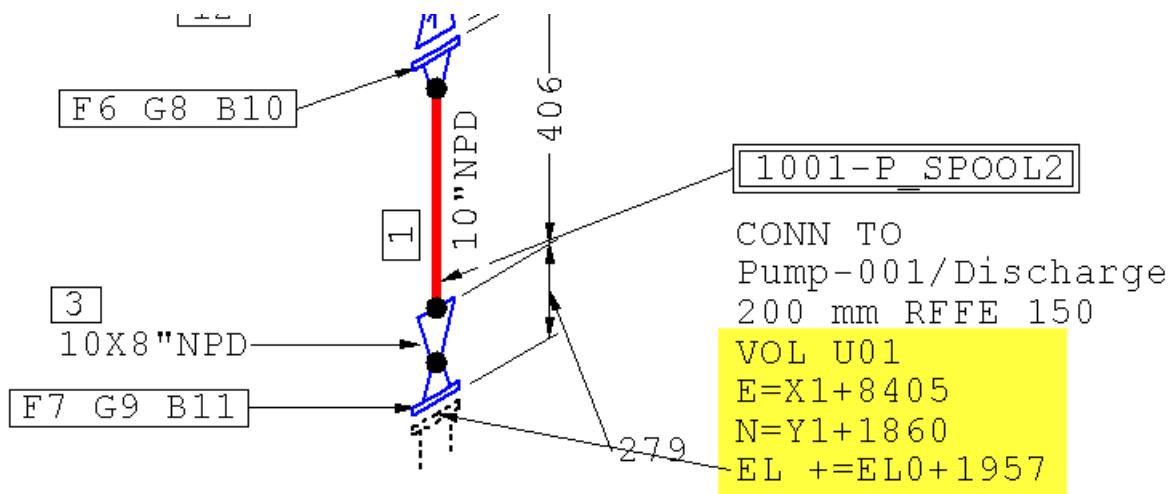
Y-PLANES
Y1      N3048
Y2      N9144
Y3      N15240

Z-PLANES
ELO     ELO

NEAREST-Z-PLANE

```

Coordinates would be seen as shown in the picture below:



Six Alternative Text records have been assigned to output Relative directions (-443,-444,-445,-446,-447,448)

^ is substituted with the Reference Plane Name

? is substituted with the distance from the nearest Reference Plane

Isometric Style Options Browser...

AlternateText	ISOGENTextID	DefaultText
-400	-400	TRACED\$PIPE
-401	-401	LAGGED\$PIPE
-402	-402	PIPE\$SUPPORT
-403	-403	COMPNS\$JOINT
-404	-404	SCREWED\$JOINT
-405	-405	SOCKET\$WELD
-406	-406	FIELD\$WELD
-407	-407	SHOP\$WELD
-410	-410	[1] DENOTES PIPE SPOOL NO\$1 DENOTE...
-411	-411	SITE\$CONNECTION
^+?	-443	^+?
^-?	-444	^-?
^+?	-445	^+?
^-?	-446	^-?
^+?	-447	^+?
^-?	-448	^-?
=	-449	=
	-451	TAPPING CONNECTION
FW	-498	

AlternateText
Specifies the text that you want to appear on the drawing.

Count: 133 | OPT: N/A | SW: ..

A typical RPD file would look as below:

```
FRAMEWORK-UNITS    MMS

X-PLANES
GLOBAL_X      E0

Y-PLANES
GLOBAL_Y      NO

Z-PLANES
GLOBAL_Z      ELO

NEAREST-Z-PLANE

VOLUME   U01
PRIORITY   1
LIMIT1     22000   500     0
LIMIT2     34000   18000   10000

X-PLANES
X1      E24384
X2      E31699.20

Y-PLANES
Y1      N3048
Y2      N9144
Y3      N15240

Z-PLANES
ELO      ELO

NEAREST-Z-PLANE
```

Lab23: Performance Analysis Tool

Isometric Performance log Analyser is a tool which provides an easy method of identifying labels/filters/report contributing to poor performance of Isometrics.

In general, if a specific attribute from Model/Catalog is to be seen on Isometric, Labels are created in Catalog and configured within Isometric Option Browser to display the property values returned by the label on Isometric drawing/MTO/Cut List/Neutral File/Drawing Frame and so on. In process of creating these labels, sometimes user may unknowingly create specific labels that might introduce a huge impact on performance of Isometrics.

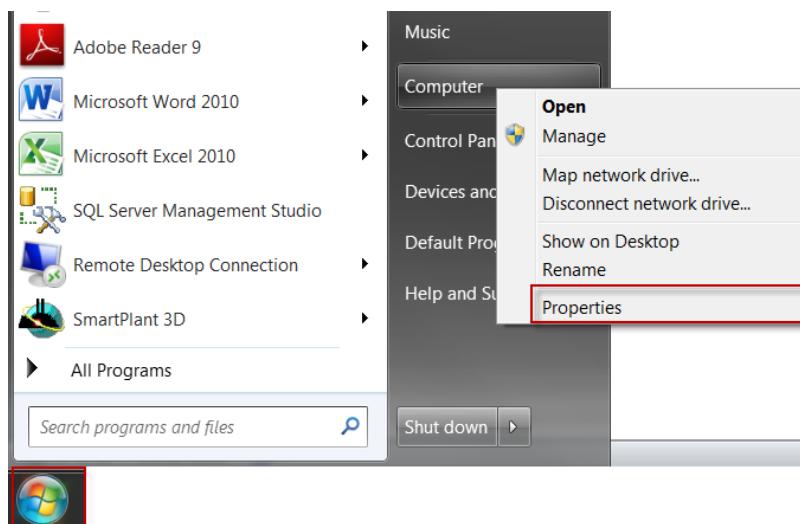
A good example of such poor label would be a SQL label. It is recommended to avoid using SQL Labels in Isometric Option Browser. COM labels are always the best choice for outputs. If COM Labels are limited for some specific properties, VB Label should be considered as a next option after COM Label.

The performance can also have impact from filters and reports that are mapped in Isometric Option Browser. So this tool helps in identifying poor filters and Reports too.

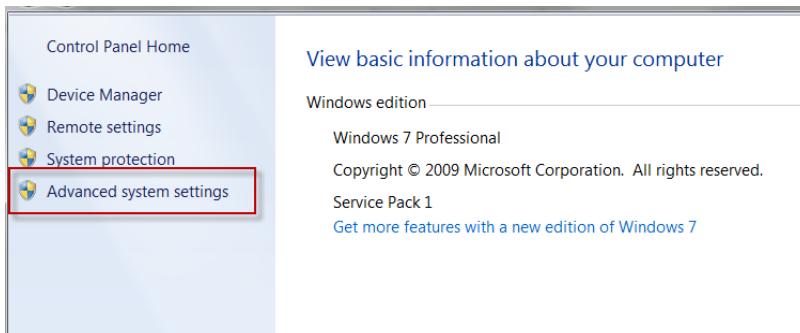
Isometric Performance log Analyser can be downloaded from eCustomer website. For more details please check with your Instructor or log a Service Request on SP3D Support.

This lab would give you hands-on experience on setting up the tool and on diagnosing the logs.

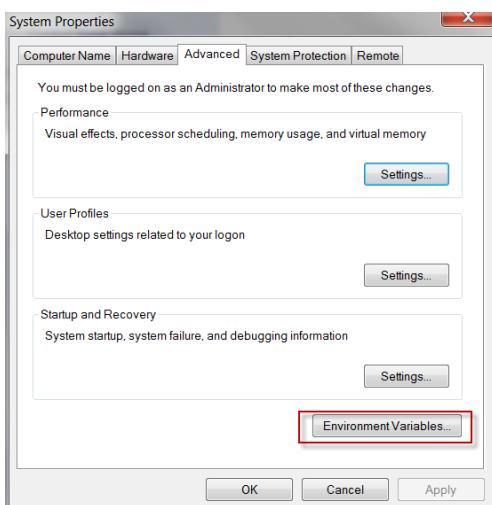
1. For this training lab, the Isometric Performance log Analyser (IsometricPerfLogAnalyser.exe) is kept at <SharedContent>\PmfgIsoStyleData\PmfgIsoStyleData\IsometricPerfLogAnalyser.exe
2. Setup an environment variable called “PERF_SCENARIO” as shown in the pictures below:
Variable value is the filename of the log file.
For e.g., If the value is “PERFIso”, log file with named as _PERFIso.plg will be created in %TEMP%
 - a) Steps in Windows 7 for setting up environment variable:
Right Click “Computer” > Properties



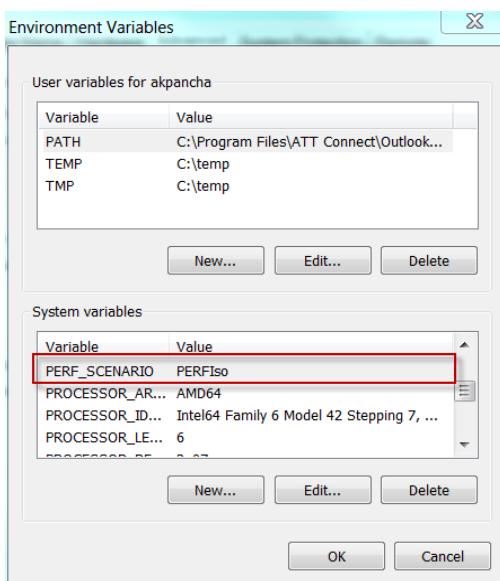
b) Select Advanced System settings



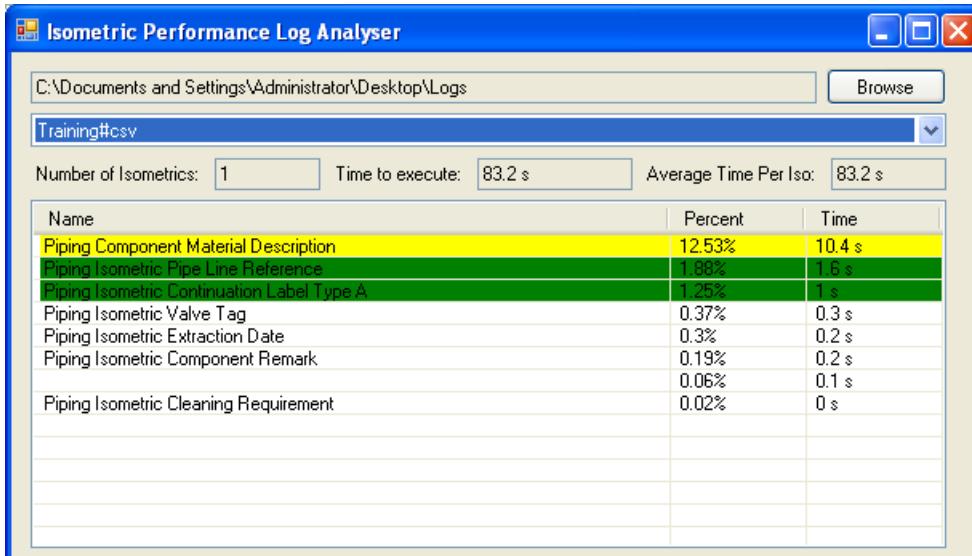
c) Under Advance Tab, Click Environment Variables



d) Create a new System Variable called "PERF_SCENARIO" and Variable value as "PERFIso"



3. Open S3D session and update one or many Isometrics that you want to analyse
4. Close S3D session.
5. You'll find the _PERFIso.plg file in %TEMP%.
6. Copy it to another folder and give it a suitable name (e.g. Training.plg).
7. Run IsoPerfLogAnalyser.exe from <SharedContent>\PmfIsoStyleData\PmfIsoStyleData\IsometricPerfLogAnalyser.exe and browse to the folder containing the *.plg file.
8. Select the log file from the drop down list and observe the captured data for Number of Isometrics, Time to execute the total number of Isometrics, Average time per Iso, Individual Label names, Percent and Time.



The colours indicate labels/filters/reports that take a significant proportion of the time.

Red > 20%

Yellow > 10%

Dark Green > 5%

Green > 1%.

9. In this Training plant, there are not any poor performing labels\filtters\reports. However it gives you a basic idea of how the tool is functioning and how it displays data about Labels\Filters\Reports names, actual time and its overall percentage.
10. Once done Analysing the tool, Disable performance logging by just removing or renaming the environment variable.

Additional Points to Rememeber:

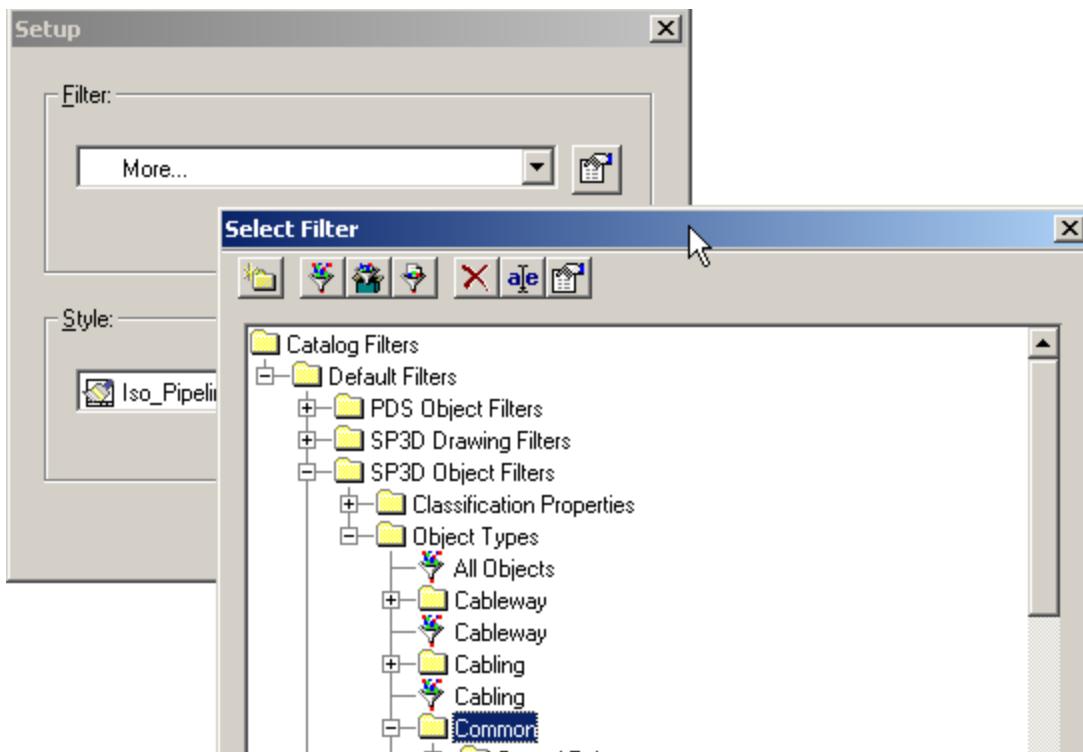
- S3D will append to _<PERF_SCENARIO>.plg every time it is run so it's best to delete it out of %TEMP% before you run S3D.
- IsoPerfLogAnalyser modifies the log files in the folder you point it at and creates ".csv" files. If the log file you copy into the folder is called, for example, "test.plg" then it will try to create "test.csv". If "test.csv" already exists then it will do nothing.
- Always close S3D before copying the log file. The log will not be completely written to disk until S3D is closed

Lab24: WBS Isometrics

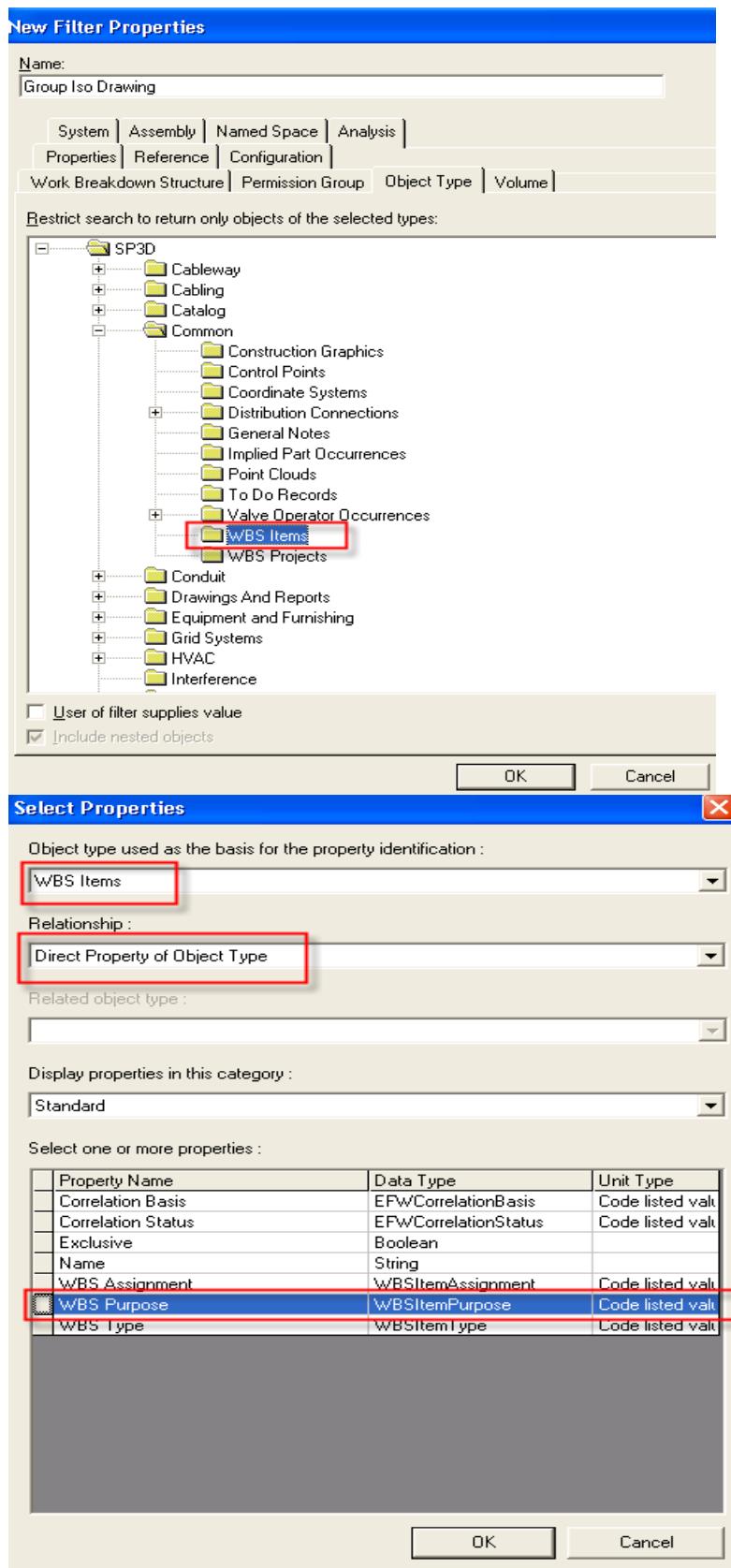
Single sheet isometrics can be extracted using the work breakdown structure. For this a style is already supplied, but a package needs to be created.

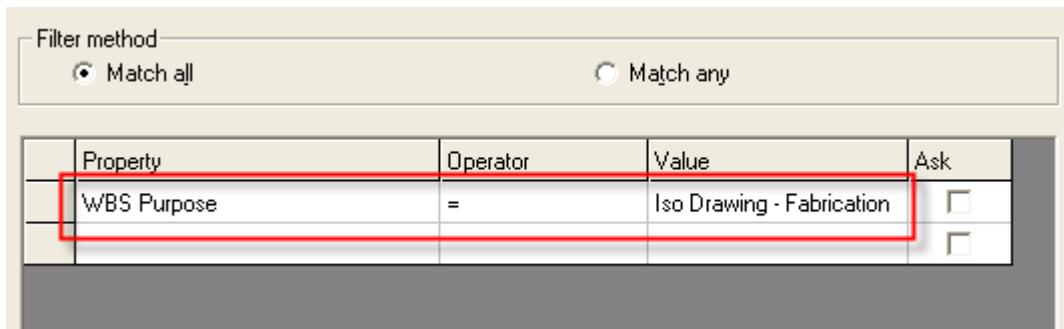
Creating a WBS package

1. Switch to Drawings and Reports task.
2. Add a new folder under the root of the plant called 'Packages'. (This folder was created in Lab5)
3. Right-click on Packages folder and add a new Piping Isometric Drawings by Query component. Rename the component 'Iso WBS'
4. Setup... Iso WBS and in the filter field select More...
5. Expand the tree till the 'Common' folder as shown in the picture

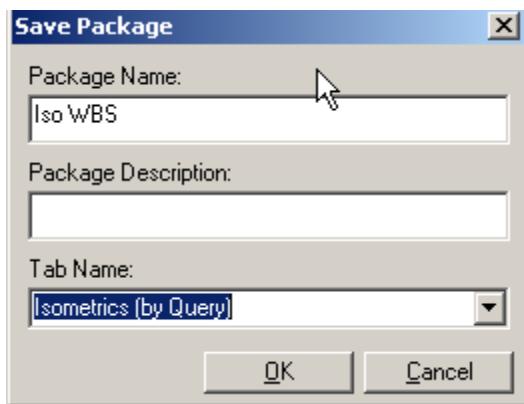


6. Create a new filter named 'Group Iso Drawing' that select WBS items of the Type 'Iso Drawings Fabrication' by selecting the following
Object Type: (Common – WBS Items)
Properties: (Common – WBS Items) – Direct Property of Object Type – (WBS Purpose) = Iso Drawing Fabrication





7. Select the filter to use it in the package
8. In the style field, select the style 'Iso_WBS'
9. Save Package as 'Iso WBS'



Creating Isometric Drawings by Manually Assigning Objects

Create isometric drawings for the pipeline **403-P** in Unit **U04** of your workspace by manually assigning piping parts to the created WBS items. After creating the isometric drawing for the created WBS items the view will resemble Figure 1.

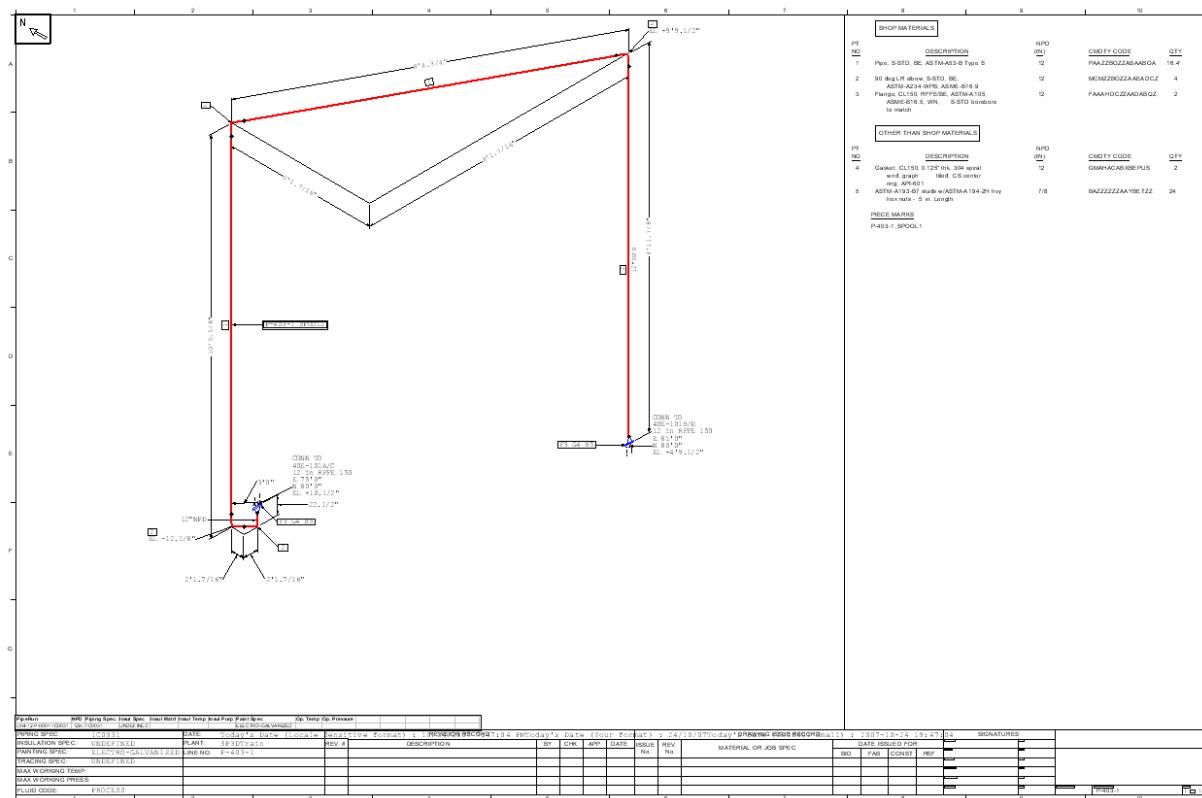


Figure 1: Output: Isometric Drawing for the WBS Group of Pipeline 403-P

Before beginning the procedure for creating isometric drawing, claim all the piping objects of a pipeline **403-P** of Unit **U04** to an active project **PJ-99** for assigning piping objects to active project. Then manually create a WBS item under the active project and assign all the piping objects to the created WBS item.

Steps:

Before beginning the procedure:

1. Define your workspace to display Unit **U04**, coordinate system **U04 CS**, and **Projects** in the **WBS** hierarchy. In your training plant, select **U04 and WBS Items** compound filter from **Plant Filters > Training Filters** in the **Select Filter** dialog box.
2. Make sure you are in the **Piping** task and the Active Permission Group is set to **Piping**.

Manually Assigning Piping Objects to an Active Project:

1. Select the **All** option in the **Locate Filter** drop-down list.
2. In the **Workspace Explorer** window, expand the hierarchy **A2 > U04 > Process**.
3. Right-click the pipeline system **403-P** and click the **Select Nested** command in the menu, to select all the piping objects in the graphic view.
4. Select the **More...** option in the **Active Project** drop-down list on the toolbar to specify the active project.
5. The **Active Project** dialog box appears. Select the **Database** option to see all the WBS projects in the dialog box and then select **PJ-99**, to specify **PJ-99** as an active project.
6. Click **OK** on the **Active Project** dialog box. The selected active project should display.
7. Select the **Project > Claim** command, to associate the selected piping objects with the active project **PJ-99**.
8. After the claim process is complete, SP3D displays the **Claim** dialog box. Click **Close** to close the dialog box.

Manually Assigning Piping Objects to WBS item:

1. In the Workspace Explorer, select the WBS tab and expand **PJ-99 > Iso Fabrication**.
2. Right-click the Iso Fabrication system in the Workspace Explorer and select the **Create WBS Item** command from the menu, to create a new WBS item in the system Iso Fabrication.
3. Select the property specifications, and click **OK**.
 - WBS Type: Group
 - WBS Purpose: Iso Drawing – Fabrication
 - Exclusive: True
 - WBS Assignment: System
 - Name PJ-99-01
 - NameRule: User Defined
 - Correlation Basis: Correlate object
4. In the Workspace Explorer window, select the System tab to expand **A2 > U04 > Process** and select the pipeline system **403-P**. This will select the pipeline **403-P** in the graphic view.
5. Select the **Project > Assign to WBS...** command. This command creates a relationship between all the components of the selected pipeline system and a selected WBS item.
6. The **Assign to WBS** dialog box appears. In the **Assign to WBS** dialog box, expand **PJ-99>Iso Fabrication** and select the WBS item **PJ-99-01** to which the piping objects need to be assigned. Then, click **OK**.
7. Select the WBS tab in the Workspace Explorer. Expand **PJ-99 > Iso Fabrication**. Right-click **PJ-99-01** and click the **Select Nested** command in the menu. The highlighted objects in the graphic view are assigned to the **PJ-99-01** WBS item.
8. Creating Isometric Drawing from WBS item:

9. Switch to the Drawings and Reports task from the Tasks > Drawings and Reports command to create isometric drawings for the created WBS items.
10. In the Management Console, expand the drawing hierarchy to Unit 01 > Isometrics > Iso WBS Isometrics. Right click the Iso WBS Isometric component and select Set up. In the package select 'Iso WBS' and in Filter select "PJ-99(WBS)" located under Plant Filters>Training Filters. Hit OK. Again Right click the Iso WBS Isometric component and Run Query option.
11. Now right-click the Iso WBS Package under Iso WBS Isometrics > PJ-99 > Iso Fabrication and click the Create Drawing(s) option to create the isometric drawing documents.
12. Right-click the Iso WBS Package isometric drawing type and click the Update Now option to update the drawings for the WBS group.

After the update process is complete, double-click the isometric drawings created for the WBS item.

Creating Isometric Drawings by Automatically Assigning Objects

Create isometric drawings for the pipe parts belonging to the pipeline **1001-P** in Unit **U01** of your workspace by automatically assigning piping parts to the created WBS items. After creating the isometric drawing for the created WBS items the view will resemble Figures 2 and 3.

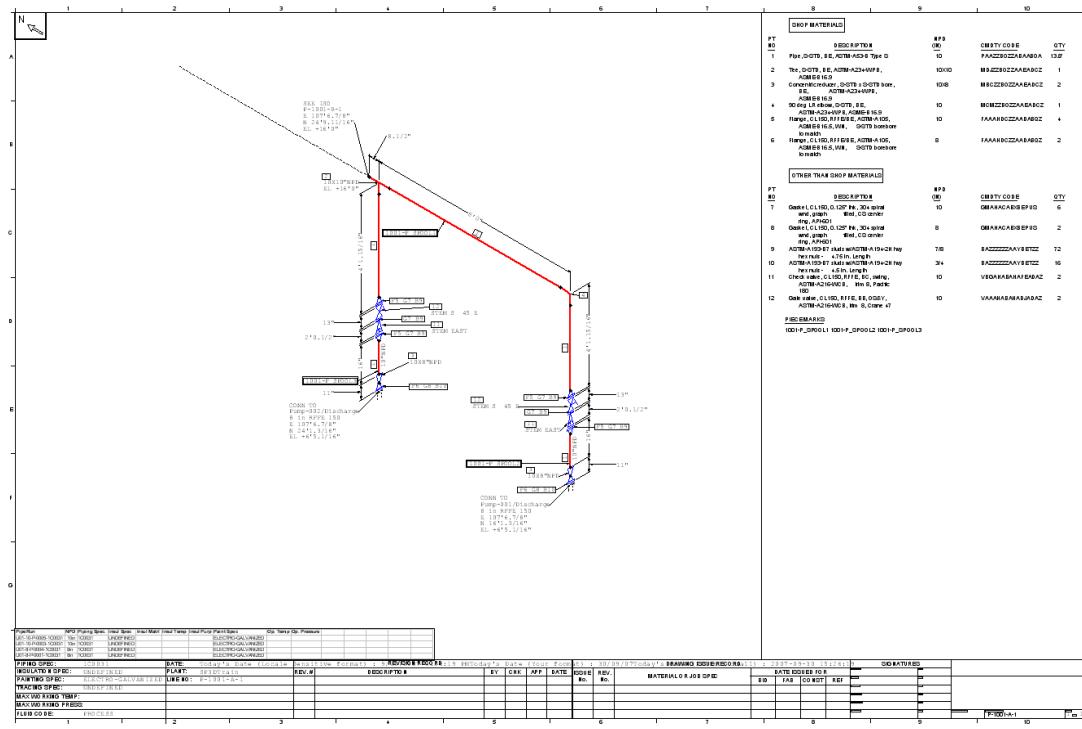


Figure 2: Output: Isometric Drawing for the First WBS Group

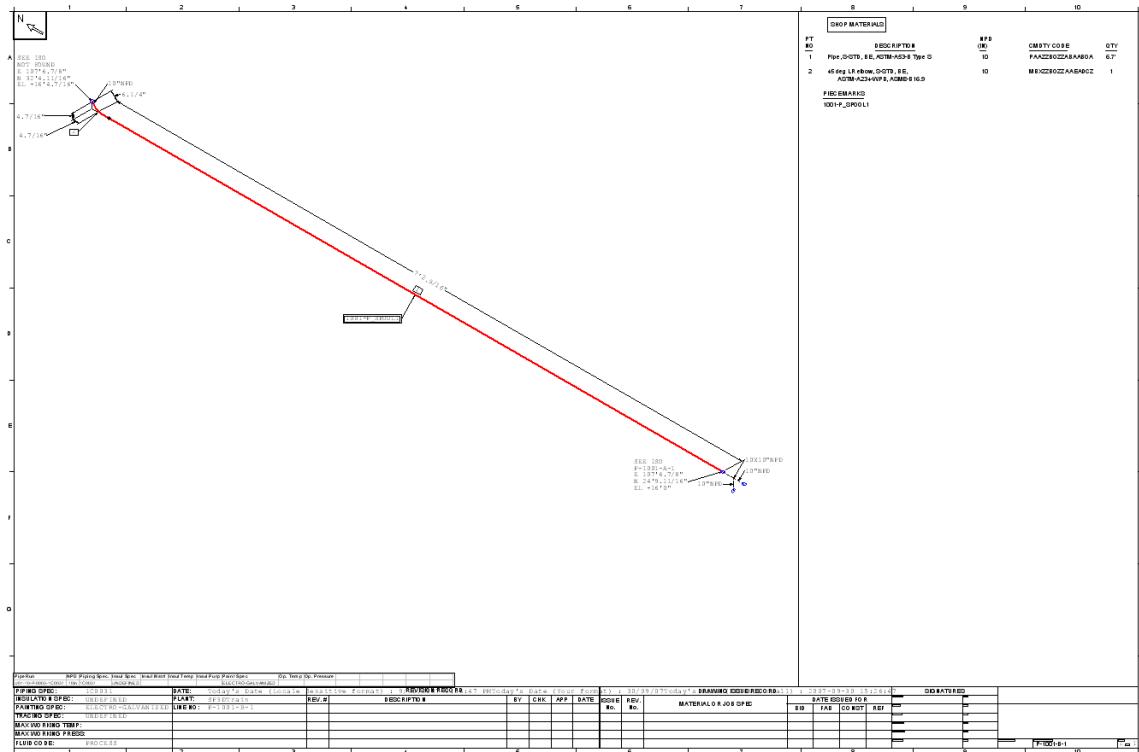


Figure 3: Output: Isometric Drawing for the Second WBS Group

Before beginning the procedure for creating isometric drawing, you will first claim and manually assign piping objects to an active project. You claim all the objects to a WBS project before you run the **Group Pipe Parts** command on the objects to automatically assign them to create WBS item.

Steps:

Before beginning the procedure:

1. Define your workspace to display Unit U01, coordinate system U01 CS, and Projects in the WBS hierarchy. In your training plant, select U01 and WBS Items compound filter from Plant Filters > Training Filters in the Select Filter dialog box.
2. Make sure you are in the Piping task and the Active Permission Group is set to Piping.

Manually Assigning Piping Objects to Active Project:

Assign all the piping objects of pipeline 1001-P to an active project PJ-99 in Unit U01 of your workspace.

1. In the Piping task, select the **Piping Parts** option in the **Locate Filter** drop-down list on the **Common** toolbar to select only the piping parts in the graphic view.
2. Use the **Inside fence** option on the **Common** toolbar to select all piping parts belonging to the pipeline **1001-P** and select the piping parts.
3. To specify the **Active Project**, select the **More...** option in the **Active Project** drop-down list on the main toolbar.

4. The **Active Project** dialog box appears. Select the **Database** option to see all the WBS projects in the dialog box. And then select **PJ-99** to specify **PJ-99** as an active project.
5. Click **OK** in the **Active Project** dialog box. The selected active project should appear, on the main toolbar.
6. Select the **Project > Claim** command to associate the selected piping objects with the active project **PJ-99**.
7. After the claim process is complete, SP3D displays the **Claim** dialog box. Click **Close** to close the dialog box.

Automatically Assigning Piping Objects to the Created WBS Items:

Group the piping parts into discrete sets by using their properties in a label definition query. In this case, the discrete sets are the WBS items. Use the following specifications for the query upon which the grouping of objects will be based:

Isometric Sheet Number: Pipe Part attribute

1. Select the piping parts of the pipeline **1001-P**, as shown in Figure 4, to assign them to isometric sheet number **A**.

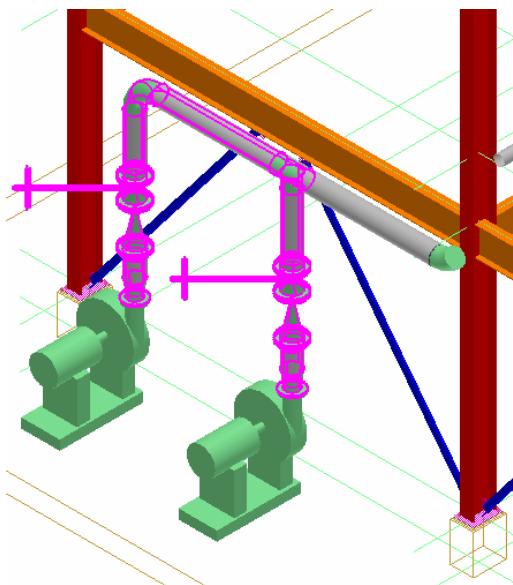


Figure 4: Piping Parts of Pipeline 1001-P

2. Right-click the selected parts and open the properties dialog box to assign the selected piping parts to an isometric sheet number **A** for creating an isometric drawing. Key in **A** in the **Isometric Sheet Number** box in the **Selection Properties** dialog box, and click **OK**.
3. Now select the remaining pipe parts belonging to **1001-P**, as shown in Figure 5.

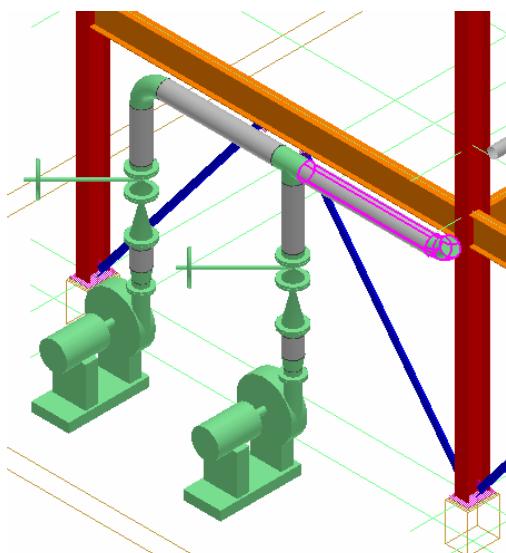


Figure 5: Remaining Selected Part of Pipeline 1001-P

4. Right-click the selected pipe parts and open the **Selection Properties** dialog box to assign them to another isometric sheet number **B** for creating an isometric drawing. Key in **B** in the **Isometric Sheet Number** box in the **Selection Properties** dialog box, and click **OK**.
5. Now to assign these pipe parts to the appropriate WBS items, select the **Group Pipe Parts** button on the vertical toolbar.
6. The **Automated WBS Creation** dialog box appears. Set the following specifications in this dialog box, and click **OK**:
 - WBS Automated Creation Rule Name: WBS Iso- Fabrication
 - Name Rule: Label Name Rule
 - Query Label: WBS Iso Grouping Query- Fabrication
 - Discrimination Filter: U01
 - WBS Item's Parent: Iso Fabrication
 - Maximum Number Of Objects: 100
 - Pull In Associated Items: Connection and Reportable
 - Maintain Existing WBS Items?: True
7. SP3D prompts you to view the log file once the process is complete. Click **No** to close the log dialog box and click **Cancel** on the **Automated WBS Creation** dialog box. Two WBS items are created in the WBS hierarchy. Select the **WBS** tab in the **Workspace Explorer** to view the WBS item **Iso Fabrication**.
8. Set the **Locate Filter** to **ALL**. Right-click the WBS item **P-1001-A-1** in the **Workspace Explorer** and select the **Select Nested** option to highlight all the pipe parts that belong to **P-1001-A-1** WBS item.

Creating Isometric Drawing from WBS items:

1. Switch to the **Drawings and Reports** from **Tasks > Drawings and Reports** to create isometric drawings for the created WBS items.

2. In the **Management Console**, expand the drawing hierarchy to **Unit 01 > Isometrics > Iso WBS Isometrics**. SP3D displays a message box. Click **OK** to continue.
3. Right-click the **Iso WBS Isometrics** component in the **Management Console** and select the **Run Query** option. SP3D uses the query defined in the **Iso WBS Isometrics** component to find the WBS items with **Iso fabrication** in the model and displays the result of the search in the drawing hierarchy.
4. Now right-click the **Iso WBS Package** option in the hierarchy and click the **Create Drawing(s)** option to create the isometric drawing documents.
5. Right-click the **Iso WBS Package** isometric drawing type and click the **Update Now** option to update the drawings for both the WBS groups.
6. After the updation process is complete, double-click the isometric drawings created for the WBS items one by one. A pictorial representation of both isometrics will be displayed.

Updating Isometric Drawings:

Place a **45 deg elbow** and route a **5 ft** pipe from the free end of the pipeline **1001-P**. After updating the pipeline, update the WBS item and then update the isometric drawing of the pipeline **1001-P**. After updating the drawing, the view of the drawings will resemble Figures 7 and 8.

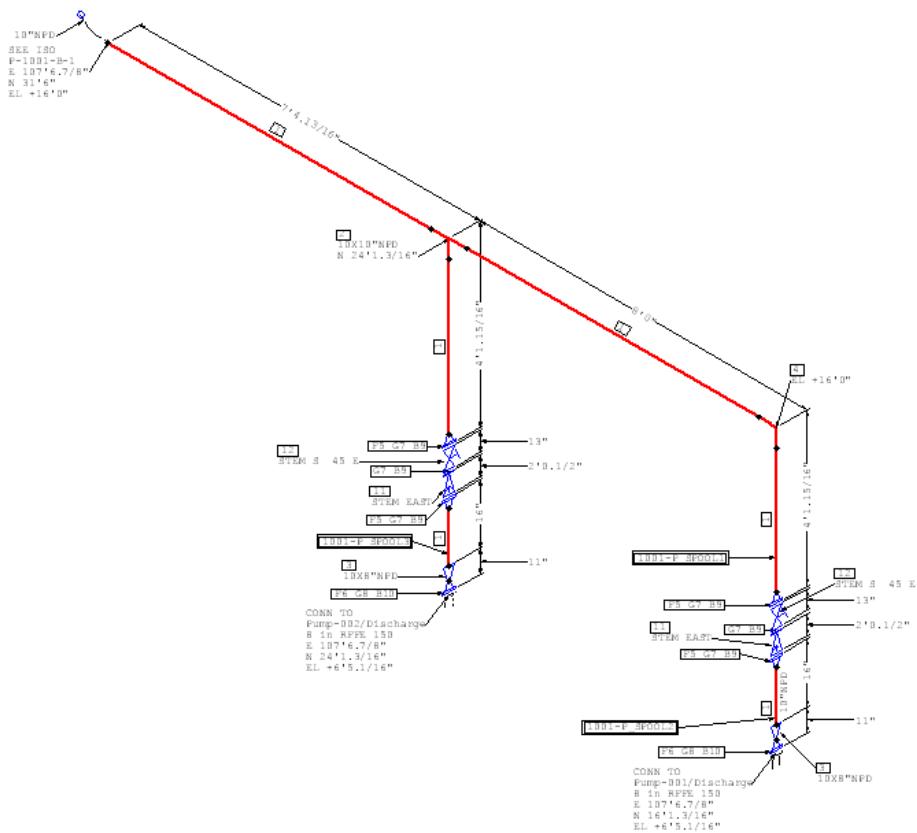


Figure 7: Output: Isometric Drawing from WBS P-1001-A-1

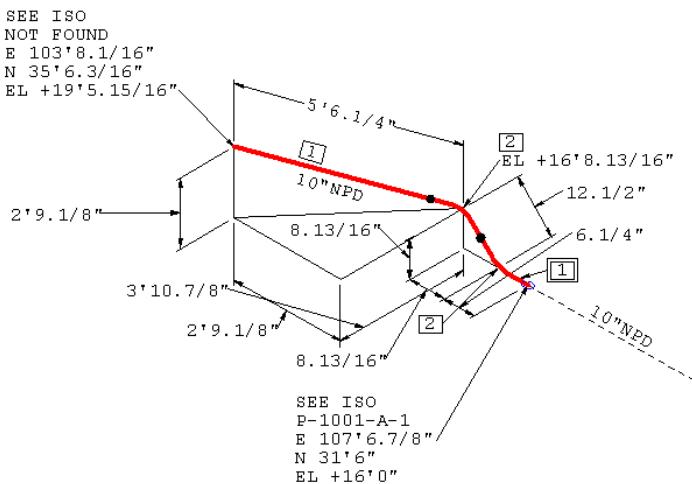


Figure 8: Output: Isometric Drawing from WBS P-1001-B-1

Steps:

1. Switch to the **Piping** task from the **Tools > Piping** command to be able to work in the piping environment.
2. Insert a **45 deg elbow** and route a **5 ft** pipe from the free end of the pipeline **1001-P** in Unit **U01** of your workspace by using the **Insert Component** and **Route Pipe** command. After inserting the elbow and routing the pipe the view of the model should resemble Figure 9.

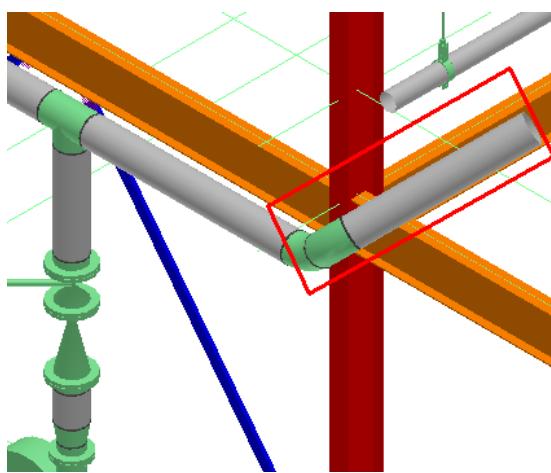


Figure 9: Placed Elbow and Routed Pipe

3. Make sure the **Locate Filter** is set to **Piping Parts**. Now select the 45 deg elbow and pipe you have placed, as shown in Figure 10.

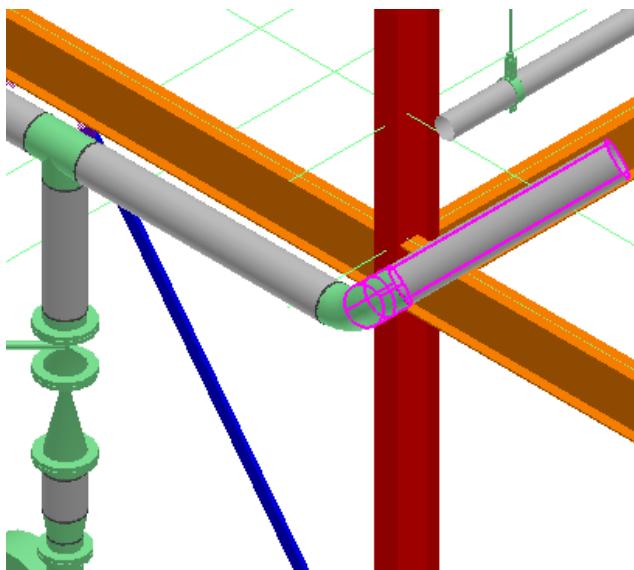


Figure 10: Selected Pipe Parts

4. Right-click the selected pipe parts and open the **Selection Properties** dialog box to assign the pipe parts to the isometric sheet number **B** for creating an isometric drawing. Type **B** in the **Isometric Sheet Number** field in the **Selection Properties** dialog box and click **OK**.
5. Select the pipe, as shown in Figure 11.

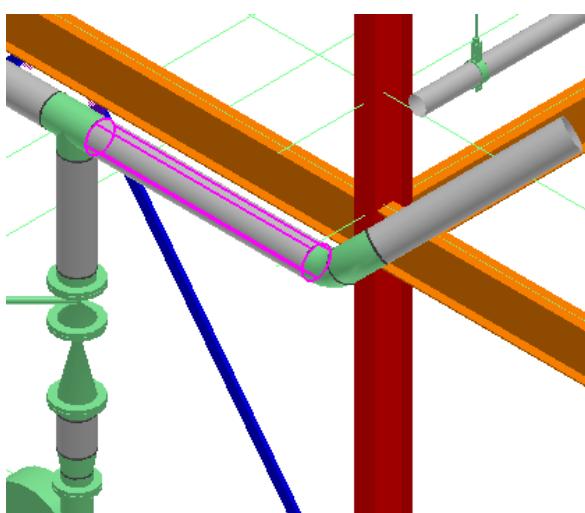


Figure 11: Selected Pipe

6. Right-click the selected pipe and open the properties dialog box re-assign it to isometric sheet number **A** for creating an isometric drawing. Type **A** in the **Isometric Sheet Number** box in the **Selection Properties** dialog box, and click **OK**.
7. Now to assign these pipe parts to the appropriate WBS items, click the **Group Pipe Parts** button on the vertical toolbar.

8. The **Automated WBS Creation** dialog box appears. Set the following specifications in this dialog box and click **OK**:
 - WBS Automated Creation Rule Name: WBS Iso- Fabrication
 - Name Rule: Label Name Rule
 - Query Label: WBS Iso Grouping Query- Fabrication
 - Discrimination Filter: U01
 - WBS Item's Parent: Iso Fabrication
 - Maximum Number Of Objects: 100
 - Pull In Associated Items: Connection and Reportable
 - Maintain Existing WBS Items?: False
9. SP3D prompts you to view the log file once the process is complete. Click **No** to close the log dialog box and click **Cancel** on the **Automated WBS Creation** dialog box.
10. Switch to the **Drawings and Reports** task to update the isometric drawings for the created WBS items.
11. In the **Management Console**, expand the drawing hierarchy to **Unit 01 > Isometrics > Iso WBS Isometrics > PJ-99 > Iso Fabrication > Iso WBS Package**.
12. Right-click the **Iso WBS Package** isometric drawing type and click the **Update Now** option to update the isometric drawings.
13. After the updation is complete, double-click the isometric drawings created for the WBS items one by one.

Changing the Status of WBS Items:

Change the status of the WBS item PJ-99-01 to Approved. Then, you will place a temperature indicator TI-504 on the pipeline 403-P and assign all the piping objects of the pipeline 403-P to the WBS item PJ-99-01. This will show that the temperature indicator, placed after changing the status of the WBS item to Approved, cannot be assigned to the WBS item.

Before beginning the procedure:

- Switch to the **Piping** task from the **Tools > Piping** command.
- Define your workspace to display **Unit U04**, coordinate system **U04 CS**, and **Projects** in the **WBS** hierarchy. In your training plant, select **U04 and WBS Items** compound filter from **Plant Filters > Training Filters** in the **Select Filter** dialog box.

Steps:

1. In the **Workspace Explorer**, select the **WBS** tab.
2. Right-click the WBS item **PJ-99-01** under PJ-99 folder and select the **Properties** option from the menu to change the properties of the WBS item **PJ-99-01**.
3. The **WBS Item Properties** dialog box appears. On the **Configuration** tab, select the **Approved** option in the **Status** drop-down list and click **OK**.
4. Now place a temperature indicator **TI-1504** on the pipeline **403-P**. Place a 1 -1/2 " socket and a nipple first.

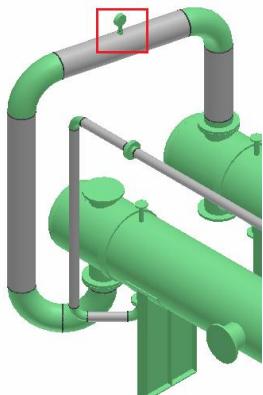


Figure 12: Placed Temperature Indicator

5. In the **Workspace Explorer** window, select the **WBS** tab.
6. In the **Workspace Explorer** window, select the **System** tab. Expand **A2 > U04 > Process** and select the pipeline system **403-P**. The pipeline **403-P** will be highlighted in the graphic view.
7. Now select the **Project > Assign to WBS...** command. The **Assign to WBS** dialog box appears.
8. In the **Assign to WBS** dialog box expand **PJ-99** folder and select **PJ-99-01**. Then click **OK**. A message is displayed stating that the object you are trying to assign is in non-working status. This message indicates that you cannot assign piping parts to a WBS item in non-working status.
9. Select the **Piping Parts** option in the **Locate Filter** drop-down list and select the temperature indicator **TI-1504** in the graphic view.
10. Right-click the temperature indicator **TI-1504** and open the **Pipe Instrument Properties** dialog box.
11. The **WBS Item** record is not shown on the **Relationships** tab on the **Pipe Instrument Properties** dialog box.

