

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.)
0.5	0.84	1.38	0.94	4	0.5	60	7560	32134	<300	2500	5	15000	28
0.75	1.06	1.69	1.36	4	0.5	60	7560	22235	<300	2500	7	15000	40
1	1.31	2	1.79	4	0.5	60	7560	16867	<300	2500	9	15000	53
1.25	1.66	2.5	2.74	4	0.5	60	7560	11024	<300	2500	14	11024	60
1.5	1.91	2.88	3.65	4	0.5	60	7560	8291	<300	2500	18	8291	60
2	2.38	3.62	5.84	4	0.63	120	12120	8301	<300	2500	36	8301	120
2.5	2.88	4.12	6.81	4	0.63	120	12120	7115	<300	2500	42	7115	120
3	3.5	5	10.01	4	0.63	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 A 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	26.50	27.75	53	24	1.25	1000	55740	25118	<300	10000	398	25118	1000
28	28.50	29.75	57	28	1.25	1000	55740	27292	<300	10000	366	27292	1000
30	30.50	31.75	61	28	1.25	1000	55740	25538	<300	10000	392	25538	1000
32	32.50	33.88	72	28	1.50	1600	84300	32930	<300	10000	486	32930	1600
34	34.50	35.88	76	32	1.50	1600	84300	35495	<300	10000	451	30000	1352
36	36.50	38.13	95	32	1.50	1600	84300	28324	<300	10000	565	28324	1600
38	38.50	40.13	100	32	1.50	1600	84300	26883	<300	10000	595	26883	1600
40	40.50	42.13	105	36	1.50	1600	84300	28779	<300	10000	556	28779	1600
42	42.50	44.25	119	36	1.50	1600	84300	25453	<300	10000	629	25453	1600
44	44.50	46.38	134	40	1.50	1600	84300	25197	<300	10000	635	25197	1600
46	46.50	48.38	140	40	1.50	1600	84300	24135	<300	10000	663	24135	1600
48	48.50	50.38	146	44	1.50	1600	84300	25474	<300	10000	628	25474	1600
50	50.50	52.50	162	44	1.75	3000	118800	32308	<300	10000	929	30000	2786
52	52.50	54.50	168	44	1.75	3000	118800	31100	<300	10000	965	30000	2894
54	54.50	56.50	174	44	1.75	3000	118800	29980	<300	10000	1001	29980	3000
56	56.50	58.50	181	48	1.75	3000	118800	31567	<300	10000	950	30000	2851
58	58.50	60.50	187	48	1.75	3000	118800	30506	<300	10000	983	30000	2950
60	60.50	62.50	193	52	1.75	3000	118800	31974	<300	10000	938	30000	2815

Winding contact dimensions per ASME B16.20

Garlock Bolt Torque Values for FLEXSEAL® Spiral Wound Gaskets - ANSI B16.47 Series A 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	27.00	29.00	88	28	1.63	2200	100800	32086	<800	10000	686	30000	2057
28	29.00	31.00	94	28	1.63	2200	100800	29947	<800	10000	735	29947	2200
30	31.25	33.25	101	28	1.75	3000	118800	32832	<800	10000	914	30000	2741
32	33.50	35.50	108	28	1.88	4000	138240	35713	<800	10000	1120	30000	3360
34	35.50	37.50	115	28	1.88	4000	138240	33756	<800	10000	1185	30000	3555
36	37.63	39.63	121	32	2.00	4400	159120	41962	<800	10000	1049	30000	3146
38	38.50	40.00	92	32	1.50	1600	84300	29169	<800	10000	549	29169	1600
40	40.25	42.13	121	32	1.63	2200	100800	26590	<800	10000	827	26590	2200
42	42.25	44.13	127	32	1.63	2200	100800	25359	<800	10000	868	25359	2200
44	44.50	46.50	143	32	1.75	3000	118800	26595	<800	10000	1128	26595	3000
46	46.38	48.38	149	28	1.88	4000	138240	26007	<800	10000	1538	26007	4000
48	48.63	50.63	156	32	1.88	4000	138240	28375	<800	10000	1410	28375	4000
50	51.00	53.00	163	32	2.00	4400	138240	27079	<800	10000	1625	27079	4400
52	53.00	55.00	170	32	2.00	4400	138240	26076	<800	10000	1687	26076	4400
54	55.25	57.25	177	28	2.25	6360	205380	32542	<800	10000	1954	30000	5863
56	57.25	59.25	183	28	2.25	6360	205380	31425	<800	10000	2024	30000	6072
58	59.50	61.50	190	32	2.25	6360	205380	34578	<800	10000	1839	30000	5518
60	61.50	63.50	196	32	2.25	6360	205380	33472	<800	10000	1900	30000	5700

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Qualification Statement for the use of Garlock Bolt Torque Tables - 150# - 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