Benefits

- PTFE – even without lubrication – excels at offering an exceptionally low coefficient of friction in combination with metals and plastics
- PTFE is highly anti-adhesive, without any stick-slip effect
- PTFE has high elongation properties enabling easy fitting of sealing and guide elements to one-piece pistons
- PTFE – when subjected to moderate stress – offers an exceptionally wide (for plastics) thermal operating range from –200 °C to +260 °C
- PTFE is chemically resistant to nearly all solid, liquid and gaseous media
- PTFE is age-resistant, non-combustible and physiologically neutral in the stated temperature range

PTFE piston rings have been manufactured and used in oil-free compressors for many years. The demand for seals suitable for oil-free applications has grown considerably in recent years. This development has largely been driven by increased awareness of environmental concerns, more stringent regulations and the constant need to achieve further cost reductions.

By fine-tuning filler contents and manufacturing processes we have developed a system range of PTFE special compounds enabling us to offer the optimum compound even for extreme application conditions.

Piston Rings

Fields of Application

Meanwhile, our solutions have established themselves as essential elements in numerous industrial, engineering and consumer goods sectors.

Selected examples include:

- Compressors operating under full and low-lube conditions
- Gas rotary pumps
- Expansion machinery
- Liquid gas and vacuum pumps
- Wobble piston compressors
- Rotation compressors for loading/unloading of silos
- Generation of oil-free compressed air for the food processing industry, pharmaceutical industry and dentistry
- Compressed air for the crafts and do-it-yourself market
- Pneumatic hammer drills
- Automotive technology, including ride leveling and air-conditioning systems

Types

Straight Joint
Piston rings with straight joints are used for sealing pressure differences above 15 bar. With this gap, leakage is slightly higher than with piston rings that have a scarf joint. Due to the high compressor speeds (rpm) typically achieved today, the loss of gas from leakage has a minor impact on compressor performance. The amount of gas leakage is negligible.

Scarf Joint
Piston rings with scarf joints are used for sealing pressure differences above 15 bar. During the run-in period the sealing effect (tightness) of scarf joints is slightly better than that of piston rings with a straight joint.

Overlapped Joint
The overlapped joint achieves a favorable sealing effect. For this reason, it is primarily used for sealing gases with a specific light weight. Due to the occurrence of bending stress and the resulting risk of breakage in the overlapping areas, piston rings with overlapped joints should only be used in compressors operating with pressure differences of a maximum of 15 bar.

Gas-tight Joint
Our gas-tight piston rings achieve the best sealing effect. The special design of the joint reduces leakage to a minimum. As with the overlapping joint the level of differential pressure is limited to a maximum of 15 bar. With regard to assembly please note that the piston ring achieves its good sealing effect only in one direction of pressure.

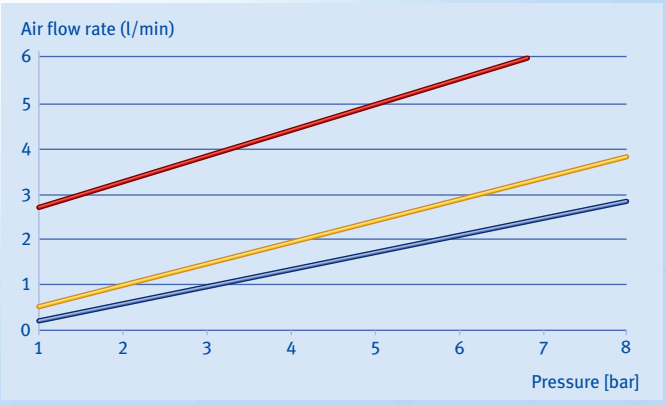
A piston ring always seals two surfaces. It is pressed against the cylinder wall and the groove flank by the pressure load and its inherent pre-loading force.

PTFE piston rings are self-clamping. Consequently, in most cases, there is no need to back the ring by a clamping spring. For compressors with upright cylinders self-clamping piston rings up to app. 700 mm can be manufactured.

Limit Values, PTFE Piston Rings[1]

Median piston speed up to	m/s	5.2
Temperature	°C	–60 to +200
Max. pressure differences to be sealed	bar	100

Efficiency of the different types of piston ring cut[2]



Test Conditions:
Piston rings made of PTFE,
dimensions:
Ø 48 x Ø 60 x 6
Piston rings not run in
Static test
T = 100 °C
Medium: Air

Scarf Joint
Overlapped Joint
Gas-tight Joint

Technical Details

Compounds

The selection of the suitable compound is largely affected by the contact surface, medium used and a number of other factors. Please contact our application engineers to discuss your requirements.

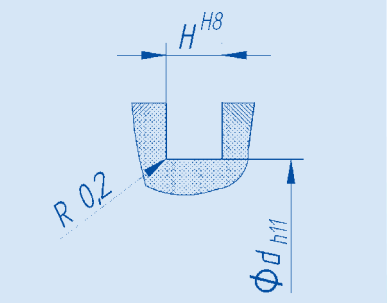
Contact Surfaces

In wear tests to determine the most favorable wear resistance of PTFE compounds with sealing and guide elements for compressors gray cast iron (e.g. fine-laminar gray cast iron) has found to be a particularly favorable contact surface. However, whenever there is a risk of corrosion due to the humidity contained in the gas, high-alloyed chrome steels, hard-anodized aluminum or Nikasil are normally used. The best wear results have been obtained with the following surface roughnesses:

	Gray cast iron	*chrome steels and hard-anodized aluminum*
Rz	2.0 to 4.0 µm	1.0 to 2.0 µm
Ra	0.4 to 0.8 µm	0.1 to 0.25 µm

Design and Fitting Instructions

Design of installation space



Surface Quality

	Groove base	*Groove flank*
Rz	10 µm	4 µm
Ra	1.6 µm	0.8 µm

Piston rings should be installed by keeping elongation to an absolute minimum.

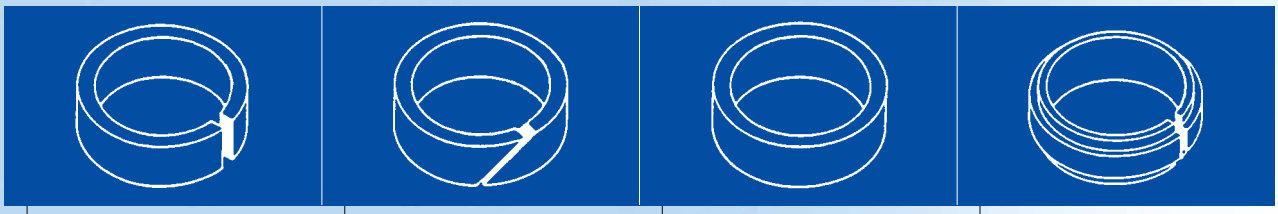
Benefits

- Chemical and thermal resistance to virtually all media used in hydraulics and pneumatics
- Suitable for use with non-hardened contact surfaces
- High bearing capacity, pressure resistance and low wear
- No stick-slip even with low sliding speeds and high transverse loads
- Minimal lubrication required
- Extremely low breakaway forces even after prolonged downtimes
- Large compound selection, e.g. wear-resistant PTFE compounds for oil-free applications
- Easy installation due to cut grooves

Guide rings and bands serve to prevent any contact of the piston and/or rod with the cylinder wall in order to avoid subsequent damage to these parts. Usually, guides with straight or scarf joints are used. The scarf joint is the most commonly used joint.

Guide Rings and Bands

Guide Ring Versions



Straight Joint

Scarf Joint

Continuous

Shouldered with straight Joint

Guide rings with scarf joints provide the advantage of fully running across the cylinder contact surface, thus causing no “markings” on the surface unlike the straight joint.

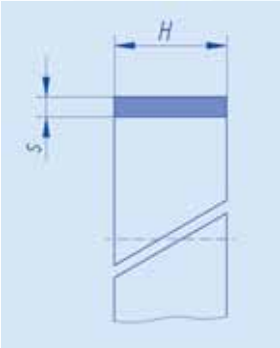
Guide rings with straight or scarf joints can only be fitted if no more than $^1/_3$ of the guide ring width overruns the valve nests inside the cylinder. If several valve nests are overrun, one-piece shrink-fitted guide rings are used. Depending on the respective application, piston guide rings with axial and/or radial balancing grooves may be used as well. The dimensions of the guide ring depend on the particular application.

Operating Limits[(1)]	
Sliding speeds	≤ 4 m/s
Temperature range	–100 °C to +200 °C
Specific pressure load	at 20 °C max. 10.0 N/mm²
	at 100 °C max. 5.0 N/mm²
	at 180 °C max. 2.5 N/mm²

Guide Band Versions

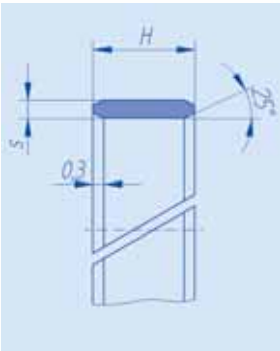
Preferential Ranges, Guide Bands

a) Hydraulics (PTFE-bronze)



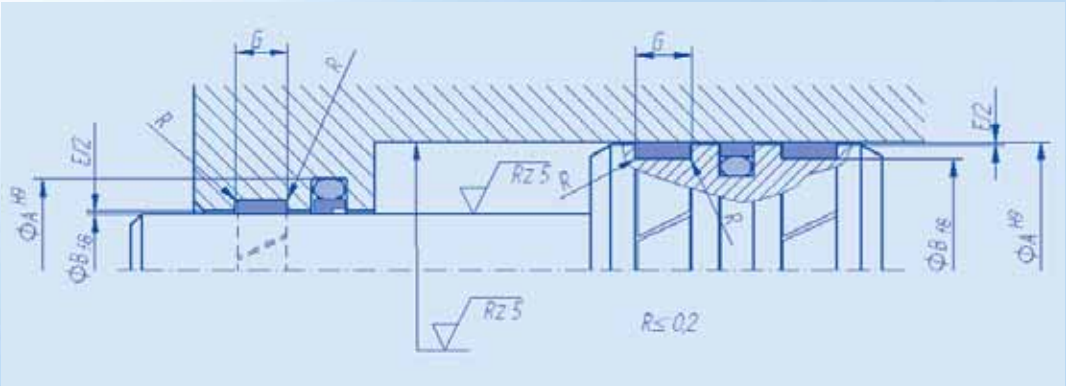
Nominal Dimensions Width H	Thickness s	Groove Width G	Groove Base Gauge w/rod guide A^{H9}	w/piston guide B_{f8}	Radial-Clearance max. E/2
4.0	1.55	4.0 + 0.2	B + 3.1	A – 3.1	0.3
5.5	2.50	5.6 + 0.2	B + 5.0	A – 5.0	0.5
8.0	2.00	8.1 + 0.2	B + 4.0	A – 4.0	0.4
9.5	2.50	9.6 + 0.2	B + 5.0	A – 5.0	0.5
10.0	2.00	10.1 + 0.2	B + 4.0	A – 4.0	0.4
15.0	2.50	15.1 + 0.2	B + 5.0	A – 5.0	0.5
20.0	2.50	20.1 + 0.2	B + 5.0	A – 5.0	0.5
24.5	2.50	25.0 + 0.2	B + 5.0	A – 5.0	0.5

b) Pneumatics (PTFE-carbon)



Nominal Dimensions Width H	Thickness s	Groove Width G	Groove Base Gauge w/rod guide A^{H9}	w/piston guide B_{f8}	Radial-Clearance max. E/2
4.0	1.55	4.0 + 0.2	B + 3.1	A – 3.1	0.3
8.0	1.55	8.1 + 0.2	B + 3.1	A – 3.1	0.3
10.0	1.55	10.1 + 0.2	B + 3.1	A – 3.1	0.3
15.0	1.55	15.1 + 0.2	B + 3.1	A – 3.1	0.3

Installation Example



Surface Quality

See Spring-Energized Seals chapter.

PTFE Laminated Piston

The PTFE laminated piston is a gapless enclosure of the piston skirt made from aluminum or gray cast iron with a PTFE film.

Characteristics:

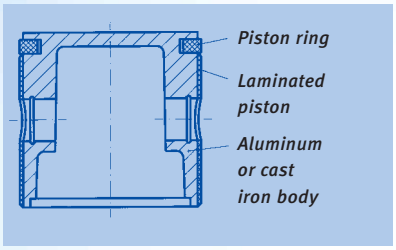
- Maximum use of the available guide surface
- High-temperature-resistant PTFE metal composite
- Minimal thickness of the PTFE guide band casing

Applications and Typical Uses

- In dry-running compressors as plunger piston guide for compressing 100% oil-free air
- To achieve minimum friction and to serve as an optimum guide for low-lube operations
- Armature plating for solenoid valves
- Piston plating for gas meters

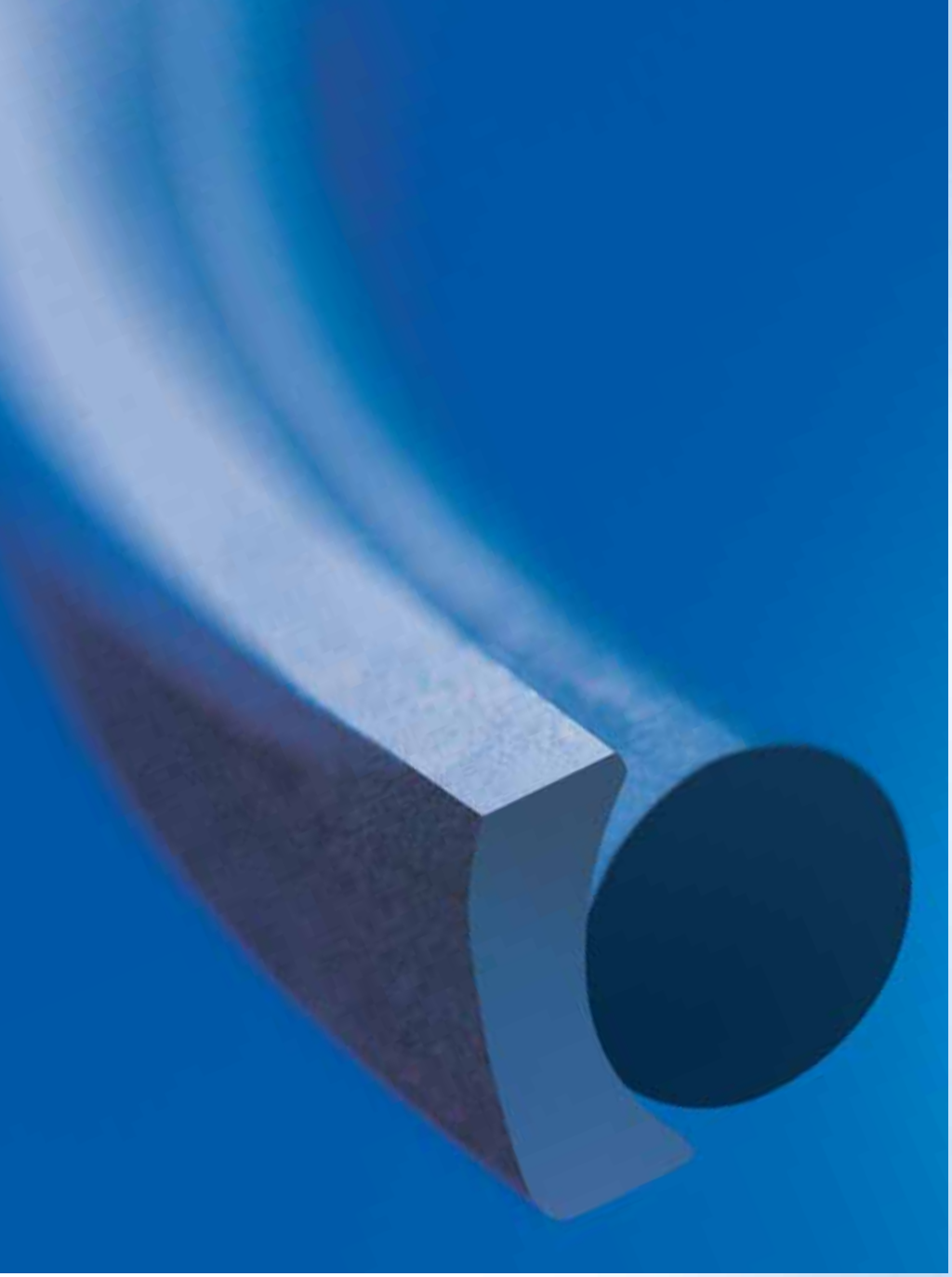
Limit Values of the Permanent PTFE Composite [1]

Max. median piston speed	m/s	5.2
Max. temperature load of the permanent composite	°C	+200



Benefits of the lamination vis-à-vis standard guide rings and bands

- The specific surface pressure is reduced by plating the piston skirt all the way to the seal groove, thus resulting in very long service life
- Reduced running clearance of the piston due to small radial thickness of the PTFE laminated piston and the resulting low thermal expansion
- Reduced running clearance largely prevents piston slap, resulting in significantly smoother operation
- Improved thermal transition from the metal piston to the cylinder wall due to the minimal thickness of PTFE laminated piston and the large contact surface



Benefits

- No stick-slip even with low sliding speeds and even after prolonged downtimes
- Low wear
- Good dry-running properties
- Simple design of installation grooves
- Low friction
- Ø 3 mm to Ø 3000 mm available
- High pressure stability
- Small installation spaces
- Lubrication depot
- For internally and externally sealing functions

Type MRA and MRI are **double-acting** composite seals. They are primarily used with alternating directions of pressure (e.g. piston seals).

Type SRI and SRA are **single-acting** composite seals. They have proven to be particular effective for sealing piston rods. The sealing effect is produced by the inherent preload of the PTFE profile ring vis-à-vis the rod and the preload of the rubber-elastic O-ring in the groove area.
With rising system pressure the radial contact pressures increase as well.

Rotary composite seals are particularly well suited for sealing rotating shafts, such as in rotary transmissions, rotary distributors, rotary joints and swiveling motors in mobile hydraulics and machine tools. A specially designed slide ring based on PTFE or PE is pressed against the surface by an elastomer O-ring and additionally activated by the system pressure.

Composite Seals

Fields of Application

Composite seals are particularly well suited for sealing pistons and rods in hydraulic and pneumatic working cylinders.

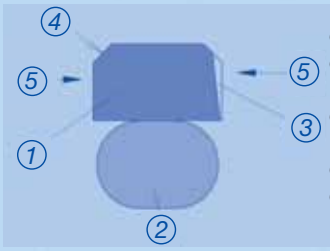
They consist of two components:

- a profile ring made of the high-strength fluoro-plastic, PTFE, or alternatively from an ultra-high-molecular PE for dynamic sealing of the sliding surface (primary seal)
- an O-ring for static sealing in the groove area (secondary seal)

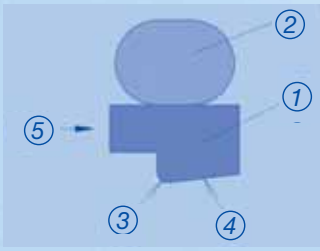
Versions and Operating Limits [1]

Sliding speed	max. 4 m/s ⇔
Temperature range	–45 °C bis +200 °C
Service pressure	max. 400 bar

Design and Action Principle



① *MRA composite seal*
② *O-ring serving as elastic pre-loading element*
③ *Relief groove prevents "sticking" to groove flank*
④ *Phase facilitates assembly*
⑤ *Direction of pressure*



① *SRI composite seal*
② *O-ring serving as elastic pre-loading element*
③ *Sealing edge generates nearly linear sealing compression*
④ *Wedge angle promotes return of drag film into compression area*
⑤ *Direction of pressure*

Fitting Instructions

- Use lead-in chamfers/fitting tapers for cylinder barrel and piston rod
- Debur and chamfer sharp edges
- Cover crests of thread
- Carefully remove dust, dirt, swarf, chips, etc.
- Do not use sharp-edged fitting tools

To facilitate assembly we recommend:

Greasing and/or oiling of sliding surfaces and seals (do not use lubricants with solid additives). Heating of externally sealing PTFE rings in oil or hot water up to 80 °C to 120 °C.

Surface Quality

	Dynamic contact surface/rod	*Static groove diameter/ housing*
Rz	≤ 1.0 µm	≤ 6.3 µm
Rmax	≤ 2.0 µm	≤ 12.5 µm

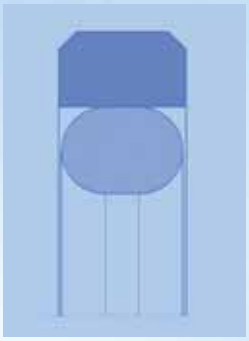
Compounds

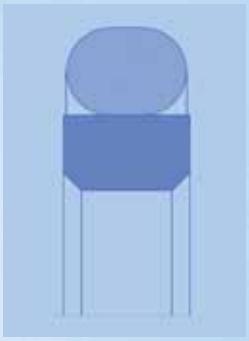
On request, depending on application.

Type MRA | MRI

Groove Dimensions

*Depending on installation conditions, other profiles – differing from the standard dimensions provided – may be selected for **composite seal type MRA** (externally sealing) and **type MRI** (internally sealing). The respective groove dimensions are listed in the table below.



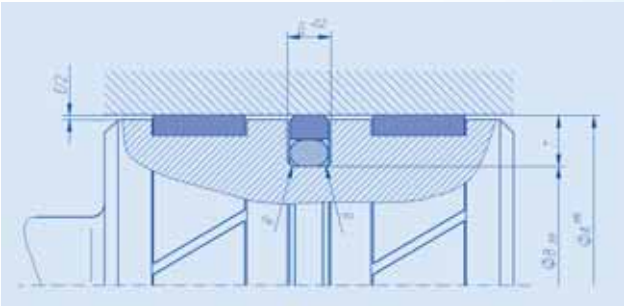


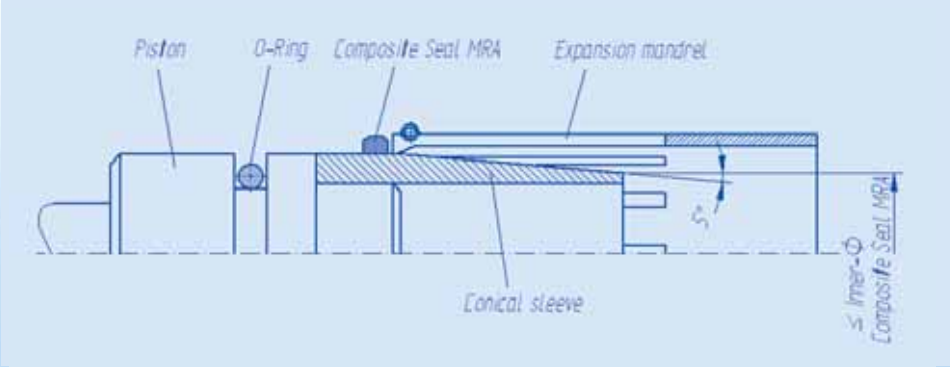
*Profile Designation**	*Groove Depth T*	*Groove Width $G^{+0.2}$*	*Radius R max*	*Radial Clearance max E/2*
8 – 15	2.45	2.2	0.4	0.15
15 – 40	3.75	3.2	0.6	0.15
40 – 80	5.50	4.2	1.0	0.20
80 – 133	7.75	6.3	1.3	0.20
133 – 330	10.50	8.1	1.8	0.25
330 – 670	12.25	8.1	1.8	0.25
670 – 1000	14.00	9.5	2.5	0.30
≥ 1000	19.00	13.80	3.0	0.40

Fitting Instructions

- Insert O-ring into groove
- Slide composite seals onto fitting shell using expander
- Let composite seal snap into groove
- If necessary, we recommend subsequent calibration using a sleeve
- To assist with making the fitting tools, we will be happy to provide respective drawings

Installation Example MRA

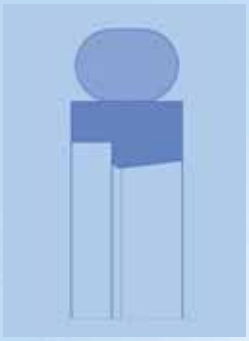


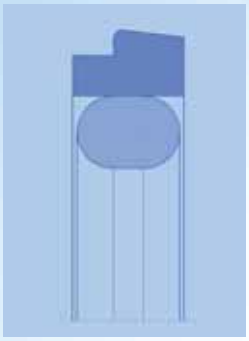


Type SRI | SRA

Groove Dimensions

*Depending on installation conditions, other profiles – differing from the standard dimensions provided – may be selected for **composite seal type SRI** (internally sealing) and **type SRA** (externally sealing). The respective groove dimensions are listed in the table below.





*Profile Designation**	*Groove Depth T*	*Groove Width G$^{+0.2}$*	*Radius R max*	*Radial Clearance max E/2*
3 – 8	2.45	2.2	0.4	0.15
8 – 19	3.65	3.2	0.6	0.15
19 – 38	5.35	4.2	1.0	0.20
38 – 200	7.55	6.3	1.3	0.20
200 – 256	10.25	8.1	1.8	0.25
256 – 650	12.00	8.1	1.8	0.25
650 – 1000	13.65	9.5	2.5	0.30
≥ 1000	19.00	13.80	3.0	0.40

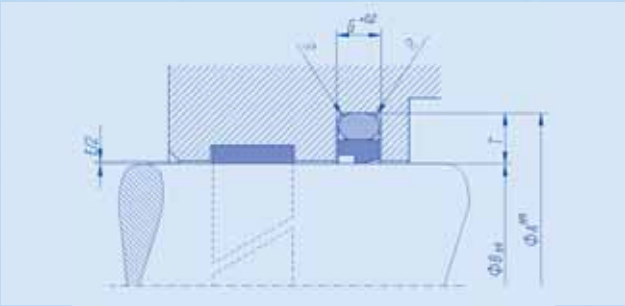
Fitting Instructions

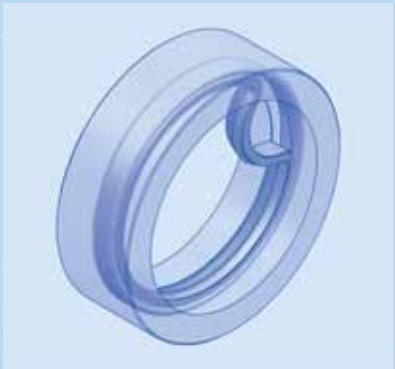
For rod diameters below 30 mm use axially accessible grooves.

For rod diameters above 30 mm the seals may be installed in the closed grooves.

- **Inset O-ring into groove**
- **Compress composite seal into a “kidney” shape and insert into groove**
- **If necessary, we recommend subsequent calibration, using a mandrel**

Installation Example, Rod Seal SRI



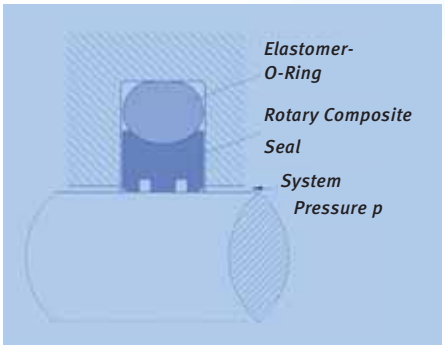


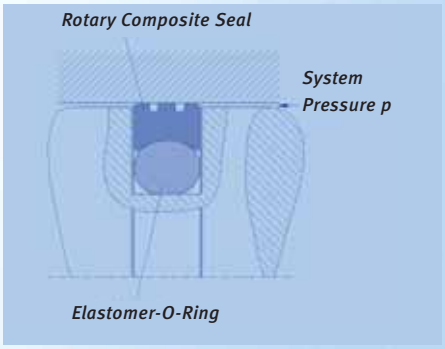
Type MRR

Groove Dimensions

*Depending on installation conditions, other profiles – differing from the standard dimensions provided – may be selected for **Rotary composite seal type MRR** (internally and externally sealing). The respective groove dimensions are listed in the table below.

Design and Action Principle





MRR internally sealing

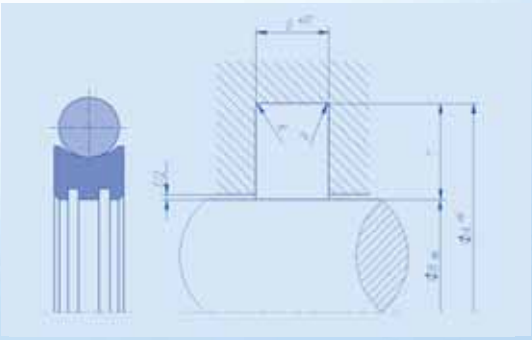
*Profile Designation**	*Groove Depth T*	*Groove Width $G^{+0.2}$*	*Radius R max*	*Radial Clearance max E/2*
6 – 19	2.45	2.2	0.4	0.15
19 – 38	3.75	3.2	0.6	0.15
38 – 200	5.50	4.2	1.0	0.20
200 – 256	7.75	6.3	1.3	0.20
256 – 650	10.50	8.1	1.8	0.25
650 – 1000	14.00	9.5	1.8	0.25

MRR externally sealing

*Profile Designation**	*Groove Depth T*	*Groove Width $G^{+0.2}$*	*Radius R max*	*Radial Clearance max E/2*
8 – 40	2.45	2.2	0.4	0.15
40 – 80	3.75	3.2	0.6	0.15
80 – 133	5.50	4.2	1.0	0.20
133 – 330	7.75	6.3	1.3	0.20
330 – 670	10.50	8.1	1.8	0.25
670 – 1000	14.00	9.5	1.8	0.25

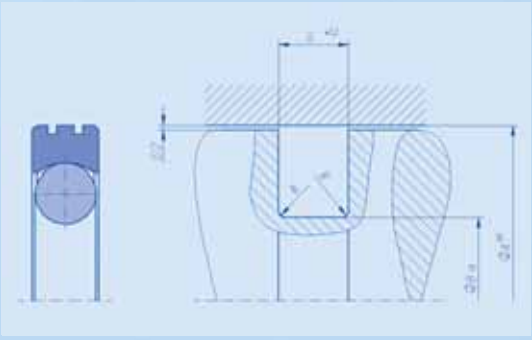
Groove Dimensions

Shaft seal internally sealing



Groove Dimensions

Shaft seal externally sealing



Operating Limits[1]	
Rotation speed	max 2.5 m/s ↻
Temperature range	–45 °C to +200 °C
Service pressure	max 300 bar

Fitting Instructions

See table, page 54 and 55.

Surface Quality

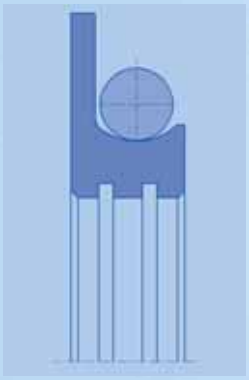
	Contact surface, dynamic	*Groove base diameter, static*
Rz	≤ 1.6 µm	≤ 6.3 µm
Rmax	≤ 2.0 µm	≤ 12.5 µm
Ra	≤ 0.2 µm	≤ 0.4 µm
Hardness	≤ 58 HRC	–

Compounds

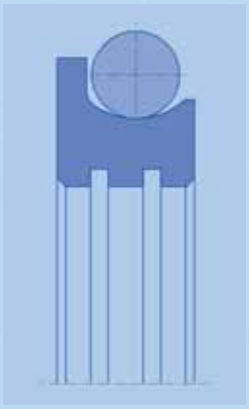
On request, depending on application.

Special Versions

With clamp-in flange



With compression support



Benefits

- No stick-slip even with low sliding speeds
- Extremely low breakaway forces even after prolonged downtimes
- Low wear and long service life
- Good sealing performance due to several sequentially located sealing edges
- High operating reliability thanks to multicomponent sealing kit
- Simple design of installation spaces
- Very good chemical and thermal resistance
- Extensive product line tailored to field application requirements
- No special maintenance requirements

V-packings and V-packing kits are primarily used for sealing rods subjected to axial motion. A packing kit consists of the number of V-packings needed for the particular application requirements as well as a base and end ring. In case there is a risk of gap extrusion under high pressure loads, the base and end rings may also be made of metallic materials. To achieve pre-defined sealing forces and adjustment of the packing in case of thermal expansion, installation of an axially acting spring (compression spring or cup spring) is necessary.

V-Packings | Kits

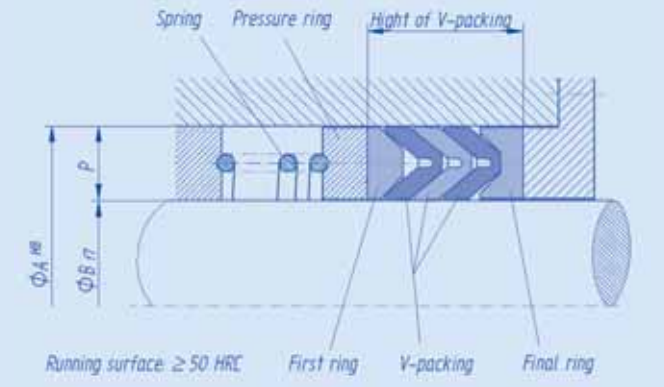
Fields of Application

- Equipment such as plunger piston pumps, metering pumps, hydraulic cylinders, control and shut-off fittings and valve stems
- Industrial sectors, such as chemical, petrochemical, flue gas purification, pharmaceutical, food processing, painting, steel, fittings

Versions and Operating Limits[1]

HN 7001 and		
HN 7002	Sliding speed	max 0.5 m/s ⇔
	Temperature range	–200 °C to +240 °C
HN 7001	Service pressure	max 300 bar
HN 7002	Service pressure	max 100 bar

Design and Action Principle



Pre-Loading by Axially Acting Spring

Based on experience, the specific surface compression of both springs should be between 0.2 and 0.4 N/mm².

With the slightly stiffer type HN 7001 it may be necessary to increase preload to 0.8 N/mm².

Fitting Instructions

- Always install packings with sealing lips facing towards the pressure side
- Spring is normally installed on the pressure side of the packing
- In case of aggressive media and installation of the spring on the pressureless side, spring compression must be adapted to the maximum media pressure which might be generated
- Prior to fitting, the installation space of the packing must be cleaned from dirt, swarf, etc.
- Rod and housing bore must be provided with lead-in chamfers between 15° and 30° to avoid damaging the sealing edges

Surface Quality

	Dynamic contact surface/ rod	*Static groove base diameter/ housing*
Rz	≤ 1.0 µm	≤ 4.0 µm
Rmax	≤ 2.0 µm	≤ 10.0 µm

Compounds

On request, depending on application.

Compound Table

PTFE compounds can be tailored to exactly meet the needs of the particular application based on our in-house compound development and compounding expertise. By means of specifically adapted fillers and filler combinations compound characteristics can be subjected to pinpoint optimization.

Compound No.	*Fillers*	*Fields of Application/Operating Conditions*	*Seal Type*
			 Shaft seals Spring-energized seals Memory packings Piston and Guide Rings Jacket and Stepped Rings V-Packings
HS000RW	Unfilled	• With low sliding speeds and pressures • With highly lubricating media • Suitable for soft contact surfaces made of metals and plastics • Use in food processing and pharmaceutical industry • Very good diffusion sealing effect • Used for static sealing needs • FDA-approved	
HS 10300	Special compound	• High abrasion resistance with lubricated and non-lubricated conditions • Universal uses • For medium sliding speeds, pressures and temperatures	
HS 11018	Glass fibers/ graphite	• Standard for process gas compressors • Pressure differences up to 200 bar • Very good chemical resistance • BGVV-approved	
HS 11030 HS 11031	Special compound	• Pressure-stable PTFE compound • Good wear resistance under high pressure loads and oil lubrication, also in water and steam/vapor • Very good chemical resistance • Not suitable for soft contact surfaces	
HS 11035	Special compound	• Highly pressure-stable PTFE compound • Good wear resistance under high pressure loads and oil lubrication, also in water and steam/vapor • Good electrical conductivity • Very good chemical resistance • Higher thermal conductivity and lower thermal expansion than glass fibers • Not suitable for soft contact surfaces	
HS 11041	Special compound	• Temperature stable PTFE compound with low wear in oil-free conditions • For soft mating surfaces • Non-abrasive fillers	
HS 17019	Graphite	• Good sliding property • Low coefficient of friction • Good electric conductivity • Good thermal conductivity • Very good chemical resistance • BGVV-approved	

Compound No.	*Fillers*	*Fields of Application/Operating Conditions*	*Seal Type*  Shaft seals  Spring-energized seals  Memory packings  Piston and Guide Rings  Jacket and Stepped Rings  V-Packings
HS 17020 HS 17021	Carbon	• Low-cost PTFE standard compound • High pressure resistance and hardness • Good sliding and wear properties • Good thermal conductivity • Largely resistant to chemicals • Electric conductivity • Low volume resistance and surface resistance • BAM-approved	    
HS 17027	Carbon/ graphite	• For dry gases in piston compressors • Very high pressure resistance and hardness • Good sliding and wear properties • Good thermal conductivity • Largely resistant to chemicals • Electric conductivity • Low volume resistance and surface resistance • BAM-approved	
HS 17034	Glass fibers	• Use in medical and food processing technology • Better thermal conductivity, pressure and wear resistance compared to PTFE without fillers • Very good chemical resistance • Good dielectric properties • Not for soft contact surfaces • BGVV-approved and FDA-conformant	
HS 21027	Carbon/ graphite	• For dry gases in piston compressors • High pressure resistance and hardness • Good sliding and wear properties • Good thermal conductivity • Largely resistant to chemicals • Electric conductivity • BAM-approved	
HS 21029	Special compound	• For high temperatures • Excellent sliding and wear properties with dry-running conditions and medium sliding speeds • Suitable for soft contact surfaces made of metals and plastics with minimal surface compression	 Standard compound

Compound No.	*Fillers*	*Fields of Application/Operating Conditions*	*Seal Type*
			 Shaft seals  Spring-energized seals  Memory packings  Piston and Guide Rings  Jacket and Stepped Rings  V-Packings
HS 21037	Special compound	• Very high abrasion resistance with non-lubricated and lubricated operation • Universal use • For high sliding speeds, pressures and temperatures • Dimensionally stable compound	 Standard compound Type HN 2390 
HS 21059	Special compound	• Excellent sliding and wear properties • Also with oil-free conditions • Suitable for soft contact surfaces made of metals and plastics with minimal surface compression	 Standard compound Type HN 2580  Standard compound 
HS 21054	Bronze/ MOS_2	• Minimal cold flow • High pressure resistance • Good thermal conductivity • Good sliding and wear properties	 
HS 21060	Special compound	• For soft contact surfaces • Very good wear properties in oil-free operations	
HS 22105	Special compound	• Good wear resistance with fuel applications • Suitable for high-frequency motions • Good diffusion sealing effect	
HS 22111	Special compound	• High pressure stability • Good wear resistance in oil-free conditions • Suitable for high operating temperatures • For dry gases in piston compressors	 
HS 4080 PE-UHMW	Unfilled	• Dimensionally stable compound for high pressures • Particularly high wear resistance with abrasive media, e.g. paints, lacquers • Highly suitable for use in water • Suitable for food and pharmaceutical industry applications • Good sliding properties • Good chemical resistance (with slight limitations compared to PTFE) • Temperatures up to max 100 °C • Lowest gas permeability • BGVV-approved and FDA-conformant	   

elringklinger
Kunststofftechnik

Technical Questionnaire

Please complete and return it via Fax: ++(0)71 42/583-200

1. *Brief description of application*

_____

_____

_____

_____

_____

2. *Contact surface*

Diameter (mm): _____

Material: _____

Surface quality/finish (µm): _____

Hardness (HRC): _____

3. *Installation space*

Groove dimension (mm): _____

Material: _____

Surface quality/finish (HRC): _____

4. *Operating conditions*

Medium: _____

Normal pressure (bar): _____

Peak pressure (bar): _____

Temperature range (°C): _____

Stroke frequency: _____

Stroke length (mm): _____

Stroke speed (m/s): _____

Speed range (RPM) (min^{-1}): _____

Rotating direction: _____

Concentric tolerance (mm): _____

Center offset (mm): _____

Other details: _____

_____

5. *Special needs*

e.g. approvals, friction,
service life, etc.: _____

_____

_____

6. *Requirement*

Once-off (quantity/pieces): _____

Monthly (quantity/pieces): _____

Annually (quantity/pieces): _____

_____

Company (address)

_____

Contact

_____

Phone

_____

Fax

_____

email

ElringKlinger Kunststofftechnik GmbH | Abt. KVO Vertrieb | Etzelstraße 10 | D-74321 Bietigheim-Bissingen
Phone ++49(0)71 42) 5 83-0 | Fax ++49(0)71 42) 583-200 | info@elringklinger-kunststoff.de | www.elringklinger-kunststoff.de

Take our Plastics Know-How to the Test.

LORENZ COMPANY

elringklinger
Kunststofftechnik

ElringKlinger Kunststofftechnik GmbH | Etzelstraße 10 | D-74321 Bietigheim-Bissingen
Phone ++49 (0) 71 42 / 583-0 | Fax ++49 (0) 71 42 / 583-200 | info@elringklinger-kunststoff.de | www.elringklinger-kunststoff.de
Division Venus | Badenbergstraße 15 | D-89520 Heidenheim
Phone ++49 (0) 73 21 / 96 41-0 | Fax ++49 (0) 73 21 / 96 41-50 | info-h@elringklinger-kunststoff.de

DQS certified according to ISO/TS 16949 (Reg.-No. 002504 TS/Q1/003) | DIN EN ISO 14001 (Reg.-No. 002504 UM)