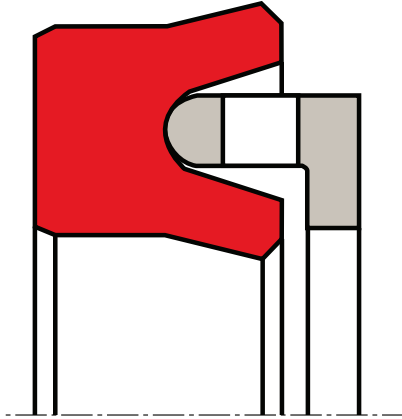


piston seal K22-R

seal spec



description

symmetric piston seal as K22-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 piston lip seals.
- no interference fit on the inside 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 spaces.
- good sealing in the low pressure range.
- good static and dynamic sealing.
- suitable for long travel.
- little tendency 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.

application



not bolded symbols; please consult our technical for application limitations

category of profile

machined only.

single acting

the K22-R seal is designed for use as a piston seal - either single or double acting where two seals are used 'back to back'

area of application: hydraulics

- reciprocating pistons in hydraulic cylinders.
- as piston seals for applications with small extrusion gap and without specific impact load.
- can also be used as a pivot seal in the case of small loads.
- repair seal for older equipment.
- replacement for rubber fabric seals of older equipment.

note

- under certain operating conditions, this seal may "pump" via the trailing side, i.e. as it does not fit tightly on the inside diameter, small amounts of operating media may be pressed out when the seal is deformed under pressure which may result in additional drag pressure built up.
- not suitable for new designs (prefer the more modern K01-R type).
- open housings are required.

function

K22-R profiles are lip seals designed to seal pressurised space against the atmosphere or in case of back to back arrangement with intermediate guide ring to seal between two pressurised spaces, 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 NBR	s-mart POM	-30 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	-	-	O
s-mart NBR	s-mart PA ²	-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 ³	s-mart POM	-50 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	++	-	O
s-mart EPDM ³	s-mart PA ²	-50 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	+	-	O
s-mart EPDM ³	s-mart PTFE glass	-50 °C ... +150 °C	0,5 m/s	160 bar (16 MPa)	++	-	O
s-mart HNBR	s-mart POM	-25 °C ... +100 °C	0,5 m/s	160 bar (16 MPa)	+	O	+
s-mart HNBR	s-mart PA ²	-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.

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

² POM up to ø260 mm, PA above ø260 mm

³ 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 table applies to an operating temperature of 70 °C.

use larger cross sections to increase maximum allowed gap dimension. if the permissible extrusion gap cannot be achieved, K02-R is to be used.

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

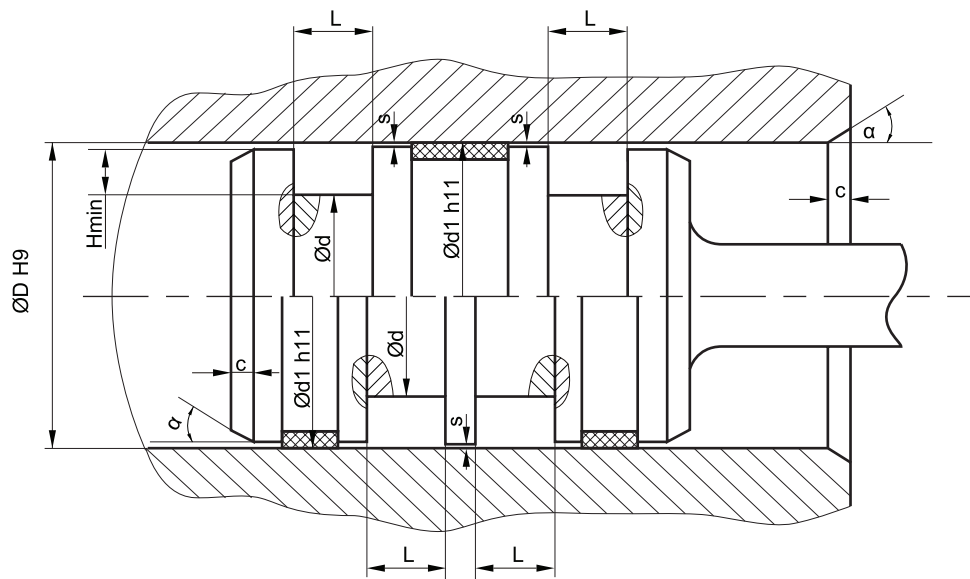
seal housing tolerances	
Ød	h10
ØD	H9

mode of installation

open housings are required.



recommended mounting space:



plastic guiderings (wearbands) have to feature a adequate cutting gap (recommendation: 2-5% of D). if metalic guides are used, spiral grooves shall be provided. the height of the retaining collar Hmin has to be sufficient to assure a stable fit in the housing (larger than 2/3-cs, smaller retaining collars will increase the danger of eversion of the profile in case of occuring drag pressure). in order to avoid drag pressure built up in case of back-to-back arrangement, the distance between the seals should be as small as possible.

insertion chamfer:

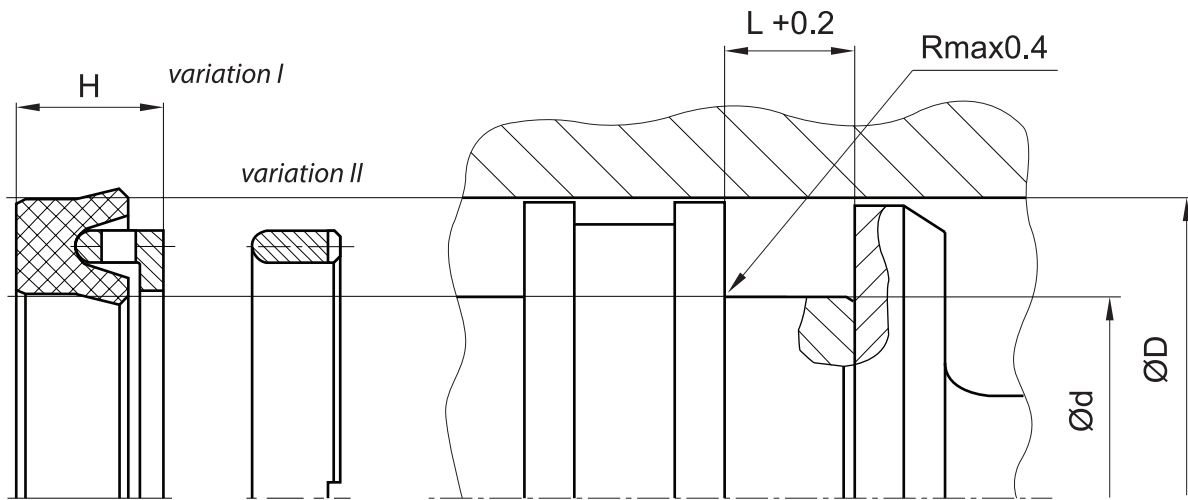
in order to avoid damage to the piston seal during installation, the piston and the housing is to be chamfered and rounded as shown in the "recommended mounting space" drawing. the size of chamfer depends on the seal type and profile width.

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).

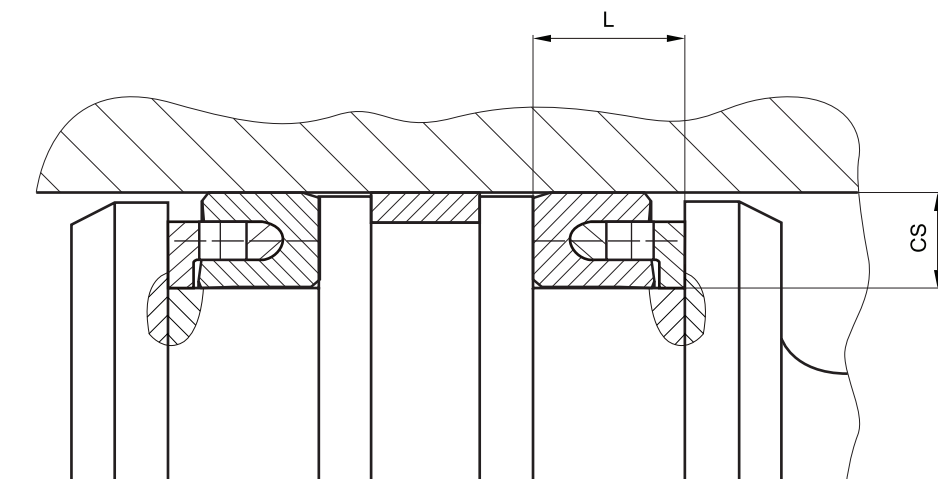
**seal & housing recommendations**

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	4
25 ~ 49,9	ØD - 10	7	5
50 ~ 74,9	ØD - 12	8	6
75 ~ 149,9	ØD - 16	10	7,5
150 ~ 299,9	ØD - 20	12	10
300 ~ 500	ØD - 24	18	12,5
500 ~ 750	ØD - 30	20	15
> 750	ØD - 40	26	20

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.