Turcon® and Zurcon® Roto Seals

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Turcon® Roto Glyd Ring®

■ Turcon® Roto Glyd Ring®

■ General Description

Double-acting Turcon® Roto Glyd Ring® is used to seal shafts, axles, cylinder bores, rotary manifolds, and swivels with rotary, helical or oscillating movement. It consists of a seal ring in high-grade Turcon® material activated by an elastomeric O-Ring.

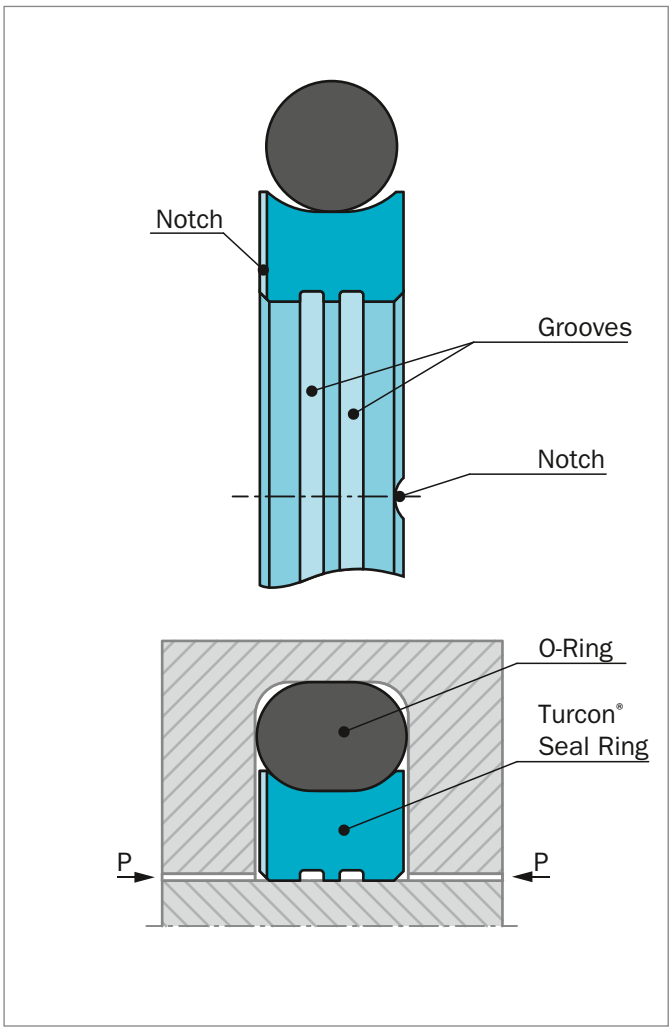


Figure 124: Turcon® Roto Glyd Ring®

The contact surface profile of the seal ring is specially designed for use at high-pressure and low sliding speeds.

METHOD OF OPERATION

The double-acting performance of the seal follows from the symmetrical cross section which allows the seal to respond to pressure in both directions.

Initial contact pressure is provided by radial compression of the O-Ring. When the system pressure is increased the O-Ring transforms this into additional contact pressure, the contact pressure of the seal is thereby automatically adjusted so sealing is ensured under all service conditions.

Depending on the profile cross-section of the seal, the contact surface has none, one or two continuous machined grooves. These improve seal efficiency by increasing the specific surface load pressure against the sealed surface. They also form a lubricant reservoir and reduce friction.

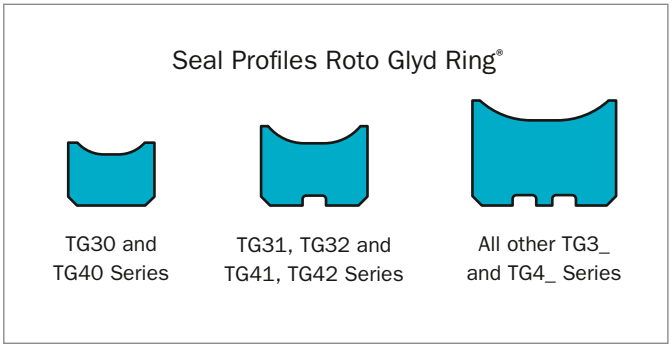


Figure 125: Crosssection profiles depending on Series No.

NOTCH

To assure rapid activation of the seal at sudden changes of pressure and direction of motion, radial notches are added on both sides of the seal ring.

ADVANTAGES

- Initial contact pressure of Roto Glyd Ring® is available for shaft and bore sealing applications
- Double-acting seal
- Low friction
- Lubricant reservoir
- Stick-slip free operation
- No vulcanizing to mating surfaces
- Simple groove design
- Small groove dimensions
- For use at high-pressure and low sliding-speeds
- Available in all sizes up to 2,700 mm diameter (to 2,600 mm for shaft seals)

TYPICAL APPLICATIONS

Roto Glyd Ring® is used as a double acting rotary seal for hydraulic and pneumatic equipment in sectors such as:

- Rotary distributors and unions
- High pressure valve stems
- Manipulators
- Pivoting motors in mobile hydraulics and machine tools
- Hydraulic motors
- Blow molding machines
- Top drives
- Rotary tables
- FPSO swivel units
- Core cutting equipment

OPERATING CONDITIONS

Seal performance is influenced by such factors as lubrication capability of the sealed medium and heat dissipation in the hardware. It follows that testing should always be made. With good lubrication, the following values can be used:

Pressure:	Up to 30 MPa
Speed:	Up to 2.0 m/s
PV:	Up to 2.5 MPa m/s The value must be reduced for diameters < 50 mm.
Temperature:	-45 °C to +200 °C*) depending on O-Ring elastomer and medium
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally-friendly hydraulic fluids (bio-oils), water and others depending on seal and elastomer material.

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 and temperature and gap value. Temperature range also dependant on media.

*) IMPORTANT NOTE FOR THE BORE VERSION

In the case on unpressurized applications in temperatures below 0 °C please contact your local Trelleborg Sealing Solutions marketing company for more information.

FRICTIONAL POWER

Guide values for the frictional power P can be determined from the graph in Figure 126. They are shown as a function of the sliding speed and operating pressure for a shaft diameter of 50 mm / 1.968 inch with an oil temperature of +60 C°. At higher temperatures, these application limits must be reduced.

Formula for other diameters d:

$$P = \frac{P_{50} \times (d)\ [W]}{(\ 50\ mm\ )}$$

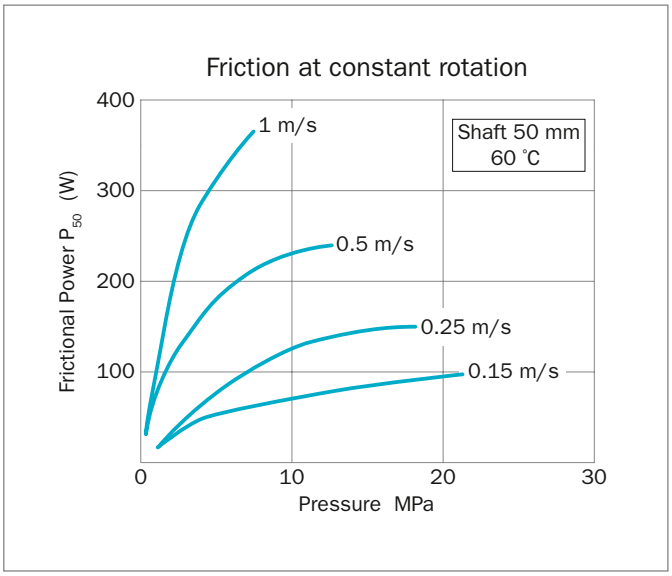


Figure 126: Frictional power for Turcon® Roto Glyd Ring®

The guide values apply for constant operating conditions. Changes in operating conditions such as pressure fluctuations or alternating directions of shaft rotation can result in considerably higher friction values.

INSTALLATION INSTRUCTIONS

Roto Glyd Ring® is installed according to information starting at page 313.

Closed groove installation according to dimensions at Table 80, page 236.

RECOMMENDED MATERIALS

The following material combinations have proven effective for rotary applications:

Turcon® Roto Glyd Ring® in Turcon® T40
All-round material in lubricating fluids and fluids with limited lubrication e.g. water:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	HNBR 70 Shore A	H
	(according to temperature)	
Set code:	T40N, T40V or T40H	

Turcon® Roto Glyd Ring® in Turcon® M15
Material for light to medium applications with high sealing effect in fluids with good lubrication:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	HNBR 70 Shore A	H
	(according to temperature)	
Set code:	M15N, M15V or M15H	

Turcon® Roto Glyd Ring® in Zurcon® Z80
For slow turning applications with fluids, air, gases and risk of high abrasive wear; temperature limit -45 °C to +80 °C:

O-Ring	NBR 70 Shore A
Set code:	Z80N

Z80 are for slow turning motion and not for constant rotation.

For specific applications other Turcon® and Zurcon® materials are available.

Table 79: Turcon® Roto Glyd Ring®

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® M04 For lubricating and non-lubricating fluids and gases Smooth and tight surface texture Good sealing performance Suitable for softer mating surfaces High extrusion resistance For swiveling and low velocity rotary service only Carbon filled Color: Black	M04	NBR 70	N	-30 to +100	Steel Hardend steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M15 Recommended material for rotary motion For lubricating fluids Tight surface texture Good sealing performance Very good wear properties Low friction Good extrusion resistance Suited to softer mating surfaces Polyaramide, mineral fiber, lubricant, graphite and Turcon® filled Color: Dark gray	M15	NBR 70	N	-30 to +100	Hardend steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M30 For lubricating and non-lubricating fluids and gases Good wear and extrusion resistance Suited to high temperature service Tight surface structure Good sealing performance Suited to softer surfaces For swiveling and low velocity rotary service only Aromatic polymer, graphite, Turcon® filled Color: Dark green-gray	M30	NBR 70	N	-30 to +100	Steel Hardend steel Stainless steel Titanium HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		

Table is continued on next page

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® T10 For lubricating and non-lubricating fluids and gases Suitable for slow rotary service in lubricating fluid High extrusion resistance Not for electrically conducting fluids Carbon, graphite filled Color: Black	T10	NBR 70	N	-30 to +100	Steel Hardend steel Chrome-plated steel (rod) Stainless steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		EPDM 70	E	-45 to +145		
Turcon® T40 All-round material for rotary and turning movements Good wear resistance and service life with both lubricating and non-lubricating fluids Surface texture less suited to gas sealing Carbon fiber filled Color: Gray	T40	NBR 70	N	-30 to +100	Hardend steel Hard Alloys	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Zurcon® Z80 For lubricating and non-lubricating fluids and gases High abrasion and extrusion resistance Well suited to abrasive mating surfaces and fluids For swiveling and intermittent low velocity rotary service only Good chemical resistance Ultra-high molecular weight polyethylene Color: White to off-white	Z80	NBR 70	N	-30 to +80	Steel Hardend steel Ceramic coatings HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		

* Service temperatures are only valid when using hydraulic mineral oil. Note that frictional heat may cause increased temperatures at the seal.

▭ Recommended material.

Note:
Rotary seals exert high loads on mating surfaces and mild steels are best suited for slow or swiveling service.
As a basic principle, the hardness of the mating surface should increase with the peripheral speed, and a hardness of 60 HRC is recommended for velocities above 1 m/s. Due to the mechanical stresses imposed, a hardness depth of 0.5 mm or more is recommended to limit dimensional changes to the mating surface.

■ Installation Recommendation for Shaft

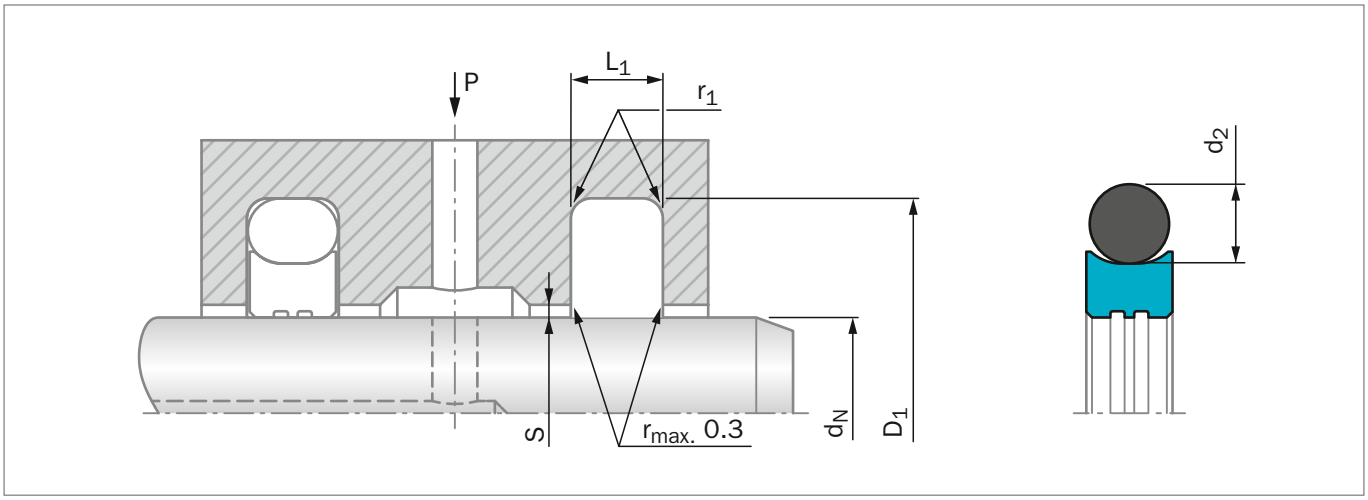


Figure 127: Installation Drawing

Table 80: Installation Dimensions – Standard Recommendations

Series Number	Shaft Diameter d_N f8/h9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	No. of Grooves in the Sealing Surface
	Recommended Range	Available Range	D_1 H9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	
TG30	6 - 18.9	6 - 130.0	d_N + 4.9	2.20	0.40	0.20	0.15	-	1.78	0
TG31	19 - 37.9	10 - 245.0	d_N + 7.5	3.20	0.60	0.25	0.20	0.15	2.62	1
TG32	39 - 199.9	19 - 455.0	d_N + 11.0	4.20	1.00	0.30	0.25	0.20	3.53	1
TG33	200 - 255.9	38 - 655.0	d_N + 15.5	6.30	1.30	0.35	0.30	0.25	5.33	2
TG34	256 - 649.9	120 - 655.0	d_N + 21.0	8.10	1.80	0.40	0.35	0.30	7.00	2
TG35	650 - 999.9	650 - 999.9	d_N + 28.0	9.50	2.50	0.45	0.40	0.35	8.40	2
TG35X	1,000 - 2,600	-	d_N + 28.0	9.50	2.50	0.45	0.40	0.35	8.40	2

* At pressures **> 30 MPa**: Use diameter tolerance H8/f8 (bore/shaft) in area of seal.
At pressures **> 10 MPa** it is recommendable to choose the next larger cross section according to the column “Available range“ i.e. for shaft ø d_n = 80 mm: TG33 00 800-.

ORDERING EXAMPLE

Turcon® Roto Glyd Ring® , complete with O-Ring, standard application:

Series:	TG32 from Table 80
Shaft diameter:	d_N = 80.0 mm
TSS Part No.:	TG3200800 from Table 81

Select the material from Table 79. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 81 can be determined following the example opposite.

TSS Article No. TG32 0 0800 - T40 N

- Series No.
- Type (Standard)
- Shaft Diameter x 10**
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

** For diameters ≥ 1,000.0 mm multiply only by factor 1.
Example: TG35X for diameter 1,200.0 mm
TSS Article No.: TG35X1200 – T40N

Table 81: Standard Installation Dimensions / TSS Part Number

Shaft Dia. d_N f8/h9	Groove Dia. D_1 H9	Groove Width L_1 +0.20	TSS Part No.	O-Ring Sizes
6.0	**10.9**	**2.2**	**TG3000060**	**7.65 x 1.78**
10.0	**14.9**	**2.2**	**TG3000100**	**11.80 x 1.80**
12.0	**16.9**	**2.2**	**TG3000120**	**13.20 x 1.80**
14.0	**18.9**	**2.2**	**TG3000140**	**15.60 x 1.78**
15.0	19.0	2.2	TG3000150	17.17 x 1.78
16.0	**20.9**	**2.2**	**TG3000160**	**17.17 x 1.78**
18.0	**22.9**	**2.2**	**TG3000180**	**19.00 x 1.80**
20.0	**24.9**	**3.2**	**TG3000200**	**21.95 x 1.78**
20.0	**27.5**	**3.2**	**TG3100200**	**21.89 x 2.62**
22.0	**29.5**	**3.2**	**TG3100220**	**25.07 x 2.62**
25.0	**29.5**	**2.2**	**TG3000250**	**26.70 x 1.78**
25.0	**32.5**	**3.2**	**TG3100250**	**28.24 x 2.62**
28.0	**35.5**	**3.2**	**TG3100280**	**31.42 x 2.62**
30.0	37.5	3.2	TG3100300	32.99 x 2.62
32.0	**39.5**	**3.2**	**TG3100320**	**34.59 x 2.62**
35.0	42.5	3.2	TG3100350	37.77 x 2.62
36.0	**43.5**	**3.2**	**TG3100360**	**39.34 x 2.62**
40.0	**47.5**	**3.2**	**TG3100400**	**42.52 x 2.62**
40.0	**51.0**	**4.2**	**TG3200400**	**44.04 x 3.53**
45.0	**56.0**	**4.2**	**TG3200450**	**50.39 x 3.53**
50.0	**61.0**	**4.2**	**TG3200500**	**53.57 x 3.53**
55.0	66.0	4.2	TG3200550	59.92 x 3.53
56.0	**67.0**	**4.2**	**TG3200560**	**59.92 x 3.53**
60.0	67.5	3.2	TG3100600	63.17 x 2.62
60.0	71.0	4.2	TG3200600	63.09 x 3.53
63.0	**74.0**	**4.2**	**TG3200630**	**66.27 x 3.53**
70.0	**81.0**	**4.2**	**TG3200700**	**75.79 x 3.53**
75.0	86.0	4.2	TG3200750	78.97 x 3.53
80.0	**91.0**	**4.2**	**TG3200800**	**85.32 x 3.53**
85.0	96.0	4.2	TG3200850	88.49 x 3.53
90.0	**101.0**	**4.2**	**TG3200900**	**94.84 x 3.53**
95.0	106.0	4.2	TG3200950	101.19 x 3.53
100.0	**111.0**	**4.2**	**TG3201000**	**104.37 x 3.53**
105.0	116.0	4.2	TG3201050	110.72 x 3.53
110.0	**121.0**	**4.2**	**TG3201100**	**113.89 x 3.53**
120.0	131.0	4.2	TG3201200	123.42 x 3.53
125.0	**136.0**	**4.2**	**TG3201250**	**129.77 x 3.53**
130.0	137.5	3.2	TG3101300	133.02 x 2.62
130.0	141.0	4.2	TG3201300	136.12 x 3.53
135.0	146.0	4.2	TG3201350	139.29 x 3.53
140.0	**151.0**	**4.2**	**TG3201400**	**145.64 x 3.53**
140.0	**155.5**	**6.3**	**TG3301400**	**145.42 x 5.33**
150.0	161.0	4.2	TG3201500	158.34 x 3.53
150.0	165.5	6.3	TG3301500	158.12 x 5.33
150.0	171.0	8.1	TG3401500	158.12 x 7.00
160.0	**171.0**	**4.2**	**TG3201600**	**164.69 x 3.53**
170.0	181.0	4.2	TG3201700	177.39 x 3.53
180.0	**191.0**	**4.2**	**TG3201800**	**183.74 x 3.53**
190.0	201.0	4.2	TG3201900	196.44 x 3.53
200.0	**215.5**	**6.3**	**TG3302000**	**208.92 x 5.33**
210.0	225.5	6.3	TG3302100	215.27 x 5.33
220.0	**235.5**	**6.3**	TG3302200	**227.97 x 5.33**
230.0	245.5	6.3	TG3302300	234.32 x 5.33
250.0	**271.0**	**8.1**	**TG3402500**	**266.07 x 7.00**
280.0	**301.0**	**8.1**	**TG3402800**	**291.47 x 7.00**
300.0	321.0	8.1	TG3403000	304.17 x 7.00
320.0	**341.0**	**8.1**	**TG3403200**	**329.57 x 7.00**
350.0	365.5	6.3	TG3303500	354.97 x 5.33
350.0	371.0	8.1	TG3403500	354.97 x 7.00
360.0	**381.0**	**8.1**	**TG3403600**	**367.67 x 7.00**
400.0	421.0	8.1	TG3404000	405.26 x 7.00
500.0	521.0	8.1	TG3405000	506.86 x 7.00
600.0	621.0	8.1	TG3406000	608.08 x 7.00
650.0	678.0	9.5	TG3506500	662.90 x 8.40
700.0	728.0	9.5	TG3507000	713.00 x 8.40
800.0	828.0	9.5	TG3508000	813.00 x 8.40
900.0	928.0	9.5	TG3509000	913.00 x 8.40
950.0	978.0	9.5	TG3509500	962.00 x 8.40
950.0	978.0	9.5	TG3509500	962.00 x 8.40
1,500.0	1,528.0	9.5	TG35X1500	1,513.00 x 8.40
2,000.0	2,028.0	9.5	TG35X2000	2,013.00 x 8.40
2,500.0	2,528.0	9.5	TG35X2500	2,513.00 x 8.40

The shaft diameters in **bold** type correspond to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 2,600 mm diameter including imperial (inch) sizes can be supplied.

■ Installation Recommendation for Bore

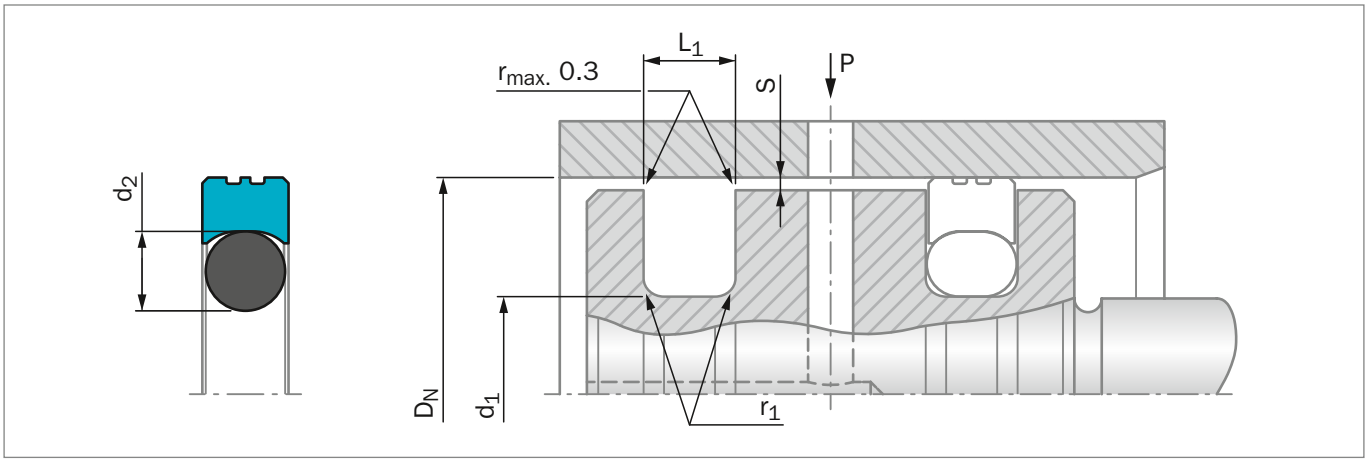


Figure 128: Installation Drawing

Table 82: Installation Dimensions – Standard Recommendations

Series Number	Bore Diameter D_N H9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	No. of Grooves in the Sealing Surface
	Recommended Range	Available Range	d_1 h9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	
TG40	8 - 39.9	8 - 135.0	D_N - 4.9	2.20	0.40	0.20	0.15	-	1.78	0
TG41	40 - 79.9	14 - 250.0	D_N - 7.5	3.20	0.60	0.25	0.20	0.15	2.62	1
TG42	80 - 132.9	22 - 460.0	D_N - 11.0	4.20	1.00	0.30	0.25	0.20	3.53	1
TG43	133 - 329.9	40 - 675.0	D_N - 15.5	6.30	1.30	0.35	0.30	0.25	5.33	2
TG44	330 - 669.9	133 - 690.0	D_N - 21.0	8.10	1.80	0.40	0.35	0.30	7.00	2
TG45	670 - 999.9	-	D_N - 28.0	9.50	2.50	0.45	0.40	0.35	8.40	2
TG45X	1,000 - 2,700	-	D_N - 28.0	9.50	2.50	0.45	0.40	0.35	8.40	2

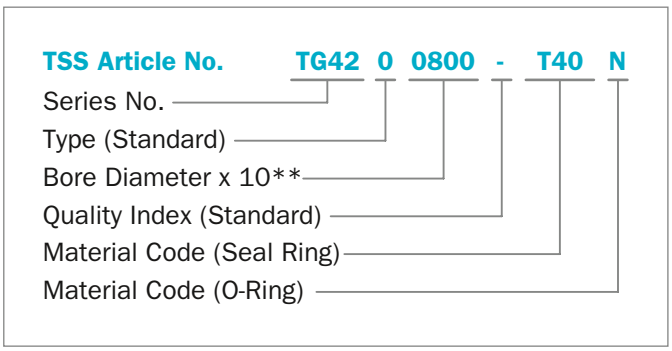
* At pressures **> 30 MPa**: Use diameter tolerance H8/f8 (bore / shaft) in area of seal.
At pressures **> 10 MPa** it is recommendable to choose the next larger cross section according to the column “Available range“ i.e. for shaft ø D_N = 80 mm: TG43 00 800-.

ORDERING EXAMPLE

Roto Glyd Ring® , complete with O-Ring, standard application:

Series:	TG42 from Table 82
Boe diameter:	D_N = 80.0 mm
Dimensions:	TG4200800 from Table 83

Select the material from Table 79. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 83 can be determined following the example opposite.



** For diameters ≥ 1,000.0 mm multiply only by factor 1.
Example: TG35X for diameter 1,200.0 mm
TSS Article No.: TG45**X1200** – T40N

Table 83: Standard Installation Dimensions / TSS Part Number

Bore Dia. D_N H9	Groove Dia. d_1 h9	Groove Width L_1 +0.2	TSS Part No.	O-Ring Dimensions
10.0	**5.1**	**2.2**	**TG4000100**	**4.80 x 1.80**
12.0	**7.1**	**2.2**	**TG4000120**	**6.70 x 1.80**
14.0	9.1	2.2	TG4000140	8.75 x 1.80
15.0	10.1	2.2	TG4000150	9.50 x 1.80
16.0	**11.1**	**2.2**	**TG4000160**	**10.60 x 1.80**
18.0	13.1	2.2	TG4000180	12.42 x 1.78
20.0	**15.1**	**2.2**	**TG4000200**	**14.00 x 1.78**
23.0	18.1	2.2	TG4000230	17.17 x 1.78
25.0	**20.1**	**2.2**	**TG4000250**	**19.00 x 1.80**
28.0	20.5	3.2	TG4100280	20.29 x 2.62
30.0	25.1	2.2	TG4000300	25.12 x 1.78
32.0	**27.1**	**2.2**	**TG4000320**	**26.70 x 1.78**
35.0	30.1	2.2	TG4000350	29.87 x 1.78
40.0	**32.5**	**3.2**	**TG4100400**	**31.42 x 2.62**
45.0	37.5	3.2	TG4100450	36.17 x 2.62
50.0	**42.5**	**3.2**	**TG4100500**	**40.94 x 2.62**
54.0	46.5	3.2	TG4100540	45.69 x 2.62
55.0	47.5	3.2	TG4100550	45.69 x 2.62
60.0	52.5	3.2	TG4100600	52.07 x 2.62
63.0	**55.5**	**3.2**	**TG4100630**	**53.64 x 2.62**
65.0	57.5	3.2	TG4100650	56.82 x 2.62
70.0	62.5	3.2	TG4100700	61.60 x 2.62
75.0	67.5	3.2	TG4100750	66.34 x 2.62
80.0	**69.0**	**4.2**	**TG4200800**	**66.27 x 3.53**
85.0	72.0	4.2	TG4200850	72.62 x 3.53
90.0	79.0	4.2	TG4200900	78.97 x 3.53
95.0	84.0	4.2	TG4200950	82.14 x 3.53
100.0	**89.0**	**4.2**	**TG4201000**	**88.49 x 3.53**
110.0	99.0	4.2	TG4201100	98.02 x 3.53
120.0	109.0	4.2	**TG4201200**	107.54 x 3.53
125.0	**114.0**	**4.2**	**TG4201250**	**113.89 x 3.53**
130.0	119.0	4.2	TG4201300	117.07 x 3.53
140.0	124.5	6.3	TG4301400	123.19 x 5.33
150.0	134.5	6.3	TG4301500	132.72 x 5.33
150.0	134.5	6.3	TG4301500	132.72 x 5.33
160.0	**144.5**	**6.3**	**TG4301600**	**142.24 x 5.33**
170.0	154.5	6.3	TG4301700	151.77 x 5.33
180.0	164.5	6.3	TG4301800	164.47 x 5.33
190.0	174.5	6.3	TG4301900	170.82 x 5.33
200.0	**184.5**	**6.3**	**TG4302000**	**183.52 x 5.33**
210.0	194.5	6.3	TG4302100	189.87 x 5.33
220.0	204.5	6.3	TG4302200	202.57 x 5.33
230.0	214.5	6.3	TG4302300	208.92 x 5.33
240.0	224.5	6.3	TG4302400	221.62 x 5.33
250.0	**234.5**	**6.3**	**TG4302500**	**234.32 x 5.33**
280.0	264.5	6.3	TG4302800	266.07 x 5.33
300.0	284.5	6.3	TG4303000	278.77 x 5.33
320.0	**304.5**	**6.3**	**TG430320**	**304.17 x 5.33**
350.0	329.0	8.1	TG4403500	329.57 x 7.00
380.0	359.0	8.1	**TG4403800**	354.97 x 7.00
400.0	**379.0**	**8.1**	**TG4404000**	**367.67 x 7.00**
420.0	399.0	8.1	TG4404200	393.07 x 7.00
450.0	429.0	8.1	TG4404500	417.96 x 7.00
480.0	459.0	8.1	TG4404800	456.06 x 7.00
500.0	**479.0**	**8.1**	**TG4405000**	**468.76 x 7.00**
600.0	579.0	8.1	TG4406000	582.68 x 7.00
700.0	672.0	9.5	TG4507000	670.30 x 8.40
800.0	772.0	9.5	TG4508000	770.30 x 8.40
900.0	872.0	9.5	TG4509000	870.30 x 8.40
1,000.0	972.0	9.5	TG45X1000	970.30 x 8.40
1,500.0	1,472.0	9.5	TG45X1500	1,470.30 x 8.40
2,000.0	1,972.0	9.5	TG45X2000	1,970.30 x 8.40
2,500.0	2,472.0	9.5	TG45X2500	2,470.30 x 8.40

The bore diameters in **bold** type correspond to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 2,700 mm diameter including imperial (inch) sizes can be supplied.

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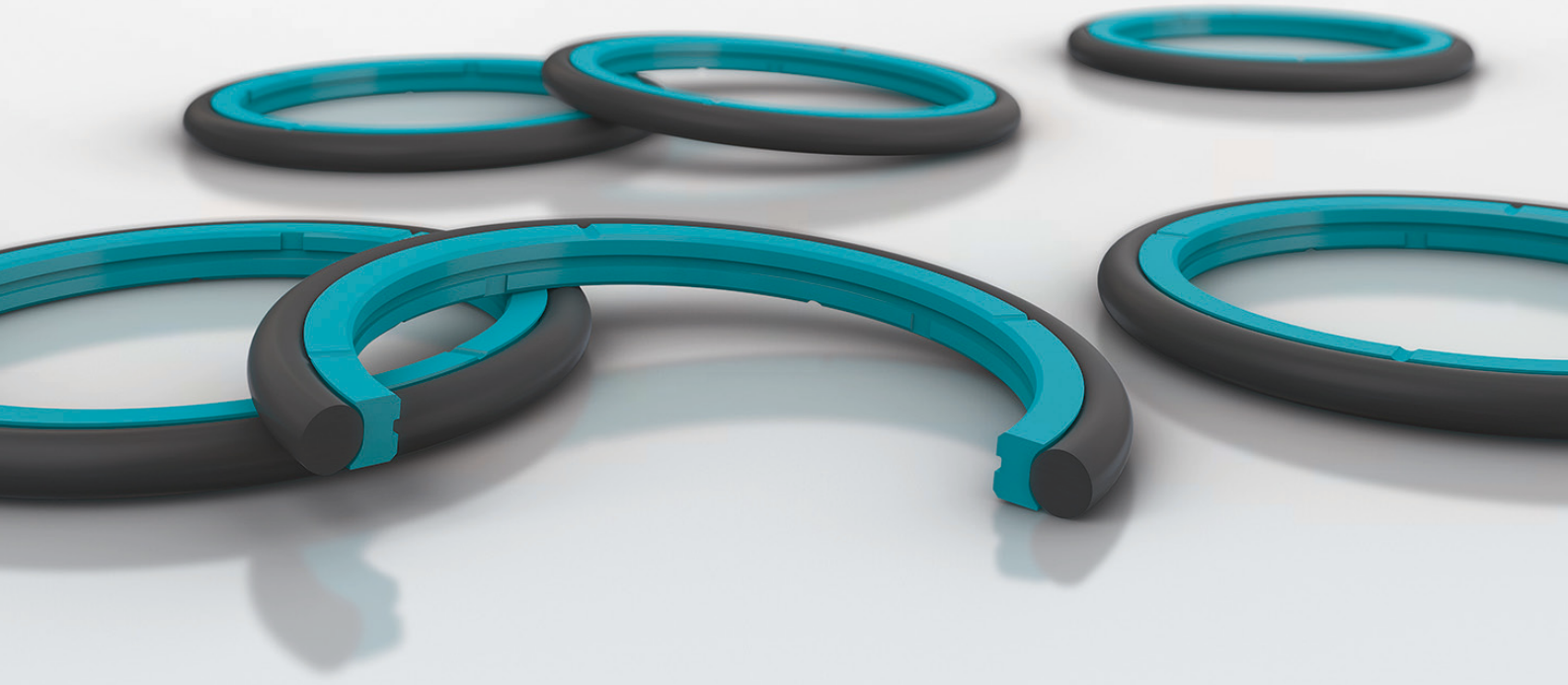
Turcon® Roto Glyd Ring® K



Turcon® Roto Glyd Ring® K

General Description

Turcon® Roto Glyd Ring® K is used to seal shafts, axles, bores, rotary manifolds and swivels with rotary, helical or oscillating movement. It consists of a seal ring in high-grade Turcon® material activated by an elastomer O-Ring.

The contact surface profile of the seal ring is specially designed for use at high pressure and low sliding speeds.

Preferably, the Roto Glyd Ring® K version is used as single -acting seal because of its asymmetric appearance although a semi double-acting sealing function is maintained.

Roto Glyd Ring® K is supplied with an axial pressure relief groove. As illustrated in Figure 129, the continuous radial groove is on one side linked to the pressure chamber.

The seal is thus relieved of pressure from one side and can be used for higher PV values than Turcon® Roto Glyd Ring® .

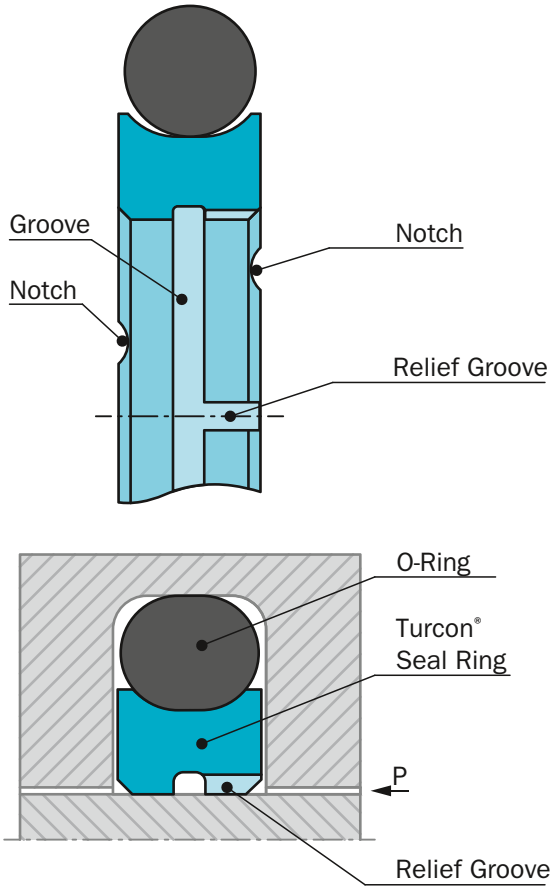


Figure 129: Turcon® Roto Glyd Ring® K with pressure relief.

This Roto Glyd Ring® version is identified in the TSS Article Number by a "K" at the 5th digit, see Ordering Examples. For this seal, the direction of installation must be observed.

METHOD OF OPERATION

Initial contact pressure of the Roto Glyd Ring® K is provided by radial compression of the O-Ring. When the system pressure is increased, the O-Ring transforms this into additional contact pressure. The contact pressure of the seal is thereby automatically adjusted so sealing is ensured under all service conditions.

The single-acting performance of the seal follows from the asymmetrical cross section which allows the seal to respond to high pressure in one direction.

The axial pressure relief groove connecting the pressurized fluid to the circumferential center groove ensures a pressure balance of more than half of the seal contact area. This significantly reduces the seal friction when compared to the double-acting Roto Glyd Ring® .

As the K version still has full sealing contact and hold pressure from both directions, it can act as a double-acting rotary seal. The relieved side must be installed on the side with the higher pressure.

The unrelieved side of the seal is only for low pressure, which should not exceed 3 MPa as it is not sufficiently supported to prevent extrusion from high pressure.

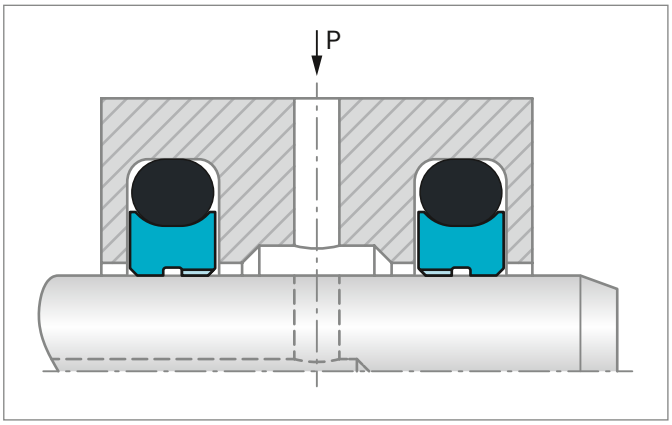


Figure 130: Right installation of Roto Glyd Ring® K

NOTCH

To assure rapid activation of the seal at sudden changes of pressure and direction of motion, radial notches are added on both sides of the seal ring.

ADVANTAGES

- Single-acting rotary seal
- Simple groove design
- Small groove dimensions
- Very low friction
- Stick-slip free operation
- No vulcanizing to mating surfaces

TYPICAL APPLICATIONS

Roto Glyd Ring® K is preferably used as a single-acting rotary seal for hydraulic and pneumatic equipment in applications such as:

- In end caps of rotary distributors and unions
- High pressure valve stems
- Manipulators
- Hydraulic motors
- Pivoting motors in mobile hydraulic and machine tools
- Blow molding machines

OPERATING CONDITIONS

Seal performance is influenced by such factors as lubrication capability of the sealed medium and heat dissipation in the hardware. It follows that testing should always be made. With good lubrication, the following values can be assumed:

Pressure:	Up to 30 MPa (from pressure relieved side) Up to 3 MPa (from pressure unrelieved side)
Speed:	Up to 2.0 m/s
PV:	Up to 2.5 MPa m/s The value must be reduced for diameters < 50 mm.
Temperatures:	-45 °C to +200 °C *) depending on O-Ring elastomer and medium
Media:	Mineral oil-based hydraulic fluids, flame-retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils), water and others, depending on seal and elastomer material.

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.

*) IMPORTANT NOTE

In the case of unpressurized applications in temperatures below 0 °C please contact your local Trelleborg Sealing Solutions marketing company for more information.

INSTALLATION INSTRUCTIONS

Roto Glyd Ring® is installed according to information at page 313.

Closed groove installation according to dimensions at Table 85 on page 248.

RECOMMENDED MATERIALS

The following material combinations have proven effective for rotary applications:

Turcon® Roto Glyd Ring® K in Turcon® T40
All-round material in lubricating fluids and fluids with limited lubrication e.g. water:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	HNBR 70 Shore A	H
	(according to temperature)	
Set code:	T40N, T40V or T40H	

Turcon® Roto Glyd Ring® K in Turcon® M15
Material with high sealing effect for light to medium applications in fluids with good lubrication:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	HNBR 70 Shore A	H
	(according to temperature)	
Set code:	M15N, M15V or M15H	

Turcon® Roto Glyd Ring® K in Zurcon® Z80
For slow turning applications with fluid, air, gases and risk of high abrasive wear; temperature limit -45 °C to +80 °C:

O-Ring	NBR 70 Shore A
Set code:	Z80N

Z80 are for slow turning motion and not for constant rotation.

For specific applications other Turcon® and Zurcon® materials are available.

Table 84: Turcon® Roto Glyd Ring® K

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® M04 For lubricating and non-lubricating fluids and gases Smooth and tight surface texture Good sealing performance Suitable for softer mating surfaces High extrusion resistance For swiveling and low velocity rotary service only Carbon filled Color: Black	M04	NBR 70	N	-30 to +100	Steel Hardend steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M15 Recommended material for rotary motion For lubricating fluids Tight surface texture Good sealing performance Very good wear properties Low friction Good extrusion resistance Suited to softer mating surfaces Polyaramide, mineral fiber, lubricant, graphite and Turcon® filled Color: Dark gray	M15	NBR 70	N	-30 to +100	Hardend steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M30 For lubricating and non-lubricating fluids and gases Good wear and extrusion resistance Suited to high temperature service Tight surface structure Good sealing performance Suited to softer surfaces For swiveling and low velocity rotary service only Aromatic polymer, graphite, Turcon® filled; Color: Dark green-gray.	M30	NBR 70	N	-30 to +100	Steel Hardend steel Stainless steel Titanium HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		

Table is continued on next page

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® T10 For lubricating and non-lubricating fluids and gases Suitable for slow rotary service in lubricating fluid High extrusion resistance Not for electrically conducting fluids Carbon, graphite filled Color: Black	T10	NBR 70	N	-30 to +100	Steel Hardend steel Chrome-plated steel (rod) Stainles steel	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		EPDM 70	E	-45 to +145		
Turcon® T40 All-round material for rotary and turning movements Good wear resistance and service life with both lubricating and non-lubricating fluids Surface texture less suited to gas sealing Carbon fiber filled Color: Gray.	T40	NBR 70	N	-30 to +100	Hardend steel Hard Alloys	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Zurcon® Z80 For lubricating and non-lubricating fluids and gases High abrasion and extrusion resistance Well suited to abrasive mating surfaces and fluids For swiveling and intermittent low velocity rotary service only Good chemical resistance Ultra-high molecular weight polyethylene Color: White to off-white	Z80	NBR 70	N	-30 to +80	Steel Hardend steel Ceramic coatings HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		

* Service temperatures are only valid when using hydraulic mineral oil. Note that frictional heat may cause increased temperatures at the seal.

▭ Recommended material.

Note:
Rotary seals exert high loads on mating surfaces and mild steels are best suited for slow or swiveling service.
As a basic principle, the hardness of the mating surface should increase with the peripheral speed, and a hardness of 60 HRC is recommended for velocities above 1 m/s. Due to the mechanical stresses imposed, a hardness depth of 0.5 mm or more is recommended to limit dimensional changes to the mating surface.

■ Installation Recommendation for Shaft

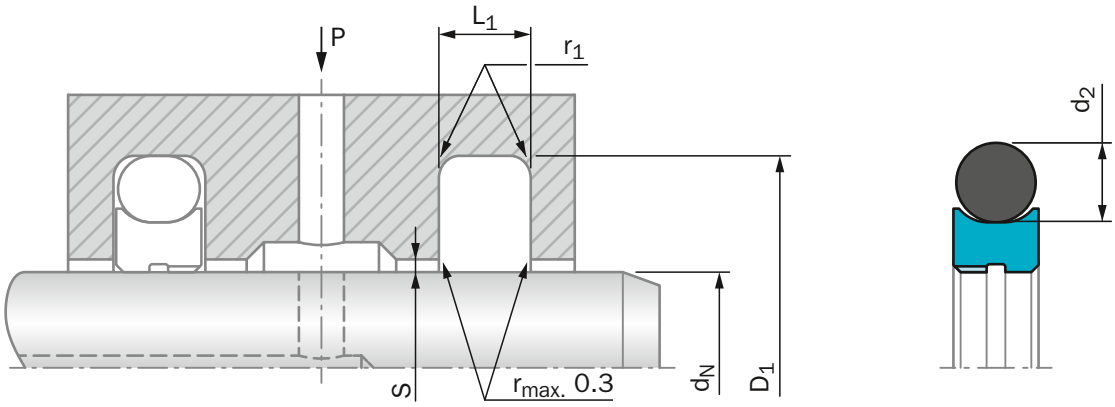


Figure 131: Installation Drawing

Table 85: Installation Dimensions – Standard Recommendations

Series Number	Shaft Diameter d_N f8/h9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	No. of Grooves in the Sealing Surface
	Recommended Range	Available Range	D_1 H9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	
TG31K	19 - 37.9	10 - 245.0	d_N + 7.5	3.20	0.60	0.20	0.15	0.10	2.62	1
TG32K	38 - 199.9	19 - 455.0	d_N + 11.0	4.20	1.00	0.25	0.20	0.15	3.53	1
TG33K	200 - 255.9	38 - 655.0	d_N + 15.5	6.30	1.30	0.30	0.25	0.20	5.33	2
TG34K	256 - 649.9	120 - 655.0	d_N + 21.0	8.10	1.80	0.35	0.30	0.25	7.00	2
TG35K	650 - 999.9	650 - 999.9	d_N + 28.0	9.50	2.50	0.40	0.35	0.30	8.40	2

* At pressures **> 30 MPa**: Use diameter tolerance H8/f8 (bore / shaft) in area of seal.
At pressures **> 10 MPa** it is recommendable to choose the next larger cross section according to the column “Available range“ i.e. for shaft ø d_N = 80 mm: TG33K 800-.

ORDERING EXAMPLE

Turcon® Roto Glyd Ring® K, complete with O-Ring, standard application:

Series:	TG32K (from Table 85)
Shaft diameter:	d_N = 80 mm
TSS Part No.:	TG32K0800 (from Table 86)

Select the material from Table 84. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 86 can be determined following the example opposite.

TSS Article No. **TG32 K 0800 - T40 N**

- Series No. — TG32
- Type (Standard) — K
- Shaft Diameter x 10** — 0800
- Quality Index (Standard) — -
- Material Code (Seal Ring) — T40
- Material Code (O-Ring) — N

** For diameters $d_N \geq$ 1,000.0 mm only on TSS Special Article Number..

Table 86: Standard Installation Dimensions / TSS Part Number

Shaft Dia. d_N f8/h9	Groove Dia. D_1 H9	Groove Width L_1 +0.20	TSS Part No.	O-Ring Dimensions
20.0	27.5	3.2	TG31K0200	21.89 x 2.62
22.0	29.5	3.2	**TG31K0220**	25.07 x 2.62
25.0	32.5	3.2	TG31K0250	28.24 x 2.62
28.0	35.5	3.2	**TG31K0280**	31.42 x 2.62
30.0	37.5	3.2	TG31K0300	32.99 x 2.62
32.0	39.5	3.2	**TG31K0320**	34.59 x 2.62
35.0	42.5	3.2	TG31K0350	37.77 x 2.62
36.0	43.5	3.2	**TG31K0360**	39.34 x 2.62
40.0	51.0	4.2	TG32K0400	44.04 x 3.53
42.0	53.0	4.2	**TG32K0420**	47.22 x 3.53
45.0	56.0	4.2	TG32K0450	50.39 x 3.53
48.0	59.0	4.2	**TG32K0480**	53.57 x 3.53
50.0	61.0	4.2	TG32K0500	53.57 x 3.53
52.0	63.0	4.2	**TG32K0520**	56.74 x 3.53
55.0	66.0	4.2	TG32K0550	59.92 x 3.53
56.0	67.0	4.2	**TG32K0560**	59.92 x 3.53
60.0	71.0	4.2	TG32K0600	63.09 x 3.53
63.0	74.0	4.2	**TG32K0630**	66.27 x 3.53
65.	76.0	4.2	TG32K0650	69.44 x 3.53
70.0	81.0	4.2	**TG32K0700**	75.79 x 3.53
75.0	86.0	4.2	TG32K0750	78.97 x 3.53
80.0	91.0	4.2	**TG32K0800**	85.32 x 3.53
85.0	96.0	4.2	TG32K0850	88.49 x 3.53
90.0	101.0	4.2	**TG32K0900**	94.84 x 3.53
95.0	106.0	4.2	TG32K0950	101.19 x 3.53
100.0	111.0	4.2	**TG32K1000**	104.37 x 3.53
105.0	116.0	4.2	TG32K1050	110.72 x 3.53
110.0	121.0	4.2	**TG32K1100**	113.89 x 3.53
115.0	126.0	4.2	TG32K1150	120.24 x 3.53
120.0	131.0	4.2	TG32K1200	123.42 x 3.53
125.0	136.0	4.2	TG32K1250	129.77 x 3.53
130.0	141.0	4.2	TG32K1300	136.12 x 3.53
135.0	146.0	4.2	TG32K1350	139.29 x 3.53
140.0	151.0	4.2	**TG32K1400**	145.64 x 3.53
150.0	161.0	4.2	TG32K1500	158.34 x 3.53
160.0	171.0	4.2	**TG32K1600**	164.69 x 3.53
170.0	181.0	4.2	TG32K1700	177.39 x 3.53
180.0	191.0	4.2	**TG32K1800**	183.74 x 3.53
190.0	201.0	4.2	TG32K1900	196.44 x 3.53
200.0	215.5	6.3	**TG33K2000**	208.92 x 5.33
210.0	225.5	6.3	TG33K2100	215.27 x 5.33
220.0	235.5	6.3	**TG33K2200**	227.97 x 5.33
230.0	245.5	6.3	TG33K2300	234.32 x 5.33
240.0	255.5	6.3	**TG33K2400**	247.02 x 5.33
250.0	265.5	6.3	TG33K2500	253.37 x 5.33
280.0	301.0	8.1	**TG34K2800**	291.47 x 7.00
300.0	321.0	8.1	TG34K3000	304.17 x 7.00
320.0	341.0	8.1	**TG34K3200**	329.57 x 7.00
350.0	371.	8.1	TG34K3500	354.97 x 7.00
360.0	381.0	8.1	**TG34K3600**	367.67 x 7.00
400.0	421.0	8.1	TG34K4000	405.26 x 7.00
500.0	521.0	8.1	TG34K5000	506.86 x 7.00
550.0	571.0	8.1	TG34K5500	557.66 x 7.00
600.0	621.0	8.1	TG34K6000	608.08 x 7.00
700.0	728.0	9.5	TG35K7000	712.90 x 8.40*
800.0	828.0	9.5	TG35K8000	812.90 x 8.40*
900.0	928.0	9.5	TG35K9000	912.90 x 8.40*

The Shaft diameters in **bold** type correspond to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 999.9 mm diameter including inch sizes can be supplied. For diameters ≥ 1,000.0 mm only with a TSS Special Article Number.

* Theoretical ideal O-Ring size

■ Installation Recommendation for Bore

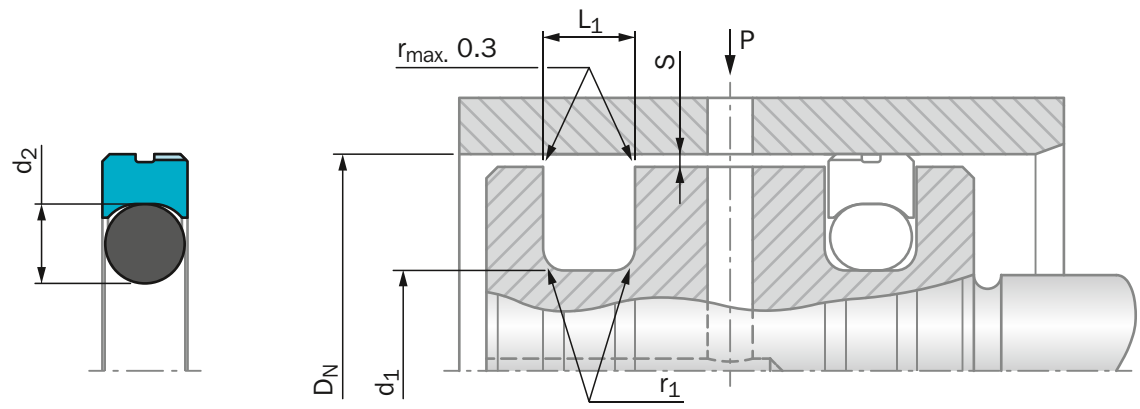


Figure 132: Installation Drawing

Table 87: Installation Dimensions – Standard Recommendations

Series Number	Bore Diameter D_N H9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	No. of Grooves in the Sealing Surface
	Recommended Range	Available Range	d_1 h9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	
TG41K	40 - 79.9	14 - 250.0	D_N - 7.5	3.20	0.60	0.20	0.15	0.10	2.62	1
TG42K	80 - 132.9	22 - 460.0	D_N - 11.0	4.20	1.00	0.25	0.20	0.15	3.53	1
TG43K	133 - 329.9	40 - 675.0	D_N - 15.5	6.30	1.30	0.30	0.25	0.20	5.33	2
TG44K	330 - 669.9	133 - 690.0	D_N - 21.0	8.10	1.80	0.35	0.30	0.25	7.00	2
TG45K	670 - 999.9	-	D_N - 28.0	9.50	2.50	0.40	0.35	0.30	8.40	2

* At pressures **> 30 MPa**: Use diameter tolerance H8/f8 (bore / shaft) in area of seal.
At pressures **> 10 MPa** it is recommendable to choose the next larger cross section according to the column “Available range“ i.e. for shaft ø 80 mm: TG43K 800- .

ORDERING EXAMPLE

Turcon® Roto Glyd Ring® K complete with O-Ring, standard application:

Series:	TG42K (from Table 87)
Bore diameter:	D_N = 80.0 mm
TSS Part No.:	TG42K0800 (from Table 88)

Select the material from Table 84. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 88 can be determined following the example opposite.

TSS Article No. **TG42 K 0800 - T40 N**

- Series No.
- Type (Standard)
- Bore Diameter x 10**
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

** For diameters $D_N \geq$ 1,000.0 mm only with a TSS Special Article Number.

Table 88: Standard Installation Dimensions / TSS Part Number

Bore Dia. D_N H9	Groove Dia. d_1 h9	Groove Width L_1 +0.20	TSS Part No.	O-Ring Dimensions
40.0	32.5	3.2	TG41K0400	31.42 x 2.62
42.0	34.5	3.2	TG41K0420	32.99 x 2.62
45.0	37.5	3.2	TG41K0450	36.17 x 2.62
48.0	40.5	3.2	TG41K0480	39.34 x 2.62
50.0	42.5	3.2	TG41K0500	40.94 x 2.62
52.0	44.5	3.2	TG41K0521	44.12 x 2.62
55.0	47.5	3.2	TG41K0550	45.69 x 2.62
56.0	48.5	3.2	TG41K0560	47.29 x 2.62
60.0	52.5	3.2	TG41K0600	52.07 x 2.62
63.0	55.5	3.2	TG41K0630	53.64 x 2.62
65.0	57.5	3.2	TG41K0650	56.82 x 2.62
70.0	62.5	3.2	TG41K0700	61.60 x 2.62
75.0	67.5	3.2	TG41K0750	66.34 x 2.62
80.0	69.0	4.2	TG42K0800	66.27 x 3.53
85.0	74.0	4.2	TG42K0850	72.62 x 3.53
90.0	79.0	4.2	TG42K0900	78.97 x 3.53
95.0	84.0	4.2	TG42K0950	82.14 x 3.53
100.0	89.0	4.2	TG42K1000	88.49 x 3.53
110.0	99.0	4.2	TG42K1100	98.02 x 3.53
115.0	104.0	4.2	TG42K1150	101.19 x 3.53
120.0	109.0	4.2	TG42K1200	107.54 x 3.53
125.0	114.0	4.2	TG42K1250	113.89 x 3.53
130.0	119.0	4.2	TG43K1300	117.07 x 5.33
135.0	119.5	6.3	TG43K1350	116.84 x 5.33
140.0	124.5	6.3	TG43K1400	123.19 x 5.33
150.0	134.5	6.3	TG43K1500	132.72 x 5.33
160.0	144.5	6.3	TG43K1600	142.24 x 5.33
170.0	154.5	6.3	TG43K1700	151.77 x 5.33
180.0	164.5	6.3	TG43K1800	164.47 x 5.33
190.0	174.5	6.3	TG43K1900	170.82 x 5.33
200.0	184.5	6.3	TG43K2000	183.52 x 5.33
210.0	194.5	6.3	TG43K2100	189.87 x 5.33
220.0	204.5	6.3	TG43K2200	202.57 x 5.33
230.0	214.5	6.3	TG43K2300	208.92 x 5.33
240.0	224.5	6.3	TG43K2400	221.62 x 5.33
250.0	234.5	6.3	TG43K2500	234.32 x 5.33
280.0	264.5	6.3	TG43K2800	266.07 x 5.33
300.0	284.5	6.3	TG43K3000	278.77 x 5.33
320.0	304.5	6.3	TG43K3200	304.17 x 5.33
350.0	334.5	8.1	TG43K3500	329.57 x 7.00
400.0	379.0	8.1	TG44K4000	367.67 x 7.00
420.0	399.0	8.1	TG44K4200	393.07 x 7.00
450.0	429.0	8.1	TG44K4500	417.96 x 7.00
480.0	459.0	8.1	TG44K4800	456.06 x 7.00
500.0	479.0	8.1	TG44K5000	468.76 x 7.00
550.0	529.0	8.1	TG44K55000	532.26 x 7.00
600.0	579.0	8.1	TG44K6000	582.68 x 7.00
650.0	629.0	8.1	TG44K6500	633.48 x 7.00
700.0	672.0	9.5	TG45K7000	670.30 x 8.40*
800.0	772.0	9.5	TG45K8000	770.30 x 8.40*
900.0	872.0	9.5	TG45K9000	870.30 x 8.40*

The Bore diameters in **bold** type correspond to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 999.9 mm diameter including inch sizes can be supplied. For diameters ≥ 1,000.0 mm only with a TSS Special Article Number.

* Theoretical ideal O-Ring size

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Turcon® Roto Glyd Ring® V

■ Turcon® Roto Glyd Ring® V[1)]

■ General Description

Turcon® Roto Glyd Ring® V with pressure relief is used to seal rotary applications, such as transmission lead-throughs, journals and swivels, with rotary or oscillating movement.

The seal is double-acting and can be exposed to pressure from one, or both, sides.

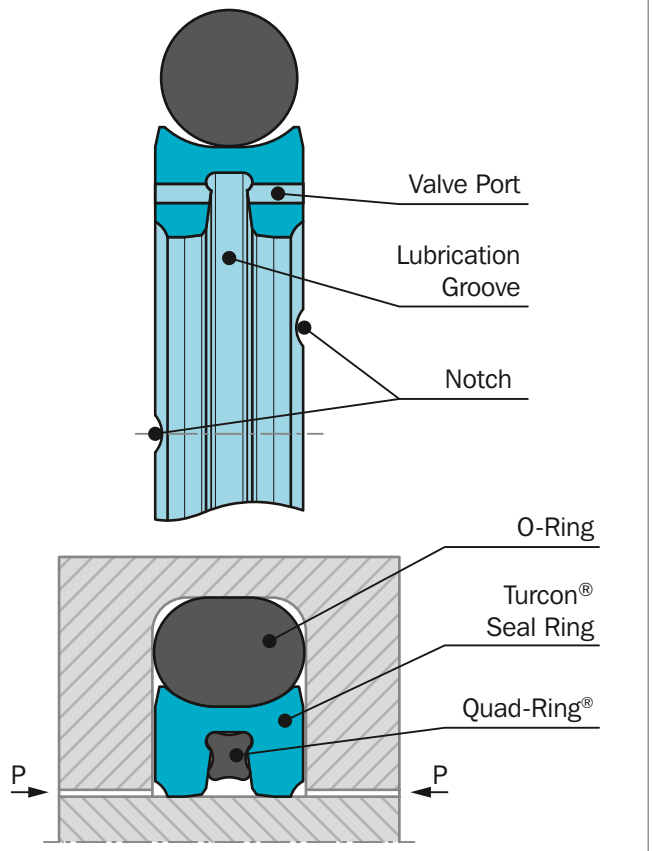


Figure 133 Turcon® Roto Glyd Ring® V with pressure relief

It consists of a seal ring of Turcon® material with an integrated elastomeric Quad-Ring® Seal (X-Ring) and is activated by an O-Ring as an elastic energizing element.

The contact surface profile of the seal ring is specially designed for use under high pressures and sliding speeds of up to 2 m/s.

1) Patent pending: PCT/EP2016/058798

VALVE PORTS

When the system pressure is higher than the pressure in the circumferential lubricating groove, the system pressure bypasses the Quad-Ring® via the valve ports and pressure balances the seal, see Figure 134.

NOTCH

To assure that a rapid activation of the seal takes place at sudden changes of pressure and direction of motion, radial notches are machined on both sides of the seal ring.

METHOD OF OPERATION

The double-acting performance of the seal follows from the symmetrical cross-section, which allows the seal to respond to pressure in both directions.

Initial contact pressure is provided by radial compression of the O-Ring. When the system pressure is activated, the O-Ring transforms this into additional radial seal contact pressure on the mating surface and thereby automatically adjusts the sealing force to ensure high sealing performance under all service conditions.

The Turcon® seal ring profile is supported by two “legs” to reduce contact area with the shaft or bore and thereby decrease friction (torque) and wear.

When exposed to pressure from one side, ports through the sidewalls permit system pressure to deform the Quad-Ring® , which opens to the lubrication groove, see Figure 134. At this point, only one “leg” of Roto Glyd Ring® V is in full pressurized contact with the counter surface and pressure is balanced around half of the dynamic contact area. The other “leg” is just obtaining a minor part of the pressure, which is mainly coming from the initial O-Ring compression – with the result of a major reduction in frictional heat generation.

Reduced contact surfaces under all operating conditions significantly improve friction and wear characteristics.

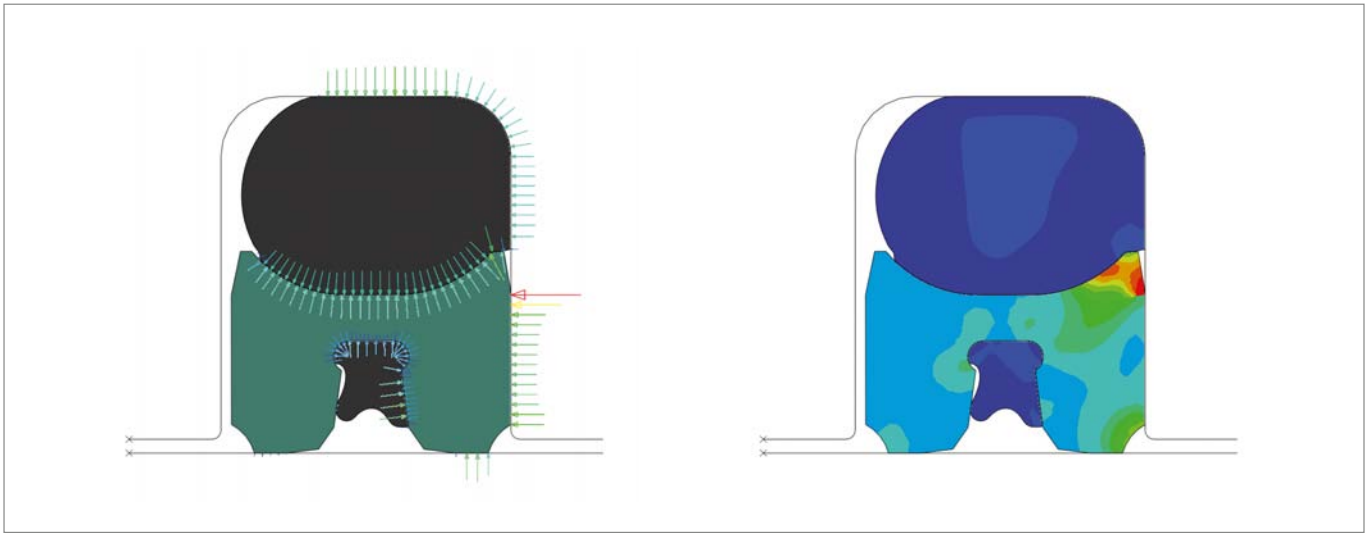


Figure 134 Turcon® Roto Glyd Ring® V - Finite Element Analysis (FEA).

In Figure 134, the system pressure is acting on the left side of the seal and has, via the valve ports, deformed the Quad-Ring® and balanced pressure over half of the dynamic contact area of the seal. The full system pressure is then only interacting on the right leg.

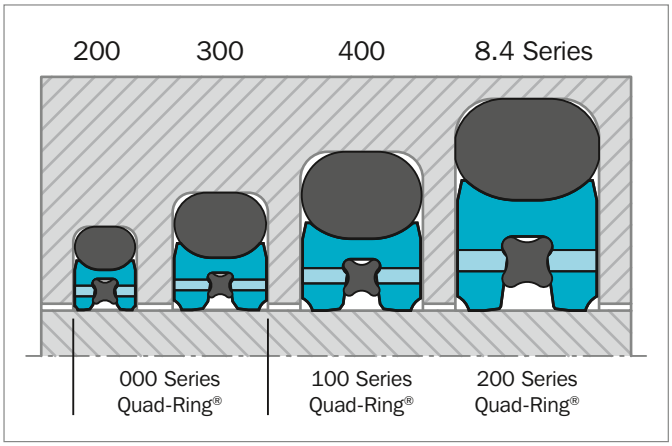


Figure 135 Cross-section profiles of available standard seal series for shaft and bore sealing dependent on Series No.

ADVANTAGES

- Available for shaft and bore sealing applications
- Low to high pressure
- Low to medium speed
- Low friction
- Stick-slip-free starting, no sticking
- High abrasion resistance and dimensional stability
- Simple groove design, small groove dimensions
- Recommended Turcon® materials: M15, M30, M04, T40 and Zurcon® Z80 for all shaft sizes from 35 mm and all bore sizes from 22 mm up to diameter 500 mm

TYPICAL APPLICATIONS

Roto Glyd Ring® V is used as a double-acting rotary seal for hydraulic and pneumatic equipment in applications such as:

- Rotary distributors and unions
- Rotary transmission lead-troughs
- Rotary connections with swivel movement, e.g. damping units
- High pressure valve stems
- Manipulators
- Pivoting motors in mobile hydraulics and machine tools
- Hydraulic motors
- Blow molding machines
- Top drives
- Rotary index tables
- Core cutting equipment

OPERATING CONDITIONS

Seal performance is influenced by such factors as lubrication capability of the sealed media and heat dissipation in the hardware, it follows that testing should always be made.

With good lubrication, the following values can be assumed as a guideline:

Pressure:	Up to 20 MPa at continuous rotation To 30 MPa at slow turning motion According to temperature and seal material
Temperature:	-45 °C to +130 °C*) Dependent on seal ring, O-Ring and Quad-Ring® material
Speed:	Up to 2 m/s According to pressure, temperature and seal material
PV:	Up to 10 MPa m/s The value must be reduced for diameters < 50 mm
Acceleration:	Up to 0.9 m/s2, in other cases contact your local Trelleborg Sealing Solutions marketing company.
Media:	Mineral oil-based hydraulic fluids, flame-retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils) and others, depending on seal and elastomer material For sealing e.g. coolants, water or air use T40 or Z80

NOTE

For continuous operation at temperatures over +100 °C, pressure and speed must be limited and use of O-Rings / Quad-Ring® in HNBR or FKM

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.

*) IMPORTANT NOTE FOR THE BORE VERSION:

In case of unpressurized applications in temperatures below 0 °C please contact your local Trelleborg Sealing Solutions marketing company for more information.

MATING SURFACE MATERIALS

Sealing of applications with rotating movements requires very good mating surfaces.
A minimum hardness of 55 HRC to a hardening depth of at least 0.5 mm is recommended - at higher speed and/or pressure 60 to 64 HRC and a depth of 0.5 to 1.0 mm is recommended.
Particular attention must be paid to avoid coatings and plating's, e.g. ceramic surfaces with poor heat dissipation and (hard) chrome where material Turcon® M30 and Zurcon® Z80 are recommended.

FRICTIONAL POWER

Guide values for the frictional power P can be determined from the graph in Figure 136.
They are shown as a function of the sliding speed and operating pressure for a shaft diameter d_N of 50 mm with an oil temperature of +60 C°.

Formula for other diameters d_N:

Frictional power $P = \frac{P_{50} \times d_N}{50\ mm}$ [W]

Find P_{50} for Turcon® M15 in the diagram Figure 136

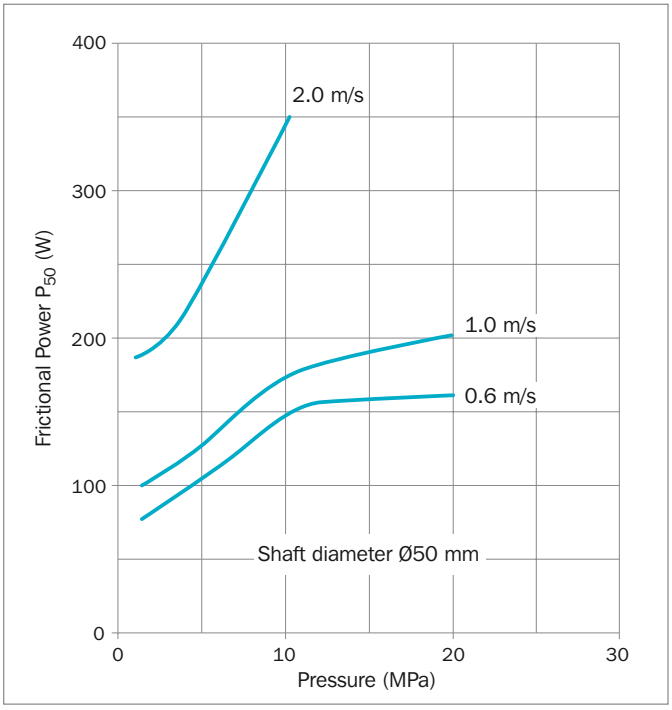


Figure 136 Frictional power for Turcon® Roto Glyd Ring® V in Turcon® M15

The guide values apply for constant operating conditions. Changes in operating condition, such as pressure fluctuations or alternating directions of shaft rotation, can result in considerably higher friction values.

RECOMMENDED MATERIALS

The following material combinations have proven effective for applications with high pressure and medium rotary speed:

Roto Glyd Ring® V in Turcon® M15
Standard material for Roto Glyd Ring® V.
For applications where high sealing efficiency, low friction and good wear resistance are important.

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	(Choice of O-Ring / Quad-Ring® depends on media and temperature)	

Set code: M15N or M15V

Roto Glyd Ring® V in Turcon® M30
A material that combines high sealing performance, low friction, long service life with good wear and extrusion resistance.
Suitable for hard and softer mating surfaces

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	(Choice of O-Ring / Quad-Ring® depends on media and temperature)	

Set code: M30N or M30V

Roto Glyd Ring® V in Turcon® M04
An improved carbon-filled material for linear and rotary applications which can run on softer mating surfaces.

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	(Choice of O-Ring / Quad-Ring® depends on media and temperature)	

Set code: M04N or M04V

Roto Glyd Ring® V in Turcon® T40
Preferred for fluid applications where service life and wear resistance are more important than 100% sealing performance.
For fluids with high and low lubricating properties.
Preferred material for water based fluids

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	(Choice of O-Ring / Quad-Ring® depends on media and temperature)	

Set code: T40N or T40V

For specific applications, other material combinations are available.

Table 89: Turcon® Roto Glyd Ring® V

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® M04 For lubricating and non-lubricating fluids and gases Smooth and tight surface texture Good sealing performance Suitable for softer mating surfaces High extrusion resistance For swiveling and low velocity rotary service only Carbon filled Color: Black	M04	NBR 70	N	-30 to +100	Steel Hardened steel	20
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M15 Preferred material for rotary motion For lubricating fluids Tight surface texture Good sealing performance Very good wear properties Low friction Good extrusion resistance Suited to softer mating surfaces Polyaramide, mineral fiber, lubricant, graphite and Turcon® filled Color: Dark gray	M15	NBR 70	N	-30 to +100	Hardened steel	20
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Turcon® M30 For lubricating and non-lubricating fluids and gases Good wear and extrusion resistance Suited to high temperature service Tight surface structure Good sealing performance Suited to softer surfaces For swiveling and low velocity rotary service only Aromatic polymer, graphite, Turcon® filled Color: Dark green-gray	M30	NBR 70	N	-30 to +100	Steel Hardened steel Stainless steel Titanium HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Turcon® T40 All-round material for rotary and turning movements Good wear resistance and service life with both lubricating and non-lubricating fluids Surface texture less suited to gas sealing Carbon fiber filled Color: Gray.	T40	NBR 70	N	-30 to +100	Hardened steel Hard alloys	20
		NBR 70 Low temp.	T	-45 to +80		
		FKM 70	V	-10 to +200		
		HNBR 70	H	-30 to +150		
Zurcon® Z80 For lubricating and non-lubricating fluids and gases High abrasion and extrusion resistance Well suited to abrasive mating surfaces and fluids For swiveling and intermittent low velocity rotary service only Good chemical resistance Ultra-high molecular weight polyethylene Color: White to off-white	Z80	NBR 70	N	-30 to +80	Steel Hardened steel Ceramic coatings HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		

* Service temperatures are only valid when using hydraulic mineral oil. Note that frictional heat may cause increased temperatures at the seal.

▭ Recommended material.

Note:
Rotary seals exert high loads on mating surfaces and mild steels are best suited for slow or swiveling service.
As a basic principle, the hardness of the mating surface should increase with the peripheral speed, and a hardness of 60 HRC is recommended for velocities above 1 m/s. Due to the mechanical stresses imposed, a hardness depth of 0.5 mm or more is recommended to limit dimensional changes to the mating surface.

QUAD-RING® MATERIALS

Standard materials for Quad-Ring® :

NBR 70 Shore A: Material code N7004
FKM 70 Shore A: Material code V7002s

Further special materials on request.

As standard, the Quad-Ring® in NBR elastomer is pre-installed in the circumferential lubrication groove of the Turcon® seal ring – attention must be paid to the medium compatibility and temperature limit of NBR.

If another elastomer material is required, Roto Glyd Ring® V is delivered with the Quad-Ring® uninstalled.
To get Roto Glyd Ring® V **without** Quad-Ring® in NBR, use the feature code [W] in the 5th character in the TSS Article No,
See ordering example page 261 or page 264.

■ Recommended Installation for Shaft

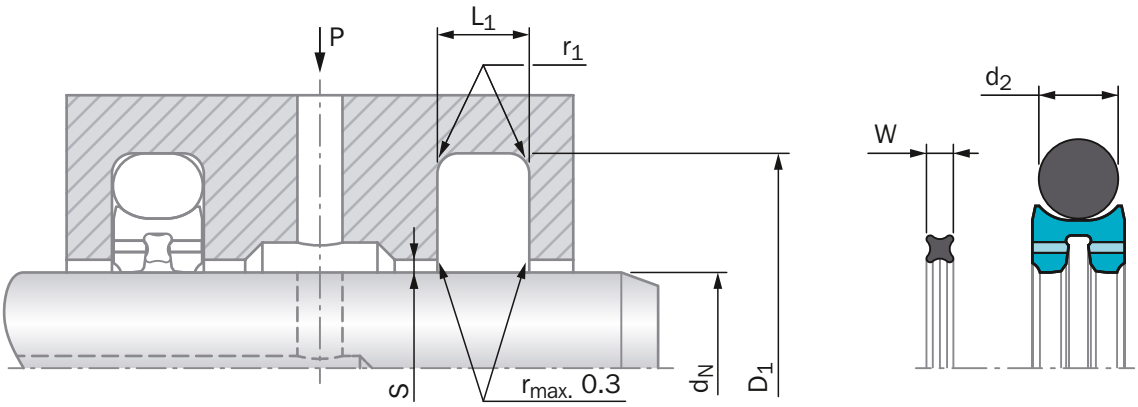


Figure 137 Installation Drawing

Table 90: Installation Dimensions – Standard Recommendations

Series Number	Shaft Diameter d_N f8/h9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	Quad-Ring® Cross-Section-Ø
	Standard Application	Available Range	D_1 H9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	W
TG720	35 - 79.9	35 - 144.9	d_N + 11.0	4.2	1.0	0.40	0.25	0.15	3.53	1.78
TG730	80 - 144.9	38 - 144.9	d_N + 15.5	6.3	1.3	0.50	0.30	0.20	5.33	1.78
TG740	145 - 269.9	80 - 269.9	d_N + 21.0	8.1	1.8	0.60	0.35	0.25	7.00	2.62
TG750	270 - 500	200 - 500	d_N + 28.0	9.5	2.5	0.70	0.40	0.30	8.40	3.53

* At pressures > **30 MPa** use diameter tolerance H8/f8 (bore/rod) in the area of the seal or consult your local Trelleborg Sealing Solutions marketing company for alternative material or profiles.
Slydring® / Wear Rings are not applicable at very small radial clearances, please consult the Slydring® catalog.

ORDERING EXAMPLE

Roto Glyd Ring® V, complete with Quad-Ring® in NBR pre-installed and O-Ring, standard application:

Series:	TG730 from Table 90
Shaft diamater:	d_N = 80.0 mm
TSS Part No.:	TG7300800

Select the material from Table 89. The corresponding code numbers are appended to the TSS Part No. (from Table 91). Together these form the TSS Article Number. The TSS Article Number for all intermediate sizes can be determined following the example:

TSS Article No. **TG73 0 0800 - M15 N**

- Series No.
- Type (Standard)**
- Shaft Diameter x 10***
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

** Ordering Roto Glyd Ring® V **without** NBR Quad-Ring® please use suffix "W" in the fifth character TG73**W**00800-
*** For diameters d_N > 500 mm only on TSS Special Article Number.

Table 91: Standard Installation Dimensions / TSS Part No.

Shaft Diameter	Groove Diameter	Groove Width	TSS Part No.	O-Ring Dimension	Quad-Ring® Dimension
d_N f8/h9	D_1 H9	L_1 +0.2			
35.0	46.0	4.2	TG7200350	40.87 x 3.53	33.05 x 1.78
36.0	**47.0**	**4.2**	**TG7200360**	**40.87 x 3.53**	**34.65 x 1.78**
38.0	53.5	6.3	TG7300380	43.82 x 5.33	37.82 x 1.78
40.0	**51.0**	**4.2**	**TG7200400**	**44.04 x 3.53**	**37.82 x 1.78**
45.0	**56.0**	**4.2**	**TG7200450**	**50.39 x 3.53**	**44.17 x 1.78**
45.0	**60.5**	**6.3**	**TG7300450**	**50.17 x 5.33**	**44.17 x 1.78**
50.0	**61.0**	**4.2**	**TG7200500**	**53.57 x 3.53**	**47.35 x 1.78**
50.0	**65.5**	**6.3**	**TG7300500**	**56.52 x 5.33**	**47.35 x 1.78**
55.0	66.0	4.2	TG7200550	59.92 x 3.53	53.70 x 1.78
56.0	**67.0**	**4.2**	**TG7200560**	**59.92 x 3.53**	**53.70 x 1.78**
56.0	**71.5**	**6.3**	**TG7300560**	**62.87 x 5.33**	**53.70 x 1.78**
60.0	71.0	4.2	TG7200600	63.09 x 3.53	56.87 x 1.78
60.0	75.5	6.3	TG7300600	66.04 x 5.33	56.87 x 1.78
63.0	**74.0**	**4.2**	**TG7200630**	**66.27 x 3.53**	**60.05 x 1.78**
63.0	**78.5**	**6.3**	**TG7300630**	**69.22 x 5.33**	**60.05 x 1.78**
70.0	**81.0**	**4.2**	**TG7200700**	**75.79 x 3.53**	**66.40 x 1.78**
70.0	**85.5**	**6.3**	**TG7300700**	**75.57 x 5.33**	**66.40 x 1.78**
75.0	86.0	4.2	TG7200750	78.97 x 3.53	72.75 x 1.78
80.0	**91.0**	**4.2**	**TG7200800**	**85.32 x 3.53**	**75.92 x 1.78**
80.0	**95.5**	**6.3**	**TG7300800**	**85.09 x 5.33**	**75.92 x 1.78**
80.0	**101.0**	**8.1**	**TG7400800**	**88 x 7.00**	**75.87 x 2.62**
85.0	96.0	4.2	TG7200850	88.49 x 3.53	82.27 x 1.78
85.0	100.5	6.3	TG7300850	91.44 x 5.33	82.27 x 1.78
90.0	**101.0**	**4.2**	**TG7200900**	**94.84 x 3.53**	**88.62 x 1.78**
90.0	**105.5**	**6.3**	**TG7300900**	**97.79 x 5.33**	**88.62 x 1.78**
95.0	106.0	4.2	TG7200950	101.19 x 3.53	88.62 x 1.78
100.0	111.0	4.2	TG7201000	104.37 x 3.53	94.97 x 1.78
100.0	115.5	6.3	TG7301000	107.32 x 5.33	94.97 x 1.78
105.0	116.0	4.2	TG7201050	110.72 x 3.53	101.32 x 1.78
105.0	120.5	6.3	TG7301050	110.49 x 5.33	101.32 x 1.78
110.0	**121.0**	**4.2**	**TG7201100**	**113.89 x 3.53**	**107.67 x 1.78**
110.0	**125.5**	**6.3**	**TG7301100**	**116.84 x 5.33**	**107.67 x 1.78**
120.0	135.5	6.3	TG7301200	126.37 x 5.33	114.02 x 1.78
125.0	**136.0**	**4.2**	**TG7201250**	**129.77 x 3.53**	**120.37 x 1.78**
125.0	**140.5**	**6.3**	**TG7301250**	**129.54 x 5.33**	**120.37 x 1.78**
125.0	**146.0**	**8.1**	**TG7401250**	**132.72 x 7.00**	**120.32 x 2.62**
130.0	145.5	6.3	TG7301300	135.89 x 5.33	126.72 x 1.78
135.0	146.0	4.2	TG7201350	139.29 x 3.53	126.72 x 1.78
135.0	150.5	6.3	TG7301350	142.24 x 5.33	126.72 x 1.78
140.0	**151.0**	**4.2**	**TG7201400**	**145.64 x 3.53**	**133.07 x 1.78**

Shaft Diameter d_N f8/h9	Groove Diameter D_1 H9	Groove Width L_1 +0.2	TSS Part No.	O-Ring Dimension	Quad-Ring® Dimension
140.0	**155.5**	**6.3**	**TG7301400**	**145.42 x 5.33**	**133.07 x 1.78**
150.0	171.0	8.1	TG7401500	158.12 x 7.00	145.72 x 2.62
160.0	**181.0**	**8.1**	**TG7401600**	**170.82 x 7.00**	**152.07 x 2.62**
170.0	191.0	8.1	TG7401700	177.17 x 7.00	164.77 x 2.62
180.0	**201.0**	**8.1**	**TG7401800**	**189.87 x 7.00**	**171.12 x 2.62**
190.0	211.0	8.1	TG7401900	196.22 x 7.00	183.82 x 2.62
200.0	**221.0**	**8.1**	**TG7402000**	**208.90 x 7.00**	**190.17 x 2.62**
200.0	**228.0**	**9.5**	**TG7502000**	**213 x 8.40**	**190.09 x 3.53**
210.0	231.0	8.1	TG7402100	215.27 x 7.00	202.87 x 2.62
220.0	**241.0**	**8.1**	**TG7402200**	**227.97 x 7.00**	**209.22 x 2.62**
220.0	**248.0**	**9.5**	**TG7502200**	**209 x 8.40**	**209.14 x 3.53**
230.0	251.0	8.1	TG7402300	240.67 x 7.00	221.92 x 2.62
250.0	**271.0**	**8.1**	**TG7402500**	**266.07 x 7.00**	**240.97 x 2.62**
250.0	**278.0**	**9.5**	**TG7502500**	**241 x 8.40**	**240.89 x 3.53**
260.0	281.0	8.1	TG7402600	266.07 x 7.00	247.32 x 2.62
280.0	**308.0**	**9.5**	**TG7502800**	**293 x 8.40**	**266.29 x 3.53**
300.0	328.0	9.5	TG7503000	313 x 8.40	291.69 x 3.53
320.0	348.0	9.5	TG7503200	333 x 8.40	304.39 x 3.53
350.0	378.0	9.5	TG7503500	330 x 8.40	329.79 x 3.53
360.0	**388.0**	**9.5**	**TG7503600**	**355 x 8.40**	**355.19 x 3.53**
400.0	428.0	9.5	TG7504000	413 x 8.40	380.59 x 3.53
500.0	528.0	9.5	TG7505000	513 x 8.40	456.06 x 3.53

The shaft diameters in **bold** type correspond to the recommendations of ISO 3320.
Other dimensions and all intermediate sizes up to 500 mm diameter including imperial (inch) sizes can be supplied.

■ Recommended Installation for Bore

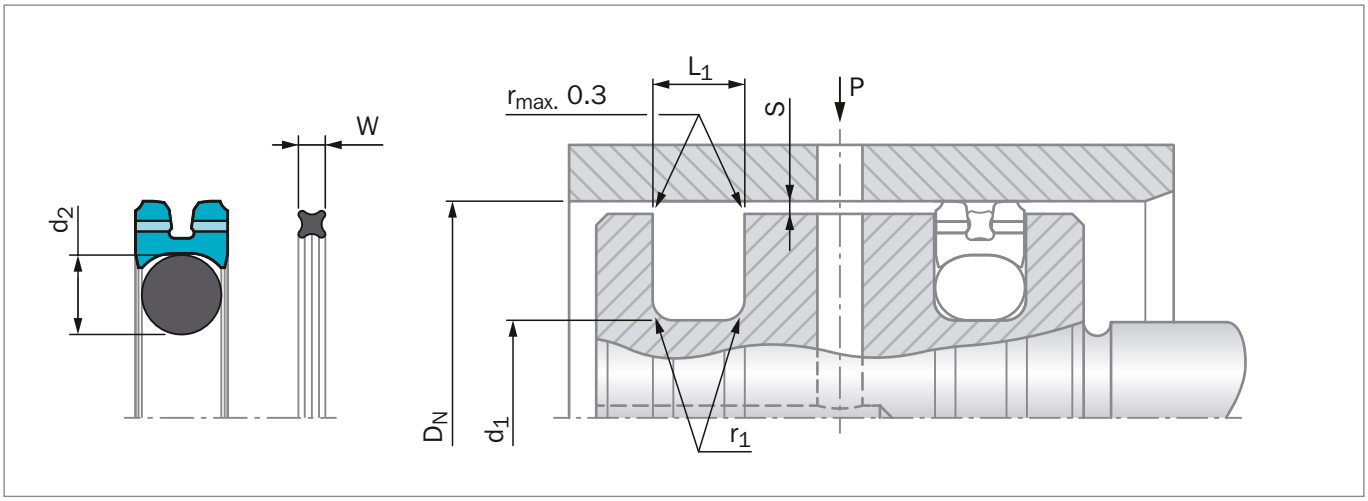


Figure 138 Installation Drawing

Table 92: Installation Dimensions – Standard Recommendations

Series Number	Bore Diameter D_N H9		Groove Diameter	Groove Width	Radius	Radial Clearance S_{max}*			O-Ring Cross-Section-Ø	Quad-Ring® Cross-Section-Ø
	Standard Application	Available Range	d_1 h9	L_1 +0.2	r_1	10 MPa	20 MPa	30 MPa	d_2	W
TG820	22 - 79.9	22 - 149.9	D_N - 11.0	4.2	1.00	0.40	0.25	0.15	3.53	1.78
TG830	80 - 149.9	40 - 149.9	D_N - 15.5	6.3	1.30	0.50	0.30	0.20	5.33	1.78
TG840	150 - 274.9	85 - 274.9	D_N - 21.0	8.1	1.80	0.60	0.35	0.25	7.00	2.62
TG850	275 - 500	200 - 500	D_N - 28.0	9.5	2.50	0.70	0.40	0.30	8.40	3.53

* At pressures > **30 MPa** use diameter tolerance H8/f8 (bore/rod) in the area of the seal or consult your local Trelleborg Sealing Solutions marketing company for alternative material or profiles.
Slydring® / Wear Rings are not applicable at very small radial clearances please consult the Slydring® catalog.

ORDERING EXAMPLE

Roto Glyd Ring® V, complete with Quad-Ring® in NBR pre-installed and O-Ring, standard application:

Series:	TG830 from Table 92
Bore diamater:	D_N = 80.0 mm
TSS Part No.:	TG8300800

Select the material from Table 89. The corresponding code numbers are appended to the TSS Part No. (from Table 93) Together these form the TSS Article Number. The TSS Article Number for all intermediate sizes can be determined following the example:

TSS Article No. **TG83 0 0800 - M15 N**

- Series No.
- Type (Standard)**
- Bore Diameter x 10***
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

** Ordering Roto Glyd Ring® V **without** NBR Quad-Ring® please use suffix "W" in the fifth character. TG83**W**00800-
***For diameters D_N > 500 mm only on TSS Special Article Number.

Table 93: Standard Installation Dimensions / TSS Part Number

Bore Diameter	Groove Diameter	Groove Width	TSS Part No.	O-Ring Dimension	Quad-Ring® Dimension
D_N H9	d_1 h9	L_1 +0.2			
22.0	11.0	4.2	TG8200220	10.69 x 3.53	17.17 x 1.78
23.0	12.0	4.2	TG8200230	10.69 x 3.53	17.17 x 1.78
25.0	**14.0**	**4.2**	**TG8200250**	**13.87 x 3.53**	**20.35 x 1.78**
28.0	17.0	4.2	TG8200280	15.47 x 3.53	21.95 x 1.78
30.0	19.0	4.2	TG8200300	18.66 x 3.53	25.12 x 1.78
32.0	**21.0**	**4.2**	**TG8200320**	**20.22 x 3.53**	**26.70 x 1.78**
35.0	24.0	4.2	TG8200350	23.40 x 3.53	29.87 x 1.78
40.0	**29.0**	**4.2**	**TG8200400**	**28.17 x 3.53**	**34.65 x 1.78**
40.0	**24.5**	**6.3**	**TG8300400**	**23.16 x 5.33**	**33.05 x 1.78**
45.0	29.5	6.3	TG8300450	27.94 x 5.33	37.82 x 1.78
50.0	**39.0**	**4.2**	**TG8200500**	**37.69 x 3.53**	**44.17 x 1.78**
50.0	**34.5**	**6.3**	**TG8300500**	**32.69 x 5.33**	**44.17 x 1.78**
54.0	43.0	4.2	TG8200540	40.87 x 3.53	47.35 x 1.78
54.0	38.5	6.3	TG8300540	37.47 x 5.33	47.35 x 1.78
55.0	39.5	6.3	TG8300550	37.47 x 5.33	47.35 x 1.78
60.0	49.0	4.2	TG8200600	47.22 x 3.53	53.70 x 1.78
63.0	**52.0**	**4.2**	**TG8200630**	**50.39 x 3.53**	**56.87 x 1.78**
63.0	**47.5**	**6.3**	**TG8300630**	**46.99 x 5.33**	**53.70 x 1.78**
65.0	49.5	6.3	TG8300650	46.99 x 5.33	56.87 x 1.78
70.0	59.0	4.2	TG8200700	56.74 x 3.53	63.22 x 1.78
75.0	64.0	4.2	TG8200750	63.09 x 3.53	66.40 x 1.78
75.0	59.5	6.3	TG8300750	56.52 x 5.33	66.40 x 1.78
80.0	**69.0**	**4.2**	**TG8200800**	**66.27 x 3.53**	**72.75 x 1.78**
80.0	**64.5**	**6.3**	**TG8300800**	**62.87 x 5.33**	**72.75 x 1.78**
83.0	72.0	4.2	TG8200830	69.44 x 3.53	75.92 x 1.78
83.0	67.5	6.3	TG8300830	66.04 x 5.33	72.75 x 1.78
85.0	64.0	8.1	TG8400850	63 x 7.00	72.69 x 2.62
90.0	79.0	4.2	TG8200900	78.97 x 3.53	82.27 x 1.78
90.0	74.5	6.3	TG8300900	72.39 x 5.33	82.27 x 1.78
90.0	69.0	8.1	TG8400900	68 x 7.00	75.87 x 2.62
95.0	84.0	4.2	TG8200950	82.14 x 3.53	88.62 x 1.78
95.0	79.5	6.3	TG8300950	78.74 x 5.33	88.62 x 1.78
100.0	**89.0**	**4.2**	**TG8201000**	**88.49 x 3.53**	**88.62 x 1.78**
100.0	**84.5**	**6.3**	**TG8301000**	**81.92 x 5.33**	**88.62 x 1.78**
110.0	94.5	6.3	TG8301100	91.44 x 5.33	101.32 x 1.78
120.0	104.5	6.3	TG8301200	100.97 x 5.33	107.67 x 1.78
125.0	**114.0**	**4.2**	**TG8201250**	**113.89 x 3.53**	**114.02 x 1.78**
125.0	**109.5**	**6.3**	**TG8301250**	**107.32 x 5.33**	**114.02 x 1.78**
125.0	**104.0**	**8.1**	**TG8401250**	**103 x 7.00**	**113.97 x 2.62**
130.0	114.5	6.3	TG8301300	113.67 x 5.33	120.37 x 1.78

Bore Diameter	Groove Diameter	Groove Width	TSS Part No.	O-Ring Dimension	Quad-Ring® Dimension
D_N H9	d_1 h9	L_1 +0.2			
140.0	124.5	6.3	TG8301400	123.19 x 5.33	126.72 x 1.78
160.0	**139.0**	**8.1**	**TG8401600**	**135.89 x 7.00**	**145.72 x 2.62**
170.0	149.0	8.1	TG8401700	145.42 x 7.00	152.07 x 2.62
180.0	159.0	8.1	TG8401800	158.12 x 7.00	164.77 x 2.62
200.0	**179.0**	**8.1**	**TG8402000**	**177.17 x 7.00**	**183.82 x 2.62**
200.0	**172.0**	**9.5**	**TG8502000**	**171 x 8.40**	**177.39 x 3.53**
210.0	189.0	8.1	TG8402100	183.52 x 7.00	190.17 x 2.62
220.0	199.0	8.1	TG8402200	196.22 x 7.00	202.87 x 2.62
225.0	197.0	9.5	TG8502250	196 x 8.40	202.79 x 3.53
230.0	209.0	8.1	TG8402300	202.57 x 7.00	209.22 x 2.62
240.0	219.0	8.1	TG8402400	215.27 x 7.00	221.92 x 2.62
250.0	**229.0**	**8.1**	**TG8402500**	**227.97 x 7.00**	**228.27 x 2.62**
250.0	**222.0**	**9.5**	**TG8502500**	**221 x 8.40**	**228.19 x 3.53**
270.0	249.0	8.1	TG8402700	240.67 x 7.00	247.32 x 2.62
270.0	242.0	9.5	TG8502700	241 x 8.40	247.24 x 3.53
280.0	252.0	9.5	TG8502800	251 x 8.40	253.59 x 3.53
300.0	272.0	9.5	TG8503000	271 x 8.40	278.99 x 3.53
320.0	**292.0**	**9.5**	**TG8503200**	**291 x 8.40**	**291.69 x 3.53**
350.0	322.0	9.5	TG8503500	321 x 8.40	329.79 x 3.53
380.0	352.0	9.5	TG8503800	351 x 8.40	355.19 x 3.53
400.0	**372.0**	**9.5**	**TG8504000**	**371 x 8.40**	**380.59 x 3.53**
420.0	392.0	9.5	TG8504200	391 x 8.40	380.59 x 3.53
450.0	422.0	9.5	TG8504500	421 x 8.40	430.66 x 3.53
480.0	452.0	9.5	TG8504800	451 x 8.40	456.06 x 3.53
500.0	**472.0**	**9.5**	**TG8505000**	**471 x 8.40**	**456.06 x 3.53**

The bore diameters printed in **bold** type conform to the recommendations of ISO 3320.
Other dimensions and all intermediate sizes up to 500 mm diameter including imperial (inch) sizes can be supplied.

Zurcon® Roto Glyd Ring® S

■ Zurcon® Roto Glyd Ring® S

■ General Description

Zurcon® Roto Glyd Ring® S is used to seal rotary transmission lead-throughs journals, swivels and with rotary or oscillating movement.
The seal is double-acting and can be exposed to pressure from one, or both, sides.

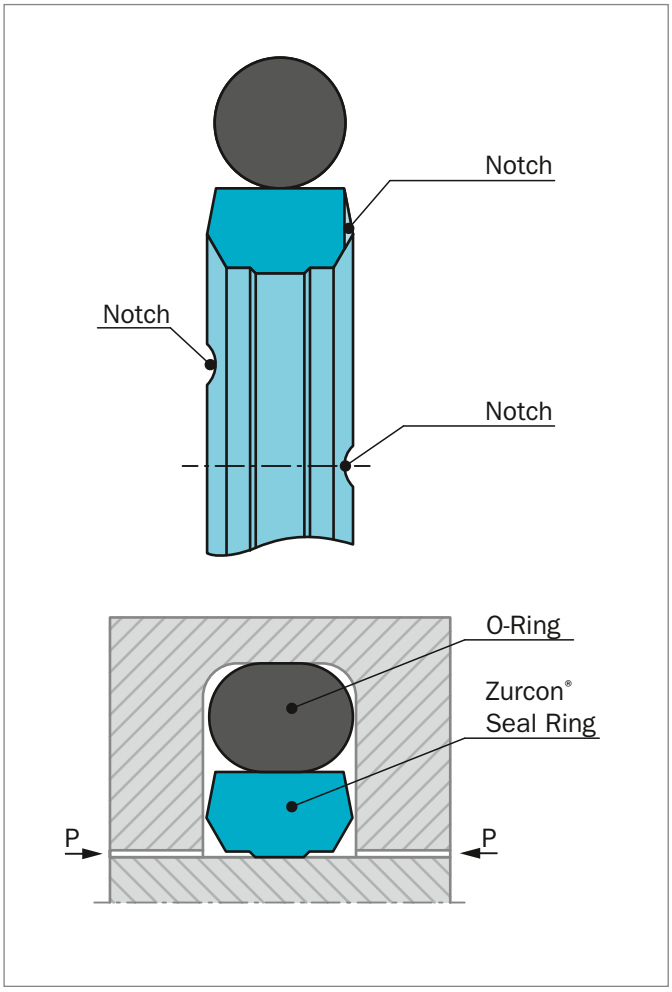


Figure 139 Zurcon® Roto Glyd Ring® S

It consists of a seal ring of Zurcon® material and is activated by an O-Ring as an elastic energizing element.

The contact surface profile of the seal ring is specially designed for use under high pressures and at low sliding speeds.

Pat. pending: DE 101 45914 A1
WO 03/027545 A1

METHOD OF OPERATION

Reduced contact surfaces under all operating conditions significantly improve friction and wear characteristics. When exposed to low pressure, only the central section of the seal comes into contact with the mating surface.

As the system pressure increases, the seal ring is tilted slightly generating the hydrostatic pressure balance in the sealing gap. Tilting the ring under pressure optimizes the lubrication between the seal and the mating surface.

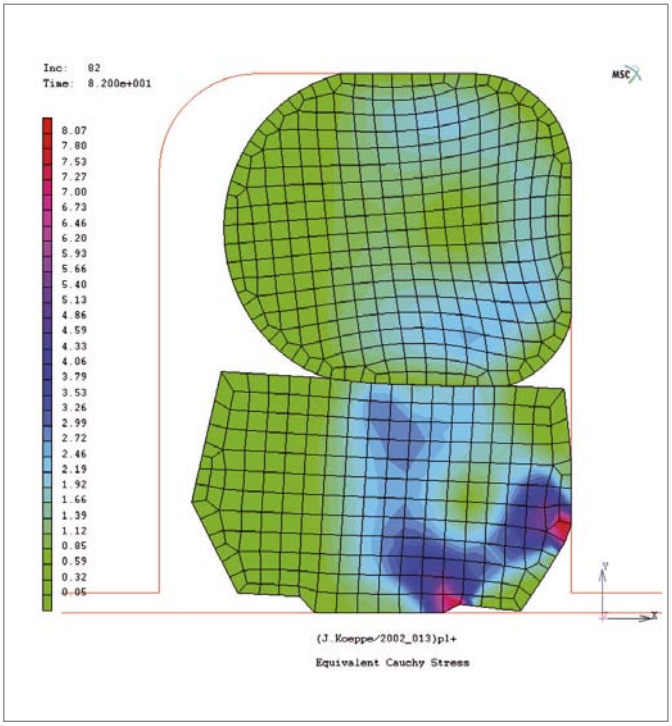


Figure 140 Zurcon® Roto Glyd Ring® S - Finite Element Analysis (FEA)

The profile is supported by a second edge which restricts contact with the shaft or bore, thereby significantly reducing friction and wear. The O-Ring material can be adapted to suit operating conditions. The angle on both sides of Zurcon® Seal Ring prevents extrusion into the system gap.

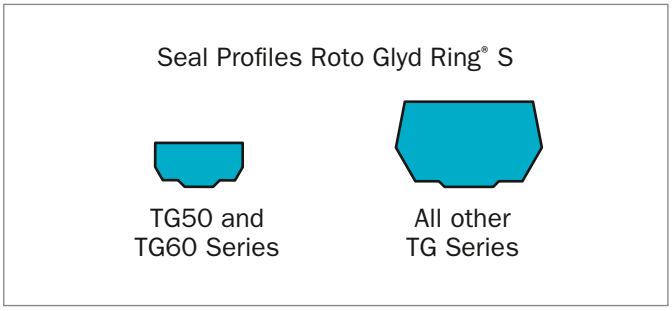
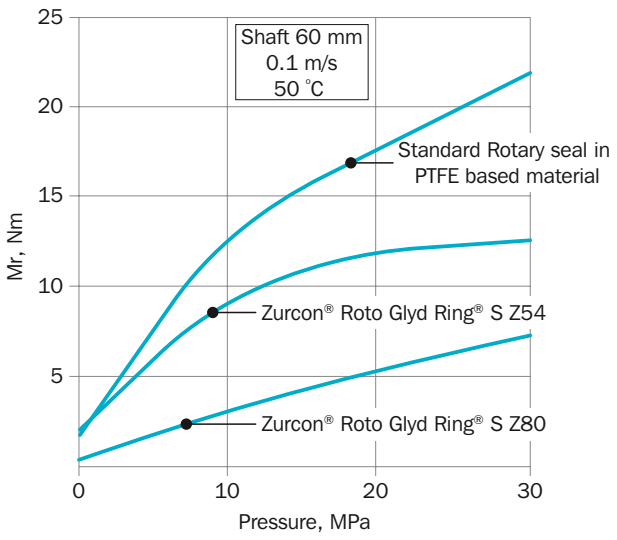


Figure 141 Cross-section profiles depending on Series No.



Note:
The test results are only valid for slow rotation or oscillating movements.
The reduced friction of Zurcon® Roto Glyd Ring® S demonstrates the advantages of the design.

Figure 142 Friction of seals after endurance test

NOTCH

To assure that rapid activation of the seal takes place at sudden changes of pressure and direction of motion, radial notches are machined on both sides of the seal ring.

ADVANTAGES

- Available for shaft and bore sealing applications
- Low to high pressure
- Low friction
- Stick-slip-free starting, no sticking
- High abrasion resistance and dimensional stability
- Simple groove design, small groove dimensions
- Available in material Z53 and Z54 for all shaft sizes up to 2,200 mm diameter and for all bore sizes up to 2,300 mm
- Available in material Z80 for all shaft sizes up to 2,600 mm diameter and for all bore sizes up to 2,700 mm.

APPLICATION EXAMPLES

- Shafts, axels and rotary transmission lead-throughs.
- Rotary indexing tables
- Rotary connections with swivel movement, e.g. damping units

OPERATING CONDITIONS

Pressure:	Up to 40 MPa
PV:	Up to 6.5 MPa x m/s
Acceleration:	Up to 0.9 m/s2, in other cases contact your local Trelleborg Sealing Solutions marketing company.
Temperatures:	-30 °C to +100 °C
Media:	Mineral oil-based hydraulic fluids, flame-retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils) and others, depending on seal and elastomer material. For sealing e.g. coolants, water or air use Z80.

NOTE

For continuous operation at temperatures over +60 °C, pressure and speed must be limited.

Table 94: Material

Material	Pressure P MPa	P x V MPa x m/s	Temperature t° °C
Zurcon® Z53*	40	6.5	-30/+100
Zurcon® Z54	25	6.5	-30/+100
Zurcon® Z80	30	6.5	-30/+80

*Zurcon® Z53 only for p >30 MPa

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 value gap.

INSTALLATION INSTRUCTIONS

Roto Glyd Ring® S is installed according to information at page 313.

Closed groove installation according to dimensions at Table 96 on page 273.

RECOMMENDED MATERIALS

The following material combinations have proven effective for applications with slow turning movements:

Roto Glyd Ring® S in Zurcon® Z80
All round material:

O-Ring:	NBR 70 Shore A	N
	FKM 70 Shore A	V
	(according to media)	

Set code: Z80N or Z80V

Roto Glyd Ring® S in Zurcon® Z54
Material for high sealing effect:

O-Ring:	NBR 70 Shore A	N

Set code: Z54N

For specific applications, other material combinations are available.

Table 95: Zurcon® Roto Glyd Ring® S

Material, Applications, Properties	Code	O-Ring Material Shore D	Code	Service Temp.* °C	Mating Surface Material	MPa max. Dynamic
Zurcon® Z53** For lubricating hydraulic fluids Very high abrasion and extrusion resistance Good sealing performance Well suited to abrasive mating surfaces For swiveling and intermittent low- velocity rotary service only Limited chemical resistance Maximum service temperature: +110 °C Cast polyurethane Color: Yellow to light brown	Z53	NBR 70	N	-30 to +100	Hardend steel Chrome-plated steel (shaft) Ceramic coatings Stainless steel	40
		NBR 70 Low temp.	T	-45 to +80		
Zurcon® Z54** For lubricating hydraulic fluids Very high abrasion resistance Good sealing performance Well suited to abrasive mating surfaces. For swiveling and intermittent low velocity rotary service only Maximum service temperature: +110 °C Cast polyurethane Color: Turquoise	Z54	NBR 70	N	-30 to +100	Steel Hardend steel Chrome-plated steel (shaft) Ceramic coating Stainless steel	25
		NBR 70 Low temp.	T	-45 to +80		
Zurcon® Z80 For lubricating and non-lubricating fluids and gases High abrasion and extrusion resistance Well suited to abrasive mating surfaces and fluids For swiveling and intermittent low velocity rotary service only Good chemical resistance Ultra-high molecular weight polyethylene Color: White to off-white	Z80	NBR 70	N	-30 to +80	Steel Hardend steel Ceramic coatings HVOF Tungsten carbide	30
		NBR 70 Low temp.	T	-45 to +80		

* Service temperatures are only valid when using hydraulic mineral oil. Note that frictional heat may cause increased temperatures at the seal.
** Maximum diameter 2,200 mm

Note:
Rotary seals exert high loads on mating surfaces and mild steels are best suited for slow or swiveling service.
As a basic principle, the hardness of the mating surface should increase with the peripheral speed, and a hardness of 60 HRC is recommended for velocities above 1 m/s. Due to the mechanical stresses imposed, a hardness depth of 0.5 mm or more is recommended to limit dimensional changes to the mating

■ Installation Recommendation for Shaft

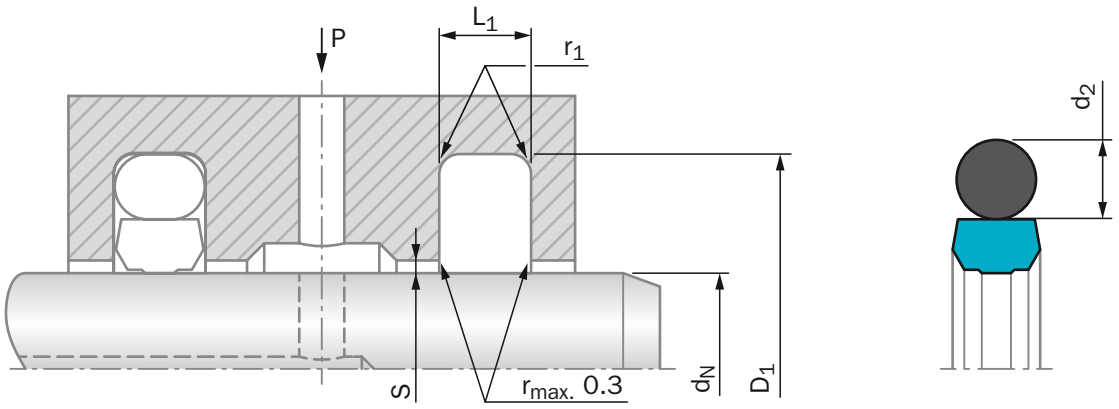


Figure 143 Installation Drawing

Table 96: Installation Dimensions – Standard Recommendations

Series Number	Shaft Diameter d_N f8/h9		Groove Diameter*	Groove Width	Radius	Radial Clearance S_{max}*		O-Ring Cross-Section-Ø
	Standard Range	Available Range	D_1 H9	L_1 +0.2	r_1	10 MPa	30 MPa	d_2
TG50	12 - 18.9	10 - 18.9	d_N + 4.9	2.20	0.40	0.20	0.10	1.78
TG51	19 - 37.9	12 - 59.9	d_N + 7.5	3.20	0.60	0.25	0.15	2.62
TG52	38 - 132.9	19 - 199.9	d_N + 11.0	4.20	1.00	0.30	0.20	3.53
TG53	133 - 255.9	38 - 329.9	d_N + 15.5	6.30	1.30	0.35	0.25	5.33
TG54	256 - 649.9	120 - 655.0	d_N + 21.0	8.10	1.80	0.40	0.25	7.00
TG55	650 - 999.9	650 - 999.9	d_N + 28.0	9.50	2.50	0.50	0.30	8.40
TG55X**	1,000 - 2,600	-	d_N + 28.0	9.50	2.50	0.50	0.30	8.40

* For max. temperature = +60 °C at the seal.
** Z53 and Z54 max. ø 2,200 mm.

ORDERING EXAMPLE

Zurcon® Roto Glyd Ring® S, complete with O-Ring, standard application:

Series:	TG52 from Table 96
Shaft diamater:	d_N = 80.0 mm
TSS Part No.:	TG5200800 from Table 97

Select the material from Table 95. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 97 can be determined following the example opposite.

TSS Article No. TG52 0 0800 - Z54 N

- Series No.
- Type (Standard)
- Shaft Diameter x 10***
- Quality Index (Standard)
- Material Code (Seal Ring)
- Material Code (O-Ring)

*** For diameters ≥ 1,000.0 mm multiply only by factor 1.

Example: TG55X for diameter 1,200.0 mm
TSS Article No.: TG55**X1200** - Z54N

Table 97: Standard Installation Dimensions / TSS Part Number

Shaft Dia. d_N f8/h9	Groove Dia. D_1 H9	Groove Width L_1 +0.2	TSS Part No.	O-Ring Sizes
10.0	**14.9**	**2.2**	**TG5000100**	**12.42 x 1.80**
12.0	**16.9**	**2.2**	**TG5000120**	**14.00 x 1.78**
14.0	**18.9**	**2.2**	**TG5000140**	**15.60 x 1.78**
15.0	19.9	2.2	TG5000150	17.17 x 1.78
16.0	**20.9**	**2.2**	**TG5000160**	**18.77 x 1.78**
18.0	**22.9**	**2.2**	**TG5000180**	**20.35 x 1.78**
20.0	**27.5**	**3.2**	**TG5100200**	**23.47 x 2.62**
22.0	**29.5**	**3.2**	**TG5100220**	**25.07 x 2.62**
25.0	**32.5**	**3.2**	**TG5100250**	**28.24 x 2.62**
28.0	**35.5**	**3.2**	**TG5100280**	**31.42 x 2.62**
30.0	37.5	3.2	TG5100300	34.59 x 2.62
32.0	**39.5**	**3.2**	**TG5100320**	**36.17 x 2.62**
35.0	42.5	3.2	TG5100350	39.34 x 2.62
36.0	**43.5**	**3.2**	**TG5100360**	**39.34 x 2.62**
40.0	**51.0**	**4.2**	**TG5200400**	**47.22 x 3.53**
42.0	53.0	4.2	TG5200420	47.22 x 3.53
45.0	**56.0**	**4.2**	**TG5200450**	**50.39 x 3.53**
48.0	59.0	4.2	TG5200480	53.57 x 3.53
50.0	**61.0**	**4.2**	**TG5200500**	**56.74 x 3.53**
52.0	63.0	4.2	TG5200520	59.92 x 3.53
55.0	66.0	4.2	TG5200550	59.92 x 3.53
56.0	**67.0**	**4.2**	**TG5200560**	**63.09 x 3.53**
60.0	71.0	4.2	TG5200600	66.27 x 3.53
63.0	**74.0**	**4.2**	**TG5200630**	**69.44 x 3.53**
65.0	76.0	4.2	TG5200650	72.62 x 3.53
70.0	**81.0**	**4.2**	**TG5200700**	**75.79 x 3.53**
75.0	86.0	4.2	TG5200750	82.14 x 3.53
80.0	**91.0**	**4.2**	**TG5200800**	**85.32 x 3.53**
85.0	96.0	4.2	TG5200850	91.67 x 3.53
90.0	**101.0**	**4.2**	**TG5200900**	**98.02 x 3.53**
95.0	106.0	4.2	TG5200950	101.19 x 3.53
100.0	**111.0**	**4.2**	**TG5201000**	**107.54 x 3.53**
105.0	116.0	4.2	TG5201050	110.72 x 3.53
110.0	**121.0**	**4.2**	**TG5201100**	**117.07 x 3.53**
115.0	126.0	4.2	TG5201150	120.24 x 3.53
120.0	131.0	4.2	TG5201200	126.59 x 3.53
125.0	**136.0**	**4.2**	**TG5201250**	**132.94 x 3.5**
130.0	141.0	4.2	TG5201300	136.12 x 3.53
135.0	150.5	6.3	TG5201300	142.24 x 5.33
140.0	155.5	6.3	TG5301400	148.59 x 5.33
150.0	165.5	6.3	TG5301500	158.12 x 5.33
160.0	175.5	6.3	TG5301600	170.82 x 5.33
170.0	185.5	6.3	TG5301700	177.17 x 5.33
180.0	195.5	6.3	TG5301800	189.87 x 5.33
190.0	205.5	6.3	TG5301900	202.57 x 5.33
200.0	**215.5**	**6.3**	**TG5302000**	**208.92 x 5.33**
210.0	225.5	6.3	TG5302100	221.62 x 5.33
220.0	**235.5**	**6.3**	**TG5302200**	**227.97 x 5.33**
230.0	245.5	6.3	TG5302300	240.67 x 5.33
240.0	255.5	6.3	TG5302400	247.02 x 5.33
250.0	**265.5**	**6.3**	**TG5302500**	**266.07 x 5.30**
280.0	**301.0**	**8.1**	**TG5402800**	**291.47 x 7.00**
300.0	321.0	8.1	TG5403000	304.17 x 7.00
320.0	**341.0**	**8.1**	**TG5403200**	**329.57 x 7.00**
350.0	371.0	8.1	TG5403500	354.97 x 7.00
360.0	**381.0**	**8.1**	**TG5403600**	**367.67 x 7.00**
400.0	421.0	8.1	TG5404000	405.26 x 7.00
500.0	521.0	8.1	TG5405000	506.86 x 7.00*
600.0	621.0	8.1	TG5406000	608.08 x 7.00*
700.0	728.0	9.5	TG5507000	712.90 x 8.40*
800.0	828.0	9.5	TG5508000	812.90 x 8.40*
900.0	928.0	9.5	TG5509000	912.90 x 8.40*
1,000.0	1,028.0	9.5	TG55X1000	1,012.90 x 8.40*
1,500.0	1,528.0	9.5	TG55X1500	1,512.90 x 8.40*
2,000.0	2,028.0	9.5	TG55X9200	2,012.90 x 8.40*
2,500.0	2,528.0	9.5	TG55X2500	2,512.90 x 8.40*

The shaft diameters printed in **bold** type conform to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 2,200 mm diameter for Z53 and Z54 (2,600 mm for Z80) including inch sizes can be supplied.

* Theoretical ideal O-Ring size

■ Installation Recommendation for Bore

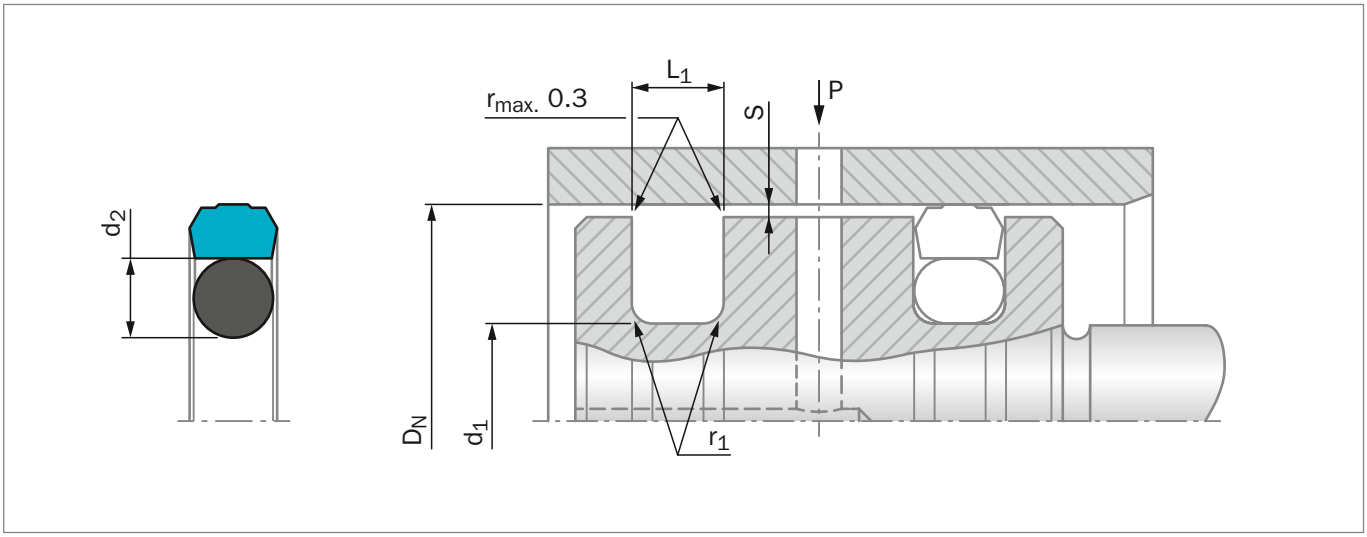


Figure 144 Installation Drawing

Table 98: Installation Dimensions – Standard Recommendations

Series Number	Bore Diameter D_N H9		Groove Diameter*	Groove Width	Radius	Radial Clearance S_{max}*		O-Ring Cross-Section-Ø
	Standard Range	Available Range	d_1 h9	L_1 +0.2	r_1	10 MPa	30 MPa	d_2
TG60	12 - 19.9	10 - 24.9	D_N - 4.9	2.20	0.40	0.20	-	1.78
TG61	20 - 39.9	14 - 69.9	D_N - 7.5	3.20	0.60	0.25	0.15	2.62
TG62	40 - 132.9	22 - 199.9	D_N - 11.0	4.20	1.00	0.30	0.20	3.53
TG63	133 - 255.9	40 - 329.9	D_N - 15.5	6.30	1.30	0.35	0.25	5.33
TG64	256 - 669.9	133 - 690.0	D_N - 21.0	8.10	1.80	0.40	0.25	7.00
TG65	670 - 999.9	670 - 999.9	D_N - 28.0	9.50	2.50	0.45	0.30	8.40
TG65X**	1,000 - 2,700	-	D_N - 28.0	9.50	2.50	0.45	0.30	8.40

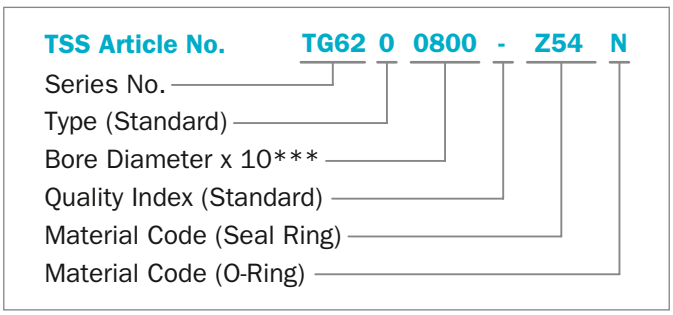
* For max. temperature = +60 °C at the seal.
** Z53 and Z54 max. ø 2,300 mm

ORDERING EXAMPLE

Zurcon® Roto Glyd Ring® S, complete with O-Ring, standard application:

Series:	TG62 from Table 98
Bore diamater:	D_N = 80.0 mm
TSS Part No.:	TG6200800 from Table 99

Select the material from Table 95. The corresponding code numbers are appended to the TSS Part No. Together they form the TSS Article No. The TSS Article No. for all intermediate sizes not shown in Table 99 can be determined following the example opposite.



*** For diameters DN ≥ 1,000.0 mm multiply only by factor 1.
Example: TG65X for diameter DN 1,200.0 mm
TSS Article No.: TG65**X1200** - Z54N.

Table 99: Standard Installation Dimensions / TSS Part Number

Bore Dia. D_N H9	Groove Dia. d_1 h9	Groove Width L_1 +0.2	TSS Part No.	O-Ring Sizes
12.0	**7.1**	**2.2**	**TG6000120**	**7.10 x 1.80**
14.0	9.1	2.2	TG6000140	9.25 x 1.78
15.0	10.1	2.2	TG6000150	10.60 x 1.80
16.0	**11.1**	**2.2**	**TG6000160**	**11.20 x 1.80**
18.0	13.1	2.2	TG6000180	13.20 x 1.80
20.0	**12.5**	**3.2**	**TG6100200**	**12.37 x 2.62**
22.0	14.5	3.2	TG6100220	14.50 x 2.65
25.0	**17.5**	**3.2**	**TG6100250**	**18.00 x 2.65**
28.0	20.5	3.2	TG6100280	20.29 x 2.65
30.0	22.5	3.2	TG6100300	23.47 x 2.65
32.0	24.5	3.2	TG6100320	25.07 x 2.65
35.0	27.5	3.2	TG6100350	28.24 x 2.65
40.0	**29.0**	**4.2**	**TG6200400**	**29.75 x 3.53**
42.0	31.0	4.2	TG6200420	31.35 x 3.53
45.0	34.0	4.2	TG6200450	34.52 x 3.53
48.0	37.0	4.2	TG6200480	37.69 x 3.53
50.0	**39.0**	**4.2**	**TG6200500**	**40.87 x 3.53**
52.0	41.0	4.2	TG6200520	40.87 x 3.53
55.0	44.0	4.2	TG6200550	44.04 x 3.53
56.0	45.0	4.2	TG6200560	47.22 x 3.53
60.0	49.0	4.2	TG6200600	50.39 x 3.53
63.0	**52.0**	**4.2**	**TG6200630**	**53.57 x 3.53**
65.0	54.5	4.2	TG6300650	56.74 x 5.33
80.0	**69.0**	**4.2**	**TG6200800**	**69.44 x 3.53**
85.0	74.0	4.2	TG6200850	75.79 x 3.53
90.0	79.0	4.2	TG6200900	78.97 x 3.53
95.0	84.0	4.2	TG6200950	85.32 x 3.53
100.0	**89.0**	**4.2**	**TG6201000**	**91.67 x 3.53**
110.0	99.0	4.2	TG6201100	101.19 x 3.53
115.0	104.0	4.2	TG6201150	104.37 x 3.53
120.0	109.0	4.2	TG6201200	110.72 x 3.53
125.0	**114.0**	**4.2**	**TG6201250**	**117.07 x 3.53**
130.0	119.0	4.2	TG6201300	120.24 x 3.53
135.0	119.5	6.3	TG6301350	120.02 x 5.33
140.0	124.5	6.3	TG6301400	126.37 x 5.33
150.0	134.5	6.3	TG6301500	135.89 x 5.33
160.0	**144.5**	**6.3**	**TG6301600**	**145.42 x 5.33**
170.0	154.5	6.3	TG6301700	158.12 x 5.33
180.0	164.5	6.3	TG6301800	164.47 x 5.33
190.0	174.5	6.3	TG6301900	177.17 x 5.33
200.0	**184.5**	**6.3**	**TG6302000**	**189.87 x 5.33**
210.0	194.5	6.3	TG6302100	196.22 x 5.33
220.0	204.5	6.3	TG6302200	208.92 x 5.33
230.0	214.5	6.3	TG6302300	215.27 x 5.33
240.0	224.5	6.3	TG6302400	227.92 x 5.33
250.0	**234.5**	**6.3**	**TG6302500**	**240.67 x 5.33**
280.0	259.0	8.1	TG6402800	266.07 x 7.00
300.0	279.0	8.1	TG6403000	278.77 x 7.00
320.0	**299.0**	**8.1**	**TG6403200**	**304.17 x 7.00**
350.0	329.0	8.1	TG6403500	329.57 x 7.00
400.0	**379.0**	**8.1**	**TG6404000**	**380.37 x 7.00**
420.0	399.0	8.1	TG6404200	405.26 x 7.00
450.0	429.0	8.1	TG6404500	430.66 x 7.00
480.0	459.0	8.1	TG6404800	468.76 x 7.00
500.0	**479.0**	**8.1**	**TG6405000**	**481.38 x 7.00**
600.0	579.0	8.1	TG6406000	582.68 x 7.00
700.0	672.0	9.5	TG6507000	670.00 x 8.40*
800.0	772.0	9.5	TG6508000	770.30 x 8.40*
900.0	872.0	9.5	TG6509000	870.30 x 8.40*
1,000.0	972.0	9.5	TG65X1000	970.30 x 8.40*
1,500.0	1,472.0	9.5	TG65X1500	1,470.30 x 8.40*
2,000.0	1,972.0	9.5	TG65X2000	1,970.30 x 8.40*
2,500.0	2,472.0	9.5	TG65X2500	2,470.30 x 8.40*

The bore diameters printed in **bold** type conform to the recommendations of ISO 3320.

Other dimensions and all intermediate sizes up to 2,300 mm diameter for Z53 and Z54 (2,700 mm for Z80) including inch sizes can be supplied.

* Theoretical ideal O-Ring size