



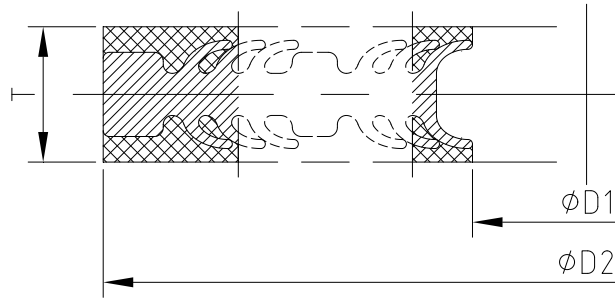
# Fishbone Gaskets Size and Torque

## Catalog

Class Series.....	2
TYPE I (Basic Construction) for TG (Tongue and Groove) Flanges.....	2
TYPE I (Basic Construction) for MFM (Male-Female) Flanges.....	4
TYPE II (With Centering Ring Construction) for FF (Flat Face) & RF (Raised Face) Flanges.....	6
Above 24" A series.....	9
Above 24" B series.....	10
Applicable standards.....	12



## Class Series

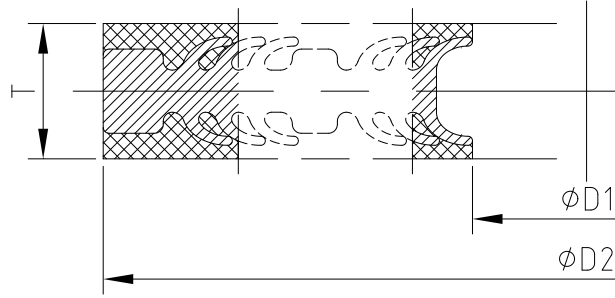


### TYPE I (Basic Construction) for TG (Tongue and Groove) Flanges

NPS	D1 (mm)	D2 (mm)	Class150 (PN20bar)			Class300 (PN50bar)			Class400 (PN68bar)		
			Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	25.4	36	8.1	97.3	44.6	8.1	97.3	41.7	8.1	97.3	43.6
3/4" (20)	33.3	43.9	10.2	97.3	41.7	12.8	195.3	83.7	12.8	195.3	83.7
1" (25)	38.1	51.9	15.5	97.3	54.2	19.4	195.3	83.7	19.4	195.3	83.7
1 1/4" (32)	47.7	64.5	23.5	97.3	79.9	29.4	195.3	85.2	29.4	195.3	96.6
1 1/2" (40)	54.1	74	31.8	97.3	83.4	47.7	350.9	150.4	47.7	350.9	150.4
2" (50)	73.2	93	51.3	195.3	166.7	25.6	195.3	83.7	25.6	195.3	88.2
2 1/2" (65)	85.9	105.7	59.1	195.3	167.4	35.5	350.9	150.4	35.5	350.9	150.4
3" (80)	108.1	127.9	72.8	195.3	167.4	43.7	350.9	150.4	47.9	350.9	172.6
3 1/2" (90)	120.7	140.5	40.3	195.3	124.9	48.4	350.9	150.4	65.4	568.7	243.7
4" (100)	132	158	58.3	195.3	167.4	70.0	350.9	186.0	86.8	568.7	295.1
5" (125)	160.5	186.5	83.8	350.9	251.3	83.8	350.9	245.6	114.6	568.7	389.7
6" (150)	190.7	216.7	98.3	350.9	295.0	65.6	350.9	211.4	98.7	568.7	335.4
8" (200)	238.3	271.7	140.6	350.9	300.8	109.4	568.7	377.0	172.4	854.3	586.0
10" (250)	286.1	324.5	140.9	568.7	422.6	120.7	854.3	448.2	201.7	1271.0	685.7
12" (300)	343.3	381.7	166.9	568.7	487.5	161.0	1271.0	671.0	298.2	1805.1	1014.0
14" (350)	375	413.4	207.3	854.3	622.0	139.9	1271.0	618.7	275.0	1805.1	934.9
16" (400)	425.9	470.5	191.1	854.3	573.3	191.1	1805.1	880.2	387.3	2471.1	1316.9
18" (450)	489.4	534	245.1	1271.0	735.3	181.6	1805.1	921.5	405.5	2471.1	1378.6
20" (500)	533.8	584.8	229.8	1271.0	689.4	212.8	1805.1	1100.3	528.1	3283.5	1795.6
24" (600)	641.9	692.7	303.4	1805.1	910.1	303.4	3283.5	1798.0	839.1	5405.9	2852.9



NPS	D1 (mm)	D2 (mm)	Class600 (PN110bar)			Class900 (PN150bar)		
			Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	25.4	36	8.7	97.3	56.4	21.1	350.9	150.4
3/4" (20)	33.3	43.9	15.0	195.3	83.7	29.1	350.9	150.4
1" (25)	38.1	51.9	21.7	195.3	87.9	49.3	568.7	243.7
1 1/4" (32)	47.7	64.5	33.3	195.3	129.4	75.5	568.7	243.7
1 1/2" (40)	54.1	74	53.3	350.9	198.3	114.9	854.3	366.1
2" (50)	73.2	93	32.1	195.3	116.7	72.6	568.7	243.7
2 1/2" (65)	85.9	105.7	47.5	350.9	168.9	102.4	854.3	366.1
3" (80)	108.1	127.9	65.1	350.9	226.5	122.9	568.7	335.2
3 1/2" (90)	120.7	140.5	89.0	568.7	302.3			
4" (100)	132	158	118.0	568.7	381.8	245.5	1271.0	669.5
5" (125)	160.5	186.5	178.2	854.3	576.4	360.2	1805.1	982.5
6" (150)	190.7	216.7	153.3	854.3	496.1	279.1	1271.0	761.1
8" (200)	238.3	271.7	263.7	1271.0	853.2	521.4	2471.1	1421.9
10" (250)	286.1	324.5	304.8	1805.1	986.0	542.3	2471.1	1479.0
12" (300)	343.3	381.7	324.5	1805.1	1049.8	577.4	2471.1	1574.7
14" (350)	375	413.4	411.4	2471.1	1330.9	725.9	3283.5	1979.8
16" (400)	425.9	470.5	574.6	3283.5	1859.1	1007.0	4256.9	2746.4
18" (450)	489.4	534	782.0	4256.9	2530.1	1459.7	6745.0	3981.0
20" (500)	533.8	584.8	778.1	4256.9	2517.4	1859.0	8288.8	5070.0
24" (600)	641.9	692.7	1222.7	6745.0	3955.6	3164.5	16801.7	8630.5
NPS	D1 (mm)	D2 (mm)	Class1500 (PN260bar)			Class2500 (PN420bar)		
			Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	25.4	36	28.8	350.9	150.4	50.0	350.9	150.4
3/4" (20)	33.3	43.9	39.7	350.9	150.4	68.8	350.9	166.6
1" (25)	38.1	51.9	67.2	568.7	243.7	116.4	568.7	282.1
1 1/4" (32)	47.7	64.5	102.9	568.7	303.2	203.8	854.3	493.9
1 1/2" (40)	54.1	74	156.7	854.3	461.8	305.6	1271.0	740.6
2" (50)	73.2	93	99.1	568.7	291.9	196.2	854.3	475.5
2 1/2" (65)	85.9	105.7	139.6	854.3	411.4	272.2	1271.0	659.6
3" (80)	108.1	127.9	215.5	1271.0	635.0	415.0	1805.1	1005.7
4" (100)	160.5	186.5	371.9	1805.1	1095.9	773.6	3283.5	1874.5
5" (125)	190.7	216.7	589.5	3283.5	1737.0	1192.1	5405.9	2888.5
6" (150)	238.3	271.7	465.1	2471.1	1370.5	1759.0	8288.8	4262.1
8" (200)	286.1	324.5	840.2	4256.9	2475.9	1792.5	8288.8	4343.4
10" (250)	343.3	381.7	1344.6	6745.0	3962.0	3107.5	16801.7	7529.7
12" (300)	375	413.4	1431.5	8288.8	4218.2	4549.1	22664.6	11022.7
14" (350)	425.9	470.5	1856.0	12048.6	5469.2			
16" (400)	489.4	534	2640.7	16801.7	7781.4			
18" (450)	533.8	584.8	3649.2	22664.6	10753.1			
20" (500)	641.9	692.7	4753.2	29753.7	14006.0			
24" (600)	25.4	36	7551.7	48076.3	22252.3			

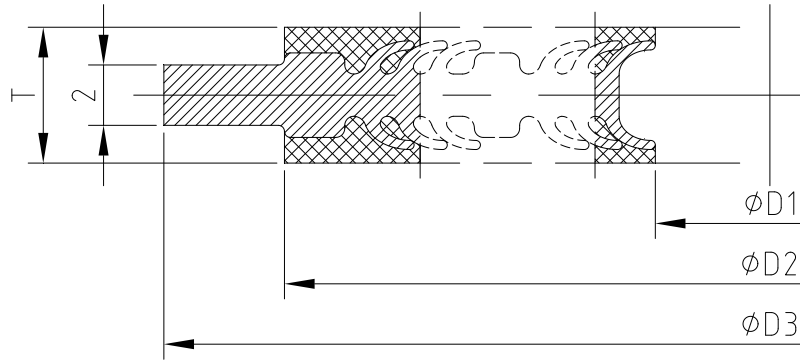


**TYPE I (Basic Construction) for MFM (Male-Female) Flanges**

NPS	D1 (mm)	D2 (mm)	Class150 (PN20bar)			Class300 (PN50bar)			Class400 (PN68bar)		
			Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	23	36	9.6	97.3	52.6	9.6	97.3	47.8	9.6	97.3	47.8
3/4" (20)	29	43	12.6	97.3	50.3	15.7	195.3	83.7	15.7	195.3	83.7
1" (25)	36	51	16.3	97.3	56.9	20.3	195.3	83.7	20.3	195.3	83.7
1 1/4" (32)	46	64	24.7	97.3	83.4	30.9	195.3	89.5	30.9	195.3	98.0
1 1/2" (40)	53	74	33.3	97.3	83.4	49.9	350.9	150.4	49.9	350.9	152.4
2" (50)	69	93	60.6	195.3	167.4	30.3	195.3	83.7	30.3	195.3	94.9
2 1/2" (65)	80	105	72.1	195.3	167.4	43.2	350.9	150.4	43.2	350.9	150.4
3" (80)	101	127	91.8	195.3	167.4	55.1	350.9	150.4	55.1	350.9	187.0
3 1/2" (90)	113	140	52.0	195.3	161.1	62.4	350.9	162.2	72.8	568.7	252.8
4" (100)	129	158	61.3	195.3	167.4	73.6	350.9	189.4	88.4	568.7	300.6
5" (125)	157	186	87.8	350.9	263.5	87.8	350.9	248.7	116.1	568.7	394.7
6" (150)	187	216	103.1	350.9	300.8	68.8	350.9	213.6	99.7	568.7	338.9
8" (200)	238	271	139.4	350.9	300.8	108.4	568.7	374.7	171.3	854.3	582.5
10" (250)	288	324	136.4	568.7	409.1	116.9	854.3	443.4	199.5	1271.0	678.4
12" (300)	343	381	165.8	568.7	487.5	159.9	1271.0	668.1	296.9	1805.1	1009.5
14" (350)	373	413	211.2	854.3	633.6	142.6	1271.0	620.4	275.7	1805.1	937.4
16" (400)	425	470	191.7	854.3	575.2	191.7	1805.1	879.4	386.9	2471.1	1315.6
18" (450)	489	534	246.2	1271.0	738.5	182.3	1805.1	922.3	405.8	2471.1	1379.8
20" (500)	534	584	227.3	1271.0	681.9	210.5	1805.1	1095.5	525.9	3283.5	1787.9
24" (600)	642	692	300.7	1805.1	902.2	300.7	3283.5	1792.4	836.4	5405.9	2843.9



NPS	Class600 (PN110bar)					Class900 (PN150bar)				
	D1 (mm)	D2 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	23	36	8.7	97.3	56.4	23	36	22.9	350.9	150.4
3/4" (20)	29	43	15.0	195.3	83.7	29	43	31.4	350.9	150.4
1" (25)	36	51	21.7	195.3	87.9	36	51	49.5	568.7	243.7
1 1/4" (32)	46	64	33.3	195.3	129.4	46	64	76.6	568.7	243.7
1 1/2" (40)	53	74	53.3	350.9	198.3	53	74	117.4	854.3	366.1
2" (50)	69	93	32.1	195.3	116.7	69	93	78.2	568.7	243.7
2 1/2" (65)	80	105	47.5	350.9	168.9	80	105	110.4	854.3	366.1
3" (80)	101	127	65.1	350.9	226.5	101	127	133.2	568.7	363.1
3 1/2" (90)	113	140	89.0	568.7	302.3					
4" (100)	129	158	118.0	568.7	381.8	129	158	250.0	1271.0	681.9
5" (125)	157	186	178.2	854.3	576.4	157	186	364.8	1805.1	994.9
6" (150)	187	216	153.3	854.3	496.1	187	216	282.0	1271.0	769.0
8" (200)	238	271	263.7	1271.0	853.2	238	271	518.2	2471.1	1413.3
10" (250)	288	324	304.8	1805.1	986.0	288	324	536.5	2471.1	1463.2
12" (300)	343	381	324.5	1805.1	1049.8	343	381	574.8	2471.1	1567.7
14" (350)	373	413	411.4	2471.1	1330.9	373	413	727.9	3283.5	1985.1
16" (400)	425	470	574.6	3283.5	1859.1	425	470	1006.0	4256.9	2743.7
18" (450)	489	534	782.0	4256.9	2530.1	489	534	1460.9	6745.0	3984.3
20" (500)	534	584	778.1	4256.9	2517.4	534	584	1851.0	8288.8	5048.2
24" (600)	642	692	1222.7	6745.0	3955.6	642	692	3154.6	16801.7	8603.4
NPS	Class1500 (PN260bar)					Class2500 (PN420bar)				
	D1 (mm)	D2 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	22	36	32.2	350.9	150.4	19	36	60.2	350.9	150.4
3/4" (20)	28	43	44.0	350.9	150.4	22	43	86.9	350.9	210.6
1" (25)	35	51	69.2	568.7	243.7	29	51	136.2	568.7	329.9
1 1/4" (32)	44	64	108.9	568.7	320.8	39	64	235.7	854.3	571.2
1 1/2" (40)	51	74	166.0	854.3	489.1	47	74	341.4	1271.0	827.4
2" (50)	67	93	109.6	568.7	323.1	64	93	221.9	854.3	537.7
2 1/2" (65)	79	105	152.3	854.3	448.9	76	105	303.4	1271.0	735.2
3" (80)	98	127	238.2	1271.0	701.8	96	127	464.5	1805.1	1125.4
4" (100)	125	158	387.5	1805.1	1141.7	122	158	818.4	3283.5	1983.1
5" (125)	153	186	609.6	3283.5	1796.2	150	186	1250.6	5405.9	3030.2
6" (150)	180	216	485.6	2471.1	1430.9	174	216	1882.0	8288.8	4560.2
8" (200)	235	271	845.1	4256.9	2490.2	222	271	1884.8	8288.8	4566.9
10" (250)	281	324	1360.6	6745.0	4009.2	269	324	3251.3	16801.7	7878.1
12" (300)	338	381	1445.7	8288.8	4260.0	321	381	4788.7	22664.6	11603.4
14" (350)	368	413	1885.6	12048.6	5556.3					
16" (400)	420	470	2667.7	16801.7	7861.0					
18" (450)	483	534	3696.9	22664.6	10893.6					
20" (500)	524	584	4815.7	29753.7	14190.4					
24" (600)	627	692	7698.4	48076.3	22684.6					



**TYPE II (With Centering Ring Construction) for FF (Flat Face) & RF (Raised Face) Flanges**

NPS	Class150 (PN20bar)						Class300 (PN50bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	23	33	46	7.0	97.3	41.7	23	34	52	7.8	97.3	41.7
3/4" (20)	29	40	55	9.5	97.3	41.7	29	42.5	65	15.0	195.3	83.7
1" (25)	36	50	65	15.0	97.3	52.5	36	50.5	71	19.5	195.3	83.7
1 1/4" (32)	45	61	74	21.1	97.3	71.9	45	61	80	26.4	195.3	83.7
1 1/2" (40)	51	67	84	23.5	97.3	77.7	51	70	93	43.0	350.9	150.4
2" (50)	67	87	103	48.0	195.3	156.0	67	91	109	29.5	195.3	83.7
2 1/2" (65)	79	99	122	55.5	195.3	167.4	79	103	128	40.8	350.9	150.4
3" (80)	99	119	134	68.0	195.3	167.4	99	124	147	52.1	350.9	150.4
3 1/2" (90)	111	131	160	37.7	195.3	116.9	111	136	163	57.7	350.9	150.4
4" (100)	126	148	173	47.0	195.3	140.9	126	151	179	64.8	350.9	170.6
5" (125)	154	176	195	67.9	350.9	203.7	154	179	214	77.8	350.9	226.9
6" (150)	184	206	220	80.2	350.9	240.7	184	212	249	66.3	350.9	205.8
8" (200)	234	260	277	119.2	350.9	300.8	234	266	306	104.8	568.7	361.4
10" (250)	285	315	338	121.4	568.7	364.2	285	321	360	115.8	854.3	436.2
12" (300)	340	370	407	143.6	568.7	430.7	340	376	420	153.7	1271.0	648.6
14" (350)	370	400	449	177.9	854.3	533.7	370	408	484	137.3	1271.0	603.7
16" (400)	420	455	512	164.2	854.3	492.7	420	460	538	177.2	1805.1	835.9
18" (450)	485	520	547	212.1	1271.0	636.2	485	525	595	169.2	1805.1	884.5
20" (500)	530	570	604	198.9	1271.0	596.8	530	575	652	196.8	1805.1	1054.9
24" (600)	635	675	715	262.9	1805.1	807.5	635	680	773	280.6	3283.5	1721.0



NPS	Class400 (PN68bar)						Class600 (PN110bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	23	34	52	7.8	97.3	41.7	23	34.5	52	8.4	97.3	54.4
3/4" (20)	29	42.5	65	15.0	195.3	83.7	29	42.5	65	15.6	195.3	83.7
1" (25)	36	50.5	71	19.5	195.3	83.7	36	50.5	71	21.2	195.3	85.8
1 1/4" (32)	45	61	80	26.4	195.3	86.7	45	62.5	80	32.2	195.3	125.0
1 1/2" (40)	51	70	93	43.0	350.9	150.4	51	72	93	52.1	350.9	193.8
2" (50)	67	91	109	29.5	195.3	91.6	67	91	109	33.3	195.3	121.3
2 1/2" (65)	79	103	128	40.8	350.9	150.4	79	104	128	50.4	350.9	179.3
3" (80)	99	124	147	52.1	350.9	177.7	99	125	147	68.7	350.9	239.1
3 1/2" (90)	111	136	160	67.4	568.7	243.7	111	138	160	95.0	568.7	322.6
4" (100)	126	151	176	79.6	568.7	270.7	126	155	192	116.5	568.7	376.8
5" (125)	154	179	211	105.9	568.7	360.1	154	183	239	175.6	854.3	568.0
6" (150)	184	212	246	96.1	568.7	326.6	184	214	265	153.3	854.3	495.9
8" (200)	234	266	303	165.2	854.3	561.7	234	267	319	255.5	1271.0	826.5
10" (250)	285	321	357	196.3	1271.0	667.4	285	322	398	299.3	1805.1	968.2
12" (300)	340	376	417	288.3	1805.1	980.1	340	378	455	318.5	1805.1	1030.6
14" (350)	370	408	481	268.3	1805.1	912.2	370	410	490	407.1	2471.1	1317.2
16" (400)	420	460	534	367.8	2471.1	1250.6	420	465	563	563.2	3283.5	1822.0
18" (450)	485	525	592	389.2	2471.1	1323.3	485	530	611	772.1	4256.9	2498.0
20" (500)	530	575	646	506.3	3283.5	1721.5	530	580	681	765.2	4256.9	2475.5
24" (600)	635	680	766	803.1	5405.9	2730.7	635	685	788	1196.3	6745.0	3870.2



NPS	Class900 (PN150bar)						Class1500 (PN260bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
1/2" (15)	23	34.5	61	20.4	350.9	150.4	22	34.5	61	28.8	350.9	150.4
3/4" (20)	29	42.5	68	30.4	350.9	150.4	28	42.5	68	42.6	350.9	150.4
1" (25)	36	50.5	77	48.1	568.7	243.7	35	50.5	77	67.3	568.7	243.7
1 1/4" (32)	45	62.5	87	72.9	568.7	243.7	44.5	62.5	87	100.5	568.7	296.2
1 1/2" (40)	51	72	96	112.4	854.3	366.1	51	72	96	153.2	854.3	451.4
2" (50)	67	91	141	75.5	568.7	243.7	65	91	141	105.9	568.7	312.0
2 1/2" (65)	79	104	163	108.7	854.3	366.1	78.5	104	163	149.4	854.3	440.4
3" (80)	99	125	166	129.7	568.7	353.8	96	125	173	232.1	1271.0	683.9
4" (100)	126	155	204	242.2	1271.0	660.6	122	155	207	375.4	1805.1	1106.2
5" (125)	154	183	246	355.0	1805.1	968.1	150	183	252	593.2	3283.5	1748.0
6" (150)	184	214	287	278.9	1271.0	760.7	178	214	280	478.0	2471.1	1408.6
8" (200)	234	269	357	515.7	2471.1	1406.5	231	269	350	840.7	4256.9	2477.3
10" (250)	285	322	433	532.5	2471.1	1452.4	280	322	433	1341.9	6745.0	3954.1
12" (300)	340	378	496	566.8	2471.1	1545.9	335	378	519	1425.7	8288.8	4201.0
14" (350)	370	410	519	718.5	3283.5	1959.5	364	410	576	1866.1	12048.6	5498.8
16" (400)	420	466	573	993.0	4256.9	2708.2	416	466	639	2627.4	16801.7	7742.0
18" (450)	485	531	636	1449.1	6745.0	3952.2	480	531	703	3659.6	22664.6	10783.6
20" (500)	530	582	696	1846.3	8288.8	5035.2	522	582	754	4786.1	29753.7	14102.9
24" (600)	635	687	836	3122.9	16801.7	8516.9	620	687	900	7618.3	48076.3	22448.7
NPS	Class2500 (PN420bar)											
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)						
1/2" (15)	18.5	34.5	68	54.9	350.9	150.4						
3/4" (20)	21.5	42.5	74	85.3	350.9	206.6						
1" (25)	28.5	50.5	84	134.0	568.7	324.7						
1 1/4" (32)	37.5	62.5	103	226.9	854.3	549.8						
1 1/2" (40)	45	72	115	326.8	1271.0	791.8						
2" (50)	63	91	144	212.8	854.3	515.7						
2 1/2" (65)	75	104	166	298.8	1271.0	723.9						
3" (80)	95	125	195	449.9	1805.1	1090.0						
4" (100)	120	155	233	789.1	3283.5	1912.0						
5" (125)	147	183	277	1217.2	5405.9	2949.3						
6" (150)	173	214	315	1845.7	8288.8	4472.2						
8" (200)	219	269	385	1866.9	8288.8	4523.6						
10" (250)	266	322	474	3225.1	16801.7	7814.6						
12" (300)	318	378	547	4723.4	22664.6	11445.1						





Above 24" A series

NPS	Class150 (PN20bar)						Class300 (PN50bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	685	730	773	251.5	1805.1	784.8	685	735	833	297.6	4256.9	1859.8
28" (700)	735	780	830	230.7	1805.1	773.6	735	785	896	336.1	4256.9	2100.4
30" (750)	785	830	881	245.8	1805.1	853.9	785	835	950	405.9	5405.9	2536.8
32" (800)	835	880	938	313.1	3283.5	1407.2	835	885	1004	484.7	6745.0	3029.1
34" (850)	885	935	989	306.8	3283.5	1407.2	885	940	1055	545.9	6745.0	3411.6
36" (900)	935	985	1046	323.6	3283.5	1407.2	935	990	1116	561.3	8288.8	3552.3
38" (950)	976	1026	1109	337.3	3283.5	1407.2	976	1028	1052	450.3	3283.5	2814.3
40" (1000)	1030	1080	1160	315.9	3283.5	1407.2	1030	1085	1112	541.7	4256.9	3385.9
42" (1050)	1080	1130	1217	330.7	3283.5	1432.1	1080	1135	1163	589.8	4256.9	3648.8
44" (1100)	1135	1185	1274	312.4	3283.5	1410.2	1135	1190	1217	694.5	5405.9	4340.8
46" (1150)	1185	1240	1325	342.8	3283.5	1544.6	1185	1245	1271	930.7	6745.0	5781.5
48" (1200)	1235	1290	1382	324.4	3283.5	1513.5	1235	1295	1322	877.4	6745.0	5483.9
50" (1250)	1290	1350	1433	413.7	5405.9	2316.8	1290	1355	1376	1024.1	8288.8	6400.5
52" (1300)	1340	1400	1490	429.3	5405.9	2316.8	1340	1405	1427	1097.0	8288.8	6856.1
54" (1350)	1390	1455	1547	464.4	5405.9	2316.8	1390	1465	1490	1538.1	12048.6	9613.1
56" (1400)	1440	1505	1604	440.5	5405.9	2316.8	1440	1515	1541	1639.3	12048.6	10245.4
58" (1450)	1490	1560	1662	473.8	5405.9	2351.0	1490	1570	1592	1539.9	12048.6	9624.1
60" (1500)	1540	1610	1712	451.6	5405.9	2316.8	1540	1620	1643	1634.4	12048.6	10215.2
NPS	Class400 (PN68bar)						Class600 (PN110bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	685	735	830	801.1	5405.9	2723.8	685	745	865	1214.3	6745.0	3928.6
28" (700)	735	785	890	969.4	6745.0	3296.1	735	795	912	1459.7	8288.8	4722.4
30" (750)	785	835	944	1159.7	8288.8	3942.9	785	850	970	1661.7	8288.8	5376.0
32" (800)	835	885	1001	1292.4	8288.8	4394.2	835	900	1020	2077.9	12048.6	6722.8
34" (850)	885	940	1052	1455.6	8288.8	4949.1	885	955	1071	2332.1	12048.6	7545.1
36" (900)	935	990	1116	1403.3	8288.8	4771.4	935	1005	1128	2849.2	16801.7	9217.9
38" (950)	976	1028	1071	1313.3	5405.9	4465.3	976	1051	1103	2800.4	12048.6	9060.2
40" (1000)	1030	1085	1125	1562.7	6745.0	5313.2	1030	1105	1154	2690.5	12048.6	8704.6
42" (1050)	1080	1135	1176	1701.2	6745.0	5781.5	1080	1160	1217	3757.1	16801.7	12155.3
44" (1100)	1135	1190	1230	1984.4	8288.8	6746.9	1135	1215	1268	3585.4	16801.7	11600.0
46" (1150)	1185	1245	1287	1930.4	8288.8	6563.2	1185	1270	1325	3910.6	16801.7	12652.0
48" (1200)	1235	1295	1344	3008.3	12048.6	10228.2	1235	1320	1389	4625.4	22664.6	14964.5
50" (1250)	1290	1355	1401	2880.2	12048.6	9792.8	1290	1380	1446	6291.0	29753.7	20353.3
52" (1300)	1340	1405	1452	3085.2	12048.6	10327.4	1340	1430	1497	5886.4	29753.7	19044.4
54" (1350)	1390	1465	1516	4272.5	16801.7	14401.4	1390	1485	1554	6340.2	29753.7	20512.5
56" (1400)	1440	1515	1566	3984.3	16801.7	13546.6	1440	1535	1611	7311.8	38185.5	23655.9
58" (1450)	1490	1570	1617	4277.4	16801.7	14401.4	1490	1590	1662	7837.0	38185.5	25355.0
60" (1500)	1540	1620	1681	4994.1	22664.6	16979.9	1540	1640	1731	10227.5	48076.3	33089.1



NPS	Class900 (PN150bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	685	745	881	4033.3	22664.6	11000.0
28" (700)	735	795	944	4958.5	29753.7	13523.2
30" (750)	785	850	1008	5644.8	29753.7	15395.0
32" (800)	835	900	1071	6797.5	38185.5	18538.5
34" (850)	885	955	1135	8215.8	48076.3	22406.8
36" (900)	935	1005	1198	9033.5	48076.3	24636.9
38" (950)	976	1051	1198	9865.5	48076.3	26905.9
40" (1000)	1030	1105	1249	9027.0	48076.3	24619.1
42" (1050)	1080	1160	1300	9926.9	48076.3	27073.2
44" (1100)	1135	1215	1366	11600.0	59542.7	31636.2
46" (1150)	1185	1270	1433	13495.5	72701.1	36805.9
48" (1200)	1235	1320	1484	14511.0	72701.1	39575.5

**Above 24" B series**

NPS	Class75 (PN11bar)						Class150 (PN20bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	662	698	706	71.8	195.3	167.4	662	698	723	86.2	350.9	284.2
28" (700)	712	748	757	69.3	195.3	167.4	712	748	774	83.2	350.9	291.0
30" (750)	766	802	808	67.7	195.3	167.4	766	802	825	81.2	350.9	300.8
32" (800)	818	854	858	66.2	195.3	167.4	818	854	879	79.4	350.9	300.8
34" (850)	866	906	909	68.3	195.3	167.4	866	906	933	124.3	568.7	487.5
36" (900)	920	960	971	113.0	350.9	300.8	920	960	985	119.8	568.7	487.5
38" (950)	970	1014	1022	125.2	350.9	300.8	970	1014	1043	166.9	854.3	695.3
40" (1000)	1020	1064	1073	119.5	350.9	300.8	1020	1064	1093	159.4	854.3	692.3
42" (1050)	1070	1114	1123	114.8	350.9	300.8	1070	1114	1144	153.1	854.3	692.2
44" (1100)	1130	1174	1179	188.3	568.7	487.5	1130	1174	1195	149.0	854.3	705.9
46" (1150)	1175	1223	1230	184.4	568.7	487.5	1175	1223	1254	237.1	1271.0	1089.5
48" (1200)	1227	1275	1281	174.9	568.7	487.5	1227	1275	1304	224.8	1271.0	1089.5
50" (1250)	1277	1325	1331	181.8	568.7	487.5	1277	1325	1355	214.3	1271.0	1087.7
52" (1300)	1327	1375	1385	173.1	568.7	487.5	1327	1375	1406	205.4	1271.0	1077.6
54" (1350)	1380	1428	1436	179.8	568.7	487.5	1380	1428	1462	198.2	1271.0	1075.6
56" (1400)	1430	1480	1493	260.9	854.3	732.3	1430	1480	1512	195.7	1271.0	1077.0
58" (1450)	1485	1535	1544	246.1	854.3	732.3	1485	1535	1577	282.0	1805.1	1547.2
60" (1500)	1535	1585	1595	254.2	854.3	732.3	1535	1585	1628	268.9	1805.1	1547.2



NPS	Class300 (PN50bar)						Class400 (PN68bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	662	710	769	189.2	1805.1	1170.6	662	710	744	588.7	2471.1	2001.5
28" (700)	712	760	823	188.8	1805.1	1180.0	712	760	798	849.6	3283.5	2814.4
30" (750)	766	814	884	235.9	2471.1	1474.3	766	814	855	827.1	3283.5	2812.3
32" (800)	818	866	938	324.9	3283.5	2030.7	818	866	909	1005.7	4256.9	3419.3
34" (850)	866	918	992	323.7	3283.5	2023.4	866	918	960	986.4	4256.9	3353.8
36" (900)	920	972	1046	439.1	4256.9	2744.5	920	972	1020	1351.1	5405.9	4593.8
38" (950)	970	1022	1096	428.9	4256.9	2680.4	970	1022	1071	1299.0	5405.9	4416.5
40" (1000)	1020	1072	1147	422.3	4256.9	2639.3	1020	1072	1125	1522.7	6745.0	5177.0
42" (1050)	1070	1122	1198	550.7	5405.9	3441.8	1070	1122	1176	1659.4	6745.0	5642.0
44" (1100)	1130	1182	1249	546.9	5405.9	3418.3	1130	1182	1230	1953.3	8288.8	6641.3
46" (1150)	1175	1231	1315	705.9	6745.0	4412.1	1175	1231	1287	1882.5	8288.8	6400.6
48" (1200)	1227	1283	1366	687.2	6745.0	4295.0	1227	1283	1344	2945.1	12048.6	10013.4
50" (1250)	1277	1339	1417	681.0	6745.0	4256.4	1277	1339	1401	2809.2	12048.6	9551.3
52" (1300)	1327	1389	1468	669.3	6745.0	4182.9	1327	1389	1452	3011.7	12048.6	10239.8
54" (1350)	1380	1454	1528	736.6	6745.0	4603.5	1380	1454	1516	4208.9	16801.7	14310.3
56" (1400)	1430	1504	1592	1256.6	12048.6	7853.8	1430	1504	1566	3926.9	16801.7	13351.4
58" (1450)	1485	1561	1654	1215.4	12048.6	7596.3	1485	1561	1617	4220.1	16801.7	14348.5
60" (1500)	1535	1611	1704	1290.5	12048.6	8065.9	1535	1611	1681	4929.2	22664.6	16759.2
NPS	Class600 (PN110bar)						Class900 (PN150bar)					
	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)	D1 (mm)	D2 (mm)	D3 (mm)	Minimum Torque (N.m)	Maximum Torque (N.m)	Preferred Torque (N.m)
26" (650)	662	718	763	977.9	4256.9	3163.7	662	718	836	3407.1	16801.7	9292.0
28" (700)	712	768	817	1191.9	5405.9	3856.2	712	768	900	4241.9	22664.6	11568.7
30" (750)	766	826	877	1468.5	6745.0	4751.2	766	826	957	5321.3	29753.7	14512.7
32" (800)	818	878	931	1754.0	8288.8	5674.6	818	878	1014	5958.3	29753.7	16250.0
34" (850)	866	930	995	2573.5	12048.6	8326.1	866	930	1071	7216.0	38185.5	19679.9
36" (900)	920	984	1046	2450.3	12048.6	7927.3	920	984	1122	6165.7	29753.7	16815.6
38" (950)	970	1045	1103	2770.7	12048.6	8964.0	970	1045	1198	9760.8	48076.3	26620.5
40" (1000)	1020	1095	1154	2645.2	12048.6	8558.0	1020	1095	1249	8875.0	48076.3	24204.5
42" (1050)	1070	1150	1217	3696.8	16801.7	11960.1	1070	1150	1300	9767.4	48076.3	26638.4
44" (1100)	1130	1210	1268	3557.8	16801.7	11510.6	1130	1210	1366	11510.6	59542.7	31392.6
46" (1150)	1175	1260	1325	3853.0	16801.7	12465.7	1175	1260	1433	13296.8	72701.1	36264.0
48" (1200)	1227	1312	1389	4572.8	22664.6	14794.4	1227	1312	1484	14346.1	72701.1	39125.6
50" (1250)	1277	1367	1446	6180.0	29753.7	19994.0						
52" (1300)	1327	1417	1497	5785.9	29753.7	18719.2						
54" (1350)	1380	1475	1554	6259.9	29753.7	20252.7						
56" (1400)	1430	1525	1611	7222.1	38185.5	23365.6						
58" (1450)	1485	1585	1662	7790.5	38185.5	25204.4						
60" (1500)	1535	1635	1731	10168.6	48076.3	32898.4						

Maximum Torque based on ASTM A193 B7 bolts.

Preferred Torque based on the maximum working pressure of ASME B16.5 and ASME B16.47 flanges.



## Applicable standards

PN Series	Class Series	JIS Series	BS10 Series
EN 1092	ASME B16.5	JIS B2220	BS 10
EN 1514	ASME B16.47	JIS B2404	
BS 4504	ASME B16.20		
BS 4865	ASME B 16.21		
DIN	EN 1759		
	EN 12560		
	BS 1560		
	BS 3381		
	JPI-7S-15		
	JPI-7S-41		
	JPI-7S-43		
	MSS SP-44 (A series)		
	API 605 (B series)		