Pegler V905/SV905 series bolt tightening torques

Tightening of the flange bolts

What torque should be applied to the flange bolts of butterfly valves to ensure the correct installation of the valve? Before analysing all the factors, this requirement seems quite simple. The installation of the valve requires several components: the valve, the flange, the nut, the bolt, and the stud bolt. Each of these is provided by a different manufacturer, and each has different characteristics. The torque suitable for one combination may be too large or too small for another combination. The following lists the information that needs to be understood in order to calculate the torque requirements.

Valve	**Flange**	**Bolt**	**Nut**
Type	Type	Type	Type
Size	Size	Structural material	Structural material
Structural material	Surface treatment	Surface treatment	Surface treatment
Surface treatment	Flange conditions		
Lubrication	**General factors**		
Type	The temperature and relative humidity during installation		
Coverage area	The rotational speed of the bolt		

It is almost impossible to fully understand all the relevant conditions. Therefore, calculating the precise torque requirements is not feasible. Due to the presence of many external factors, no reputable manufacturer can provide accurate information. The International Fastener Association provides some detailed information on "calculated" torque values. Even with such information, the accuracy of using a torque wrench is only 25%. Given the difficulty and inaccuracy of this method, it is recommended to use the "nut rotation speed" method.

"Nut rotation speed" tightening (applicable to standard iron and steel flanges) should be followed according to the installation procedures of the manufacturer. For non-metallic or non-standard flanges, please follow the manufacturer's installation procedures.

1. The valve and the flange surface must be parallel and aligned with each other. For rubber valve seat butterfly valves, the valve must be fully open before tightening the flange bolts.
2. After aligning the holes in the joint, use enough bolts and keep them in a "tight fit" state to ensure that all the parts of the joint are in full contact with each other. "Tight fit" means the degree of tightness achieved by manually using a wrench to the fullest extent.
3. After the initial fitting operation, place the bolts in all the remaining holes and achieve a tight fit. In larger joints, repeated fitting operations may be required.

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4. Tighten the opposite bolts in sequence to ensure uniform pressure around the entire flange.
5. After all the bolts are tightly fitted, then each bolt in the joint should be tightened further according to the applicable tightening amount given in the following. During the tightening process, the valve or the flange must not rotate.

The bolt length does not exceed 8 times the diameter or 8 inches (203.2 mm) = 1/4 turn
The bolt length exceeds 8 times the diameter or 8 inches (203.2 mm) = 1/2 turn

Reference value of bolt torque

DN	PN16 Flange		Edge to edge of the nut	Suggest installing the minimum torque.N.m				Carbon steel / stainless steel Theoretical maximum torque N.m (GB/T 3098.13)			
	aperture	bolt		4.8	8.8	9.8	10.9	4.8	8.8	9.8	10.9
DN50	19	M16	24	83.87	148.46	162.05	181.51	186.38	329.91	360.1	403.35
DN65	19	M16	24	83.87	148.46	162.05	181.51	186.38	329.91	360.1	403.35
DN80	19	M16	24	83.87	148.46	162.05	181.51	186.38	329.91	360.1	403.35
DN100	19	M16	24	83.87	148.46	162.05	181.51	186.38	329.91	360.1	403.35
DN125	19	M16	24	83.87	148.46	162.05	181.51	186.38	329.91	360.1	403.35
DN150	23	M20	30	164.39	302.70	318.46	356.71	365.32	672.66	707.69	792.68
DN200	23	M20	30	164.39	302.70	318.46	356.71	365.32	672.66	707.69	792.68
DN250	28	M24	36	285.59	517.55	544.49	609.89	634.63	1150.1	1209.98	1355.31
DN300	28	M24	36	285.59	517.55	544.49	609.89	634.63	1150.1	1209.98	1355.31
DN350	28	M24	36	285.59	517.55	544.49	609.89	634.63	1150.1	1209.98	1355.31
DN400	31	M27	41	431.57	782.09	822.82	921.65	959.04	1737.99	1828.48	2048.1
DN450	31	M27	41	431.57	782.09	822.82	921.65	959.04	1737.99	1828.48	2048.1
DN500	34	M30	46	578.82	1048.96	1103.57	1236.12	1286.27	2331.02	2452.39	2746.94
DN600	37	M33	50	805.80	1460.30	1536.32	1720.85	1790.67	3245.1	3414.05	3824.11

More information

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