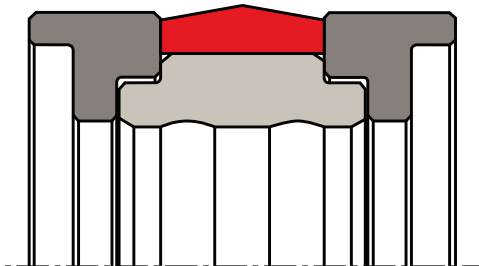


piston seal K09-H

seal spec



application



not bolded symbols; please consult our technical for application limitations

description

profile ring activated compact piston seal with integrated guiding elements. design for high pressure range, excellent static sealing capacity. mainly used in mining / tunneling industry.

- asymmetric double acting compact piston seal set, consisting of a gliding part, a preload element and combined guiding and backup elements.
- interference fit on the inside diameter.
- various materials are available for different purposes.
- easy to slip over stepped grooves (see notes on installation and recommended mounting space).
- highest degree of sealing across a wide temperature range.
- for pressures up to 1500 bar as a seal between pressurised spaces.
- excellent sealing in all pressure ranges.
- very good static sealing.
- suitable for short and long travel.
- due to compact design an inexpensive construction of piston is possible.
- no drag pressure build-up.
- for holding functions.
- improved guiding properties due to activated guiding and support elements.
- because of the excellent sealing effect, a fluid transport between the pressurised spaces is practically prevented.
- increased preload and reinforced guiding and support elements especially for high pressure application.
- 2 grooves on the inside diameter of the preload element for local limiting the preload force.

category of profile

machined product only.

double acting

the K09-H seal is designed for use as a piston seal.

area of application: hydraulics

- reciprocating pistons in hydraulic cylinders.
- as piston seals for clamping function resp. for low requests for movement.
- as piston seal in high pressure cylinders (e.g. mining).

note

- very high frictional force.
- the ratio between nominal width and sealing height cs/H should be approximately $1/2.5$ (essentially according to ISO 6547 housings for piston seals with integrated guide rings).

function

K09-H profiles are compact piston seals designed 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 | energizer | back-up ring | | | | | | |
| s-mart HPU | s-mart NBR | s-mart POM / s-mart PA ² | -20 °C ... +100 °C | 0,3 m/s | 1500 bar (150 MPa) | - | + | + |
| s-mart GPU | s-mart NBR | s-mart POM / s-mart PA ² | -30 °C ... +100 °C | 0,3 m/s | 1500 bar (150 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.

² POM up to Ø260 mm, PA above Ø260 mm

++ ... 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 resp. for higher gliding speeds PTFE-materials should be used (e.g. profile K09-F or a different sealing system).

note on special material:

other 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). the temperature limits are determined by the guide- and support parts, using special materials can expand the temperature limits.

gap dimension

by using the guide and support parts, the extrusion gap for the sealing part is already integrated in the seal. the gap between piston and housing should not exceed 0,4 mm, fabrication tolerances have to be included.

surface quality

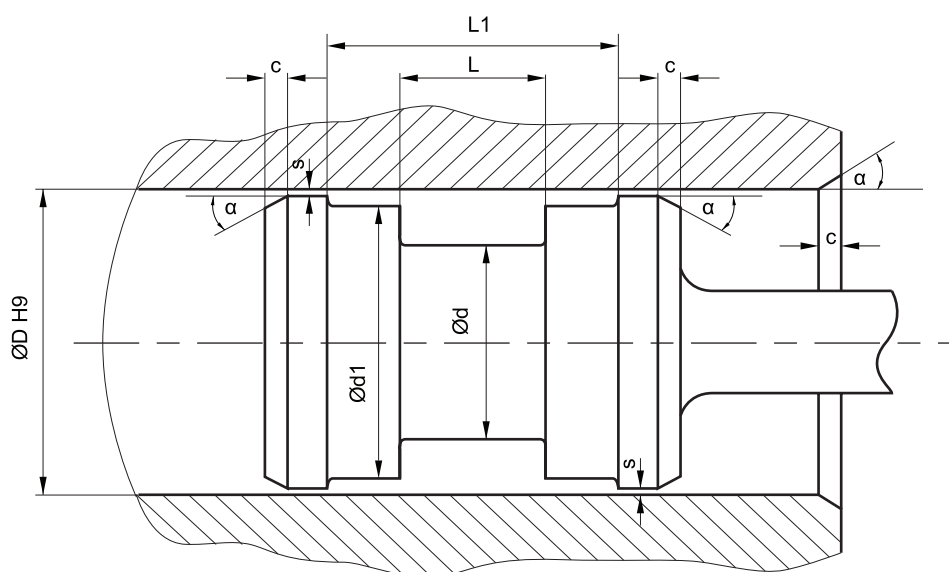
| surface roughness | Rtmax (µm) | Ra (µm) |
|-------------------|------------|----------|
| sliding surface | ≤2,5 | ≤0,1-0,5 |
| bottom of groove | ≤6,3 | ≤1,6 |
| groove face | ≤15 | ≤3 |

tolerance recommendation

| seal housing tolerances | |
|-------------------------|----|
| Ød | h9 |
| Ød1 | h8 |
| ØD | H9 |

mode of installation

first of all the preload element should be slipped over the piston and snapped into the groove, then the first guiding and backup element should be placed into the groove, followed by the gliding part and then the second guiding and backup element. the installation of the guiding- and backup elements as well as the gliding part is generally trouble-free.

recommended mounting space:

**insertion chamfer:**

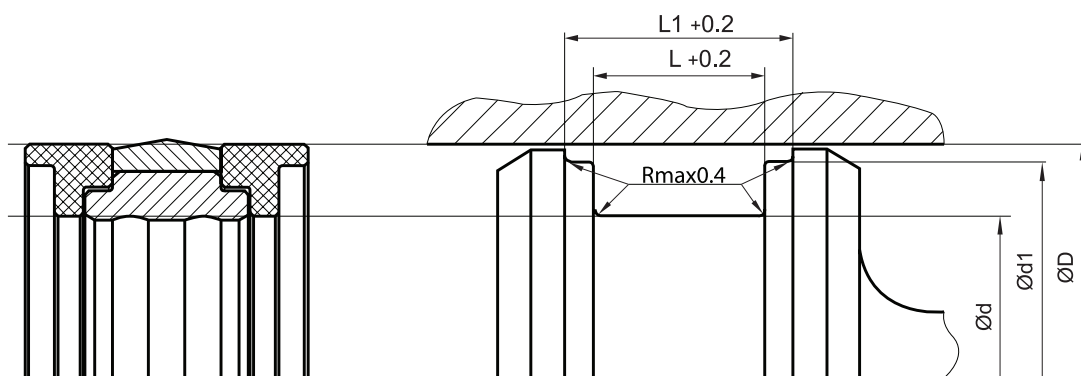
in order to avoid damage to the piston seal during installation, the piston and the housing is to be chamfered and rounded as shown in the "recommended mounting space" drawing. the size of chamfer depends on the seal type and profile width.

| cs (mm) | c (mm) | |
|---------|------------------------------------|------------------------------------|
| | $\alpha = 15^\circ \dots 20^\circ$ | $\alpha = 20^\circ \dots 30^\circ$ |
| 5 | 4 | 2,5 |
| 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...

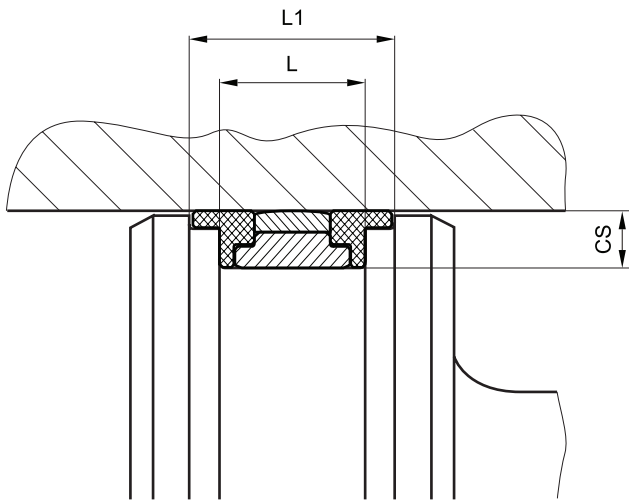


the ratio between nominal width and seal height cs/H should not drop below $1/2,5$. therefore we recommend the following housing heights.

| $\varnothing D$ [mm] | $\varnothing d$ [mm] | $\varnothing d1$ [mm] | L [mm] | L1 [mm] | $cs = (\varnothing D - \varnothing d)/2$ [mm] |
|----------------------|----------------------|-----------------------|--------|---------|---|
| 20 - 49,9 | $\varnothing D - 10$ | $\varnothing D - 3$ | 12,5 | 20,5 | 5 |
| 50 - 79,9 | $\varnothing D - 15$ | $\varnothing D - 4$ | 20 | 28 | 7,5 |
| 80 - 149,9 | $\varnothing D - 20$ | $\varnothing D - 5$ | 25 | 36 | 10 |
| 150 - 399,9 | $\varnothing D - 25$ | $\varnothing D - 6$ | 32 | 46 | 12,5 |
| 400 - 750 | $\varnothing D - 30$ | $\varnothing D - 8$ | 36 | 50 | 15 |
| >750 | $\varnothing D - 40$ | $\varnothing D - 8$ | 40 | 54 | 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.