

# INVERTED SHAFT SEALS

## OVBC

### DESCRIPTION

The OVBC profile is an inverted shaft seal composed of a single internal metal cage with a rubber coating covering half of the outside of the cage and a primary sealing lip without spring.

### ADVANTAGES

- Good radial rigidity, particularly for large diameters
- Good stability when assembled, preventing the bounce-back effect
- Good static sealing
- Good thermal expansion compensation
- Good heat transfer
- Sealing for high viscosity fluids
- Primary sealing lip generating low levels of friction and heat

### APPLICATIONS

- All types of rotative applications
- Rotating hubs
- Fixed shafts

### MATERIALS

#### Rubber

- ACM 70 - 75 Shore A
- EPDM 70 - 75 Shore A
- FKM 70 - 75 Shore A
- HNBR 70 - 75 Shore A
- NBR 70 - 75 Shore A

#### Metal cage

- Steel - AISI 1010
- Stainless steel - AISI 304
- Stainless steel - AISI 316

### SEAL DESIGN

#### Tolerance for the inside diameter of the seal (Ød)

Shaft diameter Ød1 (mm)	Apparent metal cage	Rubber coating	Coating with grooves
Ød1 ≤ 50.0	-0.20 / -0.10	-0.30 / -0.15	-0.40 / -0.20
50.0 < Ød1 ≤ 80.0	-0.23 / -0.13	-0.35 / -0.20	-0.45 / -0.25
80.0 < Ød1 ≤ 120.0	-0.25 / -0.15	-0.35 / -0.20	-0.45 / -0.25
120.0 < Ød1 ≤ 180.0	-0.28 / -0.18	-0.45 / -0.25	-0.55 / -0.30
180.0 < Ød1 ≤ 300.0	-0.30 / -0.20	-0.45 / -0.25	-0.55 / -0.30
300.0 < Ød1 ≤ 500.0	-0.35 / -0.23	-0.55 / -0.30	-0.65 / -0.35

#### Roundness tolerance

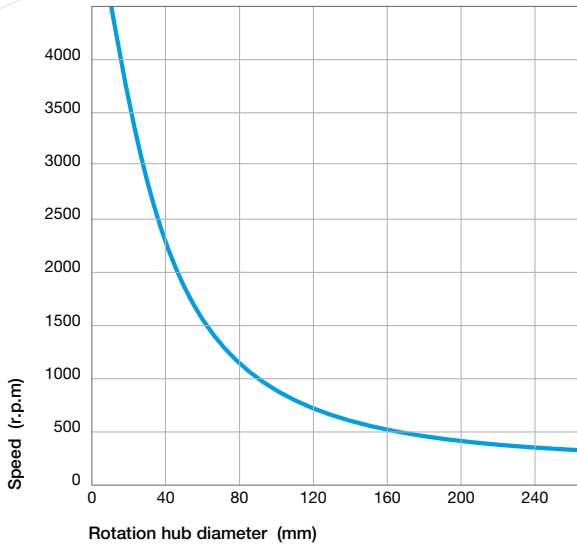
Shaft diameter Ød1 (mm)	Apparent metal cage	Rubber coating
Ød1 ≤ 50.0	0.18	0.25
50.0 < Ød1 ≤ 80.0	0.25	0.35
80.0 < Ød1 ≤ 120.0	0.30	0.50
120.0 < Ød1 ≤ 180.0	0.40	0.65
180.0 < Ød1 ≤ 300.0	0.25% of the inside diameter	0.80
300.0 < Ød1 ≤ 500.0	0.25% of the inside diameter	1.00

#### Tolerance for the outside diameter of the seal (ØD)

Free and without constraint, the outside diameter of the sealing lip is always bigger than the diameter of the rotating hub. The pre-tightening or interference denotes the difference between these two values. Depending on the hub diameter, the diameter of the sealing lip is generally considered to be greater, between 0.8 and 3.5 mm.

**TECHNICAL DATA**

**Speed**



Linear speed calculation:

$$s \text{ (m/s)} = \frac{\text{rotating hub } \varnothing \text{ (mm)} \times \text{speed (rpm)} \times \pi}{60,000}$$

**Pressure**

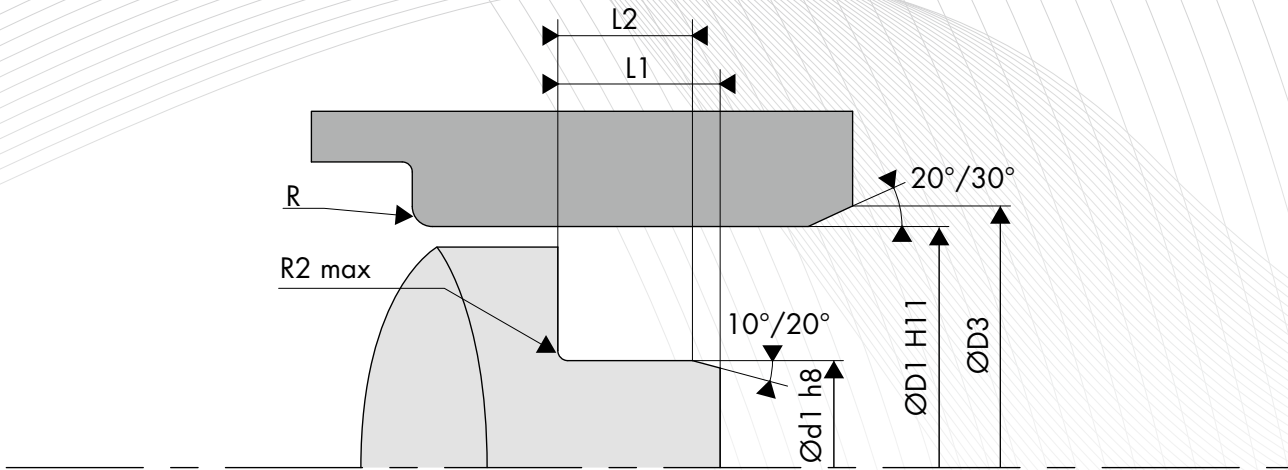
**Inverted shaft seals with a primary sealing lip and no spring are used only in pressurised environments.**

We recommend using inverted shaft seals with springs for use in pressurised environments between 0.02 and 0.05 MPa (max).

**Temperature / Media**

Media		Maximum temperature depending on the materials						
		ACM	AEM	EPDM	FKM	HNBR	NBR	VMQ
Mineral oils	Oils for motors	+130°C	+130°C	-	+170°C	+130°C	+100°C	+150°C
	Oils for gearboxes	+120°C	+130°C	-	+150°C	+110°C	+80°C	+130°C
	Oils for hypoid gears	+120°C	+130°C	-	+150°C	+110°C	+80°C	-
	ATF oils	+120°C	+130°C	-	+170°C	+130°C	+100°C	-
	Hydraulic oils	+120°C	+130°C	-	+150°C	+130°C	+90°C	-
	Greases	-	+130°C	-	-	+100°C	+90°C	-
Fire-resistant fluids	HFA group - Emulsion with more than 80% water	-	-	-	-	+70°C	+70°C	+60°C
	HFB group - Opposite solution (water in oil)	-	-	-	-	+70°C	+70°C	+60°C
	HFC group - Polymer aqueous solution	-	-	+60°C	-	+70°C	+70°C	-
	HFD group - Water-free synthetic fluids	-	-	-	+150°C	-	-	-
Other fluids	EL + L heating oil	-	-	-	-	+100°C	+90°C	-
	Air	+150°C	+150°C	+150°C	+200°C	+130°C	+100°C	+200°C
	Water	-	-	+150°C	+100°C	+100°C	+90°C	-
	Water for washing	-	-	+130°C	+100°C	+100°C	+90°C	-
Temperature range	Min.	-25°C	-40°C	-45°C	-20°C	-30°C	-30°C	-60°C
	Max.	+150°C	+150°C	+150°C	+200°C	+150°C	+100°C	+200°C





## ○ ROTATING HUB DESIGN

### Rotating hub hardness

Rotation speed	Hardness in HRC
$s \leq 4.0$ m/sec	45 HRC
$4.0 < s \leq 10.0$ m/s	55 HRC
$s > 10.0$ m/sec	60 HRC

### Surface roughness

Ra *	0.2 to 0.8 $\mu\text{m}$
Rz	1.0 to 4.0 $\mu\text{m}$
Rmax	$\leq 6.3$ $\mu\text{m}$

\*Ra = 0.1  $\mu\text{m}$  for demanding applications

### Rotating hub tolerance

Rotating hub diameter $\text{ØD1}$ (mm)	Tolerance H11 (mm)
$3.0 < \text{ØD1} \leq 6.0$	0 / +0.075
$6.0 < \text{ØD1} \leq 10.0$	0 / +0.090
$10.0 < \text{ØD1} \leq 18.0$	0 / +0.110
$18.0 < \text{ØD1} \leq 30.0$	0 / +0.130
$30.0 < \text{ØD1} \leq 50.0$	0 / +0.160
$50.0 < \text{ØD1} \leq 80.0$	0 / +0.190
$80.0 < \text{ØD1} \leq 120.0$	0 / +0.220
$120.0 < \text{ØD1} \leq 180.0$	0 / +0.250
$180.0 < \text{ØD1} \leq 250.0$	0 / +0.290
$250.0 < \text{ØD1} \leq 315.0$	0 / +0.320
$315.0 < \text{ØD1} \leq 400.0$	0 / +0.360
$400.0 < \text{ØD1} \leq 500.0$	0 / +0.400

### Chamfer and radius

Rotating hub diameter $\text{ØD1}$ (mm)	Chamfer diameter $\text{ØD3}$ (mm)	Radius R (mm)
$\text{ØD1} \leq 10.0$	$\text{ØD1} + 1.50$	2.00
$10.0 < \text{ØD1} \leq 20.0$	$\text{ØD1} + 2.00$	2.00
$20.0 < \text{ØD1} \leq 30.0$	$\text{ØD1} + 2.50$	3.00
$30.0 < \text{ØD1} \leq 40.0$	$\text{ØD1} + 3.00$	3.00
$40.0 < \text{ØD1} \leq 50.0$	$\text{ØD1} + 3.50$	4.00
$50.0 < \text{ØD1} \leq 70.0$	$\text{ØD1} + 4.00$	4.00
$70.0 < \text{ØD1} \leq 95.0$	$\text{ØD1} + 4.50$	5.00
$95.0 < \text{ØD1} \leq 130.0$	$\text{ØD1} + 5.50$	6.00
$130.0 < \text{ØD1} \leq 240.0$	$\text{ØD1} + 7.00$	8.00
$240.0 < \text{ØD1} \leq 500.0$	$\text{ØD1} + 11.00$	12.00

### Rotating hub run out and eccentricity

