Turcon® AQ-Seal®

Double-acting

Rubber-energized plastic-faced seal

Material:
Turcon®, Zurcon® and Elastomer

Turcon® AQ-Seal®

Description

Turcon® AQ-Seal® is a double-acting seal consisting of a seal ring of Turcon® material, an Quad-Ring® seal and an O-Ring as energizing element.

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

AQ-Seal® is supplied as standard with radial notches on both sides which ensure direct pressurizing of the seal under all operating conditions.

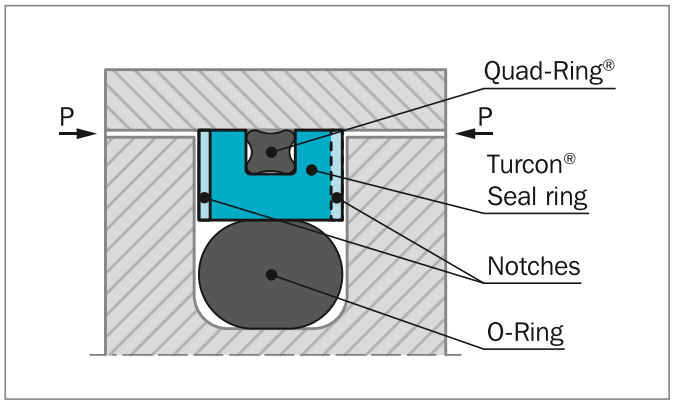

Figure 119: Turcon® AQ-Seal®

AQ-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 Quad-Ring® 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
- Simple groove design, small installation space, interchangeable with Turcon® Glyd Ring® and Turcon® Glyd Ring® T installation according to ISO 7425-1
- Outstanding sliding properties, no stick-slip effect
- Diameter from 15 to 700 mm (for sizes above use Turcon® AQ-Seal® with Bean Seal, see page 431)

APPLICATION EXAMPLES

AQ-Seal® is the recommended sealing element for double acting pistons of positioning and holding cylinders for:

- Mobile hydraulics
- Machine tools
- Presses
- Semi-static piston accumulators
- Active stabilizers
- Hydro-pneumatic suspensions for heavy vehicles
- Subsea connectors
- Offshore valves
- Wind Power
- Pressure intensifiers
- Jacks
- Lifts
- Hydraulic vices

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 reciprocating movements
Temperature:	-45 °C to +200 °C* depending on O-Ring and Quad-Ring® seal material
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils), phosphate ester, water and others, depending on temperature, seal, O-Ring and Quad-Ring® seal material compatibility see Table 102
Clearance:	The maximum permissible radial clearance S_{max} is shown in Table 103, 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.

* In the case of unpressurized applications in temperatures below 0 °C please contact your local Customer Solution Center for more information!

INSTALLATION INSTRUCTIONS

AQ-Seal® is installed according to information on page 247 to 249 and 251.

Closed groove installation applies same dimensions as for Turcon® Glyd Ring® in Table 81 page 249.

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, phosphate ester, bio-oils or fluids having low lubricating properties:

O-Ring and Quad-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:

O-Ring and Quad-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 102.

Table 102: Turcon® Material for AQ-Seal®

Material, Applications, Properties	Code	O-Ring Material Shore A***	Code	O-Ring and Quad-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 Low wear or abrasion of counter surface including fluids with low lubrication performance Lowest friction and best sliding properties Lowest wear on seals Improved absorption of abrasive contaminants BAM tested Mineral fiber and Additives filled Color: Dark gray	M12	NBR 70	N	-30 to +100	Steel Steel hardened Cast iron Stainless steel Titanium	40
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
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 Cast iron	50
		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 BAM tested Carbon, graphite filled Color: Black	T10	NBR 70	N	-30 to +100	Steel Stainless steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		EPDM 70	E**	-45 to +145		
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 Cast iron Stainless steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		EPDM 70	E**	-45 to +145		

Table continues on next page

Material, Applications, Properties	Code	O-Ring Material Shore A***	Code	O-Ring and Quad-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 Cast iron Stainless steel Aluminum	25
		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 Bronze filled BAM tested Color: Light to dark brown, which may have variations in shading	T46	NBR 70	N	-30 to +100	Steel hardened Cast iron	40
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
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 Steel hardened Stainless steel Aluminum Ceramic coating	30
		NBR 70 Low temp.	T	-45 to +80		
		EDPM 70	E**	-45 to (+145)		

* The O-Ring and Quad-Ring® Operation Temperature is only valid in mineral hydraulic oil (except EPDM).

** Material not suitable for mineral oils.

*** Quad-Ring® material NBR 70 code: N7004
FKM 70 code: V7002

BAM: Tested by "Bundesanstalt Materialprufung, Germany".

Highlighted materials are recommended.

Installation Recommendation

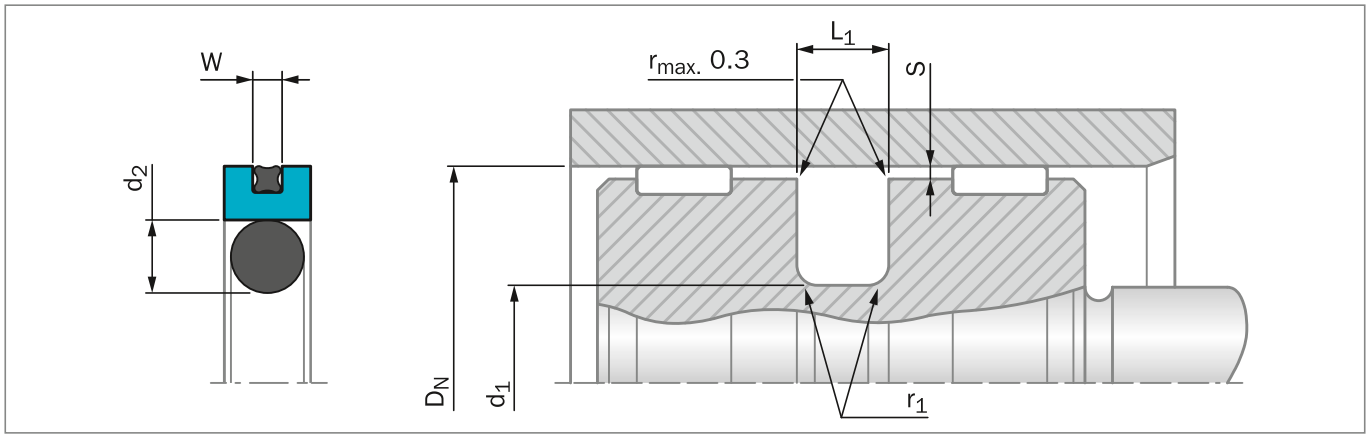

Figure 120: Installation Drawing

Table 103: Installation Dimensions

Bore Diameter D_N H9				Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross Section	Quad-Ring® Cross Section
Standard Application		Light Application		d_1 h9	L_1 +0.2	$r_{1\ max}$	10 MPa	20 MPa	40 MPa	d_2	W
Series No.	Diameter Range	Series No.	Diameter Range								
PQ12	15 - 39.9	PQ14	40 - 79.9	D_N - 11.0	4.2	1.0	0.25	0.15	0.10	3.53	1.78
PQ12	40 - 79.9	PQ14	80 - 132.9	D_N - 15.5	6.3	1.3	0.30	0.20	0.15	5.33	1.78
PQ22	80 - 132.9	PQ24	133 - 252.9	D_N - 21.0	8.1	1.8	0.30	0.20	0.15	7.00	2.62
PQ22	133 - 252.9	-	-	D_N - 24.5	8.1	1.8	0.30	0.20	0.15	7.00	2.62
PQ32	253 - 462.9	-	-	D_N - 28.0	9.5	2.5	0.45	0.30	0.25	8.40	3.53
PQ52	463 - 700.0	-	-	D_N - 35.0	11.5	3.0	0.55	0.40	0.35	10.00	5.33

* 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.

ORDERING EXAMPLE

AQ-Seal® complete with Quad-Ring® and O-Ring standard application:

Series:	PQ22 from Table 103
Bore Diameter:	D_N = 80.0 mm
TSS Part No.	PQ2200800 from Table 104

Select the material from Table 102. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article Number. The TSS Article Number for all intermediate sizes can be determined by following the example:

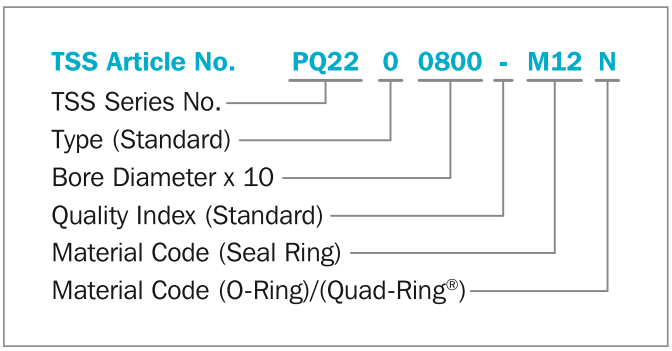

Table 104: Installation Dimensions / TSS Part No.

Bore	Groove Diameter	Groove Width	Part No.	O-Ring Size	Quad-Ring® Size
D_N H9	d_1 h9	L_1 +0.2			
16.0	5.0	4.2	PQ1200160	4.34 x 3.53	12.42 x 1.78
18.0	7.0	4.2	PQ1200180	6.40 x 3.53	14.00 x 1.78
20.0	9.0	4.2	PQ1200200	8.40 x 3.53	15.60 x 1.78
22.0	11.0	4.2	PQ1200220	10.69 x 3.53	17.17 x 1.78
25.0	**14.0**	**4.2**	**PQ1200250**	**13.87 x 3.53**	**20.35 x 1.78**
28.0	17.0	4.2	PQ1200280	15.47 x 3.53	23.52 x 1.78
30.0	19.0	4.2	PQ1200300	18.66 x 3.53	25.12 x 1.78
32.0	**21.0**	**4.2**	**PQ1200320**	**20.22 x 3.53**	**26.70 x 1.78**
35.0	24.0	4.2	PQ1200350	23.40 x 3.53	29.87 x 1.78
40.0	**29.0**	**4.2**	**PQ1400400**	**28.17 x 3.53**	**34.65 x 1.78**
42.0	31.0	4.2	PQ1400420	29.75 x 3.53	37.82 x 1.78
45.0	34.0	4.2	PQ1400450	32.92 x 3.53	37.82 x 1.78
48.0	37.0	4.2	PQ1400480	36.09 x 3.53	41.00 x 1.78
50.0	**39.0**	**4.2**	**PQ1400500**	**37.69 x 3.53**	**44.17 x 1.78**
50.0	**34.5**	**6.3**	**PQ1200500**	**32.69 x 5.33**	**44.17 x 1.78**
52.0	41.0	4.2	PQ1400520	40.87 x 3.53	47.35 x 1.78
55.0	44.0	4.2	PQ1400550	44.04 x 3.53	50.52 x 1.78
60.0	49.0	4.2	PQ1400600	47.22 x 3.53	53.70 x 1.78
63.0	**52.0**	**4.2**	**PQ1400630**	**50.39 x 3.53**	**56.87 x 1.78**
63.0	**47.5**	**6.3**	**PQ1200630**	**46.99 x 5.33**	**56.87 x 1.78**
65.0	54.0	4.2	PQ1400650	53.57 x 3.53	60.05 x 1.78
70.0	59.0	4.2	PQ1400700	56.74 x 3.53	63.22 x 1.78
70.0	54.5	6.3	PQ1200700	53.34 x 5.33	63.22 x 1.78
75.0	64.0	4.2	PQ1400750	63.09 x 3.53	69.57 x 1.78
80.0	**64.5**	**6.3**	**PQ1400800**	**62.87 x 5.33**	**72.75 x 1.78**
80.0	59.0	8.1	PQ2200800	58.00 x 7.00	71.12 x 2.62
85.0	69.5	6.3	PQ1400850	69.22 x 5.33	75.92 x 1.78
85.0	64.0	8.1	PQ2200850	63.00 x 7.00	75.87 x 2.62
90.0	74.5	6.3	PQ1400900	72.39 x 5.33	82.27 x 1.78
90.0	69.0	8.1	PQ2200900	68.00 x 7.00	82.22 x 2.62
95.0	79.5	6.3	PQ1400950	78.74 x 5.33	88.62 x 1.78
95.0	74.0	8.1	PQ2200950	73.00 x 7.00	82.22 x 2.62
100.0	**84.5**	**6.3**	**PQ1401000**	**81.92 x 5.33**	**88.62 x 1.78**
100.0	79.0	8.1	PQ2201000	78.00 x 7.00	88.57 x 2.62
105.0	89.5	6.3	PQ1401050	88.27 x 5.33	94.97 x 1.78
105.0	84.0	8.1	PQ2201050	83.00 x 7.00	94.92 x 2.62
110.0	94.5	6.3	PQ1401100	91.44 x 5.33	101.32 x 1.78
110.0	89.0	8.1	PQ2201100	88.00 x 7.00	101.27 x 2.62
115.0	99.5	6.3	PQ1401150	97.79 x 5.33	107.67 x 1.78
115.0	94.0	8.1	PQ2201150	93.00 x 7.00	107.62 x 2.62

Bore	Groove Diameter	Groove Width	Part No.	O-Ring Size	Quad-Ring® Size
D_N H9	d_1 h9	L_1 +0.2			
120.0	104.5	6.3	PQ1401200	100.97 x 5.33	114.02 x 1.78
120.0	99.0	8.1	PQ2201200	98.00 x 7.00	107.62 x 2.62
125.0	**109.5**	**6.3**	**PQ1401250**	**107.32 x 5.33**	**114.02 x 1.78**
125.0	**104.0**	**8.1**	**PQ2201250**	**103.00 x 7.00**	**113.97 x 2.62**
130.0	114.5	6.3	PQ1401300	113.67 x 5.33	120.37 x 1.78
130.0	109.0	8.1	PQ2201300	108.00 x 7.00	120.32 x 2.62
135.0	114.0	8.1	PQ2401350	113.67 x 7.00	126.67 x 2.62
140.0	119.0	8.1	PQ2401400	116.84 x 7.00	126.67 x 2.62
150.0	129.0	8.1	PQ2401500	126.37 x 7.00	139.37 x 2.62
160.0	**139.0**	**8.1**	**PQ2401600**	**135.89 x 7.00**	**145.72 x 2.62**
170.0	149.0	8.1	PQ2401700	145.42 x 7.00	158.42 x 2.62
180.0	159.0	8.1	PQ2401800	158.12 x 7.00	171.12 x 2.62
190.0	169.0	8.1	PQ2401900	164.47 x 7.00	177.47 x 2.62
200.0	**179.0**	**8.1**	**PQ2402000**	**177.17 x 7.00**	**190.17 x 2.62**
210.0	189.0	8.1	PQ2402100	183.52 x 7.00	196.52 x 2.62
220.0	199.0	8.1	PQ2402200	196.22 x 7.00	202.87 x 2.62
230.0	209.0	8.1	PQ2402300	202.57 x 7.00	215.57 x 2.62
240.0	219.0	8.1	PQ2402400	215.27 x 7.00	221.92 x 2.62
250.0	225.5	8.1	PQ2202500	227.97 x 7.00	234.62 x 2.62
250.0	**229.0**	**8.1**	**PQ2402500**	**227.97 x 7.00**	**234.62 x 2.62**
280.0	252.0	9.5	PQ3202800	250.00 x 8.40	266.29 x 3.53
300.0	272.0	9.5	PQ3203000	270.00 x 8.40	278.99 x 3.53
310.0	282.0	9.5	PQ3203100	280.00 x 8.40	291.69 x 3.53
320.0	292.0	9.5	PQ3203200	304.00 x 8.40	304.39 x 3.53
350.0	322.0	9.5	PQ3203500	330.00 x 8.40	329.79 x 3.53
400.0	372.0	9.5	PQ3204000	370.00 x 8.40	380.59 x 3.53
420.0	392.0	9.5	PQ3204200	390.00 x 8.40	380.59 x 3.53
450.0	422.0	9.5	PQ3204500	420.00 x 8.40	430.66 x 3.53
480.0	445.0	11.5	PQ5204800	444.00 x 10.00	456.06 x 5.33
500.0	465.0	11.5	PQ5205000	464.00 x 10.00	456.06 x 5.33
600.0	565.0	11.5	PQ5206000	564.00 x 10.00	557.58 x 5.33
700.0	665.0	11.5	PQ5207000	664.00 x 10.00	658.88 x 5.33

The dimensions in **bold** type are suitable for grooves to ISO 7425-1. Bore diameter in accordance with ISO 3320.
All intermediate sizes up to 700 mm diameter can be supplied. Sizes > 700 mm diameter with special elastomers on request, see Turcon® AQ-Seal® with Bean Seal page 431