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| Voneseals Technology (Shanghai) Inc.

Address: NO.58,Qiantangjiang Road, Jiashan, Jiaxing City, Zhejiang, P.R.C

Telephones: 0573-8482 1888

Node: www.voneseals.com

| Shanghai Garnor Sealing Technology Co., Ltd.

Address: No.196,Yuntong Road,Building#6,Pudong,Shanghai,P.R.C

Telephones: 021-5531 7321

Node: www.garnor.com

| Guangzhou JST Seals Technology Co., Ltd.

Address: No. 1, Xinyu North Road, Ningxi Subdistrict, Zengcheng District,
Guangzhou City, Guangdong P.R.C.

Telephones: 020-8245 3660

Node: www.jst-seals.com



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SEALS GUIDE FOR HYDRAULIC

**Better Materials
for a Better Future**

以材料科技助力人类美好生活

SS03-2024





Voneseals Group is a company specializing in sealing system solutions. The company's mission is to focus on customer needs, persist in the research of materials, products and application technologies, and provide the most professional sealing solutions.

Although our goal is to make this manual cover as wide a range of seals as possible, this manual only covers commonly used standard seal products.

In practice, especially in some special working conditions and environments, the seals covered in this manual may not fully meet your actual requirements. In this case, please contact our technicians or authorized distributors. Based on our many years of experience in providing sealing system solutions, on the support and assistance of senior experts in polymer materials at home and abroad, and on our professional experimental and verification means, we can certainly provide you with a set of tailor-made sealing solutions.

The information provided in this manual has been compiled from many years of experience gained in the production and application of seals by our company. However, the performance of the seals does not depend entirely on the seals themselves, but also on many other factors such as pressure, temperature, speed, medium, finish and so on during the specific use. Therefore, we recommend that you contact our technical staff for selection and testing under their guidance.

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■ DUST COLLAR

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
HWF	Dust Collar		M1001	-	-30 ~ +100	1.0	19
HWG	Dust Collar		M1001 M1112	-	-50 ~ +100 -20 ~ +120	1.0	21
HWS	Dust Collar		P2005	-	-30 ~ +100	1.0	23
HWY	Dust Collar		P2005	-	-30 ~ +100	0.5	25
FD1	Dust Collar		P2071N P2071V	-	-30 ~ +100 -20 ~ +200	5.0	27
FD2	Dust Collar		P2071N P2071V	-	-30 ~ +100 -20 ~ +200	5.0	30
GWJ	Pin Dust Ring		M1001	-	-30 ~ +100	1.0	32

■ PISTON ROD SEALS

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
HRS	Piston Rod Seals		P2001	35	-30 ~ +100	1.0	34
HRD	Piston Rod Seals		P2001	35	-30 ~ +100	0.5	36
HRE	Piston Rod Seals		M6006	30	-46 ~ +90	0.5	38
HRX	Piston Rod Cushion Seals		M2005 MF112	50	-30 ~ +100 -20 ~ +120	1.0	40
STR	Piston Rod Seals		P2071N P2071V	40	-30 ~ +100 -20 ~ +200	5.0	42
SHR	Piston Rod Seals		PCA01N PCA01V	40	-30 ~ +100 -20 ~ +200	15	45
GTR	Piston Rod Seals		P2071N P2071V	40	-30 ~ +100 -20 ~ +200	5.0	48

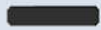
■ PISTON SEAL

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
HPB	Piston Seal		M6112	25	-30 ~ +120	0.5	51
HPGA	Piston Seal		M5000 M500H	50	-35 ~ +110 -20 ~ +130	1.5	53
HPIA	Piston Seal		MJ001	30	-30 ~ +100	0.5	55
HPK	Piston Seal		M4000	80	-30 ~ +110	1.0	57
HPS	Piston Seal		P2001	35	-30 ~ +100	0.5	59
HPU	Piston Seal		M8002	50	-30 ~ +100	0.5	61
GTP	Piston Seal		P2071N P2071V	40	-30 ~ +100 -20 ~ +200	5.0	63
GHP	Piston Seal		PCA01N PCA01V	40	-30 ~ +100 -20 ~ +200	15	66
STP	Piston Seal		P2071N P2071V	40	-30 ~ +100 -20 ~ +200	5.0	69
XTP	Piston Seal		P2071N P2071V	40	-30 ~ +100 -20 ~ +200	2.0	72

■ ROTARY SEAL

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
GRP	Rotary seals for holes		PC002N PC002V	30	-30 ~ +100 -20 ~ +200	1.0	75
GRR	Rotary seals for shafts		PT003N PC002V	30	-30 ~ +80 -20 ~ +200	1.0	77
ZHP	Rotary seals for holes		PC002N PC002T	35	-30 ~ +100 -50 ~ +100	1.0	79
ZUR	Rotary seals for shafts		PT003N PT003T	35	-30 ~ +80 -50 ~ +80	1.0	81

■ GUIDE ELEMENT

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
GF3	Guide Tape		S1106	-	-100 ~ +200	5.0	83
GFC	Guide Tape		S1108	-	-50 ~ +120	0.5	85
HGR	Guide Ring		Polyformaldehyde (CH ₂ O) _n S1101 Polytetrafluoroethylene filled S1106 Phenolic binder S1108	-	-40 ~ +100 -100 ~ +200 -50 ~ +120	1.0 5.0 0.5	86

■ SEWAGE RING

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
KZT	Sewage Ring		S1106	-	-100 ~ +200	5.0	89

■ STATIC SEAL

Model Number	Name	Section View	Standard Material	Work Pressure (MPa)	Operating Temperature (°C)	Working Speed (m/s)	Pagination
OR	Static Seal		P2001	60	-30 ~ +100	0.5	91
YR	Static Seal		P2001	60	-30 ~ +100	-	93

Basic Physical Properties of Materials and Application Characteristics

Material Type	Material Code	Durometer	Tensile Strength (MPa)	Elongation At Break (%)	100% Implantation Dissociation (MPa)	Permanent deformation rate in compression (%)		Temperature Range (°C)	Application Examples
						Experiment Condition	A: 70°C, 24h B: 100°C, 70h C: 175°C, 24h		
Polyurethane (AU)	P2001	93 (ShA)	48	400	10	25 (A)		-30~+100°C	Hydraulic Standard Materials
Polyurethane (AU)	P2002	95 (ShA)	45	300	15	27 (A)		-20~+110°C	Hydrolysis-resistant and Acid and Alkali Resistant Materials
Polyurethane (AU)	P2005	95 (ShA)	48	400	12	25 (A)		-30~+100°C	Hydraulic Standard Materials
Polyurethane (AU/EU)	P2006	93 (ShA)	45	400	8	25 (A)		-46~+90°C	Low-temperature Resistant Materials
Polyurethane (AU)	P2009	54 (ShD)	40	380	17	27 (A)		-20~+100°C	Sealing Materials for Tracks
Polyurethane (AU)	P2010	82 (ShA)	35	420	6	23 (A)		-40~+90°C	Low-hardness Pneumatic Sealing Materials
Polyurethane (AU)	P2011	90 (ShA)	40	420	10	25 (A)		-35~+100°C	General Materials for Pneumatic Seals
Polyurethane (AU)	P2019	52 (ShD)	40	380	15	27 (A)		-20~+100°C	Sealing Materials for Tracks
Polyurethane (EU)	P2024	93 (ShA)	40	400	10	28 (A)		-30~+90°C	Hydrolysis-resistant, Guide Sleeve Static Sealing Material
Polyurethane (AU)	P2100	92 (ShA)	50	450	10	40 (B)		-35~+100°C	High Resilience Material
Polyurethane (AU)	P2112	93 (ShA)	55	400	11	48 (B)		-20~+120°C	High-temperature Resistant and Hydrolysis-resistant Materials
Polyurethane (AU)	P2114	87 (ShA)	45	400	8	40 (B)		-20~+120°C	High-temperature Resistant and High-resilience Materials
Nitrile Rubber (NBR)	N1101	70 (ShA)	12	250	8	28 (B)		-35~+100°C	O-ring Material, Combined Sealing Elastomer Material
	M5570	72 (ShA)	15.3	213	6.3	10 (B)		-55~+100°C	Low-temperature Elastomer Materials
	M2575	77 (ShA)	23.8	304	5.9	12 (B)		-30~+100°C	Elastomer Materials
	M5975	75 (ShA)	22.4	410	3.6	24 (B)		-20~+100°C	Elastomer Materials
	N1103	80 (ShA)	12	200	8	28 (B)		-35~+100°C	O-ring Material
	N1106	90 (ShA)	14	120	12	28 (B)		-35~+100°C	O-ring Material
	M2490	89 (ShA)	20.7	220	9.5	31.3 (B)		-30~+100°C	General Sealing Materials
Hydrogenated Nitrile Rubber (HNBR)	H1585	85 (ShA)	21	156	15	9 (B)		-24~+150°C	High-temperature Resistant and Wear-resistant Materials
Fluororubber (FKM)	F1102	75 (ShA)	10	150	8	25 (C)		-20~+220°C	Heat-resistant Sealing Material
Silicone rubber (VMQ)	V1101	70 (ShA)	5	150	3	25 (C)		-90~+220°C	Sealing Materials Resistant to High and Low Temperatures

Material Type	Material Code	Durometer	Tensile Strength (MPa)	Elongation At Break (%)	Bending Properties (MPa)	Impact Strength of Simply Supported Beams (Shortfalls, KJ/m²)	Temperature Range (°C)	Application Examples
Polyamide Resin (Pa)	S1024	80 (ShD)	50	260	1600 (Modulus)	15.3	-40~+100°C	Low-absorbent Nylon Material
Modified Polyamide Resin (PA+GF)	S1028	120 (Rockwell I)	130	3	200 (Dissociation) 6500 (Modulus)	12	-40~+120°C	General Purpose Materials
Polyoxymethylene (POM)	S1101	80 (ShD)	60	15	80 (Dissociation) 2800 (Modulus)	5	-40~+100°C	General Purpose Materials
Phenolic Adhesive Fabric (PF)	S1108	140 (Ball Pressure)	90	/	110 (Dissociation) 3900 (Modulus)	Compressive Strength: $\geq 340\text{MPa}$	-50~+120°C	High Strength and High Load Capacity
Polytetrafluoroethylene (PTFE)	P1001	58 (ShD)	27.3	362	/	Compressive Strength: 20.6 MPa (15% Deformity)	-200~+260°C	High and Low Temperature Resistance, Corrosion Resistance
Modified polytetrafluoroethylene (PTFE+Cu)	P2071	66 (ShD)	29	329	/	Compressive Strength: 25 MPa (15% Deformity)	-200~+260°C	Resistant to High and Low Temperatures, Good Self-lubrication, Wear-resistant
Modified polytetrafluoroethylene (PTFE+Carbon fiber)	PC002	67 (ShD)	26.5	351	/	Compressive Strength: 29 MPa (15% Deformity)	-200~+260°C	Resistant to High and Low Temperatures, Abrasion and Pressure
Modified polytetrafluoroethylene (PTFE+mineral fiber)	PCA01	65 (ShD)	21	295	/	Compressive Strength: 25 MPa (15% Deformity)	-200~+260°C	High and Low Temperature Resistance, Abrasion Resistance, Low Friction
Ultra-high molecular weight polyethylene (UPE)	PT003	64 (ShD)	47.6	260	/	Compressive Strength: 30 MPa (15% Deformity)	-269~+80°C	Low Temperature Resistant, Self-lubricating, Wear Resistant

Material Resistance Properties and Applicable Surfaces

Material Type	Material Code	Oil Resistance																Suitable Surface Materials		
		Lubricating Oil (Agent)					Hydraulic Oil					Water and Others			Heat Resistance	Low Temperature Resistance	Waterproof			
		Engine Oil	Gear Oil	Motor Oil	Lithium-based Grease	Silicone Grease	Turbine Oil	Oil + Water Emulsion	Aqueous Ethylene Glycol	Biodegradable Hydraulic Fluid	Phosphate	Fluids	Brake Fluid	Water					Hot Water And Steam	Water Soluble Cutting Oil
NITRILE RUBBER	NBR70	◎	◎	◎	◎	◎	◎	◎	◎	○	×	◎	△	△	△	○	○	○	Steel, Chrome-plated Steel, Cast Iron	
NITRILE RUBBER	NBR85	○	○	○	○	○	○	○	○	○	×	○	△	△	×	△	○	○	Steel, Chrome-plated Steel, Cast Iron	
NITRILE RUBBER	NBR90	◎	◎	◎	◎	◎	◎	◎	◎	○	×	◎	△	○	×	△	○	○	Steel, Chrome-plated Steel, Cast Iron	
HYDROGENATED NBR	HNBR85	◎	◎	◎	◎	◎	◎	◎	◎	○	×	◎	△	○	×	△	○	○	Steel, Chrome-plated Steel, Cast Iron	
HYDROGENATED NBR	HNBR90	◎	◎	◎	◎	◎	◎	◎	◎	○	×	◎	△	○	○	○	○	○	Steel, Chrome-plated Steel, Cast Iron	
FLUOROELASTOMER	FKM70	○	△	◎	◎	◎	○	△	△	○	◎	◎	△	△	△	△	◎	△	○	Steel, Chrome-plated Steel, Cast Iron
FLUOROELASTOMER	FKM80	○	△	◎	◎	◎	○	△	△	○	◎	◎	×	△	×	△	◎	△	○	Steel, Chrome-plated Steel, Cast Iron
GENERAL POLYURETHANE	PU	○	△	◎	○	◎	◎	×	×	○	×	◎	×	△	×	×	○	○	◎	Steel, Chrome-plated Steel, Cast Iron
HYDROLYSIS-RESISTANT POLYURETHANE	H-PU	◎	△	◎	◎	◎	◎	△	△	◎	×	◎	×	○	△	△	○	△	◎	Steel, Chrome-plated Steel, Cast Iron
LOW TEMPERATURE RESISTANT POLYURETHANE	T-PU	○	△	◎	○	◎	◎	×	×	○	×	◎	×	△	×	×	○	◎	◎	Steel, Chrome-plated Steel, Cast Iron
CLIP-ON RUBBER	FAB	◎	◎	◎	◎	◎	◎	○	○	○	×	◎	△	△	△	○	○	△	○	Steel, Chrome-plated Steel, Cast Iron
PURE POLYTETRAFLUOROETHYLENE	PTFE	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	△	Steel, Chrome-plated Steel, Cast Iron
COPPER POWDER MODIFIED POLYTETRAFLUOROETHYLENE	PTFE+Cu	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	○	◎	◎	◎	Steel, Chrome-plated Steel, Stainless Steel
CGRAPHITE MODIFIED POLYTETRAFLUOROETHYLENE	PTFE+C	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	Steel, Chrome-plated Steel, Stainless Steel
CARBON FIBER MODIFIED POLYTETRAFLUOROETHYLENE	PTFE+GF	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	Steel, Chrome-plated Steel, Stainless Steel, Cast Iron,Hard Aluminum
GLASS FIBER MODIFIED POLYTETRAFLUOROETHYLENE	PTFE+CF	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	Steel, Chrome-plated Steel, Cast Iron
NYLON (LOANWORD)	PA	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	△	△	△	◎	◎	◎	Steel, Chrome-plated Steel, Cast Iron
POLYFORMALDEHYDE (CH2O)N	POM	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	Steel, Chrome-plated Steel, Cast Iron
ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE	UPE	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	Steel, stainless steel, aluminum, ceramic coating
PHENOLIC RESIN (USED MANUFACTURE BAKELITE)	PF	◎	◎	◎	◎	◎	◎	△	○	◎	◎	◎	△	△	△	△	◎	◎	◎	Steel, Chrome Plated Steel, Cast Iron, Stainless steel

OIL RESISTANCE STANDARD

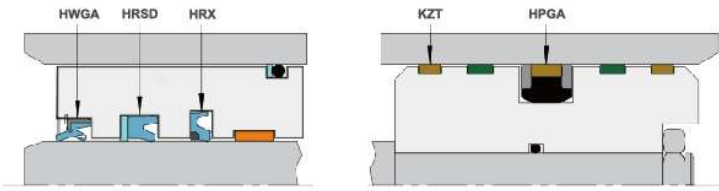
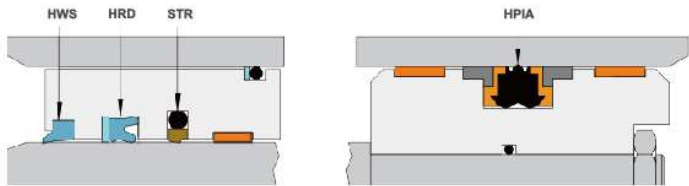
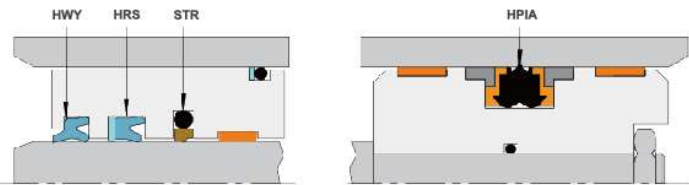
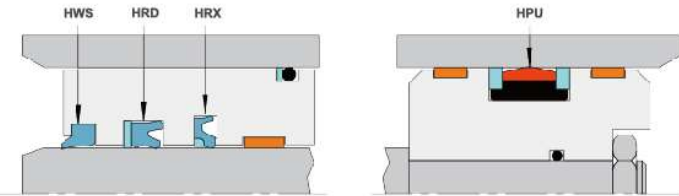
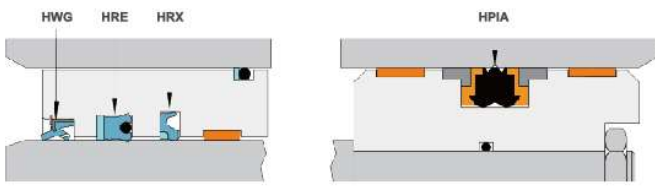
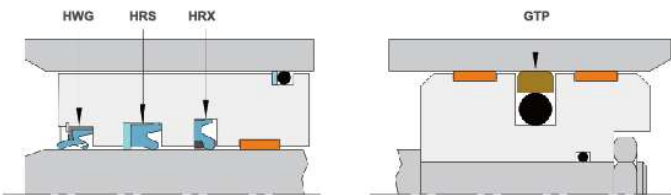
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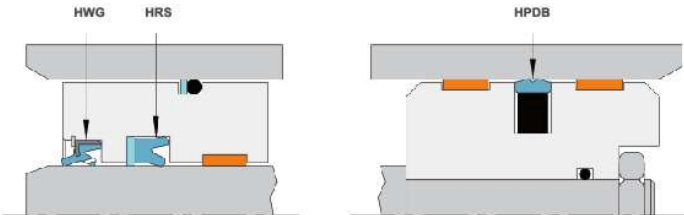
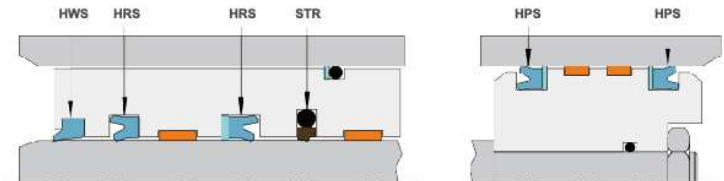
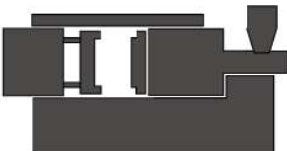
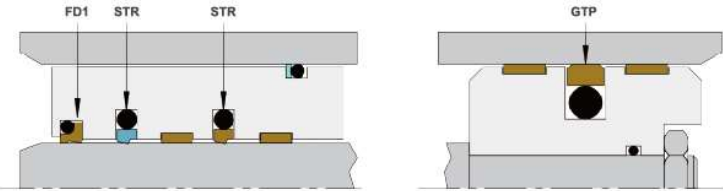
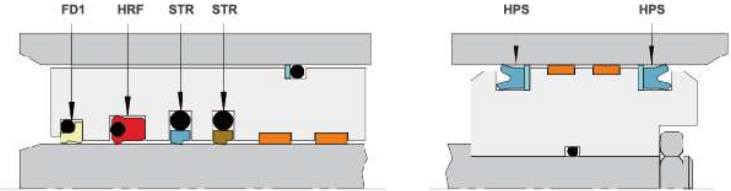
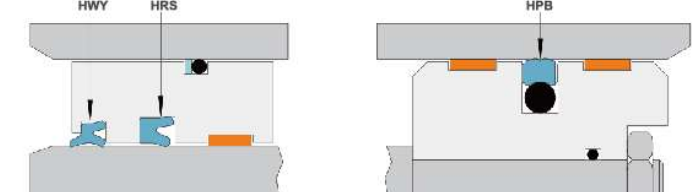
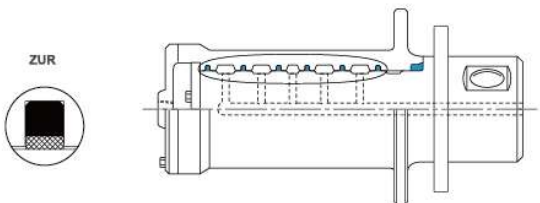
—: Fair, if no other material is available then use it, otherwise do not use it. ※

△: Resistance information is not available, or resistance varies with material composition. Please contact us for more information.

×: Inapplicable

※: Please consult with us before using these materials.

Applications	Sealing System Configuration Legend
Excavator Cylinder 	
Crane Luffing Cylinders 	
Crane Boom Extension Cylinder 	
Pump Boom Cylinder 	
Pump Truck Outrigger Cylinder 	
Loader Cylinder 	

Applications	Sealing System Configuration Legend
Forklift Cylinder 	
Shield Machine Propulsion Cylinder 	
Machine Tool Cylinders 	
Marine Offshore Cylinder 	
Agricultural Machinery Cylinder 	
Central Rotary Adapter 	

Sealing groove design

A set of qualified sealing system, in addition to the selection of seals, the design of the sealing groove is particularly important, including the selection of the sealing groove, extrusion gap selection, the roughness of the working surface and the determination of the installation of the fine dimensions.

■ Extrusion Gap Selection

In piston seals and rod seals, there is a gap between the moving surfaces. The size of the gap directly affects the service life of the seal and the processing costs. How to select the correct maximum allowable clearance is an important issue that designers must consider.

The size of the maximum permissible clearance is directly related to the diameter of the dynamic edge, the material and section thickness of the selected seal, the system pressure, and the ambient temperature.

After years of accumulation of engineering practice, we have designed a set of selection of the maximum allowable clearance of the simple method. Through the chart, we can get the maximum allowable clearance of the selected seals under the corresponding working conditions. Examples are as follows.

■ Working Condition

1. Machining of moving surfaces according to our recommended values.
2. Lubricating fluid

For special cases, such as non-lubricated fluids, water, acidic and alkaline fluids, please contact our technical service department.

Our charts have been developed for worst case scenarios where the stroke is "pushed" to the softest material (e.g. Shore 85A for polyurethane, Shore 70A for NBR).

If the working stroke is "pull", the extrusion gap can be increased by 25%.

If Shore hardness 93A polyurethane and Shore hardness 85A nitrile rubber are used instead of Shore hardness 85A polyurethane and Shore hardness 70A nitrile rubber, respectively, the extrusion gap can be increased by 15%.

■ Case I Polyurethane With Shore A Hardness Greater Than 85

d/D = Moving Edge Diameter = 90 mm*

S = Section Size = 7.5 mm

P = Work Pressure = 315 bar

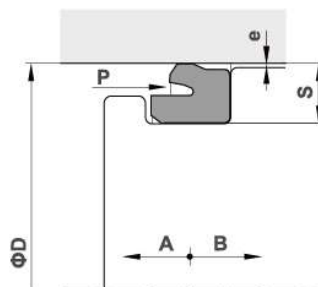
T = Operating Temperature = 80 °C

* Note: The diameter of the moving edge is the diameter of the sliding edge, for piston seals it is the diameter of the cylinder barrel, for rod seals it is the diameter of the piston rod.

Charting Methodology [See Page 10]:

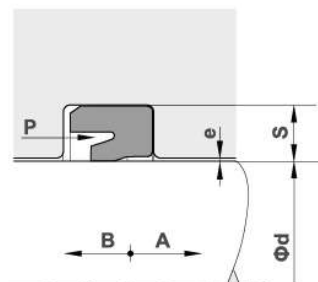
1. Draw a line connecting d/D and S and extend it so that it intersects line 1
2. Draw a line connecting P and T and extend it so that it intersects line 2
3. Connect the two intersections with a straight line and read out the value on the "e" ruler, which is the allowable clearance value of 0.16mm.

Piston Seal



A = Pushed
B = Draw

Piston Rod Seals



■ Case II Shore hardness A greater than 70 less than 85 NBR, HNBR and FKM

d/D = Moving Edge Diameter = 100 mm*

S = Section Size = 6.0 mm

P = Work Pressure = 100 bar

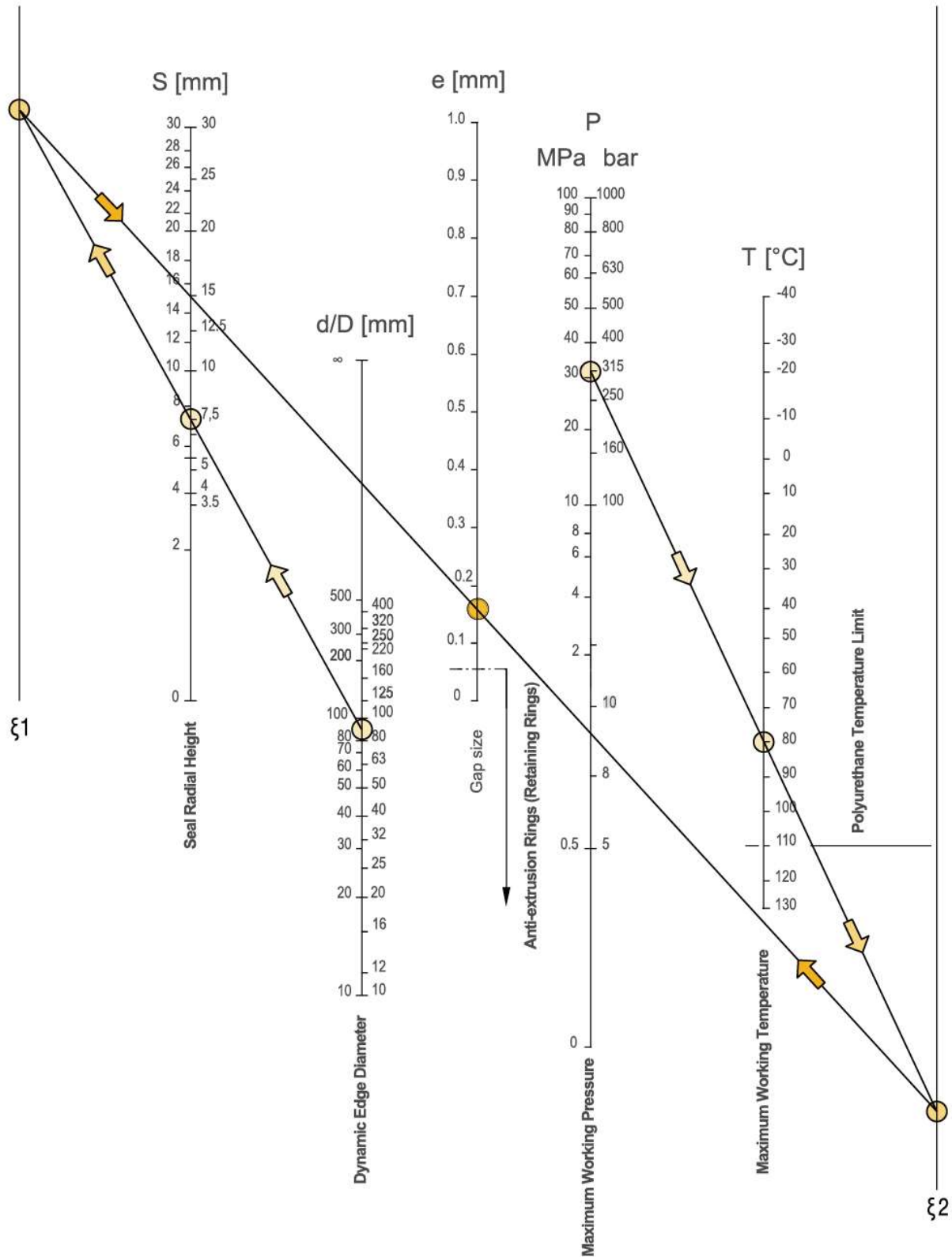
T = Operating Temperature = 80 °C

* Note: The diameter of the moving edge is the diameter of the sliding edge, for the piston seal it is the diameter of the cylinder barrel, for the rod seal it is the diameter of the piston rod.

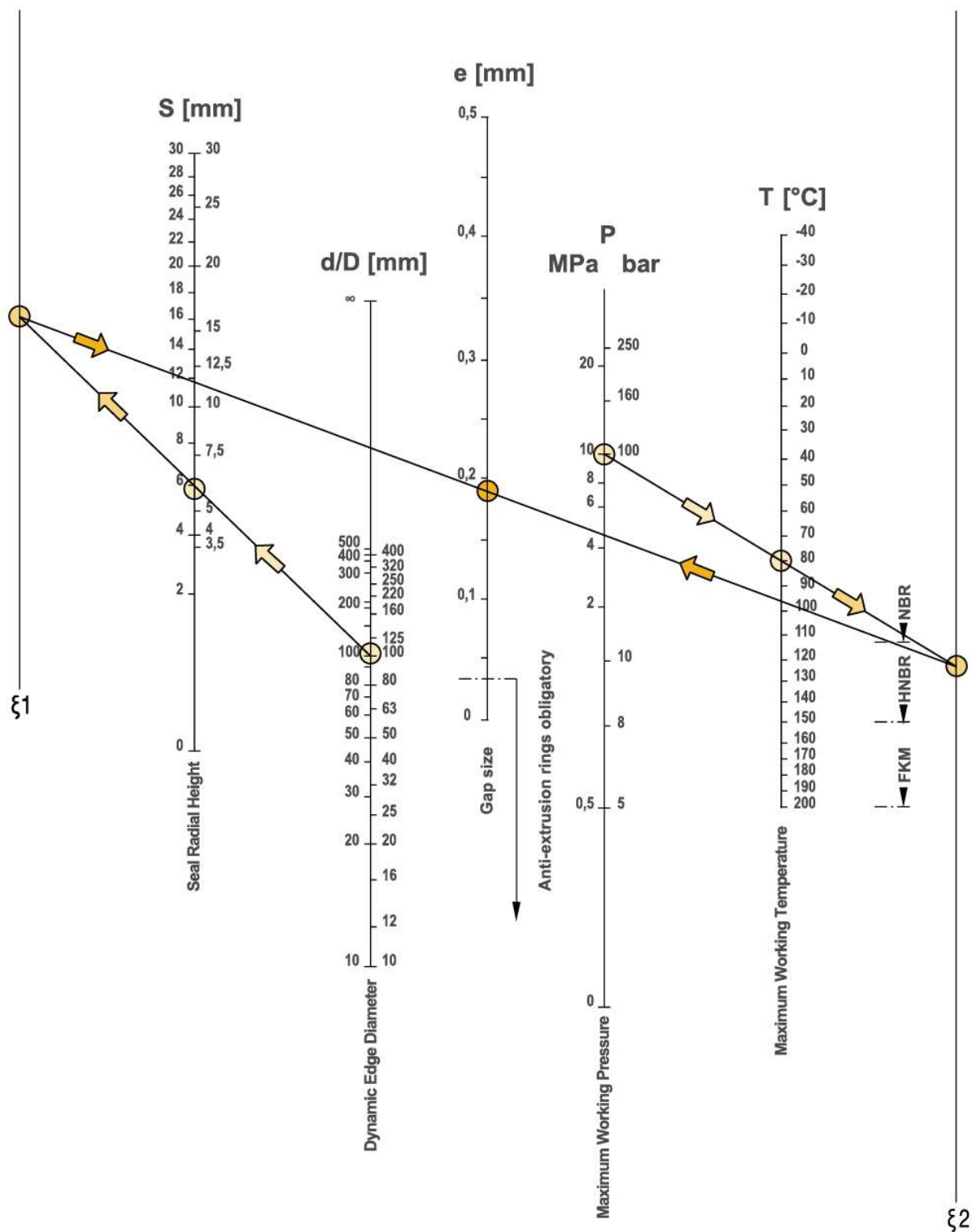
Charting Methodology [See Page 11]:

1. Draw a line connecting d/D and S and extend it so that it intersects line 1
2. Draw a line connecting P and T and extend it so that it intersects line 2
3. Connect the two intersection points with a straight line and read out the value on the "e" ruler, which is the allowable clearance value of 0.18mm.

Polyurethane seals with a Shore A hardness greater than 85°.



NBR, HNBR and FKM with a Shore hardness A greater than 70° and less than 85°.



Trench Detail Dimensioning

ISO and DIN standards for seal grooves have been promulgated for use and should be considered and complied with when designing. For those seals that require special groove design, such as non-standard seals spool seals, rotary seals, etc., the groove dimensions are described separately. In summary, the surface roughness, lead angles and dimensions listed here have been verified and most have been standardized.

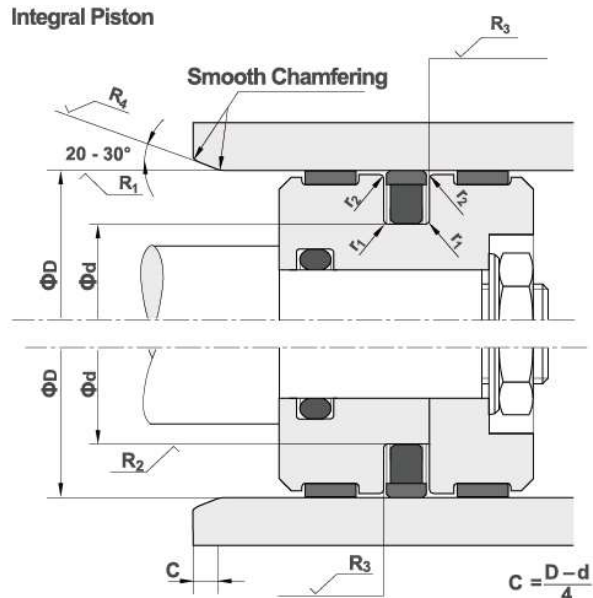
We advise our customers to comply with the requirements of the catalog with regard to tolerances and surface roughness parameters. Only then can the seals be installed easily and without damage.

It is not enough for the surface to be machined by grinding for the final treatment of the dynamic seal surface, but it is also necessary to carry out a post-polishing process.

For the necessary rounding requirements, refer to the individual seal data or application standards.

Piston Detailing

Integral Piston



Split Piston

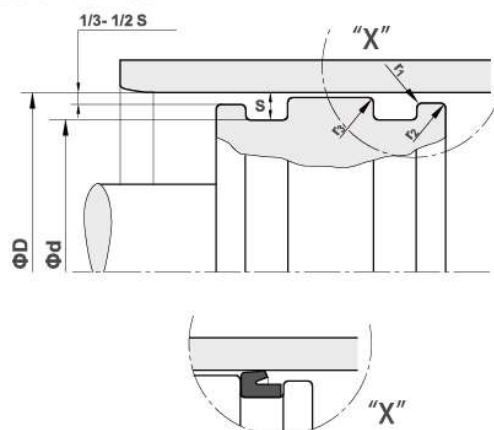
Dynamic Sealing Surfaces

Rubber and PTFE Products	$R_1: R_2 \ 1.0 \mu\text{m} / R_a \ 0.2 \mu\text{m}$
	$80 \% \leq *t_{p1} \leq 95 \%$
Polyurethane Products	$R_1: R_2 \ 1.6 \mu\text{m} / R_a \ 0.4 \mu\text{m}$
	$60 \% \leq *t_{p1} \leq 80 \%$
Static Sealing Surface	$R_2: R_2 \ 6.3 \mu\text{m} / R_a \ 0.8 \mu\text{m}$ $*t_{p2} \geq 60 \%$
Non-sealing surfaces and introduction of guide angles	$R_3: R_2 \ 16 \mu\text{m} / R_a \ 4 \mu\text{m}$
	$R_4: R_2 \ 10 \mu\text{m} / R_a \ 1.6 \mu\text{m}$

Piston Detailing

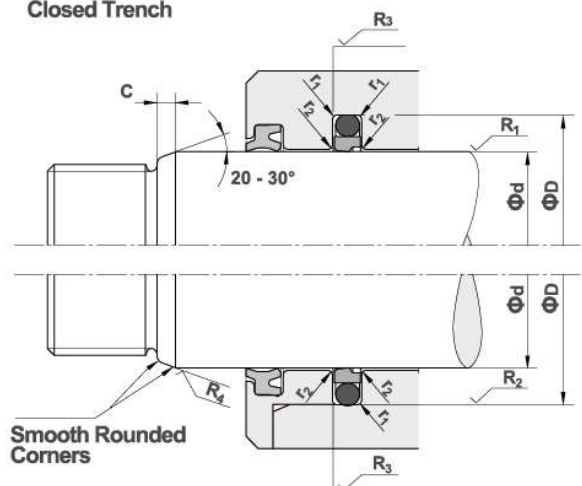
When the seal is assembled to the piston by stretching, the piston shoulder diameter should be reduced to facilitate installation. Based on this, metal contact between the piston and the inside of the cylinder wall under lateral loading can be avoided.

S=Section thickness



Piston Rod Detailing

Closed Trench



Open Trench

Dynamic Sealing surfaces

Rubber and PTFE Products	$R_1: R_2 \ 1.0 \mu\text{m} / R_a \ 0.2 \mu\text{m}$
	$80 \% \leq *t_{p1} \leq 95 \%$
Polyurethane Products	$R_1: R_2 \ 1.6 \mu\text{m} / R_a \ 0.4 \mu\text{m}$
	$60 \% \leq *t_{p1} \leq 80 \%$
Static Sealing Surface	$R_2: R_2 \ 6.3 \mu\text{m} / R_a \ 0.8 \mu\text{m}$ $*t_{p2} \geq 60 \%$
Non-sealing Surfaces and Introduction of Guide Angles	$R_3: R_2 \ 16 \mu\text{m} / R_a \ 4 \mu\text{m}$
	$R_4: R_2 \ 10 \mu\text{m} / R_a \ 1.6 \mu\text{m}$

Hydraulic Seal Installation Guide

The following must be observed before installing the seal:

- ◆ Check that the mechanical parts (including rods and cylinders) have an inlet chamfer, if not, they must be mounted using the slide with a flat face.
- ◆ Polishing, chamfering or rounding of sharp edges, masking of threaded parts
- ◆ Remove process waste, all impurities and other foreign matter, and carefully clean all mechanical parts.
- ◆ Additives (e.g. molybdenum disulfide or zinc sulfide). Apply grease or lubricant to the seals and mechanical parts to facilitate installation. In this regard, it must be ensured in advance that the lubricant is compatible with the sealing material. Avoid greases containing solids
- ◆ If using mounting tools, make sure they are clean and free of sharp edges
- ◆ The seals can be immersed in hot oil at +60°C~+80°C (EPDM material in hot water) to make the material have good elasticity, especially for fiber braided seals and harder especially for fiber braided seals and harder seals.
- ◆ Considering the sliding characteristics, the use of polymers (e.g., nylon or paraformaldehyde) for mounting tools (e.g., mandrels, calibration tubes, push-in tools, sliding tools, plugs, etc.) usually yields an excellent surface finish so that the friction ring is not damaged. The use of polymers (e.g., nylon or paraformaldehyde) for mounting tools (e.g., mandrels, push-in tools, sliding tools, plugs, etc.) usually results in an excellent surface roughness so that the friction ring is not damaged.

The method of installation depends on the type of groove (open or closed) and the type of seal.
The following table gives all the methods for the correct installation of seals.

Seal Type	Rod Seal		Piston Seal		Dust Collar	
Trench Type	Closed	Open-ended	Closed	Open-ended		
Combined Seals	typology 1.A	typology 1.C	typology 2.A	typology 2.C	-	-
Lip Seal	typology 1.B		typology 2.B		-	-
Combination - Tightly Sealed	typology 1.B		-		-	-
Form A Tight Seal	-		typology 2.B		-	-
Flexible Dust Ring	-	-	-	-	-	typology 3.A
Rigid Dust Ring	-	-	-	-	typology 3.B	-
Combined Dust Ring	-	-	-	-	typology 3.C	-

Installation Type 1.A - Rod Combination Seal - Closed Groove

Applicable seal type designator.STR、SHR、GTR

Using the Installation Tool:

- ◆ First embed the O-ring in the groove
- ◆ Prepare a push-in rod and plug to fit the size of the workpiece
- ◆ Snap one end of the friction ring into the groove, then use the push-in lever to push it into the groove (as shown in Figure 5-1); the
- ◆ Take care to prevent any twisting of the seal assembly

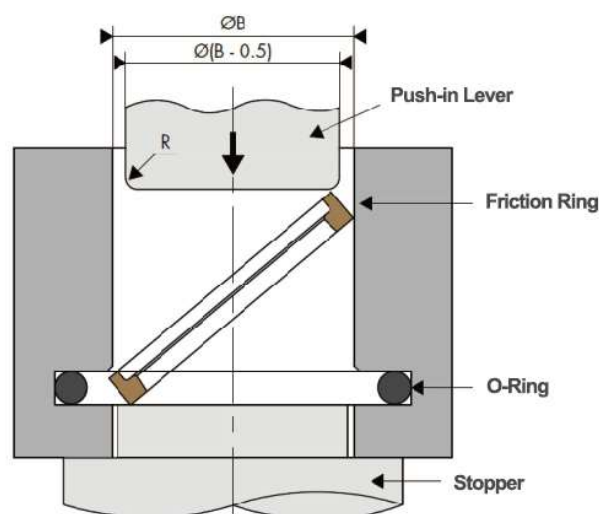
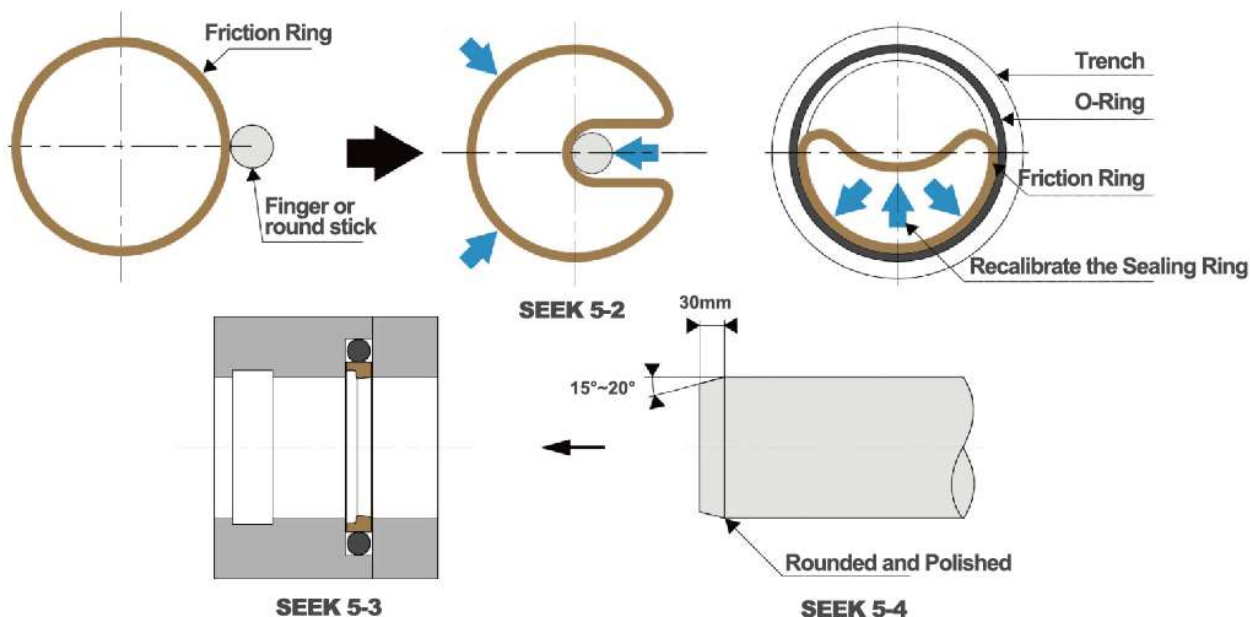


图 5-1

Without Installation Tools.

- ◆ First embed the O-ring in the groove:.
- ◆ Use a molding tool to bend the friction ring into a kidney shape, taking care not to form sharp corners (as shown in Figure 5-2)
- ◆ Position the friction ring in the groove and restore its shape so that it fits snugly against the O-ring; the
- ◆ Finally, use the mandrel to correct the friction ring, the mandrel needs to have a chamfer between 15°~20° length 30mm (as shown in Figure 5-4).



Installation Type 1.B-Lip Seal, Rod Combination-Forced Tight Seal - Closed Groove

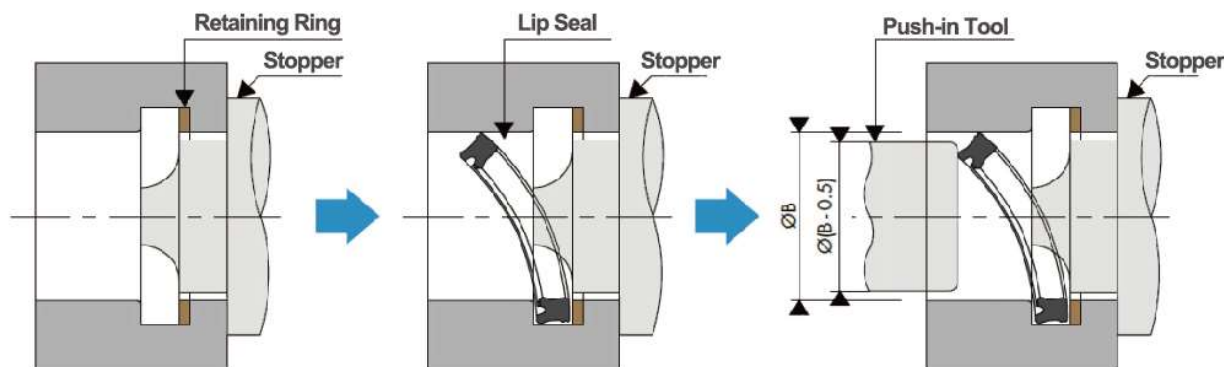
Applicable Seal Type Designator:HRD、HRE、HRS

Using the installation tool:

- ◆ Prepare a push-in rod and plug to fit the size of the workpiece.
- ◆ Snap one end of the lip seal into the groove, then use the push-in lever to push it into the groove (as shown in Figure 5-5)
- ◆ Performing the entire operation should not be interrupted to prevent permanent bending of the seal.

Without installation tools:

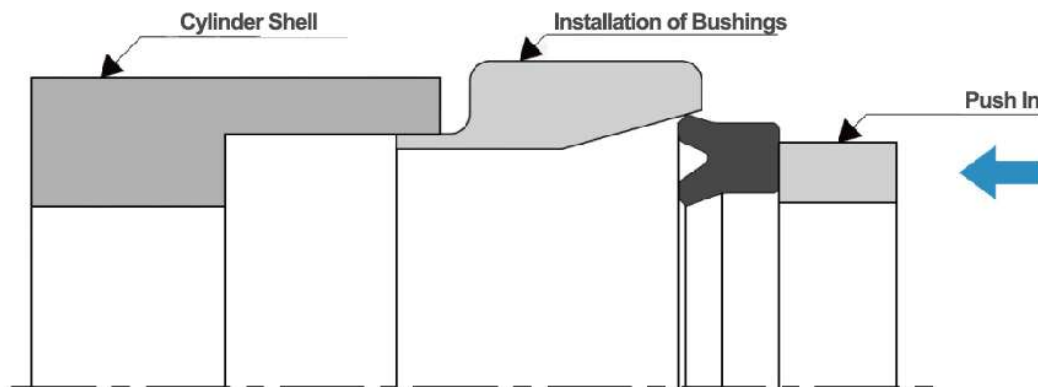
- ◆ For seals with retaining rings, the seal is first installed into the groove, followed by the retaining ring.
- ◆ Use the molding tool to bend the lip seal into a kidney shape, being careful not to form a sharp corner (as shown in Figure 5-2)
- ◆ Finally the lip seal is corrected using a mandrel (as shown in Figure 5-4)



Installation Type 1.C-Pole Seal -Open Groove

Suitable for All Rod Seal Types

- ◆ Open trenching is simpler to install and does not require specific tools.
- ◆ For combined seals, distortion of the seal assembly must be avoided, and for the final installation (piston rod through the seal), the inlet chamfer must be long enough to correct the friction ring with the piston rod, which can also be corrected with a correction mandrel (as shown in Figure 5-4); and
- ◆ For lip seals, combination-force-tight seals and force-tight seals, the seals can be pushed into the groove using a push-in plug. If there is no chamfer on the cylinder barrel, it shall be positioned using a mounting bushing immediately adjacent to the cylinder barrel with a chamfer angle of between 15° and 20° and a length of at least 30 mm (shown in Figure 5-6).



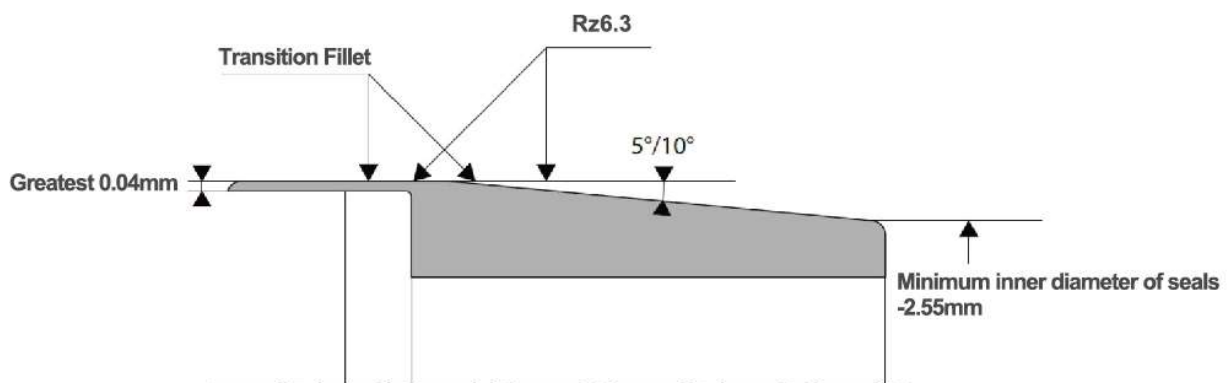
SEEK 5-6

Installation Type 2.A - Combined Seal for Piston - Closed Groove

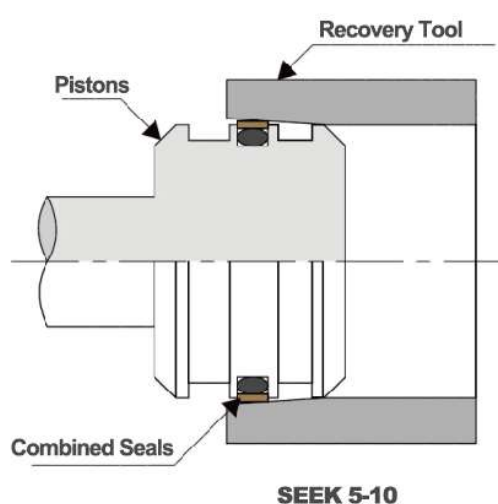
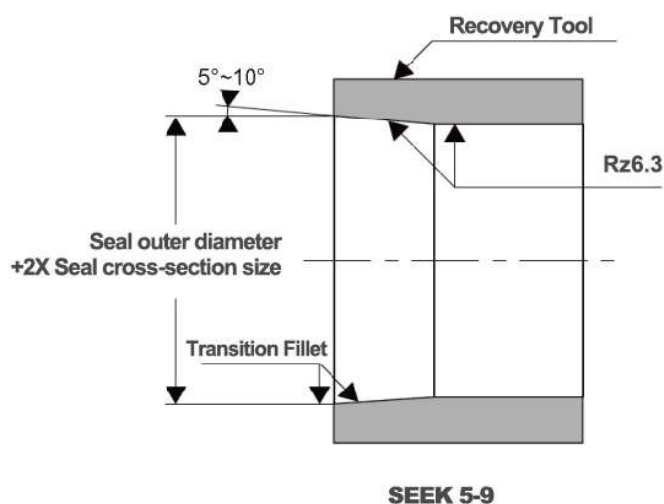
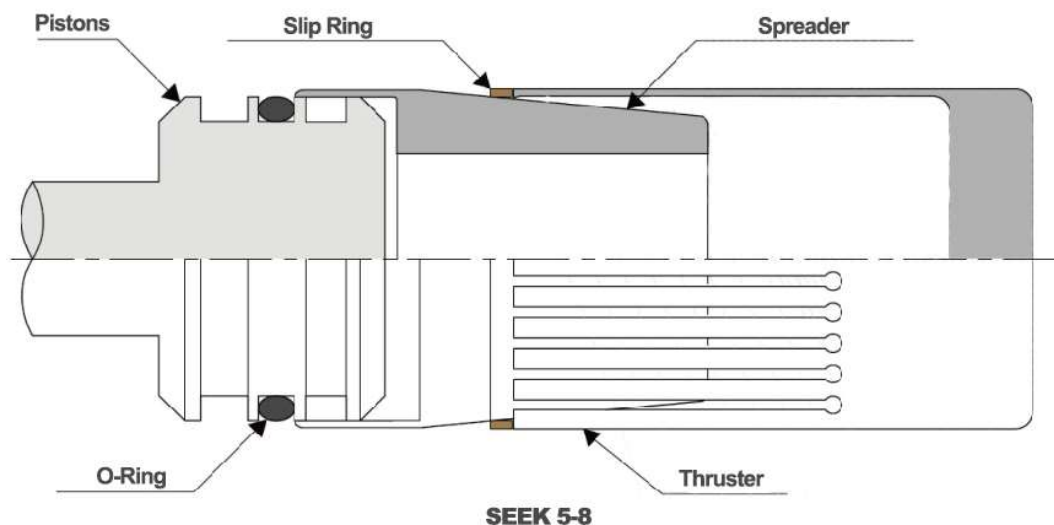
Applicable seal types:GTP、GHP、STP、XTP、HPGA

Using the Installation Tool.

- ◆ O-ring expansion into groove
- ◆ Put the expansion mandrel on the piston (as shown in Figure 5-7)
- ◆ Attach the friction ring to the expander and push it into the groove with the pusher (as shown)
- ◆ The friction ring is then recovered using a recovery tool, or the cylinder is recovered using a cylinder, but the cylinder must have a chamfer with an angle of 15° to 20° and a length of 30 mm (as shown in Figure 5-8).



SEEK 5-7



No Installation Tools

- ◆ Install the O-ring expansion into the groove.
- ◆ Heat the friction ring in hot oil (EPDM material in hot water) at +80°C~+100°C to facilitate stretching.
- ◆ Fit the friction ring into the groove while avoiding any sharp edges.
- ◆ Use the recovery tool to recover the friction ring, or use the cylinder to recover, but the cylinder must have a chamfer with an angle of 15°~20° and a length of 30mm (as shown in Figure 5-9).

Mounting type 2.B - Lip seal, combination seal for piston - Closed groove

Applicable seal types: HPB、HP1A、HPS、HPU

Using the installation tool.

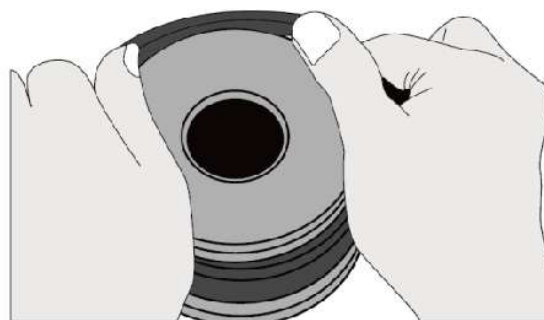
- ◆ For seals containing a retaining ring or L-ring, install the seal first, followed by the other components.
- ◆ Snap piston seal end into piston groove
- ◆ Insert a rod with a swivel arm, into the hole in the piston body;
- ◆ Subsequently rotate the rotating arm of the installation tool to ensure that the piston seal is fully pressed into the groove (as shown in Figure 5-11).



SEEK 5-11

Without Installation Tools:

- ◆ For seals containing a retaining ring or L-ring, install the seal followed by the other components.
- ◆ Snap piston seal end into piston groove
- ◆ Stretch the expanding piston seal firmly by hand, then slide it into the groove along the oiled piston body (as shown in Figure 5-12)



SEEK 5-12

Installation Type 2.C-seal For Piston - Open Groove

Open Trench Installation Is Relatively Simple And Does Not Require Specific Tools

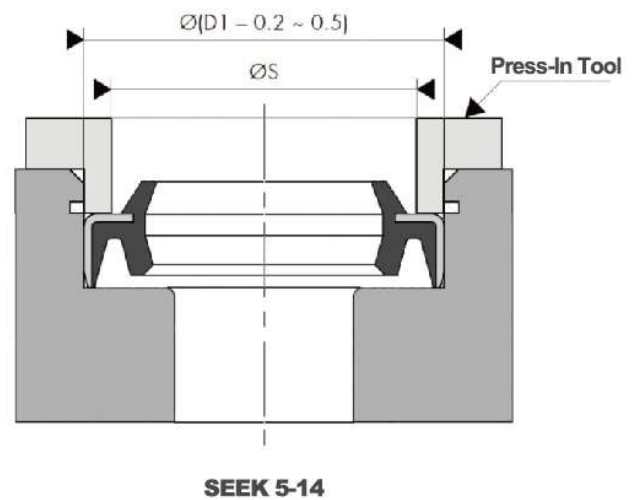
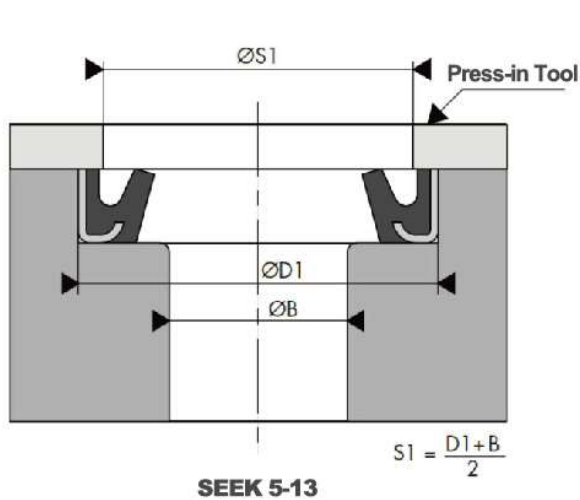
- ◆ For seals containing a retaining ring or L-ring, install the seal first, followed by the other components.
- ◆ For combined seals, distortion of the seal assembly must be avoided. For final installation (piston body into cylinder body), the inlet chamfer of the friction ring must be long enough when using the cylinder body to correct the friction ring, and a correction mandrel can also be used (as shown in Figure 5-7).
- ◆ For lip seals, combined - forced tight seals, can use the push-in tool to push the seal into the groove, if there is no chamfer on the cylinder cylinder, must use the mounting bushings close to the cylinder for positioning, the chamfer angle between $15^{\circ} \sim 20^{\circ}$, the length of at least 30mm (as shown in Figure 5-6)

Mounting Type 3.A-dust Ring-open Groove

Applicable dust ring type: HWF、HWG、GWJ

Dust Rings With Metal Housings Must Be Pressed Into The Grooves Using A Mounting Tool.

- ◆ Position the dust ring horizontally in relation to the cylinder barrel.
- ◆ Subsequent pressing into the dust ring must ensure that the thrust force is evenly dispersed to prevent the dust ring from tilting and becoming permanently deformed (as shown in Figures 5-13 and 5-14).



Mounting Type 3.B-Dust Ring-closed Groove

Applicable dust ring type: HWS、HWY

Flexible rubber or polyurethane dust rings are easier to install and do not require specific tools.

- ◆ Start by bending the dust ring into a kidney shape, being careful not to form sharp corners.
- ◆ Subsequent installation of the dust ring into the groove.
- ◆ Use the mandrel to correct the dust ring.

Mounting Type 3.C-Combined Dust Ring - Closed Groove

Applicable Dust Ring Type:FD1、FD2

- ◆ First install the O-ring into the groove
- ◆ Then bend the dust ring friction ring into a kidney shape, taking care not to form a sharp angle.
- ◆ Subsequently, the dust ring friction ring is snapped into the groove and restored to its shape so that it fits snugly against the O-ring.
- ◆ Finally, the dust ring friction ring is corrected using a mandrel with a chamfer of 15° to 20° and a length of 30 mm.

Hydraulic Seals Storage Guide

Seals, as spare parts, are usually stored for long periods of time. During storage, sealing materials undergo physical changes and when they are exposed to oxygen and ozone light, heat, moisture, oils and solvents, they can deform, harden, soften or crack and thus become unserviceable.

The ISO standard 2230:2002 "Rubber products - Storage guidelines" lists storage recommendations and gives storage time limits for different materials to ensure that the material maintains its optimum physical and chemical properties.

■ TEMP

The ideal storage temperature is recommended to be preferably between +5°C and +25°C. If the temperature exceeds +25°C, the sealing material may undergo physical changes, no longer maintain its original technical properties and may break prematurely. All heat sources (radiators, lamps and sunlight, etc.) must be controlled so that the temperature does not exceed +25°C.

On the other hand, if the temperature in the storage area is below +5°C, the seals may become more rigid, which does not necessarily change their chemical and physical properties, and it is recommended to bring them back to +20°C before putting them into service.

■ HUMIDITY

In general, the relative humidity in the storage area for rubber seals should not exceed 70% or 65% for polyurethane seals. Avoid humid places, as well as places prone to condensation.

■ LIGHT SOURCES AND ULTRAVIOLET LIGHT

Rubber seals must not be exposed to sunlight or artificial light with a high UV content, normal incandescent lighting is recommended, as well as covering the windows of the storage area with protective red or orange paint, and packaging in special UV resistant bags to ensure that the seal is better protected.

■ RADIATE

Precautions must be taken to protect stored components from all sources of ionizing radiation.

■ OZONE

As ozone is highly harmful to rubber seals, there must be no ozone-generating equipment in the storage area, such as mercury vapor lamps, high-voltage electrical equipment, motors or other products that may produce silent charges or sparks. There must be no flammable gases or organic vapors in the storage area, as their photochemical processes may produce ozone.

■ DISTORTION

Seals must be preferably stored in places where they are not subject to constraints, pressure or any other conditions that could cause them to deform. Seals should be kept in their original packaging as much as possible.

■ CONTACT WITH LIQUIDS AND SEMI-LIQUIDS

Seals must not be stored in contact with liquids (acids, disinfectants, oils, greases, etc.) or other semi-fluid materials, unless packaged in this way by the manufacturer.

■ CONTACT WITH METAL

Certain metals, such as manganese, iron, copper, brass and other compounds are damaging to rubber. Seals cannot be stored in contact with these metals unless the rubber part is secured to it, in which case a rolled package would be preferred.

■ CONTACT WITH OTHER MATERIALS

Rubber seals must not be stored in contact with PVC because of the risk of transferring plasticizers or other components. Rubber with different compositions must be stored separately from each other.

■ CLEANSE

If necessary, clean the seals with soap and water or denatured alcohol. The use of water to clean textile fibers and steel-rubber (corrosion problems) or polyurethane seals should be particularly avoided. The seals must be dry at ambient temperature and not near a heat source. The seals must not come into contact with wire brushes or sharp objects.

■ STORAGE AND CONTROL

Storage time depends largely on the type of material, and rubber is particularly sensitive to storage.

Recommended storage time under ideal storage conditions

Material Type	Custody Period
PU	4Year
NBR-HNBR-CR-EPDM	7Year
FKM-FFKM-VQM-FVQM	10Year
PA-POM-PEEK-TPI	20Year
PTFE	limitless

Remarks:

- Depending on the type of material, different storage periods are recommended as shown in the table above. There may be different recommendations in different countries and by different trade associations. Rubber seals should be used within 24 months if possible. Since improper storage will affect the performance of the sealing material, the hardness and surface condition of the seals must be checked one by one before use after long term storage. If deterioration such as hardening and cracking occurs, the batch must be scrapped.
- During the storage period of the above products, they should be stored in the warehouse away from direct sunlight, high temperature and high humidity, and kept in the standard packing condition.
- Rubber products in the long-term storage process will precipitate white frost on the surface, this phenomenon is called precipitation frost or frost phenomenon, does not affect the use of products.

HWF Type Dust Ring



Product Description

HWF type dust ring is a single-lip metal skeleton dust ring, which is very firmly fixed in the open groove by the interference fit between the metal skeleton and the groove. HWF type dust ring is flush with the end face of the cylinder, which can avoid external mechanical damage to a large extent. HWF type dust ring can prevent the intrusion of dust, dirt, grit, and metal chips, and achieves excellent dust scraping effect through the special design of the dust ring lip.

Product Benefits

Good resistance to abrasion and weathering
Very good dust resistance and long sealing life
Simple grooves for easy design and machining
Low axial height of mounting groove, no protrusion of dust ring lip

Scope of Application

HWF type dust ring is widely used in construction machinery, agricultural machinery, loading and unloading platforms, industrial vehicles, lifting machinery, support cylinders and so on.

Technical Parameters

operating temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
working speed: $\leq 1\text{m/s}$
standard material: M1001 organosilicon: P2001
metal skeleton: SPCC

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3 \mu\text{m}$	$\leq 1.6 \mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6 \mu\text{m}$	$\leq 6.3 \mu\text{m}$
Groove Side		$\leq 3.2 \mu\text{m}$	$\leq 12.5 \mu\text{m}$

Recommended Tolerance

Nominal Diameter	Φd	f8
Groove Bottom Diameter	ΦD	H8
Trench Width	L	+0.5

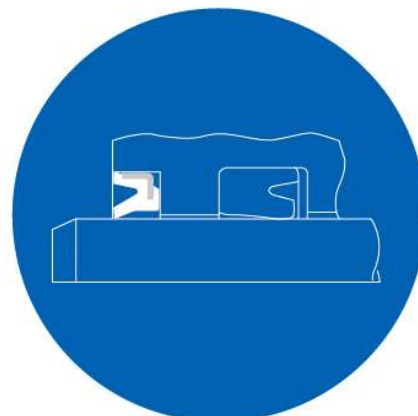
Installation Instructions

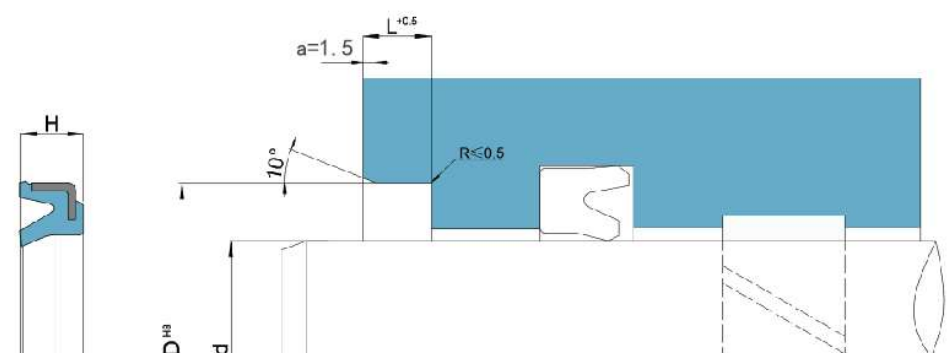
The HWF type dust ring has a slightly larger outside diameter D, which ensures a reliable tight fit on the outside diameter of the groove after installation. Before installation, matching lubricant must be applied to the dust ring. When pressed into the groove, ensure concentricity and avoid tilting.

Ordering Code

HWF dXDXL Material code

Typical Example: HWF 100X114X8 M1001





d	D	H	L	Ordering Code
32	45	7	7	HWF 32X45X7 M1001
35	47	7	7	HWF 35X47X7 M1001
45	57	7	7	HWF 45X57X7 M1001
50	62	7	7	HWF 50X62X7 M1001
55	69	8	8	HWF 55X69X8 M1001
60	74	8	8	HWF 60X74X8 M1001
63	77	8	8	HWF 63X77X8 M1001
65	79	8	8	HWF 65X79X8 M1001
70	84	8	8	HWF 70X84X8 M1001
75	89	8	8	HWF 75X89X8 M1001
80	94	8	8	HWF 80X94X8 M1001
85	99	8	8	HWF 85X99X8 M1001
90	104	8	8	HWF 90X104X8 M1001
95	109	8	8	HWF 95X109X8 M1001
100	114	8	8	HWF 100X114X8 M1001
110	126	9	9	HWF 110X126X9 M1001
110	130	10	10	HWF 110X130X10 M1001
120	136	9	9	HWF 120X136X9 M1001
125	141	9	9	HWF 125X141X9 M1001
140	160	10	10	HWF 140X160X10 M1001
150	170	10	10	HWF 150X170X10 M1001
160	180	10	10	HWF 160X180X10 M1001

HWG Type Dust Ring



Product Description

HWG type dust ring is a double acting metal skeleton dust ring. The sealing lip facing the media side reduces the residual oil film. In addition, the sealing lip is designed with a small hole to prevent the dust ring from being taken out of the groove under possible "trapped pressure". HWG is widely used in heavily polluted applications where high dust protection is required, such as excavators, loaders, agricultural machinery and other heavily polluted working conditions.

Product Benefits

- Good abrasion and weathering resistance
- Simple grooves for easy design and machining
- Sealing lip reduces residual oil film
- Dust ring lip extends, good dust and water scraping effect, long sealing life

Scope of Application

HWG type dust rings are widely used in construction machinery, forklifts, agricultural machinery and standard cylinders.

Technical Parameters

Operating Temperature: -50°C ~ +100°C (M1001)
-20°C ~ +120°C (M1112)

Working Speed: ≤1m/s

standard Material: M1001 Organosilicon: P2001

Metal Skeleton: SPCC

M1112 Organosilicon: P2112

Metal Skeleton: SPCC

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	≤ 0.3 μm	≤ 1.6 μm
Bottom of Trench	ΦD	≤ 1.6 μm	≤ 6.3 μm
Groove Side		≤ 3.2 μm	≤ 12.5 μm

Recommended Tolerance

Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H8
Groove Side	L	

Installation Instructions

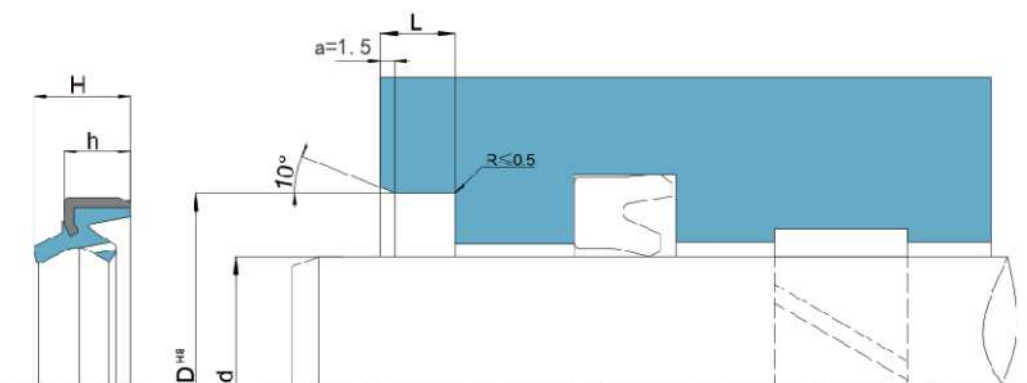
The HWG type dust ring has a slightly larger outside diameter D, which ensures a reliable tight fit on the outside diameter of the groove after installation. Before installation, matching lubricant must be applied to the dust ring. When pressed into the groove, ensure concentricity and avoid tilting.

Ordering Code

HWG dXDXL Material Code

Typical Example: HWG 100X114X8 M1001 (Other materials available)





d	D	h	H	L	公差	Ordering Code
30	42	6	9.7	6	(+0.3,+0.5)	HWG 30X42X6 M1001
32	44	7	10.7	7	(+0.3,+0.5)	HWG 32X44X7 M1001
35	47	7	10.7	7	(+0.3,+0.5)	HWG 35X47X7 M1001
40	52	7	10.7	7	(+0.3,+0.5)	HWG 40X52X7 M1001
45	57	7	10.7	7	(+0.3,+0.5)	HWG 45X57X7 M1001
50	62	7	10.7	7	(+0.3,+0.5)	HWG 50X62X7 M1001
55	69	8	11.7	8	(+0.4,+0.6)	HWG 55X69X8 M1001
60	74	8	11.7	8	(+0.4,+0.6)	HWG 60X74X8 M1001
63	77	8	11.7	8	(+0.4,+0.6)	HWG 63X77X8 M1001
65	79	8	11.7	8	(+0.4,+0.6)	HWG 65X79X8 M1001
70	84	8	11.7	8	(+0.4,+0.6)	HWG 70X84X8 M1001
75	89	8	11.7	8	(+0.4,+0.6)	HWG 75X89X8 M1001
80	94	8	11.7	8	(+0.4,+0.6)	HWG 80X94X8 M1001
85	99	8	11.7	8	(+0.4,+0.6)	HWG 85X99X8 M1001
90	104	8	11.7	8	(+0.4,+0.6)	HWG 90X104X8 M1001
95	109	8	11.7	8	(+0.4,+0.6)	HWG 95X109X8 M1001
100	114	8	11.7	8	(+0.4,+0.6)	HWG 100X114X8 M1001
105	121	9	12.5	9	(+0.4,+0.6)	HWG 105X121X9 M1001
110	126	9	12.5	9	(+0.4,+0.6)	HWG 110X126X9 M1001
115	131	9	12.5	9	(+0.4,+0.6)	HWG 115X131X9 M1001
120	136	9	12.5	9	(+0.4,+0.6)	HWG 120X136X9 M1001
125	141	9	12.5	9	(+0.4,+0.6)	HWG 125X141X9 M1001
130	146	9	12.5	9	(+0.4,+0.6)	HWG 130X146X9 M1001
140	160	10	14.5	10	(+0.4,+0.6)	HWG 140X160X10 M1001
150	170	10	14.5	10	(+0.4,+0.6)	HWG 150X170X10 M1001
160	180	10	14.5	10	(+0.4,+0.6)	HWG 160X180X10 M1001

HWS Type Dust Ring



Product Description

HWS type dust ring is a single-acting dust ring, the excess outer diameter can ensure that the dust ring closely fits in the groove, thus preventing the intrusion of impurity particles and moisture. The special lip design of HWS type dust ring will not destroy the oil film attached to the piston rod, and will not produce "oil scraping" failure. HWS dust ring root design has a tab, reducing the contact surface between the piston rod and the dust ring, reducing the friction, thus reducing the risk of being easily carried out under certain working conditions (such as high speed, long stroke cylinders). HWS type dust ring is designed with a tab at the root, which reduces the contact surface between the piston rod and the dust ring, and lowers the friction of the dust ring, thus reducing the risk of the dust ring being easily taken out under certain working conditions (such as high-speed and long-stroke cylinders), and it is suitable for low and medium-pollution working conditions.

Product Benefits

Good dust resistance
Good resistance to abrasion and weathering
Easy to install, no tools required
Stabilized in the trench and not easily lifted out

Scope of Application

HWS type dust rings are widely used in construction machinery, forklifts, injection molding machines, agricultural machinery and standard oil cylinders.

Technical Parameters

operating temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
working speed: $\leq 1\text{m/s}$
Standard material: Polyurethane P2005

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish

Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

Installation Instructions

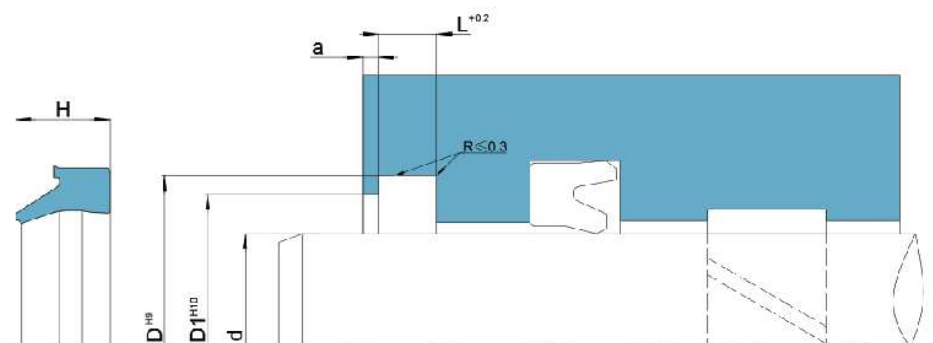
The dust ring can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the dust ring before installation.

Ordering Code

HWS dXDXD1XLXH Material Designator

Example: HWS 100X112.2X106X7.1X12 P2005 (other materials available)





d	D	D1	L	H	a	Ordering Code
16	24.6	19	5.3	7	2	HWS 16X24.6X19X5.3X7 P2005
20	28.6	23	5.3	7	2	HWS 20X28.6X23X5.3X7 P2005
22	30.6	25	5.3	7	2	HWS 22X30.6X25X5.3X7 P2005
25	33.6	28	5.3	7	2	HWS 25X33.6X28X5.3X7 P2005
28	36.6	31	5.3	7	2	HWS 28X36.6X31X5.3X7 P2005
30	38.6	33	5.3	7	2	HWS 30X38.6X33X5.3X7 P2005
32	40.6	35	5.3	7	2	HWS 32X40.6X35X5.3X7 P2005
35	43.6	38	5.3	7	2	HWS 35X43.6X38X5.3X7 P2005
36	44.6	39	5.3	7	2	HWS 36X44.6X39X5.3X7 P2005
40	48.6	43	5.3	7	2	HWS 40X48.6X43X5.3X7 P2005
45	55.6	49	5.3	7.5	2	HWS 45X55.6X49X5.3X7.5 P2005
50	60.6	53	5.3	7	2	HWS 50X60.6X53X5.3X7 P2005
55	65.6	58	5.3	7	2	HWS 55X65.6X58X5.3X7 P2005
56	66.6	59	5.3	7	2	HWS 56X66.6X59X5.3X7 P2005
60	70.6	63	5.3	7.5	2	HWS 60X70.6X63X5.3X7.5 P2005
63	73.6	66	5.3	7	2	HWS 63X73.6X66X5.3X7 P2005
65	75.6	68	5.3	7	2	HWS 65X75.6X68X5.3X7 P2005
70	80.6	73	5.3	7	2	HWS 70X80.6X73X5.3X7 P2005
75	87.2	81	7.1	12	5	HWS 75X87.2X81X7.1X12 P2005
80	88.6	83	5.3	7	2	HWS 80X88.6X83X5.3X7 P2005
85	97.2	91	7.1	12	5	HWS 85X97.2X91X7.1X12 P2005
90	102.2	96	7.1	11	4	HWS 90X102.2X96X7.1X11 P2005
100	112.2	106	7.1	12	5	HWS 100X112.2X106X7.1X12 P2005
110	118.6	113	5.3	7	2	HWS 110X118.6X113X5.3X7 P2005
110	122.2	116	7.1	12	5	HWS 110X122.2X116X7.1X12 P2005
125	140	132.6	10.1	16	6	HWS 125X140X132.6X10.1X16 P2005
130	142.2	136	7.1	12	5	HWS 130X142.2X136X7.1X12 P2005
140	155.2	147.6	10.1	16	6	HWS 140X155.2X147.6X10.1X16 P2005
150	165	157.6	10.1	16	6	HWS 150X165X157.6X10.1X16 P2005
160	175	167.6	10.2	14	6	HWS 160X175X167.6X10.2X14 P2005
180	200	190	10.2	18	8	HWS 180X200X190X10.2X18 P2005
200	220	210	10.2	18	8	HWS 200X220X210X10.2X18 P2005
220	240	230	10.2	18	8	HWS 220X240X230X10.2X18 P2005
250	270	260	10.2	18	8	HWS 250X270X260X10.2X18 P2005

HWY Type Dust Ring



Product Description

HWY type dust ring is a double-action polyurethane dust ring, the sealing lip facing the medium side can reduce the residual oil film. HWY type dust ring will not destroy the oil film attached to the piston rod under the premise of dust scraping, and will not produce "oil scraping" faults, which is suitable for low and medium pollution working conditions.

Product Benefits

Double-lip design effectively reduces residual oil film
Used in conjunction with Strainer seals to create an oil return effect.
Good abrasion and weather resistance, good dustproof performance
Easy to install, no tools required

Scope of Application

HWY type dust ring is widely used in construction machinery, forklift trucks, air cylinders, injection molding machines, agricultural machinery and standard oil cylinders.

Technical Parameters

Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
Working speed: $\leq 0.5\text{m/s}$
Standard material: polyurethane P2005

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

Installation Instructions

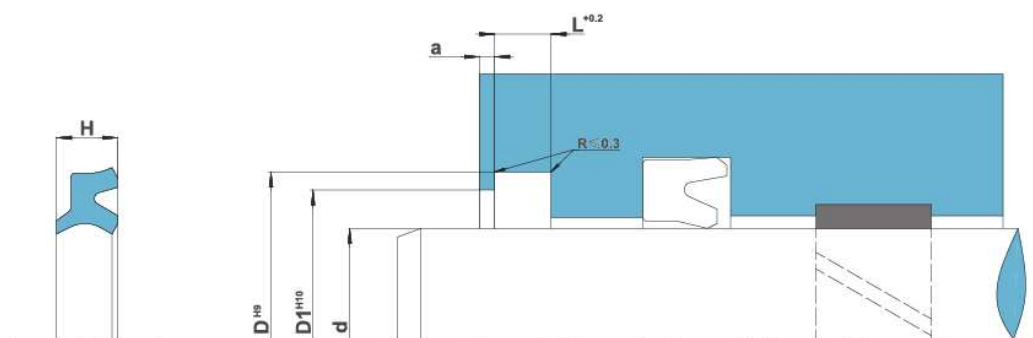
The dust ring can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the dust ring before installation.

Ordering Code

HWY dXDXD1XLXH Material Designator

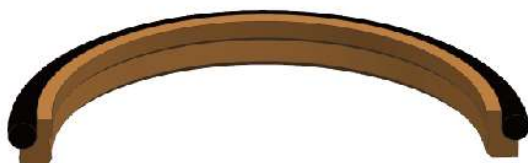
Example: HWY 100X110X105X7X8 P2005 (other materials available)





d	D	D1	L	H	a	Ordering Code
8	13	10.5	3.5	4.1	2	HWY 8x13x10.5x3.5x4.1 P2005
10	16	12.5	4	4.8	2	HWY 10x16x12.5x4x4.8 P2005
12	18	14.5	4	4.8	2	HWY 12x18x14.5x4x4.8 P2005
14	20	16.5	4	4.8	2	HWY 14x20x16.5x4x4.8 P2005
16	24	20.3	5	6	2	HWY 16x24x20.3x5x6 P2005
18	24	20.5	4	4.8	2	HWY 18x24x20.5x4x4.8 P2005
20	26	22.5	4	4.8	2	HWY 20x26x22.5x4x4.8 P2005
22	28	24.5	4	4.8	2	HWY 22x28x24.5x4x4.8 P2005
25	31	27.5	4	4.8	2	HWY 25x31x27.5x4x4.8 P2005
28	36	32.3	5	6	2	HWY 28x36x32.3x5x6 P2005
30	38	34	6	6.5	2	HWY 30x38x34x6x6.5 P2005
32	40	36	6	6.5	2	HWY 32x40x36x6x6.5 P2005
35	43	39	6	6.5	2	HWY 35x43x39x6x6.5 P2005
36	44	40	6	6.5	2	HWY 36x44x40x6x6.5 P2005
40	48	44	6	6.5	2	HWY 40x48x44x6x6.5 P2005
45	53	49	6	6.5	2	HWY 45x53x49x6x6.5 P2005
50	58	54	6	6.5	2	HWY 50x58x54x6x6.5 P2005
53	61	57	6	6.5	2	HWY 53x61x57x6x6.5 P2005
55	63	59	6	6.5	2	HWY 55x63x59x6x6.5 P2005
56	64	60	6	6.5	2	HWY 56x64x60x6x6.5 P2005
60	68	64	6	6.5	2	HWY 60x68x64x6x6.5 P2005
63	71	67	6	6.5	2	HWY 63x71x67x6x6.5 P2005
65	73	69	6	6.5	2	HWY 65x73x69x6x6.5 P2005
70	80	75	7	8	3	HWY 70x80x75x7x8 P2005
80	90	85	7	8	3	HWY 80x90x85x7x8 P2005
85	95	90	7	8	3	HWY 85x95x90x7x8 P2005
90	100	95	7	8	3	HWY 90x100x95x7x8 P2005
100	110	105	7	8	3	HWY 100x110x105x7x8 P2005
110	120	115	7	8	3	HWY 110x120x115x7x8 P2005
120	130	125	7	8	3	HWY 120x130x125x7x8 P2005
125	138	132	8	9.5	3	HWY 125x138x132x8x9.5 P2005
130	143	137	8	9.5	3	HWY 130x143x137x8x9.5 P2005
140	153	147	8	9.5	3	HWY 140x153x147x8x9.5 P2005
150	163	157	8	9.5	3	HWY 150x163x157x8x9.5 P2005
160	173	167	8	9.5	3	HWY 160x173x167x8x9.5 P2005
170	185	174	8.5	9.5	3	HWY 170x185x174x8.5x9.5 P2005
180	193	187	8	9.5	3	HWY 180x193x187x8x9.5 P2005
200	213	207	8	9.5	3	HWY 200x213x207x8x9.5 P2005
220	233	227	8	9.5	3	HWY 220x233x227x8x9.5 P2005
230	243	237	8	9.5	3	HWY 230x243x237x8x9.5 P2005
250	265	258	10	11.5	3	HWY 250x265x258x10x11.5 P2005

FD1 TYPE DUST RING



Product Description

FD1 type dust ring consists of a PTFE sliding ring and an O-ring, with the sealing function of preventing the entry of dust, dirt, sand and metal chips, and reducing the residual oil film. FD1 type dust ring has low friction, and the selection of different O-ring materials can be applied to corrosive media or high-speed, high-temperature and poorly lubricated working conditions.

Product Benefits

- Small groove size
- Extremely small starting and movement friction, smooth movement at low speeds, no crawling phenomenon
- Wear-resistant, long service life
- Wide range of applicable temperatures (choose the right O-ring material)
- High chemical resistance (selection of suitable O-ring material)
- Available in diameters up to 2500mm

Scope of Application

FD1 type dust rings are widely used in press machines, injection molding machines, rolling mills and other industrial equipment.

Material Selection

Makings	Durometer	Nicknames
Nitrile Rubber NBR	70 Shore A	N
Fluoroelastomer FKM	75 Shore A	V
Modification PTFE	66 Shore D	P2071

Technical Parameters

Operating temperature: -30°C ~ +100°C (P2071N) -20°C ~ +200°C (P2071V)
Working speed: ≤5m/s

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	≤ 0.3μm	≤ 1.6μm
Bottom of Trench	ΦD	≤ 1.6μm	≤ 6.3μm
Groove Side		≤ 3.2μm	≤ 12.5μm

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

Installation Instructions

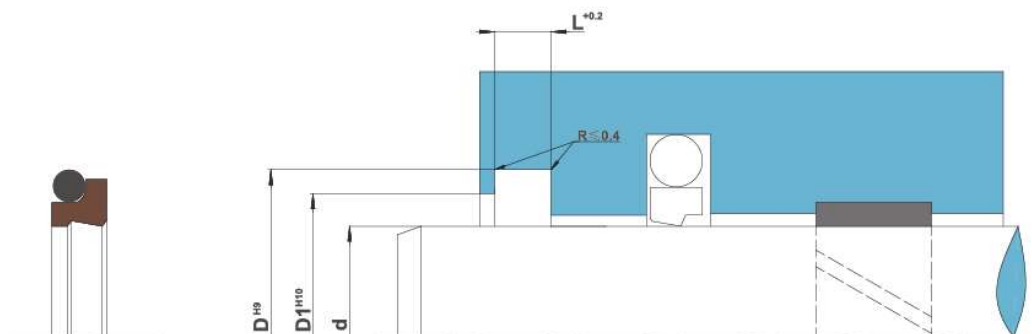
The dust ring can be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be soft and free of sharp edges. A compatible lubricant must be applied to the dust cap before installation.

Ordering Code

FD1-dXDXL Material Designator

Example: FD1-63X69.8X5 P2071N

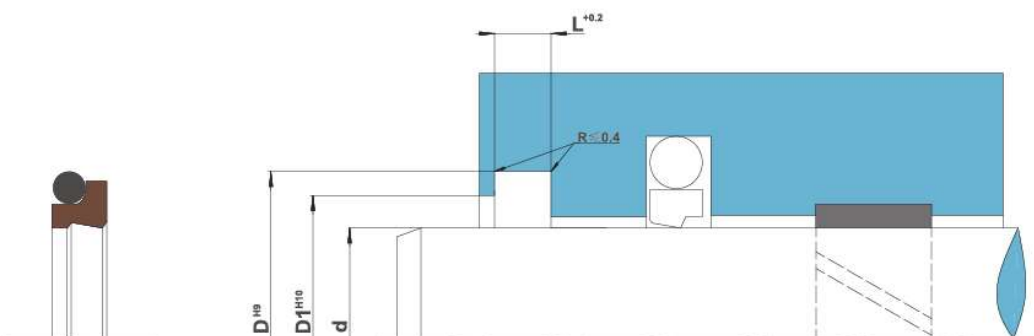




d	D	D1	L	Ordering Code
4	8.8	5.5	3.7	FD1-4x8.8x3.7 P2071N
5	9.8	6.5	3.7	FD1-5x9.8x3.7 P2071N
6	10.8	7.5	3.7	FD1-6x10.8x3.7 P2071N
8	12.8	9.5	3.7	FD1-8x12.8x3.7 P2071N
10	14.8	11.5	3.7	FD1-10x14.8x3.7 P2071N
12	18.8	13.5	5	FD1-12x18.8x5 P2071N
14	20.8	15.5	5	FD1-14x20.8x5 P2071N
15	21.8	16.5	5	FD1-15x21.8x5 P2071N
16	22.8	17.5	5	FD1-16x22.8x5 P2071N
18	24.8	19.5	5	FD1-18x24.8x5 P2071N
20	26.8	21.5	5	FD1-20x26.8x5 P2071N
22	28.8	23.5	5	FD1-22x28.8x5 P2071N
25	31.8	26.5	5	FD1-25x31.8x5 P2071N
28	34.8	29.5	5	FD1-28x34.8x5 P2071N
30	36.8	31.5	5	FD1-30x36.8x5 P2071N
32	38.8	33.5	5	FD1-32x38.8x5 P2071N
35	41.8	36.5	5	FD1-35x41.8x5 P2071N
36	42.8	37.5	5	FD1-36x42.8x5 P2071N
38	44.8	39.5	5	FD1-38x44.8x5 P2071N
40	46.8	41.5	5	FD1-40x46.8x5 P2071N
42	48.8	43.5	5	FD1-42x48.8x5 P2071N
45	51.8	46.5	5	FD1-45x51.8x5 P2071N

d	D	D1	L	Ordering Code
50	56.8	51.5	5	FD1-50x56.8x5 P2071N
55	61.8	56.5	5	FD1-55x61.8x5 P2071N
56	62.8	57.5	5	FD1-56x62.8x5 P2071N
60	66.8	61.5	5	FD1-60x66.8x5 P2071N
63	69.8	64.5	5	FD1-63x69.8x5 P2071N
65	73.8	66.5	6	FD1-65x73.8x6 P2071N
70	78.8	71.5	6	FD1-70x78.8x6 P2071N
75	83.8	76.5	6	FD1-75x83.8x6 P2071N
80	88.8	81.5	6	FD1-80x88.8x6 P2071N
85	93.8	86.5	6	FD1-85x93.8x6 P2071N
90	98.8	91.5	6	FD1-90x98.8x6 P2071N
95	103.8	96.5	6	FD1-95x103.8x6 P2071N
100	108.8	101.5	6	FD1-100x108.8x6 P2071N
105	113.8	106.5	6	FD1-105x113.8x6 P2071N
110	118.8	111.5	6	FD1-110x118.8x6 P2071N
115	123.8	116.5	6	FD1-115x123.8x6 P2071N
120	128.8	121.5	6	FD1-120x128.8x6 P2071N
125	133.8	126.5	6	FD1-125x133.8x6 P2071N
130	138.8	131.5	6	FD1-130x138.8x6 P2071N
135	143.8	136.5	6	FD1-135x143.8x6 P2071N
140	148.8	141.5	6	FD1-140x148.8x6 P2071N
145	153.8	146.5	6	FD1-145x153.8x6 P2071N

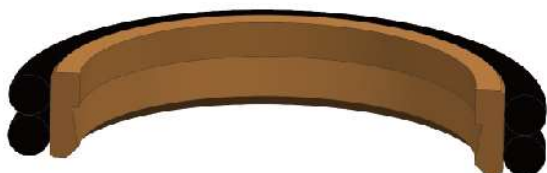
FD1 TYPE DUST RING



d	D	D1	L	Ordering Code
150	158.8	151.5	6	FD1-150x158.8x6 P2071N
160	168.8	161.5	6	FD1-160x168.8x6 P2071N
170	178.8	171.5	6	FD1-170x178.8x6 P2071N
180	188.8	181.5	6	FD1-180x188.8x6 P2071N
190	198.8	191.5	6	FD1-190x198.8x6 P2071N
200	208.8	201.5	6	FD1-200x208.8x6 P2071N
210	218.8	211.5	6	FD1-210x218.8x6 P2071N
220	228.8	221.5	6	FD1-220x228.8x6 P2071N
230	238.8	231.5	6	FD1-230x238.8x6 P2071N
240	248.8	241.5	6	FD1-240x248.8x6 P2071N
250	258.8	251.5	6	FD1-250x258.8x6 P2071N
260	272.2	262	8.4	FD1-260x272.2x8.4 P2071N
270	282.2	272	8.4	FD1-270x282.2x8.4 P2071N
280	292.2	282	8.4	FD1-280x292.2x8.4 P2071N
290	302.2	292	8.4	FD1-290x302.2x8.4 P2071N
300	312.2	302	8.4	FD1-300x312.2x8.4 P2071N
310	322.2	312	8.4	FD1-310x322.2x8.4 P2071N
320	332.2	322	8.4	FD1-320x332.2x8.4 P2071N
330	342.2	332	8.4	FD1-330x342.2x8.4 P2071N
340	352.2	342	8.4	FD1-340x352.2x8.4 P2071N
350	362.2	352	8.4	FD1-350x362.2x8.4 P2071N
360	372.2	362	8.4	FD1-360x372.2x8.4 P2071N

d	D	D1	L	Ordering Code
370	382.2	372	8.4	FD1-370x382.2x8.4 P2071N
380	392.2	382	8.4	FD1-380x392.2x8.4 P2071N
390	402.2	392	8.4	FD1-390x402.2x8.4 P2071N
400	412.2	402	8.4	FD1-400x412.2x8.4 P2071N
410	422.2	412	8.4	FD1-410x422.2x8.4 P2071N
420	432.2	422	8.4	FD1-420x432.2x8.4 P2071N
430	446	432.5	11	FD1-430x446x11 P2071N
440	456	442	11	FD1-440x456x11 P2071N
450	466	452	11	FD1-450x466x11 P2071N
460	476	462	11	FD1-460x476x11 P2071N
470	486	472	11	FD1-470x486x11 P2071N
480	496	482	11	FD1-480x496x11 P2071N
490	506	492	11	FD1-490x506x11 P2071N
500	516	502	11	FD1-500x516x11 P2071N
600	616	602	11	FD1-600x616x11 P2071N
630	646	632	11	FD1-630x646x11 P2071N
650	670	652.5	14	FD1-680x700x14 P2071N
700	720	702.5	14	FD1-700x720x14 P2071N
800	820	802.5	14	FD1-800x820x14 P2071N
900	920	902.5	14	FD1-900x920x14 P2071N
1000	1020	1002.5	14	FD1-1000x1020x14 P2071N
1200	1220	1202.5	14	FD1-1200x1220x14 P2071N

FD2 Type Dust Ring



Product Description

Type FD2 consists of a PTFE sliding ring and two O-rings, which have dustproof and

The PTFE dust lip can scrape away dust, dirt, sand and metal shavings attached to the rod, while the sealing lip can retain dust, dirt, sand and metal shavings carried by the piston rod when it is extended.

The PTFE dust lip can scrape away dust, dirt, sand and metal chips attached to the rod, and the sealing lip can retain the residual oil film carried by the piston rod when it is extended outward.

FD2 type dustproof ring can be combined with shaft seals (such as Steckle or HMG) which have better oil return performance.

The FD2 type dust seal can be used in tandem with shaft seals that have better oil return properties (e.g. Stirrup seals or HRS type rod seals).

Product Benefits

Small groove size

Extremely small starting and movement friction, which ensures smooth movement at low speeds without creeping.

Wear-resistant, long service life

Wide range of applicable temperatures (selection of suitable O-ring material)

High resistance to chemical media (selection of suitable O-ring material)

Available in large diameters

Scope of Application

FD2 type dust rings are widely used in press machines, injection molding machines, rolling mills and other industrial equipment.

Material Selection

Makings	Durometer	Nicknames
Nitrile Rubber NBR	70 Shore A	N
Fluoroelastomer FKM	75 Shore A	V
Modified PTFE	66 Shore D	P2071

Technical Parameters

Operating temperature: -30°C ~ +100°C (P2071N)

-20°C ~ +200°C (P2071V)

Working speed: ≤5m/s

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	≤ 0.3 μm	≤ 1.6 μm
Bottom of Trench	ΦD	≤ 1.6 μm	≤ 6.3 μm
Groove Side		≤ 3.2 μm	≤ 12.5 μm

Surface Finish

Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

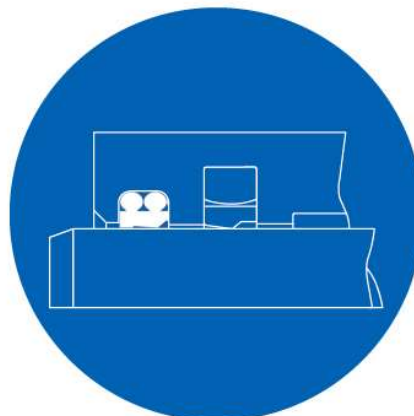
Installation Instructions

The dust ring can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the dust ring before installation.

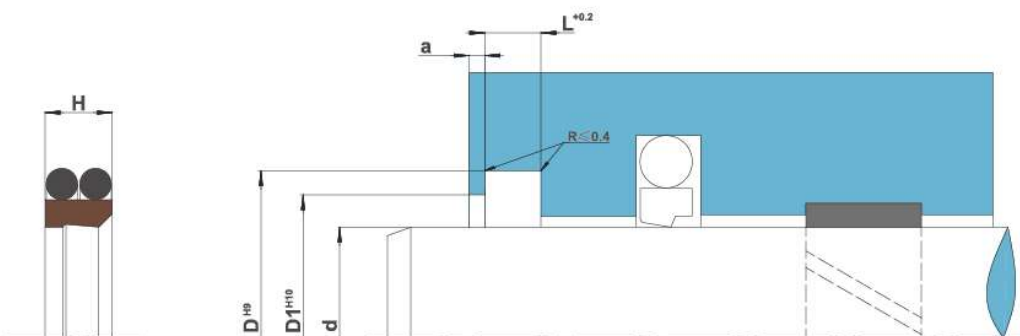
Ordering Code

FD2-dXDXL Material Designator

Example: FD2-63X71.8X6.3 P2071N



FD2 TYPE DUST RING



d	D	D1	L	H	a	Ordering Code
12	19.6	13	4.2	4	4	FD2-12x19.6x4.2 P2071N
14	21.6	15	4.2	4	4	FD2-14x21.6x4.2 P2071N
15	22.6	16	4.2	4	4	FD2-15x22.6x4.2 P2071N
16	23.6	17	4.2	4	4	FD2-16x23.6x4.2 P2071N
18	25.6	19	4.2	4	4	FD2-18x25.6x4.2 P2071N
20	27.6	21	4.2	4	4	FD2-20x27.6x4.2 P2071N
22	29.6	23	4.2	4	4	FD2-22x29.6x4.2 P2071N
25	32.6	26	4.2	4	4	FD2-25x32.6x4.2 P2071N
28	35.6	29	4.2	4	4	FD2-28x35.6x4.2 P2071N
30	37.6	31	4.2	4	4	FD2-30x37.6x4.2 P2071N
32	39.6	33	4.2	4	4	FD2-32x39.6x4.2 P2071N
35	42.6	36	4.2	4	4	FD2-35x42.6x4.2 P2071N
36	43.6	37	4.2	4	4	FD2-36x43.6x4.2 P2071N
38	45.6	39	4.2	4	4	FD2-38x45.6x4.2 P2071N
40	48.8	41.5	6.3	6	4	FD2-40x48.8x6.3 P2071N
42	50.8	43.5	6.3	6	4	FD2-42x50.8x6.3 P2071N
45	53.8	46.5	6.3	6	4	FD2-45x53.8x6.3 P2071N
50	58.8	51.5	6.3	6	4	FD2-50x58.8x6.3 P2071N
55	63.8	56.5	6.3	6	4	FD2-55x63.8x6.3 P2071N
56	64.8	57.5	6.3	6	4	FD2-56x64.8x6.3 P2071N
60	68.8	61.5	6.3	6	4	FD2-60x68.8x6.3 P2071N
63	71.8	64.5	6.3	6	4	FD2-63x71.8x6.3 P2071N
65	73.8	66.5	6.3	6	4	FD2-65x73.8x6.3 P2071N
70	82.2	72	8.1	7.7	4	FD2-70x82.2x8.1 P2071N
75	87.2	77	8.1	7.7	4	FD2-75x87.2x8.1 P2071N
80	92.2	82	8.1	7.7	4	FD2-80x92.2x8.1 P2071N
85	97.2	87	8.1	7.7	4	FD2-85x97.2x8.1 P2071N
90	102.2	92	8.1	7.7	4	FD2-90x102.2x8.1 P2071N
95	107.2	97	8.1	7.7	4	FD2-95x107.2x8.1 P2071N
100	112.2	102	8.1	7.7	4	FD2-100x112.2x8.1 P2071N
105	117.2	107	8.1	7.7	4	FD2-105x117.2x8.1 P2071N
110	122.2	112	8.1	7.7	4	FD2-110x122.2x8.1 P2071N
115	127.2	117	8.1	7.7	4	FD2-115x127.2x8.1 P2071N
120	132.2	122	8.1	7.7	4	FD2-120x132.2x8.1 P2071N
125	137.2	127	8.1	7.7	4	FD2-125x137.2x8.1 P2071N
130	142.2	132	8.1	7.7	4	FD2-130x142.2x8.1 P2071N

d	D	D1	L	H	a	Ordering Code
135	147.2	137	8.1	7.7	4	FD2-135x147.2x8.1 P2071N
140	156	142	11.5	11	4	FD2-140x156x11.5 P2071N
145	161	147	11.5	11	4	FD2-145x161x11.5 P2071N
150	166	152	11.5	11	4	FD2-150x166x11.5 P2071N
160	176	162	11.5	11	4	FD2-160x176x11.5 P2071N
170	186	172	11.5	11	4	FD2-170x186x11.5 P2071N
180	196	182	11.5	11	4	FD2-180x196x11.5 P2071N
190	206	192	11.5	11	4	FD2-190x206x11.5 P2071N
200	216	202	11.5	11	4	FD2-200x216x11.5 P2071N
210	226	212	11.5	11	4	FD2-210x226x11.5 P2071N
220	236	222	11.5	11	4	FD2-220x236x11.5 P2071N
230	246	232	11.5	11	4	FD2-230x246x11.5 P2071N
240	256	242	11.5	11	4	FD2-240x256x11.5 P2071N
250	266	252	11.5	11	4	FD2-250x266x11.5 P2071N
260	276	262	11.5	11	4	FD2-260x276x11.5 P2071N
270	286	272	11.5	11	4	FD2-270x286x11.5 P2071N
280	296	282	11.5	11	4	FD2-280x296x11.5 P2071N
290	310	292	11.5	11	4	FD2-290x310x11.5 P2071N
300	316	302	11.5	11	4	FD2-300x316x11.5 P2071N
320	336	322	11.5	11	4	FD2-320x336x11.5 P2071N
350	366	352	11.5	11	4	FD2-350x366x11.5 P2071N
360	376	362	11.5	11	4	FD2-360x376x11.5 P2071N
380	396	382	11.5	11	4	FD2-380x396x11.5 P2071N
400	424	402.5	15.5	14.8	4	FD2-400x424x15.5 P2071N
420	444	422.5	15.5	14.8	4	FD2-420x444x15.5 P2071N
450	474	452.5	15.5	14.8	4	FD2-450x474x15.5 P2071N
500	519	497.5	15.5	14.8	4	FD2-495x519x15.5 P2071N
550	574	552.5	15.5	14.8	4	FD2-550x574x15.5 P2071N
600	624	602.5	15.5	14.8	4	FD2-600x624x15.5 P2071N
630	654	632.5	15.5	14.8	4	FD2-630x654x15.5 P2071N
650	677.3	652.5	18	17.2	4	FD2-650x677.3x18 P2071N
700	727.3	702.5	18	17.2	4	FD2-700x727.3x18 P2071N
800	827.3	802.5	18	17.2	4	FD2-800x827.3x18 P2071N
900	927.3	902.5	18	17.2	4	FD2-900x927.3x18 P2071N
1000	1027.3	1002.5	18	17.2	4	FD2-1000x1027.3x18 P2071N
1200	1227.3	1202.5	18	17.2	4	FD2-1200x1227.3x18 P2071N

GWJ Type Pin Dust Ring



Product Description

GWJ type dust ring is a single-acting metal skeleton dust ring. The function of GWJ type dust ring is to prevent dust, dirt, sand and metal debris from entering the pin at the end of the cylinder shaft, and to minimize “biting” of the rotary shaft due to the intrusion of external pollution. The special design of the dust lip realizes a good dust scraping effect. During greasing, the dust lip can be opened to release excess grease.

Product Benefits

- Good abrasion and weather resistance
- Good dust protection
- Simple grooves for fully automated assembly

Scope of Application

GWJ type dust rings are widely used for the protection of pin hole bearings in construction machinery and other equipment.

Technical Parameters

- Working Temperature: -30°C ~ +100°C
- Working speed: ≤1m/s
- Standard material: M1001 Polyurethane P2001
- Metal skeleton SPCC

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	≤ 0.3 μm	≤ 1.6 μm
Bottom of Trench	ΦD	≤ 1.6 μm	≤ 6.3 μm
Groove Side		≤ 3.2 μm	≤ 12.5 μm

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H8
Groove Side	L	+0.5

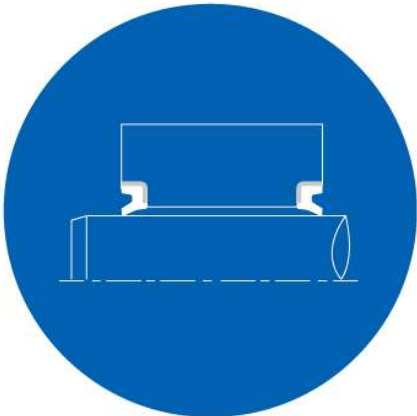
Installation Instructions

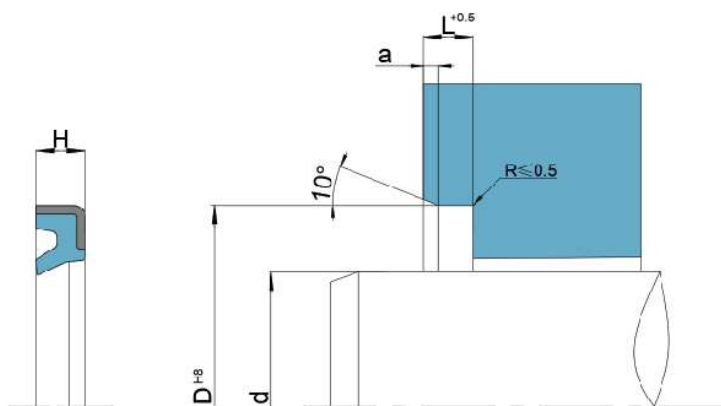
The GWJ-type dust ring has a slightly larger outside diameter D, which ensures a reliable tight fit in the outside diameter of the groove after installation. Before installation, matching lubricant must be applied to the dust ring, and when pressed into the groove, the same axis should be ensured to avoid tilting.

Ordering Code

GWJ dXDXL M1001 Material Designator

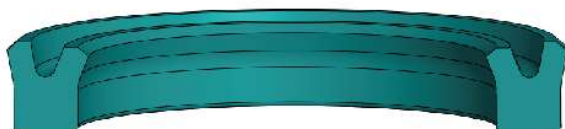
Example:GWJ 100X115X8 M1001





d	D	L	a	Ordering Code
25	35	4	1	GWJ 25X35X4 M1001
30	40	4	1	GWJ 30X40X4 M1001
35	45	4	1	GWJ 35X45X4 M1001
35	45	5	1	GWJ 35X45X5 M1001
40	50	4	1	GWJ 40X50X4 M1001
40	50	5	1	GWJ 40X50X5 M1001
45	55	4	1	GWJ 45X55X4 M1001
45	60	4	1	GWJ 45X60X4 M1001
50	60	4	1	GWJ 50X60X4 M1001
50	60	5	1	GWJ 50X60X5 M1001
50	65	4	1	GWJ 50X65X4 M1001
50	65	5	1	GWJ 50X65X5 M1001
55	65	5	1	GWJ 55X65X5 M1001
55	70	5	1	GWJ 55X70X5 M1001
60	70	5	1	GWJ 60X70X5 M1001
60	75	4	1	GWJ 60X75X4 M1001
60	75	5	1	GWJ 60X75X5 M1001
65	75	4	1	GWJ 65X75X4 M1001
65	80	5	1	GWJ 65X80X5 M1001
70	85	5	1	GWJ 70X85X5 M1001
70	85	8	1	GWJ 70X85X8 M1001
75	90	5	1	GWJ 75X90X5 M1001
75	90	8	1	GWJ 75X90X8 M1001
80	95	5	1	GWJ 80X95X5 M1001
80	95	8	1	GWJ 80X95X8 M1001
85	100	8	1	GWJ 85X100X8 M1001
90	105	6	1	GWJ 90X105X6 M1001
90	105	8	1	GWJ 90X105X8 M1001
90	110	10	1	GWJ 90X110X10 M1001
95	110	8	1	GWJ 95X110X8 M1001
100	115	6	1	GWJ 100X115X6 M1001
100	115	8	1	GWJ 100X115X8 M1001
110	125	8	1	GWJ 110X125X8 M1001
120	135	8	1	GWJ 120X135X8 M1001
120	140	8	1	GWJ 120X140X8 M1001
130	150	7	1	GWJ 130X150X7 M1001
140	170	10	1	GWJ 140X160X10 M1001
150	170	10	1	GWJ 150X170X10 M1001
160	180	8	1	GWJ 160X180X8 M1001
180	200	8	1	GWJ 180X200X8 M1001

HRS Type Piston Rod Seal



Product Description

HRS type piston rod seal is a kind of shaft lip seal which has interference between the outer diameter and the bottom of the groove. HRS is insensitive to shock loads and pressure peaks, and has a high resistance to extrusion, which is suitable for more severe working conditions. HRS is made of high-performance polyurethane material, which has a very low compression permanent deformation and very good abrasion resistance. As a result, HRS has a very long sealing life and is suitable for heavy-duty traveling hydraulics and piston rod sealing of cylinders for general hydraulic equipment.

Product Benefits

Insensitivity to shock loads and pressure spikes
Low permanent deformation in compression
Very good static and dynamic sealing properties
Excellent wear and extrusion resistance
Simple grooves for easy installation

Scope of Application

The HRS type piston rod seal is widely used in construction machinery, agricultural machinery, injection molding machines, forklifts, loading and unloading platforms, standard cylinders, etc.

Technical Parameters

Working pressure: $\leq 35\text{MPa}$ (without retaining ring)
Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
Working speed: $\leq 1\text{m/s}$
Standard material: polyurethane P2001

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

Installation Instructions

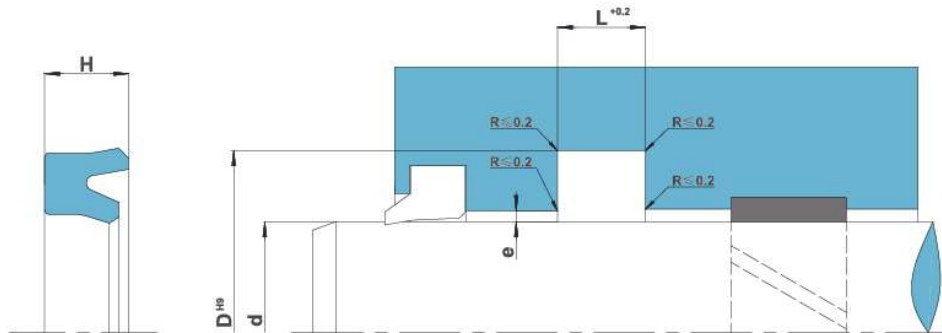
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

HRS dDXL Material Designator

Example: HRS 100X115X10 P2001 (other materials available)





Note: for clearance e please refer to section “design of sealing grooves”.

d	D	L	Ordering Code
6	13	5.7	HRS 6X13X5.7 P2001
8	16	5.7	HRS 8X16X5.7 P2001
10	16	5.2	HRS 10X16X5.2 P2001
12	19	5.7	HRS 12X19X5.7 P2001
16	24	6.3	HRS 16X24X6.3 P2001
18	26	5.7	HRS 18X26X5.7 P2001
20	28	6.3	HRS 20X28X6.3 P2001
22	30	6.3	HRS 22X30X6.3 P2001
25	33	5.7	HRS 25X33X5.7 P2001
28	35.5	5.7	HRS 28X35.5X5.7 P2001
30	40	7	HRS 30X40X7 P2001
32	42	7	HRS 32X42X7 P2001
35	45	7	HRS 35X45X7 P2001
38	48	7	HRS 38X48X7 P2001
40	50	7	HRS 40X50X7 P2001
45	55	7	HRS 45X55X7 P2001
50	60	7	HRS 50X60X7 P2001
55	65	7	HRS 55X65X7 P2001
56	66	7	HRS 56X66X7 P2001
60	70	7	HRS 60X70X7 P2001
63	73	7	HRS 63X73X7 P2001
65	75	7	HRS 65X75X7 P2001
70	80	7	HRS 70X80X7 P2001

d	D	L	Ordering Code
75	85	8	HRS 75X85X8 P2001
80	90	7	HRS 80X90X7 P2001
90	105	10	HRS 90X105X10 P2001
100	115	10	HRS 100X115X10 P2001
110	125	10	HRS 110X125X10 P2001
120	140	13	HRS 120X140X13 P2001
125	145	16	HRS 125X145X16 P2001
130	150	16	HRS 130X150X16 P2001
140	155	10	HRS 140X155X10 P2001
150	170	13	HRS 150X170X13 P2001
160	180	13	HRS 160X180X13 P2001
170	190	13	HRS 170X190X13 P2001
180	200	13	HRS 180X200X13 P2001
200	220	13	HRS 200X220X13 P2001
210	230	13	HRS 210X230X13 P2001
220	240	13	HRS 220X240X13 P2001
230	250	13	HRS 230X250X13 P2001
240	260	13	HRS 240X260X13 P2001
250	270	17	HRS 250X270X17 P2001
280	300	16	HRS 280X300X16 P2001
290	310	16	HRS 290X310X16 P2001
300	330	20	HRS 300X330X20 P2001
320	350	20	HRS 320X350X20 P2001

HRD Type Piston Rod Seal



Product Description

HRDs are piston rod seals with a secondary lip that is an interference fit between the outside diameter and the bottom of the groove. A film of lubricant is stored between the two lips of the HRD, which reduces seal wear and prolongs the service life of the seal. HRDs also provide excellent low pressure sealing due to the radial preload applied to the secondary lip. For multi-stage cylinder applications, a 4 or 5 mm cross-section is recommended.

Product Benefits

- Insensitivity to shock loads and pressure spikes
- Low permanent deformation in compression
- Good dynamic and static sealing effect
- Excellent abrasion and extrusion resistance
- Long sealing life

Scope of Application

HRD type piston rod seals are widely used in construction machinery, agricultural machinery, injection molding machines, forklifts, loading and unloading platforms, standard cylinders, telescopic sleeve hydraulic cylinders, multi-stage cylinders and so on.

Technical Parameters

Working pressure: $\leq 35\text{MPa}$ (without retaining ring)
 Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
 Working speed: $\leq 0.5\text{m/s}$
 Standard material: polyurethane P2001

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

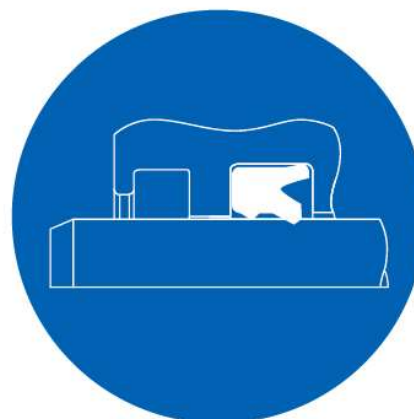
Installation Instructions

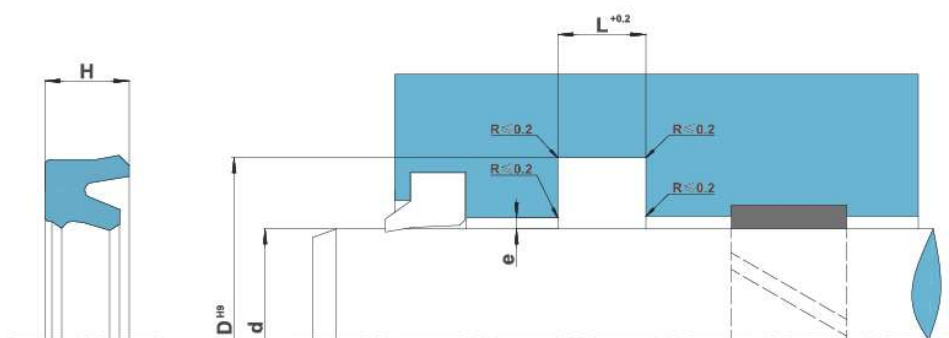
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

HRD dXDXL Material Designator

Example: HRD 100X120X16 P2001 (other materials available)





Note: for clearance e please refer to section "design of sealing grooves".

d	D	L	Ordering Code
20	28	6.3	HRD 20X28X6.3 P2001
22	30	6.3	HRD 22X30X6.3 P2001
25	33	6.3	HRD 25X33X6.3 P2001
28	36	6.3	HRD 28X36X6.3 P2001
30	38	6.3	HRD 30X38X6.3 P2001
32	42	8	HRD 32X42X8 P2001
35	45	8	HRD 35X45X8 P2001
36	46	8	HRD 36X46X8 P2001
40	50	8	HRD 40X50X8 P2001
45	55	8	HRD 45X55X8 P2001
50	60	8	HRD 50X60X8 P2001
55	65	11	HRD 55X65X11 P2001
56	71	12.5	HRD 56X71X12.5 P2001
60	70	11	HRD 60X70X11 P2001
63	78	12.5	HRD 63X78X12.5 P2001
70	85	12.5	HRD 70X85X12.5 P2001
80	95	12.5	HRD 80X95X12.5 P2001
90	105	12.5	HRD 90X105X12.5 P2001
100	120	16	HRD 100X120X16 P2001
110	130	16	HRD 110X130X16 P2001
120	140	16	HRD 120X140X16 P2001
125	145	16	HRD 125X145X16 P2001
130	150	16	HRD 130X150X16 P2001
140	160	16	HRD 140X160X16 P2001
150	170	16	HRD 150X170X16 P2001
160	180	16	HRD 160X180X16 P2001
180	200	16	HRD 180X200X16 P2001
200	225	20	HRD 200X225X20 P2001

HRE Type Piston Rod Seal



Product Description

The HRE piston rod seal is a compression type seal with a highly elastic O-ring in the lip compared to the HRS or HRD. the O-ring provides a preload on the lip and provides very good sealing performance even at low pressures or in a vacuum. When the system pressure increases, the compression of the lip is increased by the forced sealing structure, achieving a reliable seal. In low-temperature, low-pressure conditions, conventional lip seals are prone to external leakage due to material shrinkage, which reduces lip interference, while HRE type piston rod seals solve this problem faster.

Product Benefits

Excellent static and dynamic sealing properties
Excellent wear and extrusion resistance
Insensitivity to shock loads and pressure peaks
Initial radial force of the O-Ring ensures a good low pressure sealing effect
Simple grooves for easy installation

Scope of Application

HRE type piston rod seals are widely used to seal plungers, pneumatic drills, multi-stage cylinders, forging presses and traveling equipment.

Technical Parameters

Working pressure: $\leq 30\text{MPa}$ (without retaining ring)
Working Temperature: $-46^{\circ}\text{C} \sim +90^{\circ}\text{C}$
Working speed: $\leq 0.5\text{m/s}$
Standard material: M6006
Lip seal: polyurethane P2006
O-ring: NBR

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

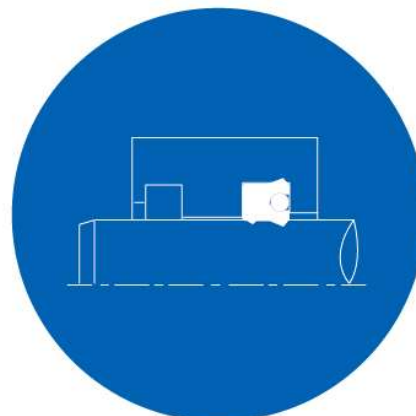
Installation Instructions

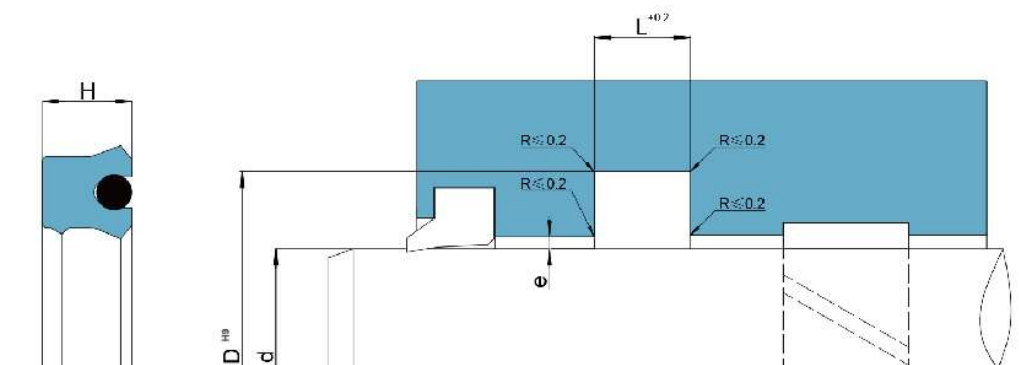
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

HRE dXDXL Material Designator

Example: HRE 100X115X10 M6006 (other materials available)





Note: For clearance e please refer to section "Design of sealing grooves".

d	D	L	Ordering Code
55	65	11	HRE 55X65X11 M6006
60	75	10	HRE 60X75X10 M6006
65	80	10	HRE 65X80X10 M6006
70	80	8	HRE 70X80X8 M6006
75	90	10	HRE 75X90X10 M6006
80	95	12.5	HRE 80X95X12.5 M6006
85	100	10	HRE 85X100X10 M6006
90	105	10	HRE 90X105X10 M6006
100	115	10	HRE 100X115X10 M6006
110	125	10	HRE 110X125X10 M6006
120	135	10	HRE 120X135X10 M6006
125	140	10	HRE 125X140X10 M6006
130	145	10	HRE 130X145X10 M6006
140	155	10	HRE 140X155X10 M6006
150	165	10	HRE 150X165X10 M6006
160	175	10	HRE 160X175X10 M6006
170	185	10	HRE 170X185X10 M6006
180	200	13	HRE 180X200X13 M6006
190	210	13	HRE 190X210X13 M6006
200	220	13	HRE 200X220X13 M6006
220	240	13	HRE 220X240X13 M6006
240	260	13	HRE 240X260X13 M6006
250	270	13	HRE 250X270X13 M6006
280	300	15	HRE 280X300X15 M6006
300	320	13	HRE 300X320X13 M6006

HRX Type Piston Rod Cushion Seal



Product Description

HRX type piston rod seal is a combination cushion seal with retaining ring. The elastomer is injection molded from high performance polyurethane material, which has very good wear and media resistance. HRX outer lip is designed with a pressure relief groove, which has very good ability to relieve back pressure, avoiding damage to the main seal caused by high back pressure. The retaining ring has very good impact resistance, resistance to extrusion, and can adapt to harsh working conditions.

Product Benefits

Good abrasion resistance, impact resistance, good resistance to extrusion, small compression permanent deformation
Good oil return characteristics and back pressure relief ability
Adaptable to the most demanding working conditions
Small size, easy to install

Scope of Application

HRX type piston rod seals are widely used in construction machinery, agricultural machinery, injection molding machines, industrial vehicles, standard oil cylinders and so on.

Technical Parameters

Working pressure: $\leq 50\text{MPa}$
Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (M2005) $-20^{\circ}\text{C} \sim +120^{\circ}\text{C}$ (MF112)
Working speed: $\leq 1\text{m/s}$
Standard material: M2005
Lip seal: polyurethane P2005
Retaining ring: Polyformaldehyde S1101
MF112 Lip seal: Polyurethane P2112
Retaining ring: modified nylon S1024

Design Statement

Allowable clearance e

35MPa	40MPa	50MPa
≤ 0.40	≤ 0.20	≤ 0.15

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish

Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

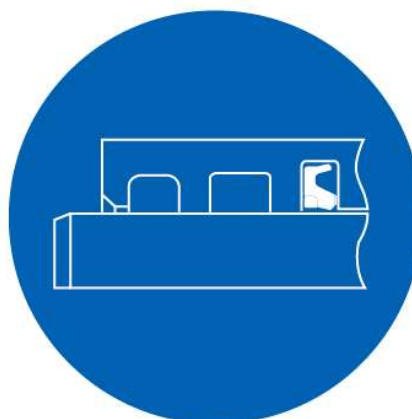
Installation Instructions

HRX seals can be easily installed into closed grooves by first removing the retaining ring and squeezing it into a kidney shape, followed by installation of the retaining ring. If an installation tool is used, it must be of soft material and without sharp edges. Before installation, matching lubricant must be applied to the sealing ring.

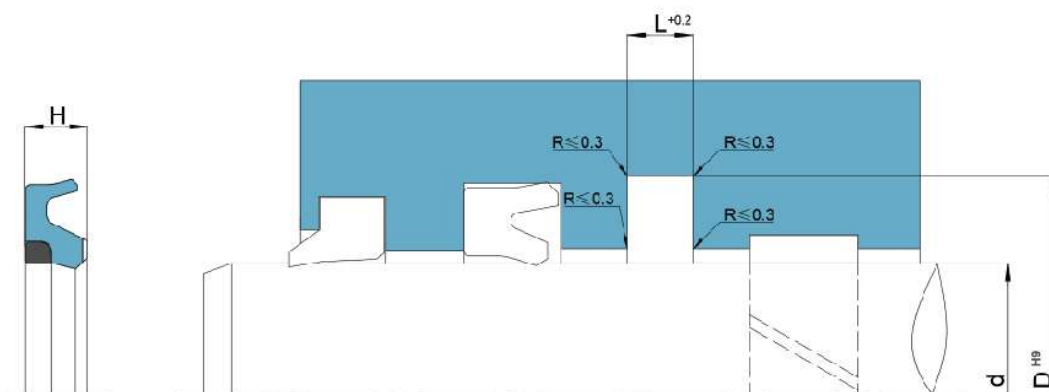
Ordering Code

HRX dXDXL Material Designator

Example: HRX 100X115.5X6.3 MF112

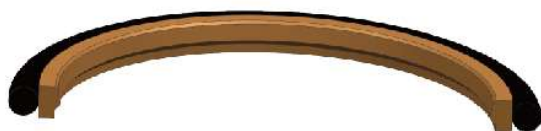


HRX TYPE PISTON ROD CUSHION SEAL



d	D	L	Ordering Code
40	55.5	6.3	HRX 40X55.5X6.3 MF112
45	60.5	6.3	HRX 45X60.5X6.3 MF112
50	65.5	6.3	HRX 50X65.5X6.3 MF112
55	70.5	6.3	HRX 55X70.5X6.3 MF112
60	75.5	6.3	HRX 60X75.5X6.3 MF112
63	78.5	6.3	HRX 63X78.5X6.3 MF112
65	80.5	6.3	HRX 65X80.5X6.3 MF112
70	85.5	6.3	HRX 70X85.5X6.3 MF112
75	90.5	6.3	HRX 75X90.5X6.3 MF112
80	95.5	6.3	HRX 80X95.5X6.3 MF112
85	100.5	6.3	HRX 85X100.5X6.3 MF112
90	105.5	6.3	HRX 90X105.5X6.3 MF112
95	110.5	6.3	HRX 95X110.5X6.3 MF112
100	115.5	6.3	HRX 100X115.5X6.3 MF112
105	120.5	6.3	HRX 105X120.5X6.3 MF112
110	125.5	6.3	HRX 110X125.5X6.3 MF112
115	130.5	6.3	HRX 115X130.5X6.3 MF112
120	135.5	6.3	HRX 120X135.5X6.3 MF112
125	140.5	6.3	HRX 125X140.5X6.3 MF112
130	145.5	6.3	HRX 130X145.5X6.3 MF112
140	155.5	6.3	HRX 140X155.5X6.3 MF112
150	165.5	6.3	HRX 150X165.5X6.3 MF112
160	175.5	6.3	HRX 160X175.5X6.3 MF112
170	185.5	6.3	HRX 170X185.5X6.3 MF112
180	195.5	6.3	HRX 180X195.5X6.3 MF112
190	205.5	6.3	HRX 190X205.5X6.3 MF112
200	221	8	HRX 200X221X8 MF112
220	241	8	HRX 220X241X8 MF112

STR Type Piston Rod Seal



Product Description

The STR type piston rod seal consists of a PTFE slip ring and an O-ring, and it is preloaded and used in conjunction with a double-lip dust ring for optimum sealing.

Product Benefits

- Small groove size
- Extremely small starting and movement friction, can ensure smooth movement at low speeds, no crawling phenomenon
- Wear-resistant, anti-extrusion, long service life.
- Special shape of sealing structure, with good oil film oil return characteristics
- Wide range of applicable temperatures (select the appropriate O-ring material)
- Strong resistance to chemical media (choose the right O-ring material)
- Available in diameters up to 2500 mm

Scope of Application

STR type piston rod seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Makings	Makings
Nitrile rubberNBR	70 Shore A	N
FluoroelastomerFKM	75 Shore A	V
ModificationPTFE	66 Shore D	P2071

Technical Parameters

Working pressure: $\leq 40\text{MPa}$
 Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (P2071N) $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (P2071V)
 Working speed: $\leq 5\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	4~8	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	8~19	3.2	3.65	0.4~0.25	0.25~0.15
C	3.53	19~38	4.2	5.35	0.4~0.25	0.25~0.15
D	5.33	38~200	6.3	7.55	0.5~0.3	0.3~0.2
E	6.99	200~256	8.1	10.25	0.5~0.3	0.3~0.2
F	6.99	256~650	8.1	12	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	13.65	0.7~0.4	0.4~0.3
H	12	≥ 1000	13.8	19	0.7~0.4	0.4~0.3

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

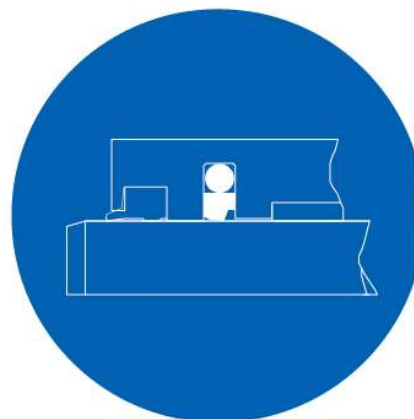
Installation Instructions

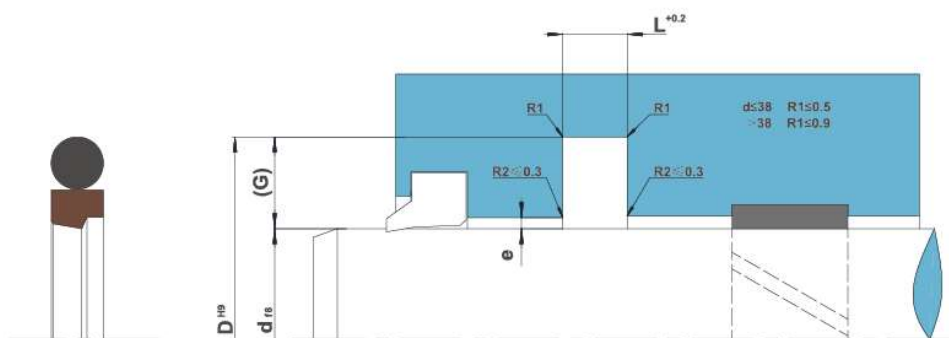
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

STR dXDXL Material Designator

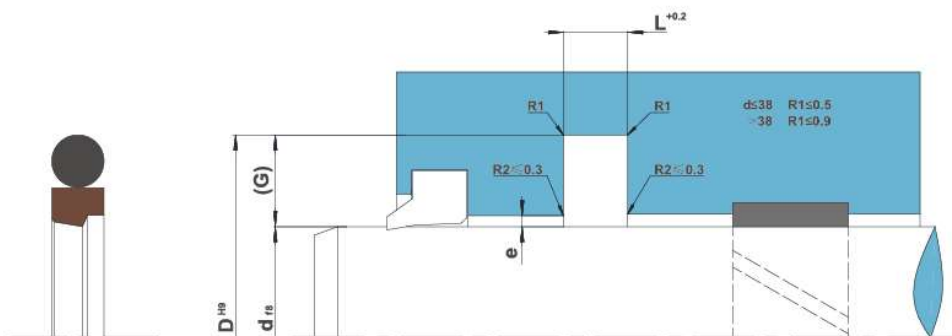
Example: STR 63X78.1X6.3 P2071N





d	D	L	Ordering Code
5	9.9	2.2	STR 5X9.9X2.2 P2071N
8	15.3	3.2	STR 8X15.3X3.2 P2071N
10	17.3	3.2	STR 10X17.3X3.2 P2071N
12	19.3	3.2	STR 12X19.3X3.2 P2071N
15	22.3	3.2	STR 15X22.3X3.2 P2071N
18	25.3	3.2	STR 18X25.3X3.2 P2071N
20	30.7	4.2	STR 20X30.7X4.2 P2071N
22	32.7	4.2	STR 22X32.7X4.2 P2071N
25	35.7	4.2	STR 25X35.7X4.2 P2071N
26	36.7	4.2	STR 26X36.7X4.2 P2071N
28	38.7	4.2	STR 28X38.7X4.2 P2071N
30	40.7	4.2	STR 30X40.7X4.2 P2071N
32	42.7	4.2	STR 32X42.7X4.2 P2071N
35	45.7	4.2	STR 35X45.7X4.2 P2071N
36	46.7	4.2	STR 36X46.7X4.2 P2071N
38	53.1	6.3	STR 38X53.1X6.3 P2071N
40	55.1	6.3	STR 40X55.1X6.3 P2071N
42	57.1	6.3	STR 42X57.1X6.3 P2071N
45	60.1	6.3	STR 45X60.1X6.3 P2071N
48	63.1	6.3	STR 48X63.1X6.3 P2071N
50	65.1	6.3	STR 50X65.1X6.3 P2071N
52	67.1	6.3	STR 52X67.1X6.3 P2071N
55	70.1	6.3	STR 55X70.1X6.3 P2071N
56	71.1	6.3	STR 56X71.1X6.3 P2071N
60	75.1	6.3	STR 60X75.1X6.3 P2071N

d	D	L	Ordering Code
63	78.1	6.3	STR 63X78.1X6.3 P2071N
65	80.1	6.3	STR 65X80.1X6.3 P2071N
70	85.1	6.3	STR 70X85.1X6.3 P2071N
75	90.1	6.3	STR 75X90.1X6.3 P2071N
80	95.1	6.3	STR 80X95.1X6.3 P2071N
85	100.1	6.3	STR 85X100.1X6.3 P2071N
90	105.1	6.3	STR 90X105.1X6.3 P2071N
95	110.1	6.3	STR 95X110.1X6.3 P2071N
100	115.1	6.3	STR 100X115.1X6.3 P2071N
105	120.1	6.3	STR 105X120.1X6.3 P2071N
110	125.1	6.3	STR 110X125.1X6.3 P2071N
115	130.1	6.3	STR 115X130.1X6.3 P2071N
120	135.1	6.3	STR 120X135.1X6.3 P2071N
125	140.1	6.3	STR 125X140.1X6.3 P2071N
130	145.1	6.3	STR 130X145.1X6.3 P2071N
135	150.1	6.3	STR 135X150.1X6.3 P2071N
140	155.1	6.3	STR 140X155.1X6.3 P2071N
145	160.1	6.3	STR 145X160.1X6.3 P2071N
150	165.1	6.3	STR 150X165.1X6.3 P2071N
155	170.1	6.3	STR 155X170.1X6.3 P2071N
160	175.1	6.3	STR 160X175.1X6.3 P2071N
165	180.1	6.3	STR 165X180.1X6.3 P2071N
170	185.1	6.3	STR 170X185.1X6.3 P2071N
175	190.1	6.3	STR 175X190.1X6.3 P2071N
180	195.1	6.3	STR 180X195.1X6.3 P2071N



d	D	L	Ordering Code
185	200.1	6.3	STR 185X200.1X6.3 P2071N
190	205.1	6.3	STR 190X205.1X6.3 P2071N
195	210.1	6.3	STR 195X210.1X6.3 P2071N
200	220.5	8.1	STR 200X220.5X8.1 P2071N
210	230.5	8.1	STR 210X230.5X8.1 P2071N
220	240.5	8.1	STR 220X240.5X8.1 P2071N
225	245.5	8.1	STR 225X245.5X8.1 P2071N
230	250.5	8.1	STR 230X250.5X8.1 P2071N
240	260.5	8.1	STR 240X260.5X8.1 P2071N
250	270.5	8.1	STR 250X270.5X8.1 P2071N
260	284	8.1	STR 260X284X8.1 P2071N
270	294	8.1	STR 270X294X8.1 P2071N
280	304	8.1	STR 280X304X8.1 P2071N
290	314	8.1	STR 290X314X8.1 P2071N
300	324	8.1	STR 300X324X8.1 P2071N
310	334	8.1	STR 310X334X8.1 P2071N
320	344	8.1	STR 320X344X8.1 P2071N
330	354	8.1	STR 330X354X8.1 P2071N
340	364	8.1	STR 340X364X8.1 P2071N
350	374	8.1	STR 350X374X8.1 P2071N
360	384	8.1	STR 360X384X8.1 P2071N
370	394	8.1	STR 370X394X8.1 P2071N
380	404	8.1	STR 380X404X8.1 P2071N
390	414	8.1	STR 390X414X8.1 P2071N
400	424	8.1	STR 400X424X8.1 P2071N

d	D	L	Ordering Code
410	434	8.1	STR 410X434X8.1 P2071N
420	444	8.1	STR 420X444X8.1 P2071N
430	454	8.1	STR 430X454X8.1 P2071N
440	464	8.1	STR 440X464X8.1 P2071N
450	474	8.1	STR 450X474X8.1 P2071N
460	484	8.1	STR 460X484X8.1 P2071N
470	494	8.1	STR 470X494X8.1 P2071N
480	504	8.1	STR 480X504X8.1 P2071N
490	514	8.1	STR 490X514X8.1 P2071N
500	524	8.1	STR 500X524X8.1 P2071N
510	534	8.1	STR 510X534X8.1 P2071N
520	544	8.1	STR 520X544X8.1 P2071N
530	554	8.1	STR 530X554X8.1 P2071N
540	564	8.1	STR 540X564X8.1 P2071N
550	574	8.1	STR 550X574X8.1 P2071N
560	584	8.1	STR 560X584X8.1 P2071N
580	604	8.1	STR 580X604X8.1 P2071N
600	624	8.1	STR 600X624X8.1 P2071N
650	677.3	9.5	STR 650X677.3X9.5 P2071N
700	727.3	9.5	STR 700X727.3X9.5 P2071N
800	827.3	9.5	STR 800X827.3X9.5 P2071N
900	927.3	9.5	STR 900X927.3X9.5 P2071N
1000	1038	13.8	STR 1000X1038X13.8 P2071N
1200	1238	13.8	STR 1200X1238X13.8 P2071N
1500	1538	13.8	STR 1500X1538X13.8 P2071N

SHR Type Piston Rod Seal



Product Description

SHR type piston rod seal consists of PTFE slip ring and O-ring. SHR has very low coefficient of friction, no creep phenomenon, often used as the first seal of tandem sealing, which can effectively reduce the lip pressure of the second sealing ring, and extend the service life of the second sealing ring. Due to the selection of different rubber material O-rings, SHR combination seals can be applied in different working conditions to meet different fluid mediums and operating temperatures.

Product Benefits

- Small groove size
- Extremely small starting and movement friction, can ensure smooth movement at low speeds, no crawling phenomenon
- Wear-resistant, anti-extrusion, long service life
- Wide range of applicable temperatures (selection of suitable O-ring material)
- Strong resistance to chemical media (choose the right O-ring material)
- Special shaped sealing structure to reduce load and friction under pressure and improve oil film suction back function to enhance sealing life
- Available up to 2500mm in diameter

Scope of Application

SHR type piston rod seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Durometer	Nicknames
Nitrile Rubber	70 Shore A	N
Fluoroelastomer	75 Shore A	V
Modification PTFE	65 Shore D	PCA01

Technical Parameters

Working pressure: $\leq 40\text{MPa}$
 Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (PCA01N) $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (PCA01V)
 Working speed: $\leq 15\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	4~8	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	8~19	3.2	3.65	0.4~0.25	0.25~0.15
C	3.53	19~38	4.2	5.35	0.4~0.25	0.25~0.15
D	5.33	38~200	6.3	7.55	0.5~0.3	0.3~0.2
E	6.99	200~256	8.1	10.25	0.5~0.3	0.3~0.2
F	6.99	256~650	8.1	12	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	13.65	0.7~0.4	0.4~0.3
H	12	≥ 1000	13.8	19	0.7~0.4	0.4~0.3

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

Installation Instructions

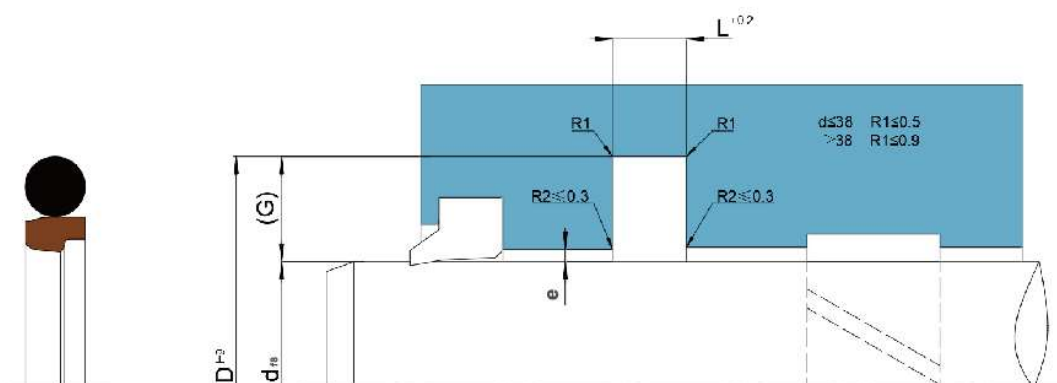
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

SHR dXDXL Material Designator

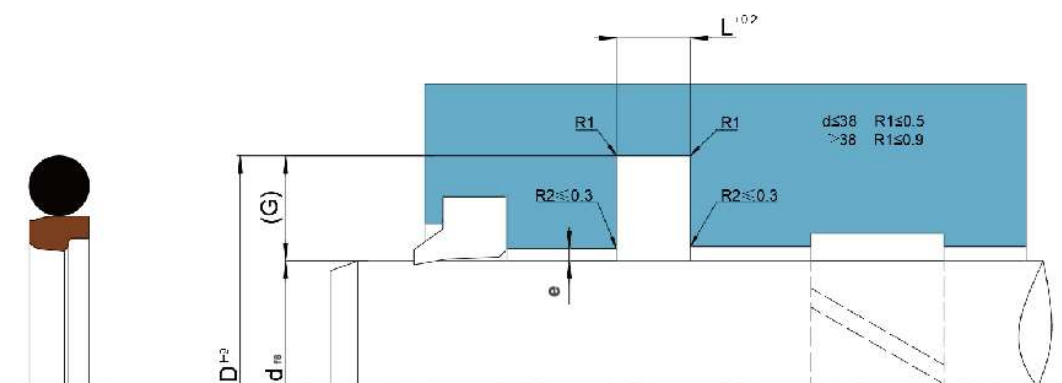
Example: SHR 63X78.1X6.3 PCA01N





d	D	L	Ordering Code
5	9.9	2.2	SHR 5X9.9X2.2 PCA01N
8	15.3	3.2	SHR 8X15.3X3.2 PCA01N
10	17.3	3.2	SHR 10X17.3X3.2 PCA01N
12	19.3	3.2	SHR 12X19.3X3.2 PCA01N
15	22.3	3.2	SHR 15X22.3X3.2 PCA01N
18	25.3	3.2	SHR 18X25.3X3.2 PCA01N
20	30.7	4.2	SHR 20X30.7X4.2 PCA01N
22	32.7	4.2	SHR 22X32.7X4.2 PCA01N
25	35.7	4.2	SHR 25X35.7X4.2 PCA01N
26	36.7	4.2	SHR 26X36.7X4.2 PCA01N
28	38.7	4.2	SHR 28X38.7X4.2 PCA01N
30	40.7	4.2	SHR 30X40.7X4.2 PCA01N
32	42.7	4.2	SHR 32X42.7X4.2 PCA01N
35	45.7	4.2	SHR 35X45.7X4.2 PCA01N
36	46.7	4.2	SHR 36X46.7X4.2 PCA01N
38	53.1	6.3	SHR 38X53.1X6.3 PCA01N
40	55.1	6.3	SHR 40X55.1X6.3 PCA01N
42	57.1	6.3	SHR 42X57.1X6.3 PCA01N
45	60.1	6.3	SHR 45X60.1X6.3 PCA01N
48	63.1	6.3	SHR 48X63.1X6.3 PCA01N
50	65.1	6.3	SHR 50X65.1X6.3 PCA01N
52	67.1	6.3	SHR 52X67.1X6.3 PCA01N
55	70.1	6.3	SHR 55X70.1X6.3 PCA01N
56	71.1	6.3	SHR 56X71.1X6.3 PCA01N
60	75.1	6.3	SHR 60X75.1X6.3 PCA01N

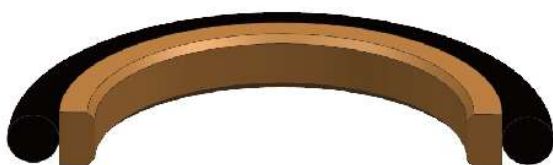
d	D	L	Ordering Code
63	78.1	6.3	SHR 63X78.1X6.3 PCA01N
65	80.1	6.3	SHR 65X80.1X6.3 PCA01N
70	85.1	6.3	SHR 70X85.1X6.3 PCA01N
75	90.1	6.3	SHR 75X90.1X6.3 PCA01N
80	95.1	6.3	SHR 80X95.1X6.3 PCA01N
85	100.1	6.3	SHR 85X100.1X6.3 PCA01N
90	105.1	6.3	SHR 90X105.1X6.3 PCA01N
95	110.1	6.3	SHR 95X110.1X6.3 PCA01N
100	115.1	6.3	SHR 100X115.1X6.3 PCA01N
105	120.1	6.3	SHR 105X120.1X6.3 PCA01N
110	125.1	6.3	SHR 110X125.1X6.3 PCA01N
115	130.1	6.3	SHR 115X130.1X6.3 PCA01N
120	135.1	6.3	SHR 120X135.1X6.3 PCA01N
125	140.1	6.3	SHR 125X140.1X6.3 PCA01N
130	145.1	6.3	SHR 130X145.1X6.3 PCA01N
135	150.1	6.3	SHR 135X150.1X6.3 PCA01N
140	155.1	6.3	SHR 140X155.1X6.3 PCA01N
145	160.1	6.3	SHR 145X160.1X6.3 PCA01N
150	165.1	6.3	SHR 150X165.1X6.3 PCA01N
155	170.1	6.3	SHR 155X170.1X6.3 PCA01N
160	175.1	6.3	SHR 160X175.1X6.3 PCA01N
165	180.1	6.3	SHR 165X180.1X6.3 PCA01N
170	185.1	6.3	SHR 170X185.1X6.3 PCA01N
175	190.1	6.3	SHR 175X190.1X6.3 PCA01N
180	195.1	6.3	SHR 180X195.1X6.3 PCA01N



d	D	L	Ordering Code
185	200.1	6.3	SHR 185X200.1X6.3 PCA01N
190	205.1	6.3	SHR 190X205.1X6.3 PCA01N
195	210.1	6.3	SHR 195X210.1X6.3 PCA01N
200	220.5	8.1	SHR 200X220.5X8.1 PCA01N
210	230.5	8.1	SHR 210X230.5X8.1 PCA01N
220	240.5	8.1	SHR 220X240.5X8.1 PCA01N
225	245.5	8.1	SHR 225X245.5X8.1 PCA01N
230	250.5	8.1	SHR 230X250.5X8.1 PCA01N
240	260.5	8.1	SHR 240X260.5X8.1 PCA01N
250	270.5	8.1	SHR 250X270.5X8.1 PCA01N
260	284	8.1	SHR 260X284X8.1 PCA01N
270	294	8.1	SHR 270X294X8.1 PCA01N
280	304	8.1	SHR 280X304X8.1 PCA01N
290	314	8.1	SHR 290X314X8.1 PCA01N
300	324	8.1	SHR 300X324X8.1 PCA01N
310	334	8.1	SHR 310X334X8.1 PCA01N
320	344	8.1	SHR 320X344X8.1 PCA01N
330	354	8.1	SHR 330X354X8.1 PCA01N
340	364	8.1	SHR 340X364X8.1 PCA01N
350	374	8.1	SHR 350X374X8.1 PCA01N
360	384	8.1	SHR 360X384X8.1 PCA01N
370	394	8.1	SHR 370X394X8.1 PCA01N
380	404	8.1	SHR 380X404X8.1 PCA01N
390	414	8.1	SHR 390X414X8.1 PCA01N
400	424	8.1	SHR 400X424X8.1 PCA01N

d	D	L	Ordering Code
410	434	8.1	SHR 410X434X8.1 PCA01N
420	444	8.1	SHR 420X444X8.1 PCA01N
430	454	8.1	SHR 430X454X8.1 PCA01N
440	464	8.1	SHR 440X464X8.1 PCA01N
450	474	8.1	SHR 450X474X8.1 PCA01N
460	484	8.1	SHR 460X484X8.1 PCA01N
470	494	8.1	SHR 470X494X8.1 PCA01N
480	504	8.1	SHR 480X504X8.1 PCA01N
490	514	8.1	SHR 490X514X8.1 PCA01N
500	524	8.1	SHR 500X524X8.1 PCA01N
510	534	8.1	SHR 510X534X8.1 PCA01N
520	544	8.1	SHR 520X544X8.1 PCA01N
530	554	8.1	SHR 530X554X8.1 PCA01N
540	564	8.1	SHR 540X564X8.1 PCA01N
550	574	8.1	SHR 550X574X8.1 PCA01N
560	584	8.1	SHR 560X584X8.1 PCA01N
580	604	8.1	SHR 580X604X8.1 PCA01N
600	624	8.1	SHR 600X624X8.1 PCA01N
650	677.3	9.5	SHR 650X677.3X9.5 PCA01N
700	727.3	9.5	SHR 700X727.3X9.5 PCA01N
800	827.3	9.5	SHR 800X827.3X9.5 PCA01N
900	927.3	9.5	SHR 900X927.3X9.5 PCA01N
1000	1038	13.8	SHR 1000X1038X13.8 PCA01N
1200	1238	13.8	SHR 1200X1238X13.8 PCA01N
1500	1538	13.8	SHR 1500X1538X13.8 PCA01N

GTR Type Piston Rod Seal



Product Description

The GTR type piston rod seal consists of a PTFE slip ring and an O-ring with preload for bi-directional sealing.

Product Benefits

Small groove size
Extremely small starting and movement friction, can ensure smooth movement at low speeds, no crawling phenomenon
Wear-resistant, anti-extrusion, long service life
Wide range of applicable temperatures (selection of suitable O-ring material)
High resistance to chemical media (choose the right O-ring material).
Available in diameters up to 2500 mm

Scope of Application

GTR type piston rod seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Durometer	Nicknames
Nitrile rubberNBR	70 Shore A	N
FluoroelastomerFKM	75 Shore A	V
ModificationPTFE	66 Shore D	P2071

Technical Parameters

Working pressure: $\leq 40\text{MPa}$

Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (P2071N) $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (P2071V)

Working speed: $\leq 5\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	4~8	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	8~19	3.2	3.65	0.4~0.25	0.25~0.15
C	3.53	19~38	4.2	5.35	0.4~0.25	0.25~0.15
D	5.33	38~200	6.3	7.55	0.5~0.3	0.3~0.2
E	6.99	200~256	8.1	10.25	0.5~0.3	0.3~0.2
F	6.99	256~650	8.1	12	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	13.65	0.7~0.4	0.4~0.3
H	12	≥ 1000	13.8	19	0.7~0.4	0.4~0.3

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f8
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

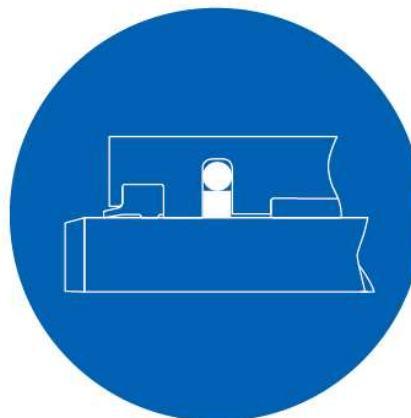
Installation Instructions

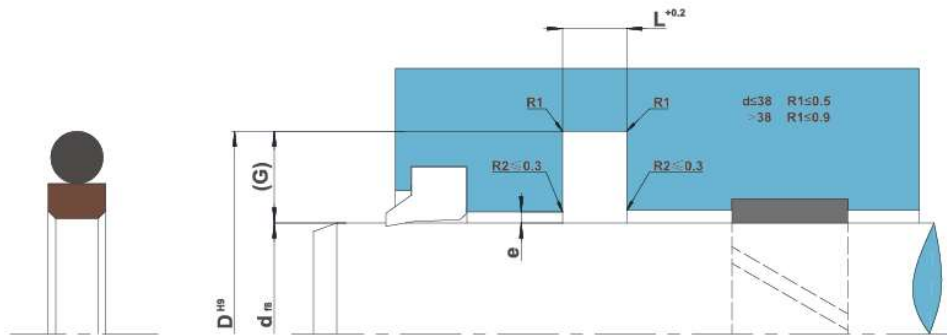
The seal can usually be easily installed into a closed groove by squeezing it into a kidney shape. If an installation tool is used, it must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

GTR dXDXL Material Designator

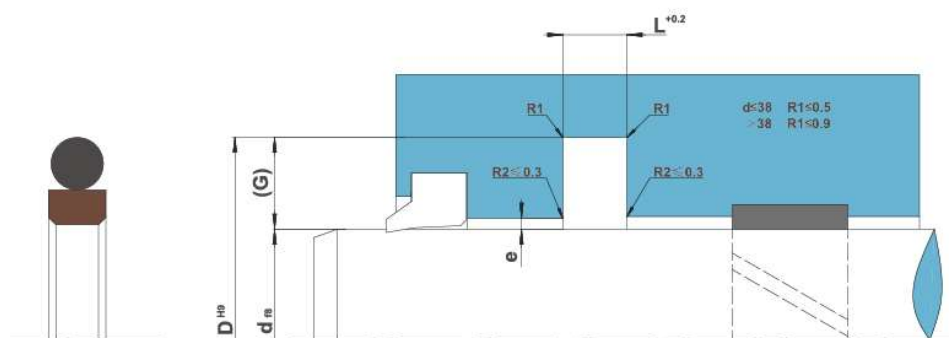
Example: GTR 63X78.1X6.3 P2071N





d	D	L	Ordering Code
4	8.9	2.2	GTR 4X8.9X2.2 P2071N
5	9.9	2.2	GTR 5X9.9X2.2 P2071N
6	10.9	2.2	GTR 6X10.9X2.2 P2071N
8	15.3	3.2	GTR 8X15.3X3.2 P2071N
10	17.3	3.2	GTR 10X17.3X3.2 P2071N
12	19.3	3.2	GTR 12X19.3X3.2 P2071N
14	21.3	3.2	GTR 14X21.3X3.2 P2071N
15	22.3	3.2	GTR 15X22.3X3.2 P2071N
16	23.3	3.2	GTR 16X23.3X3.2 P2071N
18	25.3	3.2	GTR 18X25.3X3.2 P2071N
20	30.7	4.2	GTR 20X30.7X4.2 P2071N
22	32.7	4.2	GTR 22X32.7X4.2 P2071N
25	35.7	4.2	GTR 25X35.7X4.2 P2071N
28	38.7	4.2	GTR 28X38.7X4.2 P2071N
30	40.7	4.2	GTR 30X40.7X4.2 P2071N
32	42.7	4.2	GTR 32X42.7X4.2 P2071N
35	45.7	4.2	GTR 35X45.7X4.2 P2071N
36	46.7	4.2	GTR 36X46.7X4.2 P2071N
38	53.1	6.3	GTR 38X53.1X6.3 P2071N
40	55.1	6.3	GTR 40X55.1X6.3 P2071N
42	57.1	6.3	GTR 42X57.1X6.3 P2071N
45	60.1	6.3	GTR 45X60.1X6.3 P2071N

d	D	L	Ordering Code
48	63.1	6.3	GTR 48X63.1X6.3 P2071N
50	65.1	6.3	GTR 50X65.1X6.3 P2071N
52	67.1	6.3	GTR 52X67.1X6.3 P2071N
55	70.1	6.3	GTR 55X70.1X6.3 P2071N
56	71.1	6.3	GTR 56X71.1X6.3 P2071N
60	75.1	6.3	GTR 60X75.1X6.3 P2071N
63	78.1	6.3	GTR 63X78.1X6.3 P2071N
65	80.1	6.3	GTR 65X80.1X6.3 P2071N
70	85.1	6.3	GTR 70X85.1X6.3 P2071N
75	90.1	6.3	GTR 75X90.1X6.3 P2071N
80	95.1	6.3	GTR 80X95.1X6.3 P2071N
85	100.1	6.3	GTR 85X100.1X6.3 P2071N
90	105.1	6.3	GTR 90X105.1X6.3 P2071N
95	110.1	6.3	GTR 95X110.1X6.3 P2071N
100	115.1	6.3	GTR 100X115.1X6.3 P2071N
110	125.1	6.3	GTR 110X125.1X6.3 P2071N
120	135.1	6.3	GTR 120X135.1X6.3 P2071N
125	140.1	6.3	GTR 125X140.1X6.3 P2071N
130	145.1	6.3	GTR 130X145.1X6.3 P2071N
140	155.1	6.3	GTR 140X155.1X6.3 P2071N
150	165.1	6.3	GTR 150X165.1X6.3 P2071N
160	175.1	6.3	GTR 160X175.1X6.3 P2071N



d	D	L	Ordering Code
170	185.1	6.3	GTR 170X185.1X6.3 P2071N
180	195.1	6.3	GTR 180X195.1X6.3 P2071N
190	205.1	6.3	GTR 190X205.1X6.3 P2071N
200	220.5	8.1	GTR 200X220.5X8.1 P2071N
210	230.5	8.1	GTR 210X230.5X8.1 P2071N
220	240.5	8.1	GTR 220X240.5X8.1 P2071N
230	250.5	8.1	GTR 230X250.5X8.1 P2071N
240	260.5	8.1	GTR 240X260.5X8.1 P2071N
250	270.5	8.1	GTR 250X270.5X8.1 P2071N
260	284	8.1	GTR 260X284X8.1 P2071N
270	294	8.1	GTR 270X294X8.1 P2071N
280	304	8.1	GTR 280X304X8.1 P2071N
290	314	8.1	GTR 290X314X8.1 P2071N
300	324	8.1	GTR 300X324X8.1 P2071N
310	334	8.1	GTR 310X334X8.1 P2071N
320	344	8.1	GTR 320X344X8.1 P2071N
330	354	8.1	GTR 330X354X8.1 P2071N
340	364	8.1	GTR 340X364X8.1 P2071N
350	374	8.1	GTR 350X374X8.1 P2071N
360	384	8.1	GTR 360X384X8.1 P2071N
370	394	8.1	GTR 370X394X8.1 P2071N
380	404	8.1	GTR 380X404X8.1 P2071N

d	D	L	Ordering Code
390	414	8.1	GTR 390X414X8.1 P2071N
400	424	8.1	GTR 400X424X8.1 P2071N
410	434	8.1	GTR 410X434X8.1 P2071N
420	444	8.1	GTR 420X444X8.1 P2071N
430	454	8.1	GTR 430X454X8.1 P2071N
440	464	8.1	GTR 440X464X8.1 P2071N
450	474	8.1	GTR 450X474X8.1 P2071N
460	484	8.1	GTR 460X484X8.1 P2071N
470	494	8.1	GTR 470X494X8.1 P2071N
480	504	8.1	GTR 480X504X8.1 P2071N
490	514	8.1	GTR 490X514X8.1 P2071N
500	524	8.1	GTR 500X524X8.1 P2071N
550	574	8.1	GTR 550X574X8.1 P2071N
600	624	8.1	GTR 600X624X8.1 P2071N
630	654	8.1	GTR 630X654X8.1 P2071N
650	677.3	9.5	GTR 650X677.3X9.5 P2071N
700	727.3	9.5	GTR 700X727.3X9.5 P2071N
800	827.3	9.5	GTR 800X827.3X9.5 P2071N
900	927.3	9.5	GTR 900X927.3X9.5 P2071N
1000	1038	13.8	GTR 1000X1038X13.8 P2071N
1200	1238	13.8	GTR 1200X1238X13.8 P2071N
1500	1538	13.8	GTR 1500X1538X13.8 P2071N

HPB Piston Seals



Product Description

The HPB piston seal is a double acting combination seal consisting of a polyurethane sliding ring and an O-ring as a preload element for light to medium duty hydraulic cylinders. The HPB piston seal has excellent dynamic and static sealing properties. The sliding ring and the O-ring can be made of different materials according to the working conditions to meet different fluid media and operating temperatures.

Product Benefits

Excellent wear resistance
Very good dynamic and static sealing performance
Compact structure, can be used for small piston
Easy to install, no tools required for installation

Scope of Application

HPB type piston seals are widely used in agricultural machinery, light construction machinery and traveling equipment.

Technical Parameters

Working pressure: $\leq 25\text{MPa}$
Working Temperature: $-30^{\circ}\text{C} \sim +120^{\circ}\text{C}$
Working speed: $\leq 0.5\text{m/s}$
Standard material: M6112 Slip ring: polyurethane P2112
Elastomer: NBR

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

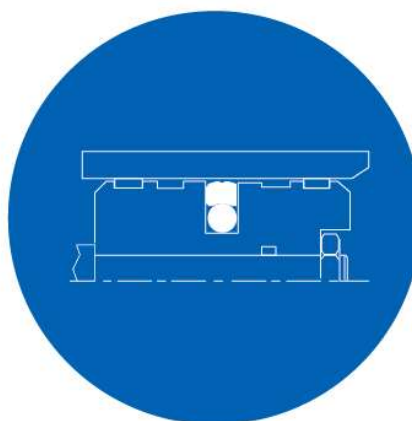
Installation Instructions

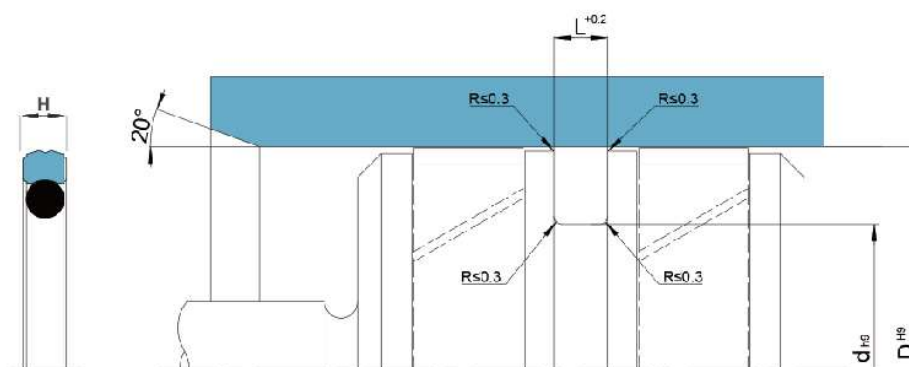
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

HPB DXdXL Material Designator

Example: HPB 100X84.5X6.3 M6112





D	d	H	L	Ordering Code
40	29	4	4.2	HPB 40X29X4.2 M6112
45	34	4	4.2	HPB 45X34X4.2 M6112
50	39	4	4.2	HPB 50X39X4.2 M6112
55	44	4	4.2	HPB 55X44X4.2 M6112
60	49	4	4.2	HPB 60X49X4.2 M6112
63	52	4	4.2	HPB 63X52X4.2 M6112
65	54	4	4.2	HPB 65X54X4.2 M6112
70	59	4	4.2	HPB 70X59X4.2 M6112
75	64	4	4.2	HPB 75X64X4.2 M6112
75	59.5	6	6.3	HPB 75X59.5X6.3 M6112
80	64.5	6	6.3	HPB 80X64.5X6.3 M6112
90	74.5	6	6.3	HPB 90X74.5X6.3 M6112
95	79.5	6	6.3	HPB 95X79.5X6.3 M6112
100	84.5	6	6.3	HPB 100X84.5X6.3 M6112
105	89.5	6	6.3	HPB 105X89.5X6.3 M6112
110	94.5	6	6.3	HPB 110X94.5X6.3 M6112
115	99.5	6	6.3	HPB 115X99.5X6.3 M6112
120	104.5	6	6.3	HPB 120X104.5X6.3 M6112
125	109.5	6	6.3	HPB 125X109.5X6.3 M6112
130	114.5	6	6.3	HPB 130X114.5X6.3 M6112
135	114	7.8	8.1	HPB 135X114X8.1 M6112
140	119	7.8	8.1	HPB 140X119X8.1 M6112
145	124	7.8	8.1	HPB 145X124X8.1 M6112
160	139	7.8	8.1	HPB 160X139X8.1 M6112
165	144	7.8	8.1	HPB 165X144X8.1 M6112
180	159	7.8	8.1	HPB 180X159X8.1 M6112
185	164	7.8	8.1	HPB 185X164X8.1 M6112
200	179	7.8	8.1	HPB 200X179X8.1 M6112
210	189	7.8	8.1	HPB 210X189X8.1 M6112

HPGA Piston Seals



Product Description

HPGA type piston seal is a double-action combination seal, consisting of one PTFE slip ring, one rubber expansion ring and two modified nylon retaining rings as a double-action combination piston seal, with extremely low coefficient of friction between dynamic and static friction, it still operates smoothly at low speeds and has no creeping phenomenon. The modified nylon retaining ring is resistant to extrusion and insensitive to pressure peaks. HPGA seals are used in a wide range of applications, especially for heavy-duty, fast-speed applications, such as excavator cylinders.

Product Benefits

Resistant to large radial clearances
Very high impact pressure resistance, excellent extrusion resistance
Extremely low starting and motion friction, no creeping phenomena
Resistant to abrasion, long service life
High contact pressure of the rubber elastomer

Scope of Application

HPGA type piston combination seal is mainly used in heavy-duty construction machinery, injection molding machines, hydraulic presses, excavators and so on.

Technical Parameters

Working pressure: $\leq 50\text{MPa}$
Working temperature: $-35 \sim +110^{\circ}\text{C}$ (M5000) $-20 \sim +130^{\circ}\text{C}$ (M500H)
Working speed: $\leq 1.5\text{m/s}$
Standard material: M5000 Slip ring: filled bronze powder PTFE
Retaining ring: modified nylon Elastomer: nitrile rubber
M500H Slip ring: filled bronze powder PTFE
Retaining ring: modified nylon Elastomer: hydrogenated nitrile rubber

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

Installation Instructions

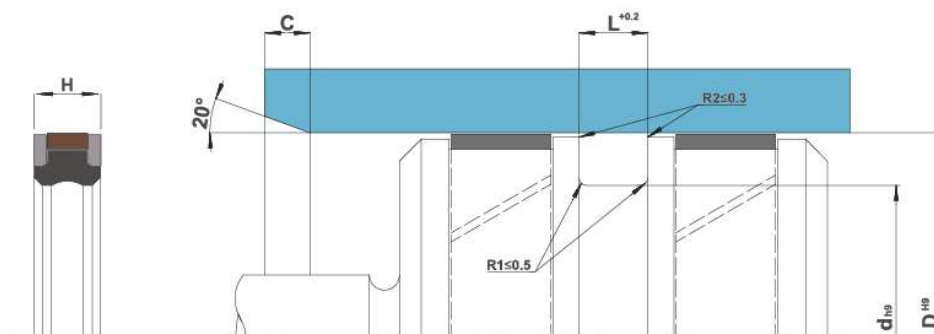
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For cooler temperatures, heat the slip ring by 60°C . Before installation, the seal must be coated with matching lubricant.

Ordering Code

HPGA DXdXL Material Designator

Example: HPGA 100X85X12.5 M500H (other materials available)





D	d	H	L	Ordering Code
50	36	8.5	9	HPGA 50X36X9 M500H
60	46	8.5	9	HPGA 60X46X9 M500H
65	50	10.5	11	HPGA 65X50X11 M500H
70	55	10.5	11	HPGA 70X55X11 M500H
75	60	10.5	11	HPGA 75X60X11 M500H
80	65	10.5	11	HPGA 80X65X11 M500H
85	70	10.5	11	HPGA 85X70X11 M500H
90	75	10.5	11	HPGA 90X75X11 M500H
95	80	10.5	11	HPGA 95X80X11 M500H
100	85	12	12.5	HPGA 100X85X12.5 M500H
105	90	12	12.5	HPGA 105X90X12.5 M500H
110	95	12	12.5	HPGA 110X95X12.5 M500H
115	100	12	12.5	HPGA 115X100X12.5 M500H
120	105	12	12.5	HPGA 120X105X12.5 M500H
125	102	15.5	16	HPGA 125X102X16 M500H
130	107	15.5	16	HPGA 130X107X16 M500H
135	112	15.5	16	HPGA 135X112X16 M500H
140	117	15.5	16	HPGA 140X117X16 M500H
145	122	15.5	16	HPGA 145X122X16 M500H
150	127	15.5	16	HPGA 150X127X16 M500H
160	137	15.5	16	HPGA 160X137X16 M500H
170	147	15.5	16	HPGA 170X147X16 M500H
180	157	15.5	16	HPGA 180X157X16 M500H
185	162	15.5	16	HPGA 185X162X16 M500H
190	167	15.5	16	HPGA 190X167X16 M500H
200	177	15.5	16	HPGA 200X177X16 M500H
210	187	15.5	16	HPGA 210X187X16 M500H
220	197	15.5	16	HPGA 220X197X16 M500H
225	202	15.5	16	HPGA 225X202X16 M500H
230	207	15.5	16	HPGA 230X207X16 M500H
240	217	15.5	16	HPGA 240X217X16 M500H
250	222	17	17.5	HPGA 250X222X17.5 M500H
260	232	17	17.5	HPGA 260X232X17.5 M500H
270	242	17	17.5	HPGA 270X242X17.5 M500H
280	252	17	17.5	HPGA 280X252X17.5 M500H
300	272	17	17.5	HPGA 300X272X17.5 M500H
320	292	17	17.5	HPGA 320X292X17.5 M500H

HPGA Piston Seals



Product Description

HPIA type piston seal is a five-piece two-way combination seal, consisting of a nitrile rubber seal, two pieces of high hardness polyester elastomer and two pieces of polyformaldehyde guide ring combination. HPIA is a double-acting piston seal with good dynamic and static sealing performance, compact structure, suitable for installation of small space of the piston, is very suitable for low and medium-pressure, the frequency of reciprocating motion is not high and there is a static pressure retention requirements of the occasion.

Product Benefits

Guiding and sealing functions integrated in a small space
Sealing ring is not pushed into the radial sealing gap
Special design so that the seal does not twist in the groove
Suitable for rapid pressure changes
Very good dynamic and static sealing capability

Scope of Application

HPIA type piston combination seals are mainly used in presses, drive cylinders, support cylinders, etc. in industrial and traveling equipment.

Technical Parameters

Working pressure: $\leq 30\text{MPa}$
Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
Working speed: $\leq 0.5\text{m/s}$
Standard material: MJ001
Elastomer: Nitrile rubber
Retaining ring: polyester elastomer
Guide ring: polyformaldehyde

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\text{ }\mu\text{m}$	$\leq 3.2\text{ }\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\text{ }\mu\text{m}$	$\leq 6.3\text{ }\mu\text{m}$
Groove Side		$\leq 3.2\text{ }\mu\text{m}$	$\leq 12.5\text{ }\mu\text{m}$

Surface Finish	D	d	d1	d2
30~250	H9	h9	h9	h11

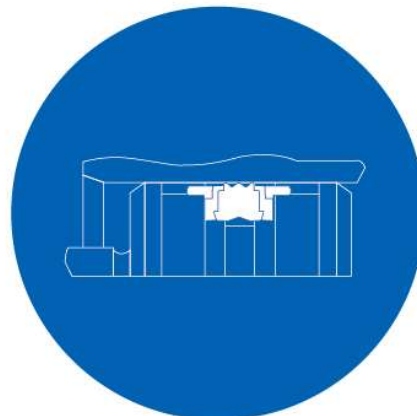
Installation Instructions

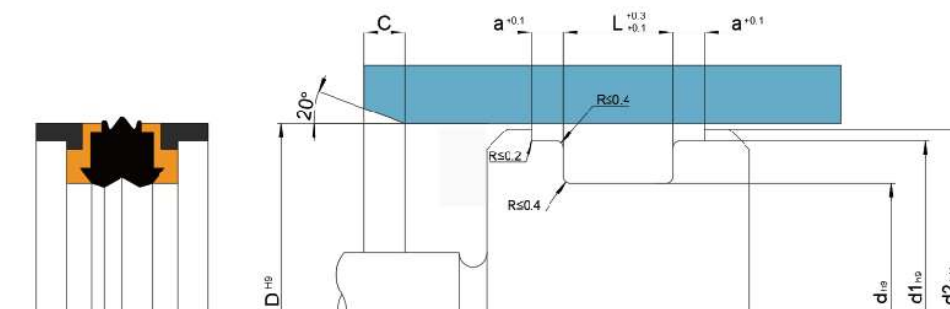
When installing, do not pull the seal over the sharp edges. When installing the seal, pay attention to the natural order of the individual elements: first install one of the angled opening guide rings. Take care that the openings of the guide ring and the retaining ring are not in the same position. Before mounting, the seal must be coated with matching lubricant.

Ordering Code

HPIA DXdXLXa Material Designator

Example: HPIA 100X75X22.4X6.35 MJ001





D	d	L	d1	d2	a	Ordering Code
30	21	13.5	27	29	2.1	HPIA 30X21X13.5X2.1 MJ001
32	22	15.5	28	31	2.6	HPIA 32X22X15.5X2.6 MJ001
40	30	16.4	35.4	38.5	6.35	HPIA 40X30X16.4X6.35 MJ001
50	34	18.4	45.4	48.5	6.35	HPIA 50X34X18.4X6.35 MJ001
55	39	18.4	50.36	53.5	6.35	HPIA 55X39X18.4X6.35 MJ001
60	44	18.4	55.4	58.5	6.35	HPIA 60X44X18.4X6.35 MJ001
63	47	18.4	58.4	61.5	6.35	HPIA 63X47X18.4X6.35 MJ001
70	50	22.4	64.2	68.3	6.35	HPIA 70X50X22.4X6.35 MJ001
75	55	22.4	69.2	73.3	6.35	HPIA 75X55X22.4X6.35 MJ001
80	60	22.4	74.15	78.3	6.35	HPIA 80X60X22.4X6.35 MJ001
85	65	22.4	79.3	83.3	6.35	HPIA 85X65X22.4X6.35 MJ001
90	70	22.4	84.15	88.3	6.35	HPIA 90X70X22.4X6.35 MJ001
100	75	22.4	93.15	98	6.35	HPIA 100X75X22.4X6.35 MJ001
105	80	22.4	98.1	103	6.35	HPIA 105X80X22.4X6.35 MJ001
110	85	22.4	103.1	108	6.35	HPIA 110X85X22.4X6.35 MJ001
115	90	22.4	108.1	113	6.35	HPIA 115X90X22.4X6.35 MJ001
120	95	22.4	113.1	118	6.35	HPIA 120X95X22.4X6.35 MJ001
125	100	25.4	118.1	123	6.35	HPIA 125X100X25.4X6.35 MJ001
130	105	25.4	122.6	127.5	9.5	HPIA 130X105X25.4X9.5 MJ001
140	115	25.4	133	138	6.35	HPIA 140X115X25.4X6.35 MJ001
140	115	25.4	132.6	137.5	9.5	HPIA 140X115X25.4X9.5 MJ001
145	120	25.4	137.6	142.5	9.5	HPIA 145X120X25.4X9.5 MJ001
150	125	25.4	142.6	147.5	9.5	HPIA 150X125X25.4X9.5 MJ001
160	135	25.4	152.6	157.5	9.5	HPIA 160X135X25.4X9.5 MJ001
165	140	25.4	157.6	162.5	9.5	HPIA 165X140X25.4X9.5 MJ001
170	145	25.4	161.7	167.1	12.7	HPIA 170X145X25.4X12.7 MJ001
180	155	25.4	171.7	177.1	12.7	HPIA 180X155X25.4X12.7 MJ001
190	165	25.4	181.7	187	12.7	HPIA 190X165X25.4X12.7 MJ001
200	175	25.4	191.6	197	12.7	HPIA 200X175X25.4X12.7 MJ001
210	185	25.4	201.6	207	12.7	HPIA 210X185X25.4X12.7 MJ001
220	195	25.4	211.6	217	12.7	HPIA 220X195X25.4X12.7 MJ001
230	205	25.4	221.6	227	12.7	HPIA 230X205X25.4X12.7 MJ001
240	215	25.4	231.6	237	12.7	HPIA 240X215X25.4X12.7 MJ001
250	225	25.4	241.6	247	12.7	HPIA 250X225X25.4X12.7 MJ001

HPK Piston Seals



Product Description

HPK type piston seal is a combination seal, consists of an open modified nylon slip ring and a rubber rectangular ring. HPK is a double acting combination piston seal, modified nylon slip ring is resistant to extrusion, wear, insensitive to pressure peaks, and can be passed through small holes (no burrs on the edges of the small holes). It is especially suitable for heavy load, high pressure, and applications that do not have strict requirements for pressure retention.

Product Benefits

Small groove size resistant to shock loads
Extremely small starting and movement friction, smooth movement at low speeds, no crawling phenomenon.
Good resistance to extrusion under high pressure and large gaps.
Wear-resistant, long service life
No tools required for installation due to openings in the slip ring.

Scope of Application

HPK type piston combination seals are mainly used in heavy-duty hydraulic equipment with working pressures up to 80 MPa and in some cases higher.

Technical Parameters

Working pressure: $\leq 80\text{MPa}$
Working Temperature: $-30^{\circ}\text{C} \sim +110^{\circ}\text{C}$
Working speed: $\leq 1\text{m/s}$
Standard material: M4000
Slip ring: modified nylon
Rectangular ring: Nitrile rubber

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

Installation Instructions

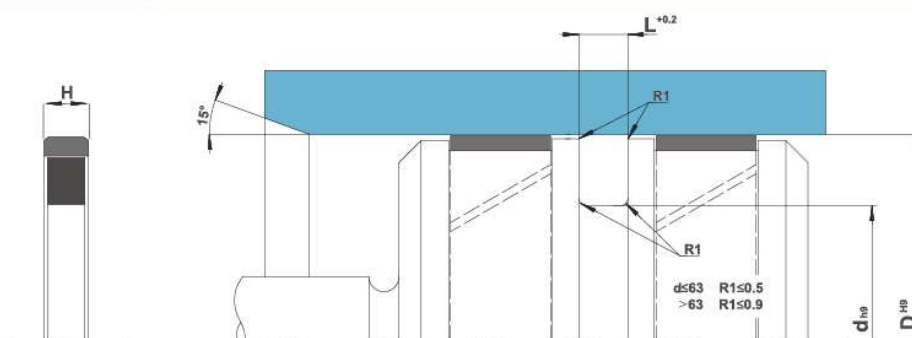
When installing, do not pull the seal over sharp edges. If an installation tool is used, the tool must be of soft material and free of sharp edges. Before installation, the seal must be coated with matching lubricant.

Ordering Code

HPK DXdXL Material Designator

Example: HPK 100X84.5X6.3 M4000





D	d	H	L	Ordering Code
32	21	3.9	4.2	HPK 32X21X4.2 M4000
40	29	3.9	4.2	HPK 40X29X4.2 M4000
50	39	3.9	4.2	HPK 50X39X4.2 M4000
55	44	3.9	4.2	HPK 55X44X4.2 M4000
60	49	3.9	4.2	HPK 60X49X4.2 M4000
63	47.5	6	6.3	HPK 63X47.5X6.3 M4000
63	44.7	6.7	7	HPK 63X44.7X7 M4000
70	59	3.9	4.2	HPK 70X59X4.2 M4000
75	54	7.8	8.1	HPK 75X54X8.1 M4000
80	59	7.8	8.1	HPK 80X59X8.1 M4000
80	64.5	6	6.3	HPK 80X64.5X6.3 M4000
85	64	7.8	8.1	HPK 85X64X8.1 M4000
90	69	7.8	8.1	HPK 90X69X8.1 M4000
90	74.5	6	6.3	HPK 90X74.5X6.3 M4000
95	74	7.8	8.1	HPK 95X74X8.1 M4000
100	84.5	6	6.3	HPK 100X84.5X6.3 M4000
105	84	7.8	8.1	HPK 105X84X8.1 M4000
110	94.5	6	6.3	HPK 110X94.5X6.3 M4000
115	94	7.8	8.1	HPK 115X94X8.1 M4000
120	99	7.8	8.1	HPK 120X99X8.1 M4000
125	104	7.8	8.1	HPK 125X104X8.1 M4000
125	109.5	6	6.3	HPK 125X109.5X6.3 M4000
130	109	7.8	8.1	HPK 130X109X8.1 M4000
135	114	7.8	8.1	HPK 135X114X8.1 M4000
140	119	7.8	8.1	HPK 140X119X8.1 M4000
145	124	7.8	8.1	HPK 145X124X8.1 M4000
150	129	7.8	8.1	HPK 150X129X8.1 M4000
160	139	7.8	8.1	HPK 160X139X8.1 M4000
165	144	7.8	8.1	HPK 165X144X8.1 M4000
170	149	7.8	8.1	HPK 170X149X8.1 M4000
175	154	7.8	8.1	HPK 175X154X8.1 M4000
180	159	7.8	8.1	HPK 180X159X8.1 M4000
190	169	7.8	8.1	HPK 190X169X8.1 M4000
200	179	7.8	8.1	HPK 200X179X8.1 M4000
210	189	7.8	8.1	HPK 210X189X8.1 M4000
220	199	7.8	8.1	HPK 220X199X8.1 M4000
230	209	7.8	8.1	HPK 230X209X8.1 M4000
240	225	7.8	8.1	HPK 240X225X8.1 M4000
250	229	7.8	8.1	HPK 250X229X8.1 M4000
270	249	7.8	8.1	HPK 270X249X8.1 M4000
280	255.5	7.8	8.1	HPK 280X255.5X8.1 M4000
300	272	9.1	9.5	HPK 300X272X9.5 M4000
320	292	9.1	9.5	HPK 320X292X9.5 M4000

HPS Piston Seals



Product Description

HPS type piston seal is a single acting polyurethane piston seal. The lip seal is not sensitive to the straightness or ellipticity of the cylinder, so it is especially suitable for occasions where the cylinder machining precision is not high. HPS piston seal is made of high grade polyurethane material, which is resistant to abrasion and pressure impact, and it is especially suitable for cylinders with low to medium pressures and the requirement of pressure retention. Since it is a single-acting seal, it is common to install two of them back to back on the piston for double-acting cylinders or to use it in tandem with HPK or GTP. For double acting cylinders, two pieces are usually installed back to back on the piston or used in series with HPK or GTP.

Product Benefits

- Insensitivity to shock loads and pressure spikes
- Low permanent deformation in compression
- Very good static and dynamic sealing properties
- Excellent wear and extrusion resistance
- Insensitivity to cylinder machining accuracy
- Simple grooves for easy installation

Scope of Application

HPS type piston seals are widely used as piston seals in heavy-duty traveling machines and hydrostatic presses.

Technical Parameters

Working pressure: $\leq 35\text{MPa}$
 Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
 Working speed: $\leq 0.5\text{m/s}$
 Standard material: polyurethane P2001

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

Installation Instructions

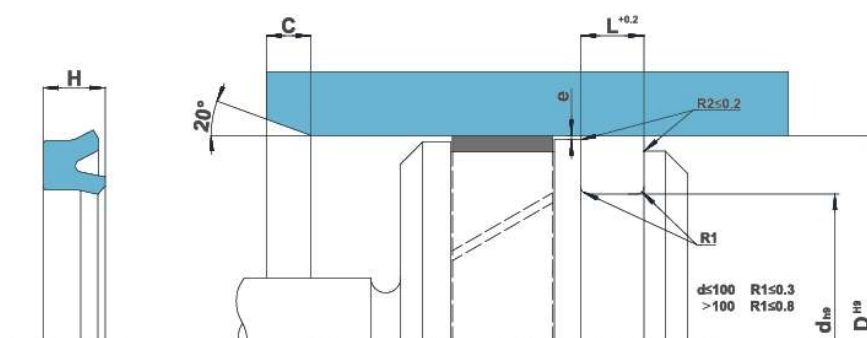
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, use a If manual installation is difficult, an installation tool may be used, but the tool must be made of soft material and have no sharp edges. Before installation, the seal must be Apply a compatible lubricant to the seal before installation.

Ordering Code

HPS DXdXL Material Designator

Example: HPS 100X85X10 P2001 (other materials available)





Note: for clearance e please refer to section “design of sealing grooves”.

D	d	L	Ordering Code
32	24	6.3	HPS 32X24X6.3 P2001
40	32	6.3	HPS 40X32X6.3 P2001
40	30	7	HPS 40X30X7 P2001
45	35	7	HPS 45X35X7 P2001
50	40	7	HPS 50X40X7 P2001
50	42	6.3	HPS 50X42X6.3 P2001
55	45	7	HPS 55X45X7 P2001
56	45	8	HPS 56X45X8 P2001
60	50	7	HPS 60X50X7 P2001
63	53	7	HPS 63X53X7 P2001
63	53	8	HPS 63X53X8 P2001
65	55	8	HPS 65X55X8 P2001
70	60	7	HPS 70X60X7 P2001
75	65	7	HPS 75X65X7 P2001
80	70	7	HPS 80X70X7 P2001
80	65	12.5	HPS 80X65X12.5 P2001
90	75	10	HPS 90X75X10 P2001
90	75	12.5	HPS 90X75X12.5 P2001
95	80	10	HPS 95X80X10 P2001
100	85	10	HPS 100X85X10 P2001
100	85	12.5	HPS 100X85X12.5 P2001

D	d	L	Ordering Code
110	95	10	HPS 110X95X10 P2001
115	100	10	HPS 115X100X10 P2001
120	105	12.5	HPS 120X105X12.5 P2001
125	105	16	HPS 125X105X16 P2001
130	115	10	HPS 130X115X10 P2001
140	125	10	HPS 140X125X10 P2001
150	135	10	HPS 150X135X10 P2001
160	145	10	HPS 160X145X10 P2001
160	140	16	HPS 160X140X16 P2001
170	150	13	HPS 170X150X13 P2001
180	150	20	HPS 180X150X20 P2001
190	175	10	HPS 190X175X10 P2001
200	175	20	HPS 200X175X20 P2001
210	190	13	HPS 210X190X13 P2001
220	200	16.5	HPS 220X200X16.5 P2001
230	210	16	HPS 230X210X16 P2001
240	220	13	HPS 240X220X13 P2001
250	230	16.5	HPS 250X230X16.5 P2001
280	255	20	HPS 280X255X20 P2001
320	290	22	HPS 320X290X22 P2001
360	330	23	HPS 360X330X23 P2001

HPU Piston Seals



Product Description

The HPU type piston seal is a double-acting combination piston seal consisting of a polyurethane sealing slip ring, a rubber elastomer and two retaining rings for bi-directional sealing of pistons in heavy-duty hydraulic cylinders.

Product Benefits

- Resistant to large radial clearances
- Excellent dynamic and static sealing properties
- Resistant to very high impact pressures, excellent extrusion resistance
- Resistant to abrasion, long service life
- High contact pressure of the rubber elastomer

Scope of Application

HPU type piston combination seal is mainly used in hydraulic bracket, tunneling equipment, heavy-duty construction machinery and so on.

Technical Parameters

Working pressure: $\leq 50\text{MPa}$
 Working Temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
 Working speed: $\leq 0.5\text{m/s}$
 Standard material: M8002
 Slip ring: polyurethane
 Retaining ring: polyformaldehyde
 Elastomer: NBR

Design Statement

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\text{ }\mu\text{m}$	$\leq 3.2\text{ }\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\text{ }\mu\text{m}$	$\leq 6.3\text{ }\mu\text{m}$
Groove Side		$\leq 3.2\text{ }\mu\text{m}$	$\leq 12.5\text{ }\mu\text{m}$

Surface Finish

Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

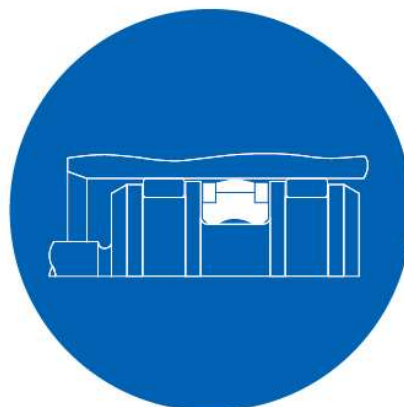
Installation Instructions

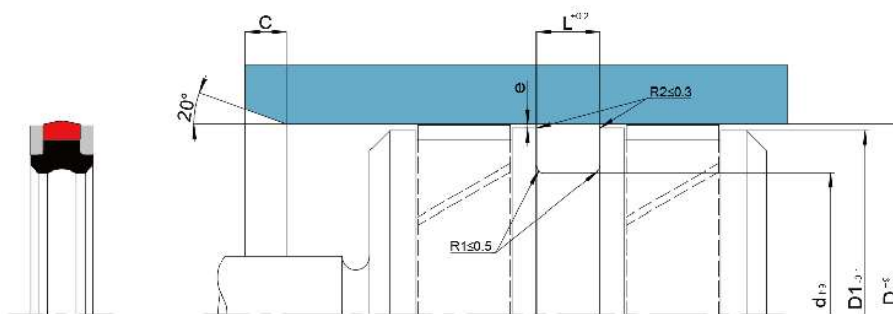
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

HPU DXdXL Material Designator

Example: HPU 120X105X16 M8002





D	d	L	D1	Ordering Code
80	62	22.5	79.3	HPU 80X62X22.5 M8002
90	75	21	89.3	HPU 90X75X21 M8002
100	85	22.5	99.3	HPU 100X85X22.5 M8002
110	95	16	109.2	HPU 110X95X16 M8002
120	105	16	119.2	HPU 120X105X16 M8002
125	110	16	124.2	HPU 125X110X16 M8002
130	115	16	129.2	HPU 130X115X16 M8002
140	123	16	139.2	HPU 140X123X16 M8002
150	133	20	149.2	HPU 150X133X20 M8002
160	145	16	159.2	HPUA 160X145X16 M8002
165	145	20	164.2	HPU 165X145X20 M8002
170	150	20	169.2	HPU 170X150X20 M8002
180	163	20	179.2	HPUA 180X163X20 M8002
190	170	16	189.2	HPU 190X170X16 M8002
200	180	16	199.2	HPU 200X180X16 M8002
210	190	16	209.2	HPU 210X190X16 M8002
220	200	20	219.2	HPU 220X200X20 M8002
230	205	25	229.2	HPU 230X205X25 M8002
240	220	20	239.2	HPU 240X220X20 M8002
250	225	25	249.2	HPU 250X225X25 M8002
260	235	25	259.2	HPU 260X235X25 M8002
270	245	24	269.2	HPU 270X245X24 M8002
280	255	25	279.2	HPU 280X255X25 M8002
290	265	27	289.2	HPU 290X265X27 M8002
300	275	25	299.2	HPU 300X275X25 M8002
305	280	25	304.2	HPU 305X280X25 M8002
310	285	25	309.2	HPU 310X285X25 M8002
320	290	30	319.2	HPU 320X290X30 M8002
330	300	35	329.2	HPU 330X300X35 M8002
345	315	30	344.2	HPU 345X315X30 M8002
350	320	30	349.2	HPU 350X320X30 M8002
360	330	31.5	359.2	HPU 360X330X31.5 M8002
370	340	32	369.2	HPU 370X340X32 M8002
380	350	32	379.2	HPU 380X350X32 M8002
400	370	32	399.2	HPU 400X370X32 M8002
420	390	32	419.2	HPU 420X390X32 M8002
450	410	32	449.2	HPU 450X410X32 M8002
480	440	32	479.2	HPU 480X440X32 M8002
500	470	32	499.2	HPU 500X470X32 M8002

GTP Piston Seals



Product Description

The GTP type piston seal consists of a PTFE slip ring and an O-ring with a preloaded, and is used for bi-directional piston sealing of hydraulic cylinders.

Product Benefits

Small groove size
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant, anti-extrusion, long service life
Wide range of applicable temperatures (choose the right O-ring material)
High resistance to chemical media (choose the right O-ring material).
Available in diameters up to 2500 mm

Scope of Application

GTP type piston combination seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Durometer	Nicknames
Nitrile rubberNBR	70 Shore A	N
FluoroelastomerFKM	75 Shore A	V
ModificationPTFE	66 Shore D	P2071

Technical Parameters

Working pressure: ≤40MPa
Working temperature: -30℃ ~ +100℃(P2071N)
-20℃ ~ +200℃(P2071V)
Working speed: ≤5m/s

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	8~15	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	15~40	3.2	3.75	0.4~0.25	0.25~0.15
C	3.53	40~80	4.2	5.50	0.4~0.25	0.25~0.15
D	5.33	80~133	6.3	7.7	0.5~0.3	0.3~0.2
E	6.99	133~330	8.1	10.50	0.5~0.3	0.3~0.2
F	6.99	330~670	8.1	12.25	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	14.00	0.7~0.4	0.4~0.3
H	12	≥1000	19.00	19.00	0.7~0.4	0.4~0.3

Surface Finish		Ra	Rz
Sliding Surface	ΦD	≤ 0.4μm	≤ 3.2μm
Bottom of Trench	Φd	≤ 1.6μm	≤ 6.3μm
Groove Side		≤ 3.2μm	≤ 12.5 μm

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

Installation Instructions

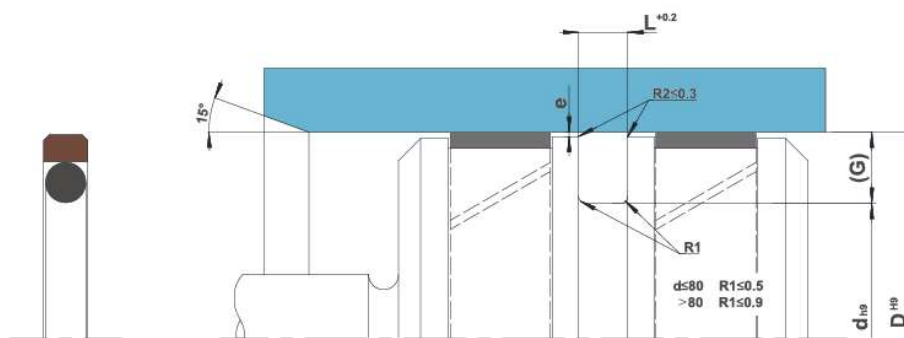
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For lower temperatures, the slip ring can be heated up to 60℃. Before installation, the seal must be coated with matching lubricant.

Ordering Code

GTP DXdXL Material Designator

Example: GTP 63X52X4.2 P2071N





D	d	L	Ordering Code
185	164	8.1	GTP 185X164X8.1 P2071N
190	169	8.1	GTP 190X169X8.1 P2071N
195	174	8.1	GTP 195X174X8.1 P2071N
200	179	8.1	GTP 200X179X8.1 P2071N
210	189	8.1	GTP 210X189X8.1 P2071N
220	199	8.1	GTP 220X199X8.1 P2071N
225	204	8.1	GTP 225X204X8.1 P2071N
230	209	8.1	GTP 230X209X8.1 P2071N
240	219	8.1	GTP 240X219X8.1 P2071N
250	229	8.1	GTP 250X229X8.1 P2071N
260	239	8.1	GTP 260X239X8.1 P2071N
270	249	8.1	GTP 270X249X8.1 P2071N
280	259	8.1	GTP 280X259X8.1 P2071N
290	269	8.1	GTP 290X269X8.1 P2071N
300	279	8.1	GTP 300X279X8.1 P2071N
310	289	8.1	GTP 310X289X8.1 P2071N
320	299	8.1	GTP 320X299X8.1 P2071N
330	305.5	8.1	GTP 330X305.5X8.1 P2071N
340	315.5	8.1	GTP 340X315.5X8.1 P2071N
350	325.5	8.1	GTP 350X325.5X8.1 P2071N
360	335.5	8.1	GTP 360X335.5X8.1 P2071N
370	345.5	8.1	GTP 370X345.5X8.1 P2071N
380	355.5	8.1	GTP 380X355.5X8.1 P2071N
390	365.5	8.1	GTP 390X365.5X8.1 P2071N

D	d	L	Ordering Code
400	375.5	8.1	GTP 400X375.5X8.1 P2071N
410	385.5	8.1	GTP 410X385.5X8.1 P2071N
420	395.5	8.1	GTP 420X395.5X8.1 P2071N
430	405.5	8.1	GTP 430X405.5X8.1 P2071N
440	415.5	8.1	GTP 440X415.5X8.1 P2071N
450	425.5	8.1	GTP 450X425.5X8.1 P2071N
460	435.5	8.1	GTP 460X435.5X8.1 P2071N
470	445.5	8.1	GTP 470X445.5X8.1 P2071N
480	455.5	8.1	GTP 480X455.5X8.1 P2071N
490	465.5	8.1	GTP 490X465.5X8.1 P2071N
500	475.5	8.1	GTP 500X475.5X8.1 P2071N
520	495.5	8.1	GTP 520X495.5X8.1 P2071N
540	515.5	8.1	GTP 540X515.5X8.1 P2071N
600	575.5	8.1	GTP 600X575.5X8.1 P2071N
700	672	9.5	GTP 700X672X9.5 P2071N
740	712	9.5	GTP 740X712X9.5 P2071N
800	772	9.5	GTP 800X772X9.5 P2071N
900	872	9.5	GTP 900X872X9.5 P2071N
1000	962	13.8	GTP 1000X962X13.8 P2071N
1200	1172	13.8	GTP 1200X1172X13.8 P2071N
1400	1362	13.8	GTP 1400X1362X13.8 P2071N
1500	1462	13.8	GTP 1500X1462X13.8 P2071N
2000	1962	13.8	GTP 2000X1962X13.8 P2071N

GHP Piston Seals



Product Description

The GHP piston seal consists of a PTFE slip ring and an O-ring, and is a two-way combination seal. The GHP piston seal has low friction operating characteristics, and is suitable for poor lubrication or high speed conditions. By choosing different O-ring materials, GHP can be used in a wide range of applications, such as corrosive media and high and low temperature environments.

Product Benefits

- Compact construction
- Crush resistant, insensitive to peak pressures
- Extremely low starting and motion friction, no crawling at low speeds
- Wear-resistant, extrusion-resistant, long service life
- Wide temperature range (selection of suitable O-ring material)
- High resistance to chemical media (selection of suitable O-ring material)
- Available in diameters up to 2500 mm

Scope of Application

GHP type piston seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Durometer	Nicknames
Nitrile rubber NBR	70 Shore A	N
Fluoroelastomer FKM	75 Shore A	V
Modification PTFE	65 Shore D	PCA01

Technical Parameters

Working pressure: $\leq 40\text{MPa}$
 Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (PCA01N) $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (PCA01V)
 Working speed: $\leq 15\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	8~15	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	15~40	3.2	3.75	0.4~0.25	0.25~0.15
C	3.53	40~80	4.2	5.50	0.4~0.25	0.25~0.15
D	5.33	80~133	6.3	7.75	0.5~0.3	0.3~0.2
E	6.99	133~330	8.1	10.50	0.5~0.3	0.3~0.2
F	6.99	330~670	8.1	12.25	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	14	0.7~0.4	0.4~0.3
H	12	≥ 1000	13.8	13.8	0.7~0.4	0.4~0.3

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H 9
Bottom of Trench	Φd	h 9
Groove Side	L	+0.2

Installation Instructions

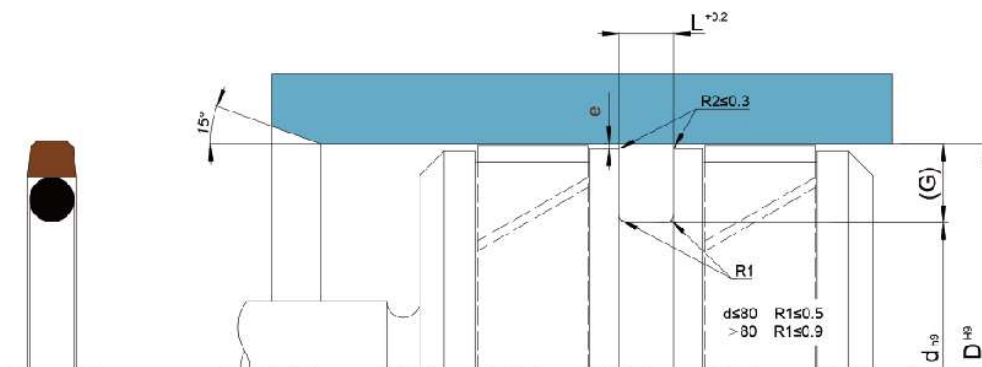
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For lower temperatures, the slip ring can be heated up to 60°C . Before installation, the seal must be coated with matching lubricant.

Ordering Code

GHP DXdXL Material Designator

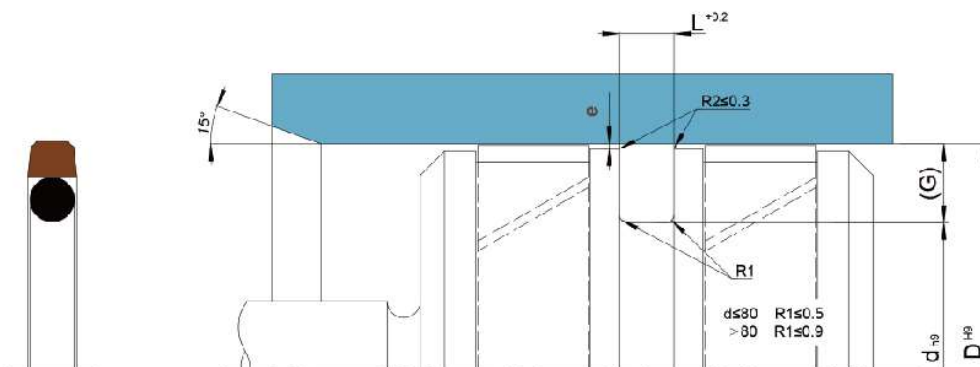
Example: GHP 63X52X4.2 PCA01N





D	d	L	Ordering Code
8	3.1	2.2	GHP 8X3.1X2.2 PCA01N
10	5.1	2.2	GHP 10X5.1X2.2 PCA01N
12	7.1	2.2	GHP 12X7.1X2.2 PCA01N
15	7.5	3.2	GHP 15X7.5X3.2 PCA01N
16	8.5	3.2	GHP 16X8.5X3.2 PCA01N
18	10.5	3.2	GHP 18X10.5X3.2 PCA01N
20	12.5	3.2	GHP 20X12.5X3.2 PCA01N
22	14.5	3.2	GHP 22X14.5X3.2 PCA01N
25	17.5	3.2	GHP 25X17.5X3.2 PCA01N
28	20.5	3.2	GHP 28X20.5X3.2 PCA01N
30	22.5	3.2	GHP 30X22.5X3.2 PCA01N
32	24.5	3.2	GHP 32X24.5X3.2 PCA01N
35	27.5	3.2	GHP 35X27.5X3.2 PCA01N
38	30.5	3.2	GHP 38X30.5X3.2 PCA01N
40	29	4.2	GHP 40X29X4.2 PCA01N
42	31	4.2	GHP 42X31X4.2 PCA01N
45	34	4.2	GHP 45X34X4.2 PCA01N
48	37	4.2	GHP 48X37X4.2 PCA01N
50	39	4.2	GHP 50X39X4.2 PCA01N
52	41	4.2	GHP 52X41X4.2 PCA01N
55	44	4.2	GHP 55X44X4.2 PCA01N
60	49	4.2	GHP 60X49X4.2 PCA01N
63	52	4.2	GHP 63X52X4.2 PCA01N

D	d	L	Ordering Code
65	54	4.2	GHP 65X54X4.2 PCA01N
70	59	4.2	GHP 70X59X4.2 PCA01N
75	64.5	4.2	GHP 75X64.5X4.2 PCA01N
80	64.5	6.3	GHP 80X64.5X6.3 PCA01N
85	69.5	6.3	GHP 85X69.5X6.3 PCA01N
90	74.5	6.3	GHP 90X74.5X6.3 PCA01N
95	79.5	6.3	GHP 95X79.5X6.3 PCA01N
100	84.5	6.3	GHP 100X84.5X6.3 PCA01N
105	89.5	6.3	GHP 105X89.5X6.3 PCA01N
110	94.5	6.3	GHP 110X94.5X6.3 PCA01N
115	99.5	6.3	GHP 115X99.5X6.3 PCA01N
120	104.5	6.3	GHP 120X104.5X6.3 PCA01N
125	109.5	6.3	GHP 125X109.5X6.3 PCA01N
130	114.5	6.3	GHP 130X114.5X6.3 PCA01N
135	114	8.1	GHP 135X114X8.1 PCA01N
140	119	8.1	GHP 140X119X8.1 PCA01N
145	124	8.1	GHP 145X124X8.1 PCA01N
150	129	8.1	GHP 150X129X8.1 PCA01N
155	134	8.1	GHP 155X134X8.1 PCA01N
160	139	8.1	GHP 160X139X8.1 PCA01N
165	144	8.1	GHP 165X144X8.1 PCA01N
170	149	8.1	GHP 170X149X8.1 PCA01N
175	154	8.1	GHP 175X154X8.1 PCA01N



D	d	L	Ordering Code
180	159	8.1	GHP 180X159X8.1 PCA01N
185	164	8.1	GHP 185X164X8.1 PCA01N
190	169	8.1	GHP 190X169X8.1 PCA01N
195	174	8.1	GHP 195X174X8.1 PCA01N
200	179	8.1	GHP 200X179X8.1 PCA01N
210	189	8.1	GHP 210X189X8.1 PCA01N
220	199	8.1	GHP 220X199X8.1 PCA01N
225	204	8.1	GHP 225X204X8.1 PCA01N
230	209	8.1	GHP 230X209X8.1 PCA01N
240	219	8.1	GHP 240X219X8.1 PCA01N
250	229	8.1	GHP 250X229X8.1 PCA01N
260	239	8.1	GHP 260X239X8.1 PCA01N
270	249	8.1	GHP 270X249X8.1 PCA01N
280	259	8.1	GHP 280X259X8.1 PCA01N
290	269	8.1	GHP 290X269X8.1 PCA01N
300	279	8.1	GHP 300X279X8.1 PCA01N
310	289	8.1	GHP 310X289X8.1 PCA01N
320	299	8.1	GHP 320X299X8.1 PCA01N
330	305.5	8.1	GHP 330X305.5X8.1 PCA01N
340	315.5	8.1	GHP 340X315.5X8.1 PCA01N
350	325.5	8.1	GHP 350X325.5X8.1 PCA01N
360	335.5	8.1	GHP 360X335.5X8.1 PCA01N
370	345.5	8.1	GHP 370X345.5X8.1 PCA01N

D	d	L	Ordering Code
380	355.5	8.1	GHP 380X355.5X8.1 PCA01N
390	365.5	8.1	GHP 390X365.5X8.1 PCA01N
400	375.5	8.1	GHP 400X375.5X8.1 PCA01N
410	385.5	8.1	GHP 410X385.5X8.1 PCA01N
420	395.5	8.1	GHP 420X395.5X8.1 PCA01N
430	405.5	8.1	GHP 430X405.5X8.1 PCA01N
440	415.5	8.1	GHP 440X415.5X8.1 PCA01N
450	425.5	8.1	GHP 450X425.5X8.1 PCA01N
460	435.5	8.1	GHP 460X435.5X8.1 PCA01N
470	445.5	8.1	GHP 470X445.5X8.1 PCA01N
480	455.5	8.1	GHP 480X455.5X8.1 PCA01N
490	465.5	8.1	GHP 490X465.5X8.1 PCA01N
500	475.5	8.1	GHP 500X475.5X8.1 PCA01N
540	515.5	8.1	GHP 540X515.5X8.1 PCA01N
600	575.5	8.1	GHP 600X575.5X8.1 PCA01N
660	635.5	8.1	GHP 660X635.5X8.1 PCA01N
700	672	9.5	GHP 700X672X9.5 PCA01N
800	772	9.5	GHP 800X772X9.5 PCA01N
900	872	9.5	GHP 900X872X9.5 PCA01N
1000	962	13.8	GHP 1000X962X13.8 PCA01N
1200	1172	13.8	GHP 1200X1172X13.8 PCA01N
1500	1462	13.8	GHP 1500X1462X13.8 PCA01N
2000	1962	13.8	GHP 2000X1962X13.8 PCA01N

STP Piston Seals



Product Description

The STP type piston seal consists of a PTFE slip ring and an O-ring with preload, one-way action, and two STP type seals are required for double-acting pistons.

Product Benefits

Small groove size
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant and anti-extrusion, long service life
Special shape of sealing structure, with good oil film oil return characteristics
Wide range of applicable temperatures (select the appropriate O-ring material)
Strong resistance to chemical media (choose the right O-ring material)
Available in diameters up to 2500 mm

Scope of Application

STP type piston combination seals are widely used in control cylinders, servo systems, machine tool cylinders, fast response cylinders and construction machinery.

Material Selection

Makings	Durometer	Nicknames
Nitrile rubberNBR	70 Shore A	N
FluoroelastomerFKM	75 Shore A	V
ModificationPTFE	66 Shore D	P2071

Technical Parameters

Working pressure: $\leq 40\text{MPa}$
Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (P2071N)
 $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (P2071V)
Working speed: $\leq 5\text{m/s}$

Design Statement

cross-sectional	o-ring section	rod diameter range	slot width	trough depth	maximum clearance	maximum clearance
	mm	d(mm)	L(mm)	G(mm)	0~20MPa	20~40MPa
A	1.78	8~17	2.2	2.45	0.3~0.2	0.2~0.1
B	2.62	17~27	3.2	3.65	0.4~0.25	0.25~0.15
C	3.53	27~60	4.2	5.35	0.4~0.25	0.25~0.15
D	5.33	60~200	6.3	7.55	0.5~0.3	0.3~0.2
E	6.99	200~256	8.1	10.25	0.5~0.3	0.3~0.2
F	6.99	256~670	8.1	12.00	0.6~0.35	0.35~0.25
G	8.4	650~1000	9.5	13.65	0.7~0.4	0.4~0.3
H	12	≥ 1000	13.8	19.00	0.7~0.4	0.4~0.3

Surface Finish

		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish

Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

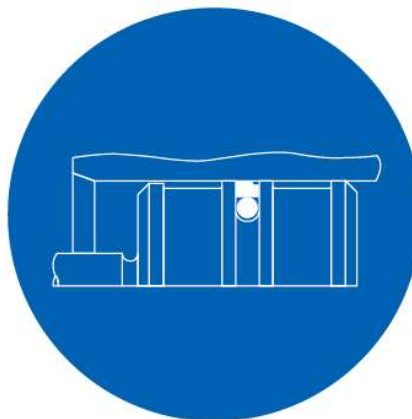
Installation Instructions

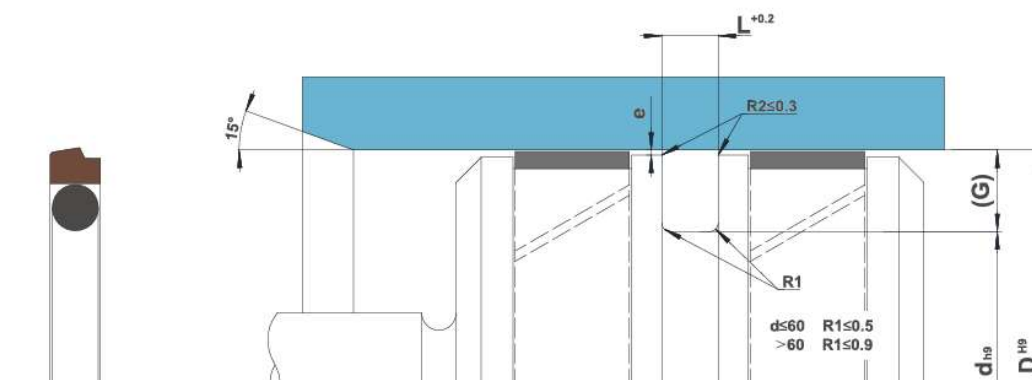
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For cooler temperatures, heat the slip ring by 60°C . Before installation, the seal must be coated with matching lubricant.

Ordering Code

STP DXdXL Material Designator

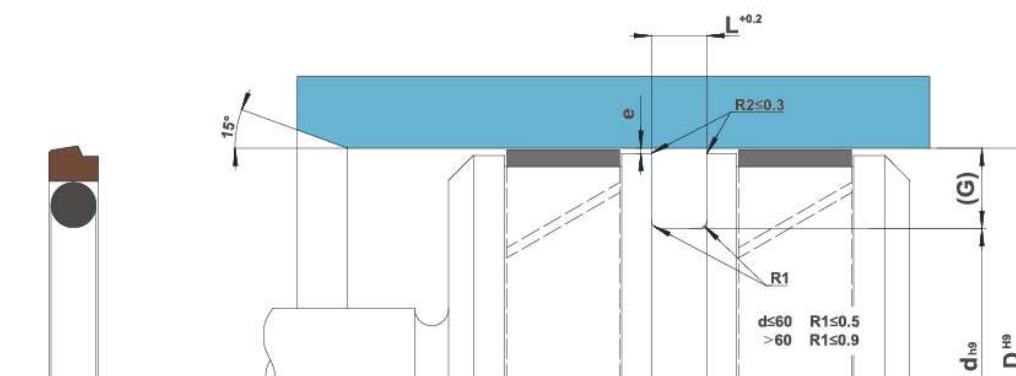
Example: STP 63X47.9X6.3 P2071N





D	d	L	Ordering Code
8	3.1	2.2	STP 8X3.1X2.2 P2071N
10	5.1	2.2	STP 10X5.1X2.2 P2071N
12	7.1	2.2	STP 12X7.1X2.2 P2071N
15	10.1	2.2	STP 15X10.1X2.2 P2071N
16	11.1	2.2	STP 16X11.1X2.2 P2071N
18	10.7	3.2	STP 18X10.7X3.2 P2071N
20	12.7	3.2	STP 20X12.7X3.2 P2071N
22	14.7	3.2	STP 22X14.7X3.2 P2071N
25	17.7	3.2	STP 25X17.7X3.2 P2071N
28	17.3	4.2	STP 28X17.3X4.2 P2071N
30	19.3	4.2	STP 30X19.3X4.2 P2071N
32	21.3	4.2	STP 32X21.3X4.2 P2071N
35	24.3	4.2	STP 35X24.3X4.2 P2071N
40	29.3	4.2	STP 40X29.3X4.2 P2071N
42	31.3	4.2	STP 42X31.3X4.2 P2071N
45	34.3	4.2	STP 45X34.3X4.2 P2071N
48	37.3	4.2	STP 48X37.3X4.2 P2071N
50	39.3	4.2	STP 50X39.3X4.2 P2071N
52	41.3	4.2	STP 52X41.3X4.2 P2071N
55	44.3	4.2	STP 55X44.3X4.2 P2071N
60	44.9	6.3	STP 60X44.9X6.3 P2071N
63	47.9	6.3	STP 63X47.9X6.3 P2071N
65	49.9	6.3	STP 65X49.9X6.3 P2071N

D	d	L	Ordering Code
70	54.9	6.3	STP 70X54.9X6.3 P2071N
75	59.9	6.3	STP 75X59.9X6.3 P2071N
80	64.9	6.3	STP 80X64.9X6.3 P2071N
85	69.9	6.3	STP 85X69.9X6.3 P2071N
90	74.9	6.3	STP 90X74.9X6.3 P2071N
95	79.9	6.3	STP 95X79.9X6.3 P2071N
100	84.9	6.3	STP 100X84.9X6.3 P2071N
105	89.9	6.3	STP 105X89.9X6.3 P2071N
110	94.9	6.3	STP 110X94.9X6.3 P2071N
115	99.9	6.3	STP 115X99.9X6.3 P2071N
120	104.9	6.3	STP 120X104.9X6.3 P2071N
125	109.9	6.3	STP 125X109.9X6.3 P2071N
130	114.9	6.3	STP 130X114.9X6.3 P2071N
135	119.9	6.3	STP 135X119.9X6.3 P2071N
140	124.9	6.3	STP 140X124.9X6.3 P2071N
145	129.9	6.3	STP 145X129.9X6.3 P2071N
150	134.9	6.3	STP 150X134.9X6.3 P2071N
155	139.9	6.3	STP 155X139.9X6.3 P2071N
160	144.9	6.3	STP 160X144.9X6.3 P2071N
165	149.9	6.3	STP 165X149.9X6.3 P2071N
170	154.9	6.3	STP 170X154.9X6.3 P2071N
175	159.9	6.3	STP 175X159.9X6.3 P2071N



D	d	L	Ordering Code
180	164.9	6.3	STP 180X164.9X6.3 P2071N
185	169.9	6.3	STP 185X169.9X6.3 P2071N
190	174.9	6.3	STP 190X174.9X6.3 P2071N
200	179.5	8.1	STP 200X179.5X8.1 P2071N
210	189.5	8.1	STP 210X189.5X8.1 P2071N
220	199.5	8.1	STP 220X199.5X8.1 P2071N
225	204.5	8.1	STP 225X204.5X8.1 P2071N
230	209.5	8.1	STP 230X209.5X8.1 P2071N
240	219.5	8.1	STP 240X219.5X8.1 P2071N
250	229.5	8.1	STP 250X229.5X8.1 P2071N
260	236	8.1	STP 260X236X8.1 P2071N
270	246	8.1	STP 270X246X8.1 P2071N
280	256	8.1	STP 280X256X8.1 P2071N
290	266	8.1	STP 290X266X8.1 P2071N
300	276	8.1	STP 300X276X8.1 P2071N
310	286	8.1	STP 310X286X8.1 P2071N
320	296	8.1	STP 320X296X8.1 P2071N
330	306	8.1	STP 330X306X8.1 P2071N
340	316	8.1	STP 340X316X8.1 P2071N
350	326	8.1	STP 350X326X8.1 P2071N
360	336	8.1	STP 360X336X8.1 P2071N
370	346	8.1	STP 370X346X8.1 P2071N
380	356	8.1	STP 380X356X8.1 P2071N

D	d	L	Ordering Code
390	366	8.1	STP 390X366X8.1 P2071N
400	376	8.1	STP 400X376X8.1 P2071N
410	386	8.1	STP 410X386X8.1 P2071N
420	396	8.1	STP 420X396X8.1 P2071N
430	406	8.1	STP 430X406X8.1 P2071N
440	416	8.18	STP 440X416X8.1 P2071N
450	426	8.1	STP 450X426X8.1 P2071N
460	436	8.1	STP 460X436X8.1 P2071N
470	446	8.1	STP 470X446X8.1 P2071N
480	456	8.1	STP 480X456X8.1 P2071N
490	466	8.1	STP 490X466X8.1 P2071N
500	476	8.1	STP 500X476X8.1 P2071N
550	526	8.1	STP 550X526X8.1 P2071N
600	576	8.1	STP 600X576X8.1 P2071N
650	626	8.1	STP 650X626X8.1 P2071N
700	672.7	9.5	STP 700X672.7X9.5 P2071N
800	772.7	9.5	STP 700X772.7X9.5 P2071N
900	872.7	9.5	STP 900X872.7X9.5 P2071N
1000	962	13.8	STP 1000X962X13.8 P2071N
1200	1162	13.8	STP 1200X1162X13.8 P2071N
1500	1462	13.8	STP 1500X1462X13.8 P2071N
2000	1962	13.8	STP 2000X1962X13.8 P2071N

XTP Piston Seals



Product Description

XTP type piston seal consists of a PTFE slip ring, a star ring and two (or one) O-rings, the star ring is in the groove of the slip ring to prevent internal leakage.

Product Benefits

With good pressure retention performance very small starting and movement friction, smooth movement at low speeds, no creeping phenomenon wear resistance, resistance to extrusion, long service life wide range of applicable temperatures (choose the right X-ring, O-ring material) strong resistance to chemical media (choose the right X-ring, O-ring material) can be provided with the maximum diameter of the product

Scope of Application

XTP type piston seals are widely used in traveling hydraulics, cranes, standard cylinders and accumulators.

Material Selection

Makings	Durometer	Nicknames
Nitrile rubberNBR	70 Shore A	N
FluoroelastomerFKM	75 Shore A	V
ModificationPTFE	66 Shore D	P2071

Technical Parameters

Working pressure: $\leq 40\text{MPa}$
 Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (P2071N)
 $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (P2071V)
 Working speed: $\leq 2\text{m/s}$

Design Statement

Double O-Ring

cross-sectional	Bore range D(mm)	rod diameter range mm	Star ring cross-section mm	slot width L(mm)	trough depth G(mm)	maximum clearance e		
						10MPa	25MPa	40MPa
A	40~80	2.62	1.78	6.3	5.0	0.30	0.20	0.15
B	80~133	3.52	2.62	8.3	6.5	0.40	0.30	0.15
C	133~450	5.33	3.52	12.3	9.0	0.40	0.30	0.20
D	450~700	6.99	5.33	16.3	15.5	0.50	0.40	0.30

Single O-Ring

cross-sectional	Bore range D(mm)	rod diameter range mm	Star ring cross-section mm	slot width L(mm)	trough depth G(mm)	maximum clearance e		
						10MPa	25MPa	40MPa
A	15~40	3.53	1.78	4.2	5.50	0.25	0.15	0.10
B	40~80	5.33	1.78	6.3	7.75	0.30	0.20	0.15
C	180~133	6.99	2.62	8.1	10.50	0.30	0.20	0.15
D	133~253	6.99	2.62	8.1	12.25	0.30	0.20	0.15
E	253~463	8.40	3.53	9.5	14.00	0.45	0.30	0.25
G	463~700	10.00	5.33	11.5	17.50	0.55	0.40	0.35

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

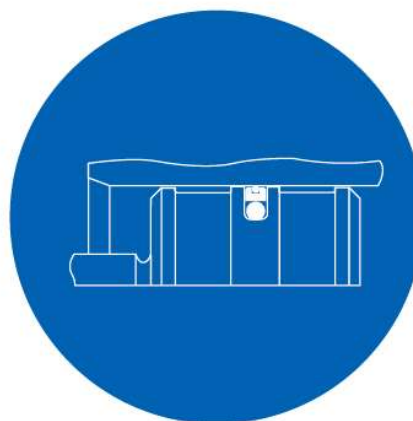
Installation Instructions

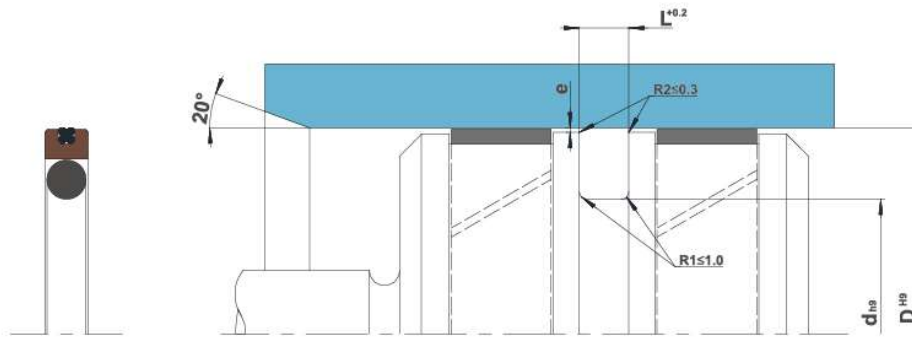
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. When the temperature is low, the slip ring can be heated up to 60°C . Before installation, the seal must be coated with matching lubricant

Ordering Code

Double O-Ring: XTP2-DXdXL Material Designator
 Single O-Ring: XTP1-DXdXL Material Designator

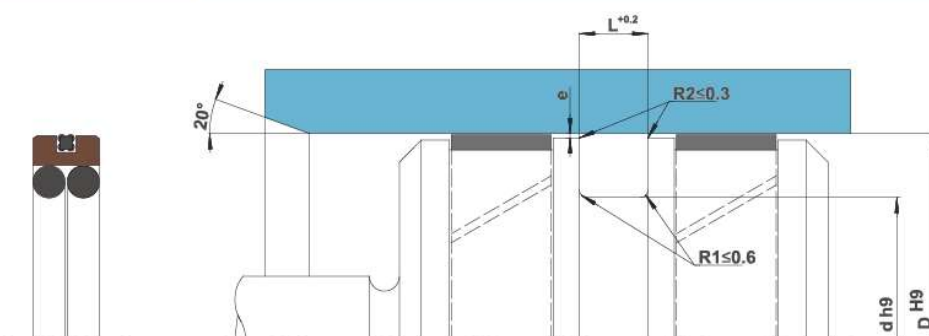
Example: XTP2-100X87X8.3 P2071N





D	d	L	Ordering Code
16	5	4.2	XTP1-16X5X4.2 P2071N
18	7	4.2	XTP1-18X7X4.2 P2071N
20	9	4.2	XTP1-20X9X4.2 P2071N
22	11	4.2	XTP1-22X11X4.2 P2071N
25	14	4.2	XTP1-25X14X4.2 P2071N
28	17	4.2	XTP1-28X17X4.2 P2071N
30	19	4.2	XTP1-30X19X4.2 P2071N
32	21	4.2	XTP1-32X21X4.2 P2071N
35	24	4.2	XTP1-35X24X4.2 P2071N
40	29	4.2	XTP1-40X29X4.2 P2071N
42	31	4.2	XTP1-42X31X4.2 P2071N
45	34	4.2	XTP1-45X34X4.2 P2071N
48	37	4.2	XTP1-48X37X4.2 P2071N
50	39	4.2	XTP1-50X39X4.2 P2071N
50	34.5	6.3	XTP1-50X34.5X6.3 P2071N
52	41	4.2	XTP1-52X41X4.2 P2071N
55	44	4.2	XTP1-55X44X4.2 P2071N
60	49	4.2	XTP1-60X49X4.2 P2071N
63	52	4.2	XTP1-63X52X4.2 P2071N
63	47.5	6.3	XTP1-63X47.5X6.3 P2071N
65	54	4.2	XTP1-65X54X4.2 P2071N
70	59	4.2	XTP1-70X59X4.2 P2071N
70	54.5	6.3	XTP1-70X54.5X6.3 P2071N
75	64	4.2	XTP1-75X64X4.2 P2071N
80	64.5	6.3	XTP1-80X64.5X6.3 P2071N
80	59	8.1	XTP1-80X59X8.1 P2071N
85	69.5	6.3	XTP1-85X69.5X6.3 P2071N
85	64	8.1	XTP1-85X64X8.1 P2071N
90	74.5	6.3	XTP1-90X74.5X6.3 P2071N
90	69	8.1	XTP1-90X69X8.1 P2071N
95	79.5	6.3	XTP1-95X79.5X6.3 P2071N
95	74	8.1	XTP1-95X74X8.1 P2071N
100	84.5	6.3	XTP1-100X84.5X6.3 P2071N
100	79	8.1	XTP1-100X79X8.1 P2071N
105	89.5	6.3	XTP1-105X89.5X6.3 P2071N
105	84	8.1	XTP1-105X84X8.1 P2071N

D	d	L	Ordering Code
110	94.5	6.3	XTP1-110X94.5X6.3 P2071N
110	89	8.1	XTP1-110X89X8.1 P2071N
115	99.5	6.3	XTP1-115X99.5X6.3 P2071N
115	94	8.1	XTP1-115X94X8.1 P2071N
120	104.5	6.3	XTP1-120X104.5X6.3 P2071N
120	99	8.1	XTP1-120X99X8.1 P2071N
125	109.5	6.3	XTP1-125X109.5X6.3 P2071N
125	104	8.1	XTP1-125X104X8.1 P2071N
130	114.5	6.3	XTP1-130X114.5X6.3 P2071N
130	109	8.1	XTP1-130X109X8.1 P2071N
135	114	8.1	XTP1-135X114X8.1 P2071N
140	119	8.1	XTP1-140X119X8.1 P2071N
150	129	8.1	XTP1-150X129X8.1 P2071N
160	139	8.1	XTP1-160X139X8.1 P2071N
170	149	8.1	XTP1-170X149X8.1 P2071N
180	159	8.1	XTP1-180X159X8.1 P2071N
190	169	8.1	XTP1-190X169X8.1 P2071N
200	179	8.1	XTP1-200X179X8.1 P2071N
210	189	8.1	XTP1-210X189X8.1 P2071N
220	199	8.1	XTP1-220X199X8.1 P2071N
230	209	8.1	XTP1-230X209X8.1 P2071N
240	219	8.1	XTP1-240X219X8.1 P2071N
250	229	8.1	XTP1-250X229X8.1 P2071N
250	225.5	8.1	XTP1-250X225.5X8.1 P2071N
280	252	9.5	XTP1-280X252X9.5 P2071N
300	272	9.5	XTP1-300X272X9.5 P2071N
320	292	9.5	XTP1-320X292X9.5 P2071N
350	322	9.5	XTP1-350X322X9.5 P2071N
400	372	9.5	XTP1-400X372X9.5 P2071N
420	392	9.5	XTP1-420X392X9.5 P2071N
450	422	9.5	XTP1-450X422X9.5 P2071N
480	445	11.5	XTP1-480X445X11.5 P2071N
500	465	11.5	XTP1-500X465X11.5 P2071N
600	565	11.5	XTP1-600X565X11.5 P2071N
700	665	11.5	XTP1-700X665X11.5 P2071N



D	d	L	Ordering Code
40	30	6.3	XTP2-40X30X6.3 P2071N
42	32	6.3	XTP2-42X32X6.3 P2071N
45	35	6.3	XTP2-45X35X6.3 P2071N
48	38	6.3	XTP2-48X38X6.3 P2071N
50	40	6.3	XTP2-50X40X6.3 P2071N
52	42	6.3	XTP2-52X42X6.3 P2071N
55	45	6.3	XTP2-55X45X6.3 P2071N
60	50	6.3	XTP2-60X50X6.3 P2071N
63	53	6.3	XTP2-63X53X6.3 P2071N
65	55	6.3	XTP2-65X55X6.3 P2071N
70	60	6.3	XTP2-70X60X6.3 P2071N
75	65	6.3	XTP2-75X65X6.3 P2071N
80	67	8.3	XTP2-80X67X8.3 P2071N
85	72	8.3	XTP2-85X72X8.3 P2071N
90	77	8.3	XTP2-90X77X8.3 P2071N
95	82	8.3	XTP2-95X82X8.3 P2071N
100	87	8.3	XTP2-100X87X8.3 P2071N
105	92	8.3	XTP2-105X92X8.3 P2071N
110	97	8.3	XTP2-110X97X8.3 P2071N
115	102	8.3	XTP2-115X102X8.3 P2071N
120	107	8.3	XTP2-120X107X8.3 P2071N
125	112	8.3	XTP2-125X112X8.3 P2071N
130	117	8.3	XTP2-130X117X8.3 P2071N
135	117	12.3	XTP2-135X117X12.3 P2071N

D	d	L	Ordering Code
140	122	12.3	XTP2-140X122X12.3 P2071N
150	132	12.3	XTP2-150X132X12.3 P2071N
160	142	12.3	XTP2-160X142X12.3 P2071N
170	152	12.3	XTP2-170X152X12.3 P2071N
180	162	12.3	XTP2-180X162X12.3 P2071N
190	172	12.3	XTP2-190X172X12.3 P2071N
200	182	12.3	XTP2-200X182X12.3 P2071N
210	192	12.3	XTP2-210X192X12.3 P2071N
220	202	12.3	XTP2-220X202X12.3 P2071N
230	212	12.3	XTP2-230X212X12.3 P2071N
240	222	12.3	XTP2-240X222X12.3 P2071N
250	232	12.3	XTP2-250X232X12.3 P2071N
280	262	12.3	XTP2-280X262X12.3 P2071N
300	282	12.3	XTP2-300X282X12.3 P2071N
320	302	12.3	XTP2-320X302X12.3 P2071N
350	332	12.3	XTP2-350X332X12.3 P2071N
400	382	12.3	XTP2-400X382X12.3 P2071N
420	402	12.3	XTP2-420X402X12.3 P2071N
450	432	12.3	XTP2-450X432X12.3 P2071N
480	449	16.3	XTP2-480X449X16.3 P2071N
500	469	16.3	XTP2-500X469X16.3 P2071N
600	569	16.3	XTP2-600X569X16.3 P2071N
700	669	16.3	XTP2-700X669X16.3 P2071N

GRP Rotary Seals for Bores



Product Description

The GRP type rotary seal consists of a PTFE sealing ring and an O-ring combined and preloaded for bi-directional sealing of rotating bores.

Product Benefits

Small groove size for easy design
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant, extrusion-resistant, long service life
Wide temperature range and high chemical resistance (selection of suitable O-ring material)
Resistant to higher pressures and speeds
Available in diameters up to 2500 mm

Scope of Application

GRP type rotary combination seals are widely used in rotary track mandrels, rotary joints, hose reels and machine tool hydraulics.

Material Selection

Subassemblies	Makings	Durometer	Nicknames
collector ring (electrical engineering)	ModificationPTFE	67 Shore D	PC002
	ModificationPTFE	65 Shore D	PCA01
O-Ring	Low temperature NBR	70 Shore A	T
	Nitrile rubber NBR	70 Shore A	N
	Fluorine rubber FKM	75 Shore A	V

Technical Parameters

Working pressure: $\leq 30\text{MPa}$
Working temperature: $-45^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (PC002T)
 $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (PC002N)
 $-20^{\circ}\text{C} \sim +200^{\circ}\text{C}$ (PC002V)
Working speed: $\leq 1\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~40MPa
A	1.78	8~38	2.2	2.45	0.15~0.1	0.1~0.05
B	2.62	38~80	3.2	3.75	0.2~0.15	0.15~0.1
C	3.53	80~135	4.2	5.50	0.25~0.2	0.2~0.15
D	5.33	135~320	6.3	7.75	0.3~0.25	0.25~0.2
E	6.99	320~700	8.1	10.50	0.35~0.3	0.3~0.25
F	8.4	700~1000	9.5	14.00	0.4~0.35	0.35~0.3

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	f7
Groove Side	L	+0.2

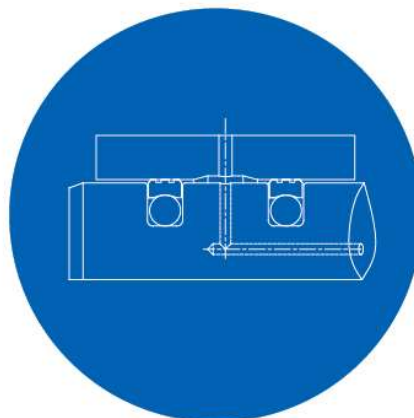
Installation Instructions

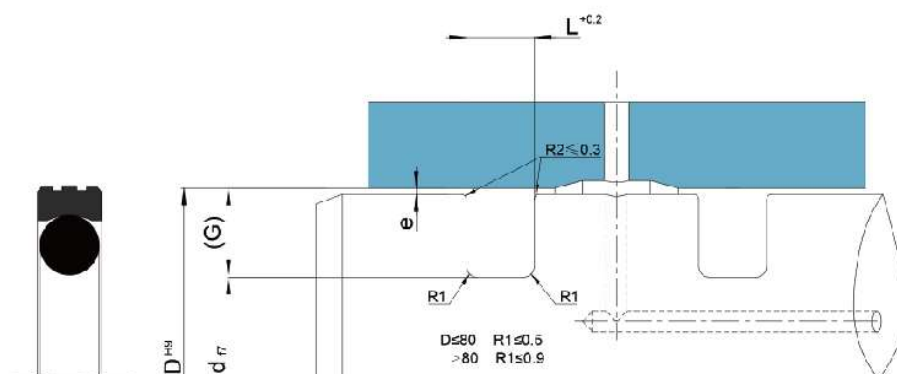
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For cooler temperatures, heat the slip ring by 60°C . Before installation, the seal must be coated with matching lubricant.

Ordering Code

GRP DXdXL Material Designator

Example: GRP 100X89X4.2 PC002N





D	d	L	Ordering Code
40	32.5	3.2	GRP 40X32.5X3.2 PC002N
42	34.5	3.2	GRP 42X34.5X3.2 PC002N
45	37.5	3.2	GRP 45X37.5X3.2 PC002N
48	40.5	3.2	GRP 48X40.5X3.2 PC002N
50	42.5	3.2	GRP 50X42.5X3.2 PC002N
52	44.5	3.2	GRP 52X44.5X3.2 PC002N
55	47.5	3.2	GRP 55X47.5X3.2 PC002N
56	48.5	3.2	GRP 56X48.5X3.2 PC002N
60	52.5	3.2	GRP 60X52.5X3.2 PC002N
63	55.5	3.2	GRP 63X55.5X3.2 PC002N
65	57.5	3.2	GRP 65X57.5X3.2 PC002N
70	62.5	3.2	GRP 70X62.5X3.2 PC002N
75	67.5	3.2	GRP 75X67.5X3.2 PC002N
80	69	4.2	GRP 80X69X4.2 PC002N
85	74	4.2	GRP 85X74X4.2 PC002N
90	79	4.2	GRP 90X79X4.2 PC002N
95	84	4.2	GRP 95X84X4.2 PC002N
100	89	4.2	GRP 100X89X4.2 PC002N
105	94	4.2	GRP 105X94X4.2 PC002N
110	99	4.2	GRP 110X99X4.2 PC002N
115	104	4.2	GRP 115X104X4.2 PC002N
120	109	4.2	GRP 120X109X4.2 PC002N
125	114	4.2	GRP 125X114X4.2 PC002N
130	119	4.2	GRP 130X119X4.2 PC002N
135	119.5	6.3	GRP 135X119.5X6.3 PC002N
140	124.5	6.3	GRP 140X124.5X6.3 PC002N

D	d	L	Ordering Code
150	134.5	6.3	GRP 150X134.5X6.3 PC002N
160	144.5	6.3	GRP 160X144.5X6.3 PC002N
170	154.5	6.3	GRP 170X154.5X6.3 PC002N
180	164.5	6.3	GRP 180X164.5X6.3 PC002N
190	174.5	6.3	GRP 190X174.5X6.3 PC002N
200	184.5	6.3	GRP 200X184.5X6.3 PC002N
210	194.5	6.3	GRP 210X194.5X6.3 PC002N
220	204.5	6.3	GRP 220X204.5X6.3 PC002N
230	214.5	6.3	GRP 230X214.5X6.3 PC002N
240	224.5	6.3	GRP 240X224.5X6.3 PC002N
250	234.5	6.3	GRP 250X234.5X6.3 PC002N
260	244.5	6.3	GRP 260X244.5X6.3 PC002N
270	254.5	6.3	GRP 270X254.5X6.3 PC002N
280	264.5	6.3	GRP 280X264.5X6.3 PC002N
290	274.5	6.3	GRP 290X274.5X6.3 PC002N
300	284.5	6.3	GRP 300X284.5X6.3 PC002N
320	304.5	6.3	GRP 320X304.5X6.3 PC002N
350	329	8.1	GRP 350X329X8.1 PC002N
400	379	8.1	GRP 400X379X8.1 PC002N
420	399	8.1	GRP 420X399X8.1 PC002N
450	429	8.1	GRP 450X429X8.1 PC002N
480	459	8.1	GRP 480X459X8.1 PC002N
500	479	8.1	GRP 500X479X8.1 PC002N
550	529	8.1	GRP 550X529X8.1 PC002N
600	579	8.1	GRP 600X579X8.1 PC002N
650	629	8.1	GRP 650X629X8.1 PC002N

GRR Rotary Seals for Bores



Product Description

The rotary seal type GRR consists of a PTFE sealing ring and an O-ring combined and preloaded for bi-directional sealing of rotating shafts.

Product Benefits

Small groove size for easy design
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant, anti extrusion, long service life
Wide range of applicable temperatures (choose the right O-ring material)
High resistance to chemical media (choose the right O-ring material)
Available in diameters up to 2500mm

Scope of Application

GRR type rotary combination seals are widely used in rotary track mandrels, rotary joints, hose reels and machine tool hydraulics.

Material Selection

Subassemblies	Makings	Durometer	Nicknames
collector ring (electrical engineering)	Modification PTFE	67 Shore D	PC002
	Ultra high molecular weight Polyethylene	64 Shore D	PT003
	Low temperature NBR	70 Shore A	T
O-Ring	Nitrile rubber NBR	70 Shore A	N
	Fluorine rubber FKM	75 Shore A	V

Technical Parameters

Working pressure: ≤30MPa
Working temperature: -45℃ ~ +80℃ (PT003T)
-30℃ ~ +100℃ (PC002N)
-20℃ ~ +200℃ (PC002V)
Working speed: ≤1m/s

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance 0~20MPa	maximum clearance 20~40MPa
B	2.62	19~37.9	3.2	3.75	0.2~0.15	0.15~0.1
C	3.53	38~199.9	4.2	5.50	0.25~0.2	0.2~0.15
D	5.33	200~255.9	6.3	7.75	0.3~0.25	0.25~0.2
E	6.99	256~649.9	8.1	10.50	0.35~0.3	0.30~0.25
G	8.4	650~999.9	9.5	14.00	0.4~0.35	0.35~0.3

Surface Finish		Ra	Rz
Sliding Surface	ΦD	≤ 0.3μm	≤ 1.6μm
Bottom of Trench	Φd	≤ 1.6μm	≤ 6.3μm
Groove Side		≤ 3.2μm	≤ 12.5μm

Surface Finish		
Sliding Surface	Φd	f7
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

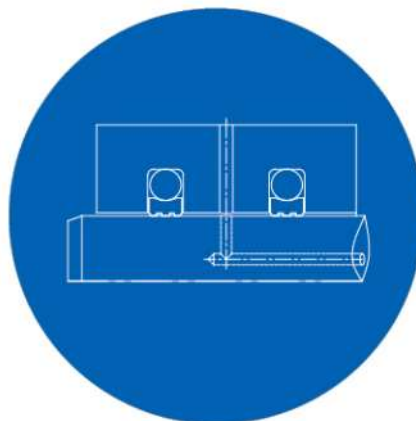
Installation Instructions

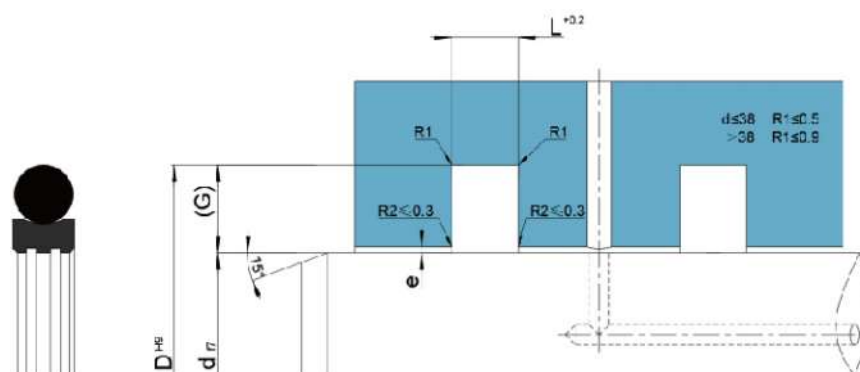
The seal is usually easily installed into the closed groove by extruding it into a kidney shape.
The seal is usually easily installed into the closed groove by squeezing it into the shape of a kidney. If an installation tool is used, it must be of soft material and without sharp edges. Before installation, the seal must be of soft material and without sharp edges. Before installation, a compatible lubricant must be applied to the seal.

Ordering Code

GRR dXDXL Material Designator

Example: GRR 100X111X4.2 PT003N





D	d	L	Ordering Code
20	27.5	3.2	GRR 20X27.5X3.2 PT003N
22	29.5	3.2	GRR 22X29.5X3.2 PT003N
25	32.5	3.2	GRR 25X32.5X3.2 PT003N
28	35.5	3.2	GRR 28X35.5X3.2 PT003N
30	37.5	3.2	GRR 30X37.5X3.2 PT003N
32	39.5	3.2	GRR 32X39.5X3.2 PT003N
35	42.5	3.2	GRR 35X42.5X3.2 PT003N
36	43.5	3.2	GRR 36X43.5X3.2 PT003N
40	51	4.2	GRR 40X51X4.2 PT003N
42	53	4.2	GRR 42X53X4.2 PT003N
45	56	4.2	GRR 45X56X4.2 PT003N
48	59	4.2	GRR 48X59X4.2 PT003N
50	61	4.2	GRR 50X61X4.2 PT003N
52	63	4.2	GRR 52X63X4.2 PT003N
55	66	4.2	GRR 55X66X4.2 PT003N
56	67	4.2	GRR 56X67X4.2 PT003N
60	71	4.2	GRR 60X71X4.2 PT003N
63	74	4.2	GRR 63X74X4.2 PT003N
65	76	4.2	GRR 65X76X4.2 PT003N
70	81	4.2	GRR 70X81X4.2 PT003N
75	86	4.2	GRR 75X86X4.2 PT003N
80	91	4.2	GRR 80X91X4.2 PT003N
85	96	4.2	GRP 85X96X4.2 PT003N
90	101	4.2	GRR 90X101X4.2 PT003N
95	106	4.2	GRR 95X106X4.2 PT003N
100	111	4.2	GRR 100X111X4.2 PT003N
105	116	4.2	GRR 105X116X4.2 PT003N
110	121	4.2	GRR 110X121X4.2 PT003N

D	d	L	Ordering Code
115	126	4.2	GRR 115X126X4.2 PT003N
120	131	4.2	GRR 120X131X4.2 PT003N
125	136	4.2	GRR 125X136X4.2 PT003N
130	141	4.2	GRR 130X141X4.2 PT003N
135	146	4.2	GRR 135X146X4.2 PT003N
140	151	4.2	GRR 140X151X4.2 PT003N
150	161	4.2	GRR 150X161X4.2 PT003N
160	171	4.2	GRR 160X171X4.2 PT003N
170	181	4.2	GRR 170X181X4.2 PT003N
180	191	4.2	GRR 180X191X4.2 PT003N
190	201	4.2	GRR 190X201X4.2 PT003N
200	215.5	6.3	GRR 200X215.5X6.3 PT003N
210	225.5	6.3	GRR 210X225.5X6.3 PT003N
220	235.5	6.3	GRR 220X235.5X6.3 PT003N
230	245.5	6.3	GRR 230X245.5X6.3 PT003N
240	255.5	6.3	GRR 240X255.5X6.3 PT003N
250	265.5	6.3	GRR 250X265.5X6.3 PT003N
260	281	8.1	GRR 260X281X8.1 PT003N
270	291	8.1	GRR 270X291X8.1 PT003N
280	301	8.1	GRR 280X301X8.1 PT003N
300	321	8.1	GRR 300X321X8.1 PT003N
320	341	8.1	GRR 320X341X8.1 PT003N
350	371	8.1	GRR 350X371X8.1 PT003N
360	381	8.1	GRR 360X381X8.1 PT003N
400	421	8.1	GRR 400X421X8.1 PT003N
500	521	8.1	GRR 500X521X8.1 PT003N
550	571	8.1	GRR 550X571X8.1 PT003N
600	621	8.1	GRR 600X621X8.1 PT003N

ZHP Rotary Seals for Bores



Product Description

The ZHP type rotary seal consists of a rectangular ring combined with a PTFE sealing ring, the rectangular ring acts as an elastomer and provides a static seal. Compared with the O-ring, ZHP has improved contact stress and deformation characteristics and can withstand higher pressures and is used for bi-directional sealing of rotating bores.

Product Benefits

Small groove size for easy design
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant, anti-extrusion, long service life
Wide range of applicable temperatures (choose suitable rectangular ring material)
High resistance to chemical media (selection of suitable rectangular ring material)
Available in diameters up to 2500 mm

Scope of Application

ZHP type rotary combination seals are widely used in rotary track mandrels, rotary joints, hose reel flexure wheels and machine tool hydraulics.

Material Selection

Subassemblies	Makings	Durometer	Nicknames
Collector ring (electrical engineering)	Modification PTFE	67 Shore D	PC002
	Ultra high molecular weight polyethylene upe	65 Shore D	PCA01
	Low temperature NBR	70 Shore A	M5570
Rectangular	Nitrile rubber NBR	70 Shore A	M2575
	Fluorine rubber FKM	75 Shore A	FKM75

Technical Parameters

Working pressure: $\leq 35\text{MPa}$
Working temperature: $-50 \sim +200^{\circ}\text{C}$ (according to the temperature range of the selected elastomer material)
Working speed: $\leq 1\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~35MPa
A	1.78	8~38	2.2	2.45	0.15~0.1	0.1~0.05
B	2.62	38~80	3.2	3.75	0.2~0.15	0.15~0.1
C	3.53	80~135	4.2	5.50	0.25~0.2	0.2~0.15
D	5.33	135~320	6.3	7.75	0.3~0.25	0.25~0.2
E	6.99	320~700	8.1	10.50	0.35~0.3	0.3~0.25
F	8.4	700~1000	9.5	14.00	0.4~0.35	0.35~0.3

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	f7
Groove Side	L	+0.2

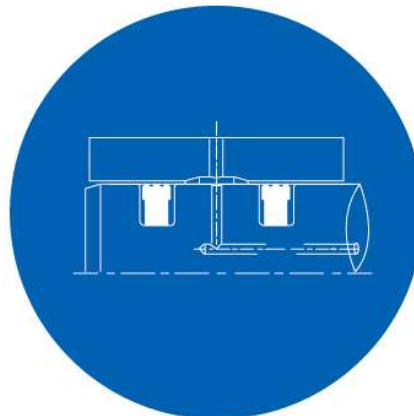
Installation Instructions

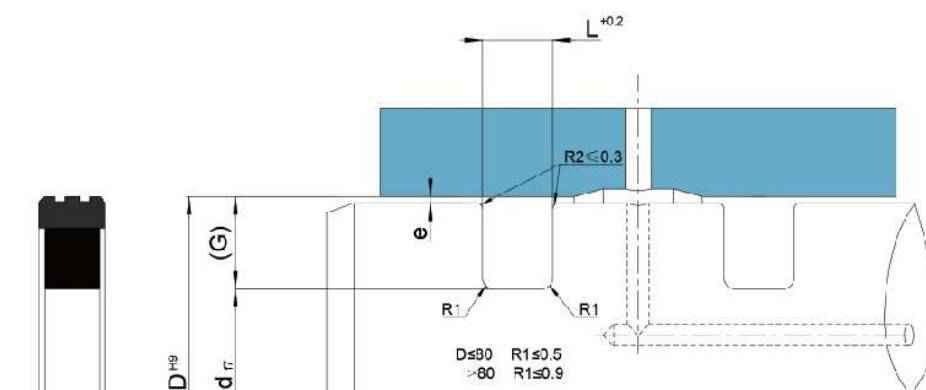
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and without sharp edges. For cooler temperatures, heat the slip ring by 60°C . Before installation, the seal must be coated with matching lubricant.

Ordering Code

ZHP DXdXL Material Designator

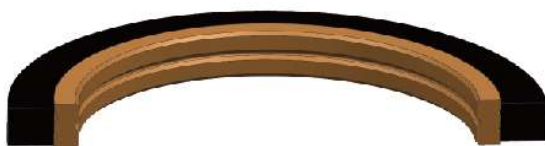
Example: ZHP 100X89X4.2 PC002+M2575





D	d	L	Ordering Code
65	57.5	3.2	ZHP 65X57.5X3.2 PC002+M2575
70	62.5	3.2	ZHP 70X62.5X3.2 PC002+M2575
75	67.5	3.2	ZHP 75X67.5X3.2 PC002+M2575
80	69	4.2	ZHP 80X69X4.2 PC002+M2575
85	74	4.2	ZHP 85X74X4.2 PC002+M2575
90	79	4.2	ZHP 90X79X4.2 PC002+M2575
95	84	4.2	ZHP 95X84X4.2 PC002+M2575
100	89	4.2	ZHP 100X89X4.2 PC002+M2575
110	99	4.2	ZHP 110X99X4.2 PC002+M2575
120	109	4.2	ZHP 120X109X4.2 PC002+M2575
125	114	4.2	ZHP 125X114X4.2 PC002+M2575
130	119	4.2	ZHP 130X119X4.2 PC002+M2575
135	119.5	6.3	ZHP 135X119.5X6.3 PC002+M2575
140	124.5	6.3	ZHP 140X124.5X6.3 PC002+M2575
150	134.5	6.3	ZHP 150X134.5X6.3 PC002+M2575
160	144.5	6.3	ZHP 160X144.5X6.3 PC002+M2575
170	154.5	6.3	ZHP 170X154.5X6.3 PC002+M2575
180	164.5	6.3	ZHP 180X164.5X6.3 PC002+M2575
200	184.5	6.3	ZHP 200X184.5X6.3 PC002+M2575
225	209.5	6.3	ZHP 225X209.5X6.3 PC002+M2575
240	224.5	6.3	ZHP 240X224.5X6.3 PC002+M2575
250	234.5	6.3	ZHP 250X234.5X6.3 PC002+M2575
270	254.5	6.3	ZHP 270X254.5X6.3 PC002+M2575
300	284.5	6.3	ZHP 300X284.5X6.3 PC002+M2575

ZUP Rotary Seals for Shafts



Product Description

The ZUR type rotary seal consists of a PTFE sealing ring combined with a rectangular ring, which acts as an elastomer with greater preload and radial stress distribution for bi-directional sealing of rotating shafts.

Product Benefits

Small groove size for easy design
Extremely small starting and movement friction, smooth movement at low speed, no crawling phenomenon
Wear-resistant, extrusion-resistant, long service life
Wide temperature range and high chemical resistance (selection of suitable rectangular ring material)
Resistant to higher pressures and speeds
Available in diameters up to 2500 mm

Scope of Application

ZUR type rotary combination seals are widely used in rotary track mandrels, rotary joints, hose reels and machine tool hydraulics.

Material Selection

Subassemblies	Makings	Durometer	Nicknames
Collector ring (electrical engineering)	Modification PTFE	67 Shore D	PC002
	Ultra high molecular weight polyethylene upe	64 Shore D	PT003
	Low temperature NBR	70 Shore A	M5570
Rectangular	Nitrile rubber NBR	70 Shore A	M2575
	Fluorine rubber FKM	75 Shore A	FKM75

Technical Parameters

Working pressure: $\leq 35\text{MPa}$
Working temperature: $-50 \sim +200^{\circ}\text{C}$ (according to the temperature range of the selected slip ring and elastomer material)
Working speed: $\leq 1\text{m/s}$

Design Statement

cross-sectional	o-ring section mm	rod diameter range d(mm)	slot width L(mm)	trough depth G(mm)	maximum clearance e 0~20MPa	maximum clearance e 20~35MPa
B	2.62	19~37.9	3.2	3.75	0.2~0.15	0.15~0.1
C	3.53	38~199.9	4.2	5.50	0.25~0.2	0.2~0.15
D	5.33	200~255.9	6.3	7.75	0.3~0.25	0.25~0.2
E	6.99	256~649.9	8.1	10.50	0.35~0.3	0.30~0.25
G	8.4	650~999.9	9.5	14.00	0.4~0.35	0.35~0.3

Surface Finish		Ra	Rz
Sliding Surface	Φd	$\leq 0.3\mu\text{m}$	$\leq 1.6\mu\text{m}$
Bottom of Trench	ΦD	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	Φd	f7
Bottom of Trench	ΦD	H9
Groove Side	L	+0.2

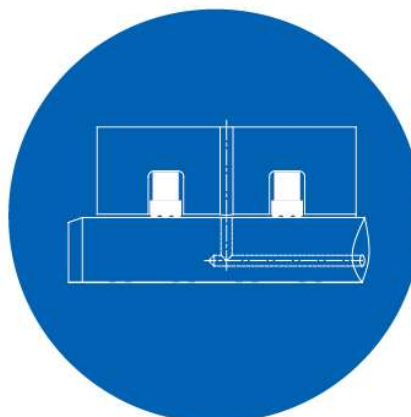
Installation Instructions

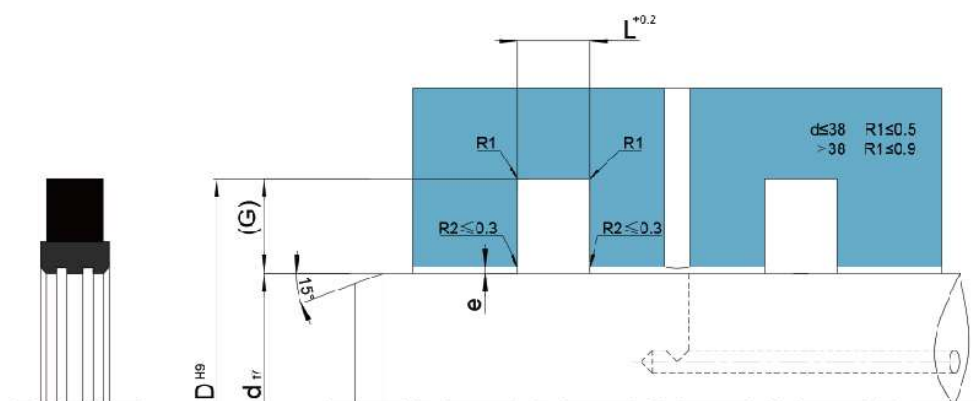
The seal is usually easily installed into the closed groove by extruding it into a kidney shape
The seal is usually easily installed into the closed groove by squeezing it into the shape of a kidney. If an installation tool is used, it must be of soft material and without sharp edges. Before installation, the
Before installation, a compatible lubricant must be applied to the seal.

Ordering Code

ZUR dXDXL Material Designator

Example: ZUR 100X115.3X6.3 PC002+M2575





d	D	L	Ordering Code
30	37.5	3.2	ZUR 30X37.5X3.2 PT003+M2575
35	42.5	3.2	ZUR 35X42.5X3.2 PT003+M2575
36	43.5	3.2	ZUR 36X43.5X3.2 PT003+M2575
40	51	4.2	ZUR 40X51X4.2 PT003+M2575
45	55	5	ZUR 45X55X5 PT003+M2575
45	56	4.2	ZUR 45X56X4.2 PT003+M2575
50	61	4.2	ZUR 50X61X4.2 PT003+M2575
55	66	4.2	ZUR 55X66X4.2 PT003+M2575
60	71	4.2	ZUR 60X71X4.2 PT003+M2575
65	76	4.2	ZUR 65X76X4.2 PT003+M2575
70	80	5	ZUR 70X80X5 PT003+M2575
70	81	4.2	ZUR 70X81X4.2 PT003+M2575
75	86	4.2	ZUR 75X86X4.2 PT003+M2575
80	90	5	ZUR 80X90X5 PT003+M2575
80	91	4.2	ZUR 80X91X4.2 PT003+M2575
85	95	5	ZUR 85X95X5 PT003+M2575
85	96	4.2	ZUR 85X96X4.2 PT003+M2575
90	100	5	ZUR 90X100X5 PT003+M2575
90	101	4.2	ZUR 90X101X4.2 PT003+M2575
100	110	5	ZUR 100X110X5 PT003+M2575
100	111	4.2	ZUR 100X111X4.2 PT003+M2575
105	116	4.2	ZUR 105X116X4.2 PT003+M2575
110	120	5	ZUR 110X120X5 PT003+M2575
110	121	4.2	ZUR 110X121X4.2 PT003+M2575

d	D	L	Ordering Code
115	125	5	ZUR 115X125X5 PT003+M2575
115	126	4.2	ZUR 115X126X4.2 PT003+M2575
120	131	4.2	ZUR 120X131X4.2 PT003+M2575
125	135	5	ZUR 125X135X5 PT003+M2575
125	136	4.2	ZUR 125X136X4.2 PT003+M2575
130	140	5	ZUR 130X140X5 PT003+M2575
130	141	4.2	ZUR 130X141X4.2 PT003+M2575
135	146	4.2	ZUR 135X146X4.2 PT003+M2575
140	155.5	6.3	ZUR 140X155.5X6.3 PT003+M2575
150	160	5	ZUR 150X160X5 PT003+M2575
150	165.5	6.3	ZUR 150X165.5X6.3 PT003+M2575
160	175.5	6.3	ZUR 160X175.5X6.3 PT003+M2575
170	185.5	6.3	ZUR 170X185.5X6.3 PT003+M2575
180	190	5	ZUR 180X190X5 PT003+M2575
180	195.5	6.3	ZUR 180X195.5X6.3 PT003+M2575
190	205.5	6.3	ZUR 190X205.5X6.3 PT003+M2575
200	215.5	6.3	ZUR 200X215.5X6.3 PT003+M2575
210	225.5	6.3	ZUR 210X225.5X6.3 PT003+M2575
220	235.5	6.3	ZUR 220X235.5X6.3 PT003+M2575
230	245.5	6.3	ZUR 230X245.5X6.3 PT003+M2575
240	255.5	6.3	ZUR 240X255.5X6.3 PT003+M2575
250	265.5	6.3	ZUR 250X265.5X6.3 PT003+M2575
280	301	8.1	ZUR 280X301X8.1 PT003+M2575

GF3 Type Guide Belt



Product Description

GF3 is a guide tape made of modified PTFE material pressed and sintered for use in pistons or piston rods.

Product Benefits

Can be supplied in any length Due to the addition of bronze powder in PTFE material, this product has the characteristics of high load bearing, low wear, low friction, etc. At low speed and large radial load, no crawling phenomenon grooves are simple and easy to design.

Non-standard products can be supplied according to customer's specifications.

Scope of Application

GF3 type live guide belts are mainly used in injection molding machine cylinders, control cylinders, regulating cylinders and handling machinery.

Material Selection

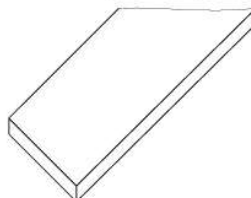
Makings	Nicknames
Bronze filled PTFE	S1106
Carbon fiber filled PTFE	S1112

Technical Parameters

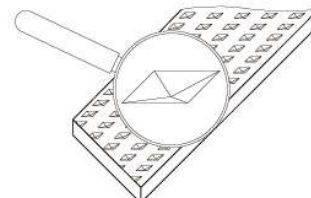
Bronze filled PTFE			
Medium	Mineral oil	HFA, HFB	HFC
Temp	-100~+200°C	+5~+60°C	-30~+60°C
Tempo	≤5.0 m/s	≤5.0 m/s	≤5.0 m/s

Surface treatment

GF3 Model
Smooth surface (standard)



GFW Model
Embossed finish (on request)

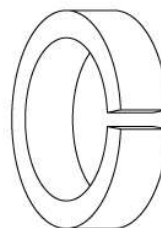


Incision Type

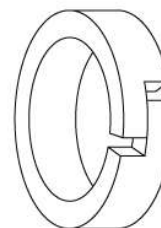
Type A
Oblique Incision



S-Shaped
Straight Incision



Z-type
Z-cut



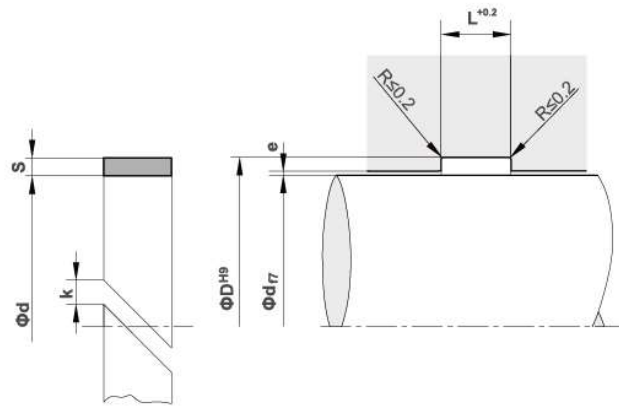
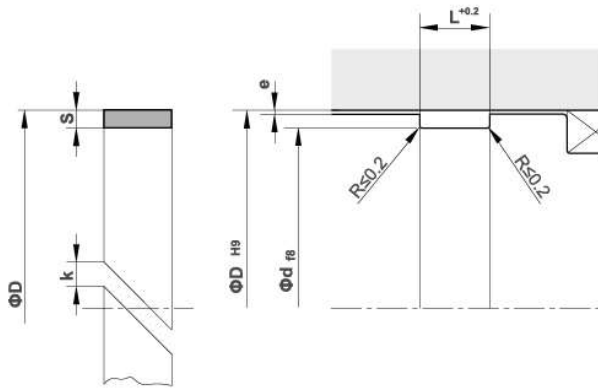
Type A and S guide bands are open supports that act only as supports, with all system pressure acting on the seals. type Z guide rings are closed supports that act as both seals and guides in special applications.

Ordering Code

GF3 or GFW-dXDXL Material Designator

Example: GF3-95X100X15 S1106





Groove Size

d/D (mm)	S (mm)	L (mm)	d (mm)	D (mm)	e (mm)
≤ 50	1.50	6.3	D-3.0	d+3	0.25
≤ 50	1.50	8.1	D-3.0	d+3	0.25
≤ 50	1.50	10	D-3.0	d+3	0.25
≤ 50	1.50	15	D-3.0	d+3	0.25
≤ 50	1.55	2.5	D-3.1	d+3.1	0.25
≤ 51	1.55	4.0	D-3.1	d+3.1	0.25
≤ 50	2.00	6.3	D-4.0	d+4	0.3
≤ 51	2.00	8.1	D-4.0	d+4	0.3
> 50	2.00	9.7	D-4.0	d+4	0.3
> 50	2.00	15	D-4.0	d+4	0.3
> 50	2.00	20	D-4.0	d+4	0.3
> 50	2.50	4.2	D-5.0	d+5	0.4
> 50	2.50	5.6	D-5.0	d+5	0.4
> 50	2.50	6.3	D-5.0	d+5	0.4
> 50	2.50	8.1	D-5.0	d+5	0.4
> 50	2.50	9.7	D-5.0	d+5	0.4
> 50	2.50	15	D-5.0	d+5	0.4
> 50	2.50	20	D-5.0	d+5	0.4
> 50	2.50	25	D-5.0	d+5	0.4
> 50	2.50	30	D-5.0	d+5	0.4

The clearance "e" guarantees an optimal service life of the guide belt.
The operating conditions of the seals should also be taken into account.

Calculation of the unfolded length of the guide tape

Piston Rod Guide Belt:
 $L = 3.11 \times (d + S) - 0.8$

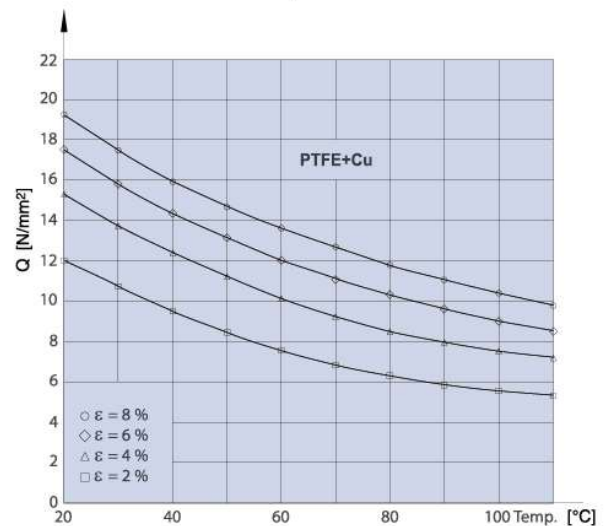
Piston guide belt:
 $L = 3.11 \times (D - S) - 0.8$

The coefficient of thermal expansion and gap dimensions are included in the above equations.

Guide Belt Model Selection

Depending on the permissible deformation of the guiding belt used, the corresponding curve is selected. Smaller permanent deformations (eps) guarantee a more precise guiding effect. The following is the formula for calculating the minimum belt width.

$$L \geq \frac{F}{Q(d_1 - k \cdot \sqrt{2})}$$



Permissible loads for S1106 material at different temperatures and compression deflection rates

GUIDE TAPE

GFC Type Guide Belt



Product Description

The GFC type is a guide tape pressed from polyester fibers impregnated with phenolic resin, with PTFE added to reduce friction, and can be used for pistons or piston rods.

Product Benefits

Available in any length, suitable for large sizes added PTFE has self-lubricating, improved lubrication characteristics with some vibration damping effect compared with thermoplastic materials, radial load bearing capacity is higher grooves are simple, easy to design with precise tolerances and dimensional accuracy

Scope of Application

GFC type live guide belts are mainly used in heavy-duty cylinders, construction machinery and other occasions with large radial loads.

Working Conditions

Operating Temperature	Hydraulic Oil	-50~+120℃
	HFA, HFB, HFC	-30~+80℃
Radial Load Strength q		320N/mm ²
Water Absorption		< 0.1%
Surface Velocity		≤0.5m/s

Mounting

For pistons and piston rods with a diameter of ≤ 100 mm, it is recommended to use guide rings type HGR and for pistons made of non-ferrous or light metal, guide bands type GF3 are recommended. The installed guide bands must have a clearance at the joints k.

$$k=0.015xd+2$$

The calculated value of k should be simplified to a value ending in 0.5 mm or an integer: The unfolding length U of the guide strip can be calculated using the following formula.

Piston: $U=TTx(d-S)-k$

Piston rod: $U=TTx(d+S)-k$

Allowable Radial Force

The calculation of the allowable radial force is based on the size of the projected area D-H of the piston or the projected area d-h of the piston rod.

Example: Cylinder diameter D = 80mm, guiding belt width L = 15mm, the material is -3 type safety factor of 4, then the allowable radial force FR

$$FR = \frac{D \cdot L \cdot q}{v} = \frac{80 \cdot 15 \cdot 320}{4} = 96\,000\text{ N}$$

Recommended safety factor v: $v > 3$

Ordering Code

GFC dXDXL Material Designator

Example: GFC 95X100X15 S1108

Order by length.

GFC Thickness X Width - Length (m)



HGR Type Guide Belt



Product Description

HGR type guide ring is a guiding support element in the sealing system, which bears the radial load in the system and avoids metal contact between the moving parts. HGR is usually available in three kinds of materials: phenolic fabric guide ring, PTFE-filled guide ring, and polyformaldehyde guide ring. Among them, phenolic fabric guide ring has the largest static radial compression strength ($\geq 300\text{MPa}$), which is suitable for cylinders with large partial loads, such as hydraulic bracket cylinders and cylinders for engineering machinery equipment; the static radial compression strength of paraformaldehyde guide ring is medium ($\geq 120\text{MPa}$), which is suitable for cylinders with medium partial loads, such as multi-stage cylinders; PTFE-filled guide ring is mainly used in light-loading conditions, such as air cylinders or metallurgical cylinders with higher temperatures. PTFE filled guide rings are mainly used for light load conditions, such as cylinders or metallurgical cylinders with high temperature. The guide rings have openings for easy installation.

Product Benefits

- Simple and quick fastening without the need for auxiliary tools during installation
- No metal contact on the sliding surface, thus reducing damage to metal parts. Has a vibration damping effect
- Increased radial load carrying capacity due to a wide range of material options
- Excellent emergency working conditions in case of insufficient lubrication.
- Precise tolerances and dimensional accuracy

Working Conditions

Makings	Nicknames
Phenolic resin (used manufacture bakelite)	S1108
Polyformaldehyde (CH_2O) _n	S1101
Polytetrafluoroethylene filled	S1106

Working Conditions

Operating Temperature	-50~+120°C	Phenolic sandwich fabric S1108
	-40~+100°C	Polyformaldehyde S1101
	-100~+200°C	Polytetrafluoroethylene filled S1106
Working Speed	0.5m/s	Phenolic sandwich fabric S1108
	1m/s	Polyformaldehyde S1101
	5m/s	PTFE filled S1106
Radial Load Strength	300MPa	Phenolic sandwich fabric S1108
	120MPa	Polyformaldehyde S1101
	25MPa(15%deformity)	PTFE filled S1106

Installation Instructions

For piston rods with diameters $d \leq 50\text{ mm}$, open grooves are recommended. For pistons made of non-ferrous or light metals, it is recommended to use guide strips of type GF3 mounted guide strips must have a clearance at the joint k :

$$k=0.015xd+2$$

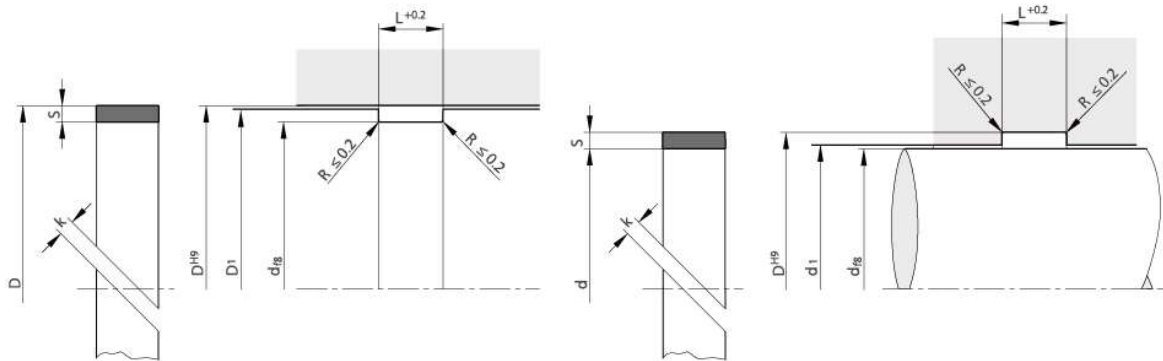
The unfolded length U of the guide strip can be calculated using the following formula: piston: $U=TTx(d-S)-k$ piston rod: $U=TTx(d+S)-k$

Ordering Code

HGR dXDXL Material Designator

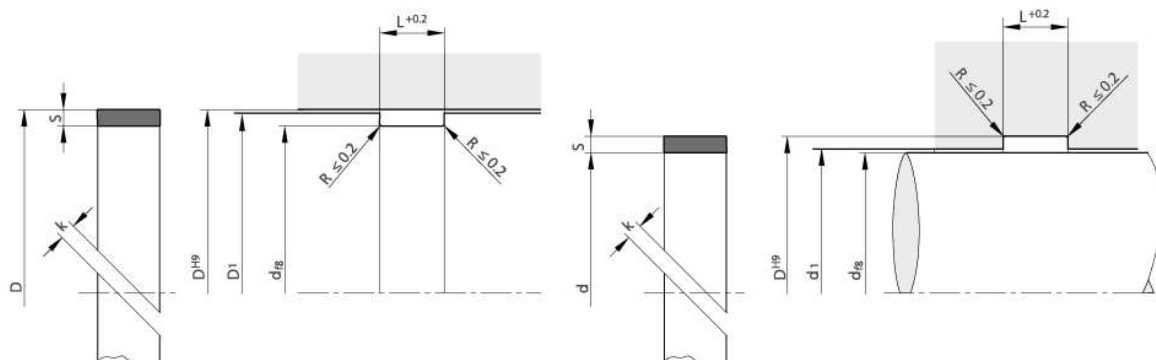
Example: HGR 100X105X15 S1108





d	D	L	d1	D1	Ordering Code
20	25	5.6	20.2	24.8	HGR 20X25X5.6 S1108
25	30	5.6	25.2	29.8	HGR 25X30X5.6 S1108
28	33	5.6	28.2	32.8	HGR 28X33X5.6 S1108
30	35	5.6	30.2	34.8	HGR 30X35X5.6 S1108
32	37	5.6	32.3	36.7	HGR 32X37X5.6 S1108
35	40	5.6	35.3	39.7	HGR 35X40X5.6 S1108
40	45	5.6	40.4	44.6	HGR 40X45X5.6 S1108
45	50	5.6	45.4	49.6	HGR 45X50X5.6 S1108
50	55	5.6	50.4	54.6	HGR 50X55X5.6 S1108
55	60	5.6	55.4	59.6	HGR 55X60X5.6 S1108
55	60	9.7	55.4	59.6	HGR 55X60X9.7 S1108
60	65	5.6	60.5	64.5	HGR 60X65X5.6 S1108
60	65	9.7	60.5	64.5	HGR 60X65X9.7 S1108
65	70	5.6	65.5	69.5	HGR 65X70X5.6 S1108
65	70	9.7	65.5	69.5	HGR 65X70X9.7 S1108
70	75	5.6	70.5	74.5	HGR 70X75X5.6 S1108
70	75	9.7	70.5	74.5	HGR 70X75X9.7 S1108
75	80	5.6	75.5	79.5	HGR 75X80X5.6 S1108
75	80	9.7	75.5	79.5	HGR 75X80X9.7 S1108
80	85	5.6	80.5	84.5	HGR 80X85X5.6 S1108
80	85	9.7	80.5	84.5	HGR 80X85X9.7 S1108
85	90	5.6	85.5	89.5	HGR 85X90X5.6 S1108
85	90	9.7	85.5	89.5	HGR 85X90X9.7 S1108
90	95	5.6	90.5	94.5	HGR 90X95X5.6 S1108
90	95	9.7	90.5	94.5	HGR 90X95X9.7 S1108
95	100	5.6	95.5	99.5	HGR 95X100X5.6 S1108
95	100	9.7	95.5	99.5	HGR 95X100X9.7 S1108
100	105	5.6	100.6	104.4	HGR 100X105X5.6 S1108
100	105	9.7	100.6	104.4	HGR 100X105X9.7 S1108
105	110	5.6	105.6	109.4	HGR 105X110X5.6 S1108
105	110	9.7	105.6	109.4	HGR 105X110X9.7 S1108
110	115	5.6	110.6	114.4	HGR 110X115X5.6 S1108
110	115	9.7	110.6	114.4	HGR 110X115X9.7 S1108
115	120	5.6	115.6	119.4	HGR 115X120X5.6 S1108
115	120	9.7	115.6	119.4	HGR 115X120X9.7 S1108
120	125	5.6	120.6	124.4	HGR 120X125X5.6 S1108

d	D	L	d1	D1	Ordering Code
120	125	9.7	120.6	124.4	HGR 120X125X9.7 S1108
125	130	9.7	125.6	129.4	HGR 125X130X9.7 S1108
125	130	15	125.6	129.4	HGR 125X130X15 S1108
130	135	9.7	130.6	134.4	HGR 130X135X9.7 S1108
130	135	15	130.6	134.4	HGR 130X135X15 S1108
135	140	9.7	135.6	139.4	HGR 135X140X9.7 S1108
135	140	15	135.6	139.4	HGR 135X140X15 S1108
140	145	9.7	140.7	144.3	HGR 140X145X9.7 S1108
140	145	15	140.7	144.3	HGR 140X145X15 S1108
145	150	9.7	145.7	149.3	HGR 145X150X9.7 S1108
145	150	15	145.7	149.3	HGR 145X150X15 S1108
150	155	9.7	150.7	154.3	HGR 150X155X9.7 S1108
150	155	15	150.7	154.3	HGR 150X155X15 S1108
155	160	9.7	155.7	159.3	HGR 155X160X9.7 S1108
155	160	15	155.7	159.3	HGR 155X160X15 S1108
160	165	9.7	160.7	164.3	HGR 160X165X9.7 S1108
160	165	15	160.7	164.3	HGR 160X165X15 S1108
165	170	9.7	165.7	169.3	HGR 165X170X9.7 S1108
165	170	15	165.7	169.3	HGR 165X170X15 S1108
170	175	9.7	170.7	174.3	HGR 170X175X9.7 S1108
170	175	15	170.7	174.3	HGR 170X175X15 S1108
175	180	9.7	175.7	179.3	HGR 175X180X9.7 S1108
175	180	15	175.7	179.3	HGR 175X180X15 S1108
180	185	9.7	180.7	184.3	HGR 180X185X9.7 S1108
180	185	15	180.7	184.3	HGR 180X185X15 S1108
185	190	9.7	185.7	189.3	HGR 185X190X9.7 S1108
185	190	15	185.7	189.3	HGR 185X190X15 S1108
190	195	9.7	190.7	194.3	HGR 190X195X9.7 S1108
190	195	15	190.7	194.3	HGR 190X195X15 S1108
195	200	9.7	195.7	199.3	HGR 195X200X9.7 S1108
195	200	15	195.7	199.3	HGR 195X200X15 S1108
200	205	15	200.7	204.3	HGR 200X205X15 S1108
205	210	15	205.7	209.3	HGR 205X210X15 S1108
210	215	15	210.7	214.3	HGR 210X215X15 S1108
215	220	15	215.7	219.3	HGR 215X220X15 S1108
220	225	15	220.7	224.3	HGR 220X225X15 S1108



d	D	L	d1	D1	Ordering Code
225	230	15	225.7	229.3	HGR 225X230X15 S1108
230	235	15	230.7	234.3	HGR 230X235X15 S1108
235	240	15	235.7	239.3	HGR 235X240X15 S1108
240	245	15	240.7	244.3	HGR 240X245X15 S1108
245	250	15	245.7	249.3	HGR 245X250X15 S1108
250	255	15	250.7	254.3	HGR 250X255X15 S1108
255	260	15	255.7	259.3	HGR 255X260X15 S1108
260	265	15	260.7	264.3	HGR 260X265X15 S1108
265	270	15	265.7	269.3	HGR 265X270X15 S1108
270	275	15	270.7	274.3	HGR 270X275X15 S1108
275	280	15	275.8	279.2	HGR 275X280X15 S1108
275	280	25	275.8	279.2	HGR 275X280X25 S1108
280	285	15	280.8	284.2	HGR 280X285X15 S1108
280	285	25	280.8	284.2	HGR 280X285X25 S1108
285	290	15	285.8	289.2	HGR 285X290X15 S1108
285	290	25	285.8	289.2	HGR 285X290X25 S1108
290	295	15	290.8	294.2	HGR 290X295X15 S1108
290	295	25	290.8	294.2	HGR 290X295X25 S1108
295	300	15	295.8	299.2	HGR 295X300X15 S1108
295	300	25	295.8	299.2	HGR 295X300X25 S1108
300	305	15	301	304	HGR 300X305X15 S1108
300	305	25	301	304	HGR 300X305X25 S1108
305	310	15	306	309	HGR 305X310X15 S1108
305	310	25	306	309	HGR 305X310X25 S1108
310	315	15	311	314	HGR 310X315X15 S1108
310	315	25	311	314	HGR 310X315X25 S1108
315	320	15	316	319	HGR 315X320X15 S1108
315	320	25	316	319	HGR 315X320X25 S1108
320	325	15	321	324	HGR 320X325X15 S1108
320	325	25	321	324	HGR 320X325X25 S1108
325	330	15	326	329	HGR 325X330X15 S1108
325	330	25	326	329	HGR 325X330X25 S1108
330	335	15	331	334	HGR 330X335X15 S1108
330	335	25	331	334	HGR 330X335X25 S1108
335	340	15	336	339	HGR 335X340X15 S1108
335	340	25	336	339	HGR 335X340X25 S1108

d	D	L	d1	D1	Ordering Code
340	345	15	341	344	HGR 340X345X15 S1108
340	345	25	341	344	HGR 340X345X25 S1108
345	350	15	346	349	HGR 345X350X15 S1108
345	350	25	346	349	HGR 345X350X25 S1108
350	355	15	351	354	HGR 350X355X15 S1108
350	355	25	351	354	HGR 350X355X25 S1108
355	360	25	356	359	HGR 355X360X25 S1108
360	365	25	361	364	HGR 360X365X25 S1108
365	370	25	366	369	HGR 365X370X25 S1108
370	375	25	371	374	HGR 370X375X25 S1108
375	380	25	376	379	HGR 375X380X25 S1108
380	385	25	381	384	HGR 380X385X25 S1108
385	390	25	386	389	HGR 385X390X25 S1108
390	395	25	391	394	HGR 390X395X25 S1108
395	400	25	396	399	HGR 395X400X25 S1108
400	405	25	401	404	HGR 400X405X25 S1108
405	410	25	406	409	HGR 405X410X25 S1108
410	415	25	411	414	HGR 410X415X25 S1108
415	420	25	416	419	HGR 415X420X25 S1108
420	425	25	421	424	HGR 420X425X25 S1108
425	430	25	426	429	HGR 425X430X25 S1108
430	435	25	431	434	HGR 430X435X25 S1108
435	440	25	436	439	HGR 435X440X25 S1108
440	445	25	441	444	HGR 440X445X25 S1108
445	450	25	446	449	HGR 445X450X25 S1108
450	455	25	451	454	HGR 450X455X25 S1108
455	460	25	456	459	HGR 455X460X25 S1108
460	465	25	461	464	HGR 460X465X25 S1108
465	470	25	466	469	HGR 465X470X25 S1108
470	475	25	471	474	HGR 470X475X25 S1108
475	480	25	476	479	HGR 475X480X25 S1108
480	485	25	481	484	HGR 480X485X25 S1108
485	490	25	486	489	HGR 485X490X25 S1108
490	495	25	491	494	HGR 490X495X25 S1108
495	500	25	496	499	HGR 495X500X25 S1108
500	505	25	501	504	HGR 500X505X25 S1108

KZT Sewage Retention Loop



Product Description

KZT type dirt-retaining ring is an auxiliary sealing element which mainly plays the role of dirt-retaining in the hydraulic cylinder, with extremely low coefficient of static and dynamic friction, the movement is still smooth under low speed, no crawling phenomenon. Hard objects in the hydraulic system can be embedded in the dirt ring to reduce and avoid hard objects scratching the cylinder and other seals. KZT is generally installed on both sides of the piston, or the guide sleeve against the rod cavity side. KZT has an opening, easy to install.

Product Benefits

- Wear-resistant and low friction
- No crawling at low speeds and large radial loads
- Work well even with insufficient lubrication
- Simple grooves for easy design
- Non-standard products can be supplied according to customer's required specifications

Scope of Application

KZT type naphthenic ring is mainly used in the working condition with harsh environment, such as excavator, metallurgical equipment, mining equipment and so on.

Technical Parameters

Working Temperature: $-100^{\circ}\text{C} \sim +200^{\circ}\text{C}$
Working speed: $\leq 5\text{m/s}$
Standard material: filled PTFE S1106

Design Statement

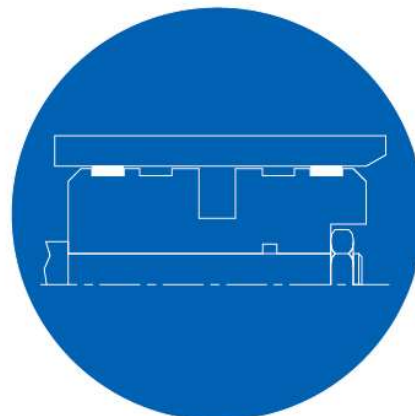
Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

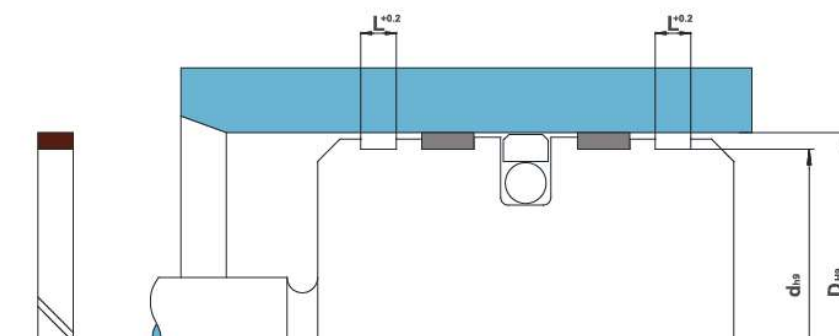
Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

Ordering Code

KZT DXdXL Material Designator

Example: KZT 125X117X6.2 S1106

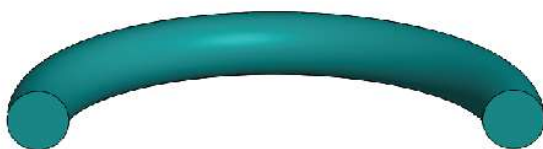




D	d	L	Ordering Code
65	57	6.2	KZT 65X57X6.2 S1106
70	62	6.2	KZT 70X62X6.2 S1106
75	67	6.2	KZT 75X67X6.2 S1106
80	72	6.2	KZT 80X72X6.2 S1106
85	77	6.2	KZT 85X77X6.2 S1106
90	82	6.2	KZT 90X82X6.2 S1106
95	87	6.2	KZT 95X87X6.2 S1106
100	92	6.2	KZT 100X92X6.2 S1106
105	97	6.2	KZT 105X97X6.2 S1106
110	102	6.2	KZT 110X102X6.2 S1106
115	107	6.2	KZT 115X107X6.2 S1106
120	112	6.2	KZT 120X112X6.2 S1106
125	117	6.2	KZT 125X117X6.2 S1106
130	122	6.2	KZT 130X122X6.2 S1106
135	127	6.2	KZT 135X127X6.2 S1106
140	132	6.2	KZT 140X132X6.2 S1106
145	137	6.2	KZT 145X137X6.2 S1106
150	142	6.2	KZT 150X142X6.2 S1106

D	d	L	Ordering Code
160	152	6.2	KZT 160X152X6.2 S1106
170	162	8.2	KZT 170X162X8.2 S1106
180	172	8.2	KZT 180X172X8.2 S1106
185	177	8.2	KZT 185X177X8.2 S1106
190	182	8.2	KZT 190X182X8.2 S1106
200	192	8.2	KZT 200X192X8.2 S1106
210	202	8.2	KZT 210X202X8.2 S1106
220	212	8.2	KZT 220X212X8.2 S1106
225	217	8.2	KZT 225X217X8.2 S1106
230	222	8.2	KZT 230X222X8.2 S1106
240	232	8.2	KZT 240X232X8.2 S1106
250	242	8.2	KZT 250X242X8.2 S1106
260	252	8.2	KZT 260X252X8.2 S1106
270	262	8.2	KZT 270X262X8.2 S1106
280	272	8.2	KZT 280X272X8.2 S1106
300	282	8.2	KZT 300X282X8.2 S1106
320	312	8.2	KZT 320X312X8.2 S1106
360	352	8.2	KZT 360X252X8.2 S1106

OR Type Static Seal



Product Description

The OR Static Seal is a polyurethane O-Ring with a very low compression set. O-rings made of this material are more resistant to extrusion than normal O-rings, making them more suitable for high impulse pressures or where space constraints prevent the use of retaining rings. Due to its high abrasion resistance, OR is also suitable for dynamic sealing applications and has achieved very good results: for example, pilot valve sealing of pneumatic valves or dynamic sealing of main spools. It can also be used for the positioning of short-stroke clamping cylinders, or for sealing valve bodies that are fed with HFA fluid but lack lubrication.

Product Benefits

- Excellent static and dynamic sealing properties
- Excellent wear and extrusion resistance
- Insensitivity to shock loads and pressure peaks
- Low permanent compression set
- Simple grooves for easy installation

Scope of Application

OR type static seals can be used in situations where the physical properties of other O-rings cannot be met. Mostly used for sealing cylinders, control elements and valves.

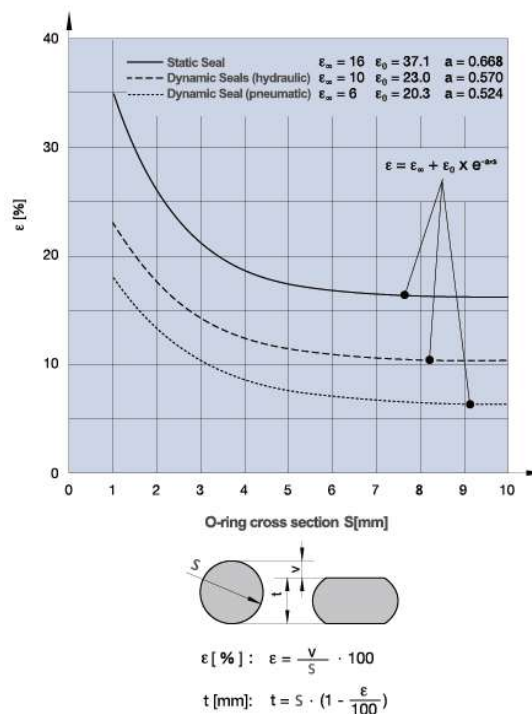
Material Selection

Standard Material	Durometer	Nicknames
organosilicon	93 Shore A	P2001

Technical Parameters

Working pressure: ≤60MPa (related to cross-section, extrusion gap, temperature and whether there is a retaining ring)
 Working temperature: -30 ~ +100°C (hydraulic)
 -30 ~ +80°C (pneumatic)
 Working speed: ≤0.5m/s
 Standard material: polyurethane P2001

Recommended Compression Ratio



Installation Instructions

Due to the high modulus of the polyurethane material, the grooves are slightly different from normal O-rings. All sides of the grooves need to be chamfered with a chamfer radius of at least 0.1 mm.

Dynamic applications need to meet the following minimum section dimensions:

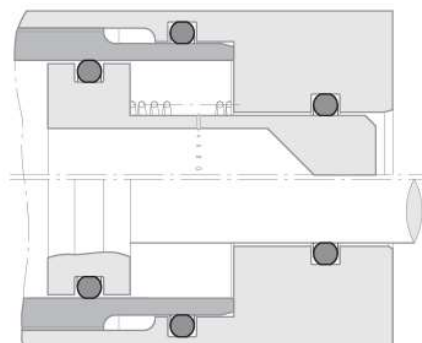
$$S=5.7 \text{ d} \leq 150 \text{ mm}$$

$$S=7.0 \text{ d} \leq 200 \text{ mm}$$

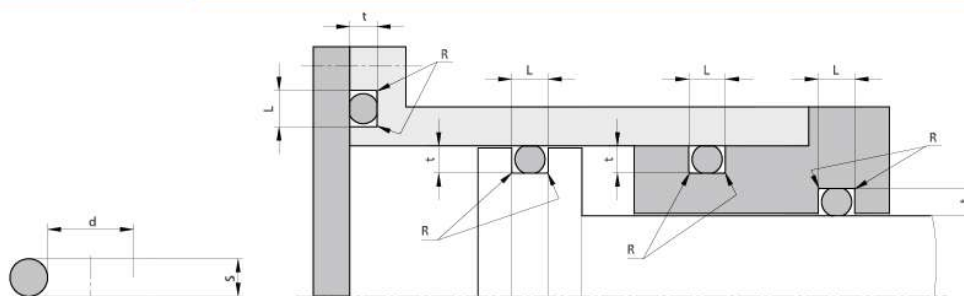
Ordering Code

OR dXs Material Designator

Example: OR 100X5.3 P2001



OR TYPE STATIC SEAL



■ Groove Size

S (mm)	R (mm)	Groove depth (radial) t (mm)			Groove depth (axial) L (mm) no retaining ring
		state of not working	dynamic (hydraulic)	dynamic (air pressure)	
1.00	0.2	0.65 ^{±0.05}	0.75 ^{±0.02}	0.80 ^{±0.02}	1.4 ^{+0.2}
1.50	0.2	1.05 ^{±0.05}	1.20 ^{±0.02}	1.25 ^{±0.02}	2.0 ^{+0.2}
1.80	0.2	1.30 ^{±0.05}	1.45 ^{±0.02}	1.55 ^{±0.02}	2.4 ^{+0.2}
2.00	0.2	1.50 ^{±0.05}	1.65 ^{±0.02}	1.75 ^{±0.02}	2.7 ^{+0.2}
2.50	0.2	1.95 ^{±0.05}	2.10 ^{±0.02}	2.20 ^{±0.02}	3.4 ^{+0.2}
2.65	0.3	2.05 ^{±0.05}	2.25 ^{±0.02}	2.35 ^{±0.02}	3.6 ^{+0.2}
3.00	0.3	2.40 ^{±0.05}	2.55 ^{±0.02}	2.70 ^{±0.02}	4.2 ^{+0.2}

S (mm)	R (mm)	Groove depth (radial) t (mm)			Groove depth (axial) L (mm) no retaining ring
		state of not working	dynamic (hydraulic)	dynamic (air pressure)	
3.50	0.3	2.80 ^{±0.07}	3.05 ^{±0.05}	3.20 ^{±0.05}	4.8 ^{+0.2}
3.55	0.3	2.85 ^{±0.07}	3.10 ^{±0.05}	3.25 ^{±0.05}	4.8 ^{+0.2}
4.00	0.3	3.25 ^{±0.07}	3.50 ^{±0.05}	3.65 ^{±0.05}	5.4 ^{+0.2}
5.00	0.3	4.15 ^{±0.10}	4.45 ^{±0.05}	4.65 ^{±0.05}	6.8 ^{+0.2}
5.30	0.5	4.40 ^{±0.10}	4.70 ^{±0.05}	4.90 ^{±0.05}	7.2 ^{+0.2}
7.00	0.5	5.85 ^{±0.10}	6.25 ^{±0.05}	6.55 ^{±0.05}	9.6 ^{+0.2}

d	s	Ordering Code
1.78	1.7	OR 1.78X1.7 P2001
2.9	1.78	OR 2.9X1.78 P2001
4	2.15	OR 4X2.15 P2001
4.47	1.78	OR 4.47X1.78 P2001
4.5	2.5	OR 4.5X2.5 P2001
5	1	OR 5X1 P2001
6.07	1.78	OR 6.07X1.78 P2001
6.75	1.78	OR 6.75X1.78 P2001
8	2	OR 8X2 P2001
8.5	1.9	OR 8.5X1.9 P2001
9.12	3.53	OR 9.12X3.53 P2001
9.19	2.62	OR 9.19X2.62 P2001
10	2	OR 10X2 P2001
10.5	1.8	OR 10.5X1.8 P2001
10.5	1.9	OR 10.5X1.9 P2001
10.82	1.78	OR 10.82X1.78 P2001
12.3	1.9	OR 12.3X1.9 P2001
12.42	1.78	OR 12.42X1.78 P2001
13	1.5	OR 13X1.5 P2001
13.94	2.62	OR 13.94X2.62 P2001
14	1.78	OR 14X1.78 P2001
14.3	1.9	OR 14.3X1.9 P2001
15	2	OR 15X2 P2001
15.5	3.75	OR 15.5X3.75 P2001
17.12	2.62	OR 17.12X2.62 P2001
18.77	1.78	OR 18.77X1.78 P2001
21.89	2.62	OR 21.89X2.62 P2001
25	3.5	OR 25X3.5 P2001
35.3	3.5	OR 35.3X3.5 P2001
43.8	3.1	OR 43.8X3.1 P2001
48.8	3.1	OR 48.8X3.1 P2001
53.8	3.1	OR 53.8X3.1 P2001

d	s	Ordering Code
59.6	5.7	OR 59.6X5.7 P2001
60	5	OR 60X5 P2001
65	5	OR 65X5 P2001
68.8	3.1	OR 68.8X3.1 P2001
69.6	5.7	OR 69.6X5.7 P2001
74.6	5.7	OR 74.6X5.7 P2001
78.8	3.1	OR 78.8X3.1 P2001
79.6	5.7	OR 79.6X5.7 P2001
80	5	OR 80X5 P2001
84.6	5.7	OR 84.6X5.7 P2001
89.6	5.7	OR 89.6X5.7 P2001
90	5.3	OR 90X5.3 P2001
99.4	3.1	OR 99.4X3.1 P2001
99.6	5.7	OR 99.6X5.7 P2001
100	5	OR 100X5 P2001
100	5.3	OR 100X5.3 P2001
109.6	5.7	OR 109.6X5.7 P2001
110	5	OR 110X5 P2001
119.6	5.7	OR 119.6X5.7 P2001
129.4	3.1	OR 129.4X3.1 P2001
129.6	5.7	OR 129.6X5.7 P2001
134.4	3.1	OR 134.4X3.1 P2001
139.4	3.1	OR 139.4X3.1 P2001
139.6	5.7	OR 139.6X5.7 P2001
139	5	OR 139X5 P2001
144.4	3.1	OR 144.4X3.1 P2001
148.6	5.7	OR 148.6X5.7 P2001
153.6	5.7	OR 153.6X5.7 P2001
159.3	5.7	OR 159.3X5.7 P2001
219.3	5.7	OR 219.3X5.7 P2001
228.6	5.7	OR 228.6X5.7 P2001
239	5.3	OR 239X5.3 P2001

YR Type Static Seal



Product Description

In the current design of hydraulic systems, O-rings or O-ring/retaining ring combinations are often used for static seals. However, this sealing solution involves certain risks during assembly, as the O-ring may be twisted and the retaining ring may not be optimally positioned. This solution also shows drawbacks in working conditions with pressure pulses and dirt intrusion. In this case, the YR seal can be an ideal alternative. The YR's strong, symmetrical cross-section structure and extrusion-resistant polyurethane material make the YR strong and improve sealing performance under pressure fluctuations. The YR has two sealing zones, which provide double protection and reduce the probability of leakage, resulting in a stable and reliable seal.

Product Benefits

- More resistant to twisting than O-rings
- Good resistance to extrusion
- Easy to install
- Longer service life

Scope of Application

YR type seals can be used in forklift trucks, construction machinery, industrial cylinders, injection molding machines and cartridge valves.

Technical Parameters

Working pressure: $\leq 60\text{MPa}$ (related to cross-section, extrusion gap and temperature)
Working temperature: $-30^{\circ}\text{C} \sim +100^{\circ}\text{C}$
Standard material: polyurethane P2001

Design Statement

PU	Allowable clearance e		
$t=(D-d)/2$	15MPa	20MPa	40MPa
$t \leq 5$	0.30	0.20	0.15
$t > 5$	0.35	0.25	0.20

Surface Finish		Ra	Rz
Sliding Surface	ΦD	$\leq 0.4\mu\text{m}$	$\leq 3.2\mu\text{m}$
Bottom of Trench	Φd	$\leq 1.6\mu\text{m}$	$\leq 6.3\mu\text{m}$
Groove Side		$\leq 3.2\mu\text{m}$	$\leq 12.5\mu\text{m}$

Surface Finish		
Sliding Surface	ΦD	H9
Bottom of Trench	Φd	h9
Groove Side	L	+0.2

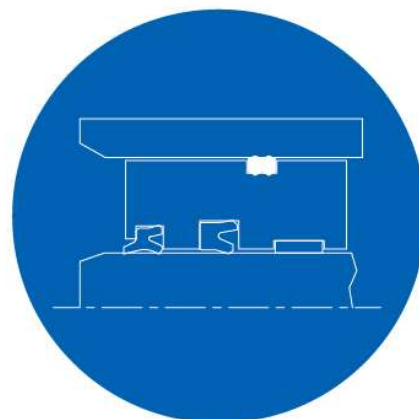
Installation Instructions

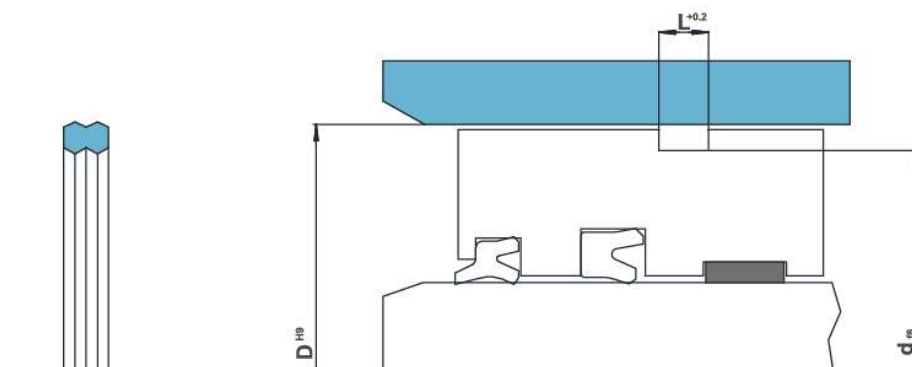
When installing, do not pull the seal on a sharp edge. If manual installation is difficult, an installation tool may be used, but the tool must be of soft material and free of sharp edges. A matching lubricant must be applied to the seal before installation.

Ordering Code

YR DXdXL Material Designator

Example: YR 75X69.4X5.3 P2001

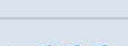




D	d	L	Ordering Code
22	17.5	3.7	YR 22X17.5X3.7 P2001
26	22	3.6	YR 26X22X3.6 P2001
30	27.6	2.4	YR 30X27.6X2.4 P2001
38	35.8	2.4	YR 38X35.8X2.4 P2001
40	35.2	5.4	YR 40X35.2X5.4 P2001
50	45.8	3.4	YR 50X45.8X3.4 P2001
55	50	6.7	YR 55X50X6.7 P2001
63	57.6	4.8	YR 63X57.6X4.8 P2001
74.6	70	3.8	YR 74.6X70X3.8 P2001
75	69.4	5.3	YR 75X69.4X5.3 P2001
75	69.6	6.2	YR 75X69.6X6.2 P2001
80	73.8	5	YR 80X73.8X5 P2001
80.5	75.7	6.7	YR 80.5X75.7X6.7 P2001
85.5	80.7	7.3	YR 85.5X80.7X7.3 P2001
90	83.8	5	YR 90X83.8X5 P2001
90.5	85.7	7.3	YR 90.5X85.7X7.3 P2001
100	90.6	7.5	YR 100X90.6X7.5 P2001
105	96.6	7.1	YR 105X96.6X7.1 P2001

D	d	L	Ordering Code
110	101.4	9	YR 110X101.4X9 P2001
110.5	105.1	7.7	YR 110.5X105.1X7.7 P2001
111	105.2	6.2	YR 111X105.2X6.2 P2001
115.5	110.7	7.7	YR 115.5X110.7X7.7 P2001
118	110	5.4	YR 118X110X5.4 P2001
120	114.6	6.2	YR 120X114.6X6.2 P2001
126	120.2	6.2	YR 126X120.2X6.2 P2001
134.5	126.1	7.1	YR 134.5X126.1X7.1 P2001
154.5	146.1	7.1	YR 154.5X146.1X7.1 P2001
165	156.4	9	YR 165X156.4X9 P2001
175.5	167.1	7.1	YR 175.5X167.1X7.1 P2001
185.5	177.1	7.1	YR 185.5X177.1X7.1 P2001
197.5	189.1	7.1	YR 197.5X189.1X7.1 P2001
220	210	8.7	YR 220X210X8.7 P2001
250	240	8	YR 250X240X8 P2001
260	250	8	YR 260X250X8 P2001
265	255	8	YR 265X255X8 P2001
280	270	8	YR 280X270X8 P2001

Piston Rod Seals

model number	name (of a thing)	section view	Optional Materials	work pressure (MPa)	operating temperature (°C)	working speed (m/s)	Product Features
HRF	Piston Rod Seals		M6412	30 (without retaining ring)	-40°C~+120°C	0.5	1. symmetrical structure, can be used as piston rod seal or piston seal; 2. good dynamic and static sealing performance, suitable for low-temperature and low-pressure or vacuum, high requirements for sealing occasions.
HRN	Piston Rod Seals		P2001	25MPa (without retaining ring)	-30~+100	1.0	1. An oil drain groove is provided on the end face to prevent damage to the lip caused by back pressure; 2. Good low pressure sealing, suitable for crushing hammer sealing.
HRSD	Piston Rod Seals		P2114	25 (without retaining ring)	-20°C~+120°C	1.0	1. Adopting high temperature resistant polyurethane material, large interference, good low pressure sealing effect; 2. Suitable for high frequency working conditions such as small digging cylinders.
HRU	Piston Rod Seals		M8002	50	-30~+100	0.5	1. Excellent static and dynamic sealing ability, good resistance to high pressure; 2. Suitable for mining equipment, steel industry, marine hydraulics, cranes, etc..
HRVC	Piston Rod Seals		M2003	35	-30~+100	0.5	1. It has excellent wear resistance and sealing performance, and can be adapted to special working condition requirements by changing or adjusting the axial preload; 2. It is suitable for high-frequency working conditions such as pumping the main cylinder.
VZQ	Piston Rod Seals		UPE+PU+NBR	35	-30~+80	0.5	1. Low friction, wear resistance, good static and dynamic sealing performance, long working life; 2. Suitable for water conservancy cylinder and other ceramic rod hydraulic cylinder.
FVR	Piston Rod Seals		PC002+ stainless steels	35	-200~+260	15.0	1. Small mounting dimensions (open groove), low coefficient of friction, long life and ability to compensate for wear; 2. Used in applications with stringent requirements for temperature, speed, and media resistance.
VLR	Piston Rod Seals		P2071N P2071V	40	-30~+100 -20~+200	5.0	1. Very good sealing performance; 2. Suitable for military, aerospace cylinders and other demanding low-friction working conditions.
GCR	Piston Rod Seals		P2071N P2071V	35	-30~+100 -20~+200	5.0	1. Small groove size, alternative to O-ring to improve wear resistance and friction performance, can be directly fitted into the existing standard O-ring groove; 2. Suitable for use as a double-acting seal, used in machine tools, manipulators, valves and other fields.
STB	Piston Rod Seals		NBR+POM PKM+PEEK	70	-30~+100 -20~+200	0.5	1. Retaining rings on both sides eliminate spiral or twisting failures that can occur under dynamic motion; 2. Suitable for dynamic applications as an alternative to O-rings or star rings.
XTR	Piston Rod Seals		P2071N P2071V	40	-30~+100 -20~+200	2.0	1. Equipped with star ring, it has very good dynamic and static sealing performance; 2. Suitable for cylinders or accumulators to isolate gas and liquid media.

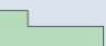
Piston Seal

model number	name (of a thing)	section view	optional Materials	work pressure (MPa)	operating temperature (°C)	working speed (m/s)	Product Features
HPD	Piston Rod Seals		M6009	30	-30~+100	0.5	1. Polyurethane slip rings have very good dynamic and static sealing performance and are very resistant to wear; 2. Suitable for medium load working condition with strict requirements on internal leakage.
GYP	Piston Rod Seals		P2071N P2071V	100	-30~+100 -20~+200	5.0	1. High-strength retaining rings are installed on both sides for higher pressures or clearances; 2. Bi-directional piston sealing systems for higher pressures or larger clearance values.
GCP	Piston Rod Seals		P2071N P2071V	16	-30~+100 -20~+200	5.0	1. Small groove size, alternative to O-ring to improve wear resistance and friction performance, can be directly fitted into the existing standard O-ring groove; 2. Suitable for use as a double-acting seal, used in machine tools, manipulators, valves and other fields.
STA	Piston Rod Seals		NBR+POM PKM+PEEK	70	-30~+100 -20~+200	0.5	1. Retaining rings on both sides eliminate spiral or twisting failures that can occur under dynamic motion; 2. Suitable for dynamic applications as an alternative to O-rings or star rings.
FVP	Piston Rod Seals		PC002+ stainless steels	35	-200~+260	15.0	1. Small mounting dimensions (open groove), low coefficient of friction, long life and ability to compensate for wear; 2. Used in applications with stringent requirements for temperature, speed, and media resistance.

Dust Collar

model number	name (of a thing)	section view	Optional Materials	work pressure (MPa)	operating temperature (°C)	working speed (m/s)	Product Features
HWB	Dust Collar		P2006	-	-46 ~ +90	0.5	1. Precise end face closure protection to avoid accumulation of dirt; 2. Suitable for waterproof and dustproof working conditions, or working conditions where the cylinder has a large side load and the piston rod has eccentricity, such as hydraulic bracket and crane cylinder.
HWC	Dust Collar		P2009	-	-30 ~ +100	1.0	1. The outer diameter sealing lip prevents external dirt from entering; 2. Suitable for traveling machinery, mining equipment and other harsh working conditions.
HWE	Dust Collar		P2001	-	-30 ~ +100	1.0	1. Small installation size, good stability in the groove, not easy to be taken out; 2. Suitable for injection molding machine cylinders and other low and medium pollution working conditions.
HWGA	Dust Collar		M1112	-	-20 ~ +120	1.0	1. The design of outer diameter polyurethane lip and thickened inner lip is excellent for dustproof; 2. Adopting high temperature resistant polyurethane material, suitable for excavator cylinders and other harsh working conditions.
HWN	Dust Collar		M1001	-	-30 ~ +100	1.0	1. Simple structure, good scraping effect on dirt; 2. Applicable to engineering machinery, agricultural machinery, cranes, etc.
HWT	Dust Collar		P2005	-	-30 ~ +100	1.0	1. Single-acting dust ring, good dustproof performance, not easy to be taken out; 2. Suitable for medium and low pollution working conditions, such as injection molding machines, press cylinders and so on.
HWX	Dust Collar		P2006	-	-46 ~ +90	0.5	1. The external dust lip design can effectively prevent moisture and impede the penetration of dust and muddy water; 2. Suitable for dump trucks, agricultural machinery and other all-weather field working environment.
HWYD	Dust Collar		P2006	-	-46 ~ +90	0.5	1. Excellent contact stress, very good scraping effect on residual oil film; 2. Suitable for harsh working conditions and dirty operating environments.
FD9	Dust Collar		P2071N P2071V	-	-30 ~ +100 -20 ~ +200	5.0	1. Low friction, low viscous friction, excellent adjustment and positioning ability; 2. Suitable for injection molding machine, hydraulic machine, rolling machine, metallurgical machinery, etc.,.

Guide Element

model number	name (of a thing)	section view	Optional Materials	work pressure (MPa)	operating temperature (°C)	working speed (m/s)	Product Features
GFA	Guide Element		S1101	-	-40 ~ +100	1.0	1. Unique beveled angle design with good dustproof and ice scraping effect; 2. Suitable for working conditions with heavy dust, icing or large radial-radial load.
GFI	Guide Element		S1101	-	-40 ~ +100	1.0	1. Notch design, more reliable and stable installation; 2. Suitable for heavy-duty working conditions.
GFL	Guide Element		S1101	-	-40 ~ +100	1.0	1. High load bearing, low abrasion, low friction coefficient of material, long service life; 2. Suitable for heavy-duty working conditions such as dump trucks.
GFT	Guide Element		S1101	-	-40 ~ +100	1.0	1. Notch design, more reliable and stable installation; 2. Suitable for heavy-duty working conditions.

Static Seal

model number	name (of a thing)	section view	Optional Materials	work pressure (MPa)	operating temperature (°C)	working speed (m/s)	Product Features
SP	Static Seal		P2001	60	-30 ~ +100	-	1. Good pressure-bearing capacity and anti-twisting; 2. Suitable for static sealing working condition instead of O-ring plus retaining ring.

Sealing Program Questionnaire

person in charge: _____

Date: _____

Number: _____

1. Company Information

company identification			
associates		office	
Company Address			
telephones		telex	
E-mail address			

2. Basic Information

application environment		application terminal	
Currently using brands		product Number	
New design seal			
Projected annual usage		quote	
Current utilization			
sports format	☐ static (as inelectrostatic force)	☐ revolve	☐ backwards and forwards (e.g. of piston or pumpaction)
Seal type and working condition	☐ piston rod	☐ pistons	☐ face seal
RPM:	Angle of rotation:	Itinerary:	Speed:
Stress:	Directions:	Temperature:	Medium:

3. Groove Size

piston rod	pistons	end face

If there are other special working condition requirements, please contact us for consultation so that we can recommend suitable materials and structures.

