

SHAFT SEALS WITH PTFE COATING

SBJ



DESCRIPTION

The SBJ profile is a shaft seal composed of a single external metal cage with an inner rubber coating, PTFE-coated single sealing lip and integrated spring.

ADVANTAGES

Good radial rigidity, particularly for large diameters

Good stability when assembled, preventing the bounce-back effect

Waterproofing for low and high viscosity fluids, and for environments with little lubrication

Modern primary sealing lip with low radial forces

Bonded PTFE tape for a low friction coefficient that tolerates greater speeds

APPLICATIONS

All types of rotative applications

Machine tools Transmissions
Agriculture Automotive
Construction Military

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
Filled PTFE

Lip adhesion

PTFE

Metal cage

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

Spring

Steel - AISI 1070 - 1090
Stainless steel - AISI 316

SEAL DESIGN

Tolerance for the outside diameter of the seal (ØD)

| Bore diameter ØD1 (mm) | Apparent metal cage | Rubber coating | Coating with grooves |
|------------------------|---------------------|----------------|----------------------|
| ØD1 ≤ 50.0 | +0.10 / +0.20 | +0.15 / +0.30 | +0.20 / +0.40 |
| 50.0 < ØD1 ≤ 80.0 | +0.13 / +0.23 | +0.20 / +0.35 | +0.25 / +0.45 |
| 80.0 < ØD1 ≤ 120.0 | +0.15 / +0.25 | +0.20 / +0.35 | +0.25 / +0.45 |
| 120.0 < ØD1 ≤ 180.0 | +0.18 / +0.28 | +0.25 / +0.45 | +0.30 / +0.55 |
| 180.0 < ØD1 ≤ 300.0 | +0.20 / +0.30 | +0.25 / +0.45 | +0.30 / +0.55 |
| 300.0 < ØD1 ≤ 500.0 | +0.23 / +0.35 | +0.30 / +0.55 | +0.35 / +0.65 |
| 500.0 < ØD1 ≤ 630.0 | +0.23 / +0.35 | +0.35 / +0.65 | +0.40 / +0.75 |

Roundness tolerance

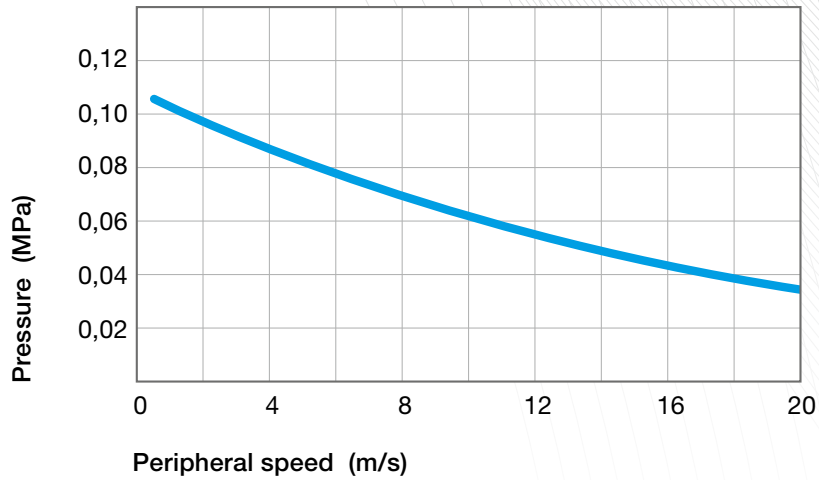
| Bore diameter ØD1 (mm) | Apparent metal cage | Rubber coating |
|------------------------|-------------------------------|----------------|
| ØD1 ≤ 50.0 | 0.18 | 0.25 |
| 50.0 < ØD1 ≤ 80.0 | 0.25 | 0.35 |
| 80.0 < ØD1 ≤ 120.0 | 0.30 | 0.50 |
| 120.0 < ØD1 ≤ 180.0 | 0.40 | 0.65 |
| 180.0 < ØD1 ≤ 300.0 | 0.25% of the outside diameter | 0.80 |
| 300.0 < ØD1 ≤ 500.0 | 0.25% of the outside diameter | 1.00 |
| 500.0 < ØD1 ≤ 630.0 | - | - |

Tolerance for the inside diameter of the seal (Ød)

Free and without constraint, the inside diameter of the sealing lip is always smaller than the diameter of the shaft. The pre-tightening or interference denotes the difference between these two values. Depending on the shaft diameter, the diameter of the sealing lip is generally considered to be less, between 0.8 and 3.5 mm.

TECHNICAL DATA

Speed / Pressure ratio



Linear speed calculation:

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

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 |



SHAFT DESIGN

Shaft 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 | 0.1 to 0.4 μm |
| Rz | 1.0 to 4.0 μm |
| Rmax | ≤ 6.3 μm |

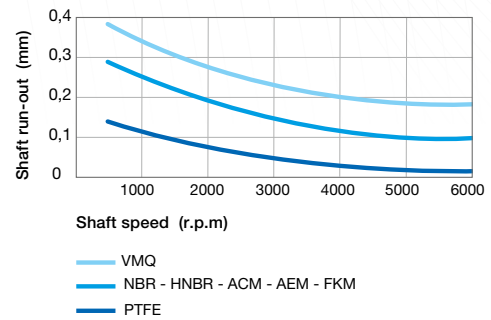
Shaft tolerance

| Shaft diameter $\varnothing d1$ (mm) | Tolerance h11 (mm) |
|---|-----------------------|
| $\varnothing d1 \leq 3.0$ | -0.060 / 0 |
| $3.0 < \varnothing d1 \leq 6.0$ | -0.075 / 0 |
| $6.0 < \varnothing d1 \leq 10.0$ | -0.090 / 0 |
| $10.0 < \varnothing d1 \leq 18.0$ | -0.110 / 0 |
| $18.0 < \varnothing d1 \leq 30.0$ | -0.130 / 0 |
| $30.0 < \varnothing d1 \leq 50.0$ | -0.160 / 0 |
| $50.0 < \varnothing d1 \leq 80.0$ | -0.190 / 0 |
| $80.0 < \varnothing d1 \leq 120.0$ | -0.220 / 0 |
| $120.0 < \varnothing d1 \leq 180.0$ | -0.250 / 0 |
| $180.0 < \varnothing d1 \leq 250.0$ | -0.290 / 0 |
| $250.0 < \varnothing d1 \leq 315.0$ | -0.320 / 0 |
| $315.0 < \varnothing d1 \leq 400.0$ | -0.360 / 0 |
| $400.0 < \varnothing d1 \leq 500.0$ | -0.400 / 0 |

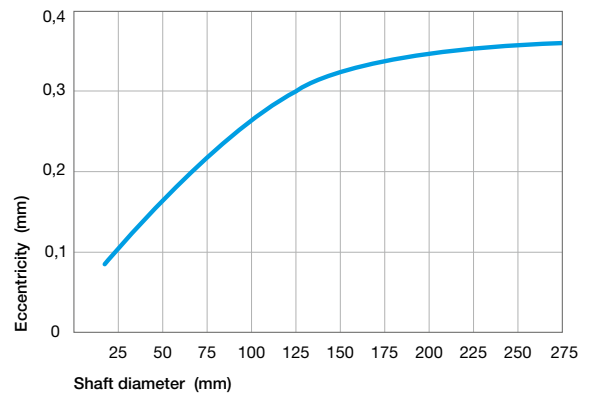
Chamfer and radius

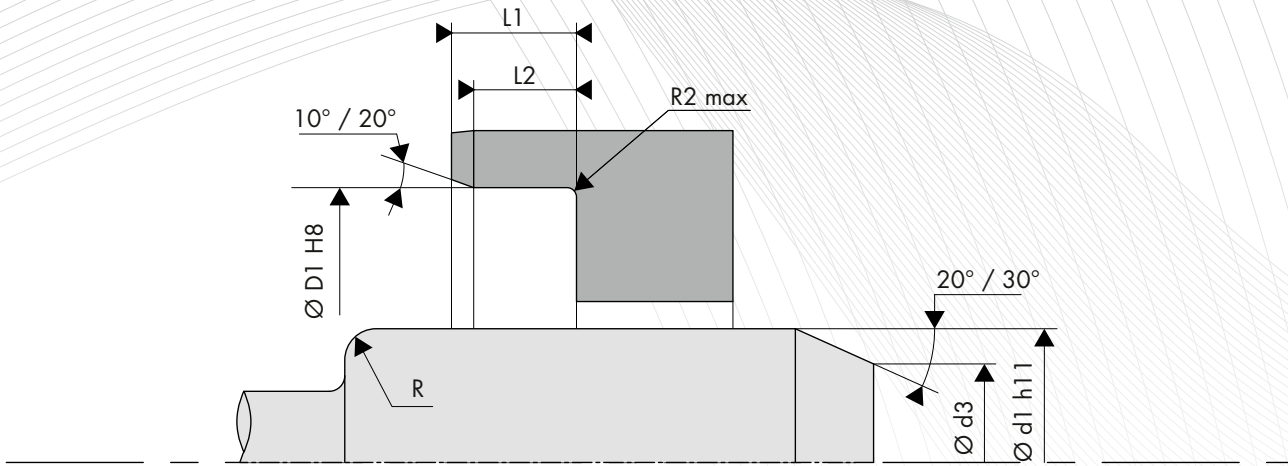
| Shaft diameter $\varnothing d1$ (mm) | Chamfer diameter $\varnothing d3$ (mm) | Radius R (mm) |
|---|---|------------------|
| $\varnothing d1 \leq 10.0$ | $\varnothing d1 - 1.50$ | 2.00 |
| $10.0 < \varnothing d1 \leq 20.0$ | $\varnothing d1 - 2.00$ | 2.00 |
| $20.0 < \varnothing d1 \leq 30.0$ | $\varnothing d1 - 2.50$ | 3.00 |
| $30.0 < \varnothing d1 \leq 40.0$ | $\varnothing d1 - 3.00$ | 3.00 |
| $40.0 < \varnothing d1 \leq 50.0$ | $\varnothing d1 - 3.50$ | 4.00 |
| $50.0 < \varnothing d1 \leq 70.0$ | $\varnothing d1 - 4.00$ | 4.00 |
| $70.0 < \varnothing d1 \leq 95.0$ | $\varnothing d1 - 4.50$ | 5.00 |
| $95.0 < \varnothing d1 \leq 130.0$ | $\varnothing d1 - 5.50$ | 6.00 |
| $130.0 < \varnothing d1 \leq 240.0$ | $\varnothing d1 - 7.00$ | 8.00 |
| $240.0 < \varnothing d1 \leq 500.0$ | $\varnothing d1 - 11.00$ | 12.00 |

Shaft run out



Eccentricity





HOUSING DESIGN

Surface roughness

| | |
|------|----------------|
| Ra | 0.8 to 3.2 µm |
| Rz | 6.3 to 16.0 µm |
| Rmax | ≤16.0 µm |

Housing tolerance

| Bore diameter ØD1 (mm) | Tolerance H8 (mm) |
|---------------------------|----------------------|
| 3.0 < ØD1 ≤ 6.0 | 0 / +0.018 |
| 6.0 < ØD1 ≤ 10.0 | 0 / +0.022 |
| 10.0 < ØD1 ≤ 18.0 | 0 / +0.027 |
| 18.0 < ØD1 ≤ 30.0 | 0 / +0.033 |
| 30.0 < ØD1 ≤ 50.0 | 0 / +0.039 |
| 50.0 < ØD1 ≤ 80.0 | 0 / +0.046 |
| 80.0 < ØD1 ≤ 120.0 | 0 / +0.054 |
| 120.0 < ØD1 ≤ 180.0 | 0 / +0.063 |
| 180.0 < ØD1 ≤ 250.0 | 0 / +0.072 |
| 250.0 < ØD1 ≤ 315.0 | 0 / +0.081 |
| 315.0 < ØD1 ≤ 400.0 | 0 / +0.089 |
| 400.0 < ØD1 ≤ 500.0 | 0 / +0.097 |
| 500.0 < ØD1 ≤ 630.0 | 0 / +0.110 |

Housing radius and width

| Height H1 (mm) | Width | | Radius R2 max (mm) |
|-------------------|----------------------|----------------------|-----------------------|
| | L2min (H1 x 0.85) | L1min (H1 x +0.3) | |
| 7.00 | 5.95 | 7.30 | 0.50 |
| 8.00 | 6.80 | 8.30 | |
| 10.00 | 8.50 | 10.30 | |
| 12.00 | 10.30 | 12.30 | 0.70 |
| 15.00 | 12.75 | 15.30 | |
| 20.00 | 17.00 | 20.30 | |