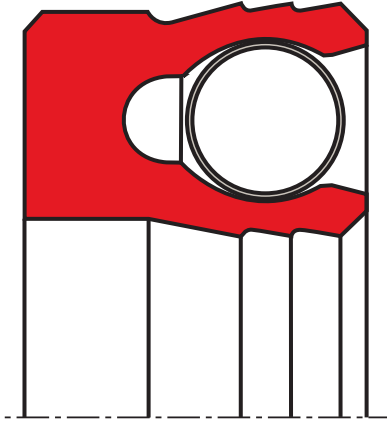


rod seal S03-S

seal spec



application



not bolded symbols; please consult our technical for application limitations

description

helicoil spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.

- asymmetric single-acting rod lip seals, with the dynamic sealing lip being differently shaped than the static one. the preload is created by a helicoil spring inserted in the groove.
- interference fit on the outside diameter.
- one sealing edge for profile widths smaller than 5 mm; three sealing edges for widths of 5mm or more.
- various materials are available for different purposes.
- good sealing effect across a wide temperature range.
- sealing effect enhanced by high recovery rate.
- for pressures up to 200 bar as a seal between pressurised space and atmosphere (in certain cases also above that, see "gap dimensions").
- good sealing in all pressure ranges.
- excellent static and dynamic sealing after short run-in time.
- suitable for short and long travel.
- no reverse leakage (i.e. minor relative motion of the sealing edges when the direction is changed).
- little friction in dry running or in media with poor lubricating effect (in aqueous media only suitable to a limited extent).
- low break-away load.
- high contact pressure at low spring compression.

category of profile

machined only.

single acting

the S03-S seal is designed for use as a rod seal.

application range:

reciprocating and swiveling rods on cylinders, push rods, fittings in the chemical industry.

note

- special measures required when used at temperatures below -60°C, because of material shrinkage.
- considering the limited long-time rupture strength of PTFE materials, the cs/H ratio should not fall below a value of 1/1.5. using back up rings can widen the application range.
- cross-sections limited to 20 mm.

function

S03-S profiles are lip seals designed to seal pressurised space against the atmosphere; mainly for reciprocating movements. the design is based on application in aggressive media or with high thermal demands. 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 PTFE virgin	spring '1.4310	-200 °C ... +260 °C	1,0 m/s	100 bar (10 MPa)	++	++	O
s-mart PTFE glass	spring '1.4310	-200 °C ... +260 °C	1,0 m/s	160 bar (16 MPa)	++	++	+
s-mart UHMWPE	spring '1.4310	-200 °C ... +80 °C	0,5 m/s	200 bar (20 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 decreased leakage rates elastomer materials (polyurethane or rubber) in other sealing systems are to be preferred.

gap dimension

operating pressure (Mpa)	(ØD - Ød)/2 mm			
	2	5	7,5	10 ≤
	max. permissible gap dimension			
5	0,15	0,35	0,55	0,65
10	0,10	0,25	0,40	0,50
15	0,07	0,22	0,35	0,45
20	0,07	0,20	0,30	0,40

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 table refers to a operating temperature of 80°C. temperatures below may increase the safe extrusion gap slightly, at temperatures above 80 °C, the gap dimensions has to be reduced or a stronger profile selected.

in exceptional cases, a pressure above the limit of 200 bar is possible, the safe extrusion gap is the result of the tolerance pair H8/f8, influences due to thermal expansion have to be considered. we also recommend contacting our technical department.

surface quality

surface roughness	Rtmax (µm)	Ra (µm)
sliding surface	≤2,0	≤0,05-0,3
bottom of groove	≤10	≤1,6
groove face	≤10	≤1,6

tolerance recommendation

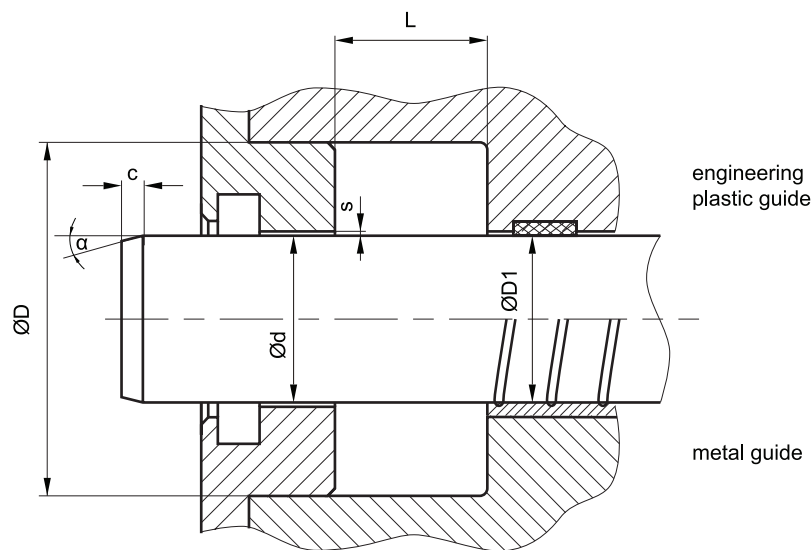
seal housing tolerances	
Ød	h10
ØD	H9

mode of installation

normally, an open mounting space is to be provided. the profile should not be snapped into place, as the spring may be damaged and normal function can no longer be ensured.



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:

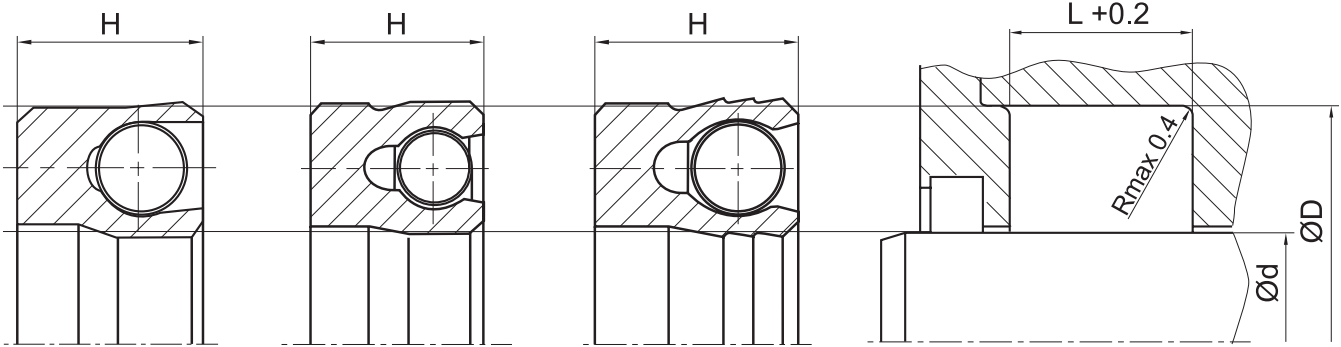
in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the “recommended mounting space” drawing. the size of chamfer depends on the seal type and profile width.

cs (mm)	c (mm)	
	α = 15° ... 20°	α = 20° ... 30°
(2)	2	1
(3)	3	1,5
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...



cs (mm)	spring
2.....<3	Ø1,5 - 0,6 x 0,06

cs = cross section = (ØD - Ød)/2

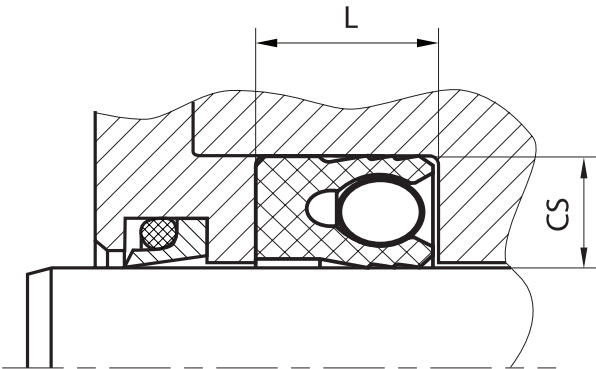
cs (mm)	spring
3.....<5	Ø2,5 - 0,6 x 0,12

cs (mm)	spring
3.....<7,5	Ø4 - 1,2 x 0,15
7,5.....<10,5	Ø6 - 2 x 0,15
10,5.....<14,25	Ø8,5 - 3 x 0,3
14,25.....<20	Ø11,7 - 4 x 0,4

with PTFE materials, the profile size does not depend so much on the seal diameter but rather on pressure and extrusion gap. this relationship is described under "gap dimensions". nominal widths not shown in the diagram can be interpolated if required.
the ratio between nominal width and seal height cs/H should not drop below 1/1.5. therefore we recommend the following housing heights.

cs = (ØD - Ød)/2 [mm]	L [mm]
2	3,5
3	5
4	6,5
5	8,8
6	10
7,5	12,3
10	16
12,5	19,8
15	24,5
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.