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.

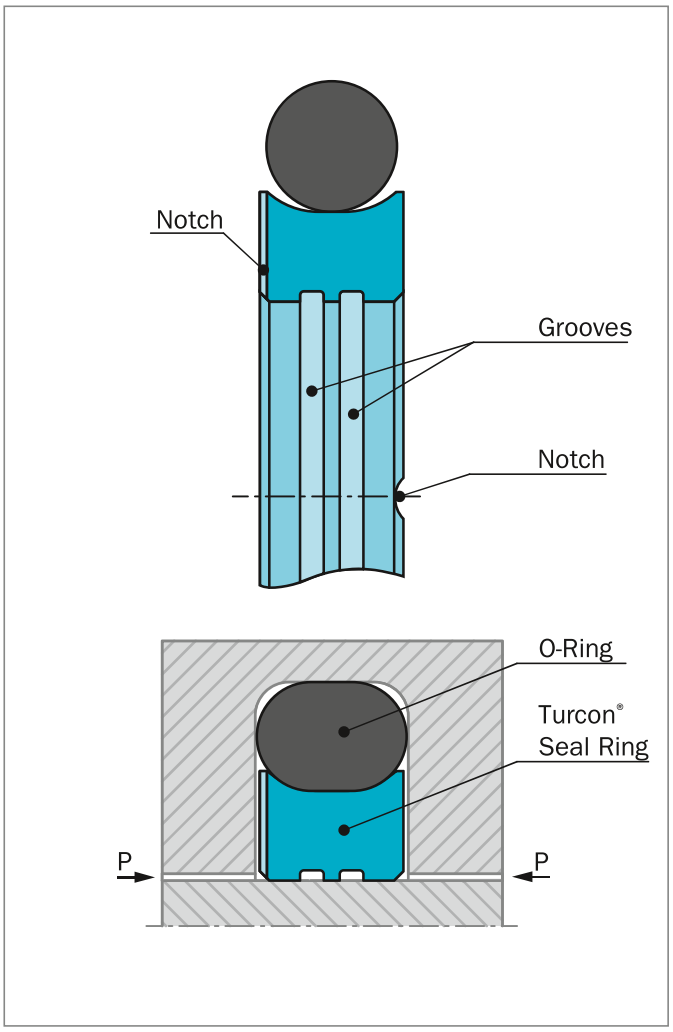


Figure 124: Turcon® Roto Glyd Ring®

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.

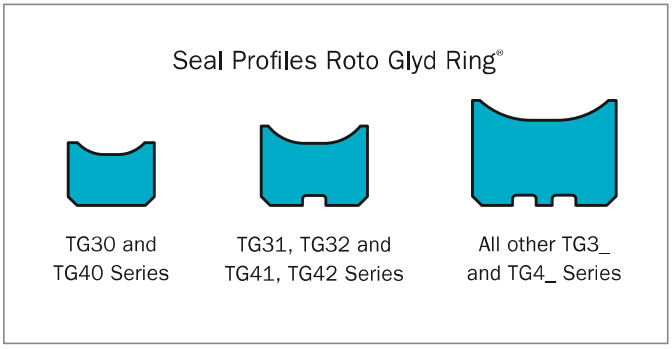


Figure 125: Crosssection profiles depending on Series No.

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:

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

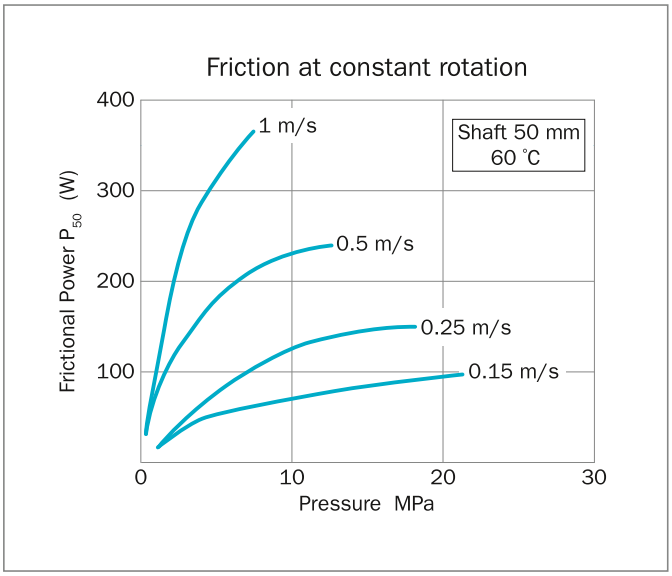


Figure 126: Frictional power for Turcon® Roto Glyd Ring®

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

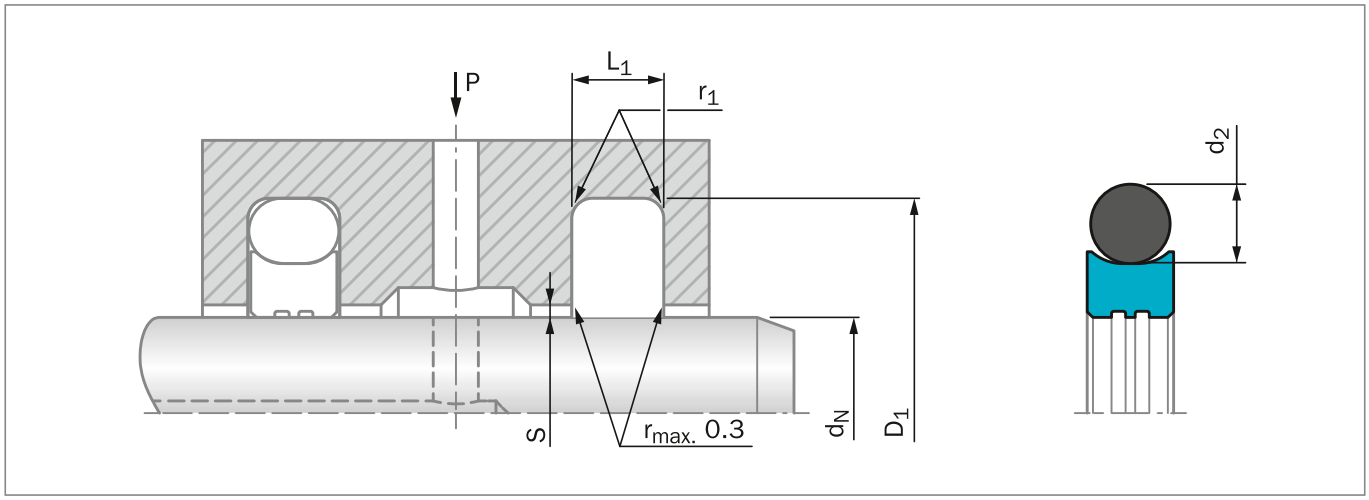


Figure 127: Installation Drawing

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

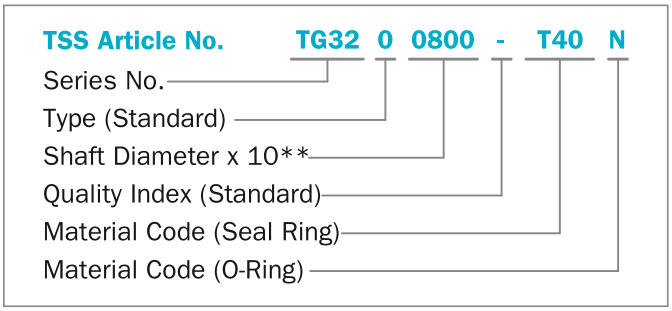
* At pressures **> 30 MPa**: Use diameter tolerance H8/f8 (bore/shaft) in area of seal.
At pressures **> 10 MPa** it is recommendable to choose the next larger cross section according to the column "Available range"
i.e. for shaft ø d_n = 80 mm: TG33 00 800-.

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.



** 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

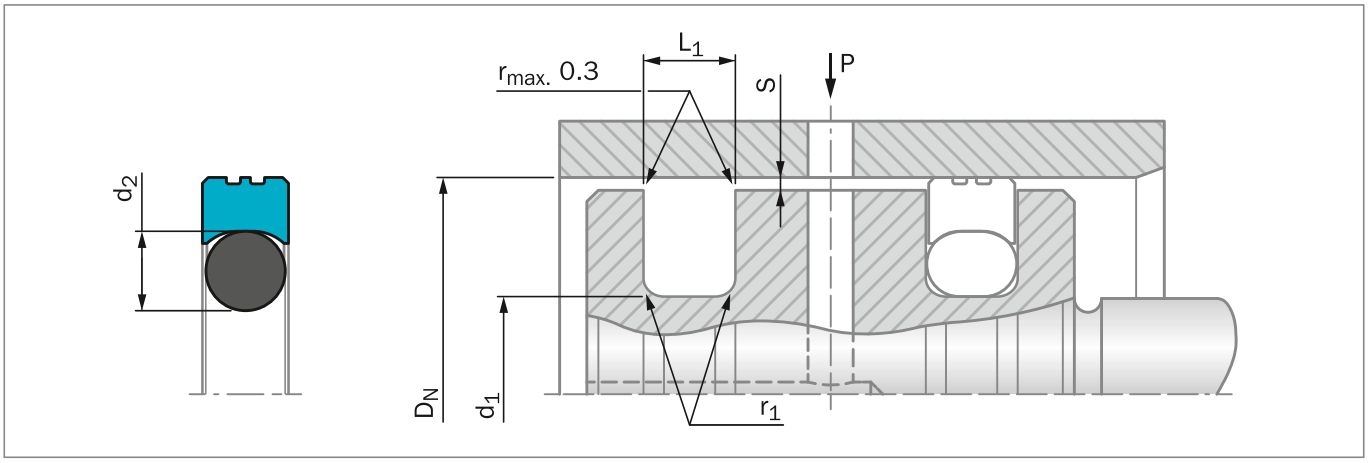


Figure 128: Installation Drawing

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.

TSS Article No. **TG42 0 0800 - T40 N**

- Series No. (TG42)
- Type (Standard) (0)
- Bore Diameter x 10** (0800)
- Quality Index (Standard) (-)
- Material Code (Seal Ring) (T40)
- Material Code (O-Ring) (N)

** 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.