



MISTAKES = TIME = MONEY. INDUSTRIAL SOLUTIONS: Autodesk Plant Design Suite Workflow

Matias Jose Parodi

Instructional Demo

LinkedIn: <https://ar.linkedin.com/in/matias-jose-parodi-39501938>



Class summary

This presentation will focus on the knowledge required to start a project in Plant Design Suite software by analyzing examples and procedures in order to show how the most relevant tools of this software work.

It will show how to enter, manipulate, validate, extract, and export information through the programs included in Plant Design Suite software.

Last but not least, you will realize how this technology can facilitate the coordination between disciplines and time managing, and how it can help to minimize design hours for missing errors.

Key learning objectives

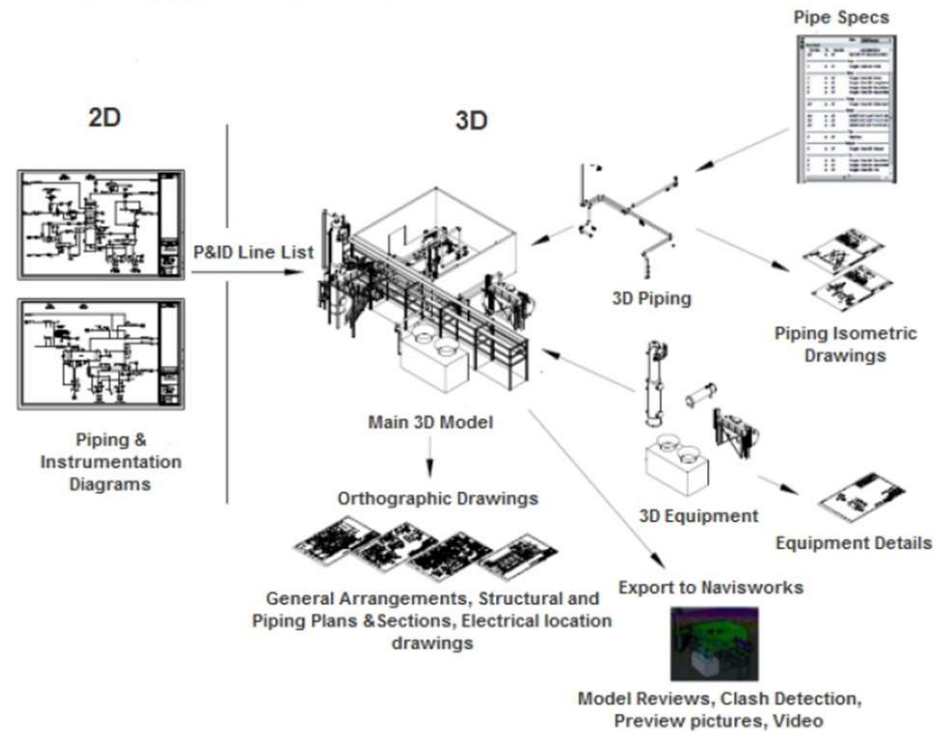
At the end of this class, you will be able to:

- Learn how to create a Spec Sheet from a Catalog with Spec Editor.
- Learn how to place custom symbol equipment, design and TAG P&ID drawings.
- Learn how to work with references to place equipment and route pipes with components in AutoCAD Plant 3D.
- Learn how to generate material lists and drawing documentation.



Autodesk PLANT DESIGN SUITE WORKFLOW

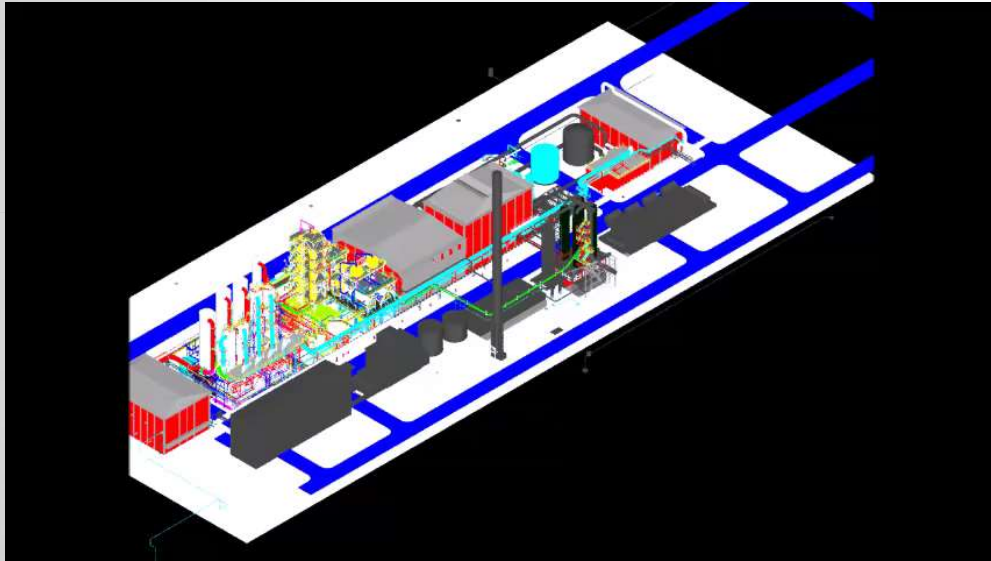
Following is a diagram that illustrates how these components interact.



Is important respect the order will enter the information to the Project. Following this procedure will save 30% of time.



Sub-Products Plant, CASE STUDY – Buenos Aires, Argentina



Sub-Products Plant



Sub-Products Plant

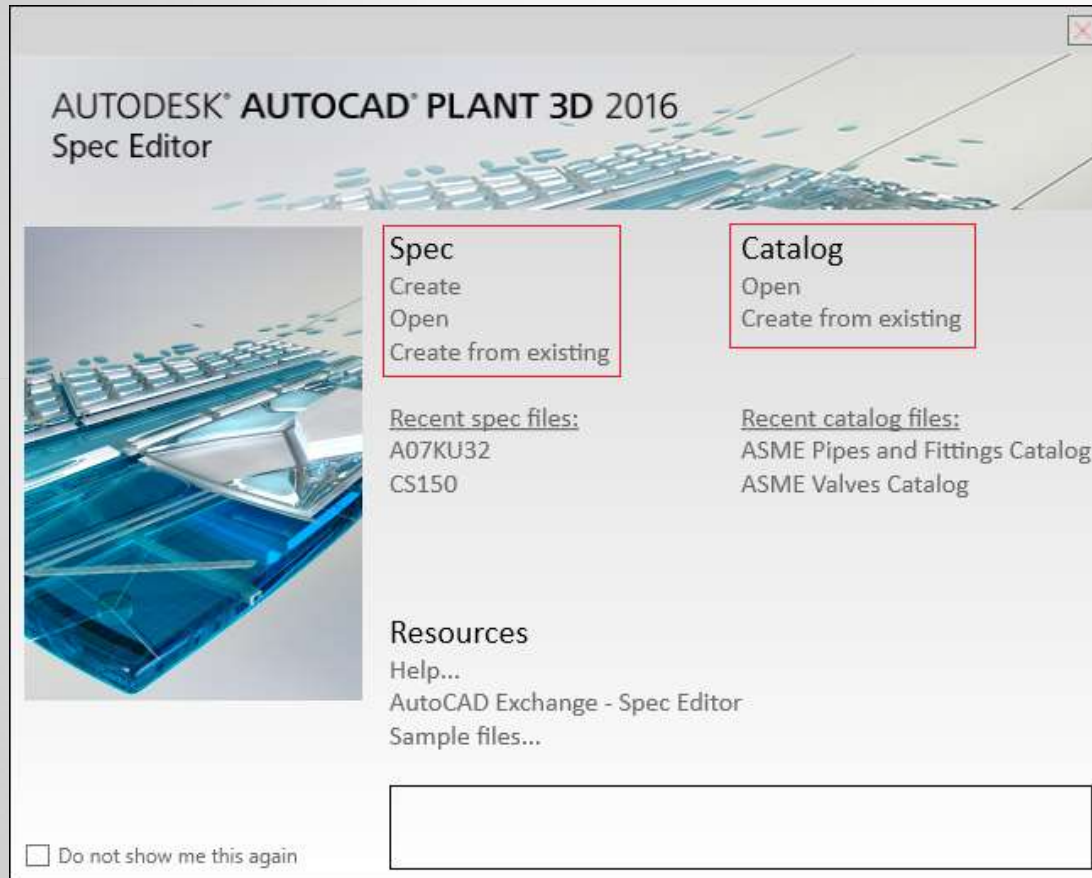
CHAPTER 1 - AutoCAD Spec Editor 2016



Content:

- Difference between Spec and Catalog.
- Workspace Spec Editor.
- Create a custom component:
 - 1) P3D Parametric Graphic
 - 2) AutoCAD DWG Block

Difference between Spec & Catalogs



Spec Definition:

In the Spec Editor, you can create a spec sheet from parts that you copy from the catalogs and use them in AutoCAD Plant 3D when routing pipe.

Catalog Definition:

You use industry standard catalogs in the Specs and Catalogs Editor to create spec files. You can copy, modify, and save catalog files to create custom catalogs. AutoCAD Plant 3D supports modeling with all of the parts contained in the default catalogs.

Workflow AutoCAD Spec Editor 2016

Autodesk AutoCAD Plant 3D Spec Editor 2016

File Edit Specs Catalogs Tools Help

Spec Sheet: C:\AutoCAD Plant 3D 2016 Content\CPak Common\A07KU32.psp

Spec: A07KU32

Edition Options

Spec Editor Branch Table Editor Catalog Editor

Spec Information

Spec: A07KU32
Description: Carbon Steel #150
File Location: C:\AutoCAD Plant 3D 2016 Content\CPak Common\A07KU32.psp
Last Saved: 11/5/2015 1:02:24 PM

Min Size	To	Max Size	Long Description	Part Use Priority	Branch In Use
----- Elbow -----					
2 1/2"	to	4"	ELL 45 LR, BW, ASME B16.9		
1/4"	to	2"	ELL 45, 3000 LB, SW, ASME B16.11		
2 1/2"	to	4"	ELL 90 SR, BW, ASME B16.9		
1/4"	to	2"	ELL 90, 3000 LB, SW, ASME B16.11		

Edit Parts... Add Notes to Group Add to Spec Remove from Spec Find in Catalog Layout and Settings

Catalog: C:\AutoCAD Plant 3D 2016 Content\CPak ASME\ASME Pipes and Fittings Catalog.pcat

Catalog Browser

Catalog: ASME Pipes and Fitting

Common filters

Part category: ~ All ~ Size range: From: ~ All ~ To: ~ All ~ Reducing size range: From: ~ All ~ To: ~ All ~ Units: ~ All ~

Main end conn... ~ All ~

Property overrides

☐ Apply property overrides to parts added to spec

Material: Material Code: Schedule:

Filter	Size Range	Long Description (Family)	Short Description	Material	Material Code	End Type	Facing	Pressure Class	Schedule	Design Std	Design Press
	1/8" - 3"	PIPE NIPPLE, LONG TYPE, SCH STD, TEXPE, 3 1/2" LG ASTM A733	PIPE NIPPLE, LONG TYPE			THDM			STD	LONG	
	1/2" - 24"	BOLT SET, RTJ, 400 LB, LUG BOLT	Bolt set				RTJ	400			
	1/2" - 24"	BOLT SET, FF, 300 LB, LUG BOLT	Bolt set				FF	300			
	1/8" - 3/4"	PIPE NIPPLE, LONG TYPE, MPT, 1 1/2" LG ASTM A733	Pipe Nipple, Long Type			THDM				Long	
	1/4" - 24"	FLANGE THREADED, 150 LB, FF, MSS SP-51	FLANGE THREADED			FF	FF	150			

Generate a New/Custom Component:

In every project we always have some special component that will not be available in the standard catalogs. In that case we have two ways to create our own specialized components:



- Duplicate a Component from the Catalog that already exist and change the properties information.



- Create a New Component



Catalog Editor Workspace

Autodesk AutoCAD Plant 3D Spec Editor 2016

File Edit Specs Catalogs Tools Help

Spec Editor Branch Table Editor Catalog Editor

Catalog: C:\AutoCAD Plant 3D 2016 Content\CPak ASME\ASME Pipes and Fittings Catalog.pcat

Editing Piping Component General Properties

General Properties Sizes

Connection Port Properties

☐ All Ports have the same properties

Current Port: **Port 1 (S1)**

Nominal Unit: **Inch**

End Type: **FL**

Flange Std:

Gasket Std:

Piping Component Properties

Long Description (Family): **FLANGE THREADED, 150 LW, FF, MSS SP 51**

Compatible Standard: **MSS SP 51**

Manufacturer:

Material:

Material Code:

Short Description: **FLANGE THREADED**

Edit Operator Assignments **Save to Catalog**

Create New Component **Duplicate Component** **Delete Component**

Common Filters

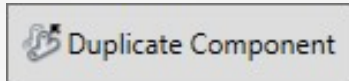
Reset Filters Part Category: ~ All ~ Component Type: ~ All ~ Main End Type: ~ All ~ Pressure Class: ~ All ~ Units: ~ All ~

Catalog: **ASME Pipes and Fitting**

Filter	Size Range	Long Description (Family)	Short Description	Material	Material Code	End Type	Facing	Pressure Class	Schedule	Design Std	Design
	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~
	1/8" - 3"	PIPE NIPPLE, LONG TYPE, SCH STD, TEXPE, 3 1/2" LG ASTM A733	PIPE NIPPLE, LONG TYPE			THDM			STD	LONG	
	1/2" - 24"	BOLT SET, RTJ, 400 LB, LUG BOLT	Bolt set				RTJ	400			
	1/2" - 24"	BOLT SET, FF, 300 LB, LUG BOLT	Bolt set				FF	300			
	1/8" - 3/4"	PIPE NIPPLE, LONG TYPE, MPT, 1 1/2" LG ASTM A733	Pipe Nipple, Long Type			THDM				Long	
	1/4" - 24"	FLANGE THREADED, 150 LW, FF, MSS SP 51	FLANGE THREADED			FL	FF	150			



Duplicate Component:



General Properties:

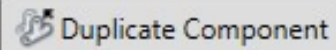
- Connection port properties:
It's important that we enter the correct data to the component family because you could have connections problems with other piping components when you start drafting in AutoCAD Plant 3D.
- Piping components properties:
In this field we can add or modify general information family of components such as material code, description, manufacturer, etc.
- **Attention, when you save a component to the catalog be careful in which one you do it.**

Sizes:

- Add, duplicate y remove size:
Here you can add or remove each nominal diameters of each member of the family.
- Connection port properties:
In this panel individually we edit the information each member of the family.
- Size parameters:
The dimensions modified in this panel directly affect the 3D block of each member of the family.
- **Attention, when you save a component to the catalog be careful in which one you do it.**



Duplicate Component:



General Properties

Editing Piping Component General Properties

General Properties | Sizes



View large preview with dimensions

☐ All Ports have the same properties

Current Port: **Port 1 (S1)**

Nominal Unit: **Inch**

End Type: **FL**

Flange Std:

Gasket Std:

Piping Component Properties

Long Description (Family): **FLANGE THREADED, 150 LW, FF, N**

Compatible Standard: **MSS SP 51**

Manufacturer:

Material:

Material Code:

Short Description: **FLANGE THREADED**

Sizes

Editing Piping Component Sizes

General Properties | Sizes

Size

1/4"
3/8"
1/2"
3/4"
1"
1 1/4"
1 1/2"
2"
2 1/2"

Connection Port Properties

☐ All Ports have the same properties

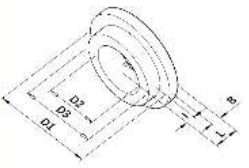
Current Port: **Port 1 (S1)**

Nominal Diameter: **0.25**

Piping Component Properties

Long Description (Size): **FLANGE THREADED, 1/4" ND, 150 LW**

Weight:



Size Parameters

These dimensions affect the actual size of the component in the 3D model.

L: **0.38**

B: **0.28**

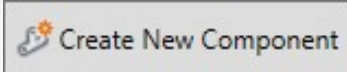
D1: **2.5**

D2: **0.54**

D3: **0.88**



Create New Component:



When you select this option there are two ways to create a custom component for the Catalog we want to complete.

Plant 3D Parametric Graphics:

- The program provides us with several blocks we can choose according to the desired component.
- Also contains a tool advanced blocks according to the requirements of the model.

AutoCAD DWG Block based Graphics:

- If the desired component is not in any of the catalogs provided by the AutoCAD program can be parameterized in the block.
- Adoptarlo a nuestra Piping Class y/o hacerlo parte de nuestro Catálogo.



Important: We must pay attention when we load the information for each component, connection type and number of ports. In this way we avoid compatibility conflicts in Plant 3D model drawing.

Plant 3D Parametric Graphics

Create New Component

Basic Part Family Information

Component Category: Units: ☒ Imperial ☐ Metric

Piping Component: Size From: To:

Primary End Type: Short Description:

Graphics

☒ Plant 3D Parametric Graphics

☐ Custom - AutoCAD DWG Block based graphics

Adapter
BleedRing
BlindDisk
Cap
Coupling
Cross
Crossover
Elbow
ElbowSideOutlet
Flange
BlindFlange
Instrument
Nipple
Nozzle
Orlet
OrificePlate
Pipe
Plug

Elbow CPBE
Elbow CPBE_F_F
Elbow CPBE_F_F
Elbow CPBE_F_F

Boxed Bend w. Pipe Projection
Boxed Bend w. Pipe Projection (FLG)
Boxed Bend w. Pipe Projection (MJ, FLG at port 1)
Boxed Bend w. Pipe Projection (MJ, FLG at port 1)

Advanced shape options

Launch Catalog Builder... Create Cancel Help

AutoCAD DWG Block based graphics

Create New Component

Basic Part Family Information

Component Category: Units: ☒ Imperial ☐ Metric

Component: Size From: To:

Short Description: Primary End Type:

Graphics

☐ Plant 3D Parametric Graphics

☒ Custom - AutoCAD DWG Block based graphics

Number of Connection Ports:

Blocks must have this number of ports. You will select blocks in the next step.

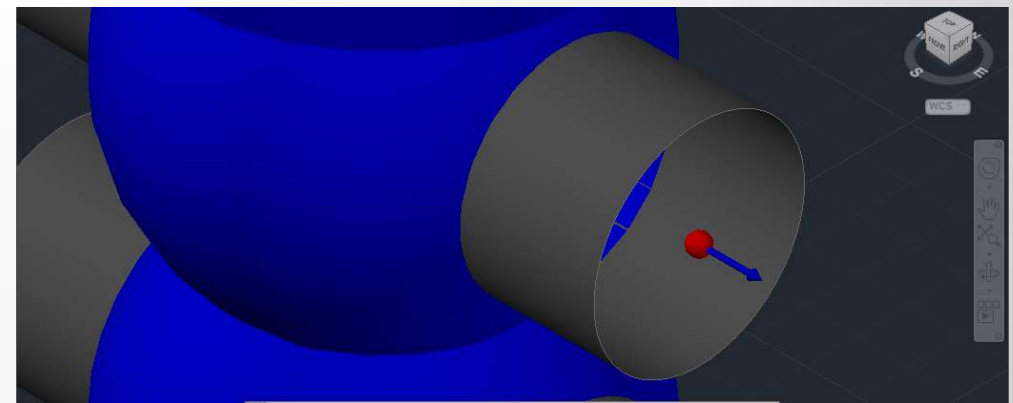
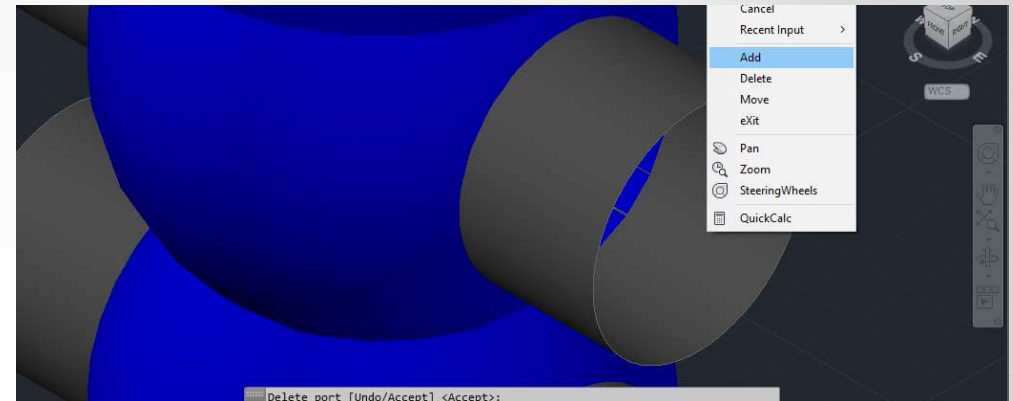
To learn more about creating Block Based piping components [click here](#).

Launch Catalog Builder... Create Cancel Help



Procedure: Custom – AutoCAD DWG block based graphics, Part 01

- In Plant 3D software we create the necessary models and convert them into blocks.
- With the command PLANTPARTCONVERT select the desired block. Add the corresponding number of ports in the orientation of the way out of the pipe connection and select ENTER to finish.
- Once complete return to the Spec Editor to begin creating your new custom component.



Procedure: Custom – AutoCAD DWG block based graphics, Part 02

General Properties:

- Connection port properties: In this panel we assign the corresponding properties of the component, such as connection type, pressure class, etc.
- Piping component properties: Here we enter the information that describes the component family. Example: type and material code, manufacturer, etc.

Autodesk AutoCAD Plant 3D Spec Editor 2016

File Edit Specs Catalogs Tools Help

Spec Editor Branch Table Editor Catalog Editor

Catalog: C:\AutoCAD Plant 3D 2016 Content\CPak ASME\ASME Valves Catalog.pcat

Editing Piping Component General Properties

General Properties Sizes **02**

Connection Port Properties

☐ All Ports have the same properties

Current Port: Port 1 (S1)

Nominal Unit: Inch

End Type: BV

Flange Std:

Gasket Std:

Facing: **03**

Piping Component Properties

Long Description (Family):

Compatible Standard:

Manufacturer:

Material:

Material Code:

Short Description: DOUBLE SEAT VALVE

Design Std: **04**

Edit Operator Assignments Save to Catalog

Create New Component Duplicate Component Delete Component

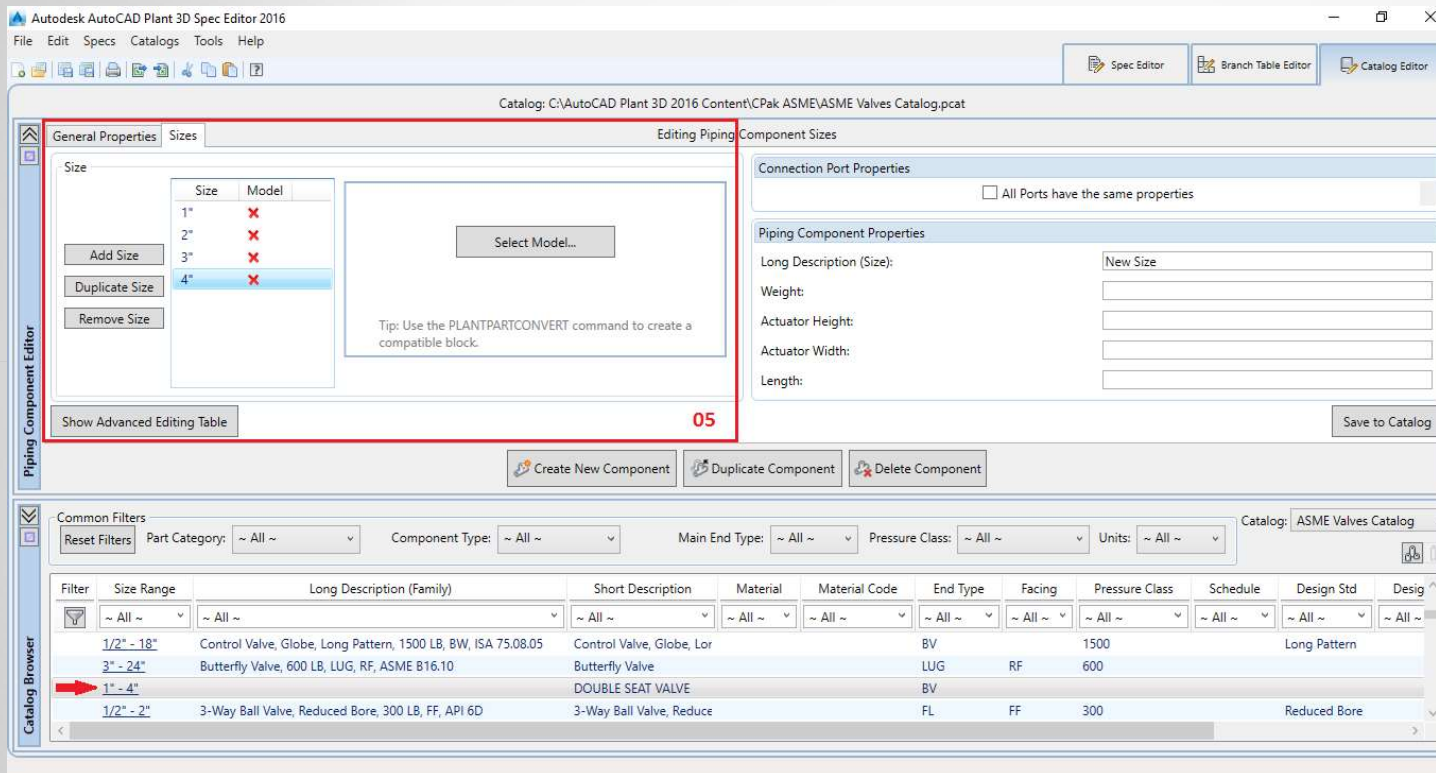
Common Filters

Reset Filters Part Category: ~ All ~ Component Type: ~ All ~ Main End Type: ~ All ~ Pressure Class: ~ All ~ Units: ~ All ~ Catalog: ASME Valves Catalog **01**

Filter	Size Range	Long Description (Family)	Short Description	Material	Material Code	End Type	Facing	Pressure Class	Schedule	Design Std	Design
	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~	~ All ~
	1/2" - 18"	Control Valve, Globe, Long Pattern, 1500 LB, BW, ISA 75.08.05	Control Valve, Globe, Lor			BV		1500			Long Pattern
	3" - 24"	Butterfly Valve, 600 LB, LUG, RF, ASME B16.10	Butterfly Valve			LUG	RF	600			
	1" - 4"		DOUBLE SEAT VALVE			BV					
	1/2" - 2"	3-Way Ball Valve, Reduced Bore, 300 LB, FF, API 6D	3-Way Ball Valve, Reduce			FL	FF	300			Reduced Bore



Procedure: Custom – AutoCAD DWG block based graphics, Part 03

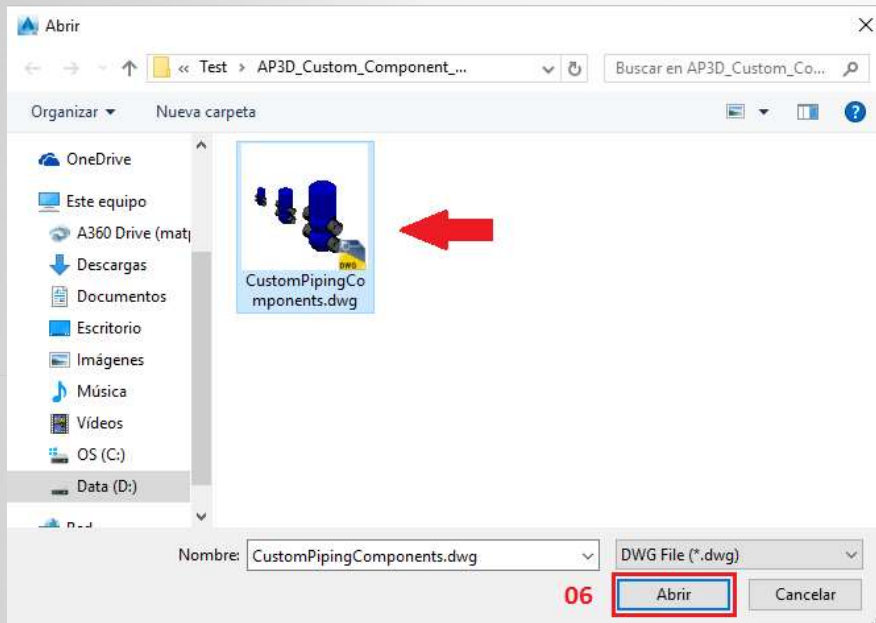


Sizes:

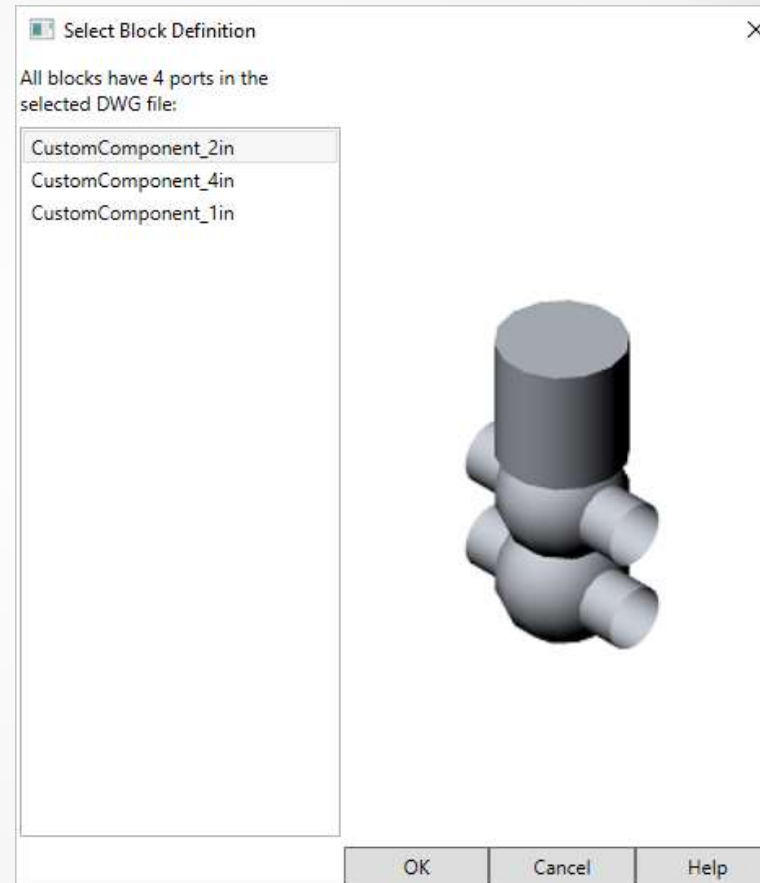
- **Add, duplicate y remove:**
You can be defined nominal diameters of each member of the family.
- **Select model:** In this option assign each block we created in Plant 3D to the corresponding component.
- **Connection port properties/piping component properties:**
The information entered here is just additional. The block created already has the size need it.



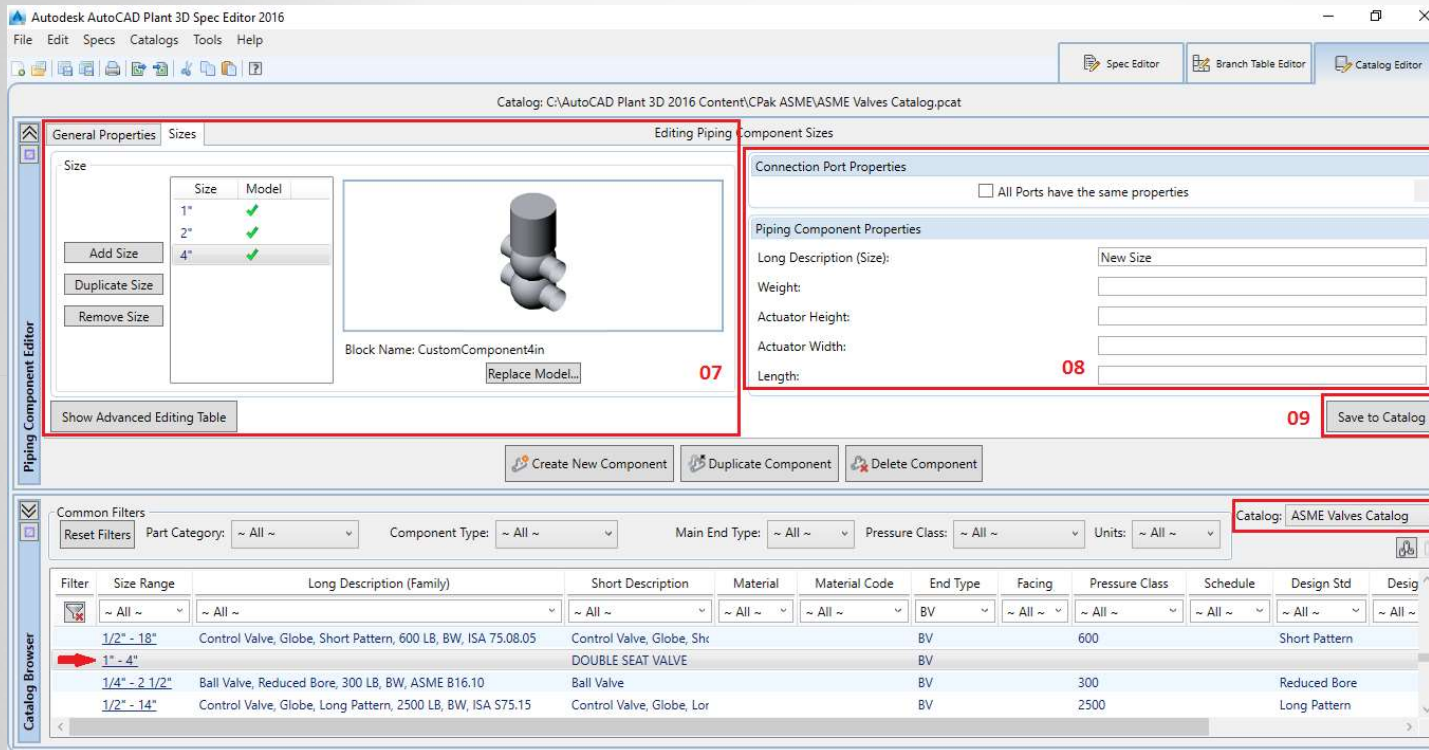
Procedure: Custom – AutoCAD DWG block based graphics, Part 04



In the explorer window select the file with the custom parts you convert with the “plantpartconvert” command and click open. Select the block 3D for each size you Add in the new family.



Procedure: Custom – AutoCAD DWG block based graphics, Part 05



- Complete all the custom blocks for each size.
- Fill the information in the connection properties fields.
- Save to the Catalog.

Attention:

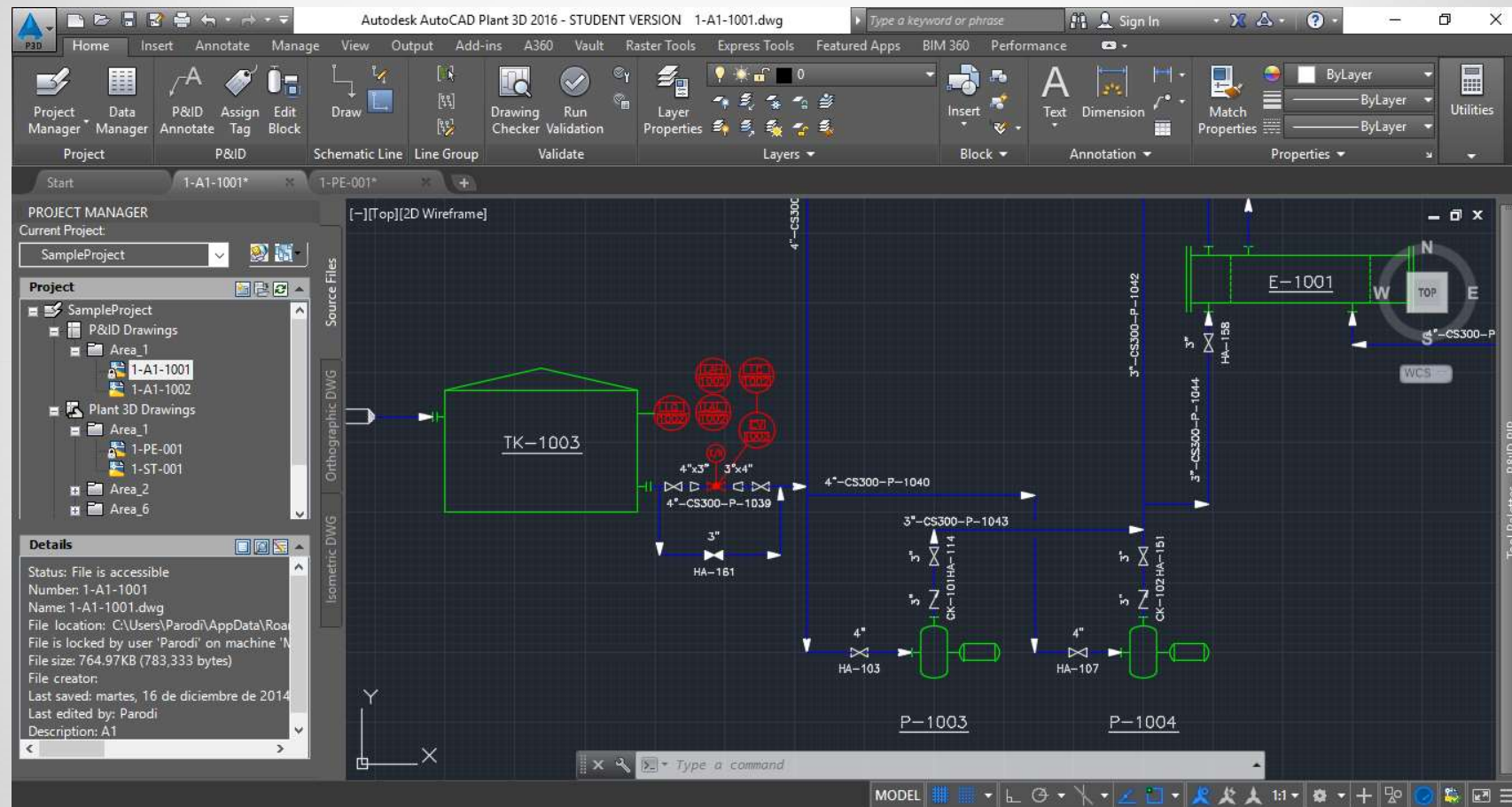
When you convert a Block in a Plant 3D Component (PLANTPARTCONVERT) you can't modify your geometry again.

CHAPTER 2 - AutoCAD P&ID 2016

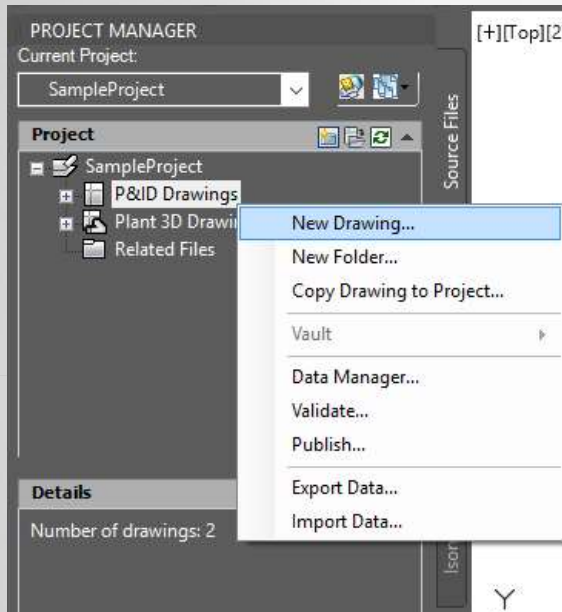
Content:

- Workspace AutoCAD P&ID.
- Custom Symbol P&ID.
- Procedure Format/Configuration TAG

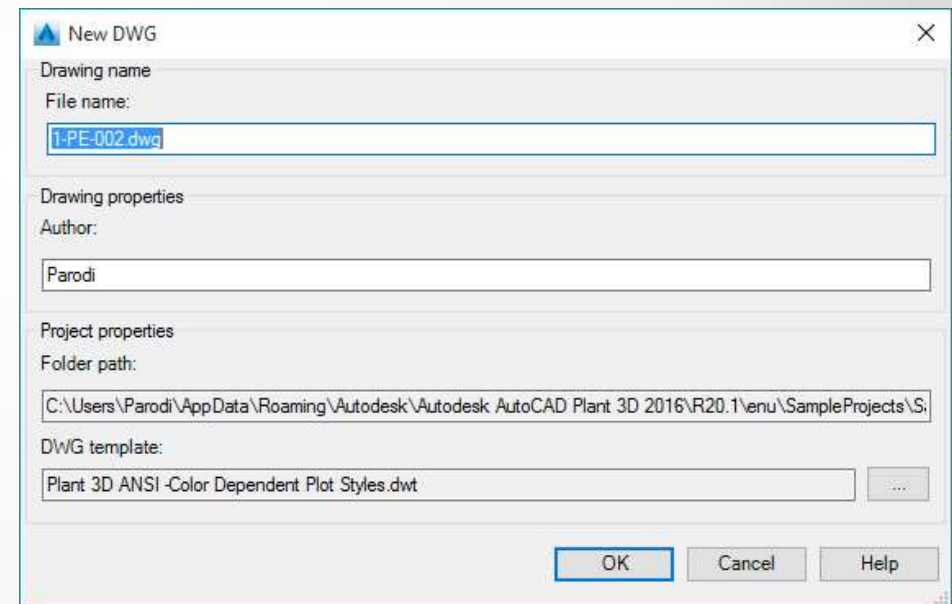
Workspace AutoCAD P&ID 2016



Create and Configure a P&ID Drawing

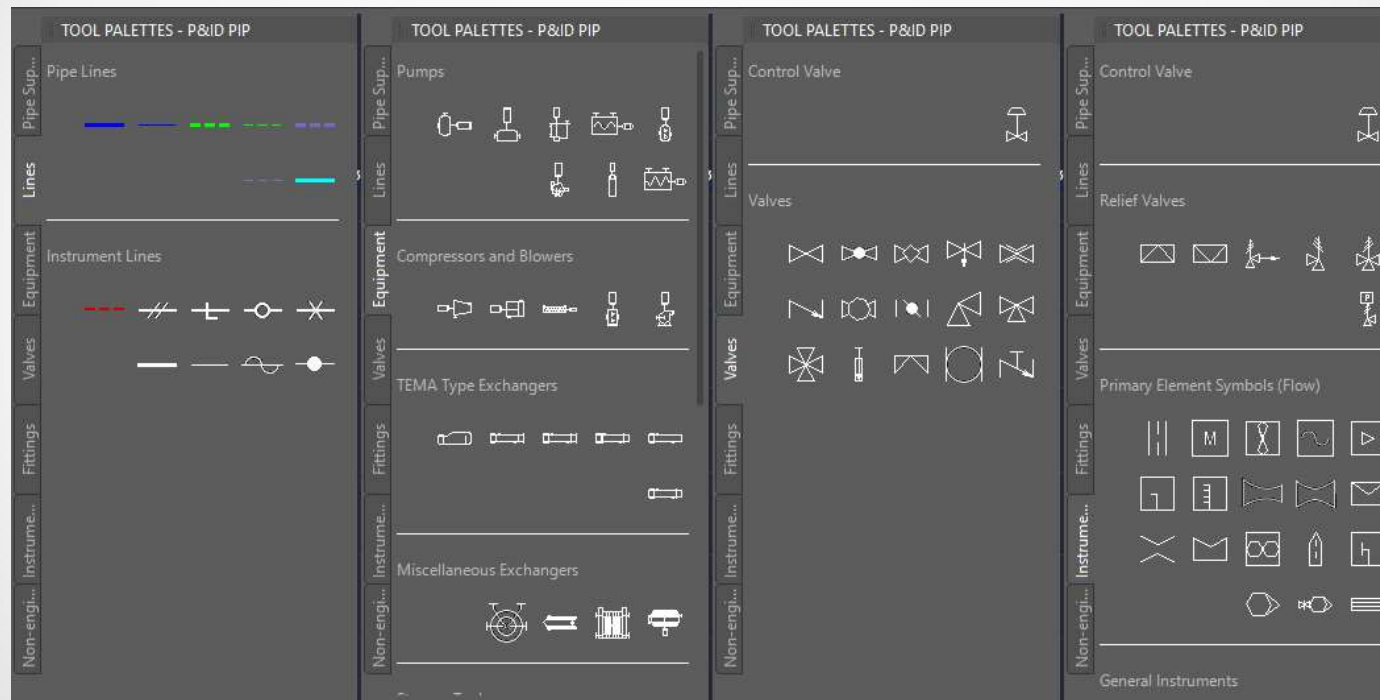


In the New DWG dialog box we define the name of the file, author, folder path, etc.



Click + right button of the mouse to create a new DWG drawing in the folder we select.

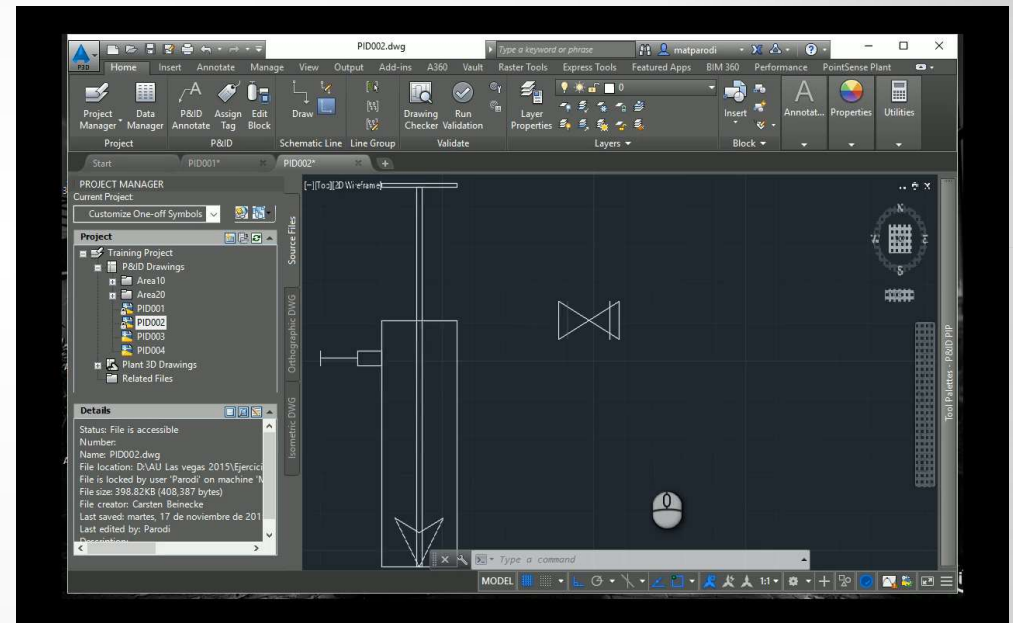
We can find in Tool Palettes several Standard Symbol Libraries (PIP, ISO, ISA, DIN, JIS-ISO)



Create Custom P&ID Symbol

Creating a Custom P&ID Symbol:

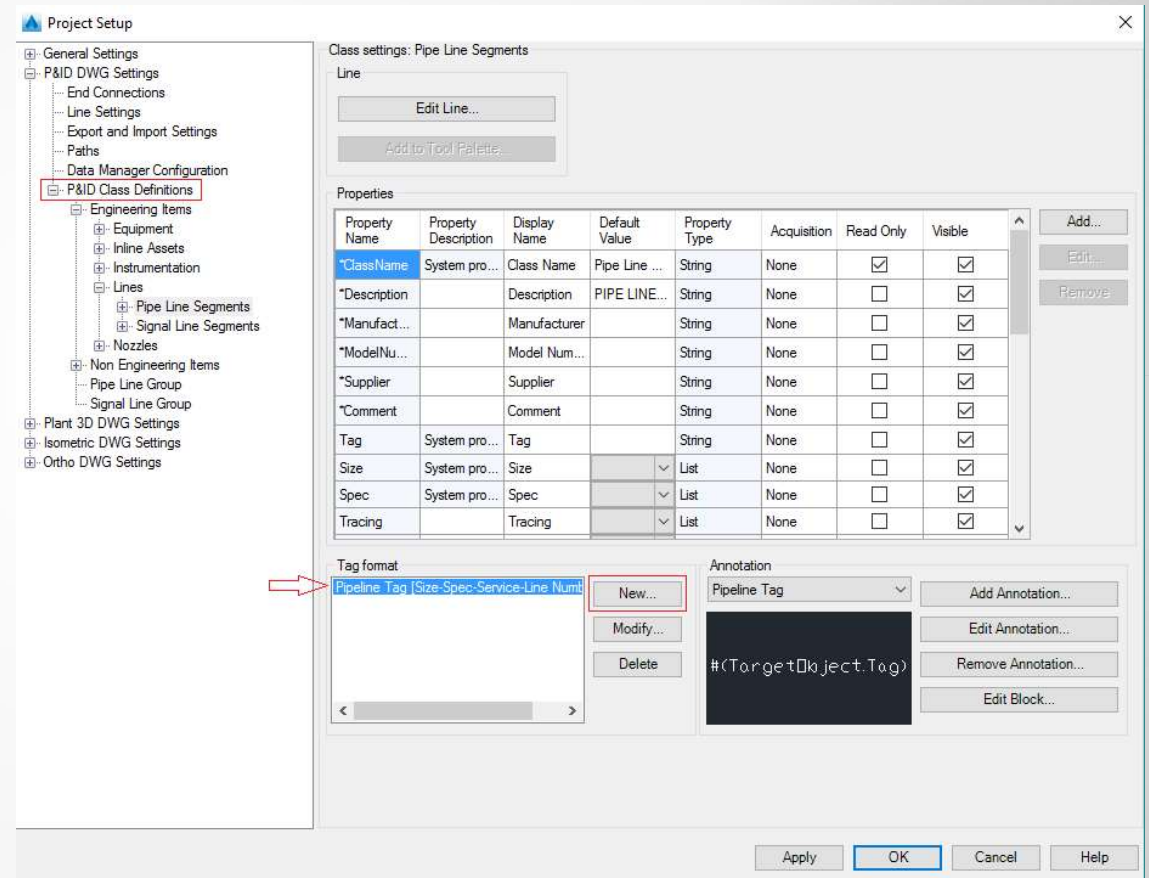
1. Using AutoCAD geometry, create the symbol you need.
2. Select the geometry and create a block.
3. Convert in P&ID object and select the appropriate category.
4. Edit the P&ID object's block and add connection points.
5. Save the changes and ready!

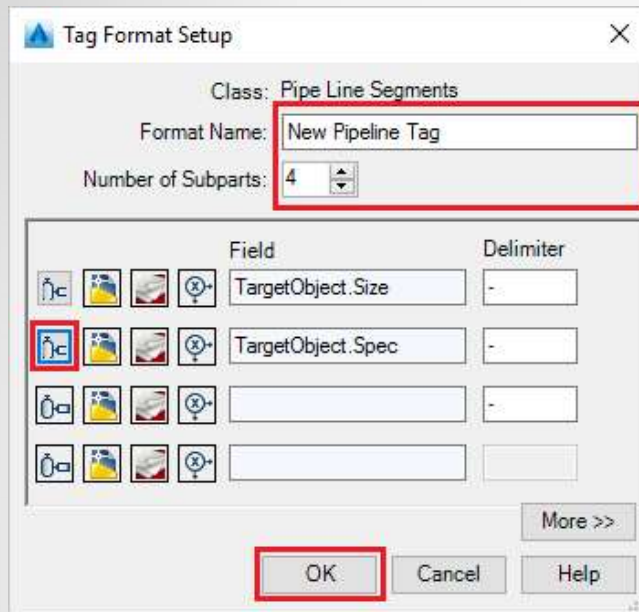


TAG P&ID Pipe Line Configuration

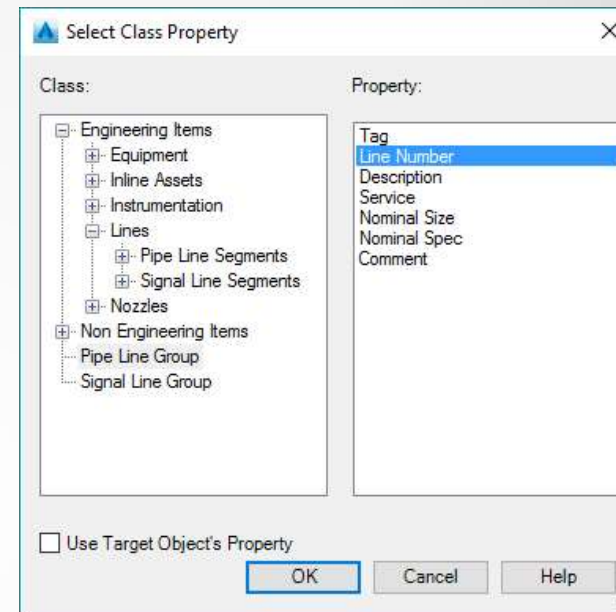
Define a TAG Format for a family:

1. TAG formats are accessed from the Project Settings dialog, under the P&ID Class Definitions portion of the tree.
2. Press the “New...” button raises the TAG Format Setup dialog.

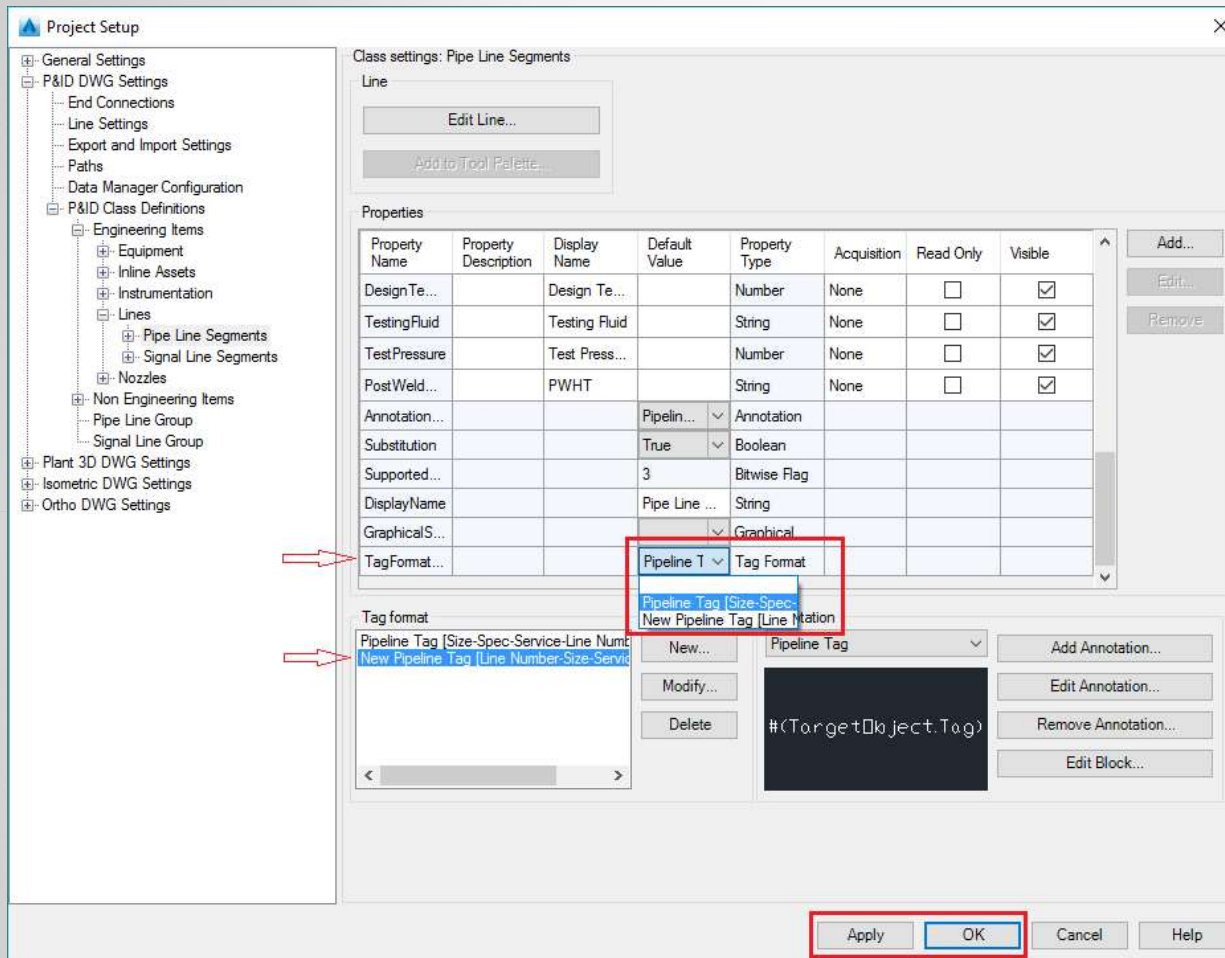




In *Tag Format Setup* dialog box fill the *Format Name* and the *Number of Subparts*.
Select Class Properties  another dialog box will appear.



In the tree class category you can select with information and in what order it will appear your custom TAG.



Finally, when you return to the *Projec Setup* window, in the *Properties* panel look for *TagFormatName*.

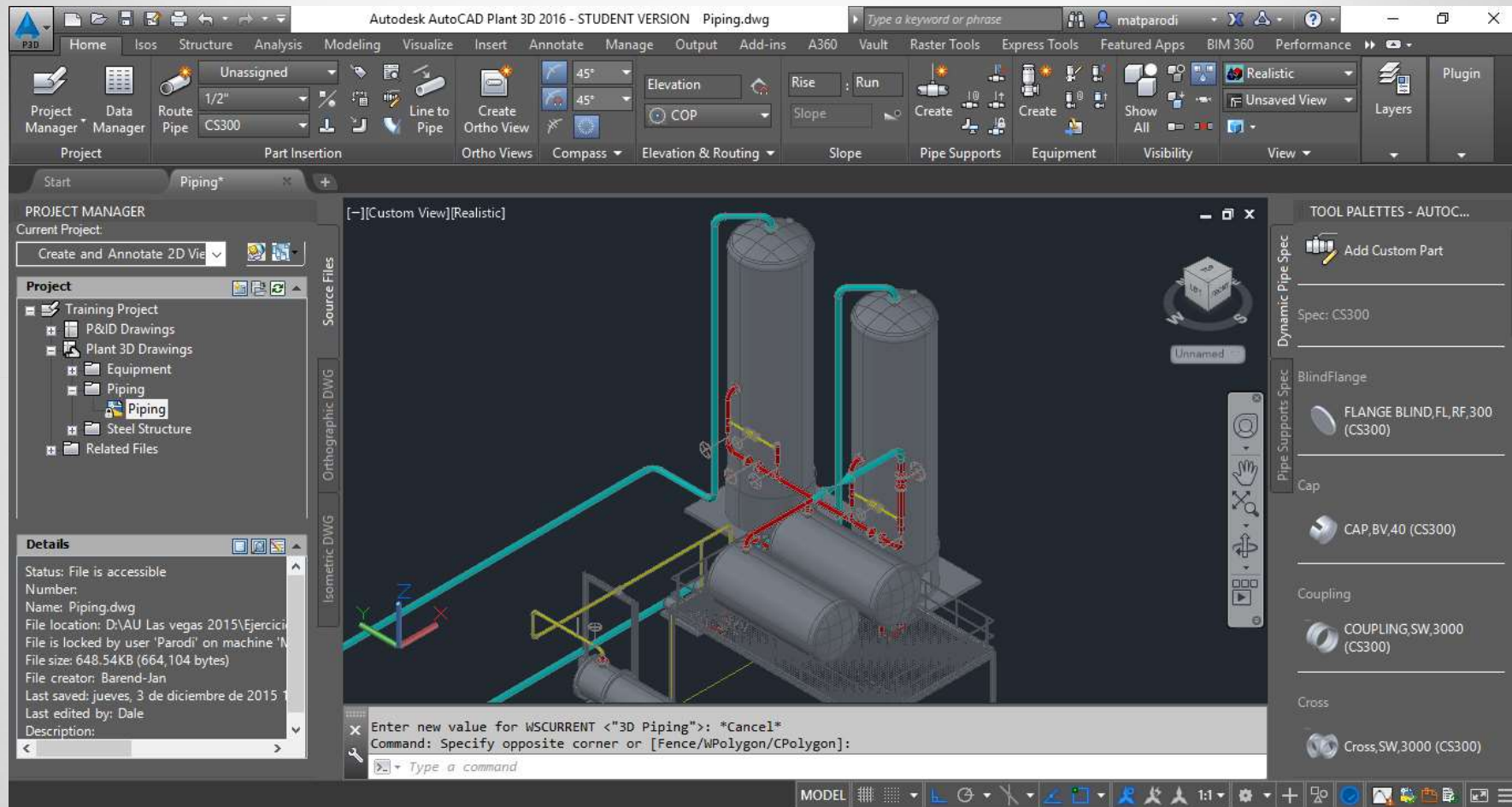
As you can see in the *Default Value* column, change the format TAG for your customized in the option list, apply and accept.

CHAPTER 3 - AutoCAD Plant 3D 2016

Content:

- Workspace AutoCAD Plant 3D.
- Work with Xrefs Files.
- Route Pipe Lines.
- Custom Parametric Equipment.

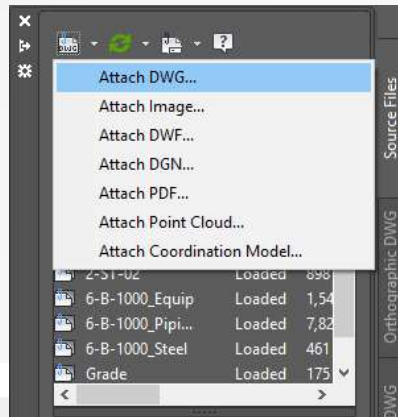
Workspace AutoCAD Plant 3D 2016



Work with References:

There are different ways of Attach, the more common are DWG and RCP Files.

When you select the type of file you want to attach a *Select Reference File* window shall open, browse the file you need it and click open. There are two ways to attach a **DWG File**:

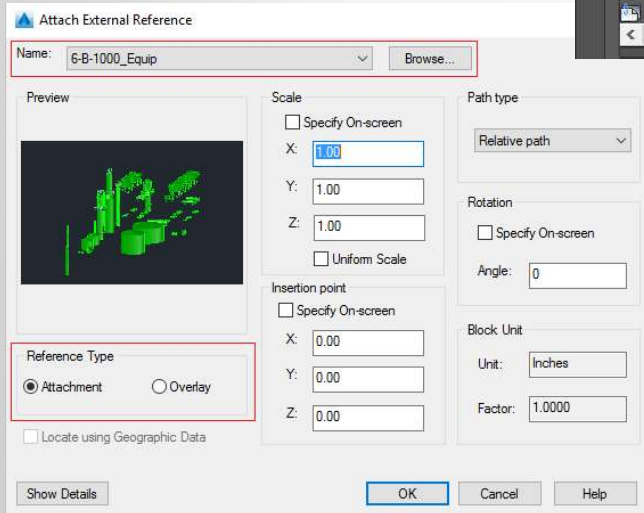


Overlaid Xrefs:

An overlaid xref does not load or bring with it any nested xrefs. For example, if you xref "A" into your parent drawing, which contains a nested xref, drawing "B", only drawing "A" will be referenced in. Drawing "B" will not be loaded into the parent drawing because it is a nested xref.

Attached Xrefs:

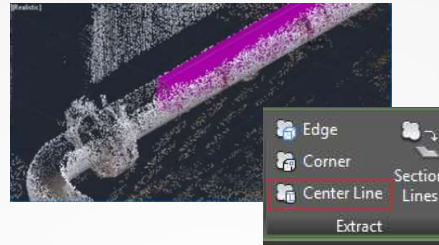
Attached xrefs, when referenced into a drawing, will include nested xrefs, which means if drawing "A" is referenced into your drawing and it has nested xrefs "B" and "C" in it, drawings "B" and "C" will be attached to the parent drawing along with drawing "A."



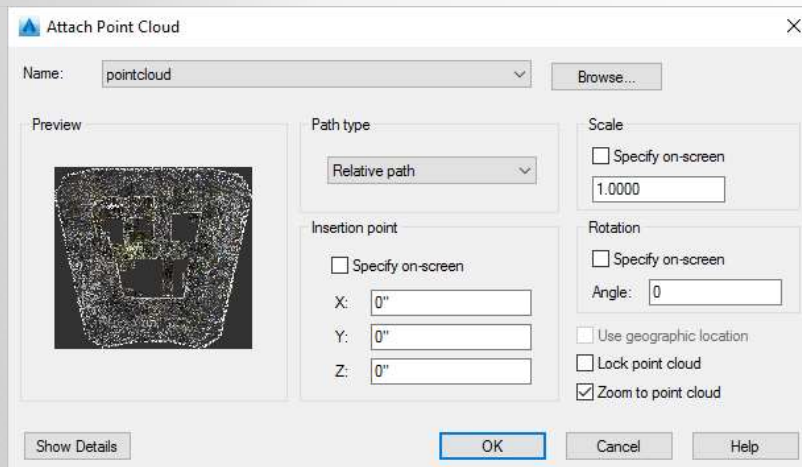
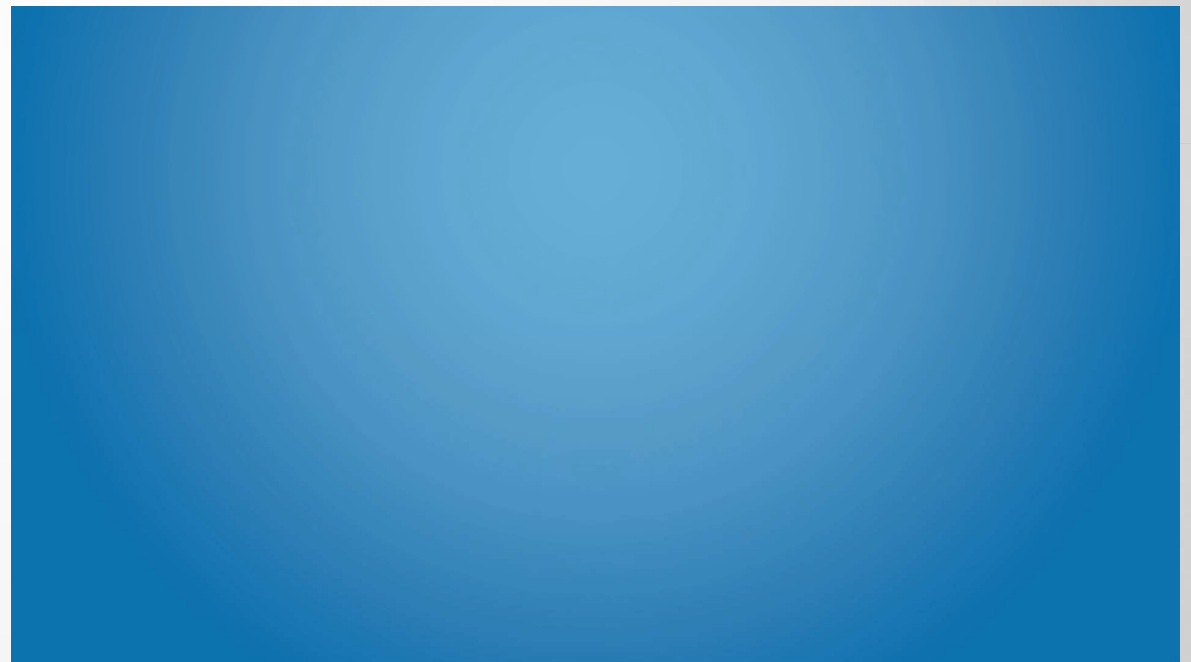
RCS/RCP File, Point Cloud:

The use of this technology has increased in recent years, minimizing working hours in field reconnaissance and reducing the risks of accidents.

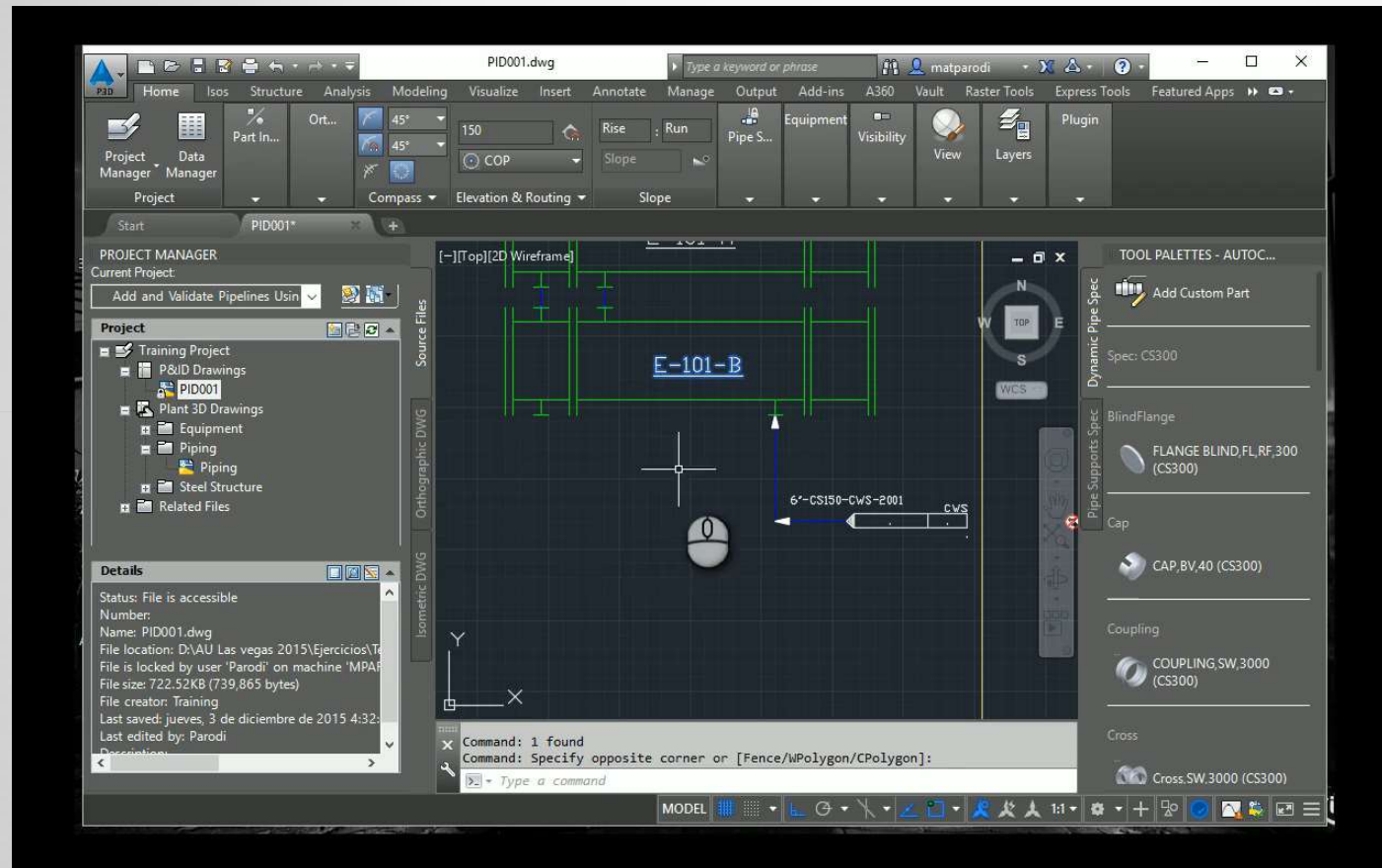
The procedure and options for attaching a point cloud file to the geometric model is the same.



In the point cloud ribbon you will find tools, like *Extract Centerline*, useful for place parametric geometry. If you have to work with big point clouds I recommend the next Add-in:



Routing pipes lines – P&ID Line List



P&ID Line List palette, the process of placing 3D pipe lines and inline components into a Plant 3D model. The first thing you do is select from the drop down list the P&ID drawing that you want to use. The next step is select the line or inline component you want to add. In this case, you'll want to place the pipe lines before placing the inline components.

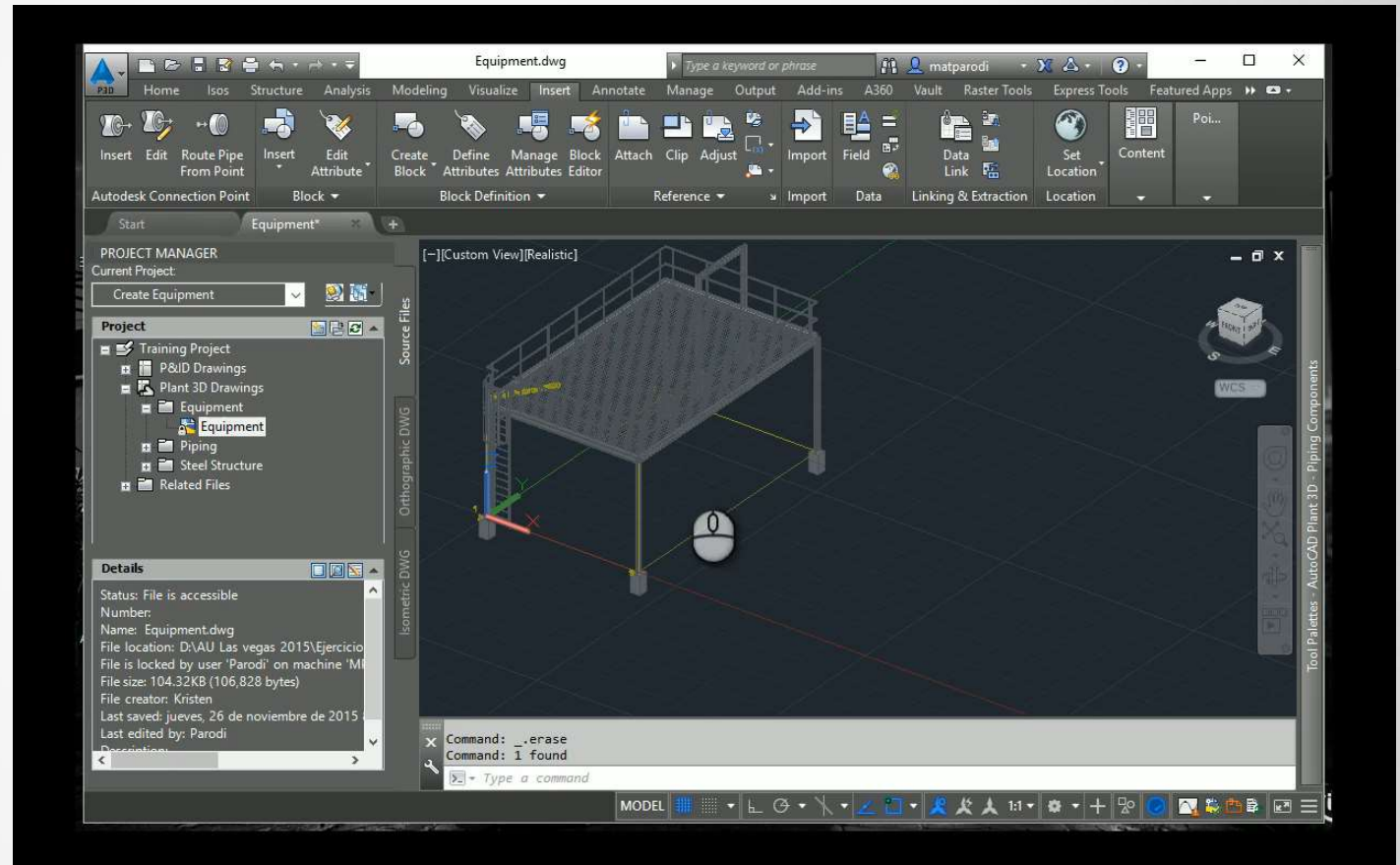
When the pipe line was designed, placing the inline component is easier and quicker.

Create Custom Equipment

AutoCAD Plant 3D 2016 contain a Equipment Library.

Besides you can custom in a basic way a missing Equipment.

In specific cases you may need place a special Equipment with more level of detail. You can do a parametric model in Autodesk AutoCAD or Inventor and then convert to a Plant 3D equipment component.



CHAPTER 4 – Drawing Documentation and Reports



Content:

- Report Lists (Components, Valves, Lines, etc.)
- Create Orthographic Drawings
- TAG and dimensión drawings.



Generate Defaults Report from Data Manager

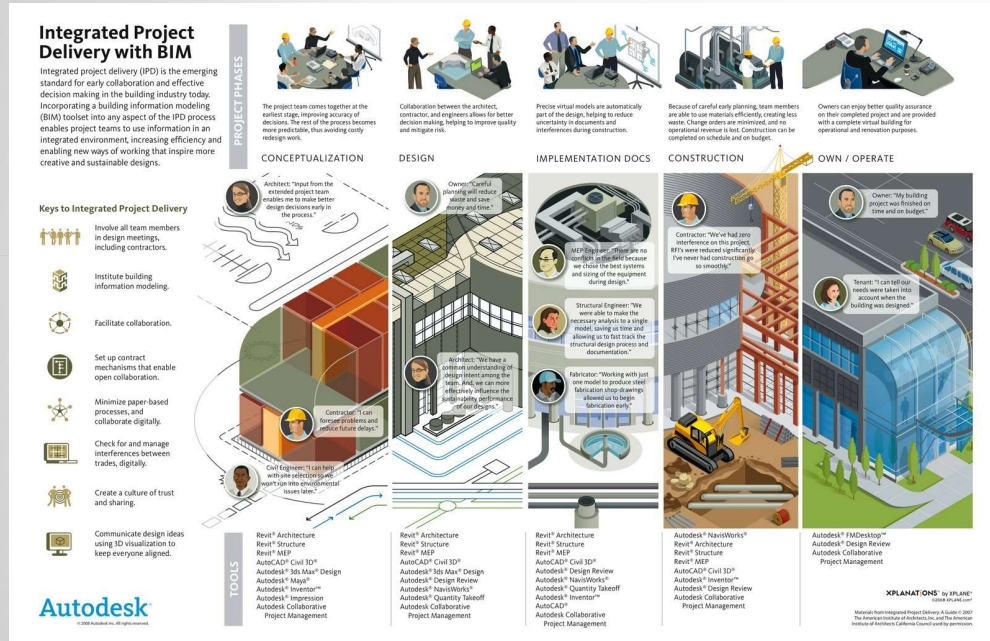
Construction Document Generation

TAG pipe lines and components, dimensions.

Additional Content – Autodesk BIM 360



The next generation of BIM is for anyone, anywhere, at any time...





**THANKS FOR
YOUR ATTENTION
AND
PLEASE DON'T ASK
TOO MUCH**



