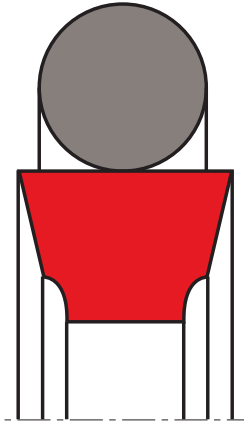


rod seal S09-SA

seal spec



description

the rod seal S09-SA is a further technical development of the S09-D seal which has been successfully used for decades. it is fully interchangeable with the earlier S09-D seals in all new applications.

the benefits of the patented seal concept are provided by the innovative functional principle of the trapezoidal profile cross-section.

both lateral profile flanks are inclined so that the seal profile tapers towards the seal surface. the profile can thus retain the robust and compact form typical of piston seals without losing any of the flexibility required to achieve a pressure-related maximum compression.

the edge angle created by the special S09-SA cross- sectional form permits an additional degree of freedom and enables a slight tilting movement of the seal. the maximum compression is thus always shifted towards the area of the seal edge directly exposed to the pressure. on the low-pressure edge of the seal, on the other hand, the S09-SA exhibits only zones with neutral strains without compressive or shearing loads, thus effectively reducing the danger of gap extrusion. the resulting benefits for the user can be seen in the following list.

application



not bolded symbols; please consult our technical for application limitations

category of profile

machined or molded/standard/trade product.

double acting

the S09-SA seal is designed for use as a rod seal.

area of application: hydraulics

the S09-SA is the recommended sealing element for double acting inside sealing seal for hydraulic components such as:

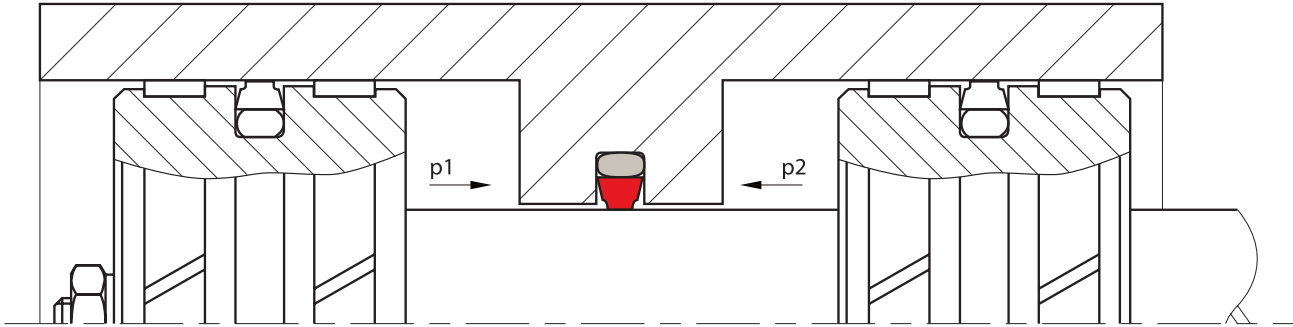
- injection moulding machines
- machine tools
- presses
- handling machinery
- agriculture
- valves.

it is particularly recommended for heavy duty and large diameter applications.

advantages

the benefits offered to date by the S09 are still retained in full, and are now complemented by a number of further important advantages:

- very good static leak-tightness
- increased clearance possible (approx. +50%), depending on the operating conditions
- low friction, no stick-slip effect
- simple groove design
- installation grooves to ISO 7425/2
- available for all rod diameters up to 2.600 mm.

**media**

mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally safe hydraulic fluids (bio-oils), water, air and others, depending on the O-Ring material.

operating parameters & material for standard application:

| material | | temperature | max. surface speed | max. pressure ¹ |
|--------------------|---------------------------------------|-------------------|--------------------|----------------------------|
| sealing element | energizer | | | |
| s-mart PTFE bronze | s-mart NBR (70 Shore A) | -30°C ... + 100°C | 15 m/s | 600 bar (60 MPa) |
| | s-mart NBR (70 Shore A for low temp.) | -45°C ... + 80°C | 15 m/s | 600 bar (60 MPa) |
| | s-mart FKM (70 Shore A) | -10°C ... + 200°C | 15 m/s | 600 bar (60 MPa) |

for hydraulic components with reciprocating movement in mineral oils containing zinc or medium with good lubricating performance. for hydraulic high compressive strength, good sliding and wear properties, good extrusion resistance, BAM tested.

mating surface material: steel tubes, steel hardened cast iron

colour: greyish to dark brown

operating parameters & material for special application:

| material | | temperature | max. surface speed | max. pressure ¹ |
|--|---------------------------------------|-------------------|--------------------|----------------------------|
| sealing element | energizer | | | |
| PTFE + carbon fibre (carbon fibre filled) | s-mart NBR (70 Shore A) | -30°C ... + 100°C | 15 m/s | 250 bar (25 MPa) |
| | s-mart NBR (70 Shore A for low temp.) | -45°C ... + 80°C | 15 m/s | 250 bar (25 MPa) |
| | s-mart FKM (70 Shore A) | -10°C ... + 200°C | 15 m/s | 250 bar (25 MPa) |
| | s-mart EPDM ² (70 Shore A) | -45°C ... + 145°C | 15 m/s | 250 bar (25 MPa) |

non-lubricating fluids or pneumatic applications require self-lubricating sealing materials.

for all lubricating and non-lubricating hydraulic fluids, hydraulic oils without zinc, water hydraulic, soft mating surfaces, good extrusion resistance. surface texture not suitable for gases.

mating surface material: steel, cast iron, stainless steel, aluminium, bronze, alloys

colour: grey

operating parameters & material for special application:

| material | | temperature | max. surface speed | max. pressure ¹ |
|-------------------------------|---------------------------------------|-------------------|--------------------|----------------------------|
| sealing element | energizer | | | |
| s-mart PU (cast polyurethane) | s-mart NBR (70 Shore A) | -30°C ... + 100°C | 15 m/s | 800 bar (80 MPa) |
| | s-mart NBR (70 Shore A for low temp.) | -45°C ... + 80°C | 15 m/s | 800 bar (80 MPa) |

if rougher surface finish must be sealed.

for lubricating hydraulic fluids, high abrasion resistance, high extrusion resistance, limited chemical resistance.

mating surface material: steel, steel hardened, cast iron, ceramic coating, stainless steel.

colour: yellow to light-brown

important note:

the above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. temperature range also dependent on medium.

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

² attention: not suitable for mineral oils!



installation dimensions

| rod diameter - d (f8/h9) | | | D (H9) | L + 0,2 | r | max. permissible gap dimension - s ¹ | | | O-Ring cross section |
|--------------------------|-------------------|------------------------|----------|---------|-----|---|--------|--------|----------------------|
| standard application | light application | heavy duty application | | | | 10 MPa | 20 MPa | 40 MPa | |
| 3 ~7,9 | 8 ~18,9 | ~ | d + 4,9 | 2,2 | 0,4 | 0,40 | 0,30 | 0,20 | 1,78 |
| 8 ~18,9 | 19 ~37,9 | ~ | d + 7,3 | 3,2 | 0,6 | 0,60 | 0,50 | 0,30 | 2,62 |
| 19 ~37,9 | 38 ~199,9 | 8 ~18,9 | d + 10,7 | 4,2 | 1,0 | 0,70 | 0,50 | 0,30 | 3,53 |
| 38 ~199,9 | 200 ~255,9 | 19 ~37,9 | d + 15,1 | 6,3 | 1,3 | 0,80 | 0,60 | 0,40 | 5,33 |
| 200 ~255,9 | 256 ~649,9 | 38 ~199,9 | d + 20,5 | 8,1 | 1,8 | 0,80 | 0,60 | 0,40 | 6,99 |
| 256 ~649,9 | 650 ~999,9 | 200 ~255,9 | d + 24,0 | 8,1 | 1,8 | 0,90 | 0,70 | 0,50 | 7,00 |
| 650 ~999,9 | ≥ 10002 | 256 ~649,9 | d + 27,3 | 9,5 | 2,5 | 1,00 | 0,80 | 0,60 | 8,40 |
| ≥ 1000 ² | - | 650 ~999,9 | d + 38,0 | 13,8 | 3,0 | 1,20 | 0,90 | 0,70 | 12,00 |

important note:

the above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. temperature range also dependent on medium.

¹ at pressures > 40 MPa use diameter tolerance H8/f8 (bore/piston) in area of the seal. the radial clearance is valid for material PTFE + Bronze at +60°C.

² energiser has a special shape.

surface quality

| surface roughness | material | Rtmax [µm] | Rz DIN [µm] | Ra [µm] |
|-------------------|--------------|-------------|-------------|-------------|
| mating surface | PTFE + | 0.63 - 2.50 | 0.40 - 1.60 | 0.05 - 0.20 |
| | PU & Rubber | 1.00 - 4.00 | 0.63 - 2.50 | 0.10 - 0.40 |
| groove surface | | < 16 | < 10.0 | < 1.6 |

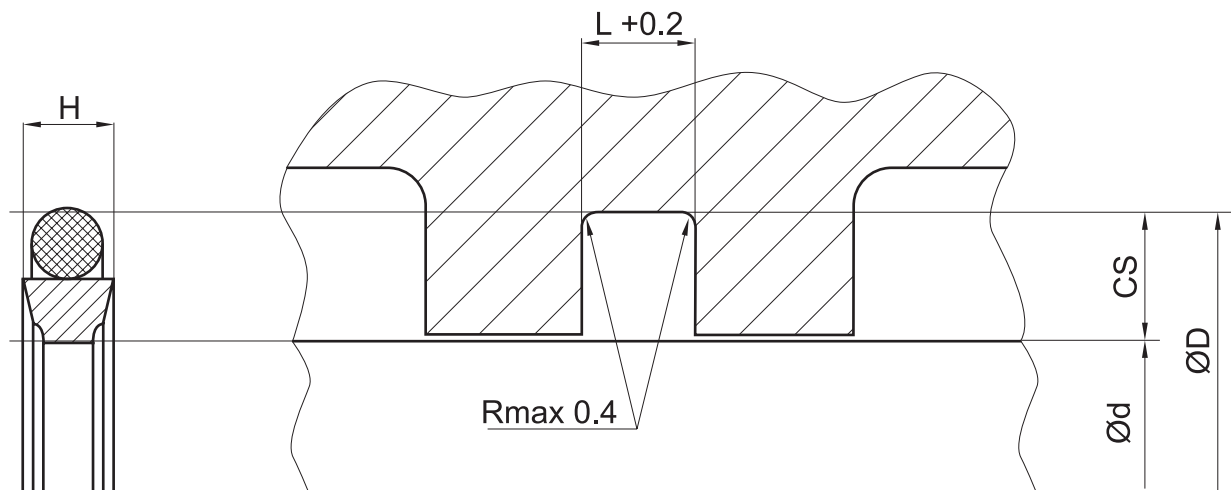
tolerance recommendation

seal housing tolerances

| | |
|----|-------|
| Ød | f8/h9 |
| ØD | H9 |

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...



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.