

## TR/3/M/PTV

The TR/3/M/PTV seal is a rotary shaft seal based on the TR/3/M design and has been developed based on a close cooperation between TENUITE R&D, lab engineers and several important clients/users, who tested the seals on-site in their facilities.

The TR/3/M/PTV is characterized a flexible metal band, which is completely drowned in the sealing back, and a particularly robust lip with an exclusive antifriction band patented with the patent number PCT/EP2006/004962.



Similar to the TR/3/M, this version offers remarkable advantages compared to normal rotary shaft seals with a stiff metal insert. It can be installed without a retainer plate, and it does not shrink over time. However, in extreme cases, a retainer plate might be advisable.

Dimensions and tolerances are according to DIN 3760.

Maximum pressure capability is 0,5 bar.

Exclusive features of TR/3/M/PTV seals are:

- Antifriction material vulcanized during the process according to patent PCT/EP2006/004962
- Possibility of assembly without retainer plate
- Improved resistance to possible shaft misalignments
- Decreased radial force exerted on shaft
- Significantly reduced friction and temperature generated by friction
- Protected spring to avoid slipping/popping out from groove
- Reduced spring preload
- Absence of external metallic parts and consequent prevention of damages to housing bore

Possible size range for TR/3/M/PTV seals:  $\varnothing d_{\min} = 60 \text{ mm}$ ;  $\varnothing D_{\max} = 2\,350 \text{ mm}$  (please also see the drawing at the next page)

## Materials

The table below shows working temperature ranges (minimum, maximum, peak (\*)) applicable to each type of compound as well as possible spring configurations.

Material	Temperature		Standard spring	Special spring	Recommended circumferential shaft speed	Misalignment
	min	max				
	°C	°C (*)			m/s	
<b>NBR</b>	-30	+100 (+120)	Carbon steel	AISI 302	15	According to cross section
<b>HNBR</b>	-40	+150 (+175)	Carbon steel	AISI 302	23	
<b>FKM</b>	-20	+200 (+250)	AISI 302	AISI 316	30	

The PTFE compounds used for the TR/3/M/PTV coating design may vary depending on the applications demand. The table below shows the most used ones with the relative coefficients of friction. For more details, please contact the TENUTE Technical Department / SKF Seals Application Engineering.

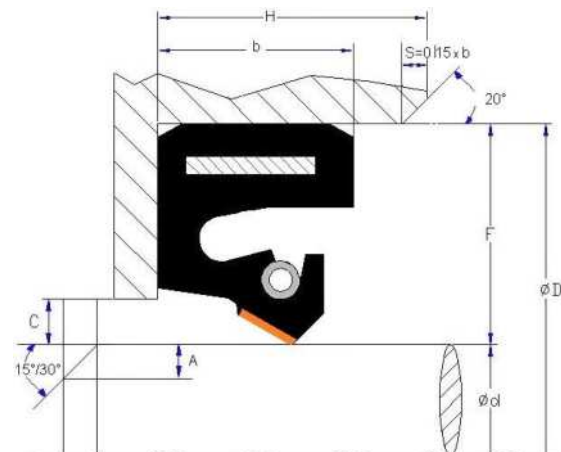
- 1\* ... PTFE with glass and molybdenum bisulfide
- 2\* ... PTFE with carbon and graphite
- 3\* ... PTFE with bronze
- 4\* ... PTFE with bronze and molybdenum bisulfide

Material	Coefficient of friction
PTFE Virgin	0,06
PTV / MoS <sub>2</sub> (1*)	0,08
PG (2*)	0,11
PB (3*)	0,13
PB / MoS <sub>2</sub> (4*)	0,13

## Assembly of TR/3/M/PTV seals

The drawing shows the details of the housing dimensions and the assembly of the TR/3/M/PTV seal in applications without pressure.

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



$$C_{\text{maximum}} = 0,2 \times F$$

## Shaft and housing diameter tolerance

Shaft diameter Ød		Tolerance	Housing diameter ØD		Tolerance
Over	Up to		Over	Up to	
mm	mm		mm	mm	
60	1 000	h11	80	1 600	H8
1 000	2 290	h10	1 600	2 350	+0,2 / 0

## Housing height tolerance and chamfers

Housing height			Shaft chamfer			Housing chamfer
b	H	Tolerance	Ød		A minimum	S
mm	mm	mm	Over mm	Up to mm	mm	
Up to 10	b + 0,3	+0,2 / 0	60	250	3	S = 0,15 x b
Over 10	b + 0,4	+0,3 / 0	250	800	4,5	
			800	1 500	6	
			1 500	2 290	7,5	

## Shaft and housing surface finishing

A roughness of Ra from 0,2 to 0,6 µm is recommended for the shaft in standard applications, while in case of high speeds, a finishing to Ra from 0,2 to 0,4 µm is recommended. Plunge grinding is required. For the housing bore a finish turning is sufficient.

## Shaft hardness

Up to 15 m/s	Over 15 m/s
40 HRC	60 HRC and above
PTFE PG (2*)	PTFE PB (3*)

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