

Turcon® AQ Seal® 5 with Bean Seal



Double-acting

Rubber-energized plastic-faced seal

Material:

Turcon®, Zurcon® and Elastomer



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Turcon® AQ Seal® 5 with Bean Seal*



Description

Turcon® AQ Seal® 5 with Bean Seal is a patented development of the proven standard Turcon® AQ Seal®.

The particular characteristics of AQ Seal® 5 with Bean Seal are the seal profile with a defined seal edge and the use of two O-Rings as energizing elements to optimize the pressure profile and to reduce the gas permeability.

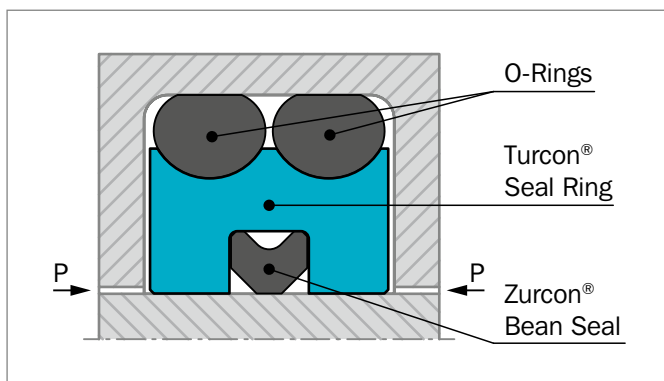


Figure 81: Turcon® AQ Seal® 5 with Bean Seal

AQ Seal® 5 with Bean Seal combines the benefits of a low-friction Turcon® slipper seal with the high sealing characteristics of an elastomeric seal by incorporating a limited foot print Bean Seal in the dynamic sealing face. This optimizes leakage control while minimizing friction.

ADVANTAGES

- High sealing effect in applications requiring media separation, e.g. fluid/fluid or fluid/gas
- Double security through the combination of low-friction special materials with elastomer seals
- Higher pressure application, higher sliding speed compared to AQ Seal® 5 with Quad-Ring®
- Outstanding sliding properties, no stick-slip effect.
- Available for any rod diameters from 32 mm and up to 2,200 mm

APPLICATION EXAMPLES

TurconAQ Seal® 5 is mainly designed for heavy duty and large diameter applications and is recommended as double acting piston seal for hydraulic equipment such as:

- Mobile hydraulics
- Presses
- Stabilizers
- Heavy duty suspension cylinders
- Media separation of fluid /fluid or fluid/gas; please note that one of the media must be lubricating
- Hydro-pneumatic suspensions for heavy vehicles
- Cylinders with retaining function over longer periods such as jacks and support cylinders

OPERATING CONDITIONS

Pressure:	Up to 60 MPa with mineral oil Up to 40 MPa for media with low lubricating properties
Speed:	Up to 3 m/s with linear movements
Temperature:	-45 °C to +110 °C depending on seal, O-Ring and Bean Seal material
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, phosphate ester and others, depending on temperature, seal, O-Ring and Bean Seal material compatibility see Table 63.
Clearance:	The maximum permissible radial clearance S_{max} is shown in Table 65 as a function of the operating pressure and functional diameter.

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.

* Patent application: WO 90/00693 A1



INSTALLATION INSTRUCTIONS

AQ Seal® 5 is installed according to information on page 39 and 40.

RECOMMENDED MATERIALS

The following material combinations have proven effective for hydraulic applications:

Turcon® AQ Seal® 5 in Turcon® M12

All round material for light to heavy hydraulic applications with linear movements in mineral oils, flame retardant hydraulic fluids and phosphate ester.

Bean Seal: Zurcon® Z54

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

Set code: M12N or M12V

Turcon® AQ Seal® 5 in Turcon® T46

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

Bean Seal: Zurcon® Z54

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 63.

**Table 63: Recommended Turcon® Materials for Turcon® AQ Seal® 5**

Material, Applications, Properties	Code	O-Ring Material Shore A	Code	O-Ring Operating Temp. * °C	Mating Surface Material	MPa max. Dyna- mic
Turcon® M12 First material choice for seals in 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 seals 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	50
		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® T08 For lubricating fluids and linear motion Very high compressive strength and extrusion resistance Hard counter surfaces is recommended Bronze filled Color: Light to dark brown, which may have variations in shading	T08	NBR 70	N	-30 to +100	Steel hardened Steel chrome plated (rod) Cast iron	60
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to (+200)		
Turcon® T10 For hydraulic and pneumatic For linear motion in lubricating and non-lubricating fluids High extrusion resistance Good chemical resistance Not for electrically conducting fluids Carbon, graphite filled BAM tested Color: Black	T10	NBR 70	N	-30 to +100	Steel	40
		NBR 70 Low temp.	T	-45 to +80	Steel chrome plated (rod)	
		FKM 70	V	-10 to (+200)	Stainless steel	
Turcon® T29 For lubricating and non-lubricating fluids Good extrusion resistance Surface texture is not suitable for gas sealing Not for electrically conducting fluids Carbon fiber filled Color: Gray	T29	NBR 70	N	-30 to +100	Steel	30
		NBR 70 Low temp.	T	-45 to +80	Steel chrome plated (rod)	
		FKM 70	V	-10 to (+200)	Cast iron 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	MPa max. Dyna- mic
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	25
		NBR 70 Low temp.	T	-45 to +80	Steel chrome plated (rod)	
		FKM 70	V	-10 to (+200)	Cast iron Stainless steel Aluminum	
Turcon® T46 For lubricated hydraulics in linear motion High compressive strength High extrusion resistance Very good sliding and wear properties Bronze filled BAM tested Color: Light to dark brown, which may have variations in shading.	T46	NBR 70	N	-30 to +100	Steel hardened	50
		NBR 70 Low temp.	T	-45 to +80	Steel chrome plated (rod)	
		FKM 70	V	-10 to (+200)	Cast iron	
Zurcon® Z80 For lubrication and non-lubrication 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) Color: White to off-white	Z80	NBR 70	N	-30 to (+100)	Steel	35
		NBR 70 Low temp.	T	-45 to +80	Steel hardened Steel chrome plated (rod) Stainless steel Aluminum Ceramic coating	

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

BAM: Tested by "Bundesanstalt Materialprüfung, Germany"

Highlighted materials are recommended.

Table 64: Zurcon® Z54 for Bean Seal

Material, Applications, Properties	Code	O–Ring Material Shore A	Code	O–Ring Operating Temp.* °C	Mating Surface Material
Zurcon® Z54 For mineral oil based fluids Linear and slowly turning movements High sealing effect High abrasion resistance Good extrusion resistance Limited chemical resistance Max. working temperature +110 °C Cast Polyurethane Color: Turquoise	Z54	-	-	-	Steel Steel hardened Steel chrome plated (rod) Cast iron Stainless steel Ceramic coating



Installation Recommendation

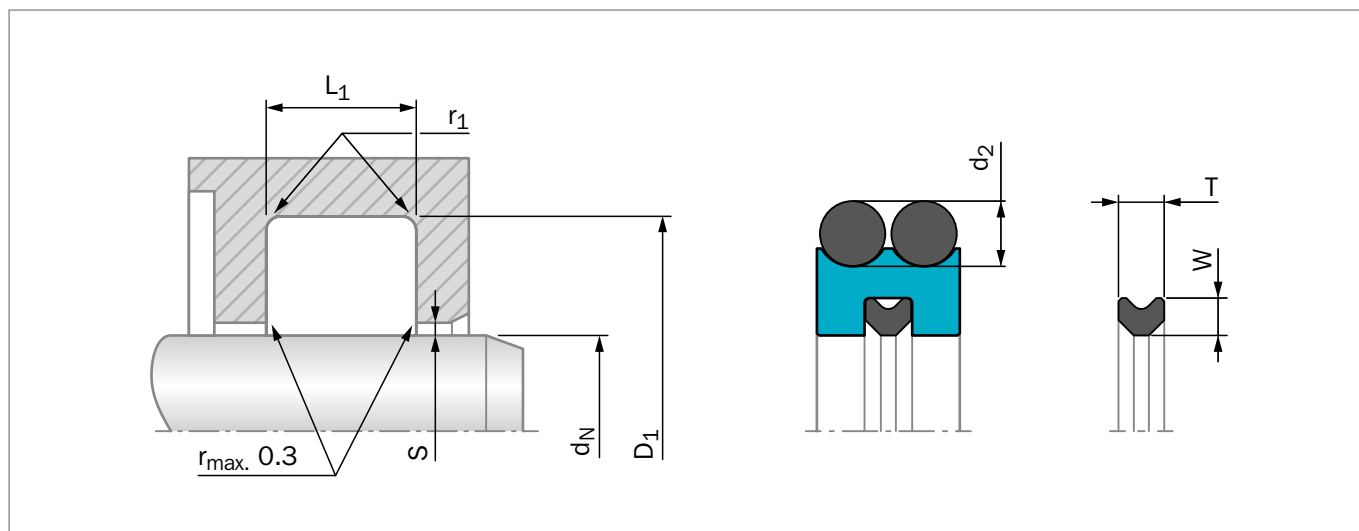


Figure 82: Installation Drawing

Table 65: Installation Dimensions – Standard installation

Series No.	Rod Diameter d_N f8/h9		Groove Diameter D_1 H9	Groove Width L_1 +0.2	Radius r_{1max}	Radial Clearance S_{max}^*			O-Ring Cross Section d_2	Bean Seal Cross Section	
	Standard Application	Available Range				10 MPa	20 MPa	40 MPa		W	T
RQC10	40 - 79.9	32 - 250.0	$d_N + 10.0$	6.3	0.6	0.30	0.20	0.15	2.62	1.70	1.70
RQC20	80 - 132.9	50 - 450.0	$d_N + 13.0$	8.3	1.0	0.40	0.30	0.15	3.53	2.52	2.65
RQC30	133 - 462.9	80 - 650.0	$d_N + 18.0$	12.3	1.3	0.40	0.30	0.20	5.33	3.50	3.65
RQC40	463 - 999.9	180 - 999.9	$d_N + 31.0$	16.3	1.8	0.50	0.40	0.30	7.00	5.20	5.05
RQC4X	1,000 - 2,200.0	1,000 - 2,200.0	$d_N + 31.0$	16.3	1.8	0.50	0.40	0.30	7.00	5.20	5.05

*At pressures > 40 MPa use diameter tolerance H8/f8 (bore/rod) in the area of the seal use Turcon® AQ Seal® 5 CR or consult your local Customer Solution Center for alternative material or profiles.

Slydring® / Wear Rings are not applicable at very small radial clearances please consult the Slydring® section in this catalog.

All AQ Seal® supplied without Bean Seals must have "W" in the 5th character of the TSS Article Number.

ORDERING EXAMPLE

AQ Seal® 5 complete with Bean Seal and O-Rings, standard application:

Series:	RQC20 from Table 65
Rod diameter:	$d_N = 80.0$ mm
TSS Part No.:	RQC200800 from Table 66

Select the material from Table 63. 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. **RQC2** **0** **0800** - **M12** **N**

Series No. _____

Type (Standard) _____

Rod Diameter x 10** _____

Quality Index (Standard) _____

Material Code (Seal Ring) _____

Material Code (O-Ring) _____

** For diameters $d_N \geq 1,000.0$ mm multiply only by factor 1.

Example: RQC4X for diameter $d_N = 1,200.0$ mm

TSS Article No.: RQC4X1200-M12N



Table 66: Installation Dimensions / TSS Part No.

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_1 H9	L_1 +0.2			d_N f8/h9	D_1 H9	L_1 +0.2		
40.0	50.0	6.3	RQC100400	44.12 x 2.62	160.0	178.0	12.3	RQC301600	164.47 x 5.33
42.0	52.0	6.3	RQC100420	47.29 x 2.62	170.0	188.0	12.3	RQC301700	177.17 x 5.33
45.0	55.0	6.3	RQC100450	50.47 x 2.62	180.0	198.0	12.3	RQC301800	183.52 x 5.33
48.0	58.0	6.3	RQC100480	52.07 x 2.62	190.0	208.0	12.3	RQC301900	196.22 x 5.33
50.0	60.0	6.3	RQC100500	55.25 x 2.62	200.0	218.0	12.3	RQC302000	208.92 x 5.33
50.0	63.0	8.3	RQC200500	56.74 x 3.53	220.0	238.0	12.3	RQC302200	227.97 x 5.33
52.0	62.0	6.3	RQC100520	56.82 x 2.62	230.0	248.0	12.3	RQC302300	234.32 x 5.33
55.0	65.0	6.3	RQC100550	59.99 x 2.62	240.0	258.0	12.3	RQC302400	247.02 x 5.33
56.0	66.0	6.3	RQC100560	61.60 x 2.62	250.0	258.0	12.3	RQC302500	253.37 x 5.33
56.0	69.0	8.3	RQC200560	63.09 x 3.53	280.0	298.0	12.3	RQC302800	291.47 x 5.33
60.0	70.0	6.3	RQC100600	64.77 x 2.62	300.0	318.0	12.3	RQC303000	304.17 x 5.33
60.0	73.0	8.3	RQC200600	66.27 x 3.53	320.0	338.0	12.3	RQC303200	329.57 x 5.33
63.0	73.0	6.3	RQC100630	67.95 x 2.62	350.0	368.0	12.3	RQC303500	354.97 x 5.33
63.0	76.0	8.3	RQC200630	69.44 x 3.53	400.0	418.0	12.3	RQC304000	405.26 x 5.33
65.0	75.0	6.3	RQC100650	69.52 x 2.62	420.0	438.0	12.3	RQC304200	430.66 x 5.33
70.0	80.0	6.3	RQC100700	75.87 x 2.62	450.0	468.0	12.3	RQC304500	456.06 x 5.33
70.0	83.0	8.3	RQC200700	75.79 x 3.53	465.0	496.0	16.3	RQC404650	481.38 x 7.00
75.0	85.0	6.3	RQC100750	82.22 x 2.62	480.0	511.0	16.3	RQC404800	494.16 x 7.00
75.0	88.0	8.3	RQC200750	82.14 x 3.53	500.0	531.0	16.3	RQC405000	506.86 x 7.00
80.0	90.0	6.3	RQC100800	82.22 x 2.62	550.0	581.0	16.3	RQC405500	557.66 x 7.00
80.0	93.0	8.3	RQC200800	85.32 x 3.53	600.0	631.0	16.3	RQC406000	608.08 x 7.00
85.0	98.0	8.3	RQC200850	91.67 x 3.53	650.0	681.0	16.3	RQC406500	668.00 x 7.00
90.0	100.0	6.3	RQC100900	94.92 x 2.62	700.0	731.0	16.3	RQC407000	718.00 x 7.00
90.0	103.0	8.3	RQC200900	94.84 x 3.53	750.0	781.0	16.3	RQC407500	768.00 x 7.00
95.0	108.0	8.3	RQC200950	101.19 x 3.53	800.0	831.0	16.3	RQC408000	818.00 x 7.00
100.0	110.0	6.3	RQC101000	101.27 x 2.62	850.0	881.0	16.3	RQC408500	868.00 x 7.00
100.0	113.0	8.3	RQC201000	104.37 x 3.53	900.0	931.0	16.3	RQC409000	918.00 x 7.00
105.0	118.0	8.3	RQC201050	110.72 x 3.53	950.0	981.0	16.3	RQC409500	968.00 x 7.00
110.0	120.0	6.3	RQC101100	113.97 x 2.62	1,000.0	1,031.0	16.3	RQC4X1000	1,018.00 x 7.00
110.0	123.0	8.3	RQC201100	117.07 x 3.53	1,050.0	1,081.0	16.3	RQC4X1050	1,068.00 x 7.00
115.0	128.0	8.3	RQC201150	120.24 x 3.53	1,200.0	1,231.0	16.3	RQC4X1200	1,218.00 x 7.00
120.0	133.0	8.3	RQC201200	126.59 x 3.53	1,300.0	1,331.0	16.3	RQC4X1300	1,318.00 x 7.00
120.0	138.0	12.3	RQC301200	126.37 x 5.33	1,400.0	1,431.0	16.3	RQC4X1400	1,418.00 x 7.00
125.0	138.0	8.3	RQC201250	129.77 x 3.53	1,500.0	1,531.0	16.3	RQC4X1500	1,518.00 x 7.00
125.0	143.0	12.3	RQC301250	132.72 x 5.33	2,000.0	2,031.0	16.3	RQC4X2000	2,018.00 x 7.00
130.0	143.0	8.3	RQC201300	136.12 x 3.53	2,200.0	2,231.0	16.3	RQC4X2200	2,218.00 x 7.00
130.0	148.0	12.3	RQC301300	135.89 x 5.33	The rod diameters in bold type are in accordance with the recommendations of ISO 3320. Other dimensions and all intermediate sizes up to 2,200 mm diameter, including imperial (inch) sizes converted to mm, can be supplied.				
135.0	148.0	8.3	RQC201350	139.29 x 3.53					
135.0	153.0	12.3	RQC301350	142.24 x 5.33					
140.0	158.0	12.3	RQC301400	145.42 x 5.33					
150.0	168.0	12.3	RQC301500	158.12 x 5.33					
160.0	173.0	8.3	RQC201600	164.69 x 3.53					