

Description of Bolt Torque Tables

Nominal Pipe Size (in)	Winding Contact I.D. (in)	Winding Contact O.D. (in)	Gasket Contact Area (sq.in.)	Number Of Bolts	Size of Bolts (in)	Bolt Torque at 60ksi Stress (ft.lbs.)	Comp Force Per Bolt @ 60ksi (psi)	Max. Gasket Stress Avail. (psi)	Internal Pressure (psig)	Min. Rec'd Gasket Stress (psi)	Min. Rec'd Torque/Bolt (ft.lbs.)	Max. Rec'd/Avail. Gasket Stress (psi)	Preferred Torque/Bolt (ft.lbs.)
0.50	0.84	1.38	0.94	4	1	60	7560	32134	<300	2500	5	15000	28
0.75	1.06	1.69	1.36	4	1	60	7560	22235	<300	2500	7	15000	40
1.00	1.31	2	1.79	4	1	60	7560	16867	<300	2500	9	15000	53
1.25	1.66	2.5	2.74	4	1	60	7560	11024	<300	2500	14	11024	60
1.50	1.91	2.88	3.65	4	1	60	7560	8291	<300	2500	18	8291	60
2.00	2.38	3.62	5.84	4	1	120	12120	8301	<300	2500	36	8301	120
2.50	2.88	4.12	6.81	4	1	120	12120	7115	<300	2500	42	7115	120
3.00	3.5	5	10.01	4	1	120	12120	4844	<300	2500	62	4844	120
Nominal pipe size (inches) - actual line size	Contacted I.D. - inside diameter of the gasket winding (inches).	Contacted O.D. - outside diameter of the gasket winding (inches).	Gasket contact area (square inches) as defined by previous columns (1)	Number of bolts used	Size of bolts (inches)	Maximum torque per bolt at 60,000 psi bolt stress (foot pounds). See <i>Load on Stud Bolts Under Torque</i> table in the Engineered Gasketing Products catalog.	Compressive force per bolt at 60,000 psi bolt stress (pounds). See <i>Load on Stud Bolts Under Torque</i> table in the Engineered Gasketing Products catalog.	Maximum gasket compression available (psi). Based on 60,000 psi tensile stress in the bolts. (2)	Internal pressure rating (psig) of the piping system.	Garlock's minimum recommended gasket stress (psi) for GYLON, GRAPH-LOCK and compressed sheet products.	Minimum torque required per bolt (foot pounds) to arrive at the minimum gasket stress shown in the previous column. (3)	Maximum gasket stress recommended or available (psi). Garlock does not recommend exceeding 15,000 psi on GYLON, GRAPH-LOCK or compressed sheet materials. Therefore the maximum compression is based on 15,000 psi gasket stress or 60,000 psi bolt stress:	Maximum (preferred) torque required per bolt (foot pounds) to arrive at the maximum available / recommended gasket stress shown in the previous column. (4)

(1) See sample calculation #1 (2) See sample calculation #2 (3) See sample calculation #3 (4) See sample calculation #4

Garlock Bolt Torque Values for **FLEXSEAL®** Spiral Wound Gaskets - ANSI B16.47 Series B Class 75# Flanges

Nominal Pipe Size (in)	Winding Contact I.D. (in)	Winding Contact O.D. (in)	Gasket Contact Area (sq.in.)	Number Of Bolts	Size of Bolts (in)	Bolt Torque at 60ksi Stress (ft.lbs.)	Comp Force Per Bolt @ 60ksi (lbs.)	Max. Gasket Stress Avail. (psi)	Internal Pressure (psig)	Min. Rec'd Gasket Stress (psi)	Min. Rec'd Torque/Bolt (ft.lbs.)	Max. Rec'd/Avail. Gasket Stress (psi)	Preferred Torque/Bolt (ft.lbs.)
26.00	26.25	27.00	31.37	36	0.63	120	12120	13910	<145	10000	86	13910	120
28.00	28.25	29.13	39.43	40	0.63	120	12120	12295	<145	10000	98	12295	120
30.00	30.25	31.13	42.18	44	0.63	120	12120	12643	<145	10000	95	12643	120
32.00	32.25	33.13	44.93	48	0.63	120	12120	12949	<145	10000	93	12949	120
34.00	34.25	35.13	47.68	52	0.63	120	12120	13219	<145	10000	91	13219	120
36.00	36.25	37.25	57.73	40	0.75	200	18120	12556	<145	10000	159	12556	200
38.00	38.25	39.31	64.72	40	0.75	200	18120	11198	<145	10000	179	11198	200
40.00	40.25	41.31	68.06	44	0.75	200	18120	11714	<145	10000	171	11714	200
42.00	42.25	43.25	67.15	48	0.75	200	18120	12952	<145	10000	154	12952	200
44.00	44.25	45.50	88.11	36	0.88	320	25140	10271	<145	10000	312	10271	320
46.00	46.25	47.50	92.04	40	0.88	320	25140	10926	<145	10000	293	10926	320
48.00	48.38	49.50	86.48	44	0.88	320	25140	12791	<145	10000	250	12791	320
50.00	50.25	51.50	99.89	44	0.88	320	25140	11073	<145	10000	289	11073	320
52.00	52.38	53.63	104.07	48	0.88	320	25140	11596	<145	10000	276	11596	320
54.00	54.38	55.63	107.99	48	0.88	320	25140	11174	<145	10000	286	11174	320
56.00	56.50	57.88	123.52	40	1.00	490	33060	10706	<145	10000	458	10706	490
58.00	58.50	59.88	127.84	44	1.00	490	33060	11379	<145	10000	431	11379	490
60.00	60.50	61.75	120.02	44	1.00	490	33060	12120	<145	10000	404	12120	490

Winding contact dimensions per ASME B16.20

Garlock Bolt Torque Values for FLEXSEAL® Spiral Wound Gaskets - ANSI B16.47 Series B Class 150# Flanges

Nominal Pipe Size (in)	Winding Contact I.D. (in)	Winding Contact O.D. (in)	Gasket Contact Area (sq.in.)	Number Of Bolts	Size of Bolts (in)	Bolt Torque at 60ksi Stress (ft.lbs.)	Comp Force Per Bolt @ 60ksi (lbs.)	Max. Gasket Stress Avail. (psi)	Internal Pressure (psig)	Min. Rec'd Gasket Stress (psi)	Min. Rec'd Torque/Bolt (ft.lbs.)	Max. Rec'd/Avail. Gasket Stress (psi)	Preferred Torque/Bolt (ft.lbs.)
26.00	26.50	27.50	42.41	36	0.75	200	18120	15381	<290	10000	130	15381	200
28.00	28.50	29.50	45.55	40	0.75	200	18120	15911	<290	10000	126	15911	200
30.00	30.50	31.50	48.69	44	0.75	200	18120	16373	<290	10000	122	16373	200
32.00	32.50	33.50	51.84	48	0.75	200	18120	16779	<290	10000	119	16779	200
34.00	34.50	35.75	68.97	40	0.88	320	25140	14581	<290	10000	219	14581	320
36.00	36.50	37.75	72.89	44	0.88	320	25140	15175	<290	10000	211	15175	320
38.00	38.37	39.75	84.67	40	1.00	490	33060	15618	<290	10000	314	15618	490
40.00	40.25	41.88	104.81	44	1.00	490	33060	13878	<290	10000	353	13878	490
42.00	42.50	43.88	93.28	48	1.00	490	33060	17012	<290	10000	288	17012	490
44.00	44.25	45.88	115.02	52	1.00	490	33060	14946	<290	10000	328	14946	490
46.00	46.50	48.19	125.49	40	1.12	710	43680	13922	<290	10000	510	13922	710
48.00	48.50	50.00	116.04	44	1.12	710	43680	16562	<290	10000	429	16562	710
50.00	50.50	52.19	136.10	48	1.12	710	43680	15405	<290	10000	461	15405	710
52.00	52.50	54.19	141.40	52	1.12	710	43680	16063	<290	10000	442	16063	710
54.00	54.50	56.00	130.18	56	1.12	710	43680	18790	<290	10000	378	18790	710
56.00	56.88	58.18	117.93	60	1.12	710	43680	22224	<290	10000	319	22224	710
58.00	59.07	60.19	104.67	48	1.25	1000	55740	25561	<290	10000	391	25561	1000
60.00	61.31	62.44	109.59	52	1.25	1000	55740	26449	<290	10000	378	26449	1000

Winding contact dimensions per ASME B16.20

Garlock Bolt Torque Values for FLEXSEAL® Spiral Wound Gaskets - ANSI B16.47 Series B Class 300# Flanges

Nominal Pipe Size (in)	Winding Contact I.D. (in)	Winding Contact O.D. (in)	Gasket Contact Area (sq.in.)	Number Of Bolts	Size of Bolts (in)	Bolt Torque at 60ksi Stress (ft.lbs.)	Comp Force Per Bolt @ 60ksi (lbs.)	Max. Gasket Stress Avail. (psi)	Internal Pressure (psig)	Min. Rec'd Gasket Stress (psi)	Min. Rec'd Torque/Bolt (ft.lbs.)	Max. Rec'd/Avail. Gasket Stress (psi)	Preferred Torque/Bolt (ft.lbs.)
26.00	26.50	28.00	64.21	32	1.25	1000	55740	27780	<750	10000	360	27780	1000
28.00	28.50	30.00	68.92	36	1.25	1000	55740	29116	<750	10000	343	29116	1000
30.00	30.50	32.00	73.63	36	1.38	1360	69300	33882	<750	10000	401	30000	1204
32.00	32.50	34.00	78.34	32	1.50	1600	84300	34433	<750	10000	465	30000	1394
34.00	34.50	36.00	83.06	36	1.50	1600	84300	36539	<750	10000	438	30000	1314
36.00	36.50	38.00	87.77	32	1.62	2200	100800	36751	<750	10000	599	30000	1796
38.00	39.75	41.25	95.43	36	1.62	2200	100800	38027	<750	10000	579	30000	1736
40.00	41.75	43.25	100.14	40	1.62	2200	100800	40264	<750	10000	546	30000	1639
42.00	43.75	45.25	104.85	36	1.75	3000	118800	40789	<750	10000	735	30000	2206
44.00	45.75	47.25	109.56	40	1.75	3000	118800	43372	<750	10000	692	30000	2075
46.00	47.88	49.38	114.57	36	1.88	4000	138240	43438	<750	10000	921	30000	2763
48.00	49.75	51.63	149.29	40	1.88	4000	138240	37040	<750	10000	1080	30000	3240
50.00	51.88	53.38	123.99	44	1.88	4000	138240	49055	<750	10000	815	30000	2446
52.00	53.88	55.38	128.71	48	1.88	4000	138240	51555	<750	10000	776	30000	2328
54.00	55.25	57.25	176.71	48	1.88	4000	138240	37549	<750	10000	1065	30000	3196
56.00	58.25	60.00	162.53	36	2.25	6360	205380	45492	<750	10000	1398	30000	4194
58.00	60.44	61.94	144.18	40	2.25	6360	205380	56981	<750	10000	1116	30000	3349
60.00	62.56	64.19	161.77	40	2.25	6360	205380	50784	<750	10000	1252	30000	3757

Winding contact dimensions per ASME B16.20

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Qualification Statement for the use of Garlock Bolt Torque Tables - 75# - 300# Class Flanges with FLEXSEAL Spiral Wound Gaskets

- These bolt torque tables are only to be used as a general guide. They should not be considered to contain absolute values due to the large number of uncontrollable variables involved with bolted joints.
- The tables were developed to be used with all of our FLEXSEAL Spiral Wound Gaskets (Flexible Graphite, PTFE or THERMa-PUR filled)
- All bolt torque values are based upon the use of new nuts (A194 Grade 2H) and new bolts (A193 Grade B7) of proper design, acceptable quality and approved materials of construction as well as metallurgy. It is also required that two hardened steel flat washers be used under each nut and that a lubricant be used on the nuts, bolts and washers, but **not on the gasket**.
- The contact dimensions used to calculate the gasket area are based on the winding dimensions as specified in ASME B16.20.
- The flanges are assumed to be in good condition and in compliance with ASME B16.47 specifications. Special attention with respect to the seating surface finish and flatness should be given.
- The relationship between the bolt torque values and their transmitted loads is taken from the bolt tables listed in the Engineered Gasketing Products catalog.
- Only torque wrenches that have been calibrated shall be used. The proper bolt tightening pattern must be followed (see Installation Instructions section of the Engineered Gasketing Products catalog for proper bolting pattern) with the desired ultimate torque value arrived at in a minimum of three even increments. All bolts in the flanges should then be checked in consecutive order in a counter-clockwise direction.
- No provisions have been made in these tables to account for vibration effects on the bolts. These tables are not