
POLYPAC[®] - PHD Seal



Double Acting

Heavy Duty High Pressure

Material:

PTFE, NBR Elastomer, POM



■ PHD Seal



Description

The PHD Seal is a high-pressure heavy-duty piston seal with excellent leakage control and superior extrusion and wear resistance.

The PHD seal is a combination of a PTFE based slipper seal energised by an elastomer profile ring and completed with two Back-up rings (POM). It is manufactured with a predefined interference fit, which together with the squeeze of the elastomer part ensures a good sealing effect even at low system pressure. At higher pressures the elastomer part is energised by the system pressure and consequently activates the slipper seal in the radial direction.

The Back-up rings prevent the slipper seal from extrusion and ensure a long service life even under harsh conditions.

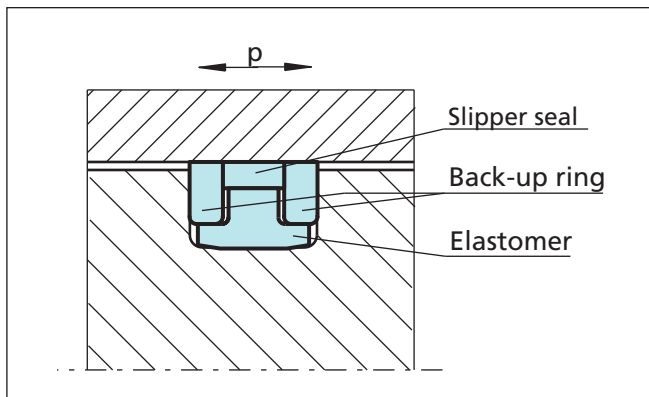


Figure 25 PHD Seal

Advantages

- Simple groove design
- No stick-slip effect when starting for smooth operation
- Minimum static and dynamic coefficient of friction
- Increased clearance possible
- Due to larger extrusion gap, safe use even with soiled media
- Long service life

Application Examples

The PHD Seal is the recommended sealing element for double acting pistons of hydraulic cylinders working in very harsh conditions such as:

- Excavators
- Heavy duty hydraulic cylinders

Technical Data

Operating conditions

Pressure:	Up to 40 MPa Peak pressure up to 60 MPa
Speed:	Up to 1.5 m/s
Temperature:	-45 °C to +135 °C
Media:	Mineral oil based hydraulic fluids, water/oil and glycol/oil emulsions
Clearance:	The maximum permissible radial clearance S_{max} is shown in Table XXV, as a function of the operating pressure and functional diameter.

Important Note:

The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.

Materials

Standard Application:

For hydraulic components:

- In mineral oils or medium with good lubricating performance
- in water /oil and water/glycol emulsions

Slipper Seal: Bronze filled PTFE

Energiser: NBR 80 Shore A

Back-up rings: POM

Material code for the set: PTNO4

Special Application:

- For special applications requiring other material combinations, please contact your local Trelleborg Sealing Solutions Company.



POLYPAC® PHD Seal

Table XXIV Standard PTFE Based Materials for PHD Piston Seal

Material, Applications, Properties	Code	Energiser Material	Code	Energiser Operating Temp.* °C	Mating Surface Material	MPa max.
Material TR55 Standard material for hydraulics, good compressive strength, good sliding and wear properties, good extrusion resistance. Bronze filled Colour: Bronze to dark green	PT_04	NBR - 70 Shore A	N	-30 to +100	Steel tubes Steel, hardened Cast iron	40
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +135#		
Material TR12 For all lubricating fluids, hard mating surfaces, good sliding properties, low friction Colour pigment filled Colour: Dark green	PT_0A	NBR - 70 Shore A	N	-30 to +100	Steel tubes Steel, hardened	40
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +135#		
Material TR25 For all lubricating and non-lubricating hydraulic fluids, good chemical resistance, good dielectric properties. Glass fibre filled+graphite+MoS2 Colour: Grey to blue	PT_0J	NBR - 70 Shore A	N	-30 to +100	Steel tubes Steel, hardened Cast iron	40
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +135#		
Material TR30 For water hydraulic, oil hydraulic and pneumatic for all lubricating and non-lubricating fluids, high extrusion resistance, good chemical resistance. Carbon, graphite filled Colour: Black	PT_0C	NBR - 70 Shore A	N	-30 to +100	Steel Stainless steel	40
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +135		
		EPDM - 70 Shore A	E**	-45 to +135#		

Limited high temperature due to POM Back-up Ring. * The Energiser Operation Temperature is only valid in mineral hydraulic oil.
 ** Material not suitable for mineral oils. Highlighted material is standard.

Material Code definition:

PHD seal with slipper seal material TR55 and NBR energiser:

PTN04



■ Installation Recommendation

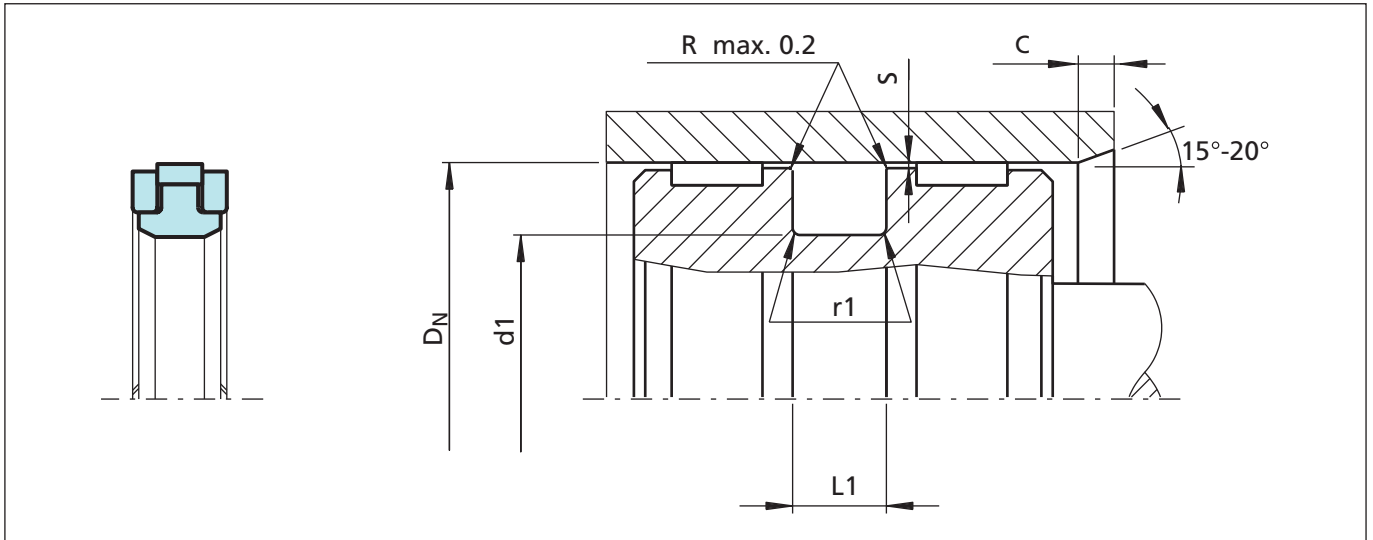


Figure 26 Installation drawing

Ordering Example

PHD Seal, complete.
 Bore diameter: $D_N = 80.0$ mm
 TSS Part No.: PKP000800 (from Table XXV)
 Seal: PTFE TR55
 Energiser: NBR
 Back-up ring: POM
 Material set-code: PTN04
 Polypac Ref. No.: PHD 8065

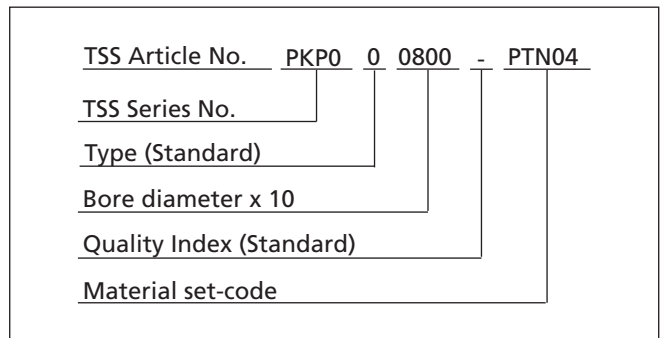


Table XXV Installation dimensions / TSS Part No.

Bore Dia.	Groove Dia.	Groove Width	Inlet Chamfer	Radius	TSS Part No.	Polypac Ref. No.
D_N H9	$d1$ h9	$L_1 +0.2$	C	r_1		
50.0	36.0	9.0	5.0	0.3	PKP000500	PHD 5036
55.0	41.0	9.0	5.0	0.3	PKP000550	PHD 5541
60.0	46.0	9.0	5.0	0.3	PKP000600	PHD 6046
63.0	48.0	11.0	5.0	0.5	PKP000630	PHD 6348
65.0	50.0	11.0	5.0	0.5	PKP000650	PHD 6550
70.0	55.0	11.0	5.0	0.5	PKP000700	PHD 7055
75.0	60.0	11.0	5.0	0.5	PKP000750	PHD 7560
80.0	65.0	11.0	5.0	0.5	PKP000800	PHD 8065
85.0	70.0	11.0	5.0	0.5	PKP000850	PHD 8570

Radial Clearance (S): For pressure up to 35 MPa 0.50 For pressure from 35 MPa up to 60 MPa 0.30



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Bore Dia.	Groove Dia.	Groove Width	Inlet Chamfer	Radius	TSS Part No.	Polypac Ref. No.
D_N H9	d_1 h9	$L_1 +0.2$	C	r_1		
90.0	75.0	11.0	5.0	0.5	PKP000900	PHD 9075
95.0	80.0	12.5	5.0	0.5	PKP000950	PHD 9580
100.0	85.0	12.5	5.0	0.5	PKP001000	PHD 10085
105.0	90.0	12.5	5.0	0.5	PKP001050	PHD 10590
110.0	95.0	12.5	5.0	0.5	PKP001100	PHD 11095
115.0	100.0	12.5	5.0	0.5	PKP001150	PHD 115100
120.0	105.0	12.5	5.0	0.5	PKP001200	PHD 120105
125.0	102.0	16.0	6.5	0.6	PKP001250	PHD 125102
130.0	107.0	16.0	6.5	0.6	PKP001300	PHD 130107
135.0	112.0	16.0	6.5	0.6	PKP001350	PHD 135112
140.0	117.0	16.0	6.5	0.6	PKP001400	PHD 140117
145.0	122.0	16.0	6.5	0.6	PKP001450	PHD 145122
150.0	127.0	16.0	6.5	0.6	PKP001500	PHD 150127
155.0	132.0	16.0	6.5	0.6	PKP001550	PHD 155132
160.0	137.0	16.0	6.5	0.6	PKP001600	PHD 160137
165.0	142.0	16.0	6.5	0.6	PKP001650	PHD 165142
170.0	147.0	16.0	6.5	0.6	PKP001700	PHD 170147
180.0	157.0	16.0	6.5	0.6	PKP001800	PHD 180157

Radial Clearance (S): For pressure up to 35 MPa 0.50 For pressure from 35 MPa up to 60 MPa 0.30