

# **BFGoodrich**

## **PACKING INSTALLATION INSTRUCTIONS**

GARLOCK Sealing Technologies  
Compression Packing Division  
300 Ailing Drive  
Sodus, NY 14551-1091  
Ph 800-472-4120/315-483-6961  
Fax 800-525-6599/315-483-2378

Now that you have selected the proper packing for your application (if in doubt, contact your local GARLOCK Area Manager or our Technical Services' Application Engineer) to attain maximum reliable service, it must be installed properly. The following instructions are industry-accepted procedures as described in the Compression Packing Handbook sponsored by the members of the FLUID SEALING ASSOCIATION.

### **PACKING THE PUMP CORRECTLY**

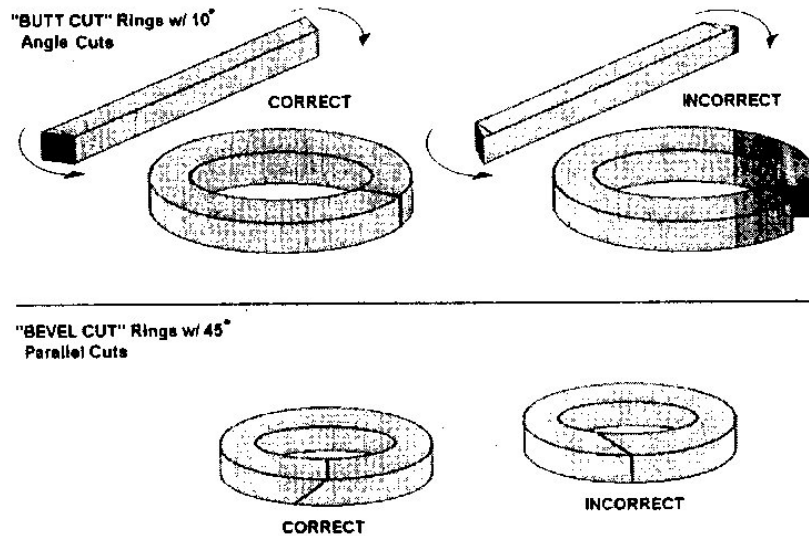
The importance of packing the pump correctly cannot be overemphasized. Many packing failures are due to incorrect installation of the packing. The following steps have been devised to ensure effective installation of packings in pumps.

1. REMOVE ALL OF THE OLD PACKING FROM THE STUFFING BOX.  
Clean box and shaft thoroughly and examine shaft or sleeve for wear and scoring. Replace the shaft or sleeve if wear is excessive.
2. USE THE CORRECT CROSS-SECTION OF PACKING OR DIE-FORMED RINGS.  
To determine the correct packing size, measure the diameter of the shaft (inside the stuffing box area, if possible) and then measure the diameter of the stuffing box (to give the OD of the ring). Subtract the ID measurement from the OD measurement and divide by two. The result is the required packing size.

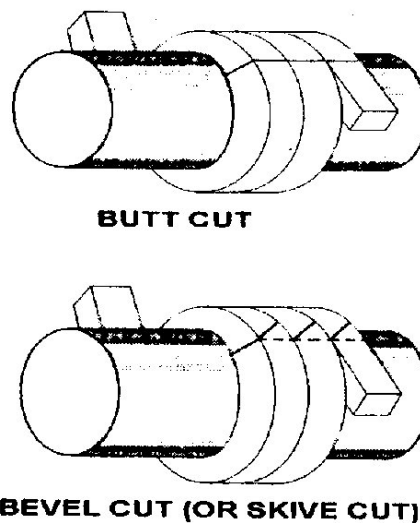
### **CUT PACKING INTO RINGS - DON'T WIND IT AROUND THE SHAFT**

3. WHEN USING COIL OR SPIRAL PACKING, ALWAYS CUT THE PACKING INTO SEPARATE RINGS.

Never wind a coil of packing into a stuffing box. Rings can be cut with butt (square), bias or diagonal joints, depending on the method used for cutting. The following illustration shows these methods of preparing bulk packing. The best way to cut packing rings is to cut them on a mandrel with the same diameter as the shaft in the stuffing box area. If there is no shaft wear, rings can be cut on the shaft outside the stuffing box. Hold the packing tightly on the mandrel, but do not stretch excessively. Cut the ring and insert it into the stuffing box, making certain it fits the packing space properly. Each additional ring can be cut in the same manner, or the first ring can be used as a master from which the balance of the rings are cut.



If the butt cut rings are cut on a flat surface, be certain that the side of the master rings, and 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 maple 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. This is where die-cut rings are of great advantage, as they give you the exact size ring for the ID of the shaft and the OD at the stuffing box. There is no waste due to incorrectly cut rings.

4. INSTALL ONE RING AT A TIME.

Make sure it is clean, and has not picked up any dirt in handling. If desired, lubricate the shaft.

Seat rings firmly (except PTFE filament and graphite yarn packings, which should be snugged up very gently, then tightened gradually after the pump is on stream). Joints of successive rings should be staggered and kept at least 90-degrees apart. Each individual ring should firmly seated with a tamping tool. When enough rings have been individually seated so that the nose at the gland will reach them, individual tamping should be supplemented by the gland.

5. AFTER THE LAST RING IS INSTALLED,

Take-up the bolts finger-tight or very slightly snugged up. Do not jam the packing into place by excessive gland loading. Start pump, and take up bolts until leakage is decreased to a tolerable minimum. Make sure gland bolts are taken up evenly.

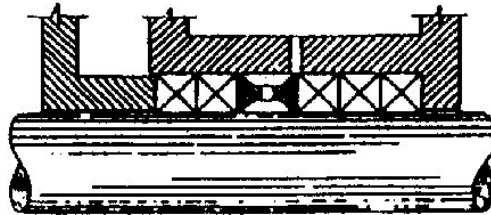
**STOPPING LEAKAGE ENTIRELY AT THIS POINT WILL CAUSE THE PACKING TO BURN UP**

6. ALLOW THE PACKING TO LEAK FREELY WHEN STARTING UP A NEWLY PACKED PUMP. Excessive leakage during the first hour of operation will result in a better packing life over a longer period of time. Take up gradually on the gland as the packing seats, until leakage is reduced to a tolerable level.

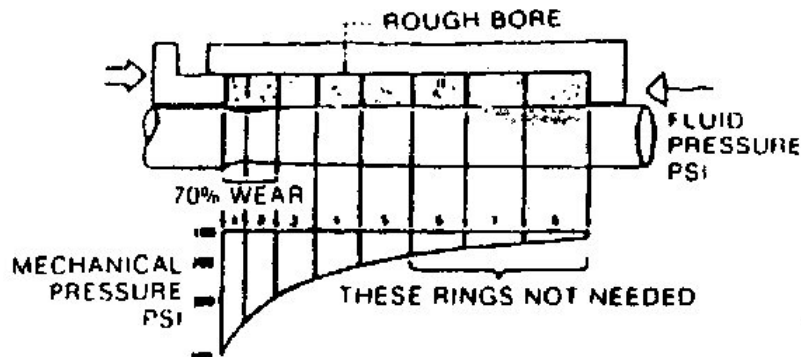
**NEVER TRY TO STOP LEAKAGE ENTIRELY, UNLESS PACKING MANUFACTURER INDICATES THAT IT IS SAFE TO DO SO.**

7. WHEN SPECIFIED BY THE PUMP MANUFACTURER, PROVIDE MEANS OF LUBRICATING THE SHAFT AND PACKING THROUGH THE LANTERN RING BY SUPPLYING WATER, OIL, GREASE, OR LIQUID HANDLED IN THE PUMP.

Fittings for this purpose are standard on many pumps.



8. IF THE STUFFING BOX HAS A LANTERN RING (see illustration above), make sure that the lantern ring, as installed, is slightly behind the fluid inlet so that it will move under the inlet as follower pressure is applied.
9. REPLACE PACKING WHEN LEAKAGE CANNOT BE CONTROLLED BY FURTHER TAKE-UP ON THE FOLLOWER GLAND.
10. ON BOTH CENTRIFUGAL AND RECIPROCATING PUMPS, about 70% of wear is on the outer two packing rings nearest the gland. However, each additional ring does throttle some fluid pressure.



The mechanical pressure curve above shows eight packing rings. The first five rings do the

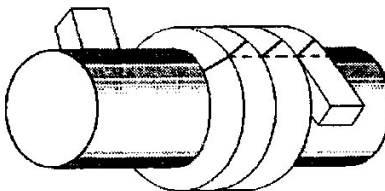
majority of the sealing. The bottom three do little sealing, but are needed to fill the available space. The advantage of using fewer rings is less rod wear. Also, the stuffing box design is simpler and takes less material. But, wear isn't the only problem. With high temperatures, high pressures, corrosive chemicals, or abrasive particles in the fluid, more rings may be the only solution for some services. In such cases, the bottom ring contacting the fluid may have the most wear from these severe service conditions.

### **PACKING VALVES CORRECTLY**

As with pump packing, the first step in getting the most out of a valve packing is correct installation. Here is the correct way to pack valves.

1. CAREFULLY PERFORM ALL OPERATIONS LISTED UNDER PUMP PACKING, STEPS 1 - 5.

Rings used on valves and expansion joints are generally cut with a diagonal joint (illustrated below). In preparing diagonal cut (45-degree) rings, be sure the first ring is cut carefully, and then tested on the stem.



**BEVEL CUT (OR SKIVE CUT)**

1. BRING THE FOLLOWER DOWN ON THE PACKING TO THE POINT WHERE HEAVY RESISTANCE TO WRENCHING IS FELT.

During this time, turn valve stem back and forth to determine ease of turning. Do not torque down to the point where the stem won't turn.

2. AFTER THE VALVE HAS BEEN ON THE LINE A DAY OR SO EVEN IF NO LEAKAGE EXISTS THE FOLLOWER SHOULD BE TIGHTENED SLIGHTLY.

Obviously, if leakage is occurring, the follower must be tightened.

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