



# GRAPHMAX™

## Installation Instructions

### PUMPS (SEE REVERSE FOR VALVES)

1. Unpack stuffing box using standard methods. Ensure that the stuffing box is completely free from used packing and any additional solids or corrosion remaining from the process.
2. Inspect pump sleeve to insure that it is in good condition (**Sleeve conditions have a direct impact on the service life of packings in pumps**). If the sleeve requires replacement, replace with an OEM sleeve or equivalent following the OEM's sleeve replacement procedure.
3. Clean packing gland and gland follower to insure free insertion into the pump stuffing box.
4. Measure shaft sleeve O.D. Packing rings must be cut on a shaft or mandrel of the same diameter as the pump sleeve.
5. Measure stuffing box bore.
6. Calculate packing cross section:  $(\text{Stuffing box bore} - \text{Pump Sleeve O.D.})/2$ .
7. Wrap the packing around the mandrel and mark one ring.
8. Remove from mandrel and skive or butt cut the packing (**See Figures 1 and 2**). Use a sharp knife; using a dull knife will result in unraveling of the cut ends and cause greater leakage.
9. Using this first ring of packing as a template, cut all additional rings required for the equipment. After cutting the rings, check their fit on the mandrel before installation.
10. Install each packing ring by inserting it into the stuffing box, then push it as far as it will go into the stuffing box using the packing gland. Next use a Chesterton 176 tamping tool to firmly seat the ring in the bottom of the stuffing box.
11. Repeat step 10 as many times as is necessary to fill the stuffing box staggering all ring joints 90°.
12. Install packing gland and follower and tighten gland bolts finger tight. Using the gland nose as a reference, tighten the gland bolts until the packing set is initially compressed 10% of its actual uncompressed height. **For example**, 5 rings of .312"/ 8mm packing, the uncompressed packing set height is measured to be 1.562"/ 40mm. The gland nose should move into the stuffing box approximately .156"/ 4mm. Formula =  $.10 \times (\text{number of rings} \times \text{ring cross section})$ .
13. Back off on gland load. Loosen gland bolts until gland moves freely.
14. Finger tighten bolts until gland is snug against packing and tighten one flat.
15. Utilizing a feeler gage, make certain that the gland is not touching the shaft (**as this will generate excessive heat and can cause severe equipment wear and damage**).
16. Prior to starting the pump, make certain that the gland nose is inserted into the stuffing box a minimum of .312"/ 8mm.
17. Some manufacturers recommend pre-heating the equipment. Follow the manufacturer's instructions and vent pump casing. Ensure gland nuts are still snug. Start the pump.
18. After starting the equipment, adjust the gland bolts to achieve an acceptable leakage rate. Adjustments should be made gradually; no more than one adjustment every 15 minutes. Adjust the nuts a single flat at a time alternating between bolts.
19. During break-in the packing may smoke or steam slightly. The packing gland may also get hotter than you are normally used to. This condition will usually settle out in the first 4 - 6 hours of operation. A temporary external water flush may be used to cool the stuffing box during break-in.

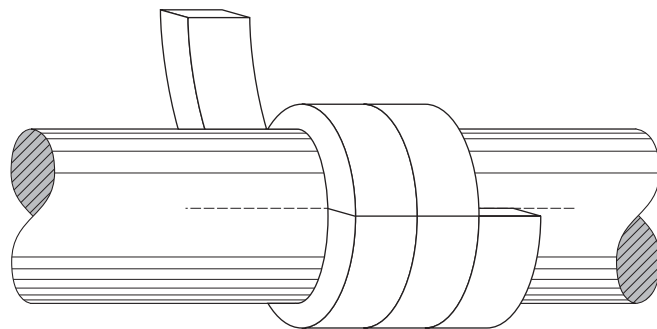


FIGURE 1 — Butt Joint

# VALVES

**Precaution:** Installer must follow all plant procedures and safety practices of the equipment manufacturer into which this product is to be installed.

1. Make sure that the pressure has been released and that the valve has cooled to a safe level.
2. Remove all old packing material (**follow safe extraction procedures**).
3. Before installing packing, inspect the stem and stuffing box wall to make sure that they are free of wear, scale or corrosion. Carefully clean stem and stuffing box wall to remove any residual materials that could affect the sealing performance of the packing. Valve stem must also be free of nicks, scratches and burrs. Repair or replace as necessary.
4. Calculate packing cross section:  $(\text{Stuffing box bore} - \text{Valve Stem O.D.})/2$ .
5. Always cut the packing into separate rings. Never wind a coil of packing into the stuffing box. The most desirable method of cutting rings for valves and expansion joints is to skive cut (45 degrees). (**See Figure 2**).
6. Wrap the packing around the mandrel and mark one ring.
7. Remove from mandrel and skive cut the packing (**See Figure 2**). Use a sharp knife; using a dull knife will result in unraveling of the cut ends and cause greater leakage.
8. Using this first ring of packing as a template, cut all additional rings required for the equipment. After cutting the rings, check their fit on the mandrel before installation.
9. Install each packing ring by inserting it into the stuffing box, then push it as far as it will go into the stuffing box using the packing gland. Next use a Chesterton 176 Tamping tool to firmly seat the ring in the bottom of the stuffing box. Stagger the joints 180°.
10. Install packing gland and follower and tighten gland bolts finger tight. Using the gland nose as a reference, tighten the gland bolts until the packing set is initially compressed 30% of its actual uncompressed height. **For example**, 5 rings of .312"/ 8mm packing, the uncompressed packing set height is measured to be 1.562"/ 40mm. The gland nose should move into the stuffing box approximately .469"/ 12mm. Formula =  $.30 \times (\text{number of rings} \times \text{ring cross section})$ .
11. If there is less than a packing cross section of the gland follower visible, add a sixth ring. Make certain that the gland nose is inserted into the stuffing box a minimum of .312"/ 8mm.
12. Chesterton recommends not more than five to seven rings be used in the stuffing box. If the stuffing box is designed for more than 7 rings, install a Chesterton 5100 or 5101 carbon bushing in the bottom of the stuffing box and install a five ring packing set.
13. Using a calibrated torque wrench, measure and record the torque value applied to the packing gland nuts. Stroke the valve a minimum of 10 full strokes. At the end of the last down/in-stroke, reapply the measured/recorded torque value. Repeat if necessary until the packing is fully consolidated (**less than 1 flat rotation of the packing gland nuts is observed**).
14. Follow normal safety precautions and procedures when returning the valve to service.
15. It is advisable to check gland adjustment after a few hours of service. Take up as necessary.

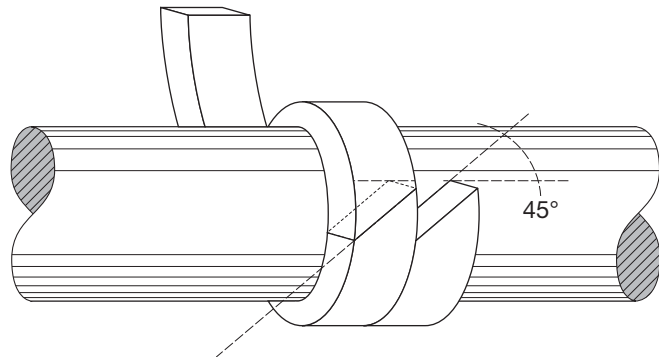


FIGURE 2 — Skive Joint

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