

Turcon® Excluder® F



Double-acting

Rubber-energized Double-acting Scraper

Material:

Turcon®, Zurcon® and Elastomer



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Turcon® Excluder® F



Description

Turcon® Excluder® F is a double-acting scraper with scraper lip and sealing lip, positioned back-to-back. The scraper is always installed with 2 O-Rings as elastic energizing elements in one groove. The scraper function itself is performed by the Excluder® F Turcon® element. The O-Rings maintains the pressure of the scraper lips against the sliding surface and compensates deflections of the piston rod.

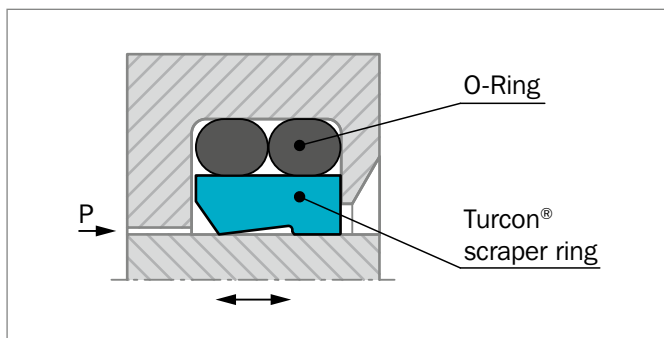


Figure 170: Turcon® Excluder® F

ADVANTAGES

In principle the same as for Excluder® 2 and 5:

- Outstanding sliding properties
- Stick-slip-free, no sticking for Turcon® materials
- Tough scraper particular in Zurcon® materials
- Can compensate for deflections of the piston rod or plunger
- Very good scraping effect even against firmly adhered dirt, etc.
- Very good sealing effect from the inside against the residual oil film adhering to the surface of the piston rod
- Identical installation as Zurcon® Excluder® 500 and Excluder® 5 from WE50 to WE52
- Very high resistance to hydraulic media
- Available for diameters from 19 up to 1,500 mm
- ISO 6195 Type D installation on recommended diameters from 40 to 140 mm

EXCLUDER® F HAS TWO FUNCTIONS:

- Scrape contaminants from the retracting piston rod to protect the system from soiling
- Hold back the residual oil film on the extending piston rod on the medium side.
- Excluder® F is preferably used in conjunction with our rod seals Turcon® Stepseal® 2K or Zurcon® Rimseal, i.e. seals with a hydrodynamic back-pumping function. Application wise the Excluder® F is placed between Excluder® 2 and Excluder® 5 for medium to "light-heavy" duty such as in:
 - Light construction machinery
 - Truck crane
 - Agriculture machines
 - Hydraulic presses
 - Injection molding machines
 - Hydraulic actuators

DISADVANTAGES COMPARED TO EXCLUDER® 2 AND 5

- Require 2 pcs O-Rings
- Not completely axially locked in the groove
- More disposed to wrong installation

ADVANTAGES COMPARED TO EXCLUDER® 2 AND 5

- Easy installation in closed groove
- Improved radial flexibility
- Improved sealing function due to O-Ring arrangement



OPERATING CONDITIONS

Speed:	15 m/s for Turcon® materials 2 m/s for Zurcon® Z80 materials 1 m/s for Zurcon® Z53/Z54 materials
Temperature:	-45 °C to +200 °C (Turcon®) -60 °C to +80 °C (Zurcon® Z80) -45 °C to +110 °C (Zurcon® Z53/Z54) depending on O-Ring materials
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils), phosphate ester, water, air and others, depending on scraper and O-ring material compatibility.

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, environment, temperature and media.

INSTALLATION INSTRUCTIONS

All Excluder® F scrapers are preferably installed in closed grooves - installation dimensions see Table 159.

MATERIALS

The following material combinations have proven effective for most applications:

Turcon® Excluder® F in Turcon® M12

All round material for hydraulic applications with linear, short stroke or helical movements in mineral oils, flame retardant hydraulic fluids, phosphate ester, bio-oils or fluids having low lubricating properties:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V

Set code: M12N or M12V

Turcon® Excluder® F in Turcon® T46

For medium to heavy applications with linear movements in mineral oils and other media with good lubrication:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V

Set code: T46N or T46V

For specific applications, all Turcon® materials are available.

Other material combinations are listed in Table 158.

**Table 158: Turcon® and Zurcon® Materials for Excluder® F**

Material, Applications, Properties	Code	O-Ring Material Shore A	Code	O-Ring Operating Temp. * °C	Mating Surface Material	Speed max. m/s
Turcon® M12 First material choice for linear motion Overall improved properties For new constructions and updating For all commonly applied hydraulic fluids including fluids with low lubrication performance Lowest friction and best sliding properties Lowest wear on scrapers Improved absorption of abrasive contaminants Low wear or abrasion of counter surface BAM tested Mineral fiber and Additives filled Color: Dark gray	M12	NBR 70	N	-30 to +100	Steel	15
		NBR 70 Low temp.	T	-45 to +80	Steel, hardened Steel, chrome plated (rod)	
		FKM 70	V	-10 to +200	Steel plated (rod) Cast iron Stainless steel Titanium	
Turcon® T40 For lubricating and non-lubricating fluids High frequency and short strokes Water hydraulics Surface texture is not suitable for gas Carbon fiber filled Color: Gray	T40	NBR 70	N	-30 to +100	Steel	15
		NBR 70 Low temp.	T	-45 to +80	Steel, chrome plated (rod) Cast iron	
		FKM 70	V	-10 to +200	Stainless steel	
		EPDM 70	E**	-45 to +145	Aluminum	
Turcon® T46 For lubricated hydraulics in linear motion High compressive strength High extrusion resistance Very good sliding and wear properties BAM tested Bronze filled Color: Light to dark brown, which may have variations in shading.	T46	NBR 70	N	-30 to +100	Steel, hardened	15
		NBR 70 Low temp.	T	-45 to +80	Steel, chrome plated (rod) Cast iron	
		FKM 70	V	-10 to +200		
Zurcon® Z53 For mineral oil based fluids Very high abrasion and extrusion resistance For counter surface with rougher surface finish More difficult to install Limited chemical resistance Max. working temperature +110 °C Cast polyurethane Color: Yellow to light-brown	Z53	NBR 70	N	-30 to +100	Steel	1
		NBR 70 Low temp.	T	-45 to +80	Steel, hardened Steel chrome plated (rod) Cast iron Ceramic coating Stainless steel	

Table continues on next page



Material, Applications, Properties	Code	O-Ring Material Shore A	Code	O-Ring Operating Temp.* °C	Mating Surface Material	Speed max. m/s
Zurcon® Z54 For mineral oil based fluids High abrasion resistance For counter surface with rougher surface finishes Good extrusion resistance Limited chemical resistance Max. working temperature +110 °C Cast polyurethane Color: Turquoise	Z54	NBR 70	N	-30 to +100	Steel	1
		NBR 70 Low temp.	T	-45 to +80	Steel, hardened Steel, chrome plated (rod) Cast iron Stainless steel Aluminum Ceramic coating	
Zurcon® Z80 For lubricating and non-lubricating fluids Water based fluids, air and gases Dry air pneumatics High abrasion and extrusion resistance For service in abrasive conditions and media with particles Good chemical resistance Limited temperature capability (-60 to +80 °C) UHMWPE (Ultra High Molecular Weight Polyethylene)	Z80	NBR 70	N	-30 to +100	Steel	2
		NBR 70 Low temp.	T	-45 to +80	Steel, chrome plated (rod) Stainless steel	
		EPDM 70	E**	-45 to +145	Aluminum Ceramic coating	

* The O-Ring Operation Temperature is only valid in mineral hydraulic oil, except EPDM.

** Material not suitable for mineral oils.

BAM: Tested by "Bundesanstalt Materialprüfung, Germany".

 Highlighted materials are recommended.

Technical drawing of a mechanical assembly showing a cross-section of a shaft with a key and a pulley. Dimensions include r_1 , L_3 , a , 60° , d_N , D_4 , D_3 , $r_{\max. 0.3}$, $\min. 1.0$, and d_2 .

Table 159: Installation Dimensions – Standard Recommendations

ORDERING EXAMPLE

Series:	WEF1 from Table 159
Rod Diameter:	$d_N = 50.0 \text{ mm}$
TSS Part No.:	WEF100500 from Table 160

TSS Article No. **WEF1** **0** **0500** **-** **M12** **N**

Series No. _____

Type (Standard) _____

Rod Diameter x 10* _____

Quality Index (Standard) _____

Material Code (Scraper) _____

Material Code (O-Ring) _____

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Table 160: Installation Dimensions / TSS Part Numbers

Rod Dia.	Groove Dia.	Groove Width	TSS Part No.	O-Ring Size	Rod Dia.	Groove Dia.	Groove Width	TSS Part No.	O-Ring Size
d _N f8/h9	D ₃ H9	L ₃ +0.2			d _N f8/h9	D ₃ H9	L ₃ +0.2		
19.0	26.6	4.2	WEF000190	23.52 x 1.78	125.4	137.6	8.1	WEF201254	129.77 x 3.53
20.0	27.6	4.2	WEF000200	23.52 x 1.78	130.0	142.2	8.1	WEF201300	136.12 x 3.53
22.0	29.6	4.2	WEF000220	26.70 x 1.78	135.0	147.2	8.1	WEF201350	139.29 x 3.53
25.0	32.6	4.2	WEF000250	28.30 x 1.78	140.0*	152.2	8.1	WEF201400	145.64 x 3.53
28.0	35.6	4.2	WEF000280	31.47 x 1.78	140.0*	156.0	11.5	WEF301400	145.42 x 5.33
30.0	37.6	4.2	WEF000300	34.65 x 1.78	140.5	156.5	11.5	WEF301405	145.42 x 5.33
32.0	39.6	4.2	WEF000320	34.65 x 1.78	150.0	166.0	11.5	WEF301500	151.77 x 5.33
35.0	42.6	4.2	WEF000350	37.82 x 1.78	153.0	169.0	11.5	WEF301530	158.12 x 5.33
36.0	43.6	4.2	WEF000360	41.00 x 1.78	155.0	171.0	11.5	WEF301550	158.12 x 5.33
40.0*	48.8	6.3	WEF100400	44.12 x 2.62	160.0*	172.2	8.1	WEF201600	164.69 x 3.53
42.0	50.8	6.3	WEF100420	45.69 x 2.62	160.0*	176.0	11.5	WEF301600	164.47 x 5.33
45.0*	53.8	6.3	WEF100450	48.90 x 2.62	165.0	181.0	11.5	WEF301650	170.82 x 5.33
48.0	56.8	6.3	WEF100480	52.07 x 2.62	170.0	186.0	11.5	WEF301700	177.17 x 5.33
50.0*	58.8	6.3	WEF100500	53.64 x 2.62	175.0	191.0	11.5	WEF301750	177.17 x 5.33
52.0	60.8	6.3	WEF100520	55.25 x 2.62	180.0*	192.2	8.1	WEF201800	183.74 x 3.53
55.0	63.8	6.3	WEF100550	58.42 x 2.62	180.0*	196.0	11.5	WEF301800	183.52 x 5.33
56.0*	64.8	6.3	WEF100560	59.99 x 2.62	188.2	204.2	11.5	WEF301882	189.87 x 5.33
60.0	67.6	4.2	WEF000600	63.22 x 1.78	190.0	206.0	11.5	WEF301900	196.22 x 5.33
60.0	68.8	6.3	WEF100600	63.17 x 2.62	200.0*	212.2	8.1	WEF202000	202.79 x 3.53
63.0*	71.8	6.3	WEF100630	66.34 x 2.62	200.0*	216.0	11.5	WEF302000	202.57 x 5.33
65.0	73.8	6.3	WEF100650	67.95 x 2.62	220.0*	232.2	8.1	WEF202200	221.84 x 3.53
70.0*	78.8	6.3	WEF100700	72.69 x 2.62	220.0*	236.0	11.5	WEF302200	221.62 x 5.33
70.0*	82.2	8.1	WEF200700	75.79 x 3.53	240.0	256.0	11.5	WEF302400	247.02 x 5.33
75.0	87.2	8.1	WEF200750	78.97 x 3.53	250.0*	262.2	8.1	WEF202500	253.59 x 3.53
80.0*	88.8	6.3	WEF100800	82.22 x 2.62	250.0*	266.0	11.5	WEF302500	253.37 x 5.33
80.0*	92.2	8.1	WEF200800	85.32 x 3.53	260.0	276.0	11.5	WEF302600	266.07 x 5.33
85.0	97.2	8.1	WEF200850	88.49 x 3.53	270.0	286.0	11.5	WEF302700	278.77 x 5.33
90.0*	98.8	6.3	WEF100900	94.92 x 2.62	280.0*	292.2	8.1	WEF202800	278.99 x 3.53
90.0*	102.2	8.1	WEF200900	94.84 x 3.53	280.0*	296.0	11.5	WEF302800	278.77 x 5.33
92.5	104.7	8.1	WEF200925	98.02 x 3.53	300.0	316.0	11.5	WEF303000	304.17 x 5.33
95.0	107.2	8.1	WEF200950	101.19 x 3.53	320.0*	332.2	8.1	WEF203200	329.79 x 3.53
100.0*	108.8	6.3	WEF101000	101.27 x 2.62	320.0*	336.0	11.5	WEF303200	329.57 x 5.33
100.0*	112.2	8.1	WEF201000	104.37 x 3.53	330.0	346.0	11.5	WEF303300	329.57 x 5.33
105.0	117.2	8.1	WEF201050	110.72 x 3.53	350.0	366.0	11.5	WEF303500	354.97 x 5.33
110.0*	118.8	6.3	WEF101100	113.97 x 2.62	360.0*	372.2	8.1	WEF203600	355.19 x 3.53
110.0*	122.2	8.1	WEF201100	113.89 x 3.53	360.0*	376.0	11.5	WEF303600	365.00 x 5.30
115.0	127.2	8.1	WEF201150	120.24 x 3.53	380.0	396.0	11.5	WEF303800	380.37 x 5.33
120.0	132.2	8.1	WEF201200	123.42 x 3.53	400.0	424.0	15.5	WEF404000	405.26 x 7.00
125.0*	133.8	6.3	WEF101250	126.67 x 2.62	440.0	464.0	15.5	WEF404400	443.36 x 7.00
125.0*	137.2	8.1	WEF201250	129.77 x 3.53	450.0	474.0	15.5	WEF404500	456.06 x 7.00



Rod Dia.	Groove Dia.	Groove Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_3 H9	L_3 +0.2		
480.0	504.0	15.5	WEF404800	481.38 x 7.00
500.0	524.0	15.5	WEF405000	506.86 x 7.00
550.0	574.0	15.5	WEF405500	557.66 x 7.00
600.0	624.0	15.5	WEF406000	608.08 x 7.00
650.0	677.3	18.0	WEF506500	662 x 8.40
700.0	727.3	18.0	WEF507000	712 x 8.40
750.0	777.3	18.0	WEF507500	762 x 8.40
800.0	827.3	18.0	WEF508000	812 x 8.40
900.0	927.3	18.0	WEF509000	912 x 8.40
1,000.0	1,027.3	18.0	WEF5X1000	1,012 x 8.40
1,100.0	1,127.3	18.0	WEF5X1100	1,112 x 8.40
1,200.0	1,227.3	18.0	WEF5X1200	1,212 x 8.40

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

* Installation in grooves according to ISO 6195 Type D

Other dimensions and all intermediate sizes up to 1,500 mm diameter including imperial (inch) sizes can be supplied upon request.

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