

HIGH-PRESSURE SHAFT SEALS DCWHP



DESCRIPTION

The DCWHP profile is a high-pressure shaft seal composed of a single metal cage with rubber grooves on the outside of the cage and a double primary sealing lip with integrated springs to separate fluids.

ADVANTAGES

Very good static sealing

Very good thermal expansion compensation

Greater roughness is allowed in the housing

Reduced risk of corrosion

Easy to assemble with very limited bounce-back effect

Sealing for low and high viscosity fluids

Sealing lips designed for higher pressures up to 1 MPa

Fluid separation system

APPLICATIONS

All types of rotative applications

2-stroke engines

Hydrostatic commands (motors and pumps)

MATERIALS

Rubber

FKM 75 - 80 - 85 - 90 Shore A
HNBR 75 - 80 - 85 - 90 Shore A
NBR 75 - 80 - 85 - 90 Shore A

Metal cage

Steel - AISI 1010

Spring

Steel - AISI 1070 - 1090

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.

Pumping leads

Clockwise	Anti-clockwise	Bi-directional
R	L	H0

Other types of pumping leads can be created according to your specifications. Please contact our experts.

TECHNICAL DATA

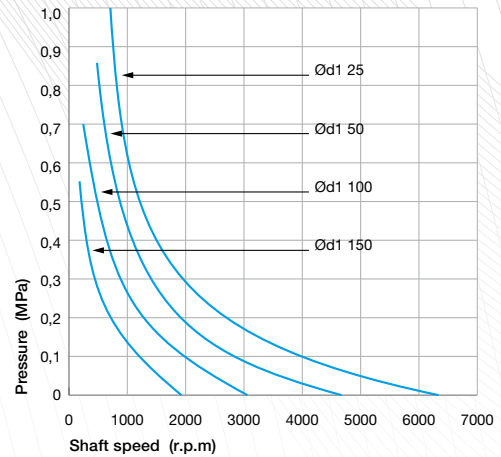
Speed - Pressure

Raised pressures generate a disturbance in the hydrodynamics at the sealing edge and lead to increased tightening in the sealing lip on the shaft, increased friction and increased temperature at the point of contact between the sealing lip on the shaft.

Code	Materials	Max. pressure	Max. speed
K8	NBR 80 Shore A	1.0 MPa	< 10 m/s
Y0	NBR 90 Shore A	1.5 MPa	< 2 m/s

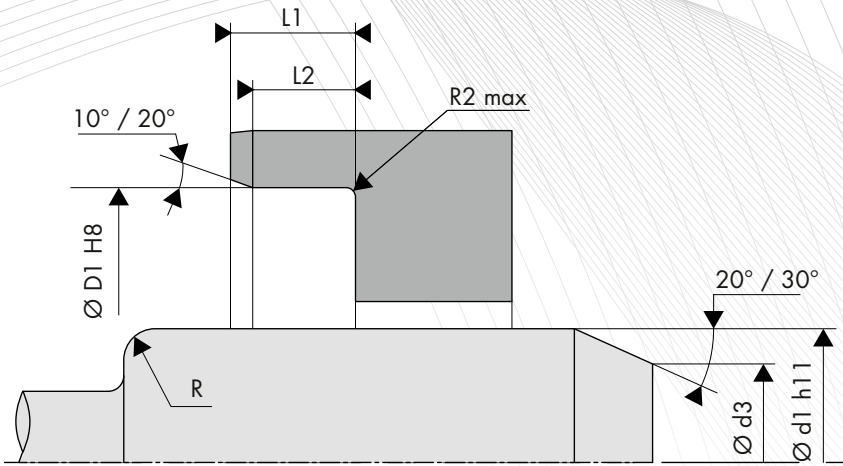
Linear speed calculation:

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



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
$s \leq 4.0 \text{ m/sec}$	45 HRC
$4.0 < s \leq 10.0 \text{ m/s}$	55 HRC
$s > 10.0 \text{ m/sec}$	60 HRC

Surface roughness

Ra *	0.2 to 0.4 μm
Rz	1.0 to 3.0 μm
Rmax	$\leq 6.3 \mu\text{m}$

*Ra = 0.1 μm for demanding applications

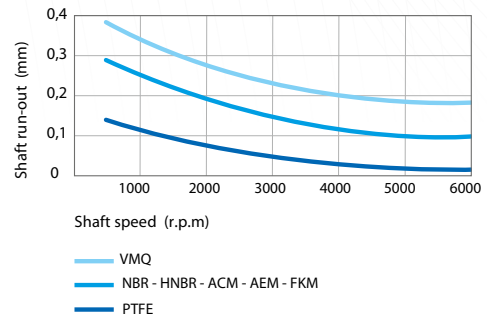
Shaft tolerance

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

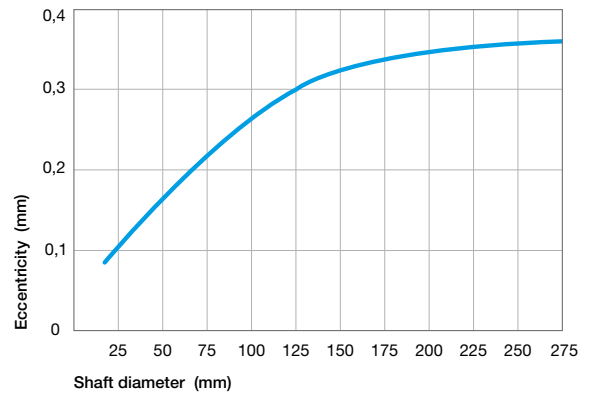
Chamfer and radius

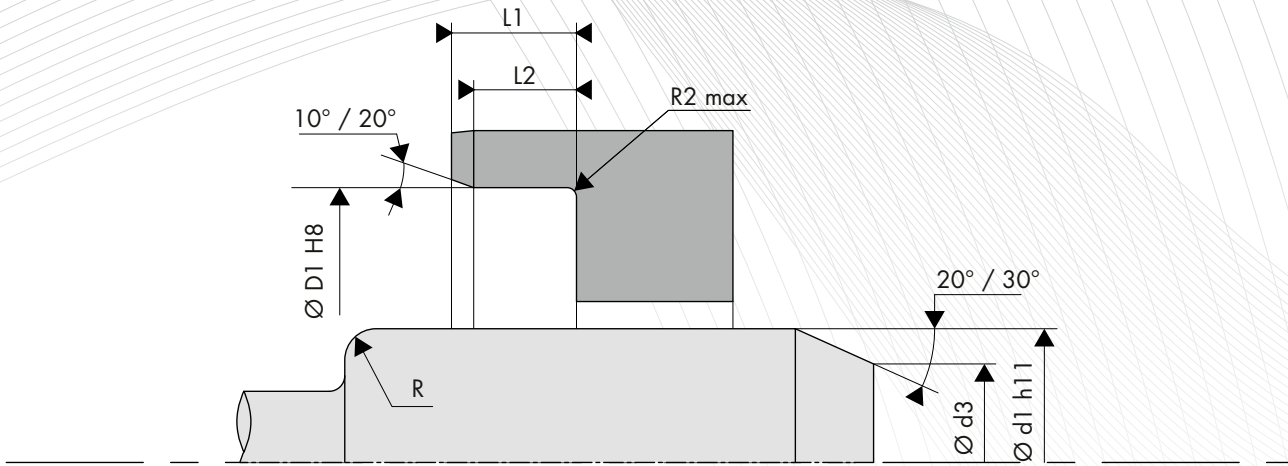
Shaft diameter $\text{Ø}d1$ (mm)	Chamfer diameter $\text{Ø}d3$ (mm)	Radius R (mm)
$\text{Ø}d1 \leq 10.0$	$\text{Ø}d1 - 1.50$	2.00
$10.0 < \text{Ø}d1 \leq 20.0$	$\text{Ø}d1 - 2.00$	2.00
$20.0 < \text{Ø}d1 \leq 30.0$	$\text{Ø}d1 - 2.50$	3.00
$30.0 < \text{Ø}d1 \leq 40.0$	$\text{Ø}d1 - 3.00$	3.00
$40.0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

Shaft run out



Eccentricity





HOUSING DESIGN

Surface roughness

Ra	1.6 to 6.3 μm
Rz	10.0 to 25.0 μm
Rmax	$\leq 25.0\ \mu\text{m}$

Housing tolerance

Bore diameter $\varnothing D1$ (mm)	Tolerance H8 (mm)
$3.0 < \varnothing D1 \leq 6.0$	0 / +0.018
$6.0 < \varnothing D1 \leq 10.0$	0 / +0.022
$10.0 < \varnothing D1 \leq 18.0$	0 / +0.027
$18.0 < \varnothing D1 \leq 30.0$	0 / +0.033
$30.0 < \varnothing D1 \leq 50.0$	0 / +0.039
$50.0 < \varnothing D1 \leq 80.0$	0 / +0.046
$80.0 < \varnothing D1 \leq 120.0$	0 / +0.054
$120.0 < \varnothing D1 \leq 180.0$	0 / +0.063
$180.0 < \varnothing D1 \leq 250.0$	0 / +0.072
$250.0 < \varnothing D1 \leq 315.0$	0 / +0.081
$315.0 < \varnothing D1 \leq 400.0$	0 / +0.089
$400.0 < \varnothing D1 \leq 500.0$	0 / +0.097
$500.0 < \varnothing D1 \leq 630.0$	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	