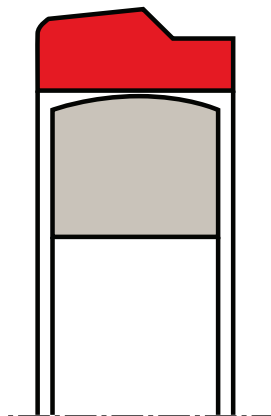


piston seal K08-ES

seal spec



application



description

profile ring-activated asymmetric PTFE piston seal, similar to K08-E, but special heavy duty design for heavy industry hydraulics or for special housing dimensions. K08-ES is for use where sealing pistons have pressure on one side. K08-ES series is designed especially for large diameters. very high resistance to pressure, design prevents twisting, very good protection against extrusion, high resistance to abrasion, good thermal conductivity, low friction, free of stick-slip, high contact pressure due to elastomer profile ring.

- asymmetric single-acting composite piston seals, with a gliding part made of low-friction material and an elastic preload element.
- interference fit on the outside diameter.
- various materials are available for different purposes.
- snaps into simple grooves (see notes on installation).
- the free space on the trailing side reduces the risk of gap extrusion.
- the massive profile ring makes only small relative movements and is thus not subject to specific wear.
- preferably used for heavy-duty applications.
- for standard application only if an O-ring is not available.
- highest degree of sealing across a wide temperature range.
- sealing effect enhanced by high recovery.
- for pressures up to 400 bar (in special cases up to 800 bar) as a seal between pressurised space and atmosphere.
- good sealing in all pressure ranges.
- good static and dynamic sealing.
- suitable for short and long travel with extremely slow or quick movements.
- no stick-slip.
- small break-away load after prolonged periods of standstill.
- exact positioning due to little friction.
- high mechanical efficiency.
- insensitive to thermal damage caused by air in the oil.
- high distortion stability.
- high pressing force due to rubber profile ring.
- tandem arrangement possible (similar to S09-E).

category of profile

machined or molded/standard/trade product.

single acting

the K08-ES 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 on hydraulic cylinders, small swiveling motion permissible.
- especially for larger diameter and heavy-duty hydraulic applications.
- as piston seal for small permissible frictional forces or if smooth running is required.
- for heavy-duty operating conditions.

note

the ratio between nominal width and sealing height NB/H should range between 1/0.75 and 1/1.5.

function

K08-ES profiles are composite piston 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.



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 glass	s-mart NBR	-30 °C ... +100 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE bronze	s-mart NBR	-30 °C ... +100 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE carbon	s-mart NBR	-30 °C ... +100 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE glass	s-mart FKM	-20 °C ... +200 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE bronze	s-mart FKM	-20 °C ... +200 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE carbon	s-mart FKM	-20 °C ... +200 °C	10 m/s	400 bar (40 MPa)	-	++	+
s-mart PTFE glass	s-mart EPDM ²	-50 °C ... +150 °C	10 m/s	400 bar (40 MPa)	++	++	+
s-mart PTFE bronze	s-mart EPDM ²	-50 °C ... +150 °C	10 m/s	400 bar (40 MPa)	++	++	+
s-mart PTFE carbon	s-mart EPDM ²	-50 °C ... +150 °C	10 m/s	400 bar (40 MPa)	++	++	+
s-mart PTFE glass	s-mart HNBR	-25 °C ... +150 °C	10 m/s	400 bar (40 MPa)	+	++	+
s-mart PTFE bronze	s-mart HNBR	-25 °C ... +150 °C	10 m/s	400 bar (40 MPa)	+	++	+
s-mart PTFE carbon	s-mart HNBR	-25 °C ... +150 °C	10 m/s	400 bar (40 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 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 decreased leakage rates elastomer materials (polyurethane or rubber) in other sealing systems are to be preferred.

gap dimension

operating pressure	cs = (ØD - Ød)/2 mm					
	5	7,5	10	12,5	15	20
	safe extrusion gap (mm)					
100 bar (10 MPa)	0,38	0,43	0,50	0,56	0,65	0,83
200 bar (20 MPa)	0,28	0,32	0,35	0,42	0,50	0,64
300 bar (30 MPa)	0,22	0,25	0,30	0,34	0,42	0,56
400 bar (40 MPa)	0,19	0,22	0,24	0,29	0,36	0,49

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.

for extrusion gap sizes resulting from tolerance pair H8/f8 pressure ranges above 400 bar can be reached in special cases, influences due to thermal expansion have to be considered. we recommend to contact our application engineering department.

surface quality

surface roughness	Rtmax (µm)	Ra (µm)
sliding surface	≤2	≤0,05-0,3
bottom of groove	≤6,3	≤1,6
groove face	≤15	≤3

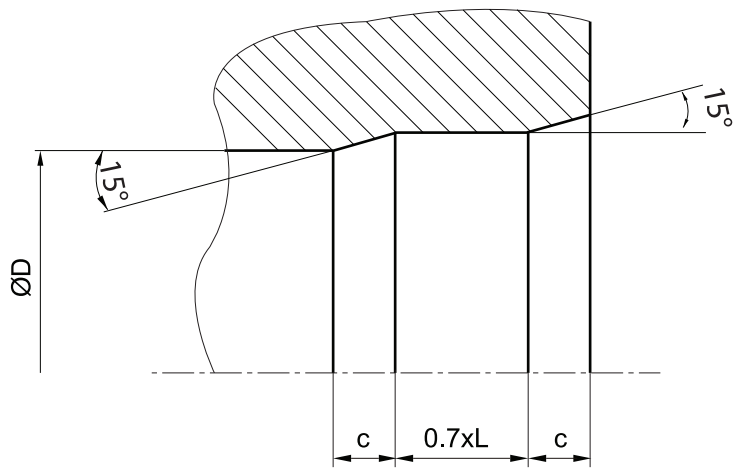
tolerance recommendation

seal housing tolerances	
Ød	h10
ØD	H9

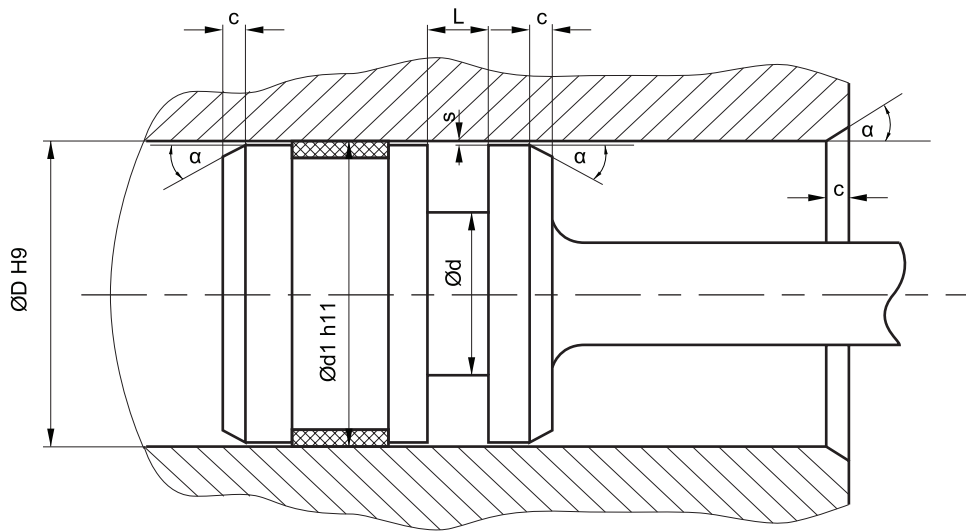


mode of installation

in case of closed grooves, it is not recommended to slip the seal over the piston by hand (uneven material deformation in the sealing part). after the O-Ring is placed into the groove, the sealing part should be stretched over a installation cone by using a sleeve (assembly aid tools). a recovery of the sealing part with a calibrating sleeve is advisable, however, a special shaped insertion chamfer on the cylinder barrel can also be designed (danger of tilting). values for "c" see insertion chamfer.



recommended mounting space:



insertion chamfer:

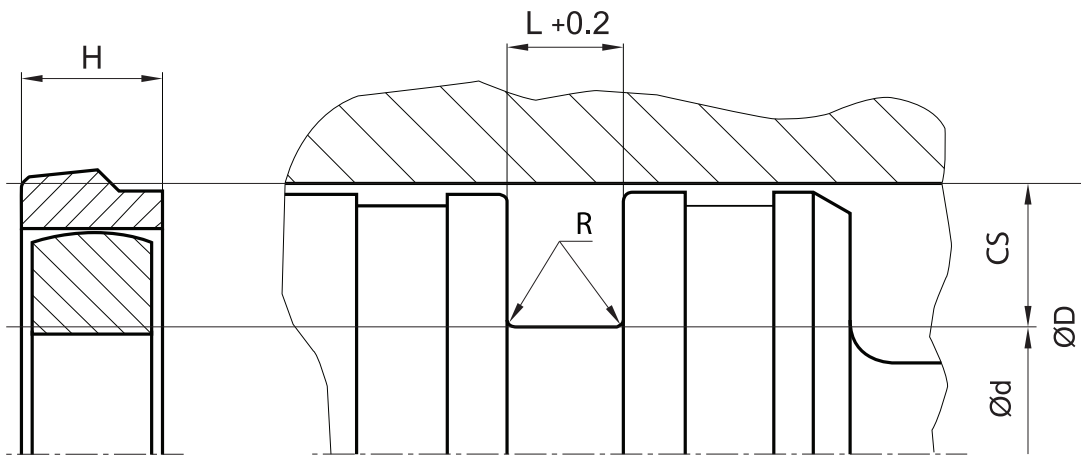
in order to avoid damage to the piston seal during installation, the piston and the housing is to be chamfered and rounded as shown in the "recommended mounting space" drawing. the size of chamfer depends on the seal type and profile width.

cs (mm)	c (mm)	
	α = 15° ... 20°	α = 20° ... 30°
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).

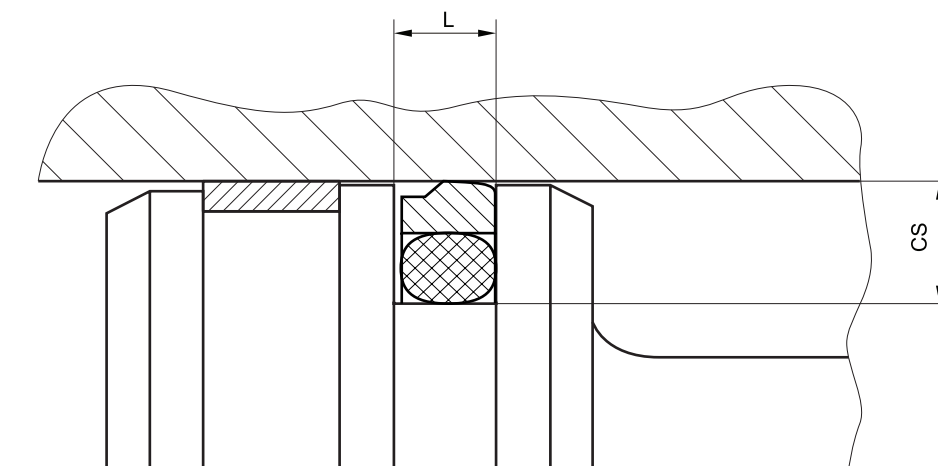
**seal & housing recommendations**

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 should be in accordance to ISO 7425 part 1. we recommend the following values:

ØD [mm]	L [mm]	cs = (ØD - Ød)/2 [mm]	L	R
20 ~ 49,9	5	5	≤ 10	max. 0,4
50 ~ 59,9	7,5	7,5	> 10 ≤ 1,5	max. 0,8
60 ~ 199,9	10	10	> 15	max. 1,2
200 ~ 299,9	12,5	12,5		
300 ~ 529,9	15	15		
530 ~ 679,9	17,5	17,5		
680 ~ 999,9	20	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.