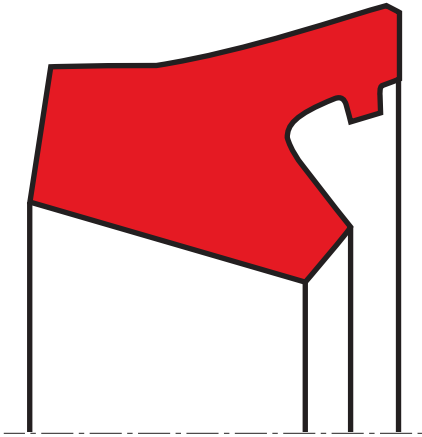


## rod seal S64

## seal spec



### description

the S64 rod seal is a single acting polyurethane rod seal with a unique design offering a hydrodynamic backpumping ability over the complete working pressure range. the pressure-independent, hydrodynamic sealing ability of this new sealing element requires no lubrication reservoir in the sealing area and ensures a constant and controlled pressure distribution over a wide pressure range.

### application



### category of profile

machined or molded/standard/trade product.

### single acting

the S64 seal is designed for use as a rod seal.

### area of application: hydraulics

S64 can be used in all applications in which previously a conventional U-ring was applied, such as:

- fork lifts
- agricultural machines
- light and medium mobile hydraulics
- industrial hydraulics
- machine tools
- injection moulding machines
- hydraulic presses

another preferred solution for tandem rod sealing systems is the combination with the S09-SG as primary seal and S64 as secondary seal, in conjunction with a double acting wiper.

### advantages

- hydrodynamic back-pumping ability over the complete working pressure range.
- low friction and therefore a reduction of heat generated.
- low breakout force even after a long period of non-operation.
- very low stick-slip.
- low increase in friction at increasing pressure.
- high extrusion resistance.
- optimum geometry of the static sealing lip for higher sealing ability.
- no entrapped oil and grease between seal and groove (due to notches).
- no pressure build-up between seal and groove OD.
- long service life.

the S64 was designed in accordance with customers' demands.

- groove dimensions according to ISO 5597 Part 2.
- interchangeable with existing U-Cup grooves.
- installation into closed grooves.
- wear and extrusion resistant high-performance polyurethane.



### operating parameters & material

material	temperature	max. surface speed	max. pressure <sup>1</sup>
s-mart PU (93 shore A)	-35 °C ... +110 °C	0,5 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.

<sup>1</sup> pressure ratings are dependent on the size of the extrusion gap.

### method of operation

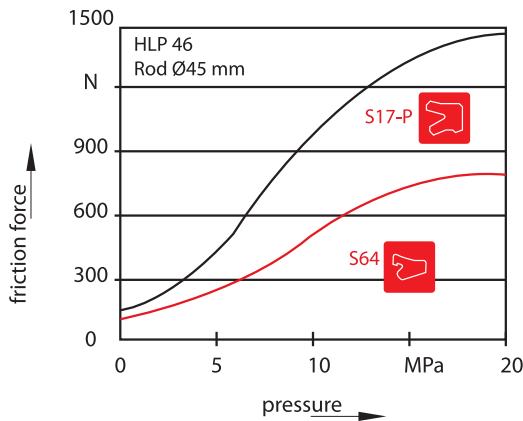
the hydrodynamic back-pumping seals such as S09-E, and the use of Finite Element Analysis (FEA) and other laboratory tests have led to the development of S64. the main objective in the development of this seal was the ability to achieve an optimum pressure distribution over the complete pressure range.

the pressure distribution curve under the sealing lip needs to have a steep gradient on the high-pressure side and a shallow gradient on the rear of the seal. the operating principles and function of S64 is similar to the well-known S09-E.

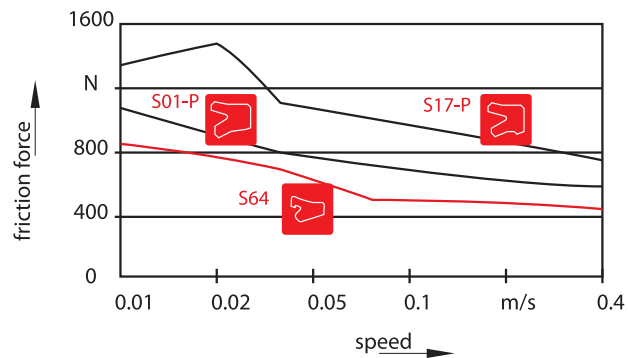
### friction

in figure below the friction values of a conventional U-ring and of S64 are being compared. a high increase in friction of the U-ring is clearly shown between approximately 5 and 15 MPa. this is due to the U-ring being totally pressed on the rod surface at increased pressure, causing elimination of the oil reservoir and dry running of the U-ring.

in comparison, the S64 shows only a low increase in friction which is due to the smaller contact area and better tribological behaviour. the result is a low friction heat generation.



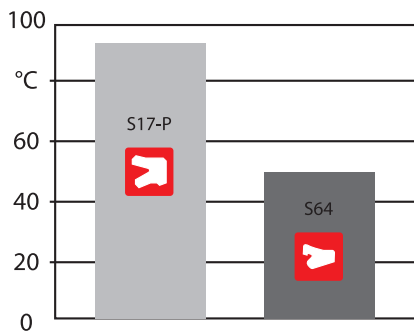
friction dependent on pressure



friction dependent on speed

### friction heat

the effect described above can be made visible by simply measuring the temperature. figure 36 shows the increase in temperature on the rod surface caused by friction, measured at a pressure of 40 MPa after 20,000 cycles. this explains the prolonged service life of S64.



increase in temperature caused by friction

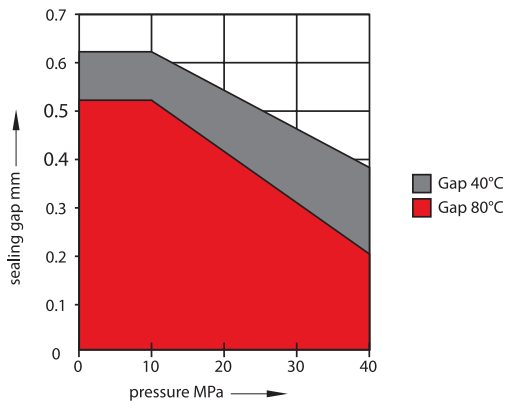
### test conditions

dimension	: 50x60x11 mm
pressure	: 0/40 MPa
velocity	: 0.1 m/s
temperature	: ambient



### gap dimension

the recommended gap dimensions described in figure sealing gap below, depend on pressure and temperature.



### surface quality

surface roughness	material	Rtmax [ $\mu\text{m}$ ]	Rz DIN [ $\mu\text{m}$ ]	Ra [ $\mu\text{m}$ ]
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

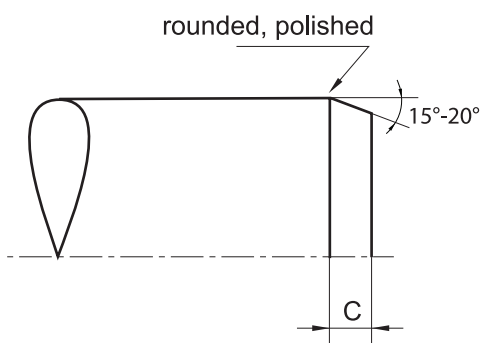
#### seal housing tolerances

$\varnothing d$	f8
$\varnothing D$	H10

### lead in chamfers

in order to avoid damage to the rod seal during installation, lead-in chamfers and rounded edges must be provided on the piston rods (figure below). if this is not possible for design reasons, a separate installation tool must be used.

the minimum length of the lead-in chamfer depends on the profile size of the seal and can be seen from the following tables.

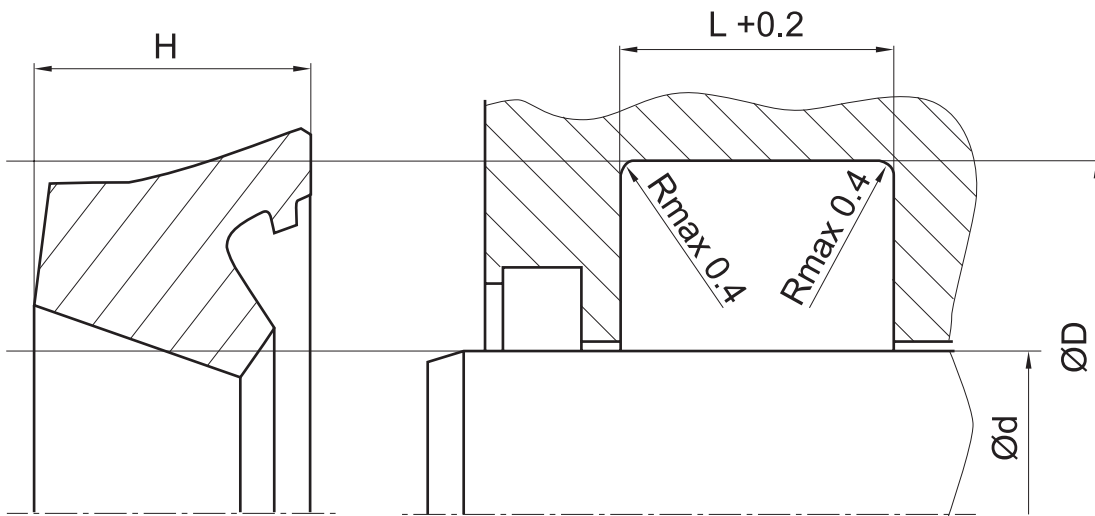


cs (mm)	c (mm)
	$\alpha = 15^\circ \dots 20^\circ$
3.5	2.0
4.0	2.0
5.0	2.5
7.5	4.0
10.0	5.0
12.5	6.5
15.0	7.5



**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.*