Turcon® Excluder® 2



Double Acting

Rubber Energized Double-acting Scraper

Material:
Turcon® and Zurcon®

■ Turcon® Excluder® 2



Description

The Turcon® Excluder® 2 is a double-acting scraper with two geometrically different scraper lips which are installed back-to-back. Excluder® 2 is always installed together with an elastic O-Ring in one groove. The scraper function is performed by the 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.

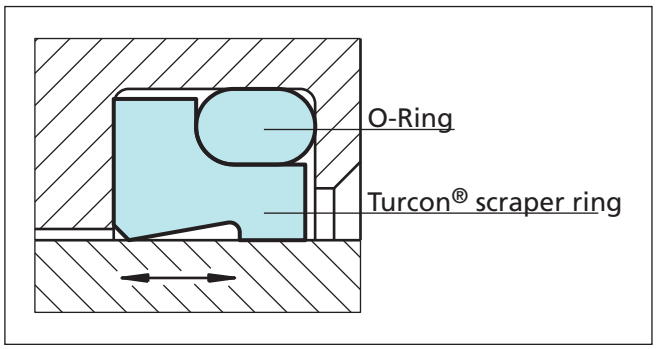


Figure 1 Turcon® Excluder® 2

Excluder® 2 has two functions:

- Scrape contaminants from the retracting piston rod and thus 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 or Zurcon® Rimseal, i.e. seals with hydrodynamic backpumping function.

Advantages

- Outstanding sliding properties
- Stick-slip-free, no sticking
- Can compensate for deflections of the piston rod or plunger
- 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® Z51/Z52)
- ISO/DIN 6195 Type D installation dimensions

Technical Data

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® Z51/Z52) -60 °C to +80 °C (Zurcon® Z80) (depending on O-Ring materials)
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally safe 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 dependent on medium.

Materials

The following material combinations have proven effective for hydraulic applications:

All round material for light to medium hydraulic applications with reciprocating, short stroke or helical movements in mineral oils, flame retardant hydraulic fluids HFC, phosphate ester, bio-oils or fluids having less satisfactory lubricating properties:

Turcon® Excluder® 2:	Turcon® M12	
O-Ring:	NBR, 70 Shore A	N
	FKM, 70 Shore A	V
Set code:	M12N or M12V	

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

Turcon® Excluder® 2:	Turcon® T46	
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 viable material combinations are listed in Table III.

Design and Installation Instructions

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

Table II Installation in Closed Grooves

Turcon® Excluder® 2 Series No.	Rod Diameter d	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

Table III 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 m/s max.
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 No wear or abrasion of counter surface Mineral fibre and Additives filled Colour: Dark grey	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 fibre filled Colour: Grey	T40	NBR - 70	N	-30 to +100	Steel Steel, chrome plated (rod) Cast iron Stainless steel Aluminium	15
		NBR - 70 Low temp.	T	-45 to +80		
		FKM - 70	V	-10 to +200		
		EPDM-70	E**	-45 to +145		
Turcon® T46 For lubricated hydraulics in linear motion High compressive strength High extrusion resistance Very good sliding and wear properties BAM tested Bronze filled Colour: 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		

* The O-Ring Operation Temperature is only valid in mineral hydraulic oil (except EPDM). ** Material not suitable for mineral oils.
*** Max. ø 2200 BAM: Tested by "Bundesanstalt Materialprüfung, Germany". Highlighted materials are standard.

Material, Applications, Properties	Code	O–Ring Material Shore A	Code	O-Ring Operating Temp.* °C	Mating Surface Material	Speed m/s max.
Zurcon® Z51*** For mineral oil based fluids Very high abrasion and extrusion resistance For counter surface with rougher surface finish Hard to install Limited chemical resistance Max. working temperature 110 °C Cast polyurethane Colour: Yellow to light-brown	Z51	NBR - 70	N	-30 to +100	Steel Steel, hardened Cast iron Ceramic coating Stainless steel	2
		NBR - 70 Low temp.	T	-45 to +80		
Zurcon® Z52*** For mineral oil based fluids High abrasion resistance For counter surface with rougher surface finish Good extrusion resistance Limited chemical resistance Max. working temperature 110 °C Cast polyurethane Colour: Turquoise	Z52	NBR - 70	N	-30 to +100	Steel Steel, hardened Steel, chrome plated (rod) Cast iron Stainless steel Aluminium	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 Aluminium Ceramic coating	2
		NBR - 70 Low temp.	T	-45 to +80		
		EPDM-70	E**	-45 to (+145)		

* The O-Ring Operation Temperature is only valid in mineral hydraulic oil (except EPDM). ** Material not suitable for mineral oils.
*** Max. ø 2200 BAM: Tested by "Bundesanstalt Materialprüfung, Germany". Highlighted materials are standard.

■ Installation Recommendation

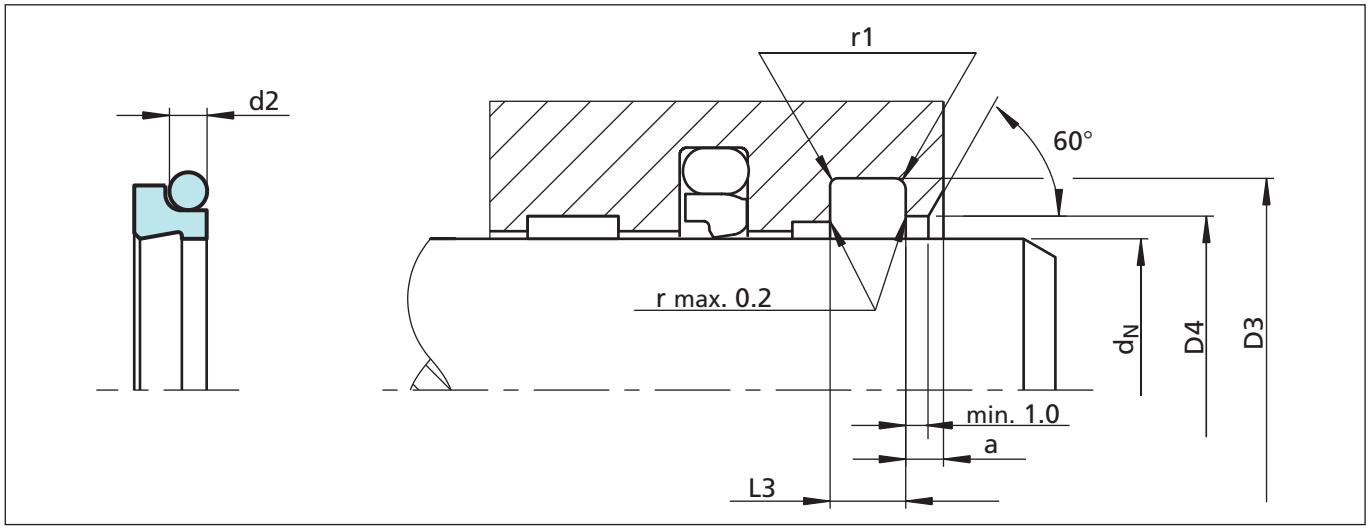


Figure 2 Installation drawing

Table IV Installation dimensions

Series No.	Rod Diameter d_N f8/h9		Groove Diameter	Groove Width	Bore Diameter	Step Width	O-Ring Cross-Section
	Recommended Range	Extended Range	D_3 H9	L_3 +0.2	D_4 H11	a min.	d_2
WE30	4.0 - 11.9	4.0 - 130.0	dN + 4.8	3.7	d + 1.5	2.0	1.78
WE31	12.0 - 64.9	10.0 - 245.0	dN + 6.8	5.0	d + 1.5	2.0	2.62
WE32	65.0 - 250.9	25.0 - 400.0	dN + 8.8	6.0	d + 1.5	3.0	3.53
WE33	251.0 - 420.9	40.0 - 655.0	dN + 12.2	8.4	d + 2.0	4.0	5.33
WE34	421.0 - 650.9	110.0 - 655.0	dN + 16.0	11.0	d + 2.0	4.0	7.00
WE35	651.0 - 999.9	140.0 - 999.9	dN + 20.0	14.0	d + 2.5	5.0	8.40
WE35X	≥ 1000.0	≥ 1000.0	dN + 20.0	14.0	d + 2.5	5.0	8.40

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

Ordering Example

Turcon® Excluder® 2 with O-Ring, NBR
Rod diameter: d_N = 50.0 mm
Series: WE31 (from Table IV)
TSS Part No.: WE3100500 (from Table V)

Select the material from Table III. The corresponding code numbers are appended to the TSS Part No. (from Table V). Together they form the TSS Article No.
For all intermediate sizes not shown in Table V, the TSS Article No. can be determined from the example opposite.

* For diameters ≥ 1000.0 mm multiply only by factor 1. Example WE35 for diameter 1200.0 mm. TSS Article No.: WE35**X1200**-M12N.

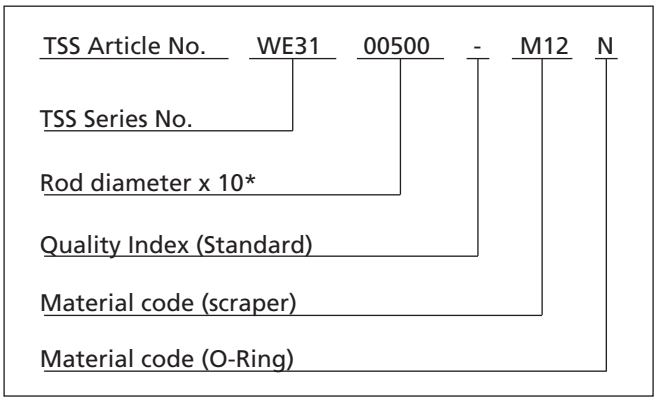


Table V Installation dimensions / TSS part numbers

Rod Diameter	Groove Diameter	Groove Width	Bore Diameter	Radius	Step Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_3 H9	L_3 +0.2	D_4 H11	r_1 max.	**a** min		
4.0*)	**8.8**	**3.7**	**5.5**	**0.4**	**2.0**	**WE3000040**	**5.60 x 1.80**
5.0*)	**9.8**	**3.7**	**6.5**	**0.4**	**2.0**	**WE3000050**	**6.70 x 1.80**
6.0*)	**10.8**	**3.7**	**7.5**	**0.4**	**2.0**	**WE3000060**	**7.65 x 1.78**
8.0*)	**12.8**	**3.7**	**9.5**	**0.4**	**2.0**	**WE3000080**	**9.50 x 1.80**
10.0*)	**14.8**	**3.7**	**11.5**	**0.4**	**2.0**	**WE3000100**	**11.80 x 1.80**
12.0*)	**18.8**	**5.0**	**13.5**	**0.8**	**2.0**	**WE3100120**	**13.94 x 2.62**
14.0*)	**20.8**	**5.0**	**15.5**	**0.8**	**2.0**	**WE3100140**	**15.54 x 2.62**
15.0	21.8	5.0	16.5	0.8	2.0	WE3100150	17.12 x 2.62
16.0	**20.8**	**3.7**	**17.5**	**0.4**	**2.0**	**WE3000160**	**17.17 x 1.78**
16.0*)	**22.8**	**5.0**	**17.5**	**0.8**	**2.0**	**WE3100160**	**18.00 x 2.65**
18.0	**22.8**	**3.7**	**19.5**	**0.4**	**2.0**	**WE3000180**	**19.00 x 1.80**
18.0*)	**24.8**	**5.0**	**19.5**	**0.8**	**2.0**	**WE3100180**	**20.29 x 2.62**
20.0*)	**26.8**	**5.0**	**21.5**	**0.8**	**2.0**	**WE3100200**	**21.89 x 2.62**
22.0*)	**28.8**	**5.0**	**23.5**	**0.8**	**2.0**	**WE3100220**	**23.47 x 2.62**
25.0*)	**31.8**	**5.0**	**26.5**	**0.8**	**2.0**	**WE3100250**	**26.64 x 2.62**
28.0*)	**34.8**	**5.0**	**29.5**	**0.8**	**2.0**	**WE3100280**	**29.82 x 2.62**
30.0	34.8	3.7	31.5	0.4	2.0	WE3000300	31.47 x 1.78
30.0	36.8	5.0	31.5	0.8	2.0	WE3100300	31.42 x 2.62
32.0*)	**38.8**	**5.0**	**33.5**	**0.8**	**2.0**	**WE3100320**	**34.59 x 2.62**
35.0	41.8	5.0	36.5	0.8	2.0	WE3100350	36.17 x 2.62
36.0*)	**42.8**	**5.0**	**37.5**	**0.8**	**2.0**	**WE3100360**	**37.77 x 2.62**
37.0	43.8	5.0	38.5	0.8	2.0	WE3100370	39.34 x 2.62
40.0*)	**46.8**	**5.0**	**41.5**	**0.8**	**2.0**	**WE3100400**	**42.52 x 2.62**
42.0	48.8	5.0	43.5	0.8	2.0	WE3100420	44.12 x 2.62
45.0*)	**51.8**	**5.0**	**46.5**	**0.8**	**2.0**	**WE3100450**	**47.29 x 2.62**
49.0	55.8	5.0	50.5	0.8	2.0	WE3100490	50.47 x 2.62
50.0*)	**56.8**	**5.0**	**51.5**	**0.8**	**2.0**	**WE3100500**	**52.07 x 2.62**
50.8	57.6	5.0	52.3	0.8	2.0	WE3100508	52.07 x 2.62
54.0	60.8	5.0	55.5	0.8	2.0	WE3100540	55.25 x 2.62
55.0	61.8	5.0	56.5	0.8	2.0	WE3100550	56.82 x 2.62
56.0*)	**62.8**	**5.0**	**57.5**	**0.8**	**2.0**	**WE3100560**	**58.42 x 2.62**
60.0	66.8	5.0	61.5	0.8	2.0	WE3100600	61.60 x 2.62
63.0*)	**69.8**	**5.0**	**64.5**	**0.8**	**2.0**	**WE3100630**	**64.77 x 2.62**
65.0	73.8	6.0	66.5	1.0	3.0	WE3200650	66.27 x 3.53
70.0	**78.8**	**6.0**	**71.5**	**1.0**	**3.0**	**WE3200700**	**72.62 x 3.53**
75.0	83.8	6.0	76.5	1.0	3.0	WE3200750	75.79 x 3.53

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 2.600 mm diameter including imperial (inch) sizes can be supplied.

Rod Diameter	Groove Diameter	Groove Width	Bore Diameter	Radius	Step Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_3 H9	L_3 +0.2	D_4 H11	r_1 max.	**a** min		
80.0	**88.8**	**6.0**	**81.5**	**1.0**	**3.0**	**WE3200800**	**82.14 x 3.53**
85.0	93.8	6.0	86.5	1.0	3.0	WE3200850	83.52 x 3.53
90.0	**98.8**	**6.0**	**91.5**	**1.0**	**3.0**	**WE3200900**	**91.67 x 3.53**
95.0	103.8	6.0	96.5	1.0	3.0	WE3200950	98.02 x 3.53
100.0	**108.8**	**6.0**	**101.5**	**1.0**	**3.0**	**WE3201000**	**101.19 x 3.53**
105.0	113.8	6.0	106.5	1.0	3.0	WE3201050	107.54 x 3.53
110.0	**118.8**	**6.0**	**111.5**	**1.0**	**3.0**	**WE3201100**	**110.72 x 3.53**
115.0	123.8	6.0	116.5	1.0	3.0	WE3201150	117.07 x 3.53
120.0	128.8	6.0	121.5	1.0	3.0	WE3201200	120.24 x 3.53
125.0	**133.8**	**6.0**	**126.5**	**1.0**	**3.0**	**WE3201250**	**126.59 x 3.53**
130.0	138.8	6.0	131.5	1.0	3.0	WE3201300	132.94 x 3.53
135.0	143.8	6.0	136.5	1.0	3.0	WE3201350	136.12 x 3.53
137.0	145.8	6.0	138.5	1.0	3.0	WE3201370	139.29 x 3.53
140.0	**148.8**	**6.0**	**141.5**	**1.0**	**3.0**	**WE3201400**	**142.47 x 3.53**
145.0	153.8	6.0	146.5	1.0	3.0	WE3201450	145.64 x 3.53
150.0	158.8	6.0	151.5	1.0	3.0	WE3201500	151.99 x 3.53
160.0	**168.8**	**6.0**	**161.5**	**1.0**	**3.0**	**WE3201600**	**158,34 x 3.53**
170.0	178.8	6.0	171.5	1.0	3.0	WE3201700	171.04 x 3.53
180.0	**188.8**	**6.0**	**181.5**	**1.0**	**3.0**	**WE3201800**	**177.39 x 3.53**
190.0	198.8	6.0	191.5	1.0	3.0	WE3201900	190.09 x 3.53
200.0	**208.8**	**6.0**	**201.5**	**1.0**	**3.0**	**WE3202000**	**202.79 x 3.53**
210.0	218.8	6.0	211.5	1.0	3.0	WE3202100	209.14 x 3.53
220.0	**228.8**	**6.0**	**221.5**	**1.0**	**3.0**	**WE3202200**	**221.84 x 3.53**
230.0	238.8	6.0	231.5	1.0	3.0	WE3202300	228.19 x 3.53
240.0	248.8	6.0	241.5	1.0	3.0	WE3202400	240.89 x 3.53
250.0	**258.8**	**6.0**	**251.5**	**1.0**	**3.0**	**WE3202500**	**253.59 x 3.53**
260.0	272.2	8.4	262.0	1.5	4.0	WE3302600	253.59 x 5.33
280.0	**292.2**	**8.4**	**282.0**	**1.5**	**4.0**	**WE3302800**	**278.77 x 5.33**
300.0	312.2	8.4	302.0	1.5	4.0	WE3303000	304.17 x 5.33
320.0	**332.2**	**8.4**	**322.0**	**1.5**	**4.0**	**WE3303200**	**329.57 x 5.33**
350.0	362.2	8.4	352.0	1.5	4.0	WE3303500	354.97 x 5.33
360.0	**372.2**	**8.4**	**362.0**	**1.5**	**4.0**	**WE3303600**	**354.97 x 5.33**
370.0	382.2	8.4	372.0	1.5	4.0	WE3303700	365.00 x 5.30
400.0	412.2	8.4	402.0	1.5	4.0	WE3304000	405.26 x 5.33
440.0	456.0	11.0	442.0	1.5	4.0	WE3404400	443.36 x 7.00
480.0	496.0	11.0	482.0	1.5	4.0	WE3404800	481.46 x 7.00

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 2.600 mm diameter including imperial (inch) sizes can be supplied.

Rod Diameter	Groove Diameter	Groove Width	Bore Diameter	Radius	Step Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_3 H9	L_3 +0.2	D_4 H11	r_1 max.	a min		
600.0	616.0	11.0	602.0	1.5	4.0	WE3406000	608.08 x 7.00
630.0	646.0	11.0	632.0	1.5	4.0	WE3406300	633.48 x 7.00
680.0	700.0	14.0	682.5	2.0	5.0	WE3506800	680.00 x 8.40
700.0	720.0	14.0	702.5	2.0	5.0	WE3507000	705.00 x 8.40
770.0	790.0	14.0	772.5	2.0	5.0	WE3507700	774.10 x 8.40
828.0	848.0	14.0	830.5	2.0	5.0	WE3508280	830.00 x 8.40
880.0	900.0	14.0	882.5	2.0	5.0	WE3508800	888.00 x 8.40
900.0	920.0	14.0	902.5	2.0	5.0	WE3509000	904.00 x 8.40
1030.0	1050.0	14.0	1032.5	2.0	5.0	WE35X1030	1035.0 x 8.40
1180.0	1200.0	14.0	1182.5	2.0	5.0	WE35X1180	1185.0 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 2.600 mm diameter including imperial (inch) sizes can be supplied.