TRELLEBORG
SEALING SOLUTIONS

TECHNICAL BULLETIN

CAPTIVE GLYD RING®
AND CAPTIVE SLYDRING®

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In case you have questions please contact:

Trelleborg Sealing Solutions Helsingør
Birger Dühring, Manager Technical Department
Tel.: +45 4927 0333
Email: birger.duhring@trelleborg.com

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Contents

The information in this Introduction is based on many decades of experience in the manufacture and application of sealing and bearing systems. However, unknown parameters and conditions may restrict general statements during usage. It is vital that Customers satisfy themselves as to the suitability of individual products through adequate testing. For this reason, and due to the wide range of applications of our products, Trelleborg Sealing Solutions can accept no liability as to the suitability or correctness of our recommendations in individual cases. The application limits for pressure, temperature, speed and media given in this Introduction are maximum values determined in the laboratory. During practical applications it should be remembered that due to the interaction of the operating parameters, the maximum values must be set correspondingly lower.
For exceptional operating conditions, please contact your Trelleborg Sealing Solutions representative.

CAPTIVE GLYD RING®
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Captive Seal and Bearing Concept

Introduction

In applications where seals and bearings are moving across surfaces that have a changing diameter, it is necessary to retain the seals and bearings firmly in the grooves to ensure they are not damaged by metal parts. Examples of such applications are where piston seals are moved in and out of cylinder bores or piston rods are travelling in and out of the rod seal areas.

To retain a seal, like an O-Ring activated Turcon® Glyd Ring® in its groove requires special designs of both seal and groove, see figure 3.

Bearing strip such as Turcite® Slydring® must be mounted in a dovetail groove to make sure it does not part from the piston or gland.

Preformed HiMod® and Orkot® Slydring® are mounted in standard grooves as they in free stage maintain sufficiently tight to the groove bottom.

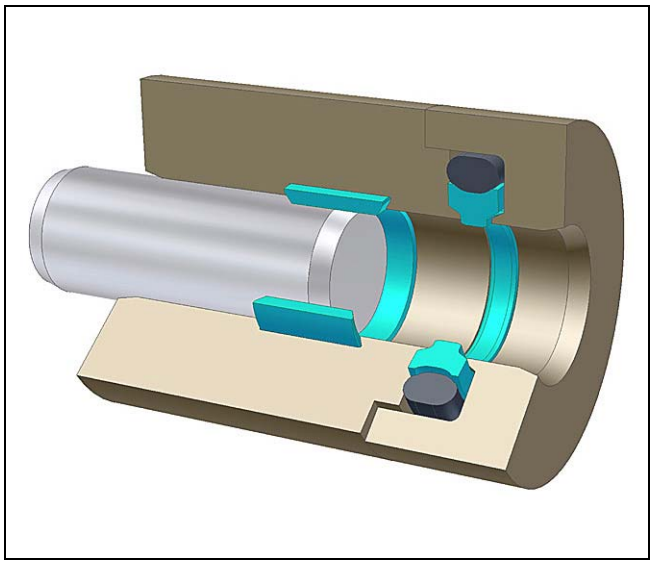

Figure 1 Example of diameter variation of rod.

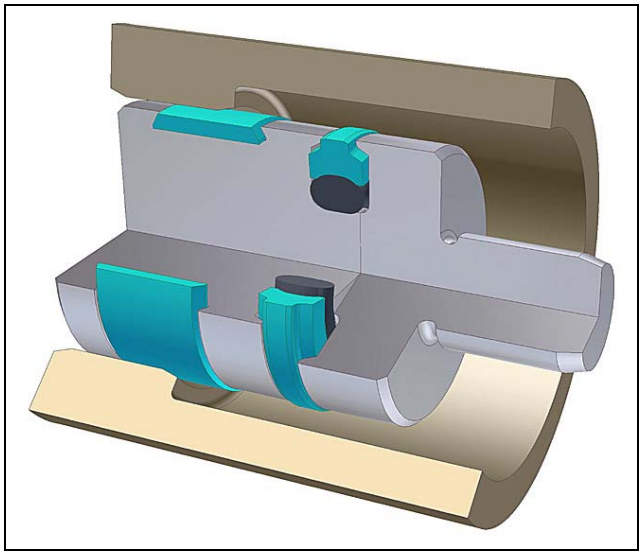

Figure 2 Example of diameter variation of piston.

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Turcon® Captive Glyd Ring®

Description

Turcon® Glyd Ring® is usually recommended as a bi-directional seal for all types of pistons and rods. However, in some applications the Glyd Ring® has to slide across mating surfaces that have dimensional changes e.g. go from a small diameter with sealing function over the seal to a large diameter with no sealing function or vice versa.

This can potentially deform, damage or even destroy the Glyd Ring® or other seal types, as they may be pressed out of the groove by the O-Ring or the system pressure.

In such applications the Turcon® Captive Glyd Ring® is the best option.

This Glyd Ring® version, shown in figure 3, is retained in a specially designed split groove. The groove prevents the sealing surface from getting damaged by a counter part with variable diameter or when passing holes.

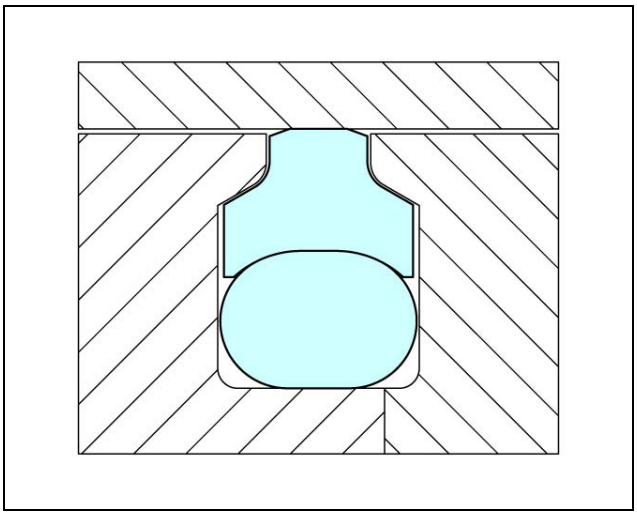

Figure 3 Captive Glyd Ring®

Advantages

- Same basic function as Turcon® Glyd Ring®
- Protected from diameter variations of counterpart
- Passes over holes in mating surface
- For linear, helical and rotary service
- Increased sealing effect and reduced friction due to narrow contact area
- Easy mounting in split groove

Applications

The applications for the Turcon® Captive Glyd Ring® are numerous and extend the field of applications of the Turcon® Glyd Ring®:

- Valves
- Connectors
- Offshore wave compensators
- Down-hole drilling motors
- Pressure boosters
- Piston cushioning in cylinders
- Jacks
- Telescopic cylinders
- Filling machines

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Technical Data

Operating conditions:
The Turcon® Glyd Ring® is recommended for reciprocating movements. Helical and slow turning service is possible.

Pressure:	Up to 70 MPa
Speed:	Up to 15 m/s
Frequency:	Up to 5 Hz.
Temperature:	-45 °C to +200 °C (depending on O-Ring Material)
Media:	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids HFC, environmentally safe hydraulic fluids (biological degradable oils), water, air and others. Depending on compatibility of the O-Ring material.
Clearance:	The maximum permissible radial clearance S_{max} is shown in table IV for Rod and table VI for piston, as a function of the operating pressure and functional diameter.

Important Note:

The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.

Material

Zurcon® Z51, hard polyurethane, is the preferred seal material because of its very high abrasion resistance. Temperature limit is +110 °C. Only for Mineral oil.

Zurcon® Z80 with good abrasion resistance is recommended for most fluids and gases Temperature limit is +80 °C.

Turcon® materials are used in higher temperature applications see table I.

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Captive Glyd Ring® Materials

Table I Materials for Turcon® Captive Glyd Ring®

Material, Applications, Properties	Code	O–Ring Material	Code	O-Ring Operating Temp.* ° C	Mating Surface Material	MPa max.
Turcon® T19 For lubricating fluids. Linear and rotary motion For high frequency and short strokes High sealing efficiency Excellent sliding and wear properties Very low friction Mild to counter surface Mineral fibre filled Colour: Dark green-grey	**T19**	NBR - 70 Shore A	N	-30 to +100	Steel (tubes) Steel hardened Steel chrome plated (rod) Cast iron Aluminium tubes	30
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM – 70 Shore A	V	-10 to +200		
Turcon® T29*** For lubricating and non-lubricating hydraulic fluids Linear and rotary motion Good extrusion resistance Surface texture not suitable for gas sealing Not for electrical conducting fluids High carbon fibre filled Colour: Grey	**T29**	NBR - 70 Shore A	N	-30 to +100	Steel Steel hardened Steel chrome plated (rod) Cast iron Stainless steel Aluminium Bronze	40
		NBR – Low temp. 70 Shore A	T	-45 to +80		
		FKM-70 Shore A	V	-10 to +200		
		Xplor H9T20 (HNBR) 95 Shore A	***	-30 to +175		
		Xplor V9T20 (FKM) 90 Shore A	***	-20 to +230		
		Xplor J9513 (FFKM) 95 Shore A	***	-10 to +260		
Turcon® T40 For lubricating and non-lubricating fluids Linear and rotary motion High frequency and short strokes **Water hydraulics** Surface texture not suitable for gas sealing Carbon fibre filled Colour: Grey.	**T40**	NBR - 70 Shore A	N	-30 to +100	Steel Steel chrome plated (rod) Cast iron Stainless steel Aluminium Bronze Alloys	30
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +200		
		EPDM-70 Shore A	E**	-45 to +145		
Turcon® T46 **Standard material** for lubricated hydraulics in linear motion High compressive strength High extrusion resistance Very good sliding and wear properties BAM tested Bronze filled Colour: Light to dark brown, which may have variations in shading.	**T46**	NBR - 70 Shore A	N	-30 to +100	Steel (tubes) Steel hardened Steel chrome plated (rod) Cast iron	60
		NBR – Low temp. 70 Shore A	T	-45 to +80		
		FKM - 70 Shore A	V	-10 to +200		

* *The O-Ring operation temperature is only valid in mineral hydraulic oil (except for EPDM).*

** *Material not suitable for mineral oils.*

*** *Material in compliance with **Norsok M710** specification*

BAM: Tested by "Bundes Anstalt Materialprüfung, Germany"

Highlighted materials are preferred.

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Material, Applications, Properties	Code	O–Ring Material	Code	O-Ring Operating Temp.* ° C	Mating Surface Material	MPa max.
Zurcon® Z51 For mineral oil based fluids Linear and slowly turning movements **Very high abrasion and extrusion resistance** For counter surface with rougher surface finish Limited chemical resistance Max. working temperature 110 °C Cast polyurethane Colour: Yellow to light-brown.	**Z51**	NBR - 70 Shore A	N	-30 to +100	Steel Steel hardened Steel chrome plated (rod) Cast iron Stainless steel Ceramic coating	70
		NBR - Low temp. 70 Shore A	T	-45 to +80		
Zurcon® Z52 For mineral oil based fluids Linear and slowly turning movements High abrasion resistance For counter surface with rougher surface finish Good extrusion resistance Limited chemical resistance Max. working temperature 110 °C Cast polyurethane Colour: Turquoise.	**Z52**	NBR - 70 Shore A	N	-30 to +100	Steel Steel hardened Steel chrome plated (rod) Cast iron Stainless steel Aluminium Bronze Ceramic coating	30
		NBR - Low temp. 70 Shore A	T	-45 to +80		
Zurcon® Z80 For lubricating and non-lubricating fluids, air and gases High abrasion and extrusion resistance Good chemical resistance Linear and slowly turning movements Limited temperature capability (max. 80 °C) UHMWPE (Ultra High Molecular Weight Polyethylene) Colour: White to off-white.	**Z80**	NBR - 70 Shore A	N	-30 to +80	Steel Steel hardened Steel chrome plated (rod) Stainless steel Aluminium Bronze Ceramic coating	45
		NBR - Low temp. 70 Shore A	T	-45 to +80		
		EPDM-70 Shore A	E**	-45 to +80		

* *The O-Ring operation temperature is only valid in mineral hydraulic oil (except for EPDM).*

** *Material not suitable for mineral oils.*

*** *Material in compliance with **Norsok M710** specification*

BAM: Tested by "Bundes Anstalt Materialprüfung, Germany"

Highlighted materials are preferred.

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Pressure Activation Ports

In applications where Turcon® Captive Glyd Ring® is exposed to rapid changes in pressure from two sides, pressure activation ports are recommended, see figure 4.

The function of the holes is like the notch on a Turcon® Glyd Ring® i.e. it ensures that the seal is pressurized during rapid change of pressure, preventing blow-by.

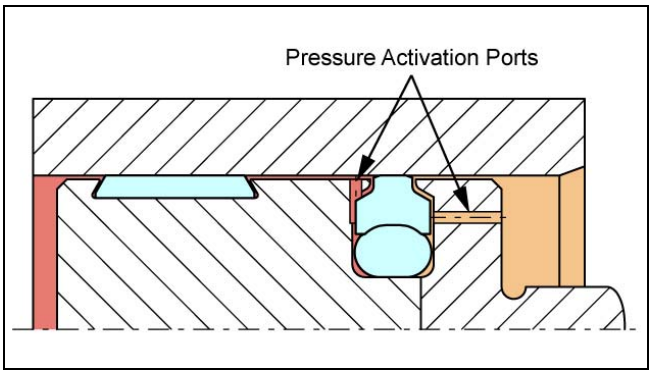

Figure 4 Pressure Activation Ports

Lead-in Chamfers

Where Turcon® Captive Glyd Ring® is moving across mating surfaces with dimensional variation the angle of lead-in chamfers should be as small as possible and not exceed 15 degrees.

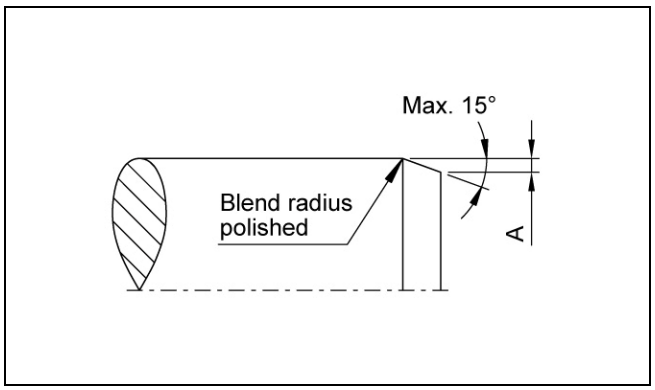

Figure 5 Lead-in chamfers Rod

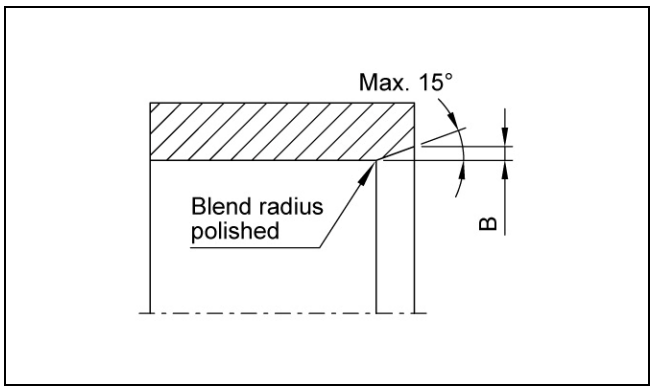

Figure 6 Lead-in chamfers Piston

Table II

	Min. distance mm A
RGC1	0.6
RGC2	0.6
RGC3	0.8
RGC4	0.8
RGC5	1.0
RGC6	1.5

Table III

	Min. distance mm B
PGC1	0.6
PGC2	0.6
PGC3	0.8
PGC4	0.8
PGC5	1.0
PGC6	1.5

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Passing Holes

The Captive Glyd Ring® is suitable for passing over holes in the counter surface. The diameter of the hole must be smaller than the width of the contact area of the seal, see Table III, and has broken edges following the same rules as “Lead-in chamfers”. It is preferable to divide the hole into several smaller holes.

Table III Maximum size of holes in counter surface

Captive Glyd Ring®	Max. diameter of hole mm
PGC1 / RGC1	0.5
PGC2 / RGC2	0.6
PGC3 / RGC3	1.0
PGC4 / RGC4	1.1
PGC5 / RGC5	2.0
PGC6 / RGC6	2.8

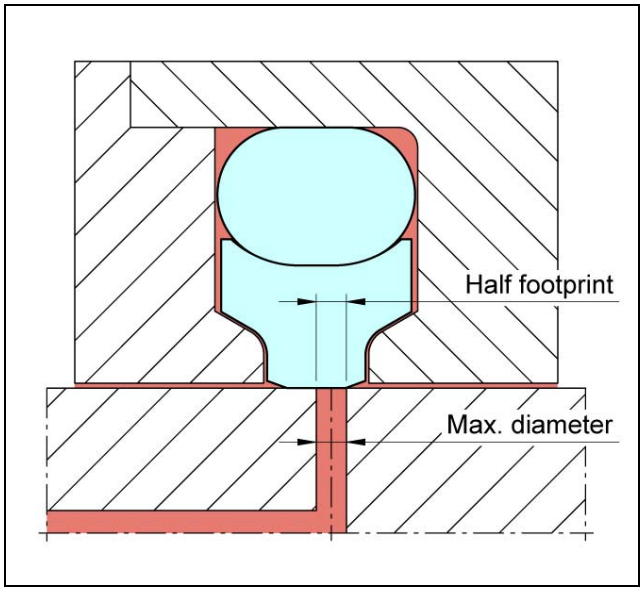

Figure 7 Half footprint = Max. hole diameter

Care should be taken if the seal passes holes at high differential fluid pressure as the seal surface may get damaged.

Preferably holes should be placed in circumferential grooves according to figure 8. This is a requirement if the hole diameter is bigger than stated in table III.

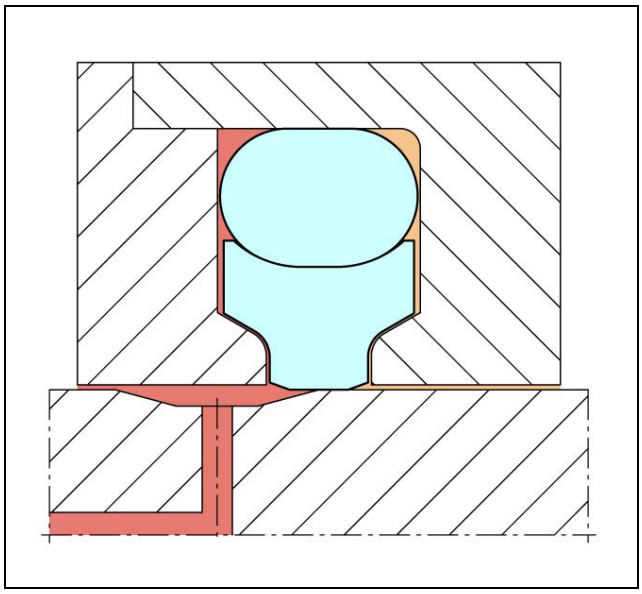

Figure 8 Holes in counter surface placed in grooves

Seal Groove Description

The Turcon® Captive Glyd Ring® uses a “split” groove design. The installation dimensions are included in figure 11 for ID seals, and figure 12 for OD seals.

To retain this seal in the groove each seal series operates with two groove widths, which have been assigned L_1 and L_2. L_2 indicates the smallest groove width.

There are also two different groove diameters for each series:
- For ID seals $øD_1$ and $øD_3$ (see figure 11)
- For OD seals $ød_1$ and $ød_3$ (see figure 12)

The groove diameter with suffix 3 indicates the diameter nearest the mating surface.

Captive Glyd Ring® is available as a standard seal on the following Part Numbers:
ID seals: RGC1 to RGC6 (see table IV)
OD seals: PGC1 to PGC6 (see table VI)

The last figure in the number designates the O-Ring series (e.g. 1 for 100 series).

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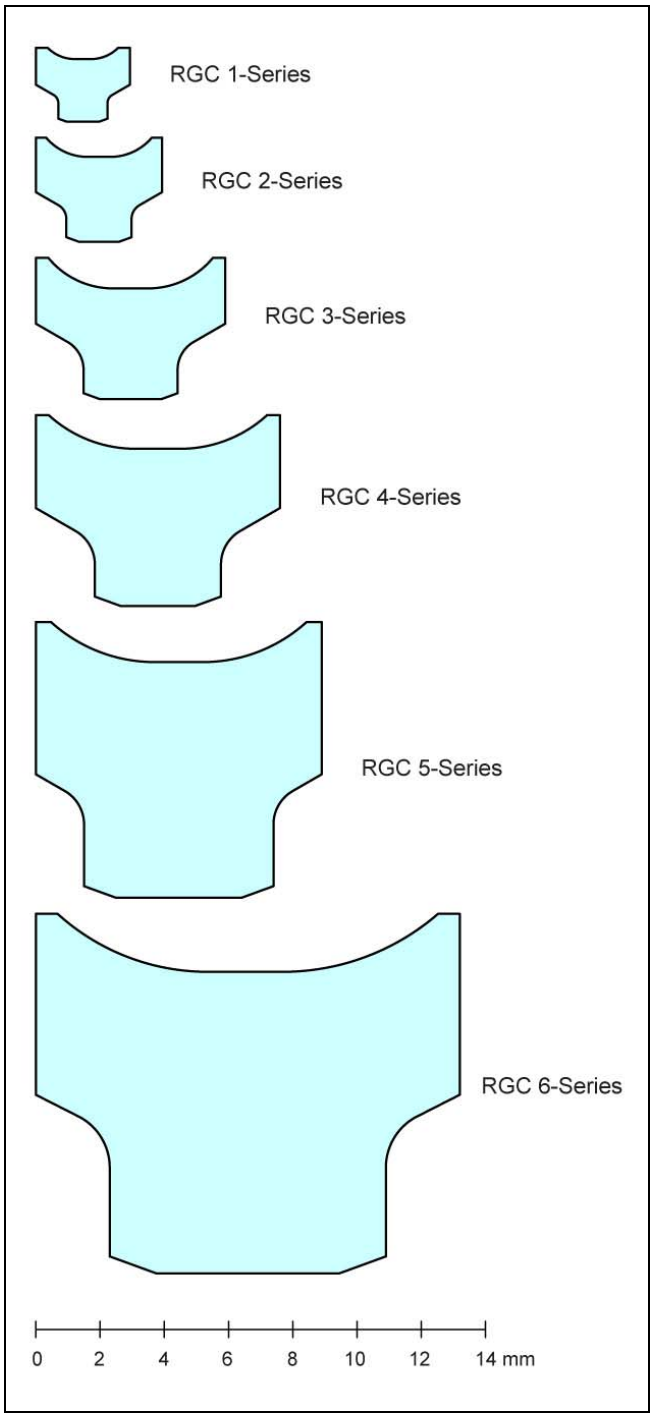

Figure 9 Rod seal profiles

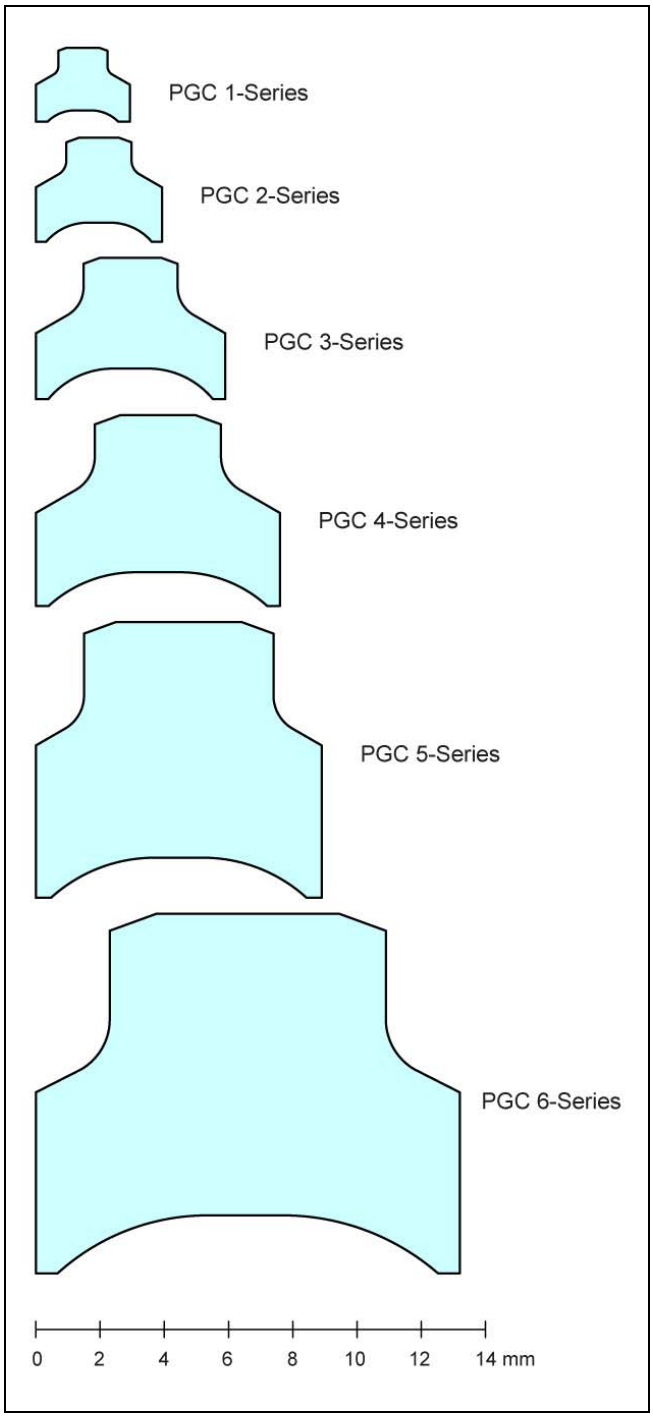

Figure 10 Piston seal profiles

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Captive Glyd Ring® Rod Installation Recommendation

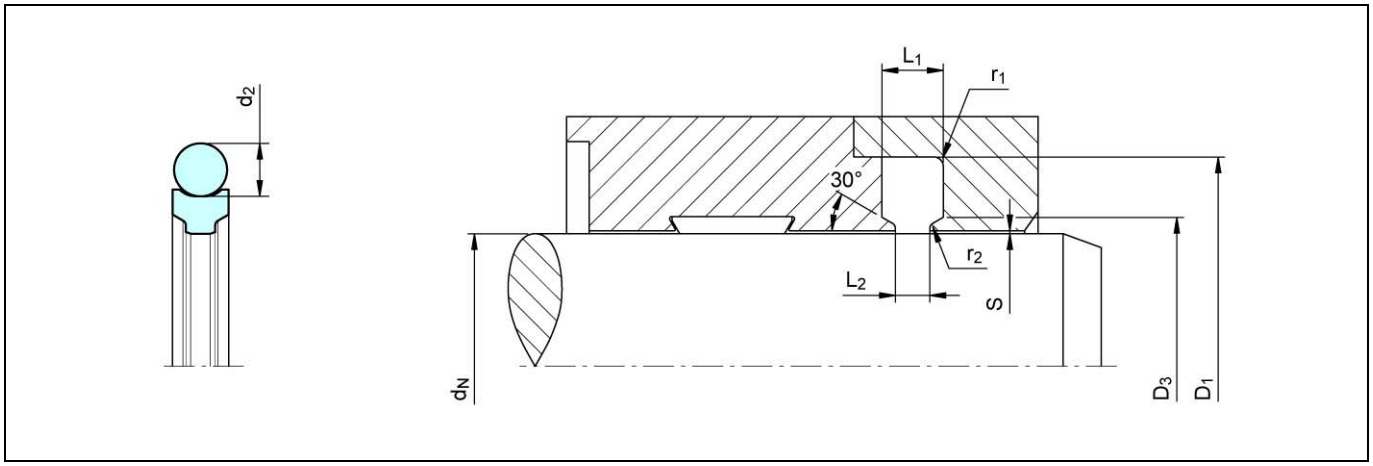


Figure 11 Installation Drawing

Table IV Installation Dimensions for Rod

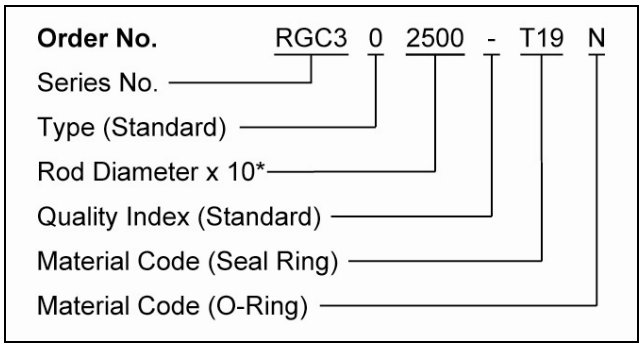
Part No.	Recommended Range d_N f8/h8	Available Range d_N f8/h8	D_1 Groove Diameter H9	D_3 Groove Diameter +0/-0.1	L_1 Groove Width +0.2/-0	L_2 Groove Width +0.2/-0	r_1 max.	r_2 +/-0.05	Radial Clearance S_{max}				O-Ring Cross-Section d_2
									0 MPa	10 MPa	20 MPa	40 MPa	
RGC1	6.0 - 59.9	6.0 – 250.0	d_N +8.0	d_N +1.6	3.2	1.8	0.5	0.3	0.60	0.35	0.20	0.15	2.62
RGC2	60.0 - 132.9	10.0 - 455.0	d_N +11.0	d_N +2.4	4.2	2.2	0.7	0.5	0.70	0.40	0.25	0.20	3.53
RGC3	133.0 - 329.9	30.0 - 660.0	d_N +15.5	d_N +3.8	6.3	3.2	0.8	1.0	0.80	0.50	0.30	0.20	5.33
RGC4	330.0 - 654.9	110.0 - 660.0	d_N +21.0	d_N +5.2	8.1	4.2	0.8	1.2	0.90	0.60	0.35	0.25	7.00
RGC5	650.0 - 999.9	650.0 - 999.9	d_N +28.0	d_N +6.8	10.0	6.8	0.8	1.2	1.00	0.70	0.45	0.30	8.40
RGC6	1000.0 - 2500.0	750.0 - 2500.0	d_N +38.0	d_N +9.2	13.8	9.2	1.2	1.8	1.40	1.00	0.70	0.55	12.00

Ordering Example

Turcon® Captive Glyd Ring® complete with O-Ring standard application; Series RGC3 from Table IV.

Rod diameter: d_N = 250.0 mm.
Part No.: RGC302500.
Select the material from table I.

The corresponding code numbers are appended to the Part No. Together these form the order number. The order number can be determined following the example to the right.



* *For diameters ≥ 1000.0 mm multiply only by factor 1.*
Example: RGC6X1200 for diameter 1200.0 mm.
Order no.: RGC6X1200-T19N.

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Table V Standard Installation Dimensions/Part No.

Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
6.0	14.0	3.2	RGC100060	9.19 x 2.62
8.0	16.0	3.2	RGC100080	10.77 x 2.62
10.0	18.0	3.2	RGC100100	12.37 x 2.62
10.0	21.0	4.2	RGC200100	13.87 x 3.53
12.0	20.0	3.2	RGC100120	15.54 x 2.62
14.0	22.0	3.2	RGC100140	17.12 x 2.62
15.0	23.0	3.2	RGC100150	18.72 x 2.62
15.0	26.0	4.2	RGC200150	20.22 x 3.53
16.0	24.0	3.2	RGC100160	18.72 x 2.62
18.0	26.0	3.2	RGC100180	21.89 x 2.62
20.0	28.0	3.2	RGC100200	23.47 x 2.62
20.0	31.0	4.2	RGC200200	25.00 x 3.53
22.0	30.0	3.2	RGC100220	25.07 x 2.62
22.0	33.0	4.2	RGC200220	26.58 x 3.53
24.0	32.0	3.2	RGC100240	26.64 x 2.62
25.0	33.0	3.2	RGC100250	28.24 x 2.62
25.0	36.0	4.2	RGC200250	29.75 x 3.53
25.4	33.4	3.2	RGC100254	28.24 x 2.62
25.4	36.4	4.2	RGC200254	29.75 x 3.53
26.0	34.0	3.2	RGC100260	29.82 x 2.62
26.0	37.0	4.2	RGC200260	29.75 x 3.53
27.0	35.0	3.2	RGC100270	29.82 x 2.62
28.0	36.0	3.2	RGC100280	31.42 x 2.62
28.0	39.0	4.2	RGC200280	32.92 x 3.53
28.575	36.6	3.2	RGC100286	31.42 x 2.62
29.0	37.0	3.2	RGC100290	32.99 x 2.62
30.0	38.0	3.2	RGC100300	32.99 x 2.62
30.0	41.0	4.2	RGC200300	34.52 x 3.53
30.0	45.5	6.3	RGC300300	34.29 x 5.33
32.0	40.0	3.2	RGC100320	34.59 x 2.62
32.0	43.0	4.2	RGC200320	36.09 x 3.53
35.0	43.0	3.2	RGC100350	37.77 x 2.62
35.0	46.0	4.2	RGC200350	40.87 3.53

Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
36.0	44.0	3.2	RGC100360	39.34 x 2.62
36.0	47.0	4.2	RGC200360	40.87 x 3.53
38.0	49.0	4.2	RGC200380	40.87 x 3.53
38.0	53.5	6.3	RGC300380	43.82 x 5.33
39.0	50.0	4.2	RGC200390	44.04 x 3.53
40.0	51.0	4.2	RGC200400	44.04 x 3.53
40.0	55.5	6.3	RGC300400	46.99 x 5.33
42.0	53.0	4.2	RGC200420	47.22 x 3.53
42.0	57.5	6.3	RGC300420	46.99 x 5.33
44.0	55.0	4.2	RGC200440	47.22 x 3.53
44.4	59.9	6.3	RGC300444	50.17 x 5.33
45.0	56.0	4.2	RGC200450	50.39 x 3.53
45.0	60.5	6.3	RGC300450	50.17 x 5.33
48.0	59.0	4.2	RGC200480	53.57 x 3.53
48.0	63.5	6.3	RGC300480	53.34 x 5.33
50.0	61.0	4.2	RGC200500	53.57 x 3.53
50.0	65.5	6.3	RGC300500	56.52 x 5.33
50.8	61.8	4.2	RGC200508	53.57 x 3.53
50.8	66.3	6.3	RGC300508	56.52 x 5.33
52.0	63.0	4.2	RGC200520	56.74 x 3.53
52.0	67.5	6.3	RGC300520	56.52 x 5.33
54.0	69.5	6.3	RGC300540	59.69 x 5.33
55.0	66.0	4.2	RGC200550	59.92 x 3.53
55.0	70.5	6.3	RGC300550	59.69 x 5.33
56.0	67.0	4.2	RGC200560	59.92 x 3.53
56.0	71.5	6.3	RGC300560	62.87 x 5.33
58.0	73.5	6.3	RGC300580	62.87 x 5.33
60.0	71.0	4.2	RGC200600	63.09 x 3.53
60.0	75.5	6.3	RGC300600	66.04 x 5.33
63.0	74.0	4.2	RGC200630	66.27 x 3.53
63.0	78.5	6.3	RGC300630	69.22 x 5.33
65.0	80.5	6.3	RGC300650	72.39 x 5.33
67.0	78.0	4.2	RGC200670	72.62 x 3.53

** For groove diameter D_3 and groove width L_2 see table IV*

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Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
70.0	81.0	4.2	RGC200700	75.79 x 3.53
70.0	85.5	6.3	RGC300700	75.57 x 5.33
72.0	83.0	4.2	RGC200720	75.79 x 3.53
75.0	86.0	4.2	RGC200750	78.97 x 3.53
75.0	90.5	6.3	RGC300750	81.92 x 5.33
80.0	91.0	4.2	RGC200800	85.32 x 3.53
80.0	95.5	6.3	RGC300800	85.09 x 5.33
83.0	94.0	4.2	RGC200830	88.49 x 3.53
85.0	100.5	6.3	RGC300850	91.44 x 5.33
86.0	97.0	4.2	RGC200860	91.67 x 3.53
90.0	101.0	4.2	RGC200900	94.84 x 3.53
90.0	105.5	6.3	RGC300900	97.79 x 5.33
92.0	103.0	4.2	RGC200920	98.02 x 3.53
95.0	106.0	4.2	RGC200950	101.19 x 3.53
95.0	110.5	6.3	RGC300950	100.97 x 5.33
100.0	111.0	4.2	RGC201000	104.37 x 3.53
100.0	115.5	6.3	RGC301000	107.32 x 5.33
101.6	112.6	4.2	RGC201016	107.54 x 3.53
101.6	117.1	6.3	RGC301016	107.32 x 5.33
104.7	120.2	6.3	RGC301047	110.49 x 5.33
105.0	116.0	4.2	RGC201050	110.72 x 3.53
105.0	120.5	6.3	RGC301050	110.49 x 5.33
110.0	121.0	4.2	RGC201100	113.89 x 3.53
110.0	125.5	6.3	RGC301100	116.84 x 5.33
110.0	131.0	8.1	RGC401100	120.02 x 7.00
112.0	127.5	6.3	RGC301120	116.84 x 5.33
115.0	126.0	4.2	RGC201150	120.24 x 3.53
115.0	130.5	6.3	RGC301150	120.02 x 5.33
118.0	133.5	6.3	RGC301180	123.19 x 5.33
120.0	131.0	4.2	RGC201200	123.42 x 3.53
120.0	135.5	6.3	RGC301200	126.37 x 5.33
125.0	136.0	4.2	RGC201250	129.77 x 3.53
125.0	140.5	6.3	RGC301250	129.54 x 5.33

Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
129.0	140.0	4.2	RGC201290	132.94 x 3.53
130.0	141.0	4.2	RGC201300	136.12 x 3.53
130.0	145.5	6.3	RGC301300	135.89 x 5.33
135.0	146.0	4.2	RGC201350	139.29 x 3.53
135.0	150.5	6.3	RGC301350	142.24 x 5.33
140.0	151.0	4.2	RGC201400	145.64 x 3.53
140.0	155.5	6.3	RGC301400	145.42 x 5.33
145.0	156.0	4.2	RGC201450	148.82 x 3.53
145.0	160.5	6.3	RGC301450	151.77 x 5.33
150.0	165.5	6.3	RGC301500	158.12 x 5.33
160.0	175.5	6.3	RGC301600	164.47 x 5.33
160.0	181.0	8.1	RGC401600	170.82 x 7.00
165.0	180.5	6.3	RGC301650	170.82 x 5.33
170.0	181.0	4.2	RGC201700	177.39 x 3.53
170.0	185.5	6.3	RGC301700	177.17 x 5.33
175.0	190.5	6.3	RGC301750	183.52 x 5.33
180.0	191.0	4.2	RGC201800	183.74 x 3.53
180.0	195.5	6.3	RGC301800	183.52 x 5.33
180.0	201.0	8.1	RGC401800	189.87 x 7.00
190.0	201.0	4.2	RGC201900	196.44 x 3.53
190.0	205.5	6.3	RGC301900	196.22 x 5.33
200.0	215.5	6.3	RGC302000	208.92 x 5.33
200.0	221.0	8.1	RGC402000	208.90 x 7.00
205.0	220.5	6.3	RGC302050	208.92 x 5.33
210.0	225.5	6.3	RGC302100	215.27 x 5.33
220.0	235.5	6.3	RGC302200	227.97 x 5.33
220.0	241.0	8.1	RGC402200	227.97 x 7.00
230.0	245.5	6.3	RGC302300	234.32 x 5.33
230.0	251.0	8.1	RGC402300	240.67 x 7.00
240.0	255.5	6.3	RGC302400	247.02 x 5.33
240.0	261.0	8.1	RGC402400	253.37 x 7.00
250.0	271.0	8.1	RGC402500	266.07 x 7.00
270.0	291.0	8.1	RGC402700	278.77 x 7.00

** For groove diameter D_3 and groove width L_2 see table IV*

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Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
280.0	301.0	8.1	RGC402800	291.47 x 7.00
290.0	311.0	8.1	RGC402900	304.17 x 7.00
310.0	331.0	8.1	RGC403100	316.87 x 7.00
350.0	371.0	8.1	RGC403500	354.97 x 7.00
370.0	391.0	8.1	RGC403700	380.37 x 7.00
400.0	421.0	8.1	RGC404000	405.26 x 7.00
650.0	678.0	10.0	RGC506500	662.95 x 8.40
660.0	688.0	10.0	RGC506600	672.95 x 8.40
670.0	698.0	10.0	RGC506700	682.95 x 8.40
680.0	708.0	10.0	RGC506800	692.95 x 8.40
688.0	716.0	10.0	RGC506880	700.95 x 8.40
690.0	718.0	10.0	RGC506900	702.95 x 8.40
710.0	738.0	10.0	RGC507100	722.95 x 8.40
740.0	768.0	10.0	RGC507400	752.95 x 8.40
750.0	788.0	13.8	RGC607500	766 x 12.00
770.0	798.0	10.0	RGC507700	782.95 x 8.40
800.0	828.0	10.0	RGC508000	812.95 x 8.40
800.0	838.0	13.8	RGC608000	816 x 12.00

Rod d_N f8/h8	Groove* Diameter D_1 H9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
850.0	878.0	10.0	RGC508500	862.95 x 8.40
850.0	888.0	13.8	RGC608500	866 x 12.00
870.0	898.0	10.0	RGC508700	882.95 x 8.40
900.0	928.0	10.0	RGC509000	912.95 x 8.40
900.0	938.0	13.8	RGC609000	916 x 12.00
910.0	938.0	10.0	RGC509100	922.95 x 8.40
950.0	978.0	10.0	RGC509500	962.95 x 8.40
950.0	988.0	13.8	RGC609500	966 x 12.00
960.0	988.0	10.0	RGC509600	972.95 x 8.40
1000.0	1038.0	13.8	RGC6X1000	1016 x 12.00
1100.0	1138.0	13.8	RGC6X1100	1116 x 12.00
1200.0	1238.0	13.8	RGC6X1200	1216 x 12.00
1300.0	1338.0	13.8	RGC6X1300	1316 x 12.00
1500.0	1538.0	13.8	RGC6X1500	1516 x 12.00
1700.0	1738.0	13.8	RGC6X1700	1716 x 12.00
2000.0	2038.0	13.8	RGC6X2000	2016 x 12.00
2500.0	2538.0	13.8	RGC6X2500	2516 x 12.00

** For groove diameter D_3 and groove width L_2 see table IV*
All O-Rings with 12 mm cross section are delivered as special profile ring.

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Captive Glyd Ring® Piston Installation Recommendation

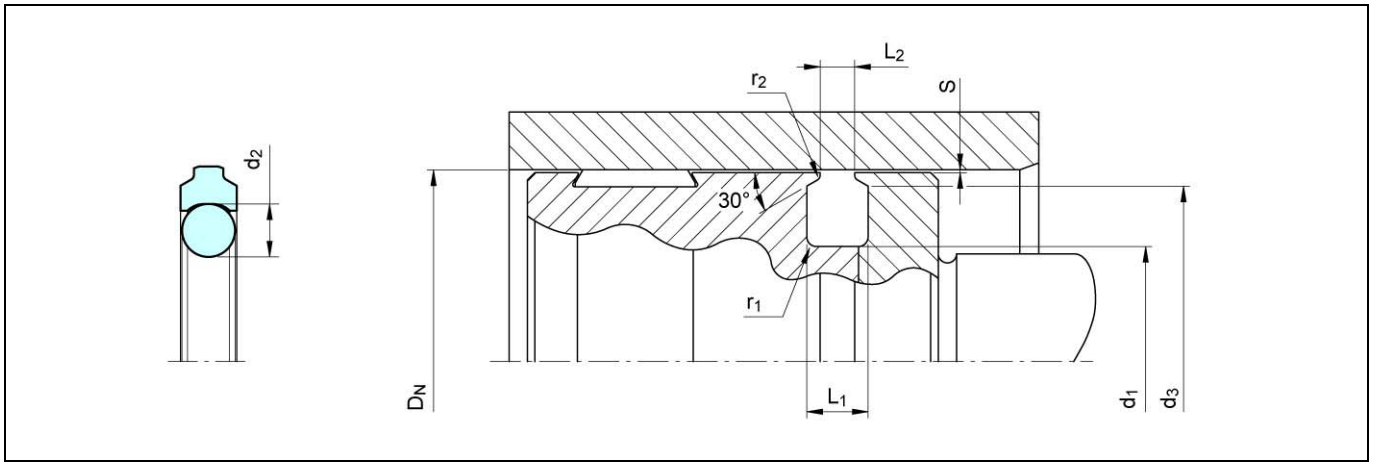


Figure 12 Installation Drawing

Table VI Installation Dimensions for Piston

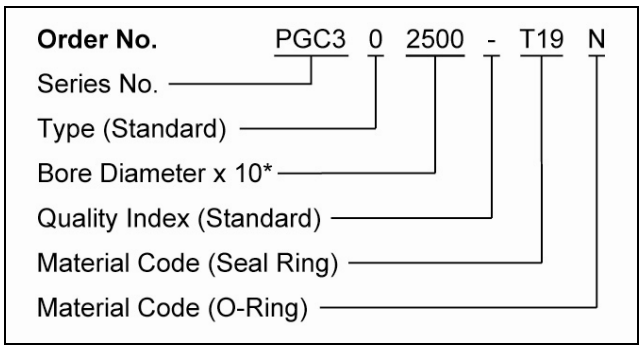
Part No.	Recommended Range D_N H8	Available Range D_N H8	d_1 Groove Diameter h9	d_3 Groove Diameter +0/-0.1	L_1 Groove Width +0.2/-0	L_2 Groove Width +0.2/-0	r_1 max.	r_2 +/-0.05	Radial Clearance S_{max}				O-Ring Cross-Section d_2
									0 MPa	10 MPa	20 MPa	40 MPa	
PGC1	15.0 - 69.9	15.0 - 260.0	D_N -8.0	D_N -1.6	3.2	1.8	0.5	0.3	0.60	0.35	0.20	0.15	2.62
PGC2	70.0 - 132.9	16.0 - 470.0	D_N -11.0	D_N -2.4	4.2	2.2	0.7	0.5	0.70	0.40	0.25	0.20	3.53
PGC3	140.0 - 329.9	22.0 - 685.0	D_N -15.5	D_N -3.8	6.3	3.2	0.8	1.0	0.80	0.50	0.30	0.20	5.33
PGC4	330.0 - 689.9	125.0 – 690.0	D_N -21.0	D_N -5.2	8.1	4.2	0.8	1.2	0.90	0.60	0.35	0.25	7.00
PGC5	690.0 - 999.9	660.0 - 999.9	D_N -28.0	D_N -6.8	10.0	6.8	0.8	1.2	1.00	0.70	0.45	0.30	8.40
PGC6	1000.0 - 2700.0	750.0 - 2700.0	D_N -38.0	D_N -9.2	13.8	9.2	1.2	1.8	1.40	1.00	0.70	0.55	12.00

Ordering Example

Turcon® Captive Glyd Ring® complete with O-Ring standard application; Series PGC3 from Table VI.

Bore diameter: D_N = 250.0 mm.
Part No.: PGC302500.
Select the material from table I.

The corresponding code numbers are appended to the Part No. Together these form the order number. The order number can be determined following the example to the right.



* *For diameters ≥ 1000.0 mm multiply only by factor 1.*
Example: PGC6X1200 for diameter 1200.0 mm.
Order no.: PGC6X1200-T19N

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Table VII Standard Installation Dimensions/Part No.

Piston D_N H8	Groove* Diameter d_1 h9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
15.0	7.0	3.2	PGC100150	6.02 x 2.62
16.0	8.0	3.2	PGC100160	7.59 x 2.62
16.0	5.0	4.2	PGC200160	4.34 x 3.53
18.0	10.0	3.2	PGC100180	9.19 x 2.62
18.0	7.0	4.2	PGC200180	5.94 x 3.53
19.0	11.0	3.2	PGC100190	10.77 x 2.62
20.0	12.0	3.2	PGC100200	10.77 x 2.62
20.0	9.0	4.2	PGC200200	8.32 x 3.53
21.0	13.0	3.2	PGC100210	12.37 x 2.62
22.0	14.0	3.2	PGC100220	13.94 x 2.62
22.0	6.5	6.3	PGC300220	5.47 x 5.33
24.0	16.0	3.2	PGC100240	15.54 x 2.62
25.0	17.0	3.2	PGC100250	15.54 x 2.62
25.0	14.0	4.2	PGC200250	13.87 x 3.53
25.0	9.5	6.3	PGC300250	8.47 x 5.33
28.0	20.0	3.2	PGC100280	18.72 x 2.62
30.0	22.0	3.2	PGC100300	21.89 x 2.62
30.0	14.5	6.3	PGC300300	13.64 x 5.33
32.0	24.0	3.2	PGC100320	23.47 x 2.62
32.0	21.0	4.2	PGC200320	20.22 x 3.53
35.0	27.0	3.2	PGC100350	26.64 x 2.62
35.0	24.0	4.2	PGC200350	23.40 x 3.53
36.0	28.0	3.2	PGC100360	26.64 x 2.62
38.0	30.0	3.2	PGC100380	28.24 x 2.62
40.0	32.0	3.2	PGC100400	31.42 x 2.62
40.0	29.0	4.2	PGC200400	28.17 x 3.53
40.0	24.5	6.3	PGC300400	23.16 x 5.33
42.0	31.0	4.2	PGC200420	29.75 x 3.53
45.0	34.0	4.2	PGC200450	32.92 x 3.53
48.0	37.0	4.2	PGC200480	36.09 x 3.53
50.0	42.0	3.2	PGC100500	40.94 x 2.62
50.0	39.0	4.2	PGC200500	37.69 x 3.53
50.0	34.5	6.3	PGC300500	32.69 x 5.33
50.8	42.8	3.2	PGC100508	40.94 x 2.62
50.8	39.8	4.2	PGC200508	37.69 x 3.53
52.0	41.0	4.2	PGC200520	40.87 x 3.53
53.0	42.0	4.2	PGC200530	40.87 x 3.53
55.0	44.0	4.2	PGC200550	44.04 x 3.53
57.0	46.0	4.2	PGC200570	44.04 x 3.53
58.0	47.0	4.2	PGC200580	47.22 x 3.53
60.0	49.0	4.2	PGC200600	47.22 x 3.53
62.0	51.0	4.2	PGC200620	50.39 x 3.53
63.0	52.0	4.2	PGC200630	50.39 x 3.53
63.0	47.5	6.3	PGC300630	46.99 x 5.33
65.0	54.0	4.2	PGC200650	53.57 x 3.53
68.0	57.0	4.2	PGC200680	56.74 x 3.53
70.0	59.0	4.2	PGC200700	56.74 x 3.53
70.0	54.5	6.3	PGC300700	53.34 x 5.33
75.0	64.0	4.2	PGC200750	63.09 x 3.53
75.0	59.5	6.3	PGC300750	56.52 x 5.33
80.0	69.0	4.2	PGC200800	66.27 x 3.53
80.0	64.5	6.3	PGC300800	62.87 x 5.33
82.5	67.0	6.3	PGC300825	66.04 x 5.33
85.0	69.5	6.3	PGC300850	69.22 x 5.33
90.0	79.0	4.2	PGC200900	78.97 x 3.53
90.0	74.5	6.3	PGC300900	72.39 x 5.33
95.0	84.0	4.2	PGC200950	82.14 x 3.53
95.0	79.5	6.3	PGC300950	78.74 x 5.33
100.0	89.0	4.2	PGC201000	88.49 x 3.53
100.0	84.5	6.3	PGC301000	81.92 x 5.33
101.6	86.1	6.3	PGC301016	85.09 x 5.33
105.0	94.0	4.2	PGC201050	91.67 x 3.53
105.0	89.5	6.3	PGC301050	88.27 x 5.33
110.0	99.0	4.2	PGC201100	98.02 x 3.53
110.0	94.5	6.3	PGC301100	91.44 x 5.33
115.0	99.5	6.3	PGC301150	97.79 x 5.33

** For groove diameter d_3 and groove width L_2 see table VI*

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Piston D_N H8	Groove* Diameter d_1 h9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
120.0	109.0	4.2	PGC201200	107.54 x 3.53
120.0	104.5	6.3	PGC301200	100.97 x 5.33
125.0	114.0	4.2	PGC201250	113.89 x 3.53
125.0	109.5	6.3	PGC301250	107.32 x 5.33
125.0	104.0	8.1	PGC401250	102.60 x 7.00
127.0	111.5	6.3	PGC301270	110.49 x 5.33
130.0	114.5	6.3	PGC301300	113.67 x 5.33
130.0	109.0	8.1	PGC401300	107.60 x 7.00
135.0	114.0	8.1	PGC401350	113.67 x 7.00
140.0	124.5	6.3	PGC301400	123.19 x 5.33
140.0	119.0	8.1	PGC401400	116.84 x 7.00
145.0	129.5	6.3	PGC301450	126.37 x 5.33
145.0	124.0	8.1	PGC401450	123.19 x 7.00
150.0	134.5	6.3	PGC301500	132.72 x 5.33
150.0	129.0	8.1	PGC401500	126.37 x 7.00
155.0	134.0	8.1	PGC401550	132.72 x 7.00
160.0	144.5	6.3	PGC301600	142.24 x 5.33
160.0	139.0	8.1	PGC401600	135.89 x 7.00
165.0	144.0	8.1	PGC401650	142.24 x 7.00
170.0	149.0	8.1	PGC401700	145.42 x 7.00
175.0	154.0	8.1	PGC401750	151.77 x 7.00
180.0	164.5	6.3	PGC301800	164.47 x 5.33
180.0	159.0	8.1	PGC401800	158.12 x 7.00
190.0	169.0	8.1	PGC401900	164.47 x 7.00
194.0	178.5	6.3	PGC301940	177.17 x 5.33
200.0	184.5	6.3	PGC302000	183.52 x 5.33
200.0	179.0	8.1	PGC402000	177.17 x 7.00
205.0	184.0	8.1	PGC402050	183.52 x 7.00
210.0	189.0	8.1	PGC402100	183.52 x 7.00
215.0	194.0	8.1	PGC402150	189.87 x 7.00
220.0	199.0	8.1	PGC402200	196.22 x 7.00
230.0	214.5	6.3	PGC302300	208.92 x 5.33
230.0	209.0	8.1	PGC402300	202.57 x 7.00
240.0	219.0	8.1	PGC402400	215.27 x 7.00
250.0	234.5	6.3	PGC302500	234.32 x 5.33
250.0	229.0	8.1	PGC402500	227.97 x 7.00

Piston D_N H8	Groove* Diameter d_1 h9	Groove* Width L_1 +0.2	Part No.	O-ring Sizes
254.0	233.0	8.1	PGC402540	227.97 x 7.00
260.0	239.0	8.1	PGC402600	240.67 x 7.00
265.0	244.0	8.1	PGC402650	240.67 x 7.00
268.0	247.0	8.1	PGC402680	240.67 x 7.00
270.0	249.0	8.1	PGC402700	240.67 x 7.00
280.0	259.0	8.1	PGC402800	253.37 x 7.00
290.0	269.0	8.1	PGC402900	266.07 x 7.00
300.0	279.0	8.1	PGC403000	278.77 x 7.00
304.8	283.8	8.1	PGC403048	278.77 x 7.00
310.0	289.0	8.1	PGC403100	278.77 x 7.00
320.0	299.0	8.1	PGC403200	291.47 x 7.00
660.0	632.0	10.0	PGC506600	630.25 x 8.40
700.0	672.0	10.0	PGC507000	670.25 x 8.40
710.0	682.0	10.0	PGC507100	680.25 x 8.40
740.0	712.0	10.0	PGC507400	710.25 x 8.40
750.0	712.0	13.8	PGC607500	710 x 12.00
780.0	752.0	10.0	PGC507800	750.25 x 8.40
800.0	772.0	10.0	PGC508000	770.25 x 8.40
800.0	762.0	13.8	PGC608000	760 x 12.00
850.0	812.0	13.8	PGC608500	810 x 12.00
900.0	872.0	10.0	PGC509000	870.25 x 8.40
900.0	862.0	13.8	PGC609000	860 x 12.00
950.0	912.0	13.8	PGC609500	910 x 12.00
1000.0	962.0	13.8	PGC6X1000	960 x 12.00
1050.0	1012.0	13.8	PGC6X1050	1010 x 12.00
1065.0	1027.0	13.8	PGC6X1065	1025 x 12.00
1070.0	1032.0	13.8	PGC6X1070	1030 x 12.00
1200.0	1162.0	13.8	PGC6X1200	1160 x 12.00
1225.0	1187.0	13.8	PGC6X1225	1185 x 12.00
1500.0	1462.0	13.8	PGC6X1500	1460 x 12.00
2000.0	1962.0	13.8	PGC6X2000	1960 x 12.00
2500.0	2462.0	13.8	PGC6X2500	2460 x 12.00
2700.0	2662.0	13.8	PGC6X2700	2660 x 12.00

** For groove diameter d_3 and groove width L_2 see table VI*

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

CAPTIVE GLYD RING®
AND CAPTIVE SLYDRING®

TSS Slydring® for Captive Applications

Preformed HiMod® and Orkot® Slydring® are normally applied mounted in standard groove design as they retain their round shape while they are in free stage. They can move in and out of cylinder parts equipped with sufficient inlet chamfers.

Orkot® Slydring® is available preformed up to ø 200 mm and HiMod® up to ø 300 mm as standard.

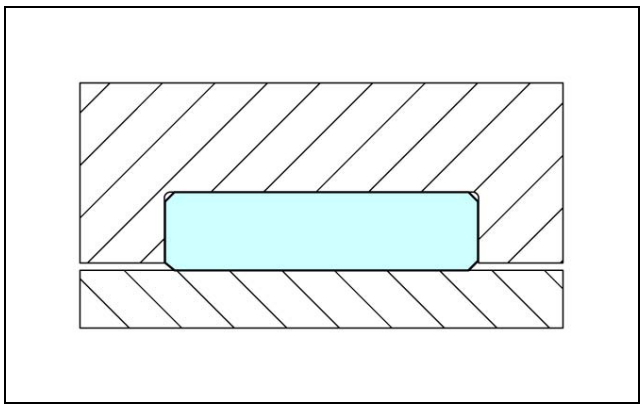

Figure 13 Orkot® Slydring®

If Turcite® Slydring® is required for captive applications it is necessary to retain the bearing in a special dovetail groove as described in the following.

Turcite® Captive Slydring®

General

The Turcite® Slydring® series has gained wide use as piston and rod bearings due to their excellent performance and simple installation. The groove design ensures efficient hardware machining and flexible Turcite® materials provide easy mounting.

Applications where the bearings move from a smaller to a larger bore size and have to be held in the groove or cannot be accessed during assembly can cause difficulties. Special precautions may be needed to ensure that the bearings stay in position during assembly.

Most rod bearings are used for diameters up to approx. 150 mm. In this diameter range positioning will normally be ensured with the Slydring® itself, which because of its flexibility will press against the bottom of the groove. Larger diameters or designs where normal rod inlets cannot be provided might cause problems.

Piston bearings may likewise present problems. With smaller diameters these may be solved by bending the Slydring® to a smaller diameter prior to installation, but again larger diameters can cause further difficulties.

Traditional solutions are to use turned and (if possible) uncut bearings, or to ensure positioning with cyanoacrylate (“instant glue”) or high viscosity grease.
The drawbacks of these solutions are that they are costly, laborious and unreliable.

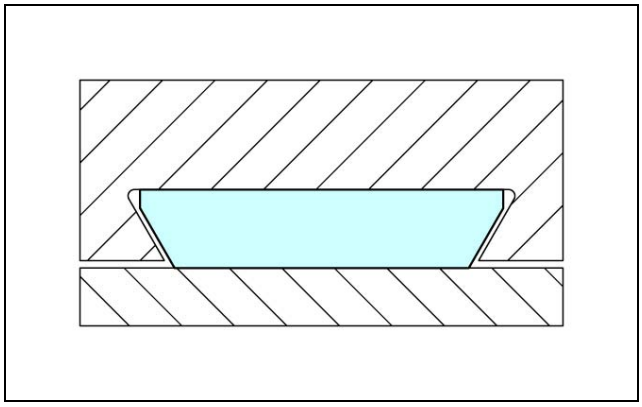

Figure 14 Captive Slydring®

CAPTIVE GLYD RING®
AND CAPTIVE SLYDRING®

Turcite® Captive Slydring®

The Turcite® Captive Slydring® has been developed to combine the bearing performance of the Slydring® with safe installation under all conditions.
In particular, in situations where the Slydring® has to pass dimensional variations or holes.

Captive Slydring®, with a Teardrop structure as standard, is supplied as a strip with a dovetail shaped profile and is mounted in grooves with a corresponding shape.

Groove Design

The grooves, as illustrated in figure 14, are fairly simple and can be machined on any type of lathe without additional cost or special tooling. The installation inlets of the grooves, see figure 23, do not require exact dimensions and can be made with a suitable hand operated grinder.

Mounting

Mounting is easy and straightforward. The end of the strip is inserted in the groove inlet and pushed into the groove and along the circumference. On large diameters, installation may be eased by punching a hole in the strip and pulling it along the groove with a suitable “tool”.

After mounting, the Captive Slydring® is locked in the groove and will not require special care during assembly.

Advantages

- Same basic function as Turcite® Slydring®, see the “Hydraulic Seals – Linear” catalogue
- Suitable for most hydraulic fluids and gases depending on material selected
- Protected from diameter variations of counterpart
- Passes over holes in its mating surface
- For linear and rotary service
- Safe assembly when Slydring® is fixed in the groove
- Teardrop pattern promotes formation of a lubricant film

Applications

The Turcite® Captive Slydring® is ideal for types of equipment where positioning of the bearing cannot be controlled during assembly or where its function requires it to be kept fixed in the groove:

- Valves
- Connectors
- Wave compensators
- Down-hole drilling motors
- Pressure boosters
- Piston cushioning in cylinders
- Jacks
- Telescopic cylinders

For piston bearings it would typical be used where the piston is inserted through a long cylinder head, where there are threads and grooves. It could also be expected to pass holes or diameter variations in the bore during dynamic operation.

On rod bearings the Captive Slydring® will ease installation of rods in large diameter bushings or save the expense of long seal/bearing carriers in plunger type cylinders. In cases where the rod end is moving in and out of the bearing area this safe Slydring® installation is required.

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Application Example

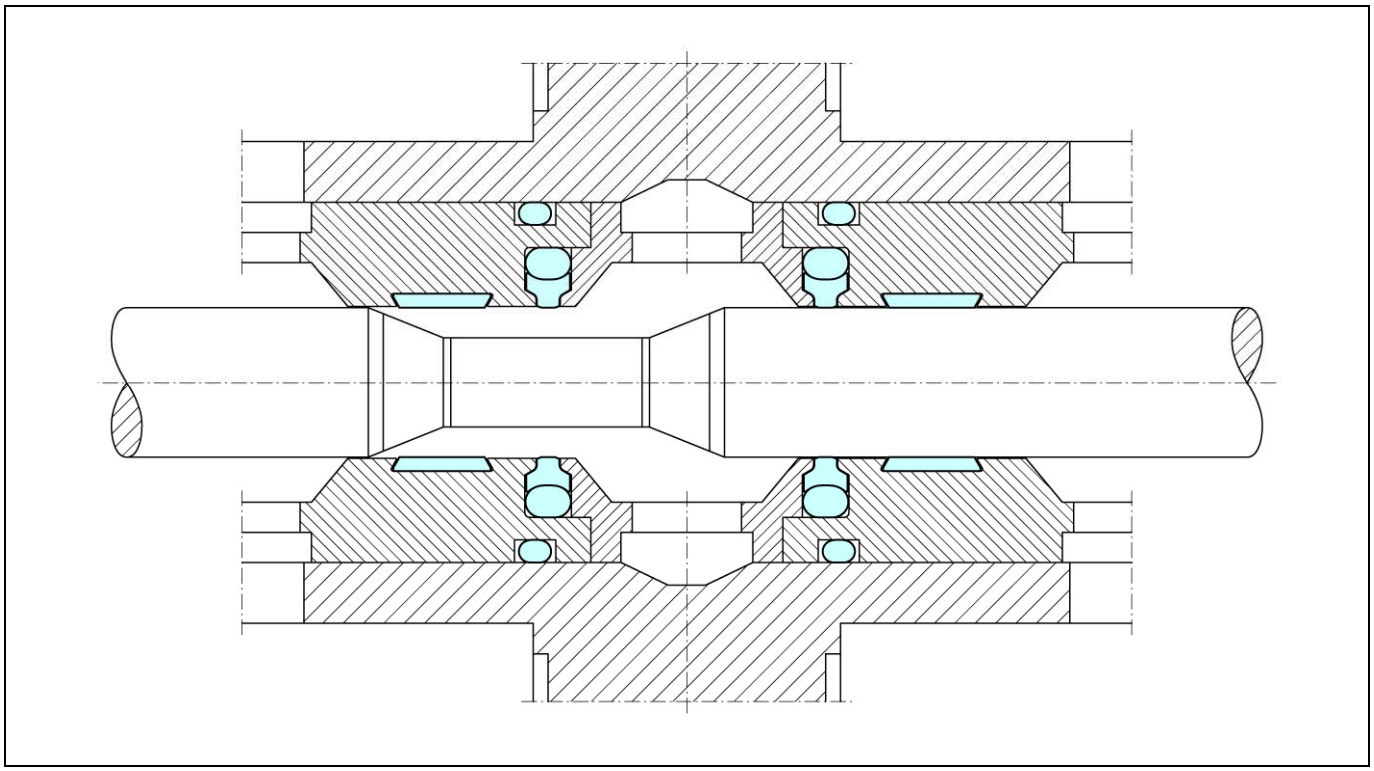

Figure 15 Application Example: Valve sealing

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Captive® Slydring® Materials

Table VII Turcite® and Zurcon® Slydring® Material

Materials, Applications, Properties	Code	Maximum Speed * m/s	Operating Temperature °C	Mating Surface Material	Maximum Bearing Load
Turcite® T47 **Standard Slydring® material** for lubricated hydraulics in linear motion Low friction Good sliding and wear properties High temperature resistance Bronze filled Colour: Greyish to dark brown. The colour of the material may have variations in shading.	**T47**	15	-60 to +150	Steel Steel chrome plated Steel hardened Cast iron	15 N/mm^2 at 25 °C 12 N/mm^2 at 80 °C 8 N/mm^2 at 120 °C
Turcite® T51 For hydraulic and pneumatic For linear motion in lubricating and non-lubricating fluids Rotary service in lubricating fluid Good chemical resistance Not for electrical conducting fluids Carbon, graphite filled Colour: Black	**T51**	15	-60 to +150	Steel Mild steel Stainless steel Aluminium tubes Alloys	15 N/mm^2 at 25 °C 12 N/mm^2 at 80 °C 8 N/mm^2 at 120 °C
Turcite® T59** For lubricating and non-lubricating fluids Linear and rotary motion High frequency and short strokes Not for electrical conducting fluids Carbon fibre filled Colour: Grey.	**T59**	15	-60 to +150	Steel Mild steel Steel chrome plated Steel hardened Stainless steel	12 N/mm^2 at 25 °C 10 N/mm^2 at 80 °C 6 N/mm^2 at 120 °C
Zurcon® Z80 For lubricating and non-lubricating fluids, air and gases High abrasion resistance Good chemical resistance Linear and slowly turning movements Limited temperature capability UHMWPE (Ultra High Molecular Weight Polyethylene) Colour: White to off-white.	**Z80**	2	-60 to +80	Steel Mild steel Steel chrome plated Steel hardened Stainless steel Aluminium Bronze Ceramic coating	25 N/mm^2 at 25 °C 8 N/mm^2 at 80 °C

* *With good lubrication*
** *Material in compliance with **Norsok M710 s**pecification*
Highlighted materials are preferred.

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Important recommendation:

The above (Table VI) 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.

Operating Conditions

Bearing load:	See Table VII.
Media:	Most fluids and gases depending on compatibility of the Turcite® or Zurcon® material.
Clearance:	The maximum permissible radial clearance is depending on the requirement at the utilized sealing system and Slydring installation diameter D_{max} and d_{min}, see table X and XII.
Speed and Dynamic load:	Strongly dependent on the actual heat generation in the area where the Slydring® is positioned.
Temperature:	The acceptable bearing load of Turcite® and Zurcon® materials decreases with increasing temperatures. The load bearing ability for dynamic applications is dependent primarily on the operating temperature. This should generally not exceed +150 °C for Turcite® (+80 °C for Z80).

Dimensioning of Turcite® Captive Slydring®

Same as Turcite® Slydring®, see the “Hydraulic Seals - Linear” catalogue.
If, however this calculation shows that the bearing pressure will be higher than sustainable with Turcite® or Zurcon ® materials, then HiMod® or Orkot® can be considered.
HiMod® and Orkot® Slydring® are stiffer than fore mentioned materials and both moulded HiMod® and Orkot® - when made “from tube” - keep their shape after installation.
It should be noted that for diameters < 200 mm for Orkot® and < 300mm for HiMod® the dovetail Captive Slydring® shape is not recommended as it’ll be hard or even impossible to assemble. So the regular rectangular cross section as per ISO is the only option available, which still means a risk of seizure should the ring escape from the groove. The risk is less for a rod ring than for a piston ring. For diameters > 200 mm the dovetail ‘Captive’ Slydring® cross section is a feasible option for Orkot® material. Note that Orkot Captive Slydrings® should be ordered “made from tube” and not “from strip” in order to hold the width tolerances. The Orkot® Captive Slydring® will be identified with a unique article number. For more information please contact the Orkot® manufacturer.

Calculation of Linear Length L

Turcite® Captive Slydring® is supplied as strip off-the-roll for cutting to size. Calculations of required cut length L are made as below or refer to the “Hydraulic Seals – Linear” catalogue:

The required cut length L is determined as follows.

Rod application: $L = c\ (d_N + W) – k$ mm.

Piston application: $L = c\ (D_N - W) – k$ mm.

c = 3.11 material factor, valid for Turcite® and Zurcon® Materials
k = Temperature constant: 0.8 for operating temperatures up to 120° C.
k = 2.0 for applications > 120° C.

Turcite® Captive Slydring® to be supplied at request on special part numbers as pieces cut-to-length for specific diameters. See figure 18.

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Type of Cut

Turcite® Captive Slydring® with an angle cut is recommended for linear movements

Turcite® Captive Slydring® with a straight cut is recommended for turning, rotary and helical movements

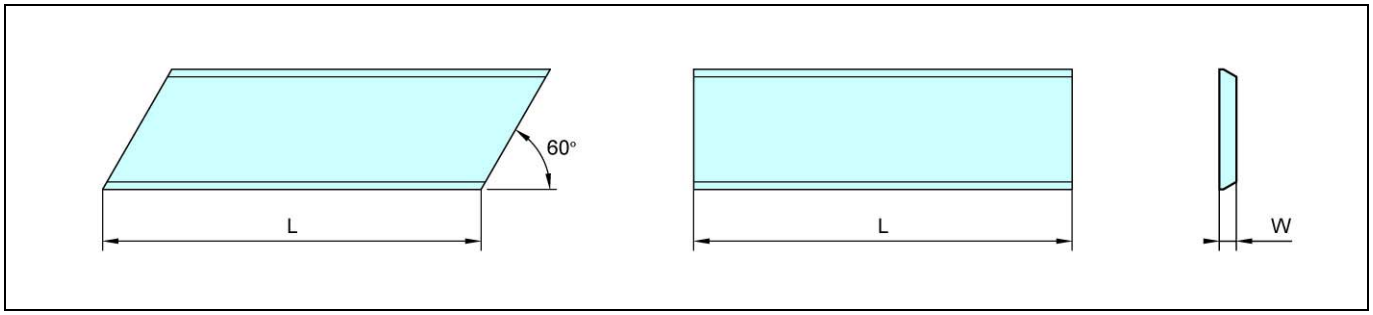

Figure 16 Slydring® with an angle cut, design code 0, and with a straight cut, design code B

How to order Captive Slydring® Off-the-roll

Off-the-Roll G M C 1 0 0000 - Material

Article

Article Subgroup
M Strip

Series
C Captive Slydring®

Sub Series
1 8.0 x 2.5 mm
2 13.0 x 2.5 mm
3 18.0 x 2.5 mm
4 28.0 x 3.0 mm

Design
0 Standard with teardrop on both sides
L Without teardrops

Functional Diameter 0000

Material

Figure 17 TSS Article no. for Off-the-Roll Slydring®

How to order Captive Slydring® Cut-to-length

Cut-to-Length G R C 1 0 0000 - Material

Article

Article Subgroup
R Slydring® Rod
P Slydring® Piston

Series
C Captive Slydring

Sub Series
1 8.0 x 2.5 mm
2 13.0 x 2.5 mm
3 18.0 x 2.5 mm
4 28.0 x 3.0 mm

Design
0 Standard 30° A-Cut with teardrop on both sides
B Butt cut with teardrop on both sides
L 30° A-Cut without teardrop
D Butt cut without teardrop
X* ≥1000 mm with 30° A-Cut and teardrop on both sides

Functional Diameter x 10

Material

** For diameters ≥ 1000.0 mm multiply only by factor 1.*
Example: GRC1X1200-T47 for diameter 1200.0 mm.

Figure 18 TSS Article no. for Slydring® Cut-to-length

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Captive Slydring® Rod Installation Recommendation

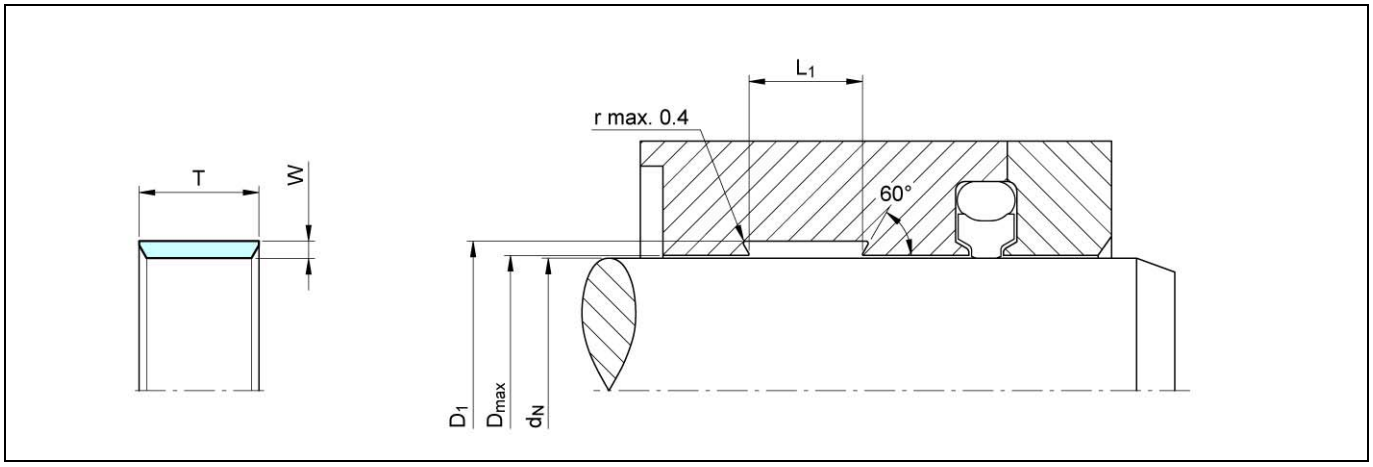

Figure 19 Installation Drawing

Table IX Installation Dimensions for Rod

Part No.	Recommended Range d_N f8/h9	D_1 Groove Diam. +0.05/-0	L_1 Groove Width +0.2/-0	D_{max} Maximum Diam.	T Slydring Width Inspection tolerance ±0.15	W Slydring Thickness +0/-0.08
GRC1	≥ 100	d_N + 5.0	8.0	See table X	9.45	2.5
GRC2	≥ 150	d_N + 5.0	13.0	See table X	14.45	2.5
GRC3	≥ 150	d_N + 5.0	18.0	See table X	19.45	2.5
GRC4	≥ 200	d_N + 6.0	28.0	See table X	29.80	3.0

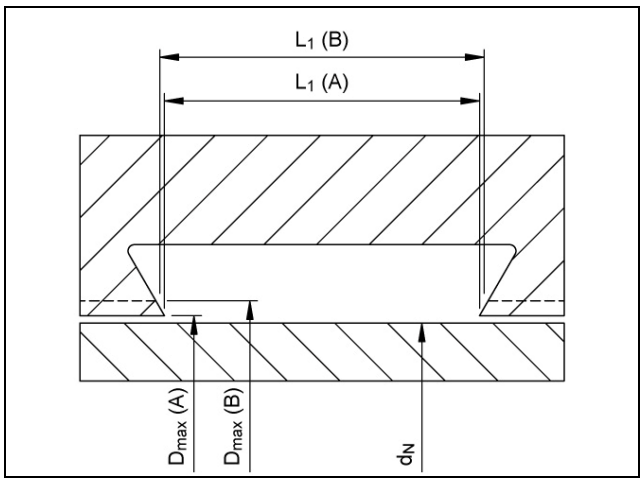

*Figure 20 The groove width **L_1** depends on the **D_{max}** in table X*

Table X Groove Width L_1 based on D_{max}

L_1 Groove Width +0.2/-0	D_{max} Maximum Diam. +0.1/-0
8.0 8.1	d_N + 0.5 d_N + 0.7
13.0 13.1	d_N + 0.5 d_N + 0.7
18.0 18.1	d_N + 0.5 d_N + 0.7
28.0 28.1 28.2	d_N + 0.5 d_N + 0.7 d_N + 0.9

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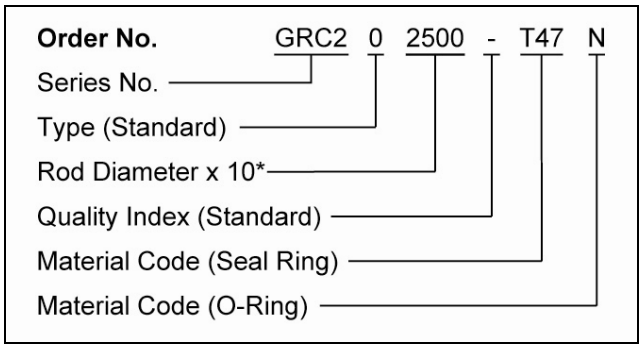
Ordering Example

Turcite® Captive Slydring® cut for specific rod diameter:
Rod diameter d_N = 250.0 mm
Series from Table IX
Groove width L_1 = 13.0 mm

Standard design:	Design code: 0 - with angle cut and teardrop structure
Material:	Turcite® T47 (other materials see Table VIII)
Part number:	GRC202500

The corresponding code numbers are appended to the Part No. Together these form the Order Number. The Order No. can be determined following the example to the right.



* *For diameters ≥ 1000.0 mm multiply only by factor 1. Example: GRC2X2500 for diameter 2500.0 mm. Order no.: GRC2X2500-T47.*

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Captive Slydring® Piston Installation Recommendation

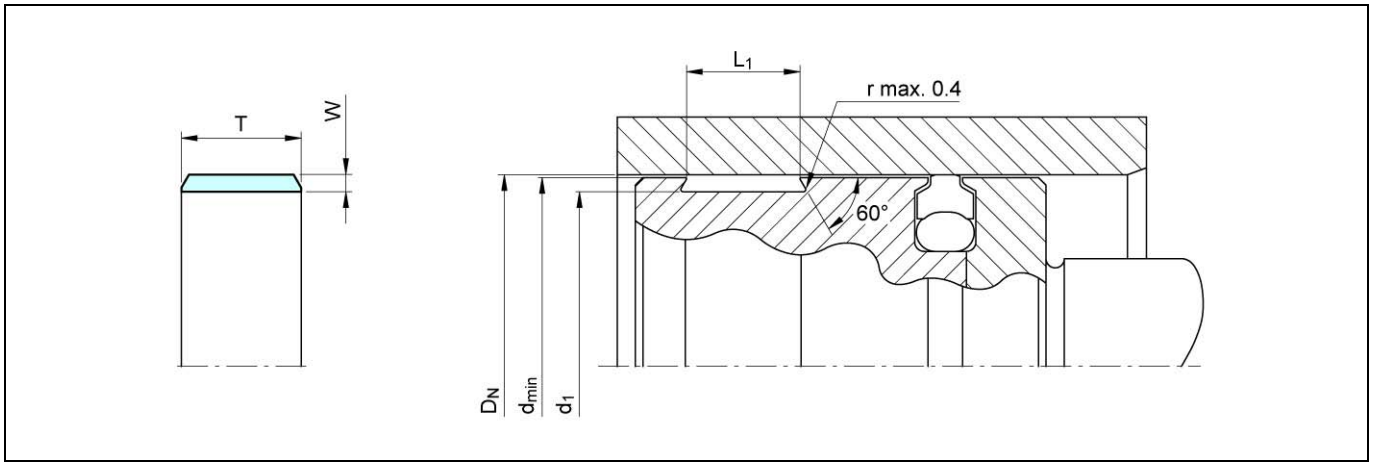

Figure 21 Installation Drawing

Table XI Installation Dimensions for Piston

Part No.	Recommended Range D_N H10	d_1 Groove Diam. +0.05/-0	L_1 Groove Width +0.2/-0	d_{min} Minimum Diam.	T Slydring Width Inspection Tolerance ±0.15	W Slydring Thickness +0/-0.08
GPC1	≥ 60	D_N - 5.0	8.0	See Table XII	9.45	2.5
GPC2	≥ 80	D_N - 5.0	13.0	See Table XII	14.45	2.5
GPC3	≥ 100	D_N - 5.0	18.0	See Table XII	19.45	2.5
GPC4	≥ 200	D_N - 6.0	28.0	See Table XII	29.80	3.0

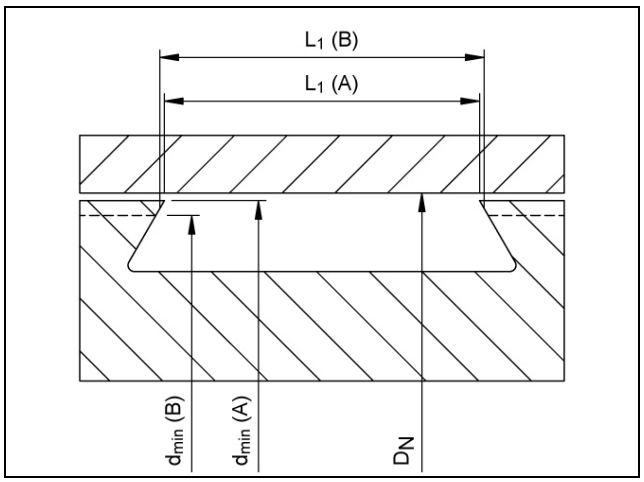

*Figure 22 The groove width **L_1** depends on the **d_{min}** in table XII*

Table XII Groove Width L_1 based on d_{max}

L_1 Groove Width +0.2/-0	d_{min} Minimum Diam. +0.1/-0
8.0 8.1	D_N - 0.5 D_N - 0.7
13.0 13.1	D_N - 0.5 D_N - 0.7
18.0 18.1	D_N - 0.5 D_N - 0.7
28.0 28.1 28.2	D_N - 0.5 D_N - 0.7 D_N - 0.9

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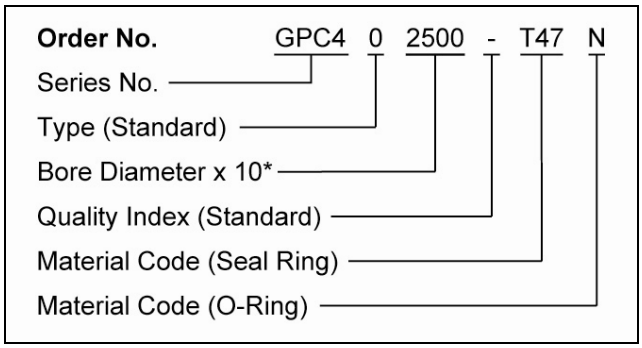
Ordering Example

Turcite® Captive Slydring® cut for specific bore diameter:

Piston diameter D_N = 250.0 mm:
Series from Table XI
Groove width L_1 = 28

Standard design:	Design code: 0 - with angle cut and teardrop structure.
Material:	Turcite® T47 (other materials see Table VIII)
Part Number:	GPC402500

The corresponding code numbers are appended to the Part No. Together these form the Order Number. The Order No. can be determined following the example to the right.



* *For diameters ≥ 1000.0 mm multiply only by factor 1.*
Example: GPC4X2500 *for diameter 2500.0 mm.*
Order no.: GPC4X2500–*T47.*

Captive Slydring® Installation

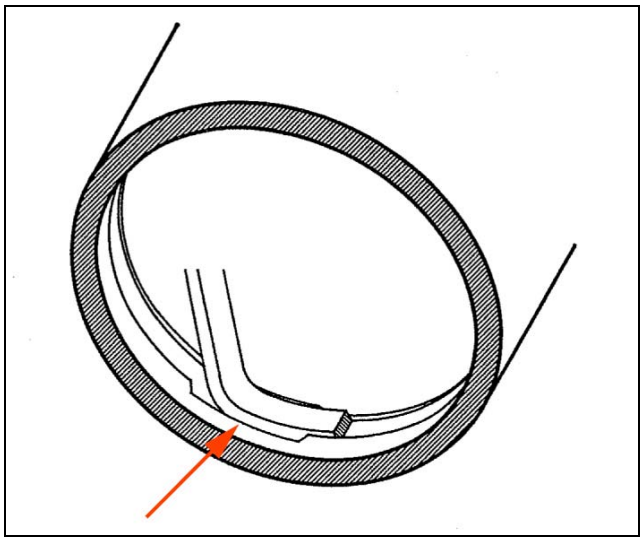


Figure 23

The installation inlets of the grooves do not require exact dimensions and can be made with a suitable hand operated grinder.

Figure 24

The end of the strip is inserted in the groove inlet and pushed into the groove and along the circumference.

On large diameters, installation may be eased by punching a hole in the strip and pulling it along the groove with a suitable “tool”.