

IN ROD

The IN ROD seal is a hydraulic or Chevron packing for piston rods to enable accurate dynamic sealing of hydraulic and oil-pressure cylinders.

This very robust design enables efficient sealing performance especially for heavy duty applications in critical conditions, such as oscillations and axial and/or radial vibrations, water hammering or temperature changes.

The special design of these packings consisting of several separate elements, enables not only an easy assembly in the housing but also allows multiple combinations in terms of sizes and materials.

The intermediate V-shaped rings or Chevrans (2) are in between the header or male ring (1) and the gland or female ring (3)

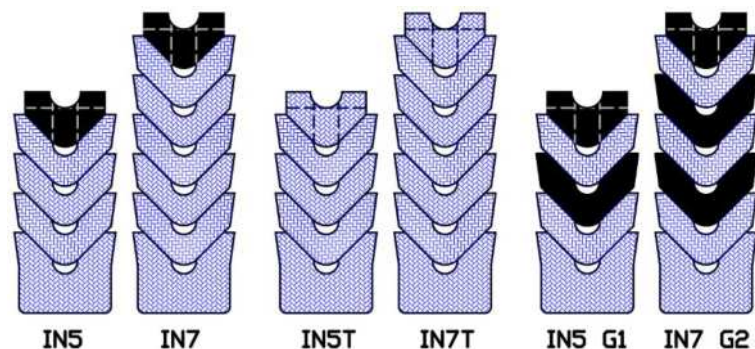
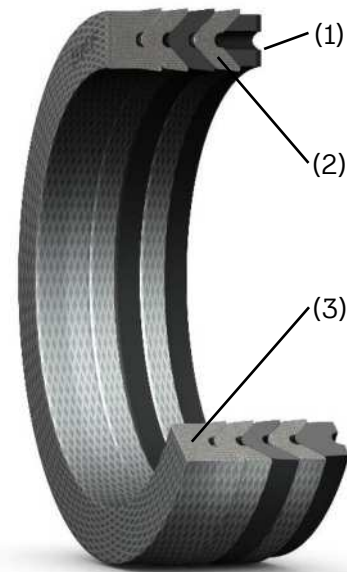
Another advantage of the packings is the opportunity to be used in split form, an essential requirement, where machine disassembling efforts or difficulties can create very, very high maintenance costs.

The IN ROD seal can handle an operating pressure up to 400 bar and a maximum surface speed of 0,5 m/s.

The number of V-shaped elements can vary according to the application requirements, generally from three to five in the rod seal design. Furthermore, the V-shaped elements or Chevrans are available made of rubber-fabric (as a standard; blue parts in image), but also made of rubber (grey parts in image)

In case of optimized sealing performance for lower pressures is required, the use of some intermediate rubber rings (grey parts in image) in the packing is recommended. The IN ROD design versions differ according to the material compounds used for the intermediate rings.

Standard sections of the IN ROD series are shown in the picture at the right-hand side: IN5, IN7, IN5T, IN7T, IN5 G1, IN7 G2, where the first number indicates the overall number of elements, and G1 respectively G2 means the amount of rubber Chevrans in the design. The extension T highlights the header or male ring made of rubber-fabric.



Exclusive features of IN ROD seals are:

- High pressure capability up to 400 bar
- Maximum surface speed of 0,5 m/s
- Flexible design according to application requirements
- Split design of all sealing elements to enable easy assembly
- Adjustable seal friction and tightness with adjustable housing
- Gland equipped with additional sealing functionality instead of pure support function

Possible size range for IN ROD seals: $\varnothing_{i_{min}} = 18 \text{ mm}$; $\varnothing_{e_{max}} = 2\,200 \text{ mm}$ (please also see the drawing at the next page)

Materials

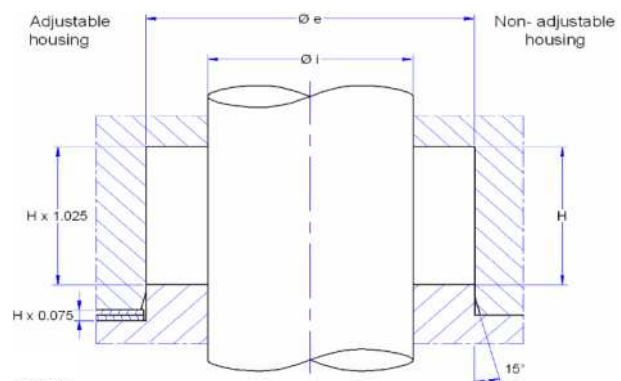
The IN ROD seals are made of fabric impregnated with nitrile compound in the standard version. The choice of materials depends on installation and working conditions. Standard materials available are shown in the table below.

Working temperature		Header ring	Intermediate	Gland ring
min	max		V-shaped rings	
°C	°C			
-30	+100	Tex / NBR	Tex / NBR NBR	Tex / NBR
-30	+150	Tex / HNBR	Tex / HNBR HNBR	Tex / HNBR
-15	+200	Tex / FKM	Tex / FKM FKM	Tex / FKM

Housing construction scheme for IN ROD

The drawing shows possible housing details of the housing for the IN ROD seal as adjustable version (left side) respectively non-adjustable version (right side).

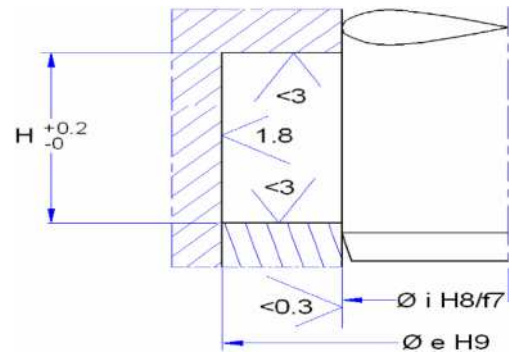
The adjustable housing offers the advantage of individual adjustment and minimum friction based on the use of gland shims and a proper calculation of the housing size H. After a long working period of the seal and recognizable wear, the original performance can be restored by adjusting the gland. For a correct housing height, it is recommended to increase H by 2,5 % and use gland shims for a total H of 7,5 %.



Particular applications or requirements different from those details shall be agreed with the TENUTE Technical Department / SKF Seals Application Engineering.

Housing tolerances and roughness

The drawing shows the housing size tolerances as well as the required housing roughness for the rod seal design.



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