

TR/3/CS/PTV

The TR/3/CS/PTV seal is a rotary shaft seal provided with a circumferential groove and radial ports for lubrication, that enables a back-to-back arrangement in applications with aggressive environments, such as roll necks in hot and cold rolling mills.

The TR/3/CS/PTV seal is characterized by a solid back and a particularly robust lip with an exclusive antifriction band patented with number PCT/EP2006/004962.



Assembly of two TR/3/CS/PTV seals in back-to-back arrangement, one facing the bearing, the other facing outboard, prevent from lubricant leakages and penetration of water, scales, and other contaminants.

The TR/3/CS/PTV seals can fit in housing bores provided with ducts for a proper lubrication of the sealing. Dimensions and tolerances are according to DIN 3760.

The use of up-to-date materials together with an improved seal design, enables enhanced performance with reduced maintenance interventions.

The TR/3/CS/PTV solid back and lip area provide a good flexibility, to compensate shaft misalignment and a maximum pressure of 0,5 bar.

The standard TR/3/CS/PTV seal back is made of high resistance cotton fabric combined with a nitrile elastomer (NBR) loaded with PTFE, in lip and body areas.

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

- Possibility for back-to-back arrangement in aggressive environments
- Antifriction material vulcanized during the process according to patent PCT/EP2006/004962
- Significantly reduced friction and temperature generated by friction
- Improved resistance to possible shaft misalignments
- Decreased radial force exerted on shaft
- Reduced friction and consequent temperature decrease
- 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

The TR/3/CS/PTV is also available as split version (TR/3/CS/PTV/SPLIT) enabling easier assembly (no pressure applicable) in applications, where it would be difficult or even impossible to use an endless design. Both solutions, TR/3/CS/PTV endless and TR/3/CS/SPLIT, require a retainer plate for a correct operation. There is also the possibility of gluing the TR/3/CS/PTV/SPLIT large diameter seals, using cold or hot gluing processes.

Possible size range for TR/3/CS/PTV seals: $\varnothing d_{\min} = 15 \text{ mm}$; $\varnothing D_{\max} = 2\,530 \text{ mm}$ (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	
NBR	-30	+100 (+120)	Carbon steel	AISI 302	15	According to cross section
HNBR	-40	+150 (+175)	Carbon steel	AISI 302	23	
FKM	-20	+200 (+250)	AISI 302	AISI 316	30	

The PTFE compounds used for the TR/3/CS/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 TENUITE 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 ₂ (1*)	0,08
PG (2*)	0,11
PB (3*)	0,13
PB / MoS ₂ (4*)	0,13

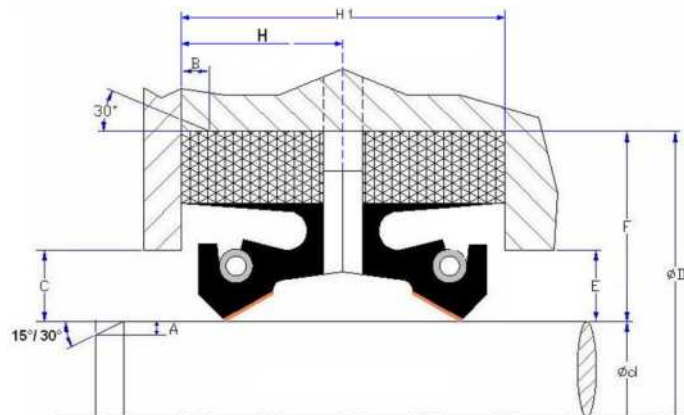
Assembly of TR/3/CS/PTV seals

The drawing shows the details of the housing dimensions and the assembly of the TR/3/CS/PTV seal in a back-to-back arrangement.

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

$$C_{\text{maximum}} = 0,5 \times F$$

$$E_{\text{maximum}} = 0,5 \times F$$



Shaft and housing diameter tolerance

Shaft diameter Ød		Tolerance	Housing diameter ØD		Tolerance
Over	Up to		Over	Up to	
mm	mm		mm	mm	
15	1 000	h11	30	1 000	H10
1 000	2 480	h10	1 000	2 530	H9

Housing height tolerance

Housing height H1	Tolerance
mm	mm
Up to 15	+0 / -0,1
Over 15	+0,1 / -0,1

Shaft and housing chamfers

Shaft diameter Ød		Shaft chamfer A	Housing diameter ØD		Housing chamfers	
Over	Up to	minimum	Over	Up to	H	B
mm	mm	mm	mm	mm	mm	mm
15	50	1,5	30	50	10	1
50	250	3	50	250	15	1,5
250	800	4,5	250	800	20	2
800	1 500	6	800	1 500	30	3
1 500	2 480	7,5	1 500	2 530	40	4

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 and PTFE compound

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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