

Slydring® Wear Rings



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Contents

566	Choice of Slydring®
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569	Design Instructions
------------	----------------------------

571	Turcite® Slydring® for Piston and Rod
------------	--

574	Zurcon® Slydring® for Piston and Rod
------------	---

583	HiMod® Slydring® for Piston and Rod
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604	Orkot® Slydring® for Piston and Rod
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■ Choice of Slydring®

The function of Slydring® is to guide the piston and piston rod of a hydraulic cylinder by absorbing transverse forces between the sliding parts and preventing metallic contact. Non-metallic guide rings offer major benefits compared with traditional metallic guides:

- High load bearing capacity
- Eliminates local stress concentrations
- Wear-resistant, long service life
- Metal/plastic pairing eliminates fretting and seizure
- Low friction
- Damping of vibrations
- Good wiping effect, embedding of foreign particles possible
- Protection of the seal against dieseling effect
- Wide choice of material of the metal components as they are not used as guides
- Eliminates hydrodynamic pressure problems in the guide system
- Simple closed groove, easy installation
- Low service costs

MATERIALS

In view of the different specific demands made on piston and rod guides, various Slydring® materials are available:

- Turcite® are highly wear-resistant, low friction, specially modified materials for low to medium duty with limited radial forces
- HiMod® materials with friction-reducing fillers for medium to heavy duty
- Orkot® fabric composite materials for heavy duty or high radial forces

In order to choose the most suitable Slydring®, it is first necessary to know all the required functional parameters. Table 185 is recommended for initial pre-selection of the Slydring® and the materials.

Piston and rod Slydring® are interchangeable if the difference in size is taken into consideration, e.g. piston Slydring®, diameter D_N 100 x 2.5 mm thick can be used as rod Slydring®, diameter D_N 95 x 2.5 mm thick.

TOLERANCES

Depending on the material and dimensions of the Slydring®, the thickness tolerance is in the range from +0.00/-0.08 mm except for Turcite® Slydring® Article GP41 + GR41 and GP43 + GR43 where it is +0.02/-0.03 mm.

Contact your local Customer Solution Center for further information on specific applications and technical questions.

**Table 185: Selection Criteria for Slydring®**

Slydring®		Application				Standard*	Installation	Material		
Type	Page	Field of Application			Mating Surface	ISO	Size Range mm	Recom- mended Slydring® Material		
			Light	Medium					Heavy	
Turcite® Zurcon® Slydring® 	571	Mobile hydraulics	•			ISO 10766	Off-the-roll up to diameter 4,200	T47		
		Standard cylinders	•	•						
		Machine tools	•	•						
		Valves	•	•				T51		
		Rotary manifolds	•	•						
		Gas equipment	•	•		ISO 10766	Off-the-roll up to diameter 4,200	M12		
		Pneumatics	•	-						
		Wind Power	•	•						
		Off-road vehicles	•	•						
		Injection molding machines	•	•		ISO 10766	Off-the-roll up to diameter 4,200	Z80/Z81 UHMWPE		
		Automotive industry	•	•						
		Foodstuff industry	•	•						
Water hydraulics	•	•								
		Dry application	•	•						
		Pneumatics	•	•						
					Steel					
					Mild steel					
					Steel, hardchromed					
					Stainless steel					
					Aluminum,					
					Ceramic coating					
HiMod® Slydring® 	583	Mobile hydraulics	•	•		ISO 10766	Rings up to diameter 300	HM061 POM/ Glass fiber		
		Standard cylinders	•	•				HM062 PA/ Glass fiber + PTFE		
		Agricultural machinery	•	•						
		Mobile hydraulics	•	•	•					
		Standard cylinders	•	•						
		Agricultural machinery	•	•						
Orkot® Slydring® 	604	Mobile hydraulics	•	•	•	ISO 10766	Rings up to diameter 1,600/ off-the roll diameter > 10,000	C320 Polymer/fabric		
		Standard cylinders	•	•	•			C380 C480 Polymer/fabric		
		Presses	•	•	•					
		Mobile hydraulics	•	•	•					
		Standard cylinders	•	•	•	ISO 10766	Rings up to diameter 500	C932 Phenolic/ cotton		
		Water hydraulics	•	•	•					
		Shipping and marine engineering	•	•	•					
		Presses	•	•	•					
				Mobile hydraulics	•	•	•			
				Standard cylinders	•	•	•			
				Presses	•	•	•			

* For Slydring® to other standards, e.g. to French standard NF E 48-037, please contact your local Customer Solution Center.



FORMS OF SUPPLY

Two characteristics must be observed:

1. Type of Cut

Figure 205 shows the commonly used angle cut. Rings with other types of cut are available on request. Design Code are shown in Table 187.

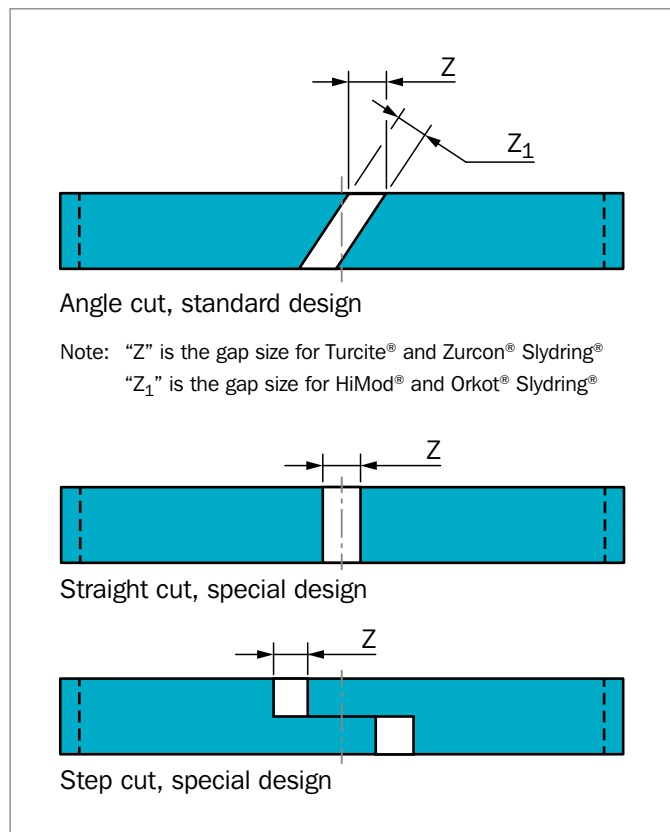


Figure 205: Type of cut

Table 187: Design Codes for Cut

Material	Turcite®		Zurcon®	HiMod®	Orkot®	
	T47 T51 M12		Z80	HM061 HM062	C380 C480 C320 C932	C380 C480 C320
Code for cut	Strip with teardrop structure*	Strip without teardrop structure	Strip without teardrop structure	Ring without teardrop structure	Ring without teardrop structure	Strip without teardrop structure
Angle cut	0	L	0	0	0	A
Straight cut	B	D	D	D**	H	D
Step cut	C	E	E	-	-	E

Design Code **0**, in bold types are the standard Slydring® versions. Teardrop structure: Detailed description can be found on page 571.

* Standard for **Turcite®** Slydring®

** HiMod® Wear Rings for non ISO groove dimensions have as standard a straight cut Code D.

2. Design Type

Slydring® has a rectangular cross-section with rounded or chamfered edges, thus preventing edge forces from becoming too high in the corner radii of the grooves. Chamfers also facilitate installation.

Slydring® is supplied with the gap necessary (dimension Z or Z₁). The ring ends are finished as standard with an angle cut.

Depending on material, Slydring® is supplied as split rings or as strip material.

Strip material is available in rolls or precut to size as listed in Table 186.

Table 186: Forms of Supply for Slydring®

Material	Ring Diameter mm	Cut Strip for Diameter mm	Off-the-Roll
Turcite® T47/T51/M12	-	8 - 4,200	see Table 188
Zurcon® Z80/Z81	on request	30 - 4,200	on request
HiMod® HM061	up to 300	-	-
HiMod® HM062	up to 300	-	-
Orkot® C380/C480/C320	16 - 1,600	300 - > 10,000	see Table 224
Orkot® C932	16 - 500	-	-



■ Design Instructions

CALCULATING BEARING LENGTH

A rough estimate of the number and width of the bearings required within an application can be calculated from the formula below:

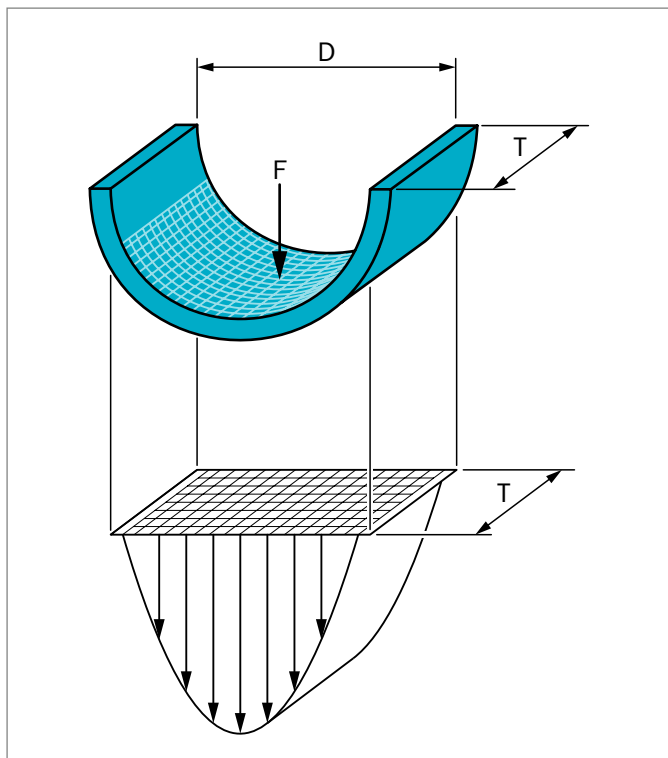


Figure 206: Load distribution

The large effective bearing area of non-metallic Slydring® provides low maximum contact pressure.

Radial forces can vary within wide ranges and cannot always be predicted. A safety factor of 2 is recommended when calculating:

$$T_{\min} = \frac{F \times f}{D \times Pr}$$

where:

F = Maximum radial load [N]

f = Safety factor

d_N / D_N = Rod / Bore diameter [mm]

Pr = Radial Slydring® pressure [N/mm²]

$T_{\min}$ = Minimum Slydring® width [mm]

Example:

d_N = 60 mm

F = 40,000 N

t = +40 °C

f = 2

Slydring® material Orkot® C 380 - see page 609.

Pr = 100 N/mm²

$$T_{\min} = \frac{40,000 \times 2}{60 \times 100} = 13.3 \text{ mm}$$

From Table 188, a groove with a width of 15 mm Series GR73 or 2 grooves with widths of 9.7 mm Series GR69 mm are selected. The installation of two strips is recommended as this gives a longer guide length.

Selected:

2 strips Series GR69 with groove width $L_2 = 9.7$ mm, standard installation – see Figure 208.

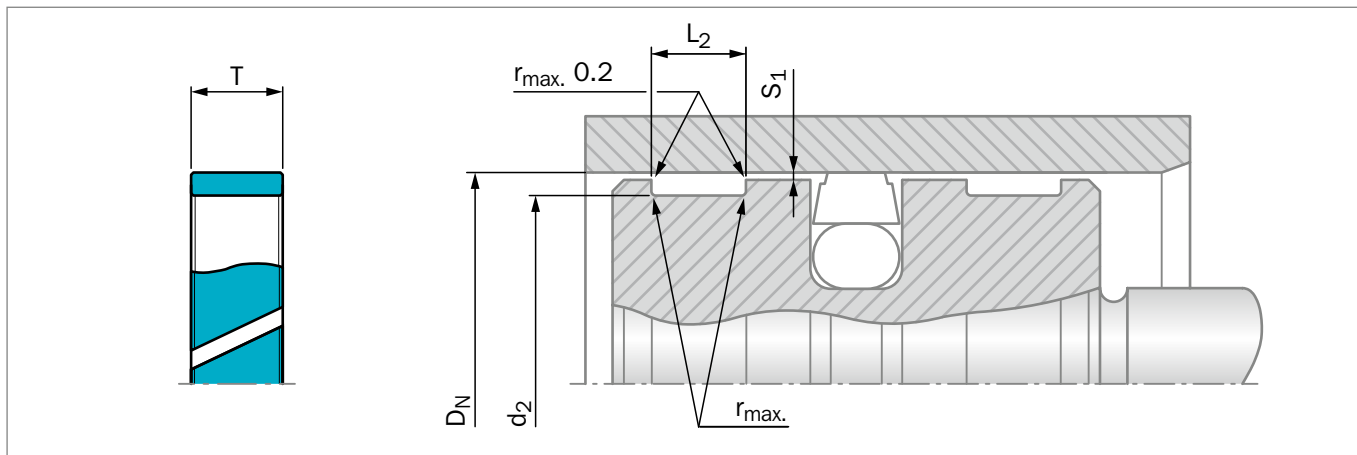


Figure 207: Piston guide

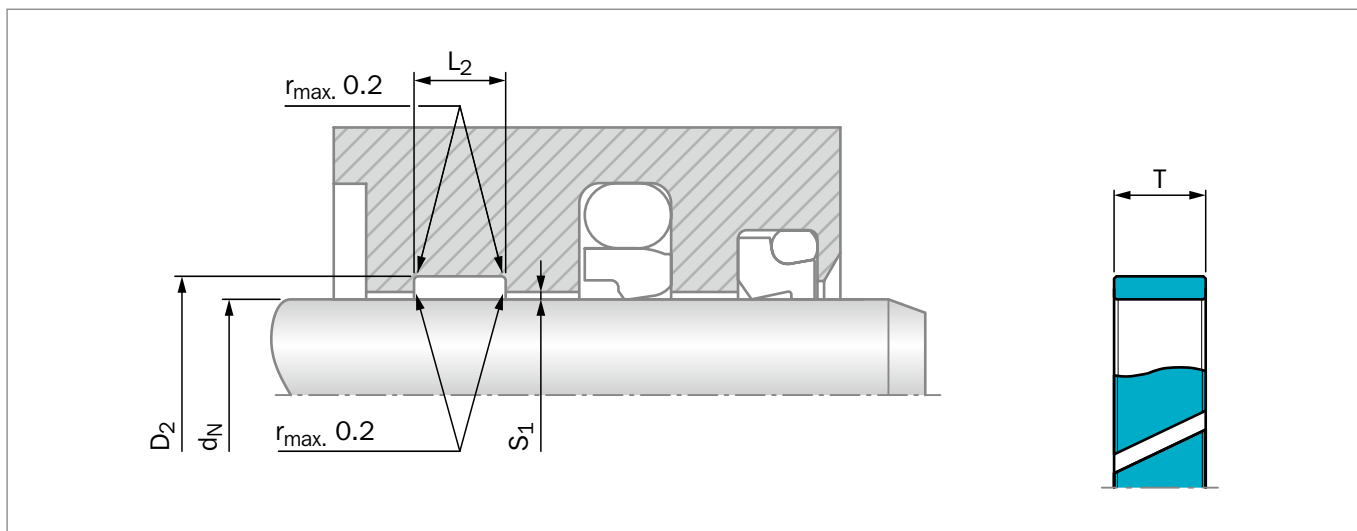


Figure 208: Rod guide

To improve the operational safety, particularly under high loads, the installation of a 3rd strip in material Turcite® M12 or T47 is recommended. It is installed on the oil side and serves, for example, as an internal scraper.

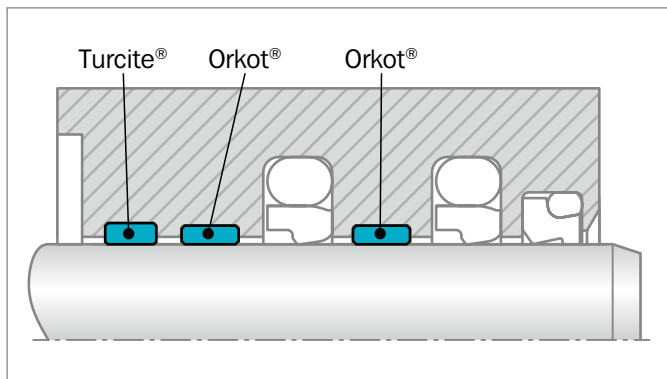


Figure 209: Rod guide for high loads (See also Figure 222 page 614)



■ Turcite® Slydring® for Piston and Rod

DESCRIPTION

Turcite® Slydring® is used as piston and rod guides due to the outstanding friction behavior, stick-slip free running and good resistance to high temperatures and chemicals.

Slydring® is available off-the-roll cut to length. Sections cut to size ready for installation are available for piston and rod diameters according to Table 186.

Slydring® has a geometrically rectangular cross-section and is chamfered for easy installation into the grooves.

TEARDROP STRUCTURE

Slydring® up to and including 4 mm radial thickness in Turcite® materials are as standard supplied with "teardrop" structure on the sliding surfaces. This structure comprises small lubricant pockets on the surface which improve the initial lubrication and promote the formation of a lubricant film. They also help to protect the seal system through their ability to embed any foreign particles. In order to be able to use the strip material for both piston and rod guides, the rings have the same teardrop structure on both sides.

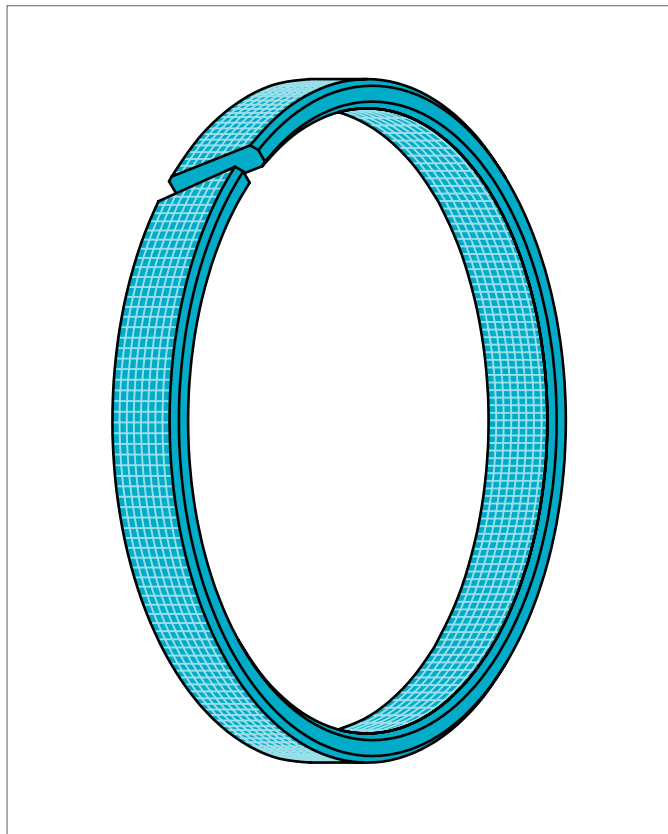


Figure 210: Turcite® Slydring® with teardrop structure structure and chamfered profile

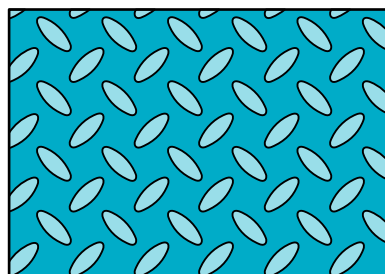


Figure 211: Teardrop structure for Turcite® Slydring®

Slydring® can also be delivered without teardrop structure. In this case, this must be indicated in the TSS Article No. (see Design Code for cut/type in Table 187).

ADVANTAGES

- No stick-slip effect when starting for smooth operation even at very low speeds
- Minimum static and dynamic friction coefficient for low operating temperature and energy loss
- Outstanding lubrication conditions further improved by the Teardrop structure
- Suitable for non-lubricating fluids depending on Turcite® material for optimum design flexibility
- High wear resistance ensures long service life
- Installation grooves according to ISO 10766
- Suitable for most hydraulic fluids in relation with the majority of modern hardware materials and surface finish depending on material selected.
- Suitable for new environmentally friendly hydraulic fluids
- The embedding of foreign particles is enhanced
- Good damping effect, absorbs vibrations



APPLICATION EXAMPLES

Turcite® Slydring® can be applied in demanding applications as a standard guiding element for hydraulic operated pistons, plus for piston rods with special requirements, in:

- Machine tools
- Injection molding machines
- Press brakes
- Presses
- Robotics and handling machinery
- Automation
- Positioning cylinders
- Servo hydraulics
- Piston accumulators
- Shock absorbers
- Valves for hydraulic and pneumatic circuits
- Agriculture
- Chemical and process industry

OPERATING CONDITIONS

Turcite® Slydring® with angle cut is recommended for linear movements:

Speed:	Up to 15 m/s
Temperature:	-60 °C to +150 °C (+200 °C)
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils), phosphate ester, water, air and others, depending on the Turcite® material compatibility.
Clearance:	The maximum permissible radial clearance S_{max} depends on the actual sealing system.
Tolerance:	Depending on the material and dimensions of Slydring®, the thickness tolerance is in the range from +0.00/-0.08 mm except for Turcite® Slydring® Article GP41 + GR41 and GP43 + GR43 where it is +0.02/-0.03 mm.
Radial Slydring®	Max. 15 N/mm ² at +25 °C
Pressure:	Max. 12 N/mm ² at +80 °C Max. 8 N/mm ² at +120 °C

When calculating the width of Turcite® Slydring® it is recommended to use a safety factor $f = 2$ - see page 569.

With Turcite® materials the allowed surface pressure decreases with increasing temperatures. The load bearing ability for dynamic applications depends primarily on the operating temperature, which should therefore generally not exceed +150 °C.

IMPORTANT NOTE

The above stated limits for pressure and speed are maximum values individually. Friction heat generated by the combination of pressure and speed may cause local heat build-up. Care should be taken not to apply high values for pressure and speed at the same time.

RECOMMENDED MATERIALS

The following materials have proven effective for hydraulic applications:

Turcon® Slydring® in Turcite® M12

All round material for light to medium hydraulic applications with linear, short stroke or helical movements in mineral oils, flame retardant hydraulic fluids, bio-oils, phosphate ester and fluids having low lubricating properties.
Low friction, high resistance to wear, heat and chemicals.

Turcon® Slydring® in Turcite® T47

For light to medium hydraulic applications with linear movement in mineral oils or media with good lubricating performance.

Turcon® Slydring® in Turcite® T51

For lubricated and poorly lubricated linear and slow rotary moving hydraulic and pneumatic components.



Table 188: Serial Numbers for Turcite® Slydring® in M12, T47, T51

Piston Serial No.	Rod Serial No.	Off-the-roll Serial No.*	Groove Width L ₂	Ring Thickness W
GP06	GR06	GM0600000-	6.00	1.00
GP22	GR22	GM2200000-	3.20	1.50
GP31	GR31	GM3100000-	10.00	1.50
GP41	GR41	GM4100000-	2.50	1.55
GP43	GR43	GM4300000-	4.00	1.55
GP49	GR49	GM4900000-	9.70	2.00
GP53	GR53	GM5300000-	15.00	2.00
GP64	GR64	GM6400000-	4.20	2.50
GP65	GR65	GM6500000-	5.60	2.50
GP67	GR67	GM6700000-	6.30	2.50
GP68	GR68	GM6800000-	8.10	2.50
GP69	GR69	GM6900000-	9.70	2.50
GP73	GR73	GM7300000-	15.00	2.50
GP74	GR74	GM7400000-	20.00	2.50
GP75	GR75	GM7500000-	25.00	2.50
GP76	GR76	GM7600000-	30.00	2.50
GP94	GR94	GM9400000-	20.00	3.00
GP98	GR98	GM9800000-	25.00	4.00
GP99	GR99	GM9900000-	9.70	4.00
GNP1	GRN1	GMN100000-	9.70	3.00
GPL2	GRL2	GML200000-	15.00	4.00
GPL3	GRL3	GML300000-	20.00	4.00
GPL5	GRL5	GML500000-	30.00	4.00

Further dimensions on request.

Dimensions in **bold** are suitable for installation in grooves to ISO 10766.

* Off-the-roll material can be supplied as complete rolls. Length of rolls varies depending on thickness and material, please contact your local Customer Solution Center.

TURCITE® FROM THE ROLL, CALCULATION OF THE LINEAR LENGTH

The linear length of Turcite® and Zurcon® Slydring® is calculated such that a gap "Z" is created at the ends of the strip after installation - Figure 207 and Figure 208, page 570. This is required for the following reasons:

- Compensation of the linear expansion of the strips due to the effects of temperature
- Avoidance of intermediate pressures and entrained pressures

When ordering strips off-the-roll for manufacturing of Turcite® and Zurcon® Slydring® in your own works, the length of the strip can be calculated using the following formulae:

Piston Slydring® :

$$L = c \times (D_N - W) - k \text{ [mm]}$$

Rod Slydring® :

$$L = c \times (d_N + W) - k \text{ [mm]}$$

where:

D_N = Bore diameter [mm]

d_N = Rod diameter [mm]

W = Ring thickness [mm]

c = 3.11 material factor, valid for Turcite® and Zurcon® Materials

k = Temperature constant:

0.8 for operating temperatures up to +120 °C

2.0 only for applications > +120 °C

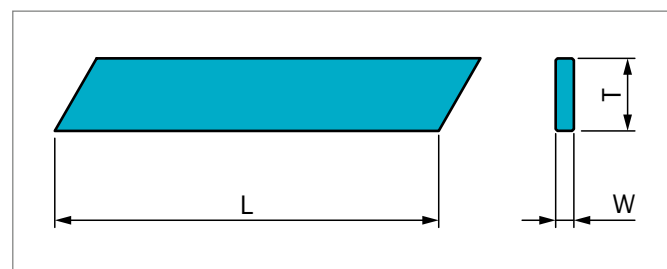


Figure 212: Cut length



■ Zurcon® Slydring® for Piston and Rod

ZURCON® Z80 / Z81

Z80 is a UHMW-PE (ultra-high molecular weight polyethylene) material preferred for use in water hydraulics and pneumatics due to excellent friction and wear properties. For foodstuff and medical applications, use Zurcon® Z81, which meets the requirements in FDA CFR 21, EC, 2002/72/EC and USP 26, 2003, chapter 88 Class. VI – 121 °C-, USP biological reactivity tests, in vivo.

Zurcon® Slydring® is as standard delivered without teardrop structure - see Table 187.

ADVANTAGES

- Good lubrication and wear performance
- Self-lubricating
- Low friction value
- No water absorption
- In compliance with FDA (Z81)
- Excellent resistance to chemicals
- High wear resistance

APPLICATION EXAMPLES

- Water hydraulics
- Presses
- Dry pneumatics
- Filling machines
- Food processing
- Medical equipment
- Ceramic coated hydraulics

OPERATING CONDITIONS

Speed, linear:	Max. 2.0 m/s
Temperature:	-60 °C to +80 °C
Media:	Mineral oil-based hydraulic fluids, flame retardant hydraulic fluids, environmentally friendly hydraulic fluids (bio-oils), phosphate ester, water, gases, dry air and others. Depending on the Zurcon® material compatibility.
Radial Slydring®	Max. 25 N/mm ² at +25 °C
Pressure:	Max. 8 N/mm ² from +60 °C to +80 °C

When calculating the width of Zurcon® Slydring® it is recommended to use a safety factor $f = 2$ - see page 569.

IMPORTANT NOTE

The above stated limits for pressure and speed are maximum values individually. Friction heat generated by the combination of pressure and speed may cause local heat build-up. Care should be taken not to apply high values for pressure and speed at the same time.

Table 189: Serial Numbers for Slydring® in Zurcon® Z80 / Z81

Piston Serial No.	Rod Serial No.	Off-the-roll TSS Article No.*	Groove Width L ₂	Ring Thickness W
GP41	GR41	GM4100000-Z80	2.50	1.55
GP43	GR43	GM4300000-Z80	4.00	1.55
GP65	GR65	GM6500000-Z80	5.60	2.50
GP69	GR69	GM6900000-Z80	9.70	2.50
GP73	GR73	GM7300000-Z80	15.00	2.50
GP75	GR75	GM7500000-Z80	25.00	2.50
GP98	GR98	GM9800000-Z80	25.00	4.00

Further dimensions on request - see Table 188.

* Off-the-roll material can be supplied as complete rolls. Length of rolls varies depending on thickness and material, please contact your local Customer Solution Center.



■ Installation Recommendation, Turcite® and Zurcon® Slydring® for Piston According to ISO 10766 Groove Dimensions

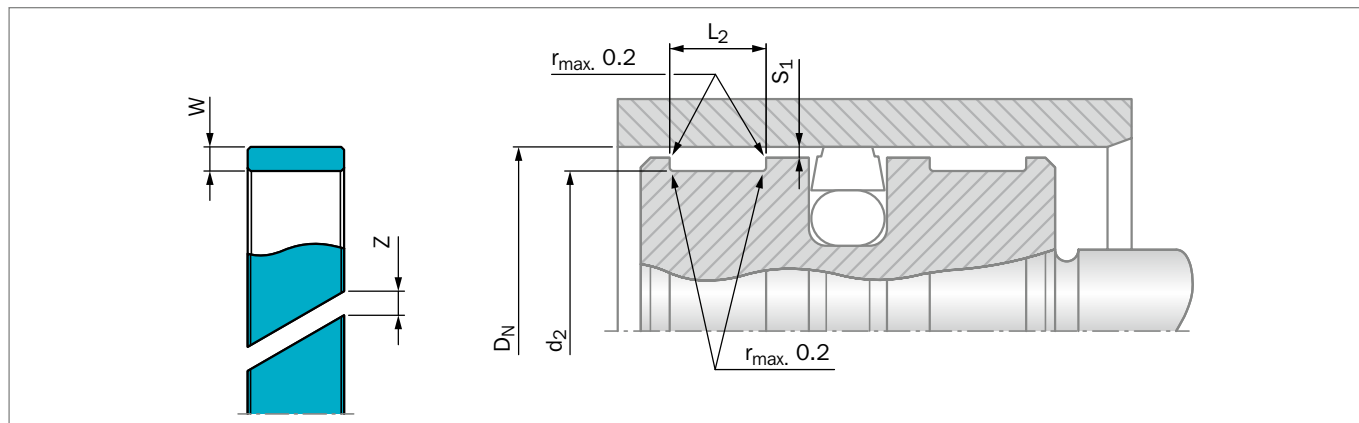


Figure 213: Installation Drawing

Table 190: Installation Dimensions

Series No.	Bore Diameter*	Groove Diameter	Groove Width	Ring Thickness	Ring Gap
	D_N H9	d_2 h8	L_2 +0.2	W	Z
GP41	8 - 20.0	$D_N - 3.10$	2.50	1.55	****
GP43	10 - 50.0	$D_N - 3.10$	4.00	1.55	****
GP65	16 - 140.0	$D_N - 5.00$	5.60	2.50	****
GP69	60 - 220.0	$D_N - 5.00$	9.70	2.50	****
GP73	130 - 400.0	$D_N - 5.00$	15.00	2.50	****
GP75	280 - 999.9	$D_N - 5.00$	25.00	2.50	****
GP75X	1,000 - 4,200.0	$D_N - 5.00$	25.00	2.50	****
GP98	280 - 999.9	$D_N - 8.00$	25.00	4.00	****
GP98X**	1,000 - 2,200.0	$D_N - 8.00$	25.00	4.00	****
GP99***	100 - 999.9	$D_N - 8.00$	9.70	4.00	****

* Recommended diameter ranges ** Slydring® in Turcite® T47 up to 3,000 mm *** Non ISO 10766 standard **** Calculation of the linear length, see page 573 For Slydring® to other standards, for example French standard NF E 48-037, please contact your local Customer Solution Center.

Table 191: Radial Clearance S_1 ****

Bore Diameter D_N	S_1 min	S_1 max
8 - 19	0.20	0.30
20 - 99	0.25	0.40
100 - 249	0.30	0.60
250 - 499	0.40	0.80
500 - 999	0.50	1.10
> 1,000	0.60	1.20

***** Specifications valid only in the area of the Slydring®, but not for the seal area. If the radial clearance S for the chosen seals is smaller than S_1 min, there is risk for metal to metal contact.

Table 192: Surface Roughness

Parameter	Mating Surface μm		Groove Surface μm
	Turcite® Materials	Zurcon® Materials	
Rz1max	0.63 - 4.00	1.00 - 4.00	< 16.0
Rz	0.40 - 2.50	0.63 - 2.50	< 10.0
Ra	0.05 - 0.40	0.10 - 0.40	< 2.5



ORDERING EXAMPLE

Slydring® for bore diameter $D_N = 100.0$ mm
Series GP69 from Table 190

Groove Width:	9.70 mm
Ring Thickness:	2.50 mm
Material:	Turcite® M12 other materials see Table 185
Standard Design:	With angle cut and teardrop structure Design code: 0
TSS Part No.:	GP6901000 from Table 193

The TSS Article No. for all intermediate sizes can be determined by following the example:

TSS Article No.	GP69	0	1000	-	M12
TSS Series No.					
Design Code (Standard)					
Bore Diameter x 10					
Quality Index (Standard)					
Material No.					

ORDERING EXAMPLE FOR $D_N \geq 1000$ MM

Slydring® for bore diameter $D_N = 2,200.0$ mm
Series GP98X from Table 190

Groove Width:	25.00 mm
Ring Thickness:	2.50 mm
Material:	Turcite® T47 other materials see Table 185
TSS Part No.:	GP98X2200 from Table 193

The TSS Article No. for all intermediate sizes can be determined by following the example:

TSS Article No.	GP98	X	2200	-	T47
TSS Series No.					
Design Code					
Bore Diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters $D_N \geq 1,000$ mm multiply only by factor 1.



Table 193: Slydring® for Piston

Dimensions				TSS Part No.	Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness		Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D _N H9	d ₂ h8	L ₂ +0.2	W		D _N H9	d ₂ h8	L ₂ +0.2	W	
8.0	4.9	2.5	1.55	GP4100080	50.0	46.9	4.0	1.55	GP4300500
10.0	6.9	2.5	1.55	GP4100100	50.0	45.0	5.6	2.50	GP6500500
10.0	6.9	4.0	1.55	GP4300100	50.0	45.0	9.7	2.50	GP6900500
12.0	8.9	4.0	1.55	GP4300120	52.0	47.0	5.6	2.50	GP6500520
14.0	10.9	4.0	1.55	GP4300140	55.0	50.0	5.6	2.50	GP6500550
15.0	11.9	4.0	1.55	GP4300150	55.0	50.0	9.7	2.50	GP6900550
16.0	12.9	4.0	1.55	GP4300160	60.0	55.0	5.6	2.50	GP6500600
16.0	11.0	5.6	2.50	GP6500160	60.0	55.0	9.7	2.50	GP6900600
18.0	14.9	4.0	1.55	GP4300180	61.0	56.0	5.6	2.50	GP6500610
18.0	13.0	5.6	2.50	GP6500180	62.0	57.0	9.7	2.50	GP6900620
20.0	16.9	4.0	1.55	GP4300200	63.0	58.0	5.6	2.50	GP6500630
20.0	15.0	5.6	2.50	GP6500200	63.0	58.0	9.7	2.50	GP6900630
22.0	17.0	5.6	2.50	GP6500220	65.0	60.0	5.6	2.50	GP6500650
25.0	21.9	4.0	1.55	GP4300250	65.0	60.0	9.7	2.50	GP6900650
25.0	20.0	5.6	2.50	GP6500250	68.0	63.0	5.6	2.50	GP6500680
25.0	20.0	9.7	2.50	GP6900250	68.0	63.0	9.7	2.50	GP6900680
27.0	22.0	5.6	2.50	GP6500270	70.0	65.0	5.6	2.50	GP6500700
27.0	22.0	9.7	2.50	GP6900270	70.0	65.0	9.7	2.50	GP6900700
28.0	23.0	5.6	2.50	GP6500280	72.0	67.0	5.6	2.50	GP6500720
30.0	26.9	4.0	1.55	GP4300300	75.0	70.0	5.6	2.50	GP6500750
30.0	25.0	5.6	2.50	GP6500300	75.0	70.0	9.7	2.50	GP6900750
30.0	25.0	9.7	2.50	GP6900300	80.0	75.0	5.6	2.50	GP6500800
32.0	28.9	4.0	1.55	GP4300320	80.0	75.0	9.7	2.50	GP6900800
32.0	27.0	5.6	2.50	GP6500320	85.0	80.0	5.6	2.50	GP6500850
32.0	27.0	9.7	2.50	GP6900320	85.0	80.0	9.7	2.50	GP6900850
33.0	28.0	5.6	2.50	GP6500330	90.0	85.0	5.6	2.50	GP6500900
35.0	30.0	5.6	2.50	GP6500350	90.0	85.0	9.7	2.50	GP6900900
35.0	30.0	9.7	2.50	GP6900350	95.0	90.0	5.6	2.50	GP6500950
36.0	31.9	4.0	1.55	GP4300360	95.0	90.0	9.7	2.50	GP6900950
37.0	32.0	5.6	2.50	GP6500370	100.0	95.0	5.6	2.50	GP6501000
37.0	32.0	9.7	2.50	GP6900370	100.0	95.0	9.7	2.50	GP6901000
40.0	36.9	4.0	1.55	GP4300400	105.0	100.0	5.6	2.50	GP6501050
40.0	35.0	5.6	2.50	GP6500400	105.0	100.0	9.7	2.50	GP6901050
40.0	35.0	9.7	2.50	GP6900400	110.0	105.0	9.7	2.50	GP6901100
41.0	36.0	5.6	2.50	GP6500410	115.0	110.0	9.7	2.50	GP6901150
41.0	36.0	9.7	2.50	GP6900410	120.0	115.0	9.7	2.50	GP6901200
42.0	37.0	5.6	2.50	GP6500420	125.0	120.0	5.6	2.50	GP6501250
45.0	40.0	5.6	2.50	GP6500450	125.0	120.0	9.7	2.50	GP6901250
45.0	40.0	9.7	2.50	GP6900450	130.0	125.0	9.7	2.50	GP6901300
48.0	43.0	5.6	2.50	GP6500480	130.0	125.0	15.0	2.50	GP7301300



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
135.0	130.0	9.7	2.50	GP6901350
135.0	130.0	15.0	2.50	GP7301350
140.0	135.0	9.7	2.50	GP6901400
140.0	135.0	15.0	2.50	GP7301400
150.0	145.0	15.0	2.50	GP7301500
160.0	155.0	9.7	2.50	GP6901600
160.0	155.0	15.0	2.50	GP7301600
170.0	165.0	15.0	2.50	GP7301700
180.0	175.0	9.7	2.50	GP6901800
180.0	175.0	15.0	2.50	GP7301800
190.0	185.0	15.0	2.50	GP7301900
200.0	195.0	9.7	2.50	GP6902000
200.0	195.0	15.0	2.50	GP7302000
210.0	205.0	15.0	2.50	GP7302100
220.0	215.0	9.7	2.50	GP6902200
220.0	215.0	15.0	2.50	GP7302200
230.0	225.0	15.0	2.50	GP7302300
240.0	235.0	15.0	2.50	GP7302400
250.0	245.0	9.7	2.50	GP6902500
250.0	245.0	15.0	2.50	GP7302500
280.0	275.0	15.0	2.50	GP7302800
280.0	275.0	25.0	2.50	GP7502800

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
280.0	272.0	25.0	4.00	GP9802800
300.0	295.0	15.0	2.50	GP7303000
320.0	315.0	15.0	2.50	GP7303200
320.0	315.0	25.0	2.50	GP7503200
320.0	312.0	25.0	4.00	GP9803200
350.0	345.0	25.0	2.50	GP7503500
360.0	355.0	15.0	2.50	GP7303600
360.0	355.0	25.0	2.50	GP7503600
360.0	352.0	25.0	4.00	GP9803600
400.0	395.0	15.0	2.50	GP7304000
400.0	395.0	25.0	2.50	GP7504000
400.0	392.0	25.0	4.00	GP9804000
450.0	445.0	15.0	2.50	GP7304500
450.0	445.0	25.0	2.50	GP7504500
450.0	442.0	25.0	4.00	GP9804500
500.0	495.0	15.0	2.50	GP7305000
500.0	495.0	25.0	2.50	GP7505000
500.0	492.0	25.0	4.00	GP9805000
1,000.0	995.0	25.0	2.50	GP75X1000
2,700.0	2,695.0	25.0	2.50	GP75X2700

All sizes printed in **bold** type conform to ISO 10766 and should be preferred.

All intermediate sizes not contained in the table are available.



■ Installation Recommendation, Turcite® and Zurcon® Slydring® for Rod According to ISO 10766 Groove Dimension

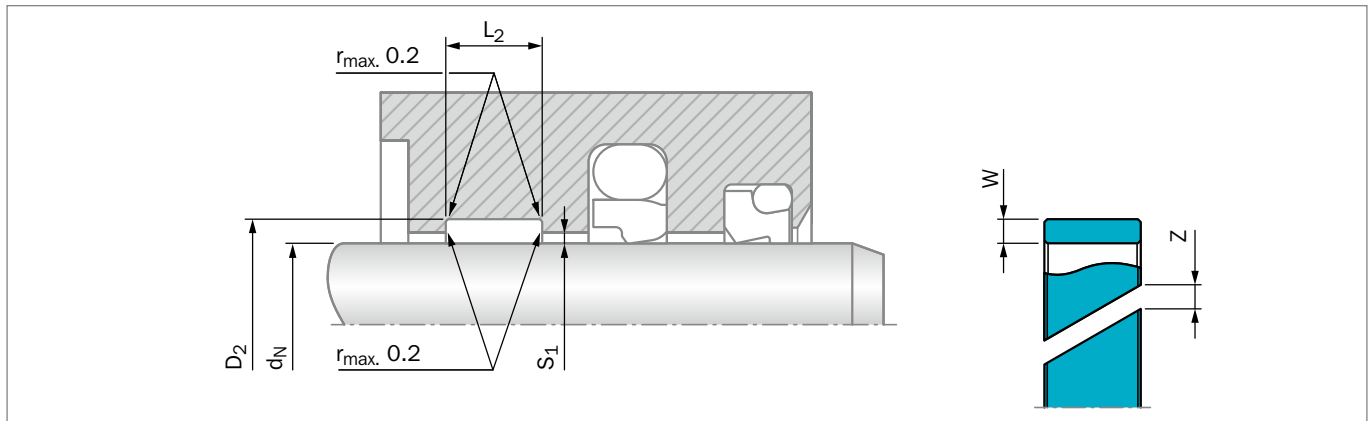


Figure 214: Installation Drawing

Table 194: Installation Dimensions

Serial No.	Rod Diameter* d_N f8/h9	Groove Diameter D_2 H8	Groove Width L_2 +0.2	Ring Thickness W	Ring Gap Z
GR41	8 - 20.0	$d_N + 3.10$	2.50	1.55	***
GR43	10 - 50.0	$d_N + 3.10$	4.00	1.55	***
GR65	15 - 140.0	$d_N + 5.00$	5.60	2.50	***
GR69	20 - 220.0	$d_N + 5.00$	9.70	2.50	***
GR73	80 - 400.0	$d_N + 5.00$	15.00	2.50	***
GR75	200 - 999.9	$d_N + 5.00$	25.00	2.50	***
GR75X	1,000 - 4,200.0	$d_N + 5.00$	25.00	2.50	***
GR98	280 - 999.9	$d_N + 8.00$	25.00	4.00	***
GR98X**	1,000 - 2,200.0	$d_N + 8.00$	25.00	4.00	***

* Recommended diameter ranges ** Slydring® in Turcite® T47 up to 3,000 mm *** Calculation of the linear length, see page 573
For Slydring® to other standards, for example French standard NF E 48-037, please contact your local Customer Solution Center.

Table 195: Radial Clearance S_1 ***

Rod Diameter d_N	S_1 min	S_1 max
8 - 19	0.20	0.30
20 - 99	0.25	0.40
100 - 249	0.30	0.60
250 - 499	0.40	0.80
500 - 999	0.50	1.10
> 1,000	0.60	1.20

*** Specifications valid only in the area of the Slydring®, but not for the seal area. If the radial clearance S for the chosen seals is smaller than S_1 min, there is risk for metal to metal contact.

Table 196: Surface Roughness

Parameter	Mating Surface μm		Groove Surface μm
	Turcite® Materials	Zurcon® Materials	
Rz1max	0.63 - 4.00	1.00 - 4.00	< 16.0
Rz	0.40 - 2.50	0.63 - 2.50	< 10.0
Ra	0.05 - 0.40	0.10 - 0.40	< 2.5

**ORDERING EXAMPLE**

Slydring® for rod diameter $d_N = 63.0$ mm
Series GR65 from Table 194

Groove Width:	5.60 mm
Ring Thickness:	2.50 mm
Material:	Turcite® M12 other materials see Table 185
Standard Design:	With angle cut and teardrop structure Design code: 0
TSS Part No.:	GR6500630 from Table 197

The TSS Article No. for all intermediate sizes can be determined by following the example:

TSS Article No.	GR65	0	0630	-	M12
TSS Series No.					
Design Code (Standard)					
Rod Diameter x 10					
Quality Index (Standard)					
Material No.					

ORDERING EXAMPLE FOR $d_N \geq 1000$ MM

Slydring® for rod diameter $d_N = 2,200.0$ mm
Series GR98X from Table 194

Groove Width:	25.00 mm
Ring Thickness:	4.00 mm
Material:	Turcite® T47 other materials see Table 185
TSS Part No.:	GR98X2200 from Table 197

The TSS Article No. for all intermediate sizes can be determined by following the example:

TSS Article No.	GR98	X	2200	-	T47
TSS Series No.					
Design Code					
Rod Diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters $d_N \geq 1,000$ mm multiply only by factor 1.

Table 197: Slydring® for Rods

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
8.0	11.1	2.5	1.55	GR4100080
10.0	13.1	2.5	1.55	GR4100100
10.0	13.1	4.0	1.55	GR4300100
12.0	15.1	4.0	1.55	GR4300120
14.0	17.1	4.0	1.55	GR4300140
15.0	18.1	4.0	1.55	GR4300150
16.0	19.1	4.0	1.55	GR4300160
16.0	21.0	5.6	2.50	GR6500160
18.0	21.1	4.0	1.55	GR4300180
18.0	23.0	5.6	2.50	GR6500180
20.0	23.1	4.0	1.55	GR4300200
20.0	25.0	5.6	2.50	GR6500200
20.0	25.0	9.7	2.50	GR6900200
22.0	25.1	4.0	1.55	GR4300220
22.0	27.0	5.6	2.50	GR6500220
22.0	27.0	9.7	2.50	GR6900220

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
25.0	28.1	4.0	1.55	GR4300250
25.0	30.0	5.6	2.50	GR6500250
25.0	30.0	9.7	2.50	GR6900250
27.0	32.0	5.6	2.50	GR6500270
27.0	32.0	9.7	2.50	GR6900270
28.0	31.1	4.0	1.55	GR4300280
28.0	33.0	5.6	2.50	GR6500280
28.0	33.0	9.7	2.50	GR6900280
30.0	35.0	5.6	2.50	GR6500300
30.0	35.0	9.7	2.50	GR6900300
32.0	37.0	5.6	2.50	GR6500320
32.0	37.0	9.7	2.50	GR6900320
35.0	40.0	5.6	2.50	GR6500350
35.0	40.0	9.7	2.50	GR6900350
36.0	41.0	5.6	2.50	GR6500360
36.0	41.0	9.7	2.50	GR6900360



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d _N f8/h9	D ₂ H8	L ₂ +0.2	W	
40.0	45.0	5.6	2.50	GR6500400
40.0	45.0	9.7	2.50	GR6900400
40.0	45.0	15.0	2.50	GR7300400
42.0	47.0	5.6	2.50	GR6500420
43.0	48.0	5.6	2.50	GR6500430
45.0	50.0	5.6	2.50	GR6500450
45.0	50.0	9.7	2.50	GR6900450
48.0	53.0	5.6	2.50	GR6500480
48.0	53.0	9.7	2.50	GR6900480
50.0	55.0	5.6	2.50	GR6500500
50.0	55.0	9.7	2.50	GR6900500
52.0	57.0	5.6	2.50	GR6500520
52.0	57.0	9.7	2.50	GR6900520
55.0	60.0	5.6	2.50	GR6500550
55.0	60.0	9.7	2.50	GR6900550
56.0	61.0	5.6	2.50	GR6500560
56.0	61.0	9.7	2.50	GR6900560
58.0	63.0	5.6	2.50	GR6500580
58.0	63.0	9.7	2.50	GR6900580
60.0	65.0	5.6	2.50	GR6500600
60.0	65.0	9.7	2.50	GR6900600
63.0	68.0	5.6	2.50	GR6500630
63.0	68.0	9.7	2.50	GR6900630
63.0	68.0	15.0	2.50	GR7300630
65.0	70.0	5.6	2.50	GR6500650
65.0	70.0	9.7	2.50	GR6900650
70.0	75.0	5.6	2.50	GR6500700
70.0	75.0	9.7	2.50	GR6900700
70.0	75.0	15.0	2.50	GR7300700
75.0	80.0	5.6	2.50	GR6500750
75.0	80.0	9.7	2.50	GR6900750
75.0	80.0	15.0	2.50	GR7300750
80.0	85.0	5.6	2.50	GR6500800
80.0	85.0	9.7	2.50	GR6900800
80.0	85.0	15.0	2.50	GR7300800
85.0	90.0	5.6	2.50	GR6500850
85.0	90.0	9.7	2.50	GR6900850
90.0	95.0	5.6	2.50	GR6500900
90.0	95.0	9.7	2.50	GR6900900
90.0	95.0	15.0	2.50	GR7300900
95.0	100.0	9.7	2.50	GR6900950

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d _N f8/h9	D ₂ H8	L ₂ +0.2	W	
95.0	100.0	15.0	2.50	GR7300950
100.0	105.0	5.6	2.50	GR6501000
100.0	105.0	9.7	2.50	GR6901000
100.0	105.0	15.0	2.50	GR7301000
105.0	110.0	9.7	2.50	GR6901050
105.0	110.0	15.0	2.50	GR7301050
110.0	115.0	9.7	2.50	GR6901100
110.0	115.0	15.0	2.50	GR7301100
115.0	120.0	9.7	2.50	GR6901150
115.0	120.0	15.0	2.50	GR7301150
120.0	125.0	5.6	2.50	GR6501200
120.0	125.0	9.7	2.50	GR6901200
120.0	125.0	15.0	2.50	GR7301200
125.0	130.0	9.7	2.50	GR6901250
125.0	130.0	15.0	2.50	GR7301250
130.0	135.0	15.0	2.50	GR7301300
135.0	140.0	15.0	2.50	GR7301350
140.0	145.0	9.7	2.50	GR6901400
140.0	145.0	15.0	2.50	GR7301400
150.0	155.0	15.0	2.50	GR7301500
155.0	160.0	15.0	2.50	GR7301550
160.0	165.0	9.7	2.50	GR6901600
160.0	165.0	15.0	2.50	GR7301600
170.0	175.0	15.0	2.50	GR7301700
180.0	185.0	9.7	2.50	GR6901800
180.0	185.0	15.0	2.50	GR7301800
190.0	195.0	15.0	2.50	GR7301900
195.0	200.0	15.0	2.50	GR7301950
200.0	205.0	15.0	2.50	GR7302000
200.0	205.0	25.0	2.50	GR7502000
210.0	215.0	15.0	2.50	GR7302100
220.0	225.0	15.0	2.50	GR7302200
220.0	225.0	25.0	2.50	GR7502200
230.0	235.0	25.0	2.50	GR7502300
240.0	245.0	25.0	2.50	GR7502400
250.0	255.0	15.0	2.50	GR7302500
250.0	255.0	25.0	2.50	GR7502500
280.0	285.0	15.0	2.50	GR7302800
280.0	285.0	25.0	2.50	GR7502800
280.0	288.0	25.0	4.00	GR9802800
300.0	305.0	25.0	2.50	GR7503000



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
320.0	325.0	15.0	2.50	GR7303200
320.0	325.0	25.0	2.50	GR7503200
320.0	328.0	25.0	4.00	GR9803200
350.0	355.0	25.0	2.50	GR7503500
360.0	365.0	15.0	2.50	GR7303600
360.0	365.0	25.0	2.50	GR7503600
360.0	368.0	25.0	4.00	GR9803600
400.0	405.0	25.0	2.50	GR7504000
400.0	408.0	25.0	4.00	GR9804000
800.0	805.0	25.0	2.50	GR7508000
800.0	808.0	25.0	4.00	GR9808000
1,000.0	1,005.0	25.0	2.50	GR75X1000
1,000.0	1,008.0	25.0	4.00	GR98X1000
2,200.0	2,205.0	25.0	2.50	GR75X2200
2,600.0	2,605.0	25.0	2.50	GR75X2600
2,600.0	2,608.0	25.0	4.00	GR98X2600

All sizes printed in **bold** type conform to ISO 10766 and should be preferred.

All intermediate sizes not contained in the table are available upon request.



■ HiMod® Slydring® for Piston and Rod

DESCRIPTION

HiMod® Slydring® are made in special, modified thermoplastic materials and can be used in hydraulic cylinders for medium to high loads. Two different grades of material are available:

HiMod® HM061: A special glass fiber reinforced polyacetal

HiMod® HM062: A special glass fiber reinforced heat-stabilized polyamid with PTFE filler

Slydring® in material HM061 and HM062 are injection molded to finish parts (mold necessary), a wide range of standard sizes (see Table 203 and Table 215) are available.

APPLICATION EXAMPLES

HiMod® Slydring® (HM061, 062) is generally utilized in a wide range of hydraulic equipment such as:

- Standard hydraulic cylinder, medium range
- Truck tail lift
- Telescopic cylinders
- Truck cranes
- Forklift truck
- Stabilizer cylinders
- Agriculture equipment
- Construction machinery

MATERIALS

HiMod® HM061

HiMod® HM061 is a polyacetal (POM) based material with glass fibers.

ADVANTAGES

- Favorable price/performance ratio
- High compressive strength
- Easy installation on pistons and glands (gland bore > 40 mm)
- High wear resistance
- Water absorption 0.2%
- High stiffness

OPERATING CONDITIONS

Velocity, reciprocating:	max. 0.8 m/s
Temperature:	-40 °C to +110 °C
Radial Slydring®	max. 40 N/mm ² at +25 °C
Pressure:	max. 25 N/mm ² > +60 °C

When calculating the width of HiMod® Slydring® it is recommended to use a safety factor $f = 2$, see page 569.

IMPORTANT NOTE

The above stated limits for pressure and speed are maximum values individually. Friction heat generated by the combination of pressure and speed may cause local heat build-up. Care should be taken not to apply high values for pressure and speed at the same time.

**HiMod® HM062**

HM062 is a polyamid (PA 66) based material with glass fibers and PTFE filler. The material is heat stabilized.

ADVANTAGES

- Good price/performance ratio
- High compressive strength even at high temperatures
- High wear resistance
- Easy installation on pistons and glands (gland bore > 30 mm)
- Low friction
- For operation under poor lubrication

OPERATING CONDITIONS

Velocity, reciprocating:	max. 1.0 m/s
Temperature:	-40 °C to +130 °C
Radial Slydring®	max. 75 N/mm ² at +60 °C
Pressure:	max. 40 N/mm ² > +60 °C

When calculating the width of HiMod® Slydring® it is recommended to use a safety factor $f = 2$ - see page 569.

IMPORTANT NOTE

The above stated limits for pressure and speed are maximum values individually. Friction heat generated by the combination of pressure and speed may cause local heat build-up. Care should be taken not to apply high values for pressure and speed at the same time.



■ Installation Recommendation, HiMod® Slydring® for Piston According to ISO 10766 Groove Dimension

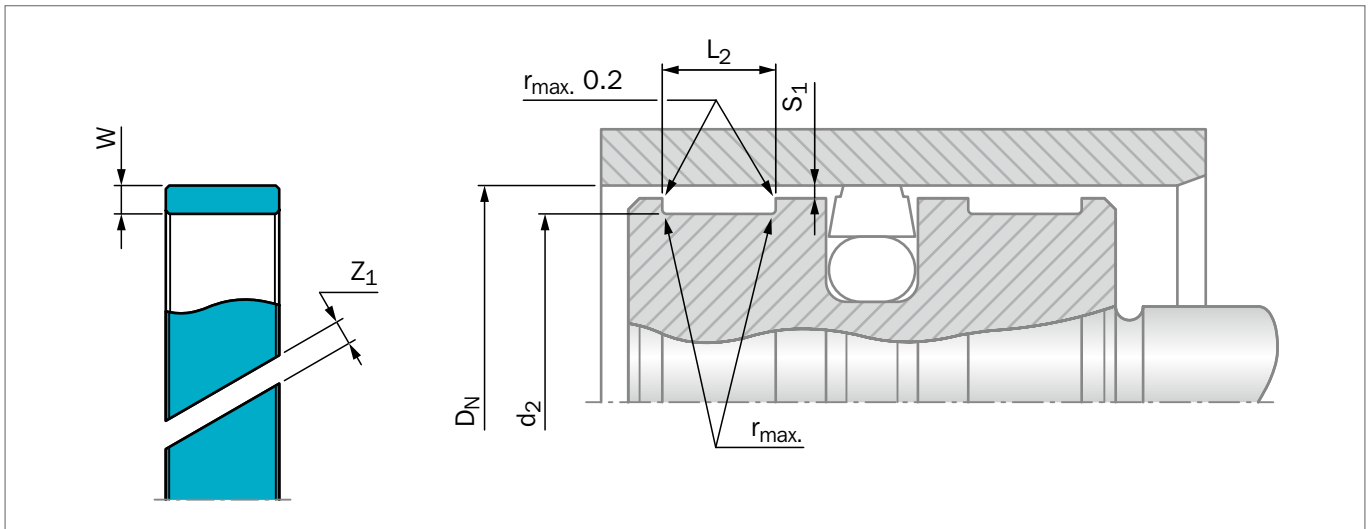


Figure 215: Installation Drawing

Table 198: Installation Dimensions

Serial No.	Bore Diameter*	Groove Diameter	Groove Width	Ring Thickness
	D_N H9	d_2 h8	L_2 +0.2	W
GP43	10 - 50.0	$D_N - 3.10$	4.00	1.55
GP65	16 - 140.0	$D_N - 5.00$	5.60	2.50
GP69	60 - 220.0	$D_N - 5.00$	9.70	2.50
GP73	130 - 300.0	$D_N - 5.00$	15.00	2.50
GP75	280 - 300.0	$D_N - 5.00$	25.00	2.50
GP98	280 - 300.0	$D_N - 8.00$	25.00	4.00

* Recommended diameter ranges.

For Slydring® to other standards, e.g. French standard NF E 48-037, please contact your local Customer Solution Center.

Table 199: Recommended Radii for Groove

D_N	r_{max}
8 - 250	0.2
> 250	0.4

Table 200: Radial Clearance S_1 **

Bore Diameter D_N	S_1 min	S_1 max
8 - 20	0.20	0.30
20 - 100	0.25	0.40
101 - 250	0.30	0.60
251 - 300	0.40	0.80

** Specifications valid only in the area of the Slydring®, but not for the seal area.

**Table 201: Recommended Gap**

D_N	Ring Gap Z_1
10 - 44	2 - 2.5
45 - 149	2 - 3
> 150	3 - 4

ORDERING EXAMPLE

Slydring® for bore diameter $D_N = 100.0$ mm
Series GP69 from Table 198:

Groove Width:	9.70 mm
Ring Thickness:	2.50 mm
Material:	HiMod® HM061 other materials see Table 185
Standard Design:	With angle cut Design code: 0
TSS Article No.:	GP6901000-HM061 from Table 203

Table 202: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Note

HM062 material can be ordered by replacing the HM061 material code in the TSS Article Number.

Please check with your local Customer Solution Center the availability and price of the HM062. This material may require new molds.

TSS Article No. GP69 0 1000 - HM061

TSS Series No. _____
Design Code (Standard) _____
Bore Diameter x 10 _____
Quality Index (Standard) _____
Material No. _____

Table 203: Slydring® for Piston in HM061

Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D_N H9	d_2 h8	L_2 +0.2	W		
12.0	8.9	4.0	1.55	GP4300120-HM061	WR 8.9 12 4
16.0	12.9	4.0	1.55	GP4300160-HM061	WR 12.9 16 4
20.0	16.9	4.0	1.55	GP4300200-HM061	WR 16.9 20 4
24.0	20.9	4.0	1.55	GP4300240-HM061	WR 20.9 24 4
25.0	21.9	4.0	1.55	GP4300250-HM061	WR 21.9 25 4
25.0	20.0	5.6	2.50	GP6500250-HM061	WR 20 25 5.6
25.0	20.0	9.7	2.50	GP6900250-HM061	WR 20 25 9.7
27.0	22.0	5.6	2.50	GP6500270-HM061	WR 22 27 5.6
27.0	22.0	9.7	2.50	GP6900270-HM061	WR 22 27 9.7
30.0	25.0	5.6	2.50	GP6500300-HM061	WR 25 30 5.6
30.0	25.0	9.7	2.50	GP6900300-HM061	WR 25 30 9.7
32.0	28.9	4.0	1.55	GP4300320-HM061	WR 28.9 32 4
32.0	27.0	5.6	2.50	GP6500320-HM061	WR 27 32 5.6
32.0	27.0	9.7	2.50	GP6900320-HM061	WR 27 32 9.7



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H9	d ₂ h8	L ₂ +0.2	W		
33.0	28.0	5.6	2.50	GP6500330-HM061	WR 28 33 5.6
35.0	30.0	5.6	2.50	GP6500350-HM061	WR 30 35 5.6
35.0	30.0	9.7	2.50	GP6900350-HM061	WR 30 35 9.7
37.0	32.0	5.6	2.50	GP6500370-HM061	WR 32 37 5.6
37.0	32.0	9.7	2.50	GP6900370-HM061	WR 32 37 9.7
40.0	35.0	5.6	2.50	GP6500400-HM061	WR 35 40 5.6
40.0	35.0	9.7	2.50	GP6900400-HM061	WR 35 40 9.7
41.0	36.0	5.6	2.50	GP6500410-HM061	WR 36 41 5.6
41.0	36.0	9.7	2.50	GP6900410-HM061	WR 36 41 9.7
45.0	40.0	5.6	2.50	GP6500450-HM061	WR 40 45 5.6
45.0	40.0	9.7	2.50	GP6900450-HM061	WR 40 45 9.7
45.0	40.0	15.0	2.50	GP7300450-HM061	WR 40 45 15
50.0	45.0	5.6	2.50	GP6500500-HM061	WR 45 50 5.6
50.0	45.0	9.7	2.50	GP6900500-HM061	WR 45 50 9.7
50.0	45.0	15.0	2.50	GP7300500-HM061	WR 45 50 15
52.0	47.0	5.6	2.50	GP6500520-HM061	WR 47 52 5.6
55.0	50.0	5.6	2.50	GP6500550-HM061	WR 50 55 5.6
55.0	50.0	9.7	2.50	GP6900550-HM061	WR 50 55 9.7
55.0	50.0	15.0	2.50	GP7300550-HM061	WR 50 55 15
57.0	52.0	5.6	2.50	GP6500570-HM061	WR 52 57 5.6
57.0	52.0	9.7	2.50	GP6900570-HM061	WR 52 57 9.7
58.0	53.0	9.7	2.50	GP6900580-HM061	WR 53 58 9.7
60.0	55.0	5.6	2.50	GP6500600-HM061	WR 55 60 5.6
60.0	55.0	9.7	2.50	GP6900600-HM061	WR 55 60 9.7
61.0	56.0	5.6	2.50	GP6500610-HM061	WR 56 61 5.6
62.0	56.0	9.7	2.50	GP6900620-HM061	WR 56 61 9.7
63.0	58.0	5.6	2.50	GP6500630-HM061	WR 58 63 5.6
63.0	58.0	9.7	2.50	GP6900630-HM061	WR 58 63 9.7
65.0	60.0	5.6	2.50	GP6500650-HM061	WR 60 65 5.6
65.0	60.0	9.7	2.50	GP6900650-HM061	WR 60 65 9.7
68.0	63.0	5.6	2.50	GP6500680-HM061	WR 63 68 5.6
68.0	63.0	9.7	2.50	GP6900680-HM061	WR 63 68 9.7
68.0	63.0	15.0	2.50	GP7300680-HM061	WR 63 68 15
70.0	65.0	5.6	2.50	GP6500700-HM061	WR 65 70 5.6
70.0	65.0	9.7	2.50	GP6900700-HM061	WR 65 70 9.7
72.0	67.0	5.6	2.50	GP6500720-HM061	WR 67 72 5.6
75.0	70.0	5.6	2.50	GP6500750-HM061	WR 70 75 5.6
75.0	70.0	9.7	2.50	GP6900750-HM061	WR 70 75 9.7
75.0	70.0	15.0	2.50	GP7300750-HM061	WR 70 75 15
80.0	75.0	5.6	2.50	GP6500800-HM061	WR 75 80 5.6
80.0	75.0	9.7	2.50	GP6900800-HM061	WR 75 80 9.7



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H9	d ₂ h8	L ₂ +0.2	W		
80.0	75.0	15.0	2.50	GP7300800-HM061	WR 75 80 15
85.0	80.0	5.6	2.50	GP6500850-HM061	WR 80 85 5.6
85.0	80.0	9.7	2.50	GP6900850-HM061	WR 80 85 9.7
85.0	80.0	15.0	2.50	GP7300850-HM061	WR 80 85 15
90.0	85.0	5.6	2.50	GP6500900-HM061	WR 85 90 5.6
90.0	85.0	9.7	2.50	GP6900900-HM061	WR 85 90 9.7
90.0	85.0	15.0	2.50	GP7300900-HM061	WR 85 90 15
95.0	90.0	5.6	2.50	GP6500950-HM061	WR 90 95 5.6
95.0	90.0	9.7	2.50	GP6900950-HM061	WR 90 95 9.7
100.0	95.0	5.6	2.50	GP6501000-HM061	WR 95 100 5.6
100.0	95.0	9.7	2.50	GP6901000-HM061	WR 95 100 9.7
100.0	95.0	15.0	2.50	GP7301000-HM061	WR 95 100 15
105.0	100.0	5.6	2.50	GP6501050-HM061	WR 100 105 5.6
105.0	100.0	9.7	2.50	GP6901050-HM061	WR 100 105 9.7
105.0	100.0	15.0	2.50	GP7301050-HM061	WR 100 105 15
110.0	105.0	9.7	2.50	GP6901100-HM061	WR 105 110 9.7
110.0	105.0	15.0	2.50	GP7301100-HM061	WR 105 110 15
115.0	110.0	9.7	2.50	GP6901150-HM061	WR 110 115 9.7
115.0	110.0	15.0	2.50	GP7301150-HM061	WR 110 115 15
120.0	115.0	9.7	2.50	GP6901200-HM061	WR 115 120 9.7
125.0	120.0	5.6	2.50	GP6501250-HM061	WR 120 125 5.6
125.0	120.0	9.7	2.50	GP6901250-HM061	WR 120 125 9.7
125.0	120.0	15.0	2.50	GP7301250-HM061	WR 120 125 15
130.0	125.0	15.0	2.50	GP7301300-HM061	WR 125 130 15
140.0	135.0	9.7	2.50	GP6901400-HM061	WR 135 140 9.7
140.0	135.0	15.0	2.50	GP7301400-HM061	WR 135 140 15
160.0	155.0	9.7	2.50	GP6901600-HM061	WR 155 160 9.7
160.0	155.0	15.0	2.50	GP7301600-HM061	WR 155 160 15
200.0	195.0	15.0	2.50	GP7302000-HM061	WR 195 200 15

All sizes printed in **bold** type conform to ISO 10766 and should be preferred for use.



■ Installation Recommendation, HiMod® Slydring® for Piston Non ISO 10766 Groove Dimension

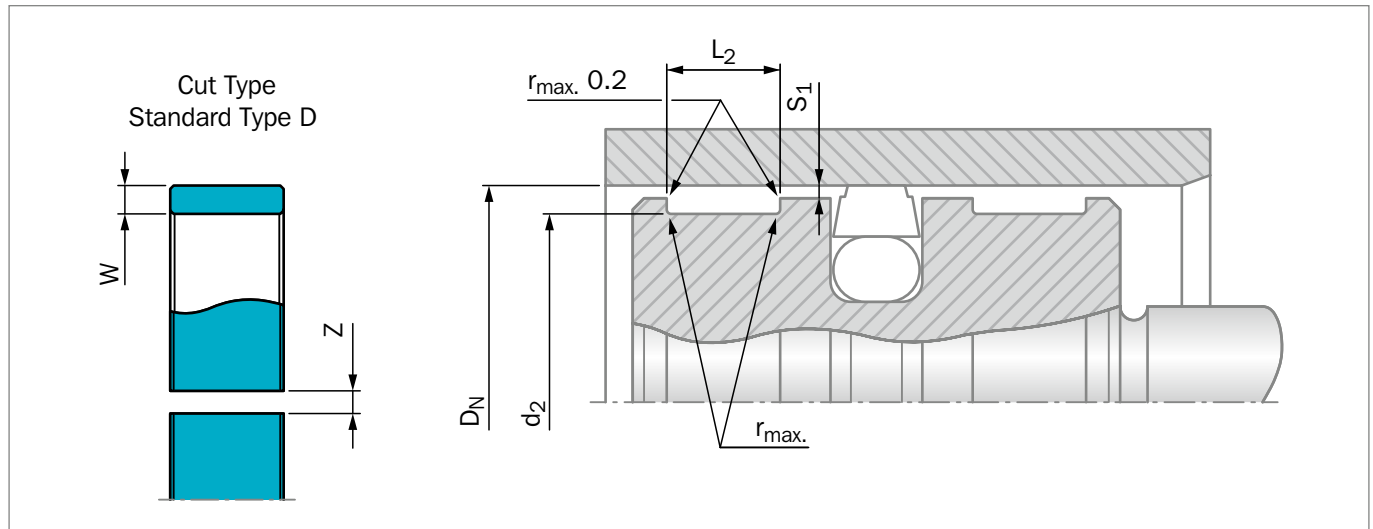


Figure 216: Installation Drawing

Table 204: Installation Dimensions HiMod® Slydring® for Piston non ISO 10766 Groove Dimensions

Series No.	Groove Diameter d_2 h8	Groove Width L_2 +0.2	Ring Thickness W	Series No.	Groove Diameter d_2 h8	Groove Width L_2 +0.2	Ring Thickness W
GP49	$D_N - 4.00$	9.70	2.00	GP91	$D_N - 6.00$	10.00	3.00
GP51	$D_N - 4.00$	10.00	2.00	GP92	$D_N - 6.00$	12.00	3.00
GP53	$D_N - 4.00$	15.00	2.00	GPN3	$D_N - 6.00$	12.80	3.00
GP54	$D_N - 4.00$	20.00	2.00	GP93	$D_N - 6.00$	15.00	3.00
GP67	$D_N - 5.00$	6.30	2.50	GPN4	$D_N - 6.00$	19.20	3.00
GP68	$D_N - 5.00$	8.10	2.50	GP94	$D_N - 6.00$	20.00	3.00
GP71	$D_N - 5.00$	10.00	2.50	GP95	$D_N - 6.00$	25.00	3.00
GPN1	$D_N - 6.00$	9.70	3.00	GPL2	$D_N - 8.00$	15.00	4.00

Table 205: Recommended Radii for Groove

D_N	r_{max}
8 - 250	0.2
> 250	0.4

Table 206: Radial Clearance S_1 *

Bore Diameter D_N	S_1 min	S_1 max
8 - 20	0.20	0.30
20 - 100	0.25	0.40
101 - 250	0.30	0.60
251 - 300	0.40	0.80

* Specifications valid only in the area of the Slydring®, but not for the seal area.

**Table 207: Recommended Gap**

D_N	Ring Gap Z_1
16 - 49	1 - 1.5
50 - 154	1.5 - 2.5
> 155	2 - 4

ORDERING EXAMPLE

For Polypac Slydring® Ref. No. E/DWR 20/2

Bore diameter $D_N = 20.0$ mm:

Groove Width:	9.70 mm
Ring Thickness:	2.00 mm
Material:	HM061
Standard Design:	With straight cut Design code: D

Table 208: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Note

HM062 material can be ordered by replacing the HM061 material code in the TSS Article Number.

Please check with your local Customer Solution Center the availability and price of the HM062. This material may require new molds.

TSS Article No. **GP49 D 0200 - HM061**

TSS Series No. _____

Design Code (Standard) _____

Bore Diameter x 10 _____

Quality Index (Standard) _____

Material No. _____

Table 209: Slydring® for Piston in HM061

Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D_N H11	d_2 h8	L_2 +0.2	W		
16.0	12.0	9.7	2.00	GP49D0160-HM061	E/DWR 16/2-9.6
18.0	14.0	9.7	2.00	GP49D0180-HM061	E/DWR 18/2-9.6
20.0	16.0	9.7	2.00	GP49D0200-HM061	E/DWR 20/2-9.6
22.0	18.0	9.7	2.00	GP49D0220-HM061	E/DWR 22/2-9.6
24.0	20.0	9.7	2.00	GP49D0240-HM061	E/DWR 24/2-9.6
25.0	21.0	9.7	2.00	GP49D0250-HM061	E/DWR 25/2-9.6
26.0	22.0	9.7	2.00	GP49D0260-HM061	E/DWR 26/2-9.6
27.0	23.0	9.7	2.00	GP49D0270-HM061	E/DWR 27/2-9.6
28.0	24.0	9.7	2.00	GP49D0280-HM061	E/DWR 28/2-9.6
29.0	25.0	9.7	2.00	GP49D0290-HM061	E/DWR 29/2-9.6
30.0	26.0	9.7	2.00	GP49D0300-HM061	E/DWR 30/2-9.6
32.0	28.0	9.7	2.00	GP49D0320-HM061	E/DWR 32/2-9.6
33.0	29.0	9.7	2.00	GP49D0330-HM061	E/DWR 33/2-9.6
34.0	30.0	9.7	2.00	GP49D0340-HM061	E/DWR 34/2-9.6
35.0	31.0	9.7	2.00	GP49D0350-HM061	E/DWR 35/2-9.6
35.0	29.0	9.7	3.00	GPN1D0350-HM061	E/DWR 35/3-9.6
36.0	32.0	9.7	2.00	GP49D0360-HM061	E/DWR 36/2-9.6
38.0	34.0	9.7	2.00	GP49D0380-HM061	E/DWR 38/2-9.6



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h8	L ₂ +0.2	W		
39.0	35.0	9.7	2.00	GP49D0390-HM061	E/DWR 39/2-9.6
39.0	35.0	12.8	2.00	GPN3D0390-HM061	E/DWR 39/2-12.8
39.0	33.0	9.7	3.00	GPN1D0390-HM061	E/DWR 39/3-9.6
40.0	36.0	9.7	2.00	GP49D0400-HM061	E/DWR 40/2-9.6
40.0	34.0	9.7	3.00	GPN1D0400-HM061	E/DWR 40/3-9.6
42.0	38.0	9.7	2.00	GP49D0420-HM061	E/DWR 42/2-9.6
44.0	40.0	9.7	2.00	GP49D0440-HM061	E/DWR 44/2-9.6
44.0	38.0	9.7	3.00	GPN1D0440-HM061	E/DWR 44/3-9.6
45.0	41.0	9.7	2.00	GP49D0450-HM061	E/DWR 45/2-9.6
45.0	39.0	9.7	3.00	GPN1D0450-HM061	E/DWR 45/3-9.6
46.0	40.0	9.7	3.00	GPN1D0460-HM061	E/DWR 46/3-9.6
48.0	42.0	9.7	3.00	GPN1D0480-HM061	E/DWR 48/3-9.6
48.0	42.0	12.8	3.00	GPN3D0480-HM061	E/DWR 48/3-12.8
49.0	45.0	9.7	2.00	GP49D0490-HM061	E/DWR 49/2-9.6
49.0	43.0	9.7	3.00	GPN1D0490-HM061	E/DWR 49/3-9.6
50.0	44.0	9.7	3.00	GPN1D0500-HM061	E/DWR 50/3-9.6
50.0	44.0	12.8	3.00	GPN3D0500-HM061	E/DWR 50/3-12.8
52.0	46.0	12.8	3.00	GPN3D0520-HM061	E/DWR 52/3-12.8
53.0	47.0	9.7	3.00	GPN1D0530-HM061	E/DWR 53/3-9.6
54.0	48.0	12.8	3.00	GPN3D0540-HM061	E/DWR 54/3-12.8
55.0	51.0	9.7	2.00	GP49D0550-HM061	E/DWR 55/2-9.6
55.0	49.0	9.7	3.00	GPN1D0550-HM061	E/DWR 55/3-9.6
55.0	49.0	12.8	3.00	GPN3D0550-HM061	E/DWR 55/3-12.8
56.0	50.0	12.8	3.00	GPN3D0560-HM061	E/DWR 56/3-12.8
57.0	51.0	12.8	3.00	GPN3D0570-HM061	E/DWR 57/3-12.8
59.0	55.0	9.7	2.00	GP49D0590-HM061	E/DWR 59/2-9.6
60.0	56.0	9.7	2.00	GP49D0600-HM061	E/DWR 60/2-9.6
60.0	54.0	12.8	3.00	GPN3D0600-HM061	E/DWR 60/3-12.8
62.0	56.0	12.8	3.00	GPN3D0620-HM061	E/DWR 62/3-12.8
63.0	57.0	12.8	3.00	GPN3D0630-HM061	E/DWR 63/3-12.8
65.0	61.0	9.7	2.00	GP49D0650-HM061	E/DWR 65/2-9.6
65.0	59.0	12.8	3.00	GPN3D0650-HM061	E/DWR 65/3-12.8
67.0	61.0	12.8	3.00	GPN3D0670-HM061	E/DWR 67/3-12.8
68.0	62.0	12.8	3.00	GPN3D0680-HM061	E/DWR 68/3-12.8
70.0	64.0	12.8	3.00	GPN3D0700-HM061	E/DWR 70/3-12.8
71.0	65.0	12.8	3.00	GPN3D0710-HM061	E/DWR 71/3-12.8
72.0	66.0	12.8	3.00	GPN3D0720-HM061	E/DWR 72/3-12.8
74.0	70.0	9.7	2.00	GP49D0740-HM061	E/DWR 74/2-9.6
74.0	68.0	12.8	3.00	GPN3D0740-HM061	E/DWR 74/3-12.8
75.0	69.0	12.8	3.00	GPN3D0750-HM061	E/DWR 75/3-12.8
76.0	70.0	12.8	3.00	GPN3D0760-HM061	E/DWR 76/3-12.8
77.0	71.0	12.8	3.00	GPN3D0770-HM061	E/DWR 77/3-12.8
80.0	74.0	12.8	3.00	GPN3D0800-HM061	E/DWR 80/3-12.8
83.0	77.0	12.8	3.00	GPN3D0830-HM061	E/DWR 83/3-12.8



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h8	L ₂ +0.2	W		
84.0	78.0	12.8	3.00	GPN3D0840-HM061	E/DWR 84/3-12.8
85.0	79.0	12.8	3.00	GPN3D0850-HM061	E/DWR 85/3-12.8
88.0	82.0	12.8	3.00	GPN3D0880-HM061	E/DWR 88/3-12.8
89.0	83.0	12.8	3.00	GPN3D0890-HM061	E/DWR 89/3-12.8
90.0	84.0	12.8	3.00	GPN3D0900-HM061	E/DWR 90/3-12.8
91.0	85.0	12.8	3.00	GPN3D0910-HM061	E/DWR 91/3-12.8
92.0	86.0	12.8	3.00	GPN3D0920-HM061	E/DWR 92/3-12.8
93.0	87.0	12.8	3.00	GPN3D0930-HM061	E/DWR 93/3-12.8
94.0	88.0	12.8	3.00	GPN3D0940-HM061	E/DWR 94/3-12.8
95.0	89.0	12.8	3.00	GPN3D0950-HM061	E/DWR 95/3-12.8
100.0	94.0	9.7	3.00	GPN1D1000-HM061	E/DWR 100/3-9.6
100.0	94.0	12.8	3.00	GPN3D1000-HM061	E/DWR 100/3-12.8
102.0	96.0	12.8	3.00	GPN3D1020-HM061	E/DWR 102/3-12.8
104.0	98.0	12.8	3.00	GPN3D1040-HM061	E/DWR 104/3-12.8
105.0	99.0	12.8	3.00	GPN3D1050-HM061	E/DWR 105/3-12.8
105.0	99.0	19.2	3.00	GPN4D1050-HM061	E/DWR 105/3-19.2
108.0	102.0	12.8	3.00	GPN3D1080-HM061	E/DWR 108/3-12.8
110.0	104.0	12.8	3.00	GPN3D1100-HM061	E/DWR 110/3-12.8
112.0	106.0	19.2	3.00	GPN4D1120-HM061	E/DWR 112/3-19.2
115.0	109.0	12.8	3.00	GPN3D1150-HM061	E/DWR 115/3-12.8
115.0	109.0	19.2	3.00	GPN4D1150-HM061	E/DWR 115/3-19.2
116.0	110.0	12.8	3.00	GPN3D1160-HM061	E/DWR 116/3-12.8
116.0	110.0	19.2	3.00	GPN4D1160-HM061	E/DWR 116/3-19.2
118.0	112.0	12.8	3.00	GPN3D1180-HM061	E/DWR 118/3-12.8
120.0	114.0	12.8	3.00	GPN3D1200-HM061	E/DWR 120/3-12.8
121.0	115.0	12.8	3.00	GPN3D1210-HM061	E/DWR 121/3-12.8
123.0	117.0	12.8	3.00	GPN3D1230-HM061	E/DWR 123/3-12.8
125.0	119.0	12.8	3.00	GPN3D1250-HM061	E/DWR 125/3-12.8
125.0	119.0	19.2	3.00	GPN4D1250-HM061	E/DWR 125/3-19.2
126.0	120.0	12.8	3.00	GPN3D1260-HM061	E/DWR 126/3-12.8
127.0	121.0	12.8	3.00	GPN3D1270-HM061	E/DWR 127/3-12.8
130.0	124.0	12.8	3.00	GPN3D1300-HM061	E/DWR 130/3-12.8
130.0	124.0	19.2	3.00	GPN4D1300-HM061	E/DWR 130/3-19.2
133.0	127.0	12.8	3.00	GPN3D1330-HM061	E/DWR 133/3-12.8
135.0	129.0	12.8	3.00	GPN3D1350-HM061	E/DWR 135/3-12.8
135.0	129.0	19.2	3.00	GPN4D1350-HM061	E/DWR 135/3-19.2
140.0	134.0	12.8	3.00	GPN3D1400-HM061	E/DWR 140/3-12.8
140.0	134.0	19.2	3.00	GPN4D1400-HM061	E/DWR 140/3-19.2
145.0	139.0	12.8	3.00	GPN3D1450-HM061	E/DWR 145/3-12.8
145.0	139.0	19.2	3.00	GPN4D1450-HM061	E/DWR 145/3-19.2
146.0	140.0	12.8	3.00	GPN3D1460-HM061	E/DWR 146/3-12.8
147.0	141.0	12.8	3.00	GPN3D1470-HM061	E/DWR 147/3-12.8
150.0	144.0	12.8	3.00	GPN3D1500-HM061	E/DWR 150/3-12.8
150.0	144.0	19.2	3.00	GPN4D1500-HM061	E/DWR 150/3-19.2



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h8	L ₂ +0.2	W		
151.0	145.0	12.8	3.00	GPN3D1510-HM061	E/DWR 151/3-12.8
152.0	146.0	19.2	3.00	GPN4D1520-HM061	E/DWR 152/3-19.2
153.0	147.0	19.2	3.00	GPN4D1530-HM061	E/DWR 153/3-19.2
154.0	148.0	19.2	3.00	GPN4D1540-HM061	E/DWR 154/3-19.2
155.0	149.0	19.2	3.00	GPN4D1550-HM061	E/DWR 155/3-19.2
158.0	152.0	19.2	3.00	GPN4D1580-HM061	E/DWR 158/3-19.2
160.0	154.0	19.2	3.00	GPN4D1600-HM061	E/DWR 160/3-19.2
165.0	159.0	19.2	3.00	GPN4D1650-HM061	E/DWR 165/3-19.2
168.0	162.0	12.8	3.00	GPN3D1680-HM061	E/DWR 168/3-12.8
168.0	162.0	19.2	3.00	GPN4D1680-HM061	E/DWR 168/3-19.2
170.0	164.0	19.2	3.00	GPN4D1700-HM061	E/DWR 170/3-19.2
172.0	166.0	19.2	3.00	GPN4D1720-HM061	E/DWR 172/3-19.2
175.0	169.0	19.2	3.00	GPN4D1750-HM061	E/DWR 175/3-19.2
180.0	174.0	19.2	3.00	GPN4D1800-HM061	E/DWR 180/3-19.2
181.0	175.0	19.2	3.00	GPN4D1810-HM061	E/DWR 181/3-19.2
185.0	179.0	19.2	3.00	GPN4D1850-HM061	E/DWR 185/3-19.2
189.0	183.0	19.2	3.00	GPN4D1890-HM061	E/DWR 189/3-19.2
190.0	184.0	19.2	3.00	GPN4D1900-HM061	E/DWR 190/3-19.2
192.0	186.0	19.2	3.00	GPN4D1920-HM061	E/DWR 192/3-19.2
195.0	189.0	19.2	3.00	GPN4D1950-HM061	E/DWR 195/3-19.2
200.0	194.0	19.2	3.00	GPN4D2000-HM061	E/DWR 200/3-19.2
205.0	199.0	19.2	3.00	GPN4D2050-HM061	E/DWR 205/3-19.2
210.0	204.0	19.2	3.00	GPN4D2100-HM061	E/DWR 210/3-19.2
215.0	209.0	19.2	3.00	GPN4D2150-HM061	E/DWR 215/3-19.2
217.0	211.0	19.2	3.00	GPN4D2170-HM061	E/DWR 217/3-19.2
220.0	214.0	19.2	3.00	GPN4D2200-HM061	E/DWR 220/3-19.2
225.0	219.0	19.2	3.00	GPN4D2250-HM061	E/DWR 225/3-19.2
230.0	224.0	19.2	3.00	GPN4D2300-HM061	E/DWR 230/3-19.2
235.0	229.0	19.2	3.00	GPN4D2350-HM061	E/DWR 235/3-19.2
237.0	231.0	19.2	3.00	GPN4D2370-HM061	E/DWR 237/3-19.2
240.0	234.0	19.2	3.00	GPN4D2400-HM061	E/DWR 240/3-19.2
245.0	239.0	19.2	3.00	GPN4D2450-HM061	E/DWR 245/3-19.2
250.0	244.0	19.2	3.00	GPN4D2500-HM061	E/DWR 250/3-19.2
254.0	248.0	19.2	3.00	GPN4D2540-HM061	E/DWR 254/3-19.2
255.0	249.0	19.2	3.00	GPN4D2550-HM061	E/DWR 255/3-19.2
260.0	254.0	19.2	3.00	GPN4D2600-HM061	E/DWR 260/3-19.2
265.0	259.0	19.2	3.00	GPN4D2650-HM061	E/DWR 265/3-19.2
270.0	264.0	19.2	3.00	GPN4D2700-HM061	E/DWR 270/3-19.2
275.0	269.0	19.2	3.00	GPN4D2750-HM061	E/DWR 275/3-19.2
280.0	274.0	19.2	3.00	GPN4D2800-HM061	E/DWR 280/3-19.2
285.0	279.0	19.2	3.00	GPN4D2850-HM061	E/DWR 285/3-19.2
290.0	284.0	19.2	3.00	GPN4D2900-HM061	E/DWR 290/3-19.2
295.0	289.0	19.2	3.00	GPN4D2950-HM061	E/DWR 295/3-19.2
300.0	294.0	19.2	3.00	GPN4D3000-HM061	E/DWR 300/3-19.2



■ Installation Recommendation, HiMod® Slydring® for Rod According to ISO 10766 Groove Dimension

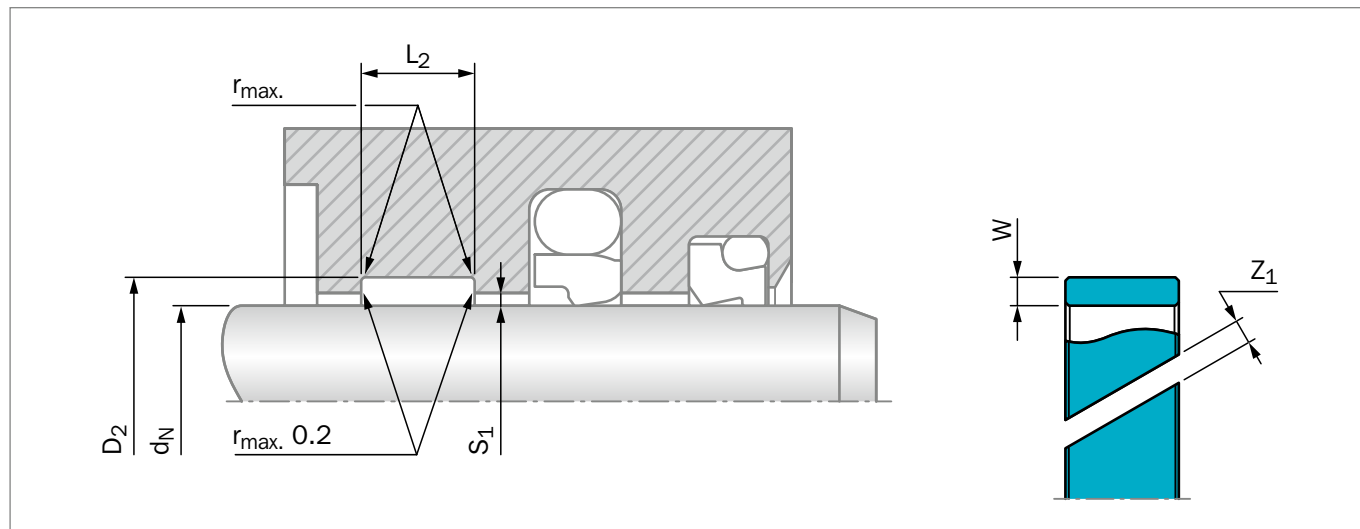


Figure 217: Installation Drawing

Table 210: Installation Dimensions

Serial No.	Rod Diameter*	Groove Diameter	Groove Width	Ring Thickness
	d_N f8/h9	D_2 H8	L_2 +0.2	W
GR43	10 - 50.0	$d_N + 3.10$	4.00	1.55
GR65	15 - 140.0	$d_N + 5.00$	5.60	2.50
GR69	20 - 220.0	$d_N + 5.00$	9.70	2.50
GR73	80 - 300.0	$d_N + 5.00$	15.00	2.50
GR75	200 - 300.0	$d_N + 5.00$	25.00	2.50
GR98	280 - 300.0	$d_N + 8.00$	25.00	4.00

* Recommended diameter ranges.

For Slydring® to other standards, e.g. French standard NF E 48-037, please contact your local Customer Solution Center.

Table 211: Recommended Radii for Groove

d_N	r_{max}
8 - 250	0.2
> 250	0.4

Table 212: Radial Clearance S_1 **

Rod Diameter d_N	S_1 min	S_1 max
8 - 20	0.20	0.30
20 - 100	0.25	0.40
101 - 250	0.30	0.60
251 - 300	0.40	0.80

** Specifications valid only in the area of the Slydring®, but not for the seal area.

**Table 213: Recommended Gap**

d_N	Ring Gap Z_1
10 - 39	2 - 2.5
40 - 149	2 - 3
> 150	3 - 4

ORDERING EXAMPLE

Slydring® for rod diameter $d_N = 63.0$ mm
Series GR69 from Table 210

Groove Width:	9.70 mm
Ring Thickness:	2.50 mm
Material:	HiMod® HM061 other materials see Table 185
Standard Design:	With angle cut Design code: 0
TSS Part No.:	GR6900630-HM061 from Table 215

Table 214: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Note

HM062 material can be ordered by replacing the HM061 material code in the TSS Article Number.

Please check with your local Customer Solution Center the availability and price of the HM062. This material may require new molds.

TSS Article No. GR69 0 0630 - HM061

TSS Series No. _____
Design Code (Standard) _____
Rod Diameter x 10 _____
Quality Index (Standard) _____
Material No. _____

Table 215: Slydring® for Rods in HM061

Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d_N f8/h9	D_2 H8	L_2 +0.2	W		
20.0	23.1	4.0	1.55	GR4300200-HM061	WR 20 23.1 4
20.0	25.0	5.6	2.50	GR6500200-HM061	WR 20 25 5.6
20.0	25.0	9.7	2.50	GR6900200-HM061	WR 20 25 9.7
22.0	27.0	5.6	2.50	GR6500220-HM061	WR 22 27 5.6
22.0	27.0	9.7	2.50	GR6900220-HM061	WR 22 27 9.7
25.0	28.1	4.0	1.55	GR4300250-HM061	WR 25 28.1 4
25.0	30.0	5.6	2.50	GR6500250-HM061	WR 25 30 5.6
25.0	30.0	9.7	2.50	GR6900250-HM061	WR 25 30 9.7
27.0	32.0	5.6	2.50	GR6500270-HM061	WR 27 32 5.6
27.0	32.0	9.7	2.50	GR6900270-HM061	WR 27 32 9.7
28.0	33.0	5.6	2.50	GR6500280-HM061	WR 28 33 5.6
30.0	35.0	5.6	2.50	GR6500300-HM061	WR 30 35 5.6
30.0	35.0	9.7	2.50	GR6900300-HM061	WR 30 35 9.7
32.0	37.0	5.6	2.50	GR6500320-HM061	WR 32 37 5.6



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d _N f8/h9	D ₂ H8	L ₂ +0.2	W		
32.0	37.0	9.7	2.50	GR6900320-HM061	WR 32 37 9.7
35.0	40.0	5.6	2.50	GR6500350-HM061	WR 35 40 5.6
35.0	40.0	9.7	2.50	GR6900350-HM061	WR 35 40 9.7
36.0	41.0	5.6	2.50	GR6500360-HM061	WR 36 41 5.6
36.0	41.0	9.7	2.50	GR6900360-HM061	WR 36 41 9.7
40.0	45.0	5.6	2.50	GR6500400-HM061	WR 40 45 5.6
40.0	45.0	9.7	2.50	GR6900400-HM061	WR 40 45 9.7
40.0	45.0	15.0	2.50	GR7300400-HM061	WR 40 45 15
45.0	50.0	5.6	2.50	GR6500450-HM061	WR 45 50 5.6
45.0	50.0	9.7	2.50	GR6900450-HM061	WR 45 50 9.7
45.0	50.0	15.0	2.50	GR7300450-HM061	WR 45 50 15
47.0	52.0	5.6	2.50	GR6500470-HM061	WR 47 52 5.6
50.0	55.0	5.6	2.50	GR6500500-HM061	WR 50 55 5.6
50.0	55.0	9.7	2.50	GR6900500-HM061	WR 50 55 9.7
50.0	55.0	15.0	2.50	GR7300500-HM061	WR 50 55 15
52.0	57.0	5.6	2.50	GR6500520-HM061	WR 52 57 5.6
52.0	57.0	9.7	2.50	GR6900520-HM061	WR 52 57 9.7
53.0	58.0	9.7	2.50	GR6900530-HM061	WR 53 58 9.7
55.0	60.0	5.6	2.50	GR6500550-HM061	WR 55 60 5.6
55.0	60.0	9.7	2.50	GR6900550-HM061	WR 55 60 9.7
56.0	61.0	5.6	2.50	GR6500560-HM061	WR 56 61 5.6
56.0	61.0	9.7	2.50	GR6900560-HM061	WR 56 61 9.7
58.0	63.0	5.6	2.50	GR6500580-HM061	WR 58 63 5.6
58.0	63.0	9.7	2.50	GR6900580-HM061	WR 58 63 9.7
60.0	65.0	5.6	2.50	GR6500600-HM061	WR 60 65 5.6
60.0	65.0	9.7	2.50	GR6900600-HM061	WR 60 65 9.7
63.0	68.0	5.6	2.50	GR6500630-HM061	WR 63 68 5.6
63.0	68.0	9.7	2.50	GR6900630-HM061	WR 63 68 9.7
63.0	68.0	15.0	2.50	GR7300630-HM061	ER 63 68 15
65.0	70.0	5.6	2.50	GR6500650-HM061	WR 65 70 5.6
65.0	70.0	9.7	2.50	GR6900650-HM061	WR 65 70 9.7
67.0	72.0	5.6	2.50	GR6500670-HM061	WR 67 72 5.6
70.0	75.0	5.6	2.50	GR6500700-HM061	WR 70 75 5.6
70.0	75.0	9.7	2.50	GR6900700-HM061	WR 70 75 9.7
70.0	75.0	15.0	2.50	GR7300700-HM061	WR 70 75 15
75.0	80.0	5.6	2.50	GR6500750-HM061	WR 75 80 5.6
75.0	80.0	9.7	2.50	GR6900750-HM061	WR 75 80 9.7
75.0	80.0	15.0	2.50	GR7300750-HM061	WR 75 80 15
80.0	85.0	5.6	2.50	GR6500800-HM061	WR 80 85 5.6
80.0	85.0	9.7	2.50	GR6900800-HM061	WR 80 85 9.7
80.0	85.0	15.0	2.50	GR7300800-HM061	WR 80 85 15



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d_N f8/h9	D_2 H8	L_2 +0.2	W		
85.0	90.0	5.6	2.50	GR6500850-HM061	WR 85 90 5.6
85.0	90.0	9.7	2.50	GR6900850-HM061	WR 85 90 9.7
85.0	90.0	15.0	2.50	GR7300850-HM061	WR 85 90 15
90.0	95.0	5.6	2.50	GR6500900-HM061	WR 90 95 5.6
90.0	95.0	9.7	2.50	GR6900900-HM061	WR 90 95 9.7
92.0	97.0	25.0	2.50	GR7500920-HM061	WR 92 97 25
95.0	100.0	5.6	2.50	GR6500950-HM061	WR 95 100 5.6
95.0	100.0	9.7	2.50	GR6900950-HM061	WR 95 100 9.7
95.0	100.0	15.0	2.50	GR7300950-HM061	WR 95 100 15
100.0	105.0	5.6	2.50	GR6501000-HM061	WR 100 105 5.6
100.0	105.0	9.7	2.50	GR6901000-HM061	WR 100 105 9.7
100.0	105.0	15.0	2.50	GR7301000-HM061	WR 100 105 15
105.0	110.0	9.7	2.50	GR6901050-HM061	WR 105 110 9.7
105.0	110.0	15.0	2.50	GR7301050-HM061	WR 105 110 15
110.0	115.0	9.7	2.50	GR6901100-HM061	WR 110 115 9.7
110.0	115.0	15.0	2.50	GR7301100-HM061	WR 110 115 15
115.0	120.0	9.7	2.50	GR6901150-HM061	WR 115 120 9.7
120.0	125.0	5.6	2.50	GR6501200-HM061	WR 120 125 5.6
120.0	125.0	9.7	2.50	GR6901200-HM061	WR 120 125 9.7
120.0	125.0	15.0	2.50	GR7301200-HM061	WR 120 125 15
125.0	130.0	15.0	2.50	GR7301250-HM061	WR 125 130 15
135.0	140.0	9.7	2.50	GR6901350-HM061	WR 135 140 9.7
135.0	140.0	15.0	2.50	GR7301350-HM061	WR 135 140 15
155.0	160.0	15.0	2.50	GR7301550-HM061	WR 155 160 15
195.0	200.0	15.0	2.50	GR7301950-HM061	WR 195 200 15

All sizes printed in **bold** type conform to ISO 10766 and should be preferred for use.



■ Installation Recommendation, HiMod® Slydring® for Rod Non ISO 10766 Groove Dimension

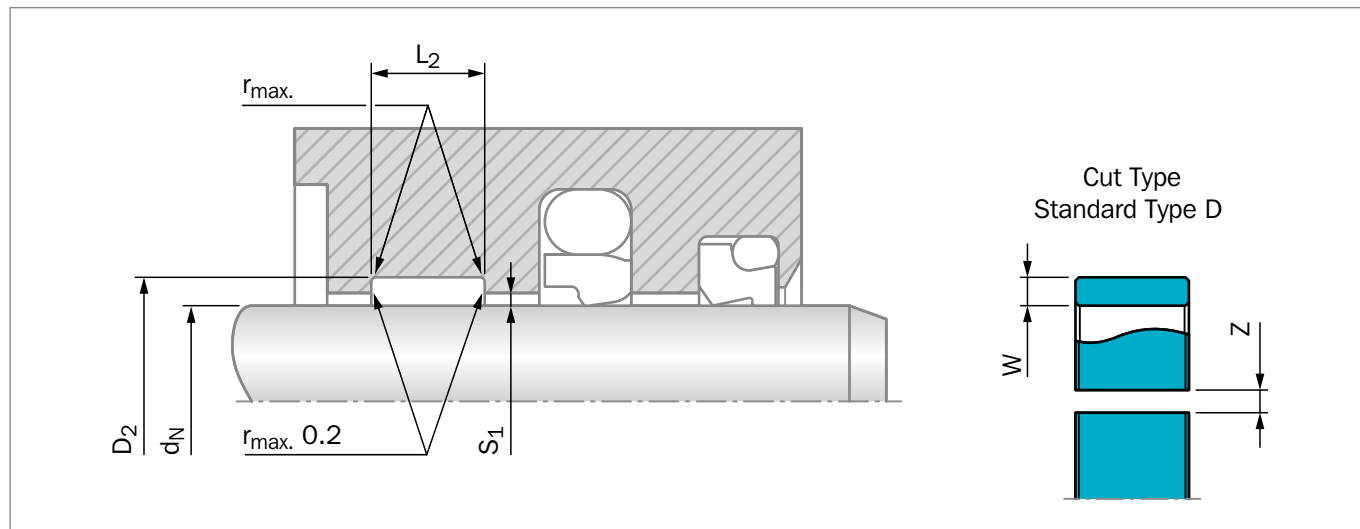


Figure 218: Installation Drawing

Table 216: Installation Dimensions HiMod® Slydring® for Rod non ISO 10766 Groove Dimensions

Serial No.	Groove Diameter	Groove Width	Ring Thickness	Serial No.	Groove Diameter	Groove Width	Ring Thickness
	D ₂ H8	L ₂ +0.2	W		D ₂ H8	L ₂ +0.2	W
GR48	d _N + 4.00	8.10	2.00	GR92	d _N + 6.00	12.00	3.00
GR49	d _N + 4.00	9.70	2.00	GRN3	d _N + 6.00	12.80	3.00
GR51	d _N + 4.00	10.00	2.00	GRN4	d _N + 6.00	19.20	3.00
GRN5	d _N + 4.00	12.80	2.00	GR94	d _N + 6.00	20.00	3.00
GR53	d _N + 4.00	15.00	2.00	GR95	d _N + 6.00	25.00	3.00
GR54	d _N + 4.00	20.00	2.00	GR96	d _N + 6.00	30.00	3.00
GRN1	d _N + 6.00	9.70	3.00	GRL5	d _N + 8.00	30.00	4.00
GR91	d _N + 6.00	10.00	3.00				

Table 217: Recommended Radii for Groove

d _N	r _{max}
8 - 250	0.2
> 250	0.4

Table 218: Radial Clearance S₁ *

Rod Diameter d _N	S ₁ min	S ₁ max
8 - 20	0.20	0.30
20 - 100	0.25	0.40
101 - 250	0.30	0.60
251 - 500	0.40	0.80
501 - 1,000	0.50	1.10
> 1,001	0.60	1.20

* Specifications valid only in the area of the Slydring®, but not for the seal area.

**Table 219: Recommended Gap**

d_N	Ring Gap Z_1
12 - 40	1 - 1.5
41 - 149	1.5 - 2.5
> 150	2 - 4

ORDERING EXAMPLE

For Polypac Slydtring® Ref. No. I/DWR 40/2

Rod diameter $d_N = 40.0$ mm:

Groove Width:	9.70 mm
Ring Thickness:	2.00 mm
Material:	HiMod® HM061 other materials see Table 185
Standard Design:	With straight cut Design code: D

Table 220: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Note

HM062 material can be ordered by replacing the HM061 material code in the TSS Article Number.

Please check with your local Customer Solution Center the availability and price of the HM062. This material may require new molds.

TSS Article No.**GR49 D 0400 - HM061**

TSS Series No. _____

Design Code (Standard) _____

Rod Diameter x 10 _____

Quality Index (Standard) _____

Material No. _____

Table 221: Slydtring® for Rod in HM061

Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter d_N h11	Groove Diameter D_2 H8	Groove Width L_2 +0.2	Thickness W		
12.0	16.0	9.7	2.00	GR49D0120-HM061	I/DWR 12/2-9.6
14.0	18.0	9.7	2.00	GR49D0140-HM061	I/DWR 14/2-9.6
15.0	19.0	9.7	2.00	GR49D0150-HM061	I/DWR 15/2-9.6
16.0	20.0	9.7	2.00	GR49D0160-HM061	I/DWR 16/2-9.6
18.0	22.0	9.7	2.00	GR49D0180-HM061	I/DWR 18/2-9.6
20.0	24.0	9.7	2.00	GR49D0200-HM061	I/DWR 20/2-9.6
22.0	26.0	9.7	2.00	GR49D0220-HM061	I/DWR 22/2-9.6
24.0	28.0	9.7	2.00	GR49D0240-HM061	I/DWR 24/2-9.6
25.0	29.0	9.7	2.00	GR49D0250-HM061	I/DWR 25/2-9.6
26.0	30.0	9.7	2.00	GR49D0260-HM061	I/DWR 26/2-9.6
27.0	31.0	9.7	2.00	GR49D0270-HM061	I/DWR 27/2-9.6
28.0	32.0	9.7	2.00	GR49D0280-HM061	I/DWR 28/2-9.6
30.0	34.0	9.7	2.00	GR49D0300-HM061	I/DWR 30/2-9.6
30.0	36.0	9.7	3.00	GRN1D0300-HM061	I/DWR 30/3-9.6
31.0	35.0	9.7	2.00	GR49D0310-HM061	I/DWR 31/2-9.6
32.0	36.0	9.7	2.00	GR49D0320-HM061	I/DWR 32/2-9.6



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d_N h11	D_2 H8	L_2 +0.2	W		
34.0	38.0	9.7	2.00	GR49D0340-HM061	I/DWR 34/2-9.6
35.0	39.0	9.7	2.00	GR49D0350-HM061	I/DWR 35/2-9.6
35.0	41.0	9.7	3.00	GRN1D0350-HM061	I/DWR 35/3-9.6
35.0	39.0	12.8	2.00	GRN5D0350-HM061	I/DWR 35/2-12.8
36.0	40.0	9.7	2.00	GR49D0360-HM061	I/DWR 36/2-9.6
36.0	42.0	9.7	3.00	GRN1D0360-HM061	I/DWR 36/3-9.6
37.0	41.0	9.7	2.00	GR49D0370-HM061	I/DWR 37/2-9.6
38.0	42.0	9.7	2.00	GR49D0380-HM061	I/DWR 38/2-9.6
40.0	44.0	9.7	2.00	GR49D0400-HM061	I/DWR 40/2-9.6
40.0	46.0	9.7	3.00	GRN1D0400-HM061	I/DWR 40/3-9.6
40.0	46.0	12.8	3.00	GRN3D0400-HM061	I/DWR 40/3-12.8
42.0	46.0	9.7	2.00	GR49D0420-HM061	I/DWR 42/2-9.6
42.0	48.0	9.7	3.00	GRN1D0420-HM061	I/DWR 42/3-9.6
44.0	50.0	9.7	3.00	GRN1D0440-HM061	I/DWR 44/3-9.6
45.0	51.0	9.7	3.00	GRN1D0450-HM061	I/DWR 45/3-9.6
45.0	51.0	12.8	3.00	GRN3D0450-HM061	I/DWR 45/3-12.8
46.0	50.0	9.7	2.00	GR49D0460-HM061	I/DWR 46/2-9.6
46.0	52.0	9.7	3.00	GRN1D0460-HM061	I/DWR 46/3-9.6
47.0	53.0	9.7	3.00	GRN1D0470-HM061	I/DWR 47/3-9.6
48.0	54.0	9.7	3.00	GRN1D0480-HM061	I/DWR 48/3-9.6
48.0	52.0	12.8	2.00	GRN5D0480-HM061	I/DWR 48/2-12.8
50.0	54.0	9.7	2.00	GR49D0500-HM061	I/DWR 50/2-9.6
50.0	56.0	9.7	3.00	GRN1D0500-HM061	I/DWR 50/3-9.6
50.0	56.0	12.8	3.00	GRN3D0500-HM061	I/DWR 50/3-12.8
52.0	58.0	9.7	3.00	GRN1D0520-HM061	I/DWR 52/3-9.6
53.0	59.0	9.7	3.00	GRN1D0530-HM061	I/DWR 53/3-9.6
54.0	60.0	9.7	3.00	GRN1D0540-HM061	I/DWR 54/3-9.6
54.0	60.0	12.8	3.00	GRN3D0540-HM061	I/DWR 54/3-12.8
55.0	59.0	9.7	2.00	GR49D0550-HM061	I/DWR 55/2-9.6
55.0	61.0	9.7	3.00	GRN1D0550-HM061	I/DWR 55/3-9.6
55.0	61.0	12.8	3.00	GRN3D0550-HM061	I/DWR 55/3-12.8
56.0	62.0	9.7	3.00	GRN1D0560-HM061	I/DWR 56/3-9.6
56.0	62.0	12.8	3.00	GRN3D0560-HM061	I/DWR 56/3-12.8
58.0	64.0	12.8	3.00	GRN3D0580-HM061	I/DWR 58/3-12.8
60.0	64.0	9.7	2.00	GR49D0600-HM061	I/DWR 60/2-9.6
60.0	66.0	9.7	3.00	GRN1D0600-HM061	I/DWR 60/3-9.6
60.0	66.0	12.8	3.00	GRN3D0600-HM061	I/DWR 60/3-12.8
61.0	67.0	12.8	3.00	GRN3D0610-HM061	I/DWR 61/3-12.8
62.0	68.0	12.8	3.00	GRN3D0620-HM061	I/DWR 62/3-12.8
63.0	69.0	12.8	3.00	GRN3D0630-HM061	I/DWR 63/3-12.8



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d _N h11	D ₂ H8	L ₂ +0.2	W		
65.0	71.0	12.8	3.00	GRN3D0650-HM061	I/DWR 65/3-12.8
66.0	72.0	12.8	3.00	GRN3D0660-HM061	I/DWR 66/3-12.8
67.0	73.0	12.8	3.00	GRN3D0670-HM061	I/DWR 67/3-12.8
69.0	75.0	12.8	3.00	GRN3D0690-HM061	I/DWR 69/3-12.8
70.0	76.0	12.8	3.00	GRN3D0700-HM061	I/DWR 70/3-12.8
70.0	76.0	19.2	3.00	GRN4D0700-HM061	I/DWR 70/3-19.2
72.0	78.0	12.8	3.00	GRN3D0720-HM061	I/DWR 72/3-12.8
73.0	79.0	12.8	3.00	GRN3D0730-HM061	I/DWR 73/3-12.8
75.0	81.0	12.8	3.00	GRN3D0750-HM061	I/DWR 75/3-12.8
75.0	81.0	19.2	3.00	GRN4D0750-HM061	I/DWR 75/3-19.2
76.0	82.0	12.8	3.00	GRN3D0760-HM061	I/DWR 76/3-12.8
78.0	84.0	12.8	3.00	GRN3D0780-HM061	I/DWR 78/3-12.8
79.0	85.0	12.8	3.00	GRN3D0790-HM061	I/DWR 79/3-12.8
80.0	86.0	12.8	3.00	GRN3D0800-HM061	I/DWR 80/3-12.8
80.0	86.0	19.2	3.00	GRN4D0800-HM061	I/DWR 80/3-19.2
82.0	88.0	12.8	3.00	GRN3D0820-HM061	I/DWR 82/3-12.8
84.0	90.0	12.8	3.00	GRN3D0840-HM061	I/DWR 84/3-12.8
85.0	91.0	12.8	3.00	GRN3D0850-HM061	I/DWR 85/3-12.8
85.0	91.0	19.2	3.00	GRN4D0850-HM061	I/DWR 85/3-19.2
86.0	92.0	12.8	3.00	GRN3D0860-HM061	I/DWR 86/3-12.8
88.0	94.0	12.8	3.00	GRN3D0880-HM061	I/DWR 88/3-12.8
90.0	96.0	12.8	3.00	GRN3D0900-HM061	I/DWR 90/3-12.8
90.0	96.0	19.2	3.00	GRN4D0900-HM061	I/DWR 90/3-19.2
91.0	97.0	12.8	3.00	GRN3D0910-HM061	I/DWR 91/3-12.8
92.0	98.0	12.8	3.00	GRN3D0920-HM061	I/DWR 92/3-12.8
93.0	99.0	12.8	3.00	GRN3D0930-HM061	I/DWR 93/3-12.8
95.0	101.0	12.8	3.00	GRN3D0950-HM061	I/DWR 95/3-12.8
95.0	101.0	19.2	3.00	GRN4D0950-HM061	I/DWR 95/3-19.2
96.0	102.0	12.8	3.00	GRN3D0960-HM061	I/DWR 96/3-12.8
97.0	103.0	12.8	3.00	GRN3D0970-HM061	I/DWR 97/3-12.8
98.0	104.0	12.8	3.00	GRN3D0980-HM061	I/DWR 98/3-12.8
99.0	105.0	12.8	3.00	GRN3D0990-HM061	I/DWR 99/3-12.8
99.0	105.0	19.2	3.00	GRN4D0990-HM061	I/DWR 99/3-19.2
100.0	106.0	12.8	3.00	GRN3D1000-HM061	I/DWR 100/3-12.8
100.0	106.0	19.2	3.00	GRN4D1000-HM061	I/DWR 100/3-19.2
101.0	107.0	12.8	3.00	GRN3D1010-HM061	I/DWR 101/3-12.8
105.0	111.0	12.8	3.00	GRN3D1050-HM061	I/DWR 105/3-12.8
105.0	111.0	19.2	3.00	GRN4D1050-HM061	I/DWR 105/3-19.2
106.0	112.0	19.2	3.00	GRN4D1060-HM061	I/DWR 106/3-19.2
107.0	113.0	12.8	3.00	GRN3D1070-HM061	I/DWR 107/3-12.8



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d _N h11	D ₂ H8	L ₂ +0.2	W		
109.0	115.0	12.8	3.00	GRN3D1090-HM061	I/DWR 109/3-12.8
110.0	116.0	12.8	3.00	GRN3D1100-HM061	I/DWR 110/3-12.8
113.0	119.0	12.8	3.00	GRN3D1130-HM061	I/DWR 113/3-12.8
115.0	121.0	12.8	3.00	GRN3D1150-HM061	I/DWR 115/3-12.8
115.0	121.0	19.2	3.00	GRN4D1150-HM061	I/DWR 115/3-19.2
117.0	123.0	12.8	3.00	GRN3D1170-HM061	I/DWR 117/3-12.8
118.0	124.0	12.8	3.00	GRN3D1180-HM061	I/DWR 118/3-12.8
120.0	126.0	12.8	3.00	GRN3D1200-HM061	I/DWR 120/3-12.8
120.0	126.0	19.2	3.00	GRN4D1200-HM061	I/DWR 120/3-19.2
123.0	129.0	12.8	3.00	GRN3D1230-HM061	I/DWR 123/3-12.8
125.0	131.0	12.8	3.00	GRN3D1250-HM061	I/DWR 125/3-12.8
125.0	131.0	19.2	3.00	GRN4D1250-HM061	I/DWR 125/3-19.2
126.0	132.0	12.8	3.00	GRN3D1260-HM061	I/DWR 126/3-12.8
127.0	133.0	12.8	3.00	GRN3D1270-HM061	I/DWR 127/3-12.8
129.0	135.0	19.2	3.00	GRN4D1290-HM061	I/DWR 129/3-19.2
130.0	136.0	12.8	3.00	GRN3D1300-HM061	I/DWR 130/3-12.8
131.0	137.0	12.8	3.00	GRN3D1310-HM061	I/DWR 131/3-12.8
132.0	138.0	12.8	3.00	GRN3D1320-HM061	I/DWR 132/3-12.8
135.0	141.0	12.8	3.00	GRN3D1350-HM061	I/DWR 135/3-12.8
138.0	144.0	12.8	3.00	GRN3D1380-HM061	I/DWR 138/3-12.8
139.0	145.0	19.2	3.00	GRN4D1390-HM061	I/DWR 139/3-19.2
140.0	146.0	12.8	3.00	GRN3D1400-HM061	I/DWR 140/3-12.8
141.0	147.0	12.0	3.00	GR92D1410-HM061	I/DWR 141/3-12.0
141.0	147.0	12.8	3.00	GRN3D1410-HM061	I/DWR 141/3-12.8
141.0	147.0	19.2	3.00	GRN4D1410-HM061	I/DWR 141/3-19.2
142.0	148.0	12.8	3.00	GRN3D1420-HM061	I/DWR 142/3-12.8
143.0	149.0	12.8	3.00	GRN3D1430-HM061	I/DWR 143/3-12.8
145.0	151.0	12.8	3.00	GRN3D1450-HM061	I/DWR 145/3-12.8
145.0	151.0	19.2	3.00	GRN4D1450-HM061	I/DWR 145/3-19.2
148.0	154.0	12.8	3.00	GRN3D1480-HM061	I/DWR 148/3-12.8
150.0	156.0	12.8	3.00	GRN3D1500-HM061	I/DWR 150/3-12.8
150.0	156.0	19.2	3.00	GRN4D1500-HM061	I/DWR 150/3-19.2
152.0	158.0	12.8	3.00	GRN3D1520-HM061	I/DWR 152/3-12.8
152.0	158.0	19.2	3.00	GRN4D1520-HM061	I/DWR 152/3-19.2
154.0	160.0	19.2	3.00	GRN4D1540-HM061	I/DWR 154/3-19.2
155.0	161.0	19.2	3.00	GRN4D1550-HM061	I/DWR 155/3-19.2
160.0	166.0	19.2	3.00	GRN4D1600-HM061	I/DWR 160/3-19.2
162.0	168.0	19.2	3.00	GRN4D1620-HM061	I/DWR 162/3-19.2
163.0	169.0	19.2	3.00	GRN4D1630-HM061	I/DWR 163/3-19.2
165.0	171.0	19.2	3.00	GRN4D1650-HM061	I/DWR 165/3-19.2



Dimensions				TSS Article No.	Polypac Ref. No.
Rod Diameter	Groove Diameter	Groove Width	Thickness		
d_N h11	D_2 H8	L_2 +0.2	W		
170.0	176.0	19.2	3.00	GRN4D1700-HM061	I/DWR 170/3-19.2
173.0	179.0	19.2	3.00	GRN4D1730-HM061	I/DWR 173/3-19.2
175.0	181.0	19.2	3.00	GRN4D1750-HM061	I/DWR 175/3-19.2
180.0	186.0	12.8	3.00	GRN3D1800-HM061	I/DWR 180/3-12.8
180.0	186.0	19.2	3.00	GRN4D1800-HM061	I/DWR 180/3-19.2
183.0	189.0	19.2	3.00	GRN4D1830-HM061	I/DWR 183/3-19.2
184.0	190.0	19.2	3.00	GRN4D1840-HM061	I/DWR 184/3-19.2
185.0	191.0	19.2	3.00	GRN4D1850-HM061	I/DWR 185/3-19.2
190.0	196.0	19.2	3.00	GRN4D1900-HM061	I/DWR 190/3-19.2
195.0	201.0	19.2	3.00	GRN4D1950-HM061	I/DWR 195/3-19.2
196.0	202.0	19.2	3.00	GRN4D1960-HM061	I/DWR 196/3-19.2
198.0	204.0	19.2	3.00	GRN4D1980-HM061	I/DWR 198/3-19.2
200.0	206.0	19.2	3.00	GRN4D2000-HM061	I/DWR 200/3-19.2
205.0	211.0	19.2	3.00	GRN4D2050-HM061	I/DWR 205/3-19.2
210.0	216.0	19.2	3.00	GRN4D2100-HM061	I/DWR 210/3-19.2
215.0	221.0	19.2	3.00	GRN4D2150-HM061	I/DWR 215/3-19.2
220.0	226.0	19.2	3.00	GRN4D2200-HM061	I/DWR 220/3-19.2
225.0	231.0	19.2	3.00	GRN4D2250-HM061	I/DWR 225/3-19.2
230.0	236.0	19.2	3.00	GRN4D2300-HM061	I/DWR 230/3-19.2
231.0	237.0	19.2	3.00	GRN4D2310-HM061	I/DWR 231/3-19.2
235.0	241.0	19.2	3.00	GRN4D2350-HM061	I/DWR 235/3-19.2
240.0	246.0	19.2	3.00	GRN4D2400-HM061	I/DWR 240/3-19.2
245.0	251.0	19.2	3.00	GRN4D2450-HM061	I/DWR 245/3-19.2
248.0	254.0	19.2	3.00	GRN4D2480-HM061	I/DWR 248/3-19.2
250.0	256.0	19.2	3.00	GRN4D2500-HM061	I/DWR 250/3-19.2
254.0	260.0	19.2	3.00	GRN4D2540-HM061	I/DWR 254/3-19.2
255.0	261.0	19.2	3.00	GRN4D2550-HM061	I/DWR 255/3-19.2
260.0	266.0	19.2	3.00	GRN4D2600-HM061	I/DWR 260/3-19.2
265.0	271.0	19.2	3.00	GRN4D2650-HM061	I/DWR 265/3-19.2
270.0	276.0	19.2	3.00	GRN4D2700-HM061	I/DWR 270/3-19.2
275.0	281.0	19.2	3.00	GRN4D2750-HM061	I/DWR 275/3-19.2
280.0	286.0	19.2	3.00	GRN4D2800-HM061	I/DWR 280/3-19.2
285.0	291.0	19.2	3.00	GRN4D2850-HM061	I/DWR 285/3-19.2
290.0	296.0	19.2	3.00	GRN4D2900-HM061	I/DWR 290/3-19.2
295.0	301.0	19.2	3.00	GRN4D2950-HM061	I/DWR 295/3-19.2
300.0	306.0	19.2	3.00	GRN4D3000-HM061	I/DWR 300/3-19.2



■ Orkot® Slydring® for Piston and Rod

DESCRIPTION

Orkot® Slydring® are manufactured from fabric-reinforced composite material using a woven fabric and thermoset resins, incorporating evenly dispersed solid lubricants. Orkot® is recommended for use in hydraulic cylinders exposed to high loads, such as in mobile hydraulics or presses. High compressive strength, good sliding behavior and exceptional wear resistance ensure a long service life.

DESIGN

Orkot® Slydring® is manufactured from either tubular or strip material cut to the right size, including an angle cut gap with the necessary width. For large diameters, > 300 mm, rings can be cut from Orkot® C320, C380 or C480 strip material. This offers economical solutions for non-standard diameters or when quantities are limited.

ADVANTAGES

- Dimensionally stable
- Vibration absorbing
- Even distribution of high radial forces
- Good sliding and dry running properties
- High wear resistance
- Long service life
- Versatile
- Can be used with wide range of media
- Stock availability

APPLICATION EXAMPLES

Orkot® Slydring is widely used as a bearing element for heavy duty hydraulic equipment, such as:

- Hydraulic actuators
- Mobile hydraulics
- Excavators
- Construction equipment
- Forestry machinery
- Mining

- Steel mills
- Presses
- Water locks
- Marine engineering
- Oil and gas

MATERIALS

Orkot® C380

Orkot® C380 is a turquoise colored, versatile Slydring® material with enhanced sliding properties in various hydraulic media, such as mineral or synthetic oils, as well as water based fluids. It is good at damping vibrations, it offers long service life, low friction and is suitable for all commonly used counter surfaces. C380 is the first choice for most applications.

Orkot® C480

Orkot® C480 is an evolutionary development of the established C380. A finely dispersed mix of solid lubricants improve the static and dynamic coefficient of friction therefore reducing or removing the effect of stick-slip. A strong affinity with hydraulic fluid improves its potential to operate when marginally lubricated.

Orkot® C320

Orkot® C320 has been the historic choice for hydraulic applications. The woven fabric reinforced thermoset composite with lubricant additives has a very high resistance to wear, good dry-running properties and dampens vibrations.

Orkot® C932

Orkot® C932 is a composite made from a fine weave cotton fabric impregnated with a phenolic resin. The material stiffness is greater than other Orkot® Slydring materials. Use of C932 in water-based fluids is not recommended.

Table 222: Orkot® Grade and Color

Orkot Grade	Color
C380	Turquoise
C480	White
C320	Dark gray
C932	Yellow-brown



OPERATING CONDITIONS

Velocity:	Exceeding 1m/s with reciprocating movements
Temperature:	-40 °C to +120 °C
Pressure Under Dynamic Conditions:	max. 100 N/mm ² at +25 °C max. 50 N/mm ² > +60 °C
Ultimate Compressive Strength:	max. > 300 N/mm ² (C380, C480, C320) max. 260 N/mm ² (C932)

IMPORTANT NOTE

The above stated limits for pressure and speed are maximum values. Friction heat generated by the combination of pressure and speed may cause local heat build-up. Care should be taken not to apply high values for pressure and speed at the same time.

Table 223: Serial Numbers for Orkot® Slydring®, ready-to-fit

Piston Serial No.	Rod Serial No.	Groove Width	Ring Thickness
GP41	GR41	2.5	1.55
GP43	GR43	4.0	1.55
GP47	GR47	6.3	2.00
GP48	GR48	8.1	2.00
GP49	GR49	9.7	2.00
GP51	GR51	10.0	2.00
GP53	GR53	15.0	2.00
GP64	GR64	4.2	2.50
GP65	GR65	5.6	2.50
GP67	GR67	6.3	2.50
GP68	GR68	8.1	2.50
GP69	GR69	9.7	2.50
GP73	GR73	15.0	2.50
GP74	GR74	20.0	2.50
GP75	GR75	25.0	2.50
GP76	GR76	30.0	2.50
GP77	GR77	35.0	2.50
GP93	GR93	15.0	3.00
GP94	GR94	20.0	3.00
GP95	GR95	25.0	3.00
GP96	GR96	30.0	3.00
GP99	GR99	9.7	4.00
GPL2	GRL2	15.0	4.00
GPL3	GRL3	20.0	4.00
GP98	GR98	25.0	4.00
GPL5	GRL5	30.0	4.00
GPL7	GRL7	40.0	4.00
GPL9	GRL9	50.0	4.00

Note that customer specific sizes can be supplied without tooling costs.

**Table 224: Part numbers for Orkot® Slydring® Coiled Strip, to cut to length**

Ring Thickness	Groove Width	Part Number			
		2 meter	3 meter	5 meter	10 meter
2.50	5.6	GM65A2000-C380	-	-	-
2.50	9.7	GM69A2000-C380	GM69A3000-C380	GM69A5000-C380	GM69X0010-C380
2.50	15.0	GM73A2000-C380	GM73A3000-C380	GM73A5000-C380	GM73X0010-C380
2.50	20.0	GM74A2000-C380	GM74A3000-C380	GM74A5000-C380	GM74X0010-C380
2.50	25.0	GM75A2000-C380	GM75A3000-C380	GM75A5000-C380	GM75X0010-C380
2.50	30.0	GM76A2000-C380	GM76A3000-C380	GM76A5000-C380	GM76X0010-C380
2.50	35.0	GM77A2000-C380	GM77A3000-C380	GM77A5000-C380	GM77X0010-C380
2.50	40.0	GM78A2000-C380	GM78A3000-C380	GM78A5000-C380	GM78X0010-C380
2.50	45.0	GM79A2000-C380	GM79A3000-C380	GM79A5000-C380	GM79X0010-C380
3.00	20.0	GM94A2000-C380	GM94A3000-C380	GM94A5000-C380	GM94X0010-C380
3.00	25.0	GM95A2000-C380	GM95A3000-C380	GM95A5000-C380	GM95X0010-C380
3.00	30.0	GM96A2000-C380	GM96A3000-C380	GM96A5000-C380	GM96X0010-C380
4.00	15.0	GML2A2000-C380	GML2A3000-C380	GML2A5000-C380	GML2X0010-C380
4.00	20.0	GML3A2000-C380	GML3A3000-C380	GML3A5000-C380	GML3X0010-C380
4.00	25.0	GM98A2000-C380	GM98A3000-C380	GM98A5000-C380	GM98X0010-C380
4.00	30.0	GML5A2000-C380	GML5A3000-C380	GML5A5000-C380	GML5X0010-C380
4.00	40.0	GML7A2000-C380	GML7A3000-C380	GML7A5000-C380	GML7X0010-C380
4.00	50.0	GML9A2000-C380	GML9A3000-C380	GML9A5000-C380	GML9X0010-C380

Standard available grades: C380 and C480. Replace material code to C480, for example: GM73X0010-C480.

Strip with a thickness of 2.50 mm is coiled with an inner diameter of 300 mm, 3 and 4 mm is coiled with a diameter of 700 mm.

INSTALLATION RECOMMENDATION

In order to protect the seal and guide system against ingress of foreign particles, we recommend the use of Turcite® Slydring® in combination with Orkot® Slydring®. The larger face area of these rings (Series GP99 from Table 188) embeds the contaminant particles, when present in the system, and keeps them away from the actual guides and seals (Figure 219). Reducing the piston diameter at both ends allows the particles to become embedded on the face side.

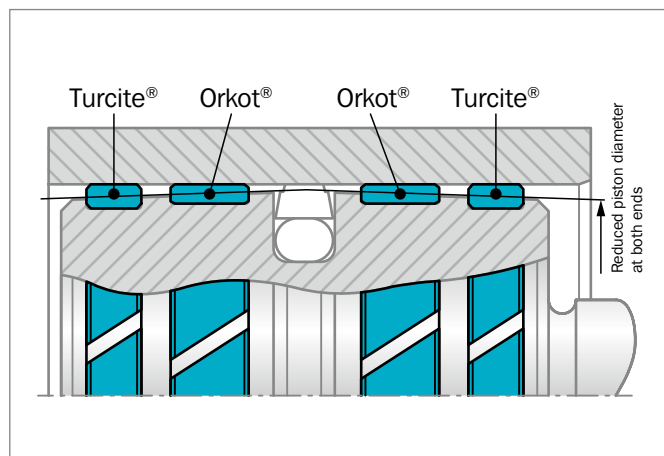


Figure 219: Arrangement of the Slydring® on the piston



■ Installation Recommendation, Orkot® Slydring® for Piston According to ISO 10766 Groove Dimension

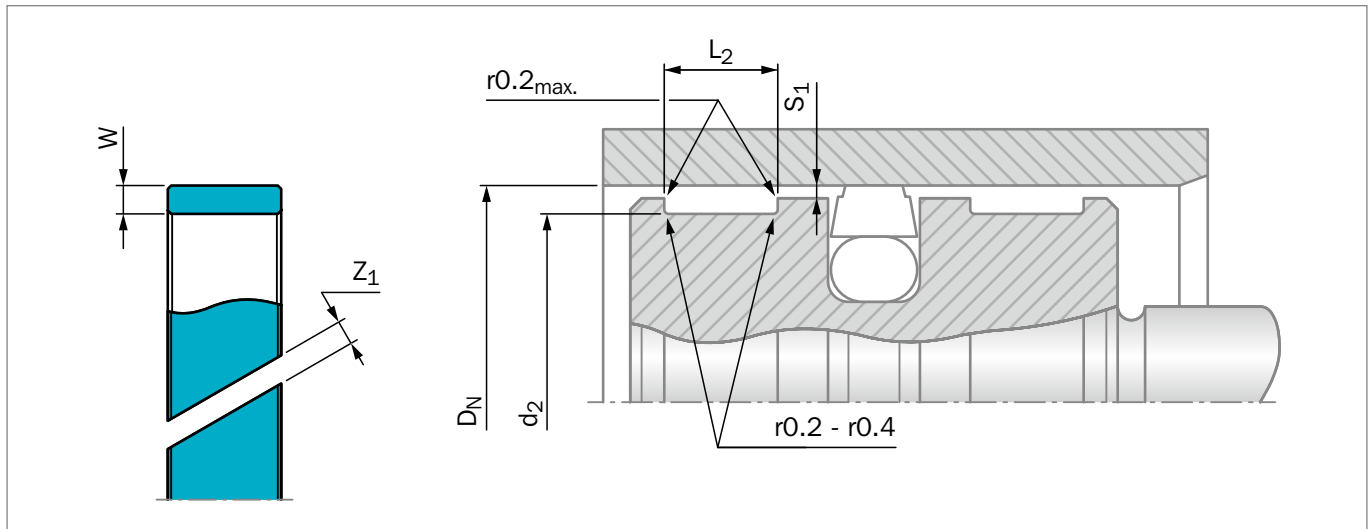


Figure 220: Installation Drawing

Table 225: Installation Dimensions

Serial No.	Bore Diameter*	Groove Diameter	Groove Width	Ring Thickness	Ring Gap**
	D_N H9	d_2 h8	L_2 +0.2	W	Z_1
GP43	16 - 50.0	$D_N - 3.10$	4.00	1.55	1 - 3
GP65	16 - 125.0	$D_N - 5.00$	5.60	2.50	2 - 6
GP69	25 - 250.0	$D_N - 5.00$	9.70	2.50	2 - 9
GP73	80 - 500.0	$D_N - 5.00$	15.00	2.50	4 - 17
GP75	125 - 999.9	$D_N - 5.00$	25.00	2.50	6 - 33
GP75X	1,000 - 1,500.0	$D_N - 5.00$	25.00	2.50	33 - 48
GP98	280 - 999.9	$D_N - 8.00$	25.00	4.00	10 - 33
GP98X	1,000 - 1,500.0	$D_N - 8.00$	25.00	4.00	33 - 48

* Recommended diameter ranges.

** see Figure 221

For Slydring® to other standards, for example French standard NF E 48-037, please contact your local Customer Solution Center.

RADIAL CLEARANCE S_1

The minimum radial gap is calculated taking into account:

- The fitting tolerances of the hardware
- The tolerance on the ring thickness
- An allowance for wear
- In case of high radial loads an allowance for elastic deformation
- A safety margin to avoid metal-to-metal contact

The gaps S_1 can be chosen larger than near to the seal (attention: take care of gap dimension for the seal) thus allowing slight tilting of the piston, still without metal-to-metal contact.

It also allows foreign particles to be wiped away by the Slydring® rather than being squeezed between the metal components. The slot ' Z_1 ' allows fluid to pass across the ring thus preventing fluid pressure build-up which might cause extrusion of the guide ring. To ensure the ring cannot escape out of the groove it is recommended to observe the following radial gap sizes as maximum values:

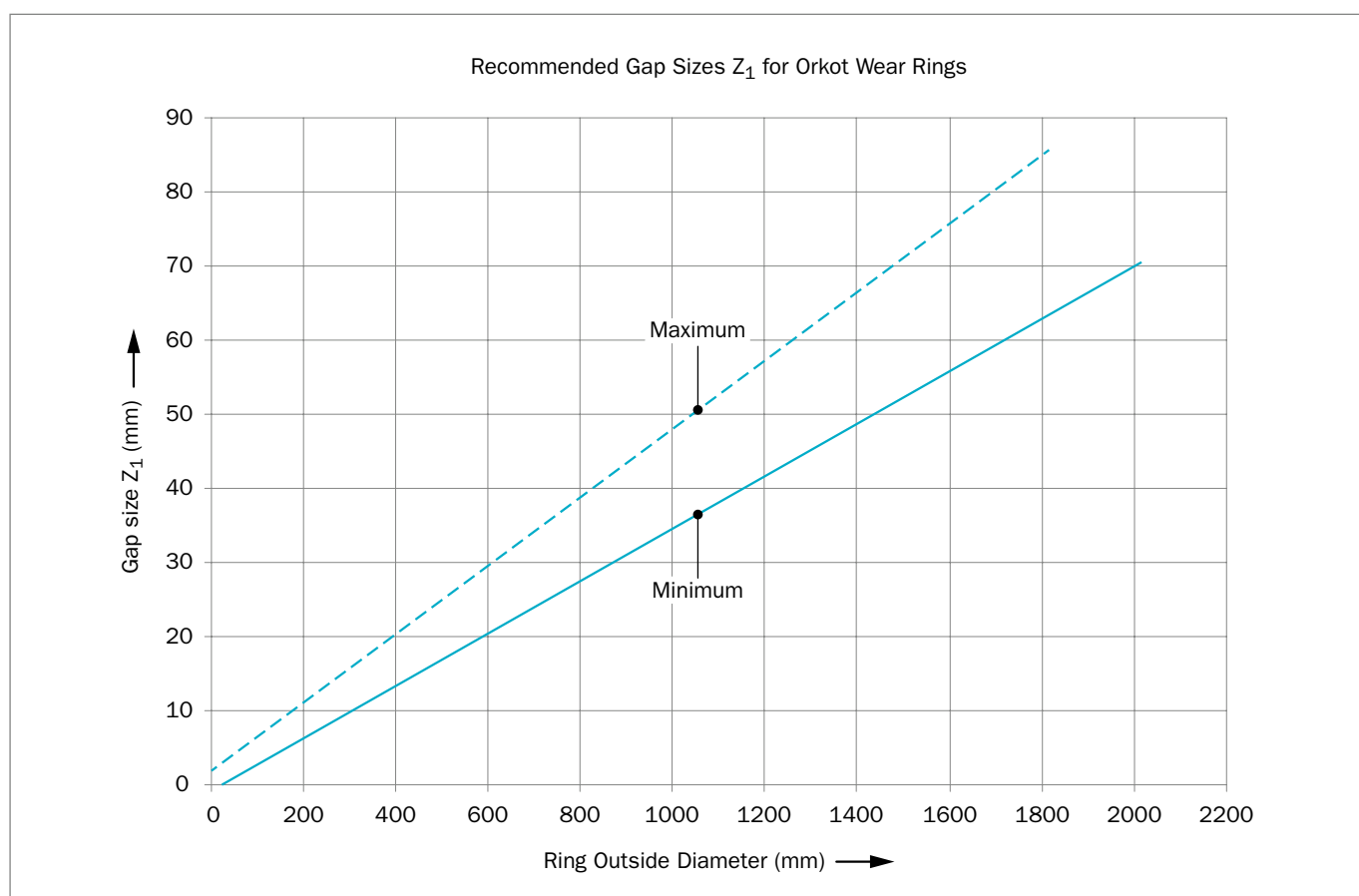
- 0.50 mm for GP43 (1.55 mm thickness)
- 0.90 mm for GP65 to GP75 (2.50 mm thickness)
- 1.50 mm for GP98 and GP98X (4.00 mm thickness)

**Table 226: Recommended Radii for Groove**

D_N	$r_{\max}$
8 - 250	0.2
> 250	0.4

Table 227: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Figure 221: Recommended Gap Sizes Z_1 for Orkot Wear Ring



ORDERING EXAMPLE

Slydring® for bore diameter $D_N = 63.0$ mm
Series GP69 from Table 225

Groove Width:	9.70 mm
Ring Thickness:	2.50 mm
Material:	Orkot® C380 other materials see Table 185
Standard Design:	With angle cut Design code: 0
TSS Part No.:	GP6900630 from Table 228

TSS Article No. GP69 0 0630 - C380

TSS Series No. _____
Design Code (Standard) _____
Bore Diameter x 10 _____
Quality Index (Standard) _____
Material No. _____

ORDERING EXAMPLE FOR DIAMETER > 1000 MM

Slydring® for bore diameter $D_N = 1,200.0$ mm
Series GP75X from Table 225

Groove Width:	25.00 mm
Ring Thickness:	2.50 mm
Material:	Orkot® C380 other materials see Table 185
Standard Design:	With angle cut Design code: X
TSS Part No.:	GP75X1200 from Table 228

TSS Article No. GP75 X 1200 - C380

TSS Series No. _____
Design Code _____
Bore Diameter x 1* _____
Quality Index (Standard) _____
Material No. _____

* For diameters $\geq 1,000$ mm multiply only by factor 1.

Please Note

Orkot® Slydring® for pistons can be used as rod guide ring, taking in account that the part number references the piston or rod diameter.

Example:

GP69 0 1000 - C380

is identical and can be replaced with

GP69 0 0950 - C380

Table 228: Slydring® for Piston

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D_N H9	d_2 h8	L_2 +0.2	W	
16.0	11.0	5.6	2.50	GP6500160
18.0	13.0	5.6	2.50	GP6500180
20.0	15.0	5.6	2.50	GP6500200
22.0	17.0	5.6	2.50	GP6500220
25.0	20.0	5.6	2.50	GP6500250
25.0	20.0	9.7	2.50	GP6900250



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
27.0	22.0	5.6	2.50	GP6500270
28.0	23.0	5.6	2.50	GP6500280
30.0	25.0	9.7	2.50	GP6900300
32.0	28.9	4.0	1.55	GP4300320
32.0	27.0	5.6	2.50	GP6500320
32.0	27.0	9.7	2.50	GP6900320
33.0	28.0	5.6	2.50	GP6500330
35.0	30.0	5.6	2.50	GP6500350
35.0	30.0	9.7	2.50	GP6900350
36.0	31.0	5.6	2.50	GP6500360
36.0	31.0	9.7	2.50	GP6900360
37.0	32.0	9.7	2.50	GP6900370
40.0	36.9	4.0	1.55	GP4300400
40.0	35.0	5.6	2.50	GP6500400
40.0	35.0	9.7	2.50	GP6900400
41.0	36.0	5.6	2.50	GP6500410
41.0	36.0	9.7	2.50	GP6900410
42.0	37.0	5.6	2.50	GP6500420
44.0	39.0	5.6	2.50	GP6500440
45.0	40.0	5.6	2.50	GP6500450
45.0	40.0	9.7	2.50	GP6900450
46.0	41.0	9.7	2.50	GP6900460
48.0	43.0	5.6	2.50	GP6500480
50.0	45.0	5.6	2.50	GP6500500
50.0	45.0	9.7	2.50	GP6900500
51.0	46.0	9.7	2.50	GP6900510
51.0	46.0	15.0	2.50	GP7300510
52.0	47.0	5.6	2.50	GP6500520
53.0	48.0	5.6	2.50	GP6500530
55.0	50.0	5.6	2.50	GP6500550
55.0	50.0	9.7	2.50	GP6900550
58.0	53.0	5.6	2.50	GP6500580
60.0	55.0	5.6	2.50	GP6500600
60.0	55.0	9.7	2.50	GP6900600
61.0	56.0	5.6	2.50	GP6500610
62.0	57.0	5.6	2.50	GP6500620
62.0	56.0	9.7	2.50	GP6900610
63.0	58.0	5.6	2.50	GP6500630
63.0	58.0	9.7	2.50	GP6900630
65.0	60.0	5.6	2.50	GP6500650



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
65.0	60.0	9.7	2.50	GP6900650
68.0	63.0	5.6	2.50	GP6500680
68.0	63.0	9.7	2.50	GP6900680
70.0	65.0	5.6	2.50	GP6500700
70.0	65.0	9.7	2.50	GP6900700
74.0	69.0	5.6	2.50	GP6500740
75.0	70.0	5.6	2.50	GP6500750
75.0	70.0	9.7	2.50	GP6900750
80.0	75.0	5.6	2.50	GP6500800
80.0	75.0	9.7	2.50	GP6900800
80.0	75.0	25.0	2.50	GP7500800
85.0	80.0	5.6	2.50	GP6500850
85.0	80.0	9.7	2.50	GP6900850
90.0	85.0	5.6	2.50	GP6500900
90.0	85.0	9.7	2.50	GP6900900
95.0	90.0	5.6	2.50	GP6500950
95.0	90.0	9.7	2.50	GP6900950
100.0	95.0	5.6	2.50	GP6501000
100.0	95.0	9.7	2.50	GP6901000
100.0	95.0	15.0	2.50	GP7301000
100.0	95.0	25.0	2.50	GP7501000
105.0	100.0	5.6	2.50	GP6501050
105.0	100.0	9.7	2.50	GP6901050
110.0	105.0	9.7	2.50	GP6901100
115.0	110.0	9.7	2.50	GP6901150
120.0	115.0	9.7	2.50	GP6901200
120.0	115.0	15.0	2.50	GP7301200
125.0	120.0	5.6	2.50	GP6501250
125.0	120.0	9.7	2.50	GP6901250
125.0	120.0	15.0	2.50	GP7301250
125.0	120.0	25.0	2.50	GP7501250
130.0	125.0	9.7	2.50	GP6901300
130.0	125.0	15.0	2.50	GP7301300
135.0	130.0	9.7	2.50	GP6901350
135.0	130.0	15.0	2.50	GP7301350
140.0	135.0	9.7	2.50	GP6901400
140.0	135.0	15.0	2.50	GP7301400
140.0	135.0	25.0	2.50	GP7501400
145.0	140.0	25.0	2.50	GP7501450
150.0	145.0	9.7	2.50	GP6901500



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
150.0	145.0	15.0	2.50	GP7301500
150.0	145.0	25.0	2.50	GP7501500
160.0	155.0	9.7	2.50	GP6901600
160.0	155.0	15.0	2.50	GP7301600
170.0	165.0	15.0	2.50	GP7301700
175.0	170.0	25.0	2.50	GP7501750
180.0	175.0	9.7	2.50	GP6901800
180.0	175.0	15.0	2.50	GP7301800
180.0	175.0	25.0	2.50	GP7501800
190.0	185.0	9.7	2.50	GP6901900
190.0	185.0	15.0	2.50	GP7301900
200.0	195.0	9.7	2.50	GP6902000
200.0	195.0	15.0	2.50	GP7302000
200.0	195.0	25.0	2.50	GP7502000
205.0	200.0	15.0	2.50	GP7302050
210.0	205.0	15.0	2.50	GP7302100
220.0	215.0	9.7	2.50	GP6902200
220.0	215.0	15.0	2.50	GP7302200
220.0	215.0	25.0	2.50	GP7502200
230.0	225.0	9.7	2.50	GP6902300
230.0	225.0	15.0	2.50	GP7302300
230.0	225.0	25.0	2.50	GP7502300
240.0	235.0	9.7	2.50	GP6902400
240.0	235.0	15.0	2.50	GP7302400
240.0	235.0	25.0	2.50	GP7502400
250.0	245.0	9.7	2.50	GP6902500
250.0	245.0	15.0	2.50	GP7302500
250.0	245.0	25.0	2.50	GP7502500
270.0	265.0	25.0	2.50	GP7502700
280.0	275.0	9.7	2.50	GP6902800
280.0	275.0	15.0	2.50	GP7302800
280.0	272.0	25.0	4.00	GP9802800
300.0	295.0	15.0	2.50	GP7303000
300.0	295.0	25.0	2.50	GP7503000
300.0	292.0	25.0	4.00	GP9803000
310.0	302.0	25.0	4.00	GP9803100
320.0	315.0	15.0	2.50	GP7303200
320.0	315.0	25.0	2.50	GP7503200
320.0	312.0	25.0	4.00	GP9803200
340.0	335.0	25.0	2.50	GP7503400



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D_N H9	d_2 h8	L_2 +0.2	W	
340.0	332.0	25.0	4.00	GP9803400
350.0	345.0	25.0	2.50	GP7503500
360.0	355.0	15.0	2.50	GP7303600
360.0	355.0	25.0	2.50	GP7503600
360.0	352.0	25.0	4.00	GP9803600
400.0	395.0	15.0	2.50	GP7304000
400.0	395.0	25.0	2.50	GP7504000
400.0	392.0	25.0	4.00	GP9804000
420.0	415.0	25.0	2.50	GP7504200
440.0	432.0	25.0	4.00	GP9804400
450.0	445.0	15.0	2.50	GP7304500
450.0	445.0	25.0	2.50	GP7504500
450.0	442.0	25.0	4.00	GP9804500
500.0	495.0	15.0	2.50	GP7305000
500.0	495.0	25.0	2.50	GP7505000
500.0	492.0	25.0	4.00	GP9805000
600.0	595.0	25.0	2.50	GP7506000
600.0	592.0	25.0	4.00	GP9806000
700.0	692.0	25.0	4.00	GP9807000
1,000.0	995.0	25.0	2.50	GP75X1000
1,000.0	992.0	25.0	4.00	GP98X1000
1,200.0	1,195.0	25.0	2.50	GP75X1200
1,500.0	1,495.0	25.0	2.50	GP75X1500

All sizes printed in **bold** type conform to ISO 10766 and should be preferred for use.

Additional sizes not covered by this list are also held in stock. Also please note that customer specific sizes can be supplied without tooling costs.



■ Installation Recommendation, Orkot® Slydring® for Rod According to ISO 10766 Groove Dimension

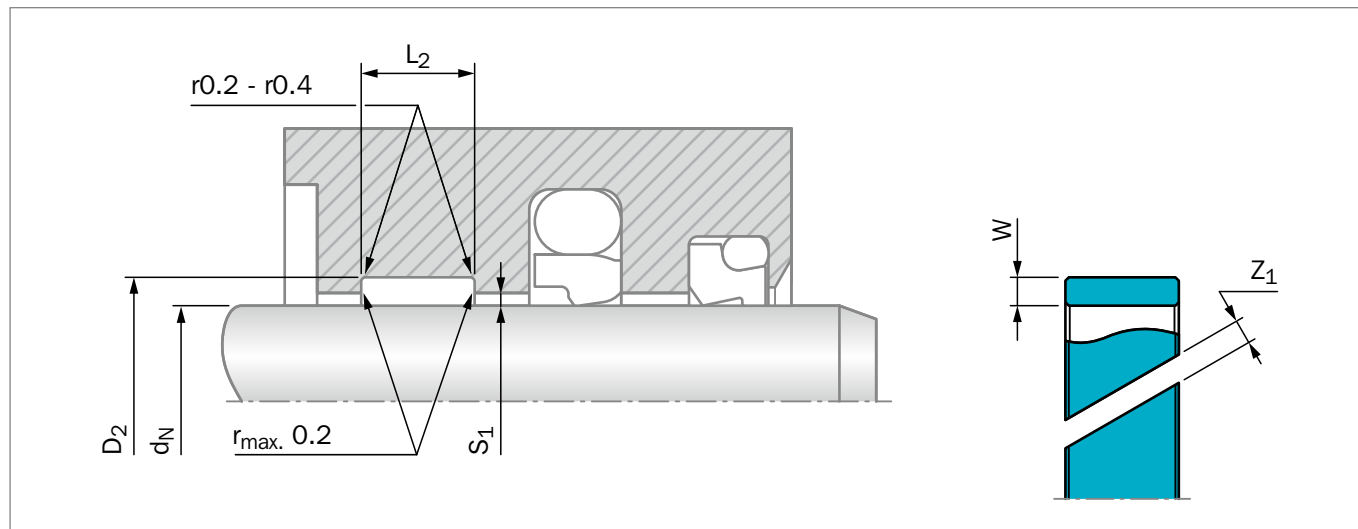


Figure 222: Installation Drawing

Table 229: Installation Dimensions

Serial No.	Rod Diameter*	Groove Diameter	Groove Width	Ring Thickness	Ring Gap**
	d_N f8/h9	D_2 H8	L_2 +0.2	W	Z_1
GR43	8 - 100.0	$d_N + 3.10$	4.00	1.55	1 - 4
GR65	11 - 120.0	$d_N + 5.00$	5.60	2.50	1 - 6
GR69	15 - 250.0	$d_N + 5.00$	9.70	2.50	2 - 12
GR73	20 - 999.0	$d_N + 5.00$	15.00	2.50	2 - 39
GR75	20 - 999.9	$d_N + 5.00$	25.00	2.50	2 - 39
GR75X	1,000 - 3,000.0	$d_N + 5.00$	25.00	2.50	39 - 60
GR98	75 - 999.9	$d_N + 8.00$	25.00	4.00	6 - 39
GR98X	1,000 - 3,000.0	$d_N + 8.00$	25.00	4.00	39 - 60

* Recommended diameter ranges. ** see Figure 223.

For Slydring® to other standards, for example French standard NF E 48-037, please contact your local Customer Solution Center.

RADIAL CLEARANCE S_1

The minimum radial gap is to be calculated taking into account.

- The fitting tolerances of the hardware
- The tolerance on the ring thickness
- An allowance for wear
- In case of high radial loads, an allowance for elastic deformation
- A safety margin to avoid metal-to-metal contact

The gaps S_1 can be chosen larger than near to the seal (attention: take care of gap dimension for the seal) thus allowing slight bending of the rod, still without metal-to-metal contact.

It also allows foreign particles to be wiped away by the Slydring® rather than being squeezed between the metal components (see page 573). The slot " Z_1 " allows fluid to pass across the ring thus preventing fluid pressure build-up which might cause extrusion of the guide ring. To ensure the ring cannot escape out of the groove, it is recommended to observe the following radial gap sizes as maximum values:

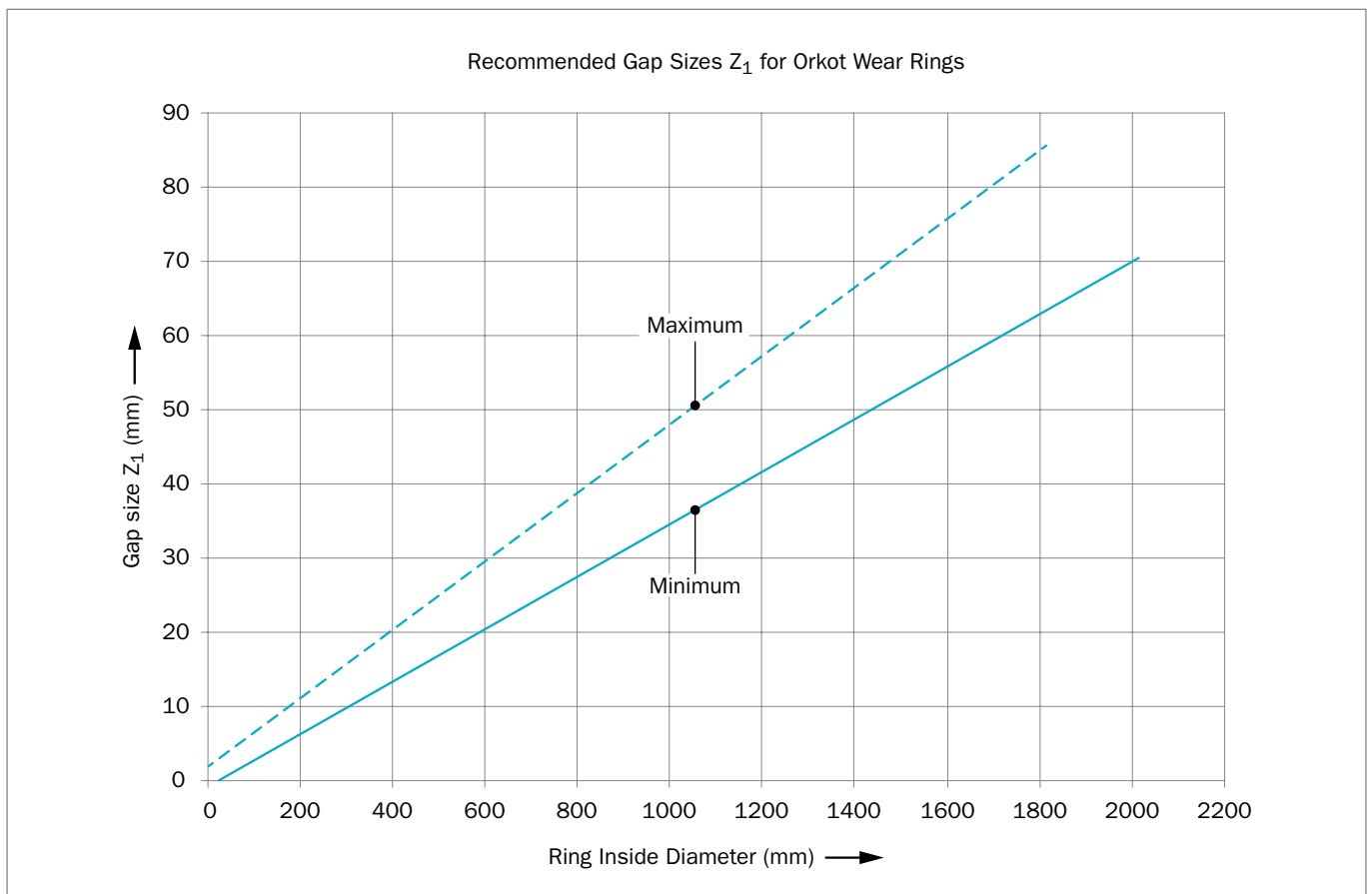
- 0.50 mm for GR43 (1.55 mm thickness)
- 0.90 mm for GR65 to GR75 (2.50 mm thickness)
- 1.50 mm for GR98 and GR98X (4.00 mm thickness)

**Table 230: Recommended Radii for Groove**

d_N	$r_{\max}$
8 - 250	0.2
> 250	0.4

Table 231: Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
Rz1max	1.00 - 4.00	< 16.0
Rz	0.63 - 2.50	< 10.0
Ra	0.10 - 0.40	< 2.5

Figure 223: Recommended Gap Sizes Z_1 for Orkot Wear Ring



ORDERING EXAMPLE

Slydring® for rod diameter $d_N = 65.0$ mm

Series GR65 from Table 229

Groove Width:	5.60 mm
Ring Thickness:	2.50 mm
Material:	Orkot® C380 other materials see Table 185
Standard Design:	With angle cut Design code: 0
TSS Part No.:	GR6500650 from Table 232

TSS Article No. **GR65 0 0650 - C380**

TSS Series No. _____
Design Code (Standard) _____
Rod Diameter x 10 _____
Quality Index (Standard) _____
Material No. _____

ORDERING EXAMPLE FOR DIAMETER > 1000 MM

Slydring® for rod diameter $d_N = 1,200.0$ mm

Series GR75X from Table 229

Groove Width:	25.00 mm
Ring Thickness:	2.50 mm
Material:	Orkot® C380 other materials see Table 185
Standard Design:	With angle cut Design code: X
TSS Part No.:	GR75X1200 from Table 232

TSS Article No. **GR75 X 1200 - C380**

TSS Series No. _____
Design Code (Standard) _____
Rod Diameter x 1* _____
Quality Index (Standard) _____
Material No. _____

* For diameters $\geq 1,000$ mm multiply only by factor 1.

Please Note

Orkot® Slydring® for rods can be used as piston guide ring, taking in account that the part number references the piston or rod diameter.

Example:

GR65 0 0650 - C380

is identical and can be replaced with

GP65 0 0700 - C380



Table 232: Slydring® for Rod

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
11.0	14.1	4.0	1.55	GR4300110
15.0	18.1	4.0	1.55	GR4300150
16.0	21.0	5.6	2.50	GR6500160
18.0	23.0	5.6	2.50	GR6500180
20.0	25.0	5.6	2.50	GR6500200
20.0	25.0	9.7	2.50	GR6900200
22.0	27.0	5.6	2.50	GR6500220
25.0	30.0	5.6	2.50	GR6500250
25.0	30.0	9.7	2.50	GR6900250
27.0	32.0	9.7	2.50	GR6900270
28.0	31.1	4.0	1.55	GR4300280
28.0	33.0	5.6	2.50	GR6500280
28.0	33.0	9.7	2.50	GR6900280
30.0	35.0	5.6	2.50	GR6500300
30.0	35.0	9.7	2.50	GR6900300
32.0	37.0	5.6	2.50	GR6500320
32.0	37.0	9.7	2.50	GR6900320
35.0	40.0	9.7	2.50	GR6900350
36.0	41.0	5.6	2.50	GR6500360
36.0	41.0	9.7	2.50	GR6900360
36.0	41.0	15.0	2.50	GR7300360
40.0	45.0	5.6	2.50	GR6500400
40.0	45.0	9.7	2.50	GR6900400
40.0	45.0	15.0	2.50	GR7300400
40.0	45.0	25.0	2.50	GR7500400
42.0	47.0	5.6	2.50	GR6500420
43.0	48.0	5.6	2.50	GR6500430
45.0	50.0	5.6	2.50	GR6500450
45.0	50.0	9.7	2.50	GR6900450
45.0	50.0	15.0	2.50	GR7300450
48.0	53.0	5.6	2.50	GR6500480
48.0	53.0	9.7	2.50	GR6900480
50.0	55.0	5.6	2.50	GR6500500
50.0	55.0	9.7	2.50	GR6900500
50.0	55.0	15.0	2.50	GR7300500
52.0	57.0	5.6	2.50	GR6500520
52.0	57.0	9.7	2.50	GR6900520
55.0	60.0	9.7	2.50	GR6900550
55.0	60.0	15.0	2.50	GR7300550
55.0	60.0	25.0	2.50	GR7500550



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
56.0	61.0	5.6	2.50	GR6500560
56.0	61.0	9.7	2.50	GR6900560
56.0	61.0	15.0	2.50	GR7300560
58.0	63.0	5.6	2.50	GR6500580
58.0	63.0	9.7	2.50	GR6900580
60.0	65.0	5.6	2.50	GR6500600
60.0	65.0	9.7	2.50	GR6900600
60.0	65.0	15.0	2.50	GR7300600
60.0	65.0	25.0	2.50	GR7500600
63.0	68.0	9.7	2.50	GR6900630
63.0	68.0	15.0	2.50	GR7300630
65.0	70.0	5.6	2.50	GR6500650
65.0	70.0	9.7	2.50	GR6900650
65.0	70.0	15.0	2.50	GR7300650
70.0	75.0	5.6	2.50	GR6500700
70.0	75.0	9.7	2.50	GR6900700
70.0	75.0	15.0	2.50	GR7300700
70.0	75.0	25.0	2.50	GR7500700
75.0	80.0	5.6	2.50	GR6500750
75.0	80.0	9.7	2.50	GR6900750
75.0	80.0	15.0	2.50	GR7300750
80.0	85.0	5.6	2.50	GR6500800
80.0	85.0	9.7	2.50	GR6900800
80.0	85.0	15.0	2.50	GR7300800
80.0	85.0	25.0	2.50	GR7500800
85.0	90.0	9.7	2.50	GR6900850
85.0	90.0	15.0	2.50	GR7300850
90.0	95.0	5.6	2.50	GR6500900
90.0	95.0	9.7	2.50	GR6900900
90.0	95.0	15.0	2.50	GR7300900
90.0	95.0	25.0	2.50	GR7500900
95.0	100.0	5.6	2.50	GR6500950
95.0	100.0	9.7	2.50	GR6900950
95.0	100.0	15.0	2.50	GR7300950
100.0	105.0	5.6	2.50	GR6501000
100.0	105.0	9.7	2.50	GR6901000
100.0	105.0	15.0	2.50	GR7301000
100.0	105.0	25.0	2.50	GR7501000
105.0	110.0	15.0	2.50	GR7301050
105.0	110.0	25.0	2.50	GR7501050



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
110.0	115.0	9.7	2.50	GR6901100
110.0	115.0	15.0	2.50	GR7301100
110.0	115.0	25.0	2.50	GR7501100
115.0	120.0	9.7	2.50	GR6901150
115.0	120.0	15.0	2.50	GR7301150
120.0	125.0	15.0	2.50	GR7301200
125.0	130.0	15.0	2.50	GR7301250
125.0	130.0	25.0	2.50	GR7501250
130.0	135.0	15.0	2.50	GR7301300
140.0	145.0	9.7	2.50	GR6901400
140.0	145.0	15.0	2.50	GR7301400
140.0	145.0	25.0	2.50	GR7501400
150.0	155.0	15.0	2.50	GR7301500
150.0	155.0	25.0	2.50	GR7501500
155.0	160.0	15.0	2.50	GR7301550
155.0	160.0	25.0	2.50	GR7501550
160.0	165.0	9.7	2.50	GR6901600
160.0	165.0	15.0	2.50	GR7301600
160.0	165.0	25.0	2.50	GR7501600
170.0	175.0	15.0	2.50	GR7301700
170.0	175.0	25.0	2.50	GR7501700
180.0	185.0	15.0	2.50	GR7301800
190.0	195.0	15.0	2.50	GR7301900
190.0	195.0	25.0	2.50	GR7501900
200.0	205.0	15.0	2.50	GR7302000
200.0	205.0	25.0	2.50	GR7502000
200.0	208.0	25.0	4.00	GR9802000
210.0	215.0	15.0	2.50	GR7302100
220.0	225.0	15.0	2.50	GR7302200
220.0	225.0	25.0	2.50	GR7502200
230.0	235.0	25.0	2.50	GR7502300
240.0	245.0	25.0	2.50	GR7502400
240.0	248.0	25.0	4.00	GR9802400
250.0	255.0	25.0	2.50	GR7502500
270.0	275.0	15.0	2.50	GR7302700
280.0	285.0	15.0	2.50	GR7302800
280.0	285.0	25.0	2.50	GR7502800
280.0	288.0	25.0	4.00	GR9802800
300.0	305.0	25.0	2.50	GR7503000
320.0	325.0	25.0	2.50	GR7503200



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
320.0	328.0	25.0	4.00	GR9803200
350.0	355.0	25.0	2.50	GR7503500
360.0	365.0	25.0	2.50	GR7503600
360.0	368.0	25.0	4.00	GR9803600
400.0	405.0	25.0	2.50	GR7504000
400.0	408.0	25.0	4.00	GR9804000
800.0	805.0	25.0	2.50	GR7508000
800.0	808.0	25.0	4.00	GR9808000
1,000.0	1,005.0	25.0	2.50	GR75X1000
1,000.0	1,008.0	25.0	4.00	GR98X1000
1,200.0	1,205.0	25.0	2.50	GR75X1200
1,500.0	1,505.0	25.0	2.50	GR75X1500

All sizes printed in **bold** type conform to ISO 10766 and should be preferred for use.

Additional sizes not covered by this list are also held in stock. Also please note that customer specific sizes can be supplied without tooling costs.