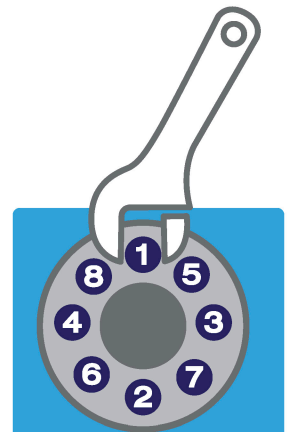


To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard design steel pipe flanges. The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.

NPS (in.)	Class 150		Class 300		Class 400		Class 600	
	Min Torque	Max Torque	Min Torque	Max Torque	Min Torque	Max Torque	Min Torque	Max Torque
0.5	30	50	30	40	30	40	30	40
0.75	30	50	60	80	60	80	60	80
1	30	60	60	80	60	80	60	80
1.25	30	60	60	80	60	80	60	80
1.5	30	60	100	140	100	140	100	140
2	60	120	60	80	60	80	60	80
2.5	60	120	100	140	100	140	100	140
3	90	120	100	150	100	150	100	150
3.5	60	120	100	170	160	290	170	290
4	70	120	100	200	160	320	190	320
5	100	200	110	200	210	320	280	490
6	130	200	110	200	190	320	260	460
8	180	200	180	320	310	490	400	700
10	170	320	250	460	360	710	500	800
12	240	320	360	700	510	1000	500	850
14	300	490	360	610	500	870	680	950
16	310	490	500	920	680	1250	800	1210
18	490	710	500	1000	680	1340	1100	1790
20	430	710	500	1000	800	1430	1100	1640
24	620	1000	800	1600	1500	2270	2000	2670

NPS (in.)	Class 900		Class 1500		Class 2500	
	Min Torque	Max Torque	Min Torque	Max Torque	Min Torque	Max Torque
0.5	70	120	70	120	50	100
0.75	70	120	70	120	63	100
1	110	190	110	190	110	160
1.25	110	190	140	190	210	250
1.5	170	290	200	290	310	360
2	110	190	130	190	220	250
2.5	170	290	190	290	300	360
3	140	230	270	360	460	500
4	260	420	420	520	710	800
5	360	600	590	800	1280	1500
6	300	500	530	680	1870	2200
8	485	800	850	1100	1780	2200
10	505	800	1570	2000	3040	4400
12	560	850	1500	2200	4610	5920
14	630	940	2120	3180		
16	910	1290	2940	4400		
18	1570	2340	3950	5920		
20	1745	2570	5150	7720		
24	2975	5140	8340	12500		



Torque Values Requirement

- Torque Values are in ft.-lbs., and use of well lubricated ASTM A193 Grade B7 bolts.
- Installation practices according to ASME PCC-1.
- The above torques values are for general use only. For critical or extreme applications (high temperature/pressure), consult with Masterpac Engineering Division.

Torque Estimation Conditions

- Gasket dimensions according to ASME B16.20
- Flange dimensions according to ASME B16.5
- Maximum working pressure based upon pressure class and certain operating conditions according to ASME B16.5, not hydrotest pressure.

Install and Tighten Bolts

Always use proper tools: calibrated torque wrench or other controlled tensioning device.

Consult Masterpac for guidance on torque specifications:

Always torque nuts in a cross bolt tightening pattern:

Tighten the nuts in multiple steps:

- Step 1 – Tighten all nuts initially by hand (larger bolts may require a small hand wrench).
- Step 2 – Torque each nut to approximately 30% of full torque.
- Step 3 – Torque the nuts to approximately 60% of full torque.
- Step 4 – Torque each nut to full torque, again using the cross bolt tightening pattern.
- Step 5 – Apply at least one final full torque to all nuts in a clockwise direction until all torque is uniform.

All technical information and advice given here is based on our previous experiences and/or test results. We give this information to the best of our knowledge, but assume no legal responsibility. Customers are asked to check the suitability and usability in the specific application, since the performance of the product can only be judged when all necessary operating data are available.