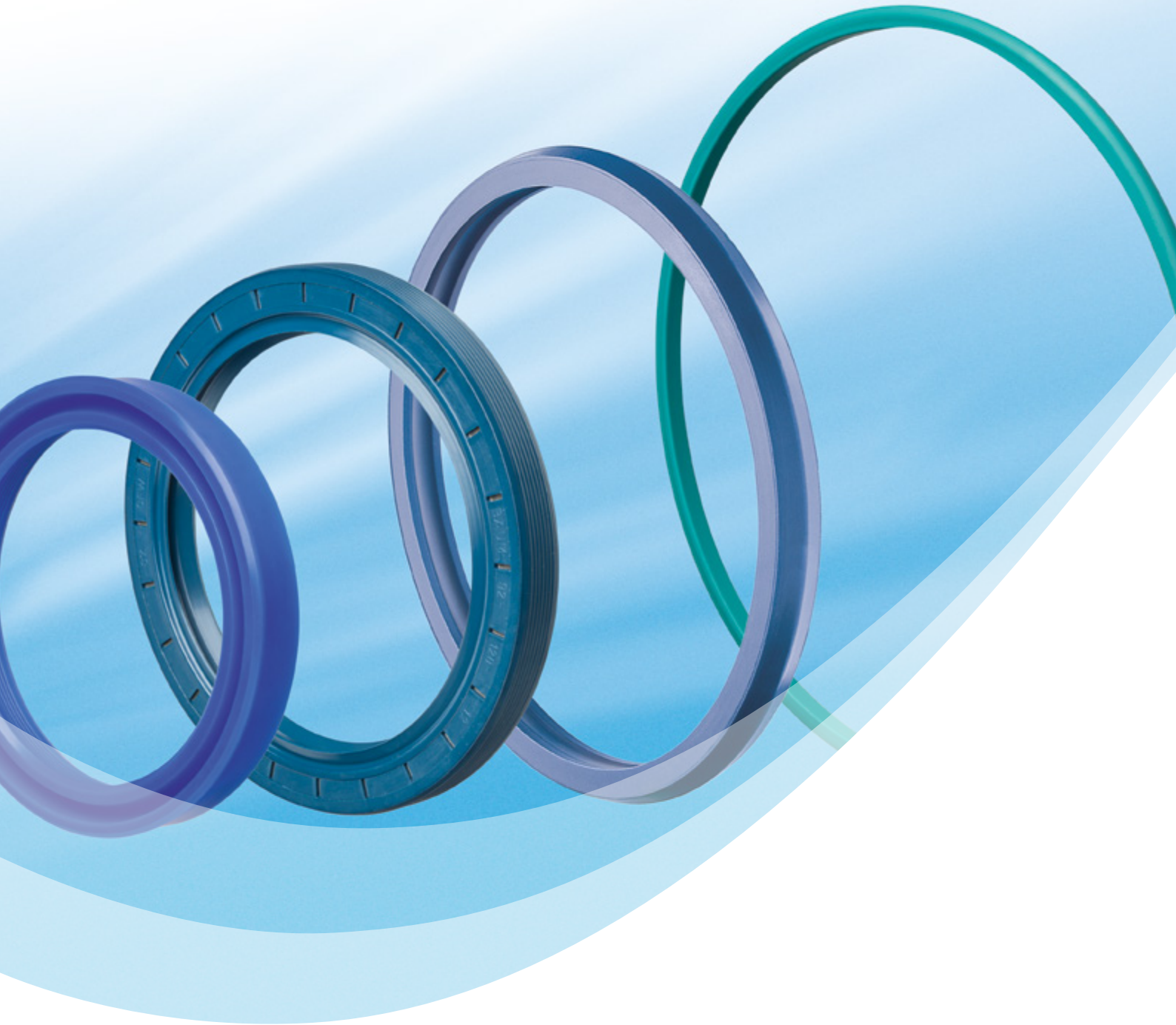


PRODUCT OVERVIEW FOR THE GENERAL INDUSTRY

FREUDENBERG
SEALING TECHNOLOGIES

FREUDENBERG
INNOVATING TOGETHER

TABLE OF CONTENT

COMPANY

The Freudenberg Group was founded in 1849 and remains family-owned to this day, split between the approximately 300 descendants of the company founder. The resulting financial stability and social awareness are key success factors that build trust.

Today, Freudenberg is a global, highly diversified group. While the limited partnership Freudenberg & Co. represents the strategic parent company, the operating management company Freudenberg SE reflects the global presence of the corporate group. Freudenberg is divided into business groups, which are active in a very wide range of sectors. From household products marketed under the Vileda® brand, all the way up to technically complex sealing solutions, the company is always regarded as a leader in innovation and technology.

The pronounced segmentation of the group pursues just one goal: to be close to customers and meet the requirements of a market specialist. The numerous research and development facilities secure the company's long-term success and enable fast reactions to market-specific and customer-specific transformations.

Freudenberg Sealing Technologies (FST) is the largest business group within the Freudenberg Group and belongs to the Seals and Vibration Control Technology business area. It is a supplier, as well as a development and service partner for customers from a very wide range of market segments, such as the automotive industry, the civil aviation sector, the engineering and shipbuilding industries, the food and pharmaceutical industries, or the agricultural and construction machinery industry.

Starting with the Simmerring® seal, developed at Freudenberg in 1929, Freudenberg Sealing Technologies has built up a diverse, continuously customer-oriented product portfolio of sealing technology products – from tailor-made custom solutions all the way up to complete seal packages. Together with the partners NOK Corporation (Japan), Sigma Freudenberg NOK (India), and NOK-Freudenberg Group (China), Freudenberg Sealing Technologies is a global network that aims to offer products in the same high quality worldwide. Freudenberg Sealing Technologies rounds off its service portfolio with the brands Dichtomatik as an industry standard solution, as well as Corteco as a specialist in the independent automotive aftermarket.

The unique performance spectrum sets standards in terms of quality, functionality, and cost-effectiveness in general industry. With its comprehensive product range and numerous services, Freudenberg Sealing Technologies offers you a performance package that is unparalleled in the market – for virtually any application. Freudenberg Sealing Technologies also uses its leading technological expertise profitably for you. We analyze your overall systems and optimally match the individual components to one another. The result is a precisely tailored solution that meets your requirements most effectively, economically, and reliably. Bolstered by single sourcing that saves both time and costs, Freudenberg Sealing Technologies is your ideal partner for all sealing-related applications, including complex systems.

We have been a leading materials expert for decades, which is a key success factor in terms of the excellent performance and continuous technological edge offered by our products. This is underlined by our renowned product groups such as Simmerring® seals, fluid technology products, hydraulic accumulators, O-rings, or liquid silicone products, which together represent the world's largest product range for all general industries' applications.

As part of the Freudenberg Group, we rely on well-founded in-house research, development, and production expertise as a way of consistently building on our technological edge through innovative solutions – in the best interests and service of our worldwide customers with their local market requirements. The extensive sales network provides both reliable and cooperative support for you and over 100,000 other customers locally in all industrial markets on every continent.

The scope of services offered by Freudenberg Sealing Technologies at a glance:

- **World's largest product range**
  Complete solutions from a single source
- **Permanent innovations**
  Technological edge which grants our customers a competitive advantage through products and sealing materials developed in-house
- **Unique materials expertise and high quality standards**
  Leading expertise for secure and cost-effective applications
- **Large number of integrated services**
  Collaborative support – from development, for example using FEM designs or tests at our test benches, all the way up to continuous product application
- **Global presence**
  Worldwide expertise with knowledge of local market requirements

PRODUCT AND MATERIALS EXPERTISE

ELASTOMERS WITH EXCELLENT CHARACTERISTICS – THE BASIS FOR INNOVATIVE SOLUTIONS

Profound materials expertise
Freudenberg Sealing Technologies has been developing innovative brand products at the highest level for decades. With profound materials experience, broad processing expertise, and comprehensive product knowledge, we continuously establish ideal prerequisites for your success. However, the quality of the material used is critical in ensuring optimum functionality of seals. This is an area in which Freudenberg Sealing Technologies is particularly proud of its worldwide pioneering role.

Targeted materials development secures the highest quality and a long service life
Working in development cooperations with various research institutes, as well as leading manufacturers of polymers and chemicals, engineers and chemists develop new materials for the most demanding functional requirements on a daily basis. Our materials developments need to meet the respective customer-specific requirements and withstand all conceivable loads encountered in their sector – not just in terms of temperature, pressure, and media resistance, but also static or dynamic loads. The service life of our products is subject to continuous improvement thanks to optimization of our materials. Constant checks on the road to becoming a series production material also guarantee you the highest quality.

OUR INDIVIDUAL MATERIALS DEVELOPMENTS ARE WORLD-LEADING

UNIQUE RANGE OF STANDARD MATERIALS

We produce more than a billion seals every year from over 15,000 tons of production materials. In total, you have access to a quantitatively and qualitatively unique range of materials with over 1,800 compounds from 1,000 raw materials for your individual sealing technology applications. A significant percentage of these are standardized compounds. The professional team of experts at Freudenberg Sealing Technologies is of course always happy to advise you and provide you with full support – from selection of the right materials, through the testing phase, all the way to the start of production.

INTEGRATIVE PERFORMANCE PACKAGE AND MUCH MORE

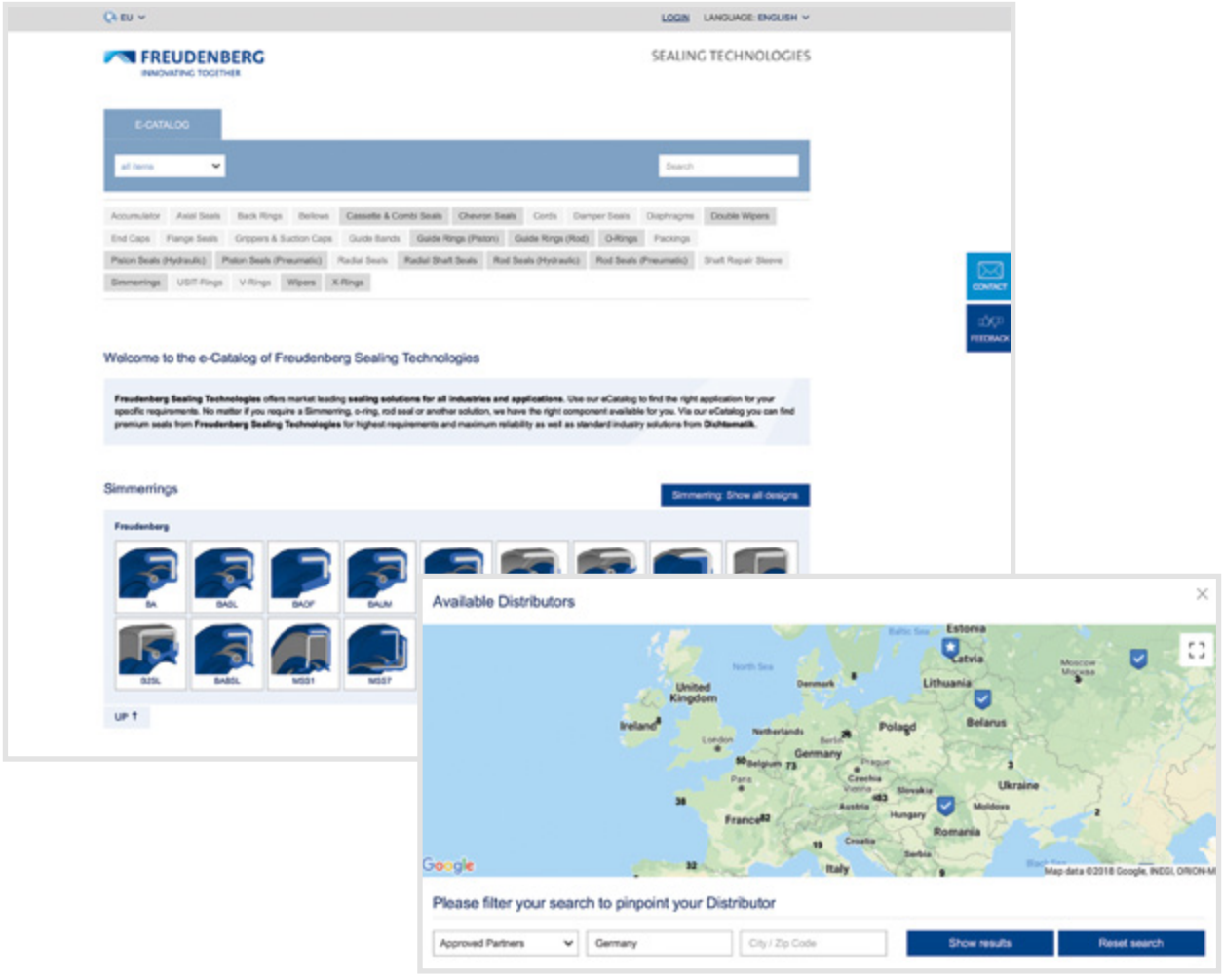
The materials are produced individually to your wishes and requirements and play a particularly important part in the integrative performance package of Freudenberg Sealing Technologies. The use of tailor-made polymers, based on dedicated raw materials, allows Freudenberg Sealing Technologies to develop high-performance materials that can meet even the most demanding functional requirements. For application-specific material selection, we use our global materials database, which combines the specialized knowledge of our experts from across the globe to create a network of technological excellence that is available at all times. Use of computer-controlled processes, from raw material selection up to compounding, ultimately ensures that the most suitable material with optimum properties is produced for your application. All of this is of course always performed in line with the highest quality and process standards and ecological guidelines – to help boost your success and for the sake of the environment.

ONLINE SERVICES

Freudenberg Sealing Technologies offers you many ways to learn more about our products on the website at **www.fst.com/services**: from specifications, through CAD models, all the way up to placing orders directly.

E-CATALOG:

- Simple overview of the catalog portfolio (Freudenberg and Dichtomatik)
- Specifications, datasheets, and CAD files on our products at a glance
- Convenient search function for distributors in your area



EASY ONLINE ORDERING PLATFORM:

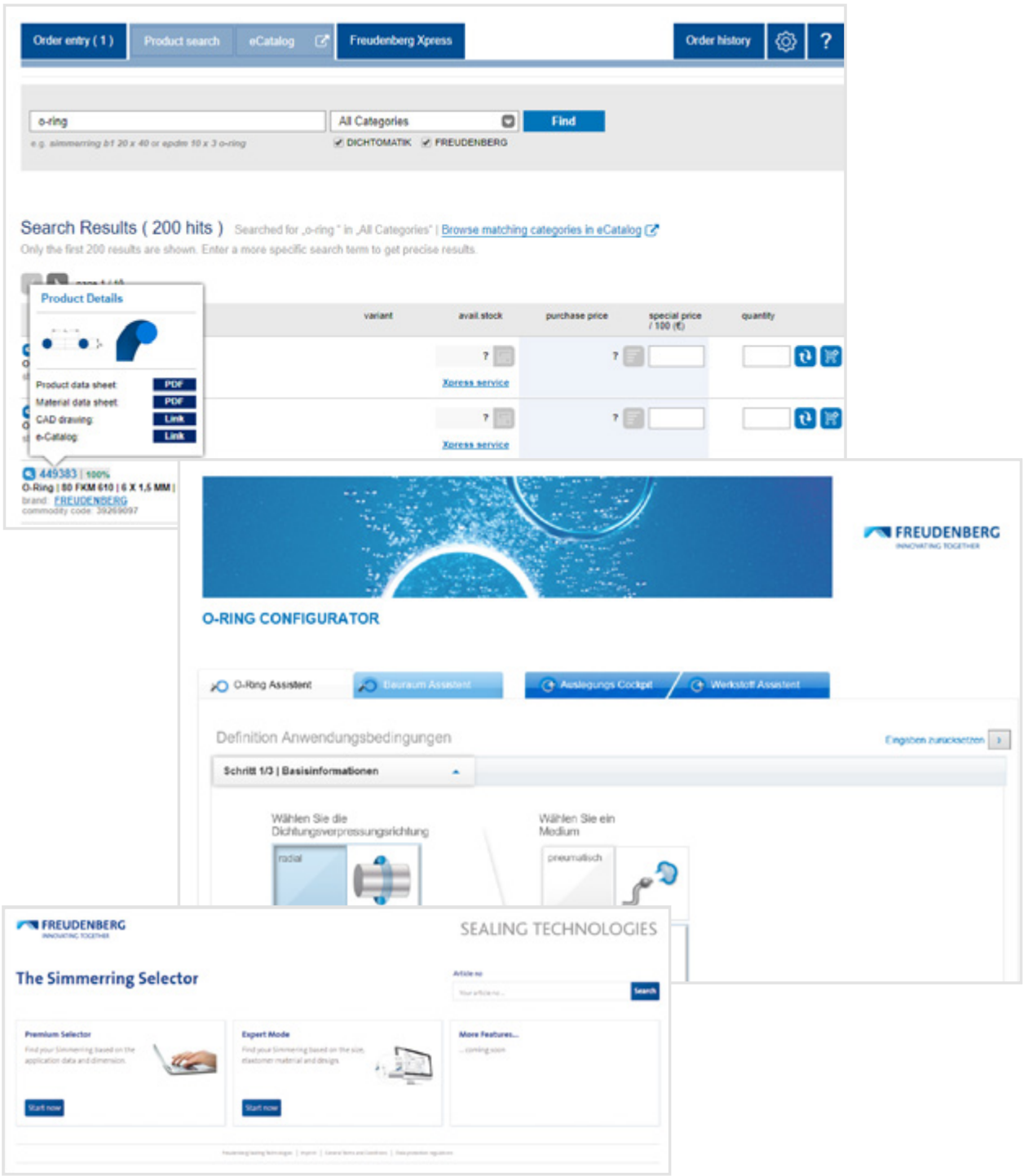
- Convenient search and fast ordering process as an exclusive service for FST customers
- Prices and availability displayed in real time
- All datasheets, CAD files, and technical article data available at a glance
- Freudenberg Xpress® Configurator for quick and easy online configuration of CNC-compatible seals as a convenient alternative for prototypes, small series, and spare parts requirements. This significantly simplifies the customer-specific part design process

O-RING CONFIGURATOR:

- Easy O-ring design
- Calculation of the accompanying installation space

SIMMERRING® SELECTOR:

- Find the optimum Simmerring® seal for your application in just a few steps by entering specific application parameters



QUALITY IN RECORD TIME

FREUDENBERG XPRESS®

Repair demands, small series, and prototyping – sealing solutions and molded parts to the quality standard of the series, produced using ultra-modern machining and milling technologies.

Freudenberg Xpress® produces machined seals, individually tailored seals, as well as customer-specific seals and parts. This allows costly and time-intensive downtimes to be avoided. A worldwide network of local Freudenberg Xpress® partners and production sites is available, so help is never far away. The locations are integrated in our production operations. This ensures that our customers always have a local contact person at their side, allowing fast deliveries to be scheduled.

Thanks to the use of original materials and sealing edge geometries, the Freudenberg Xpress® products boast the same quality as series production parts. This means that you do not have to accept any kind of compromises in terms of the safety of your seals.

PRODUCT PORTFOLIO

Freudenberg Xpress® offers all common rod and piston seals, wipers, guides, and O-rings in series production quality. Our original Freudenberg profiles and materials form the basis for this.

In addition, Freudenberg Xpress® not only offers the standard portfolio, but also customer-specific seals and parts produced from elastomers and plastics.

Machined seals are a particularly interesting alternative in cases where production of a series tool would be too expensive or not even possible due to the special design. This is often the case in prototyping, which in most cases then requires multiple functional specimens to be produced.

In terms of new developments, the limit ranges represent a critical factor that requires testing. Freudenberg Xpress® can produce particularly large seal profiles of up to 20 meters without any issues thanks to use of state-of-the-art welding technologies. Extruded seal profiles produced from the original Freudenberg polyurethane materials form the basis for the welded seals.

SEGMENT-SPECIFIC SOLUTIONS

For the special requirements of the process industry, Freudenberg Xpress® offers highly resistant seals and customer-specific parts produced from original Freudenberg premium materials. Product modifications can also be implemented without any issues. For example, the dead spaces in U-rings can be sealed with silicone to facilitate use in the food industry.

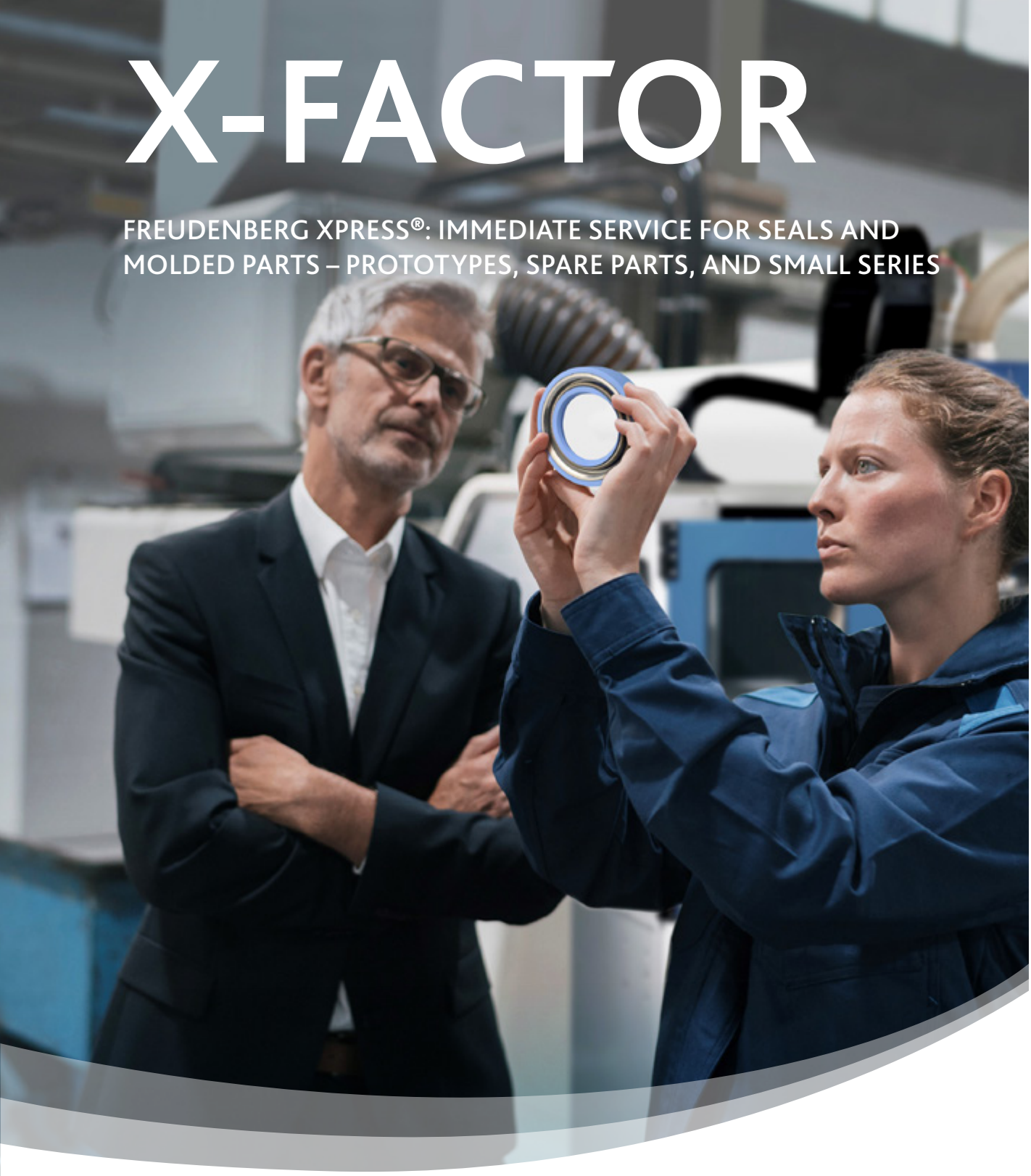
You are sure to find the right material for any application. Special materials, such as the blue Fluoroprene® XP or the black 70 EPDM 291, are available to meet the specific requirements of the food, beverage, and pharmaceutical industries. You can always find the latest overview of materials at **www.xpress.fst.com**.

THE BENEFITS AT A GLANCE:

- Original profiles and materials from series production
- Standard profiles and custom solutions
- Fast delivery for repair requirements – if necessary within 24 hours
- Cost-effective small-lot production and prototyping
- Long service life thanks to unique material characteristics and production processes
- No need for series tools
- High degree of consultancy expertise

X-FACTOR

FREUDENBERG XPRESS®: IMMEDIATE SERVICE FOR SEALS AND MOLDED PARTS – PROTOTYPES, SPARE PARTS, AND SMALL SERIES



Speed, cost-effectiveness, and quality are the key factors in the world of seals. With its worldwide network of production sites, Freudenberg Xpress® guarantees immediate, local manufacturing of seals and customer-specific parts in original quality using premium Freudenberg materials. In urgent cases, the parts can even be delivered within just 24 hours. Minimized downtimes during maintenance or repair work contribute to efficient processes. **fst.com**

FREUDENBERG
SEALING TECHNOLOGIES

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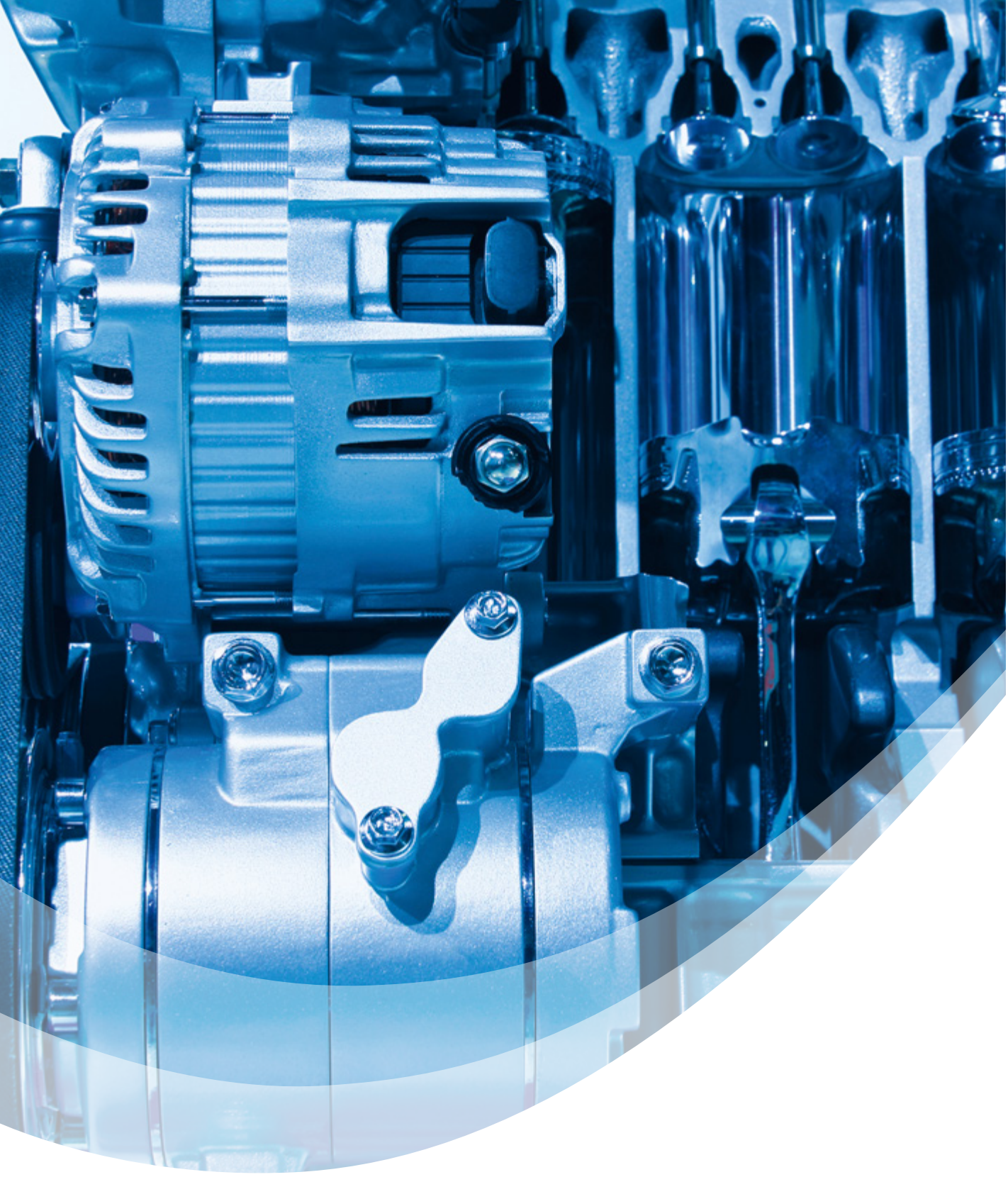


SEALS FOR ROTARY APPLICATIONS

SIMMERRING® SEALS

BA (SL)

Standard design with rubberized outer sleeve and friction-optimized seal profile. Available with dust lip (SL) to protect against light to medium levels of exterior soiling.

MATERIAL	72 NBR 902	75 FKM 585	75 FKM 260466
MAX.	–40 to +100 °C	–25 to +160 °C	–25 to +160 °C
MAX.	14 m/s (8 m/s)	38 m/s (8 m/s)	38 m/s (8 m/s)
MAX.	0.05 MPa	0.05 MPa	0.05 MPa
	Industrial transmissions, shafts (for moderate soiling), power tools, agricultural and construction machinery transmissions		Use in synthetic oils, in particular polyglycols

BA

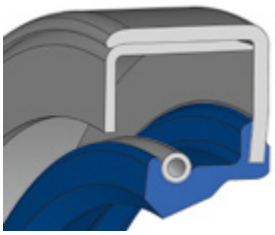
BA SL

B1 (SL) / B2 (SL)

Standard design with basic (B1) or reinforced (B2) metal outer sleeve. Available with dust lip (SL) to protect against moderate to medium levels of exterior soiling. We recommend gluing the Simmerring® seal in position for improved static tightness.

MATERIAL	72 NBR 902
MAX.	–40 to +100 °C
MAX.	14 m/s (8 m/s)
MAX.	0.05 MPa
	Industrial transmissions, shafts (for moderate soiling), power tools, heavy industry (cranes, calender transmissions, etc.)

B1 SL



B2

BAB (SL)

Pressure-resistant design with additional dust lip (SL) to protect against dirt accumulation that can be used without a backup ring.

MATERIAL	72 NBR 902	75 FKM 595
MAX.	–40 to +100 °C	–25 to +160 °C
MAX.	10 m/s	10 m/s
MAX.	1 MPa	1 MPa
	Pressurized units such as hydraulic pumps, hydraulic motors, and hydrodynamic couplings	

BAB SL

Premium Pressure Seal (PPS)

Pressure-resistant design with rubberized external interference fit (BA) and low-wear sealing lip profile that can be used without a backup ring. Boasts a patented sealing edge design that keeps the lip profile stable at up to twice the pressure of the conventional pressure design (BAB SL).

PPS

MATERIAL	75 FKM 595
MAX.	–25 to +160 °C
MAX.	15 m/s
MAX.	1 MPa (pressure peaks 2.5 MPa)
	Hydrostatic drives

BAHD

Profile for high-pressure loads with very short sealing lip and descending metal reinforcement located near the shaft to provide support.

BAHD

MATERIAL	90 NBR 129208	88 FKM 107725
MAX.	–30 to +100 °C	–25 to +160 °C
MAX.	2 m/s	2 m/s
MAX.	15 MPa	15 MPa
	Low-speed hydrostatic drives	

Modified catalog products

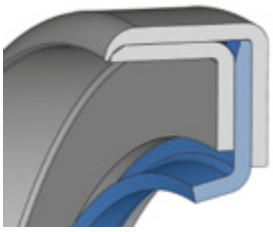
PROFILE	MODIFICATION	AREA OF APPLICATION
	Stainless steel spring (rustproof, 1.4571)	Water applications, corrosive media
	Spring with adjusted spring force (stronger/weaker)	Applications with high circumferential speeds, insufficient lubrication, strong vibrations, increased shaft wear
	Protective lip venting	Applications with circumferential speeds between 8 and 15 m/s and Simmerring® seal with protective lip. Venting helps prevent the lip from being drawn in by suction force.
	Lubrication of the protective lip	The protective lip must always be lubricated with grease. You can also order the Simmerring® seal pre-lubricated from FST.
	PTFE, nonwoven, or PTFE-impregnated nonwoven protective lip	Anwendungen mit erhöhtem Schmutzeintrag, Reifendruckregelanlagen, Lebensmittelanwendungen, aggressiven Reinigungsmedien

PTFE SIMMERRING® SEALS

B2PT

Design for extreme thermal and chemical loads, as well as for dry running and insufficient lubrication. Stainless steel housing (V4A) with PTFE sealing lip. Further versions are available, such as PTFE materials with FDA and EU Reg. 10/2011 conformity.

MATERIAL	Application-specific PTFE materials
MAX.	–80 to +200 °C
MAX.	30 m/s
MAX.	1 MPa
	Chemical engineering, mechanical engineering, mixers, centrifuges, pumps, pressure rotary feedthroughs

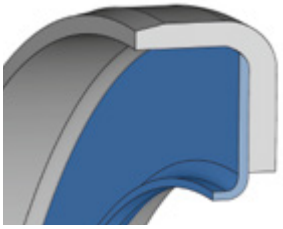


B2PT

B1PT

Combination of a metallic carrier with a PTFE disc using an innovative bonding process. The design facilitates low axial height. Further versions are available, such as PTFE materials with FDA and EU Reg. 10/2011 conformity.

MATERIAL	Application-specific PTFE materials
MAX.	–80 to +200 °C
MAX.	50 m/s
MAX.	1 MPa
	Tire pressure control systems (CTI), rotary feedthroughs, mechanical engineering

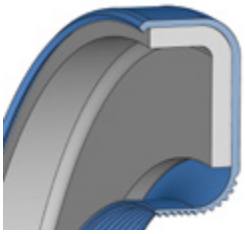


B1PT

BlueSeal

The patented technology offers a friction-optimized lip design with a high degree of chemical resistance. The installation space can be reduced by up to 50%. Further versions are available, such as PTFE materials with FDA and EU Reg. 10/2011 conformity.

MATERIAL	Application-specific PTFE materials
MAX.	–80 to +200 °C
MAX.	50 m/s
MAX.	0.03 MPa (higher pressures also possible in combination with a support plate)
	Food industry, pharmaceutical industry, engineering, motors, retarders



BlueSeal

BAPT / PTS

Design with friction-optimized PTFE sealing lip for extreme thermal and chemical loads, for dry running and insufficient lubrication. Optimum static tightness thanks to partial rubber coating on the outer sleeve. Rotational direction-dependent return feed. Optional dust lip made of nonwoven material or elastomer.

BAPT / PTS

MATERIAL	Application-specific PTFE materials
MAX.	–25 to +160 °C
MAX.	35 m/s
MAX.	1 MPa
	Hydrostatic drives, food industry, retarders, motors

MODULAR SEAL SYSTEMS

MSS1

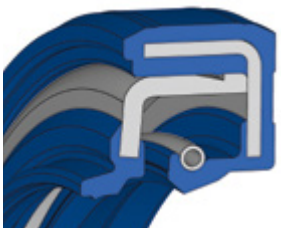
Standard design BA, combined with an inner buffer seal with sinusoidal sealing lip as a one-piece solution. Lubricated with Klüber Petamo GHY 133N high-performance lubricating grease. High resistance to soiling and metal abrasion in the oil chamber.

MSS1

MATERIAL	75 FKM 585 / 75 FKM 585	72 NBR 902 / 75 FKM 585
MAX.	–25 to +160 °C	–25 to +100 °C
MAX.	6 m/s	6 m/s
MAX.	0.05 MPa	0.05 MPa
	Industrial transmissions, drive technology, robotics	

MSS1 HS

Standard design BA, combined with an inner buffer seal with sinusoidal sealing lip as a one-piece solution. Lubricated with Klüber Petamo GHY 133N high-performance lubricating grease. High resistance to soiling and metal abrasion in the oil chamber.



MSS1 HS

MATERIAL	72 NBR 902 / 75 FKM 585	75 FKM 585 / 75 FKM 585
MAX.	–25 to +100 °C	–25 to +160 °C
MAX.	8 m/s	8 m/s
MAX.	0.05 MPa	0.05 MPa
	Industrial transmissions, drive technology, robotics	

MSS3

Modified standard design BA with bonded special nonwoven, a PTFE disc, or a PTFE-impregnated nonwoven disc as an additional protective lip against very fine dirt accumulation. Suitable for use with extremely aggressive media from outside, such as cleaning agents.

MSS3

MATERIAL	72 NBR 902	75 FKM 585
MAX.	–40 to +100 °C	–25 to +160 °C
MAX.	14 m/s (8 m/s)	38 m/s (8 m/s)
MAX.	0.05 MPa	0.05 MPa
	Drive technology, industrial transmissions, agricultural and construction machinery	

MSS7

Standard design BA, combined with a rubberized slip ring with outer, axial protective lips as a one-piece solution. A seal system with high resistance to dirt, water, and external environmental influences.

MSS7

MATERIAL	72 NBR 902 / 72 NBR 902
MAX.	–40 to +80 °C
MAX.	8 m/s
MAX.	0.05 MPa
	Drive technology, special transmissions, shafts for agricultural and construction machinery, shafts for special vehicles

CASSETTE AND COMBI SEALS

Cassette seals

The complete unit comprises a Simmerring® seal and an unlosable second ring with running surface. Cassette seals offer a rational system solution with integrated labyrinth to protect against extreme soiling. The integrated running surface meets the strict requirements of a dynamic seal.

TYPE	1		2		3		HS
MATERIAL	75 NBR 106200	75 FKM 595	75 NBR 106200	75 FKM 595	75 NBR 106200	75 FKM 595	68 ACM, 75 FKM 585, 75 NBR 106200
MAX.	–40 to +80 °C	–25 to +100 °C	–40 to +80 °C	–25 to +100 °C	–40 to +80 °C	–25 to +100 °C	–25 to +100 °C
MAX.	7 m/s	9 m/s	5 m/s	7 m/s	4 m/s	6 m/s	12 m/s
MAX.	0.05 MPa	0.05 MPa	0.05 MPa	0.05 MPa	0.05 MPa	0.05 MPa	0.03 MPa
	Agricultural machines, construction machinery, commercial vehicles						


Type 1


Type 2


Type 3


HS

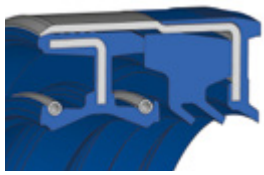
Combi seal F6, F8, F19, F20, SF21, SF22

The combi seal comprises at least two fitted elements for high dirt resistance. The PU element in this system can also provide effective sealing for small axial motions.

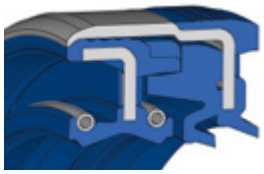
MATERIAL	75 NBR 106200	75 FKM 595
MAX.	–40 to +80 °C	–25 to +100 °C
MAX.	4 m/s	6 m/s
MAX.	0.03 MPa	0.03 MPa
	Agricultural vehicles and machines, general industry	


Combi Seal F6


Combi Seal F8


Combi Seal F19


Combi Seal SF20


Combi Seal SF21


Combi Seal SF22

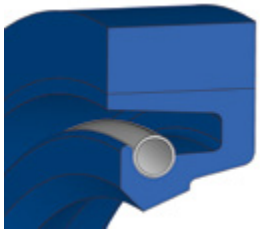
MERKEL RADIAMATIC®

Merkel Radiamatic® rotary shaft seals are primarily used in heavy industry applications in the diameter range from 100 mm to 4,000 mm. They are available in various designs, such as with self-retaining function or additional dirt deflector and for high circumferential speeds or bonding compatibility.

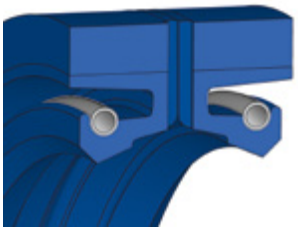
R35, R36, R37

Versions R36 and R37 with radial grooves for lubrication of the sealing lips from outside in the case of twin arrangement. Available with rubber lock for joining the ring on site.

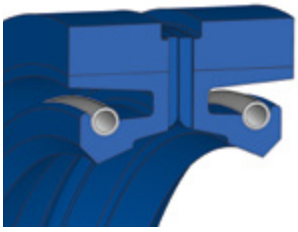
MATERIAL	80 NBR 245565	80 NBR B241	75 HNBR U467	80 FKM K670
MAX.	–20 to +80 °C	–30 to +100 °C	–20 to +140 °C	–10 to +180 °C
MAX.	12 m/s	20 m/s	25 m/s	25 m/s
MAX.	0.05 MPa	0.05 MPa	0.05 MPa	0.05 MPa
	Shipbuilding, hydraulic steelwork, rolling mills, wind turbines			



R35



R36

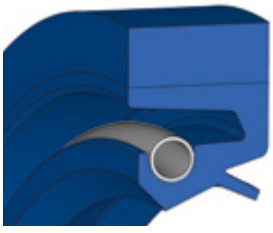


R37

R55

Based on the R35 version with additional dust lip to protect the sealing lip/bearing from external soiling.

MATERIAL	80 NBR B241	75 HNBR U467
MAX.	–30 to +100 °C	–20 to +140 °C
MAX.	5 m/s	5 m/s
MAX.	0.05 MPa	0.05 MPa
	Primarily used in wind turbines	

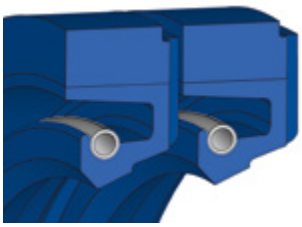


R55

R58

With reinforced sealing lip for grease-lubricated roller bearings. When used in a twin arrangement, lubrication grooves allow lubrication of the sealing lips from outside.

MATERIAL	80 NBR B241
MAX.	–30 to +100 °C
MAX.	15 m/s
MAX.	0.05 MPa
	Grease-lubricated roller bearings in rolling mills

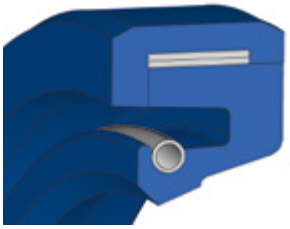


R58

RS85

Self-retaining shaft sealing ring with an integrated steel strip. The sealing lip and clamping part comprise two different elastomer components.

MATERIAL	80 NBR B241 / 85 NBR B247	75 HNBR U467 / 85 HNBR 10040	80 FKM K670 / 90 FKM K683
MAX.	–30 to +100 °C	–20 to +140 °C	–10 to +180 °C
MAX.	20 m/s	25 m/s	25 m/s
MAX.	0.05 MPa	0.05 MPa	0.05 MPa
	Large transmissions, rolling mills		

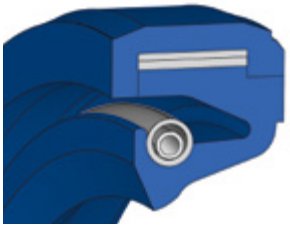


RS85

RHS51

Self-retaining shaft sealing ring for high circumferential speeds, comprising two elastomer components and an integrated steel strip. Two interleaved tension springs ensure an even radial force – one circumferential groove and multiple radial grooves (for twin arrangement) allow lubrication of the sealing lip from outside.

MATERIAL	80 NBR B241 / 85 NBR B247	75 HNBR U467 / 85 HNBR 10040	80 FKM K670 / 90 FKM K683
MAX.	–30 to +100 °C	–20 to +120 °C	–10 to +150 °C
MAX.	25 m/s	30 m/s	35 m/s
MAX.	0.02 MPa	0.02 MPa	0.02 MPa
	Large transmissions, rolling mills		



RHS51

RPM41

Self-retaining shaft sealing ring made of elastomer material with integrated steel element. One circumferential groove and multiple radial grooves (for twin arrangement) allow lubrication of the sealing lip from outside.

MATERIAL	85 NBR 245461
MAX.	–30 to +100 °C
MAX.	15.0 m/s
MAX.	0.05 MPa for Ø ≤ 700 mm; 0.03 MPa for Ø > 700 mm
	For grease-lubricated roller bearings, primarily in the steel industry

RPM41

Merkel RK15 adhesive kit

Kit for bonding Merkel Radiamatic® shaft sealing rings without metal inserts or with rubber lock. Simple and secure mounting in open installations.

Fitting shaft sealing rings in the installation space on site without complete disassembly of the shaft or housing.

The precision plastic parts in the adhesive kit are matched precisely to the seal profile.

PTFE SHAFT SEALS

Thanks to their low friction and high media resistance, shaft seals made of PTFE are primarily used in the field of process engineering.

Gerromatic G61

Self-retaining in the installation space thanks to stainless steel retaining element. The sealing lip has an undulating structure and leads to sinusoidal linear contact of the shaft in the circumferential direction.

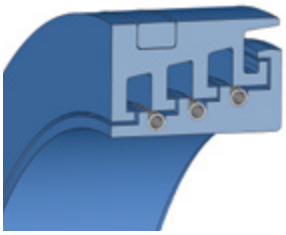
MATERIAL	PTFE K212, PTFE G212, PTFE E202, PTFE C104, PTFE Y002, PTFE B100
MAX.	–80 to +200 °C
MAX.	25 m/s
MAX.	0.8 MPa
	For aqueous and hydraulic media in pressurized applications

G61

Radiamatic® RCD

The new, contactless liquid-collecting labyrinth seal is non-wearing and durable, as well as boasting high thermal and chemical stability. Special design versions can be used for extremely high speeds.

MATERIAL	PTFE K212, PTFE GM201
MAX.	–80 to +200 °C
MAX.	25 m/s
MAX.	0 MPa
	Transmission input and output shafts, as well as auxiliary shafts; applications include wind turbines

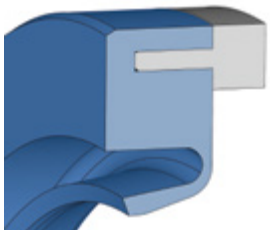


RCD

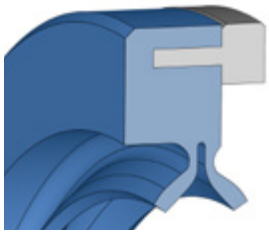
Radiamatic® HTS II (-9535, -9536, -9537, -9538, -9539, -9541)

Compared with the standard version 9535, version 9536 features an additional dust lip for use in environments with heavy soiling. Version 9538 with double lip is suitable for strict safety requirements. Version 9539 with protruding sealing lip is dead-space-free and simplifies cleaning of systems. Version 9541 with high dynamic return capability is available for fully flooded applications.

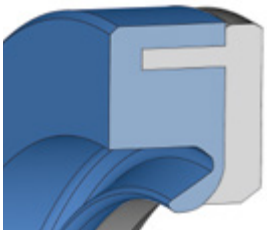
MATERIAL	PTFE K212, PTFE G212, PTFE C104, PTFE Y002, PTFE E202
MAX.	–80 to +200 °C
MAX.	25 m/s (unpressurized)
MAX.	0.6 MPa
	Beverage filling and food processing systems, transmissions, compressors, pumps, mixers, kneaders, separators, cleaning and sterilization processes



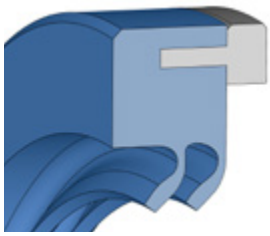
HTS II-9535



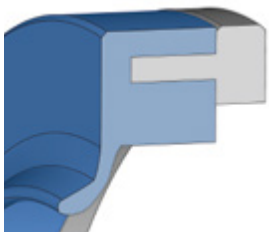
HTS II-9536



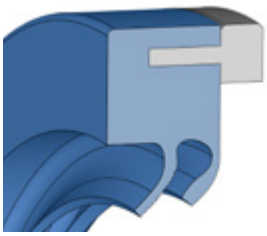
HTS II-9537



HTS II-9538



HTS II-9539

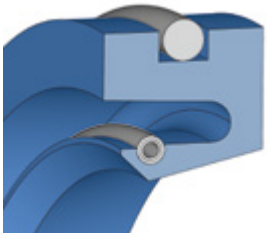


HTS II-9541

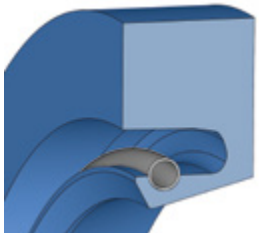
Shaft seal type 9444, 9445, 9460, 9461, 9960, 9961

The tried-and-tested, rugged shaft seals made of PTFE are suitable for tough applications and offer a high level of safety during operation. The sealing lip is partially pre energized by a spring. On certain versions, an O-ring is used to ensure excellent static sealing force.

MATERIAL	PTFE K212, PTFE G212, PTFE C104, PTFE Y002, spring made of 1.4571, O-ring made of elastomer material
MAX.	–20 to +200 °C (depending on the elastomer material used)
MAX.	18 m/s
MAX.	0.8 MPa
	General and chemical industry



9444

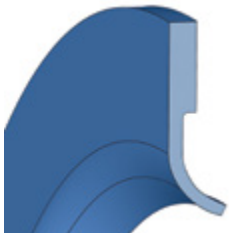


9445

9460

9461

9960



9961

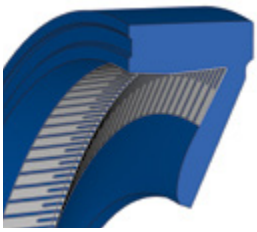
SEVENTOMATIC®

Seventomatic® shaft seals were specifically developed for use in large, grease-lubricated main bearings in multi-megawatt wind turbines. An integrated meander spring provides long-lasting, even contact pressure of the sealing lip, irrespective of the diameter and unaffected by a shaft offset of up to +/- 4 mm. The alignment of the sealing lip can be selected flexibly.

S71, S73

Version S71 with shaft sealing function, S73 with bore sealing function.

MATERIAL	Ventoguard 75 HNBR U467
MAX.	–30 to +120 °C
MAX.	3 m/s
MAX.	0.05 MPa
	Large main bearings in wind turbines



S71

S73

V-RINGS

Merkel V-ring WA-A, WA-AX, WA-L, WA-S

Seals with an axially acting, wear-resistant sealing lip. The individual types -A, -AX, -L, -S differ in terms of their profile size and tolerance of the maximum permitted axial shaft offset.

MATERIAL	60 NBR B297	65 FKM K698
MAX.	–40 to +100 °C	–20 to +150 °C
MAX.	20 m/s	20 m/s
MAX.	0.03 MPa	0.03 MPa
	Roller bearings	

WA

Merkel water deflector WA8074

Seal with an axially acting, defined sealing lip made of wear-resistant, highly stable polyurethane.

MATERIAL	95 AU V142	93 AU V167
MAX.	–25 to +110 °C	–30 to +110 °C
MAX.	6 m/s	6 m/s
MAX.	0.05 MPa	0.05 MPa
	Roller bearings primarily in the paper and steel industry. Retention of grease and repulsion of dust, scale, splash water, rolling oil emulsions, and similar media.	

WA8074

Merkel Enviromatic EA, EAX

Guard made of elastomer material with a powerful, axially acting sealing lip featuring a defined sealing edge for use even with major shaft offset. Versions EA and EAX differ in terms of their profile size and tolerance of the maximum permitted axial shaft offset.

MATERIAL	80 NBR B241	75 HNBR U467
MAX.	–30 to +100 °C	–20 to +140 °C
MAX.	20 m/s	20 m/s
MAX.	0.03 MPa	0.03 MPa
	Wind turbines, steel industry, underground mining, pulp and paper industry	

EA

EAX

END CAPS

End cap GA

Standard model with elastomer outer cap and vulcanized-in stiffening plate.

MATERIAL	75 NBR 99004, non-alloy steel DIN EN 10139 (DIN 1624)
MAX.	–40 to +100 °C
	Sealing of housing boreholes, such as mounting holes in transmission housings

GA

End cap GSA

Sealing cap with vulcanized-in stiffening plate, featuring metallic seat and partial rubberization for greater pressurization.

MATERIAL	75 NBR 99004, non-alloy steel DIN EN 10139 (DIN 1624)
MAX.	–40 to +100 °C
	Sealing of housing boreholes, such as mounting holes in transmission housings

GSA

SEALS FOR FLUID POWER APPLICATIONS

ROD SEALS (HYDRAULICS)

U-RINGS

Single-acting rod seal with asymmetric profile, recessed inner lip, and press fit on the external diameter for excellent tightness.

U-ring LF300

U-ring with grooved internal diameter contact surface. Use both as an individual seal and secondary seal in sealing systems.

MATERIAL	94 AU 925	92 AU 21100	94 AU 30000
MAX.	–30 to +110 °C	–50 to +110 °C	–35 to +120 °C
MAX.	0.6 m/s	0.6 m/s	0.6 m/s
MAX.	32 MPa	32 MPa	32 MPa
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machine, truck cranes, injection molding machines		

LF300

U-ring NI300

U-ring with additional support edge and sealing edge. An additional sealing edge largely prevents ingress of dirt.

MATERIAL	94 AU 925	94 AU 30000
MAX.	–30 to +110 °C	–35 to +120 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	45 MPa
	Earth-moving equipment, presses, support cylinders	

NI300

U-ring T20

Use both as an individual seal and secondary seal in the seal system.

MATERIAL	94 AU V142	94 AU 30000
MAX.	–30 to +110 °C	–35 to +120 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	45 MPa
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, injection molding machines, support cylinders	

T20

U-ring HDR-2C

Particularly pressure-resistant material type (hard/soft combination in 2 K technology). Use both as an individual seal and secondary seal in sealing systems.

MATERIAL	92 AU 21100 / 98 AU 928
MAX.	–50 to +110 °C
MAX.	0.5 m/s
MAX.	50 MPa
	Earth-moving equipment, forklift trucks, tail lifts, truck cranes, support cylinders

HDR-2C

U-ring NI150

Use both as an individual seal and secondary seal in the seal system.

MATERIAL	80 NBR 878
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	10 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the T20, LF300

NI150

U-ring NI250

U-ring with integrated backup ring.

MATERIAL	80 NBR 878 / POM
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	25 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the T20, LF300

NI250

U-ring NI400

U-ring with integrated backup ring.

MATERIAL	80 NBR 878 / POM
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the T20, LF300, HDR-2C

NI400

U-ring T22

U-ring with additional support edge and sealing edge. Use in combination with double-acting wipers not recommended.

MATERIAL	95 AU V142
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Earth-moving equipment, support cylinders, ship hydraulics, mobile hydraulics

T22

U-ring T23

U-ring with integrated backup ring. Use in combination with double-acting wipers not recommended.

MATERIAL	95 AU V142 / POM
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	50 MPa
	Earth-moving equipment, hydraulic steelwork, support cylinders, ship hydraulics, heavy mobile hydraulics, scrap shears

T23

U-ring T24

U-ring with additional support edge and sealing edge. Use in combination with double-acting wipers not recommended.

MATERIAL	95 AU V142
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Telescopic cylinder

T24

Merkel U-ring TM20

U-ring made of polyurethane with asymmetric profile and shortened inner lip.

MATERIAL	95 AU V142	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Secondary seal in a seal system or as individual seal in the pressure range up to 26 MPa	

TM20

Merkel U-ring TM23

Two-piece seal set, comprising a polyurethane profile ring and a backup ring made of POM.

MATERIAL	93 AU V167 / PA or POM
MAX.	+5 to +60 °C
MAX.	0.5 m/s
MAX.	50 MPa
	Mining

TM23

Merkel U-ring L20

Asymmetric elastomer U-ring with shortened inner lip.

MATERIAL	85 NBR B203, 85 NBR B247	85 FKM K664
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	16 MPa	16 MPa
	Operating media: water and water emulsion	

L20

U-ring Syprim SM

Two-piece seal set with integrated backup ring and pressure-relief function. Use as a primary rod seal within a seal system, typically in combination with a U-ring.

MATERIAL	95 AU V142/POM	94 AU 30000/POM
MAX.	–30 to +110 °C	–35 to +120 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Earth-moving equipment, forklift trucks, agricultural machines, truck cranes, injection molding machines	

Syprim SM

Merkel U-ring 0214, 0216

Two-piece seal set with an elastomer sealing edge, fabric reinforcement on the running surface (continuous on type 0214), and with an active backup ring.

MATERIAL	80 NBR B246 with BI-NBR B4 B248 / PA 6.G200 or POM PO202
MAX.	–30 to +100 °C
MAX.	1.5 m/s
MAX.	25 MPa or 40 MPa (depending on profile)
	Iron and steel industries, presses, ship hydraulics, scrap shears, special cylinders, injection molding machines, hydraulic steelwork

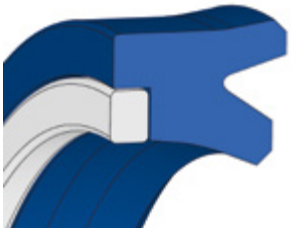
0214

0216

Merkel U-ring 0503

Two-piece seal set with an asymmetric U-ring made of polyurethane and plastic backup ring.

MATERIAL	95 AU V142 / PA or POM	94 AU 925 / PA or POM
MAX.	–30 to +110 °C	–30 to +110 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	50 MPa	50 MPa
	Individual seal for heavy engineering applications. Ideally suited to large diameters and for bridging large sealing gaps.	

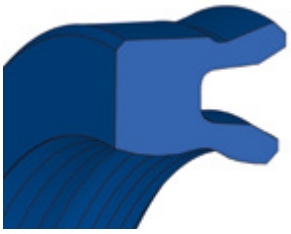


0503

Merkel U-ring TMP20

U-ring made of abrasion-resistant polyurethane.

MATERIAL	93 AU V167
MAX.	–10 to +80 °C
MAX.	1.5 m/s
MAX.	2 MPa
	Pneumatic applications with strict operational requirements



TMP20

Merkel U-ring 8009

Custom U-ring for sealing drag bearings that are subject to heavy soiling.

MATERIAL	93 AU V167
MAX.	on request
MAX.	on request
MAX.	on request
	Iron and steel industries, hydraulic steelwork, tunnel boring machines

8009

Hat seal H with/without spring

Lip seal with/without spring load. Clamping flange for securing in the installation space.

MATERIAL	88 NBR 101
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	1 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the T20, LF300

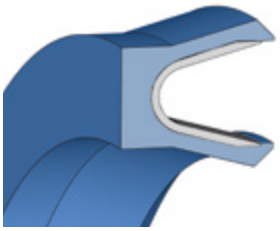
H MF

H OF

Forseal FOI

Single-acting, U-ring-type seal made of PTFE with stainless steel tension spring.

MATERIAL	PTFE F56110
MAX.	–200 to +260 °C
MAX.	15 m/s
MAX.	30 MPa
	Fittings, hydraulic cylinders, accumulators, pneumatic cylinders, applications in the food technology, medical engineering, and chemical engineering sectors



H OF

Merkel Omegat OMS-MR, OMS-MR PR, OMS-MR DW

Two-piece seal set, comprising a PTFE profile ring, on the OMS-MR PR version with patented pressure-relief function, and an elastomer ring as pre-load element. Pressure activation grooves on the OMS-MR DW version for pressurization on both sides.

MATERIAL	PTFE B602, GM201, C104 / NBR	PTFE B602, GM201, C104 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Primary seal in a seal system. The pressure-relief version for long strokes and major differences in speed	

OMS-MR

OMS-MR PR

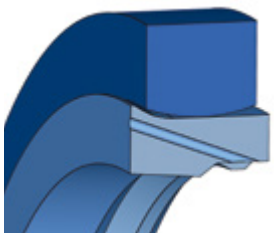
OMS-MR DW

Merkel Omegat OMS-S, OMS-S PR, OMS-S SR

Two-piece seal set, comprising a PTFE or PE profile ring, on the OMS-S PR version with patented pressure-relief function, and skids. An elastomer profile ring serves as the pre-load element on both versions.

MATERIAL	PTFE B602, GM201, C104; PE E083 / NBR	PTFE B602, GM201, C104 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Heavy industry, for example roller adjustment cylinders at steel works	

OMS-S



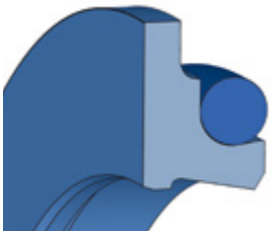
OMS-S PR

OMS-S SR

Merkel Omegat OMS-DR HB

Two-piece seal set, comprising a PTFE profile ring with holding flange to securely prevent rotation, and an O-ring as pre-load element.

MATERIAL	PTFE C104 / FKM
MAX.	+10 to +200 °C
MAX.	4 m/s
MAX.	26 MPa
	For rotary / swivel movements and for combined lifting and turning movements



OMS-DR HB

Merkel Omegat OMSU-MR, OMSU-MR PR

Two-piece seal set, comprising a polyurethane profile ring and an elastomer ring as pre-load element. Version OMSU-MR PR with patented pressure-relief function.

MATERIAL	95 AU V142 / NBR	98 AU V211 / NBR
MAX.	–30 to +100 °C	–30 to +100 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	16 MPa	16 MPa
	Can be used as an individual seal when working with exacting operating parameters up to an operating pressure of 16 MPa in connection with a double wiper	

OMSU-MR

OMSU-MR PR

Compact seal KI310

Compact seal with symmetrical profile and press fit on the external diameter. Use in combination with double-acting wipers not recommended.

MATERIAL	94 AU 925
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Earth-moving equipment, forklift trucks, agricultural machines, telescopic cylinders

KI310

Compact seal KI320

Compact seal with integrated backup ring. Profile with additional support edge and sealing edge, elements for axial securing in the installation space, as well as press fit on the external diameter. Use in combination with double-acting wipers not recommended.

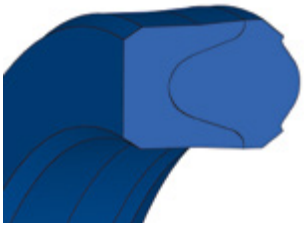
MATERIAL	94 AU 925 / POM
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	50 MPa
	Earth-moving equipment, presses, support cylinders

KI320

Merkel compact seal S8

Compact seal with a rubber head set in the fabric part. Among other applications, for installation spaces as per ISO 5597.

MATERIAL	70 NBR B209
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	25 MPa
	Spindles, standard cylinders, telescopic cylinders, machine tools



S8

Compact seal TFMI

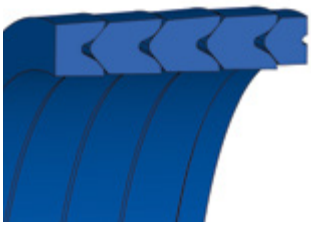
Double-acting rod seal, comprising a profile ring and an O-ring as pre-load element.

MATERIAL	PTFE 177023 / NBR
MAX.	–30 to +100 °C
MAX.	2 m/s
MAX.	16 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the Omegat OMS-MR-DW

TFMI

Merkel V-packing set V 1000

Multi-piece seal set made of rugged rubber/fabric components: Compression ring, multiple seals, and backup ring. The seal sets intended for heavy engineering applications are supplied in an open design and extra length.



V 1000

MATERIAL	BI-NR B5A151 (B/A), BI-NR B5B210 (B/B)
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	63 MPa
	Iron and steel industries, manipulators, scrap baling presses, heavy engineering

Merkel V-packing set VPS40

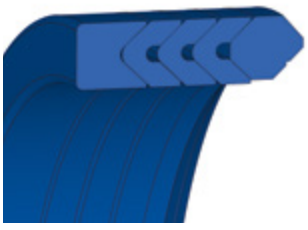
New development for use in challenging heavy industry applications and for large seal diameters. The sets fit in standard installation spaces of V-Seal Set packing kits, as well as V-packings from the Merkel V 1000 series. The sets are supplied ready-for-assembly in open design.

VPS40

MATERIAL	93 AU V167 / NBR
MAX.	–20 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Large diameters (up to 1,900 mm), high operating pressure, adjustable and non-adjustable installation spaces

Merkel V-Seal Set packing kit DMS0180

Multi-piece seal set, comprising a polyethylene compression ring, polyethylene seals, and an elastomer backup ring.



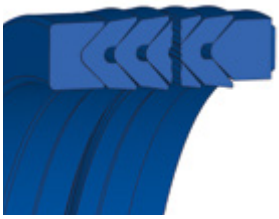
DMS0180

MATERIAL	PE E083 / NBR
MAX.	–30 to +80 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Sealing of piston rods in harsh operating conditions. Suitable for use on ceramic running surfaces

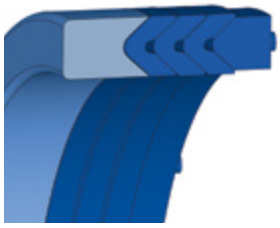
Merkel V-Seal Set packing kit ES, ESV, ES61, ES81

Multi-piece seal set in various designs, comprising one compression ring, at least three sealing elements, and one backup ring. The versions ES61 and ES81 employ different compression rings for increased extrusion protection or increased sealing effect.

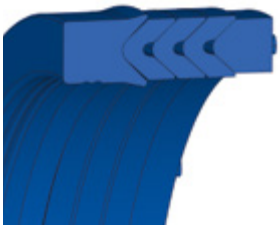
MATERIAL	BI-NBR / 85 NBR	BI-FKM / 85 FKM	PTFE B570 / BI-NBR / 85 NBR (ES 61)	94 AU 925 / BI-NBR / 85 NBR (ES 81)
MAX.	–30 to +100 °C	–15 to +140 °C	–30 to +100 °C	–30 to +100 °C
MAX.	0.5 m/s	0.5 m/s	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa	40 MPa	40 MPa
	Harsh operating conditions and large sealing gaps, for example in the iron and steel industries, in industrial presses, ship hydraulics, scrap shears, special cylinders, injection molding machines, hydraulic steelwork			



ES, ESV



ES61

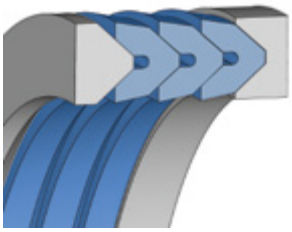


ES81

Packing ring TFW

V-shaped sealing ring made of PTFE to build up packings. Only TFW rings available from stock. Complete packings available on request.

MATERIAL	PTFE F52902
MAX.	–200 to +220 °C
MAX.	0.2 m/s to max. 1.5 m/s (depending on the application and direction of movement)
MAX.	31.5 MPa
	Axially moved valve spindles, rods, and plungers, slowly rotating shafts

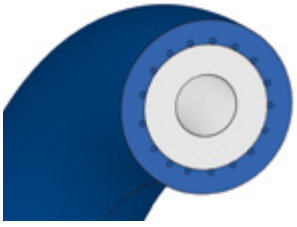


TFW

Merkel Vocomatic

Patented storage element for drag oil compensation within rod sealing systems.

MATERIAL	70 VQM 10801 / POM PO 202
MAX.	–30 to +100 °C
	Long-stroke cylinders, very different cylinder extension and retraction speeds



H OF

PISTON SEALS (HYDRAULICS)

SINGLE-ACTING PISTON SEALS

Single-acting piston seal with asymmetric profile, recessed outer lip, and press fit on the internal diameter for excellent tightness.

U-ring NA300

MATERIAL	94 AU 925	94 AU 30000
MAX.	–30 to +110 °C	–30 to +110 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Earth-moving equipment, presses, support cylinders	

NA300

U-ring NA150

MATERIAL	80 NBR 878
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	10 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the NA300

NA150

U-ring NA250

Two-piece seal set with integrated backup ring.

MATERIAL	80 NBR 878 / POM
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	25 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the NA300

NA250

U-ring NA400

U-ring with fabric reinforcement on the dynamic sealing side and backup ring as a gap-sealing element.

MATERIAL	80 NBR 878 / POM
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the NA300, T18

NA400

Merkel U-ring TM21

Single-acting U-ring with asymmetric profile, recessed outer lip, and press fit on the internal diameter.

MATERIAL	95 AU V142	93 AU V167
MAX.	–30 to +110 °C	–20 to +100 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	For strict operational requirements in heavy engineering applications, for example in injection molding machines, presses, or in large cylinders	

TM21

Merkel U-ring TMP21

Single-acting U-ring with asymmetric profile.

MATERIAL	93 AU V167
MAX.	–10 to +80 °C
MAX.	1.5 m/s
MAX.	2 MPa
	Pneumatic cylinders in heavy engineering applications

TMP21

U-ring T18

U-ring with integrated backup ring and asymmetric profile. Pressure-relief grooves facilitate a back-to-back arrangement.

MATERIAL	95 AU V142 / POM
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Support cylinders, earth-moving equipment, ship hydraulics, hydraulic steelwork

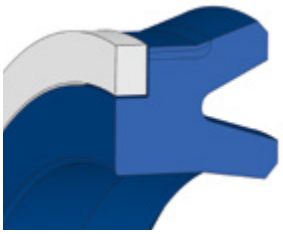
T18

Merkel U-ring 0215, 0217

Two-piece seal set, comprising an elastomer U-ring with fabric reinforcement on the running surface (runs beyond the sealing edge with type 0215) and an active backup ring.

MATERIAL	80 NBR B246 mit BI-NBR B4 B248 / PA bzw. POM
MAX.	–30 to +100 °C
MAX.	1.5 m/s
MAX.	25 MPa or 40 MPa (depending on profile)
	Iron and steel industries, industrial presses, ship hydraulics, scrap shears, injection molding machines, hydraulic steelwork

0215



0217

Merkel U-ring 0504

Two-piece seal set with an asymmetric U-ring made of polyurethane and a plastic backup ring.

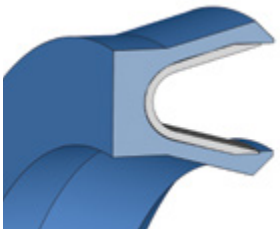
MATERIAL	95 AU V142 / PA or POM	95 AU 925 / PA or POM
MAX.	–30 to +110 °C	–30 to +110 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	50 MPa	50 MPa
	Individual seal for large diameters and for bridging large sealing gaps	

0504

Forseal FOA

Single-acting U-ring-type seal made of PTFE with metal tension spring.

MATERIAL	PTFE F56110
MAX.	–200 to +260 °C
MAX.	15 m/s
MAX.	30 MPa
	Fittings, hydraulic cylinders, accumulators, pneumatic cylinders, applications in the food technology, medical engineering, and chemical engineering sectors



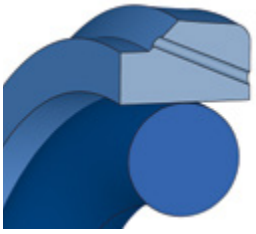
FOA

Merkel Omegat OMK-E, OMK-E PR, OMKU-E

Two-piece seal set, comprising a profile ring made of PTFE or polyurethane and an O-ring as pre-load element. Among other applications, for installation spaces based on ISO 7425/1. Rod diameter in accordance with ISO 3320. Version OMK-E PR with pressure-relief function.

MATERIAL	PTFE B602, GM201, C104; PE E083; 58 AU V206 / NBR	PTFE B602, GM201, C104 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Forklift trucks, handling equipment, agricultural machines, truck cranes, presses, ship hydraulics, injection molding machines, control devices, rolling mills	

OMK-E



OMK-E PR

Merkel Omegat OMK-ES, OMK-ES PR

Two-piece seal set, comprising one profile ring made of PTFE and one profile ring made of rubber as pre-load element. Designed specifically for large diameters and heavy hydraulic applications.

MATERIAL	PTFE B602, GM201, C104; PE E083; 58 AU V206 / NBR	PTFE B602, GM201, C104 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Manipulators, presses, ship hydraulics, injection molding machines, hydraulic steelwork, rolling mills	

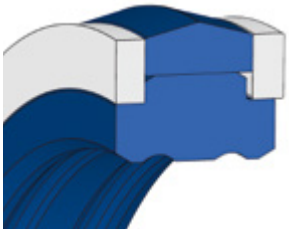
OMK-ES

OMK-ES PR

DOUBLE-ACTING PISTON SEALS

Merkel compact seal T42

Four-piece piston seal with a sealing element made of polyurethane, a pre-load element made of elastomer material, and two plastic backup rings.

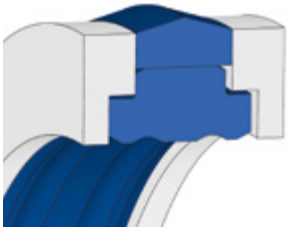


T42

MATERIAL	93 AU V167 / NBR / POM PO 202
MAX.	+5 to +60 °C
MAX.	0.1 m/s
MAX.	50 MPa
	Mining

Merkel compact seal T44

Four-piece piston seal, comprising a sealing element made of polyurethane, a pre-load element made of elastomer material, and two semi-active angled backup rings made of plastic.

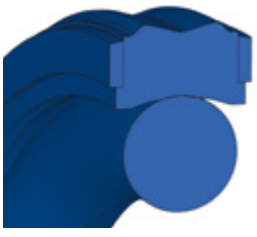


T44

MATERIAL	93 AU V167 / NBR / POM PO 202
MAX.	+5 to +60 °C
MAX.	0.1 m/s
MAX.	150 MPa
	Mining

Merkel Omegat OMK-PU

Two-piece piston seal, comprising a polyurethane profile ring with an O-ring as pre-load element.

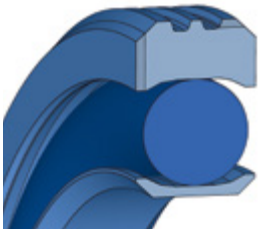


OMK-PU

MATERIAL	95 AU V142 / NBR
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	25 MPa
	Forklift trucks, agricultural machines, truck cranes, standard cylinders

Merkel Omegat OMK-DR HB

Three-piece piston seal, comprising a PTFE profile ring, an O-ring as pre-load element, and a PTFE slide ring in the groove base.



OMK-DR HB

MATERIAL	PTFE GM201 / PTFE V039 / FKM
MAX.	–10 to +100 °C
MAX.	5 m/s
MAX.	26 MPa
	For rotary / swivel movements and for combined lifting and turning movements

Merkel Omegat OMK-MR

Two-piece piston seal, comprising a profile ring made of PTFE and an O-ring as pre-load element.

OMK-MR

MATERIAL	PTFE B602, GM201 / 70 NBR B276	PTFE B602 / 70 FKM K655
MAX.	–30 to +100 °C	–30 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Forklift trucks, handling equipment, agricultural machines, truck cranes, presses, ship hydraulics, injection molding machines, control devices, rolling mills	

Merkel Omegat OMK-S

Two-piece piston seal, comprising one profile ring made of PTFE and one profile ring made of rubber as pre-load element. The seal set has been designed specifically for heavy hydraulic applications and large diameters.

OMK-S

MATERIAL	PTFE B602, GM201, C104; PE E083 / NBR	PTFE B602, GM201, C104 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	5 m/s	5 m/s
MAX.	40 MPa	40 MPa
	Large cylinders, manipulators, presses, ship hydraulics, injection molding machines, hydraulic steelwork, rolling mills	

Compact seal Simko 300

Two-piece piston seal, comprising a profile ring with pronounced sealing edges and a profile ring made of rubber as pre-load element.

MATERIAL	98 AU 928 / NBR
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, injection molding machines, support cylinders

SIMKO 300

Compact seal HDP 330

Two-piece piston seal, comprising a PA slide ring with a stepped cut and an elastomer profile ring as pre-load element. Extreme resistance to gap extrusion.

MATERIAL	PA 4112 / 70 NBR 177605
MAX.	–30 to +100 °C
MAX.	0.8 m/s
MAX.	60 MPa
	Earth-moving equipment, agricultural machines, heavy duty applications, cylinders with fully-drawn pipes

HDP 330

Compact seal Simko 320X2

Three-piece compact seal, comprising a fabric-reinforced elastomer sealing body and two guide backup rings.

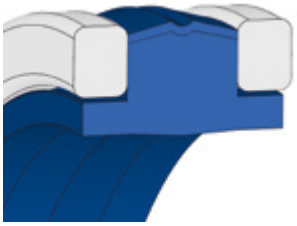
MATERIAL	80 NBR 878 / PA
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the SIMKO 300

SIMKO 320X2

Compact seal Simko 520

Three-piece compact seal, comprising a fabric-reinforced elastomer sealing body and two backup rings.

MATERIAL	80 NBR 878 / POM
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	50 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the HDP 330

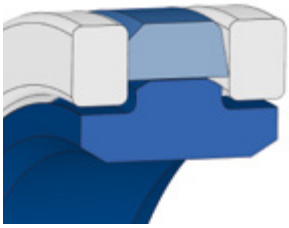


SIMKO 520

Merkel compact seal L27

Four-piece compact seal, comprising a PTFE bronze sealing element, one rubber pre-load element, and two active backup rings.

MATERIAL	PTFE B602 / NBR / POM
MAX.	–30 to +100 °C
MAX.	1.5 m/s
MAX.	50 MPa
	Excavators, earth-moving equipment, presses, injection molding machines

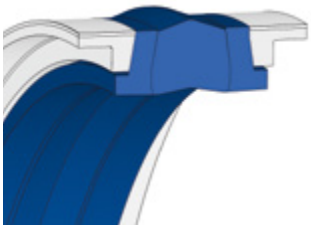


L27

Compact seal L43

Five-piece compact seal, comprising one profile ring, two backup rings, and two angled backup rings.

MATERIAL	78 NBR B281 / 97 TPE TP113 / PA 6501
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	40 MPa
	Earth-moving equipment, agricultural machines, truck cranes, standard cylinders



L43

Compact seal T19

Three-piece compact seal, comprising two angled bushes and one sealing element made of polyurethane. Designed primarily for installation spaces as per ISO 6547.

T19

MATERIAL	95 AU V142 / POM PO 202
MAX.	–30 to +110 °C
MAX.	0.5 m/s
MAX.	21 MPa
	Agricultural machines, standard cylinders

Compact seal TFMA

Two-piece compact seal, comprising a PTFE profile ring and an O-ring as pre-load element.

TFMA

MATERIAL	PTFE 177023 / NBR
MAX.	–30 to +100 °C
MAX.	2 m/s
MAX.	16 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the Omegat OMK-MR

Merkel V-Seal Set packing EK, EKV

Multi-piece seal set, comprising one compression ring, one or two seals, and a backup ring.

EK

MATERIAL	BI-NBR / 85 NBR	BI-FKM / 85 FKM
MAX.	–30 to +100 °C	–30 to +140 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Iron and steel industries, presses, ship hydraulics, scrap shears, special cylinders, injection molding machines, hydraulic steelwork	

Complete piston TDUOH

Seal with steel body and vulcanized, spring-loaded sealing lips.

MATERIAL	90 NBR 109 / Stahl
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	0.5 to 6 MPa (diameter-dependent)
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the SIMKO 300

TDUOH

Cup seal T with/without spring

Lip seal with/without spring load. Clamping flange for axial attachment in the installation space.

MATERIAL	88 NBR 101
MAX.	–30 to +100 °C
MAX.	0.5 m/s
MAX.	1 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the NA300

T MF

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SYMMETRICAL SEALS FOR RODS/PISTONS (HYDRAULICS)

U-rings N, AUN, N100, AUN100

U-rings with symmetrical profile of the sealing lips.

TYPE	N	AUN	N100	AUN100
MATERIAL	90 NBR 109	94 AU 925	90 NBR 109	94 AU 925
MAX.	–30 to +100 °C	–30 to +110 °C	–30 to +100 °C	–30 to +110 °C
MAX.	0.1 to 0.5 m/s	0.1 to 0.5 m/s	0.1 to 0.5 m/s	0.1 to 0.5 m/s
MAX.	≤ 10 MPa	≤ 20 MPa	≤ 16 MPa	≤ 30 MPa
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the T20 (rod seal) or NA300 (piston seal)			

N, AUN

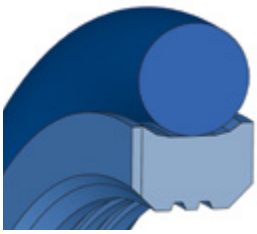
N100, AUN100

ROTARY / SWIVEL SEALS

Merkel Rotomatic M15

Two-piece rod seal kit, comprising a profile ring made of PTFE and an O-ring as pre-load element.

MATERIAL	PTFE GM201 / NBR	PTFE GM201 / FKM
MAX.	–30 to +100 °C	–10 to +150 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Excavators, pressure rotary feedthroughs, grippers	

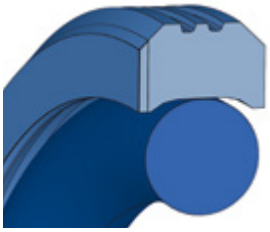


ROTOMATIC M15

Merkel Rotomatic M16

Two-piece piston seal kit, comprising a profile ring made of PTFE and an O-ring as pre-load element.

MATERIAL	PTFE GM201 / NBR	PTFE GM201 / FKM
MAX.	–30 to +100 °C	–10 to +150 °C
MAX.	0.5 m/s	0.5 m/s
MAX.	40 MPa	40 MPa
	Excavators, pressure rotary feedthroughs, grippers	



ROTOMATIC M16

Merkel Rotomatic M17

Seal featuring a lubrication groove on the running surface that has an elastomer part permanently embedded on both sides in fabric blocks.

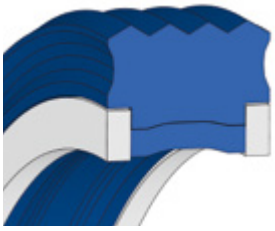
MATERIAL	80 NBR B246 / NBR-Gewebe
MAX.	–30 to +80 °C
MAX.	0.1 m/s
MAX.	20 MPa
	Excavators, pressure rotary feedthroughs, grippers

ROTOMATIC M17

Merkel Rotomatic M19

Three-piece piston seal kit, comprising an elastomer part with fabric reinforcement on the running surface which is designed in such a way that two sealing edges create a lubrication groove, as well as two activated backup rings.

MATERIAL	80 NBR B246 / NBR fabric / POM PO 202
MAX.	–30 to +80 °C
MAX.	0.2 m/s
MAX.	40 MPa
	Excavators, pressure rotary feedthroughs, grippers



ROTOMATIC M19

ROD SEALS (PNEUMATICS)

COMBINATION SEALS

Combined seals, comprising a seal and a wiper which seal inwards and wipe away dirt outwards. The special sealing edge produces good tightness with low friction and maintains an effective lubricating film over a long time period.

Combination seal NIPSL

This element has been designed for axially open installation spaces and is supported with a circular wire circlip.

MATERIAL	72 NBR 708	on request 75 FKM 595
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders	

NIPSL

Combination seal NIPSL 200

Compact combination element with low space requirement.

MATERIAL	80 NBR 4005
MAX.	–20 to +100 °C
MAX.	≤ 1 m/s
MAX.	≤ 1 MPa
	Pneumatic cylinders (small diameter)

NIPSL 200

Combination seal NIPSL 210

Very compact combined element with very low space requirement. In combination with suitable grease, also suitable for high temperature applications.

MATERIAL	75 FKM 181327
MAX.	–5 to +150 °C
MAX.	≤ 1 m/s
MAX.	≤ 1 MPa
	Compact cylinders, short-stroke cylinders

NIPSL 210

Combination seal NIPSL 300

Compact combined element with low space requirement. The material excels through its good low-temperature characteristics, as well as its high wear resistance.

MATERIAL	85 AU 20991
MAX.	–30 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 1 MPa
	Pneumatic cylinders (small diameter)

NIPSL 300

Combination seal NIPSL 310

Very compact combined element with very low space requirement. The material excels through its good low-temperature characteristics, as well as its high wear resistance.

MATERIAL	85 AU 20991
MAX.	–30 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 1 MPa
	Compact cylinders, short-stroke cylinders

NIPSL 310

Combination seal NIPSL 320

Very compact combined element with very low space requirement. The material excels through a wide range of applications, as well as its high wear resistance.

MATERIAL	94 AU 925
MAX.	–30 to +90 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Compact cylinders (also large diameters)

NIPSL 320

Combination seal AU NIPSL

The seal does not require any additional element (circlip) for axial attachment in the installation space and is also easy to install. The material excels through its suitability for a wide range of applications, as well as its high wear resistance. Very rugged design for a long service life – also with rough tolerances.

AU NIPSL

MATERIAL	94 AU 21200
MAX.	–30 to +90 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Pneumatic cylinders (also large diameters)

COMPACT SEALS

Compact seal Airzet PR

Compact seal that can be pressurized on both sides and permits short cylinder covers. The rounded sealing profile and the flexible center part provide good tightness with low friction, while also maintaining an effective lubricating film. The materials are suitable for a broad range of temperatures and media, while at the same time ensuring good wear resistance.

AIRZET PR

MATERIAL	80 NBR 186349	75 FKM 230553
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Cylinders and valves	

PISTON SEALS (PNEUMATICS)

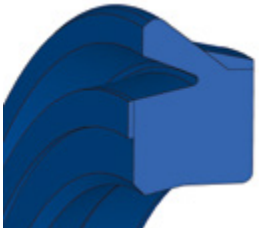
U-RINGS

U-rings with asymmetric profile and special pneumatic sealing edge on the dynamic sealing lip, which provides good tightness with low friction, while also maintaining an effective lubricating film over a long time period. The special design guarantees a secure press fit in the piston groove. Any pressure build-up between the piston seals is avoided thanks to integrated ventilation grooves. Tried-and-tested, rugged design with broad delivery range. The materials used are suitable for a broad range of temperatures and media, while at the same time ensuring good wear resistance.

U-ring NAP210

Very compact U-ring with very low space requirement.

MATERIAL	80 NBR 99079	75 FKM 99104
MAX.	–25 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders and valves	



NAP210

U-ring NAPN

Tried-and-tested, rugged design with broad delivery range.

MATERIAL	80 NBR 186349	75 FKM 230553
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders	

NAPN

U-ring NAP300

Tried-and-tested, rugged design with broad delivery range. The material excels through its good low-temperature characteristics and its high wear resistance.

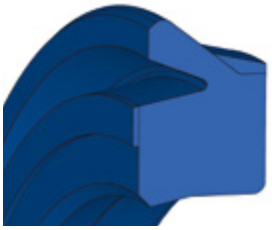
MATERIAL	80 AU 20994
MAX.	–35 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Pneumatic cylinders

NAP300

U-ring NAP310

Very compact U-ring with very low space requirement. The material excels through its good low-temperature characteristics and its high wear resistance.

MATERIAL	80 AU 20994
MAX.	–35 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Pneumatic cylinders



NAP310

COMPACT SEALS

Compact seal Airzet PK

Compact seal that can be pressurized on both sides and features grooves on the front side for pressure activation. The compact design permits very short piston designs. The rounded sealing profile and the flexible center part provide good tightness with low friction, while also enabling an effective lubricating film to be maintained over a long period. The materials used are suitable for a broad range of temperatures and media, while at the same time ensuring good wear resistance.

MATERIAL	80 NBR 186349	75 FKM 230553
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1.2 m/s	≤ 1.2 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders, short-stroke cylinders, valves	

AIRZET PK

Compact seal KDN

Tried-and-tested symmetrical design. Applications include use as a piston seal in the PNEUKO G.

MATERIAL	72 NBR 708
MAX.	–20 to +100 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Compact cylinders, short-stroke cylinders, valves

KDN

Smooth-running seal TR200

Patented piston seal that floats radially in the installation space, can be pressurized on both sides, and features grooves on the front side for secure pressure activation. Low, virtually time-independent constant friction. Jerk-free running, even at very low speeds. Optimum effective stroke thanks to very narrow installation space. The fully symmetrical design means that it can be fitted in any orientation during installation. Seals made from FKM for high-temperature applications and critical media.

MATERIAL	72 NBR 708	on request 75 FKM 230553
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders, short-stroke cylinders, valves, special applications (on request: seals made from FKM for high-temperature applications and critical media)	

TR200

Complete piston NADUOP

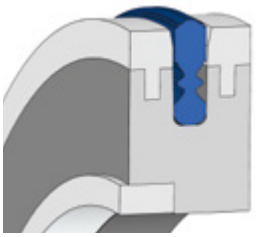
Single-piece complete piston seal with steel base plate, vulcanized sealing lips with special pneumatic sealing edge, and buffers for mechanical end-position damping. Radial venting channels allow fast pressurization in the end positions. Ready-for-installation complete piston that can be pressurized on both sides and features an integrated guide. The FKM version can also be used for high-temperature applications in combination with a suitable grease.

MATERIAL	72 NBR 708	on request 75 FKM 595
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Compact cylinders and short-stroke cylinders without position detection	

NADUOP

Complete piston Pneuko G

Complete piston with light alloy body*, piston seal KDN, static seal APR, and integrated polyamide guide ring. Ready-for-installation piston that can be pressurized on both sides, featuring very low height and integrated static seal on the inside diameter.
(*exception: when Ø ≤ 25 mm, entire body made from POM)

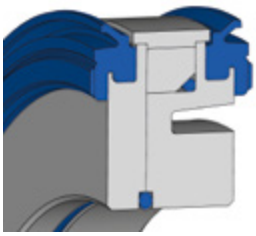


PNEUKO G

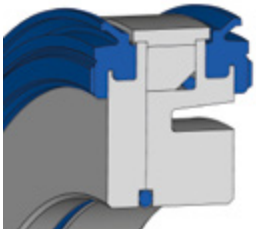
MATERIAL	72 NBR 708
MAX.	–20 to +100 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Pneumatic cylinders without position detection, custom cylinders

Complete piston Pneuko M210, Pneuko M310

Compact complete piston assembly, comprising lightweight aluminum bodies, a guide ring FRA, an integrated magnet for position detection, and sealing elements with special pneumatic sealing edge on the dynamic sealing lip, as well as integrated buffers for mechanical end-position damping. The assembly, which can be pressurized on both sides, is ready for installation and easy to attach to the piston rod. Static sealing via O-ring. The FKM version can also be used for high-temperature applications in combination with a suitable grease.



PNEUKO M210



PNEUKO M310

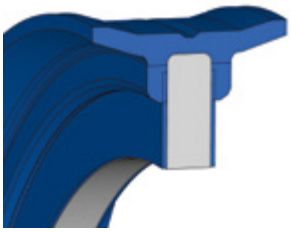
TYPE	Pneuko M310	Pneuko M210
MATERIAL	85 AU 21030	75 FKM 181327
MAX.	–30 to +80 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Short-stroke cylinders, compact cylinders, round cylinders, and ISO pneumatic cylinders with position detection	

Complete piston TDUOP, TDUOP Air

Single-piece complete piston with steel body and vulcanized sealing lips with special pneumatic sealing edge. The complete piston, which can be pressurized on both sides, features an integrated guide ring. Simple attachment to the piston rod without additional sealing elements. The TDUOP Air also features radial venting channels on the faces for faster pressurization in the end positions. The FKM version can also be used for high-temperature applications in combination with a suitable grease.

MATERIAL	72 NBR 708	on request 75 FKM 595
MAX.	–20 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.2 MPa	≤ 1.2 MPa
	Pneumatic cylinders without position detection	

TDUOP



TDUOP AIR

Complete piston TDUOP M

Complete piston assembly, comprising aluminum bodies with vulcanized sealing contour, a guide ring FRA, and a magnet for position tracking. Special pneumatic sealing edges provide good tightness and maintain the lubricating film for a long period. Simple attachment to the piston rod without the need for any additional static seal.

MATERIAL	72 NBR 708
MAX.	–20 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 1.2 MPa
	Pneumatic cylinders with position detection

TDUOP M

DAMPER SEALS (PNEUMATICS)

Damper seals feature face spacing elements and overflow channels on the outer perimeter. Secure pneumatic damping and fast movement out of the end position are achieved thanks to the integrated check valve function and automatic centering.

Damper seal D&S 300

Patented combined damping element for the cylinder cover that performs multiple functions at the same time: Static sealing between the cylinder cover and cylinder barrel, pneumatic damping through air throttling, mechanical damping at the end of the piston stroke, and integrated check valve function. This leads to a significantly lower number of components and greatly simplified machining of the cylinder cover. It also prevents noise emissions and dynamic loads for cylinder components and neighboring units.

D&S 300

MATERIAL	85 AU 21030
MAX.	–30 to +80 °C
MAX.	≤ 1 m/s
MAX.	≤ 2.5 MPa
	Pneumatic cylinders, short-stroke cylinders

Damper seal AU DIP

The materials used excel through good low-temperature characteristics and high wear resistance.

AU DIP

MATERIAL	85 AU 20991 for Ø ≤ 12	94 AU 925 for Ø > 12
MAX.	–30 to +90 °C	–30 to +90 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 2.5 MPa	≤ 2.5 MPa
	Pneumatic cylinders	

Damper seal DIP

The FKM version can also be used for high-temperature applications in combination with a suitable grease.

MATERIAL	90 NBR 109	on request 75 FKM 595
MAX.	–30 to +100 °C	–5 to +150 °C
MAX.	≤ 1 m/s	≤ 1 m/s
MAX.	≤ 1.6 MPa	≤ 1.6 MPa
	Pneumatic cylinders	

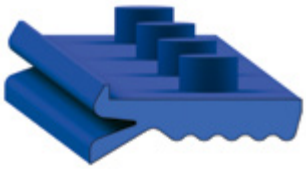
DIP

PRECISION PROFILES MADE OF POLYURETHANE

Precision profiles made of high-grade polyurethane with/without integrated fine cables for strain relief or power transmission. PU profiles boast anti-wear characteristics and are noise-reducing, suitable for highly versatile applications, and resistant to a very wide range of media.

MATERIAL	Various polyurethanes in a hardness range from 80 Shore A to 98 Shore A
MAX.	–30 to +100 °C (depending on the material used)
	Sealing/wiper profiles for telescopic covers and linear measuring systems on machine tools

Precision profiles with fine cable



Precision profiles without fine cable

PROFILES FOR RODLESS PNEUMATIC CYLINDERS

Precision profiles made of high-grade polyurethane with integrated fine cables for limiting elongation. PU profiles boast anti-wear characteristics and are noise-reducing.

MATERIAL	Various polyurethanes in a hardness range from 80 Shore A to 98 Shore A
MAX.	–30 to +100 °C (depending on the material used)
MAX.	≤ 1 m/s (potentially also greater, depending on the operating conditions)
MAX.	≤ 1.2 MPa
	Pneumatic belt and slotted cylinders without piston rod, for example used for power transmission from the driving piston to the carriage, as a strap and cover belt, or as a sealing belt for pressure-tight sealing of the longitudinal slot in the cylinder barrel

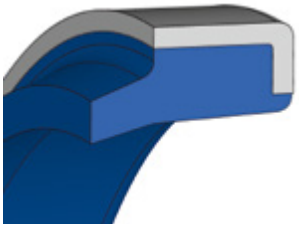
Profile with fine cable

WIPERS (SINGLE-ACTING)

Wiper AS

Wiper with metal housing and protruding wiper lip. Used in various applications, including for installation spaces as per ISO 6195 Type B.

MATERIAL	88 NBR 101	88 NBR 99035
MAX.	–30 to +100 °C	–30 to +100 °C
MAX.	2 m/s	2 m/s
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the AU AS(R)	

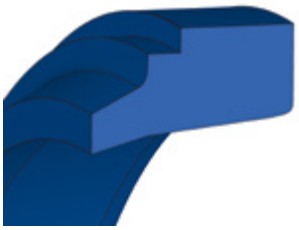


AS

Wiper ASOB

Wiper with protruding wiper lip but no metal reinforcement.

MATERIAL	88 NBR 101
MAX.	–30 to +100 °C
MAX.	2 m/s
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the PU5



ASOB

Wiper AU PS

Wiper with metal housing and a wiper lip that sits flush with the housing. Used in various applications, including for standardized installation spaces as per ISO 6195 Type B.

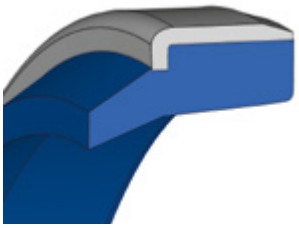
MATERIAL	94 AU 925
MAX.	–30 to +110 °C
MAX.	2 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, swivel pin sealing, support cylinders

AU PS

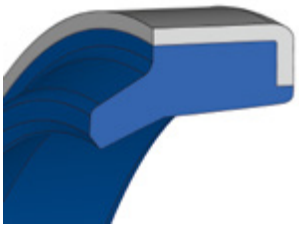
Wiper AU AS, AU ASR

Wiper with metal housing. The protruding wiper lip has a sharply defined sealing edge. Used in various applications, including for installation spaces as per ISO 6195 Type B.

MATERIAL	94 AU 925
MAX.	–30 to +110 °C
MAX.	2 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, presses, support cylinders



AU AS



AU ASR

Wiper AU ASOB

Wiper without metal reinforcement but with protruding wiper lip and base support to prevent twisting. For standardized installation spaces as per ISO 6195 Type A.

MATERIAL	94 AU 925
MAX.	–30 to +110 °C
MAX.	2 m/s
	Primarily for spare parts requirements. For new designs, we recommend more modern series, such as the PU5

AU ASOB

Merkel wiper P6

Wiper with protruding wiper lip and support segments to prevent twisting.

MATERIAL	85 NBR B247	85 FKM K664
MAX.	–30 to +100 °C	–10 to +200 °C
MAX.	2 m/s	2 m/s
	Industrial presses, hydraulic steelwork, rolling mills	

P6

Wiper PU5

Wiper with additional static sealing lip and support elements to prevent twisting. Used in various applications, including for installation spaces as per ISO 6195 Type A.

MATERIAL	95 AU V149
MAX.	–30 to +110 °C
MAX.	2 m/s
	Mining, earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, industrial presses, injection molding machines, support cylinders, telescopic cylinders

PU5

Merkel wiper PU6, PH6

Wiper with static sealing edge on the external perimeter and with support elements to prevent twisting.

MATERIAL	95 AU V142, 95 AU V149, 97 TPE TP106, 97 TPE TP107	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	2 m/s	2 m/s
	Mining, earth-moving equipment, industrial presses, presses, injection molding machines, support cylinders	

PU6 (d ≤ 70 mm)

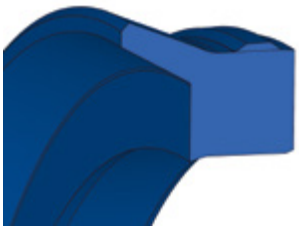
PU6 (d > 70 mm)

PH6

Merkel wiper PU12

External sealing wiper with protruding wiper lip and support segments to prevent twisting, as well as a static sealing edge to the groove base.

MATERIAL	95 AU V142, 95 AU V149	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	2 m/s	2 m/s
	Mining, earth-moving equipment, industrial presses, injection molding machines, support cylinders	



PU12

WIPERS (DOUBLE-ACTING)

Merkel double wiper P8

Wiper with the functionality of a U-ring internally and outward wiper effect.

MATERIAL	85 NBR B247	90 NBR B283	90 NBR 109
MAX.	–30 to +100 °C	–30 to +100 °C	–30 to +110 °C
MAX.	1 m/s	1 m/s	1 m/s
	Forklift trucks, industrial presses, injection molding machines		

P8

Merkel double wiper P9

Wiper designed specifically for large diameters with the functionality of a U-ring internally and outward wiper effect.

MATERIAL	85 NBR B247
MAX.	–30 to +100 °C
MAX.	2 m/s
	Industrial presses, injection molding machines, large standard cylinders

P9

Merkel double wiper PRW1

Wiper with the functionality of a U-ring internally and outward wiper effect. With additionally integrated pressure-relief function. For installation spaces based on ISO 6195 Type A.

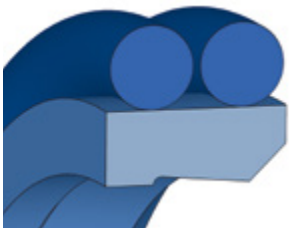
MATERIAL	94 AU 925	92 AU 21100	94 AU 30000
MAX.	–30 to +110 °C	–50 to +110 °C	–35 to +120 °C
MAX.	1 m/s	1 m/s	1 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, support cylinders		

PRW1

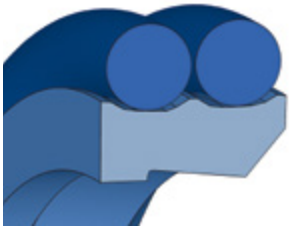
Merkel double wipers PT1, PT1-DR HB

Wipers, comprising a PTFE profile ring with sealing and wiper edge, as well as two O-rings as pre-load element. Version PT1-DR HB is suitable for combined lifting and turning movements.

MATERIAL	PTFE B602 / NBR; PTFE GM201 / NBR	PTFE B602 / FKM	PTFE GM201 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C	–10 to +150 °C
MAX.	5 m/s	5 m/s	5 m/s
	Forklift trucks, large cylinders, handling equipment, agricultural machines, presses, injection molding machines, control devices, rolling mills		



PT1

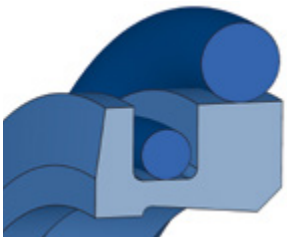


PT1-DR HB

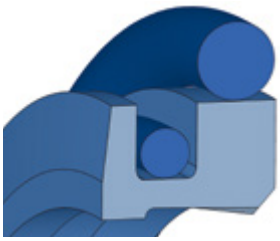
Merkel double wipers PT2, PT2 PR

Wipers comprising a PTFE profile ring with sealing and wiper edge as well as two O-rings as pre-load element. Version PT2 PR features a pressure-relieved sealing edge.

MATERIAL	PE E084 / NBR	PTFE B602 / NBR; PTFE GM201 / NBR	PTFE B602 / FKM	PTFE GM201 / FKM
MAX.	–30 to +80 °C	–30 to +100 °C	–10 to +200 °C	–10 to +150 °C
MAX.	5 m/s	5 m/s	5 m/s	5 m/s
	Industrial presses, injection molding machines, hydraulic steelwork, rolling mills			



PT2



PT2 PR

Merkel double wiper PT3

External sealing wiper comprising a PTFE profile ring with sealing and wiper edge as well as two O-rings as pre-load element.

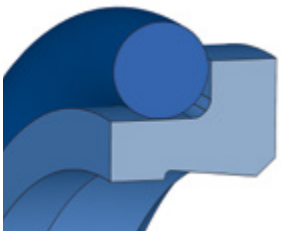
MATERIAL	PTFE B602 / NBR; PTFE GM201 / NBR	PTFE B602 / FKM	PTFE GM201 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C	–10 to +150 °C
MAX.	5 m/s	5 m/s	5 m/s
	Industrial presses, injection molding machines, hydraulic steelwork, rolling mills		

PT3

Merkel double wiper PT4

Wiper, comprising a PTFE profile ring with one sealing edge and one wiper edge as well as an O-ring as pre-load element.

MATERIAL	PTFE B602 / NBR; PTFE GM201 / NBR	PTFE B602 / FKM	PTFE GM201 / FKM
MAX.	–30 to +100 °C	–10 to +200 °C	–10 to +150 °C
MAX.	5 m/s	5 m/s	5 m/s
	Industrial presses, injection molding machines, hydraulic steelwork, rolling mills		



PT4

Merkel double wiper PU1

Wiper, comprising a PU profile ring with one sealing edge and one wiper edge as well as an O-ring as pre-load element.

MATERIAL	95 AU V142; 98 AU V211	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	1.5 m/s	1.5 m/s
	Industrial presses, injection molding machines, hydraulic steelwork, rolling mills	

PU1

Double wiper PU11

Wiper with the functionality of a U-ring internally and outward wiper effect. Also suitable for standardized installation spaces as per ISO 6195 Type C.

MATERIAL	95 AU V142	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	1 m/s	1 m/s
	Forklift trucks, injection molding machines, standard cylinders	

PU11

Double wiper DMRW2

Wiper with the functionality of a U-ring internally and outward wiper effect. With protruding wiper lip, metal housing and additionally integrated pressure-relief function.

MATERIAL	94 AU 30000
MAX.	–35 to +120 °C
MAX.	1 m/s
	Earth-moving equipment, commercial vehicles, tail lifts, agricultural machines, truck cranes, support cylinders, presses

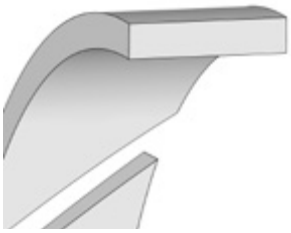
DMRW2

GUIDE RINGS (ROD)

Guide ring FRI

Slotted non-metallic guide ring made of polyamide, for various applications including standardized installation spaces as per ISO 10766.

MATERIAL	PA 4112
MAX.	–40 to +100 °C
MAX.	1 m/s
	Earth-moving equipment, forklift trucks, agricultural machines, truck cranes



FRI

Guide ring Guivex SBK

Patented non-metallic guide ring made of fabric-base laminate. Optimum stress distribution thanks to profiled static side.

MATERIAL	HG517	HG650
MAX.	–40 to +100 °C	–40 to +120 °C
MAX.	1 m/s	1 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, presses, injection molding machines, hydraulic steelwork, support cylinders	

SBK

Guide ring SB

Non-metallic guide ring made of fabric-base laminate.

MATERIAL	HG517	HG600	HG650
MAX.	–40 to +100 °C	–70 to +100 °C	–40 to +120 °C
MAX.	1 m/s	1 m/s	1 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, presses, injection molding machines, hydraulic steelwork, support cylinders		

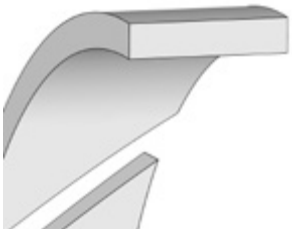
SB

GUIDE RINGS (PISTON)

Guide ring FRA

Slotted non-metallic guide ring made of polyamide, for various applications including standardized installation spaces as per ISO 10766.

MATERIAL	PA 4112
MAX.	–40 to +110 °C
MAX.	1 m/s
	Earth-moving equipment, forklift trucks, agricultural machines, truck cranes



FRA

Guide ring Guivex KBK

Patented non-metallic guide ring made of fabric-base laminate. Optimum stress distribution thanks to profiled static side.

MATERIAL	HG517	HG650
MAX.	–40 to +100 °C	–40 to +120 °C
MAX.	1 m/s	1 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, presses, injection molding machines, hydraulic steelwork, support cylinders	

KBK

Guide ring KB

Slotted non-metallic guide ring made of fabric-base laminate.

MATERIAL	HG517	HG600	HG650
MAX.	–40 to +100 °C	–70 to +100 °C	–40 to +120 °C
MAX.	1 m/s	1 m/s	1 m/s
	Earth-moving equipment, forklift trucks, tail lifts, agricultural machines, truck cranes, presses, injection molding machines, hydraulic steelwork, support cylinders		

KB

STATIC SEALS

O-RINGS (FOR DYNAMIC AND STATIC APPLICATIONS)

Endless round sealing rings with circular cross-section are used to seal off stationary machine parts from liquid and gaseous media. When certain prerequisites are met, they can also be used as dynamic sealing elements for axial, rotary, and oscillating movements.

- **Rings:** Standard solution for axial and radial applications. Easy to use.
- **X-rings:** Solution for radial use in dynamic applications.
- **D-ring:** Solution with anti-twist protection for radial use in high-pressure applications.
- **R-ring:** Solution with anti-twist protection for axial and radial use.

O-Ring

X-Ring

D-Ring

R-Ring

The following table provides a selection of important Freudenberg "core materials" for O-rings:

MATERIAL	MAX.	CHARACTERISTICS	
70 EPDM 331	Static and dynamic: −40 to +150 °C	Drinking water material; EC Regulation 1935/2004 and 2023/2006 (GMP); 3-A® Sanitary Standard Class II; ACS, AS/NZS 4020:2005; DIN EN 681; FDA 21 CFR §177.2600; NSF 51, NSF 61; ÖNorm B 5014; UBA guideline, W 270; USP Chapter 87 (in vitro); USP Class VI Ch. 88 – 121°C; WRAS BS 6920; Kiwa; ADI-free; RoHS	Food and beverage industry, pharmaceutical industry
75 FKM 233101	Static: −15 to +200 °C	Excellent media resistance; ADI-free; RoHS	Metering of liquids and solids, metering pumps, valves
75 FKM 606	Static: −40 to +230 °C	Excellent resistance to cooling water and oil; excellent high-temperature resistance; ADI-free; RoHS	Wet cylinder liners; hot water systems; turbochargers; cable connectors
80 FKM 610	Static: −40 to +200 °C Dynamic: −25 to +200 °C	Good media and temperature resistance; ADI-free; RoHS	Vacuum technology, hydraulic components
72 NBR 872	Static: −40 to +100 °C Dynamic: −30 to +100 °C	Universal NBR material; ADI-free; RoHS	Seal against mineral oils (+100 °C) and cooling water (+80 °C)
75 NBR 430	Static: −20 to +100 °C	EC Regulation 1935/2004 and 2023/2006 (GMP); 3-AR Sanitary Standard Class II; FDA 21 CFR §177.2600; ADI-free; RoHS	Food and beverage industry
90 NBR 433	Static: −20 to +100 °C	EC Regulation 1935/2004 and 2023/2006 (GMP); 3-AR Sanitary Standard Class II; FDA 21 CFR §177.2600; ADI-free; RoHS	Food and beverage industry
70 HNBR 150531	Static: −40 to +140 °C Dynamic: −25 to +140 °C	Also available as a "low PAK" version; ADI-free; RoHS	Power tools

MATERIAL	MAX.	CHARACTERISTICS	
75 HNBR 175024	statisch: –40 to +140 °C dynamisch: –25 to +140 °C	Green; ADI-free; RoHS	Motors, air-conditioning applications
75 HNBR 231199	statisch und dynamisch: –40 to +140 °C	Green; Excellent low-temperature resistance; Cold guide value DSC: -36 °C; ADI-free; RoHS	Motors; sealing of sensors in the chemical-pharmaceutical industry
75 HNBR 231142	statisch: –35 to +140 °C	EC Regulation 1935/2004 and 2023/2006 (GMP); 3-A® Sanitary Standard Class II; Arrete 9. Nov. 1994; FDA 21 CFR §177.2600; ADI-free; RoHS	Valves, threaded pipe fittings for the pharmaceutical, food and beverage industries
85 HNBR 230738	statisch und dynamisch: –40 to +140 °C	Green; excellent low-temperature resistance: cold guide value DSC: -37 °C; ADI-free; RoHS	Sealing of the hammer mechanism on power tools
75 FKM 180497	statisch: –25 to +200 °C	EC Regulation 1935/2004 and 2023/2006 (GMP); 3-A® Sanitary Standard Class II; Arrete 9. Nov. 1994; FDA 21 CFR §177.2600; USP Chapter 87 (in vitro); ADI-free; RoHS	Valves, threaded pipe and sensor fittings for the pharmaceutical and food industries

The following table provides a selection of important Freudenberg "specialties" (high-performance materials) for O-rings:

MATERIAL	MAX.	CHARACTERISTICS	
70 EPDM 291	Static: –50 to +150 °C Dynamic: –40 to +150 °C	Use in water and water steam up to max. +180 °C (briefly +210°C); EC Regulation 1935/2004 and 2023/2006 (GMP); 3-A® Sanitary Standard Class II; Arrete 9. Nov. 1994; FDA 21 CFR §177.2600; NSF 51, NSF 61; USP 36 NF 31 Ch. 381 Type 1; USP Chapter 87 (in vitro); USP Class VI Ch. 88 – 121 °C; WRAS BS 6920; Kiwa; specifically for CIP/SIP media; ADI-free; RoHS	Food and beverage industry, heating and sanitary industry, pharmaceutical industry
70 CR 233906	Static: –30 to +100 °C	Mineral oil resistant; low permeation; longstanding reference applications in SF6 gear switches; ADI-free; RoHS	SF6 gas MV and HV systems
70 CIIR 236460	Static: –60 to +130 °C	Very low permeation; very wide temperature window; ADI-free; RoHS	MV and HV systems with alternative insulating and quenching gases
Fluoroprene® XP	Static: –15 to +200 °C	Blue; EC Regulation 1935/2004 and 2023/2006 (GMP); 3-A® Sanitary Standard Class II; Arrete 9. Nov. 1994; BNIC (Cognac); FDA 21 CFR §177.2600; NSF 51; USP Class VI Ch. 88 – 121°C; USP Chapter 87 (in vitro); ADI-free; RoHS; Universal media resistance, specifically for CIP/SIP media and hot steam, as well as to avoid flavor transfer	Food and beverage industry, chemicals industry
75 Simriz® 483	Static: –20 to +230 °C	White; ADI-free; RoHS	Vacuum technology for medical and pharmaceutical applications
75 Simriz® 484	Static: –10 to +230 °C Briefly: +260 °C	3-A® Sanitary Standard Class II; FDA 21 CFR §177.2600; USP Class VI Ch. 88–121 °C; ADI-free; RoHS	Pumps and separators for the chemicals industry, as well as the pharmaceutical and food industries

MATERIAL	MAX.	CHARACTERISTICS	
75 Simriz® 494	Static: –15 to +230 °C Briefly: +260 °C	FDA 21 CFR §177.2600; USP Chapter 87 (in vitro); USP Class VI Ch. 88 – 121°C; ADI-free; RoHS	Pumps and separators for the chemicals industry, as well as the pharmaceutical and food industries
75 Simriz® 495	Static: –15 to +230 °C Briefly: +260 °C	Excellent media resistance including amines; good high-temperature resistance; ADI-free; RoHS	Dispersion and homogenization in the chemicals industry
75 Simriz® 498	Static: –5 to +320 °C	Excellent high-temperature resistance; ADI-free; RoHS	Aviation, chemicals and process industries
80 ChemXT 940	Static: –15 to +230 °C	Excellent sealing performance at low temperatures; excellent chemical resistance; ADI-free; RoHS	Quick connectors for HT temperature control units, static housings, O-rings in mechanical seals

Overview of conformity/approval:

APPROVAL	DESCRIPTION	COUNTRY
ACS	Testing specifications for elastomer materials in the drinking water sector	France
USP	Materials in the medical and pharmaceutical sector / USP = U.S. Pharmacopeia	USA
FDA 21 CFR §177.2600	Elastomer materials in the food sector / FDA = Food and Drug Administration	USA
3-A® Sanitary Standard Class II	Suitability test for the dairy industry	USA
EC Regulation 1935/2004 and 2023/2006 (GMP)	Elastomer materials in the food sector	Europe
NSF 51	Elastomer materials in the food sector	USA
NSF 61	Elastomer materials in the drinking water sector	USA
Kiwa	Testing specifications for elastomer materials in the drinking water sector	Netherlands
ÖNorm B 5014	Testing specifications for elastomer materials in the drinking water sector	Austria
UBA	Testing specifications for elastomer materials in the drinking water sector / UBA = Federal Environment Agency	Germany
W 270	DVGW Worksheet "Bacterial Ooze Formation“ / component of the UBA Drinking Water Directive	Germany
ADI-free	Materials free of animal derived ingredients (ADI)	USA / Europe
RoHS	Restriction regarding the use of certain hazardous substances in electrical and electronic equipment	Europe
Arrete	Testing specifications for elastomer materials in the food sector	France
AS / NZS 4020	Elastomer materials in the drinking water sector	Australia
WRAS / BS 6920	Testing specifications for elastomer materials in the drinking water sector	Great Britain

Micro O-rings

Micro O-rings are available with very small internal diameters (d1 > 0.75 mm) and cord thicknesses (d3 > 0.4 mm). They offer tight tolerances (ISO 3601 Part 1 for cord thicknesses not sufficient), material resistance (aging, UV, and media resistance), and a reduced, even burr. Micro O-rings are available in the materials FKM, NBR, HNBR, and EPDM.

Micro O-rings

PROFILES FOR STATIC APPLICATIONS

Special profiles, cords, or hoses are used for sealing points that either cannot be sealed or can only be sealed at considerable cost through use of molded parts or O-rings. Over 3,500 different profile dies, as well as numerous materials are available for this.

- **Profiles**
  - Hat seals
  - X-profiles
  - Other special profiles
- **Cords**
  - Cords
  - Cord rings
- **Hoses**
  - Hoses
  - Hose rings

Wind power pitch bearings, steel works, tunnel boring machines, etc.

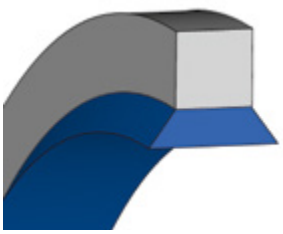
X-profile

Special profile (example profile 20128)

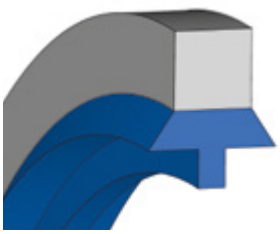
USIT RINGS

Metallic flat seals with internally vulcanized (Usit I) or externally vulcanized (Usit A, Usit A HY) trapezoidal, rubber-elastic sealing bead. USIT I SF with additional centering diaphragm for static sealing.

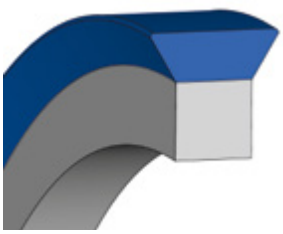
MATERIAL	70 NBR 177646	75 FKM 177645
MAX.	–30 to +100 °C	–20 to +200 °C
MAX.	< 100 MPa (installation with counter bore) < 40 MPa (installation without counter bore when Ø < 40 mm; only for USF) < 25 MPa (installation without counter bore when Ø < 40 mm)	
	Screwed connections, flange connections	



Usit I



Usit I SF



Usit A

Usit A HY

Hygienic Usit®

The Hygienic Usit® is a further development of the conventional standard Usit ring – developed specifically for the requirements of the process industry. It reliably guarantees hygienic sealing of a screw head. It also facilitates cleaning without difficulty in the form of CIP (cleaning in place), WIP (washing in place), or SIP (sterilization in place) processes without having to disassemble the system.

Hygienic Usit

MATERIAL	70 EPDM 291	70 EPDM 253815	75 Fluoroprene® XP 45
MAX.	–40 to +150 °C	–40 to +150 °C	–15 to +200 °C
	Screwed connections		
APPROVALS	FDA 21 CFR 177.2600; 3-A® Sanitary Standards Class II; EC Regulation 1935/2004 and 2023/2006; USP Ch. 87 and Ch. 88 – Class VI – 121 °C; NSF 51; ADI-free	FDA 21 CFR 177.2600; 3-A® Sanitary Standards Class II; EC Regulation 1935/2004 and 2023/2006; USP Ch. 87 and Ch. 88 – Class VI – 121 °C; ADI-free	FDA 21 CFR 177.2600; 3-A® Sanitary Standards Class I; EC Regulation 1935/2004 and 2023/2006; ADI-free

COVER SEALS

Cover seal PU 82 (internal sealing), PU 83 (external sealing)

One-piece, double-acting compact seal made of TPU for static sealing (internal or external sealing).

MATERIAL	95 AU V142	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	60 MPa	60 MPa
	Mobile cranes, construction machinery, industrial trucks, forestry equipment, injection molding machines	

PU82

PU83

Merkel Stircomatic SRC

One-piece compact seal made of polyurethane for static sealing, axially sealing.

MATERIAL	95 AU V142	93 AU V167
MAX.	–30 to +110 °C	–20 to +110 °C
MAX.	80 MPa	80 MPa
	Hydraulic hammers, hydraulic control devices	

SRC

Merkel Pinmatic

One-piece, double-acting compact seal made of polyurethane for sealing pivot bolts, internal sealing.

MATERIAL	95 AU V142
MAX.	–30 to +100 °C
MAX.	0.2 m/s
MAX.	2 MPa
	Knee levers, bearing and pivot bolts, injection molding machines

PINMATIC

ACCUMULATORS

PISTON ACCUMULATORS

Load, pressure, and temperature conditions. Design, threaded connections, flange connections, connections for temperature and pressure sensors, and systems for determining the piston position based on customer requirements.

VOLUMES	0.16 to 1,000 liters
MAX.	–40 to +150 °C
MAX.	100 MPa
	Agricultural and construction machinery, wind turbines, presses, stationary hydraulic systems, hydraulic units, oil and gas industry, shipbuilding, automotive

Piston accumulators

DIAPHRAGM ACCUMULATORS

Diaphragm accumulators with nominal volumes ranging from 0.075 to 3.5 liters. Various permeation-reduced diaphragm materials, operating pressures, and fluid connections for a very wide range of application conditions.

VOLUMES	0.075 to 3.5 liters
MAX.	–40 to +120 °C
MAX.	35 MPa
	Agricultural and construction machinery, hydraulic units, machine tools, industrial robots, automotive, wind turbines

Diaphragm accumulators

BLADDER ACCUMULATORS

Bladder accumulators with nominal volumes ranging from 1 to 57 liters. Various bladder materials, operating pressures, and fluid connections for a very wide range of application conditions.

VOLUMES	1 to 57 liters
MAX.	–20 to +80 °C
MAX.	35 MPa
	Presses, stationary hydraulic systems, hydraulic units, oil and gas industry, construction machinery, shipbuilding

Bladder accumulators

ACCESSORIES

Complementary accessories for various accumulator designs, such as safety and shut-off blocks, filling devices, clamps, and consoles.

CUSTOM DESIGNS

Aluminum diaphragm accumulators

Aluminum diaphragm accumulators with nominal volumes up to 0.75 liters. Reduced-weight, maintenance-free, and corrosion resistant thanks to patented design and manufacturing process. Custom design as required.

VOLUMES	0.16 to 0.75 liters
MAX.	–40 to +80 °C
MAX.	10 MPa
	Hydraulic pre control, agricultural and construction machinery, hydraulic units, machine tools, automotive applications

Aluminum diaphragm accumulators

Linear compensators

Innovative design combines the function of hydraulic cylinders and accumulators in a compact unit. Reduces the risk of leakage through use of fewer system components and connections in the customer system. Designs are produced on a customer-specific basis.

Customer-specific accumulator systems

Development of special hydraulic accumulator systems, such as hydraulic accumulators with hydraulic block and integrated hydraulic valves, hydropneumatic front axle suspension, or hydropneumatic cab suspension.

Suspension system

Pulsation dampers for hydraulic systems

Pulsation dampers deliver a performance increase, while offering greater convenience through reduction of both noise and pulsations, as well as an increased service life for the components in hydraulic systems. Pressure and fluid fluctuations are reduced.

SPECIAL SEAL PRODUCTS

DIAPHRAGMS

Long-stroke diaphragm BFA

Long-stroke diaphragms are thin-walled, sensitive special diaphragms made from rubber-elastic materials with fabric reinforcement. A low pressure difference of approximately 0.15 bar must be present during the piston return movement, as creases or kinks can otherwise form in the rolling convolution.

MATERIAL	50 NBR 253 with polyester fabric
	Pressure switches, control devices, pressure transducers, measurement and display devices

Long-stroke diaphragm BFA

Long-stroke diaphragm for control and regulating valves

Long-stroke diaphragms in custom designs, such as various flange types, bead designs with or without hole on the cover side or special radius dimensions, with or without fabric reinforcement (BFAO).

MATERIAL	Elastomers: VMQ, FKM, EPDM, NBR, HNBR, FVMQ Fabrics: PA, PES, Meta-Aramid
	Pressure switches, control devices

Long-stroke diaphragm

Diaphragm for solenoid valves and pressure reducers

Diaphragms as separating elements with simultaneous valve seat function.

MATERIAL	NBR, EPDM, FKM, HNBR
	Pneumatic applications, for fluid and building technology with relevant approvals, such as FDA, UBA Drinking Water Guidelines, 3-A® Sanitary, WRAS, NSF61, ACS, BFR XXI Cat. 3, USP Class VI

Diaphragm for pressure reducers

Diaphragm for gas pressure regulators

High-grade molded diaphragms with and without fabric reinforcement and/or vulcanized valve disks for gas pressure regulators in the high-pressure or low-pressure range.

MATERIAL	HNBR, NBR, ECO, and FKM (each with and without fabric reinforcement) with EN 549 approval; EPDM, VMQ
	Control, automation, and gas control technology

Diaphragm for gas pressure regulators

Diaphragm for gas meters

High-grade diaphragms made of rubberized fabric for precise measurement characteristics in gas meters. Available with and without separately formed bead. DFT™ – Dispersed Fiber Technology: Fiber-reinforced elastomer materials for diaphragms with complex shapes, improved service life, and no lateral diffusion. Available in the materials NBR or ECO with DIN EN 549 certification.

Diaphragm for loudspeakers

Optimally coordinated materials with excellent spring and damping characteristics, specifically matched to customer requirements.

Diaphragm for control and regulating valves

Thin-walled diaphragms with or without fabric reinforcement are required to ensure extremely sensitive response characteristics of a control valve. Special silicone-based materials provide the corresponding functional reliability at low temperatures.

MATERIAL	VMQ, FVMQ, PVMQ
	Precision engineering, breathing masks, respirators

Diaphragm for control and regulating valves

Control diaphragm

Form-pressed diaphragms with a diameter greater than 1,000 mm. Depending on the pressure and medium in use, materials with or without fabric reinforcement are required.

MATERIAL	CR, EPDM, HNBR, NBR, VMQ
	Control valves in system and pipeline construction

Control diaphragm

Diaphragm for shut-off valves

Molded diaphragms for shut-off valves in various designs, some featuring fabric insert and vulcanized metal components, PTFE or Simriz® coating.

MATERIAL	EPDM, VMQ
	Food, pharmaceutical, and sanitary engineering with relevant approvals

Diaphragm for shut-off valves

Diaphragm for pressure switches

Sensitive diaphragms for water level control. Pressure regulation function with thin-walled, fabric-free diaphragms as transmission elements to electrical switching contacts.

MATERIAL	EPDM, NBR, VMQ
	Household appliances, coffee makers, and heaters, as well as in the field of pneumatics

Diaphragm for pressure switches

Diaphragm for pumps and compressors

Both pure elastomer diaphragms and combinations of elastomers are used in modern pumps.

MATERIAL	CR, EPDM, FKM, HNBR, NBR
	Metering and feed pumps, double diaphragm pumps, AdBlue® pumps, vacuum pumps

Diaphragm for pumps and compressors

Diaphragm made of rubberized fabric

Diaphragms made of rubberized fabrics. Deep-drawn diaphragms are affordable alternatives to press-molded diaphragms. Rubberized fabric materials with polyester-based and polyamide-based support fabrics.

MATERIAL	CR, ECO, EPDM, NBR
	Fittings, industrial controllers, pumps

Diaphragm made of rubberized fabric

Accumulator diaphragm

Diaphragms made of materials with extremely low gas permeation and good cold flexibility for use in industrial hydraulics. As a problem solution in the event of pressure shocks in the pipe systems.

MATERIAL	AU, ECO lead-free, EPDM, HNBR, CIIR, NBR
	Units in general industry, pressure accumulators in hydraulic circuits

Accumulator diaphragm

Accumulator bladders

Complete bladders produced using the press or injection molding process, some of which are customized at a later stage. Diffusion-tight compounds as materials.

MATERIAL	ECO, CIIR, NBR, HNBR
	Agricultural and construction machinery, materials handling technology, and hydraulic circuits in general industry and the aerospace sector

Accumulator bladders

Silicone diaphragm

Diaphragms and return flow diaphragms, in some cases made of oil-resistant solid and liquid silicones, with excellent temperature stability.

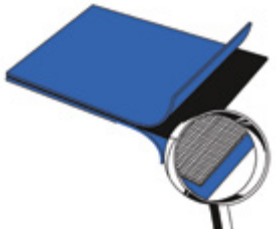
MATERIAL	VMQ, FVMQ, PVMQ optionally with fabric reinforcement
	Pneumatic applications, sanitary engineering, oil mist separators, condensate separators

Silicone diaphragm

Rubberized fabric

Rubberized fabrics are high-grade special fabrics that are coated on both sides with suitable elastomer grades. Special production methods also allow thin elastomer layers to be applied to the pretreated fabrics with good adhesion and free of pores.

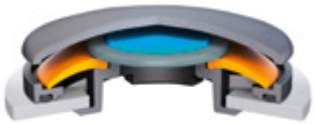
MATERIAL	CR, ECO, EPDM, NBR, PA, PES
MAX.	–40 to +130 °C
	General engineering



Rubberized fabric

Pressure compensation element DIAvent

Functional component that combines multiple nonwoven fabric layers with excellent air permeability and watertightness (IP67). Optionally with elastomer valve for reversible and unidirectional emergency degassing (type "DIAvent").



DIAvent

DIAvent Light

BOOTS AND BELLOWS

Sealing Boots

Sealing Boots offer protection from environmental influences and prevent lubricants from escaping. They are produced as single-convolution or double-convolution dust covers and are available with vulcanized or fitted clamping elements made of metal or plastic on one of the two connection areas. Reinforced dust covers offer a whole host of advantages: Improved sealing functionality, no risk of corrosion or damage to the bellows as a result of cutting by clip rings or clamping rings. In contrast to a non-reinforced dust cover, no additional installation steps or purchased parts are required.

Single convolution Bellow

MATERIAL	CR
MAX.	–40 to +100 °C
	Ball joints on steering systems and carriages

Prop shaft Boots

An S-shaped version of the sealing boot that "rolls" around the joint during installation. The boot excels through its high speed capability and pronounced resistance to internal pressure, as well as its ease of installation. This version can also be offered with installation elements on one or both connections.

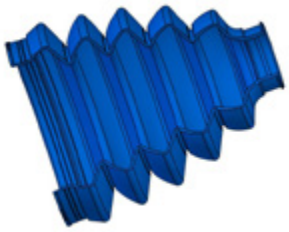
Prop shaft Boots

MATERIAL	CR	HNBR
MAX.	–40 to +100 °C	–40 to +150 °C
	Longitudinal shafts, side shafts	

CVK Boots

Use on drive shafts to secure permanent lubrication of the joints, as well as reliable and durable sealing to prevent grease from escaping and ingress of dirt. **Tripods:** A version of the boot that is available with or without additional adapter. This boot has been designed for joints with non-circular boot seats.

MATERIAL	TPE
MAX.	–40 °C to +125 °C, higher temperatures also possible in special cases
	Drive shafts in general vehicle manufacturing operations, as well as in construction machinery and commercial vehicles



CVK Boots

Steering Boots

Multi-fold boots with revised geometry to protect steering linkages.

MATERIAL	TPE
MAX.	–40 °C to +120 °C, higher temperatures also possible in special cases
	General vehicle manufacturing, agricultural and construction machinery

Steering Boots

Boots from the standard range

Use on hydraulic and pneumatic cylinders. They prevent lubricant from escaping at the joints and offer protection from soiling, splash water, dust, or atmospheric influences.

MATERIAL	CR	NBR, on request: EPDM/HNBR, FKM, VMQ
MAX.	–40 to +100 °C	–30 to +100 °C
	Engineering, agricultural machines, construction machinery, shaft and ball joints, pipe ends, axle bearings, ball joints, gear levers	

Multible convolution Bellow

Universal cable bushing

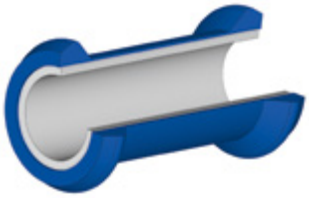
Versatile cable bushing that provides a seal from dirt, moisture, or noise emissions. The cable bushing is easy to install and also versatile thanks to the range of external diameters offered.

MATERIAL	PVC
MAX.	–40 to +70 °C
	Shipbuilding, white goods, agricultural and construction machinery

Universal cable bushing

Plug & seal

Plug & seal connections are pipe sections with rubberized outer surface with sealing beads and shock absorbers. They are used to establish a tight connection between two housings or units – for secure transport of media such as oils, water, or air. Beside the standard plug & seal designs, individual product solutions that are tailored to specific customer applications are also offered.



Plug & Seal connections

MATERIAL	ACM, AEM, VMQ, EPDM, FKM, HNBR, NBR, precision steel, aluminum
	Fittings, motor and transmission applications, piping systems

ELASTOMER COMPOUND AND PRECISION MOLDED PARTS

Molded part PFT

Precision molded parts for use as sealing or damping elements. Excel in particular through customer-specific design and high material quality. Simriz® and butyl are ideal materials for requirements such as media resistance and gas tightness.

Miniature part / Simriz®

Small and very small elastomer compound and molded parts, developed for individual customer applications. Can be produced in a wide range of materials and designs. Composite parts made of Simriz® (FFKM) and special carrier parts in particular are used for applications with extremely exacting media resistance requirements. The multifunctional characteristics of the miniature parts are also beneficial, such as sealing, damping, or magnetic control.

Valves, medical engineering, semiconductors

Rubber sheet / rubberized sealing plate

Combine multiple, often different sealing locations with one another. In principle, rubber sheets comprise a carrier part (for example punched metal plate) with vulcanized sealing lips. Multiple sealing elements (for example O-rings) are combined to create a single component. The design with the carrier sheet guarantees defined sealing bead pressure, virtually independently of the tightening torque used for the connection screws. .

General construction machinery, engine and transmission applications, tractors, and other agricultural machines

Drive element

Reduces non-uniformity in drives to secure even and smooth concentricity; The elastomer part acts as an elastic spring and damper. The functional design is produced using FEM calculation.

Mechanical drive technology, automation, vehicle engineering

Magnetic anchor and magnetic core

Composite parts made of magnetizable metal with vulcanized-in elastomer for sealing and damping in solenoid valves, as well as precision molded parts for anchor installation. Optimization of the nozzle geometry via FEM calculation, installation of the precision molded parts and springs on the carrier body. Coatings are also possible if requested by the customer, for example to reduce friction. .

Valve technology for automotive applications and general industry: Pneumatics, fuel metering, gas injectors, building technology, and household appliances (for example gas boilers, oil burners, water valves)

Valve body, axial sealing

Elastomer or elastomer composite part with carrier part made of metallic material (machined, stamped, or cast part), aluminum, brass, or plastic (injection-molded part) with opening and closing function in valves. Can be produced in virtually all combinations of materials, matched to the respective application. Cost-effective solution as a composite part with a high degree of functional reliability and long service life.

Valve technology for automotive applications and general industry: Pneumatics, fuel metering, gas injectors, building technology, and household appliances (for example gas boilers, oil burners, water valves)

Valve body, multifunctional

Elastomer composite element, comprising metallic material or a plastic part and an elastomer matched to the respective application, bonded to one another either mechanically or chemically. Functions: Sealing, damping, guiding, centering, positioning. Wide variety of designs through use of plastic support components. Cost-effective solution thanks to a reduction in the number of components. High degree of functional reliability and long service life.

Valve technology for automotive applications and general industry: Pneumatics, fuel metering, gas injectors, building technology, and household appliances (for example gas boilers, oil burners, water valves)

Intake manifold

Elastomer composite part, comprising a metal support component for secure attachment to and sealing on the cylinder head and a rubber pipe with optimized flow cross-sections for efficient air intake.

Internal combustion engines

Injector seal

On diesel engines with direct injection, injector seals prevent ingress of water, dirt, and dust into the valve area – yet also prevent oil escaping from the engine compartment. Injector seals offer our customers a high degree of reliability, coupled with temperature and media resistance, and thereby guarantee long-term and secure functioning

Diesel engines with direct injection

Thermal balance washer / reaction washer

Compensation for the various thermal expansions of aluminum housings to steel shafts when using tapered roller bearings. Benefit: Knowledge of the thermal expansion properties and expertise in gap extrusion.

Combination of various housing materials, for example in industrial transmissions

Parts stamped from webs and sheet material

Flat gaskets that are drilled, stamped, punched, or cut from a hose, with or without ground surfaces, produced from all suitable standard and custom elastomers. Benefit: No or very little tool investment and material expertise required. .

Flanges, pipe connections and boilers, cover seals, sight glass fittings

Assembly

Installation of assemblies around elastomer composite and precision molded parts. Ability to supply pre-assembled, multi-piece seal kits (modules) with integrated elastomer and elastomer composite parts.

Hydraulic cylinders, poppet valve seal kit

Parts stamped from elastomer and PTFE composite

Manufactured as composite web or sheet material with subsequent stamping or drilling out. The elastomer is responsible for the elastic pre-load and static sealing, while the PTFE reduces friction on the dynamic sealing side and is very stable.

Oil pumps for hydraulic oil in automatic transmissions

Cable bushing

PTFE molded parts. For insulating cable looms, for example in sensors. Low dielectric constant, as well as high specific volume resistance.

Electrical engineering, sensor technology

Mechanical composite part

PTFE sealing elements, for example piston rings with contact pressure element, are already pre-installed on a carrier part, such as a piston, and calibrated in the factory. Benefit: Lower vertical range of manufacture thanks to prefabricated components.

Hydraulic cylinders

Sleeve

Embossed lip seals with memory effect. This leads to an initial sealing effect, lower friction, as well as lower contact pressures on seals with contact pressure element. Wide range of applications in various areas.

Control and shut-off valves, plunger pumps, metering systems, stirrers, hydraulic cylinders, swivel joints

Sealing rings with / without support

Customized seals out of PTFE with elastomer element or metal spring for maintaining contact pressure in the various application temperature ranges, complements the standard catalog series for hydraulics. Materials: Special compounds with special fillers for high levels of tribological stress.

The temperature range depends on the elastomer material used.

For example hydraulic applications

PACKINGS

Standard range

TYPE	MATERIAL	MAX.	MAX.	MAX.	PH VALUE	
Merkel Ramilon 4586	Ramie yarn	–40 to +120 °C	2/12.5 m/s	4/100 MPa	5 to 11	Centrifugal pumps, refiners, mills, plunger pumps, stern tubes
Merkel Arostat 6204	Aramid yarn	–50 to +250 °C		20 MPa	0 to 13	Fittings
Merkel Arolan II 6215	Aramid yarn	–50 to +280 °C	26 m/s	2.5/10 MPa	1 to 13	Fittings, centrifugal pumps
Merkel Unistat 6303	PTFE yarn Graphite-filled	–200 to +280 °C	2 m/s	25/80 MPa	0 to 14	Fittings, plunger pumps
Merkel Unichem 6313	PTFE yarn	–100 to +250 °C	8 m/s	1.5 MPa	0 to 14	Centrifugal pumps
Merkel Arochem S 6216	Aramid yarn, PTFE-graphite compound yarns	–50 to +280 °C	2/25 m/s	2.5/25 MPa	1 to 13	Centrifugal pumps, plunger pumps
Merkel Grafiflex® 6501	Grafiflex	–200 to +2,500 °C		100 MPa	0 to 14	Fittings
Merkel Alchem 6375	PTFE yarn	–200 to +280 °C	2 m/s	25/50 MPa	0 to 14	Fittings, plunger pumps
Merkel Unival 6323	PTFE yarn Graphite-filled/ oiled	–100 to +280 °C	20 m/s	2.5/25 MPa	0 to 14	Fittings, centrifugal pumps
Merkel Carbosteam® 6550	Flexible carbon yarns	–30 to +550 °C		30 MPa	0 to 14	Fittings
Merkel Grafiflex® Deckeldichtungen	Grafiflex	–200 to +2,500 °C		100 MPa	0 to 14	Fittings
Merkel G-Spezial S 6565	Graphite yarns	–200 to +550 °C	25 m/s	25 MPa	0 to 14	Fittings, centrifugal pumps
Merkel G-Spezial 6560	Graphite yarns	–200 to +550 °C		45 MPa	1 to 14	Fittings
Merkel Uniflex 6588	Special yarn with high carbon content	–50 to +280 °C	25 m/s	2.5 MPa	1 to 13	Centrifugal pumps
Merkel Kombilon 6742	Carbon and PTFE yarn	–100 to +280 °C	20 m/s	2.5/16 MPa	0 to 14	Fittings, centrifugal pumps, stirrers
Merkel Univerdit® 7000	PTFE-graphite compound yarns	–30 to +250 °C	6,0 m/s	2.5/16 MPa	0 to 14	Fittings, centrifugal pumps

Special range

TYPE	MATERIAL	MAX.	MAX.	MAX.	PH VALUE	
Merkel Carbosteam® S 6555	Grafiflex	–30 to +400 °C		30 MPa	0 to 14	Fittings
Merkel Carboflex 6587		–60 to +300 °C	20 m/s	2.5 MPa	0 to 14	Pumps
Merkel Cerampack MT 6452		–50 to +750 °C		1 MPa	5 to 9	Boilers, coal mills, industrial furnaces, furnace doors up to +750 °C
Merkel Cerampack HT 6453		–50 to +850 °C		1 MPa	5 to 9	Static sealing of furnaces, burners, and heat exchangers
Merkel Thermapack 6401		–50 to +1,100 °C		1 MPa	5 to 9	
Merkel Unimix 7106	Fiber compound (PTFE fibers), top and bottom rings (Arolan 6215 or Unichem 6313)	–100 to +250 °C	10 m/s	2.5/7.5 MPa	0 to 14	Abrasive media in pump and mixer applications
Merkel Unimix 7105	Fiber compound (PTFE fibers), top and bottom rings (Arolan 6215 or Unichem 6313)	–100 to +250 °C	10 m/s	2.5/7.5 MPa	0 to 14	Abrasive media in pump and mixer applications
Endlose Packungsringe	Ramie, aramid, PTFE, PTFE/graphite compounds, carbon	–30 to +550 °C	2 m/s	1 MPa	0 to 14	Tank caps, manholes, filters, dryers, chemical mixer housings, rotary valves, rotary kilns
Tanklukendeckeld-ichtung 6324	Yarn material (PTFE), core material (EPDM, MVQ), Impregnation (PTFE)	–30 to +250 °C	2 m/s	1 MPa	0 to 14	Cover and housing seals, tank caps, manholes, filters, dryers, chemical mixer housings, rotary valves, rotary kilns

Packing pullers

A clean installation area is important for securing the sealing characteristics of new packings. Worn seals must therefore be removed carefully and fully from the seal area. Packing pullers have been developed specifically for removing worn seals both quickly and gently. The forged, helical tip is force fitted to the puller shaft. With its high pitch, it drills effortlessly into all types of braided and fabric packings. Packing pullers are supplied in sets in a practical container. Each set comprises one pair of each of the following steel pullers: 22 cm, 33 cm, 44 cm long, for packing areas with widths from 6 mm, 10 mm, and 13 mm. There are screw-on metal ring segments available for the packing pullers for fitting the packings. These transform packing pullers into ideal installation tools.

Packing pullers

Packing cutting gage

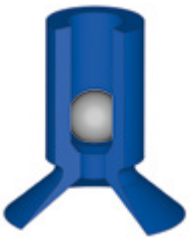
The universal packing cutting gage was developed for practical cutting of packings off a reel. Packing is cut with precise dimensions on this gage in line with the respective application. There is a slider with scales in mm and inches on the gage's plastic ruler. The scale on this ruler is aligned with the shaft or spindle diameter, whereby the packing cross-section is set via the scale on the slider. The slider stop and the cutting line are aligned at 45° for a perfect cut.

Packing cutting gage

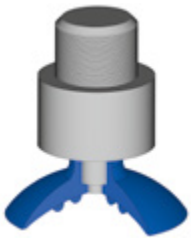
GRIPPERS AND SUCKERS

Molded parts for automated handling technology. Sensitive internal grippers for extremely sensitive materials, suction cups for largely smooth gripping surfaces, vacuum cups for rough and porous gripping surfaces on the workpieces.

Handling technology, automation, packaging machines



GR4



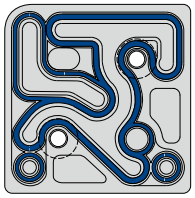
GR4A

GR4J

COVER SEALS (PLASTIC-ELASTOMER COMPOUND)

Carrier parts made of thermoplastics or thermosets; Affordable solution, particularly for complex geometries.

Cover seals can be presented with multifunctional screw connection options/ various valve functions



Example cover seals

BUTTERFLY VALVE SEALS

Seals in disk valves in processing plants. The elastomer form ring is pressed radially in the valve during the closing process and thereby seals off both high-viscosity and low-viscosity media. Low friction and a low compression set of the butterfly valve seal, as well as high temperature and media resistance, explicitly also in cleaning media (CIP – cleaning in place / SIP – sterilization in place), are critical for ensuring perfect functioning..

Food and chemicals industries

Butterfly valve seals

ISOLATING ELEMENTS

Various elastomer-metal design elements can be used to reduce vibrations and noise in the field of engines and ancillaries. Among other things, these elements are used for elastic suspension, as well as sealing of metallic components on the oil sump, the cylinder head cover on the engine block, and on injectors.

Engine and transmission applications

Isolating elements

DECOUPLED SPUR GEARS

Spur gears are used to drive camshafts and ancillaries on diesel engines to prevent noise and secure smooth running. The spur gears are radially isolated, re-connected using an elastomer element, and thereby decoupled. Both vibrations and noise can be significantly reduced.

Mid-sized and large diesel engines with sprocket wheel/spur gear drive for construction machinery, camshaft sprocket wheels, tractors, and further agricultural machines, gears for spur gear drives

Decoupled spur gears

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