

# AutoCAD Plant 3D – P&ID Valve Object Mapping

# AutoCAD Plant 3D 2014

AutoCAD Plant 3D provides a mechanism for placing inline fittings into a 3D model by picking them from a list derived from a corresponding P&ID. This white paper explains specifically how Plant 3D Valves are linked to their corresponding P&ID symbols.

### P&ID Line List Window

The P&ID Line List window lists the process lines that are defined in each P&ID and the fittings that have been placed into those lines.



By picking an item from the list and choosing the Place button, Plant 3D chooses a corresponding component of the given size from the defined Pipe Spec ready for insertion into the 3D model. The size and spec are determined from the size and spec of the process line – 150mm, CS300 in the above example.

## P&ID Object Mapping Window

The link between the class of fitting in the P&ID and that in the 3D Pipe Spec is made through the P&ID Object Mapping window in Project Setup. In this example, the P&ID Gate Valve is mapped to a 3D Valve of subtype (Gate-Inline).

Project Setup	10-10-10-10-10-10-10-10-10-10-10-10-10-1									
General Settings	P&ID Object Mapping									
P&ID DWG Settings	P&ID Classes	Plant 3D Classes								
Plant 3D DWG Settings     Export and Import Settings     Export and Import Settings		Cate Valve								
		Gate valve								
Paths Based Configuration	Plant 3D Class Mappings									
- Data Manager Configuration	Hand Valves	Valve (Sate-Inine)								
- Ploing Connection Settings	- Angle Dall Valve - Angle Check Valve - Angle Globe Valve									
- P&ID Object Mapping		$\sim$		COIL						
- Plant 3D Class Definitions	- Angle Pressure Redu					Delete				
Spec Update Settings sometric DWG Settings	- Angle Valve									
	- Angle Valve Progress									
-Ortho DWG Settings	- Ball Check Valve									
	Ball Hoat Valve									
	- Preather Valve	Branch Manaina								
	- Butterfly Valve	Property Mapping								
	- Butterfly Valve Progre	RED Presents	Birst 2D Breasts		Validate	<u>^</u>				
	- Check Valve	Paid Pioperty	Flank 3D Floperty	Fiant 3D Floperty						
	- Continuously Operate	Size	Nominal Diameter		<b>V</b>					
	- Detonation Safeguar	PnPGuid	no mapping	-						
	- Diaphragm Valve	PnPTimestamp	no mapping	-						
	- Diverter varve	Description	no mapping	-		8				
	- Rashback Arrester	Manufacturer	Manufacturer	-						
	- Row Limiter With Onf	Model Number	no mapping	-						
	- Freezing Section	Supplier	no mapping	-						
	-Gate Valve	Comment	no mapping	-	(m)					
	- Gate Valve Progress	Spec	Spec	-	<b>v</b>					
	- General Sound Abso	Valve Code	Valve Code	-						
	General Valve	Normally	Normally	-	<b>v</b>					
	General Vapour Trap	Faiure	Falure	-	1	Ŧ				
	- Globe Valve	* These properties are available	e for validation only.							
	- Hose Clamp -	Check this item during 3D n	odel to P&ID validation.							
	<	the state of the s								
				noly	OK Cancel	Helo				
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#### Plant 3D Class Mapping Window

Clicking the Edit... button on the P&ID Object Mapping window opens the Plant 3D Class Mapping window. This window allows one or more subtypes of Plant 3D Valve to be mapped to the P&ID Gate Valve.

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Note that there is only one Valve class in the Plant 3D class list and that it is not possible to extend the list.

Different types of valve are identified by their subtype. The list of subtypes is compiled from the combination of two Plant 3D Valve property fields: ValveBodyType and ValveAlignment.

The values for these fields are entered through the Piping Component Properties panel of the Spec Editor.

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	Cata	log: H:\AutoCAD Plant 3D 2014 Cont	ent\CPak ASME\ASME Valve	Catalog.pcat					
General Properties Sizes		Editing Piping Com	ponent General Properties						
	Connection Port Pr	operties			Piping Comp	onent Properties			
		All Ports have the s	ame properties		Weight Unit				•
	Current Port:	Po	rt 1 (S1)	(- <b>-</b>	C				
	Nominal Unit:	In	ch	•	Connection	Port Count:	2		
	End Type:	FI	_	•	Valve Alignn	nent:	Inline		
	Flange Std:				Valve Detail:		Continue	us	
	Gasket Std:				Valve Body 1	ype:	Gate		
	Facing:	R	F		Flow Depend	dent:	False		•
	Prorruro Clarge	2	20		Offset:		False		•
-	Pressure class.				Iso Symbol T	ype:	VALVE		
	Schedule:				Iso Symbol S	KEY:	VTFL		
View large preview with dimensions									
							Edit Operator	Assignments	ave to Catal
	6	🤔 Create New Component 🛛 🧭 Du	plicate Component 🖉 🖧 De	lete Component					
Common Filters							Cat	alog: ASME Vak	ver Catalon
Reset Filters Part Category: ~ All ~ • Co	omponent Type: 🔶 All	~ • Main Er	id Type: 🔷 All ~ 🔹 🔹	Pressure Class: ~ All ·		Units: ~ All ~	•		
	nily)	Short Description	Material Material	Code End Type	Facing	Pressure Class	Schedule	Design Std	Design
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Reference: wp-cad-00166 October 2013 Guide by Andy Davis

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Page **3** of **4** 

The editor presents the fields as free text entry fields allowing new values to be entered. However, values that are entered here that are not currently displayed in the subtypes list of the Plant 3D Class Mapping window are not automatically added to the list. Additionally, the user interface does not provide a mechanism for adding to the list in the Plant 3D Class Mapping window or any other way to view the list of the predefined values.

#### P3dEnumeration.xml

The lists of predefined Valve Body Type and Valve Alignment values are stored in a configuration file named P3dEnumeration.xml located in the application folder C:\Program Files\Autodesk\AutoCAD 2014\PLNT3D\en-US. The default contents are shown below.

```
<?xml version="1.0" encoding="utf-8"?>
<P3dPropEnumColl xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
        <p3dPropEnumList>
                 <!-- Valve Body and and combined Valve Actuator+Body Properties -->
<P3dPropEnum name="ValveBodyType">
                          <EnumValueList>
                                   <P3dEnumValue GlobalName="Ball" LocalName="Ball"/>
                                  CP3dEnumValue GlobalName="Butterfly" LocalName="Butterfly"/>
<P3dEnumValue GlobalName="Check" LocalName="Check"/>
<P3dEnumValue GlobalName="Corner" LocalName="Corner"/>
<P3dEnumValue GlobalName="Corner" LocalName="Corner"/>

                                  <P3dEnumValue GlobalName="Corner" LocalName="Corner"/>
<P3dEnumValue GlobalName="Diaphragm" LocalName="Diaphragm"/>
<P3dEnumValue GlobalName="Gate" LocalName="Gate"/>
<P3dEnumValue GlobalName="Globe" LocalName="Globe"/>
<P3dEnumValue GlobalName="Plug" LocalName="Needle"/>
<P3dEnumValue GlobalName="Plug" LocalName="Plug"/>
<P3dEnumValue GlobalName="Plug" LocalName="Plug"/>

                                  <rpre><rpre><rpre><rpre><rpre><rpre>
                                   <P3dEnumValue GlobalName="MultiPort" LocalName="Multi Port"/>
                          </EnumValueList>
                 </P3dPropEnum>
                  <P3dPropEnum name="ValveAlignmentType">
                         <EnumValueList>
                                   <P3dEnumValue GlobalName="Inline" LocalName="Inline"/>
                                  <P3dEnumValue GlobalName="Angle" LocalName="Angle"/>
<P3dEnumValue GlobalName="3-Way" LocalName="3-Way"/>
<P3dEnumValue GlobalName="4-Way" LocalName="4-Way"/>
                          </EnumValueList>
                 </P3dPropEnum>
                 <P3dPropEnum name="ValveDetailType">
                          <EnumValueList>
                                   <P3dEnumValue GlobalName="Check" LocalName="Check"/>
                                  <P3dEnumValue GlobalName="Continuous" LocalName="Check"
<P3dEnumValue GlobalName="Continuous" LocalName="Mixed Proof"/>
<P3dEnumValue GlobalName="MixedProof" LocalName="Mixed Proof"/>
<P3dEnumValue GlobalName="Throttle" LocalName="Throttle"/>
<P3dEnumValue GlobalName="PressureRelief" LocalName="Pressure Relief"/>
                                  <P3dEnumValue GlobalName="PressureRelief" LocalName="Pressure Relief"/>
<P3dEnumValue GlobalName="PressureReducing" LocalName="Pressure Reducing"/>
<P3dEnumValue GlobalName="Safety" LocalName="Safety"/>
<P3dEnumValue GlobalName="Block" LocalName="Block"/>
<P3dEnumValue GlobalName="Shuttle" LocalName="Shuttle"/>
<P3dEnumValue GlobalName="Shuttle" LocalName="Shuttle"/>

                                  <P3dEnumValue GlobalName="Diverter" LocalName="Diverter"/><P3dEnumValue GlobalName="Breather" LocalName="Breather"/>
                          </EnumValueList>
                 </P3dPropEnum>
                 <!-- Actuator and combined Valve Actuator+Body Properties -->
<P3dPropEnum name="ActuatorType">
                          <EnumValueList>
                                   <P3dEnumValue GlobalName="Diaphragm" LocalName="Diaphragm"/>
                                  <P3dEnumValue GlobalName="ElectricMotor" LocalName="Electric Motor"/>
<P3dEnumValue GlobalName="Gear" LocalName="Gear"/>
<P3dEnumValue GlobalName="Gear" LocalName="Hand Wheel"/>
<P3dEnumValue GlobalName="HandWheel" LocalName="Hand Wheel"/>
<P3dEnumValue GlobalName="HandLever" LocalName="Hand Lever"/>
                                  <P3dEnumValue GlobalName="Spring" LocalName="Spring"/>
<P3dEnumValue GlobalName="Hydraulic" LocalName="Hydraulic"/>
<P3dEnumValue GlobalName="Pneumatic" LocalName="Pneumatic"/>
<P3dEnumValue GlobalName="Solenoid" LocalName="Solenoid"/>
                          </EnumValueList>
                 </P3dPropEnum>
                  <P3dPropEnum name="OperatorType">
                         <EnumValueList>
                                  </EnumValueList>
                 </P3dPropEnum>
          </p3dPropEnumList>
</P3dPropEnumColl>
```









Page 4 of 4

This configuration file provides a translation between a value that is entered into the Spec Editor (the GlobalName) and the corresponding value that is displayed in the subtypes list in the Plant 3D Class Mapping window (LocalName).

New subtypes of valve may be added to the list by inserting new lines into the "ValveBodyType" and "ValveAlignmentType" sections of the file as required. For example to add a new Piston valve to the list of ValveBodyTypes and to add a ChangeOver value to the list of alignments, the following lines could be inserted:

The existing list of GlobalName values should not be modified, but the LocalName values may be modified if required.

The configuration file is read when the AutoCAD Plant 3D application is launched so changes will not be seen until the application is closed and restarted. The Piston and Change-Over values added above can be seen in the subtypes list of the Plant 3D Class Mapping window shown in the example, below.

lant 3D Classes	Properties		
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Spacer Disk Spectacle Blind	OD, End Type, Range Std, Gasket Std, Facing, Range Thickness, Pressure Class, Schedule, Wall Thickness, Encacement Lendh. Port Unit. Content Iso Symbol		
Support	Definition, X Coordinate (Port 1), Y Coordinate (Port 1), COP Elevation (Port 1), Status, Center of Gravity X,		
Tee Side Outlet	Center of Gravity Y, Center of Gravity Z, Required Spec, Insulation Thickness, Tracing Type, Insulation Type, Service, Tracing Spec, Insulation Spec, Tie In Number, Spool Number, Unit, Top of Pipe, Bottom of		







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