

Plant 3D Bolting Setup - METRIC

Why do we keep getting placeholder – has wrong bolt length. If we remove placeholder spec we get a E1.Facing='LFF' error.

Conditions precedent;

- We are using METRIC
- The flanges are plate flanges – slip-on but without a hub.
- These flanges have a different thickness to any other standard, so default bolts are too long.
- The pressure class is PN16 or 16
- The required bolt lengths are tabulated from Standards documents.
- Bolt Mapping copies JIS table in its entirety. This table is in the bolt catalogue that we set up.

1. The spec setup and used. METRIC. The Project setup was “Metric”. We added a #3000 imperial coupling to test a mix of units.

Autodesk AutoCAD Plant 3D Spec Editor 2018

Spec Sheet: C:\AutoCAD Plant 3D 2018 Content\Cpak Common\METRIC SANS PIPE FITTINGS.pspec

Spec: METRIC SANS PIPE FITT

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NAME & DESCRIPTIONS CHANGED FROM ASME
File Location: C:\AutoCAD Plant 3D 2018 Content\Cpak Common\METRIC SANS PIPE FITTINGS.pspec
Last Saved: 1/8/2018 8:29:25 PM

Min Size	To	Max Size	Long Description	Part Use Priority	Branch In Use
Blind Flange					
15	to	600	FLANGE BLANK, FF, PN16, SANS 1123		
Bolt Set					
6	to	3000	Bolt set, FF, 16, Machine Bolt, GR B.8		
Cap					
15	to	600	CAP, BV, SCH 40, ANSI B 16.9		
Coupling					
8	to	100	COUPLING, THCP, #3000, ANSI B 16.11		
Elbow					
15	to	600	ELBOW 45 LR, BV, SCH 40, ANSI B16.9		
15	to	600	ELBOW 90 LR, BV, SCH 40, ANSI B16.9		
Flange					
15	to	600	FLANGE PLATE, FF, PN16, SANS 1123		
Gasket					
20	to	2000	Gasket, Inside Bolt Circle 18		
Nipple					
8	to	150	NIPPLE, BARREL TYPE, THOM, BS B 2302		
Pipe					
8	to	900	PIPE, SEAMLESS, FL, ASTM A306, SCH 40		
Reducer					
20	to	150	REDUCER, CONIC, BV, ANSI B16.9		
20	to	600	REDUCER, BIC, BV, ANSI B16.9		
Sleeve					
80	to	300	EXPANSION BELLOW, FF, PN16, DOUBLE HINGED		
80	to	300	EXPANSION BELLOW, FF, PN16, SINGLE HINGED		
80	to	300	EXPANSION JOINT, FF, PN16, TR-ROD		
Tee					
20	to	600	TEE (REC), BV, B 16.9		
15	to	600	TEE BV, SCH 40, B16.9		

Spec used, All EF, all PN16

Buttons: Edit Parts, Add Notes to Group, Add to Spec, Remove from Spec, Find in Catalog, Layout and Settings

Catalog: C:\AutoCAD Plant 3D 2018 Content\Cpak Common\Metric SANS Fittings.pspec

Catalog: Metric SANS Fittings

2. Flange setup – port 1


Autodesk AutoCAD Plant 3D Spec Editor 2018

File Edit Specs Catalogs Tools Help

Spec Editor Branch Table Editor Catalog Editor

Catalog: C:\AutoCAD Plant 3D 2018 Content\Cpk Common\SANS 1123 FLANGE PN6 - PN40.pcat

Editing Piping Component General Properties



View large preview with dimensions

Connection Port Properties

All Ports have the same properties

Current Port: **Port 1 (SI)**

Nominal Unit: **Mm**

End Type: **FL**

Flange Std:

Gasket Std:

Facing: **FF**

Pressure Class: **16**

Schedule:

Piping Component Properties

Long Description (Family): **FLANGE PLATE, FF, PN16**

Compatible Standard: **SANS 1123**

Manufacturer:

Material:

Material Code:

Short Description: **FLANGE PLATE**

Design Std:

Design Pressure Factor:

Weight Unit: **KG**

Connection Port Count: **2**

Iso Symbol Type: **FLANGE**

Iso Symbol SKEY: **FLSO**

Edit Operator Assignments Save to Catalog

Create New Component Duplicate Component Delete Component

Common Filters

Reset Filters Part Ca... - All - Compon... - All - Main End Type: - All - Pressu... - All - U... - All - Catalog: SANS 1123 FLANGE PN

Filter	Size Range	Long Description (Family)	Short Description	Material	Material Code	End Type	Facing	Pressure Class	Schedule	Des
	- All -	- All -	FLANGE PLATE	- All -	- All -	- All -	FF	- All -	- All -	- All -
	15 - 600	FLANGE PLATE, FF, PN6, SANS 1123	FLANGE PLATE			FL	FF	6		
	15 - 600	FLANGE PLATE, FF, PN10, SANS 1123	FLANGE PLATE			FL	FF	10		
	15 - 600	FLANGE PLATE, FF, PN16, SANS 1123	FLANGE PLATE			FL	FF	16		
	15 - 600	FLANGE PLATE, FF, PN25, SANS 1123	FLANGE PLATE			FL	FF	25		
	15 - 500	FLANGE PLATE, FF, PN40, SANS 1123	FLANGE PLATE			FL	FF	40		

Catalog Browser

3. Flange setup – Port 2

The screenshot displays the 'Editing Piping Component General Properties' dialog in Autodesk AutoCAD Plant 3D Spec Editor 2018. The 'Connection Port Properties' section is active, showing 'Port 2 (52)' selected in the 'Current Port' dropdown, which is highlighted with a red box. The 'Piping Component Properties' section shows the following details:

- Long Description (Family): FLANGE PLATE, FF, PN16
- Compatible Standard: SANS 1123
- Manufacturer:
- Material:
- Material Code:
- Short Description: FLANGE PLATE
- Design Std:
- Design Pressure Factor:
- Weight Unit: KG
- Connection Port Count: 2
- Iso Symbol Type: FLANGE
- Iso Symbol SKEY: FLSO

Below the dialog, the 'Common Filters' section shows various filter options. The 'Catalog Browser' section displays a table of flange plate specifications:

Filter	Size Range	Long Description (Family)	Short Description	Material	Material Code	End Type	Facing	Pressure Class	Schedule	Des
- All -	- All -	- All -	FLANGE PLATE	- All -	- All -	- All -	FF	- All -	- All -	- All -
15 - 600		FLANGE PLATE, FF, PN6, SANS 1123	FLANGE PLATE			FL	FF	6		
15 - 600		FLANGE PLATE, FF, PN10, SANS 1123	FLANGE PLATE			FL	FF	10		
15 - 600		FLANGE PLATE, FF, PN16, SANS 1123	FLANGE PLATE			FL	FF	16		
15 - 600		FLANGE PLATE, FF, PN25, SANS 1123	FLANGE PLATE			FL	FF	25		
15 - 500		FLANGE PLATE, FF, PN40, SANS 1123	FLANGE PLATE			FL	FF	40		

4. Bolt catalogue set up – duplicated from JIS

Catalog: C:\AutoCAD Plant 3D 2018 Content\CPak Common\Metric bolts & gaskets.pcat

Editing Piping Component General Properties

Connection Port Properties		Piping Component Properties	
<input type="checkbox"/> All Ports have the same properties			
Current Port:	Port 1 (S1)	Long Description (Family):	Bolt set, FF, 16, Machine Bolt, GR 8
Nominal Unit:	Mm	Compatible Standard:	
End Type:		Manufacturer:	
Flange Std:	SANS 1123	Material:	
Gasket Std:		Material Code:	
Facing:	FF	Short Description:	Bolt set
Pressure Class:	16	Design Std:	
Schedule:		Design Pressure Factor:	
		Weight Unit:	
		Is Lug Set:	False
		Stud Type Description:	Machine Bolt
		Stud Description:	lg.
		Bolt Compatible Standard:	
		Iso Symbol Type:	BOLT
		Iso Symbol SKEY:	

← If this is here or not makes no difference

5. Bolt setup – sizes. We look at DN100 pipe / flange size in the bolt sizes.

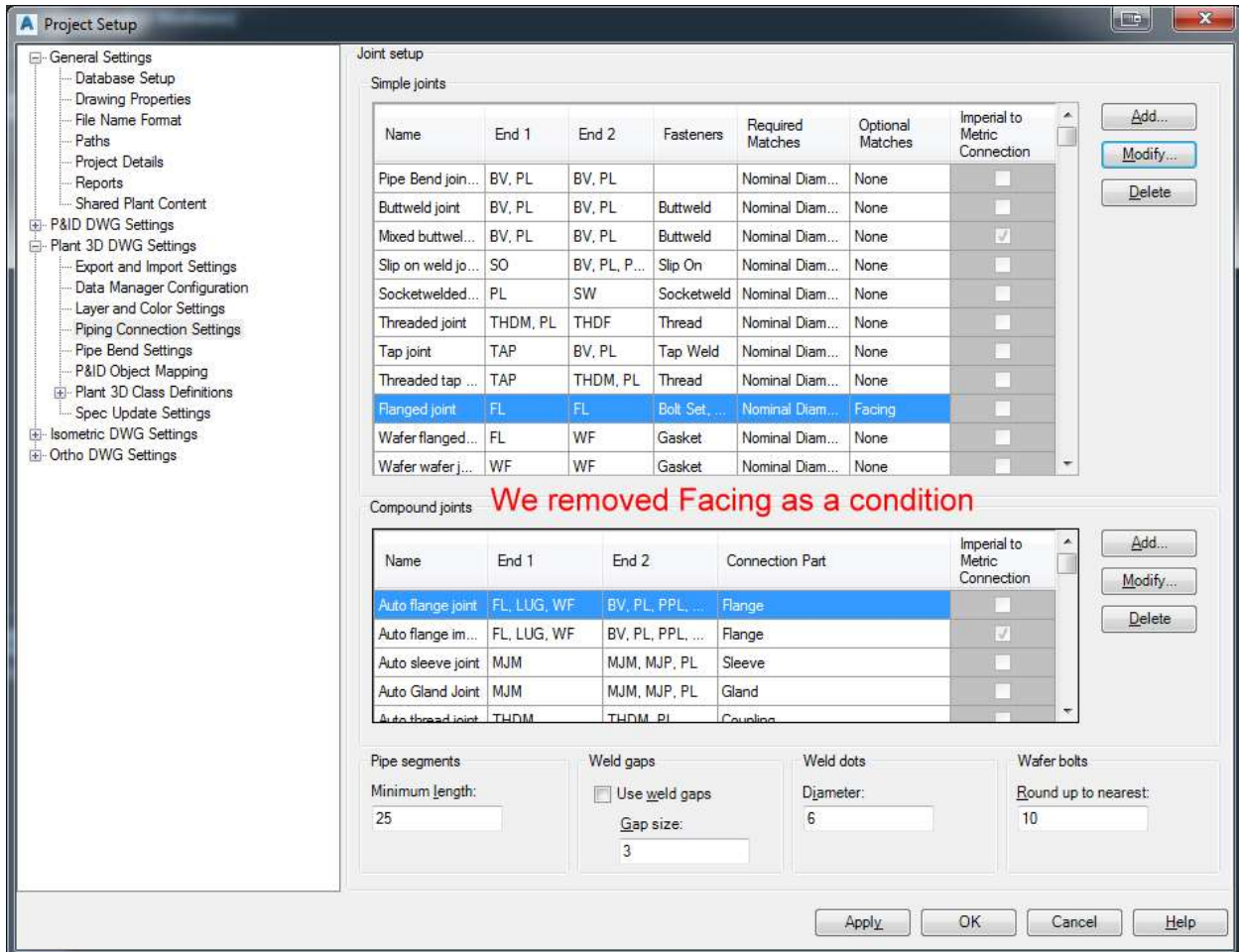
The screenshot shows the 'Piping Component Editor' for a bolt. The 'Size' list on the left has '55' selected. The 'Connection Port Properties' panel shows 'Current Port: Port 1 (SI)', 'Nominal Diameter: 100', 'Matching Pipe OD: 114.3', and 'Flange Thickness: 14'. The 'Piping Component Properties' panel shows 'Long Description (Size): Machine Bolt M16 x 55 @ 8.00 SL', 'Length: 55', 'Bolt Size: M16', and 'Number In Set: 8.00'. The 'Size Parameters' panel is empty. The 'Advanced Editing Table' at the bottom contains the following data:

Size	Long Description (Size)	Item Code	Weight	Length	Bolt Size	Number In Set	Port Name	Nominal Diameter	Matching Pipe OD	Wall Thickness	Engagement Length	Flange Thickness
40	Machine Bolt ...			30	M16	8.00	SI	40	45.0			10
50	Machine Bolt ...			50	M16	4.00	SI	50	60.3			12
65	Machine Bolt ...			50	M16	4.00	SI	65	73.02			12
80	Machine Bolt ...			55	M16	8.00	SI	80	88.9			14
100	Machine Bolt ...			55	M16	8.00	SI	100	114.3			14
125	Machine Bolt ...			65	M20	8.00	SI	125	141.3			16
150	Machine Bolt ...			75	M20	8.00	SI	150	168.3			18
200	Machine Bolt ...			90	M20	12.00	SI	200	219.1			20

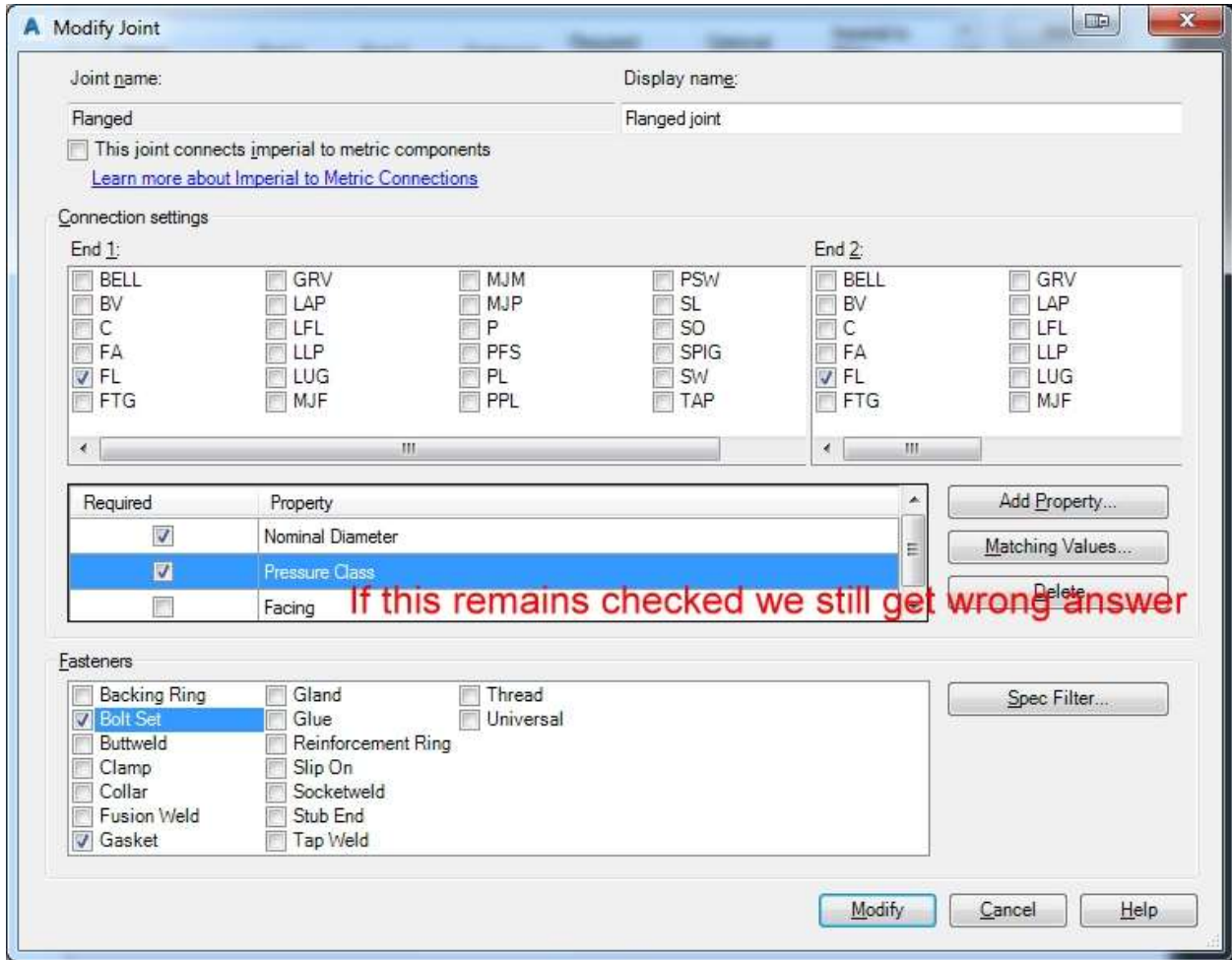
Red annotations in the image include:

- 'We expect this length' pointing to the 'Length' field in the Piping Component Properties panel.
- 'Even if @@@ is set to 55 we get the placeholder' pointing to the 'Long Description (Size)' field in the Piping Component Properties panel.
- 'If this is a value or not does not change the result' pointing to the 'Length' column in the Advanced Editing Table.

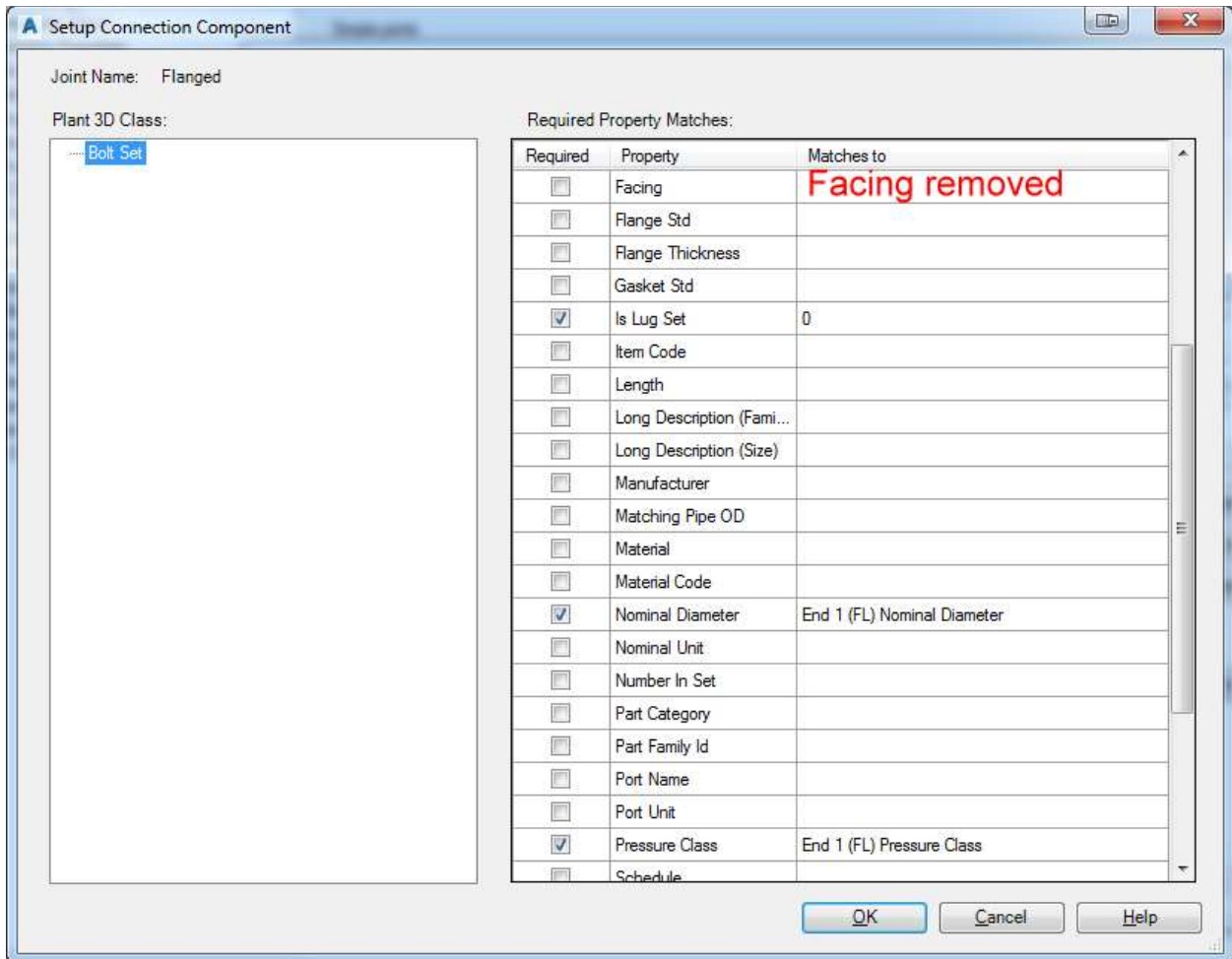
- Inside the Project, we modify the auto connection to remove facing type. RF and FF are the same for engineering purposes. By using a gasket that is inside the bolt circle produces the same gasket effect as a RF flange. There is NO B31.3 code requirement to use RF.



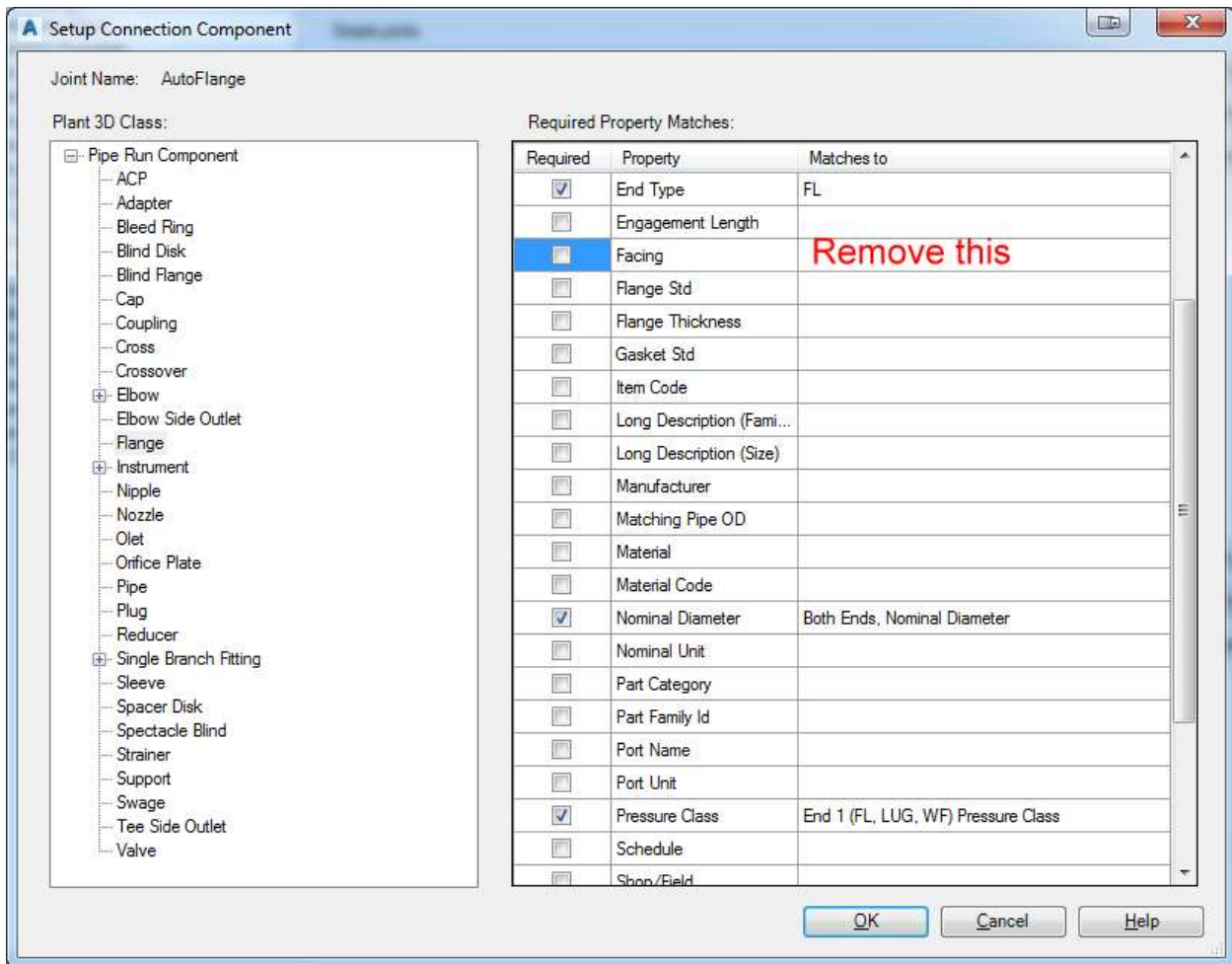
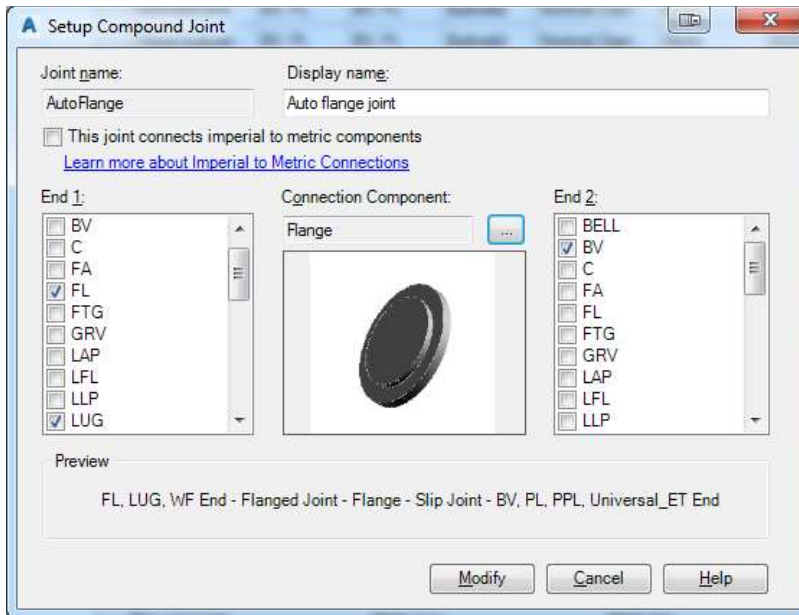
7. Simple joint modification. We uncheck Facing. If it remains checked it does not change the answer – (which answer is wrong)



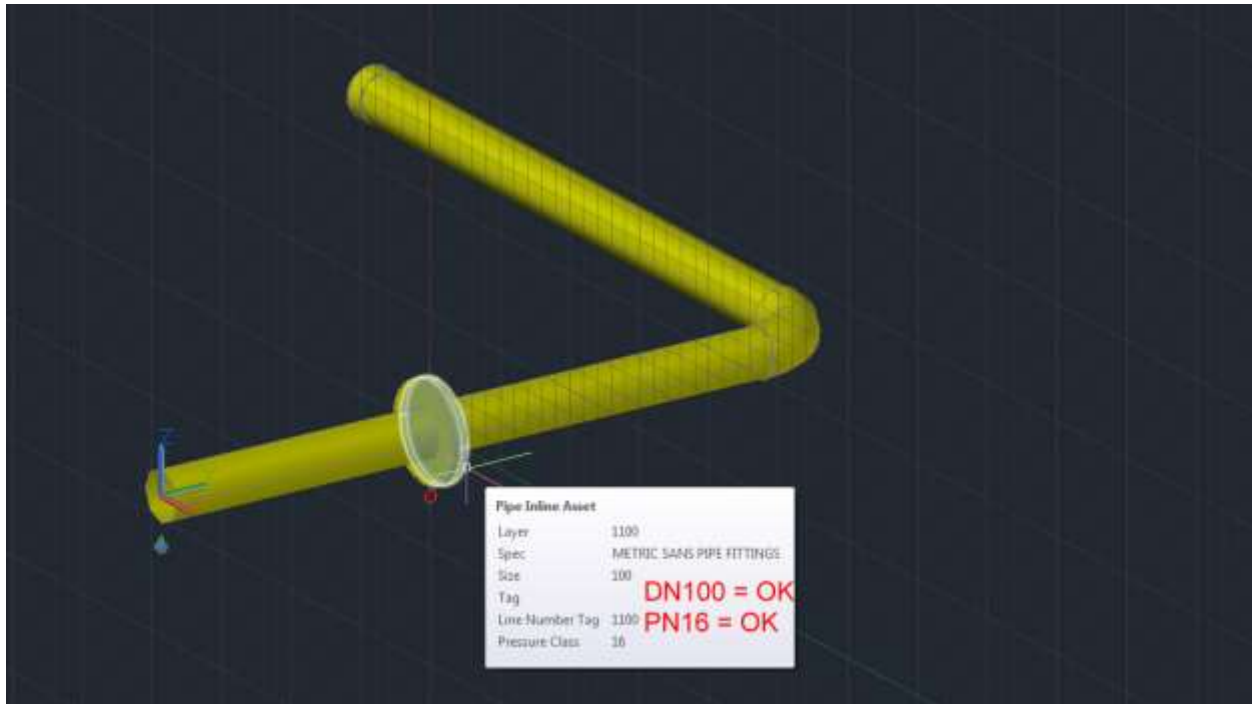
8. WE go deeper and remove Facing for bolt



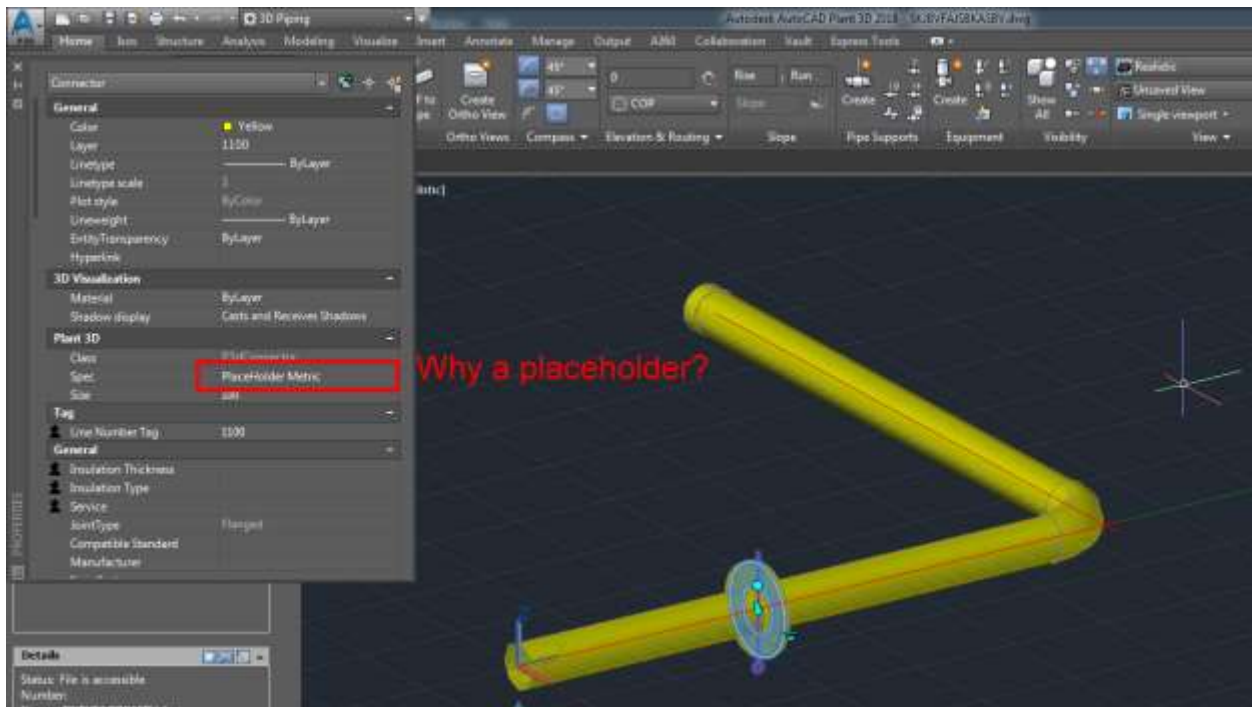
9. We now modify Compound Joint facing also



10. Basic pipeline to test the flange joint. The flange size & rating is correct according to the spec. setup.



11. Flange joint has placeholder for bolting – wrong answer.



12. ISO showing placeholder bolting info. We could manually change the length to the value that we want... but...

ID	QTY	NO	DESCRIPTION
1	2.9M	100	PIPE, SEAMLESS, PL, ASTM A106, SCH. 40
2	1	100	CAP, BV, SCH 40, ANSI B 16.9
3	1	100	ELBOW 90 LR, BV, SCH 40, ANSI B16.9
4	2	100	FLANGE, PLATE, FF, PN16, SANS 1123
5	8	16X90	PH METRIC STUD BOLT
6	1	100	GASKET, INSIDE BOLT CIRCLE, 16

Wrong answer - why a placeholder?

13. We removed the placeholder spec from the project and we get this error. We thought that we'd removed Facing as a connection requirement. How does one rectify this?

