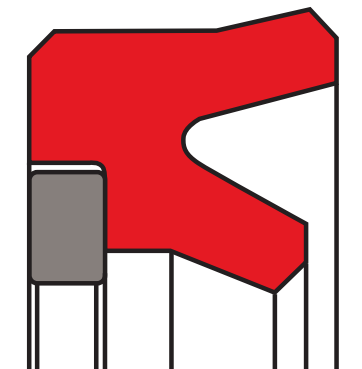


rod seal S02-P

seal spec



description

asymmetric rod seal for standard applications as S01-P, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S02-P for standard housing design.

- asymmetric single-acting rod lip seals, with the dynamic sealing lip being shorter than the static one.
- 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 and allows larger gap dimensions resp higher system pressure.
- sealing effect enhanced by high recovery rate.
- for pressures up to 700 bar as a seal between pressurized space and atmosphere.
- good sealing in the low pressure range.
- excellent static and dynamic sealing.
- suitable for long travel.
- little inclination to "stick-slip".
- low break-away load after prolonged periods of standstill.
- shorter seal heights design S02-PD.

application



not bolded symbols; please consult our technical for application limitations

category of profile

machined only.

single acting

the S02-P seal is designed for use as a rod seal.

area of application: hydraulics

- reciprocating rods on hydraulic cylinders, push rods, fittings.
- rod seals for applications with large extrusion gap and without specific impact load.

note

- this seal has the correct functioning dimension only when mounted. 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).
- for short strokes, the S04-P type is to be preferred.
- recovery volume is limited.
- design S02-PD with triangular backupring can lead to installation difficulties.

function

S02-P and S02-PD profiles are lip seals designed to seal pressurized 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.

**operating parameters & material**

diameter range: up to 600 mm

material		temperature	max. surface speed	max. pressure ¹	hydrolysis	dry running	wear resistance
sealing element	back-up ring						
s-mart PU	s-mart POM / s-mart PA ²	-30 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+
s-mart HPU	s-mart POM / s-mart PA ²	-20 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	+	+	+
s-mart LTPU	s-mart POM / s-mart PA ²	-50 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	+	+
s-mart SPU	s-mart POM / s-mart PA ²	-20 °C ... +100 °C	0,7 m/s	700 bar (70 MPa)	+	+	+
s-mart GPU	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:

as the temperature limits are determined by POM, using special materials for the back up ring can expand the temperature limits.

gap dimension

operating pressure	(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	1,50	1,50	1,50
200 bar (20 MPa)	0,60	0,70	1,00	1,10	1,25	1,50
300 bar (30 MPa)	0,40	0,50	0,75	0,75	0,80	1,00
400 bar (40 MPa)	0,30	0,30	0,50	0,50	0,60	0,75
600 bar (60 MPa)	0,20	0,25	0,30	0,30	0,30	0,30
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.

use larger cross sections to increase maximum allowed gap dimension.

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

at pressure > 40 MPa; Smax = H8/f8 (bore and rod) in area of the seal.

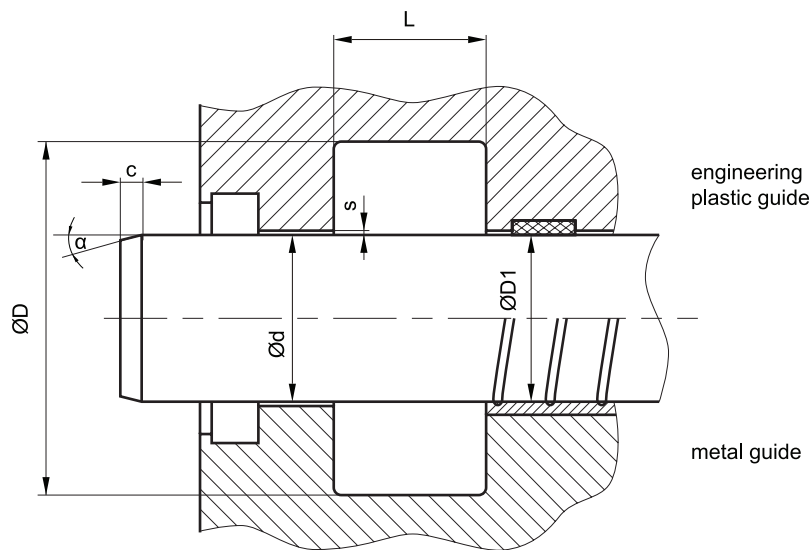
mode of installation

for inside diameters of 25 mm or more, and dependant on radial cross section (cs), the seals may 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:

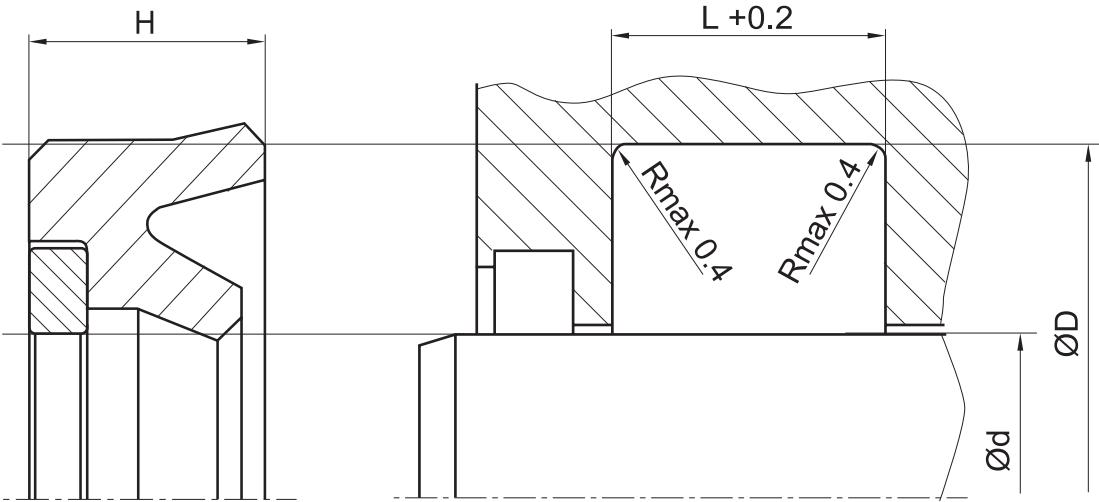
in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the “recommended mounting space” drawing. the size of chamfer depends on the seal type and profile width.

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...

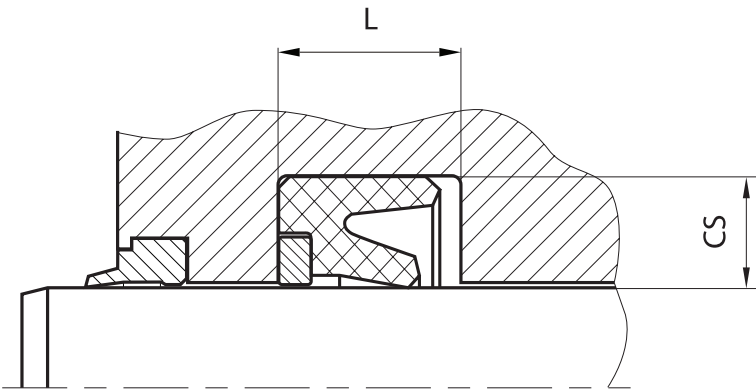


the ratio between nominal width and seal height cs/H should not drop below $1/1,25$. therefore we recommend the following housing heights.

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

above recommendations refer only to design S02-P.
if for same cross-section a smaller height is used the design S02-PD could be necessary.

fitted:



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.