

Zurcon® Excluder® Z



Injection Molded

Rubber-energized Double-acting Scraper

Material:

Zurcon® Z13 and Elastomer





ZURCON® EXCLUDER® Z



Description

Zurcon® Excluder® Z is a new injection molded O-Ring energized double-acting scraper made from Zurcon® Z13 and fitting into 6195 type D grooves.

The O-Ring maintains the correct pressure on the lips and compensates for temperature conditions and rod deflection.

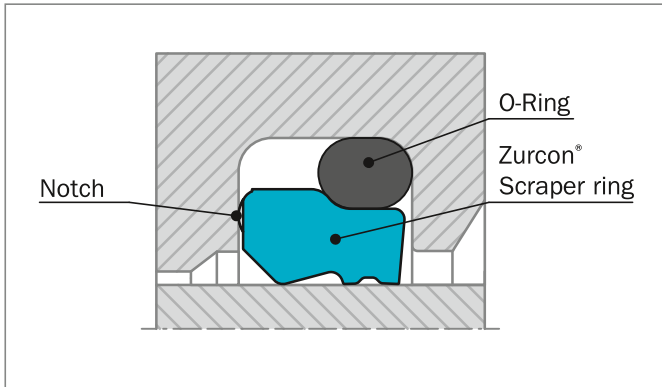


Figure 165: Zurcon® Excluder Z

The seal has three areas, each performing a specific task: scraping, sealing and support lip (see Figure 166).

Dividing each portion of the profile into several parts, it was possible to optimize angles and the radius to achieve each function while maintaining the stability necessary to cope with different application conditions.

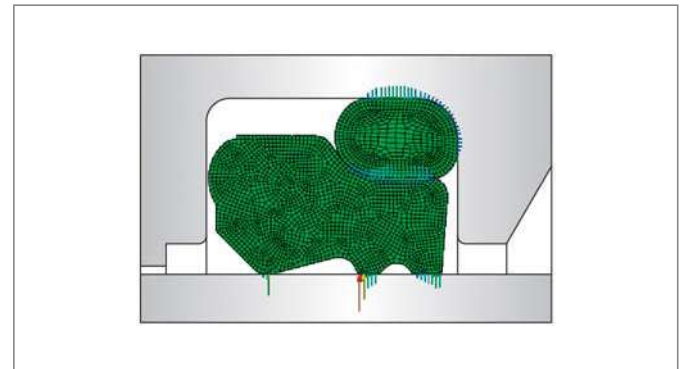


Figure 166: Contact pressure after assembly

Zurcon® Excluder® Z is designed to control fluid film during outstroke and instroke and is able to cope with hydraulic pressure coming from the system, provided it is used in combination with a primary or secondary seal with good back-pumping abilities like Zurcon® U-Cup RU9, Zurcon® L-Cup® or Zurcon® Rimseal.

Especially when used in tandem with a primary seal, this new design promises to give an effective solution for modern hydraulic applications.

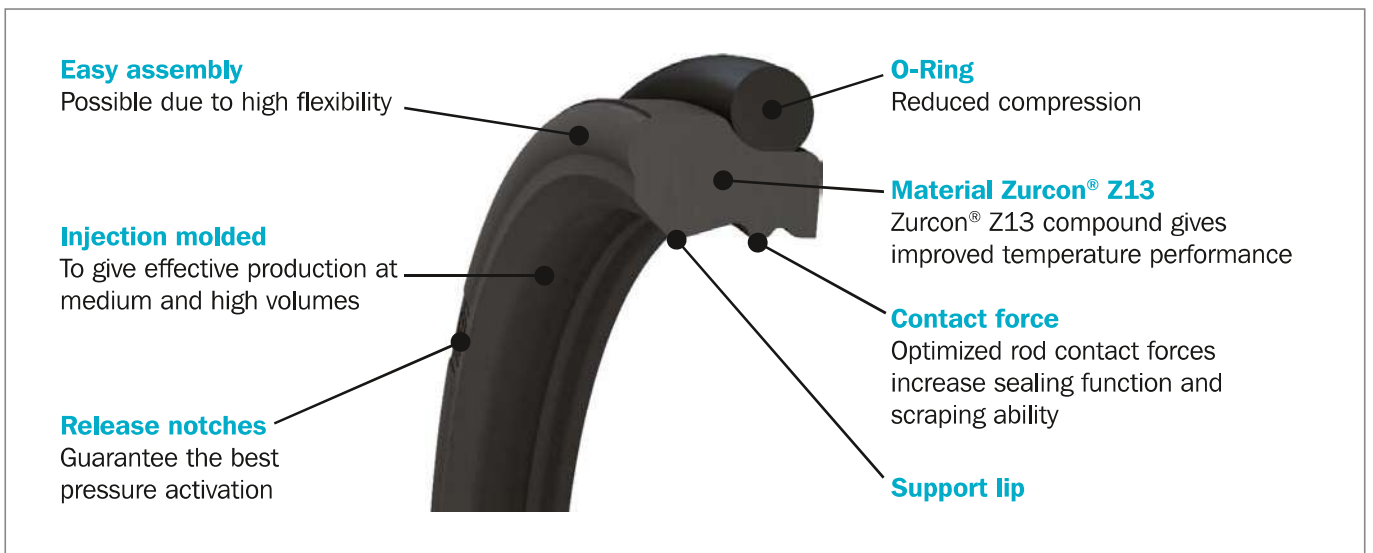


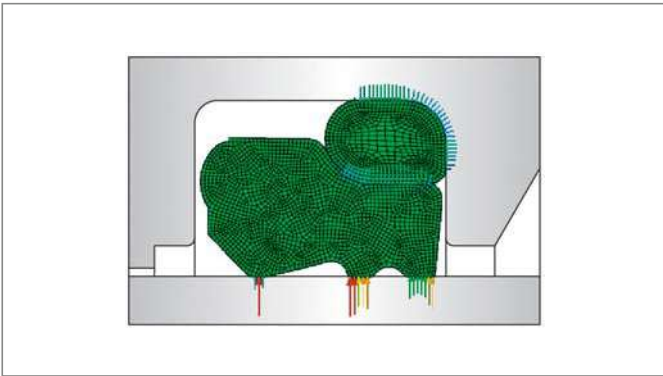
Figure 167: Zurcon® Excluder® Z design features



METHOD OF OPERATION

Four release notches guarantee optimal pressure activation of the O-Ring even with poor tolerance combinations of groove, seal and temperature. In order to improve performance throughout a wide range of application conditions, stability in the groove is of critical importance. Zurcon® Excluder® Z has a very stable design due to:

- Equal scraping, sealing and support on the inner diameter
- Lower O-Ring compression



In accordance with the optimum sealing technology specifications, Zurcon® Excluder® Z is designed to control fluid film during outstroke and instroke, due to the optimized shape of the scraping lip and improved production process. The installation phase is also easier compared to other hard TPU compounds due to the Zurcon® Z13 compounds inherent elasticity, also removing the need for calibration after installation.

ADVANTAGES

Zurcon® Excluder® Z has increased scraping and sealing capabilities from the optimized rod contact force distribution. Instead of Zurcon® Z05 used for previous scraper designs, Zurcon® Excluder® Z uses Zurcon® Z13 slipper pads that, owing to higher material flexibility, are much easier to assemble. Additionally, the compound also increases the temperature range up to +110 °C and greatly improves chemical compatibility with new generation hydraulic fluids.

Zurcon® Z13 is also available in injection molded tubes that allow machining of parts in low volumes and increases the diameter range above an injection machine's normal constraints.

Polyurethane materials have excellent abrasion resistance characteristics that guarantee a good scraping effect even in heavy-duty applications or when operating in harsh environments

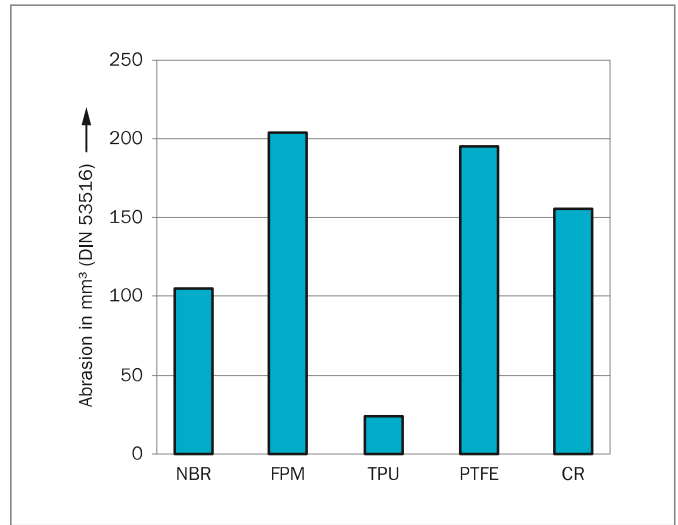


Figure 168: Comparison of abrasion resistance for different materials

Calibrated rod contact pressure and reduced friction when the oil film is controlled make Zurcon® Excluder® Z an excellent choice as a scraping element in Lubrication Management configurations.

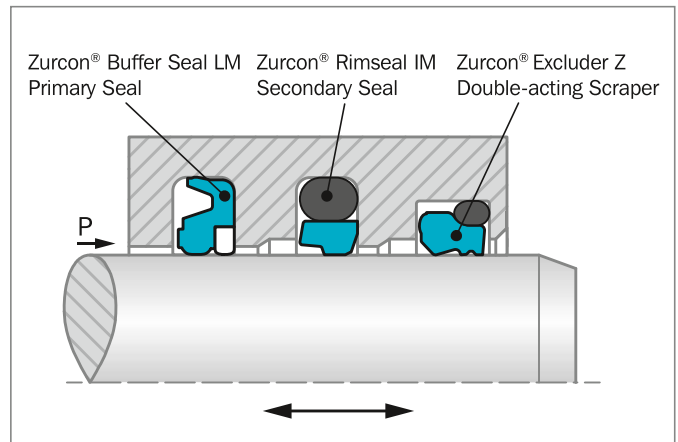


Figure 169: Tandem configuration



APPLICATION EXAMPLES

Excellent abrasion resistance and high activation force from the compressed O-Ring provide high scraping efficiency and compensate for any deflections of the piston rod in harsh environments. The closed groove installation protects the lip from damage. Zurcon® Excluder® Z is recommended for medium- and heavy-duty applications:

- Construction machinery
- Earth moving equipment
- Mobile hydraulics
- Machine tools
- Truck cranes
- Fork lifts

OPERATING CONDITIONS

Speed:	1 m/s
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 HFA, special optimized for flame retardant fluids (HFC) up to +60 °C
Installation:	Standard mounting in closed grooves. For $\varnothing < 25$ mm request a split groove. No recalibration needed for installation in closed groove. ISO 6195 Type D installation dimensions from diameter 40 mm

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 ° 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 155: Material Recommendation

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 hydraulic mineral oil.

Table 156: Z13 Chemical compatibility: General guideline (Laboratory compatibility tests 1,008 hours)

FLUIDS TYPE	DIN / ISO Code	Temperatur	Result
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	+60 °C to +60 °C	Good
	HFC	+600 °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

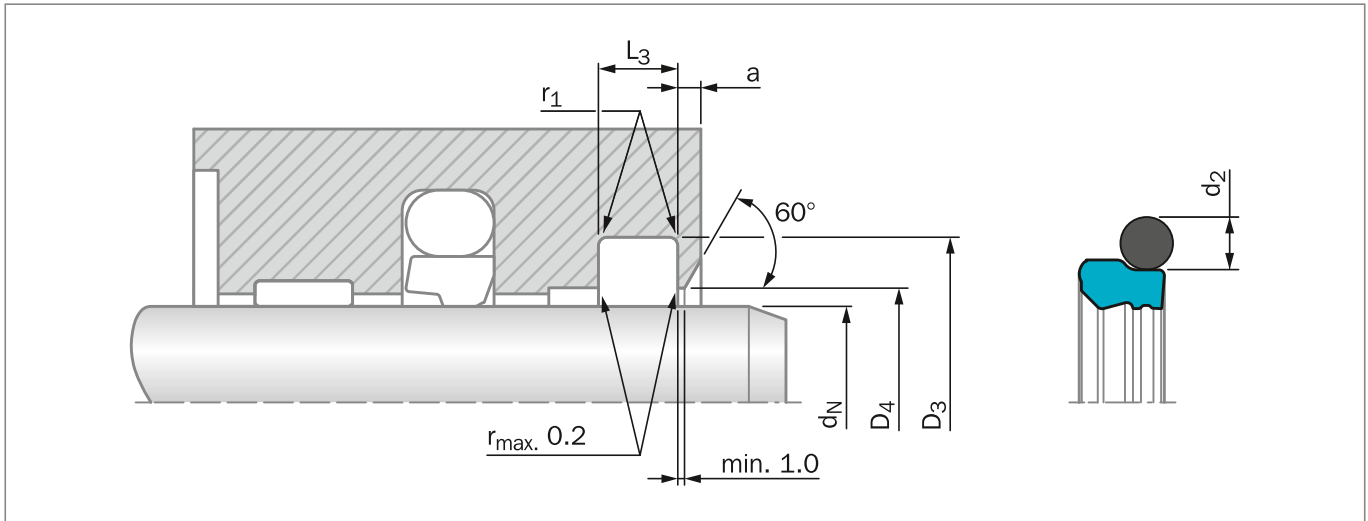


Figure 170: Installation Drawing

Table 157: Installation Dimensions – Standard Recommendations

Series No.	Rod Diameter d_N f8/h9		Groove Diameter	Groove Width	Bore Diameter	Step Width	Radius	O-Ring Cross Section
	Standard Application	Available Range	D_3 H11	L_3 +0.2	D_4 H11	a_{min}	r_1 max	d_2
WEB0	19 – 39.9	19 – 100.0	$d_N + 7.3$	4.2	$d_N + 1.5$	3.0	0.8	2.62
WEB1	40 – 69.9	30 – 200.0	$d_N + 8.8$	6.3	$d_N + 1.5$	3.0	1.0	2.62
WEB2	70 – 139.9	70 – 360.0	$d_N + 12.2$	8.1	$d_N + 2.0$	4.0	1.0	3.53
WEB3	140 – 399.9*	100 – 399.9*	$d_N + 16.0$	9.5	$d_N + 2.5$	5.0	1.5	5.33

* max. diameter for Zurcon® Z13 injection molded tubes for machining is 423 mm OD

ORDERING EXAMPLE

Zurcon® Excluder Z complete with O-Ring:

Rod Diameter:	$d_N = 50.0$ mm
Groove Width:	$L_1 = 6.3$ mm
TSS Part No.:	WEB100500

TSS Article No.	WEB1 0 0500 - Z13 N
TSS Series No.	WEB1
Type (Standard)	0
Rod Diameter x 10	0500
Quality Index (Standard)	-
Material Code (Scraper)	Z13
Material Code (O-Ring)	N



Table 158: Installation Dimensions / TSS Part No.

Rod Diameter	Groove Diameter	Groove Width	Radius	TSS Part No.	O-Ring Size
d_N f8/h9	D_1 H9	L_3 +0.2	D_4 H11		
22.0	29.6	4.2	23.5	WEB000220-Z13	25.07 x 2.62
25.0	32.6	4.2	26.5	WEB000250-Z13	28.24 x 2.62
28.0	35.6	4.2	29.5	WEB000280-Z13	29.82 x 2.62
30.0	37.6	4.2	31.5	WEB000300-Z13	32.99 x 2.62
35.0	42.6	4.2	36.5	WEB000350-Z13	37.77 x 2.62
*40.0	48.8	6.3	41.5	WEB100400-Z13	44.12 x 2.62
*45.0	53.8	6.3	46.5	WEB100450-Z13	48.90 x 2.62
*50.0	58.8	6.3	51.5	WEB100500-Z13	53.64 x 2.62
60.0	68.8	6.3	61.5	WEB100600-Z13	63.17 x 2.62
65.0	73.8	6.3	66.5	WEB100650-Z13	67.95 x 2.62
*70.0	82.2	8.1	72.0	WEB200700-Z13	75.79 x 3.53
*80.0	92.2	8.1	82.0	WEB200800-Z13	85.32 x 3.53
85.0	97.2	8.1	87.0	WEB200850-Z13	88.49 x 3.53
*90.0	102.2	8.1	92.0	WEB200900-Z13	94.84 x 3.53
95.0	107.2	8.1	97.0	WEB200950-Z13	101.19 x 3.53
*100.0	112.2	8.1	102.0	WEB201000-Z13	104.37 x 3.53
105.0	117.2	8.1	107.0	WEB201050-Z13	110.72 x 3.53
*110.0	122.2	8.1	112.0	WEB201100-Z13	113.89 x 3.53
*125.0	137.2	8.1	127.0	WEB201250-Z13	129.77 x 3.53

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

* installation in grooves according to ISO 6195 Type D