

# S-97NS series

Rotary shaft seals DIN 3760



## ENGLISH

Radial rotary shaft seals serve to seal rotating machine components. They mainly consist of a rubber part with a reinforcement plate and a worm spring made of spring steel. Depending on the intended use, there are three basic types: the standard construction forms A, B and C.

**Materials:**  
NBR (72° Shore A)

**Temperature range:**  
-30°C to +100°C

**Running speed:**  
Max. 14 m/s

**Optional:**  
Material FKM (-20°C to +200°C, running speed max 37 m/s)

**Special requirements that need special models:**

- high housing roughness,
- high housing thermal expansion,
- resistant to pressure,
- synthetic oils with special additives,
- aggressive media

## NEDERLANDS

Radiale asafdichtingen dienen voor afdichting van ronddraaiende machineonderdelen. Zij bestaan hoofdzakelijk uit een rubberen element, een verstijvingsplaat en een wormveer van veerstaal. Afhankelijk van de toepassing zijn er drie basistypen: de standaardvormen A, B en C.

**Materialen:**  
NBR (72° Shore A)

**Temperatuurbereik:**  
-30°C tot +100°C

**Loopsnelheid:**  
max. 14 m/s

**Optioneel:**  
Materiaal FKM (-20° tot +200°, loopsnelheid max. 37 m/s)

**Bijzondere eisen aan speciale ontwerpen:**

- Hoge ruwheid van behuizing,
- Hoge thermische uitzetting van behuizing,
- Drukbestendig,
- Synthetische oliën met bijzondere additieven,
- Agressieve media

## DEUTSCH

Radial-Wellendichtringe dienen zur Abdichtung an rotierenden Maschinenteilen. Sie bestehen im wesentlichen aus einem Gummitteil, einem Versteifungsblech und einer Wurmfeder aus Federstahl. Je nach Verwendungszweck werden drei verschiedene Grundtypen unterschieden: die Standardbauformen A, B und C.

**Werkstoffe:**  
NBR (72° Shore A)

**Temperaturbereich:**  
-30°C bis +100°C

**Laufgeschwindigkeit:**  
max. 14 m/s

**Optional:**  
Werkstoff FKM (-20°C bis +200°C, Laufgeschwindigkeit max. 37 m/s)

**Besondere Anforderungen, die Sonderbauformen erfordern:**

- Hohe Rauigkeit des Gehäuses,
- Hohe Wärmeausdehnung des Gehäuses,
- Dichtigkeit gegen Druck,
- Synthetische Öle mit besonderen Additiven,
- Aggressive Medien

## FRANÇAIS

Les joints d'étanchéité d'arbres radiaux servent à l'étanchéisation de pièces de machine tournantes. Ils sont composés d'une pièce en caoutchouc, d'une tôle de renforcement et d'un ressort hélicoïdal en acier à ressorts. Il existe trois types différents, en fonction de l'usage prévu: les fabrications standards A, B et C.

**Matériaux:**  
NBR (72° Shore A)

**Plage de température:**  
-30°C à +100°C

**Vitesse de fonctionnement:**  
max. 14 m/s

**En option:**  
Matériau FKM (-20°C à +200°C, vitesse de fonctionnement max. 37 m/s)

**Exigences spécifiques nécessitant des formes spéciales:**

- Grande rugosité du boîtier
- Grande dilatation thermique du boîtier
- Étanchéité à la pression
- Huiles synthétiques avec additifs spéciaux
- Fluides agressifs

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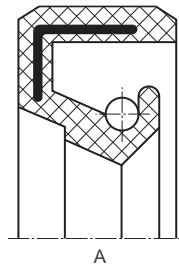
Rotary shaft seals DIN 3760

## Design shapes and descriptions

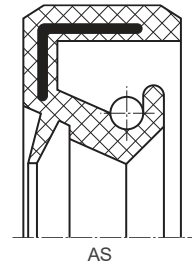
**A** (commonly used market designations: BA, (TR)A, CB, 827N, DG, SC, WA) /

**AS** (commonly used market designations: BA SL, (TR)E, CC, 827S, DGS, TC, WAS):

The rubber-elastic external jacket can bridge the gap between thermal expansion and a high degree of roughness in the housing hole. There is no frictional corrosion. Changing the seal frequently prevents damage to the housing hole. Is suited for sealing gaseous or low-viscosity media. The design AS is provided with additional dust lip to safeguard against dirt and corrosion.



A

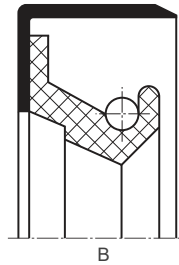


AS

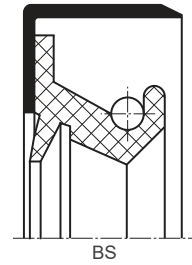
**B** (commonly used market designations: B1, (TR)C, BB, 822N, DF, SB, WB) /

**BS** (commonly used market designations: B1 SL, (TR)D, BC, 822S, DFS, TB, WBS):

Metallic housing, press in slightly during installation. Requires narrower tolerances of the housing hole, to ensure a seal even at the outer casing. BS design with an additional dust lip against dirt and risk of corrosion.



B

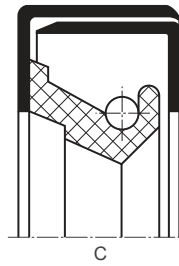


BS

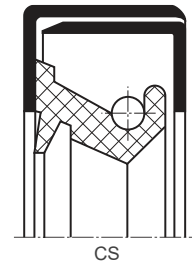
**C** (commonly used market designations: B2, (TR)B, DB, 824N, DFK, SA, WC) /

**CS** (commonly used market designations: B2 SL, (TR)F, DC, 824S, DFSK, TA, WCS):

Metallic housing with reinforcing cap. Sealing and assembly as design B. Used in preference in harsh operating conditions and for larger dimensions. Is less sensitive to assembly errors due to the reinforcing cap. CS design with additional dust lip against dirt and risk of corrosion.



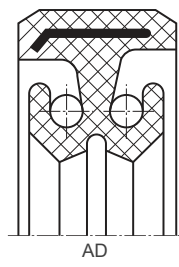
C



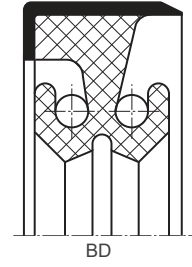
CS

**AD / BD** (not shown in the tables):

The designs AD or BD with two sealing lips are used to seal and separate two media.



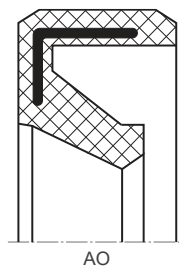
AD



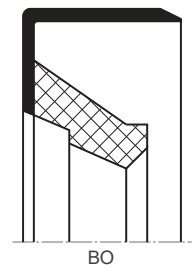
BD

**AO / BO** (not shown in the tables):

The designs AO and BO are designed without the garter springs. They are designed only for minor seal cases.



AO



BO

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## Rotary Shaft Seals

**Surface hardness of the shaft:**

The hardness of the shaft running surface should be at least 45 HRC. In the case of contaminated media or dirt from outside as well as circumferential speeds ABOVE 4 m/s, the hardness should be at least 55 HRC. The surface hardness should show at least 0.3 mm hardness penetration.

**Shaft runout:**

Concentricity deviation (runout) of the shaft should be kept within small limits. Otherwise, there is a risk that the sealing lip edge will not be able to follow the shaft due to its inertia and that leakage will occur, especially at high speeds. It is advisable to arrange the oil seal in the immediate vicinity of the bearing and to keep the bearing clearance as small as possible in order to achieve good concentricity.

**Locating bore FOR oil seals (housing):**

For the bore diameter (outer Ø), the ISO tolerance field "H8" with a maximum surface roughness depth of 16 µm must be provided. The location hole should be chamfered by approximately 5° to 10° for mounting.

**Guidelines FOR the installation of shaft seals:**

DIN guidelines must be applied when installing shaft seals. The sealing lips MUST always face the side to be sealed and be exposed (MUST NOT be jammed). The running surfaces FOR sealing lips MUST be smooth and MUST not show any damage (see also notes under shaft condition). Shaft seals MUST be installed centrally and vertically, they MUST not be installed in the direction of the axis with any tension, and they MUST not be used to transmit forces.

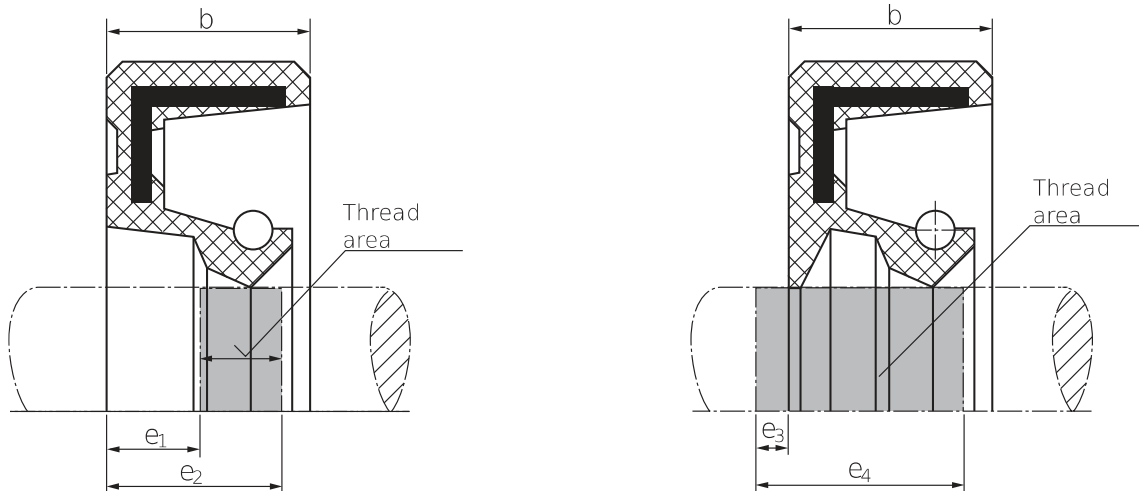
**Shaft condition:**

The ISO tolerance field "h11" must be provided for the shaft diameter in the area of the running surface. The sealing lip must not be damaged during installation.

**Installation of the shaft:** Rounding of the shaft with 1mm radius or chamfering of the shaft according to DIN.

**Surface of the shaft:** To ensure a seal between the shaft seal and the shaft, the shaft must not have a roughness of may have a peak-to-valley height Rt of 1 to max. 4 µm in the running surface area. Machining of the shaft must not leave any swirl orientation on the surface, as "conveying action" would result in leakage.

b	Tread area at			
	Sealing lip		Sealing lip & protective lip	
	e <sub>1</sub>	e <sub>2</sub> min	e <sub>3</sub>	e <sub>4</sub> min
7	3.5	6.1	1.5	7.6
8	3.5	6.8	1.5	8.3
10	4.5	8.5	2.0	10.5
12	5.0	10.0	2.0	12.0
15	6.0	12.0	3.0	15.0
20	9.0	16.5	3.0	19.5



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## Chemical and thermal resistance

Material	Low temperature	Media to be sealed												
		Mineral oil based media							Flame retardant pressure fluids			Other media		
		Engine oils	Gear oils	Hypoid gear oils	ATF oils	Pressure fluids (see VDMA 24318)	EL and L fuel oils	Fat	HSB Water-oil emulsions	HSC aqueous solutions	HSD anhydrous liquids	Water	Washing liquors	Brake fluids
°C	Permissible continuous temperatures of the medium in °C													
NBR	-40	100	80	80	100	90	90	90	70	70	---	90	90	---
FKM	-30	170	150	150	170	150	150	•	•	•	150	99	99	•

The values in the table represent a guideline, with the media grouped together. A • means that within this media group there are media which can be sealed by the elastomer, but there are also known media which can damage the elastomer.