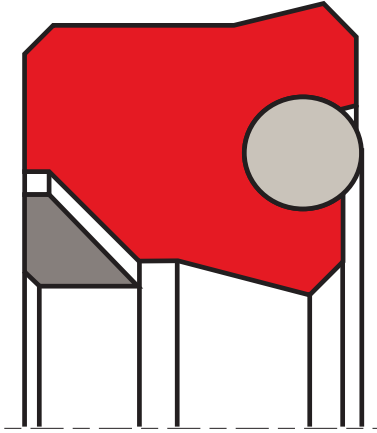


rod seal S04-PD

seal spec



application



not bolded symbols; please consult our technical for application limitations

category of profile

machined only.

single acting

the S04-PD seal is designed for use as a rod seal.

area of application: hydraulics

- reciprocating rods on hydraulic cylinders, push rods, fittings.
- as rod seals for switching functions (e.g. clutch operation).
- as rod seals for clamping functions.

note

- only when mounted, does this seal have the correct functioning dimension. when slipping the seal over the piston rod, it may appear too big.
- the ratio between nominal width and sealing height cs/H should not drop below a value of 1/1.25 (essentially according to ISO 5597 housings for piston and rod seals).
- high degree of friction.
- high break-away moment.
- the recovery volume is smaller than with simple lip seals.
- cross-section limited to 20 mm.
- design S04-PD with triangular backupring can lead to installation difficulties.

function

S04-P and S04-PD profiles are lip seals designed to seal pressurised space against the atmosphere; mainly for reciprocating movements. the design is based on application in standard hydraulic systems with conventional hydraulic oils. the operating parameters are as defined in the sealing data sheet and material data. requirements deviating from these parameters can be met to a certain degree by changing the geometry in the software program.

description

asymmetric rod seal for standard applications as S03-P, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S04-PD for short housings.

- asymmetric single-acting rod lip seals, with the dynamic sealing lip being shorter than the static one. In addition, an O-ring inserted into the groove increases the preload.
- interference fit on the outside diameter.
- various materials are available for different purposes.
- snaps into simple grooves (see notes on installation).
- best sealing effect across a wide temperature range.
- the active back up ring on the trailing side of the seal reduces extrusion wear, thereby making larger gap dimensions possible resphigher system pressure.
- for pressures up to 700 bar as a seal between pressurised space and atmosphere.
- good sealing in low pressure ranges.
- excellent static and dynamic sealing.
- suitable for short travel.
- recommended when holding or positioning under pressure.
- no reverse leakage (i.e. minor relative motion of the sealing edges when the direction is changed).
- shorter seal lengths require design S04-PD.

**operating parameters & material**

diameter range: up to 600 mm

sealing element	material		temperature	max. surface speed	max. pressure ¹	hydrolysis	dry running	wear resistance
	energizer	back-up ring						
s-mart PU	s-mart NBR (70 shore A)	s-mart POM / s-mart PA ²	-30 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+
s-mart HPU	s-mart NBR (70 shore A)	s-mart POM / s-mart PA ²	-20 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+
s-mart LTPU	s-mart NBR (70 shore A)	s-mart POM / s-mart PA ²	-30 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+
s-mart SPU	s-mart NBR (70 shore A)	s-mart POM / s-mart PA ²	-20 °C ... +100 °C	0,7 m/s	700 bar (70 MPa)	-	+	+
s-mart GPU	s-mart NBR (70 shore A)	s-mart POM / s-mart PA ²	-30 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+

the stated operation conditions represent general indications. it is recommended not to use all maximum values simultaneously.

surface speed limits apply only to the presence of adequate lubrication film.

¹ pressure ratings are dependent on the size of the extrusion gap.

² POM up to ø260 mm, PA above ø260 mm.

++ ... particularly suitable

o ... conditional suitable

+ ... suitable

- ... not suitable

for detailed information regarding chemical resistance please refer to our „list of resistance“ for increased chemical and thermal resistance rubber materials are to be preferred, attention should be paid to restrictions for pressure range and wear resistance. for higher gliding speeds another system should be used (e.g. PTFE materials).

note on special materials:

materials such as Viton, Silicone, EPDM, H-NBR, etc. can also be used for the preload element, but they are only useful in specific cases (temperature or chemical influences). the temperature limits are also determined by the supporting element; using special material can expand the temperature range.

gap dimension

operating pressure (Mpa)	(ØD - Ød)/2 mm					
	4	5	7,5	10	12,5	15,0 mm
	max. permissible gap dimension					
100 bar (10 MPa)	0,80	1,00	1,50	1,80	2,10	2,20
200 bar (20 MPa)	0,60	0,70	1,00	1,20	1,30	1,50
300 bar (30 MPa)	0,40	0,50	0,70	0,75	0,80	1,25
400 bar (40 MPa)	0,25	0,30	0,50	0,50	0,60	0,75
600 bar (60 MPa)	0,20	0,25	0,25	0,25	0,25	0,25
700 bar (70 MPa)	0,10	0,12	0,13	0,14	0,15	0,16

important note:

the above data are maximum value and can't be used at the same time. e.g. the maximum operating speed depend on material type, pressure, temperature and gap value. temperature range also dependent on medium.

the diagram applies to an operating temperature of 70 °C.

surface quality

surface roughness	Rtmax (µm)	Ra (µm)
sliding surface	≤2,5	≤0,1-0,5
bottom of groove	≤6,3	≤1,6
groove face	≤15	≤3

tolerance recommendation

seal housing tolerances	
Ød	f8
ØD	H10

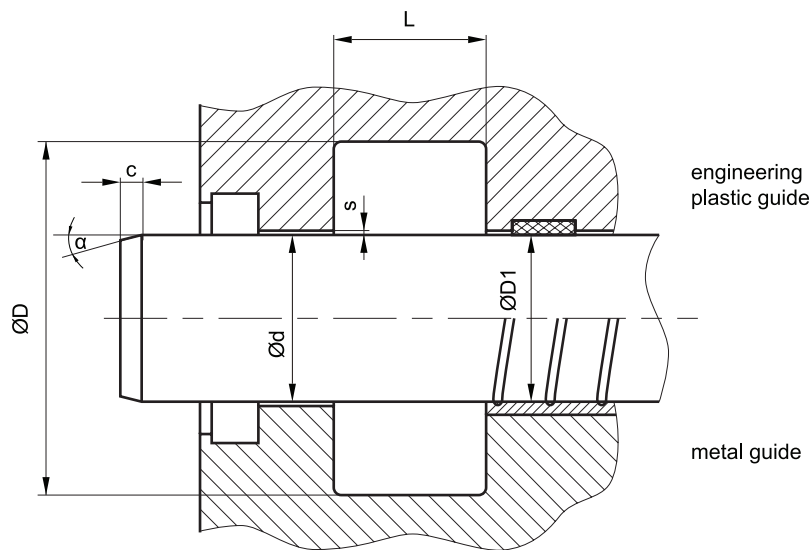
mode of installation

for inside diameters of 25 mm or more, and dependant on the radial cross section (cs), the seal can be snapped into the housing.

Ød	type of installation
≤ 6•cs	open mounting space required
> 6•cs ≤ 10•cs	snap mounting with tool
> 10•cs	snap mounting by hand



recommended mounting space:



recommended guide tolerance D1:

d f8 [mm]	p ≤ 100 [bar]	100 < p ≤ 200 [bar]	p > 200 [bar]
≤ 100	H10	H8	H8
> 100 ≤ 200	H10	H8	H7
>200	H9	H8	H7

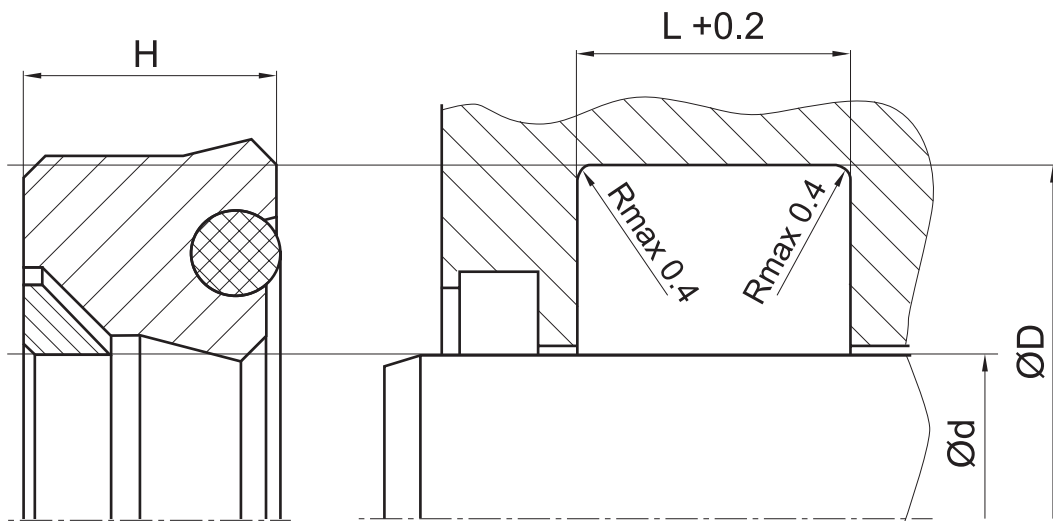
insertion chamfer:

in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the “recommended mounting space” drawing. the size of chamfer depends on the seal type and profile width.

cs (mm)	c (mm)	
	α = 15° ... 20°	α = 20° ... 30°
4	3,5	2
5	4	2,5
6	4,5	3
7,5	5	4
10	6	5
12,5	8,5	6,5
15	10	7,5
20	13	10

**seal & housing recommendations**

please note that we are able to produce those profiles to your specific need or any non standard housing. for detail measurements, please see seal-mart catalog...



the ratio between nominal width and seal height cs/H should not drop below $1/1,25$. therefore we recommend the following housing heights.

$\varnothing d$ [mm]	$\varnothing D$ [mm]	L [mm]	$cs = (\varnothing D - \varnothing d)/2$ [mm]
5 ~ 24,9	$\varnothing d + 8$	6,3	4
25 ~ 49,9	$\varnothing d + 10$	8	5
50 ~ 149,9	$\varnothing d + 15$	10	7,5
150 ~ 299,9	$\varnothing d + 20$	14	10
300 ~ 499,9	$\varnothing d + 25$	17	12,5
500 ~ 699,9	$\varnothing d + 30$	25	15
700 ~ 1000	$\varnothing d + 40$	32	20
> 1000	$\varnothing d + 40$	32	20

above recommendations refer only to design S04-P.

if for same cross-section a smaller height is used the design S04-PD could be necessary.

don't hesitate to contact our technical department for further information or for special requirements (temperature, speed etc.), so that suitable materials and/or designs can be recommended.