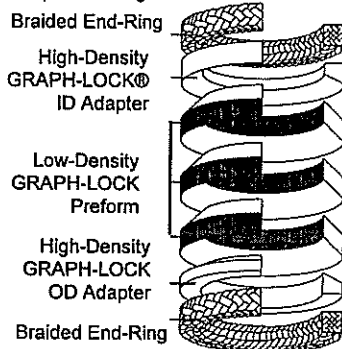## GARLOCK STYLE #9000 EVSP* SIMPLIFIED SETS

This drawing gives the ring stack arrangement of a #9000 EVSP Simplified set. The table below can be consulted for the necessary measurements for pre-planning #9000 EVSP Simplified set installation.

Cross-Section = $\dfrac{\text{Box Bore ID - Stem Diameter}}{2}$

7-Ring Set - Contains all 3 central GRAPH-LOCK® preform rings
6-Ring Set - Contains 2 GRAPH-LOCK preform rings
5-Ring Set - Contains 1 GRAPH-LOCK preform ring

Braided End-Ring
High-Density GRAPH-LOCK® ID Adapter
Low-Density GRAPH-LOCK Preform
High-Density GRAPH-LOCK OD Adapter
Braided End-Ring



### Installation Instructions

Note: Before installation of the #9000 EVSP Simplified set, open the valve to full open (or as close as possible) position.

1. Measure the depth of the stuffing box.
2. From the Required Box Depth Chart, determine the number of rings to be used in the set (5, 6, or 7), depending on available stuffing box depth. 7-ring sets should be used whenever possible.
3. To determine bushing height, subtract the Required Box Depth from the box depth (Step 1). If bushing length is calculated to be less than two cross-sections, extra rings of packing should be used to fill the excess space. **NOTE: If the stuffing box bottom is beveled, install a braided ring first, and then install the bushing.**
4. Install the bushing, and then install the bottom braided ring and all GRAPH-LOCK rings (flat GRAPH-LOCK adapter should be approximately flush to the top of the stuffing box if calculations were done properly). Do not install the top braided ring at this time.
5. Without measurement, compress the packing with the follower enough to enable the top braided ring to be installed.
6. Install the top braided ring and compress to a penetration distance of :
   1 cross-section for a 7-ring set
   3/4 cross-section for a 6-ring set,
   or 1/2 cross-section for a 5-ring set.
7. Check the torque on the gland stud nuts to establish the referenced torque (or tightness) value.
8. Actuate the stem through two or three closing stem revolutions (or through a closing stem travel of 1 to 1-1/2 cross-sections).

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9. Check the stud nut torque (or tightness) and restore to referenced torque value.
10. Repeat Steps 8 and 9 at least 5 times, or until no significant amount of stud nut torque decay is noted after the stem actuation.

**The above guidelines will yield a 30% compression factor. Additional compression may be required if excessive packing ring to stem/box bore surface clearances exist.**

**NOTE: An alternate, more accurate method of achieving an appropriate gland load is to use bolt torque measurements. In order to use this method, follow Steps 1 - 4 above. Install the last ring. Clean the gland studs with a wire brush, and then lubricate them with a suitable grease. For a valve with two gland studs, the following equations can be used to determine the appropriate bolt**

**torque to arrive at a gland load of 3800 psi, or 1.5 times the system pressure, whichever is greater. Perform Steps 8 - 10 after applying torque compression.**

For System Pressures < 2533 psi
Torque (ft lbs) =
   $(24.87) \times (OD^2 - ID^2) \times (d)$ (ft lbs)

For System Pressures > 2533 psi)
Torque (ft lbs) =
   $\dfrac{(S.P.) \times (OD^2 - ID^2) \times (d)}{101.8}$ (ft lbs)

Where: OD = Stuffing Box Bore (in)
   ID = Stem Diameter (in)
   d = Gland Stud Diameter (in)
   S.P. = System Pressure (psi)

This "torque method" may result in slightly more or less than 30% compression.

### Required Box Depth Chart

| Packing Cross-Section | Required Box Depth / Set | | |
|---|---|---|---|
| | 7-Ring | 6-Ring | 5-Ring |
| 1/8" | .750 | .625 | .500 |
| 3/16" | 1.125 | .937 | .750 |
| 1/4" | 1.500 | 1.250 | 1.000 |
| 5/16" | 1.875 | 1.563 | 1.250 |
| 3/8" | 2.250 | 1.875 | 1.500 |
| 7/16" | 2.625 | 2.188 | 1.750 |
| 1/2" | 3.000 | 2.500 | 2.000 |
| 9/16" | 3.375 | 2.813 | 2.250 |
| 5/8" | 3.750 | 3.125 | 2.500 |
| 11/16" | 4.125 | 3.438 | 2.750 |
| 3/4" | 4.500 | 3.750 | 3.000 |
| 13/16" | 4.875 | 4.063 | 3.250 |
| 7/8" | 5.250 | 4.375 | 3.500 |
| 15/16" | 5.625 | 4.688 | 3.750 |
| 1" | 6.000 | 5.000 | 4.000 |

*Patent #4,328,974