

## TR/3/CS

The TR/3/CS 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.

Assembly of two TR/3/CS 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 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 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 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 seals are:

- Possibility for back-to-back arrangement in aggressive environments
- 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 is also available as split version (TR/3/CS/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 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/SPLIT large diameter seals, using cold or hot gluing processes.

Possible size range for TR/3/CS seals:  $\varnothing d_{\min} = 15 \text{ mm}$ ;  $\varnothing D_{\max} = 2\,530 \text{ mm}$  (please also see the drawing at the next page)

## Materials

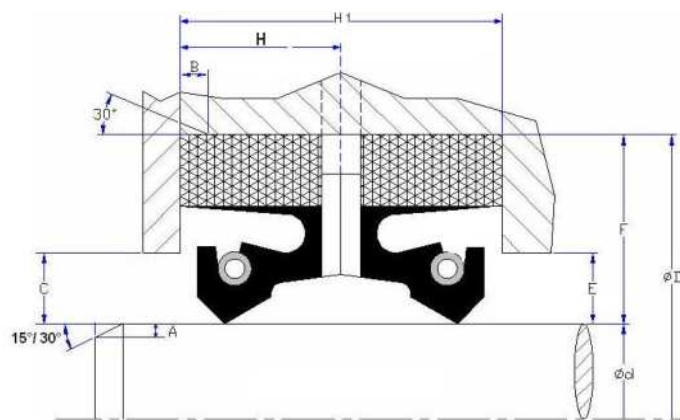
The table below shows working temperature ranges (minimum, maximum, peak (\*)) applicable to each type of compound as well as possible spring configurations.

Material	Temperature		Standard spring	Special spring	Recommended circumferential shaft speed	Misalignment
	min	max				
	°C	°C (*)				
<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	20	
<b>FKM</b>	-20	+200 (+250)	AISI 302	AISI 316	25	

## Assembly of TR/3/CS seals

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

Particular applications or requirements different from those details shall be agreed with the TENUTE 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

Up to 15 m/s	Over 15 m/s
40 HRC	50 HRC and above

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