

# GRI/DURLON® - Gasket Installation

## GASKET RESOURCES INC.

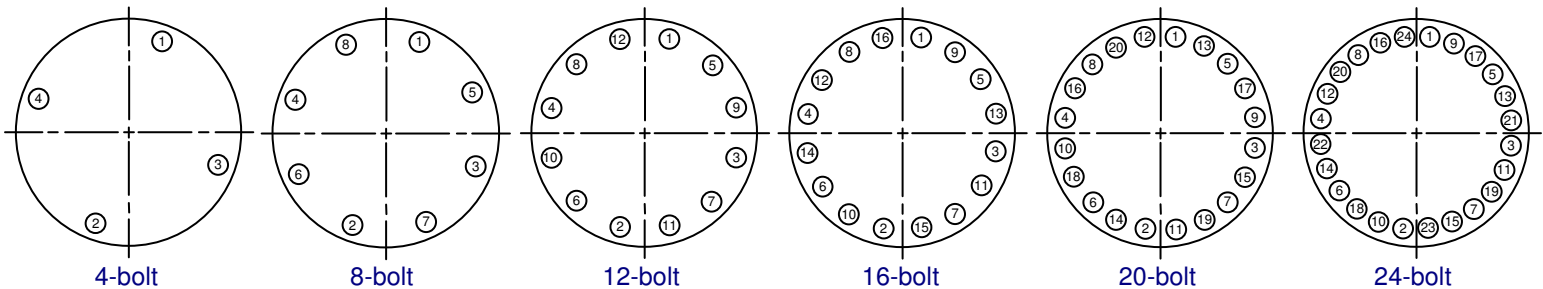
### DURLON® GASKETING - BOLT TIGHTENING WORK SHEET

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 procedures.
- \_\_\_ 2. Visually examine and clean flanges, bolts, nuts and washers. Replace components if necessary.
- \_\_\_ 3. **Lubricate bolts, nuts, AND flange surface AROUND BOLT HOLES**, or use hardened steel washers.
- \_\_\_ 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; then PRE-TIGHTEN BOLTS to 10/20 FT-LBS torque, but DO NOT EXCEED 20% of Target Torque.**
- \_\_\_ 7. Check gap for uniformity.
- \_\_\_ 8. Use the appropriate cross-pattern tightening sequence in the sketch below for Rounds 1, 2, and 3 and/or Round 4 (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 around the circumference between each of these rounds, measured at every other bolt. If the gap is not reasonably uniform around the circumference, make the appropriate adjustments by selective bolt tightening before proceeding.

- \_\_\_ **Final Rotational Round** - 100% of Final Torque (same as Round 3 or 4 above). Use **ROTATIONAL**, clockwise tightening sequence, starting with Bolt No. 1, for one complete round and continue until no further nut rotation occurs at 100% of the Final Torque value for any nut.
- \_\_\_ Short-term bolt preload loss can occur between four to twenty-four hours after initial tightening due to bolt relaxation. Consider retightening to help recover this loss.

TIGHTENING METHOD USED:

\_\_\_ Hand Wrench      \_\_\_ Manual Torque Wrench      \_\_\_ Hydraulic Torque Wrench  
\_\_\_ Impact Wrench      \_\_\_ Other

Joint Assembler: \_\_\_\_\_ Date: \_\_\_\_\_

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

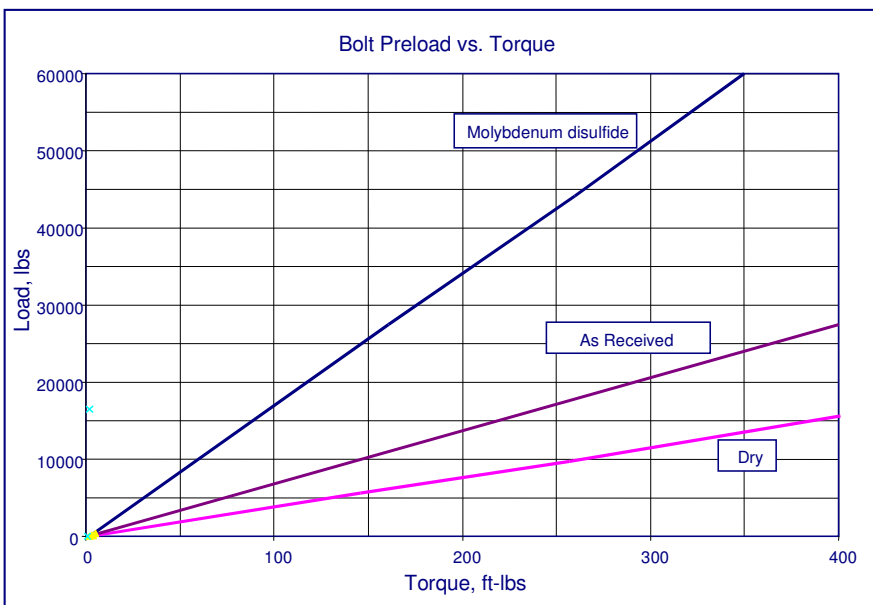
**\*\* This page can be copied for use in the field \*\***

## 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 an effective lubricant such as molybdenum disulfide.

In a dry bolt up, or where an inefficient lubricant is used, 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.



## TORQUE VALUES – ASME B16.5 RAISED FACE FLANGES

### ANSI B16.21 - RING GASKETS

#### 1/16" & 1/8" DURLON® Gasket Material - Torque: ft-lbs

Flange Size	ANSI B16.5 Class 150 RF					ANSI B16.5 Class 300 RF				
	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"	5	11	16	4-bolt	1/2"	5	11	16	4-bolt	1/2"
3/4"	8	15	23	4-bolt	1/2"	13	25	38	4-bolt	5/8"
1"	10	20	30	4-bolt	1/2"	13	25	38	4-bolt	5/8"
1-1/4"	15	30	45	4-bolt	1/2"	18	36	55	4-bolt	5/8"
1-1/2"	18	37	56	4-bolt	1/2"	30	60	90	4-bolt	3/4"
2"	37	75	113	4-bolt	5/8"	20	40	60	8-bolt	5/8"
2-1/2"	37	75	113	4-bolt	5/8"	30	60	90	8-bolt	3/4"
3"	43	86	130	4-bolt	5/8"	42	83	125	8-bolt	3/4"
3-1/2"	37	75	113	8-bolt	5/8"	47	93	141	8-bolt	3/4"
4"	37	75	113	8-bolt	5/8"	59	118	179	8-bolt	3/4"
5"	67	133	202	8-bolt	3/4"	67	133	200	8-bolt	3/4"
6"	67	133	202	8-bolt	3/4"	62	123	187	12-bolt	3/4"
8"	78	156	236	8-bolt	3/4"	98	196	297	12-bolt	7/8"
10"	108	216	327	12-bolt	7/8"	102	205	310	16-bolt	1"
12"	108	216	327	12-bolt	7/8"	153	306	460	16-bolt	1-1/8"
14"	162	325	492	12-bolt	1"	134	267	400	20-bolt	1-1/8"
16"	162	325	492	16-bolt	1"	188	376	570	20-bolt	1-1/4"
18"	241	482	731	16-bolt	1-1/8"	213	425	645	24-bolt	1-1/4"
20"	241	482	731	20-bolt	1-1/8"	234	469	710	24-bolt	1-1/4"
24"	342	684	1036	20-bolt	1-1/4"	363	726	1100	24-bolt	1-1/2"

**Note:** It is assumed that new A193 Gr. 7 studs with 2H heavy hex nuts are used. And studs, nuts and the flange facings on the nuts are lubricated with a never-seize type paste using the installation and bolt tightening practices outlined above. 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 on the previous page for the number of bolts listed.

\*\* A minimum gasket stress of 4800 psi or a torque value > 40% of bolt yield, whichever is higher, is recommended to reduce torque loss.