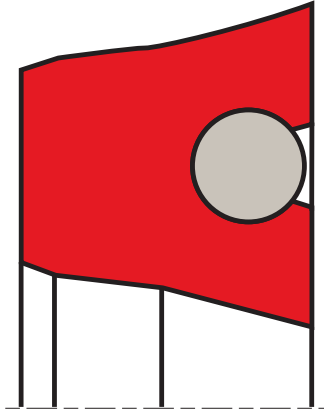


rod seal S21-P

seal spec



description

O-Ring activated symmetric rod seal with sharp-edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (profile S03-P preferred).

- symmetric single-acting rod compact ring.
- no interference fit on the outside diameter.
- sharp-edged sealing lips for the use in high viscosity media.
- various materials are available for different purposes.
- snaps into simple grooves (see notes on installation).
- good sealing effect across a wide temperature range.
- sealing effect enhanced by high recovery.
- for pressures up to 400 bar as a seal between pressurised space and atmosphere.
- good sealing in all pressure ranges.
- good static and dynamic sealing.
- suitable for short travel.
- no reverse leakage (i.e. minor relative motion of the sealing edges when the direction is changed).
- recommended for holding position under pressure.

application



not bolded symbols; please consult our technical for application limitations

category of profile

machined only.

single acting

the S21-P 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 seals.
- replacement for rubber fabric compact seals.

note

- under certain operating conditions, this seal may “pump” via the trailing side, i.e. as it does not fit tightly on the outside diameter, small amounts of operating media may be pressed out when the seal is deformed under pressure which may appear to be leakage.
- 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 friction.
- high break-away moment.
- the recovery capacity is smaller than with simple lip rings.
- cross-section limited to 20 mm.
- not suitable for new designs (new profiles like S03-P, S08-P or S08-PE should be preferred).

function

S21-P 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.

**operating parameters & material**

diameter range: up to 600 mm

material		temperature	max. surface speed	max. pressure ¹	hydrolysis	dry running	wear resistance
sealing element	energizer						
s-mart PU	s-mart NBR (70 shore A)	-30 °C ... +110 °C	0,5 m/s	400 bar (40 MPa)	-	+	++
s-mart HPU	s-mart NBR (70 shore A)	-20 °C ... +110 °C	0,5 m/s	400 bar (40 MPa)	-	+	++
s-mart LTPU	s-mart NBR (70 shore A)	-50 °C ... +110 °C	0,5 m/s	400 bar (40 MPa)	-	+	++
s-mart SPU	s-mart NBR (70 shore A)	-20 °C ... +110 °C	0,7 m/s	400 bar (40 MPa)	-	++	++
s-mart GPU	s-mart NBR (70 shore A)	-30 °C ... +110 °C	0,5 m/s	400 bar (40 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.

++ ... 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 be used for the preload element, but they are only useful in specific cases (temperature or chemical influences).

gap dimension

operating pressure	cs = (ØD - Ød)/2 mm					
	4	5	7,5	10	12,5	15
	safe extrusion gap (mm)					
100 bar (10 MPa)	0,18	0,22	0,32	0,38	0,45	0,53
200 bar (20 MPa)	0,12	0,16	0,25	0,33	0,40	0,45
300 bar (30 MPa)	0,07	0,13	0,21	0,28	0,36	0,42
400 bar (40 MPa)	0,05	0,10	0,19	0,26	0,33	0,39

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

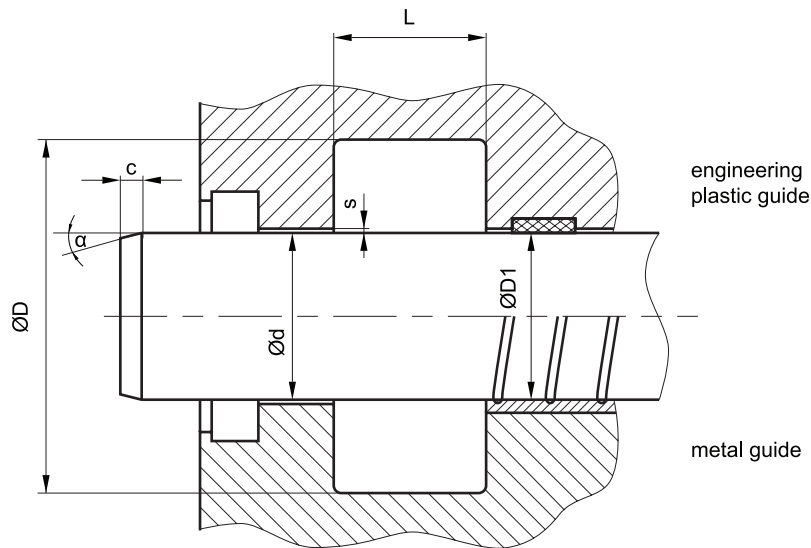
mode of installation

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:

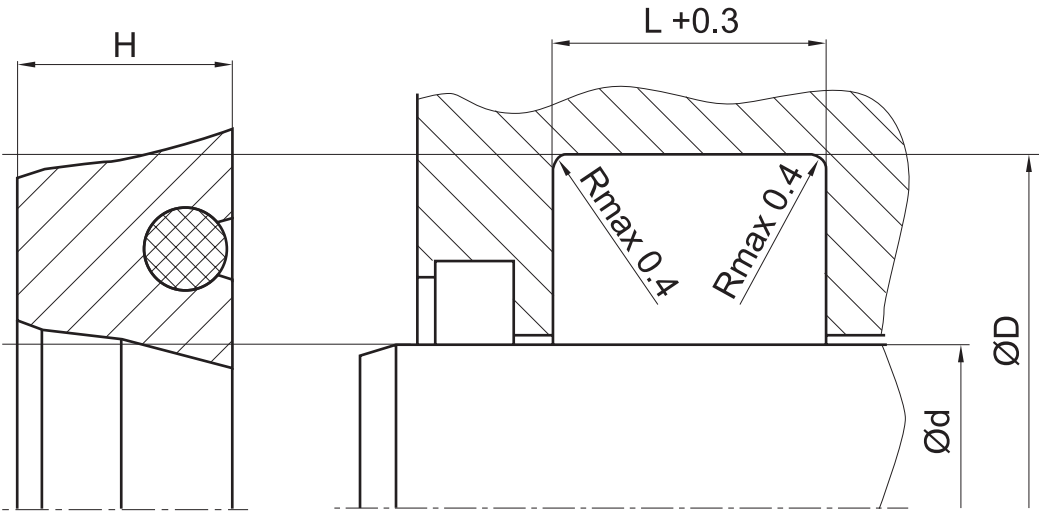
in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the “recommended mounting space” drawing. the size of chamfer depends on the seal type and profile width.

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



seal & housing recommendations

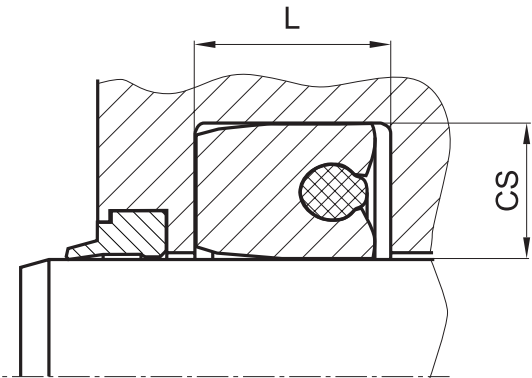
please note that we are able to produce those profiles to your specific need or any non standard housing. for detail measurements, please see seal-mart catalog...



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

$cs = (\varnothing D - \varnothing d)/2$ [mm]	L [mm]
4	6,3
5	8
6	9
7,5	10
10	14
12,5	17
15	25
20	32

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.