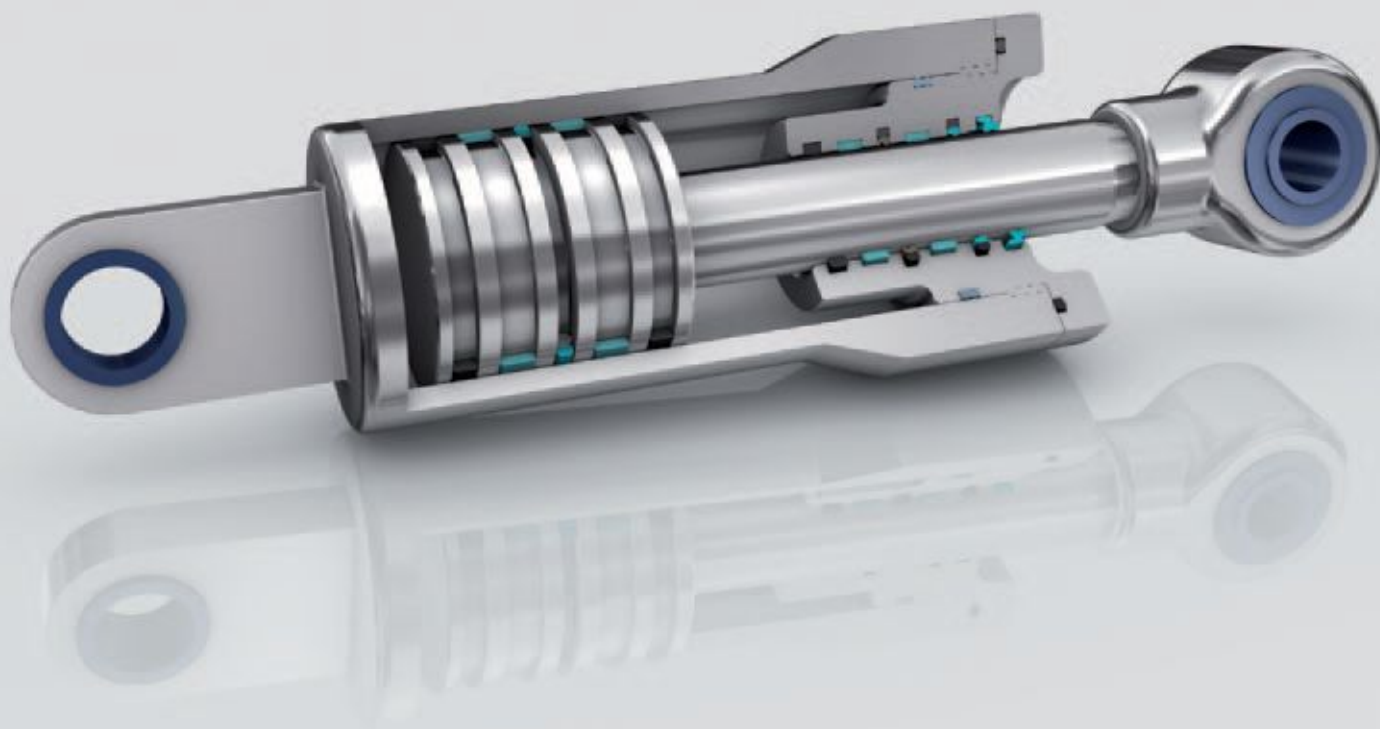


Hydraulic seals – linear

SLYDRING® - WEAR RINGS





Your Partner for Sealing Technology

Trelleborg Sealing Solutions is a major international sealing force, uniquely placed to offer dedicated design and development from our market-leading product and material portfolio: a one-stop-shop providing the best in elastomer, thermoplastic, PTFE and composite technologies for applications in aerospace, industrial and automotive industries.

With 50 years of experience, Trelleborg Sealing Solutions engineers support customers with design, prototyping, production, test and installation using state-of-the-art design tools. An international network of over 70 facilities worldwide includes over 25 manufacturing sites, strategically-positioned research and development centers, including materials and development laboratories and locations specializing in design and applications.

Developing and formulating materials in-house, we utilize the resource of our material database, including over 2,000 proprietary compounds and a range of unique products.

Trelleborg Sealing Solutions fulfills challenging service requirements, supplying standard parts in volume or a single custom-manufactured component, through our integrated logistical support, which effectively delivers over 40,000 sealing products to customers worldwide.

Facilities are certified to ISO 9001:2008 and ISO/TS 16949:2009. Trelleborg Sealing Solutions is backed by the experiences and resources of one of the world's foremost experts in polymer technology: the Trelleborg Group.

ISO 9001:2008

ISO/TS 16949:2009

The information in this brochure is intended to be for general reference purposes only and is not intended to be a specific recommendation for any individual application. The application limits for pressure, temperature, speed and media given are maximum values determined in laboratory conditions. In application, due to the interaction of operating parameters, maximum values may not be achieved. It is vital therefore, that customers satisfy themselves as to the suitability of product and material for each of their individual applications. Any reliance on information is therefore at the user's own risk. In no event will Trelleborg Sealing Solutions be liable for any loss, damage, claim or expense directly or indirectly arising or resulting from the use of any information provided in this brochure. While every effort is made to ensure the accuracy of information contained herewith, Trelleborg Sealing Solutions cannot warrant the accuracy or completeness of information.

To obtain the best recommendation for a specific application, please contact your local Trelleborg Sealing Solutions marketing company.

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Introduction



Introduction

The Trelleborg Group



Automotive

- Antivibration Systems
- Noise and Vibration Dampening
- Fluid Systems



Wheel Systems

- Agricultural and Forestry Tires
- Industrial Tires



Engineered Systems

- Engineering Solutions
- Marine Fenders
- Industrial Fluid Control
- Sealing Profiles for Buildings
- Water Proofing
- Offshore



Sealing Solutions

- Precision seals for the Industrial, Automotive and Aerospace markets

Trelleborg Sealing Solutions



Food, Pharmaceutical and Chemical Processing



Machine Tools



Oil and Gas



Semiconductor



Automotive



Aerospace



Fluid power



Life Sciences



Off-Highway

We build long term partnerships with customers and suppliers by providing leading technology and excellent service



Renewable Energy

Global Resources



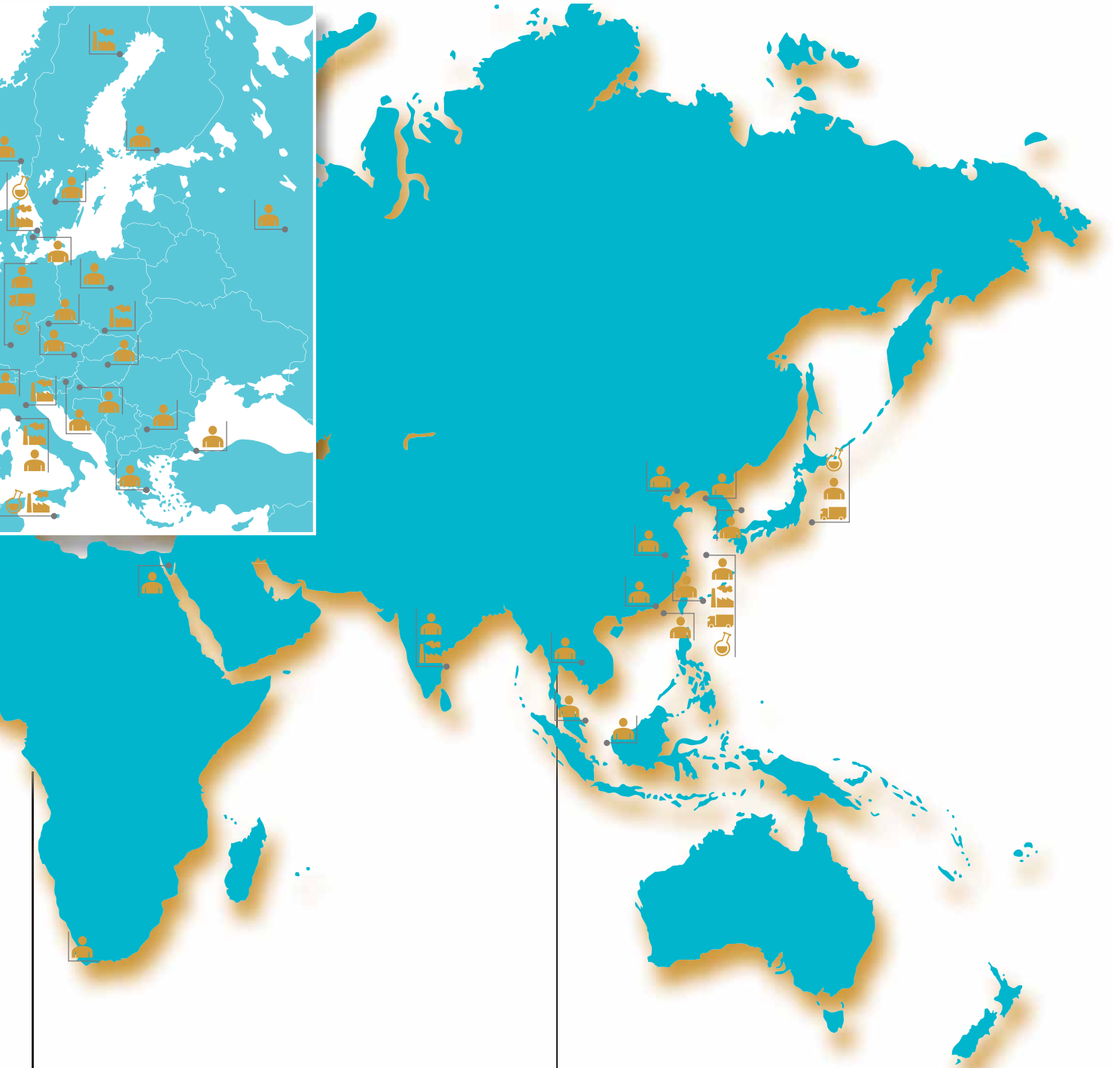
Americas

-  1 Research & Development Centers
-  13 Marketing Companies
-  1 Logistics Centers SCM
-  8 Manufacturing Sites

Worldwide

-  7 Research & Development Centers
-  43 Marketing Companies
-  4 Logistics Centers SCM
-  23 Manufacturing Sites

Global Resources



Europe

-  4 Research & Development Centers
-  19 Marketing Companies
-  1 Logistics Centers SCM
-  13 Manufacturing Sites

Asia

-  2 Research & Development Centers
-  11 Marketing Companies
-  2 Logistics Centers SCM
-  2 Manufacturing Sites

Mission Statement

Our Mission

We will be the supply partner of first choice within our chosen markets, working globally through our local teams. We will build long-term partnerships with customers and suppliers by providing leading technology and excellent service. We are determined to be different.

Sealing technology

Trelleborg Sealing Solutions offers an outstandingly comprehensive sealing portfolio – a one-stop shop providing the best in elastomer, thermoplastic, PTFE and composite technologies; our solutions are featured in virtually every application conceivable within the aerospace, automotive and industrial industries.

A worldwide presence

We are uniquely placed to offer a dedicated design and development service for sealing solutions, globally servicing, supporting and supplying our customers through an unrivalled international network.

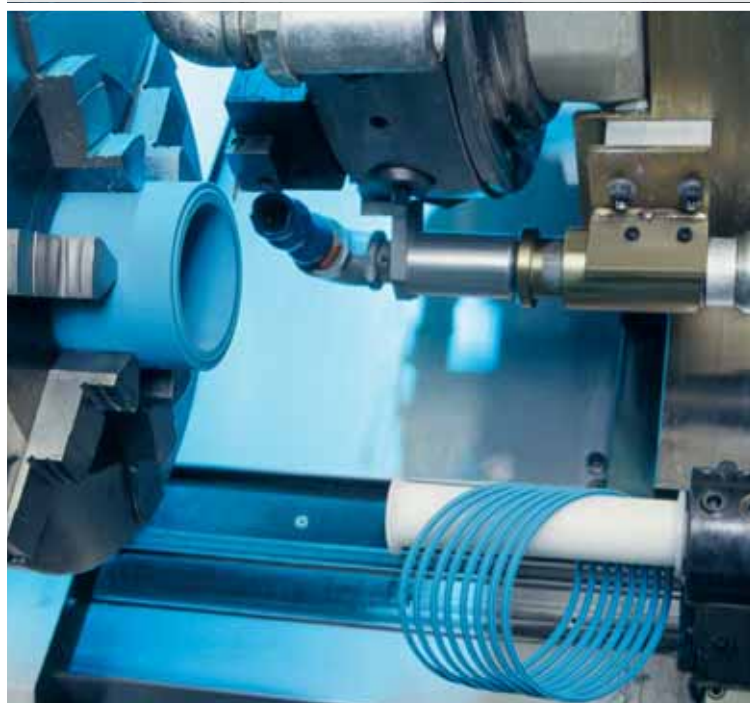
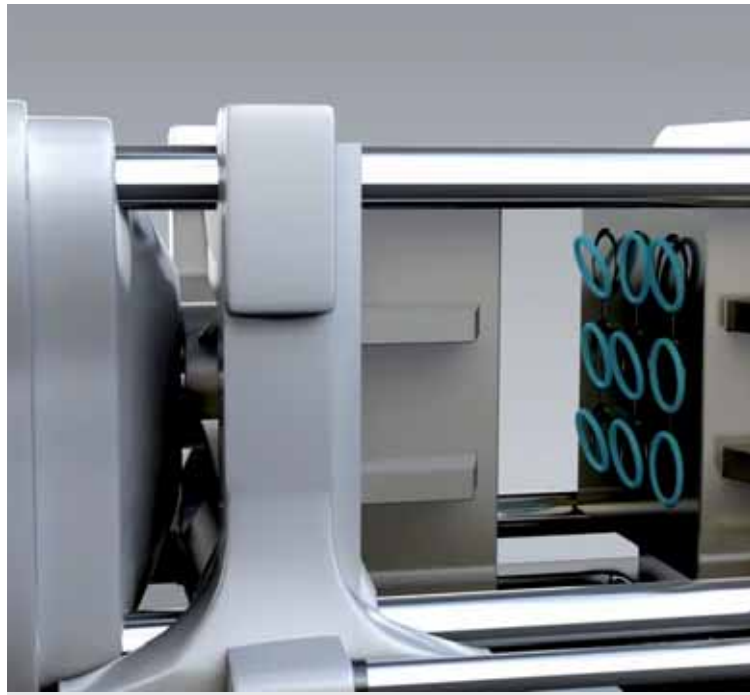
- Over 70 facilities worldwide
- More than 20 manufacturing sites
- 7 strategically positioned materials and development laboratories
- Internationally linked design and application centers

Commitment - To customers' needs long-term

The aim of Trelleborg Sealing Solutions is to facilitate customers in the achievement of cost effective, durable solutions that match their specific business requirements and needs. We are one of the world's foremost experts in polymer sealing technology. We develop and manufacture market safety-critical polymer-based precision seals and associated systems.



Mission Statement



Products, brands and materials

Our pioneering products

Trelleborg Sealing Solutions is pioneering within the sealing industry and continuously developing innovative products.

- Turcon® AQ Seal®
- D-A-S Compact Seal®
- Turcon® Double Delta®
- Turcon® Excluder®
- Turcon® Glyd Ring® T
- Turcon® Hatseal®
- Zurcon® L-Cup®
- Turcite® Slydring®
- Turcite® B-Slydway®
- Turcon® Stepseal® 2K
- Turcon® Stepseal® V
- V-Ring®
- Varilip®
- Turcon® Variseal®
- Turcon® VL-Seal™
- Turcon® Wedgpak®
- Wills Rings®
- Zurcon® Wynseal®

World renowned names united

We own many of the longest established and leading names within the seal industry. These include:

- American Variseal
- Busak+Shamban
- Dowty Seals
- Chase Walton
- Forsheda
- GNL
- Hydro-Components
- Impervia
- Nordex
- Orkot
- Palmer Chenard
- Polypac
- SF Medical
- Shamban
- Silcofab
- Skega
- Stefa
- Wills

Proprietary materials

Ongoing development has yielded some of the most successful sealing materials available for these types for sealing.

- HiMod®
- Isolast®
- Luytex®
- Orkot®
- Turcite®
- Turcon®
- Turel®
- Zurcon®



Products, brands and materials



Seals get animated



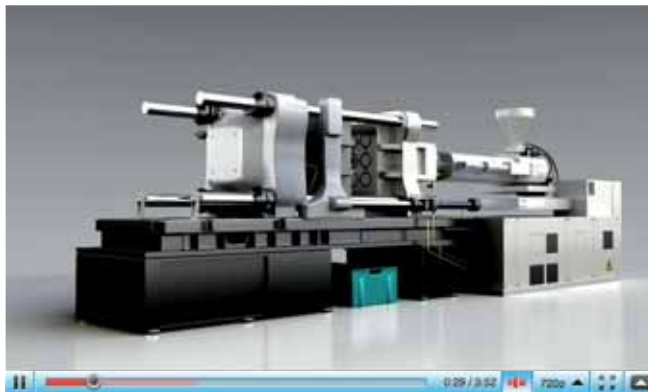
A range of films specific to different industries or products



Seals get animated

Complex sealing configurations can feature a large number sealing elements. Trying to illustrate these on a 2D page is difficult and can never properly show their function or characteristics. Trelleborg Sealing Solutions therefore turned to the latest graphic technologies to produce 3D animations of applications and typical sealing solutions for them.

A range of films specific to different industries or products are available to view on the Trelleborg Sealing Solutions website or via YouTube.



You can now link to our films and animations from

www.tss.trelleborg.com/films



or view them on You Tube at

www.YouTube.com/trelleborgseals





Online tools make life easier



Trelleborg Sealing Solutions has developed a number of online tools that make the working life of an engineer specifying seals easier.



Online tools make life easier

Trelleborg Sealing Solutions has developed a number of online tools that make the working life of an engineer specifying seals easier.

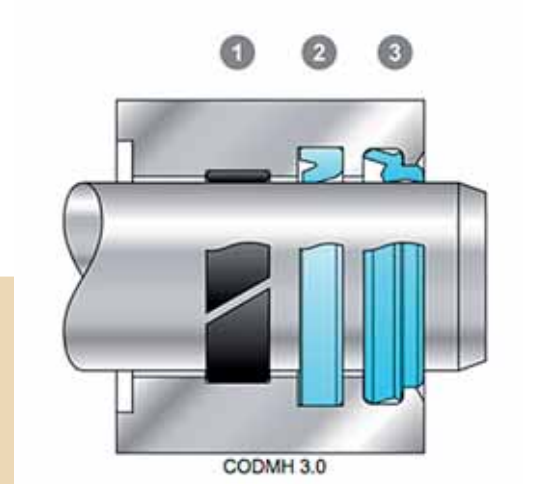
All these industry-leading online tools are available free-of-charge from the Trelleborg Sealing Solutions website at www.tss.trelleborg.com. To use these advanced services all you have to do is register on the Members Area.

www.tss.trelleborg.com



Sealing Solutions Configurator

The Sealing Solutions Configurator is the first tool of its kind offered by any seal supplier. It allows engineers to identify a proven sealing solution for their specific application in just four easy steps.



ISO Quick Search
O-Rings + Rotatings

O-Ring Quick Search
O-Ring Dimensions

Input (mm)

- Bore-Ø
- Piston-Ø
- Groove-Ø
- Groove Width
- Groove Radius
- O-Ring Inside-Ø
- OR Cross Section-Ø

Temperature

O-Ring Material

Calculation Result

- Squeeze incl. TR (%)
- Squeeze incl. TR (mm)
- Gap s (mm)
- Groove Fill (%)

O-Ring Calculator

An industry-leading tool, the easy to use O-Ring calculator includes a sizing capability, design parameter recommendations and complete measurements. Results and comments may be printed, saved online or filed as a PDF.



Powerful electronic Catalog

With the powerful electronic catalog you can search through over 100,000 seals by item number or by their properties. Comprehensive and detailed information can be accessed along with an interactive quote facility.



Versatile CAD service

The CAD download facility provides thousands of drawings from a wide seal range. It gives the option of 2 or 3 dimensional files, in a range of formats to suit most commonly used CAD systems.



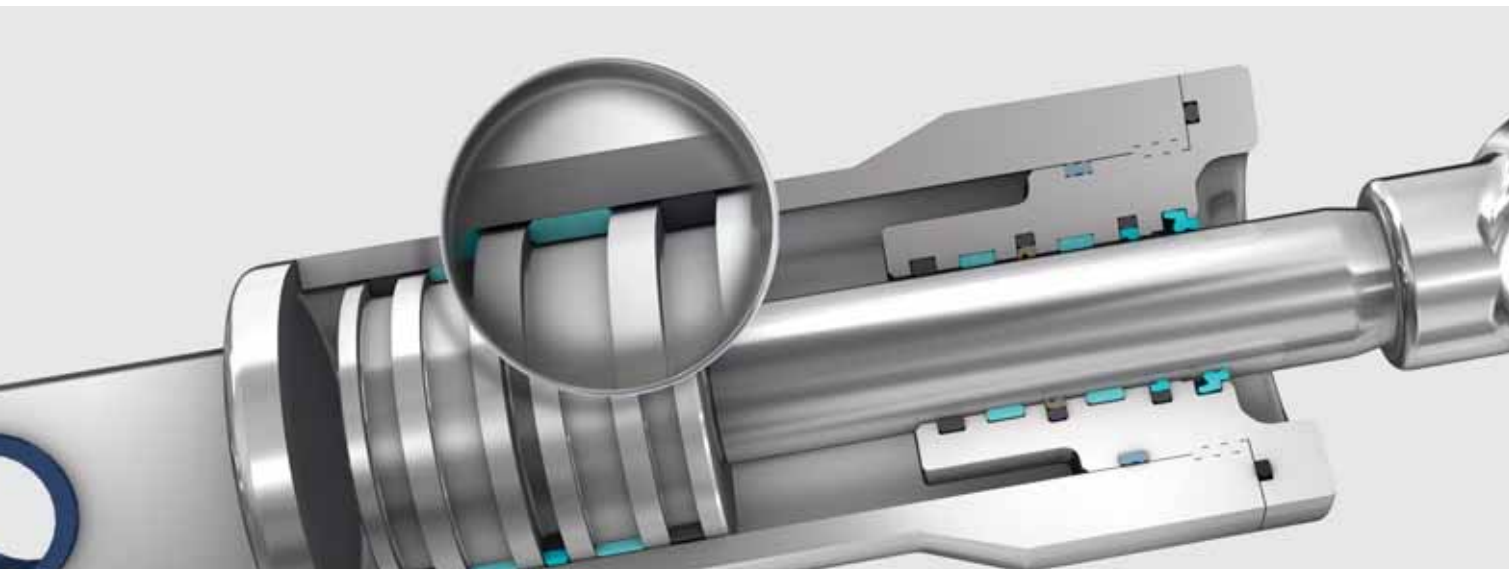
Materials search and chemical compatibility check

These two programs allow you to find out the compatibility of sealing materials to hundreds of different media and help identify the most suitable material for your application.

-  Very good suitability
-  Good suitability
-  Limited suitability
-  Unsuitable
-  Insufficient Information

Part IV

Slydring® - Wear Rings





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Turcite® and Zurcon® Slydring® for Piston and Rod 10

HiMod® Slydring® for Piston and Rod 23

Orkot® Slydring® for Piston and Rod 46



■ Choice of Slydring®

The function of Slydring® is to guide the piston and piston rod of a hydraulic cylinder and to absorb the transverse forces which occur. At the same time, metallic contact between the sliding parts of the cylinder, e.g. piston and cylinder barrel or rod and cylinder head, must be prevented. Non-metallic guide rings offer major benefits compared with the traditional metallic guides:

- Cost efficient production
- High load bearing capacity
- Eliminates local stress concentrations
- Wear-resistant, long service lives
- Metal/plastic pairing eliminates fretting and seizure
- Favourable friction behaviour
- Damping of mechanical vibrations
- Good wiping effect, embedding of foreign particles possible
- Protection of the seal against "dieseling"
- Free choice of material of the metal components as guiding properties are no longer required
- Eliminates hydrodynamic pressure problems in the guide system
- Simple closed groove, easy installation
- Low service costs

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

Please do not hesitate to contact our Technical Department for further information on specific applications and special technical questions.

Materials

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

- Highly wear-resistant, low friction, specially modified Turcite® 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 and high radial forces

In order to choose the most suitable Slydring®, it is first necessary to know all the required functional parameters. Table I can be used to make an initial preselection of the Slydring® and the materials to meet the demands of the application.

Before the final choice of Slydring® and material is made, the details and information must be checked in the relevant data sheets of Slydring® materials.



Table I Selection Criteria for Slydring®

Slydring®		Application				Standard ¹⁾	Installation	Material
Type	Page	Field of Application			Mating Surface	ISO	Size Range	Recommended Slydring® Material
			Light	Medium	Heavy		mm	
 Turcite® / Zurcon® Slydring®	10	Mobile hydraulics	●	-	-	ISO 10766	Off-the-roll up to diameter 4200	Turcite® T47
		Standard cylinders	●	●	-			
		Machine tools	●	●	-			
		Valves	●	●	-			
		Rotary manifolds	●	●	-			Turcite® T51
		Gas equipment	●	●	-			
		Pneumatics	●	-	-			Turcite® M12
		Wind Power	●	●	-			
		Off-road vehicles	●	●	-			
		Injection moulding machines	●	●	-			
		Automotive industry	●	●	-			
		Foodstuff industry	●	●	-	ISO 10766	Off-the-roll up to diameter 4200	Zurcon® Z80 / Z81 UHMWPE
		Water hydraulics	●	●	-			
		Dry application	●	●	-			
		Pneumatics	●	●	-			
 HiMod® Slydring®	23	Mobile hydraulics	●	●	-	ISO 10766	Rings up to diameter 300	HiMod® HM061 POM/Glass fibre
		Standard cylinders	●	●	-			HiMod® HM062 PA/Glass fibre + PTFE
		Agricultural machinery	●	●	-			
		Mobile hydraulics	●	●	●			
		Standard cylinders	●	●	-			
		Agricultural machinery	●	●	-			
 Orkot® Slydring®	46	Mobile hydraulics	-	●	●	ISO 10766	Rings up to diameter 1600 ²⁾	Orkot® C320 Polymer/fabric
		Standard cylinders	●	●	●			Orkot® C380 Polymer/fabric
		Presses	●	●	●			
		Mobile hydraulics	-	●	●			
		Standard cylinders	●	●	●			
		Water hydraulics	●	●	●			
		Shipping and marine engineering	●	●	●			
		Presses	●	●	●			
		Mobile hydraulics	-	●	●		Rings up to diameter 500	Orkot® C932 Phenolic/cotton
		Standard cylinders	●	●	●			
		Presses	●	●	●			

1) For Slydring® to other standards, e.g. to French standard NF E 48-037, please contact us.

2) Segments made from strip material can be used for larger diameters.



Slydring® - Wear Ring

Forms of Supply

Two characteristics must be observed with respect to the forms of supply for Slydring®:

- Type of cut

Figure 1 shows the angle cut which are the most frequently used standard type of cut. Rings with other types of cut are available on request. Design Code as shown in Table III.

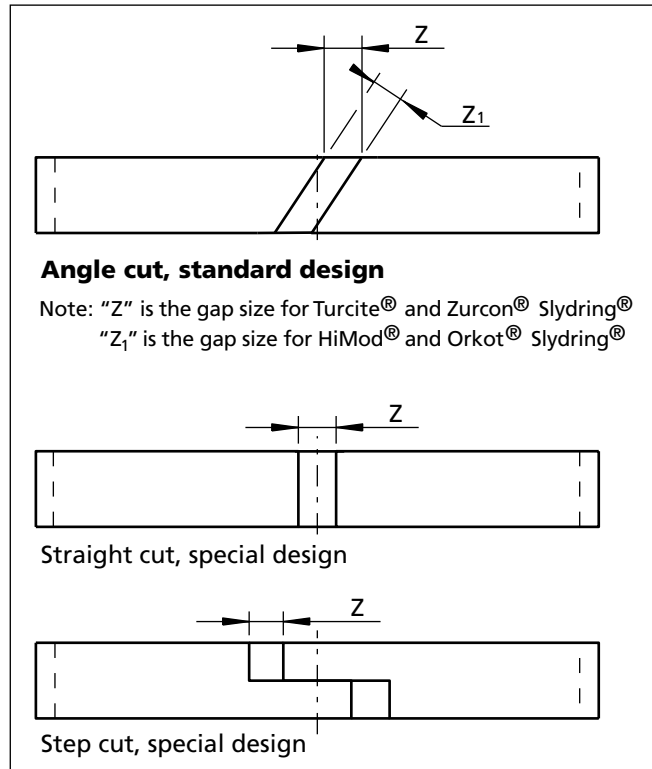


Figure 1 Type of cut

- Design type

Slydring® have a rectangular cross-section with rounded or chamfered edges, thus preventing impermissible edge forces in the corner radii of the grooves. The chamfers also serve to facilitate installation, e.g. when inserting into the cylindrical tube or guide bush.

Slydring® are supplied ready to fit with the gap necessary (dimension Z or Z₁) for their function. The ring ends are finished as standard with an angle cut.

For further details, please refer to Table II.

Slydring® are depending on material supplied as split rings and/or as strip material.

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

Table II Forms of Supply for Slydring®

Material	Ring Diameter mm	Cut Strip for Diameter mm	Off-the-Roll
Turcite® T47/T51/M12	-	8 - 4200	See Table V
Zurcon® Z80 / Z81	on request	30 - 4200	on request
Orkot® C320/C380	16 - 1600	300 - 2000	see page 46
Orkot® C932	16 - 500	-	-
HiMod® HM061	up to 300	-	-
HiMod® HM062	up to 300	-	-



Table III Design Codes for Cut

Material	Turcite®		Zurcon®	HiMod®	Orkot®	
	T47 T51 M12		Z80	HM061 HM062	C320 C380 C932	C320 C380
Code for cut	Strip	Strip	Strip	Ring	Ring	Strip
	With Teardrop structure*	Without Teardrop structure	Without Teardrop structure	Without Teardrop structure	Without Teardrop structure	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	-	E

Design Code **0**, in bold types are the standard Slydring® versions

* Standard for **Turcite®** Slydring®

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

Teardrop structure: A detailed description can be found on page 10.



■ Design Instructions

Selection of Slydring®

An initial choice can be made for various applications by checking the Selection Criteria for Slydring® in Turcite®, Zurcon®, HiMod® or Orkot®, see Table I and the pages 10, 14, 23, 25 and 46.

The values for the load on the Slydring® are valid for a load distribution as illustrated in Figure 2. The flexibility of the materials ensures a relatively constant specific load, irrespective of the size of the radial forces F , as with increasing radial loading, the guide surface subjected to the load increases also.

The radial forces which occur can vary within wide ranges and cannot always be calculated exactly in advance. For such cases, a safety factor of at least 2 is recommended when calculating (see calculation example).

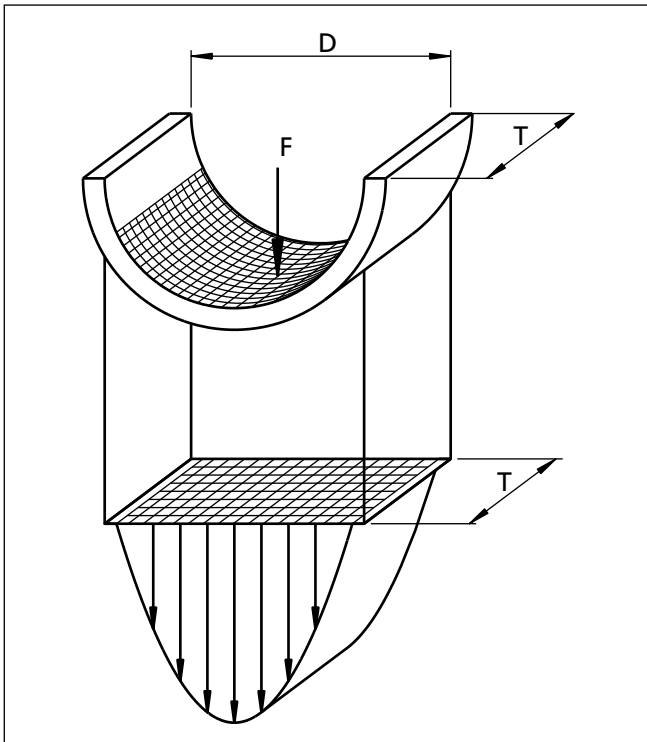


Figure 2 Load distribution

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

Dimensioning of Slydring®

The radial bearing pressure and the resulting elastic deflection are important parameters in the design of the Slydring®. The radial offset resulting from the dimensional tolerances, deflection and wear should always be less than the smallest gap to be sealed by the system. On request, we are willing to carry out dimensioning calculations for specific applications.

A rough estimate of the number and width of Slydring® required can be calculated using the following formula:

$$\text{Slydring}^{\circ} \text{ width } T_{\text{total}} = \frac{F \times f}{d_N \times Pr}$$

where:

F = Maximum radial load [N]

f = Safety factor

d_N = Rod diameter [mm]

Pr = Radial Slydring® pressure [N/mm²]

Example:

d_N = 60 mm

F = 40.000 N

t = 40 °C

f = 2

Slydring® material Orkot® C 380

Pr 100 N/mm²

$$T_{\text{total}} = \frac{40.000 \times 2}{60 \times 100} = 13.3 \text{ mm}$$

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

Selected:

2 strips Series GR69 with a groove width $L_2 = 9.7$ mm

See Figure 4 and 5.



The standard installation arrangement for pistons and rods is shown in Figure 3 and Figure 4.

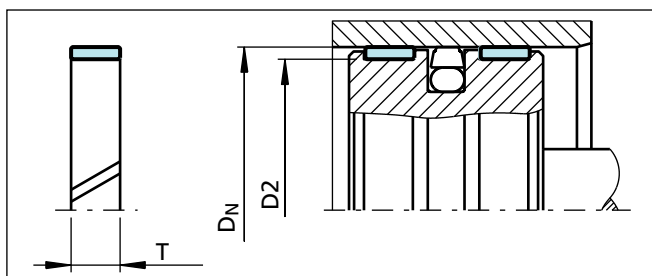


Figure 3 Piston guide

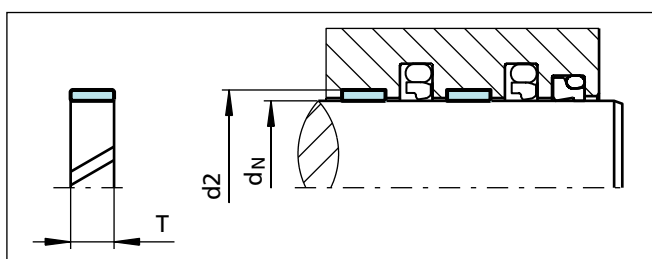


Figure 4 Rod guide

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

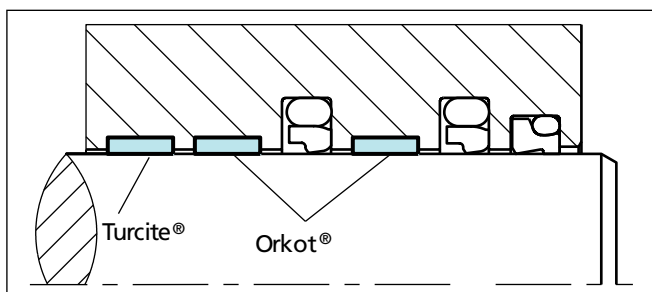


Figure 5 Rod guide for high loads
(See also Figure 15)



■ Turcite® Slydring® for Piston and Rod

Description

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

Slydring® are available as off-the-roll materials for cutting to length in the users works as listed in Table V. Sections cut to size ready for installation is available for rod and piston diameters according to Table II.

Slydring® have a geometrically rectangular cross-section and are chamfered at the edges 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 piston rod guides, the rings have this same teardrop structure on both sides.

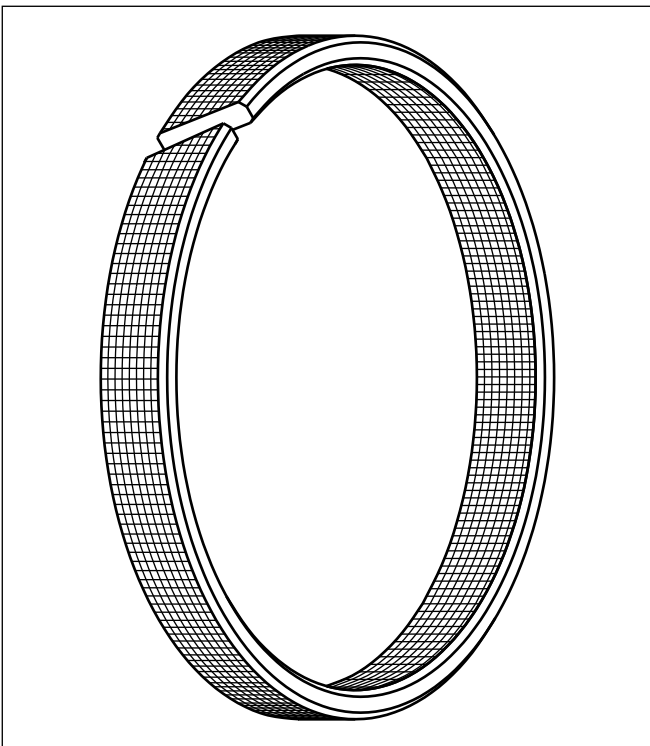


Figure 6 Turcite® Slydring® with teardrop structure

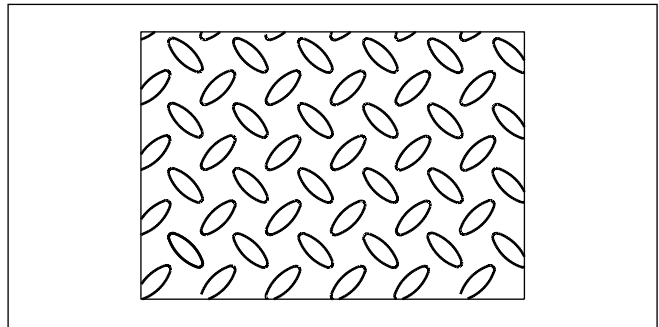


Figure 7 Teardrop structure for Turcite® Slydring®

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 III).

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 safe hydraulic fluids
- The embedding of foreign particles is enhanced
- Good damping effect, absorbs vibrations



Application Examples

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

- Machine tools
- Injection moulding machines
- Press brakes
- Presses
- Robotics & Handling machinery
- Automation
- Positioning cylinders
- Servo hydraulics
- Piston accumulators
- Shock absorber
- Valves for hydraulic & pneumatic circuits
- Agriculture
- Chemical and Process Industry

Technical Data

The Turcite® Slydring® with angle cut is recommended for reciprocating movements

Speed: Up to 15m/s

Temperature: -60 °C to +150 °C (200 °C)

Media: Mineral Oil based Hydraulic fluids, barely flammable hydraulic fluids, environmentally safe hydraulic fluids (biological degradable oils), water, air and others. Depending on the Turcite® material compatibility.

Clearance: The maximum permissible radial clearance s_{max} is depending on the actual sealing system.

Radial Slydring®
pressure P_r :
Max. 15 N/mm² at 25 °C
Max. 12 N/mm² at 80 °C
Max. 8 N/mm² at 120 °C

When calculating the width of Turcite® Slydring® it is recommended to use a safety factor $f=2$ (see page 8).

With the Turcite® materials it must be taken into account that the permissible surface pressure decreases with increasing temperatures. The load bearing ability for dynamic applications in practice is dependent primarily on the operating temperature. This 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 built-up. Care should be taken not to apply high values for pressure and speed at the same time.

Materials

Standard Application:

- For hydraulic components with reciprocating movement in mineral oils or medium with good lubricating performance. Low friction, high resistance to wear, heat and chemicals:

Turcite® T47 (bronze filled)

Special Application:

- For lubricated and poor lubricated linear and slow rotary moving hydraulic and pneumatic components:

Turcite® T51 (carbon filled)

- For all commonly applied hydraulic fluids including fluids with low lubrication performance, lowest friction and wear, improved absorption of abrasive contaminants, no wear or abrasion of counter surface:

Turcite® M12 (mineral fiber and additive filled)



Turcite® Slydring® - Wear Ring

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

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	-	GM9900000-	9.70	4.00

Further dimensions on request.

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

Table V Turcite® Slydring® Serial No. GM Length of the roll

Turcite® T47, T51, M12		
Serial number	Thickness W mm	Minimum length m
GM06	1.00	27.0
GM22 GM31	1.50	19.0
GM41 GM43	1.55	18.5
GM49 GM53	2.00	12.0
GM64 GM65 GM67 GM68 GM69 GM73 GM74 GM75 GM76	2.50	9.0
GM94	3.00	7.0
GM98 GM99	4.00	4.5

Off-the-roll material can only be supplied as complete rolls.

Length of rolls varies depending on thickness and material.



Turcite® from the roll, calculation of the Linear Length

The linear length of Turcite® and Zurcon® is calculated such that a gap "Z" is created at the ends of the strip after installation (see Figure 3 and Figure 4). 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®:

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

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.

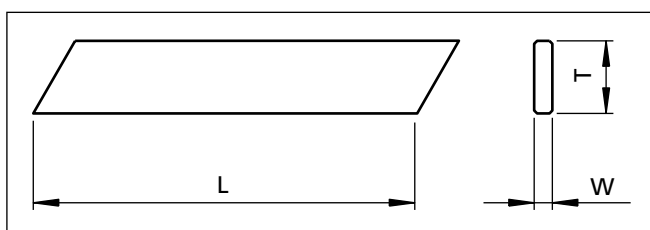


Figure 8 Cut length



■ Zurcon® Slydring® for Piston and Rod

Zurcon® Z80

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, Commission Directive 2002/72/EC and amendments and USP 26 Chapter 87 + 88.

Advantages

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

Application Examples

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

Technical Data

Velocity, reciprocating: Max. 2.0 m/s

Temperature: -60 °C to +80 °C (100 °C)

Radial Slydring®
pressure Pr: Max. 25 N/mm² at 25 °C
Max. 8 N/mm² 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 8).

Table VI Serial Numbers for Slydring® of Material Zurcon® Z80

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

Further dimensions on request.

Table VII Zurcon® Z80 Slydring® Length of the Roll

Zurcon® Z80 / Z81	Ring Thickness
Length of the Roll	W
25.0 m	1.55
15.0 m	2.50

Off-the-roll material can only be supplied as complete rolls.

Zurcon® from the roll, calculation of the linear length, see page 13

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 built-up. Care should be taken not to apply high values for pressure and speed at the same time.



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

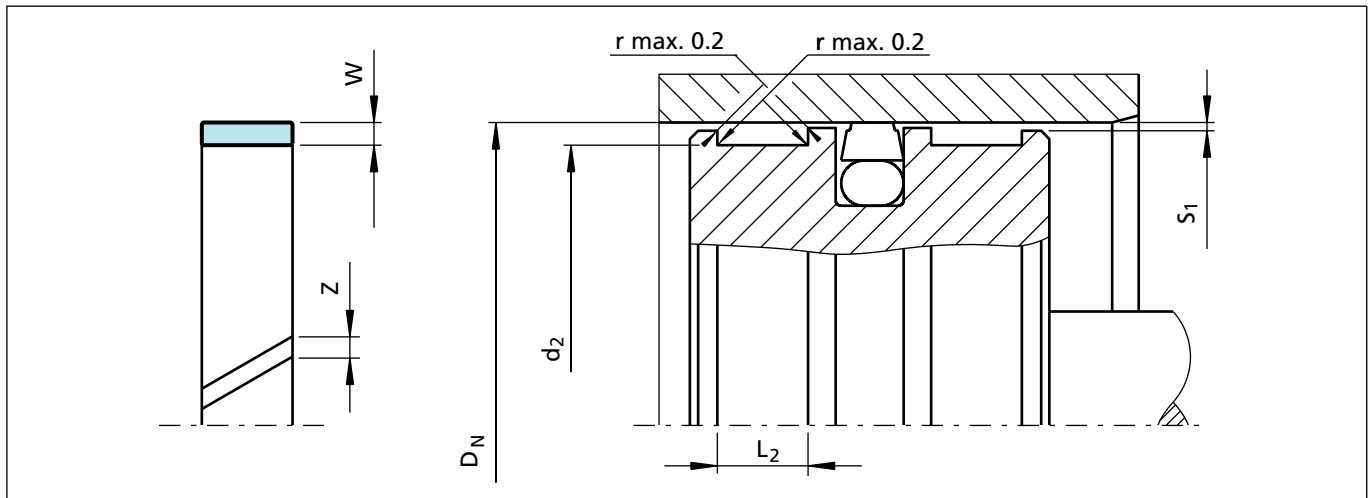


Figure 9 Installation drawing

Table VIII Installation dimensions

Serial No.	Bore Diameter ¹⁾	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	³⁾
GP43	10 - 50.0	$D_N - 3.10$	4.00	1.55	³⁾
GP65	16 - 140.0	$D_N - 5.00$	5.60	2.50	³⁾
GP69	60 - 220.0	$D_N - 5.00$	9.70	2.50	³⁾
GP73	130 - 400.0	$D_N - 5.00$	15.00	2.50	³⁾
GP75	280 - 999.9	$D_N - 5.00$	25.00	2.50	³⁾
GP75X	1000 - 4200.0	$D_N - 5.00$	25.00	2.50	³⁾
GP98	280 - 999.9	$D_N - 8.00$	25.00	4.00	³⁾
GP98X	1000 - 2200.0	$D_N - 8.00$	25.00	4.00	³⁾
GP99 ²⁾	100 - 999.9	$D_N - 8.00$	9.70	4.00	³⁾

¹⁾ Recommended diameter ranges.

²⁾ Non ISO 10766 standard.

³⁾ Calculation of the linear length, see page 13

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

⁴⁾ 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 IX Radial Clearance S_1 ⁴⁾

Bore Dia. 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 - 1000	0.50	1.10
>1001	0.60	1.20

Table X 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 DIN	0.40 - 2.50	0.63 - 2.50	< 10.0
R_a	0.05 - 0.40	0.10 - 0.40	< 2.5



Turcite® and Zurcon® Slydring® - Wear Ring

Ordering Example

Slydring® for piston diameter $D_N = 100.0$ mm
 Series GP 69 from Table VIII
 Groove width: 9.70 mm, ring thickness: 2.50 mm

Material: Turcite® T47
 (other materials see Table I)
 Standard design: With angle cut and teardrop structure
 Design code: 0

TSS Part No.: GP6901000 (from Table XI)
 The TSS Article No. can be formed from the example below.

TSS Article No.	GP69	0	1000	-	T47
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 $D_N = 2700.0$ mm
 Series GP75X from Table VIII
 Groove width: 25.00 mm, ring thickness: 3.00 mm
 TSS Part No.: GP75X2700 (from Table XI)

TSS Article No.	GP75	X	2700	-	T47
TSS Series No.					
Design code					
Bore diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters ≥ 1000.0 mm multiply only by factor 1.

Table XI Slydring® for Piston

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D_N H9	d_2 h8	$L_2 +0.2$	W	
8.0	4.9	2.5	1.55	GP4100080
10.0	6.9	2.5	1.55	GP4100100
10.0	6.9	4.0	1.55	GP4300100
12.0	8.9	4.0	1.55	GP4300120
14.0	10.9	4.0	1.55	GP4300140
15.0	11.9	4.0	1.55	GP4300150
16.0	12.9	4.0	1.55	GP4300160
16.0	11.0	5.6	2.50	GP6500160
18.0	14.9	4.0	1.55	GP4300180
18.0	13.0	5.6	2.50	GP6500180
20.0	16.9	4.0	1.55	GP4300200
20.0	15.0	5.6	2.50	GP6500200

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D_N H9	d_2 h8	$L_2 +0.2$	W	
22.0	17.0	5.6	2.50	GP6500220
25.0	21.9	4.0	1.55	GP4300250
25.0	20.0	5.6	2.50	GP6500250
25.0	20.0	9.7	2.50	GP6900250
27.0	22.0	5.6	2.50	GP6500270
27.0	22.0	9.7	2.50	GP6900270
28.0	23.0	5.6	2.50	GP6500280
30.0	26.9	4.0	1.55	GP4300300
30.0	25.0	5.6	2.50	GP6500300
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



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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	31.9	4.0	1.55	GP4300360
37.0	32.0	5.6	2.50	GP6500370
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
45.0	40.0	5.6	2.50	GP6500450
45.0	40.0	9.7	2.50	GP6900450
48.0	43.0	5.6	2.50	GP6500480
50.0	46.9	4.0	1.55	GP4300500
50.0	45.0	5.6	2.50	GP6500500
50.0	45.0	9.7	2.50	GP6900500
52.0	47.0	5.6	2.50	GP6500520
55.0	50.0	5.6	2.50	GP6500550
55.0	50.0	9.7	2.50	GP6900550
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	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
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
72.0	67.0	5.6	2.50	GP6500720
75.0	70.0	5.6	2.50	GP6500750

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thick-ness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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
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
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
125.0	120.0	5.6	2.50	GP6501250
125.0	120.0	9.7	2.50	GP6901250
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
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



Turcite® and Zurcon® Slydring® - Wear Ring

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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
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
1000.0	995.0	25.0	2.50	GP75X1000
2700.0	2695.0	25.0	2.50	GP75X2700

Max. diameter ~ 4200 mm for Turcite® Slydring® in one piece.

Zurcon® Z80 is not available as GP98, GP98X and GP99 (Thickness W=4.0 mm)

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

All intermediate sizes not contained in the table are available.



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

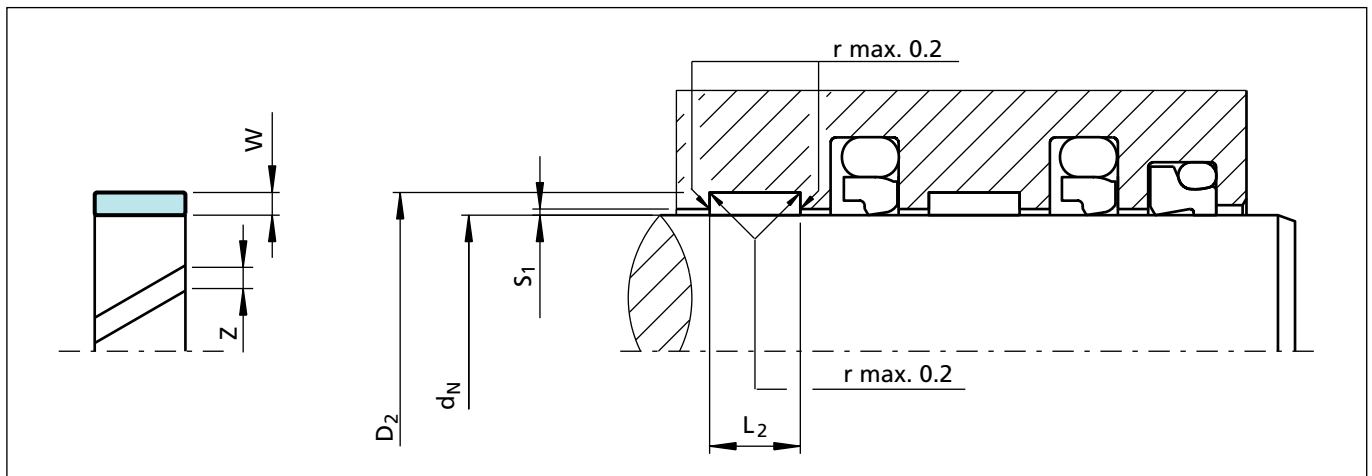


Figure 10 Installation drawing

Table XII Installation dimensions

Serial No.	Rod Diameter ¹⁾	Groove Diameter	Groove Width	Ring Thickness	Ring Gap
	d_N f8/h9	D_2 H8	$L_2 + 0.2$	W	Z
GR41	8 - 20.0	$d_N + 3.10$	2.50	1.55	²⁾
GR43	10 - 50.0	$d_N + 3.10$	4.00	1.55	²⁾
GR65	15 - 140.0	$d_N + 5.00$	5.60	2.50	²⁾
GR69	20 - 220.0	$d_N + 5.00$	9.70	2.50	²⁾
GR73	80 - 400.0	$d_N + 5.00$	15.00	2.50	²⁾
GR75	200 - 999.9	$d_N + 5.00$	25.00	2.50	²⁾
GR75X	1000 - 4200.0	$d_N + 5.00$	25.00	2.50	²⁾
GR98	280 - 999.9	$d_N + 8.00$	25.00	4.00	²⁾
GR98X	1000 - 2200.0	$d_N + 8.00$	25.00	4.00	²⁾

¹⁾ Recommended diameter ranges. ²⁾ Calculation of the linear length, see page 13

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

Table XIII Radial Clearance S_1 ³⁾

Rod Dia. 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 - 1000	0.50	1.10
>1001	0.60	1.20

³⁾ 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 XIV 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 DIN	0.40 - 2.50	0.63 - 2.50	< 10.0
R_a	0.05 - 0.40	0.10 - 0.40	< 2.5



Turcite® and Zurcon® Slydring® - Wear Ring

The TSS Article No. can be formed from the example below.

Ordering Example

Slydring® for rod diameter $d_N = 63.0$ mm
 Series GR 65 from Table XII
 Groove width: 5.60 mm, ring thickness: 2.50 mm
 Material: Turcite® T47
 (other materials see Table I)
 Standard design: With angle cut and teardrop structure
 Design code: 0
 TSS Part No.: GR6500630 (from Table XV)

TSS Article No.	GR65	0	0630	-	T47
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 $d_N = 2600.0$ mm
 Series GR75X from Table XII
 Groove width: 25.00 mm, ring thickness: 2.50 mm
 TSS Part No.: GR75X2600 (from Table XV)

TSS Article No.	GR75	X	2600	-	T47
TSS Series No.					
Design code					
Rod diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters ≥ 1000.0 mm multiply only by factor 1.

Table XV 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

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	$L_2 +0.2$	W	
22.0	27.0	9.7	2.50	GR6900220
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



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
36.0	41.0	5.6	2.50	GR6500360
36.0	41.0	9.7	2.50	GR6900360
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

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thick-ness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
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
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



Turcite® and Zurcon® Slydring® - Wear Ring

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
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
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
1000.0	1005.0	25.0	2.50	GR75X1000
1000.0	1008.0	25.0	4.00	GR98X1000
2600.0	2605.0	25.0	2.50	GR75X2600

Max. diameter ~ 4200 mm for Turcite® Slydring® in one piece.

Zurcon® Z80 is not available as GR98 and GR98X (Thickness W=4.0 mm)

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

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 material and can be used in hydraulic cylinders for medium to high loads. Two different grades of material are available:

HiMod® HM061: A special glass fibre reinforced polyacetal

HiMod® HM062: A special glass fibre reinforced heat-stabilised polyamid with PTFE filler

Slydring® in material HM061 and HM062 are injection moulded to finish parts (mould necessary), a wide range of standard sizes (see Table XXI and Table XXXIII) are available.

Application Examples

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

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

Materials

HiMod® HM061

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

Advantages

- Favourable 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

Technical Data

Velocity, reciprocating: Max. 0.8 m/s
Temperature: -40 °C to +110 °C

Radial Slydring® pressure Pr: Max. 40 N/mm² at 25 °C
Max. 25 N/mm² >60 °C

When calculating the width of HiMod® Slydring® it is recommended to use a safety factor f=2 (see page 8).

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 built-up. Care should be taken not to apply high values for pressure and speed at the same time.



HiMod® Slydring® - Wear Ring

HiMod® HM062

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

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

Technical Data

Velocity, reciprocating: Max. 1.0 m/s

Temperature: -40 °C to +130 °C

Radial Slydring®
pressure Pr: Max. 75 N/mm² at 60 °C
 Max. 40 N/mm² >60 °C

When calculating the width of HiMod® Slydring® it is recommended to use a safety factor f=2 (see page 8).

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 built-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

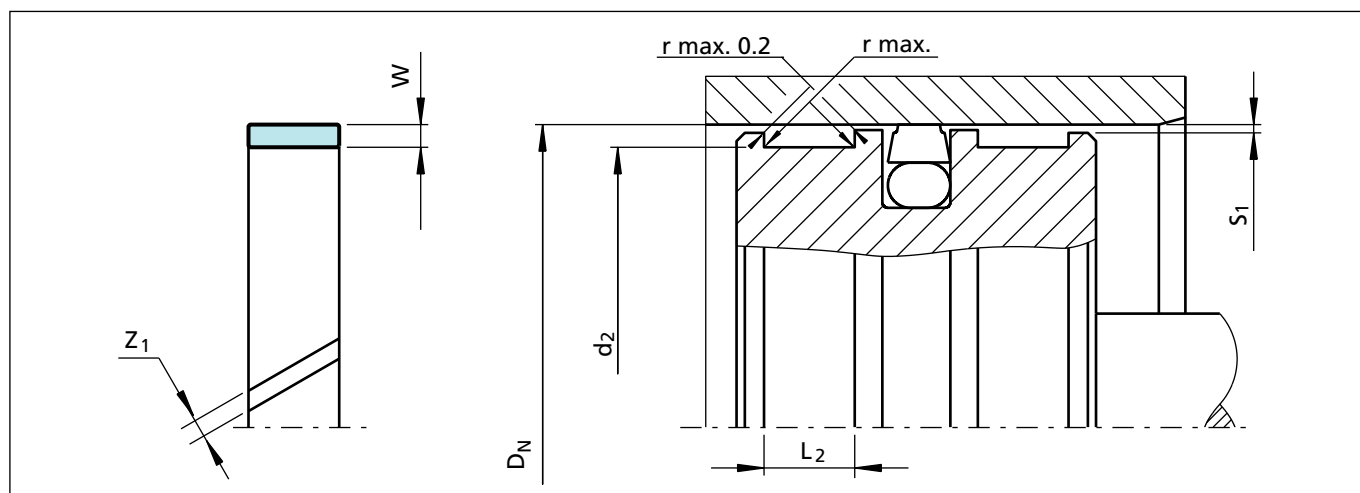


Figure 11 Installation drawing

Table XVI Installation dimensions

Serial No.	Bore Diameter ¹⁾	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

¹⁾ Recommended diameter ranges.

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

Table XVII Recommended Radii for Groove Dia.

D_N	r max.
8 - 250	0.2
>250	0.4

Table XVIII Radial Clearance S_1 ²⁾

Bore Dia. 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

²⁾ Specifications valid only in the area of the Slydring®, but not for the seal area.



HiMod® Slydring® - Wear Ring

Table XIX 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 XVI
Groove width: 9.70 mm, ring thickness: 2.50 mm

Material: HiMod® HM061
(other materials see Table I)
Standard design: With angle cut
Design code: 0

TSS Article No.: GP6901000-HM061 (from Table XXI)

Note

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

Please check with your local TSS entity the availability and price of the HM062. This material may require new moulds.

Table XX Surface Roughness

Parameter	Mating Surface µm	Groove Surface µm
	HiMod® Materials	
R _{max}	1.00 - 4.00	< 16.0
R _z DIN	0.63 - 2.50	< 10.0
R _a	0.10 - 0.40	< 2.5

TSS Article No.	GP69	0	1000	-	HM061
TSS Series No.					
Design code, standard					
Bore diameter x 10					
Quality Index (Standard)					
Material No.					

Table XXI 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

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



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		
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
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	GP6900610-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

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



HiMod® Slydring® - Wear Ring

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		
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
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

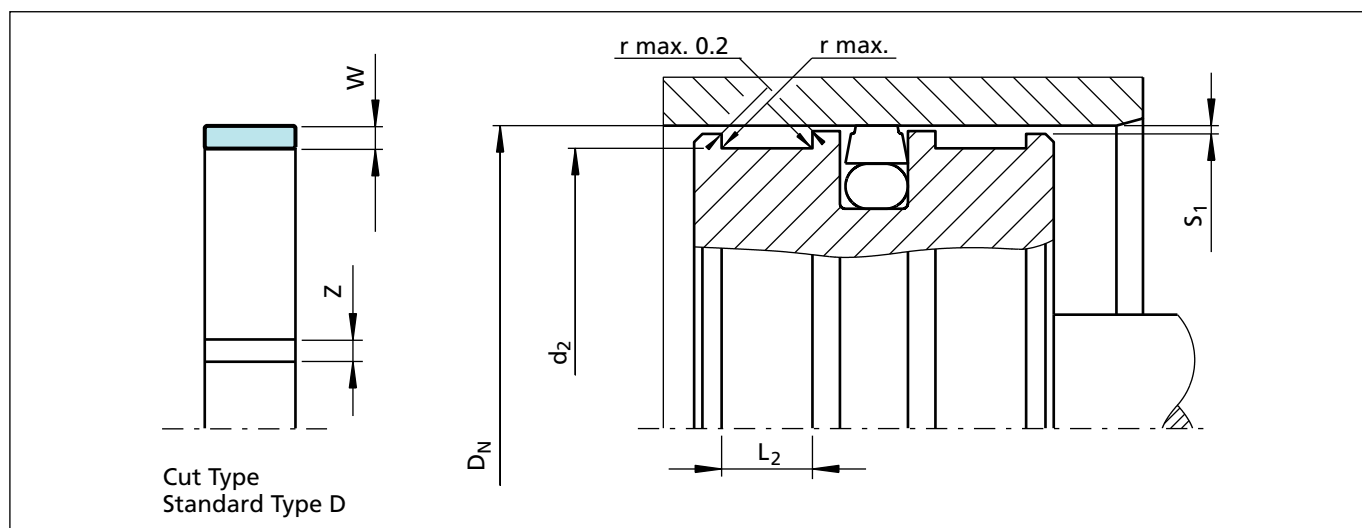


Figure 12 Installation drawing

Table XXII Installation dimensions HiMod® Slydring® for Piston non ISO 10766 Groove Dimensions

Serial No.	Groove Diameter	Groove Width	Ring Thickness
	d_2 h8	$L_2 + 0.2$	W
GP49	$D_N - 4.00$	9.70	2.00
GP51	$D_N - 4.00$	10.00	2.00
GP53	$D_N - 4.00$	15.00	2.00
GP54	$D_N - 4.00$	20.00	2.00
GP67	$D_N - 5.00$	6.30	2.50
GP68	$D_N - 5.00$	8.10	2.50
GP71	$D_N - 5.00$	10.00	2.50
GPN1	$D_N - 6.00$	9.70	3.00

Serial No.	Groove Diameter	Groove Width	Ring Thickness
	d_2 h8	$L_2 + 0.2$	W
GP91	$D_N - 6.00$	10.00	3.00
GP92	$D_N - 6.00$	12.00	3.00
GPN3	$D_N - 6.00$	12.80	3.00
GP93	$D_N - 6.00$	15.00	3.00
GPN4	$D_N - 6.00$	19.20	3.00
GP94	$D_N - 6.00$	20.00	3.00
GP95	$D_N - 6.00$	25.00	3.00
GPL2	$D_N - 8.00$	15.00	4.00

Table XXIII Recommended Radii for Groove Dia.

d_N	r max.
8 - 250	0.2
>250	0.4

Table XXIV Radial Clearance S_1 ²⁾

Bore Dia. 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

²⁾ Specifications valid only in the area of the Slydring®, but not for the seal area.



HiMod® Slydring® - Wear Ring

Table XXV Recommended Gap

D_N	Ring Gap Z
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

Note

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

Please check with your local TSS entity the availability and price of the HM062. This material may require new moulds.

Table XXVI Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
R_{max}	1.00 - 4.00	< 16.0
R_z DIN	0.63 - 2.50	< 10.0
R_a	0.10 - 0.40	< 2.5

TSS Article No.	GP49	D	0200	-	HM061
TSS Series No.					
Design code, standard					
Bore diameter x 10					
Quality Index (Standard)					
Material No.					

Table XXVII Slydring® for Piston in HM061

Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D_N H11	d_2 h9	$L_2 +0.2$	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



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h9	L ₂ +0.2	W		
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
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



HiMod® Slydring® - Wear Ring

Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h9	L ₂ +0.2	W		
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
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



Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h9	L ₂ +0.2	W		
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
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



HiMod® Slydring® - Wear Ring

Dimensions				TSS Article No.	Polypac Ref. No.
Bore Diameter	Groove Diameter	Groove Width	Thickness		
D _N H11	d ₂ h9	L ₂ +0.2	W		
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

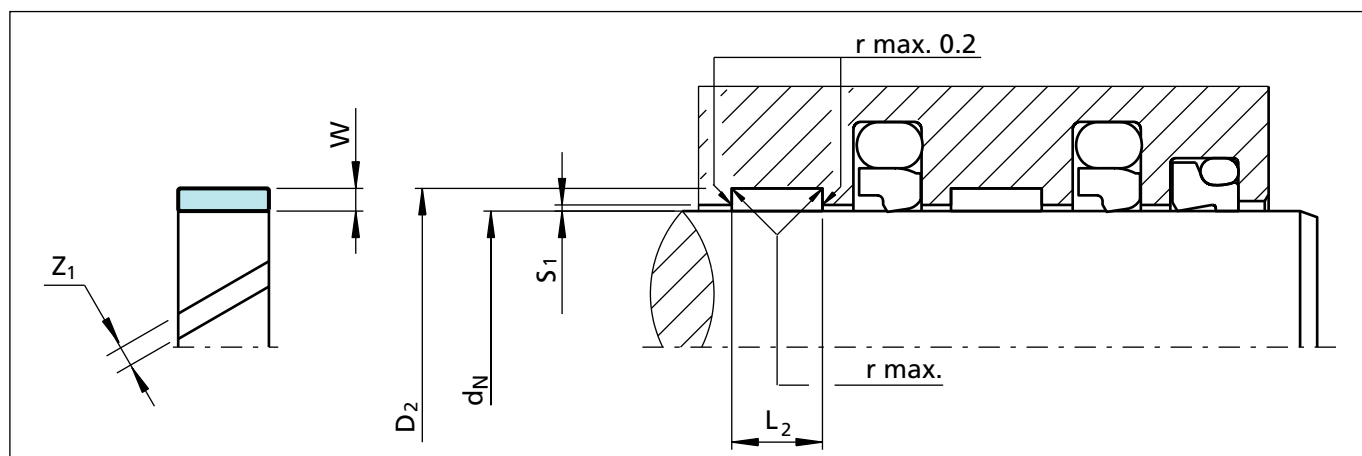


Figure 13 Installation drawing

Table XXVIII Installation dimensions

Series No.	Rod Diameter ¹⁾	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

¹⁾ Recommended diameter ranges

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

Table XXIX Recommended Radii for Groove Dia.

D_N	r max.
8 - 250	0.2
>250	0.4

Table XXX Radial Clearance S_1 ²⁾

Rod Dia. 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

²⁾ Specifications valid only in the area of the Slydring®, but not for the seal area.



HiMod® Slydring® - Wear Ring

Table XXXI Recommended Gap

D _N	Ring Gap Z ₁
10 - 39	2 - 2.5
40 - 149	2 - 3
>150	3 - 4

Table XXXII Surface Roughness

Parameter	Mating Surface µm	Groove Surface µm
	HiMod® Materials	
R _{max}	1.00 - 4.00	< 16.0
R _z DIN	0.63 - 2.50	< 10.0
R _a	0.10 - 0.40	< 2.5

Ordering Example

Slydring® for rod diameter d_N = 63.0 mm
 Series GR69 from Table XXVIII
 Groove width: 9.70 mm, ring thickness: 2.50 mm

Material: HiMod® HM061
 (other materials see Table I)
 Standard With angle cut
 design: Design code: 0
 TSS Article No.: GR6900630-HM061
 (from Table XXXIII)

TSS Article No.	GR69	0	0630	-	HM061
TSS Series No.					
Design code, standard					
Rod diameter x 10					
Quality Index (Standard)					
Material No.					

Note

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

Please check with your local TSS entity the availability and price of the HM062. This material may require new moulds.

Table XXXIII 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

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



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		
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
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

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



HiMod® Slydring® - Wear Ring

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		
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
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

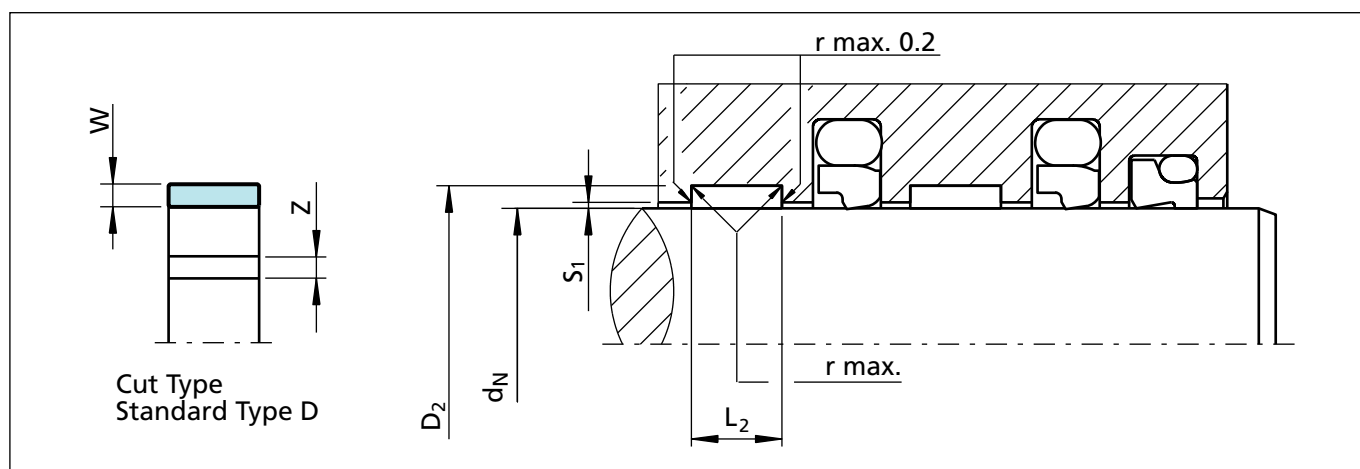


Figure 14 Installation drawing

Table XXXIV Installation dimensions HiMod® Slydring® for Rod non ISO 10766 Groove Dimensions

Serial No.	Groove Diameter	Groove Width	Ring Thickness
	D_2 H8	$L_2 + 0.2$	W
GR48	$d_N + 4.00$	8.10	2.00
GR49	$d_N + 4.00$	9.70	2.00
GR51	$d_N + 4.00$	10.00	2.00
GRN5	$d_N + 4.00$	12.80	2.00
GR53	$d_N + 4.00$	15.00	2.00
GR54	$d_N + 4.00$	20.00	2.00
GRN1	$d_N + 6.00$	9.70	3.00
GR91	$d_N + 6.00$	10.00	3.00

Serial No.	Groove Diameter	Groove Width	Ring Thickness
	D_2 H8	$L_2 + 0.2$	W
GR92	$d_N + 6.00$	12.00	3.00
GRN3	$d_N + 6.00$	12.80	3.00
GRN4	$d_N + 6.00$	19.20	3.00
GR94	$d_N + 6.00$	20.00	3.00
GR95	$d_N + 6.00$	25.00	3.00
GR96	$d_N + 6.00$	30.00	3.00
GRL5	$d_N + 8.00$	30.00	4.00

Table XXXV Recommended Radii for Groove Dia.

D_N	r max.
8 - 250	0.2
>250	0.4

Table XXXVI Radial Clearance S_1 ²⁾

Rod Dia. 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 - 1000	0.50	1.10
>1001	0.60	1.20

²⁾ Specifications valid only in the area of the Slydring®, but not for the seal area.



HiMod® Slydring® - Wear Ring

Table XXXVII Recommended Gap

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

For Polypac Slydring® Ref. No. I/DWR 40/2
 Rod diameter $d_N = 40.0$ mm
 Groove width: 9.70 mm, ring thickness: 2.00 mm

Material: HM061
 (other materials see Table I)
 Standard design: With straight cut
 Design code: D

Note

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

Please check with your local TSS entity the availability and price of the HM062. This material may require new moulds.

Table XXXVIII Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
	HiMod® Materials	
R_{max}	1.00 - 4.00	< 16.0
R_z DIN	0.63 - 2.50	< 10.0
R_a	0.10 - 0.40	< 2.5

Ordering Example

TSS Article No.	GR49	D	0400	-	HM061
TSS Series No.					
Design code, standard					
Rod diameter x 10					
Quality Index (Standard)					
Material No.					

Table XXXIX Slydring® for Rod in HM061

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		
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



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		
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
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



HiMod® Slydring® - Wear Ring

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		
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
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



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		
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
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



HiMod® Slydring® - Wear Ring

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		
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
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



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		
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® of fabric reinforced composite materials is used in hydraulic cylinders exposed to high loads that can occur e.g. in mobile hydraulics and presses. The high compressive strength, good sliding behaviour and the exceptional wear resistant properties ensure a long service life.

Slydring® of Orkot® fabric composite materials is produced as standard preformed to the intended diameter and ready-to-fit. It is manufactured with a angle cut and already has the necessary gap "Z1".

For large diameters > 300 mm, rings can be cut from Orkot® C320, C380 strip material. This offers economical solutions for non-standard diameters or when quantities are limited. Strip material is coiled to a diameter of 200 to 300 mm and can be ordered either:

- cut and finished to length observing the minimum gap stated in figure 17 (page 49) and figure 19 (page 57).
- coils at full lengths of 2 m, 3 m or 5 m (see next page)

When cut from a coil it requires more care in fitting, in particular if the diameter is below 200 to 300 mm.

Advantages

- Dimensionally stable and vibration absorbing
- Even distribution of high radial forces
- Good sliding and dry running properties
- High wear resistance
- Good wiping effect
- Long service life.

Application Examples

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

- Hydraulic actuators
- Mobile hydraulics
- Excavators
- Construction equipment
- Forrestry machinery
- Mining
- Steel mills
- Presses
- Water locks
- Marine engineering

Technical Data

Velocity: Up to 1 m/s, with reciprocating movements

Temperature: - 60 °C to + 120 °C

Pr under dynamic conditions (C380, C320, C932):
max. 100 N/mm² at 25 °C
max. 50 N/mm² >60 °C

Ultimate compressive strength (C380, C320): max. > 300 N/mm²
(C932): max. 260 N/mm²

When calculating the width of Orkot® Slydring® it is recommended to use a safety factor f=2 (see page 8).

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 built-up. Care should be taken not to apply high values for pressure and speed at the same time.

Materials

Orkot® C320

Orkot® C320 is a fabric composite material made of a thermosetting polymer, reinforced by a fine plastic mesh and lubricant additives impregnated throughout the material. It has a very high resistance to wear, good dry-running properties and dampens vibrations. Colour: dark gray.

Orkot® C380

Orkot C380 is the standard material, this turquoise coloured composite is a further development of the proven C320. It is most versatile; suitable for all commonly used hydraulic fluids such as mineral or synthetic oils, as well as water based fluids. It is an excellent electrical insulator and features enhanced sliding properties in various media.

Orkot® C932

A composite of phenolic resin impregnated into a fine cotton fabric. The material stiffness is higher than C380 / C320. The use in water based fluids is not recommended. Colour: yellow-brown.



Table XL 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	1.55
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.

Serial Number	Coiled length	Groove Width	Ring Thickness
GM73A3000-C380	3 m	15.0	2.50
GM73A5000-C380	5 m	15.0	2.50
GM74A0000-C380	2 m	20.0	2.50
GM74A3000-C380	3 m	20.0	2.50
GM74A5000-C380	5 m	20.0	2.50
GM75A0000-C380	2 m	25.0	2.50
GM75A3000-C380	3 m	25.0	2.50
GM75A5000-C380	5 m	25.0	2.50
GM76A0000-C380	2 m	30.0	2.50
GM78A5000-C380	5 m	40.0	2.50
GM95A0000-C380	2 m	25.0	3.00
GM95A5000-C380	5 m	25.0	3.00
GM98A0000-C380	2 m *	25.0	4.00
GM98A3000-C380	3 m *	25.0	4.00
GM98A5000-C380	5 m *	25.0	4.00
GML7A3000-C380	3 m *	40.0	4.00
GML7A5000-C380	5 m *	40.0	4.00

Coils have an inside diameter of approximately 200 mm
* 4 mm strip is coiled at 700 mm diam. approximately

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 GP 99 from Table IV) embeds the contaminant particles when present in the system and keeps them away from the actual guides and seals (Figure 15). Reducing the piston diameter at both ends allows the particles to become embedded on the face side.

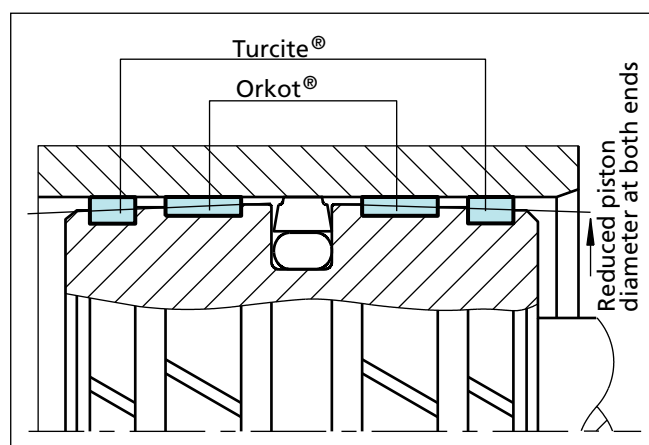


Figure 15 Arrangement of the Slydring® on the piston

Table XLI Serial Numbers for Orkot® Slydring®, Coiled Strip, to be cut to length

Serial Number	Coiled length	Groove Width	Ring Thickness
GM65A0000-C380	2 m	5.6	2.50
GM69A0000-C380	2 m	9.7	2.50
GM69A3000-C380	3 m	9.7	2.50
GM69A5000-C380	5 m	9.7	2.50
GM73A0000-C380	2 m	15.0	2.50



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

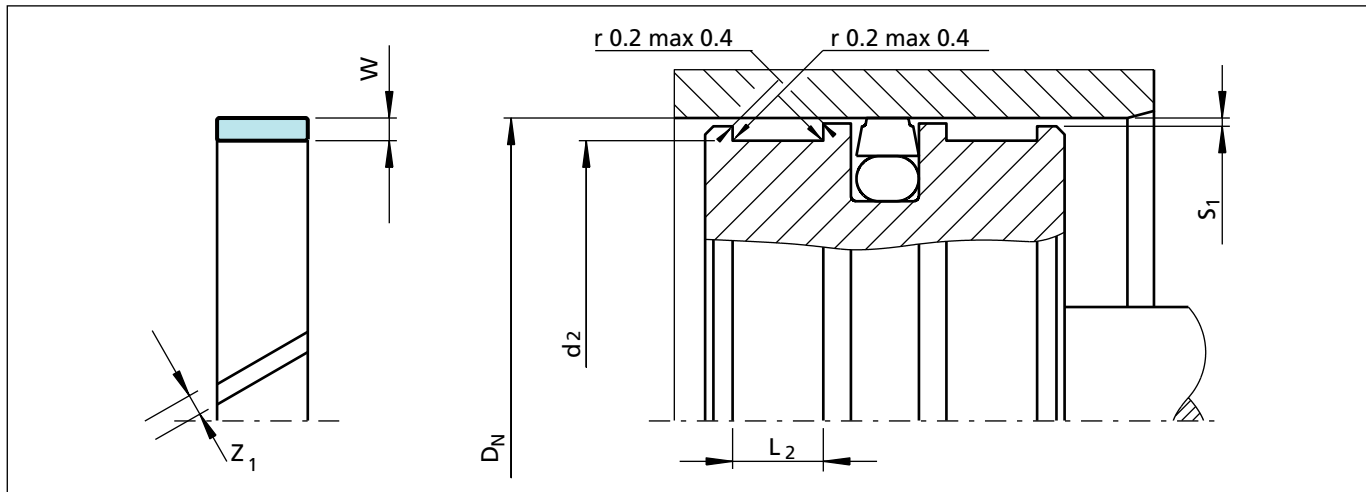


Figure 16 Installation drawing

Table XLII Installation dimensions

Serial No.	Bore Diameter ¹⁾	Groove Diameter	Groove Width	Ring Thickness	Ring Gap ²⁾
	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	1000 - 1500.0	$D_N - 5.00$	25.00	2.50	33 - 48
GP98	280 - 999.9	$D_N - 8.00$	25.00	4.00	10 - 33
GP98X	1000 - 1500.0	$D_N - 8.00$	25.00	4.00	33 - 48

¹⁾ Recommended diameter ranges.

²⁾ see Figure 17.

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

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 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 'Z₁' 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 following radial gap sizes as maximum:

- 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 XLIII Recommended Radii for Groove Dia.

D_N	r max.
8 - 250	0.2
> 250	0.4

Table XLIV Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
R_{max}	1.00 - 4.00	< 16.0
R_z DIN	0.63 - 2.50	< 10.0
R_a	0.10 - 0.40	< 2.5

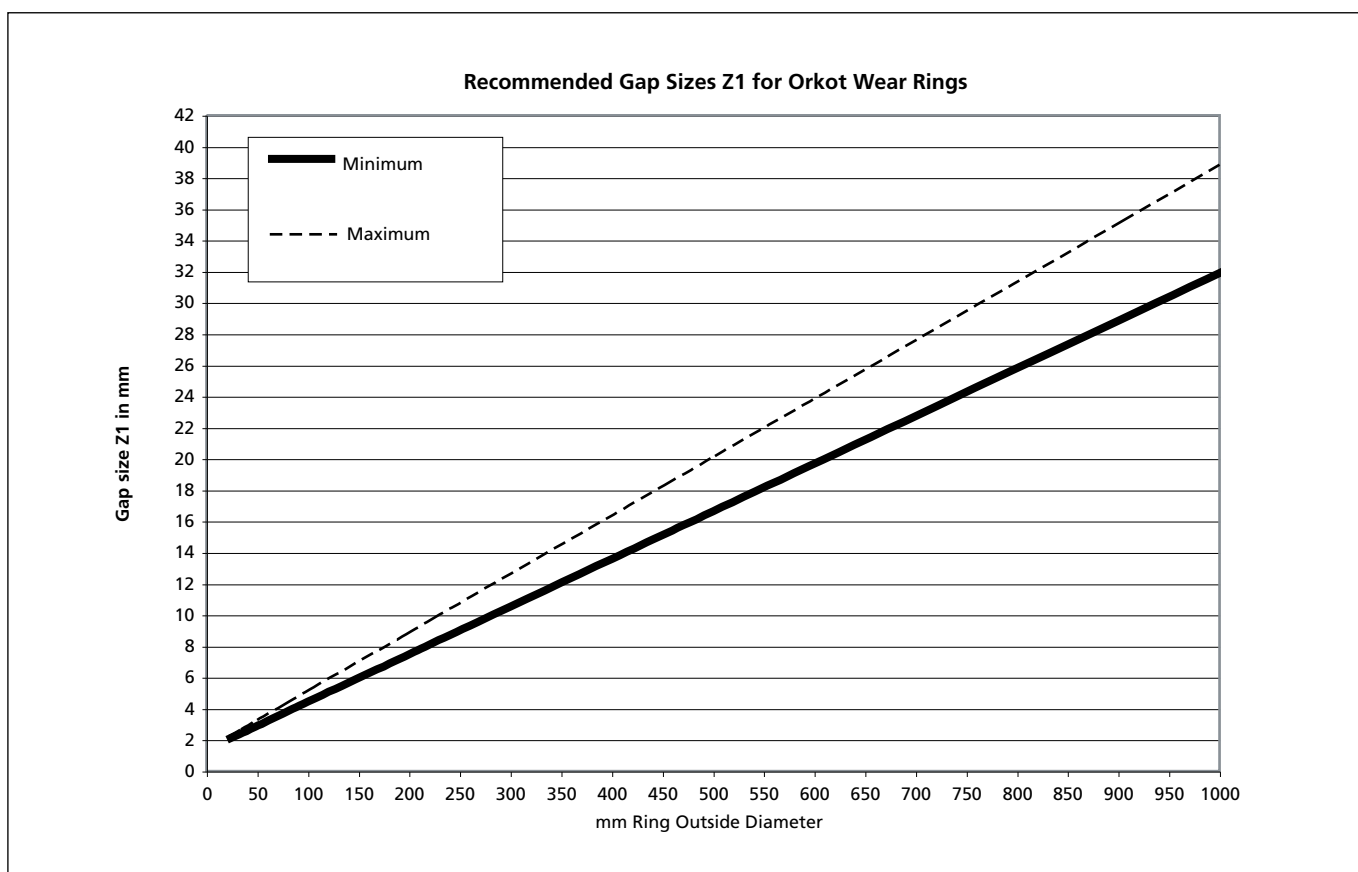


Figure 17 Recommended Gap Sizes Z1 for Orkot Wear Ring



Orkot® Slydring® - Wear Ring

Ordering Example

Slydring® for bore diameter $D_N = 100.0$ mm
 Series GP 69 from Table XLII
 Groove width: 9.7 mm, ring thickness: 2.50 mm

Material: Orkot® C380
 (other materials see Table I)
 Standard design: With angle cut
 Design code: 0
 TSS Part No.: GP6901000
 (from Table XLV)

TSS Article No.	GP69	0	1000	-	C380
TSS Series No.					
Design code, standard					
Bore diameter x 10					
Quality Index (Standard)					
Material No.					

The TSS Article No. can be formed from the example above.

Ordering Example for diameter > 1000 mm

Slydring® for bore diameter $D_N = 1200.0$ mm
 Series GP75X from Table XLII
 Groove width: 25.0 mm, ring thickness: 2.50 mm

Material: Orkot® C380
 TSS Part No.: GP75X1200
 (from Table XLV)

TSS Article No.	GP75	X	1200	-	C380
TSS Series No.					
Design code					
Bore diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters ≥ 1000.0 mm multiply only by factor 1.

Please Note

Orkot® Slydring® for pistons can be used as rod guide ring, f.inst.

GP69 0 1000 - C380

is identical and can be replaced with

GR69 0 0950 - C380

Table XLV Slydring® for Pistons

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
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

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.



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D_N H9	d₂ h8	L₂ +0.2	W	
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

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.



Orkot® Slydring® - Wear Ring

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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
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

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.



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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
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

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.



Orkot® Slydring® - Wear Ring

Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D _N H9	d ₂ h8	L ₂ +0.2	W	
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	GP7502600
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
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

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.



Dimensions				TSS Part No.
Bore Diameter	Groove Diameter	Groove Width	Thickness	
D_N H9	d₂ h8	L₂ +0.2	W	
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
1000.0	995.0	25.0	2.50	GP75X1000
1000.0	992.0	25.0	4.00	GP98X1000
1200.0	1195.0	25.0	2.50	GP75X1200
1500.0	1495.0	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

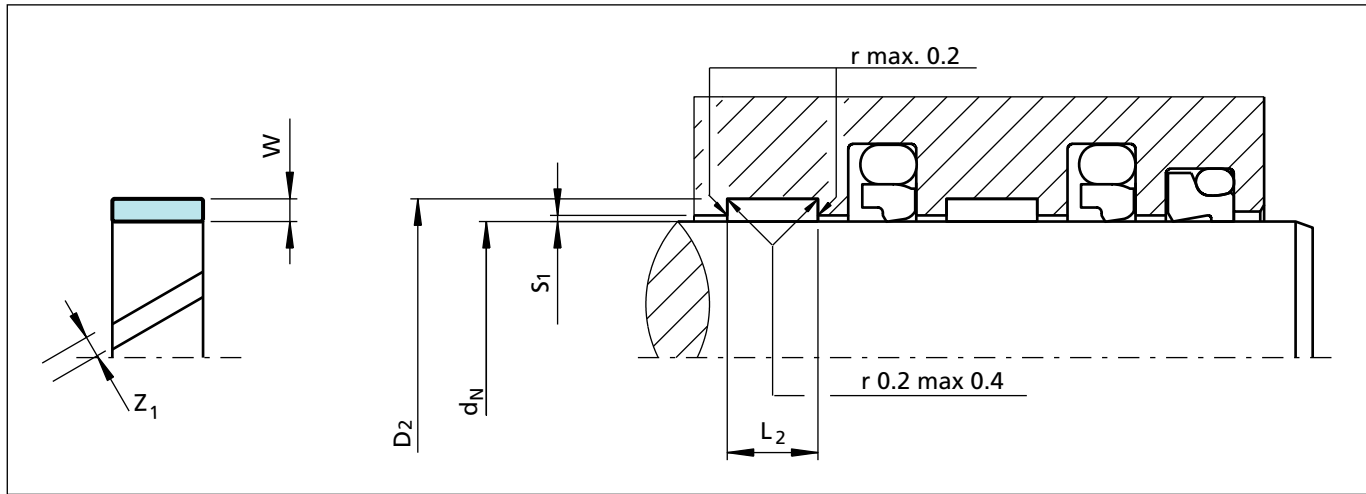


Figure 18 Installation drawing

Table XLVI Installation dimensions

Serial No.	Rod Diameter ¹⁾	Groove Diameter	Groove Width	Ring Thickness	Ring Gap ²⁾
	d_N f8/h9	D_2 H8	$L_2 +0.2$	W	Z_1
GR43	8 - 50.0	$d_N + 3.10$	4.00	1.55	1 - 3
GR65	16 - 120.0	$d_N + 5.00$	5.60	2.50	2 - 6
GR69	25 - 250.0	$d_N + 5.00$	9.70	2.50	2 - 9
GR73	75 - 500.0	$d_N + 5.00$	15.00	2.50	4 - 17
GR75	120 - 999.9	$d_N + 5.00$	25.00	2.50	5 - 33
GR75X	1000 - 1500.0	$d_N + 5.00$	25.00	2.50	33 - 49
GR98	280 - 999.9	$d_N + 8.00$	25.00	4.00	10 - 33
GR98X	1000 - 1500.0	$d_N + 8.00$	25.00	4.00	33 - 49

¹⁾ Recommended diameter ranges.

²⁾ see Figure 19.

For Slydring® to other standards, e.g French standard NF E 48-037, please contact us.

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 13). The slot "Z₁" 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 following radial gap sizes as maximum:

- 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 XLVII Recommended Radii for Groove Bottom.

d_N	r max.
8 - 250	0.2
> 250	0.4

Table XLVIII Surface Roughness

Parameter	Mating Surface μm	Groove Surface μm
R_{max}	1.00 - 4.00	< 16.0
R_z DIN	0.63 - 2.50	< 10.0
R_a	0.10 - 0.40	< 2.5

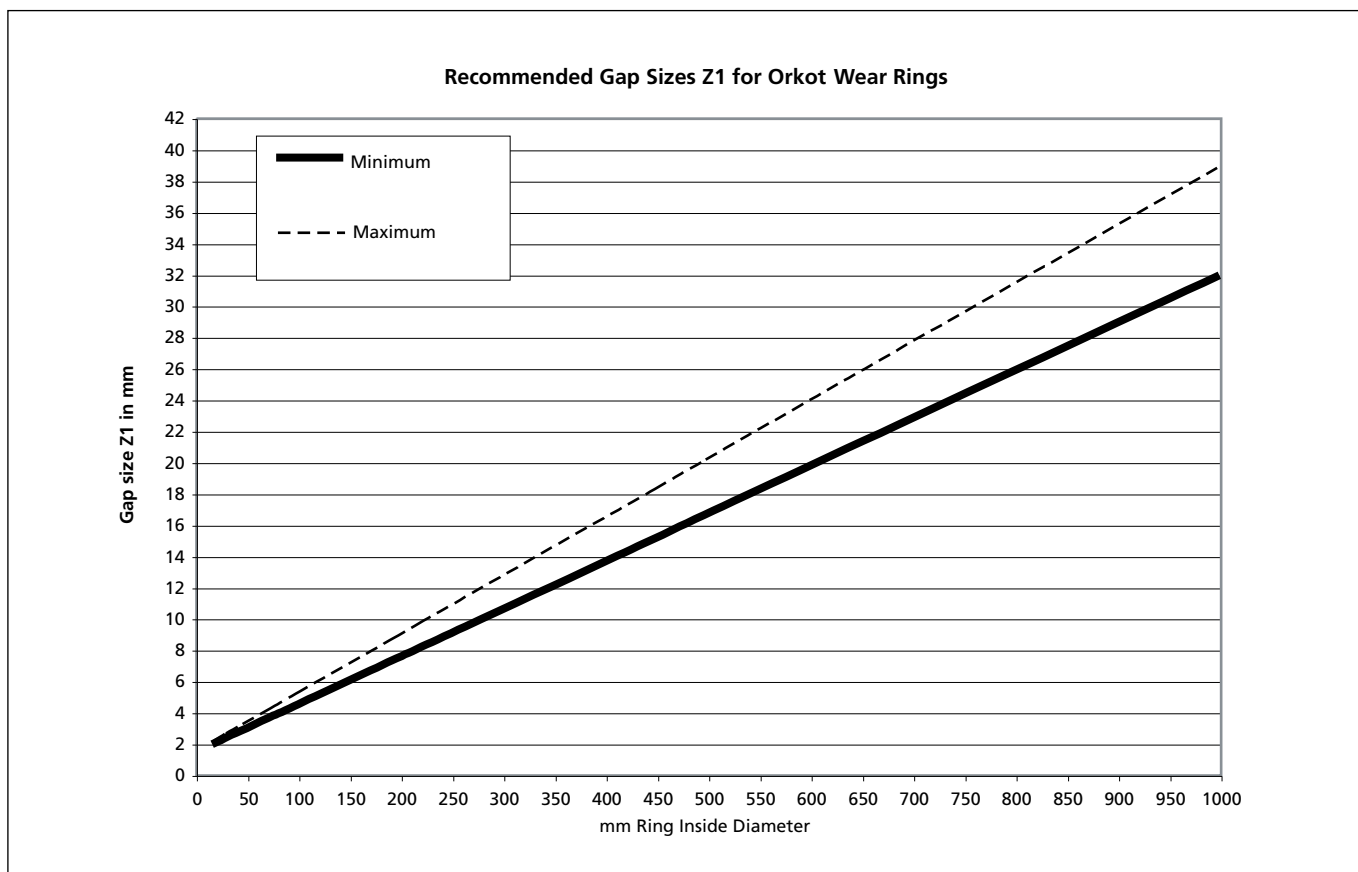


Figure 19 Recommended Gap Sizes Z1 for Orkot Wear Ring



Orkot® Slydring® - Wear Ring

Ordering Example

Slydring® for rod diameter $d_N = 63.0$ mm
Series GR 65 from Table XLVI
Groove width: 5.6 mm, ring thickness: 2.50 mm

Material: Orkot® C380
(other materials see Table I)
Standard design: With angle cut
Design code: 0
TSS Part No.: GR6500630
(from Table XLIX)

TSS Article No.	GR65	0	0630	-	C380
TSS Series No.					
Design code, standard					
Rod diameter x 10					
Quality Index (Standard)					
Material No.					

Ordering Example

Slydring® for rod diameter $d_N = 63.0$ mm
Series GR 69 from Table XLVI
Groove width: 9.7 mm, ring thickness: 2.50 mm

Material: Orkot® C380
Standard design: With angle cut
Design code: 0
TSS Part No.: GR6900630
(from Table XLIX)

TSS Article No.	GR69	0	0630	-	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 $d_N = 1200.0$ mm
Series GR 75X from Table XLVI
Groove width: 25.0 mm, ring thickness: 2.50 mm

Material: Orkot® C380
TSS Part No.: GR75X1200
(from Table XLIX)

TSS Article No.	GR75	X	1200	-	C380
TSS Series No.					
Design code					
Rod diameter x 1*					
Quality Index (Standard)					
Material No.					

* For diameters ≥ 1000.0 mm multiply only by factor 1.

Please Note

Orkot® Slydring® for rods can be used as piston guide ring, f.inst.

GR65 0 0630 - C380

is identical and can be replaced with

GP65 0 0680 - C380



Table XLIX Slydring® for Rods

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

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.



Orkot® Slydring® - Wear Ring

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
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
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

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.



Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
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
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

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.



Orkot® Slydring® - Wear Ring

Dimensions				TSS Part No.
Rod Diameter	Groove Diameter	Groove Width	Thickness	
d_N f8/h9	D_2 H8	L_2 +0.2	W	
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
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
1000.0	1005.0	25.0	2.50	GR75X1000
1000.0	1008.0	25.0	4.00	GR98X1000
1200.0	1205.0	25.0	2.50	GR75X1200
1500.0	1505.0	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.

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