



■ Turcite® Slydring® for Rod and Piston

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 rod and piston diameters according to Table 187.

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.

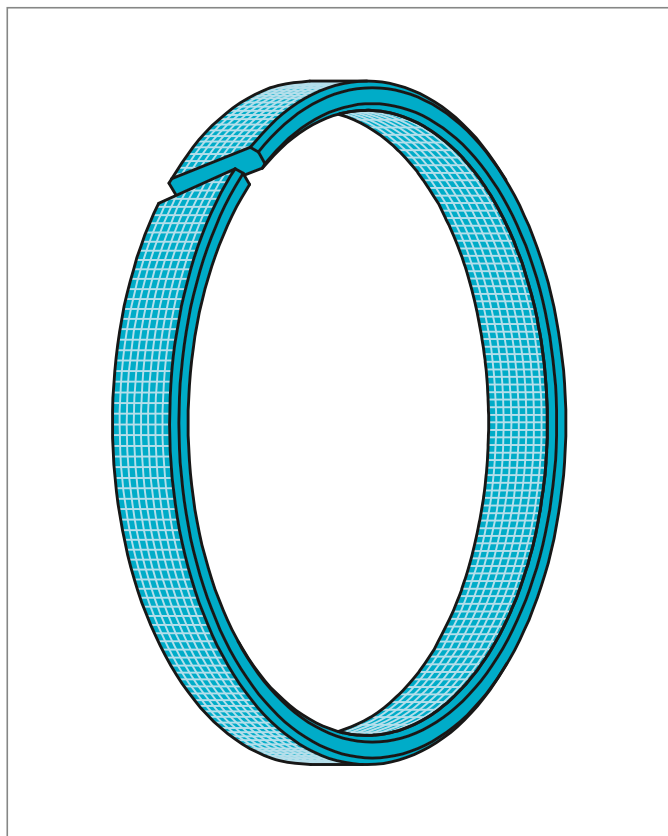


Figure 211: Turcite® Slydring® with teardrop structure structure and chamfered profile

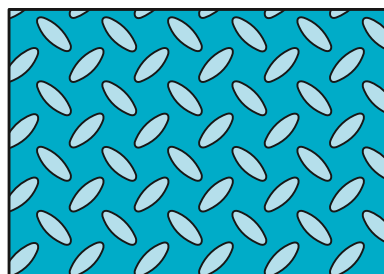


Figure 212: Teardrop structure for Turcite® Slydring®

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 188).

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® Pressure:	Max. 15 N/mm ² at +25 °C 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 189: 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
GPN1	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 208 and Figure 209, 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

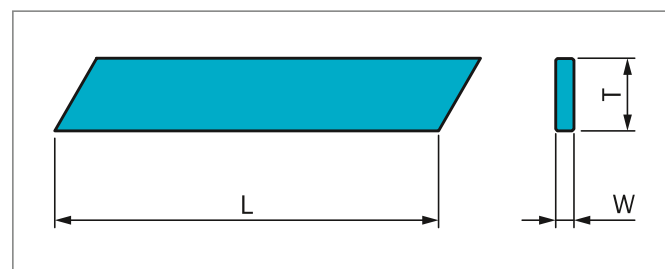


Figure 213: Cut length



■ Zurcon[®] Slydri[®] for Rod and Piston

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[®] Slydri[®] is as standard delivered without teardrop structure - see Table 188

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 Slydri[®]	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[®] Slydri[®] 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 190: Serial Numbers for Slydri[®] 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 189.

* 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

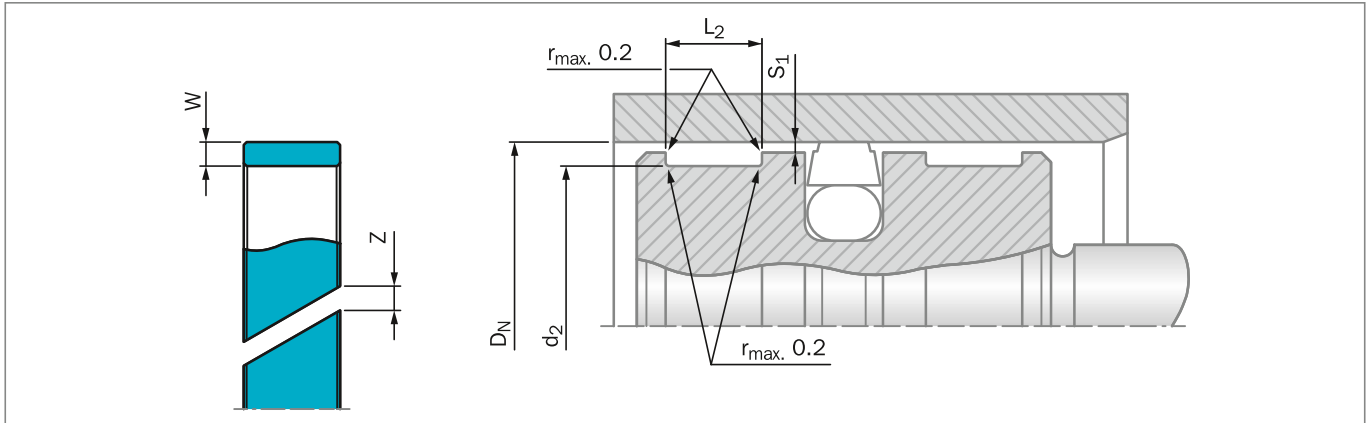


Figure 218: Installation Drawing

Table 215: 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 216: 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 217: Surface Roughness

Parameter	Mating Surface μm		Groove Surface μm
	Turcite® Materials	Zurcon® Materials	
R_{max}	0.63 - 4.00	1.00 - 4.00	< 16.0
R_z	0.40 - 2.50	0.63 - 2.50	< 10.0
R_a	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 215

Groove Width:	9.70 mm
Ring Thickness:	2.50 mm
Material:	Turcite® M12 other materials see Table 186
Standard Design:	With angle cut and teardrop structure Design code: 0
TSS Part No.:	GP6901000 from Table 218

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 215

Groove Width:	25.00 mm
Ring Thickness:	2.50 mm
Material:	Turcite® T47 other materials see Table 186
TSS Part No.:	GP98X2200 from Table 218

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 218: Slydriing® 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.	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	
135.0	130.0	9.7	2.50	GP6901350	280.0	272.0	25.0	4.00	GP9802800
135.0	130.0	15.0	2.50	GP7301350	300.0	295.0	15.0	2.50	GP7303000
140.0	135.0	9.7	2.50	GP6901400	320.0	315.0	15.0	2.50	GP7303200
140.0	135.0	15.0	2.50	GP7301400	320.0	315.0	25.0	2.50	GP7503200
150.0	145.0	15.0	2.50	GP7301500	320.0	312.0	25.0	4.00	GP9803200
160.0	155.0	9.7	2.50	GP6901600	350.0	345.0	25.0	2.50	GP7503500
160.0	155.0	15.0	2.50	GP7301600	360.0	355.0	15.0	2.50	GP7303600
170.0	165.0	15.0	2.50	GP7301700	360.0	355.0	25.0	2.50	GP7503600
180.0	175.0	9.7	2.50	GP6901800	360.0	352.0	25.0	4.00	GP9803600
180.0	175.0	15.0	2.50	GP7301800	400.0	395.0	15.0	2.50	GP7304000
190.0	185.0	15.0	2.50	GP7301900	400.0	395.0	25.0	2.50	GP7504000
200.0	195.0	9.7	2.50	GP6902000	400.0	392.0	25.0	4.00	GP9804000
200.0	195.0	15.0	2.50	GP7302000	450.0	445.0	15.0	2.50	GP7304500
210.0	205.0	15.0	2.50	GP7302100	450.0	445.0	25.0	2.50	GP7504500
220.0	215.0	9.7	2.50	GP6902200	450.0	442.0	25.0	4.00	GP9804500
220.0	215.0	15.0	2.50	GP7302200	500.0	495.0	15.0	2.50	GP7305000
230.0	225.0	15.0	2.50	GP7302300	500.0	495.0	25.0	2.50	GP7505000
240.0	235.0	15.0	2.50	GP7302400	500.0	492.0	25.0	4.00	GP9805000
250.0	245.0	9.7	2.50	GP6902500	1,000.0	995.0	25.0	2.50	GP75X1000
250.0	245.0	15.0	2.50	GP7302500	2,700.0	2,695.0	25.0	2.50	GP75X2700
280.0	275.0	15.0	2.50	GP7302800					
280.0	275.0	25.0	2.50	GP7502800					

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

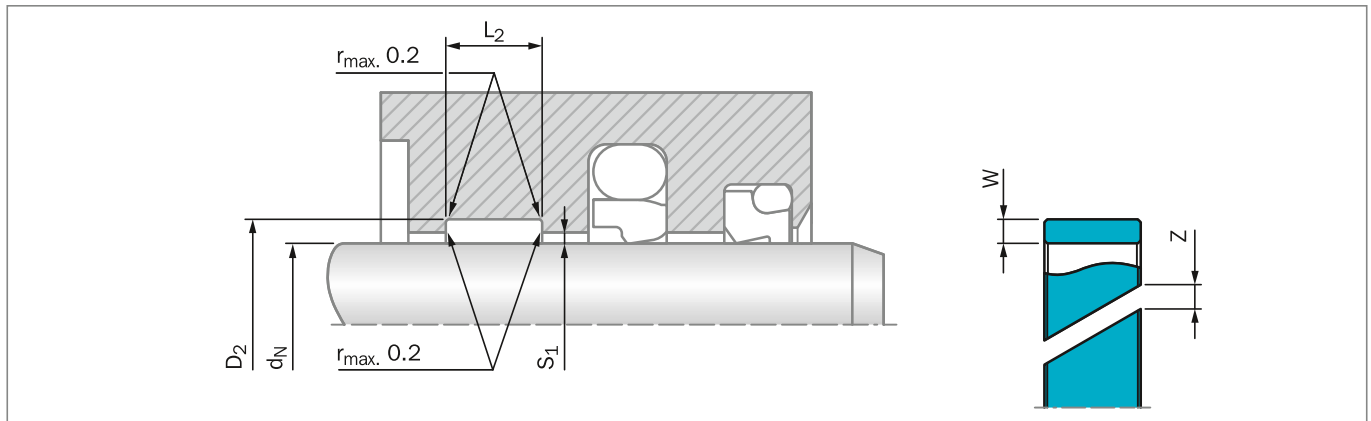


Figure 219: Installation Drawing

Table 219: 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 220: 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 221: Surface Roughness

Parameter	Mating Surface μm		Groove Surface μm
	Turcite® Materials	Zurcon® Materials	
R_{max}	0.63 - 4.00	1.00 - 4.00	< 16.0
R_z	0.40 - 2.50	0.63 - 2.50	< 10.0
R_a	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 219

Groove Width:	5.60 mm
Ring Thickness:	2.50 mm
Material:	Turcite® M12 other materials see Table 186
Standard Design:	With angle cut and teardrop structure Design code: 0
TSS Part No.:	GR6500630 from Table 222

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 219

Groove Width:	25.00 mm
Ring Thickness:	4.00 mm
Material:	Turcite® T47 other materials see Table 186
TSS Part No.:	GR98X2200 from Table 222

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 222: 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.