

Bolt Length Calculations in Plant 3D 2013

Bolt length calculations are new to AutoCAD Plant 3D 2013. This white paper describes their implementation.

All Plant 3D Users

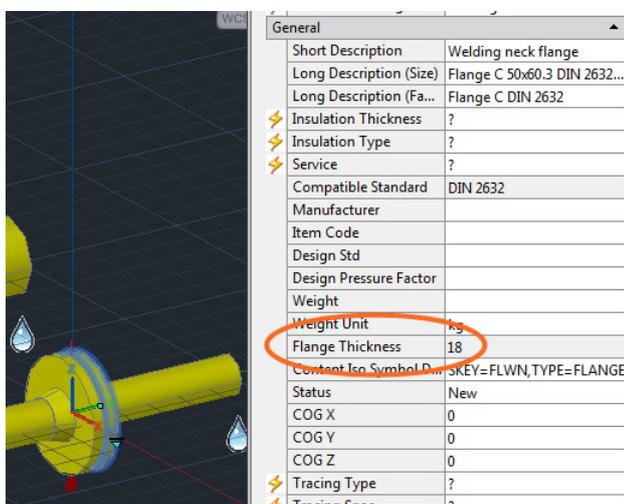
Bolt Length Calculations in Plant 3D 2013

Bolt length calculations are new to AutoCAD Plant 3D 2013. Instead of having to define multiple bolt sets in a spec, a single set can now be defined together with a table of standard lengths. The FlangeThickness values defined for a flange and the bolt set are then used to determine the correct bolt length for a given flange joint.

- If both values are equal, or one is not set, and it's not a wafer component the bolt length defined inside the bolt set is used.
- If the values are different, the bolt set FlangeThickness is subtracted from the bolt set bolt length and the flange FlangeThickness is added. The next possible 'standard' bolt length is then selected. If no standard length is available, the bolt length is rounded up to the next 10 mm.

This facilitates correct bolt set selection where flanges of different sheet thickness are connected which have the same **PressureClass**, **NominalDiameter** and **Facing**.

As an example, looking at the 10HS01 spec, it can be seen that the **DN50** flange has a defined FlangeThickness of **18mm**.



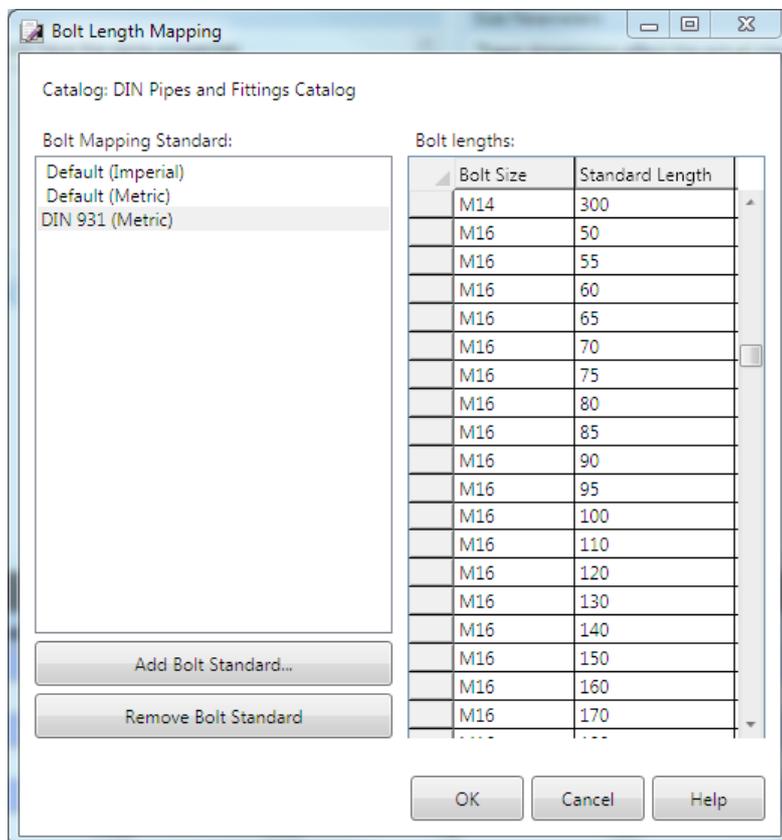
Looking at the bolt set definition in the same spec, it can be seen that for a **DN50** nominal diameter the defined bolt length of **87mm** is for a given FlangeThickness of **20mm**.

is Lug Set	Length	Stud Type	Stud	Bolt	Port	Nominal	Nomina	Matching	End	Flange Std	Gasket	Facing	Flange Thickness	Pr
<input type="checkbox"/>	54	Stud Bolt	Lg.	DIN 976	S1	6	mm			DIN 2501		C	12	10
<input type="checkbox"/>	54	Stud Bolt	Lg.	DIN 976	S1	8	mm			DIN 2501		C	12	10
<input type="checkbox"/>	69	Stud Bolt	Lg.	DIN 976	S1	10	mm			DIN 2501		C	16	10
<input type="checkbox"/>	69	Stud Bolt	Lg.	DIN 976	S1	15	mm			DIN 2501		C	16	10
<input type="checkbox"/>	73	Stud Bolt	Lg.	DIN 976	S1	20	mm			DIN 2501		C	18	10
<input type="checkbox"/>	73	Stud Bolt	Lg.	DIN 976	S1	25	mm			DIN 2501		C	18	10
<input type="checkbox"/>	83	Stud Bolt	Lg.	DIN 976	S1	32	mm			DIN 2501		C	18	10
<input type="checkbox"/>	83	Stud Bolt	Lg.	DIN 976	S1	40	mm			DIN 2501		C	18	10
<input type="checkbox"/>	87	Stud Bolt	Lg.	DIN 976	S1	50	mm			DIN 2501		C	20	10
<input type="checkbox"/>	91	Stud Bolt	Lg.	DIN 976	S1	65	mm			DIN 2501		C	22	10
<input type="checkbox"/>	95	Stud Bolt	Lg.	DIN 976	S1	80	mm			DIN 2501		C	24	10
<input type="checkbox"/>	95	Stud Bolt	Lg.	DIN 976	S1	100	mm			DIN 2501		C	24	10
<input type="checkbox"/>	99	Stud Bolt	Lg.	DIN 976	S1	125	mm			DIN 2501		C	26	10
<input type="checkbox"/>	112	Stud Bolt	Lg.	DIN 976	S1	150	mm			DIN 2501		C	28	10
<input type="checkbox"/>	104	Stud Bolt	Lg.	DIN 976	S1	200	mm			DIN 2501		C	24	10

As the bolt set FlangeThickness and the flange FlangeThickness are different a calculation is required.

Assuming both flanges are equal, the bolt length is calculated to be:

$$87.0 - 20.0 - 20.0 + 18.0 + 18.0 = 83.0$$



Looking at the bolt standard, the next possible 'standard' bolt length is **85mm**.

Similarly, for

- DN100 -> $95.0 - 24.0 - 24.0 + 20.0 + 20.0 = 87.0$ -> next 'standard' bolt length is **90.0**
- DN125 -> $99.0 - 26.0 - 26.0 + 22.0 + 22.0 = 91.0$ -> next 'standard' bolt length is **95.0**
- DN150 -> $112.0 - 28.0 - 28.0 + 22.0 + 22.0 = 100.0$ -> next 'standard' bolt length is **100.0**