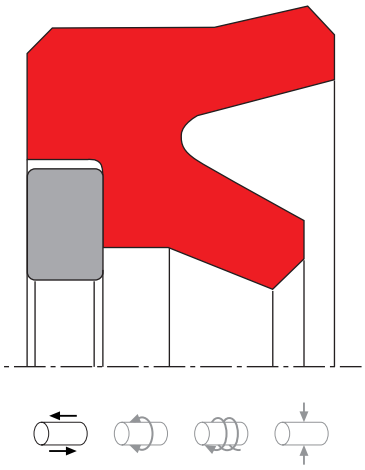
SEAL SPEC
S02-P



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 inside 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 respectively higher system pressure.
+ sealing effect enhanced by high recovery rate.
+ for pressures up to 700 bar as a seal between pressurised spaces.
+ 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.

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 or fast shifts in direction, the S04-P type is to be prefered.
- 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.

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operating parameter & material

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

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

++ particularly suitable + suitable o conditional suitable - not suitable

[2] POM up to ø260 mm, PA above ø260 mm

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.

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 material:
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	cs = (ØD - Ød)/2 mm safe extrusion gap (mm)					
	4	5	7,5	10	12,5	15
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

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 table 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 tolerance	
Ød	f8
ØD	H10

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

mode of installation

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

for inside diameters of 25mm or more, and dependant on radial cross section (cs), seals may be snapped into closed housings.

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

instead of a chamfer, the piston can also be designed with a radius. recommended size of the radius is equal to size of chamfer (R=c).

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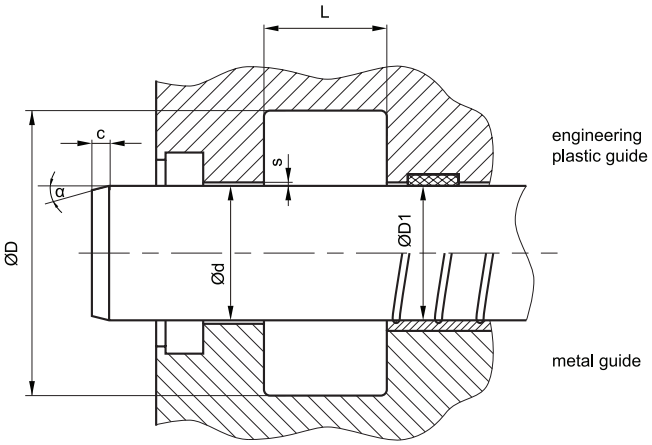
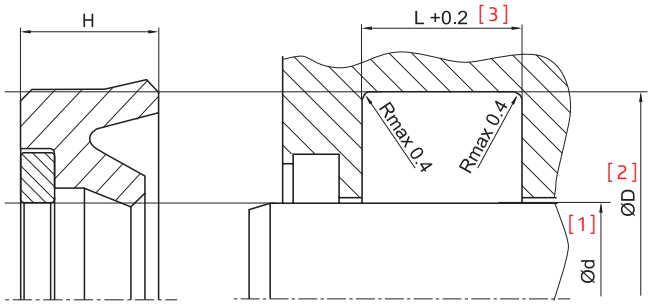
recommended mounting space



seal & housing recommendations

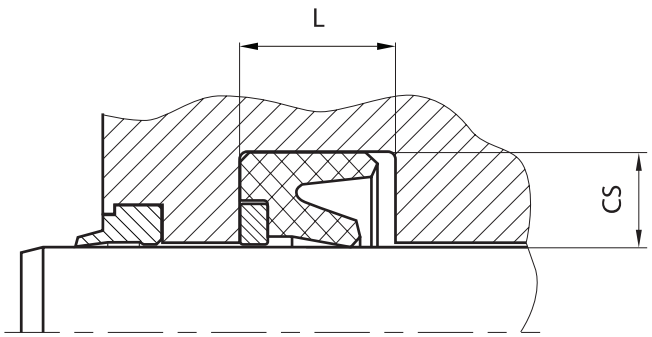
please note that we are able to produce those profiles to your specific need or any non standard housing. for detail measurements, please see seal-mart catalog...



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

fitted



Ød [mm] [1]	ØD [mm] [2]	L [mm] [3]	cs = (ØD - 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

the ratio between nominal width and seal height cs/H should not drop below 1/1.25. therefore we recommend the following housing heights.