
Turcon[®] Excluder[®] 5



Double Acting

Rubber Energized
Double-acting Scraper

Material:
Turcon[®] and Zurcon[®]



■ Turcon® Excluder® 5*



Description

The Turcon® Excluder® 5 is a patented double-acting scraper with two geometrically different scraper lips which are installed back-to-back.

The scraper is installed together with an O-Ring as elastic energizing element in one groove. The scraper function is performed by the Excluder® 5. The O-Ring maintains the pressure of the scraper lips against the sliding surface and can compensate deflections of the piston rod.

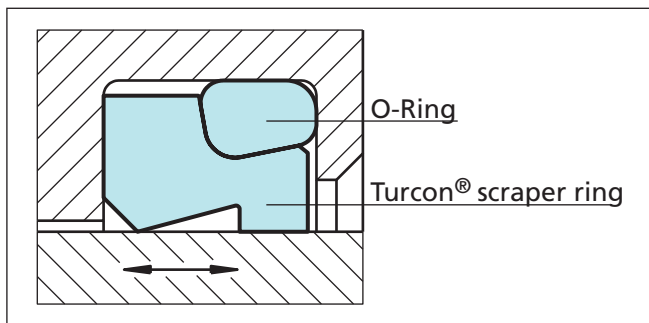


Figure 3 Turcon® Excluder® 5

Excluder® 5 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® 5 is used in conjunction with our rod seals Turcon® Stepseal® 2K or Zurcon® Rimseal, i.e. seals with a hydrodynamic back-pumping function. In contrast to the Excluder® 2, they are used particularly for heavy-duty applications such as in construction machinery, presses, etc.

Advantages

- Outstanding sliding properties
- Stick-slip-free, no sticking (Turcon® material)
- Tough scraper for heavy-duty operation
- Can compensate for deflections of the piston rod or plunger
- Very good scraping effect even against firmly adhered dirt, etc.
- Very good scraping effect from the inside against the residual oil film adhering to the surface of the piston rod
- Identical installation with that of the Zurcon® Excluder® 500

- Very high resistance to hydraulic media
- Available for all diameters up to 2.600 mm (Turcon®), 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 material)
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 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, pressure, temperature and gap value. Temperature range also dependent on medium.

Materials

The following material combinations has proven effective for most applications:

All round material for 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® 5:	Turcon® M12
O-Ring:	NBR, 70 Shore A N FKM, 70 Shore A V
Set code:	M12N or M12V



Turcon® Excluder® 5

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

Turcon® Excluder® 5: 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 VII.

Design and Installation Instructions

Excluder® 5 scrapers can be installed in split and closed grooves (installation dimensions, see Table VIII).

Installation in closed grooves is dependent on the rod diameter, profile cross-section of the scraper and on the cross-section of the corresponding O-Ring, see Table VI.

* Patent-No. EP 023 5568

Table VI Installation in Closed Grooves

Turcon® Excluder® 5 Series No.	Rod Diameter d _N	O-Ring Cross-Section d ₂
WE50	> 30.0	2.62
WE51	> 40.0	2.62
WE52	> 70.0	3.53
WE53	> 100.0	5.33
WE54	> 140.0	7.00
WE55	> 180.0	8.40

Table VII Turcon® and Zurcon® Materials for Excluder® 5

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) 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. 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 Linear and slowly turning movements 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	2
		NBR - 70 Low temp.	T	-45 to +80	Steel, hardened Cast iron Ceramic coating Stainless steel	
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	1
		NBR - 70 Low temp.	T	-45 to +80	Steel, hardened Steel, chrome plated (rod) Cast iron Stainless steel Aluminium	
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)	Aluminium 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 standard.



Installation Recommendation

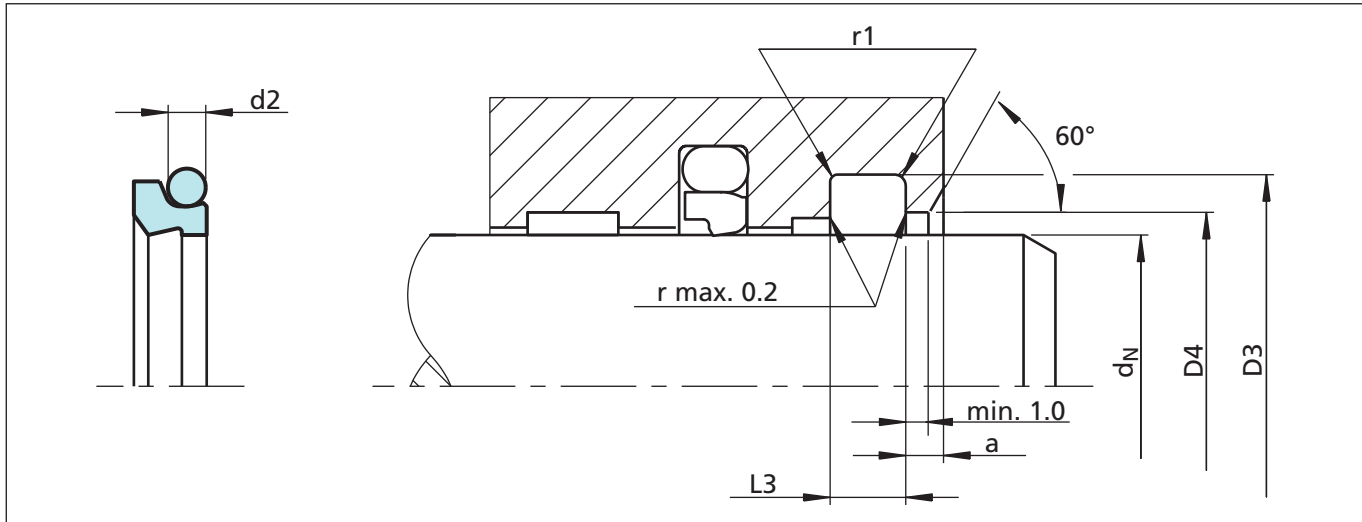


Figure 4 Installation drawing

Table VIII 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
WE50	19.0 - 39.9	19.0 - 100.0	$d_N + 7.6$	4.2	$d + 1.5$	3.0	2.62
WE51	40.0 - 69.9	30.0 - 200.0	$d_N + 8.8$	6.3	$d + 1.5$	3.0	2.62
WE52	70.0 - 139.9	70.0 - 360.0	$d_N + 12.2$	8.1	$d + 2.0$	4.0	3.53
WE53	140.0 - 399.9	100.0 - 650.0	$d_N + 16.0$	9.5	$d + 2.5$	5.0	5.33
WE54	400.0 - 649.9	200.0 - 650.0	$d_N + 24.0$	14.0	$d + 2.5$	8.0	7.00
WE55	650.0 - 999.9	400.0 - 999.9	$d_N + 27.3$	16.0	$d + 2.5$	10.0	8.40
WE55X	≥ 1000	≥ 1000	$d_N + 27.3$	16.0	$d + 2.5$	10.0	8.40

Ordering example

Turcon® Excluder® 5 with O-Ring in NBR
 Rod diameter: $d_N = 50.0$ mm
 Series: WE51 (from Table VIII)
 TSS Part No.: WE5100500 (from Table IX)

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

* For diameters ≥ 1000.0 mm multiply only by factor 1. Example WE55 for diameter 1200.0 mm. TSS Article No.: WE55X1200-M12N.

TSS Article No.	WE51	00500	-	M12	N
TSS Series No.					
Rod diameter x 10*					
Quality Index (Standard)					
Material code (scraper)					
Material code (O-Ring)					



Table IX 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.		
20.0	27.6	4.2	21.5	0.8	3.0	WE5000200	21.89 x 2.62
25.0	32.6	4.2	26.5	0.8	3.0	WE5000250	28.24 x 2.62
28.0	35.6	4.2	29.5	0.8	3.0	WE5000280	29.82 x 2.62
30.0	37.6	4.2	31.5	0.8	3.0	WE5000300	32.99 x 2.62
32.0	39.6	4.2	33.5	0.8	3.0	WE5000320	34.59 x 2.62
36.0	43.6	4.2	37.5	0.8	3.0	WE5000360	37.77 x 2.62
40.0*)	48.8	6.3	41.5	0.8	3.0	WE5100400	44.12 x 2.62
42.0	50.8	6.3	43.5	0.8	3.0	WE5100420	45.69 x 2.62
45.0*)	53.8	6.3	46.5	0.8	3.0	WE5100450	48.90 x 2.62
50.0*)	58.8	6.3	51.5	0.8	3.0	WE5100500	53.64 x 2.62
55.0	63.8	6.3	56.5	0.8	3.0	WE5100550	58.42 x 2.62
56.0*)	64.8	6.3	57.5	0.8	3.0	WE5100560	59.99 x 2.62
60.0	68.8	6.3	61.5	0.8	3.0	WE5100600	63.17 x 2.62
63.0*)	71.8	6.3	64.5	0.8	3.0	WE5100630	66.34 x 2.62
65.0	73.8	6.3	66.5	0.8	3.0	WE5100650	67.95 x 2.62
70.0*)	78.8	6.3	71.5	0.8	3.0	WE5100700	72.69 x 2.62
70.0*)	82.2	8.1	72.0	1.0	4.0	WE5200700	75.79 x 3.53
75.0	87.2	8.1	77.0	1.0	4.0	WE5200750	78.97 x 3.53
80.0*)	88.8	6.3	81.5	1.0	3.0	WE5100800	82.22 x 2.62
80.0*)	92.2	8.1	82.0	1.0	4.0	WE5200800	85.32 x 3.53
85.0	97.2	8.1	87.0	1.0	4.0	WE5200850	88.49 x 3.53
90.0*)	98.8	6.3	91.5	1.0	3.0	WE5100900	94.92 x 2.62
90.0*)	102.2	8.1	92.0	1.0	4.0	WE5200900	94.84 x 3.53
97.0	109.2	8.1	99.0	1.0	4.0	WE5200970	101.19 x 3.53
99.0	111.2	8.1	101.0	1.0	4.0	WE5200990	104.37 x 3.53
100.0*)	108.8	6.3	101.5	1.0	3.0	WE5101000	101.27 x 2.62
100.0*)	112.2	8.1	102.0	1.0	4.0	WE5201000	104.37 x 3.53
105.0	117.2	8.1	107.0	1.0	4.0	WE5201050	110.72 x 3.53
110.0*)	118.8	6.3	111.5	1.0	3.0	WE5101100	113.97 x 2.62
110.0*)	122.2	8.1	112.0	1.0	4.0	WE5201100	113.89 x 3.53
115.0	127.2	8.1	117.0	1.0	4.0	WE5201150	120.24 x 3.53
120.0	132.2	8.1	122.0	1.0	4.0	WE5201200	123.42 x 3.53
125.0*)	133.8	6.3	126.5	1.0	3.0	WE5101250	126.67 x 2.62

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.



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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.		
125.0*)	137.2	8.1	127.0	1.0	4.0	WE5201250	129.77 x 3.53
125.4	137.6	8.1	127.4	1.0	4.0	WE5201254	129.77 x 3.53
130.0	142.2	8.1	132.0	1.0	4.0	WE5201300	136.12 x 3.53
135.0	147.2	8.1	137.0	1.0	4.0	WE5201350	139.29 x 3.53
140.0*)	152.2	8.1	142.0	1.0	4.0	WE5201400	145.64 x 3.53
140.0*)	156.0	9.5	142.5	1.5	5.0	WE5301400	145.42 x 5.33
140.5	156.5	9.5	143.0	1.5	5.0	WE5301405	145.42 x 5.33
150.0	166.0	9.5	152.5	1.5	5.0	WE5301500	151.77 x 5.33
153.0	169.0	9.5	155.5	1.5	5.0	WE5301530	158.12 x 5.33
155.0	171.0	9.5	157.5	1.5	5.0	WE5301550	158.12 x 5.33
160.0*)	172.2	8.1	162.0	1.0	4.0	WE5201600	164.69 x 3.53
160.0*)	176.0	9.5	162.5	1.5	5.0	WE5301600	164.47 x 5.33
165.0	181.0	9.5	167.5	1.5	5.0	WE5301650	170.82 x 5.33
170.0	186.0	9.5	172.5	1.5	5.0	WE5301700	177.17 x 5.33
175.0	191.0	9.5	177.5	1.5	5.0	WE5301750	177.17 x 5.33
180.0*)	192.2	8.1	182.0	1.0	4.0	WE5201800	183.74 x 3.53
180.0*)	196.0	9.5	182.5	1.5	5.0	WE5301800	183.52 x 5.33
188.2	204.2	9.5	190.7	1.5	5.0	WE5301882	189.87 x 5.33
190.0	206.0	9.5	192.5	1.5	5.0	WE5301900	196.22 x 5.33
192.0	208.0	9.5	194.5	1.5	5.0	WE5301920	196.22 x 5.33
200.0*)	212.2	8.1	202.0	1.0	4.0	WE5202000	202.79 x 3.53
200.0*)	216.0	9.5	202.5	1.5	5.0	WE5302000	202.57 x 5.33
211.0	227.0	9.5	213.5	1.5	5.0	WE5302110	215.27 x 5.33
220.0*)	232.2	8.1	222.0	1.0	4.0	WE5202200	221.84 x 3.53
220.0*)	236.0	9.5	222.5	1.5	5.0	WE5302200	221.62 x 5.33
240.0	256.0	9.5	242.5	1.5	5.0	WE5302400	247.02 x 5.33
250.0*)	262.2	8.1	252.0	1.0	4.0	WE5202500	253.59 x 3.53
250.0*)	266.0	9.5	252.5	1.5	5.0	WE5302500	253.37 x 5.33
260.0	276.0	9.5	262.5	1.5	5.0	WE5302600	266.07 x 5.33
270.0	286.0	9.5	272.5	1.5	5.0	WE5302700	278.77 x 5.33
280.0*)	292.2	8.1	282.0	1.5	4.0	WE5202800	278.99 x 3.53
280.0*)	296.0	9.5	282.5	1.5	5.0	WE5302800	278.77 x 5.33
300.0	316.0	9.5	302.5	1.5	5.0	WE5303000	304.17 x 5.33
320.0*)	332.2	8.1	322.0	1.5	4.0	WE5203200	329.79 x 3.53
320.0*)	336.0	9.5	322.5	1.5	5.0	WE5303200	329.57 x 5.33
330.0	346.0	9.5	332.5	1.5	5.0	WE5303300	329.57 x 5.33

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.		
350.0	366.0	9.5	352.5	1.5	5.0	WE5303500	354.97 x 5.33
360.0*)	372.2	8.1	362.0	1.5	4.0	WE5203600	355.19 x 3.53
360.0*)	376.0	9.5	362.5	1.5	5.0	WE5303600	365.00 x 5.30
380.0	396.0	9.5	382.5	1.5	5.0	WE5303800	380.37 x 5.33
400.0	424.0	14.0	402.5	1.5	8.0	WE5404000	405.26 x 7.00
440.0	464.0	14.0	442.5	1.5	8.0	WE5404400	443.36 x 7.00
450.0	474.0	14.0	452.5	1.5	8.0	WE5404500	456.06 x 7.00
480.0	504.0	14.0	482.5	1.5	8.0	WE5404800	481.46 x 7.00
500.0	524.0	14.0	502.5	1.5	8.0	WE5405000	506.86 x 7.00
560.0	584.0	14.0	562.5	1.5	8.0	WE5405600	557.66 x 7.00
600.0	624.0	14.0	602.5	1.5	8.0	WE5406000	608.08 x 7.00
650.0	677.3	16.0	652.5	2.0	10.0	WE5506500	649.00 x 8.40
680.0	707.3	16.0	682.5	2.0	10.0	WE5506800	680.00 x 8.40
700.0	727.3	16.0	702.5	2.0	10.0	WE5507000	715.00 x 8.40
770.0	797.3	16.0	772.5	2.0	10.0	WE5507700	774.10 x 8.40
785.0	812.3	16.0	787.5	2.0	10.0	WE5507850	810.00 x 8.40
800.0	827.3	16.0	802.5	2.0	10.0	WE5508000	810.00 x 8.40
810.0	837.3	16.0	812.5	2.0	10.0	WE5508100	810.00 x 8.40
900.0	927.3	16.0	902.5	2.0	10.0	WE5509000	910.00 x 8.40
950.0	977.3	16.0	952.5	2.0	10.0	WE5509500	959.10 x 8.40
1000.0	1027.3	16.0	1002.5	2.0	10.0	WE55X1000	1010.0 x 8.40
1040.0	1067.3	16.0	1042.5	2.0	10.0	WE55X1040	1050.0 x 8.40
1130.0	1157.3	16.0	1132.5	2.0	10.0	WE55X1130	1140.0 x 8.40
1200.0	1227.3	16.0	1202.5	2.0	10.0	WE55X1200	1210.0 x 8.40
2600.0	2627.3	16.0	2602.5	2.0	10.0	WE55X2600	2610.0 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.



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