

GASKET RESOURCES INC.

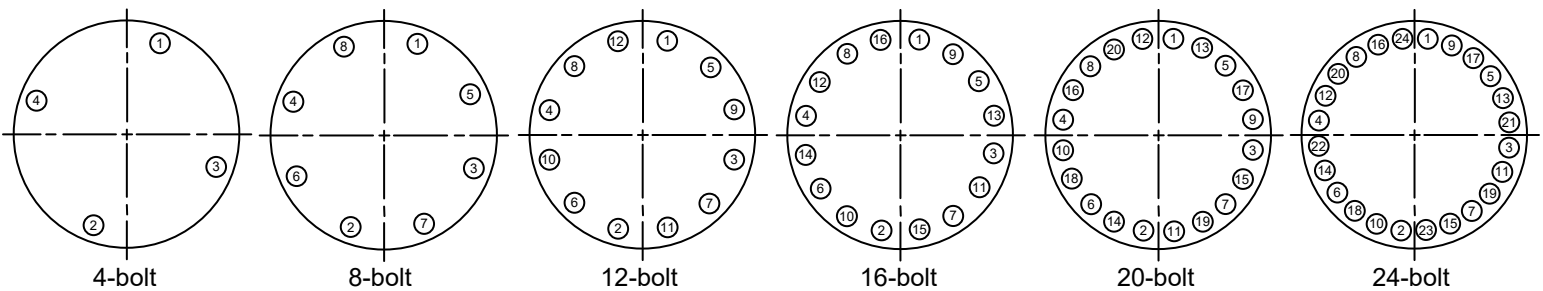
DURLON® GASKETING - BOLT TIGHTENING WORK SHEET

Location/Identification: _____ Nominal Bolt Size: _____

Gasket Contact Surface Finish on Flange: _____; Lubricant Used: _____

(Initial each step.)

- ___ 1. Be sure system is at ambient temperature and depressurized. Follow local safety rules.
- ___ 2. Visually examine and clean flanges, bolts, nuts and washers. Replace components if necessary.
- ___ 3. **Lubricate bolts, nuts, and nut bearing surfaces.** Use of hardened steel washers are recommended.
- ___ 4. Install new gasket. **DO NOT REUSE OLD GASKET, OR USE MULTIPLE GASKETS.**
- ___ 5. Number bolts in cross-pattern sequence according to the appropriate sketch below.
- ___ 6. **IMPORTANT! HAND TIGHTEN NUTS, then using a hand wrench SNUG BOLTS 1/8 to 1/4 turn, following the appropriate cross pattern tightening sequence for the number of bolts below.**
- ___ 7. Starting at the #1 bolt, use the appropriate cross-pattern tightening sequence in the sketch below for Rounds 1, 2, and 3 (each sequence constitutes a "Round").



- **Final Torque:** _____ ft-lbs
- LUBRICATE, HAND TIGHTEN, PRE-TIGHTEN BOLTS**
- **Round 1** - Tighten to _____ ft-lbs - **1st torque** value in torque chart* (30% of final torque)
- **Round 2** - Tighten to _____ ft-lbs – **2nd torque** value in torque chart (60% of final torque)
- **Round 3** - Tighten to _____ ft-lbs - **Final torque** value in torque chart (100% of final torque)

*Refer to torque chart on next page

Check gap at 90° intervals around the flange between each of these rounds. Larger flanges may require checking the gap in smaller intervals. If the gap is not reasonably uniform, make the appropriate adjustments by selective bolt tightening before proceeding.

___ **Rotational Round** - 100% of Final Torque (same as Round 3). Use ROTATIONAL, clockwise tightening sequence, starting with Bolt No. 1, for at least two complete rounds and continue until no further nut rotation occurs at 100% of the Final Torque value for any nut.

___ **Retorque** - Short-term bolt preload loss can occur between four to twenty-four hours after initial tightening due to bolt relaxation and/or gasket creep. Repeating the Rotational Round recovers this loss. This is especially important for PTFE gaskets.

Joint Assembler: _____ Date: _____

For torque questions, or tightening patterns for large diameter flanges, contact GRI Technical Services: (713) 856-9445, or tech@durlon.com

**** This page can be copied for use in the field ****

GRI/DURLON® CFG Ring Gasket Torque Values

TORQUE VALUES FOR ANSI B16.5 FLANGES

3/16" DURLON® CFG Corrugated Flexible Graphite
Ring Gaskets - Torque: ft-lbs

Fasteners: A193 Grade B7 with never seize lubricant, k = 0.17

Flange Size	B16.5 Class 150 RF/ Ring Gaskets					B16.5 Class 300 RF/ Ring Gaskets				
	Torque / Round (ft-lbs)			Bolt Tighten Seq*		Torque / Round (ft-lbs)			Bolt Tighten Seq*	
	1st	2nd	Final	Dwg*/No.	Size	1st	2nd	Final	Dwg*/No.	Size
1/2"	10	20	30	4-bolt	1/2"	10	20	30	4-bolt	1/2"
3/4"	13	27	40	4-bolt	1/2"	15	30	50	4-bolt	5/8"
1"	15	30	50	4-bolt	1/2"	21	42	70	4-bolt	5/8"
1-1/4"	20	40	60	4-bolt	1/2"	30	60	100	4-bolt	5/8"
1-1/2"	20	40	60	4-bolt	1/2"	45	90	150	4-bolt	3/4"
2"	40	80	120	4-bolt	5/8"	33	66	110	8-bolt	5/8"
2-1/2"	40	80	120	4-bolt	5/8"	42	84	140	8-bolt	3/4"
3"	40	80	120	4-bolt	5/8"	60	120	200	8-bolt	3/4"
3-1/2"	40	80	120	8-bolt	5/8"	60	120	200	8-bolt	3/4"
4"	40	80	120	8-bolt	5/8"	60	120	200	8-bolt	3/4"
5"	60	120	200	8-bolt	3/4"	60	120	200	8-bolt	3/4"
6"	60	120	200	8-bolt	3/4"	60	120	200	12-bolt	3/4"
8"	60	120	200	8-bolt	3/4"	95	190	320	12-bolt	7/8"
10"	95	190	320	12-bolt	7/8"	147	294	490	16-bolt	1"
12"	95	190	320	12-bolt	7/8"	213	426	710	16-bolt	1-1/8"
14"	147	294	490	12-bolt	1"	195	390	650	20-bolt	1-1/8"
16"	147	294	490	16-bolt	1"	273	546	910	20-bolt	1-1/4"
18"	213	426	710	16-bolt	1-1/8"	300	600	1,000	24-bolt	1-1/4"
20"	213	426	710	20-bolt	1-1/8"	300	600	1,000	24-bolt	1-1/4"
24"	300	600	1,000	20-bolt	1-1/4"	465	930	1,550	24-bolt	1-1/2"

The above torque values are based on 60ksi bolt stress or 15,000 psi gasket stress, whichever is lower.

THE EFFECT OF BOLT LUBRICATION

Bolt lubrication greatly affects the torque values used when installing gaskets. To achieve the same gasket compression, a much higher torque value is required for a dry bolt versus using a lubricant.

In a dry bolt up, or where an inefficient lubricant is used such as a light oil, the effort used in tightening is overcome by the frictional forces between the bolts and nuts and to a greater extent between the nuts and nut facings.

This can result in a lower gasket load and inadequate stress on the bolts, which can result in torque loss and eventual leakage in service.

Note: This is a general guide only and Gasket Resources Inc. does not accept responsibility for negligence or misuse of this information.

Torque Values are in ft.-lbs. and assume new A193 Gr. B7 studs with 2H heavy hex nuts; with studs, nuts and the nut bearing surfaces lubricated with a never-seize type paste (k = 0.17) using the installation and bolt tightening practices outlined in this handbook. Lubricant should not be applied to the gasket or flange faces as a release agent. Hardened steel washers are also recommended to reduce friction. * Refer to the appropriate bolt tightening sequence drawing under gasket installation in this handbook for the number of bolts listed.

**Online Torque, including ring gasket sizes up to 60" visit: <https://www.gasketresources.com/torque-value-display>



Dowington, PA –
Technical Service
(Houston, Texas)

Toll Free: (866) 707-7300
PH: (713) 856-9445
E-mail: tech@durlon.com