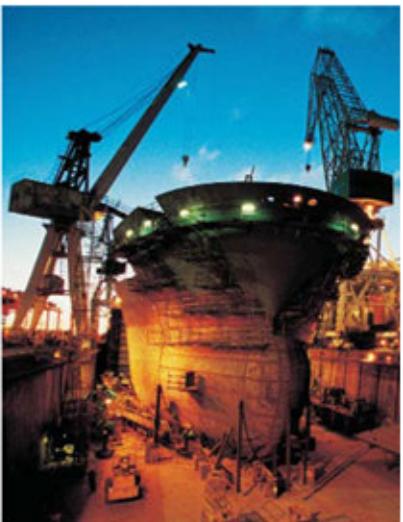
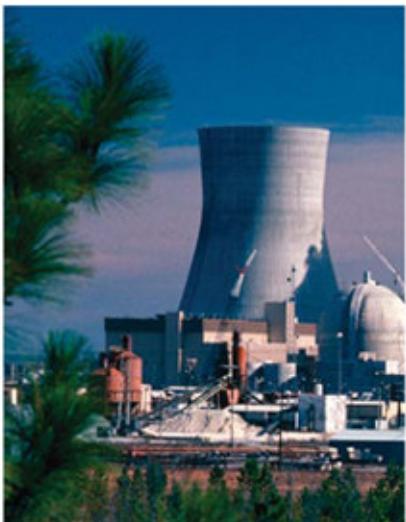


SmartPlant 3D

Isometrics Practice Labs

Process, Power & Marine



INTERGRAPH

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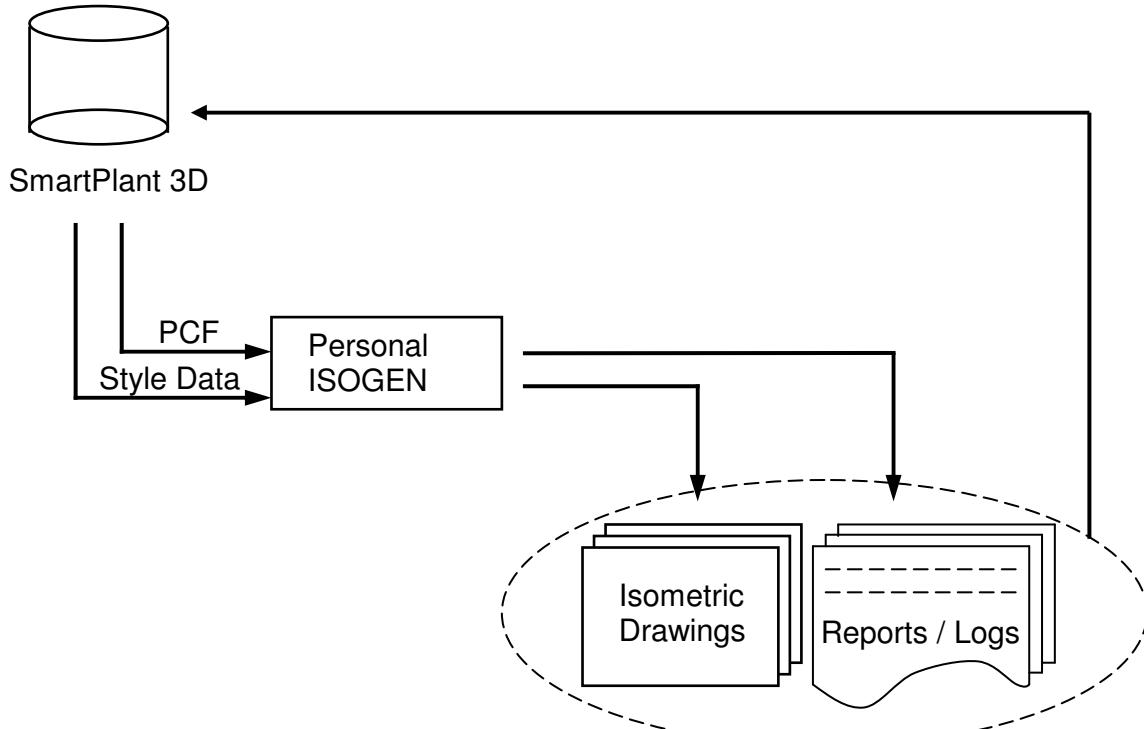
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Introduction

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:

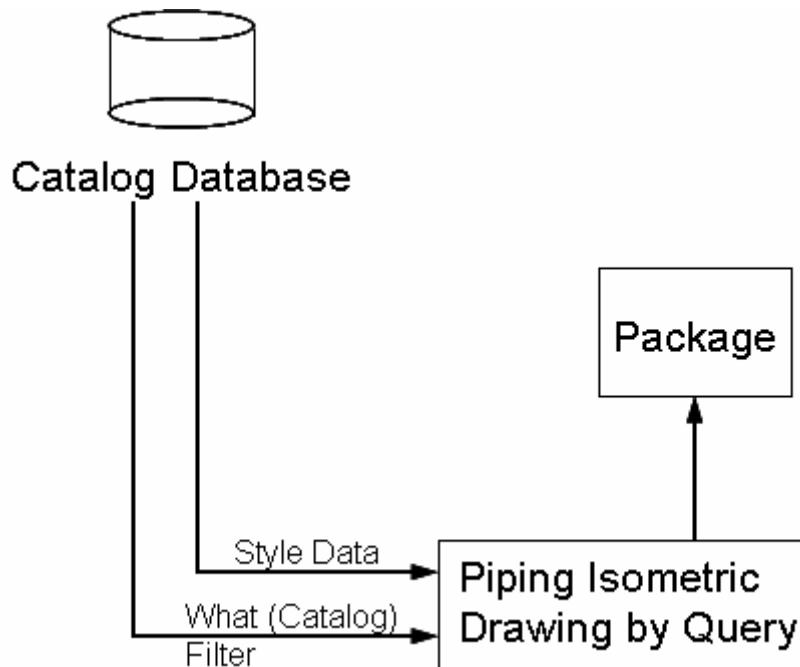
- The Administration Workflow
- The User Workflow

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.



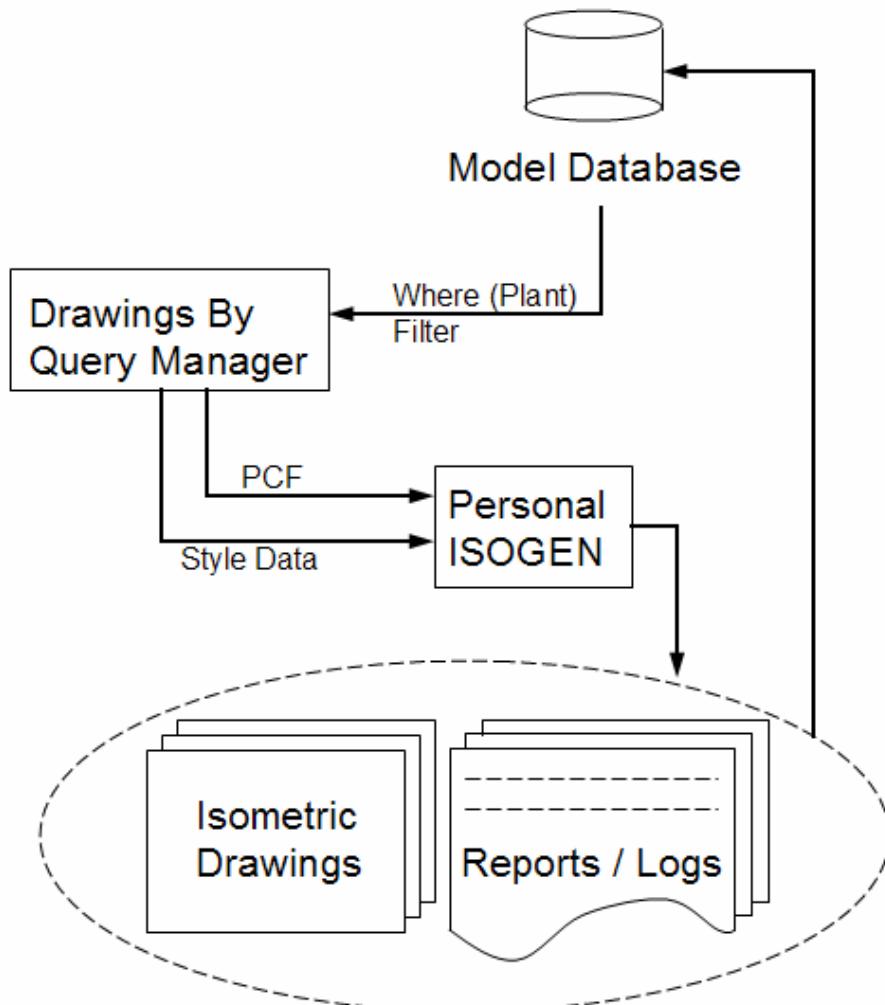
User Workflow:

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

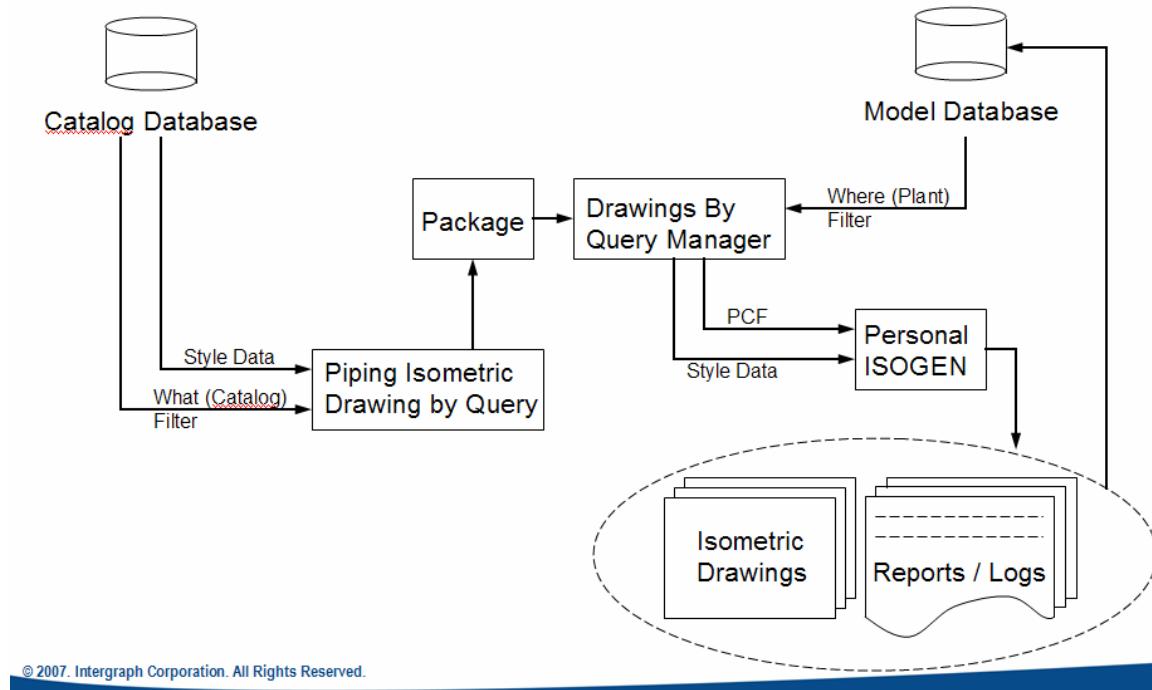
The 'Drawings by Query Manager' component references a **Package** that specifies what items will be extracted and which isometric style will be used.

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:



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**.

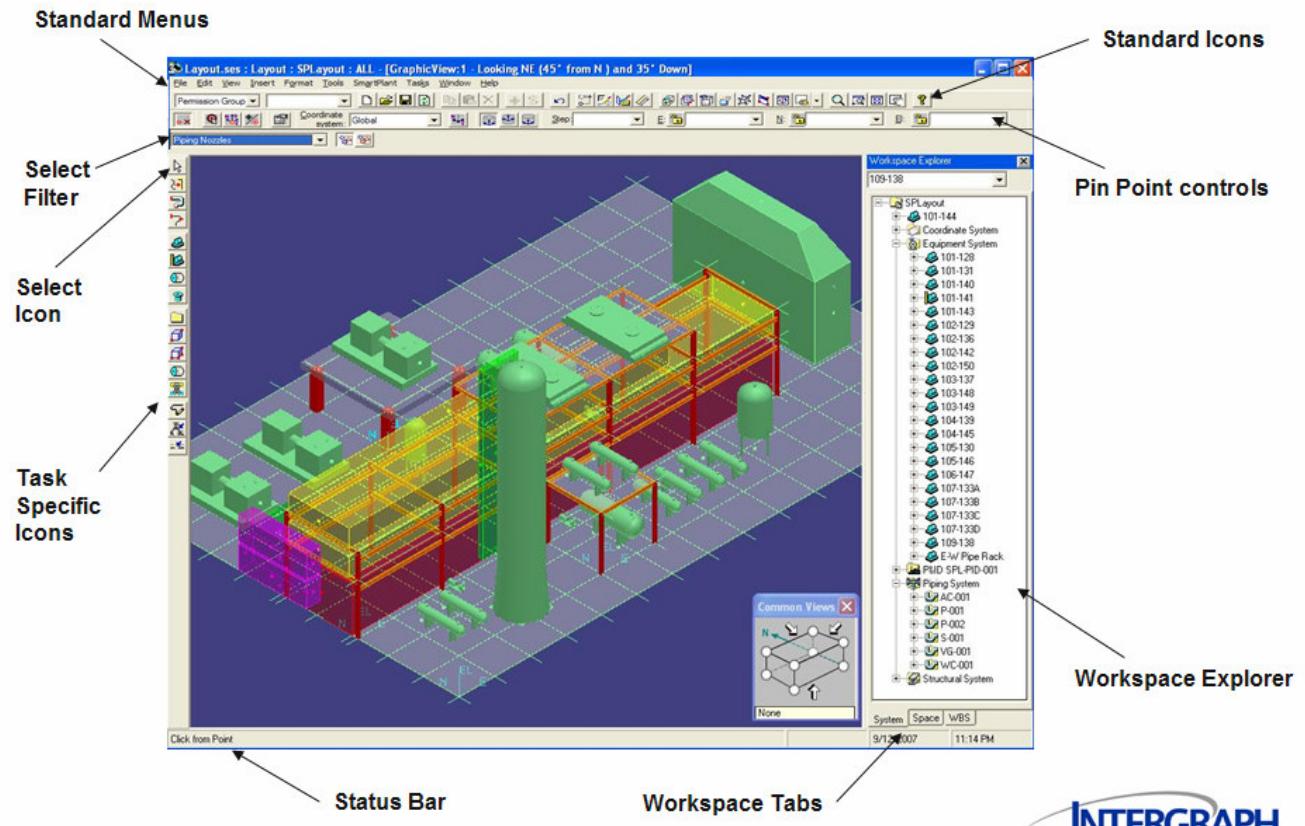
You can open the **Isometric Style Options Browser** from any of the isometric drawing styles by right-clicking the drawing style in the **Console** or in the **Drawings and Reports** task and selecting **Edit Options** on the shortcut menu. The browser allows you to set options for isometric drawing 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).

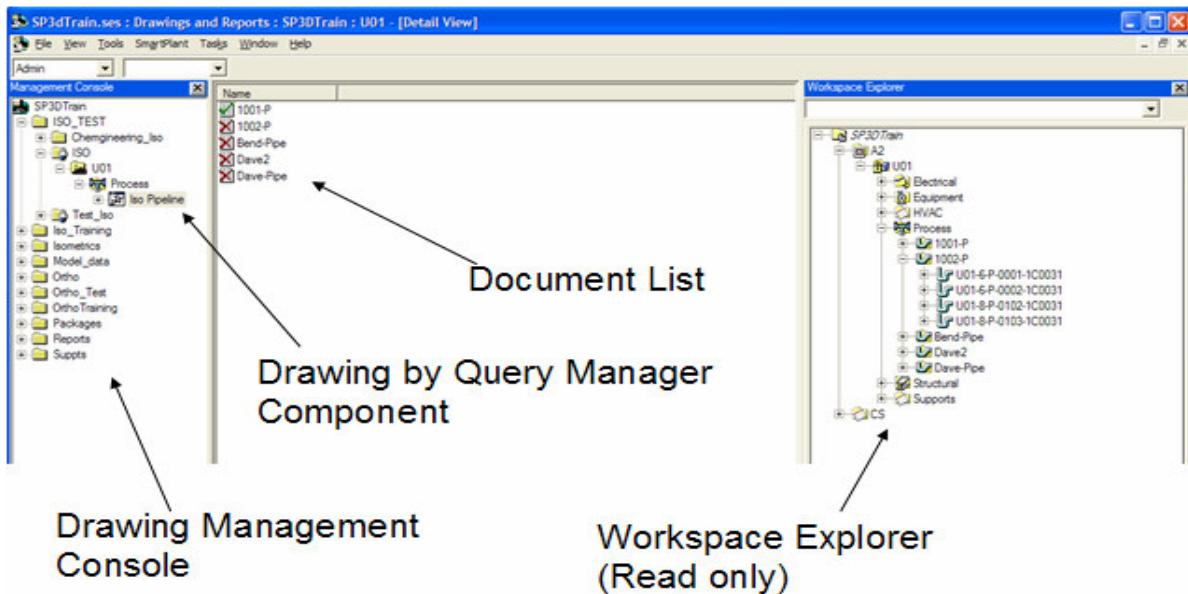
To troubleshoot the drawings, you can use the **View Extraction Data** command to access part and reports information and log files.

SmartPlant 3D User Interface:

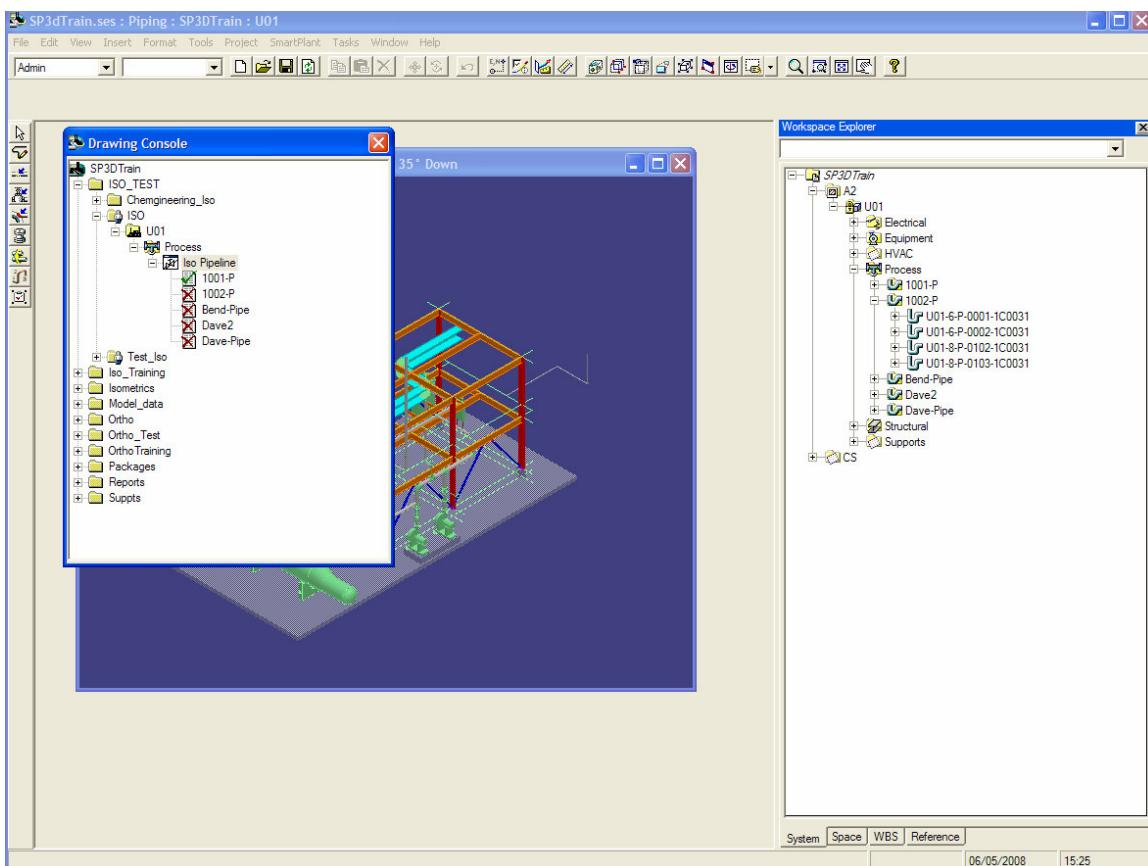
The main user interface when in the SmartPlant 3D is shown below, use these diagrams to located buttons and features mentioned in the labs.



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 Service Pack 4 or 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

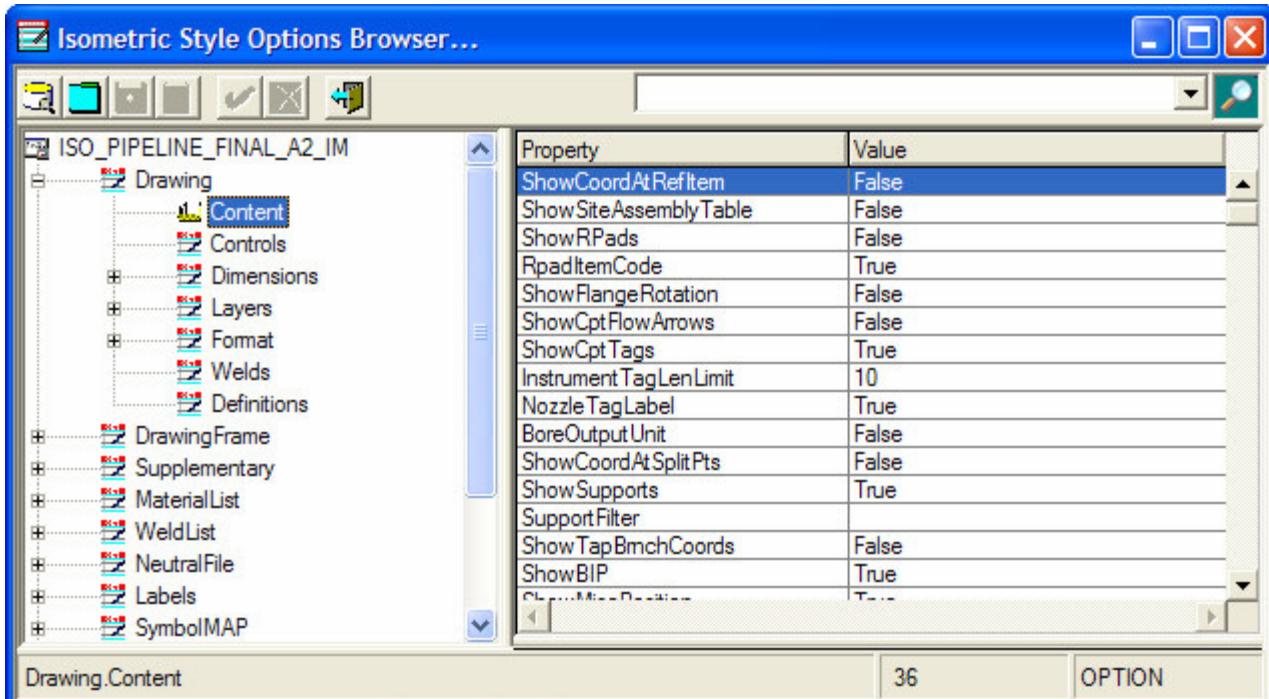


Document with Warning



No Part found in Pipeline

During these labs, you will be using the 'Isometric Options Browser' dialogue as shown below:



This dialogue is accessed through via the 'Edit Options' menu item which can be found on the right mouse menu when the 'Isometric Drawings by Query Manager' component is selected.

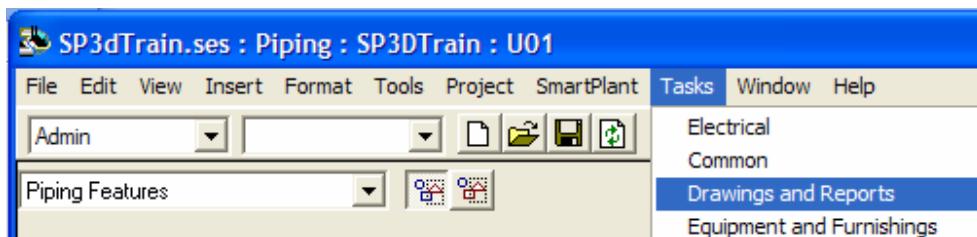
Lab 1: Out of the Box Isometric drawings extraction

Extracting Isometric Drawings using Drawings by Query Manager

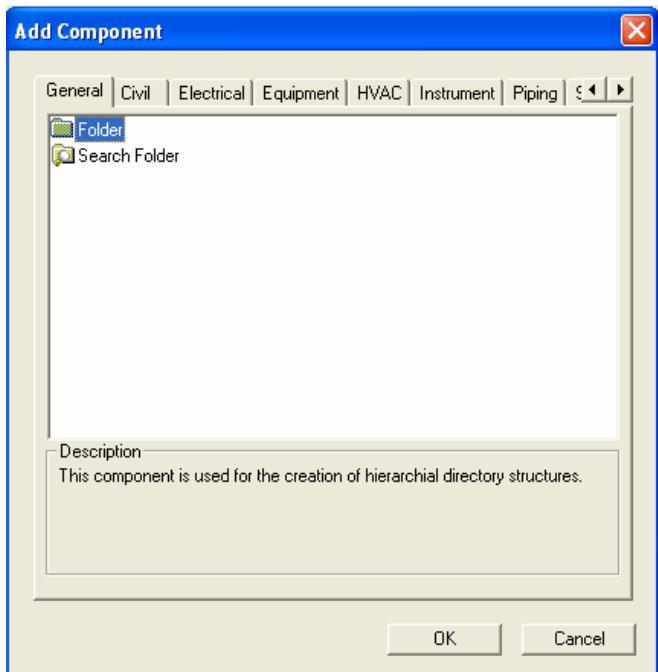
- 1) In Lab 1, you are going to generate an isometric using the 'out of the box' Iso_Pipeline style:
- 2) Enter SmartPlant 3D by double clicking the Isometric_Workshop.ses shortcut on the Desktop:



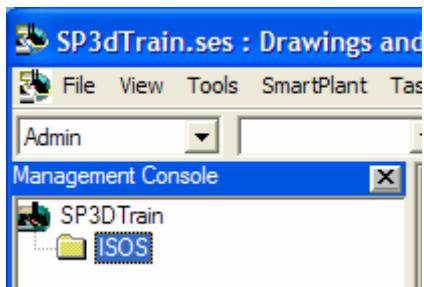
- 3) Switch to the **Drawings and Reports** task by selecting the Task -> Drawing and Reports menu item:



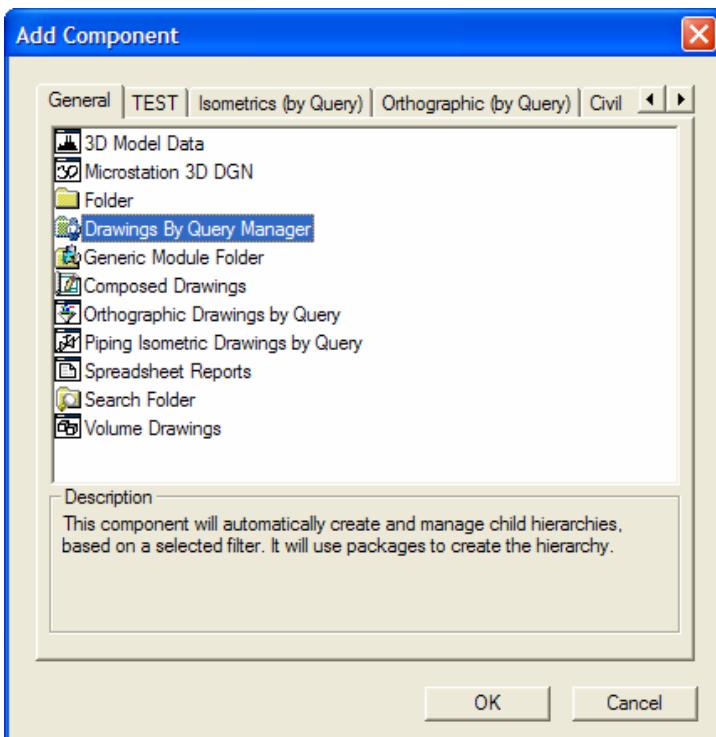
- 4) Right click on plant **SP3DTrain**, select **New..** to create a Folder, the folder is found on the General Tab:



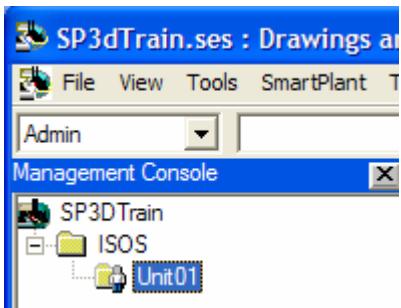
- 5) Rename the new folder to: **ISOS**



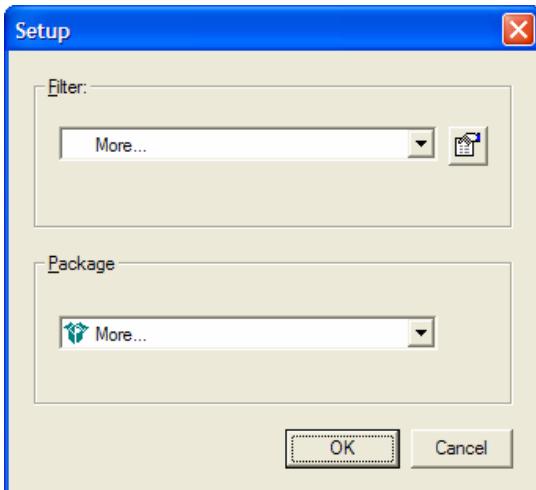
- 6) Right click on ISOS, select New.. to create a Drawing By Query Manager from the General tab



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

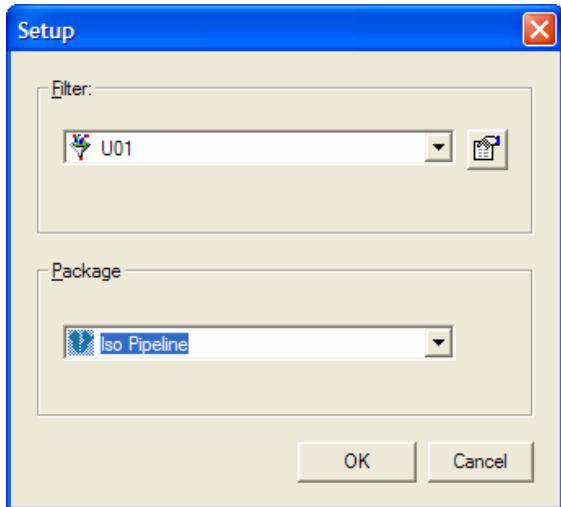


8) Right click Unit01 and select Setup..



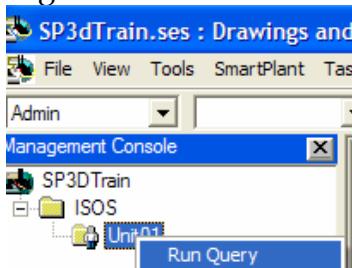
9) Under Filter select More.. and pick Training Filters>U01

10) Under Packages Select More.. and pick **Iso Pipeline**

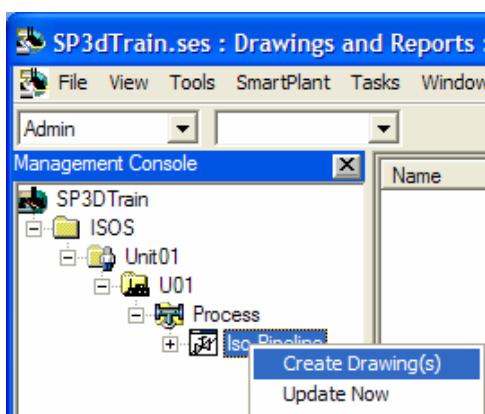


11) Click OK

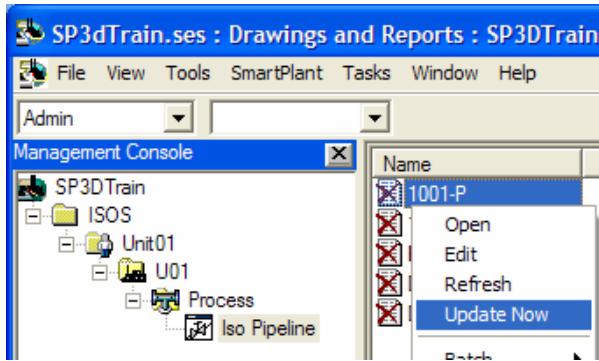
12) Right click Unit01 and select Run Query



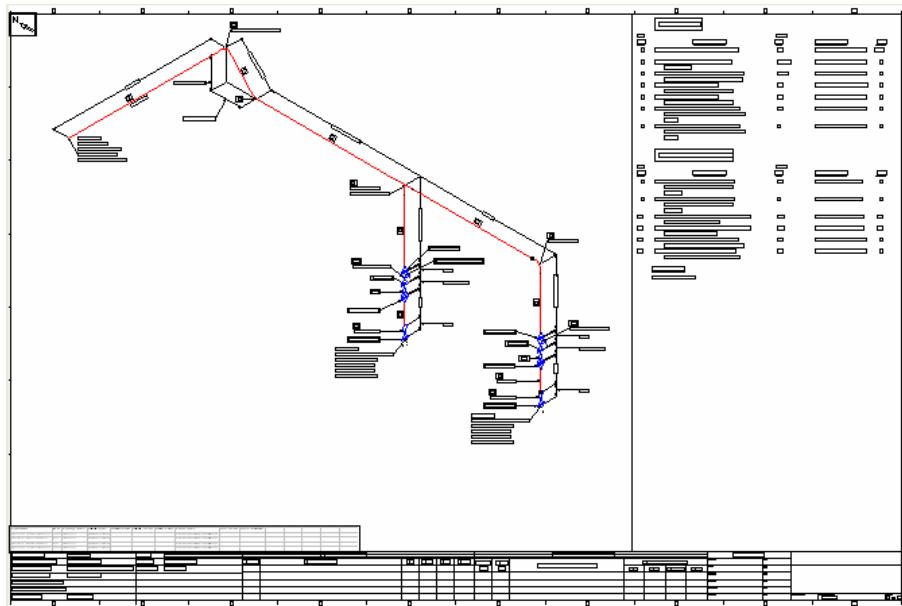
13) Expand the tree structure created and right click Iso Pipeline to launch Create Drawings:



14) Right click iso 1001-P and select **Update Now**

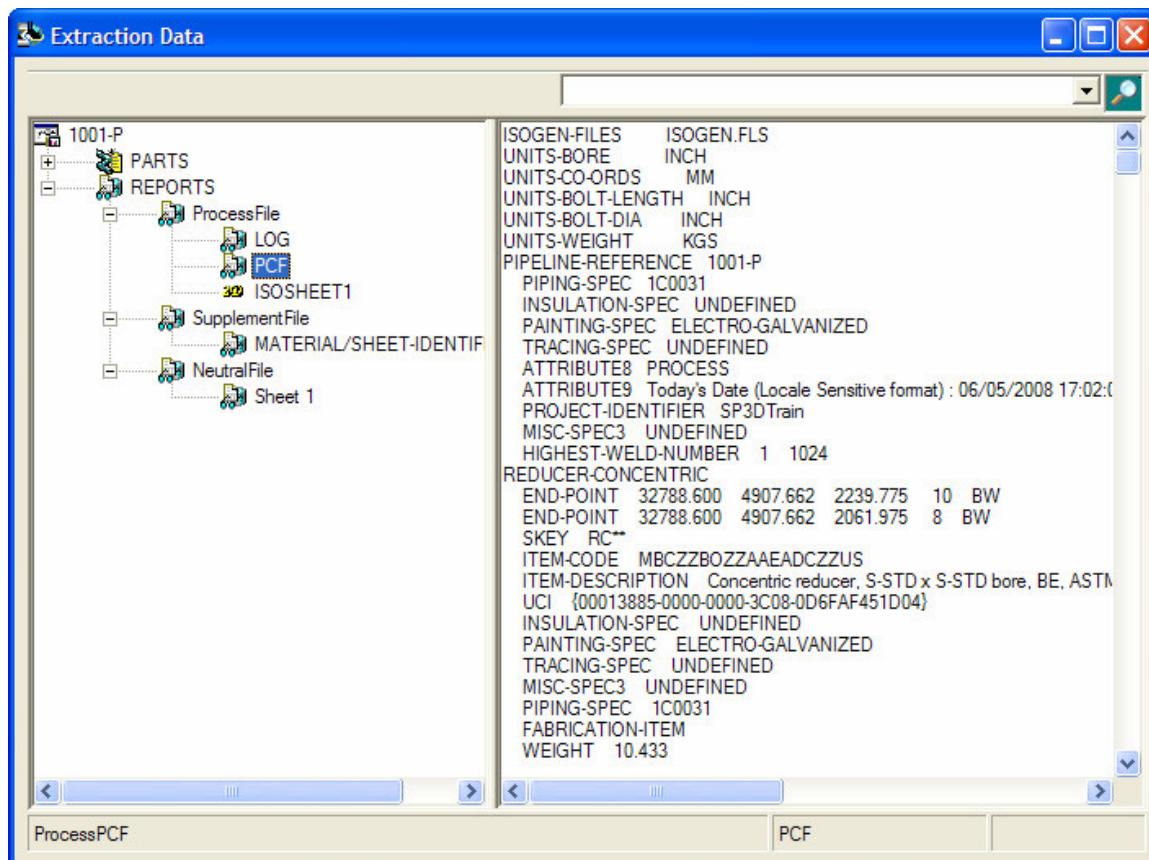


15) Once the green tick appears, double click drawing 1001-P to review the content



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

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

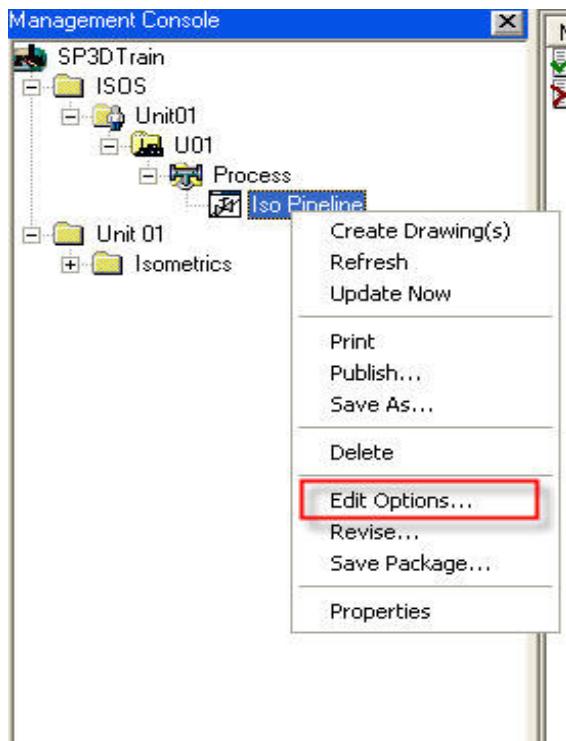


This completes Lab 1.

Lab 2: Overview of Options Browser

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

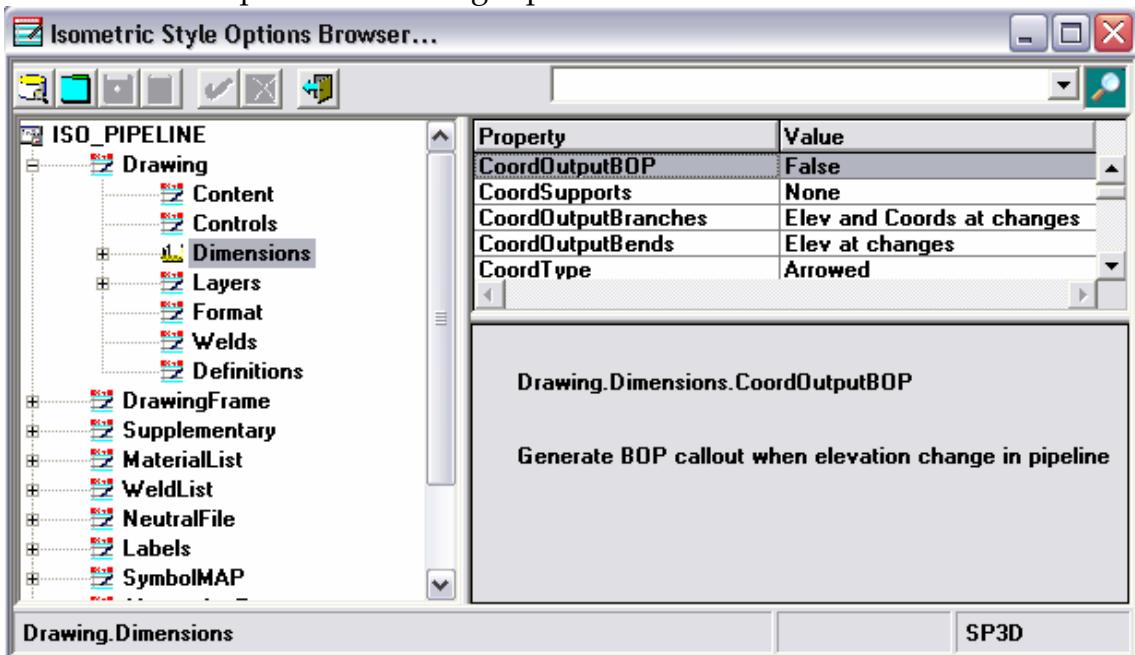
- 1) Expand the Iso Pipeline Isometric branch, select Iso Pipeline and Edit Options.



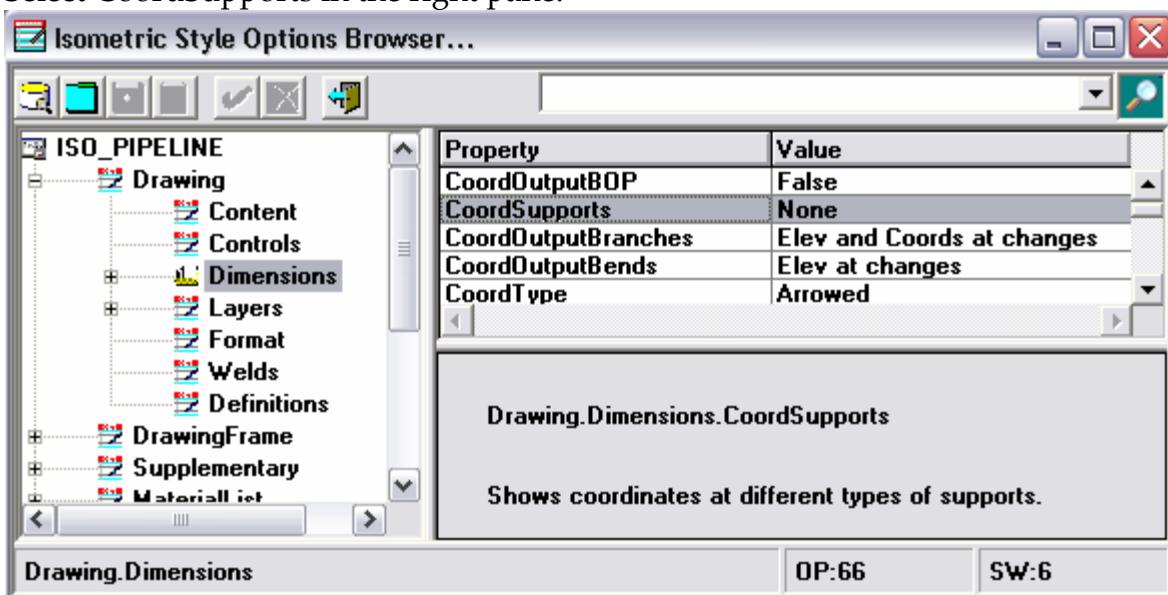
Source of Option

- 2) Expand Drawing.Dimensions

- 3) Select CoordOutputBOP in the right pane.



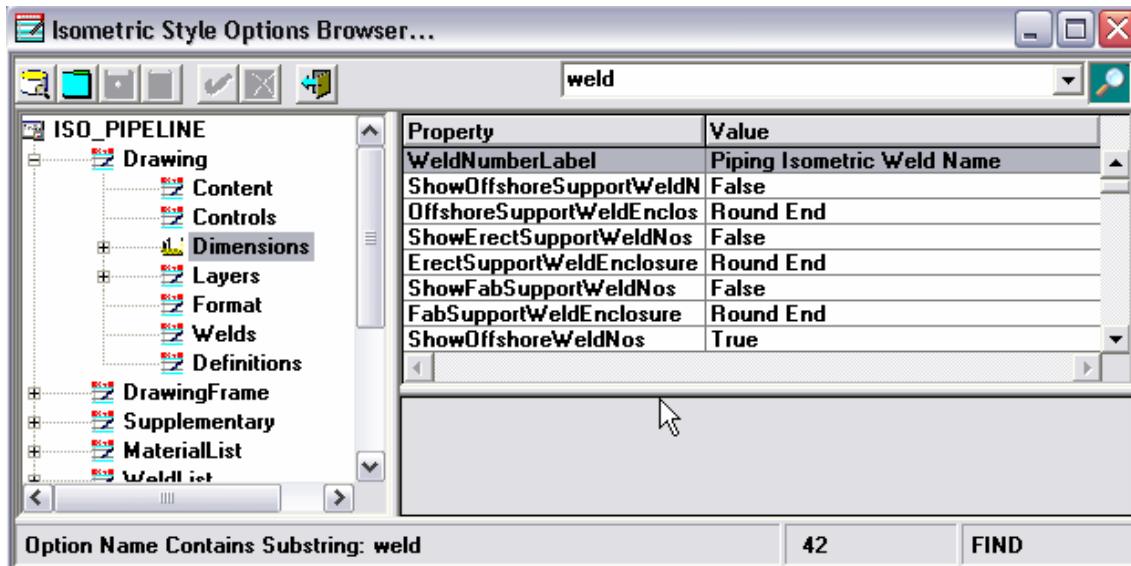
- 4) Notice the bottom right corner says SP3D, indicating that this is a SP3D (Intergraph) option, and not one supplied by Alias Isogen. Built-in help explains the possible values of the switches and their effect.
- 5) Select CoordSupports in the right pane.



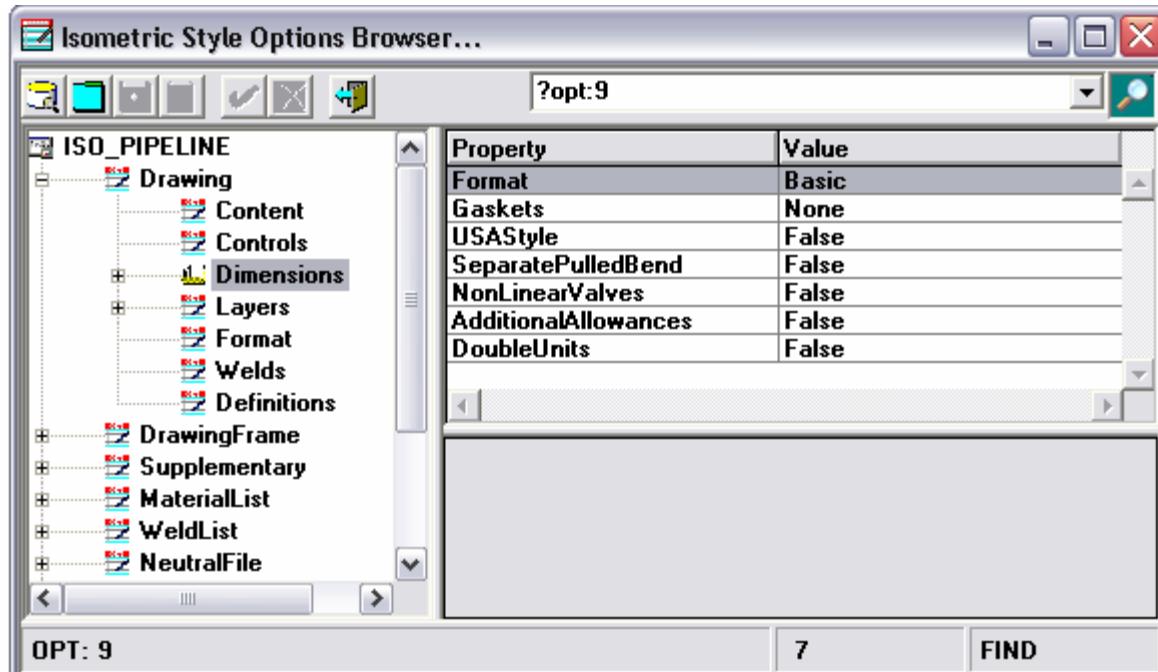
- 6) Notice the bottom row now tells us an option (OP) number and a switch (SW) number. This indicates that this is a Alias Isogen option with references to Alias' option and switch number. This information is provided to help lookup in the Alias Option Switches help guide.

Search options

- 7) The search box at the top of the browser acts as a substring search for all option names.
- 8) Type 'Weld' in the search box and press enter. All options with name containing the text 'Weld' are displayed.



- 9) The search box also helps search for Alias options by number using the search syntax ?OPT:xx where xx is the option number.
- 10) 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.

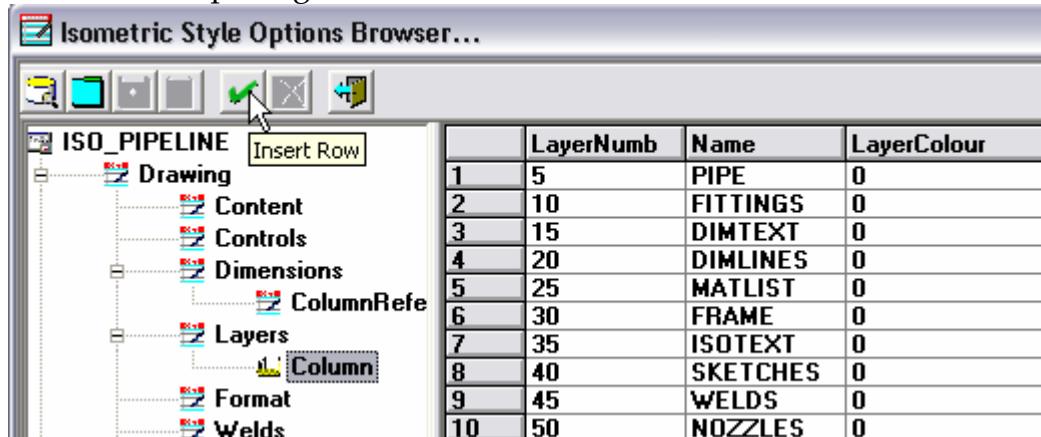


Sorting

11) Clicking on any column heading sorts a column

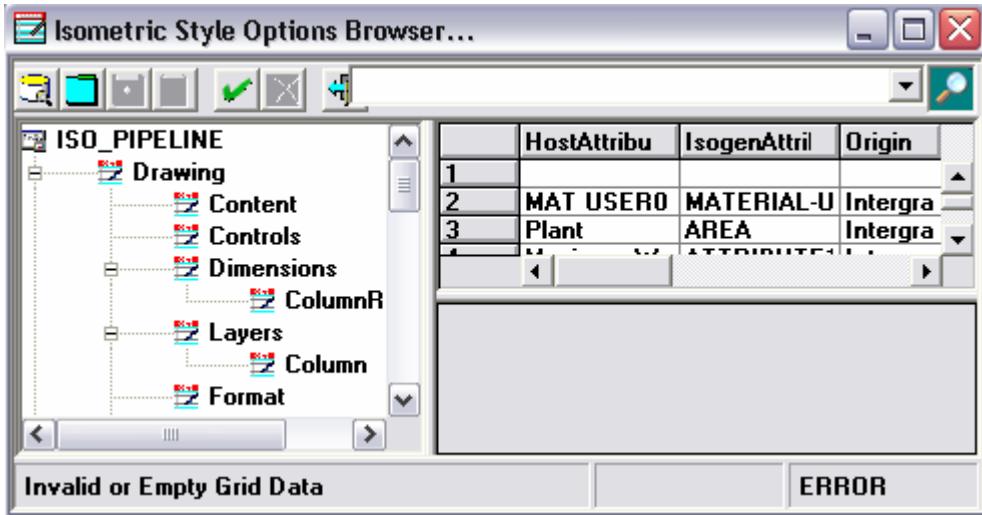
Inserting and deleting rows

12) To insert a row (where applicable) you can use either the green check button at the top of the option browser (if the focus is in the tree view) or the 'Insert' key on the keyboard, if the focus is in the grid view. E.g. Expand Drawing.Layers.Column in tree view and press green check to insert a row.



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

-
- 14) For most collections, it is not permitted to move focus away until a row is either completely filled out or deleted. This will be indicated by a message in the status bar.



Saving options

- 15) To save options to catalog, use Save to Catalog button from the toolbar.



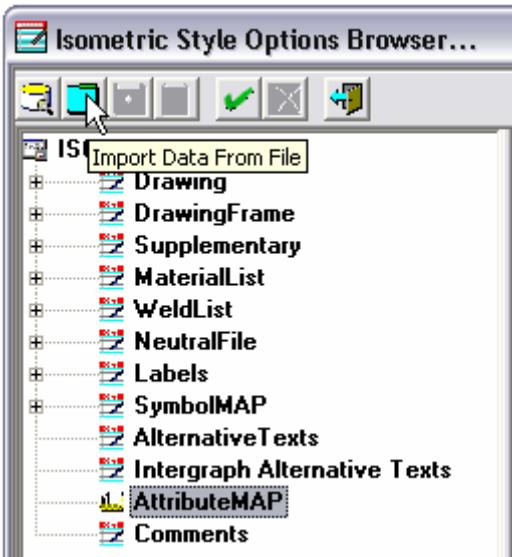
- 16) To save options to XML file, select the top node of the style and select Save 'Style XML File' button from the toolbar.



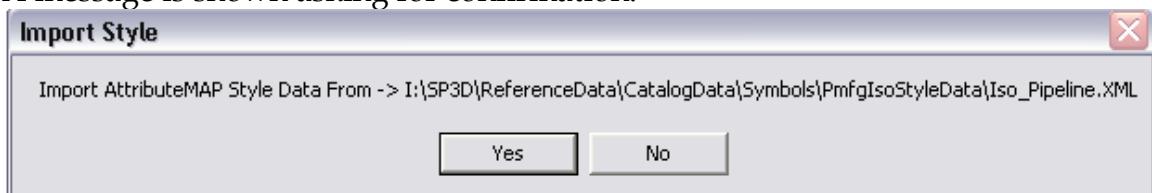
Importing options

- 17) 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.



- 18) A message is shown asking for confirmation.



Entering Comments

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

	Origin	Date	Initials	Comment
1	Intergraph	6/19/2005 5:50:20 PM	SND	Iso_Pipeline Style - First Delivery
2	Intergraph	6/19/2005 5:50:39 PM	WW	By William Wallace and Suvarat Dongre

- 20) The origin column is a pick list for the users to distinguish their comments from Intergraph comments.
- 21) If a date is entered in MM/DD/YYYY format in the date field, the software automatically fills in the time.
- 22) 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.

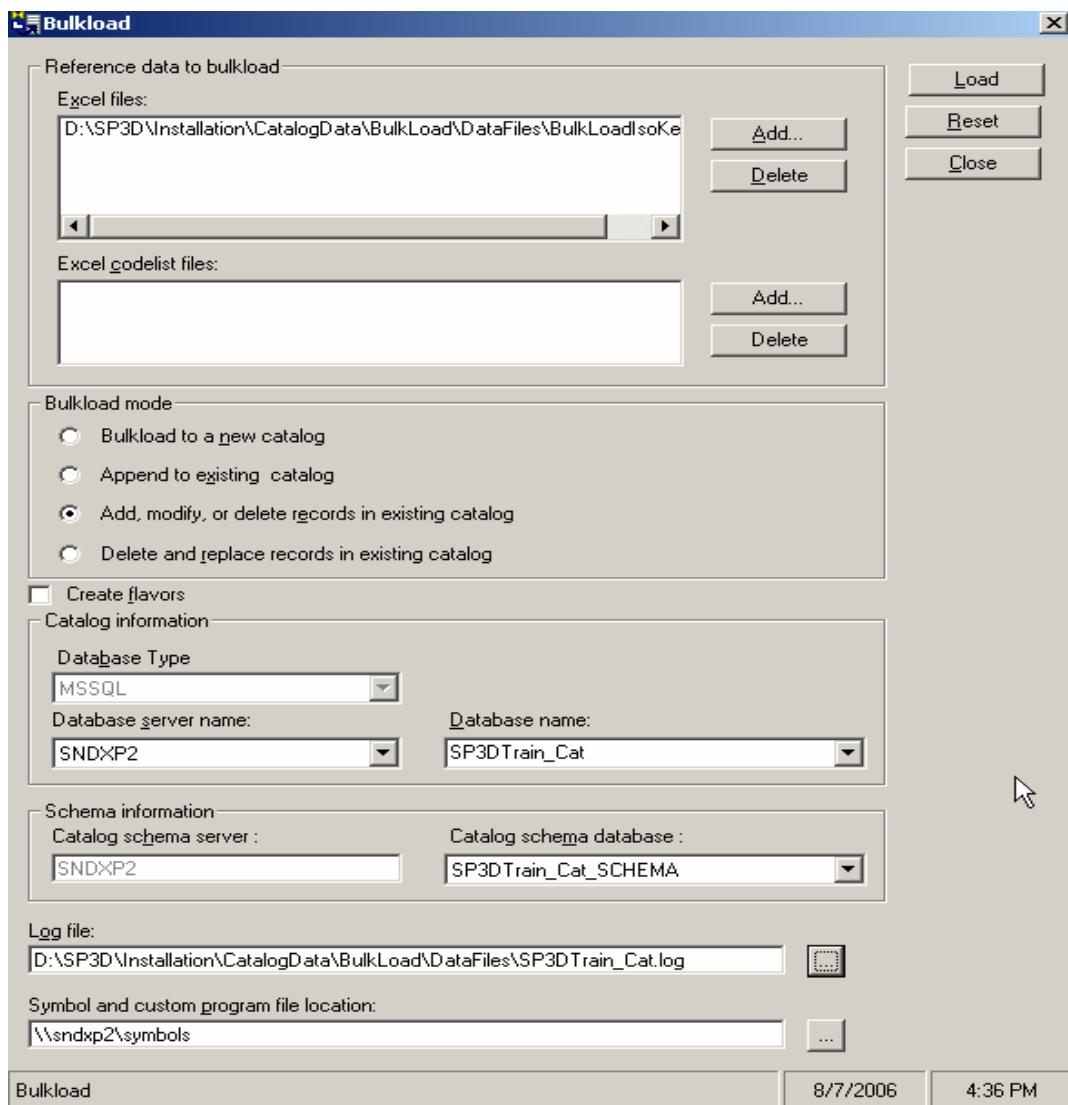
Copying Existing SP3D Border

- 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.
- 4) Save the file and exit Drawings Editor
- 5) Rename **UserIso_Pipeline.sha** to **UserIso_Pipeline.igr**

Bulkloading New style

- 6) Open the file Bulkloadisokeys.xls from [Install Directory]\\CatalogData\\Bulkload\\DataFiles.
- 7) Select row 6 (Iso_Pipeline) and right-mouse Copy.
- 8) Select row 11 (End) and right-mouse Insert Copied Cells.
- 9) Add letter A in column A of row 11
- 10) Change Iso_Pipeline to UserIso_Pipeline in the IsoNames column
- 11) Change OutPutIsoDrawingsLocation to IsoDrawings\\UserIso_Pipeline
- 12) Change IsoBackingSheet to PmfgIsoStyleData\\UserIso_Pipeline.sha
- 13) Change IngrOption to PmfgIsoStyleData\\UserIso_Pipeline.xml
- 14) Save the excel spreadsheet and close Excel.
- 15) 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.
- 16) 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

- 17) Save the file.
- 18) Start the Bulkload utility using Start → Programs → Intergraph SmartPlant 3D → Database Tools → Bulkload Reference Data
- 19) Click the Add button and add the BulkloadIsoKeys.xls from \\CatalogData\\Bulkload\\DataFiles
- 20) Change the bulkload mode to Add/Modify/Delete records
- 21) Pick the server, catalog and catalog schema name
- 22) In the log file field, select the ellipsis (...) button and click OK.
- 23) Click Load to load the new style into the catalog.

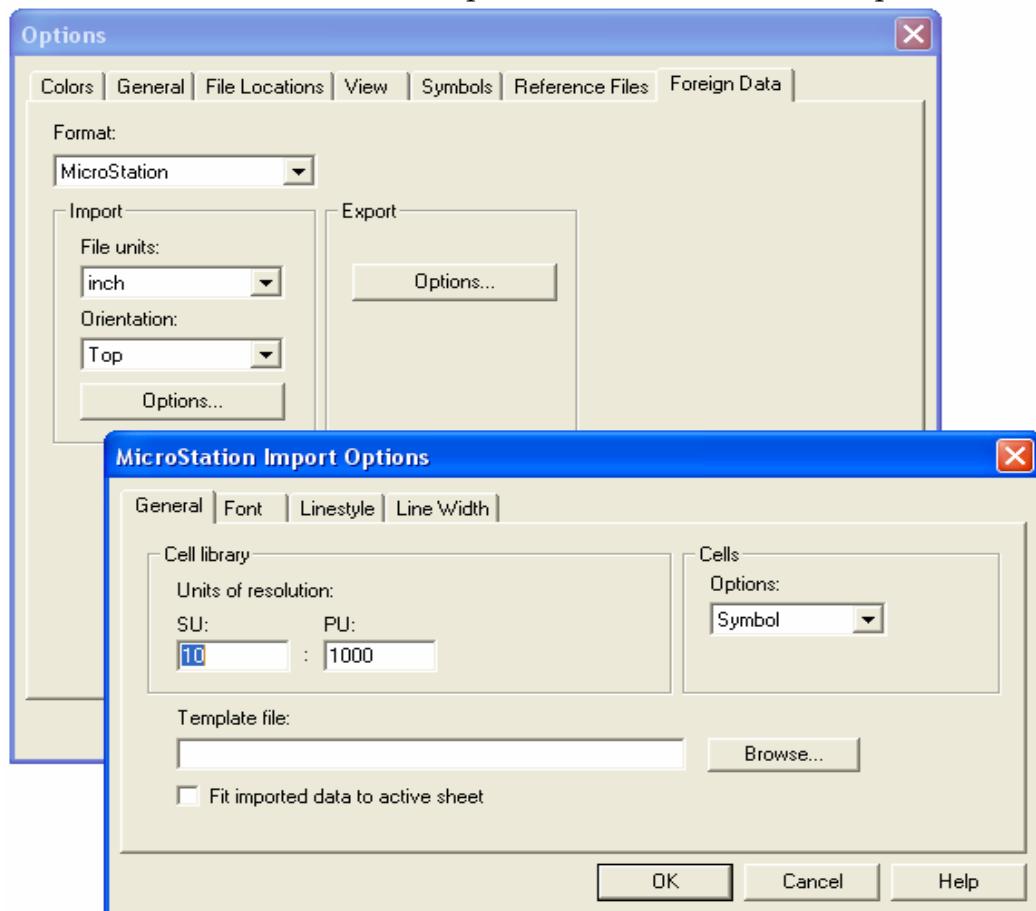


24) Review the log file , it should say
Successfully created the object in row [11]

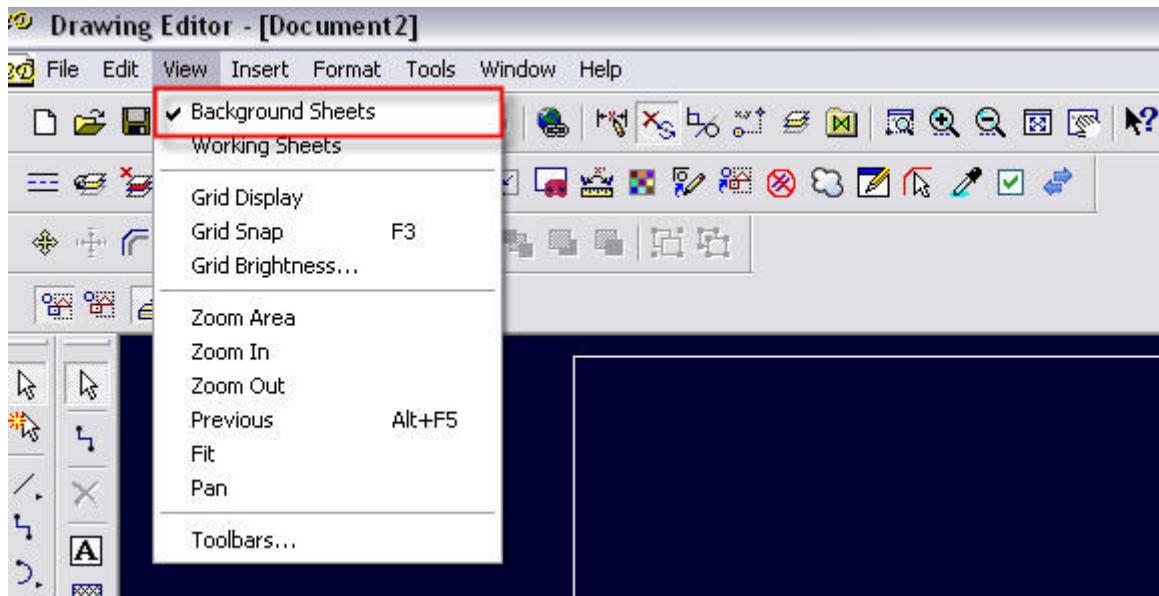
Lab 4: Importing Microstation DGN Border file

Importing existing DGN border/seed file

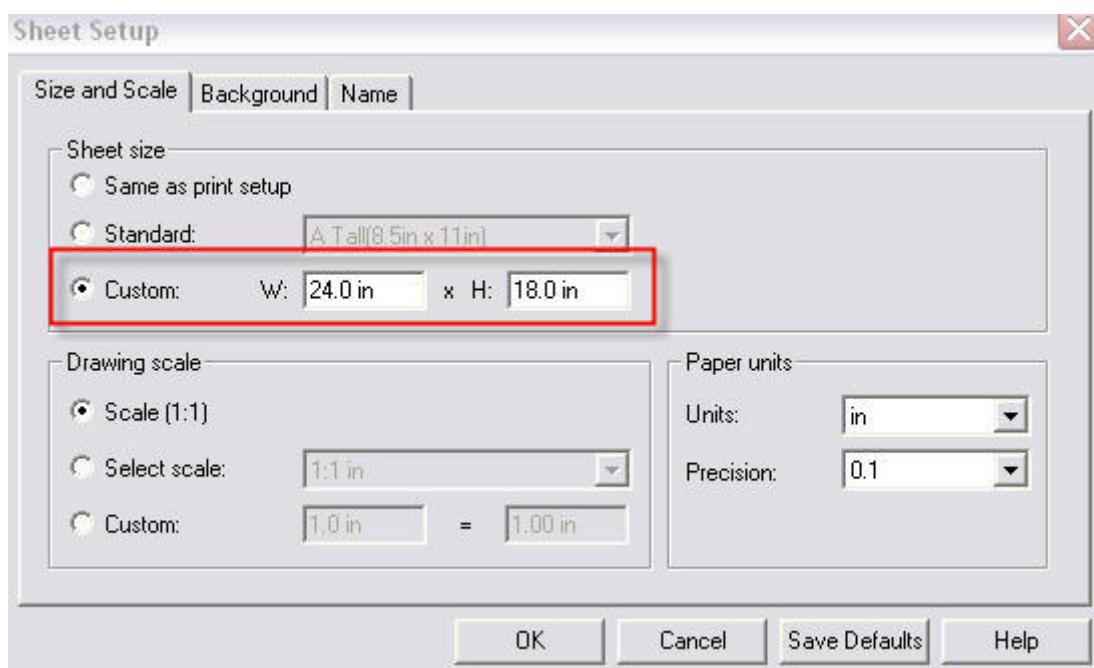
- 1) If you have an existing DGN or DWG file which is being used as seed/border, it can be re-used for SP3D isometrics.
- 2) An existing DGN file (UserIso_PipelineDGN.dgn) is available at \\[Server]\Symbols\PMfgIsoStyleData. If using DGN file, first, using MicroStation tools, merge the seed and border 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.



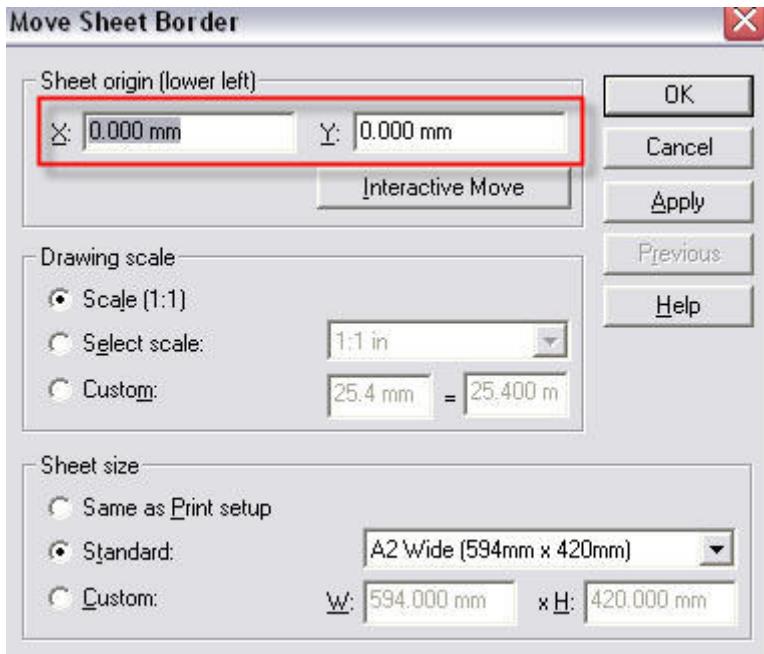
-
- 5) File – Open and navigate to the DGN (UserIso_PipelineDGN.dgn) file.
 - 6) Go to File – Sheet Setup and adjust the width and height of sheet with **Standard** or **Custom** size. Make sure that the Border graphics are in **Background** sheet and not in **Working** sheets. Sheet setup needs to be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



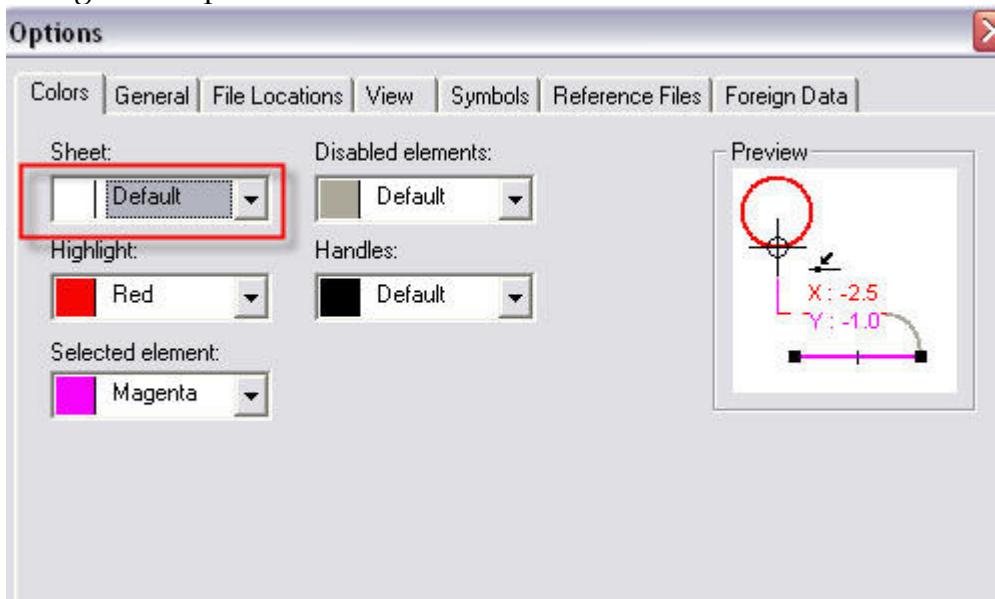
- 7) Set Custom Width as **24 in** and Height as **18 in** so as to match the size of imported DGN file.



- 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.



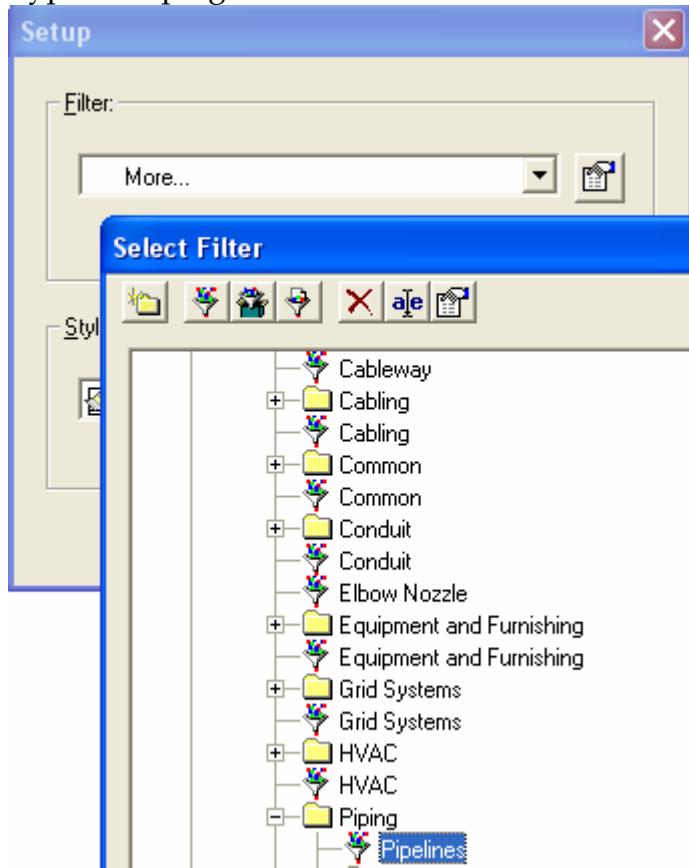
- 10) Save the file as a UserIso_PipelineDGN.sha
 11) Rename the file as UserIso_PipelineDGN.igr

- 12) This imported DGN file can now be used as a normal border file which can be utilized for creation of a new style.

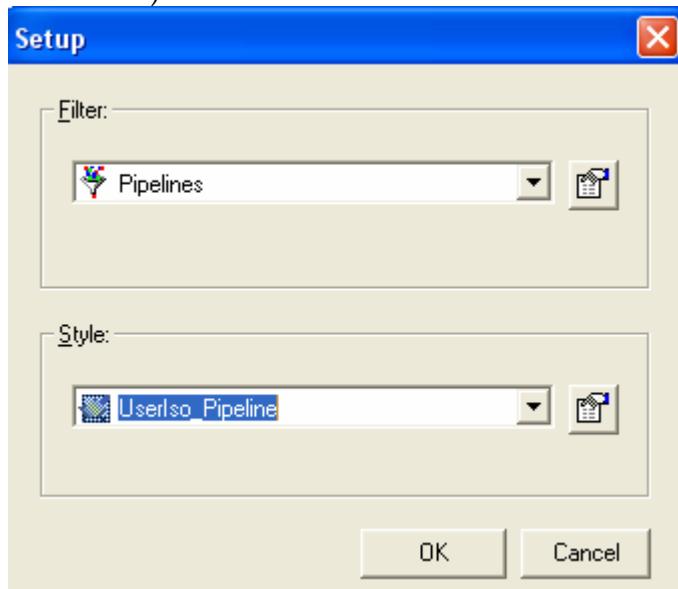
Lab 5: Create Package and Setup Hierarchy

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



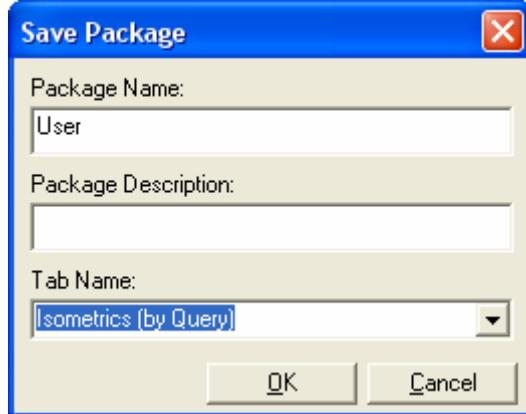
-
- 6) In the style field, select the style '**UserIso_Pipeline**' (This style was bulkloaded in earlier lab)



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

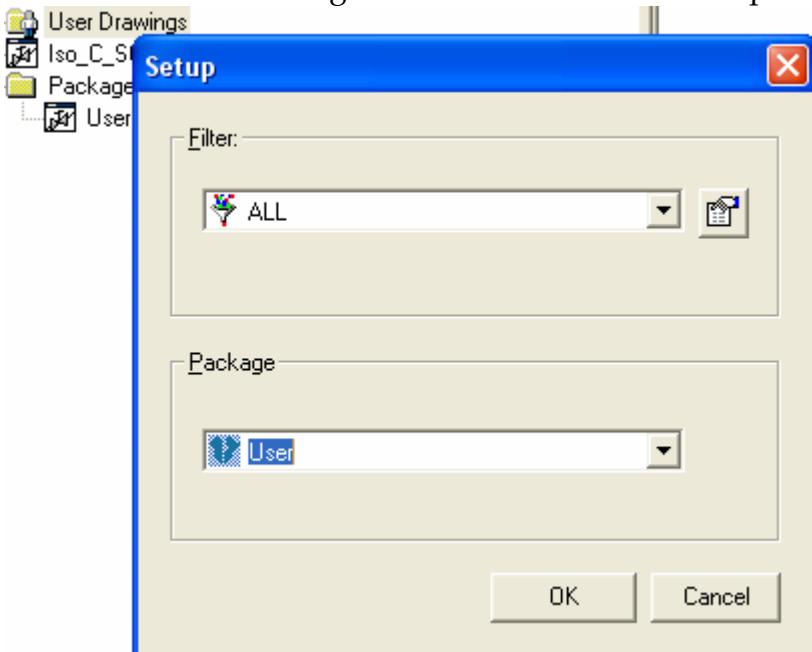


- 8) Name the Package 'User' and save it in the 'Isometrics (By Query)' folder

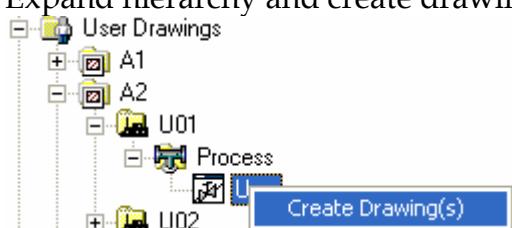


Creating Drawing by Query Manager

- 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.

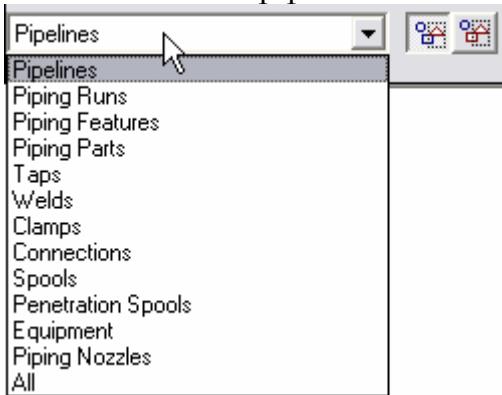


- 7) Update 1001-P

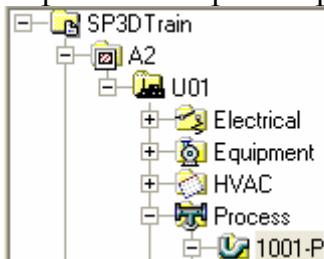
Lab6: Managing Hierarchies

Self-maintaining hierarchies

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



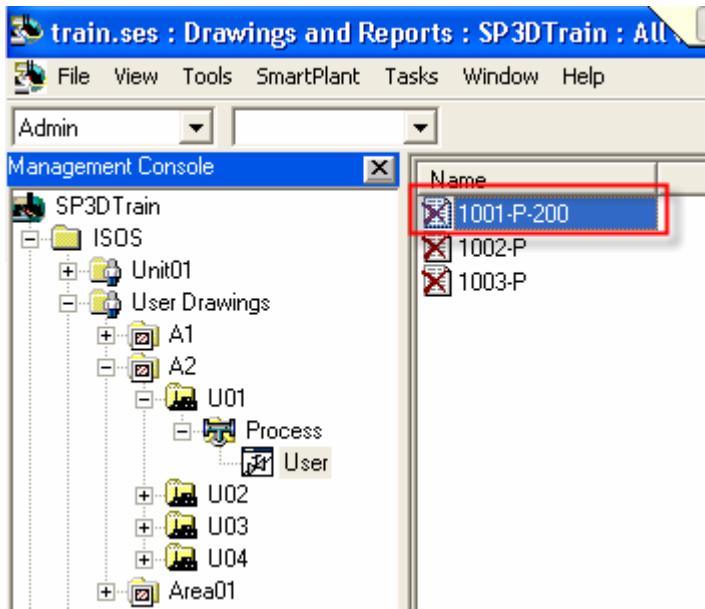
- 3) Expand workspace explorer till pipeline 1001-P is exposed. Select pipeline 1001-P.



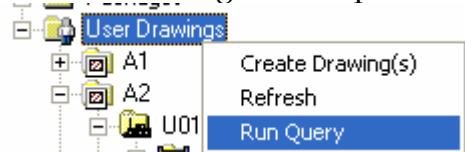
- 4) In the ribbon bar, change the name of the pipeline from 1001-P to 1001-P-200 and press enter.



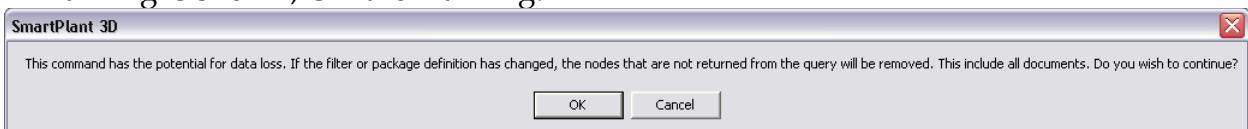
- 5) Switch to Drawings and Report task. Expand the tree, notice that the name of the pipeline is automatically changed in the detail view.



- 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.

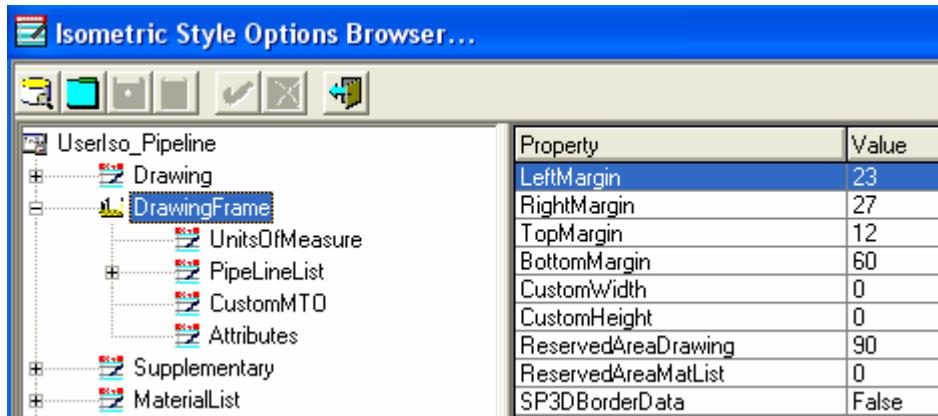


- 12) Revert changes made to Pipeline and Piping System (1001-P and Process)

Lab 7: Defining Border Size / Margins and Units

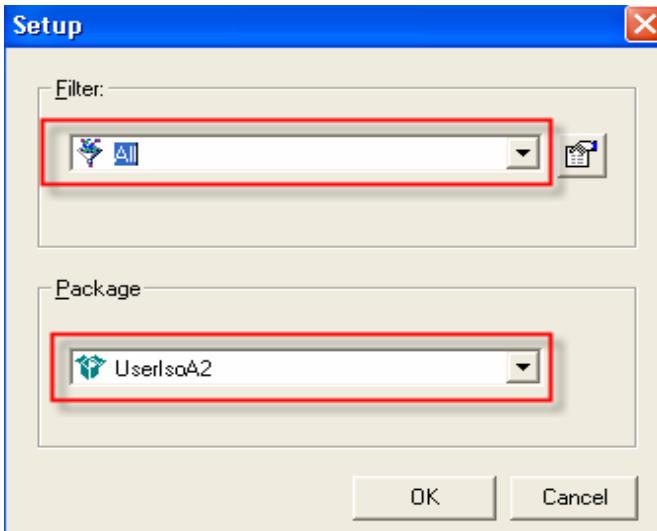
In Lab 7, you are going to set the drawing size, units and margins. Normally, the Drawing.Controls.DrawingSize option is used to specify the size of your isometric.

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.

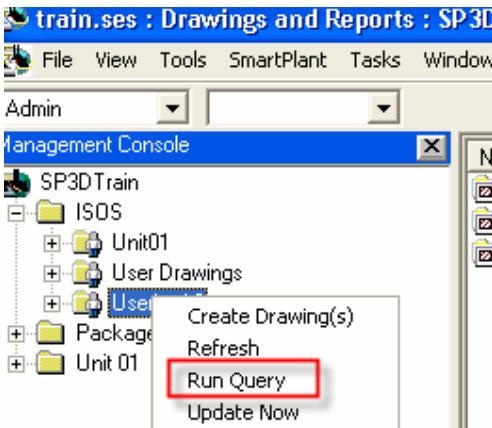


Additional options here allow you to reserve space for Margins and reserved areas in the isometric.

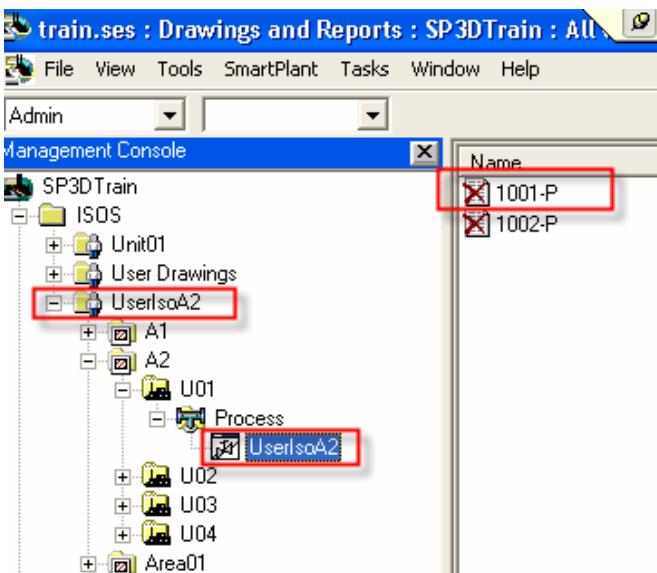
- 1) Right-click 'ISOS', select New... and add a new 'Drawing by Query Manager'
- 2) Rename it to be 'UserIsoA2'
- 3) Select More... in the filter field on the Setup dialog and select the 'Plant Filters\All' filter
- 4) Select More... in Packages field and select the 'UserIsoA2' package



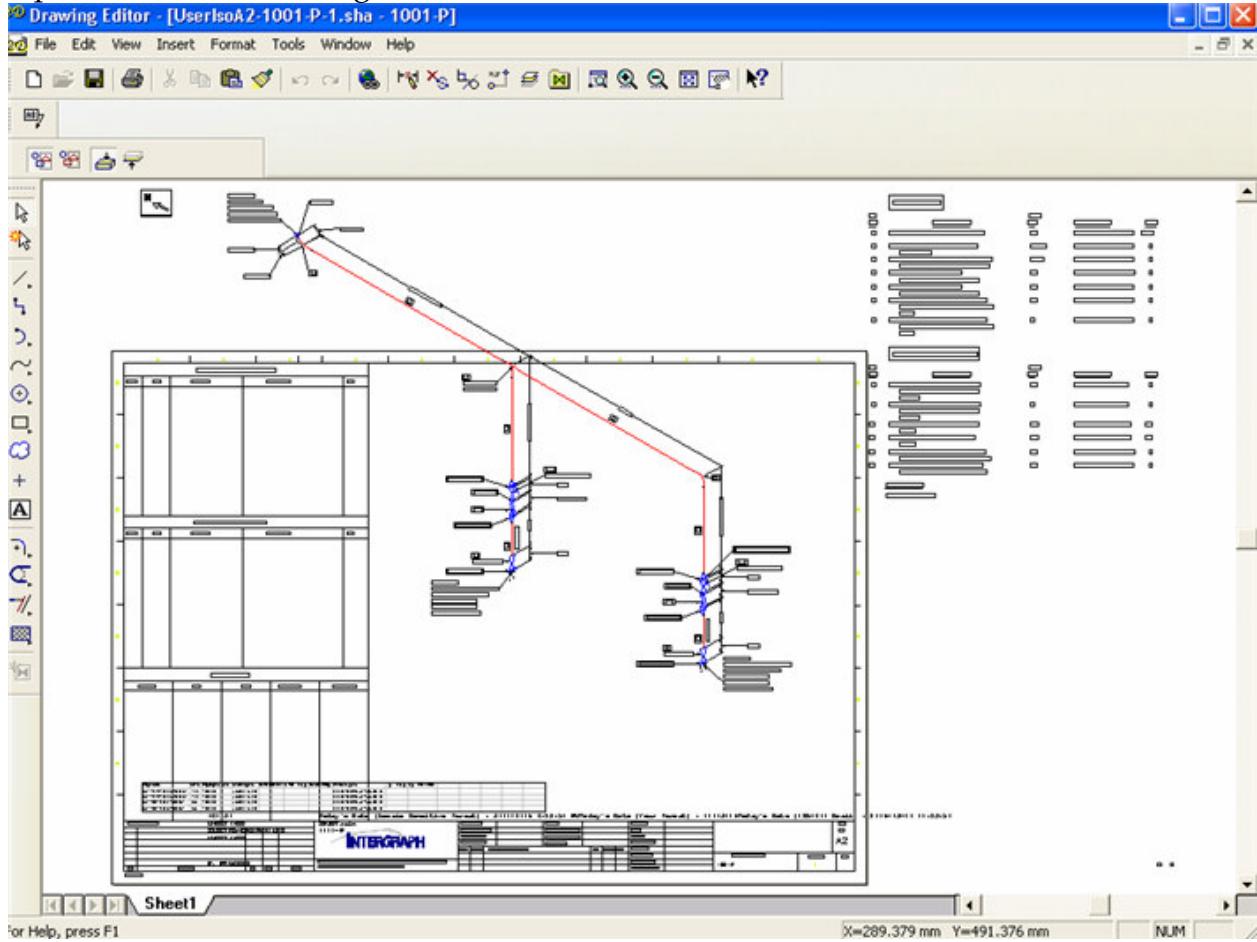
- 5) Right-mouse 'User IsoA2' and pick Run query



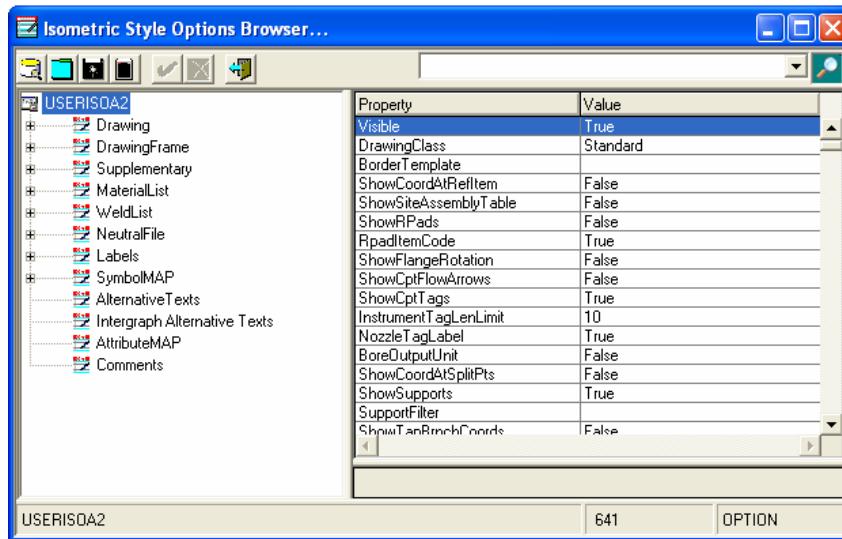
- 6) Expand hierarchy and create drawings for A2 - U01 - Process.



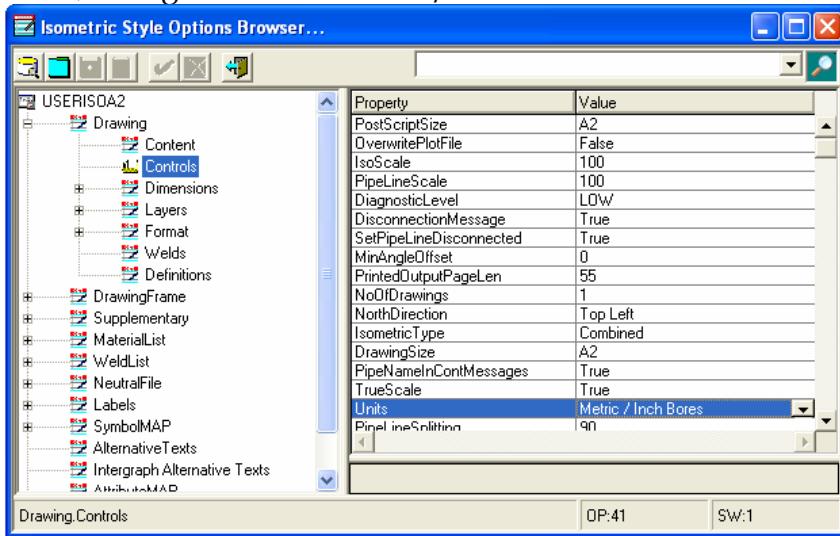
7) Update 1001 – P Drawing.



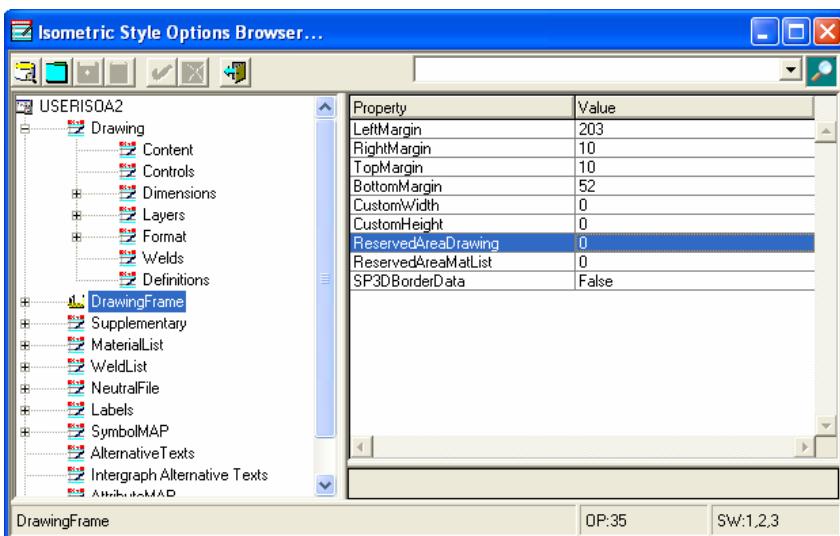
- 8) We would be changing the Drawing Size according to the size of Border file which is A2. Select the UserIsoA2 style and using a right mouse click, select 'Edit Options'



- 9) Select the Drawing.Controls section, and change DrawingSize and PostScriptSize to "A2", change Units to 'Metric / Inch Bores'



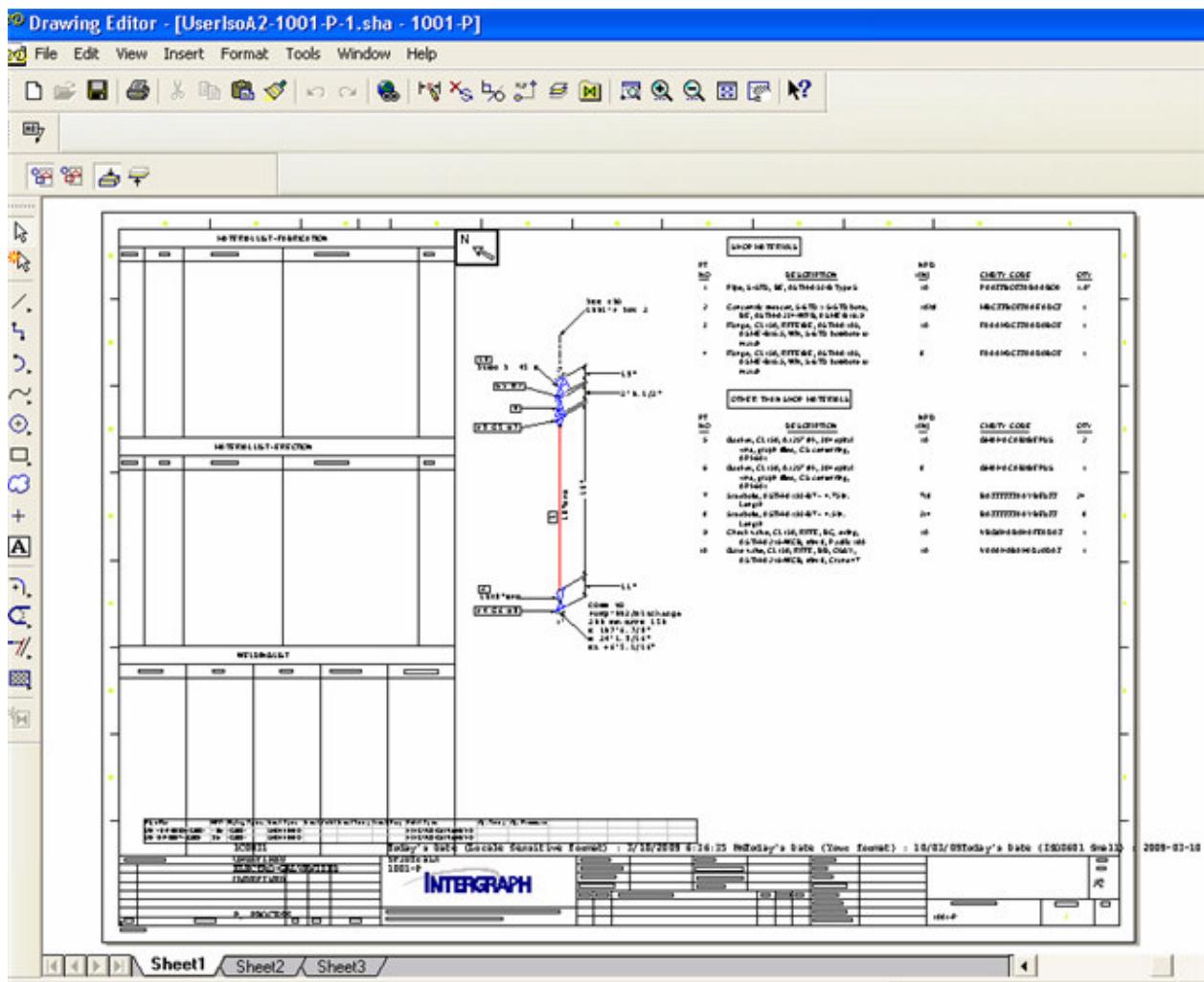
- 10) Select the DrawingFrame section and change Left Margin = 203, Right Margin = 10
Top margin = 10, Bottom margin = 52, ReservedAreaDrawing = 0



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

- 12) Update drawing 1001-P.

- 13) 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

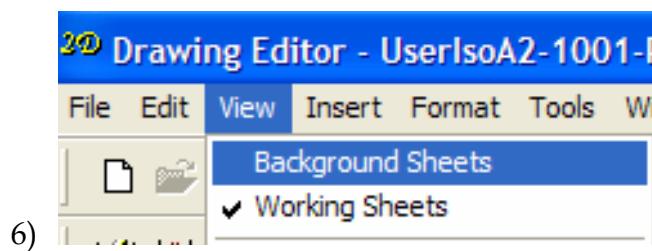
For document properties, these will not be written as attributes in the PCF, instead, they will be linked from the drawing document to the border file.

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 document, 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.

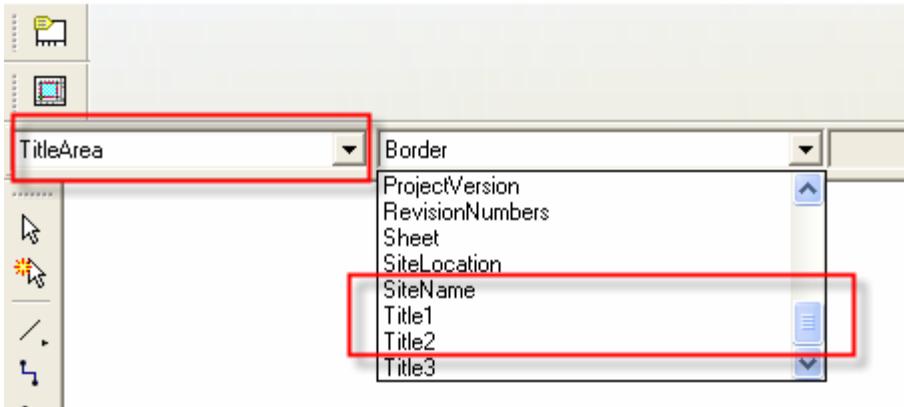
- 1) Copy the file UserIsoA2.sha from the \\[Server]\\Symbols\\PmfgIsoStyleData folder to \\[Server]\\Symbols\\Drawings\\Catalog\\templates folder
- 2) Enter the Drawings and Reports Task.
- 3) Select Tools => Edit Border Template.
- 4) Select “**UserIsoA2.sha**”
- 5) From the View menu, select Background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



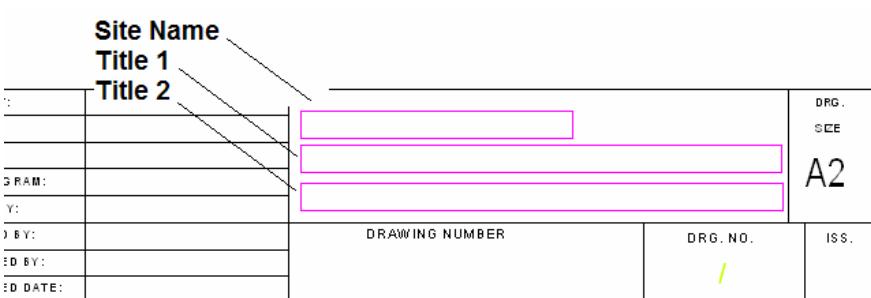
- 6)
- 7) Select the Place Drawing Property Label command
- 8)



- 9) In the Label Set pull down, pick Title Area
- 10) In the Field pull down, pick Site Name



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



- 12) 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.

- 13) Save the template, set the view back to 'Working Sheets' and exit Drawings Editor.

- 14) Copy the file UserIsoA2.sha back from the
 \\[Server]\\Symbols\\Drawings\\Catalog\\templates folder to the
 \\[Server]\\Symbols\\PmfgIsoStyleData folder

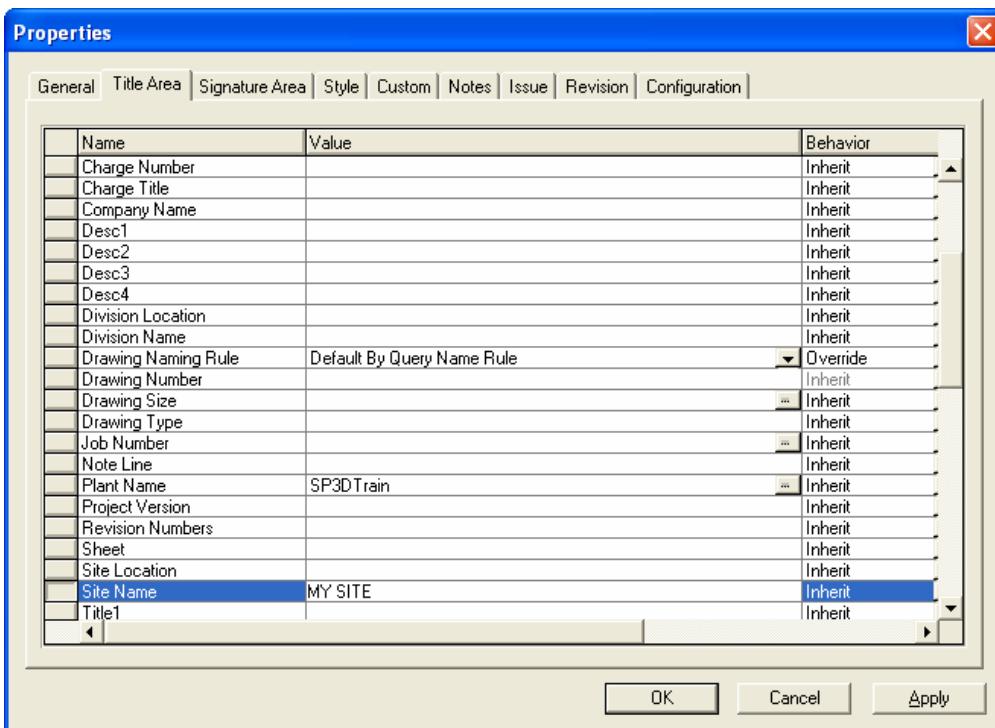
- 15) Select the UserIsoA2 style and using a right mouse click, select 'Edit Options'

- 16) Whilst the Options Browser is open, Copy and Paste the "UserIsoA2.sha" from the
 \\[Server]\\Symbols\\PmfgIsoStyleData folder to replace the one existing in the windows TEMP folder.

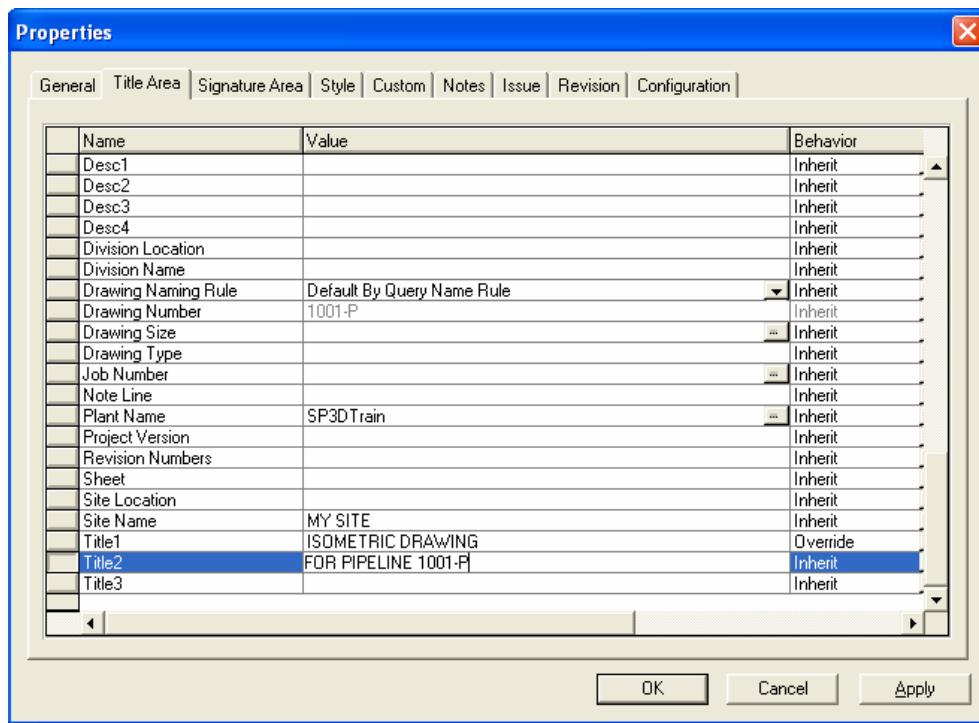
- 17) Save and exit from the options browser.

Setting Document Properties

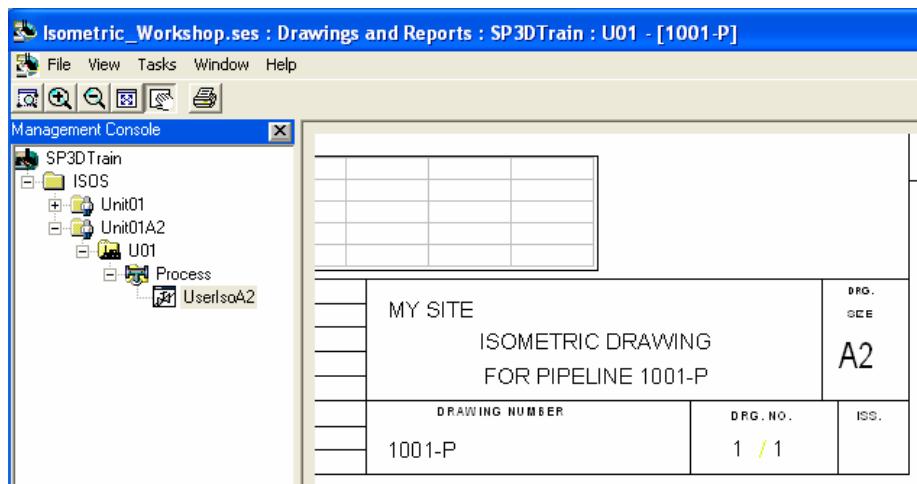
- 1) In this Lab, you are going to set a document property and see how it appears on the border.
- 2) Select the UserIsoA2  UserIsoA2 style and using a right mouse click, select 'Properties'
- 3) Select The Title Area tab and set the site name to 'MY SITE':



- 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 1001-P 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 a host attribute (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

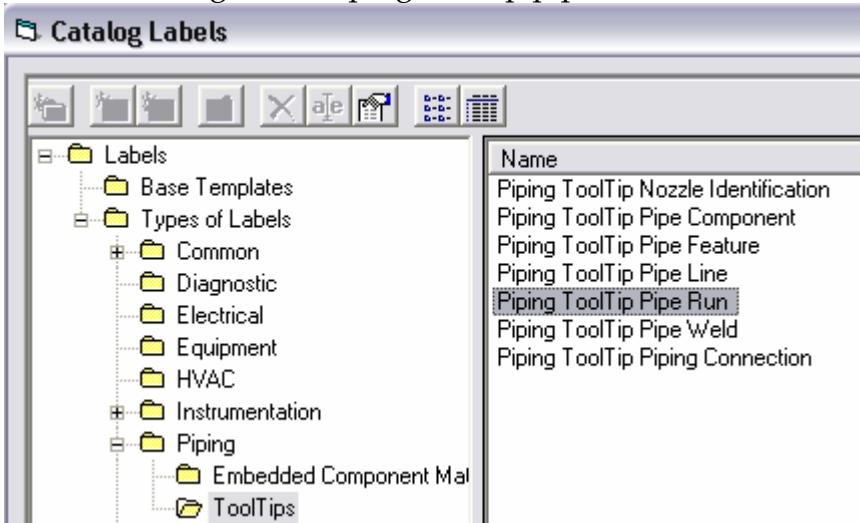
- 1) In Drawings & Reports Task expand ISOS>UserDrawings>A2>U01>Process
- 2) Select and Edit Options for the 'User' style.
- 3) Go to 'AttributeMAP' section and add a new row.
- 4) Name the new HostAttribute User1, pick ATTRIBUTE21 for the Isogen Attribute and pick the origin as 'User'

	HostAttribute	IsogenAttribute	Origin
1	User1	ATTRIBUTE21	User

Labels.DrawingFrame

- 5) Expand Labels.DrawingFrame and add a new row.
- 6) Pick ATTRIBUTE21 for label attribute

- 7) Pick the catalog label 'Piping Tooltip pipe run' as the LabelName



- 8) Pick PipeRun as the OidType

	LabelAttribute	LabelName	OidType
1	ATTRIBUTE15	IsoPipingCommodityCode	PipeRun
2	ATTRIBUTE9	Piping Isometric Extraction Date	Default
3	PIPELINE-REFERENC	Piping Isometric Pipe Line Refer	Default
4	ATTRIBUTE21	Piping ToolTip Pipe Run	PipeRun

DrawingFrame.Attributes

- 9) Expand DrawingFrame.Attributes and add a new row

- 10) Pick User1 for HostAttribute and specify values as below

	HostAttribu	XPos	YPos	CharHeight	CharWidth	Justificatio
1	User1	164.00	34.00	3.20	3.20	Left
	RotationAn	Layer	TextWeight	Font		
0	0	0		Courier New (True Type)		

- 11) Save to catalog

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

The screenshot shows a CAD drawing sheet with a table containing pipeline specifications. The table has columns for 'PIPING SPEC:', 'INSULATION SPEC:', 'PAINTING SPEC:', 'TRACING SPEC:', 'MAX WORKING TEMP:', 'MAX WORKING PRESS:', and 'FLUID CODE:'. The rows contain values like '1C0031', 'UNDEFINED', 'ELECTRO-GALVANIZED', etc. Below the table, there is a horizontal bar with numerical markers '1', '2', and '3'. A red circle is positioned near the start of the bar. To the right of the bar, there are coordinate markers: 'X: 164 mm' and 'Y: 34 mm'.

U01-6-P-0001-1C0031	6in	1C0031	UNDEFINED	ELECTRO-GALVANIZED
PIPING SPEC:	1C0031	DATE:	Today's Date (Locale	S
INSULATION SPEC:	UNDEFINED	PLANT:	SP3DTrain	R
PAINTING SPEC:	ELECTRO-GALVANIZED	LINE NO:	1002-P	
TRACING SPEC:	UNDEFINED		P-U01-6-P-0002-1C0031	
MAX WORKING TEMP:			X: 164 mm	
MAX WORKING PRESS:			Y: 34 mm	
FLUID CODE:	P, PROCESS			

Add Pipeline List Report

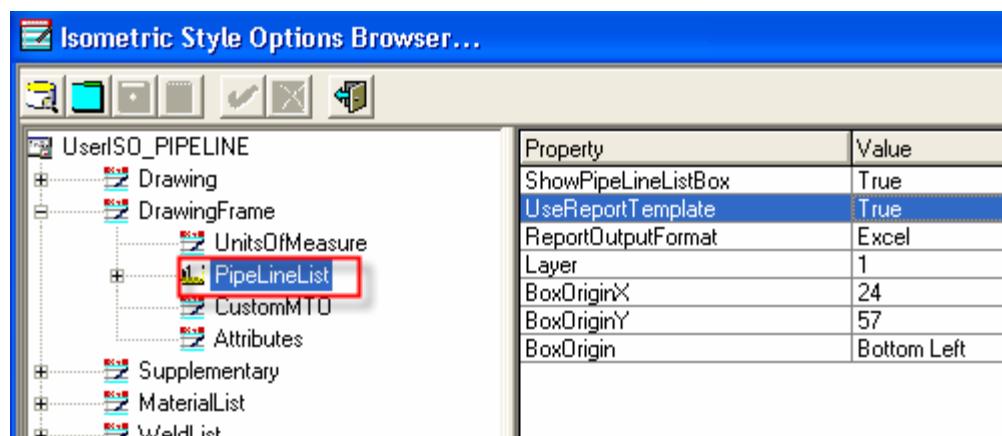
An excel table containing the properties of the runs in the pipeline may be placed on the sheet at the desired coordinates. It is possible to use labels to specify which attributes should be displayed in the excel sheet. The excel position on the drawing sheet can be determined by coordinates.

DrawingFrame.PipelineList

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

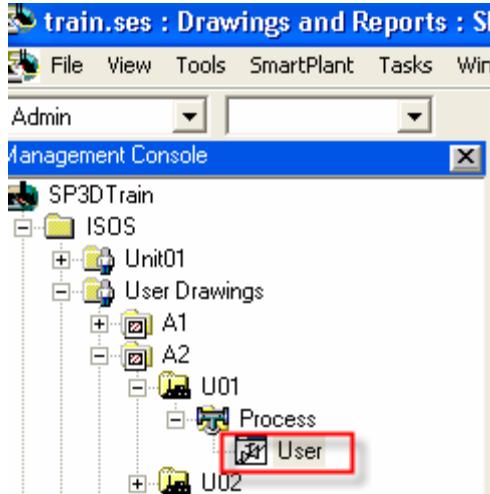
The UseReportTemplate option controls whether the new style (report) is used or old style (label driven list) is used.

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



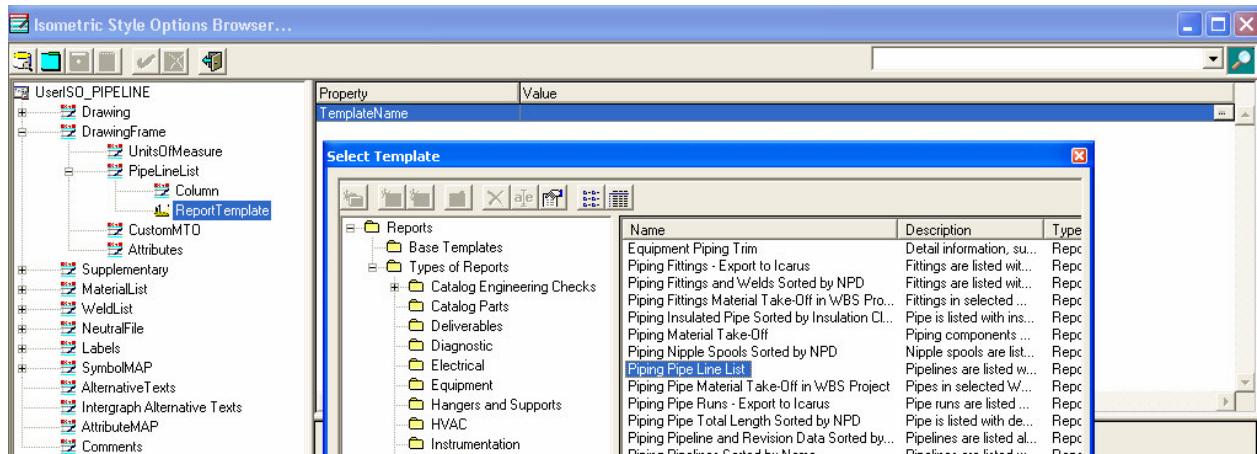
Report Template

- 1) Select and Edit Style Options 'User'



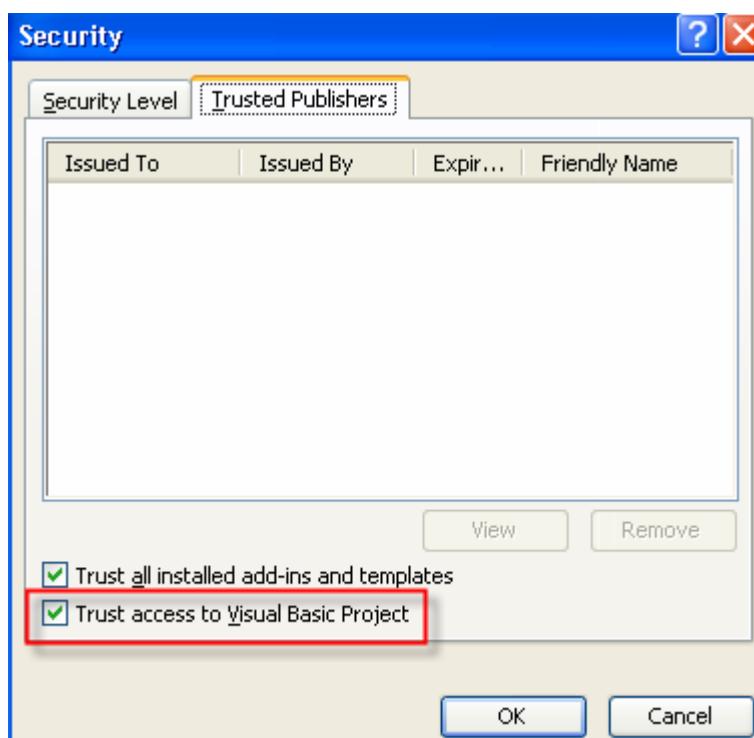
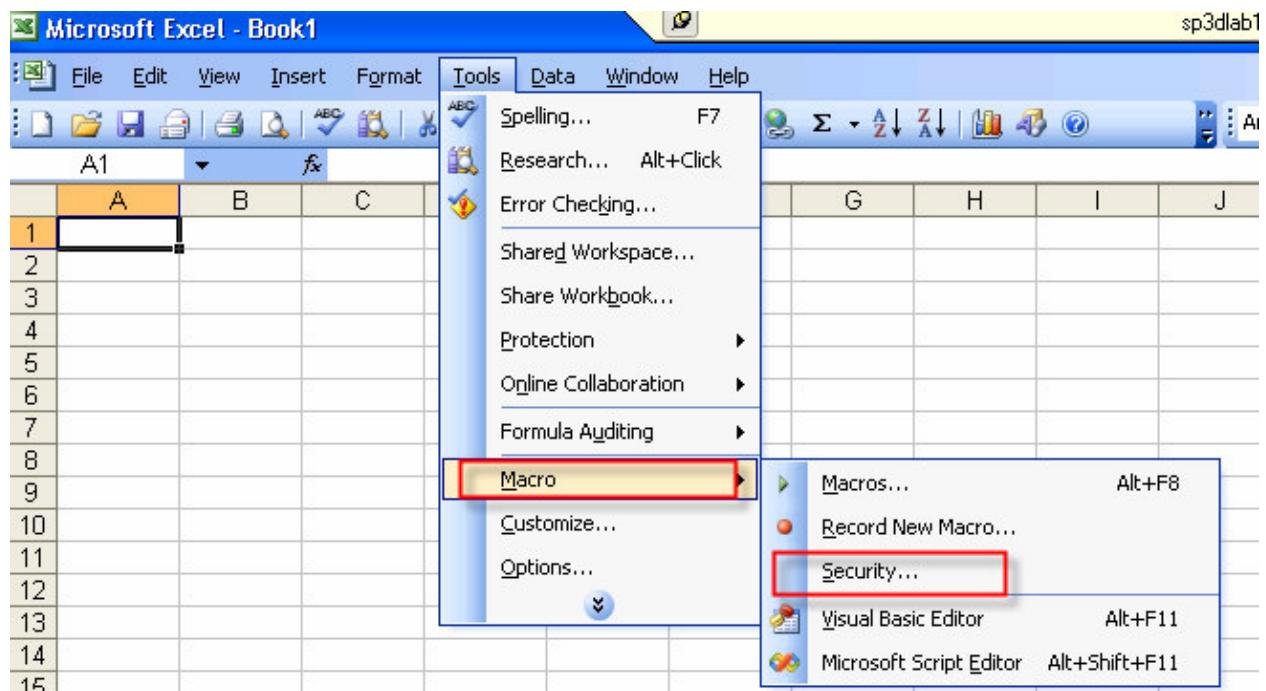
- 2) Set DrawingFrame.PipeLineList.UseReportTemplate = True

- 3) For the option 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 to output ANSI "C" size Drawing (Drawing.Controls.DrawingSize)

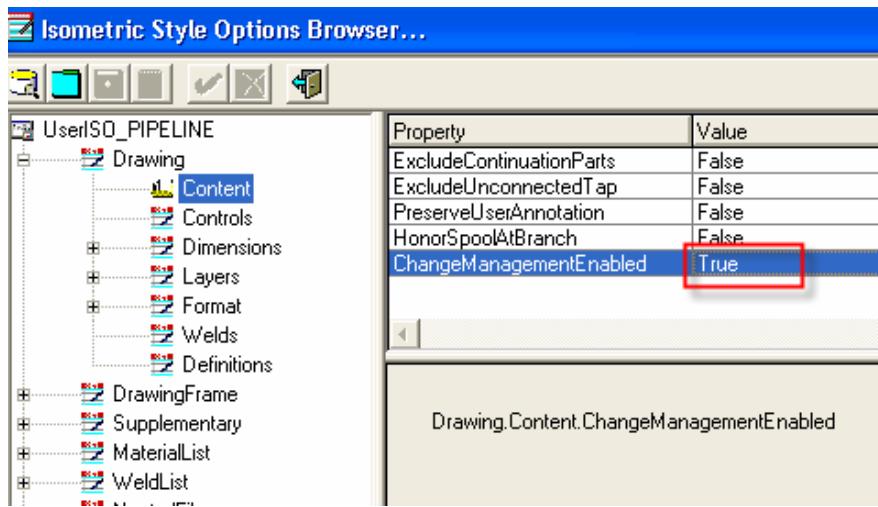
The Management Console window shows the project structure:

- SP3DTrain
- ISOS
- Unit01
- User Drawings
 - A1
 - A2
 - U01
 - Process
 - User
 - U02
 - Uin2

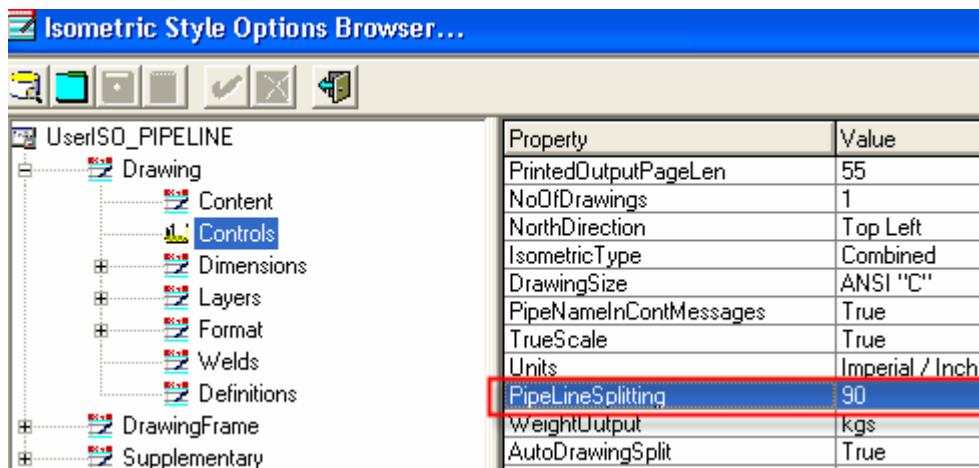
The Isometric Style Options Browser window shows the properties for UserISO_PIPELINE:

Property	Value
IsometricType	Combined
DrawingSize	ANSI "D"
PipeNameInContMessages	A3
TrueScale	A4
Units	ANSI "A"
PipeLineSplitting	ANSI "B"
WeightOutput	ANSI "C"
AutoDrawingSplit	ANSI "D"
Linear/WeightDenominator	None
PlotFilePath	
PCFOutputOnly	False
GenerateImpliedMat	True
IncludePipeSupport	True

- 2) Set **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)

MaterialList.MaterialListOverflow to Continuation Sheet

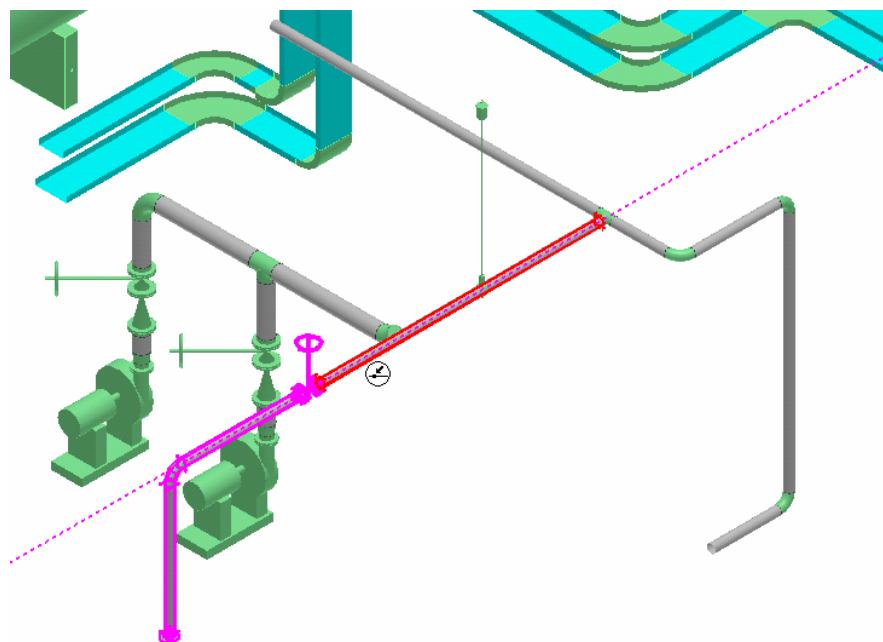
MaterialList.OverflowDrawingID to Alpha suffix (e.g: 2A, 3A, etc).

Set **MaterialList.Drw1of1OnSingleIsos** to True

Isometric Style Options Browser...

	Property	Value
UserISO_PIPELINE	ErectAccumulation	Normal
Drawing	OftshoreAccumulation	Normal
DrawingFrame	GasketAccumulation	Normal
Supplementary	BoltAccumulation	Normal
MaterialList	BoltDiameterUnits	As Drawing
WeldList	BoltLengthUnits	As Drawing
NeutralFile	WeldAccumulation	Normal
Labels	MaterialListSplitting	Per Drawing
SymbolMAP	MaterialListOverflow	Continuation Sheet
AlternativeTexts	OverflowDrawingID	Alpha suffix
Intergraph Alternative Texts	Drg1of1OnSingleSos	True
AttributeMAP	LinearQuantityStyle	n.n M n.n ft

- 5) With this done, part items will remain on the same sheet
- 6) 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..)
- 7) Switch to Piping task and model additional piping on line 1002-P. Under normal conditions this might push old components to different iso sheets

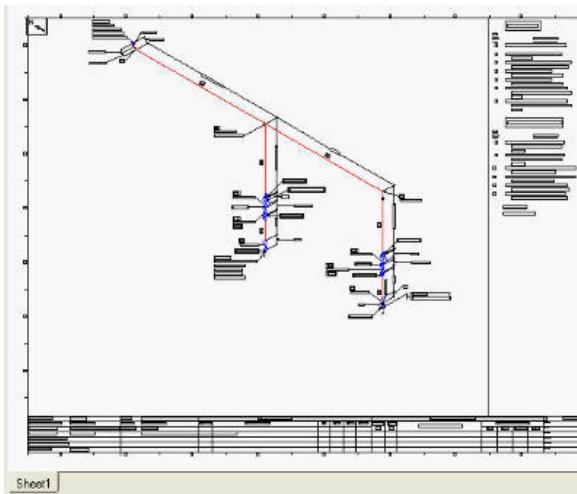


- 8) Extract line 1002-P under U01 again and compare sheets content with that of rev0
- 9) All items that were extracted the first time should appear on the same sheet numbers as before
- 10) New piping items modeled should appear added on existing sheets in previously clear spaces, or in newly created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

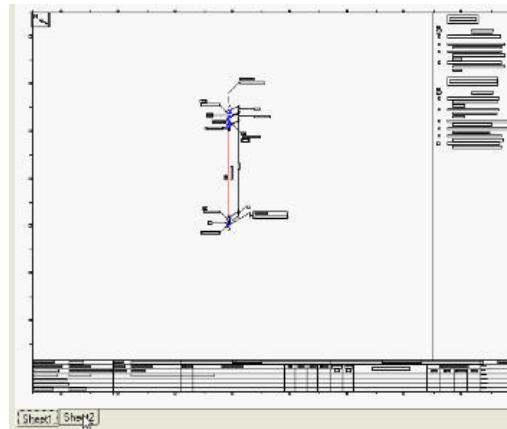
SHOP MATERIALS				
PT NO	DESCRIPTION	NPD (IN)	CMDTY CODE	QTY
1	Pipe, S-STD, BE, ASTM-A53-B Type S	6	PAAZZBOZZABAABOA	83.1'
2	Tee, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	6X6	MDJZZBOZZAAEADCZ	1
3	90 deg LR elbow, S-STD, BE, ASTM-A234-WPB, ASME-B16.9	6	MCMZZBOZZAAEADCZ	4
5	Flange, CL150, RFFE/BE, ASTM-A105, ASME-B16.5, WN, S-STD borebore to match	6	FAAAHDCZZAADABQZ	3
PIPE SUPPORTS				
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				
PT NO	DESCRIPTION	NPD (IN)	CMDTY CODE	QTY
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	VAAAHHABAHAJDADAZ	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 and select **Insert > Control Point**
- 5) Set the **subtype** for the control point to **PipingMfg Limit Point** and insert at a Flange-Flange point. Make sure the parent of the control point is a Route Connection object rather than a weld or other item



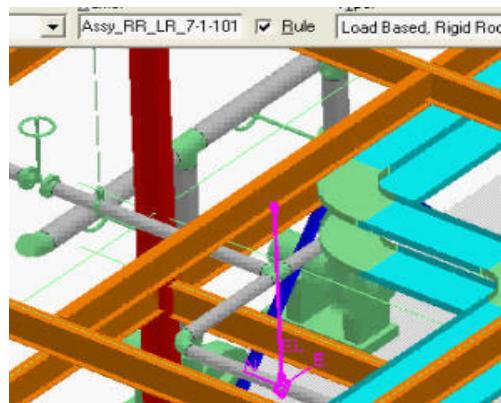
- 6) Extract iso of 1001-P, the updated drawing should have two sheets

-
- 7) 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

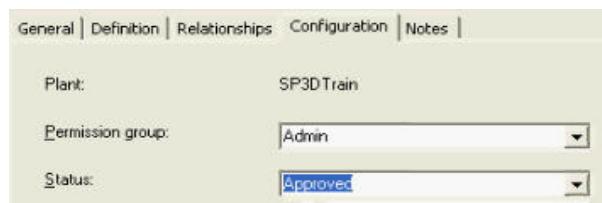
Selective display of Supports

The new **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.

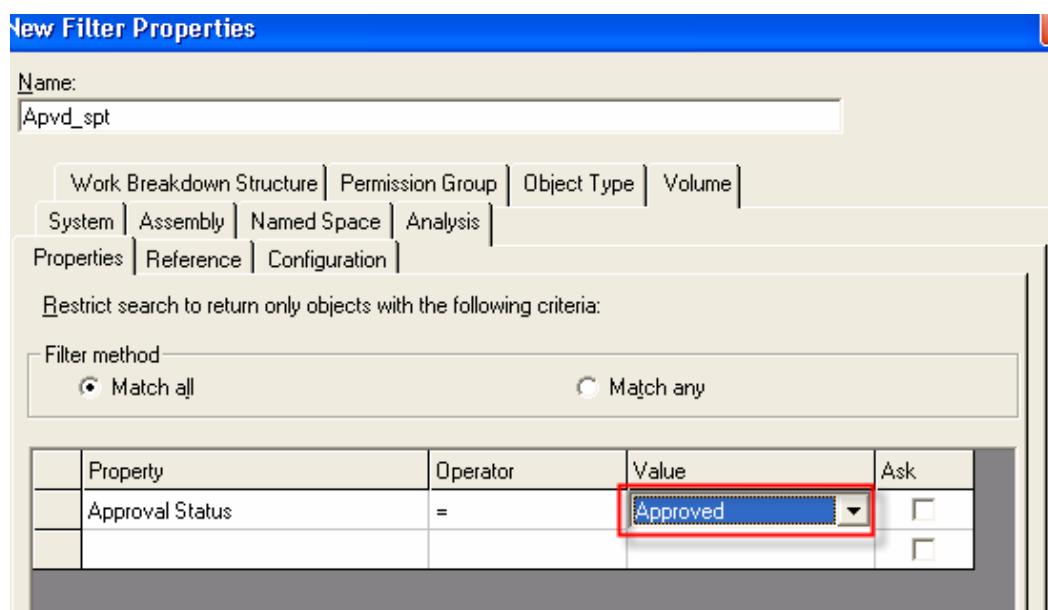
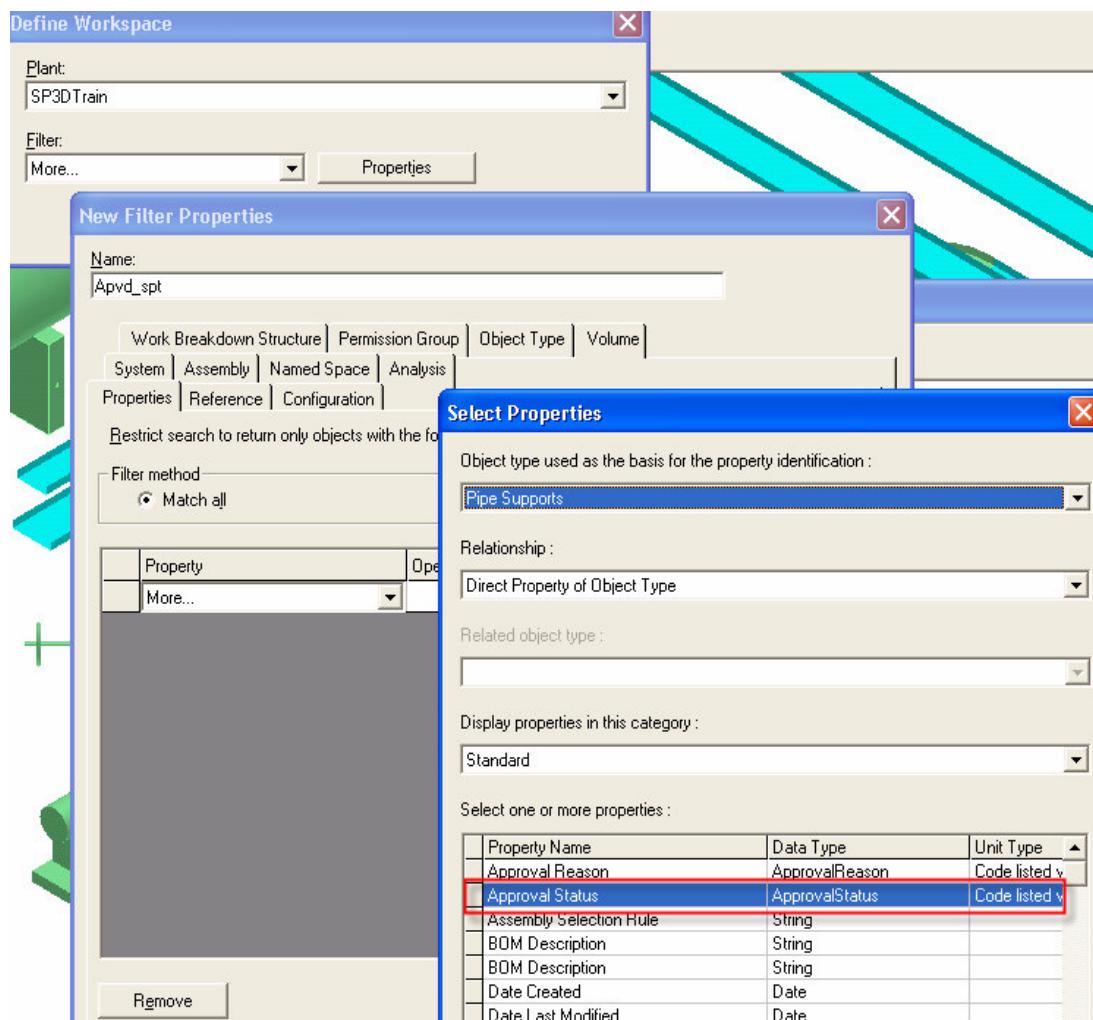
- 1) In the Piping task, add 2 new hangers by rule on 1002-P



- 2) Set status to Approved for one of the hangers assembly



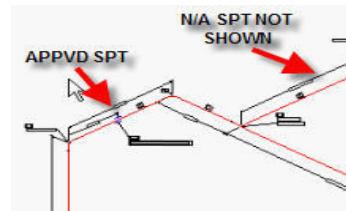
- 3) Use Tools>Select by Filter to create a Plant filter named **Apvd_Spt** that locates approved piping supports assemblies only



-
- 4) Switch tasks and Edit Options for the Iso Pipeline style in Unit01, expand the tree to Drawing.Content.SupportFilter
 - 5) Click the ellipsis button in the Value field to display the **Select Filter** dialog box



- 7) Select Plant filter Apvd_Spt and save options

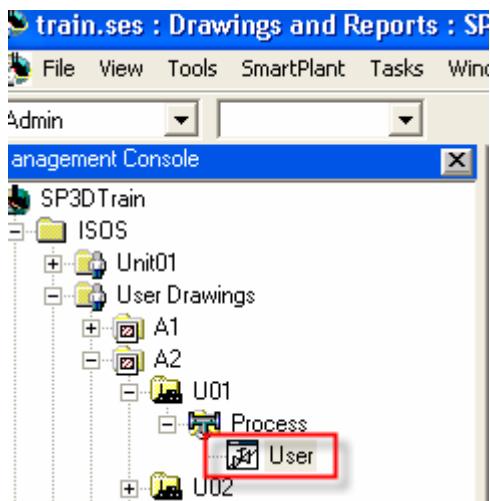


- 8) Update iso 1002-P and review the supports

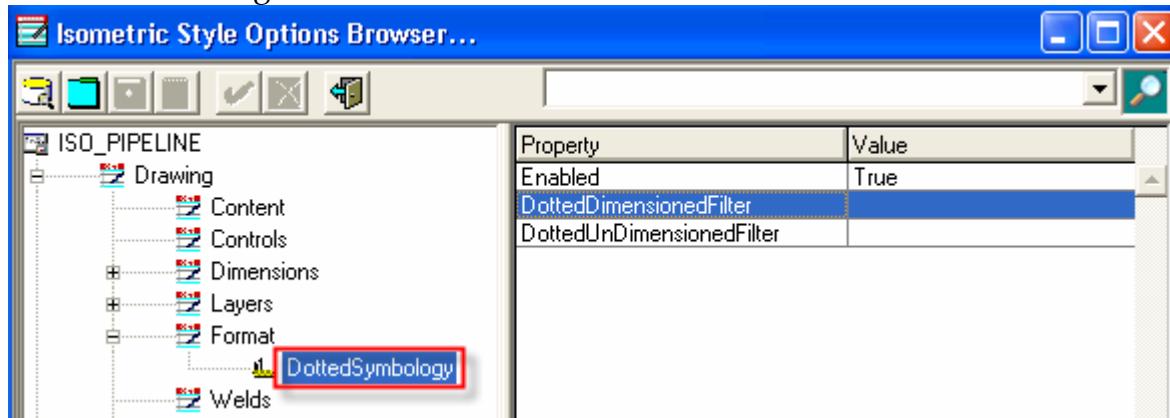
Lab 11: Drawing Format

Dotted Symbology

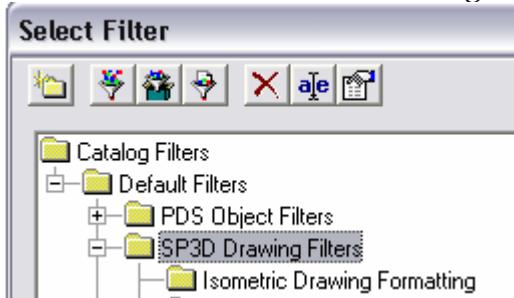
- 1) Switch to Drawings and Reports Task
- 2) Select and Edit Options for Style 'Iso Pipeline'



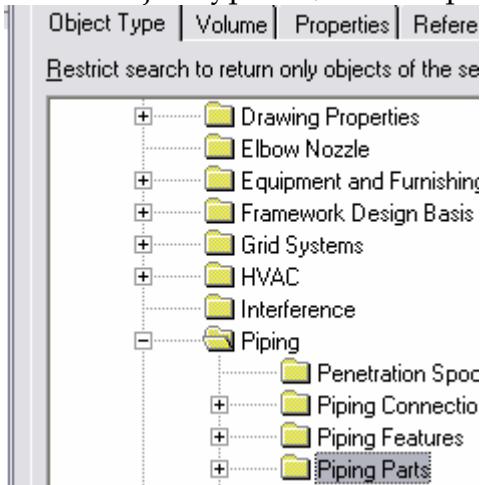
- 3) Select Drawing.Format.DottedSymbolologyEnable = True
- 4) Select the ellipsis (...) in the Drawing.Format.DottedSymbolology.DottedDimensionedFilter field to invoke the Select Filter dialog



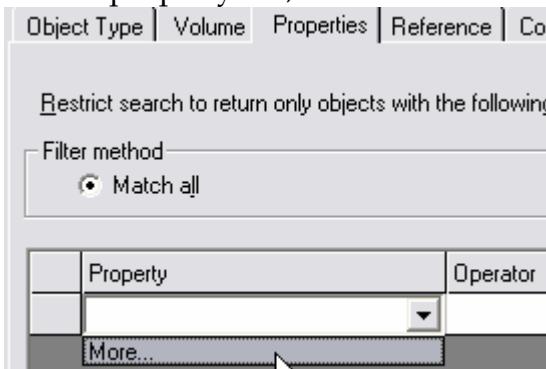
-
- 5) Expand Catalog Filters\Default Filters and create a new folder under SP3D Drawing Filters named 'Isometric Drawing Formatting'



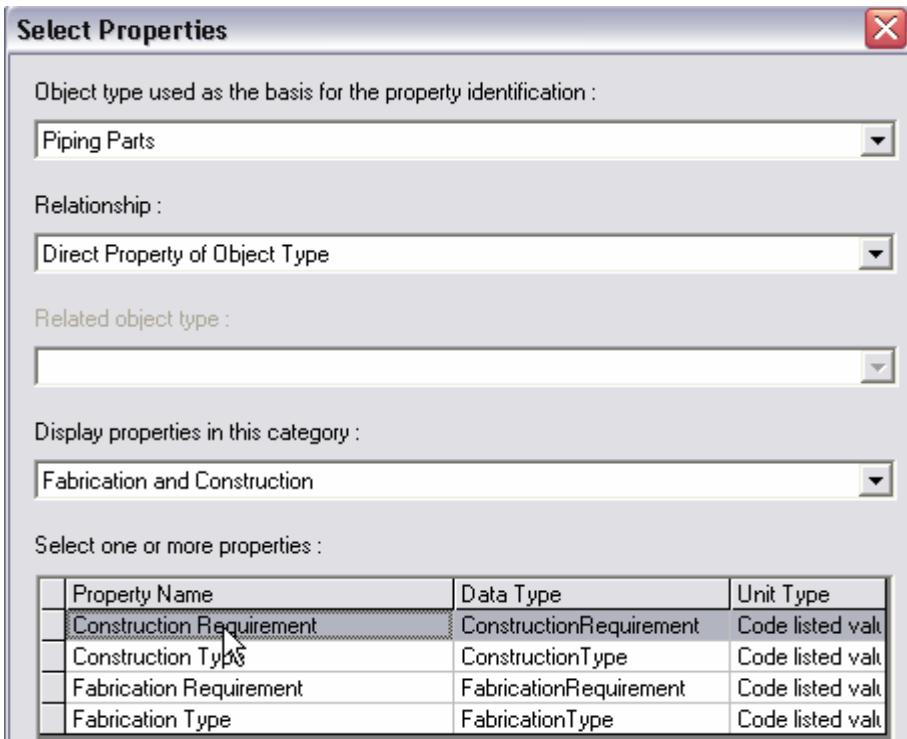
- 6) In the new folder, create a new filter and name the filter 'Dotted Dimensioned Parts'
7) On the object type tab, select Piping\Piping Parts



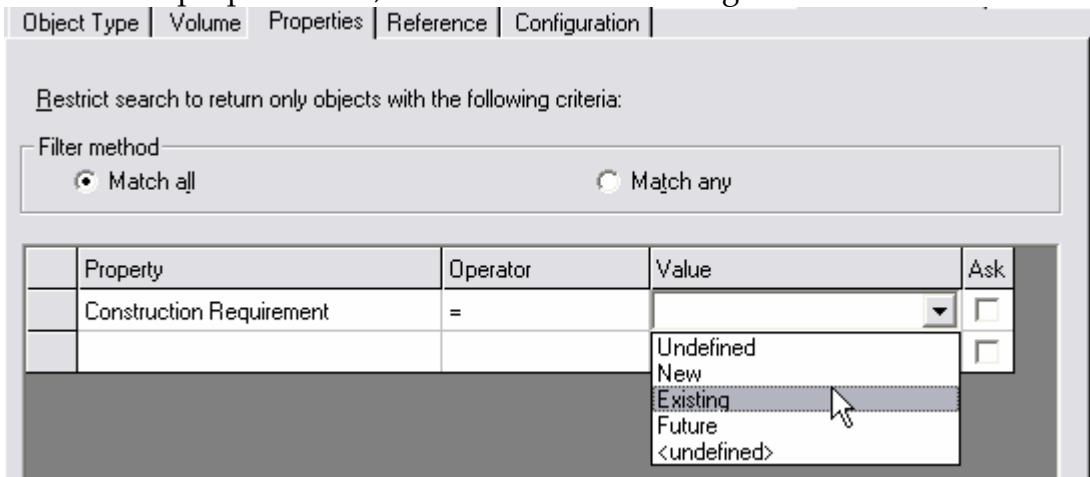
- 8) On the property tab, select More.. to add a new property.



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

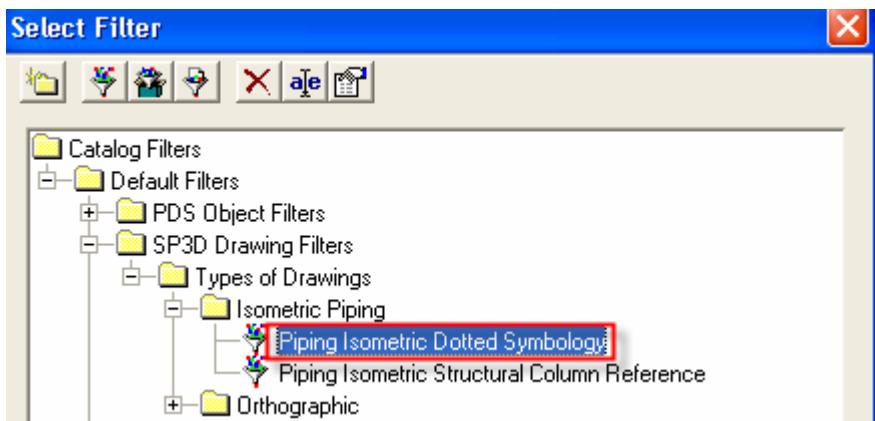


- 10) Back on the properties tab, select the value 'Existing' from the codelist

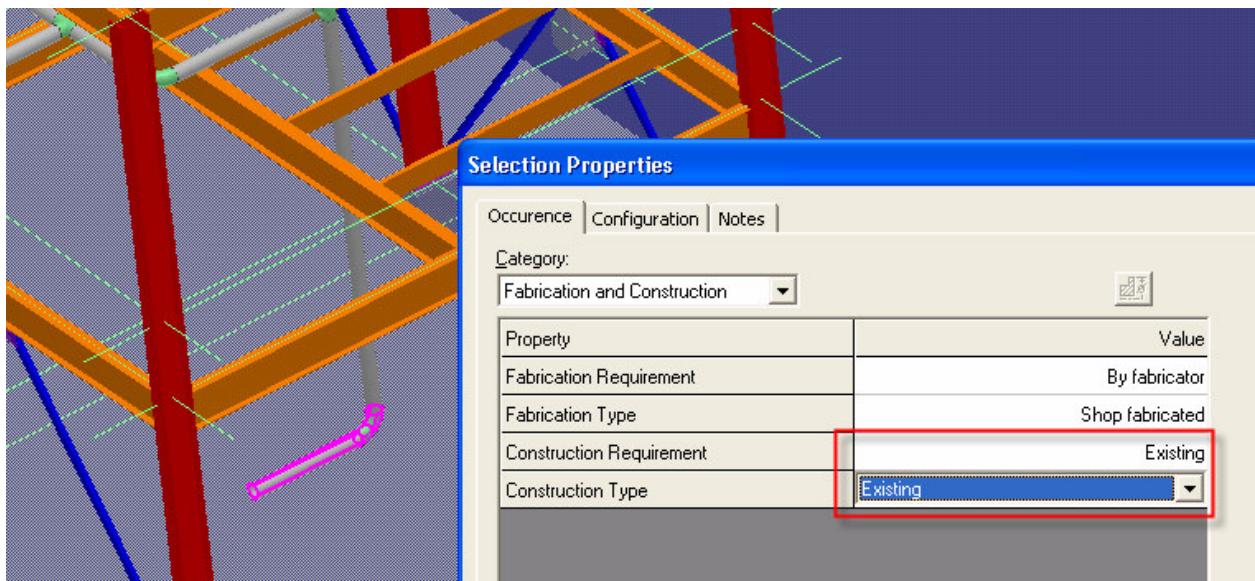


- 11) Click OK to define the new filter and then select it for the style.

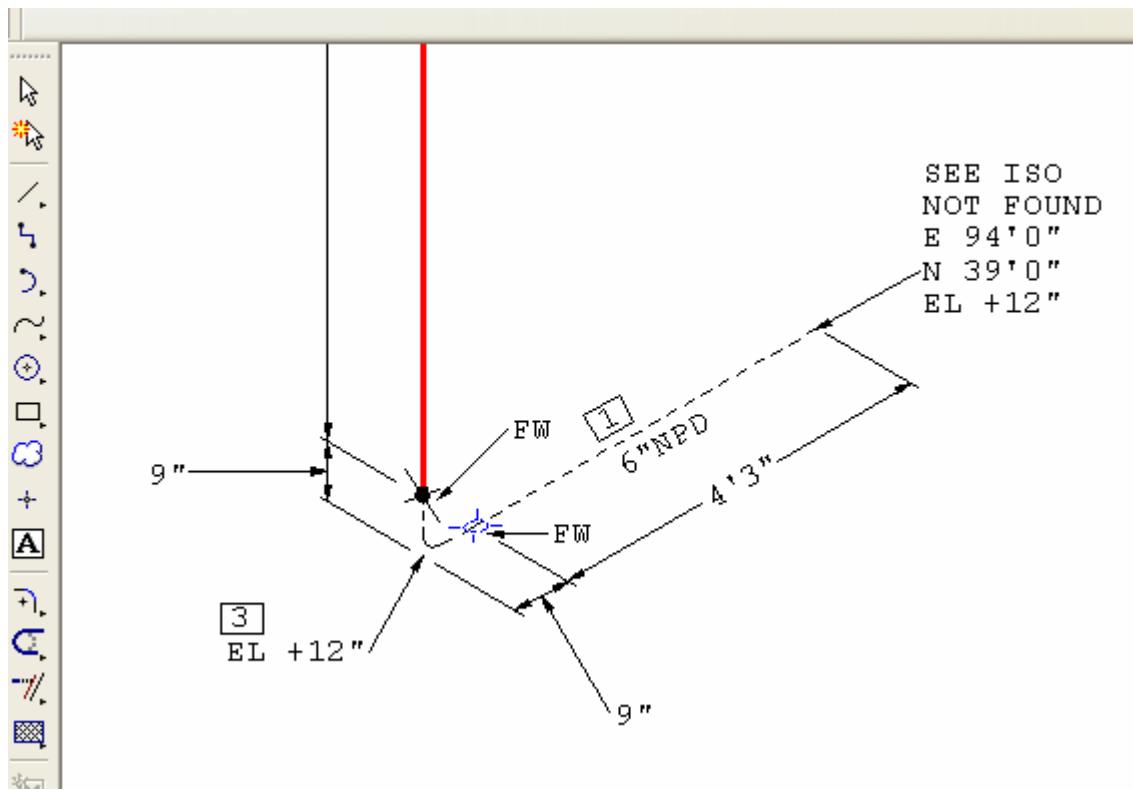
- 12) A predefined filter '**Piping Isometric Dotted Symbology**' can also be used instead which has identical filter definitions described above.



- 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.

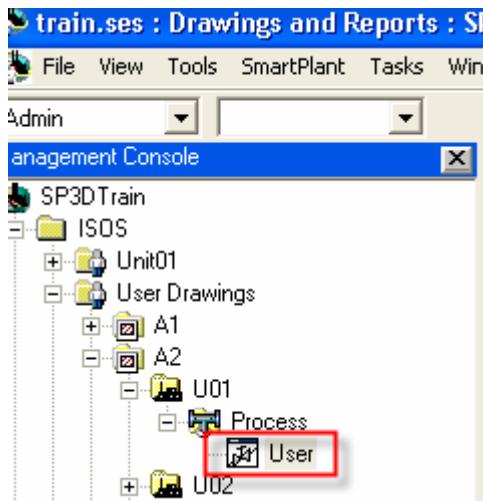


This completes Lab 11

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 and you will see the current definitions:

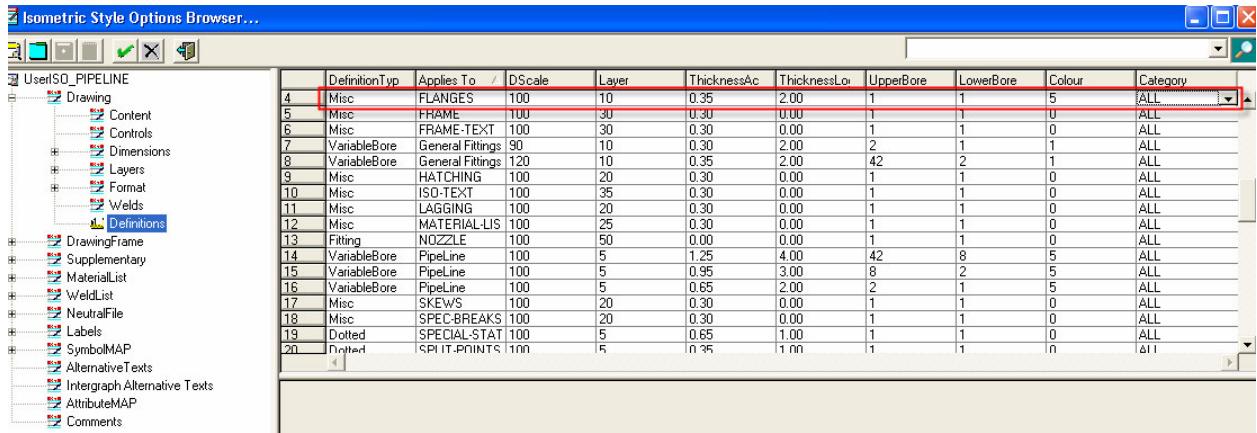
The screenshot shows the Isometric Style Options Browser window. The left pane is a tree view of drawing definition categories, and the right pane is a grid of definition details. A red box highlights the 'Definitions' item in the tree view.

	DefinitionTyp	Applies To	DScale	Layer	ThicknessAc	ThicknessLo	UpperBore	LowerBore	Colour	Category
1	VariableBore	PipeLine	100	5	0.65	2.00	2	1	5	ALL
2	VariableBore	PipeLine	100	5	0.95	3.00	8	2	5	ALL
3	VariableBore	PipeLine	100	5	1.25	4.00	42	8	5	ALL
4	Dotted	SPLIT-POINTS	100	5	0.35	1.00	1	1	0	ALL
5	Dotted	SPECIAL-STAT	100	5	0.65	1.00	1	1	0	ALL
6	Dotted	CONTINUATIO	100	5	0.35	1.00	1	1	0	ALL
7	VariableBore	General Fittings	90	10	0.30	2.00	2	1	1	ALL
8	VariableBore	General Fittings	120	10	0.35	2.00	42	2	1	ALL
9	Fitting	NOZZLE	100	50	0.00	0.00	1	1	0	ALL
10	Fitting	WELDS	100	45	0.35	1.00	1	1	0	ALL
11	VariableBore	UNDIMENSION	110	10	0.65	2.00	1	1	0	ALL
12	Misc	DIMENSION-TI	100	15	0.30	0.00	1	1	0	ALL
13	Misc	DIMENSION-LI	100	20	0.30	0.00	1	1	0	ALL
14	Misc	ISO-TEXT	100	35	0.30	0.00	1	1	0	ALL
15	Misc	FRAME-TEXT	100	30	0.30	0.00	1	1	0	ALL
16	Misc	SKEWS	100	20	0.30	0.00	1	1	0	ALL
17	Misc	HATCHING	100	20	0.30	0.00	1	1	0	ALL
18	Misc	LAGGING	100	20	0.30	0.00	1	1	0	ALL
19	Misc	TRACING	100	20	0.30	0.00	1	1	0	ALL
20	Misc	FRAME	100	30	0.30	0.00	1	1	0	ALL
21	Misc	WELD-BOX	100	30	0.30	0.00	1	1	0	ALL
22	Misc	SPEC-BREAKS	100	20	0.30	0.00	1	1	0	ALL
23	Misc	MATERIAL-LIS	100	25	0.30	0.00	1	1	0	ALL

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

- 3) Select the first item and insert a new entry using the green tick

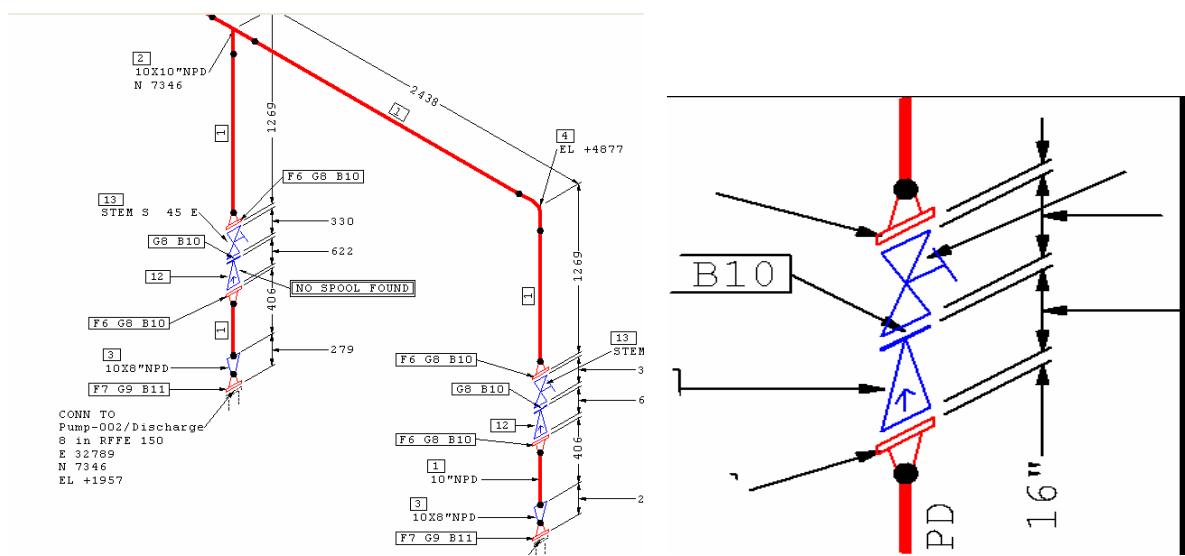
- 4) As the definition type, select Misc, applies to = Flanges, DScale = 100, Layer = 10, ThicknessActual = 0.35, ThicknessLogical = 2.00, UpperBore = 1, LowerBore = 1, Colour = 5, Category = ALL as shown:



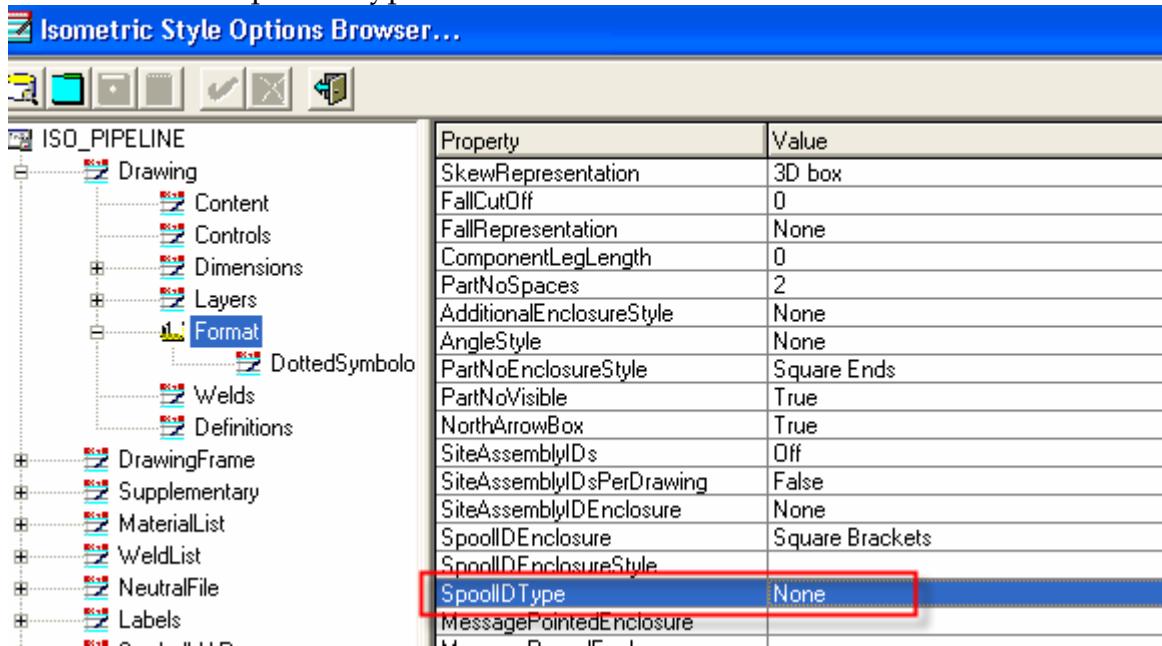
- 5) In the current drawing, the flanges are being shown in blue, this will change them to be drawn red (the same as the pipe).

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.

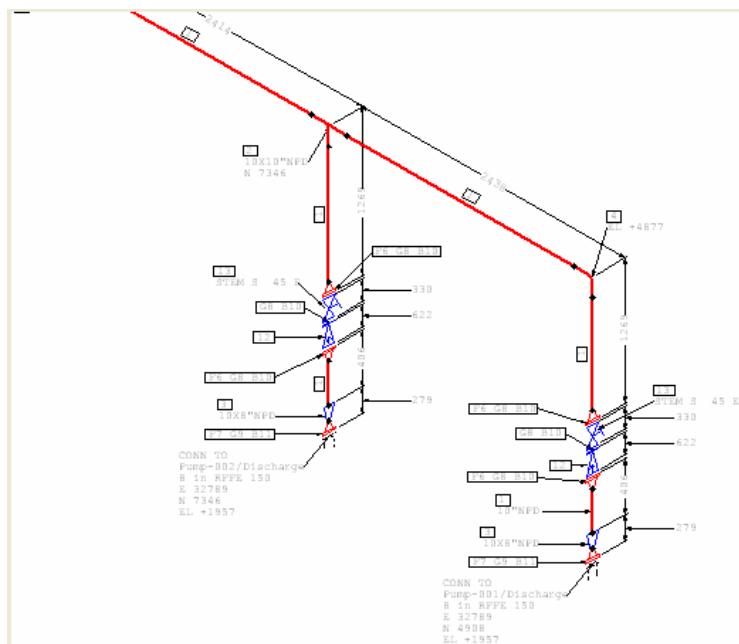
- 6) Save the changes to the catalog by clicking the 'Save to Catalog' icon: and close the Options Browser.
 7) Update the drawing 1001-P under U01.



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



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

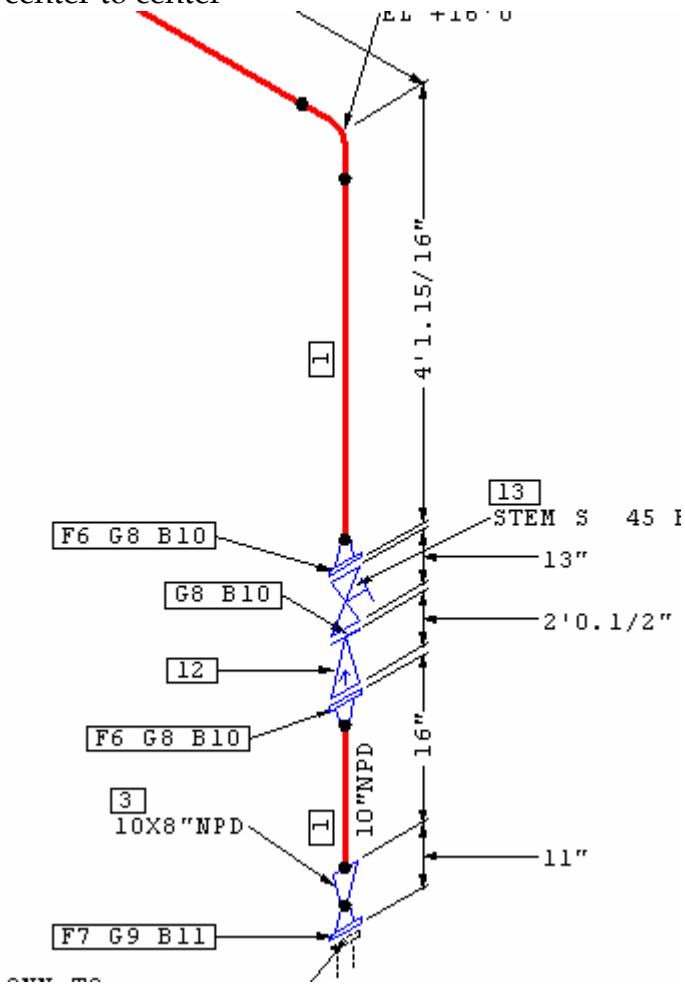


You will notice the 'NO SPOOL FOUND' message is no longer shown.
This completes Lab12

Lab 13: Drawing Dimensioning and Coordinates

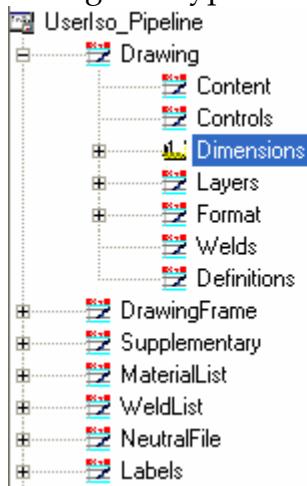
Change Dimension Style to Full String

- 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

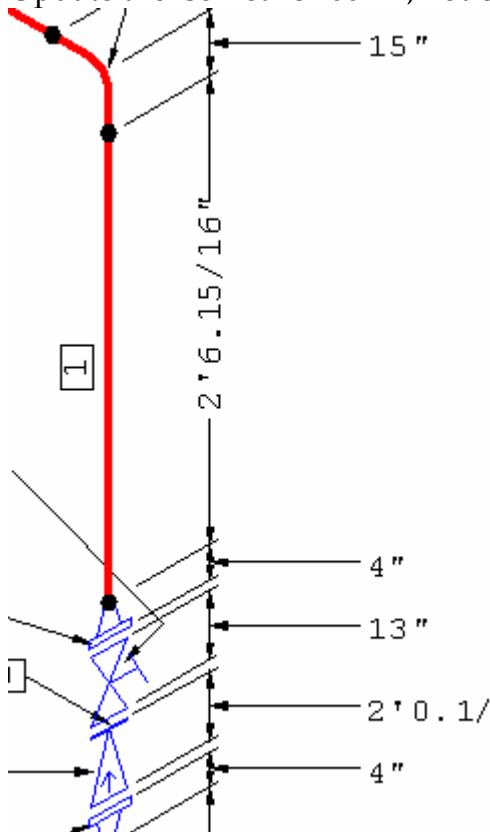
- 3) Change the type to 'Full String'



Property	Value
AddRoundOff	Normal
AdditionalAllowances	False
BranchBoreLimit	0
BranchCptLimit	0
CoordOutputBOP	False
CoordOutputBends	Elev at changes
CoordOutputBranches	Elev and Coords at changes
CoordSupports	None
CoordType	Arrowed
DoubleUnits	False
Format	Basic
FtInTolerance	Composite
Gaskets	Support
ImperialFormat	Reference Only
Inches	Basic
MetresCoordinates	Full String

- 4) Save to catalog and exit option browser.

- 5) Update the isometric 1001-P, notice dimensions

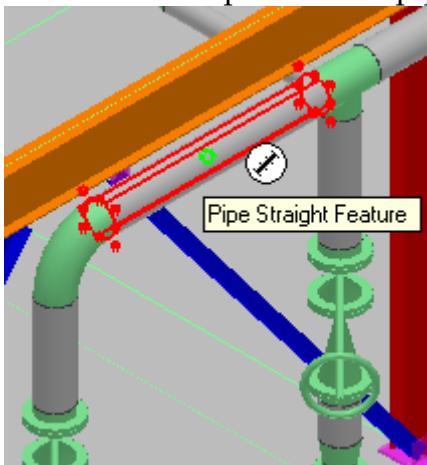


- 6) Switch format back to Basic for next labs.

Dimension to Tie-In Points

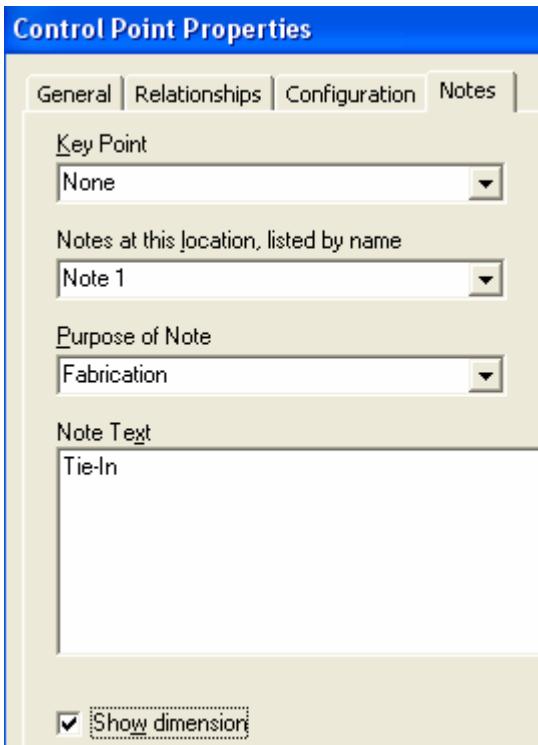
Dimensioning to tie-in points is achieved by placing a control point as a child of a pipe part, then placing a note on the control point of the type 'Fabrication' and turning the 'Show Dimension' check box of the note on.

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

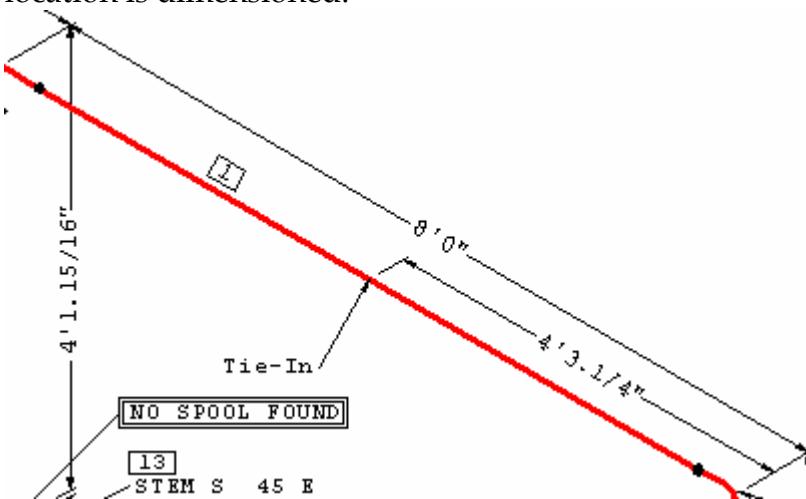


- 4) With the control point selected, invoke the property page
- 5) Click the notes tab and click 'New Note'

-
- 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.

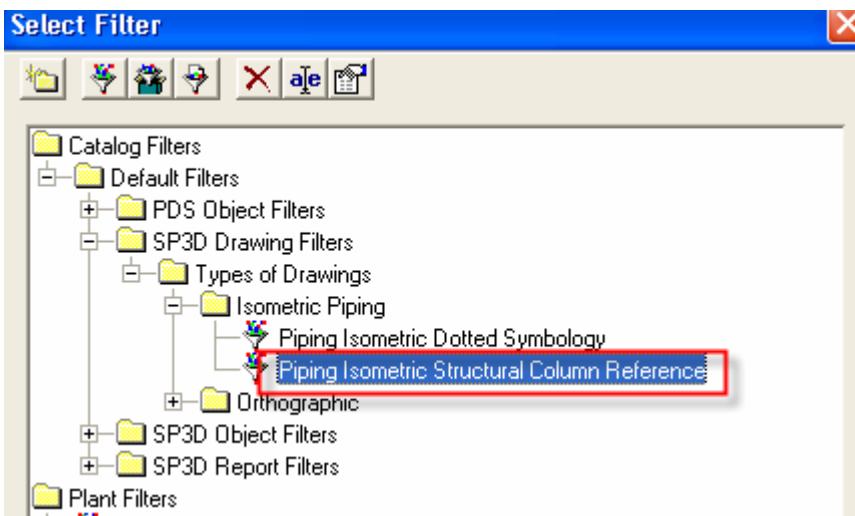


Column/Grid Reference

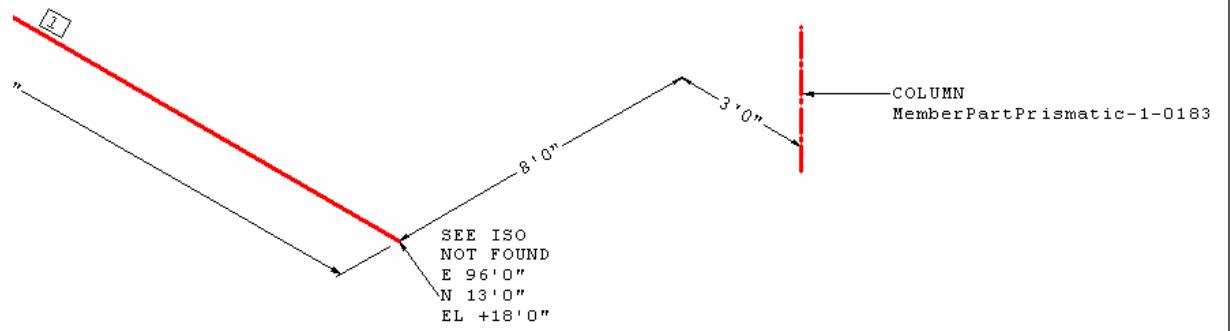
- 1) Edit Options for the 'User' Style.
- 2) Select Drawing.Dimensions.ColumnReference
- 3) Set Enable to True



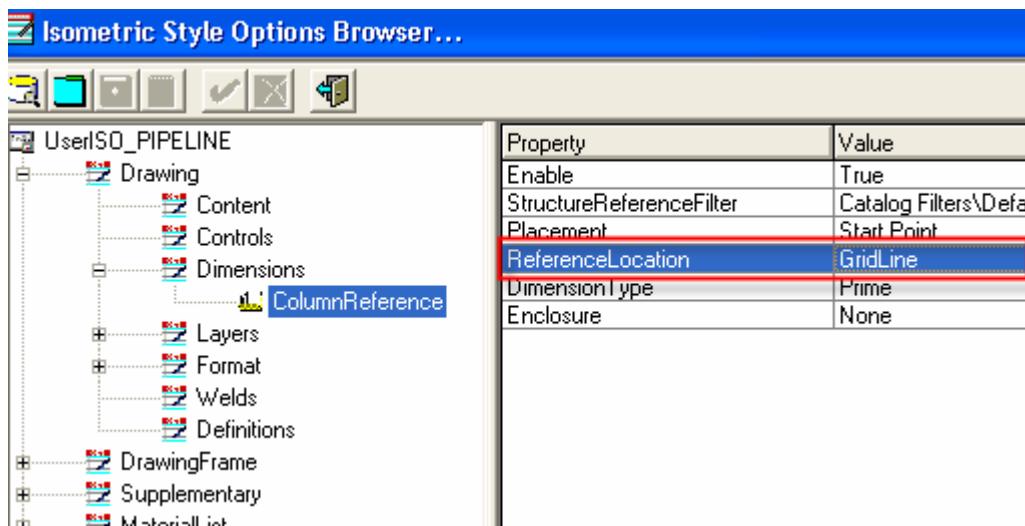
- 4) In the StructuralReferneceFilter field, select the ellipsis (...), this opens the Select Filter dialog and select filer named '**Piping Isometric Structural Column Reference**' from Catalog Filters>Default Filters>SP3D Drawing Filters>Types of Drawings>Isometric Piping.



- 5) Select the filter above and click OK.
- 6) Save to Catalog.
- 7) Extract line 1002-P. You should see structural columns referenced on the iso.



- 8) Similarly, 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

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

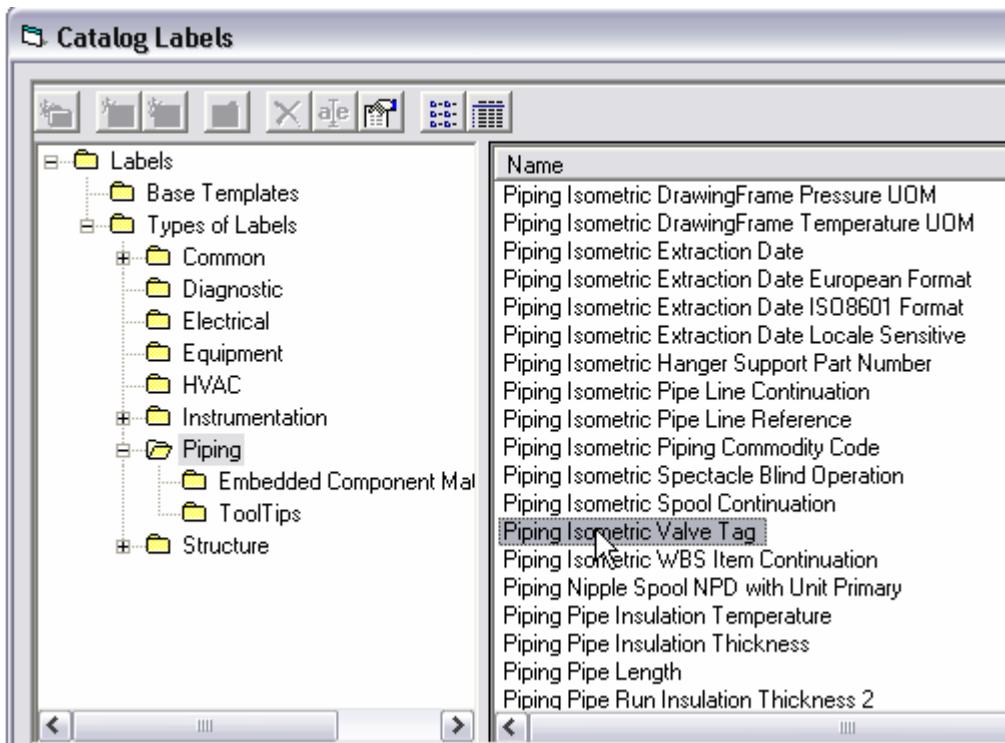
- MESSAGE-TRIANGLE
- MESSAGE-DIAMOND
- MESSAGE-CIRCLE

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

- 1) Edit Options for the 'User' style, expand the tree to find Labels.ComponentNote and then click the green check to insert a row.

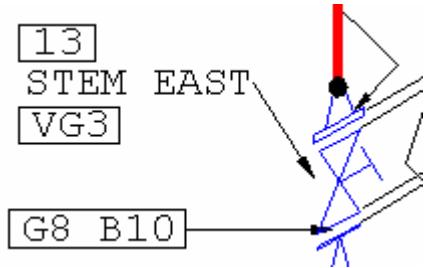


- 2) In the LabelAttribute2 column, select VALVE, then in the label column, browse to the catalog for the Catalog Labels and pick the Piping> Piping Isometric Valve Tag label



- 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.



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 a style, expand the tree to Labels.ComponentNoteConditional and insert a row.

- 2) Set the values for the row as shown

	Label#	TestLabelName	Message	TestValues	OutputLabelName
1	VALVE	Piping Isometric Valve Tag	Message	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.

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
1	END-CONNECTION-EQUIPMENT	Piping Isometric Continuation Label Type A
2	END-CONNECTION-PIPELINE	Piping Isometric Pipe Line Continuation

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

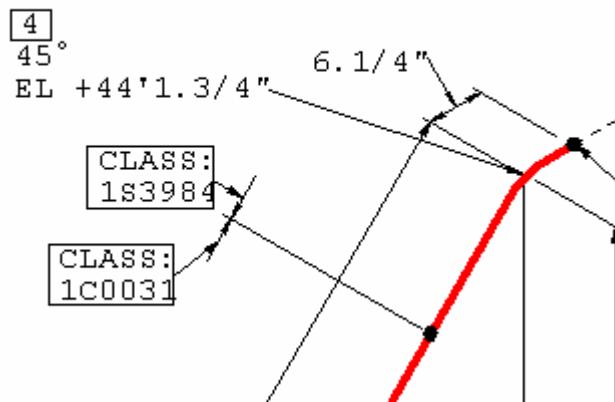
Add a new break for cleaning requirement

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.

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.

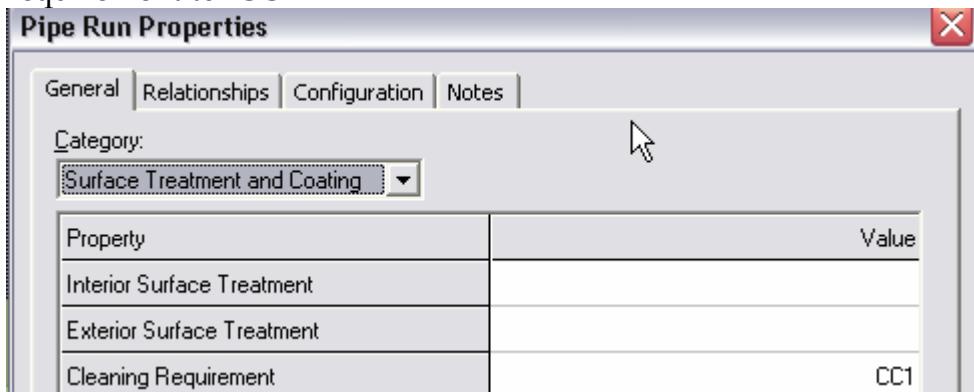
- 1) Edit Options for the Iso Pipeline style, expand the tree to find Labels.MiscSpec
- 2) Notice that MISC-SPEC-3 is already set to use a label.

	LabelAttribute	LabelName
1	MISC-SPEC3	Piping Isometric Cleaning Requirement

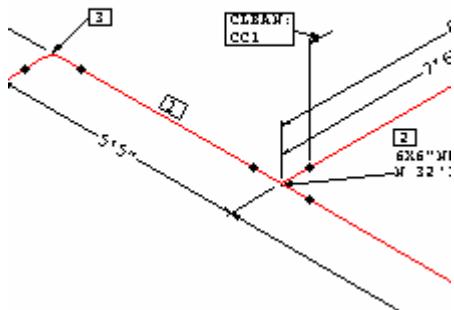
- 3) The ATEXT corresponding to MISC-SPEC-3 is numbered -295. Expand AlternativeTexts and scroll down to notice that the value for this ATEXT is set to CLEAN:

ISOGENTE	AlternateText
33	-288 LINE :
34	-289 CLASS:
35	-290 INSUL:
36	-291 TRACE:
37	-292 COAT :
38	-295 CLEAN:

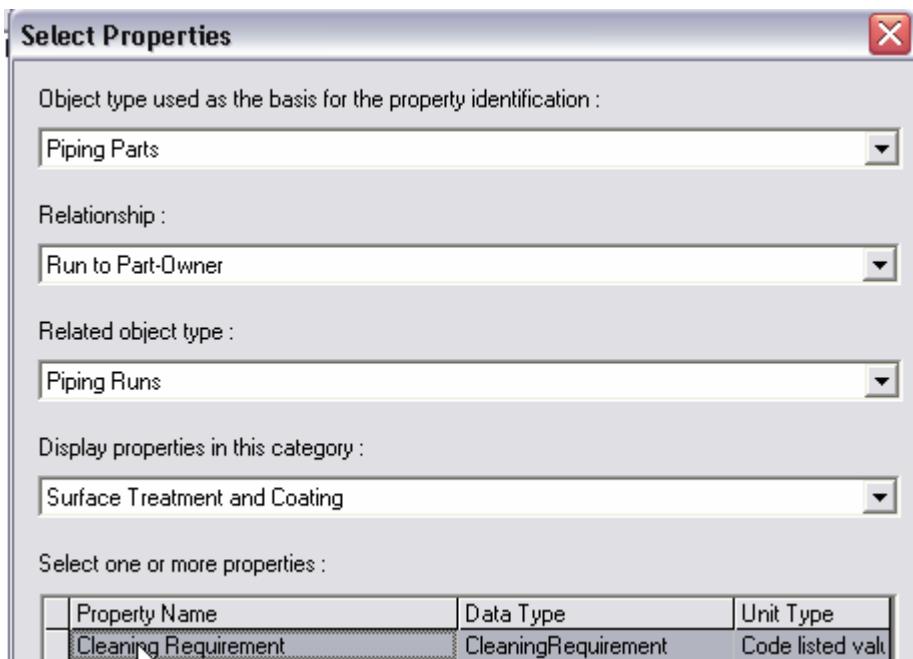
- 4) Switch to Piping task, select the pipe run Unit1-6-P-0102-1C0031 and set its cleaning requirement to 'CC1'



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



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



Labels.ComponentAttrs

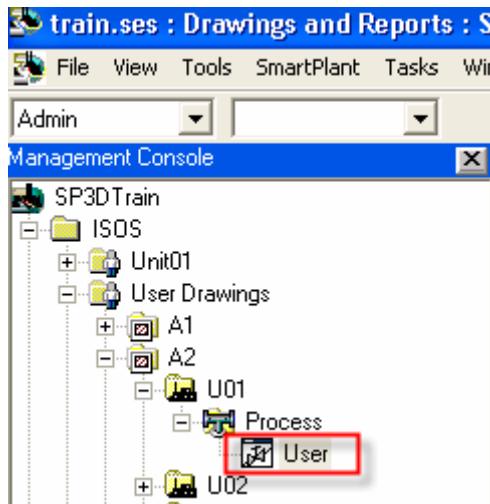
These labels, if present in the style, are evaluated for each piping part and written to the PCF file. This PCF file can then be read by Stress Analysis software such as CAESAR II.

	CompAttribute	LabelName
1	COMPONENT-ATTRIBUTE1	Piping Stress Analysis Operating Pressure
2	COMPONENT-ATTRIBUTE10	Piping Stress Analysis Test Pressure
3	COMPONENT-ATTRIBUTE2	Piping Stress Analysis Operating Temperature
4	COMPONENT-ATTRIBUTE3	Piping Stress Analysis Material Grade
5	COMPONENT-ATTRIBUTE4	Piping Stress Analysis Wall Thickness (port2)
6	COMPONENT-ATTRIBUTE5	Piping Stress Analysis Insulation Thickness
7	COMPONENT-ATTRIBUTE6	Piping Stress Analysis Insulation Density
8	COMPONENT-ATTRIBUTE7	Piping Stress Analysis Corrosion Allowance
9	COMPONENT-ATTRIBUTE8	Piping Stress Analysis Dry Weight in lbm
10	COMPONENT-ATTRIBUTE9	Piping Stress Analysis Fluid Density

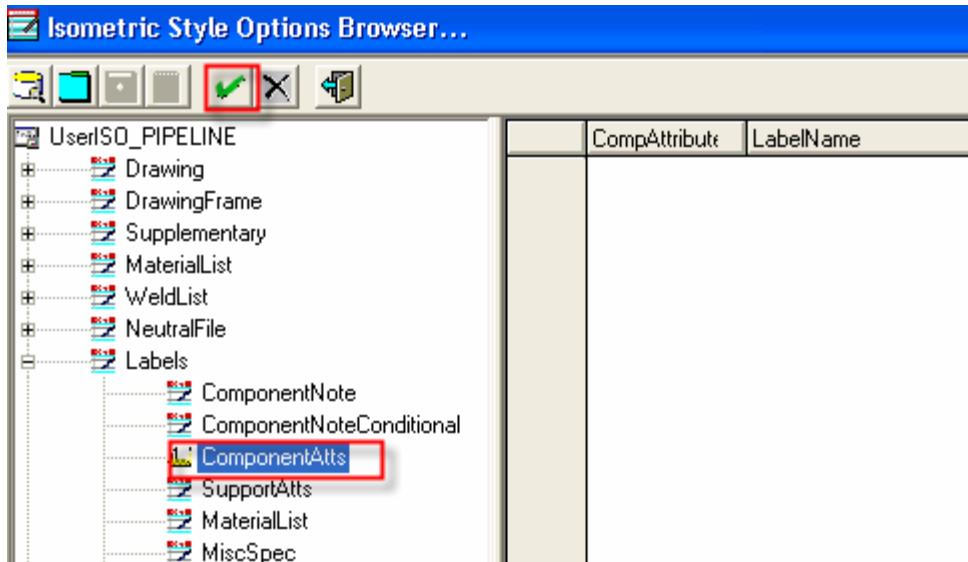
Adding Component Properties:

In this Lab, you will define additional component properties to be output to the PCF file.

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



- 2) Expand the tree to find Labels.ComponentAttrs and then click the green tick to insert a row



- 3) Component Attribute = COMPONENT-ATTRIBUTE1
Label = Labels\.\Type of Labels\Piping\Embedded Component Material Descriptions\Port Labels\Schedule Thickness 1
- 4) Click the green tick  to insert another row
- 5) Component Attribute = COMPONENT-ATTRIBUTE2
Label = Labels\.\Type of Labels\Piping\Embedded Component Material Descriptions\Port Labels\Schedule Thickness 2
- 6) Save to the catalog and update line 1001-P.
- 7) 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

```

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}

```

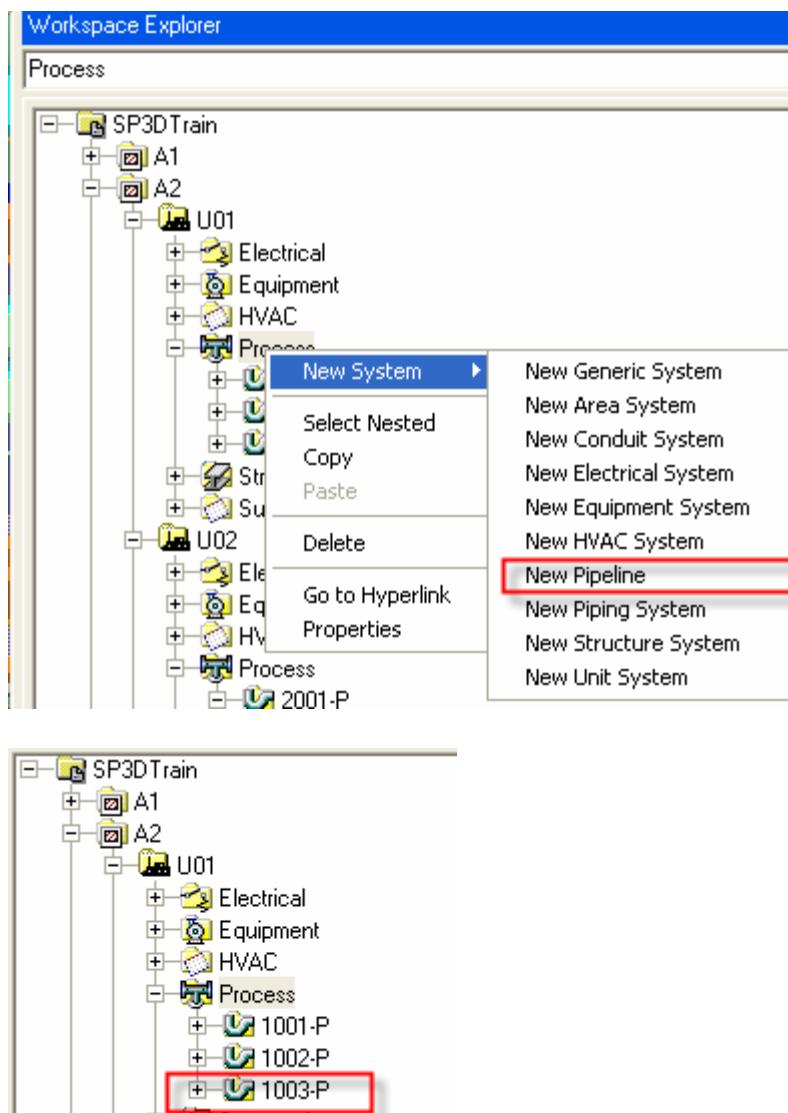
Tip: These properties could be placed in the material list, in a material report and may be of use for fabrication and stress analysis.

Lab16: Bolt Set and Gasket Ownership

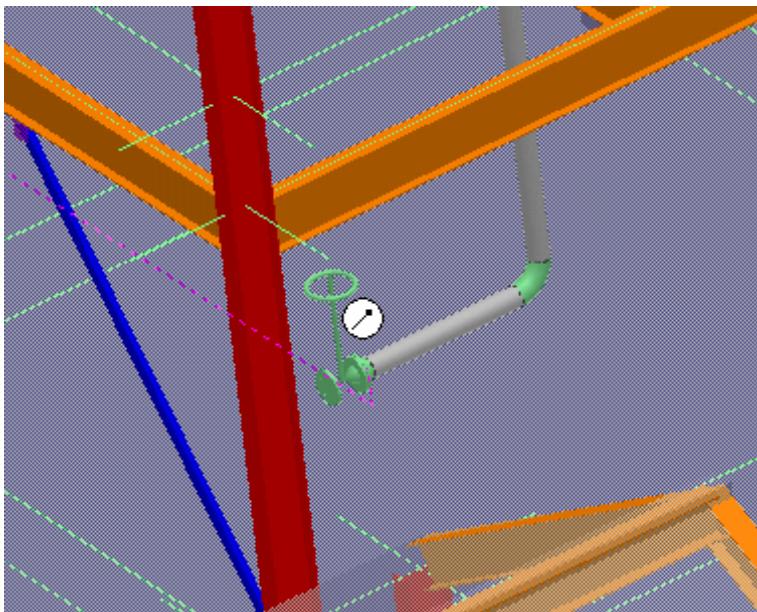
In design, many a times there is a need to assign ownership of Bolts and Gaskets to a specific component. In SP3D modeling, the ownership of Bolts and Gaskets are by default assigned to a base part (For eg. In case of Flanged Valves with Mating Flanges, Owning Part for Bolt set and Gaskets would be applied to the Valve which is the Base part)

Let's consider that we want to modify the Owing Part for Bolts and Gaskets to the mating flange of a valve in the model and verify if the Isometrics reflects the same.

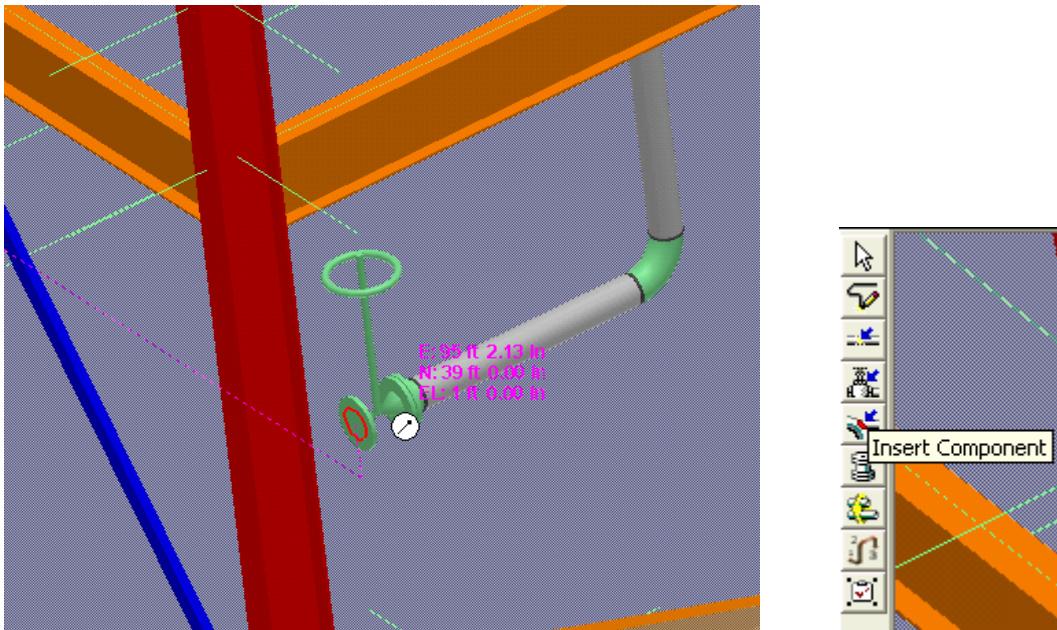
- 1) Create a new Pipeline named 1003-P under A2-U01-Process



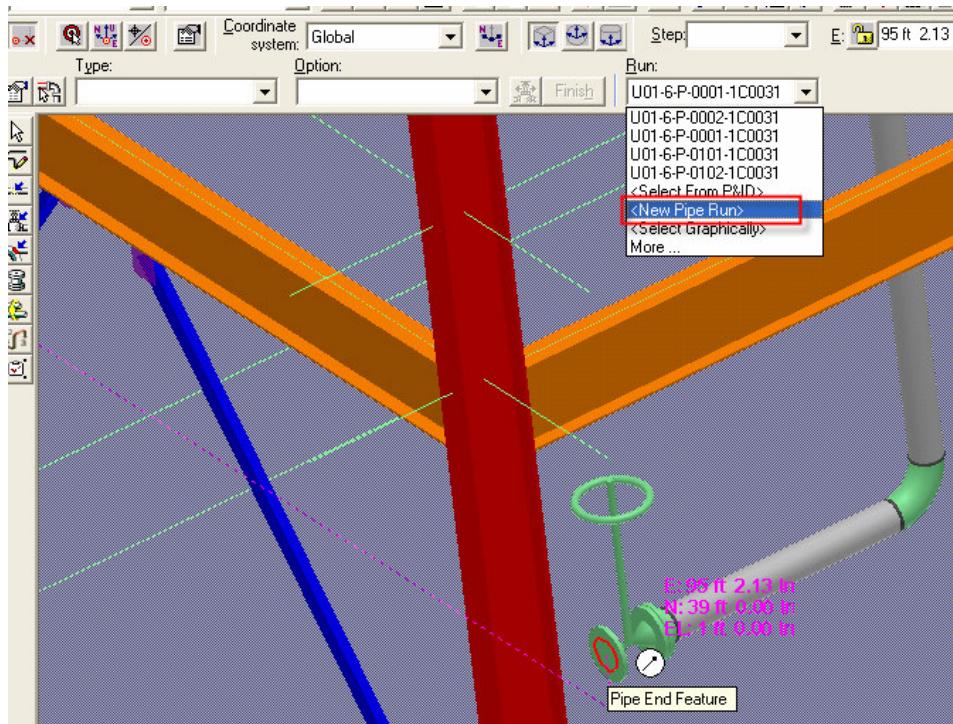
-
- 2) In Piping task, Insert a default Flange and a Gate Valve at the open end of Pipeline 1002-P



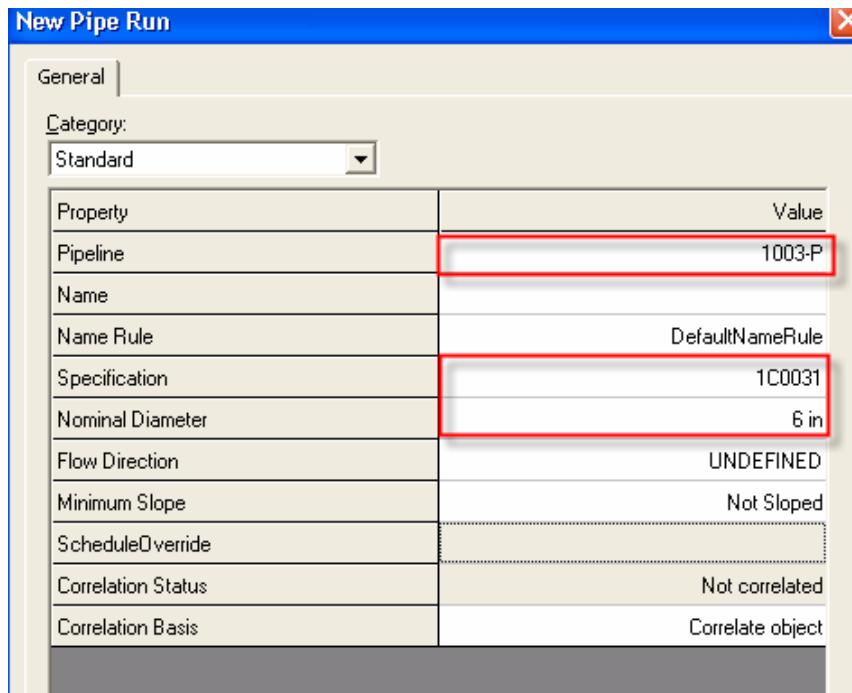
- 3) Select end feature of the Flange as shown in the picture and execute Insert Component command from vertical tool bar.



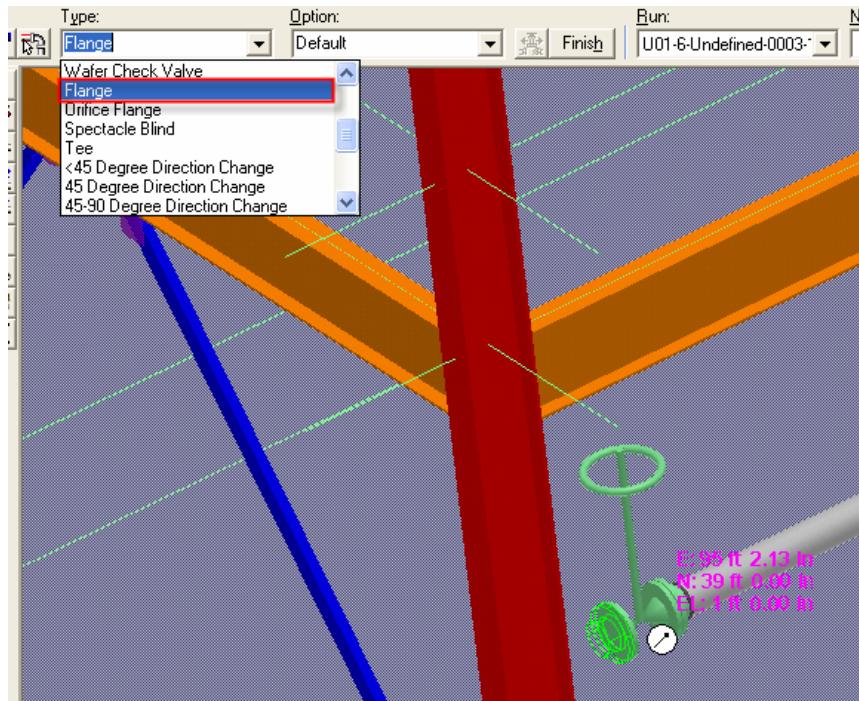
- 4) From the Ribbon Bar, select New Pipe Run as we want the flange to belong to a new Run of Pipeline 1003-P



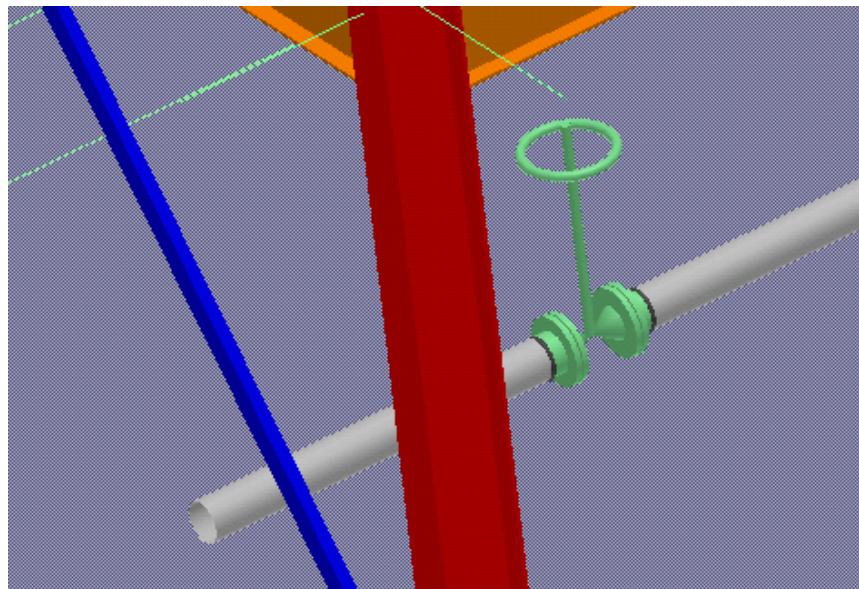
- 5) Select Pipeline as 1003-P and specify Specification as 1C0031 and NS as 6 in and Hit OK



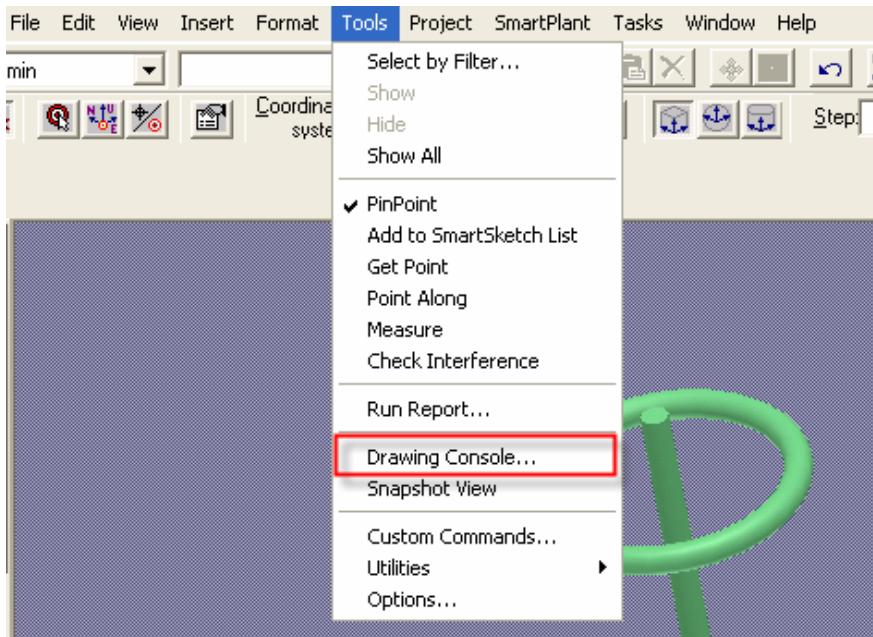
-
- 6) Select Flange from 'Type' drop down list



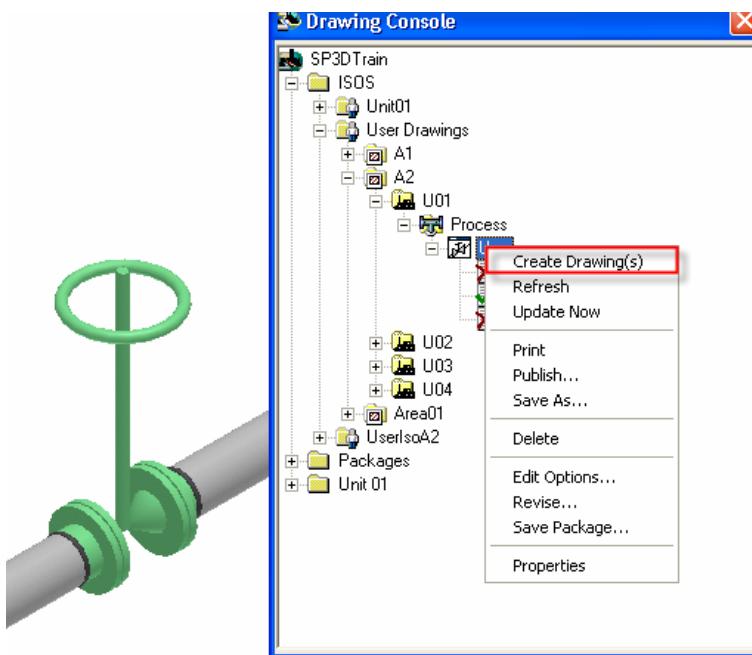
- 7) Place a Pipe of 5 ft length connecting the flange placed in the step above.



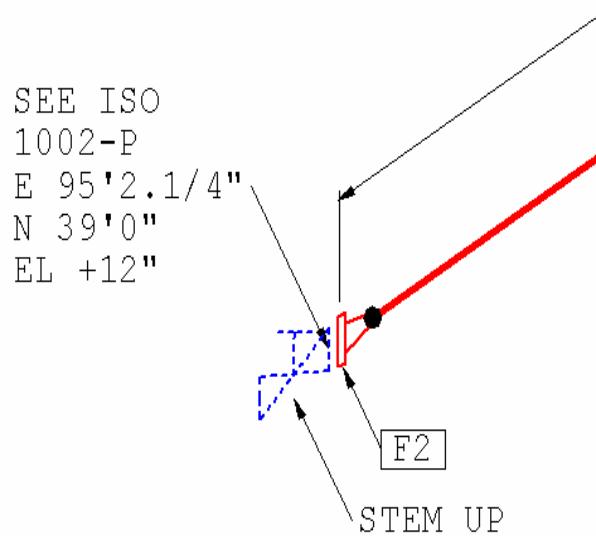
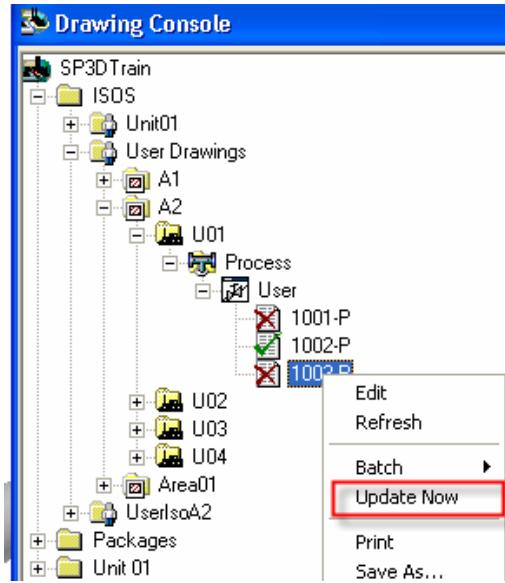
- 8) In SmartPlant 3D version 2007, Service Pack 4 and above, the drawing console is available from within all tasks. It is displayed from the Tools -> Drawing Console menu item:



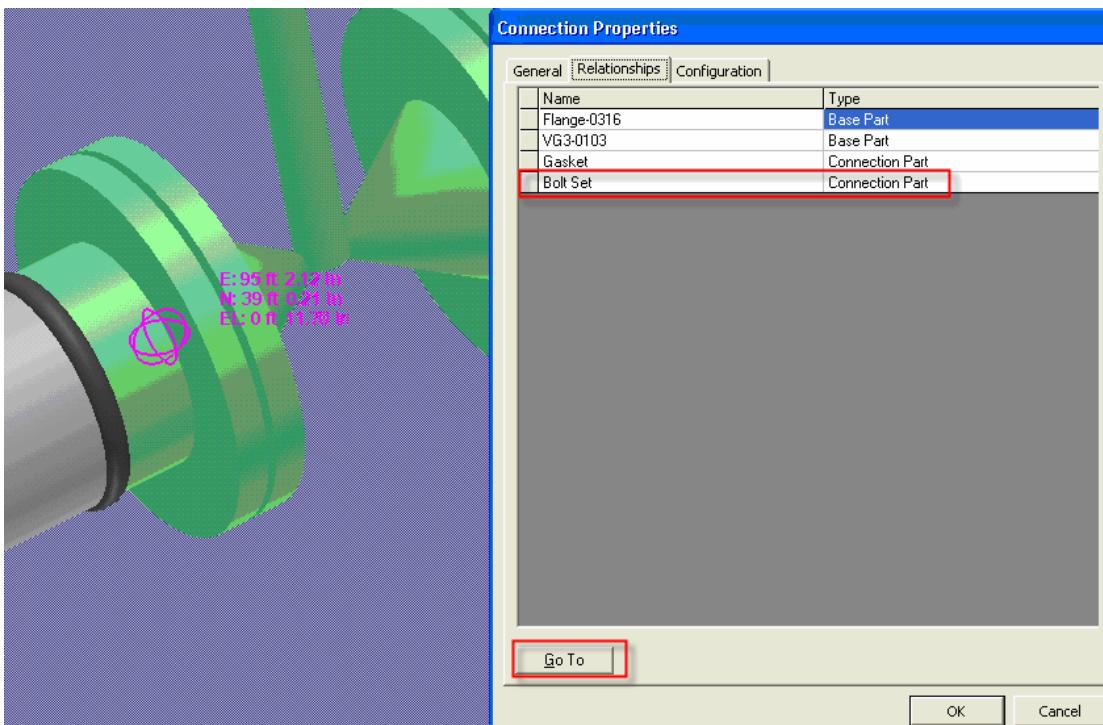
- 9) Right Click 'User' style and Create Drawing for newly routed Pipeline 1003-P



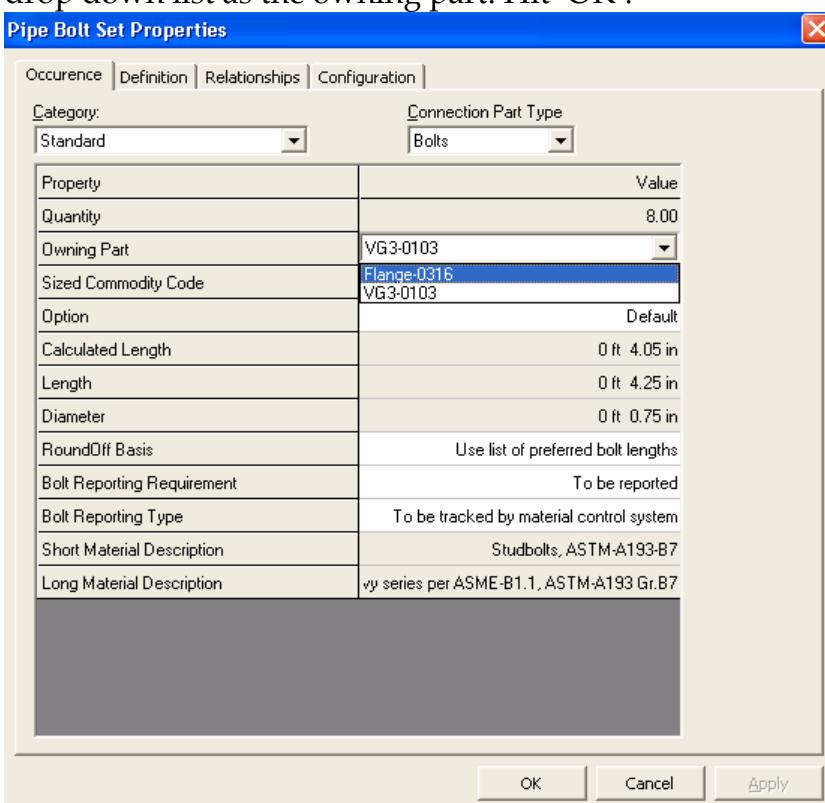
-
- 10) Update the Isometric 1003-P and observe the Flange connected to Gate Valve doesn't include Bolts and Gaskets.



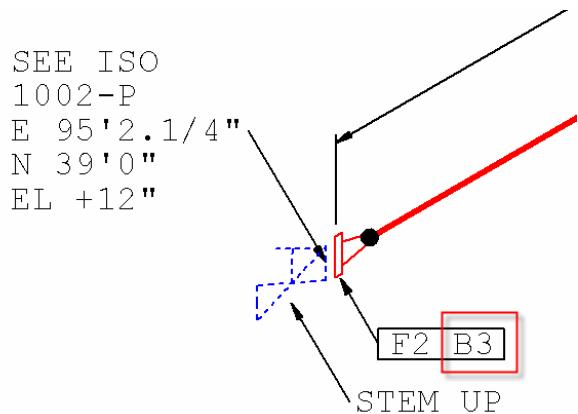
- 11) Since our goal is to assign the ownership of the Bolts and gaskets to the mating flange in 1003-P Pipeline, In Piping Task, select a 'Connection' between the Flange and Gate Valve and Edit-> Properties. Under Relationship Tab, select Bolt Set and Hit 'Go to' Tab



- 12) In Occurrence Tab of Bolt Set Properties, 'Owning Part' field allows user to select the Owning Part for the selected Bolt set.
- 13) The default value would be the Name of the Gate Valve. Select Flange from the drop down list as the owning part. Hit 'OK'.



-
- 14) Update Isometric drawing 1003-P and now since the Owing part of the Bolt set is Flange Isometric reflects the assignment of Bolts to the Flange. Similarly Ownership of Gaskets can be set same way as we did for Bolt set.



Lab 17: 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)

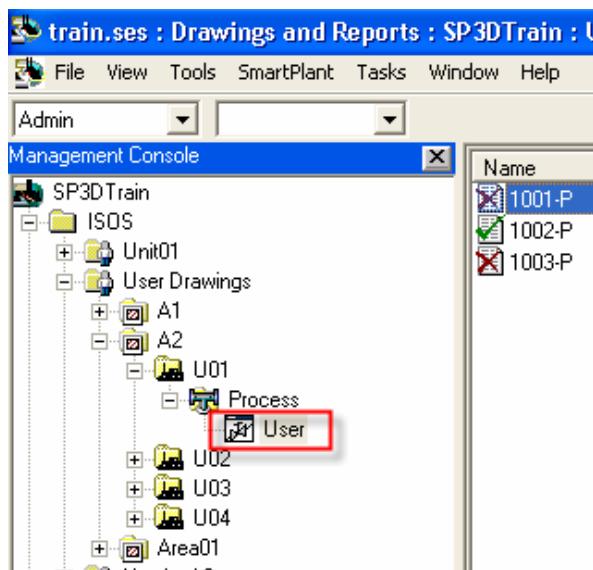
It is also possible to use labels to define attributes. Several AlternativeTexts can be set or unset to modify the column and section headings for the material list as well as to control if certain elements are shown at all.

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	SHOP MATERIALS			NPD (IN)	CMD TY CODE	QTY
	DESCRIPTION					
1	Pipe, S-STD, BE, ASTM-A53-B Type S			10	PAAZZBOZZABAABOA	20.5'
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
OTHER THAN SHOP MATERIALS						
PT NO	DESCRIPTION			NPD (IN)	CMD TY CODE	QTY
	DESCRIPTION					
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	VAAAHABAHAJDADAZ	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.*

The screenshot shows a software interface with a tree view on the left and a table on the right.

Tree View (ISO_PIPELINE):

- ISO_PIPELINE
 - Drawing
 - DrawingFrame
 - Supplementary
 - MaterialList
 - WeldList
 - NeutralFile
 - Labels
 - SymbolMAP
 - AlternativeTexts (highlighted in blue)
 - Intergraph Alternative Texts
 - AttributeMAP
 - Comments

Table (ISOGENText vs. AlternateText):

ISOGENText	AlternateText
34	-288
35	-289
36	-290
37	-291
38	-292
39	-298
40	-300
41	-303
42	-304
43	-305
44	-307
45	-308
46	-309
47	-310
48	-311
49	-312
50	-313
51	-314
52	-315
53	-316
54	-317
55	-318

- 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.

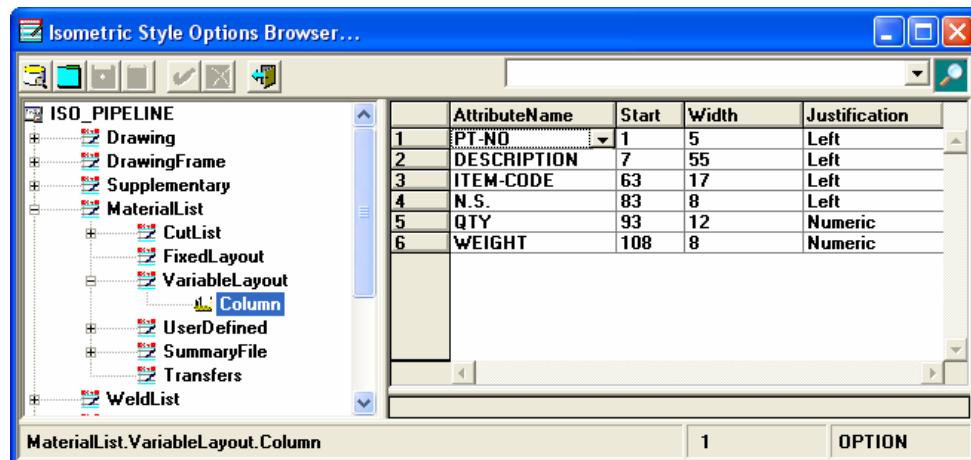
The screenshot shows a material list table with columns for PT NO, COMPONENT DESCRIPTION, NPD (IN), CMD TY CODE, and QTY.

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

- 1) 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.

- 2) 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.

- 3) 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.

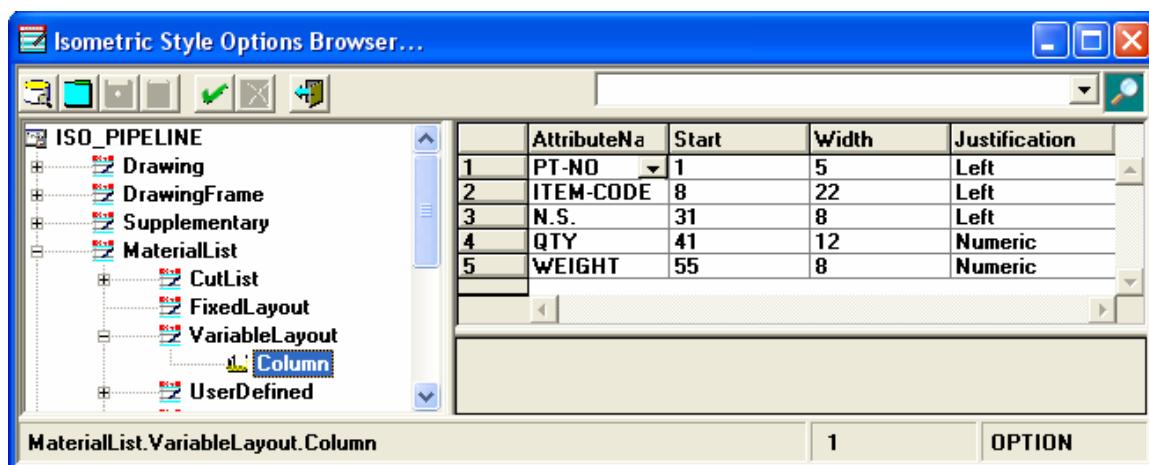
Note: If MaterialList.ExcludeWeightData is set to TRUE or if MaterialList.WeightsStyle is set to None, no weight will be displayed in the Material List on the Iso Drawing.

4) 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 “ | ” 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
1234567 8 9012345678901234567890 1 234567890 1 2345678901234 5 67890123	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
123456789012345678901234 5 67890123 4 5678901234567 8 901234 5 678901234	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.)	QTY	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.)	QTY	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

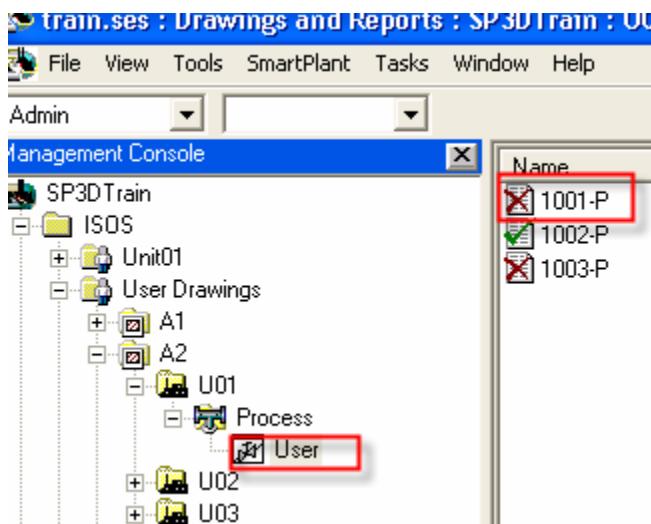
**PIPE, CS API 5L SML, GRD B, STD
WT**

Width = 10 characters

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

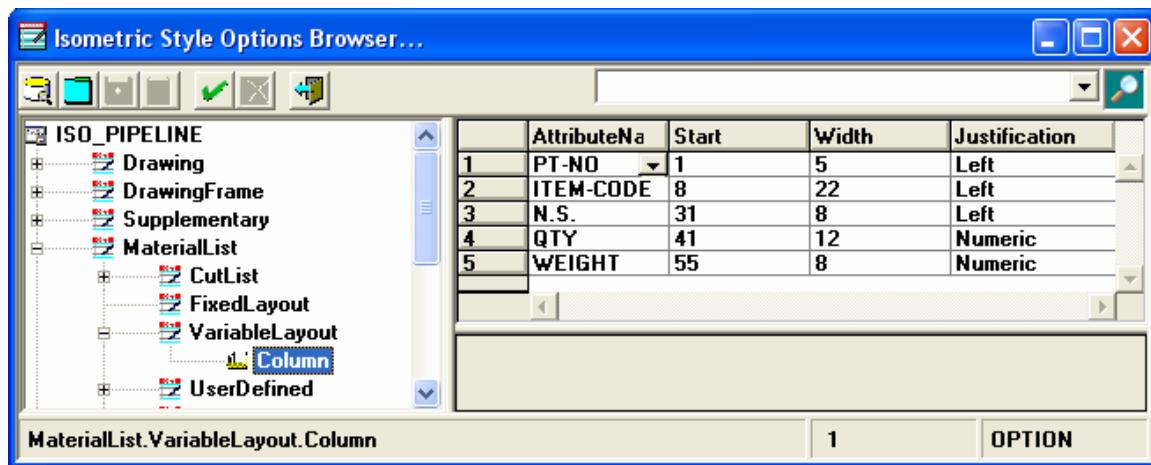
Lab

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

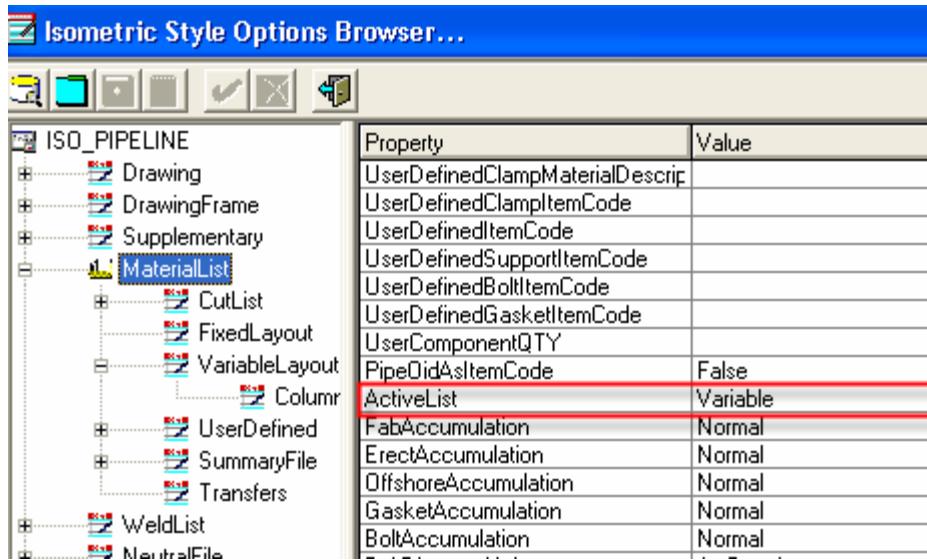


- 2) Expand MaterialList.VariableLayout.Column

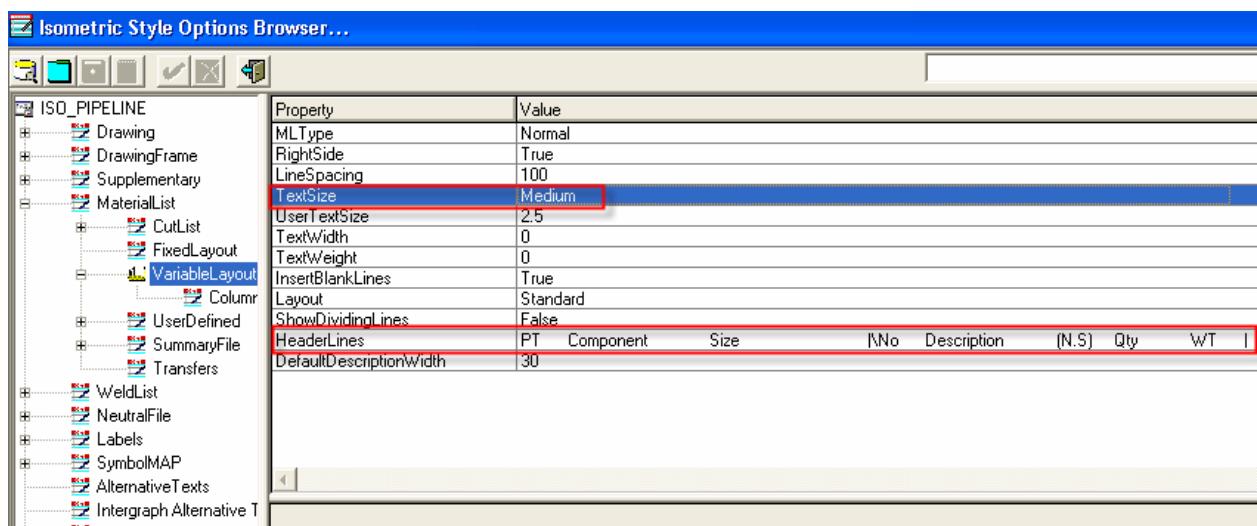
- 3) Fill in values as below



- 4) Set MaterialList.ActiveList to Variable



- 5) Refer the MaterialList.variableLayout formatting guidelines to format Header Line Columns
- 6) Set MaterialList.VariableLayout.TextSize to Medium



- 7) Set following options to set WeightData


```
MaterialList.ExcludeWeightData = FALSE
MaterialList.WeightsStyle = Total or Individual
```
- 8) Update isometric for line 1001-P and observe the Format of Variable Layout

SHOP MATERIALS

PT No	Component Description	Size (N.S)	Qty	WT
<u>PIPE</u>				
1	PAAZZBOZZABAABOA	10	20.5'	18.4
<u>FITTINGS</u>				
2	MDJZZBOZZAAEAD CZ	10X10	1	40.0
3	MBCZZBOZZAAEAD CZ	10X8	2	10.5
4	MCMZZBOZZAAEAD CZ	10	1	37.7
5	MBXZZBOZZAAEAD CZ	10	1	19.1
<u>FLANGES</u>				
6	FAAAHDCZZAADABQZ	10	4	23.6
7	FAAAHDCZZAADABQZ	8	2	17.7

OTHER THAN SHOP MATERIALS

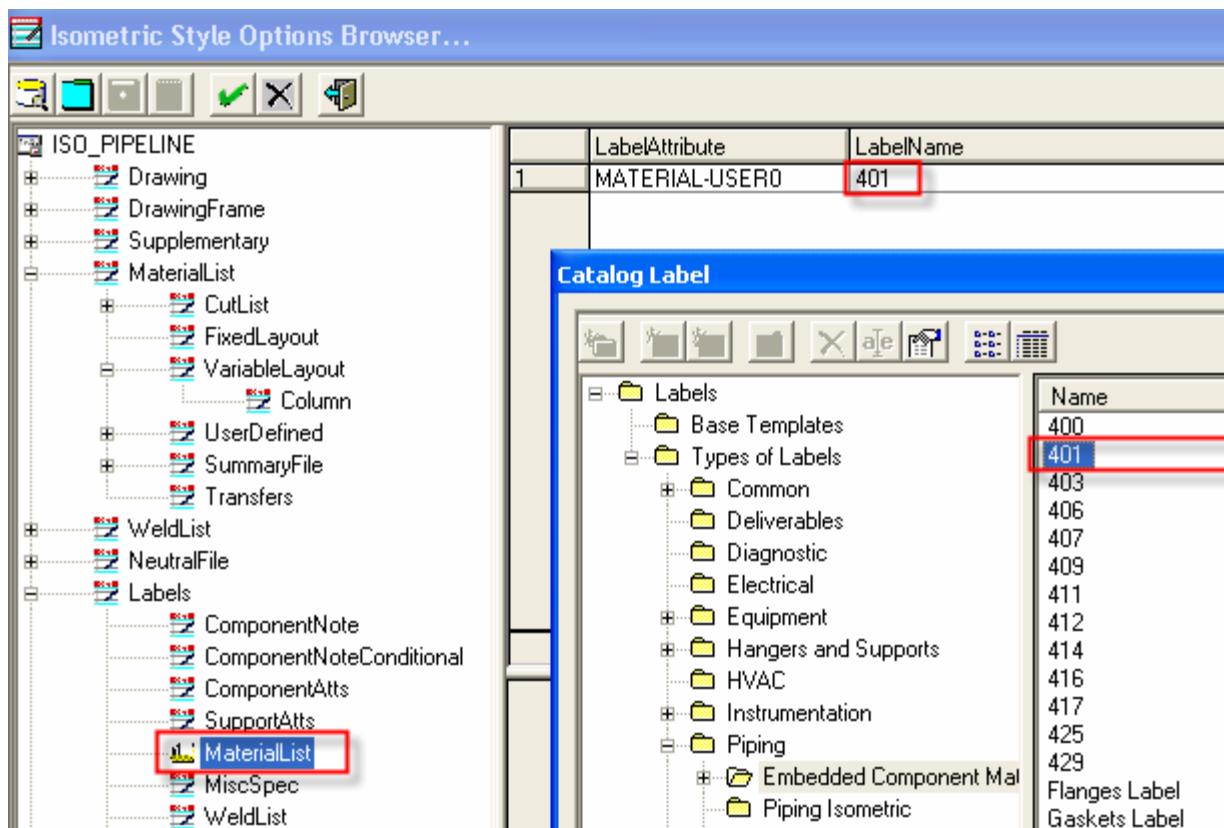
PT No	Component Description	Size (N.S)	Qty	WT
8	GMAHACABXBEPUS	10	6	-

Labels.MaterialList

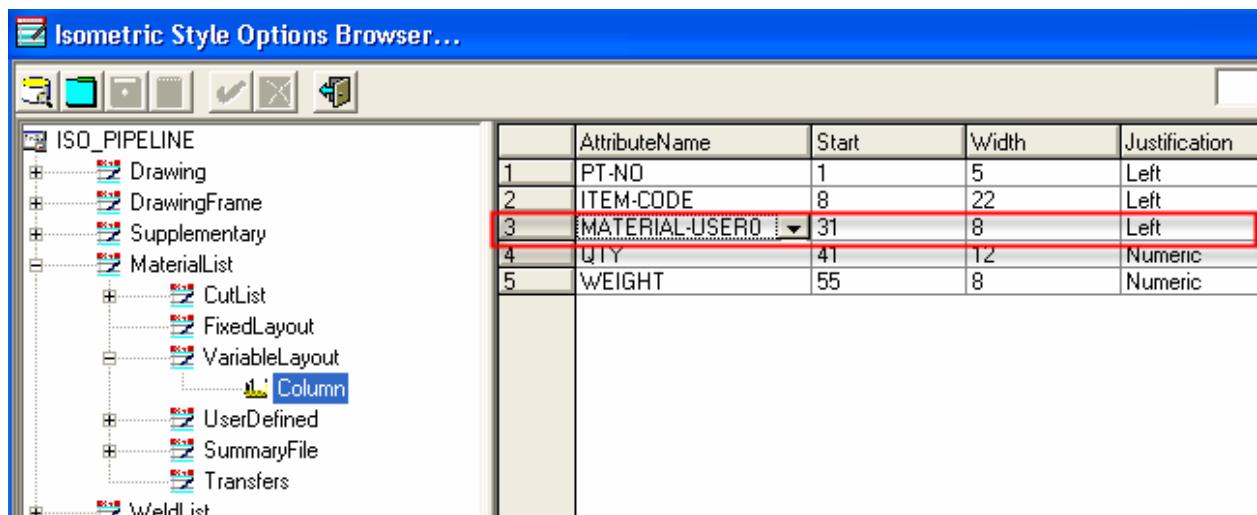
It is possible to add up to ten user-defined material list attributes. The label specified for each will be evaluated for each piping part and the result of the label will be written into the PCF and thence into the iso.

Lab:

- 1) Expand Labels.MaterialList and add a row
- 2) Select MATERIAL-USER0 as LabelAttribute and 401 as LabelName



- 3) Expand MaterialList.VariableLayout.Column
- 4) Replace the column N.S. by MATERIAL-USER0

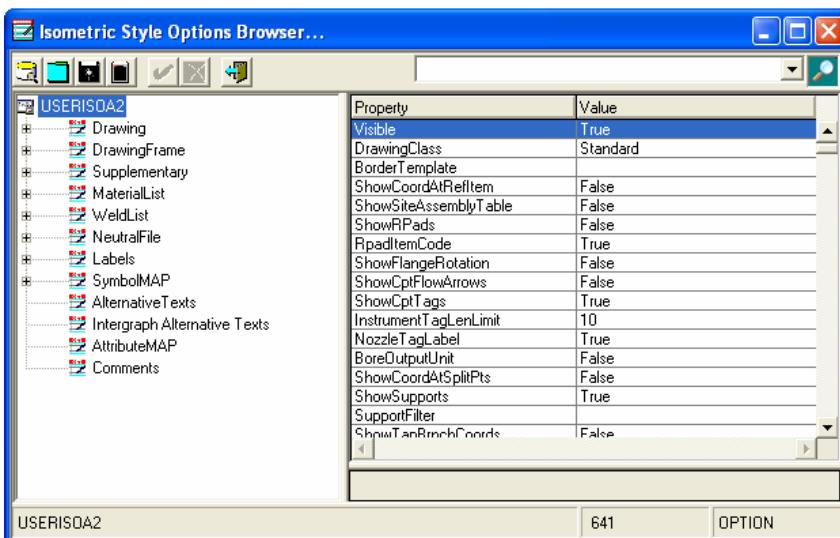
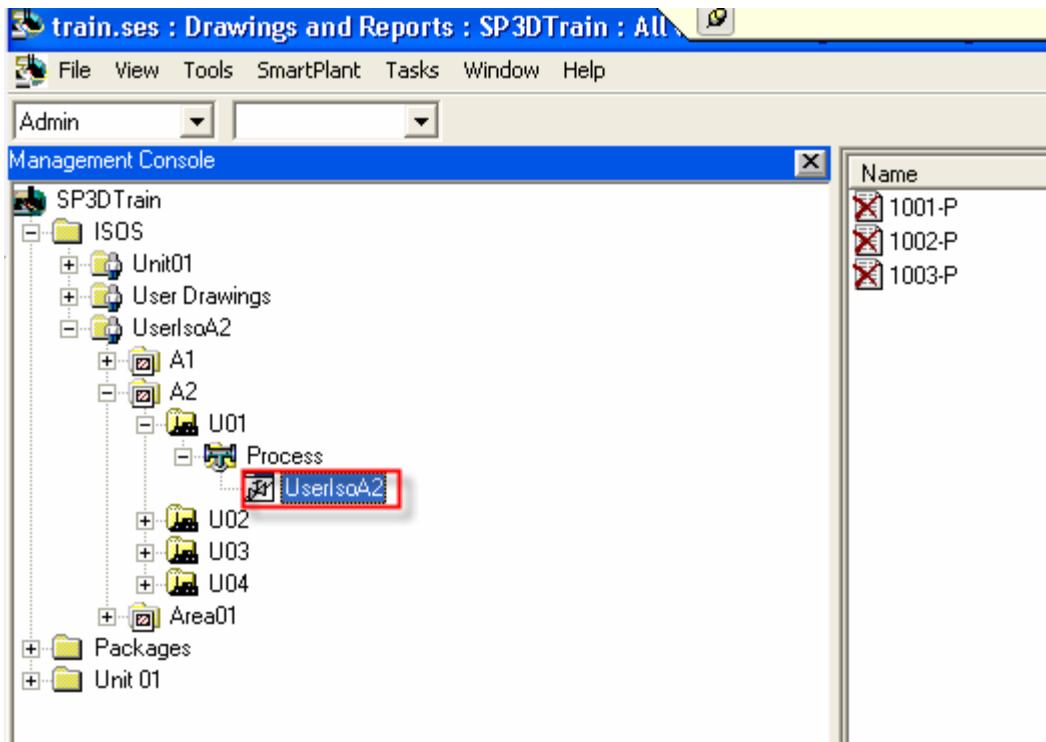


- 5) Save to catalog and update isometric for line 1002-P. Observe that Schedule Thickness values are returned instead of Nominal Size.

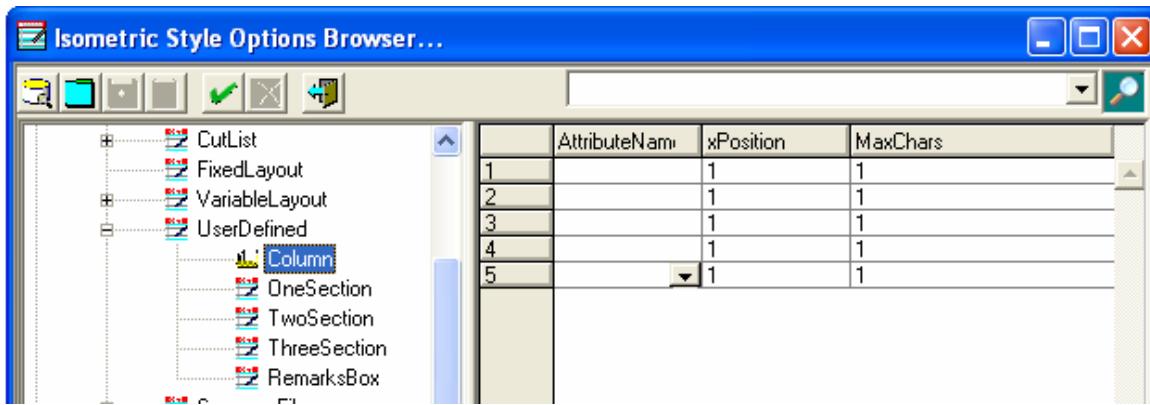
MaterialList.UserDefined

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.Column, add the following 5 entries by using the green tick  to add entries:

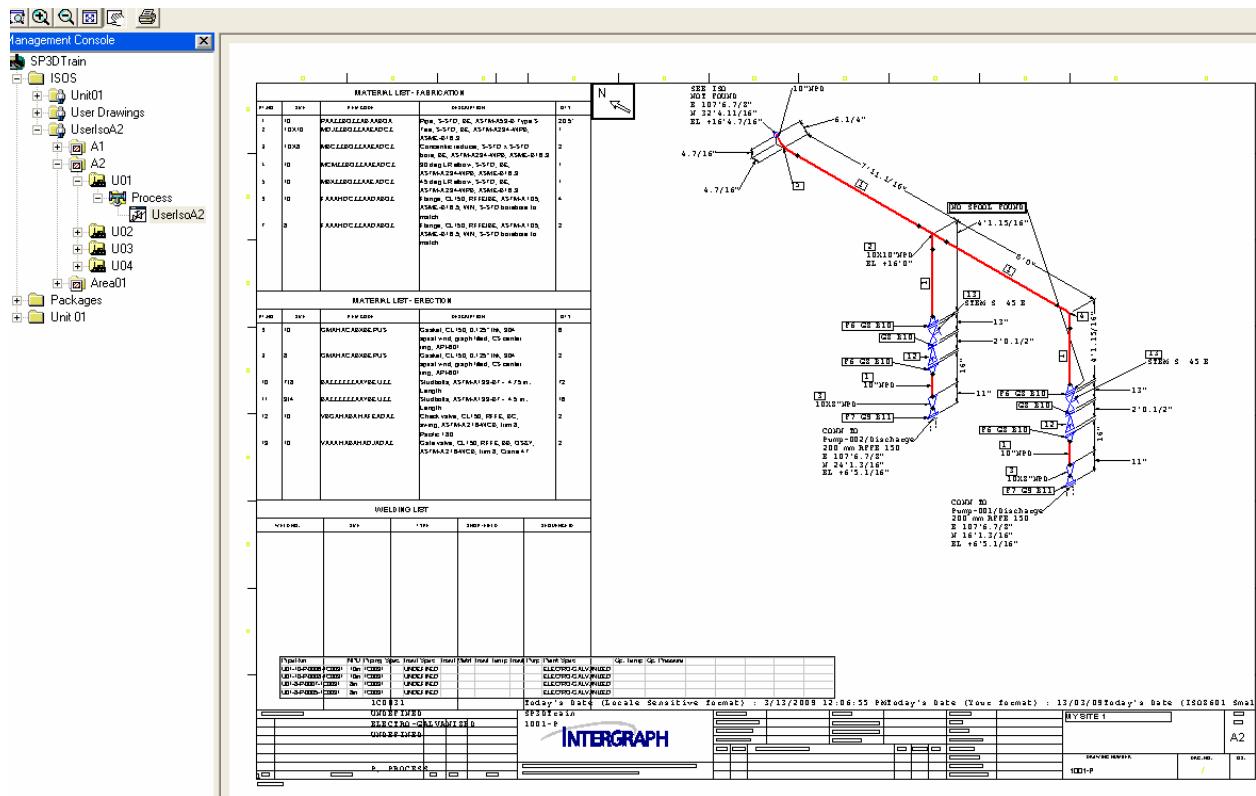


Tip: Select the Column and then click the green tick 5 times to add five entries

- 5) Set the entries as shown:

	AttributeName	xPosition	MaxChars
1	PT-N0	1	2
2	N.S.	14	17
3	ITEM-CODE	35	24
4	DESCRIPTION	92	35
5	QTY	172	15

- 6) Select MaterialList.UserDefined.TwoSection and change Section2YOffset = 120, Section1MaxEntries = 20, Section2MaxEntries = 20
- 7) Save the changes to the catalog by clicking the 'Save to Catalog' icon:  and close the Options Browser.
- 8) Update the Unit01A2 drawing 1001-P.



An A2-size single-sheet drawing is created.

Material Description by Label

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

`MaterialList.UserDefinedPipeMaterialDescription`

`MaterialList.UserDefinedSupportMaterialDescription`

`MaterialList.UserDefinedBoltMaterialDescription`

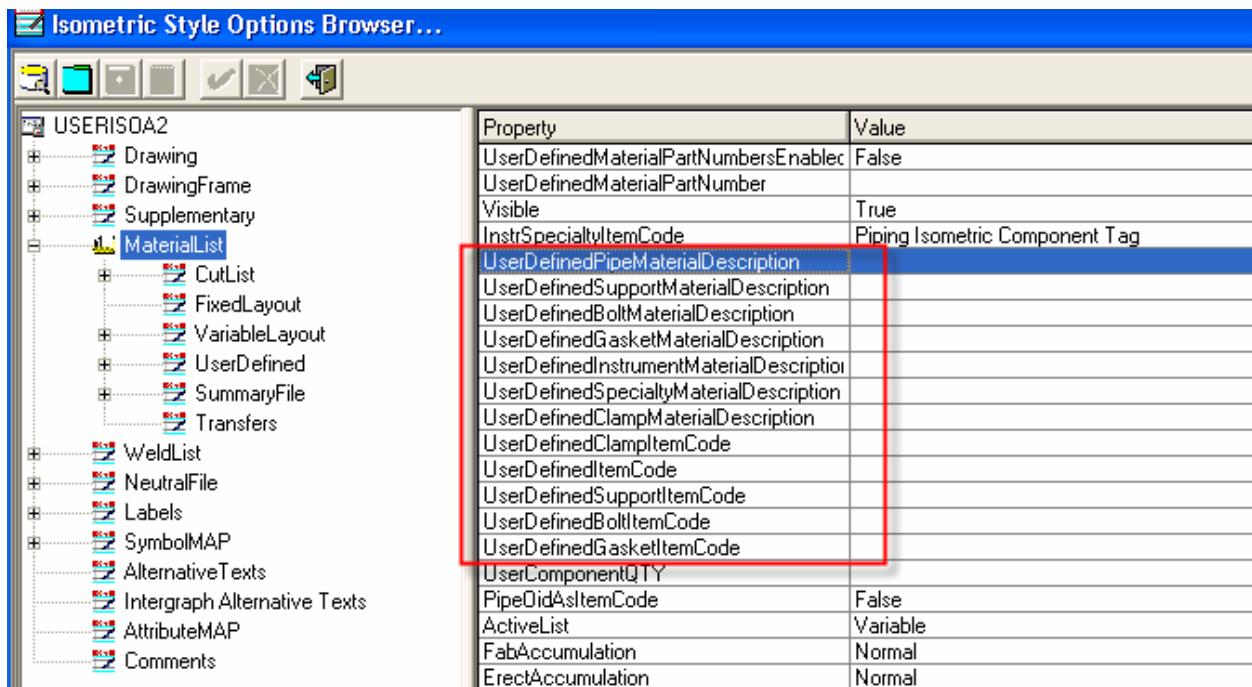
`MaterialList.UserDefinedGasketMaterialDescription`

`MaterialList.UserDefinedInstrumentMaterialDescription`

`MaterialList.UserDefinedSpecialtyMaterialDescription`

`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) Set MaterialList.CutList.Visible to True
- 2) Update isometric for line 1002-P

Lab18: 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.

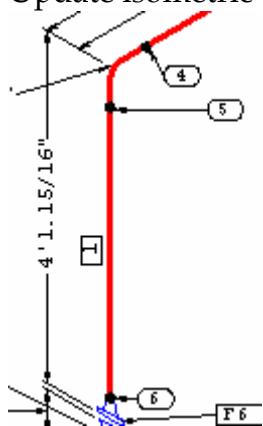
Sequence welds

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

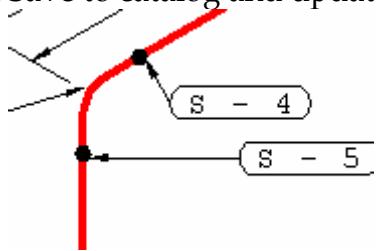
- 4) Switch to Drawings and Reports task
- 5) Edit options on the User style
- 6) Search for all weld related options using the word 'Weld' in the search box
- 7) Set ShowWeldNumbers to True
- 8) Update isometric 1001-P and see weld numbers



Change weld numbering format

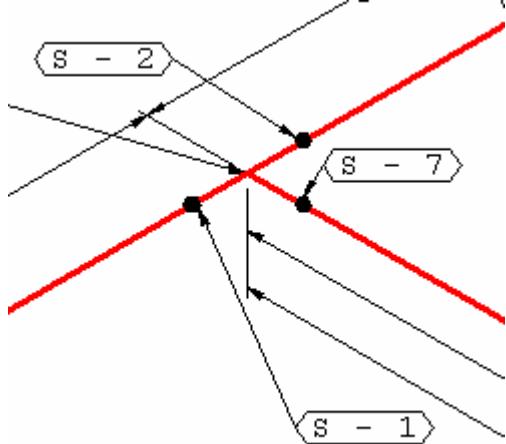
- 9) Edit Options on User style

-
- 10) Select the option Drawing.Welds.WeldNumberLabel
 - 11) Select the label 'Piping Isometric Weld Type and Sequence Number' to use
 - 12) Save to catalog and update 1001-P isometric.



Change enclosure for welds

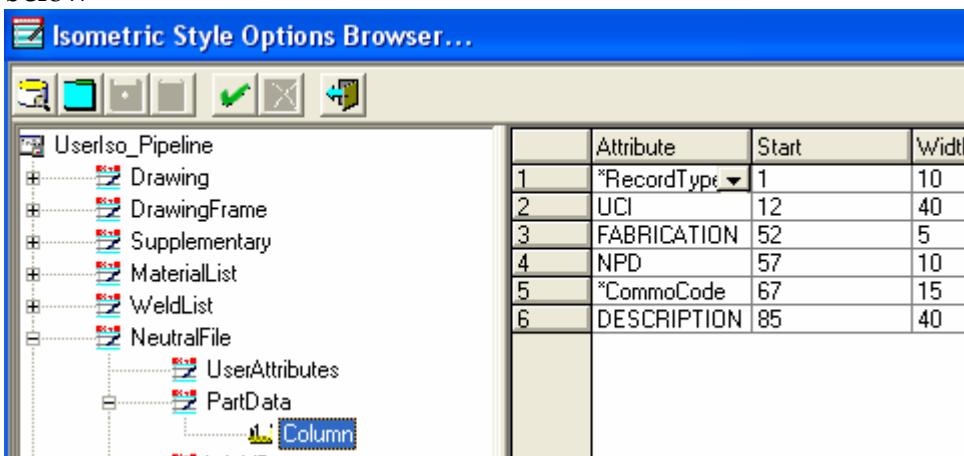
- 13) Edit Options on User style
- 14) Select the option Drawing.Welds.FabWeldEnclosure and change to Diamond End
- 15) Save to catalog and update 1002-P isometric.



Lab19: Neutral File

SP3D allows the output of a neutral file (ASCII text file) for material control purpose. The neutral file can be a single file per isometric or it can be split by sheet.

- 1) Edit options for the User style
- 2) Set NeutralFile.WeldData.Enabled = True
- 3) Set NeutralFile.BoltData.Enabled = True
- 4) Set NeutralFile.GasketData.Enabled = True
- 5) Create a new row in NeutralFile.UserAttributes
- 6) Name the new attribute RecordType
- 7) Select the *Piping Isometric Neutral File Record Type* label
- 8) Modify NeutralFile.PartData.Column so that column 1 shows the record type as below

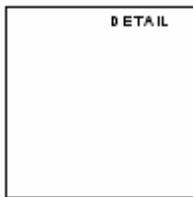


- 9) Add the row to Weld, Bolt and Gasket data
- 10) Update the 1001-P isometric to see changes.

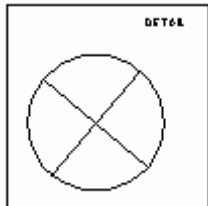
Lab20: Detail Sketch

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



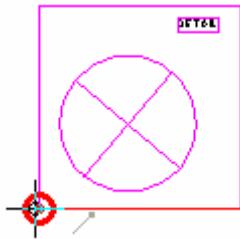
- 4) Draw your detail sketch graphics in the square. E.g. draw a circle and two lines



- 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 on <\\Server\Symbols\PmfgIsoStyleData> directory with name DETAIL1.SYM. Exit Drawing Editor.
- 9) Edit options for the 'User' style and change Supplementary.DetailSketches.Path to be <\\Server\Symbols\PmfgIsoStyleData\\> (don't forget the \ at the end)
- 10) Set ShowDetailSketch to True
- 11) Open Supplementary.DetailSketches.SketchMapping
- 12) Change HANGER.SYM to DETAIL.sym in row 2
Change SketchChkValue to Assy_VS_SR_DB_118
- | SP3DPartC | SketchSymbol | SketchChkLabel | SketchChkValue |
|-----------|--------------|---|-------------------|
| SUPPORT | DETAIL1.SYM | Piping Isometric Hanger Support Part Number | Assy_VS_SR_DB_118 |
| SUPPORT | HANGER.SYM | Piping Isometric Hanger Support Part Number | G4G_1401_01_H1 |
- 13) Save to Catalog and update the line 1002-P. A detail sketch will be shown in the top right corner of the isometric.

Lab21: Symbol Mapping

It is possible to map part classes, supports, welds and end conditions to distinct Isogen symbol keys.

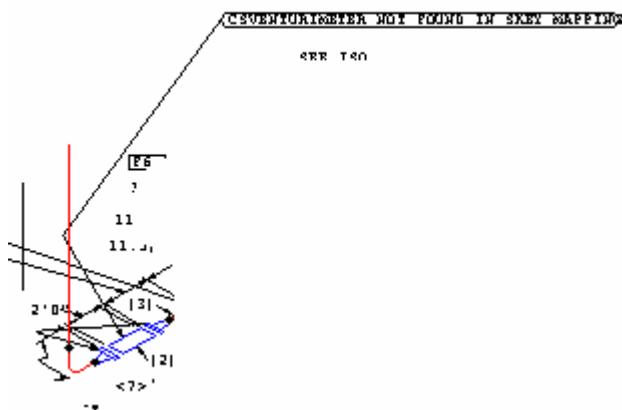
For part classes, it is possible to specify different symbols for different end conditions. It is also possible to specify that the same SKEY should be output for all end conditions and the end conditions output independently.

For supports

Mapping Symbol Keys for Components

Part classes

- 1) Update pipeline A2>>U02 >> Process >> 2003-P
- 2) The error log contains the following entry:
Description: SKEY not Found for CSVenturimeter PartClass Identifier not Found
- 3) The face of the iso also shows a message to the effect that the SKEY for the CSVenturimeter was not found.



- 4) Edit Options for the Iso Pipeline style
- 5) Select SymbolMAP and add a new row
- 6) Enter the following values to map the partclass CSVenturimeter to an Isogen SKEY and Component class.

	SP3DPartClass	EndPrepCode	IsoGenSkey	ComponentClass
1	CSVenturimeter	0	II**	INSTRUMENT

-
- 7) Save to catalog and re-update the pipeline iso. The SKEY error should no longer be reported.

Supports

- 1) Edit Options in the 'User' style.
 - 2) Select SymbolMAP and scroll down until SUPPORT is seen in the PartClass column.
In the delivered style it happens at row 316
 - 3) For supports the EndPrepCode corresponds to the CodeListNumber of the HngSupSupportType codelist.
 - 4) Change the SKEY in the row that corresponds to EndPrepCode 11 (Pipe Support) to HANG
- | | SP3DPartC | EndPrepCo | IsoGenSke | ComponentClass |
|-----|-----------|-----------|-----------|----------------|
| 336 | SUPPORT | 11 | HANG | SUPPORT |
- 5) Save to catalog and update line 1002-P.
 - 6) Make sure to change mapping back to original SKEY (01HG).

Welds

- 1) Edit Options in the 'User' style
 - 2) Select SymbolMAP and scroll down until SUPPORT is seen in the PartClass column.
In the delivered style it happens at row 316
 - 3) For welds the EndPrepCode corresponds to CodeListNumber of the WeldType codelist.
 - 4) Change the SKEY in the row that corresponds to EndPrepCode 5 (Shop Weld) to WWA
- | | SP3DPartC | EndPrepCo | IsoGenSke | ComponentClass |
|-----|-----------|-----------|-----------|----------------|
| 387 | Weld | 5 | WWA | Shop Weld |
- 5) Save to catalog and update line 1002-P.
 - 6) Make sure to change mapping back to original SKEY (WW).

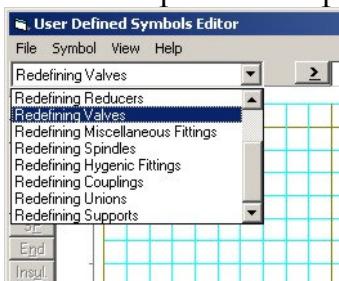
SymbolMap.Supplement

- 1) Edit Options in the Iso Pipeline style
 - 2) Expand SymbolMAP.Supplement
 - 3) Change the EndPrepMap in the row that corresponds to EndPrepCode 21 (RFFE) to CL
- | | EndPrep1 | EndPrepCo | EndPrepMe | Description |
|---|----------|-----------|-----------|-------------------------|
| 2 | RFFE | 21 | CL | Raised-face flanged end |
- 4) Save to catalog and update line 1001-P. Notice changes at flanged valves, they are actually shown clamped.
 - 5) Make sure to change mapping back to original SKEY (FL).

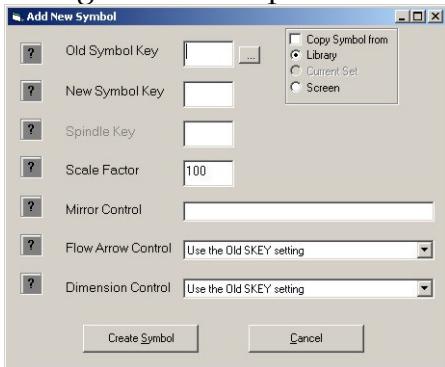
Create a new symbol key

Functionality is available to re-define the symbol keys supplied with the Isogen software or create new symbol keys in addition to those supplied. We will use the Alias Symbol Creation Utility for this.

- 1) Select *Start >> Programs >> Alias Isometrics >> Iso Utils >> Symbols Editor* to launch the Alias Symbols Editor program.
- 2) On the drop-down displayed on the ribbon bar, select *Redefining Valves*.



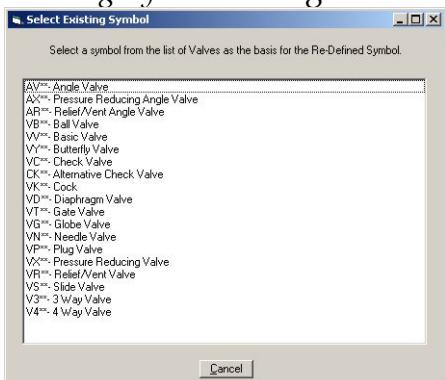
-
- 3) In the Symbols Editor application, select *Symbol >> New*. The Add New Symbol dialog will come up.



- 4) Place a check in the Copy Symbol From checkbox.

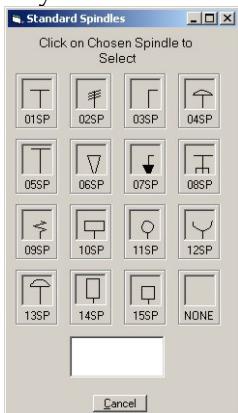


- 5) Click on the browse button next to the *Old Symbol Key* text box to bring up the *Select Existing Symbol* Dialog box.

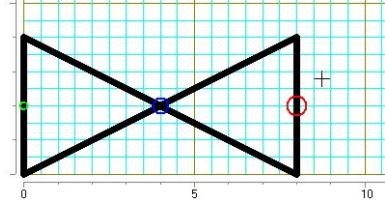


- 6) From the dialog box, select the *Basic Valve*. The dialog will automatically be dismissed.

-
- 7) Select the browse button next to the Spindle Key text box and select the 01SP spindle key.

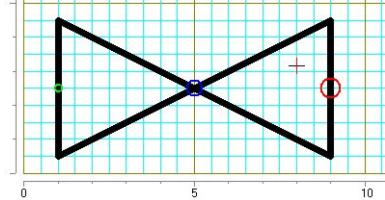


- 8) On the *Add New Symbol* dialog box, select *Create Symbol*. This will take you to the graphics-editing environment with the current symbol displayed.



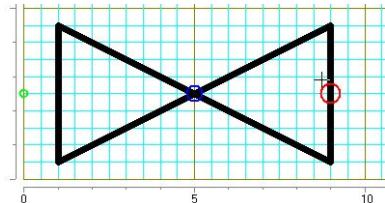
- 9) Select *Move >> Symbol Within Grid* from the main menu.

- 10) Click on the intersection of lines that is exactly two units East and one unit North of the small green circle at the left of the symbol.



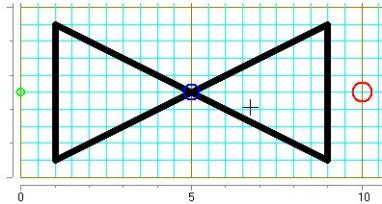
- 11) Select *Move >> Start Point* from the main menu.

- 12) Click on the intersection of lines that is exactly two units West of the small green circle.



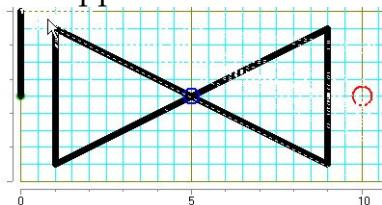
- 13) Select *Move >> End Point*.

-
- 14) Click on the intersection of lines that is exactly two units East of the large red circle.

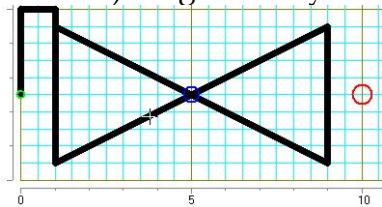


- 15) Right-click your mouse anywhere on the grid to end the command.

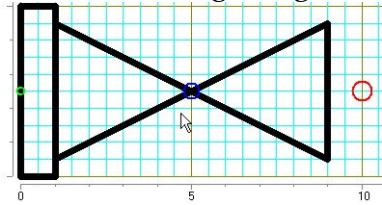
- 16) Click on the small green circle to begin drawing a line. A stretch line will appear. Continue the line five units due North and click on that intersection such that the line appears as below.



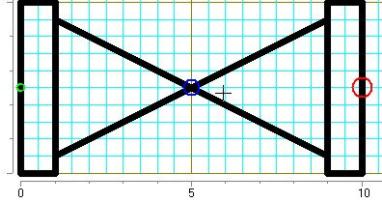
- 17) Continue in the current command, clicking two units to the East and then clicking two units to the South to add two more lines as shown below. (If you make a mistake, simply use the *Undo* button in the left-hand vertical toolbar to correct your mistake). Right-click your mouse to exit drawing the current series of lines.



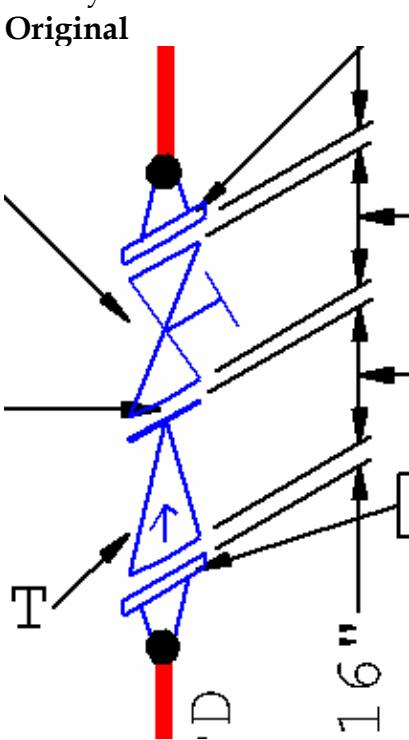
- 18) Click on the bottom left corner of the bowtie and draw three lines to create the other side of the flange. Again, right-click to end the series of lines.



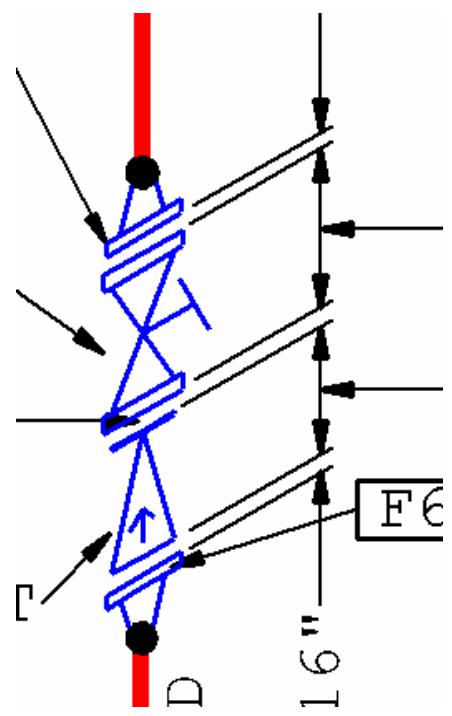
- 19) Add five lines to the other side of the bowtie to create a flange on the other side of the valve symbol. Right-click to exit the drawing series.



-
- 20) Select the *Done* button on the left-hand vertical toolbar. This will save your edits to the symbol.
 - 21) Select File >> Save As from the main menu and save the symbol library file to: *[Symbols Share]\PmfgIsoStyleData* as *Symbol.asc*. The *Symbol.bin* file is automatically created.
 - 22) Exit the Alias Symbol Editor.
 - 23) Edit Options for the 'User' style.
 - 24) From the Options Browser, select Supplementary.DataFiles .
 - 25) Click in the right-hand pane and press the Insert key to insert a row in the collection.
 - 26) Select the dropdown in the DataFileType column and select ASCII-SYMBOLS.
 - 27) Click on the browse button in the FilePath field and enter the full path to the symbols file
 - 28) Save your edits to the catalog and exit the Options Browser.
 - 29) Extract pipeline 1001-P containing a gate valve.
 - 30) Open the extracted isometric and zoom in to one of the gate valves. Verify that your new symbol was used. It should look like below



New

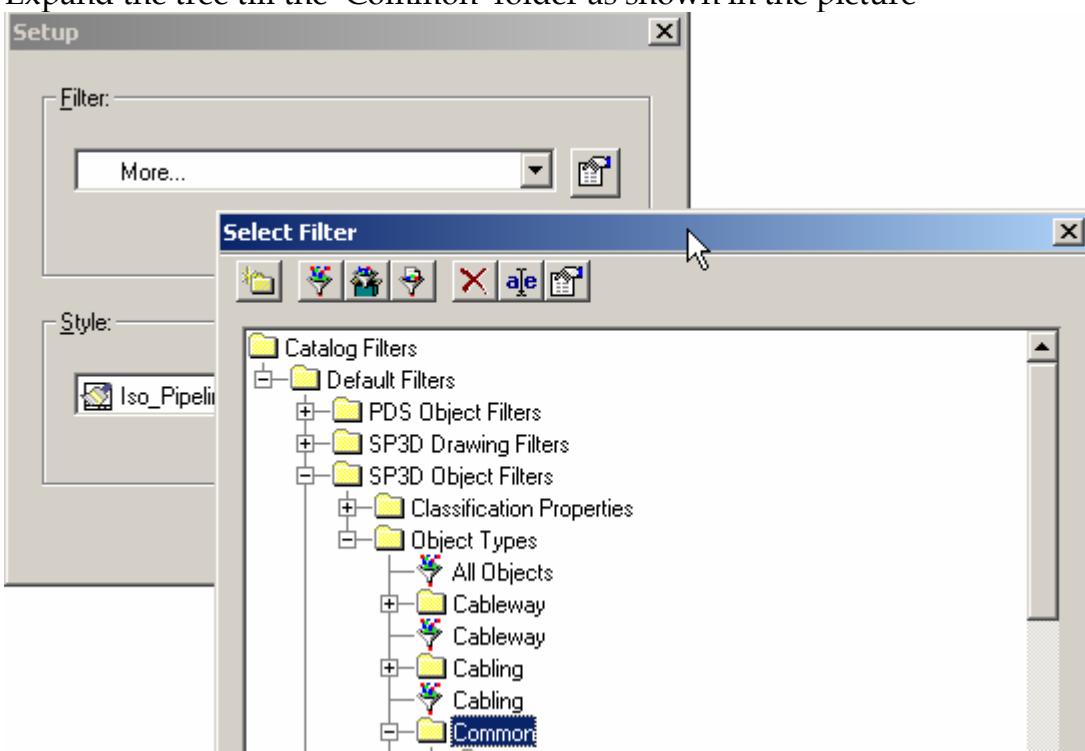


Lab22: WBS Isometrics

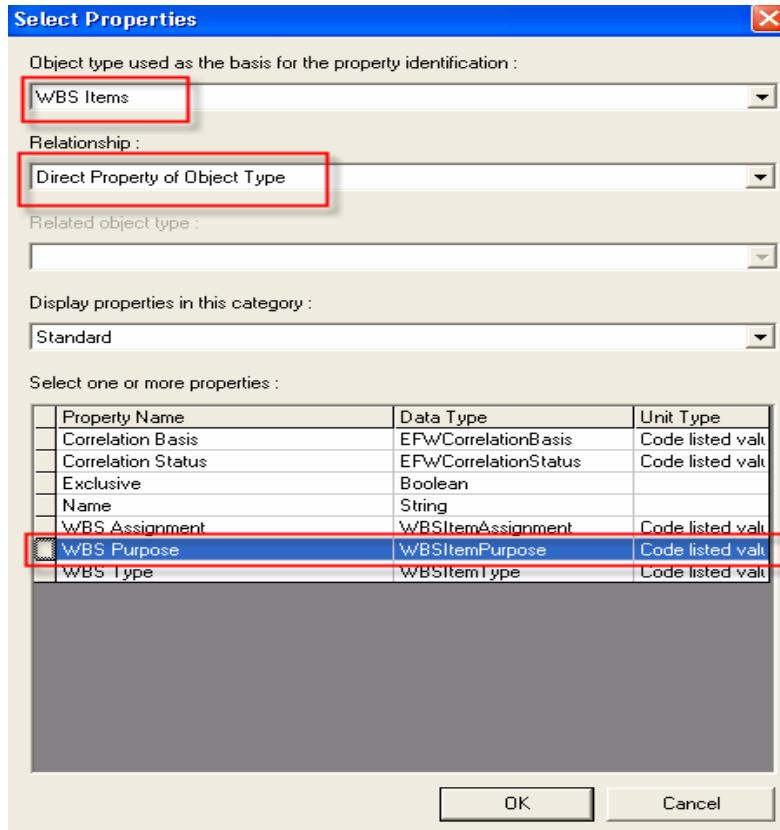
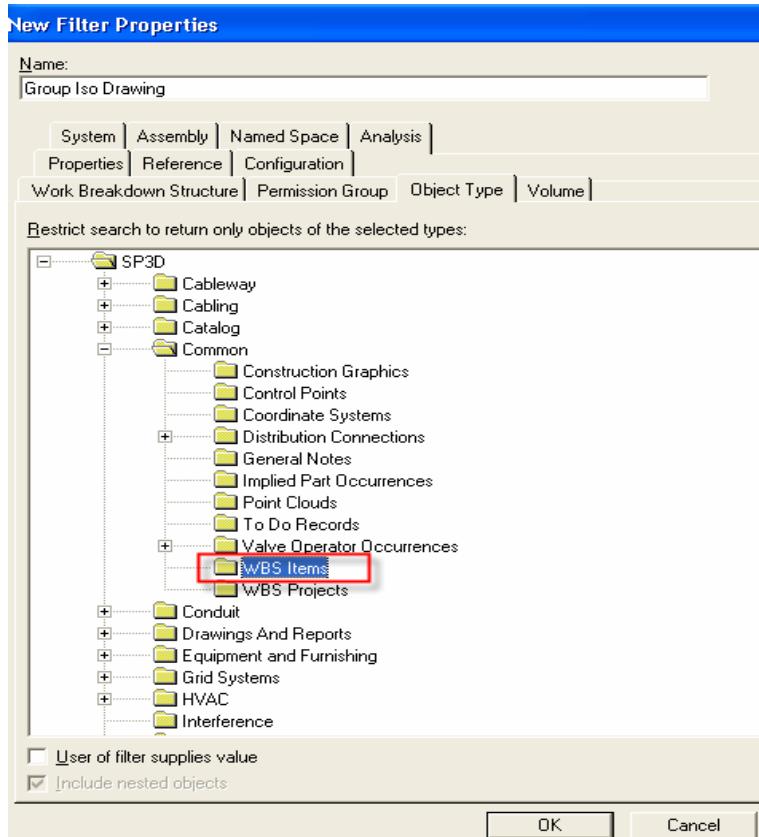
Single sheet isometrics can be extracted using the work breakdown structure. For this a style is already supplied, but a package needs to be created.

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

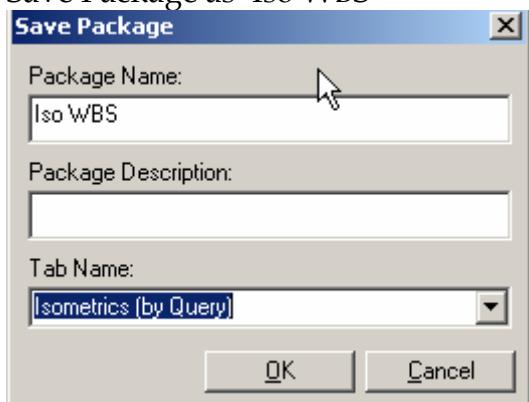


- 6) Create a new filter named 'Group Iso Drawing' that select WBS items of the Type 'Iso Drawings' by selecting the following
Object Type: (Common – WBS Items)
Properties: (Common – WBS Items) – Direct Property of Object Type – (WBS Purpose) = Iso Drawing Fabrication



Filter method				
<input checked="" type="radio"/> Match all		<input type="radio"/> Match any		
	Property	Operator	Value	Ask
	WBS Purpose	=	Iso Drawing - Fabrication	<input type="checkbox"/>

- 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.

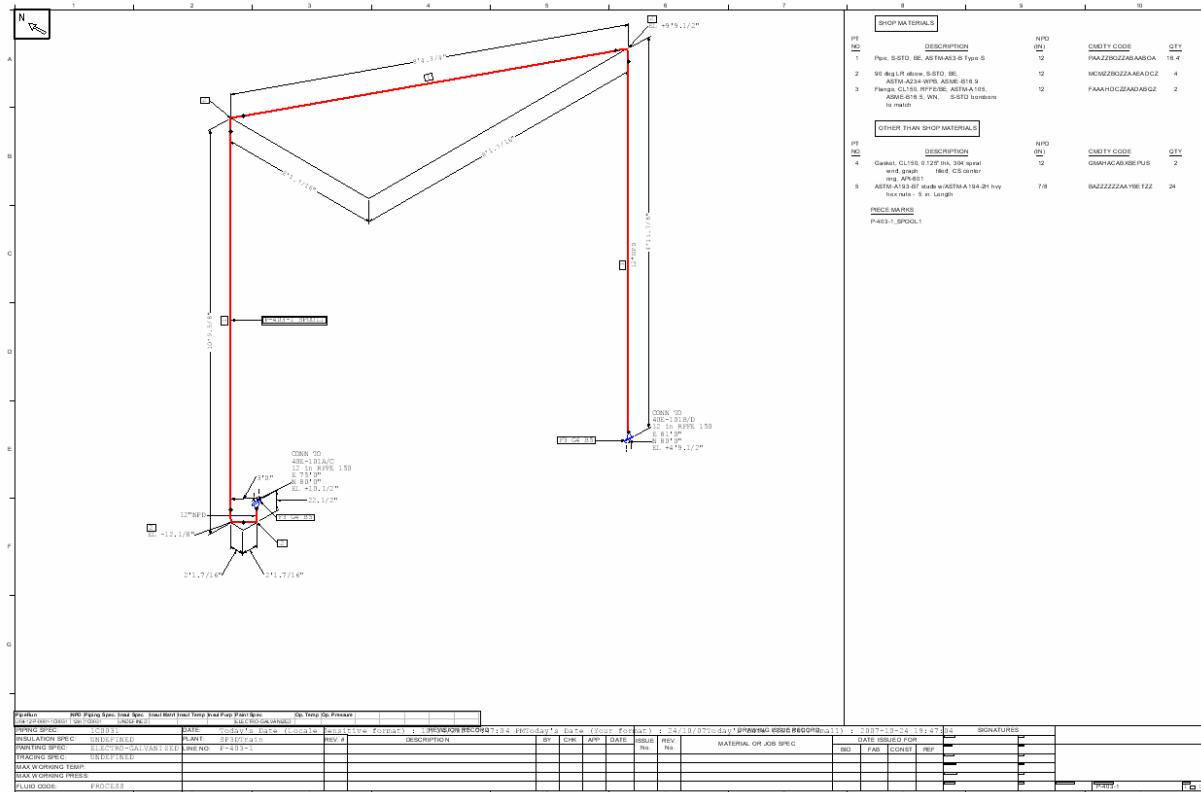


Figure 1: Output: Isometric Drawing for the WBS Group of Pipeline 403-P

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:

- 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.

-
- 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:

- 9) In the **Workspace Explorer**, select the **WBS** tab and expand **PJ-99 > Iso Fabrication**.
- 10) 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**.
- 11) 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**

- 12) 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.
- 13) 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.
- 14) 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**.
- 15) 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.

Creating Isometric Drawing from WBS item:

- 16) Switch to the **Drawings and Reports** task from the **Tasks > Drawings and Reports** command to create isometric drawings for the created WBS items.
- 17) 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' we created in last lab. Hit OK. Again Right click the Iso WBS Isometric component and **Run Query** option.
- 18) 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.
- 19) 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.

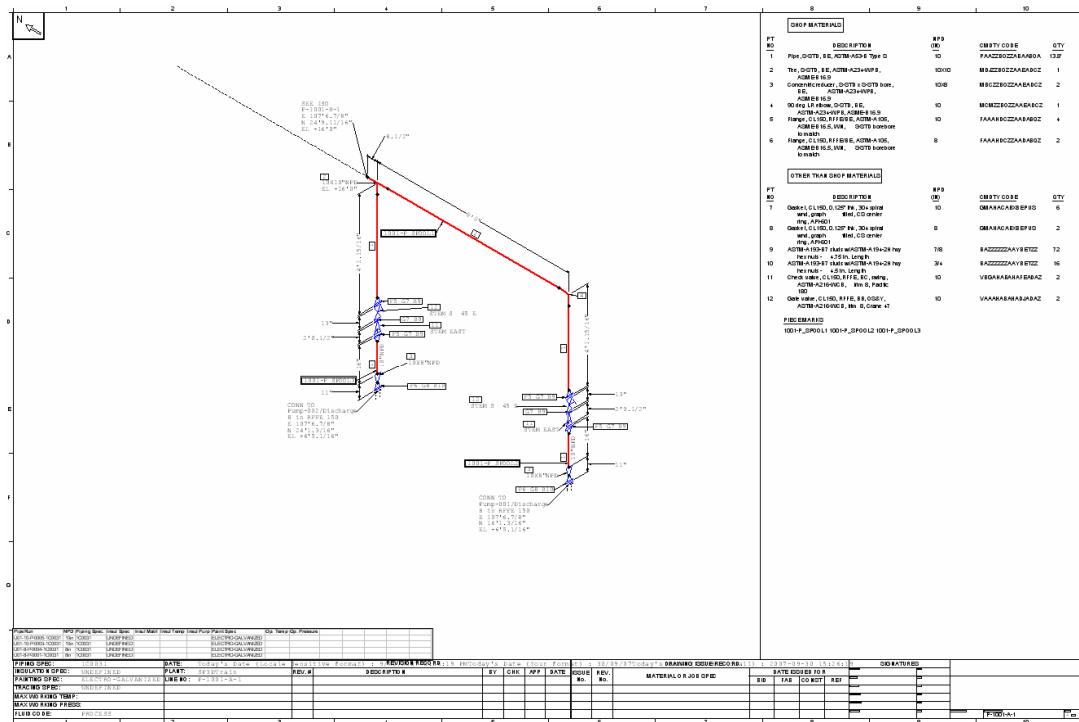


Figure 2: Output: Isometric Drawing for the First WBS Group

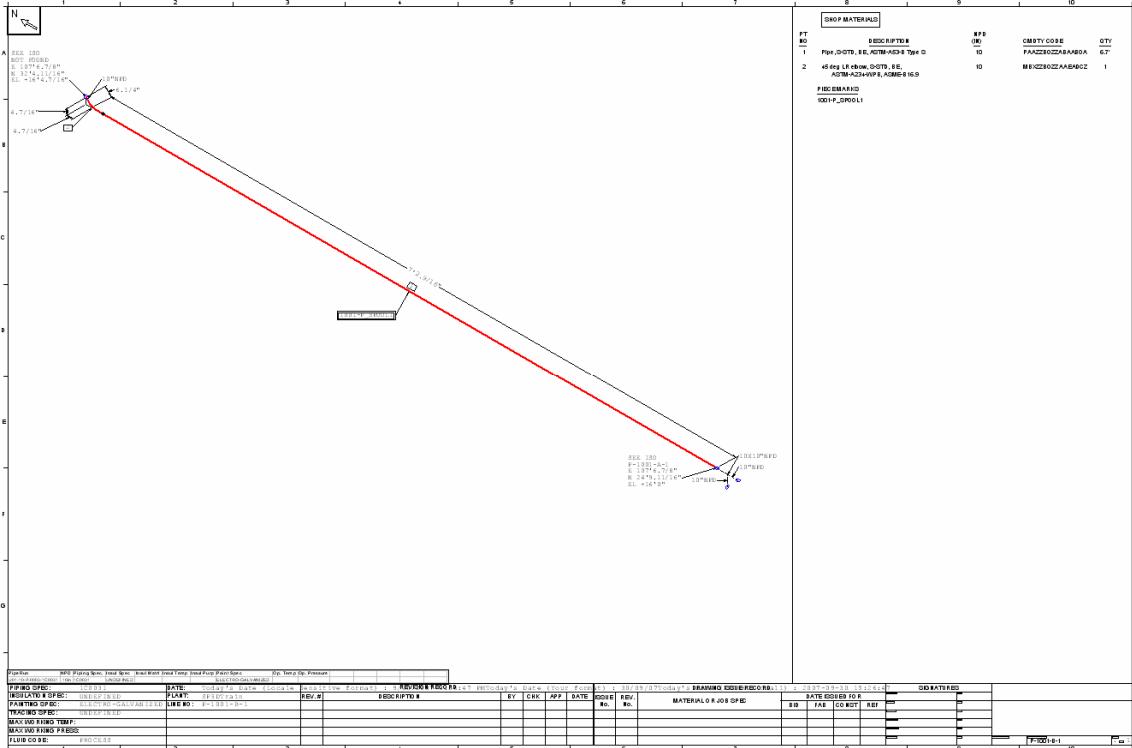


Figure 3: Output: Isometric Drawing for the Second WBS Group

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:

- 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.
 - 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

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

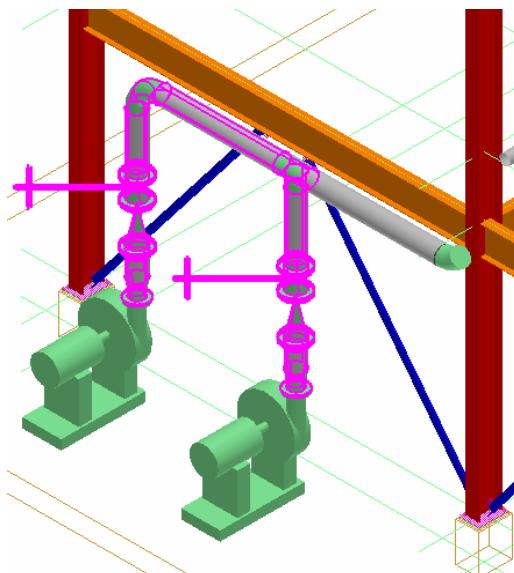


Figure 4: Piping Parts of Pipeline 1001-P

9. 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**.
10. Now select the remaining pipe parts belonging to **1001-P**, as shown in Figure 5.

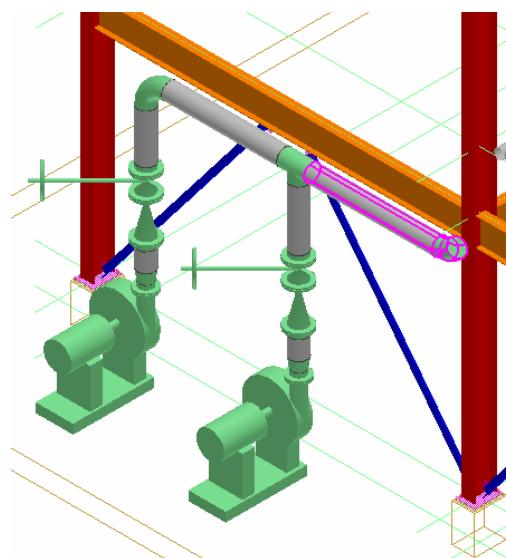


Figure 5: Remaining Selected Part of Pipeline 1001-P

11. 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**.

-
12. Now to assign these pipe parts to the appropriate WBS items, select the **Group Pipe Parts** button on the vertical toolbar.
 13. 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

14. 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**.
15. 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:

16. Switch to the **Drawings and Reports** from **Tasks > Drawings and Reports** to create isometric drawings for the created WBS items.
17. In the **Management Console**, expand the drawing hierarchy to **Unit 01 > Isometrics > Iso WBS Isometrics**. SP3D displays a message box. Click **OK** to continue.
18. 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.
19. Now right-click the **Iso WBS Package** option in the hierarchy and click the **Create Drawing(s)** option to create the isometric drawing documents.

20. Right-click the **Iso WBS Package** isometric drawing type and click the **Update Now** option to update the drawings for both the WBS groups.
21. 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.

Creating Isometric Drawings from Pipeline Objects:

Create an isometric drawing for the pipeline **1001-P** in Unit **U01** of your workspace. After creating the isometric drawing for the pipeline **1001-P** the view will resemble Figure 6.

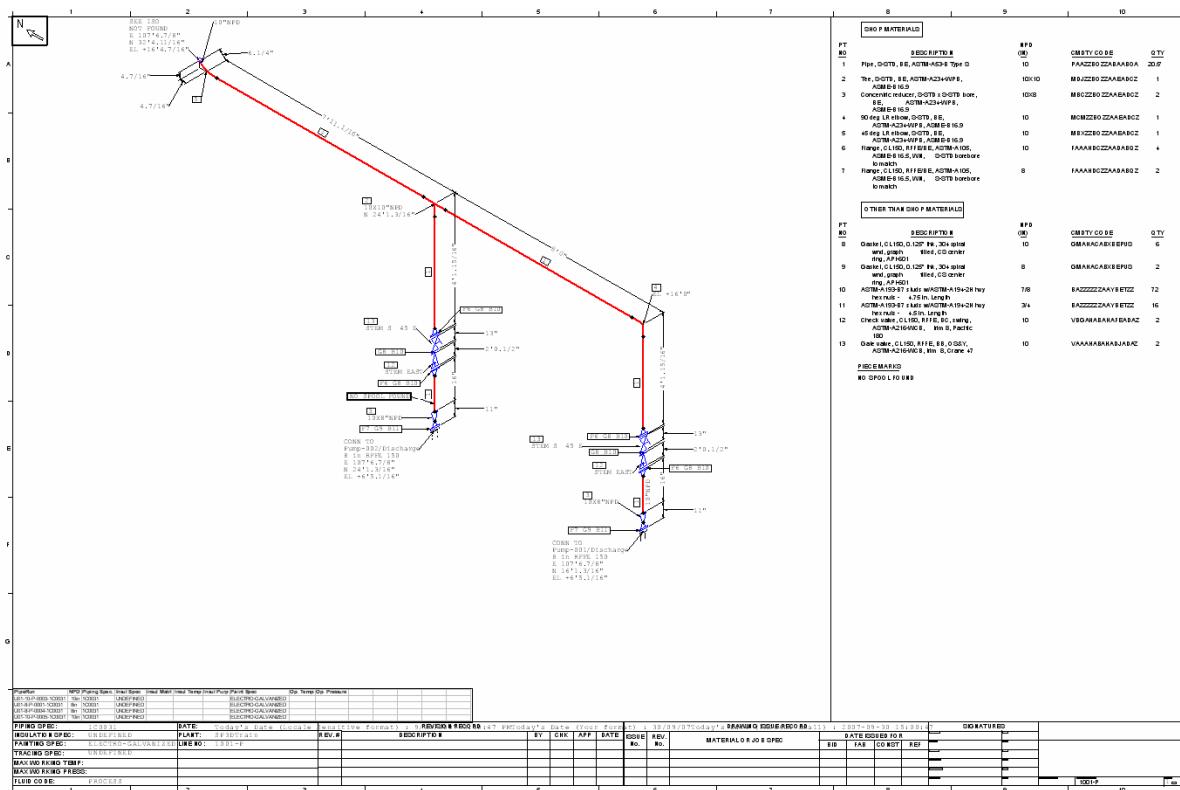


Figure 6: Output: Isometric Drawing for Pipeline 1001-P

Steps:

1. In the **Management Console** expand the drawing hierarchy to **Unit 01 > Isometrics > Iso Pipeline Isometrics**.
2. Right-click the **Iso Pipeline Isometrics** component in the **Management Console** and click the **Run Query** command. SP3D uses the query defined in the **Iso Pipeline Isometrics** component to find the pipelines in the model and display the results of the search in the drawing hierarchy.

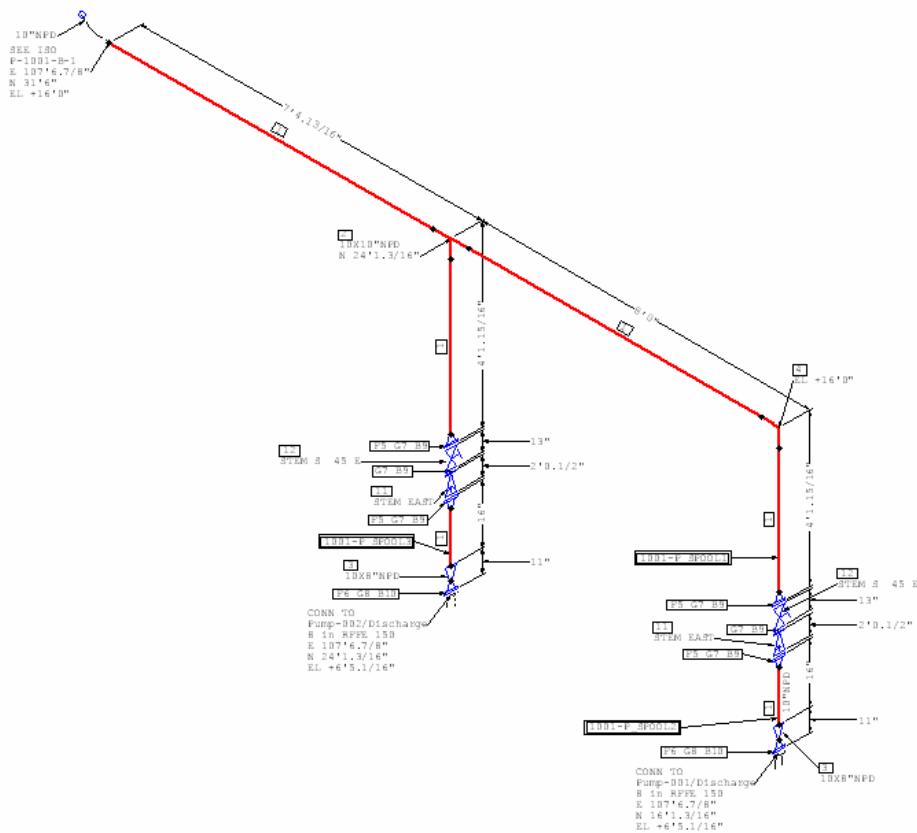
-
3. The Unit **U01** and the piping system available in **U01** appear in the hierarchy of **Management Console**. The piping isometric drawing type **Iso Pipeline** also appears in the hierarchy.
 4. Right-click the **Iso Pipeline** component in the hierarchy and click the **Create Drawing(s)** command to create the isometric drawing documents.
 5. SP3D generates isometric drawing documents for all the pipelines available in Unit **U01**.
 6. Right-click the isometric drawing document of **1001-P** and click the **Update Now** command to update the drawing.
 7. SP3D gets the piping parts and generates the isometric drawing of the pipeline **1001-P**. A green check mark appears on **1001-P** which shows that the isometric drawing for **1001-P** has been generated.

Double-click **1001-P** document to open the drawing viewer. The drawing viewer displays the pictorial representation of isometric drawing on the left panel of the screen and the material take-off for the pipeline **1001-P** on the right panel of the screen

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.



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.

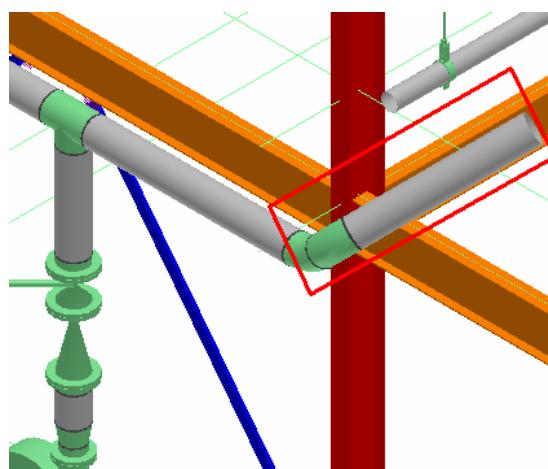


Figure 9: Placed Elbow and Routed Pipe

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.

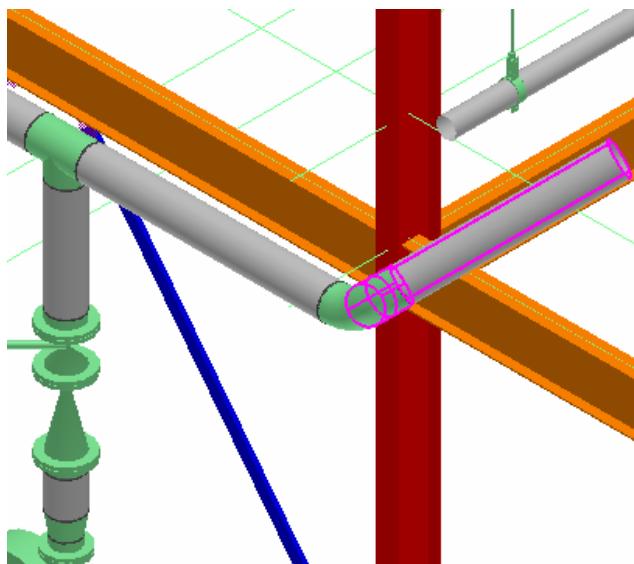


Figure 10: Selected Pipe Parts

-
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.

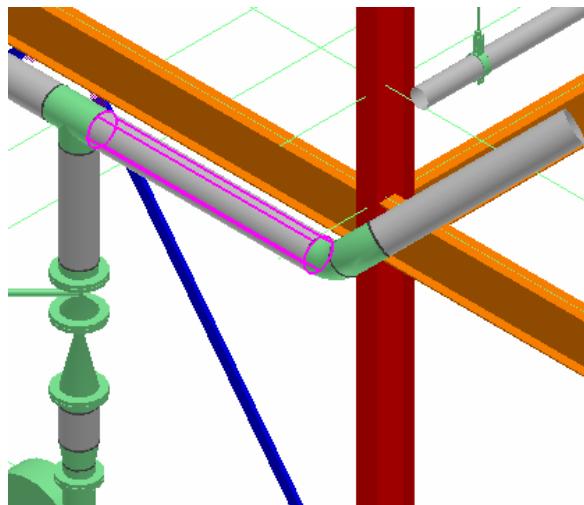


Figure 11: Selected Pipe

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 "** sockolet and a nipple first.

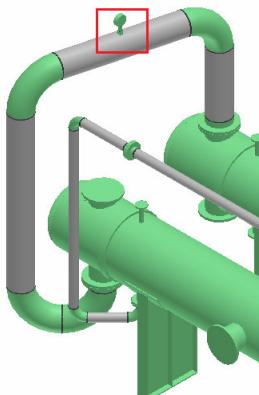


Figure 12: Placed Temperature Indicator

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.

Troubleshooting

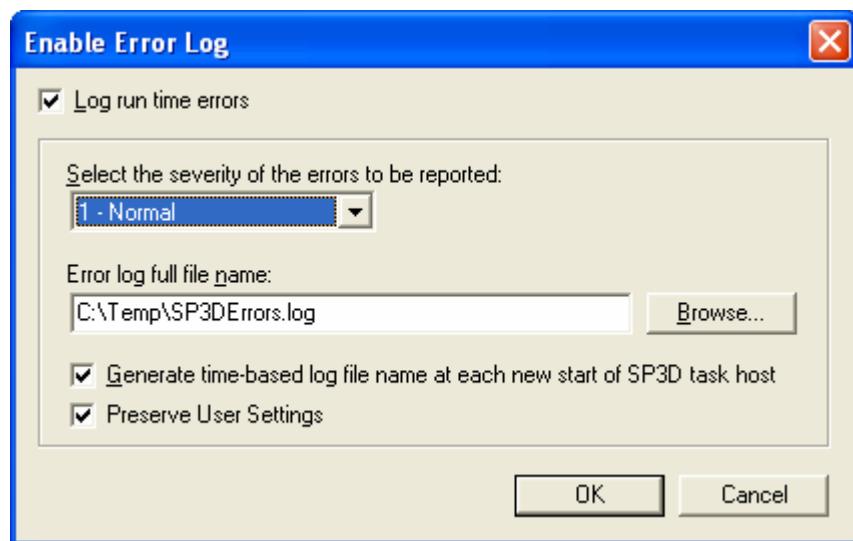
Troubleshooting -Error Log

ErrorLogEnable.exe <SP3D_Install_Dir>\Core\Tools\Administrator\Bin

Allows you to specify the severity of logged runtime errors.

Setting 1-Normal is the default and only critical errors are logged.

Setting 4-Exhaustive will log many more errors (including warnings) and could impact performance if left at this level.



Drawings.log in the %Temp% directory

You can specify the settings by modifying a switch in the registry

HKEY_LOCAL_MACHINE\Software\Intergraph\Applications\Environments\Drawings\ErrorLog

1 - General user error (Default)

Log files only contain error messages for certain anticipated error conditions, such as a missing filter or a missing view style.

101 - Development-specific error level

Adds development-specific error or informational messages.

201 - General Information

Adds informational messages about what projects and methods are being called.

301 - Batch Information

Adds special batch-specific informational messages.

999 – Exhaustive

Contains ALL informational and error messages. The log files can become very large at this level.

Create an ISOKEEPFILES environment variable

Value = Yes

This option prevents Isogen from deleting its log files in the %TEMP% folder. Environment variable should be disabled if not needed.

for036.dat

IDFImport.log

idftrans.idf

ImportTemplateFileFragment.log

pass.txt

pisogen.log

pod2ss.txt

PODExport.log

PODFile.log

podgraphics.log

podiso*.log (one per sheet in the Iso)

ProjectManager.log

For*.dat (other Fortran DAT files may be left over if crash occurs in idf generation)

Troubleshooting - IsoDebugFiles

HKEY_LOCAL_MACHINE\Software\Intergraph\Applications\Environments\Drawings\IsoDebugFiles\Save

Value = Yes

In the %temp% folder, there will be a set of .Log files with a date matching the Iso extraction - zip these up.

In the %temp%\IsoDebugFiles, there will be a folder that has the name of the pipeline system you extracted. Zip up that entire folder and include the Path data in the zip file.

Reset the Registry Key for IsoDebugFiles value to "Save" = "No" when not necessary.

May cause performance issues or uncontrolled growth of the %temp% directory

Troubleshooting - Common Issues

Disconnected Pipeline

To Do List errors

The Microsoft Excel "Trust access to Visual Basic Project" option must be enabled (Tools > Macro > Security > Trusted Publishers) or the Pipeline List report generation will fail. This is a 'per user' setting so it must be established for all users who will update Isometric Drawings

Troubleshooting - Missing XML

Microsoft XML Core Services 6.0 is required for extracting Isometric Drawings.

Personal Isogen is dependent upon the MSXML 6.0 Runtime Libraries, and if they are not installed on the client machine, Isometric Drawings will fail to update successfully

Troubleshooting Tip: Check the LOG generated under REPORTS>ProcessFile in the drawing's extraction data for the following text: "Unable to load XML document" or "Cannot get Iso Directory".

Microsoft XML Core Services 6.0 is installed automatically when installing Microsoft SQL Server 2005 SP2 on the client machine.

Troubleshooting - Missing Graphics

If a Shape2D *.sha file is open while a user updates an Isometric Drawing, missing graphics may appear in the model. For example, the user may only see dimensional information in the drawing and no pipes.

Troubleshooting Tip: “Personal ISOGEN failed while running ISOGEN module (Code -2) [Personal ISOGEN error -2]” message will appear in the log file. Close the *.sha file and update the Isometric Drawing again. (Note: The user may have to exit the session file to correctly update the iso.)

