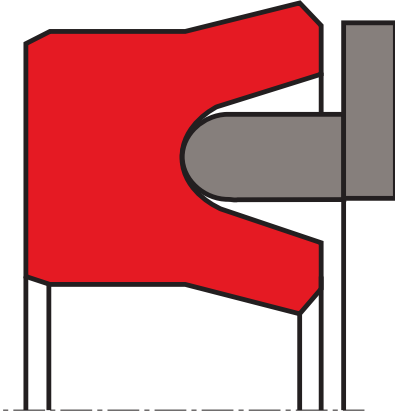


## rod seal S22-R

## seal spec



### application



not bolded symbols; please consult our technical for application limitations

### category of profile

machined only.

### single acting

the S22-R seal is designed for use as a rod seal.

### area of application: hydraulics

### 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.
- open housings required.
- not suitable for new designs (modern style S01-R should be preferred).

### function

S22-R 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

symmetric rod seal as S22-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. retainer ring in angled design possible.

- symmetric single-acting rod seal.
- no interference fit on the outside diameter.
- various materials are available for different purposes.
- sealing effect across a wide temperature range.
- sealing effect enhanced by high recovery.
- for pressures up to 160 bar as a seal between pressurised space and atmosphere.
- good sealing in the low pressure range.
- good static and dynamic sealing.
- suitable for long travel.
- little inclination to “stick-slip”.
- small break-away load after prolonged periods of standstill.
- the stabilisation of the sealing element in the housing is achieved by a retainer ring.
- this retainer ring can be designed straight or as a angled ring (for easier centering and installation). the straight design has to be furnished with pressure relief grooves, the angled design needs balancing holes (for details see “fabrication tolerances for machined seals”, ES 222.222).



## operating parameters &amp; material

diameter range: up to 600 mm

material		temperature	max. surface speed	max. pressure <sup>1</sup>	hydrolysis	dry running	wear resistance
sealing element	back-up ring						
s-mart NBR	s-mart POM <sup>2</sup>	-30 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	-	-	O
s-mart NBR	s-mart PA <sup>2</sup>	-30 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	-	-	O
s-mart FKM	s-mart PTFE glass	-20 °C ... +200 °C	0,5 m/s	160 bar (16 MPa)	-	-	O
s-mart EPDM <sup>3</sup>	s-mart POM <sup>2</sup>	-50 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	++	-	O
s-mart EPDM <sup>3</sup>	s-mart PA <sup>2</sup>	-50 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	+	-	O
s-mart EPDM <sup>3</sup>	s-mart PTFE glass	-50 °C ... +150 °C	0,5 m/s	160 bar (16 MPa)	++	-	O
s-mart HNBR	s-mart POM <sup>2</sup>	-25 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	+	O	+
s-mart HNBR	s-mart PA <sup>2</sup>	-25 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	+	O	+
s-mart HNBR	s-mart PTFE glass	-25 °C ... +150 °C	0,5 m/s	160 bar (16 MPa)	+	O	+

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.

<sup>1</sup> pressure ratings are dependent on the size of the extrusion gap.

<sup>2</sup> POM up to ø260 mm, PA above ø260 mm

<sup>3</sup> attention: not suitable for mineral oils!

++ ... particularly suitable

o ... conditional suitable

+ ... suitable

- ... not suitable

for detailed information regarding chemical resistance please refer to our „list of resistance“. for increased wear resistance and higher pressure range polyurethane materials are to be preferred, attention should be paid to restrictions in chemical and thermal resistance. for higher gliding speeds another sealing 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	cs = (ØD - Ød)/2 mm					
	4	5	7,5	10	12,5	15
	safe extrusion gap (mm)					
50 bar (5 MPa)	0,18	0,22	0,26	0,30	0,33	0,36
100 bar (10 MPa)	0,16	0,18	0,24	0,27	0,31	0,35
160 bar (16 MPa)	0,14	0,17	0,22	0,25	0,27	0,33

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

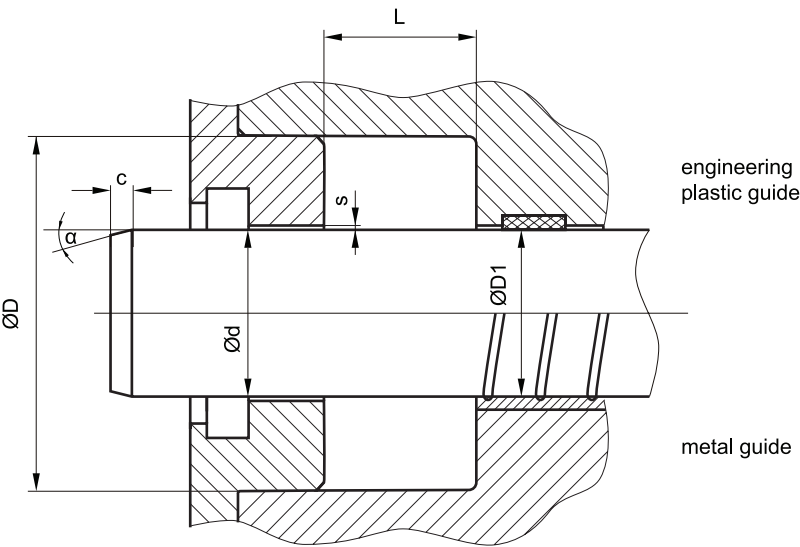
seal housing tolerances	
Ød	f8
ØD	H10

## mode of installation

open housings are required.



recommended mounting space:



recommended guide tolerance D1:

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

insertion chamfer:

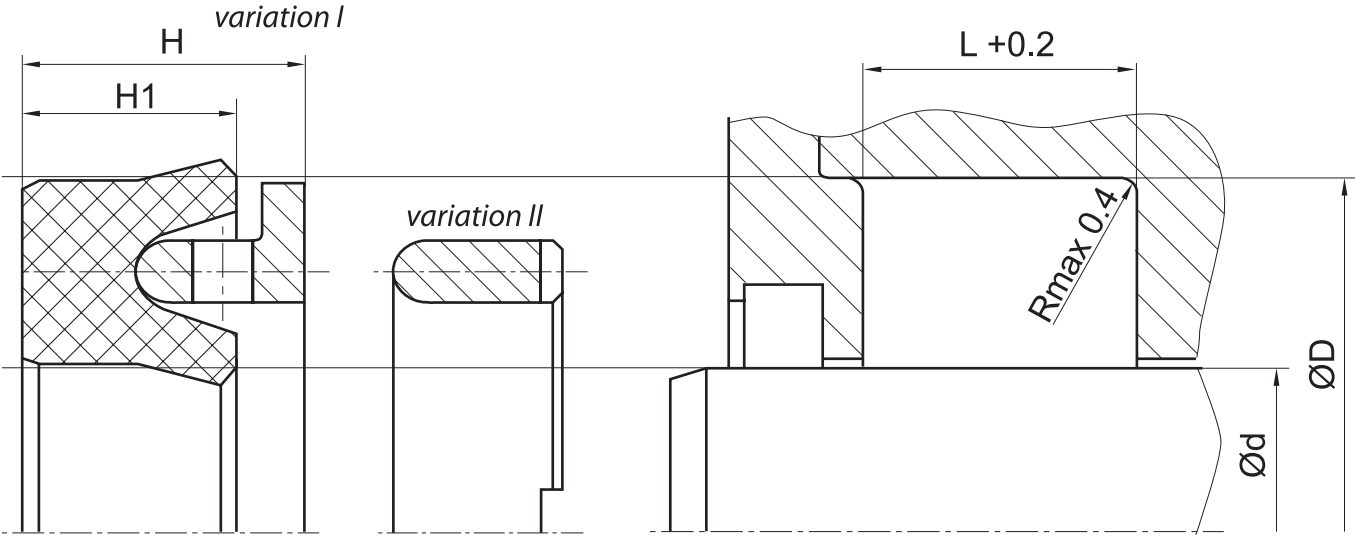
in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the “recommended mounting space” drawing. the size of chamfer depends on the seal type and profile width.

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**

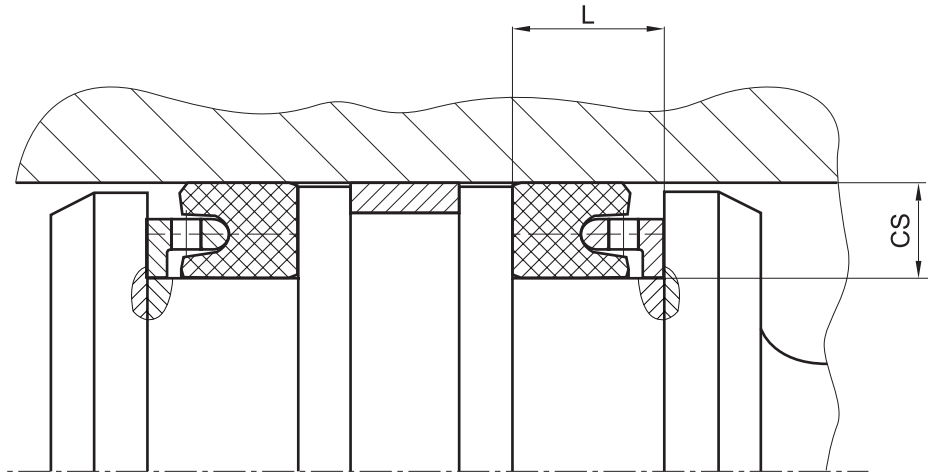
*please note that we are able to produce those profiles to your specific need or any non standard housing. for detail measurements, please see seal-mart catalog...*



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 materi- als and/or designs can be recommended.*