

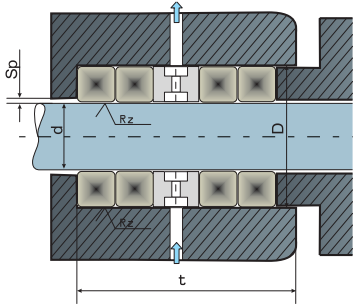
Gland Packing IOM

Selection Criteria for Choosing the right packing

To avoid extrusion between gland follower and shaft or housing, the size of the gap should be less than 2% in Valves and 5% in Pumps or Agitators of cross section of packing

Standard Stuffing Box:

d = shaft or spindle diameter	<0,6 µm Controlvalve
D = stuffing box diameter	<1,6 µm Valve
t = stuffing box depth	<5 µm Pumpshaft
Sp = width of gap	<6 µm Valve Housing
Rz = 0,6 - 5 µm Shaft	<10 µm Pumphousing
	6 - 10 µm Housing



Media
(pH- range, state of aggregation)

Temperature
(constant, varying)

Condition of aggregate
(surface, tolerance, modifications)

Pressure
(constant, varying)

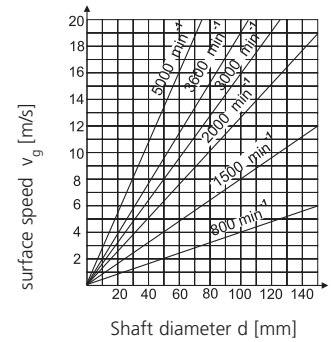
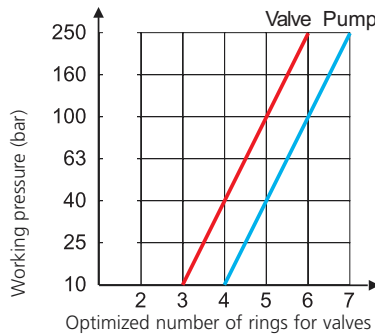
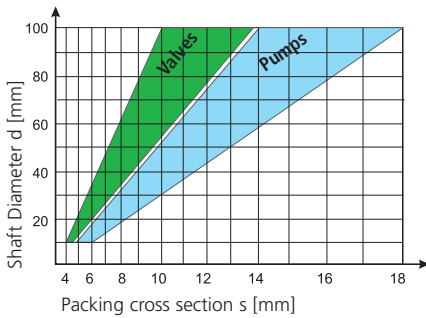
Operating Conditions
(static, rotary, oscillating)

With high shaft surface speed and/or high product temperature a pump jacket cooling may become necessary

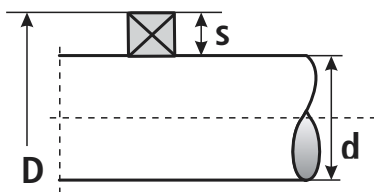
$$\text{Rotating Speed: } v = \frac{d \times \pi \times n}{60 \times 1000} = \frac{m}{s}$$

Optimized packing is undersized:
1 to 5 % of the packing's cross section

Optimized number of rings for pumps and for valve:



Calculation of Cutting Length



Calculation of cut length

$$L = (d + s) \times \pi \times X \text{ [mm]}$$

$$s = (D - d) / 2$$

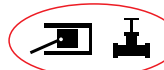
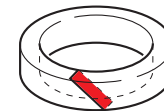
$$x = \text{Adding factor} = 1,04 \text{ to } 1,09$$

Adding factor x in % of middle line circumference

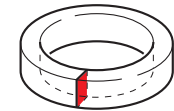
Shaft diameter	Adding factor x (%)
up to 50 mm / 2"	9%
51 to 100 mm / 2" to 4"	7%
101 to 200 mm / 4" to 8"	5%
201 mm / 8" plus	4%

Recommended Packing Cut Angle

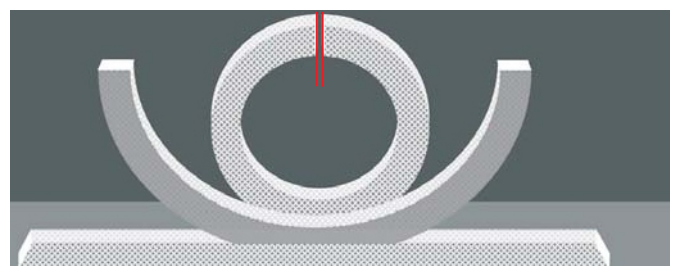
Skive cut 45°
(Valve and reciprocating pumps)

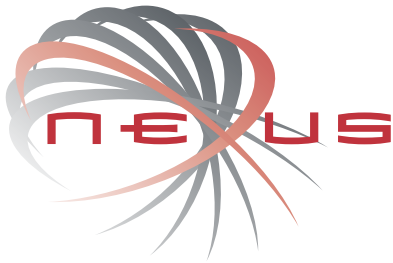


Butt cut approx. 80°
(rotary shafts)



Butt cut with a cutting angle of approx 80° brings the ends in ringform in a parallel orientation





Installation Instructions

Valve Stem Packing

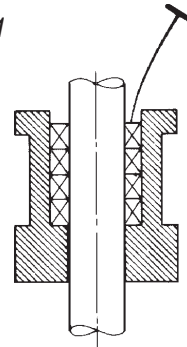
1. Remove all of the old packing from the stuffing box. Clean box and stem thoroughly and examine stem for wear and scoring. Replace stem if wear is excessive. Recommended surface finishes are 32 (micro inches) AARH on the stem, and 125 (micro inches) AARH maximum on the box bore.
2. Measure and record stem diameter, stuffing box bore and box depth. To determine the correct packing size, measure the diameter of the stem (inside the stuffing box area if possible), and the diameter of the stuffing box bore. Subtract the I.D. measurement from the O.D. measurement, and divide the difference by two. This is the required cross-sectional size.

3. Always cut the packing into individual rings. Never wind the packing into a coil in the stuffing box. Rings should be cut with a butt joint. Cut rings by using a spare stem, a mandrel with the same diameter as the stem or a packing cutter. The illustration shows how to use a mandrel to cut packing.

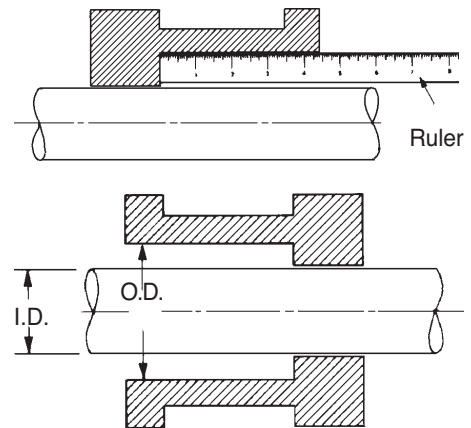
Hold the packing tightly on the mandrel, but do not stretch excessively. Cut the ring and insert it into the stuffing box, making certain that it fits the packing space properly. Each additional ring can be cut in the same manner.

4. Install one ring at a time. Make sure it is clean, and has not picked up any dirt in handling. Seat each ring firmly, making sure it is fully seated before the next ring is installed. Joints of successive rings should be staggered and kept at least 90° apart. When enough rings have been individually seated so that the nose of the gland follower will reach them, individual tamping of the rings should be supplemented by the gland follower. Bring down the gland follower and apply load with the gland bolts.
5. After the last ring is installed, bring down the gland follower and apply 25% to 35% compression to the entire packing set. If possible, record the gland nut torque values and actuate the valve through five (5) complete cycles (ending with the stem in the down position). Retighten the gland bolt nuts to the previously recorded torque value after each full actuation.

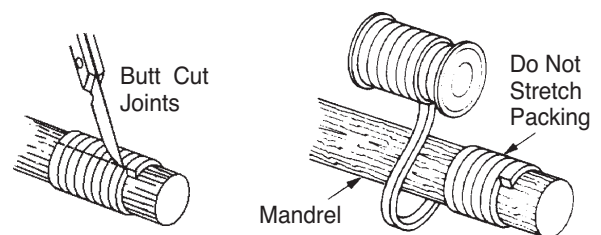
Step 1



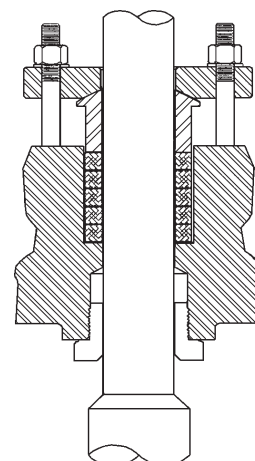
Step 2

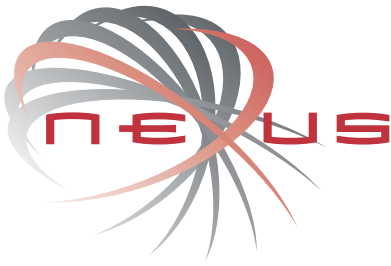


Step 3



Steps 4 and 5





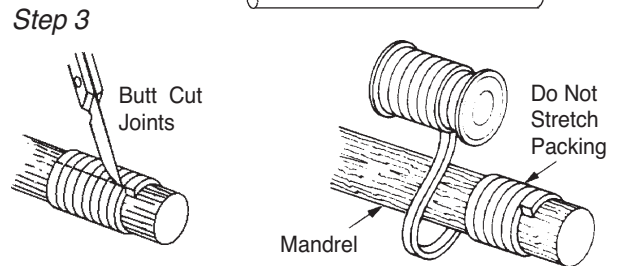
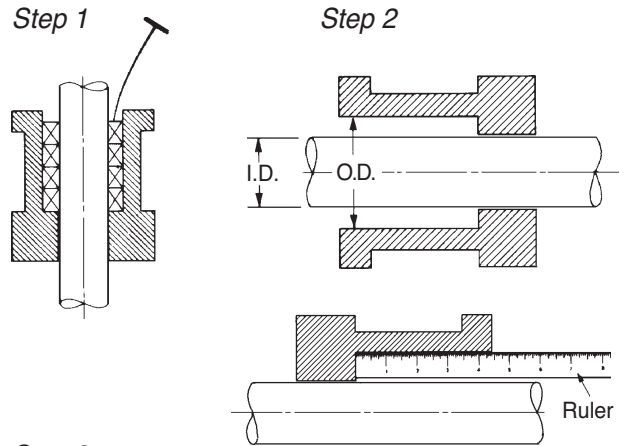
Installation Instructions

Pump Packing

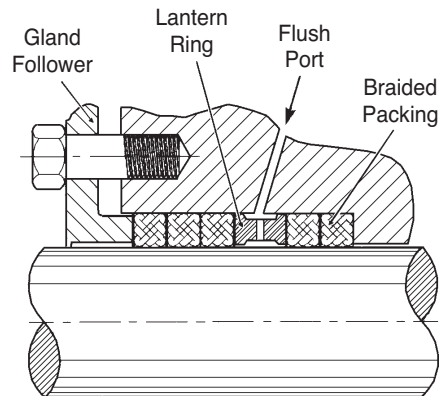
1. Remove all the old packing with packing hooks, being careful not to damage the shaft or sleeve. This means all rings, even the lantern ring and the rings below the lantern. Clean the stuffing box and examine the shaft and sleeve. Replace any worn parts that are scored or deeply grooved.
2. Measure and record shaft diameter, stuffing box bore and box depth. To determine the correct packing size, measure the diameter of the shaft and the stuffing box bore. Subtract the shaft diameter from the bore diameter and divide the difference by two. This is the required cross-sectional size.
3. Always cut the packing into individual rings. Never wind the packing into a coil in the stuffing box. Rings should be cut with a butt joint. Cut rings by using a mandrel with the same diameter as the shaft in the stuffing box area. If there is no 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 that it fits the packing space properly. Each additional ring can be cut in the same manner.

4. Install one ring at a time. Make sure it is clean, and has not picked up any dirt in handling. Lubricate the I.D. of each ring lightly. Start one end and then the other, butted closely. Work around circumference from either or both directions. Joints of successive rings should be staggered and kept at least 90° apart. Each individual ring should be firmly seated with a tamping tool. When enough rings have been individually seated so that the nose of the gland follower will reach them, individual tamping should be supplemented by the gland.
5. If a lantern ring is provided, make sure the lantern ring is installed under the pipe tap hole.
6. After the last ring is installed, bring the follower down on the packing and finger-tighten the gland nuts. Do not jam the packing by excessive gland loading. Start pump, and tighten the bolts until leakage is decreased to a tolerable minimum. Make sure gland bolts are tightened evenly. Stopping leakage entirely at this point will cause the packing to burn up.
7. Allow packing to leak freely upon startup after repack. Gradually reducing leakage during the first hour of operation will result in a better seal over a longer period of time. Tighten the gland nuts one flat at a time until the desired leakage is obtained, and the pump is running cool.



Steps 5 and 6



Suggested Leakage Rates

Shaft Diameter	Running Leakage	Break-in Leakage Equals 2 x Running Leakage
Up to 1"	3 cc/min.	
2"	6 cc/min.	
3"	9 cc/min.	
4"	12 cc/min.	
6"	18 cc/min.	
8"	24 cc/min.	
10"	30 cc/min.	

1 cc = 15 drops

WARNING:

Properties/applications shown throughout this brochure are typical. Your specific application should not be undertaken without independent study and evaluation for suitability. Failure to select the proper sealing products could result in property damage and/or serious personal injury. Performance data published in this brochure has been developed from field testing, customer field reports and/or in-house testing. While the utmost care has been used in compiling this brochure, we assume no responsibility for errors. Specifications subject to change without notice. This edition cancels all previous issues. Subject to change without notice.