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.

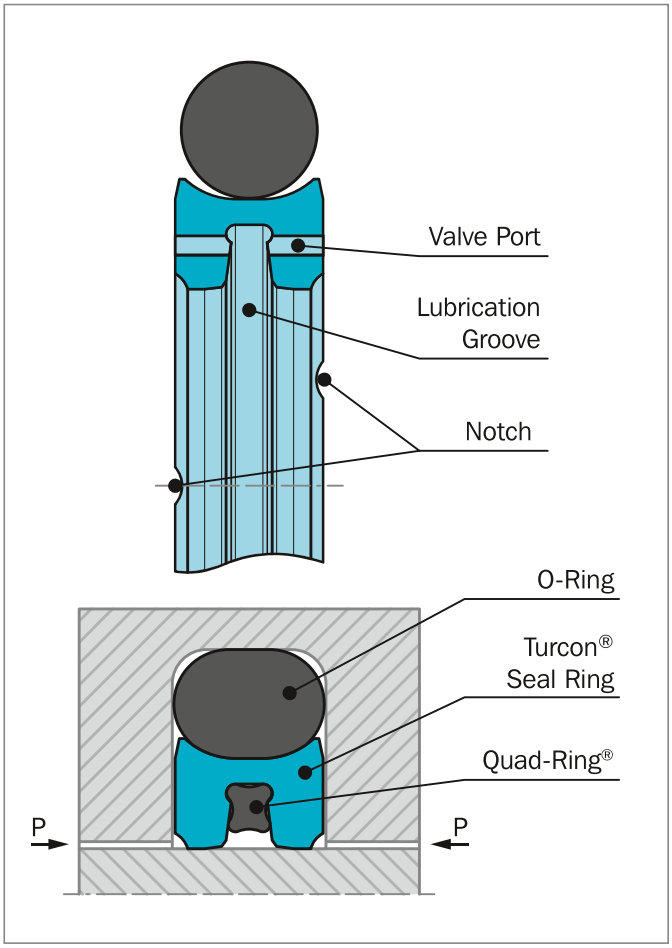

Figure 133 Turcon® Roto Glyd Ring® V with pressure relief

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.

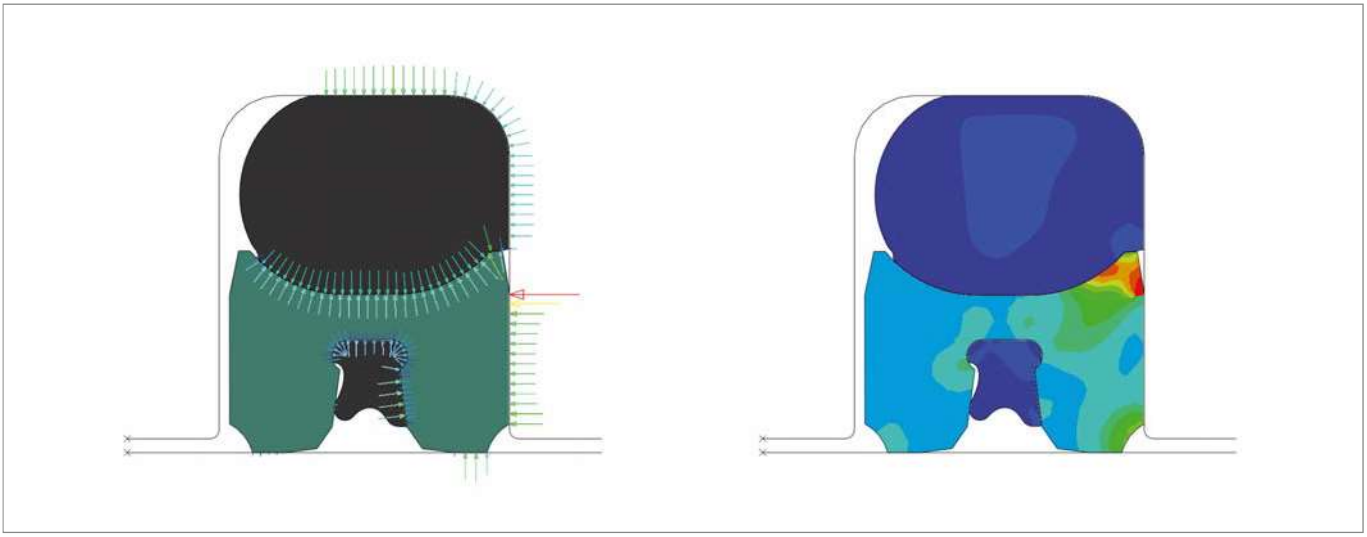

Figure 134 Turcon® Roto Glyd Ring® V - Finite Element Analysis (FEA).

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.

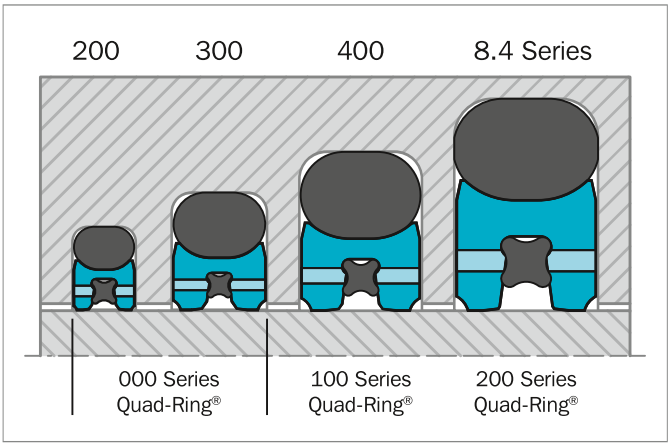

Figure 135 Cross-section profiles of available standard seal series for shaft and bore sealing dependent on Series No.

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

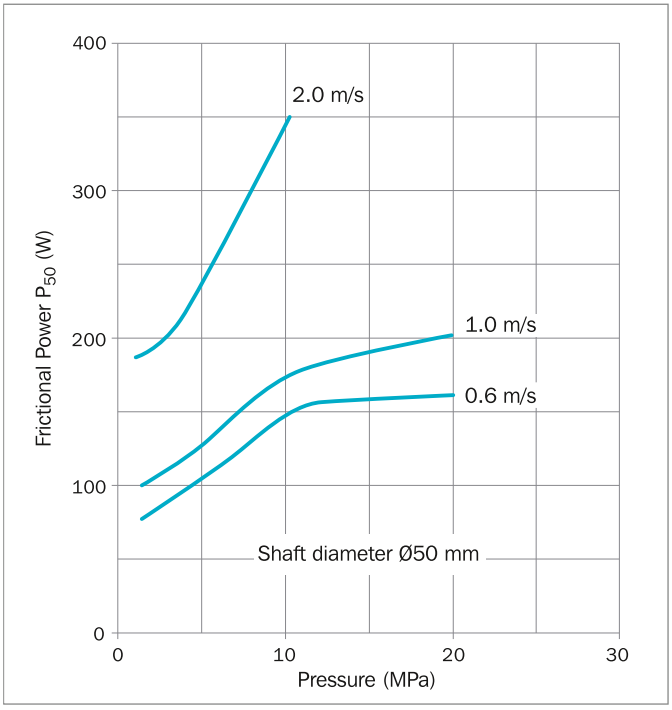

Figure 136 Frictional power for Turcon® Roto Glyd Ring® V in Turcon® M15

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

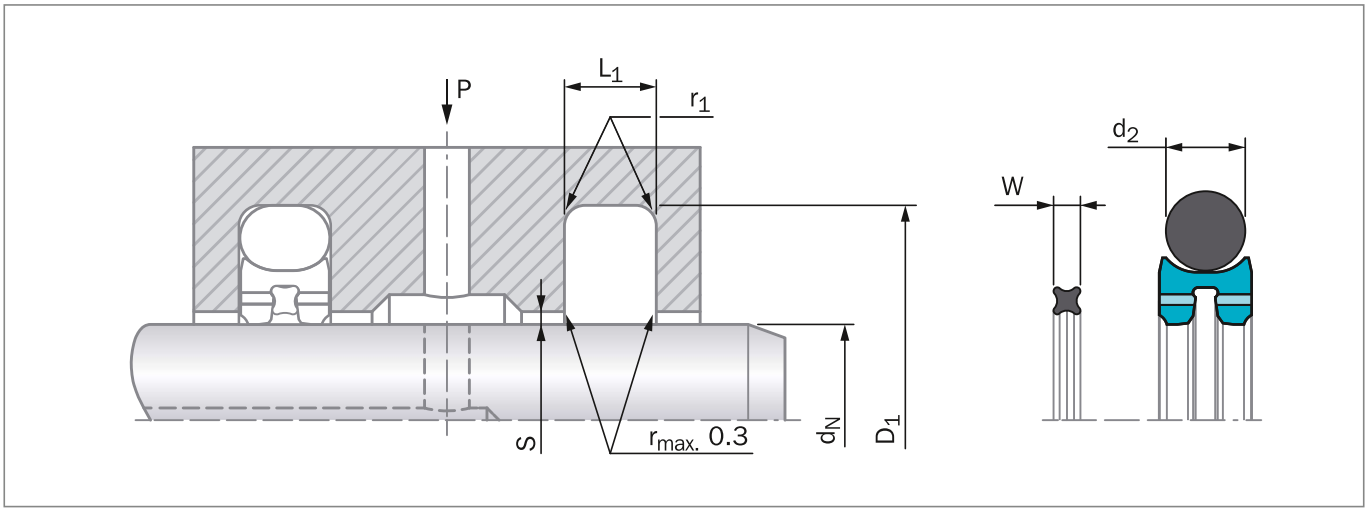

Figure 137 Installation Drawing

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 d_N f8/h9	Groove Diameter D_1 H9	Groove Width L_1 +0.2	TSS Part No.	O-Ring Dimension	Quad-Ring® Dimension
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

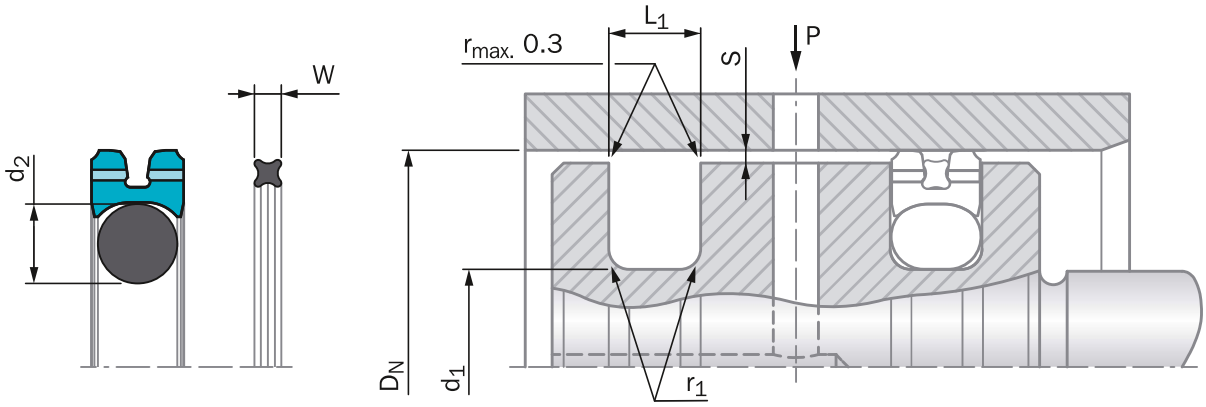

Figure 138 Installation Drawing

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**

- TG83 – Series No.
- 0 – Type (Standard)**
- 0800 – Bore Diameter x 10***
- M15 – Quality Index (Standard)
- N – 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.