

General mounting instructions for gland packings TEMAPACK

Gland Packing:

1. **Checking the gland packing.** It must be undamaged, clean and dry. Its dimensions and type must match dimensions of the areas to be sealed. The type of sealant must correspond to the operating parameters of the joint to be sealed. The shelf life of a gasket must correspond to the recommended period of storing.

Preparation and Inspection of the Packing Chamber:

2. **Remove the old packing** from the chamber with the help of an extractor, leaving no remnants. In the course of this operation make sure that the shaft (shank) is not damaged. Thoroughly clean the chamber and the shaft.
3. **Inspect the shaft** (shank, piston rod) for damage or wear. Measure the wobbling of the shaft. If it exceeds the value of $0,001 \cdot d$ (\varnothing of the shank, or shaft) we recommend repairing or replacing it.

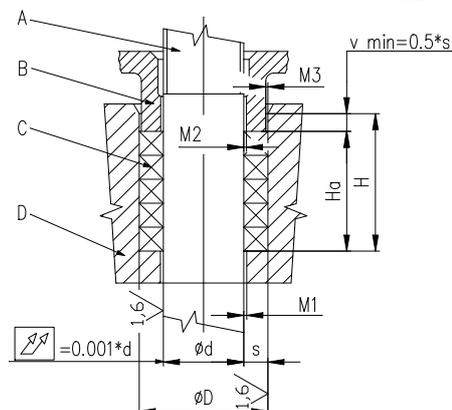
Recommended formulas for the calculation of tolerances:

$$M1 = 0,02 \cdot s, \dots \dots \text{max. } 0,30 \text{ mm}$$

$$M2 = 0,02 \cdot s, \dots \dots \text{max. } 0,30 \text{ mm}$$

$$M3 = 0,01 \cdot s, \dots \dots \text{min. } 0,10 \dots \text{max. } 0,30 \text{ mm}$$

- A shank
B lid
C packing
D chamber

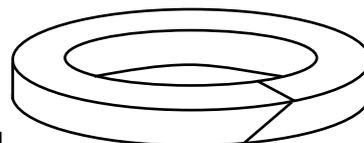


- $\varnothing d$ shank
 $\varnothing D$ chamber
s width of ring
 $s = \frac{D-d}{2}$
v min. height of line
 $v = 0,5 \cdot s$
Hapacking height
Hheight of space
 \swarrow max. total wobble
 $= 0,001 \cdot d$

If the packing space does not correspond to the required tolerances shown in the drawing, it is necessary to define the tolerances for example by using fill-in metal rings or in other ways based on the user's capabilities.

Preparation of packing ring and its insertion into the packing chamber:

4. **Maximum attention to this step.** The largest proportion of leakages is due to incorrect installation!
5. Choose the right kind of packing for the given working conditions.
6. The packing must be used in the form of individual "rings" - it must never be wound up!
7. It is necessary to choose the right dimension of woven packing or ring, otherwise a failure may occur.
8. Several ways exist of correctly trimming the packing string. Each one has its advantages as well as disadvantages. Therefore choose the way that you find the most suitable for your needs.
9. Use the pre-pressed packing rings (if appropriate, in combination with packing rings made of expanded graphite) whenever these are available. The installation is then very easy and fast. Furthermore, this method



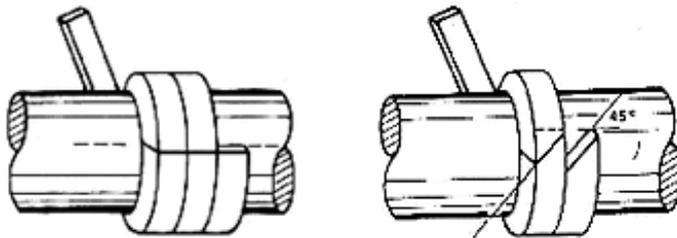
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minimizes the risk that the packing thus prepared will fail. Not all types of packing rings are suitable for pre-pressing.

10. **Cutting of packing rings** on a pin (of the same diameter as the shaft) is very easy and often used. Make sure that the incision is made so as to maintain the medium length of the packing L . See point A. While the execution of a 45° incision is more demanding, the insertion of a ring thus prepared in the packing chamber is easier. For certain high-speed applications we recommend a vertical incision



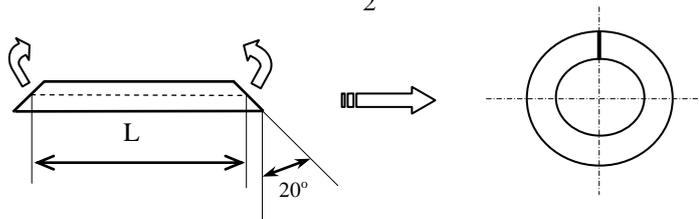
The optimal medium length of the packing should be a little longer than the length that we attained by this type of incision, because some packing strings contract to some extent after a certain period of operation. (Particularly graphite and PTFE fibers shrink slightly after operating temperatures are reached). See also point A, coefficient k .

The cutting of packing rings on the template requires a precise calculation of the medium length of the packing and skill in inserting packing rings into the chamber. See the following formula and illustration:

Formula for the calculation of the medium packing length:

Point.A

$$L = \frac{D+d}{2} \cdot k \cdot \pi$$



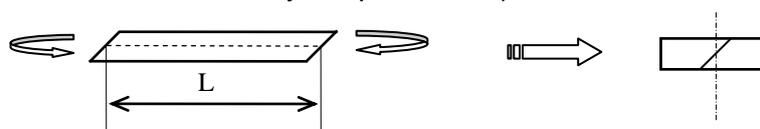
D \varnothing chamber
d \varnothing shank
k coefficient

\varnothing shank d (mm)	k coefficient
Up to 60	1.1
61 – 100	1.07
more than 100	1.04

11. **The circumference of the outer circle** is bigger than the circumference of the inner one, so that in performing the incision an angle of about 20° is required to prevent the formation of a gap on the outer side of the circle. The length must be chosen in such a way that the ring should fit tightly around the shank and that the diagonal ends of the packing should be in close contact. An incorrect length causes a lack of tightness in the packing. It is recommended to check the length by wrapping the packing around the shank or by using a preparatory packing of the same diameter. N.B.: Coefficient k takes into account the contraction (shrinkage) of the packing fibers after a certain period of operation.

12. **Cutting the packing rings** on a cutter is a very simple process, used frequently. No calculations are required. In turning the ring (in the illustration the view is spatially turned by 90° with respect to the previous one) we can neglect the fact that the circumference of the outer circle is greater than the circumference of the inner one, which is acceptable in view of the 45° lock. (Otherwise a further incision would need to be made as per point C and the length of the preparatory packing would need to be approx. $1/3 \cdot S$ longer. For practical reasons a second incision is usually not performed.)

Point.B



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13. Carefully compact each ring into the packing chamber before adding further rings and make sure that the connections of the following circles are alternately arranged at 180° intervals (if only 2 rings are installed), at 120° intervals (for 3 rings) and at 90° intervals (if the set comprises 4 or more rings). For pressures in excess of 100 bar it is recommended that pre-pressed rings be used, made out of a woven packing material.

Tightening of packing chamber and initial run

14. **Tightening and initial run of the valve:** After installing all rings, insert the packing lid and manually tighten the tightening bolts. Then, using a torque wrench, successively tighten each bolt in turn in four stages, 25, 50, 75 a 100% of the tightening torque. After each stage of tightening, open and close the valve by turning the shank. The tightening torque must be chosen such that the packing should be tight and the valve should be operable.
15. **The tightening bolts** must be in flawless condition (undamaged, clean and uncorroded) and lubricated with a suitable lubricant whose heat stability is higher than the operating temperature. Once the bolts have been tightened, we recommend opening and closing the valve several times, checking the tightening torque and in case of need, further tighten the bolts. It is also appropriate after 24 hours of operation, to tighten the bolts even in the case that no leakages of the medium area detected—this is to compensate the compression of the packing. To ensure permanent tightening tension it is advisable to use disk-shaped spring washers providing permanently optimal tightening tension. In this case it is not necessary to further tighten the packing in the course of operation.

Recommended tightening pressures of the packing inside the chamber:

- a) liquid - up to 40 bar 2x working pressure (min. 5 N/mm²)
above 40 bar 1,5x working pressure (min. 5 N/mm²)
 - b) gases - up to 40 bar 5x working pressure (min. 10 N/mm²)
40 - 200 bar 2,5 - 5x working pressure
above 200 bar 1,5x working pressure
16. **Tightening and initial run of pump:** After the installation of all rings into the pump packing, please tighten the nuts on the bolts of the packing lid manually or only with the application of only a very slight force on the bolts. Start up the pump and then continue to tighten the nuts evenly on the packing lid until the permeability is reduced to an acceptable level. Never try to stop the permeability completely, otherwise excess heat will result, which will reduce the service life of the packing and increase the wear on the shaft. As you watch the packing in operation, always tighten all of the nuts to the same degree and wait 10 - 15 minutes for the packing to settle down prior to performing the next adjustment.

Recommended pressure of the packing: 1.5 - 2x the working pressure of the medium.

Note: The practical values of the tightening pressures depend on other factors as well (construction, condition of the space being sealed, temperature, viscosity, etc.); for this reason the results of the packing may differ even under what may appear to be identical conditions.