

TR/VO/E/PTV

The TR/VO/E/PTV seal is an axial shaft seal and commonly used for the back-up rolls of hot and cold rolling mills.

The TR/VO/E/PTV seal is characterized by a particularly robust lip with an exclusive antifriction band patented with number PCT/EP2006/004962.



Due to the characteristics of the special antifriction compounds based on the self-lubricating PTFE properties, these seals offer significantly increased lifetime compared to any other traditional sealing elastomer.

Many tests performed in our own SKF / TENUTE laboratories as well as seal test on-site at customer facilities showed a significantly reduced lip wear and increased sealing performance on the long run.

The special design of the TR/VO/E/PTV seal enables improved axial sealing capability, especially under conditions, where traditional axial shaft seals have issues with the dimensional stability as well as the sealing performance in the long run.

The used components and materials are properly selected by our TENUTE Technical Department / SKF Seals Application Engineering according to the application demand and needs to be aligned prior to a quotation.

The assembling of the TR/VO/E/PTV is to be done at the outer diameter (please also see the assembly drawing at the next page).

Exclusive features of TR/VO/E/PTV seals are:

- Antifriction material vulcanized during the process according to patent PCT/EP2006/004962
- Significantly reduced friction and temperature generated by friction
- Axial sealing function
- Absence of external metallic parts and consequent prevention of damages to housing bore
- Assembly at the outer diameter of the housing bore
- Possibility of assembly without retainer plate

Possible size range for TR/VO/E/PTV seals: $\varnothing d_{\min} = 50 \text{ mm}$; $\varnothing D_{\max} = 1\,400 \text{ mm}$ (please also see the drawing at the next page)

Materials

The standard material for the TR/VO/E/PTV is nitril elastomer NBR, but for particular working conditions the seals also are available in hydrogenated nitril elastomer (HNBR), fluorocarbon elastomer (FKM) or silicone elastomer (VMQ) materials. Other combinations are available on request.

The table below shows working temperature ranges (minimum, maximum, peak (*)) applicable to each type of compound. The standard metal reinforcement is made of carbon steel.

Material	Temperature		Recommended circumferential shaft speed max
	min	max	
	°C	°C (*)	m/s
NBR	-30	+100 (+120)	60 – 90
HNBR	-40	+150 (+175)	130
VMQ	-50	+200 (+250)	130
FKM	-20	+200 (+250)	130

The PTFE compounds used for the TR/VO/E/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.

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

1* ... PTFE with glass and molybdenum bisulfide

2* ... PTFE with carbon and graphite

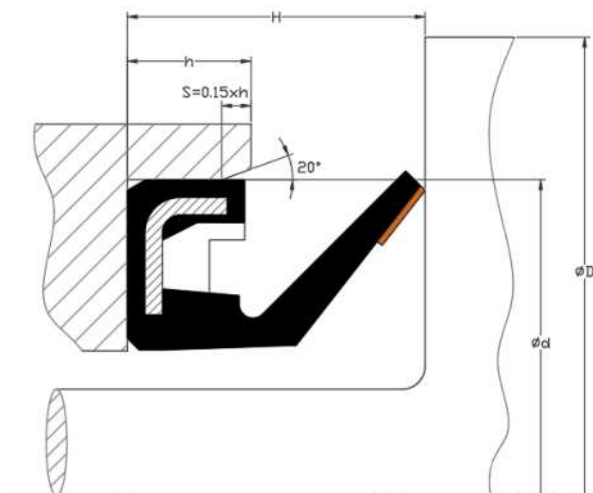
3* ... PTFE with bronze

4* ... PTFE with bronze and molybdenum bisulfide

Assembly of TR/VO/E/PTV

The drawing shows the details of the housing dimensions and the assembly of the TR/VO/E/PTV seal.

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



Housing outer diameter tolerance

Housing diameter Ød		Tolerance
Over	Up to	
mm	mm	
50	1 400	H8

Housing tolerance and chamfers

Housing height h – Tolerance	Working height H – Tolerance	Housing chamfer S
mm		
0 / +0,3	According to the axial movement	S = 0,15 x h

Sliding 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.

Sliding surface hardness and PTFE compound

Up to 90 m/s	Up to 130 m/s
50 HRC	60 HRC and above
PTFE PG (2*)	PTFE PB (3*)

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