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Installation Guide for GYLON®, GRAPH-LOCK® & Compressed Fiber Gaskets

Factors Affecting Gasket Performance

A gasket has one basic function: to create a positive seal between two relatively stationary parts. The gasket must do several different jobs well to function properly - first, create an initial seal; second, maintain the seal over a desired length of time; third, be easily removed and replaced. Varying degrees of success are dependent on how well the gasket does the following:

1. Seals system fluid.
2. Chemically resists the system fluid to prevent serious impairment of its physical properties.
3. Deforms enough to flow into the imperfections on the gasket seating surfaces to provide intimate contact between the gasket and the sealing surfaces.
4. Withstands system temperatures without serious impairments of its performance properties.
5. Is resilient and creep resistant enough to maintain an adequate portion of the applied load.
6. Has enough strength to resist crushing under the applied load and maintain its integrity when being handled and installed.
7. Does not contaminate the system fluid.
8. Does not promote corrosion of the gasket seating surfaces.
9. Is easily and cleanly removable at the time of replacement.

During the gasket selection process that follows, we recommend that these nine (9) factors be used as a checklist from the viewpoint of the user's degree of need for each factor and the manufacturer's degree of compliance.

Installation

A few simple steps must be followed during installation to ensure optimum performance:

1. Verify the flange faces are clean, free of debris/fluids, and in good working condition (flat, aligned, no major defects, etc.). For optimum performance the sealing surface should be no less than ½" wide.
2. Center the gasket on the flange. This is extremely vital where raised faces are involved.
3. Bolts/studs and nuts should be in good working order (ideally new) and turn together freely.
4. Bolt/stud threads should be lubricated with a good quality thread lubricant and installed with at least one hardened flat washer under each nut being turned to reduce friction and optimize load translation.
5. Finger-tighten and lightly snug all bolts/studs and nuts using a crossing pattern (see Figure 1) prior to beginning the torqueing process.
6. Using a calibrated torque wrench, tighten the nuts in multiple steps using a crossing pattern (see Figure 1) to evenly compress the gasket.
7. Once the final torque is achieved make a final pass at the final torque moving consecutively from bolt to bolt (see Figure 2).
8. Retorque 12-24 hours after initial installation when possible (see Figure 2). For safety reasons, Garlock does not recommend retightening a flange connection once it is brought up to temperature and/or pressure. All applicable safety standards including lockout/tagout procedures should be observed.

- NOTE: Never use liquid or metallic based anti-stick or lubricating compounds on the gaskets. Premature failure could occur as a result.

Correct Bolting Pattern

Figure 1 – Crossing Pattern

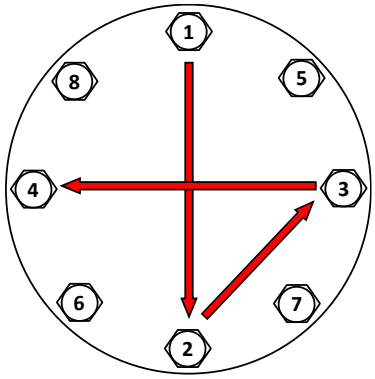
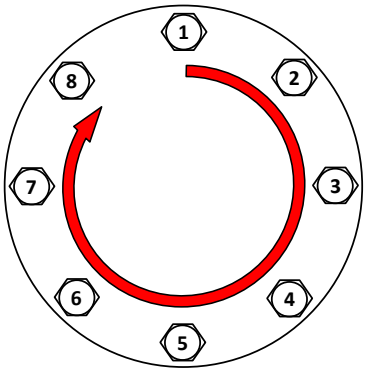


Figure 2 – Final Pass / Retorque



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Bolt Torque Values for GYLON® and Compressed Fiber* gaskets in ASME B16.5 Class 150# Raised Face Flanges with A193 Grade B7 Bolts

Nom. Pipe Size (inches)	No. of Bolts	Size of Bolts (inches)	Internal Pressure (psig)	Minimum Torque (ft.lbs.)	Preferred Torque (ft.lbs.)
1/2	4	1/2	300	19	28
3/4	4	1/2	300	27	40
1	4	1/2	300	36	53
1-1/4	4	1/2	300	54	60
1-1/2	4	1/2	300	54	60
2	4	5/8	300	69	120
2-1/2	4	5/8	300	81	120
3	4	5/8	300	119	120
3-1/2	8	5/8	300	66	120
4	8	5/8	300	84	120
5	8	3/4	300	117	200
6	8	3/4	300	148	200
8	8	3/4	300	200	200
10	12	7/8	300	188	320
12	12	7/8	300	250	320
14	12	1	300	317	490
16	16	1	300	301	490
18	16	1-1/8	300	448	710
20	20	1-1/8	300	395	710
24	20	1-1/4	300	563	1000

Minimum torque values based on a minimum gasket stress of 4800 psi except on flange sizes below 2” which are based on higher stress/torque to optimize the bolt and gasket stresses. Maximum torque values based on a maximum gasket stress of 15,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

* Includes BLUE-GARD® family, Inorganic Fiber (5500 & 5507), Graphite Fiber (9900), Carbon Fiber (9800 & 9850), and Utility Grade (700, 2900 & 2950) gasketing products.

For MULTI-SWELL™ 3760 / 3760-U use the **GRAPH-LOCK® / MULTI-SWELL™** tables.

THERMa-PUR™ products are covered in a separate installation guide.

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Bolt Torque Values for GYLON® and Compressed Fiber* gaskets in ASME B16.5 Class 300# Raised Face Flanges with A193 Grade B7 Bolts

Nom. Pipe Size (inches)	No. of Bolts	Size of Bolts (inches)	Internal Pressure (psig)	Minimum Torque (ft.lbs.)	Preferred Torque (ft.lbs.)
1/2	4	1/2	800	19	28
3/4	4	5/8	800	34	51
1	4	5/8	800	44	67
1-1/4	4	5/8	800	68	102
1-1/2	4	3/4	800	75	151
2	8	5/8	800	46	108
2-1/2	8	3/4	800	60	141
3	8	3/4	800	88	200
3-1/2	8	3/4	800	99	200
4	8	3/4	800	125	200
5	8	3/4	800	156	200
6	12	3/4	800	132	200
8	12	7/8	800	205	320
10	16	1	800	219	490
12	16	1-1/8	800	319	710
14	20	1-1/8	800	287	652
16	20	1-1/4	800	401	912
18	24	1-1/4	800	439	1000
20	24	1-1/4	800	484	1000
24	24	1-1/2	800	662	1552

Minimum torque values based on a minimum gasket stress of 4800 psi except on flange sizes below 2" which are based on higher stress/torque to optimize the bolt and gasket stresses. Maximum torque values based on a maximum gasket stress of 15,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

***** Includes BLUE-GARD® family, Inorganic Fiber (5500 & 5507), Graphite Fiber (9900), Carbon Fiber (9800 & 9850), and Utility Grade (700, 2900 & 2950) gasketing products.

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Bolt Torque Values for GRAPH-LOCK® and MULTI-SWELL™ 3760 / 3760-U gaskets in ASME B16.5 Class 150# Raised Face Flanges with A193 Grade B7 Bolts

Nom. Pipe Size (inches)	No. of Bolts	Size of Bolts (inches)	Internal Pressure (psig)	Minimum Torque (ft.lbs.)	Preferred Torque (ft.lbs.)
1/2	4	1/2	300	14	20
3/4	4	1/2	300	20	27
1	4	1/2	300	27	35
1-1/4	4	1/2	300	41	54
1-1/2	4	1/2	300	54	60
2	4	5/8	300	69	120
2-1/2	4	5/8	300	81	120
3	4	5/8	300	119	120
3-1/2	8	5/8	300	66	120
4	8	5/8	300	84	120
5	8	3/4	300	117	200
6	8	3/4	300	148	200
8	8	3/4	300	200	200
10	12	7/8	300	188	320
12	12	7/8	300	250	320
14	12	1	300	317	490
16	16	1	300	301	490
18	16	1-1/8	300	448	710
20	20	1-1/8	300	395	710
24	20	1-1/4	300	563	1000

Minimum torque values based on a minimum gasket stress of 4800 psi except on flange sizes below 2” which are based on higher stress/torque to optimize the bolt and gasket stresses. Maximum torque values based on a maximum gasket stress of 10,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

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Bolt Torque Values for GRAPH-LOCK® and MULTI-SWELL™ 3760 / 3760-U gaskets in ASME B16.5 Class 300# Raised Face Flanges with A193 Grade B7 Bolts

Nom. Pipe Size (inches)	No. of Bolts	Size of Bolts (inches)	Internal Pressure (psig)	Minimum Torque (ft.lbs.)	Preferred Torque (ft.lbs.)
1/2	4	1/2	800	14	20
3/4	4	5/8	800	25	34
1	4	5/8	800	33	45
1-1/4	4	5/8	800	51	68
1-1/2	4	3/4	800	75	101
2	8	5/8	800	46	72
2-1/2	8	3/4	800	60	94
3	8	3/4	800	88	138
3-1/2	8	3/4	800	99	154
4	8	3/4	800	125	196
5	8	3/4	800	156	200
6	12	3/4	800	132	200
8	12	7/8	800	205	320
10	16	1	800	219	341
12	16	1-1/8	800	319	498
14	20	1-1/8	800	287	435
16	20	1-1/4	800	401	608
18	24	1-1/4	800	439	1000
20	24	1-1/4	800	484	1000
24	24	1-1/2	800	662	1035

Minimum torque values based on a minimum gasket stress of 4800 psi except on flange sizes below 2” which are based on higher stress/torque to optimize the bolt and gasket stresses. Maximum torque values based on a maximum gasket stress of 10,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

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