Zurcon® Rimseal

Single-acting

Rubber-energized plastic-faced seal

Material:
Zurcon® and Elastomer

Zurcon® Rimseal*

Description

When the application requirements make high demands on leakage control and reliability, a redundant sealing system is necessary to ensure reliable sealing of hydraulic cylinders at the piston rod.

METHOD OF OPERATION

Zurcon® Rimseal is an elastomer energized seal element. The changes in seal position in the groove, necessary for optimum sealing function, are guaranteed by the combination of the two parts: the O-Ring and seal ring.

In order to achieve a contact force increasing sealing effect with increasing pressure, the seal has a chamfer on the low pressure side which causes the seal to tilt slightly so that the seal ring is forced against the side of the groove. This creates an area of maximum pressure at the edge of the seal.

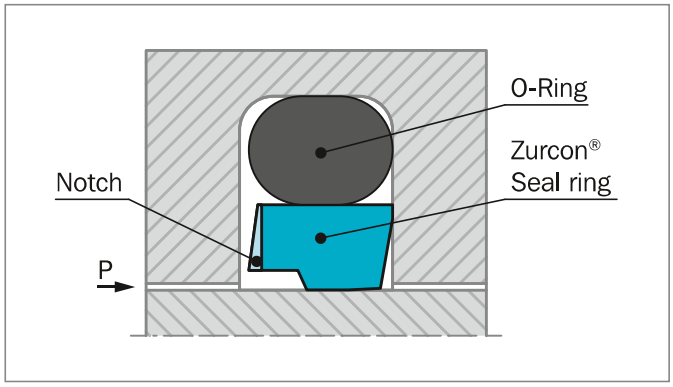

Figure 30: Zurcon® Rimseal

When Zurcon® Rimseal is used in a system with a double-acting scraper DA24 (DA22, DA17, DA27, Excluder® 2 resp. 5 or 500), the sealing function of the system must be assured even if pressure build-up occurs between Rimseal and the double-acting scraper.

The high-pressure side of the seal ring also has a chamfer which, in the event of a build-up of pressure behind Rimseal, comes into contact with the flank of the groove. Rimseal moves in the groove so that a contact pressure distribution is obtained on the rod which enhances the back-pumping effect.

ADVANTAGES

- High static and dynamic sealing effect
- Low friction for reduced power loss
- High wear resistance for long service life
- Small groove
- Easy installation
- ISO 7425-2 grooves optional
- Available for any diameter from 8 to 2,200 mm

APPLICATION EXAMPLES

- Mobile hydraulics
- Standard cylinders
- Machine tools
- Injection molding machines
- Presses

OPERATING CONDITIONS:

Pressure:	In tandem system: Up to 60 MPa As an individual element: 25 MPa
Velocity:	5 m/s with short strokes <1 m in tandem system
Temperature:	-45 °C to +110 °C depending on O-Ring material
Media:	Hydraulic fluids - Mineral oil - Synthetic and natural esters - HEES, HETG up to +60 °C - Flame retardant fluids HFA, HFC
Clearance:	The maximum permissible radial clearance S_{max} is shown in Table 23, as a function of the operating pressure and functional diameter.

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 depends on media.

* Patent No.: EP 0 670 444

SERIES

Zurcon® Rimseal is a system seal and is preferably used in tandem sealing systems in conjunction with Stepseal® 2K. For this reason the type series are identical with those for Stepseal® 2K.

Table 23 shows the relationship between the series number according to the seal diameter range and the different application class sizes:

Standard application	RR13
Light application	RR15
Heavy-duty application	RR11

REDUNDANT SEALING SYSTEM

Redundant sealing systems are used where the application conditions no longer permit reliable sealing over the demanded service life with a single seal.

The tandem sealing system is particularly important during cold starts when, due to the very high viscosity of the oil, the primary seal allows oil to pass as the piston rod is extended. In the tandem system the oil is heated as a result of the friction at the primary seal and is then reliably wiped off - at a now lower viscosity - by the secondary seal, the Zurcon® Rimseal.

As the piston rod is retracted, the oil is stored in the reservoir between the seals, and is then pumped back against the system pressure by the hydrodynamics in the seal clearance of Stepseal® 2K.

Particularly with strokes of more than 1 meter, measures have to be taken to provide a storage chamber between the seals.

Rimseal is designed to have the back-pumping effect necessary when using a double-acting scraper in the rod sealing system.

Figure 31 shows a redundant rod seal system consisting of Stepseal® 2K, Rimseal and Scraper DA22 with corresponding wear ring arrangement.

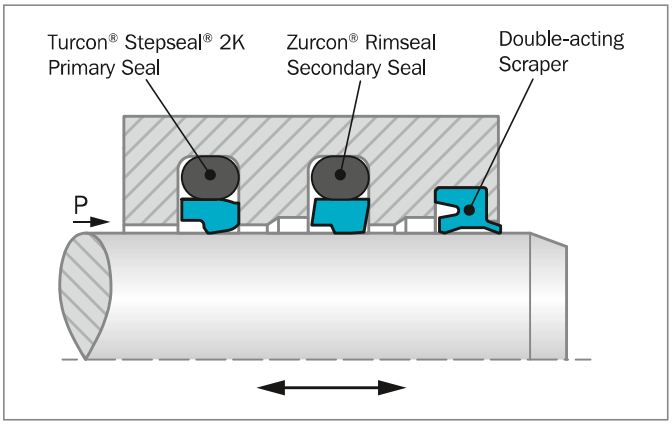

Figure 31: Zurcon® Rimseal in tandem configuration

The optimum rod sealing system for hydraulic cylinders subject to heavy loads should consist of three elements:

1) Turcon® Stepseal® 2K used as a primary seal. This seal element offers the back-pumping property necessary for redundant rod seal systems.

2) Zurcon® Rimseal as the secondary seal in this system to ensure reliable sealing of thin oil films at low secondary pressures. A Zurcon® material (polyurethane Shore D 58) is used combined with a new seal profile.

3) The final outer element of the redundant sealing system is a double-acting scraper seal (e.g. DA24, DA22, DA17, DA27. Turcon® Excluder® 2 resp. 5 or Zurcon® Excluder® 500).

The sealing system thus consists of three independent lip seals installed in line, in which the hardness of the material decreases from the pressure side to the atmospheric side.

INSTALLATION INSTRUCTIONS

Zurcon® Rimseal is installed according to information at page 37 and 38.

Closed groove installation applies the same dimensions as Turcon® Stepseal® 2K in Table 6 on page 38.

MATERIAL

Zurcon® Rimseal in Zurcon® Z54
For light to heavy applications with linear movements in mineral oils and other media according to the Technical Data. Rimseal in Zurcon® Z54, special polyurethane 58 Shore D, is available in the following material combinations as standard:

O-Ring:	NBR 70 Shore A	N
	NBR 70 Shore A Low temp.	T
Set code:	Z54N or Z54T	

Installation Recommendation

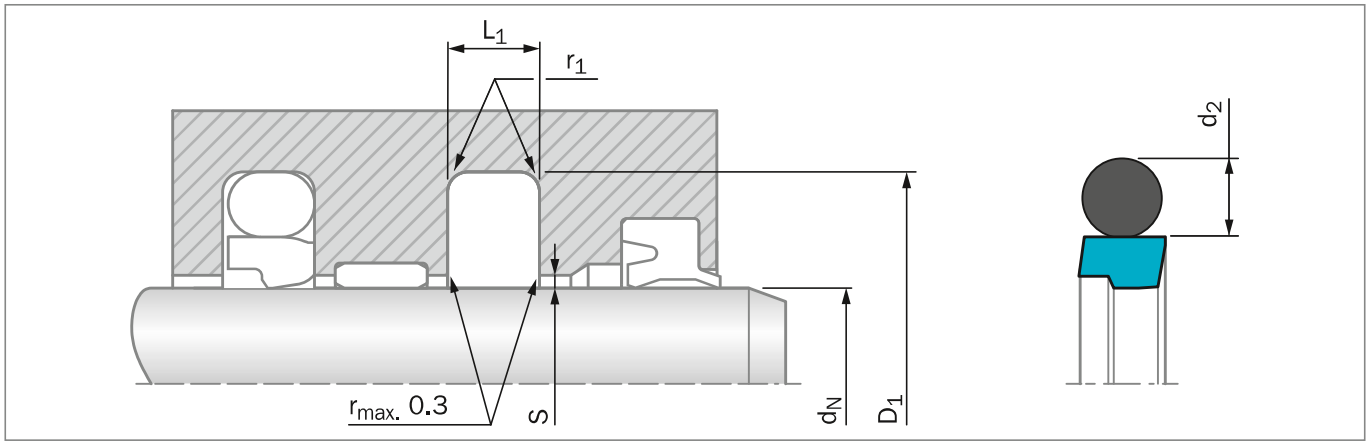

Figure 32: Installation Drawing

Table 23: Installation Dimensions – Standard Recommendations

Rod Diameter d_N f8/h9			Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*		O-Ring Cross Section
Series No. RR 13 Standard Application	Series No. RR 15 Light Application	Series No. RR 11 Heavy Duty Application	D_1 H9	L_1 +0.2	$r_{1\ max}$	10 MPa	20 MPa	d_2
8 - 18.9	19 - 37.9	-	d_N + 7.3	3.2	0.6	0.40	0.25	2.62
19 - 37.9	38 - 199.9	8 - 18.9	d_N + 10.7	4.2	1.0	0.40	0.25	3.53
38 - 199.9	200 - 255.9	19 - 37.9	d_N + 15.1	6.3	1.3	0.50	0.30	5.33
200 - 255.9	256 - 649.9	38 - 199.9	d_N + 20.5	8.1	1.8	0.60	0.35	7.00
256 - 649.9	650 - 999.9	200 - 255.9	d_N + 24.0	8.1	1.8	0.60	0.35	7.00
650 - 999.9	1,000 - 2,200	256 - 649.9	d_N + 27.3	9.5	2.5	0.70	0.50	8.40
1,000 - 2,200	-	650 - 999.9	d_N + 38.0	13.8	3.0	1.00	0.70	12.00**

Installation in closed grooves from diameters > 18 mm. Also for installation according to ISO 7425-2.
* Installed as secondary seal utilize S_{max} of the primary seal.
**All O-Rings with 12 mm cross section are delivered as a special profile ring.

ORDERING EXAMPLE

Zurcon® Rimseal complete with O-Ring, standard application:

Series:	RR13 from Table 23
Rod diameter:	d_N = 80.0 mm
TSS Part No.:	RR1300800 from Table 24

Select material Z54. The corresponding code numbers are appended to the TSS Part No. Together these form the TSS Article Number. The TSS Article Number for all intermediate sizes can be determind by following the example:

TSS Article No. RR13 0 0800 - Z54 N***

- TSS Series No.
- Type (Standard)
- Rod Diameter x 10****
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

*** Zurcon® Rimseal is always supplied as a set with a Nitrile O-Ring, code N or T. See page 68 O-Ring Code.

**** For diameters $d_N \geq$ 1,000.0 mm multiply only by factor 1.
Example: RR13 for diameter d_N = 1,200.0 mm.
TSS Article No.: RR13**X1200** - Z54N.

Table 24: Installation Dimensions / TSS Article No.

Rod	Groove Dia.	Groove Width	TSS Article No.*	O-Ring Size
d_N f8/h9	D_1 H9	L_1 +0.2		
8.0	**15.3**	**3.2**	**RR1300080-Z54N**	**10.77 x 2.62**
10.0	**17.3**	**3.2**	**RR1300100-Z54N**	**12.37 x 2.62**
12.0	**19.3**	**3.2**	**RR1300120-Z54N**	**13.94 x 2.62**
14.0	**21.3**	**3.2**	**RR1300140-Z54N**	**17.12 x 2.62**
16.0	**23.3**	**3.2**	**RR1300160-Z54N**	**18.72 x 2.62**
18.0	**25.3**	**3.2**	**RR1300180-Z54N**	**20.29 x 2.62**
20.0	27.3	3.2	RR1500200-Z54N	21.89 x 2.62
20.0	**30.7**	**4.2**	**RR1300200-Z54N**	**23.40 x 3.53**
22.0	29.3	3.2	RR1500220-Z54N	25.07 x 2.62
22.0	**32.7**	**4.2**	**RR1300220-Z54N**	**26.58 x 3.53**
25.0	**32.3**	**3.2**	**RR1500250-Z54N**	**26.64 x 2.62**
25.0	**35.7**	**4.2**	**RR1300250-Z54N**	**29.75 x 3.53**
28.0	**35.3**	**3.2**	**RR1500280-Z54N**	**29.82 x 2.62**
28.0	**38.7**	**4.2**	**RR1300280-Z54N**	**32.92 x 3.53**
30.0	37.3	3.2	RR1500300-Z54N	32.99 x 2.62
30.0	40.7	4.2	RR1300300-Z54N	34.52 x 3.53
32.0	**39.3**	**3.2**	**RR1500320-Z54N**	**34.59 x 2.62**
32.0	**42.7**	**4.2**	**RR1300320-Z54N**	**36.09 x 3.53**
35.0	42.3	3.2	RR1500350-Z54N	37.77 x 2.62
35.0	45.7	4.2	RR1300350-Z54N	37.70 x 3.53
36.0	**43.3**	**3.2**	**RR1500360-Z54N**	**39.34 x 2.62**
36.0	**46.7**	**4.2**	**RR1300360-Z54N**	**40.87 x 3.53**
40.0	**50.7**	**4.2**	**RR1500400-Z54N**	**44.04 x 3.53**
40.0	**55.1**	**6.3**	**RR1300400-Z54N**	**43.82 x 5.33**
45.0	**55.7**	**4.2**	**RR1500450-Z54N**	**50.39 x 3.53**
45.0	**60.1**	**6.3**	**RR1300450-Z54N**	**50.17 x 5.33**
50.0	**60.7**	**4.2**	**RR1500500-Z54N**	**53.57 x 3.53**
50.0	**65.1**	**6.3**	**RR1300500-Z54N**	**56.52 x 5.33**
55.0	65.7	4.2	RR1500550-Z54N	59.92 x 3.53
55.0	70.1	6.3	RR1300550-Z54N	59.69 x 5.33
56.0	**71.1**	**6.3**	**RR1300560-Z54N**	**62.87 x 5.33**
60.0	70.7	4.2	RR1500600-Z54N	63.09 x 3.53
60.0	75.1	6.3	RR1300600-Z54N	66.04 x 5.33
63.0	73.7	4.2	RR1500630-Z54N	66.27 x 3.53
63.0	**78.1**	**6.3**	**RR1300630-Z54N**	**69.22 x 5.33**
65.0	80.1	6.3	RR1300650-Z54N	69.22 x 5.33
70.0	**85.1**	**6.3**	**RR1300700-Z54N**	**75.57 x 5.33**
75.0	90.1	6.3	RR1300750-Z54N	81.92 x 5.33
80.0	**90.7**	**4.2**	**RR1500800-Z54N**	**85.32 x 3.53**
80.0	**95.1**	**6.3**	**RR1300800-Z54N**	**85.09 x 5.33**
85.0	100.1	6.3	RR1300850-Z54N	91.44 x 5.33
90.0	**105.1**	**6.3**	**RR1300900-Z54N**	**94.62 x 5.33**
95.0	110.1	6.3	RR1300950-Z54N	100.97 x 5.33
100.0	**115.1**	**6.3**	**RR1301000-Z54N**	**107.32 x 5.33**
105.0	120.1	6.3	RR1301050-Z54N	110.49 x 5.33
110.0	**125.1**	**6.3**	**RR1301100-Z54N**	**116.84 x 5.33**
110.0	**130.5**	**8.1**	**RR1101100-Z54N**	**116.89 x 7.00**
115.0	130.1	6.3	RR1301150-Z54N	120.02 x 5.33
120.0	135.1	6.3	RR1301200-Z54N	126.37 x 5.33
125.0	**140.1**	**6.3**	**RR1301250-Z54N**	**129.54 x 5.33**
125.0	**145.5**	**8.1**	**RR1101250-Z54N**	**132.72 x 7.00**
130.0	145.1	6.3	RR1301300-Z54N	135.89 x 5.33
135.0	150.1	6.3	RR1301350-Z54N	142.24 x 5.33
140.0	**155.1**	**6.3**	**RR1301400-Z54N**	**145.42 x 5.33**
145.0	160.1	6.3	RR1301450-Z54N	151.77 x 7.00
150.0	165.1	6.3	RR1301500-Z54N	158.12 x 5.33
150.0	170.5	8.1	RR1101500-Z54N	158.12 x 7.00
155.0	170.1	6.3	RR1301550-Z54N	158.12 x 5.33
160.0	**175.1**	**6.3**	**RR1301600-Z54N**	**164.47 x 5.33**
160.0	**180.5**	**8.1**	**RR1101600-Z54N**	**170.82 x 7.0**
165.0	180.1	6.3	RR1301650-Z54N	170.82 x 5.33
170.0	185.1	6.3	RR1301700-Z54N	177.17 x 5.33
175.0	190.1	6.3	RR1301750-Z54N	183.52 x 5.33
180.0	**195.1**	**6.3**	**RR1301800-Z54N**	**183.52 x 5.33**
180.0	**200.5**	**8.1**	**RR1101800-Z54N**	**189.87 x 7.00**
185.0	200.1	6.3	RR1301850-Z54N	189.87 x 5.33
190.0	205.1	6.3	RR1301900-Z54N	196.22 x 5.33
200.0	**220.5**	**8.1**	**RR1302000-Z54N**	**208.92 x 7.00**
210.0	230.5	8.1	RR1302100-Z54N	215.27 x 7.00
220.0	**240.5**	**8.1**	**RR1302200-Z54N**	**227.97 x 7.00**
230.0	250.5	8.1	RR1302300-Z54N	240.67 x 7.00
240.0	260.5	8.1	RR1302400-Z54N	253.37 x 7.00
250.0	**270.5**	**8.1**	**RR1302500-Z54N**	**266.07 x 7.00**
260.0	284.0	8.1	RR1302600-Z54N	266.07 x 7.00
280.0	**304.0**	**8.1**	**RR1302800-Z54N**	**291.47 x 7.00**
300.0	324.0	8.1	RR1303000-Z54N	316.87 x 7.00
310.0	334.0	8.1	RR1303100-Z54N	316.87 x 7.00
320.0	**344.0**	**8.1**	**RR1303200-Z54N**	**329.57 x 7.00**
340.0	364.0	8.1	RR1303400-Z54N	354.97 x 7.00
350.0	374.0	8.1	RR1303500-Z54N	367.67 x 7.00
360.0	**384.0**	**8.1**	**RR1303600-Z54N**	**367.67 x 7.00**
380.0	404.0	8.1	RR1303800-Z54N	393.07 x 7.00
400.0	424.0	8.1	RR1304000-Z54N	417.96 x 7.00
420.0	444.0	8.1	RR1304200-Z54N	430.66 x 7.00

Rod	Groove Dia.	Groove Width	TSS Article No.*	O-Ring Size
d_N f8/h9	D_1 H9	L_1 +0.2		
450.0	474.0	8.1	RR1304500-Z54N	468.76 x 7.00
480.0	504.0	8.1	RR1304800-Z54N	494.16 x 7.00
500.0	524.0	8.1	RR1305000-Z54N	506.86 x 7.00
600.0	624.0	8.1	RR1306000-Z54N	608.08 x 7.00
610.0	634.0	8.1	RR1306100-Z54N	633.48 x 7.00
620.0	644.0	8.1	RR1306200-Z54N	633.48 x 7.00
630.0	654.0	8.1	RR1306300-Z54N	658.88 x 7.00
640.0	664.0	8.1	RR1306400-Z54N	658.88 x 7.00
650.0	677.3	9.5	RR1306500-Z54N	663.00 x 8.40
656.0	683.3	9.5	RR1306560-Z54N	669.00 x 8.40
660.0	687.3	9.5	RR1306600-Z54N	673.00 x 8.40
680.0	707.3	9.5	RR1306800-Z54N	693.00 x 8.40
685.0	712.3	9.5	RR1306850-Z54N	698.00 x 8.40
700.0	724.0	8.1	RR1507000-Z54N	712.00 x 7.00
700.0	727.3	9.5	RR1307000-Z54N	713.00 x 8.40
710.0	737.3	9.5	RR1307100-Z54N	723.00 x 8.40
730.0	757.3	9.5	RR1307300-Z54N	743.00 x 8.40
760.0	787.3	9.5	RR1307600-Z54N	773.00 x 8.40
765.0	792.3	9.5	RR1307650-Z54N	778.00 x 8.40
780.0	807.3	9.5	RR1307800-Z54N	793.00 x 8.40
790.0	817.3	9.5	RR1307900-Z54N	803.00 x 8.40
800.0	827.3	9.5	RR1308000-Z54N	813.00 x 8.40
810.0	837.3	9.5	RR1308100-Z54N	823.00 x 8.40
820.0	847.3	9.5	RR1308200-Z54N	833.00 x 8.40
830.0	857.3	9.5	RR1308300-Z54N	843.00 x 8.40
850.0	877.3	9.5	RR1308500-Z54N	863.00 x 8.40
870.0	897.3	9.5	RR1308700-Z54N	883.00 x 8.40
880.0	907.3	9.5	RR1308800-Z54N	893.00 x 8.40
885.0	912.3	9.5	RR1308850-Z54N	898.00 x 8.40
890.0	917.3	9.5	RR1308900-Z54N	903.00 x 8.40
930.0	957.3	9.5	RR1309300-Z54N	943.00 x 8.40
955.0	982.3	9.5	RR1309550-Z54N	968.00 x 8.40
1,000.0	1,038.0	13.8	RR13X1000-Z54N	1,016.00 x 12.00
1,035.0	1,073.0	13.8	RR13X1035-Z54N	1,051.00 x 12.00
1,040.0	1,067.3	9.5	RR15X1040-Z54N	1,053.00 x 8.40
1,040.0	1,078.0	13.8	RR13X1040-Z54N	1,056.00 x 12.00
1,050.0	1,077.3	9.5	RR15X1050-Z54N	1,063.00 x 8.40
1,050.0	1,088.0	13.8	RR13X1050-Z54N	1,066.00 x 12.00
1,100.0	1,138.0	13.8	RR13X1100-Z54N	1,116.00 x 12.00
1,120.0	1,147.3	9.5	RR15X1120-Z54N	1,133.00 x 8.40
1,120.0	1,158.0	13.8	RR13X1120-Z54N	1,136.00 x 12.00
1,200.0	1,227.3	9.5	RR15X1200-Z54N	1,213.00 x 8.40
1,200.0	1,238.0	13.8	RR13X1200-Z54N	1,216.00 x 12.00
1,330.0	1,357.3	9.5	RR15X1330-Z54N	1,343.00 x 8.40
1,330.0	1,368.0	13.8	RR13X1330-Z54N	1,346.00 x 12.00
1,500.0	1,527.3	9.5	RR15X1500-Z54N	1,513.00 x 8.40
1,500.0	1,538.0	13.8	RR13X1500-Z54N	1,516.00 x 12.00
1,600.0	1,638.0	13.8	RR13X1600-Z54N	1,616.00 x 12.00
2,000.0	2,038.0	13.8	RR13X2000-Z54N	2,016.00 x 12.00

The rod diameters in **bold** type are in accordance with the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 2,200 mm diameter including imperial (inch) sizes can be supplied.

* TSS Article Number incl. of NBR O-Ring.
For application of low-temperature O-Ring, please use Material Set Code Z54T instead of Z54N

All O-Rings with 12 mm cross section are delivered as special profile ring.