

VALVE PACKING INSTALLATION AND ADJUSTMENT INSTRUCTIONS

The importance of packing the valve correctly cannot be overemphasized. Many packing failures are due to incorrect installation of the packing. Refer to the instructions below to ensure effective installation of packings on valves.

1.) **FOLLOW PLANT SAFETY REGULATIONS** in preparation for and during installation.

2.) **REMOVE ALL OLD PACKING FROM THE STUFFING BOX** (see Figure 33). Packing extractors and water jets are suitable tools for removing packing without damaging the stuffing box. Clean the box and stem thoroughly and examine the stem for wear and scoring. Replace the stem if wear is excessive. Make certain that the stem is concentric to the bore of the stuffing box.

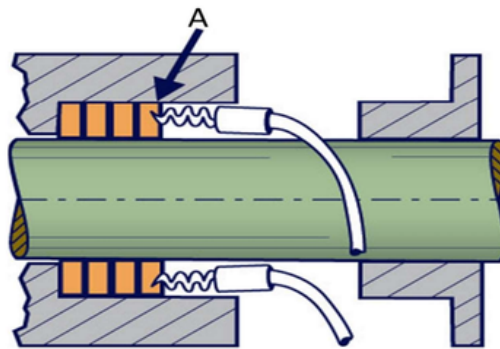


Figure 33. Packing Removal

A: Point away from shaft at 90°

3) **USE THE CORRECT CROSS-SECTION OF PACKING OR DIE-FORMED RINGS.** To determine the correct packing size, measure the diameter of the stem inside the stuffing box area, if possible, to determine the inner diameter (ID) of the ring. Then, measure the diameter of the stuffing box or bore to give the outer diameter (OD) of the ring. Subtract the ID measurement from the OD measurement and divide by two. The result is the cross section size.

4) **WHEN USING COIL OR SPIRAL BRAIDED PACKING, ALWAYS CUT THE PACKING INTO SEPARATE RINGS.**

Never wind a coil of braided packing into a stuffing box. The one exception to this general rule applies to PTFE and ePTFE cord packing (see step 5). Rings can be cut with butt (square) or skive (diagonal) joints, depending on the method used for cutting (see Figures 34 and 35). Typically butt joints are used in dynamic services (i.e. rotary pumps, mixers, agitators etc.) where controllable leakage is expected, and skive joints are used in 'stationary' services such as valves where minimal to zero leakage is required.

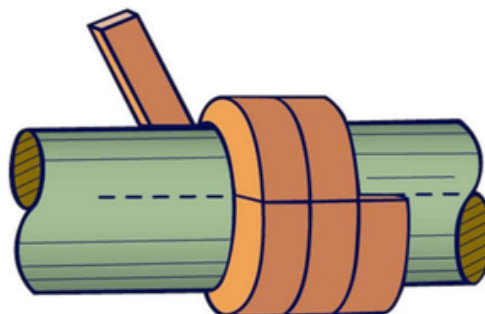


Figure 34 Butt Cut

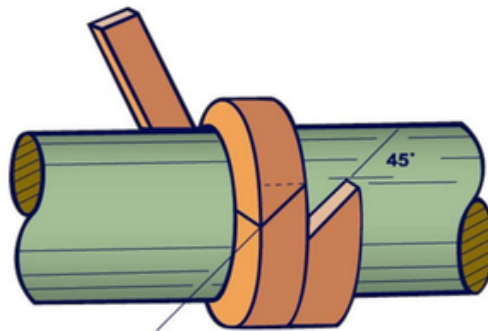


Figure 35 Skive Cut

The best way to cut packing rings is to do it on a mandrel with the same diameter as the stem or shaft to be sealed in the application in the stuffing box area. Be sure the first ring of each packing type is cut carefully and tested on the stem for proper fit.

Note that packings made of different materials and braid methods behave differently when bent around a shaft. Rings cut to a calculated length may not fit properly when installed (See figure 36).

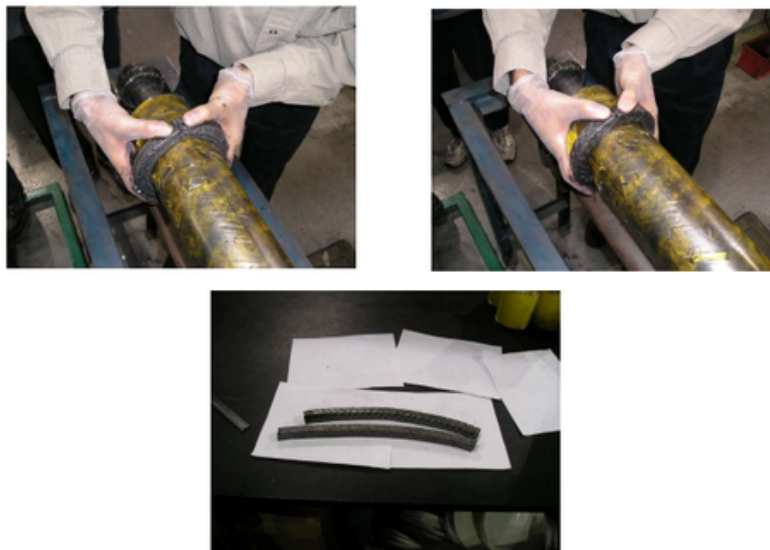


Figure 36 Length of ring is dependent on construction

Hold the packing tightly on the mandrel, but do not stretch. Although not recommended, rings can be cut on the stem outside the stuffing box; however, make sure that the stem is not damaged. Be sure the first ring is cut carefully and tested on the stem for proper fit. The ring can also be inserted into the stuffing box (if available), making certain it fits properly within the packing recess, prior to cutting additional rings. Each additional ring can be cut in the same manner, or the first ring can be used as a master from template for the remainder of the rings are to be cut. If the butt cut rings are cut on a flat surface, be certain that the side of the master rings, not the OD or ID surface, is laid on the rings to be cut. This is necessary so that the end of the rings can be reproduced.

When cutting diagonal joints, use a miter board (see figure 37) so that each successive ring can be cut at the correct angle. It is necessary that the rings be cut to the correct size. Otherwise, service life is reduced. This is where die-molded rings are of great advantage. They give you the exact size ring for the ID of the stem and the OD of the stuffing box with no waste due to incorrectly cut rings.

Make sure the ring is clean and has not picked up dirt in handling. Joints of successive rings should be staggered and kept at least 90 degrees apart. Each individual ring should be firmly seated with a tamping tool or suitable split bushing fitted to the stuffing box bore. When enough rings have been individually seated so that the nose of the gland will reach them, individual tamping should be done by the gland.

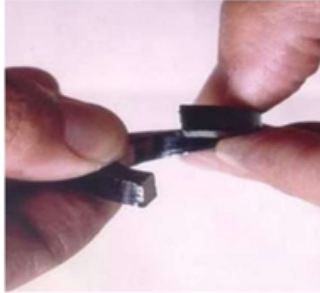


Figure 39 Helix spreading of ring

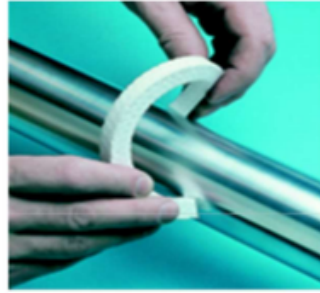


Figure 40 Installation of ring

1) SLIDE GLAND FORWARD UNTIL IT CONTACTS THE PACKING. TIGHTEN THE GLAND BOLTS TO THE TORQUE VALUE SUGGESTED BY THE MANUFACTURER. During this time, turn the valve stem back and forth to determine the ease of turning. Do not torque down to the point where the stem will not turn.

2) INSPECT THE VALVE IN A BENCH TEST OR AFTER IT HAS BEEN IN SERVICE. If leakage is observed, adjust the gland in accordance with safe maintenance procedures and manufacturer's recommendations.

3) LIVE LOADING A VALVE STEM PACKING GLAND. In its simplest form, live loading is the application of a spring load to the gland follower of a packed valve. A disc spring between the gland follower and its fastening studs and nuts provides an effective way to establish and maintain a controlled amount of stress in the packing set. The amount of the packing stress in a live loaded system can be controlled by the size of the disc spring used and how far it is compressed or deflected.

In a live loaded packing system, the follower will continue to push against the packing even when packing volume is lost by friction, extrusion, consolidation, etc. The spring load will be slightly reduced as the springs expand, but this reduction in load will be much less than the load that is lost if the packing set was not live loaded. This remaining load allows the packing stress to remain at a level above the minimum sealing stress and may enable the packing to remain leak free (see Figure 44 on page 64). For live loading theory, refer to the section, Liveload, in the Technical Reference of this manual.

When cutting diagonal joints, use a miter board so that each successive ring can be cut at the correct angle. It is necessary that the rings be cut to the correct size. Otherwise, service life is reduced.

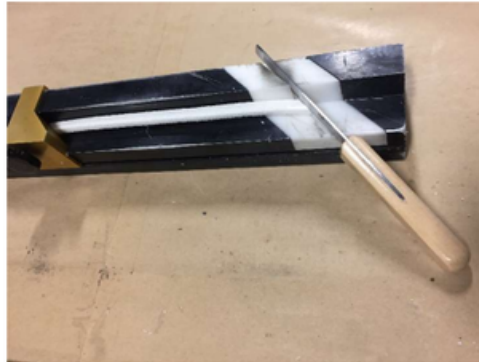


Figure 37 Measuring and Cutting Tool for Compression Packing

5) INSTALL ONE RING AT A TIME. See Figure 38 for installation of cut rings. For installation of die formed rings of flexible graphite, in order to prevent cracking and breaking of the material, do not spread apart the ring as shown in Figure 38. Form a helix with the die formed ring (see Figures 39 and 40). In small valves with 3-5 mm (1/8-3/16 inch) cross sections, soft packing materials, (e.g., ePTFE, PTFE) do not need to be cut into individual rings but may be wrapped around the stem in a consistent spiral to fill the stuffing box. Contact the manufacturer for instructions.

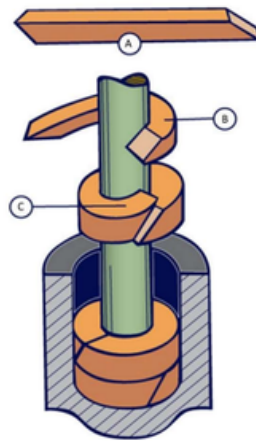


Figure 38 Spreading of Cut Sealing Rings

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