

Zurcon® Rimseal IM



Injection Molded (IM)

Single-acting

Rubber-energized plastic-faced seal

Material:

Zurcon® Z13 and Elastomer



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■ Zurcon® Rimseal IM*



■ Description

Zurcon® Rimseal IM is an O-Ring energized rod seal designed for high demanding applications, with manufacturing feasible by both injection molding and by lathing from injection molded

TPU Zurcon® tubes.

Zurcon® Rimseal IM is an asymmetric rod seal with a slipper ring made of Zurcon® Z13, fitting into both Stepseal® and ISO 7425-2 grooves.

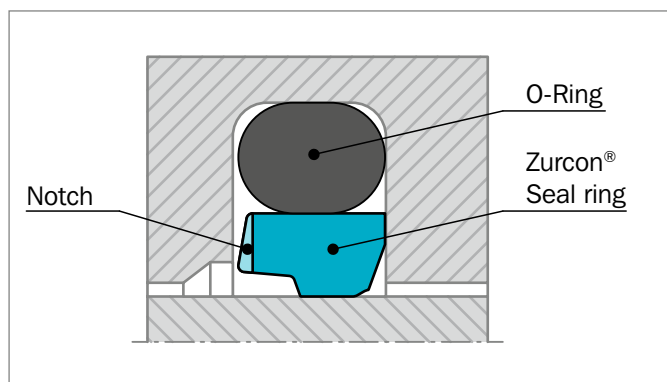


Figure 33: Zurcon® Rimseal IM

Contact length and profile tilting angles are optimized to give the desired contact pressure distribution throughout a wide range of pressures, hardware machining tolerances and different working temperatures within the admissible temperature range.

Especially in tandem with various primary seals, this new design promises to give an effective solution for modern hydraulic applications.

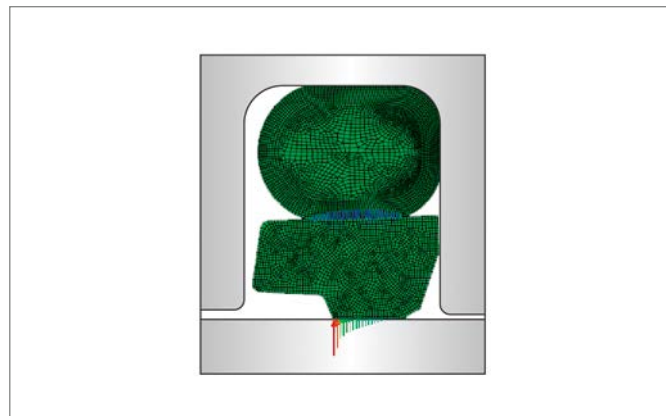


Figure 34: Zurcon® Rimseal IM

This profile is tested and proven to work efficiently within a Lubrication Management (LM) PUR system configuration.

Zurcon® Rimseal IM is able to combine very high abrasion and extrusion resistance together with chemical compatibility.

The wear resistance is improved even more with a LM configuration due to friction reduction within the whole sealing system compared to other traditional TPU solutions.

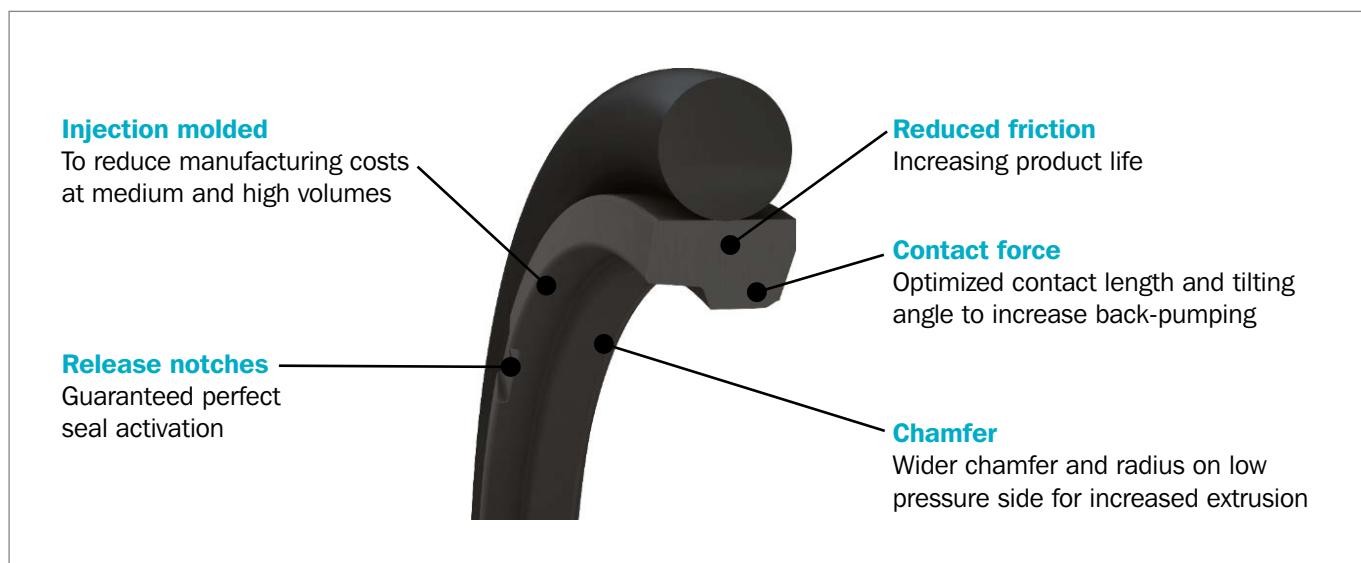


Figure 35: Zurcon® Rimseal IM design features

* Patent application: WO 92/19893 A1



METHOD OF OPERATION

Like all slipper seals, the initial compression is generated by O-Ring squeeze. The contact force distribution at low pressures is optimized for low friction and tight sealing.

Four radial notches at the back of the seal guarantee O-Ring activation, even in the cases of contact with the back side of the groove or for sudden pressure release when the pressure drops. A design shape at the outer corner was studied to increase extrusion resistance (Figure 35).

In Figure 36 shows Von Mises Stress at 3 different pressure levels: after installation, medium range and 25 MPa.

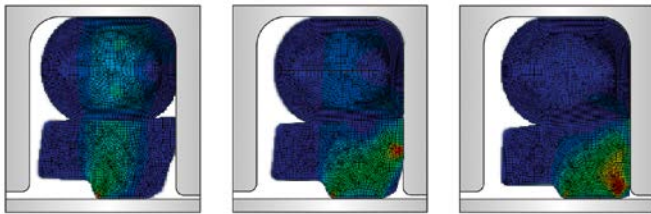


Figure 36: left: 0 MPa; center: 5 MPa; right: 25 MPa

Contact length and tilt angle are also optimized for seal stability at high pressures. The FEA design, shows very good positioning in the groove and relatively small deformation, keeping displacement to a low level with consequent lower material stress, which reduces extrusion risk. Zurcon® Rimseal IM is designed to control fluid film during both outstroke and instroke. The back-pumping function was improved with a special design on the low-pressure side which also provides additional extrusion resistance, unique to Zurcon® Z13 (Figure 36).

ADVANTAGES

- Feasible both by injection moulding and by lathing from injection moulded TPU Zurcon® Z13 tubes.
- Increased extrusion resistance and outstanding abrasion resistance of TPU Zurcon® Z13 positions Zurcon® Rimseal IM as an effective and reliable choice for tandem seal configurations
- Calibrated rod contact pressure and reduced friction from optimized back-pumping behaviour give Zurcon® Rimseal IM the capability to control oil film, making it a very good choice as a secondary seal in Lubrication Management configurations

APPLICATION EXAMPLES

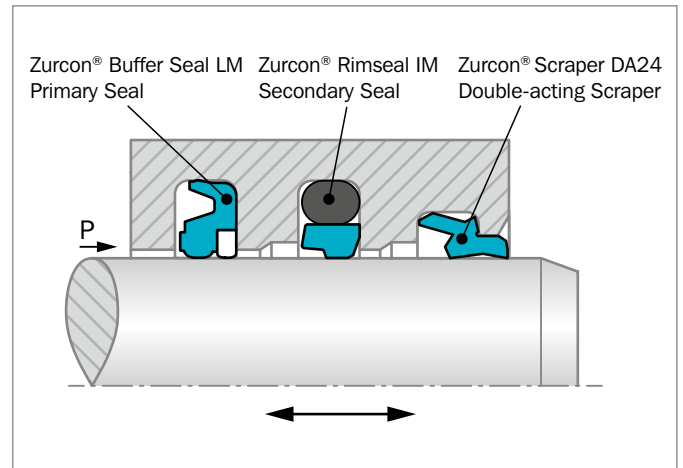


Figure 37: Tandem configuration

- Construction machinery
- Hydraulic cylinders
- Earth moving equipment
- Mobile hydraulics
- Agriculture
- Mobile cranes
- Fork lifts



OPERATING CONDITIONS:

Pressure:	60 MPa in tandem system 25 MPa as individual element
Velocity:	0.5 m/s as primary seal 5 m/s with short strokes (<1 m) in tandem systems
Temperature:	-45 °C to +110 °C depending on O-Ring material
Media:	- Mineral oil - Synthetic and natural esters - HEES, HETG up to +60 °C - Flame retardant fluids HF - Special optimized for flame retardant fluids (HFC) up to +60 °C
Installation:	- Standard mounting in closed grooves. - For Ø <18 mm request a split groove. - No recalibration needed for installation in closed groove.

IMPORTANT NOTE

The above data are maximum values and cannot be used at the same time, e.g. the maximum operating speed depends on pressure, temperature and gap value. A combination of pressure and speed might cause local heat increases, so care should be taken when evaluating high values for the above parameters simultaneously.

MATERIAL

Zurcon® Z13 is the 60 ShD TPU that combines excellent mechanical and elastic material properties:

- Temperature range from -45 °C to +110 °C (for short periods, up to +120 °C)
- Good combination of elasticity and tensile strength
- Low friction
- Excellent chemical compatibility
- Low compression set at high temperatures

Table 24: Recommended materials

Code	O-Ring Material Shore A	Code	O-Ring Temp. °C*
Z13	NBR 70	N	-30 to +100
	NBR 70 Low temp.	T	-45 to +80
	HNBR 70	H	-30 to +110
	FKM 70	V	-10 to (+200)

* The O-Ring operation temperature is only valid in mineral hydraulic oil.

Table 25: Z13 Chemical compatibility: General guideline (Laboratory compatibility tests 1,008 hours)

FLUIDS TYPE	DIN / ISO Code	Temperatur	Results
Mineral Oils	HLP	+110 °C	Excellent
	HVLP		
	HLPD		
Synthetics fluids	HEES	+80 °C to +100 °C	Excellent
	HEPG (PAG)	+60 °C	Good
	HEPR (PAO)	+100 °C	Excellent
Water based fluids	HFA	+50 °C to +60 °C	Good
	HFC	+60 °C	Excellent
Synthetics water free fluids	HFDU	+100 °C	Excellent

The above results must be considered as general guidelines. We recommend verifying the compound compatibility with the specific fluids and temperature conditions experienced in the application.



■ Installation Recommendation

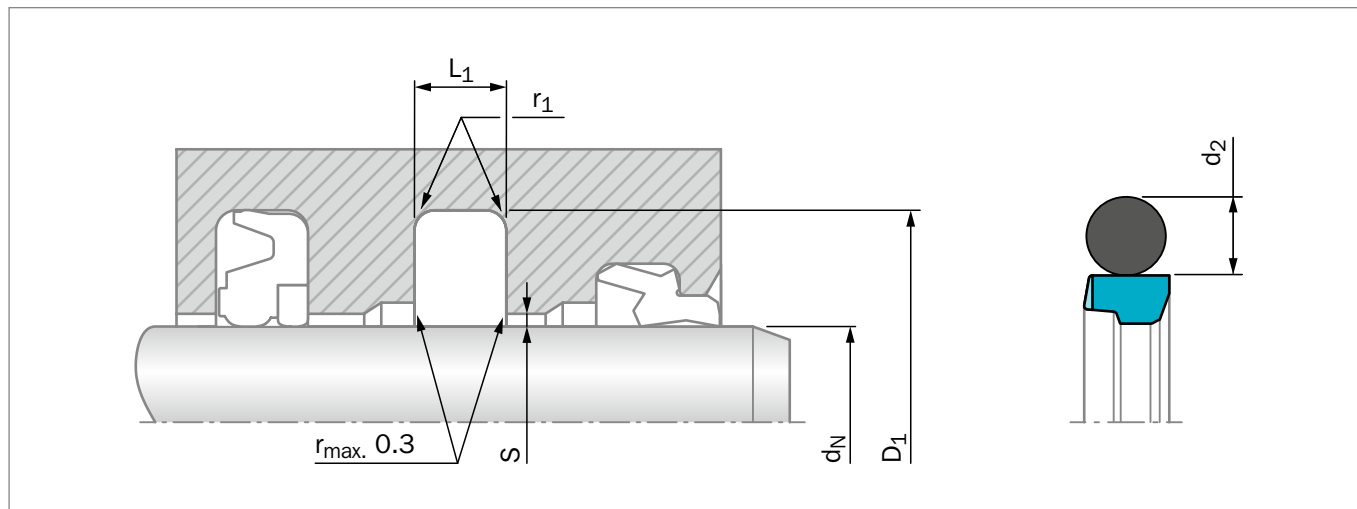


Figure 38: Installation Drawing

Table 26: Installation Dimensions – Standard Recommendations

Seal Series No.	Rod Diameter d_N f8/h9			Groove Diameter D_1 H9	Groove Width L_1 +0.2	Radius r_{1max}	Radial Clearance S_{max}^{**} at +110 °C				O-Ring Cross Section d_2
	Standard Application	Light Application	Heavy Duty Application				16 MPa	26 MPa	32 MPa	40 MPa	
RRB1	8 - 18.9***	19 - 37.9	-	$d_N + 7.3$	3.2	0.6	0.30	0.20	-	-	2.62
RRB2	19 - 37.9	38 - 149.9	8 - 18.9	$d_N + 10.7$	4.2	1.0	0.40	0.30	0.20	-	3.53
RRB3	38 - 199.9	200 - 255.9	19 - 37.9	$d_N + 15.1$	6.3	1.3	0.40	0.30	0.20	-	5.33
RRB4	200 - 255.9	256 - 399.9*	38 - 199.9	$d_N + 20.5$	8.1	1.8	0.50	0.40	0.30	0.25	7.00
RRB8	256 - 399.9*	-	200 - 255.9	$d_N + 24.0$	8.1	1.8	0.50	0.40	0.30	0.25	7.00
RRB5	-	-	256 - 399.9*	$d_N + 27.3$	9.5	2.5	0.60	0.50	0.40	0.35	8.40

Installation in closed grooves from diameters > 18 mm. Also for installation according to ISO 7425-2.

* Max diameter for lathed seal from IM Z13 tube

** When installed as secondary seal utilize S_{max} of the primary seal.

*** Special type of mold is necessary

ORDERING EXAMPLE

Zurcon® Rimseal IM complete with O-Ring:

Rod diameter	$d_N = 60.0$ mm
Groove width:	$L_1 = 6.3$ mm
TSS Part No.:	RRB300600 from Table 26 and Table 27

TSS Article No.	RRB3	0	0600	-	Z13	N
Series No.						
Type (Standard)						
Rod Diameter x 10						
Quality Index (Standard)						
Material Code (Seal Ring)						
Material Code (O-Ring)****						

**** From Table 24

**Table 27: Installation Dimensions / TSS Article No.**

Rod Diameter	Groove Diameter	Groove Width	TSS Article No.	O-Ring Size
d_N f8/h9	D_1 H9	L_1 +0.2		
50.0	65.1	6.3	RRB300500-Z13	56.52 x 5.33
60.0	75.1	6.3	RRB300600-Z13	66.04 x 5.33
65.0	80.1	6.3	RRB300650-Z13	69.22 x 5.33
70.0	85.1	6.3	RRB300700-Z13	75.57 x 5.33
75.0	90.1	6.3	RRB300750-Z13	81.92 x 5.33
80.0	95.1	6.3	RRB300800-Z13	85.09 x 5.33
85.0	100.1	6.3	RRB300850-Z13	91.44 x 5.33
90.0	105.1	6.3	RRB300900-Z13	94.62 x 5.33
95.0	110.1	6.3	RRB300950-Z13	100.97 x 5.33
100.0	115.1	6.3	RRB301000-Z13	107.32 x 5.33
105.0	120.1	6.3	RRB301050-Z13	110.49 x 5.33
110.0	125.1	6.3	RRB301100-Z13	116.84 x 5.33
115.0	130.1	6.3	RRB301150-Z13	120.02 x 5.33
120.0	135.1	6.3	RRB301200-Z13	126.37 x 5.33
125.0	140.1	6.3	RRB301250-Z13	129.54 x 5.33
130.0	145.1	6.3	RRB301300-Z13	135.89 x 5.33
140.0	155.1	6.3	RRB301400-Z13	145.42 x 5.33
150.0	165.1	6.3	RRB301500-Z13	158.12 x 5.33

All dimensions in **bold** type are in accordance with ISO 3320

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