Turcon® Excluder® 2

Double-acting

Rubber-energized Double-acting scraper

Material:
Turcon®, Zurcon® and Elastomer

Notes

Turcon® Excluder® 2

Description

Turcon® Excluder® 2 is a patented double-acting scraper with scraper lip and sealing lip, positioned back-to-back. Excluder® 2 is always installed with an elastic O-Ring in one groove. The scraper function is performed by Excluder® 2. The O-Ring maintains the pressure of the scraper lips against the sliding surface and can compensate any deflections of the piston rod.

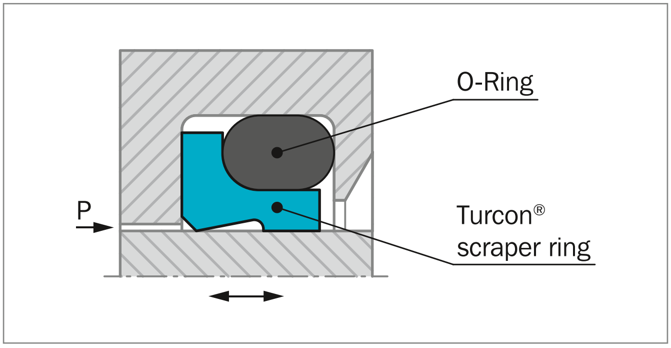

Figure 173: Turcon® Excluder® 2

Excluder® 2 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® 2 is used in conjunction with our rod seals Turcon® Stepseal® 2K, Turcon® VL Seal® or Zurcon® Rimseal, i.e. seals with hydrodynamic back-pumping function.

ADVANTAGES

- Outstanding sliding properties
- Stick-slip-free, no sticking
- Can compensate for deflections of the piston rod
- Space-saving construction
- Very good scraping effect against outside contaminants, even with firmly adhered dirt, etc.
- Very good scraping effect from the inside against the residual oil film adhering to the surface of the piston rod
- Very high resistance to hydraulic media
- Available for all diameters up to 2,600 mm (Turcon®) and up to 2,200 mm (Zurcon® Z53/Z54)
- ISO 6195 Type D installation dimensions up to diameter 63 mm

OPERATING CONDITIONS

Speed:	Up to 15 m/s for Turcon® materials
	Up to 2 m/s for Zurcon® materials
Temperature:	-45 °C to +200 °C (Turcon®) -45 °C to +110 °C (Zurcon® Z53/Z54) -60 °C to +80 °C (Zurcon® Z80) (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 the 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, pressure, temperature and gap value. Temperature range also depends on media.

INSTALLATION INSTRUCTIONS

Excluder® 2 scrapers can be installed in split and closed grooves (installation dimensions, see Table 161. Installation in closed grooves depends on the rod diameter, profile cross-section of the scraper and on the cord cross-section of the corresponding O-Ring, see Table 163.

Table 161: Installation in Closed Grooves

Turcon® Excluder® 2 Series No.	Rod Diameter d_N	O-Ring Cross-Section d_2
WE30	> 30	1.78
WE31	> 30	2.62
WE32	> 40	3.53
WE33	> 50	5.33
WE34	> 110	7.00
WE35	> 140	8.40

RECOMMENDED MATERIALS

The following material combinations have proven effective for hydraulic applications:

Turcon® Excluder® 2 in Turcon® M12

All round material for light to medium 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® 2 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 162.

Table 162: Turcon® and Zurcon® Materials for Excluder® 2

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 Steel, hardened Steel, chrome plated (rod) Steel plated Cast iron Stainless steel Titanium	15
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
Turcon® T40 For lubricating and non-lubricating fluids High frequency and short strokes Water hydraulics Surface texture is not suitable for gas sealing Carbon fiber filled Color: Gray	T40	NBR 70	N	-30 to +100	Steel Steel, chrome plated (rod) Cast iron Stainless steel Aluminum	15
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		EPDM 70	E**	-45 to +145		

Table continous 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
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 Steel, chrome plated (rod) Cast iron	15
		NBR 70 Low temp.	T	-45 to +80		
		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 Steel, hardened Steel chrome plated (rod) Cast iron Ceramic coating Stainless steel	2
		NBR 70 Low temp.	T	-45 to +80		
Zurcon® Z54*** For mineral oil based fluids Linear and slowly turning movements High abrasion resistance For counter surface with rougher surface finish Good extrusion resistance Limited chemical resistance Max. working temperature +110 °C Cast polyurethane Color: Turquoise	Z54	NBR 70	N	-30 to +100	Steel Steel, hardened Steel, chrome plated (rod) Cast iron Stainless steel Aluminum Ceramic coating	2
		NBR 70 Low temp.	T	-45 to +80		
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 Steel, chrome plated (rod) Stainless steel Aluminum Ceramic coating	2
		NBR 70 Low temp.	T	-45 to +80		
		EPDM 70	E**	-45 to (+145)		

* The O-Ring operating temperatures are only valid in mineral hydraulic oil (except EPDM).

** Material not suitable for mineral oils.

*** Max. diameter 2,200 mm

BAM: Tested by “Bundesanstalt Materialprüfung, Germany”.

▢ Highlighted materials are recommended.

Installation Recommendation

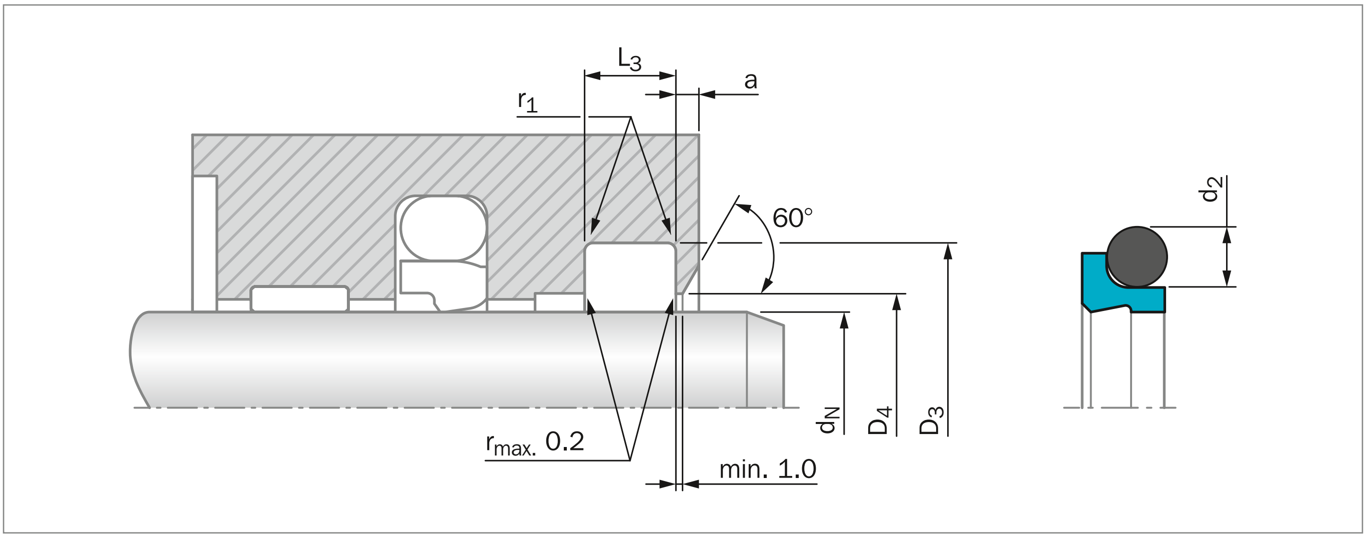

Figure 174: Installation Drawing

Table 163: Installation Dimension - 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 H9	L_3 +0.2/-0.0	D_4 H11	$a_{min.}$	$r_{1\ max}$	d_2
WE30	4 – 11.9	4 – 130	d_N + 4.8	3.7	d_N + 1.5	2.0	0.4	1.78
WE31	12 – 64.9	10 – 245	d_N + 6.8	5.0	d_N + 1.5	2.0	0.8	2.62
WE32	65 – 250.9	25 – 400	d_N + 8.8	6.0	d_N + 1.5	3.0	1.0	3.53
WE33	251 – 420.9	40 – 655	d_N + 12.2	8.4	d_N + 2.0	4.0	1.5	5.33
WE34	421 – 650.9	110 – 655	d_N + 16.0	11.0	d_N + 2.0	4.0	1.5	7.00
WE35	651 – 999.9	140 – 999.9	d_N + 20.0	14.0	d_N + 2.5	5.0	2.0	8.40
WE35X	1,000 - 2,600		d_N + 20.0	14.0	d_N + 2.5	5.0	2.0	8.40

For diameters d_N > 400 mm we recommend the use of Turcon® Excluder® 5.

ORDERING EXAMPLE

Turcon® Excluder® 2 complete with O-Ring, standard application:

Series:	WE31 from Table 163
Rod Diameter:	d_N = 50.0 mm
TSS Part No.:	WE3100500 from Table 164

Select the material from Table 162. 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 determined by following the example:

TSS Article No. **WE31 0 0500 - M12 N**

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

* For diameters d_N ≥ 1,000.0 mm multiply only by factor 1.
Example: WE35 for diameter d_N = 1,200.0 mm
TSS Article No.: WE35**X1200**-M12N

Table 164: Installation Dimensions / TSS Part Numbers

Rod Dia. d_N f8/h9	Groove Dia. D_3 H9	Groove Width L_3 +0.2	TSS Part No.	O-Ring Size	Rod Dia. d_N f8/h9	Groove Dia. D_3 H9	Groove Width L_3 +0.2	TSS Part No.	O-Ring Size
4.0*	8.8	3.7	WE3000040	5.60 x 1.80	55.0	61.8	5.0	WE3100550	56.82 x 2.62
5.0*	9.8	3.7	WE3000050	6.70 x 1.80	56.0*	62.8	5.0	WE3100560	58.42 x 2.62
6.0*	10.8	3.7	WE3000060	7.65 x 1.78	58.0	64.8	5.0	WE3100580	59.99 x 2.62
8.0*	12.8	3.7	WE3000080	9.50 x 1.80	60.0	66.8	5.0	WE3100600	61.60 x 2.62
10.0*	14.8	3.7	WE3000100	11.8 x 1.80	63.0*	69.8	5.0	WE3100630	64.77 x 2.62
12.0*	18.8	5.0	WE3100120	13.94 x 2.62	65.0	73.8	6.0	WE3200650	66.27 x 3.53
14.0*	20.8	5.0	WE3100140	15.54 x 2.62	70.0	78.8	6.0	WE3200700	72.62 x 3.53
15.0	21.8	5.0	WE3100150	17.12 x 2.62	73.0	81.8	6.0	WE3200730	75.79 x 3.53
16.0	20.8	3.7	WE3000160	17.17 x 1.78	75.0	83.8	6.0	WE3200750	75.79 x 3.53
16.0*	22.8	5.0	WE3100160	18.00 x 2.65	80.0	88.8	6.0	WE3200800	82.14 x 3.53
17.8	24.6	5.0	WE3100178	20.29 x 2.65	81.0	89.8	6.0	WE3200810	82.14 x 3.53
18.0	22.8	3.7	WE3000180	19.00 x 1.80	85.0	93.8	6.0	WE3200850	85.32 x 3.53
18.0*	24.8	5.0	WE3100180	20.29 x 2.62	86.0	94.8	6.0	WE3200860	88.49 x 3.53
20.0	24.8	3.7	WE3000200	21.95 x 1.78	88.0	96.8	6.0	WE3200880	88.49 x 3.53
20.0*	26.8	5.0	WE3100200	21.89 x 2.62	90.0	98.8	6.0	WE3200900	91.67 x 3.53
22.0	26.8	3.7	WE3000220	23.52 x 1.78	95.0	103.8	6.0	WE3200950	98.02 x 3.53
22.0*	28.8	5.0	WE3100220	23.47 x 2.62	100.0	108.8	6.0	WE3201000	101.19 x 3.53
24.0	30.8	5.0	WE3100240	26.64 x 2.62	105.0	113.8	6.0	WE3201050	107.54 x 3.53
25.0*	31.8	5.0	WE3100250	26.64 x 2.62	110.0	118.8	6.0	WE3201100	110.72 x 3.53
28.0*	34.8	5.0	WE3100280	29.82 x 2.62	115.0	123.8	6.0	WE3201150	117.07 x 3.53
29.8	36.6	5.0	WE3100298	31.42 x 2.62	120.0	128.8	6.0	WE3201200	120.24 x 3.53
30.0	34.8	3.7	WE3000300	31.47 x 1.78	125.0	133.8	6.0	WE3201250	126.59 x 3.53
30.0	36.8	5.0	WE3100300	31.42 x 2.62	130.0	138.8	6.0	WE3201300	132.94 x 3.53
32.0*	38.8	5.0	WE3100320	34.59 x 2.62	135.0	143.8	6.0	WE3201350	136.12 x 3.53
33.0	37.8	3.7	WE3000330	34.65 x 1.78	137.0	145.8	6.0	WE3201370	139.29 x 3.53
34.8	41.6	5.0	WE3100348	36.17 x 2.62	140.0	148.8	6.0	WE3201400	142.47 x 3.53
35.0	39.8	3.7	WE3000350	34.65 x 1.78	145.0	153.8	6.0	WE3201450	145.64 x 3.53
35.0	41.8	5.0	WE3100350	36.17 x 2.62	150.0	158.8	6.0	WE3201500	151.99 x 3.53
36.0*	42.8	5.0	WE3100360	37.77 x 2.62	150.0	162.2	8.4	WE3301500	151.77 x 5.33
37.0	43.8	5.0	WE3100370	39.34 x 2.62	160.0	168.8	6.0	WE3201600	158.34 x 3.53
40.0*	46.8	5.0	WE3100400	42.52 x 2.62	170.0	178.8	6.0	WE3201700	171.04 x 3.53
42.0	48.8	5.0	WE3100420	44.12 x 2.62	180.0	188.8	6.0	WE3201800	177.39 x 3.53
42.8	49.6	5.0	WE3100428	44.12 x 2.62	190.0	198.8	6.0	WE3201900	190.09 x 3.53
44.0	48.8	3.7	WE3000440	44.17 x 1.78	200.0	208.8	6.0	WE3202000	202.79 x 3.53
45.0*	49.8	3.7	WE3000450	47.35 x 1.78	210.0	218.8	6.0	WE3202100	209.14 x 3.53
45.0	51.8	5.0	WE3100450	47.29 x 2.62	220.0	228.8	6.0	WE3202200	221.84 x 3.53
49.0	55.8	5.0	WE3100490	50.47 x 2.62	230.0	238.8	6.0	WE3202300	228.19 x 3.53
50.0*	56.8	5.0	WE3100500	52.07 x 2.62	240.0	248.8	6.0	WE3202400	240.89 x 3.53
50.0	62.2	8.4	WE3300500	53.34 x 5.33	250.0	258.8	6.0	WE3202500	253.59 x 3.53
54.0	60.8	5.0	WE3100540	55.25 x 2.62	260.0	272.2	8.4	WE3302600	253.37 x 5.33

Rod Dia.	Groove Dia.	Groove Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_3 H9	L_3 +0.2		
280.0	**292.2**	**8.4**	**WE3302800**	**278.77 x 5.33**
300.0	312.2	8.4	WE3303000	304.17 x 5.33
320.0	**332.2**	**8.4**	**WE3303200**	**329.57 x 5.33**
350.0	362.2	8.4	WE3303500	354.97 x 5.33
360.0	**372.2**	**8.4**	**WE3303600**	**354.97 x 5.33**
370.0	382.2	8.4	WE3303700	365.00 x 5.30
400.0	412.2	8.4	WE3304000	405.26 x 5.33
500.0	516.0	11.0	WE3405000	494.16 x 7.00
600.0	616.0	11.0	WE3406000	608.08 x 7.00
700.0	720.0	14.0	WE3507000	705 x 8.40
800.0	820.0	14.0	WE3508000	805 x 8.40
900.0	920.0	14.0	WE3509000	905 x 8.40
1,200.0	1,220.0	14.0	WE35X1200	1,205 x 8.40
1,800.0	1,820.0	14.0	WE35X1800	1,805 x 8.40
2,600.0	2,620.0	14.0	WE35X2600	2,605 x 8.40

The rod diameters in **bold** type comply with the recommendations of ISO 3,320.

* Installation in grooves according to ISO 6,195 Type D