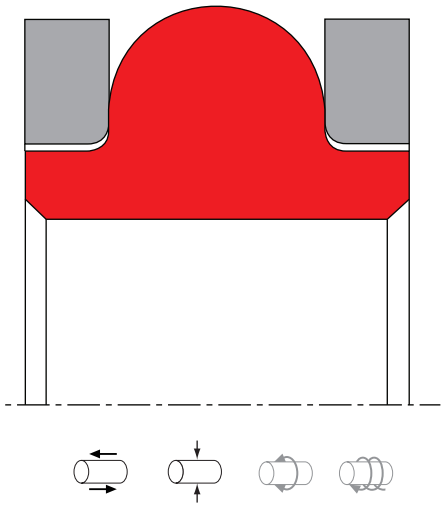
SEAL SPEC
K20-R



description

space saving, compact piston seal, suit-able for standard o-ring housings. advantage compared to o-ring: integrated active back-up rings for high pressure, design with interference fit on outside diameter prevents twisting in dynamic applications.

+ asymmetric double-acting piston compact seal. the preload is achieved by the internal stress of the seal material.
+ interference fit on the inside diameter.
+ various materials are available for different purposes.
+ snaps into simple grooves (see notes on installation).
+ good sealing effect across a wide temperature range
+ for pressures up to 700 bar as a seal pressurised spaces.
+ good sealing in the low pressure range.
+ excellent static sealing.
+ little inclination to "stick-slip".
+ the housing grooves are same as housing grooves for o-rings (see "range of profile sizes")
+ the activated back up rings reduce the risk of gap extrusion and prevent twisting in dynamic applications.
+ due to compact design an inexpensive construction of piston is possible.
+ because of the excellent sealing effect, a fluid transport between the pressurised spaces is practically prevented.

category of profile

machined or molded/standard/trade product

double acting

the K20-R seal is designed for use as a piston seal

area of application; hydraulics

- static and dynamic seals in hydraulic and pneumatic systems.
- use in systems with o-ring grooves instead of o-rings in case of stability problems (twisting) or "pumping".
- for valve seals in offshore and aviation applications.

note

- the design is based on standard o-ring dimensions according AS 568 A (american o-ring dimensions). in case of large deviations from standard groove dimensions the profile has to be checked.
- a design in PU materials is not recommendable because of the large deformation force (optional K35-P)
- high break-away load after prolonged periods of standstill.

function

K20-R profiles are compact piston seals designed to seal between two pressurised spaces; mainly for reciprocating movements, but also for static application and for minor rotating and pivoting movements. the design is based on application in standard hydraulic systems with conventional hydraulic oils, the use in pneumatic systems is furthermore possible. 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
NBR	POM / PA[2]	-	-30 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	-	-	o
HNBR	POM / PA[2]	-	-25 °C ... +100 °C	0,5 m/s	700 bar (70 MPa)	+	o	+
FKM	PAEK	-	-20 °C ... +200 °C	0,5 m/s	700 bar (70 MPa)	-	-	o
HNBR	PAEK	-	-20 °C ... +150 °C	0,5 m/s	700 bar (70 MPa)	+	o	+
FKM	PTFE glass	-	-25 °C ... +200 °C	0,5 m/s	700 bar (70 MPa)	-	-	o
HNBR	PTFE glass	-	-25 °C ... +150 °C	0,5 m/s	700 bar (70 MPa)	+	o	+

[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

the size of the permissible gap on the side opposite the source of pressure depends mainly on the seal material and the design of the seal. if the permissible gap dimensions are exceeded, there will be extrusion wear on the side opposite the source of pressure which may make the seal unfit for usage. the maximum value of the permissible extrusion gap is reached when the piston touches one side of the cylindrical tube or the guide. due to the small height of the back up rings and the resulting sensitivity to extrusion, the gap size is limited for all ranges of diameter, pressure and cross section by the standard hole/shaft basis fit f8/H8, influences due to thermal expansion have to be considered..

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	h10
t	0,05

mode of installation

the sealing element should be slipped over the piston and snapped into the groove, followed by both backup elements. at installation, pay attention that the radius on the backup elements fits to the corresponding radius on the sealing element (nonsymmetric backup elements). the installation of the backup elements is generally trouble-free, at installation of the sealing element the material deformation should not exceed the value of 30%, otherwise the permanent deformation would be too large.

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°
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

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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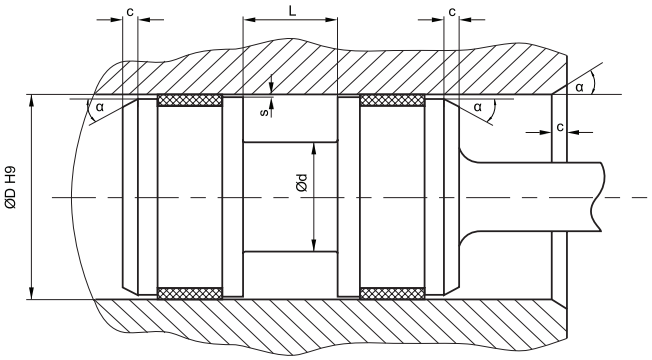
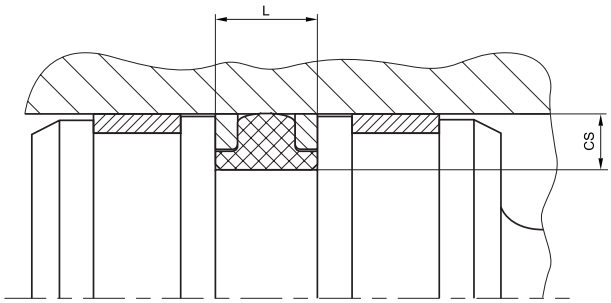
recommended mounting space



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. smaller values for Hmin will ease the installation (reduced elongation and mounting force) but the height of the retaining collar has to be sufficient to assure a stable fit in the housing (larger than cs/2, 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.

fitted



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...