

Turcon® AQ Seal® with Bean Seal



Double-acting

Rubber-energized plastic-faced seal

Material:

Turcon®, and Zurcon® and Elastomer



! This page is intentionally left blank.



Turcon® AQ Seal® with Bean Seal*



Description

Turcon® AQ Seal® with Bean Seal is a double-acting seal consisting of a seal ring of Turcon® material, a Bean Seal in Zurcon® Z54 and an O-Ring as energizing element.

The Turcon® seal ring and the Bean Seal together create the dynamic sealing function while the O-Ring performs the static sealing function.

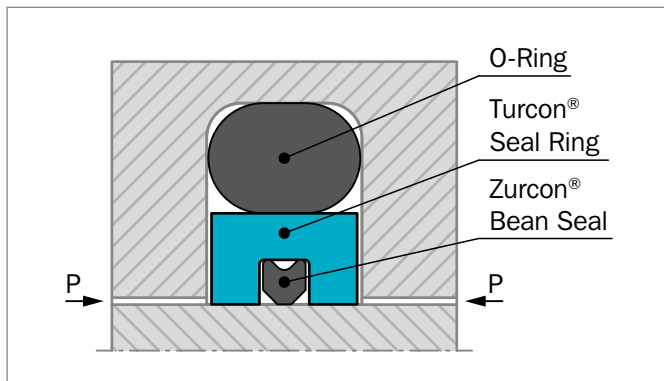


Figure 79: Turcon® AQ Seal® with Bean Seal

AQ Seal® 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® with Quad-Ring®
- Outstanding sliding properties, no stick-slip effect.
- Simple groove design, small installation space. Interchangeable with Turcon® Glyd Ring®, Turcon® Glyd Ring® T and Turcon® Stepseal® 2K groove. Installation according to ISO 7425-2 possible.
- Available for any rod diameters from 18 and up to 2,200 mm.

APPLICATION EXAMPLES

AQ Seal® with Bean Seal is the recommended sealing element for double acting positioning and holding cylinders for:

- Mobile hydraulics
- Machine tools
- Presses
- Stabilizers
- Heavy duty suspension cylinders
- Medium 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 50 MPa with mineral oil Up to 30 MPa for media with reduced lubricating properties
Speed:	Up to 2 m/s with linear movements
Temperature:	-45 °C to +110 °C depending on seal and O-Ring 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 59 and Table 60
Clearance:	The maximum permissible radial clearance S_{max} is shown in Table 61 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® V is installed according to information on page 39 and 40.

Closed groove installation applies same dimensions as for Turcon® Stepseal® 2K in Table 6 page 40.

RECOMMENDED MATERIALS

The following material combinations have proven effective for hydraulic applications:

Turcon® AQ Seal® 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® 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 59.

Table 59: Recommended Turcon® Materials for Turcon® AQ Seal®

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 abrasion of counter surface BAM tested Mineral fiber and Additives filled Color: Dark gray	M12	NBR 70	N	-30 to +100	Steel	40
		NBR 70 Low temp.	T	-45 to +80	Steel hardened	
		FKM 70	V	-10 to (+200)	Steel chrome plated (rod) Steel plated (rod) Cast iron Stainless steel Titanium	



Material, Applications, Properties	Code	O-Ring Material Shore A	Code	O-Ring Operating Temp.* °C	Mating Surface Material	MPa max. Dyna- mic
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	50
		NBR 70 Low temp.	T	-45 to +80	Steel chrome plated (rod)	
		FKM 70	V	-10 to (+200)	Cast iron	
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 BAM tested Carbon, graphite filled Color: Black	T10	NBR 70	N	-30 to +100	Steel	30
		NBR 70 Low temp.	T	-45 to +80	Steel hardened	
		FKM 70	V	-10 to (+200)	Steel chrome plated (rod) 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 hardened	
		FKM 70	V	-10 to (+200)	Steel chrome plated (rod) Cast iron Stainless steel	
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 chrome plated (rod)	25
		NBR 70 Low temp.	T	-45 to +80	Cast iron	
		FKM 70	V	-10 to (+200)	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	40
		NBR 70 Low temp.	T	-45 to +80	Steel hardened	
		FKM 70	V	-10 to (+200)	Steel chrome plated (rod) Cast iron	

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
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) Color: White to off-white	Z80	NBR 70	N	-30 to (+100)	Steel	30
		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 (except EPDM).

** Material not suitable for mineral oils.

BAM: Tested by "Bundesanstalt Materialprüfung, Germany"

☐ Highlighted materials are recommended.

Table 60: Zurcon® Z54 for Bean Seal

Material, Applications, Properties	Code	O-Ring Material Shore A	Code	O-Ring Operating Temp. * °C	Mating Surface Material	MPa max. Dyna- mic
Turcon® 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

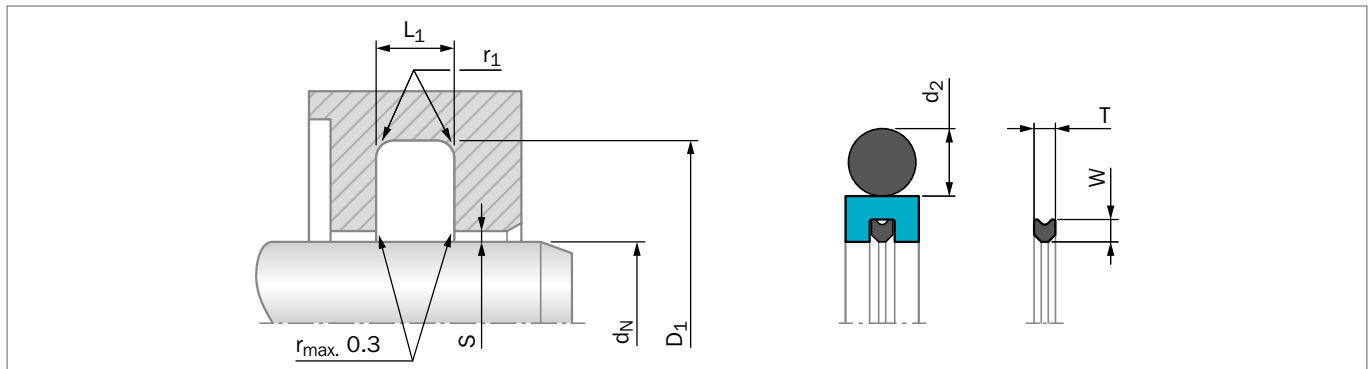


Figure 80: Installation Drawing

Table 61: Installation Dimensions – Standard Installation

Series No.	Rod Diameter d_N f8/h9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}^*			O-Ring Cross Section	Bean Seal Cross Section	
	Standard Application	Available Range	D_1 H9	$L_1 +0.2$	r_1 max	10 MPa	20 MPa	40 MPa	d_2	W	T
RQB20	19 - 37.9	18 - 450.0	$d_N + 10.7$	4.2	1.0	0.25	0.15	0.10	3.53	1.70	1.70
RQB30	38 - 199.9	30 - 650.0	$d_N + 15.1$	6.3	1.3	0.30	0.20	0.15	5.33	1.70	1.70
RQB40	200 - 255.9	105 - 999.9	$d_N + 20.5$	8.1	1.8	0.30	0.20	0.15	7.00	2.45	2.45
RQB80	256 - 649.9	120 - 999.9	$d_N + 24.0$	8.1	1.8	0.30	0.20	0.15	7.00	2.45	2.45
RQB50	650 - 999.9	285 - 999.9	$d_N + 27.3$	9.5	2.5	0.45	0.30	0.25	8.40	3.50	3.65
RQB5X	-	1,000 - 1,200.0	$d_N + 27.3$	9.5	2.5	0.45	0.40	0.35	8.40	3.50	3.65
RQB60**	-	650 - 999.9	$d_N + 38.0$	13.8	3.0	0.70	0.60	0.45	12.00	5.20	5.05
RQB6X**	1,000 - 2,200		$d_N + 38.0$	13.8	3.0	0.70	0.60	0.45	12.00	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.

** All O-Rings with 12 mm cross section are delivered as a special profile ring.

ORDERING EXAMPLE

Turcon® AQ Seal® complete with Bean Seal and O-Ring, standard application:

Series:	RQB30 from Table 61
Rod diameter:	$d_N = 80.0$ mm
TSS Part No.:	RQB300800 from Table 62

Select the material from Table 59. 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.	RQB3	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: RQB5X for diameter $d_N = 1,200.0$ mm

TSS Article No.: RQB5X1200-M12N



Table 62: 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		
18.0	28.7	4.2	RQB200180	21.82 x 3.53	95.0	110.1	6.3	RQB300950	100.97 x 5.33
20.0	30.7	4.2	RQB200200	25.00 x 3.53	100.0	110.7	4.2	RQB201000	104.37 x 3.53
22.0	32.7	4.2	RQB200220	26.58 x 3.53	100.0	115.1	6.3	RQB301000	107.32 x 5.33
25.0	35.7	4.2	RQB200250	29.75 x 3.53	105.0	115.7	4.2	RQB201050	110.72 x 3.53
28.0	38.7	4.2	RQB200280	32.92 x 3.53	105.0	120.1	6.3	RQB301050	110.49 x 5.33
30.0	40.7	4.2	RQB200300	34.52 x 3.53	110.0	120.7	4.2	RQB201100	113.89 x 3.53
32.0	42.7	4.2	RQB200320	36.09 x 3.53	110.0	125.1	6.3	RQB301100	116.84 x 5.33
35.0	45.7	4.2	RQB200350	40.87 x 3.53	110.0	131.0	8.1	RQB401100	120.02 x 7.00
36.0	46.7	4.2	RQB200360	40.87 x 3.53	115.0	125.7	4.2	RQB201150	120.24 x 3.53
40.0	50.7	4.2	RQB200400	44.04 x 3.53	115.0	130.1	6.3	RQB301150	120.02 x 5.33
40.0	55.1	6.3	RQB300400	46.99 x 5.33	120.0	130.7	4.2	RQB201200	126.59 x 3.53
42.0	52.7	4.2	RQB200420	47.22 x 3.53	120.0	135.1	6.3	RQB301200	126.37 x 5.33
42.0	57.1	6.3	RQB300420	46.99 x 5.33	125.0	135.7	4.2	RQB201250	129.77 x 3.53
45.0	55.7	4.2	RQB200450	50.39 x 3.53	125.0	140.1	6.3	RQB301250	132.72 x 5.33
45.0	60.1	6.3	RQB300450	50.17 x 5.33	130.0	140.7	4.2	RQB201300	136.12 x 3.53
48.0	58.70	4.2	RQB200480	53.57 x 3.55	130.0	145.1	6.3	RQB301300	135.89 x 5.33
48.0	63.1	6.3	RQB300480	53.34 x 5.33	135.0	145.7	4.2	RQB201350	139.29 x 3.53
50.0	60.70	4.2	RQB200500	53.57 x 3.53	135.0	150.1	6.3	RQB301350	142.24 x 5.33
50.0	65.1	6.3	RQB300500	56.52 x 5.33	140.0	150.7	4.2	RQB201400	145.64 x 3.53
52.0	62.7	4.2	RQB200520	56.74 x 3.53	140.0	155.1	6.3	RQB301400	145.42 x 5.33
52.0	67.1	6.3	RQB300520	56.52 x 5.33	145.0	155.7	4.2	RQB201450	148.82 x 3.53
55.0	65.7	4.2	RQB200550	59.92 x 3.53	145.0	160.1	6.3	RQB301450	151.77 x 5.33
55.0	70.1	6.3	RQB300550	59.69 x 5.33	150.0	165.1	6.3	RQB201500	158.12 x 5.33
56.0	66.7	4.2	RQB200560	59.92 x 3.53	160.0	175.1	6.3	RQB301600	164.47 x 5.33
56.0	71.1	6.3	RQB300560	62.87 x 5.33	160.0	180.5	8.1	RQB401600	170.82 x 7.00
60.0	70.7	4.2	RQB200600	63.09 x 3.53	165.0	180.1	6.3	RQB301650	170.82 x 5.33
60.0	75.1	6.3	RQB300600	66.04 x 5.33	170.0	180.7	4.2	RQB201700	177.39 x 3.53
63.0	73.7	4.2	RQB200630	66.27 x 3.53	170.0	185.1	6.3	RQB301700	177.17 x 5.33
63.0	78.1	6.3	RQB300630	69.22 x 5.33	175.0	190.1	6.3	RQB201750	183.52 x 5.33
65.0	80.1	6.3	RQB300650	72.39 x 5.33	180.0	190.7	4.2	RQB201800	183.74 x 3.53
70.0	80.7	4.2	RQB200700	75.79 x 3.53	180.0	195.1	6.3	RQB301800	189.87 x 5.33
70.0	85.1	6.3	RQB300700	75.57 x 5.33	180.0	200.5	8.1	RQB401800	189.87 x 7.00
75.0	85.7	4.2	RQB200750	78.97 x 3.53	190.0	201.0	4.2	RQB201900	196.44 x 3.53
75.0	90.1	6.3	RQB300750	81.92 x 5.33	190.0	205.1	6.3	RQB301900	196.22 x 5.33
80.0	90.7	4.2	RQB200800	85.32 x 3.53	200.0	215.1	6.3	RQB302000	208.92 x 5.33
80.0	95.1	6.3	RQB300800	85.09 x 5.33	200.0	220.5	8.1	RQB402000	208.92 x 7.00
85.0	100.1	6.3	RQB300850	91.44 x 5.33	210.0	225.1	6.3	RQB302100	215.27 x 5.33
90.0	100.7	4.2	RQB200900	94.84 x 3.53	220.0	235.1	6.3	RQB302200	227.97 x 5.33
90.0	105.1	6.3	RQB300900	97.79 x 5.33	220.0	240.5	8.1	RQB402200	227.97 x 7.00
95.0	105.7	4.2	RQB200950	101.19 x 3.53	230.0	245.1	6.3	RQB302300	234.32 x 5.33



Rod Dia.	Groove Dia.	Groove Width	TSS Part No.	O-Ring Size
d_N f8/h9	D_1 H9	L_1 +0.2		
230.0	250.5	8.1	RQB402300	240.67 x 7.00
240.0	255.1	6.3	RQB302400	247.02 x 5.33
240.0	260.5	8.1	RQB402400	253.37 x 7.00
250.0	270.5	8.1	RQB402500	266.07 x 7.00
260.0	284.0	8.1	RQB802600	266.07 x 7.00
270.0	290.5	8.1	RQB402700	278.77 x 7.00
270.0	294.0	8.1	RQB802700	278.77 x 7.00
280.0	300.5	8.1	RQB402800	291.47 x 7.00
280.0	304.0	8.1	RQB802800	291.47 x 7.00
300.0	324.0	8.1	RQB803000	316.87 x 7.00
320.0	344.0	8.1	RQB803200	329.57 x 7.00
350.0	370.5	8.1	RQB403500	354.97 x 7.00
350.0	374.0	8.1	RQB803500	367.67 x 7.00
360.0	384.0	8.1	RQB803600	367.67 x 7.00
400.0	420.5	8.1	RQB404000	405.26 x 7.00
400.0	424.0	8.1	RQB804000	417.96 x 7.00
450.0	474.0	8.1	RQB804500	468.76 x 7.00
500.0	524.0	8.1	RQB805000	506.86 x 7.00
550.0	574.0	8.1	RQB805500	557.66 x 7.00
600.0	624.0	8.1	RQB806000	608.08 x 7.00
650.0	677.3	9.5	RQB506500	663.00 x 8.40
700.0	724.0	8.1	RQB807000	712.00 x 7.00
800.0	827.3	9.5	RQB508000	813.00 x 8.40
900.0	927.3	9.5	RQB509000	913.00 x 8.40
1,000.0	1,027.3	9.5	RQB5X1000	1,013.00 x 8.40
1,000.0	1,038.0	13.8	RQB6X1000	1,016.00 x 12.00
1,100.0	1,138.0	13.8	RQB6X1100	1,116.00 x 12.00
1,200.0	1,227.3	9.5	RQB5X1200	1,213.00 x 8.40
1,200.0	1,238.0	13.8	RQB6X1200	1,216.00 x 12.00
1,300.0	1,338.0	13.8	RQB6X1300	1,316.00 x 12.00
1,500.0	1,538.0	13.8	RQB6X1500	1,516.00 x 12.00
2,000.0	2,038.0	13.8	RQB6X2000	2,016.00 x 12.00
2,200.0	2,238.0	13.8	RQB6X2200	2,216.00 x 12.00

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.

All O-Rings with 12 mm cross section are delivered as special profiling.

! This page is intentionally left blank.