FREUDENBERG XPRESS® – CUSTOMIZED SEALS IN ORIGINAL FREUDENBERG QUALITY
# TABLE OF CONTENTS

1 INTRODUCTION 3  
1.1 Company 4  
1.2 Freudenberg Xpress® at a glance 5  
1.3 Service offer 6  
1.4 Industry segments 8  

2 MATERIAL PORTFOLIO 9  
2.1 Materials at a glance 10  
2.2 Polyurethane 12  
2.3 Elastomeric materials 13  
2.4 Plastics and laminated fabrics 18  
2.5 Storage conditions for seals 23  

3 PRODUCT PORTFOLIO 24  
3.1 Catalog parts 25  
  Piston seals 25  
  Rod seals 26  
  Rotary seals 27  
  Wipers 28  
  Guides 29  
  Back-up rings 30  
  Static rings 30  
  3.2 Customer-specific solutions 31  
  "Everything is possible" 31  
  Merkel Radiamatic® RPM 41 32  
  Welded seals 32  
  3.3 Market-specific solutions 33  
  Heavy Industry 33  
  Process industry 33  

4 INSTALLATION RECOMMENDATIONS 34  
4.1 Piston seals 35  
4.2 Rod seals 35  
4.3 Wipers 36  
4.4 Radial shaft seals 36  
4.5 Guides 37  
4.6 O-rings 37  

5 LOCATIONS 38
Freudenberg Sealing Technologies is the largest business group of Freudenberg. Together with the partners of the NOK Corporation, the company forms a global network. This ensures a local offer of high-quality products – worldwide. The concept is supported by global manufacturing, reverse engineering, FEM simulations and diverse logistic services. When Freudenberg parts need to be replaced in existing systems, you can choose from a wide range of original Freudenberg profiles. For areas where no special technical expertise is needed, a portfolio of catalog parts is available. Numerous studies prove: Freudenberg Xpress® achieves the best leakage values compared to the competition.

More information can be found at: https://www.freudenberg-xpress.com

LEAKAGE (G) PER 1,000 DOUBLE STROKES

Test conditions: 400 bar (5,800 psi); 100 °C (212 °F); 0.3 m/s; 10,000 double strokes

Numerous studies prove: Freudenberg Xpress® achieves the best leakage values compared to the competition.

STAGES OF A PRODUCT’S LIFECYCLE

1. Quick and cost-effective Prototyping
2. Small quantities
3. High volume: series production
4. MRO demands, “firefighting”

Freudenberg Xpress® offers a global network of local service centers throughout Europe, North America, Asia and Australia – available for you from only a short distance away (see page 18 for further information). These offer you machining technology that makes a fast delivery possible when it comes to urgent needs. If needed and with previous consultation, you can get your seals within 24 hours. Additionally, the service centers offer, for example, the possibility of reverse engineering, FEM simulations and diverse logistic services. A global network of local manufacturing partners completes this offer.

ADVANTAGES AT A GLANCE

- Customized sealing solutions
- Original Freudenberg profiles and materials as used in serial production
- Sealing solutions based on your drawing or Freudenberg-specific ones
- Expert consultation
- Fast delivery for quick maintenance needs
- Economic production of small batches
- Rapid Prototyping

FREUDENBERG XPRESS® AT A GLANCE

Prototyping, spare parts, small series and many more – as your service provider Freudenberg Xpress® supplies you with cost-effective high-quality sealing solutions. Freudenberg Xpress® minimizes your downtime and maximizes your flexibility by machining your seals – from standardized parts, complex plastic parts and customer-specific solutions to welded seals and cut-to-size products. Freudenberg Xpress® provides efficient solutions for every part of a product’s lifecycle. This includes individual pieces as well as economical small series.
SERVICE OFFER

FLEXIBILITY AND FAST DELIVERIES
The Freudenberg Xpress® production is very flexible. With the help of different production processes, the latest CNC technology and automation, customized solutions as well as catalog parts can be produced. For extremely urgent repair demands, e.g. when a seal fails during the production process, Freudenberg Xpress® offers very fast deliveries – with prior consultation even within 24 hours.

MARKET-SPECIFIC SERVICES
Once the seals are produced, they can be individually laser-marked or undergo a special washing treatment. Thanks to local production sites, kitting and single packaging of your seals as well as express deliveries are also possible.

HIGH QUALITY STANDARDS
In order to offer highest quality standards to the customer, Freudenberg Xpress® is doing many in-house quality controls in terms of surface, dimensions and treatments. The materials are constantly checked with regard to lifetime and possible leakages. This is complemented by a wide product and material expertise.

FROM PROTOTYPE TO SMALL SERIES
Without the costly and time-consuming tooling production, Freudenberg Xpress® offers an economic and fast production of prototypes, small series and spare parts. Automated processes, like five billet loaders worldwide, even increase the cost-effectiveness. What’s more, the experts at Freudenberg Xpress® have made it possible to use “rapid prototyping” for elastomeric materials, which normally is not applicable.

LABORATORY AND ENGINEERING ANALYSES
Thanks to its own test laboratories and in-house test plants, Freudenberg Xpress® is able to do FEM analyses, benchmark tests and specific analyses concerning the function and lifetime of the seal.

COMPETENCE
The worldwide team of experts supports you with a profound market, application, material and product expertise. That helps customers to find the best solution for every individual application and for extremely demanding requirements. The experts can even come to your plant and give on-site application consultancy. With the help of a CAD/CAM (computer-aided design/computer-aided manufacturing) system, Freudenberg Xpress® makes an automated processing of 3-D-files possible. Additionally, a seal can be designed with the help of a STEP-file, a PDF drawing, a sample or application data. This process is called reverse engineering.

ONLINE SERVICES
Besides the online shop “EASY” and the integrated Xpress Configurator, Freudenberg Xpress® offers many other online services. In addition, we invest in creating CNC programs for all sites. This guarantees consistently high quality standards for our customers.

ALWAYS INFORMED
The latest Freudenberg Xpress® brochures, flyers and material overviews are provided online. The website also includes helpful information concerning materials, products and services as well as details about the industry segments that Freudenberg Xpress® is active in.

Additionally, you can receive the latest news, like new services or product offerings, in the Freudenberg Xpress® newsletter. Just register online.

In the movie you can get an overview of the Freudenberg Xpress® service – wide material and product portfolio, fast deliveries, global network and many more advantages.
INDUSTRY SEGMENTS

Freudenberg Xpress® offers high-quality sealing solutions for nearly every industrial sector – from the heavy industry and fluid technology area to the process industry, wind energy and many more. The goal is to support the customers with the best possible solution for every individual requirement.

The operating conditions in these industries vary greatly, even within one area. The seals have to withstand, among others, aggressive media, high temperature fluctuations, extreme pressures and harsh weather. In some sectors they have to comply with industry- and country-specific legal requirements.

Safety, reliability and efficiency also play an important role, especially for critical applications in the pharmaceutical, mobility, power, wind energy, food or beverage industries.

SEGMENTS AT A GLANCE

- Distribution
- Fluid Technologies
- Heavy Industry
- Process Industry
- Mobile Machinery
- Mobility
- Power
- Energy
### MATERI AlS AT A GLANCE

#### POLYURETHANE

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#### PLASTICS AND LAMINATED FABRICS

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**POLYURETHANE**

**PU, TPU | GENERAL PROPERTIES**

Thermoplastic polyurethane (TPU) is produced by a polyaddition reaction of difunctional diisocyanates with divalent alcohols or polyols. This reaction creates a urethane bond, being the reason for the material’s name. Depending on the kind of manufacturing method, the material can be hard and brittle or soft and elastic. It offers a high elasticity as well as a very good mechanical strength and wear resistance. Nevertheless, polyurethane reaches its limits in polar media, lyes and brake fluids. The flexibility stays good even at low temperatures. The material is also extremely resistant to ozone, oxidation, petroleum products and many more. The temperature range for standard versions is from -30 °C to +80 °C. Freudenberg Sealing Technologies has developed a special polyurethane material, 94 AU 30000, which offers a significantly higher service life and withstands a greater range of extreme temperatures (-35 °C to +120 °C).

**Areas of application**

Polyurethane is a preferred material for hydraulic applications. The Freudenberg compound 94 AU 30000 can be used universally. For example, it is suited to construction and agricultural machinery as well as materials-handling technology. In comparison to other polyurethanes, 94 AU 30000 is also resistant to hydrolysis which makes a use in biochemical applications possible. It can be used at industrial plants worldwide.

**Materials available:**
- 92 AU 21100
- 93 AU V167
- 94 AU 80000
- 94 AU 925
- 94 AU 21730
- 95 AU V142
- 95 AU 21421
- 95 AU 38588
- 96 AU 20805
- 98 AU 20806

**PROPERTIES AT A GLANCE**

- Very good resistance to oil, ozone, oxidation and petroleum products
- Special materials have an excellent temperature resistance from -35 °C to +120 °C
- High tensile strength and elongation at break
- High elasticity
- Very good mechanical strength and abrasion resistance

**EPDM | GENERAL PROPERTIES**

EPDM (Ethylene Propylene Diene Rubber Monomer) offers an excellent resistance to water and aqueous systems, polar and oxidative media, brake fluids, the flame-resistant hydraulic fluids HFC and HFD, and many more. It is suitable for high and low temperatures as well as for use in hot water, steam, acids and alkaline solutions. The material cannot be used in pure fats, oils, non-polar solvents, gasoline and hydrocarbons.

**Areas of application**

EPDM can be used for almost all sealing products. With a share of about 70%, it is the most widely used material for the food and beverage production and processing – especially the peroxide-cured types. Certain EPDM materials conform with different industry-specific legal requirements, such as those of the FDA (Food and Drug Administration), EU (Reg.) 1935/2004 and USP Class VI. This is why the material is not only recommended for the food and beverage but also for the pharmaceutical industry. Due to its heat and weathering resistance, EPDM is also a preferred material for the construction sector. Additionally, it is widely used in washing machines and dishwashers as well as in plumbing fittings. It is also available for products in the energy sector, such as cables, and the building engineering area, e.g. for a lot of window seals in buildings.

**Materials available:**
- 70 EPDM 291
- 85 EPDM 292

**PROPERTIES AT A GLANCE**

- Very good resistance to aging, ozone, light, water, polar and oxidative media
- Wide temperature range from approx. -50 °C to +150 °C
- Good tensile elongation and strength
- High abrasion resistance
- Good elastic behavior
FKM (fluororubber) is made of highly fluorinated hydrocarbons. It shows very good resistance to ozone, aging, fuels, petroleum-based oils, greases, aliphatic and aromatic hydrocarbons, whereas in polar solvents, formic and acetic acid, glycol-based brake fluid, ammonia gas, amines, alkalis and superheated steam it reaches its limits. Due to the fact that FKM is based on copolymers, terpolymers and tetrapolymers with varying fluorine content, the material can be precisely designed for specific requirements. The temperature range reaches from a minimum of -25 °C to a maximum of +200 °C.

**Areas of application**
FKM is suitable for petroleum production, chemical applications, the aerospace sector and many other industries. Due to its high media resistance it is also a good choice for the food and specific parts of the pharmaceutical industries. For highly sensitive applications in these areas it is very important to contact our material experts in advance. In the general industry the material is ideal wherever there are high rotational speeds and high temperatures. This occurs, for example, in pumps and transmissions.

**Materials available:**
- 70 FKM 576
- 70 FKM 585
- 82 FKM 33991
- 85 FKM 33995
Material Portfolio

HNBR (Hydrogenated Nitrile Rubber) is produced through full or partial hydrogenation of NBR by removing the reactive double bonds. This prevents the molecule chain from reacting to oxygen easily, and makes HNBR more heat-oxidation- and wear-resistant than NBR. The material is also resistant to different kinds of media, such as fats, steam, hot and ultrapure water. Furthermore, it shows very good mechanical stability. Its temperature range reaches from -40 °C to +140 °C.

Areas of application
The properties of HNBR make it not only a good choice for the heavy industry. The material is also used in other applications where a resistance to high temperatures, mechanical strength and good media resistance (e.g. to CIP/SIP cleaning agents and especially fats) are necessary. For example, in the process industry there are various options for usage – from dairy applications to breweries and beverage production.

PROPERTIES AT A GLANCE
• Very good resistance to fats, steam, hot and ultrapure water
• Excellent heat, oxidation and mechanical stability
• Very high abrasion resistance
• Wide temperature range from approx. -40 °C to +140 °C

Materials available:
• 82 HNBR 38179
• 85 HNBR 33993
• 90 HNBR 33996

NBR (Nitrile Butadiene Rubber) is a synthetic rubber that is fabricated through the co-polymerization of acrylonitrile (ACN) and 1,3-butadine. The attributes of NBR, such as media resistance and low-temperature flexibility, mainly depend on the proportion of ACN. The material offers a good resistance to oils, greases, silicones, hydraulic fluids (HFA, HFB and HFC) and aliphatic hydrocarbons (propane, butane, gasoline and diesel fuel). On the other side, it displays only low resistance to polar media, glycol-based brake fluid, super-heated steam, HFD pressure fluids, ultraviolet light and ozone. It is a highly elastic material which exhibits a good deformation behavior. Furthermore, it convinces with a low gas permeability.

Areas of application
As one of the most important sealing materials in the engineering sector, NBR is very suitable for applications with mechanical stress as well as for oils, fats, waxes and fuel. These conditions often appear in the heavy and mobility industry. Due to its resistance to fatty media and abrasion, the material is also used for certain applications in the process industry. Thanks to the low gas permeability, NBR contributes to the environmental protection and offers a high safety in these critical areas.

PROPERTIES AT A GLANCE
• Very good resistance to different kinds of oils, greases, silicones, hydraulic fluids, aliphatic hydrocarbons and fuels
• Very good abrasion resistance
• Good behavior in diluted acids and alkaline solutions at room temperature
• High elasticity and good deformation behavior
• Temperature resistance between -30 °C and +100 °C
• Low gas permeability

Materials available:
• 70 NBR 438
• 80 NBR 38512
• 85 NBR 38512
• 85 NBR 436
• 90 NBR 38212

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Materials available:
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• 80 NBR 38512
• 85 NBR 38512
• 85 NBR 436
• 90 NBR 38212
PTFE (Polytetrafluoroethylene) is made of a strong bond between carbon and fluorine atoms, and is unable to react with other materials. Its chemical resistance is nearly universal. It withstands many different polar and non-polar media, such as gasoline, acids, alcohols, water, lyes and brake fluids. PTFE only reaches its limits in strong reducing or oxidizing agents and under high energy radiation. The high-performance plastic offers an extremely wide temperature range from -200 °C to +260 °C. It is barely elastic and tends to creep, especially at temperature increases, but offers a high hardness. Another advantage is the lack of stick-slip effect. PTFE slides on PTFE almost as well as wet ice on wet ice. In order to further improve the properties of the material, it can be mixed with various additives, such as glass fiber, carbon or bronze.

Areas of application
PTFE is the ideal material for use in dynamic sealing solutions, such as pumps or gears. It is suitable when aggressive media are part of the process, for example, in the chemical industry. Due to the conformity with different legal requirements, e.g. those of the FDA (Food and Drug Administration) or the BfR (German Federal Institute for Risk Assessment), as well as the extreme purity, selected variants are also a preferred solution for the food, beverage and pharmaceutical industries.

Materials available:
- PTFE B602
- PTFE C104
- PTFE GM 201
- PTFE GR FLON
- PTFE W FLON
- PTFE C FLON
- PTFE B FLON
- PTFE C FLON
- PTFE EF FLON

While the almost universal chemical resistance of PEEK (Polyetheretherketone) is close to that of PTFE, it shows improved mechanical properties. PEEK offers a wide temperature range with a continuous operating temperature of -40 °C to +260 °C. This makes it one of the most robust thermoplastic materials in terms of temperature resistance. Just like PTFE, the characteristics of PEEK can be further improved by using different fillers, like, for example, glass or carbon fibers. One big advantage in comparison with PTFE is the possibility of injection molding as production method.

Materials available:
- PEEK 23310

Areas of application
PEEK is constantly growing in popularity. It is often used in hot water or steam environment. Due to its high chemical and temperature resistance, it is especially suited for process industry applications. Selected material variants have conformities for the food and beverage industry. Additionally, PEEK is a good choice for gears, compressor and pump components, drives, valves and many more. As the material is not elastic, it is only of limited use for seals. Nevertheless, it is very suitable for the production of back-up rings for O-rings under high pressure, for thrust rings and for v-packing support rings.
Material Portfolio

**POM | GENERAL PROPERTIES**

POM (Polyoxymethylene) offers a high rigidity and hardness as well as a low friction coefficient. Its dimensional stability is also very good. It offers high strength and stiffness and a low tendency to creep. These properties are maintained over a wide range of temperatures (approx. -45 °C to +100 °C). Besides a high abrasion resistance, the material shows a good chemical resistance and a low water absorption.

**Areas of application**

POM can be used for a wide range of engineering applications. It is especially suited for spring elements, as it offers a good resilience even with repeated stresses. Due to its low water absorption and high chemical resistance, some material variants with conformities are predestined for use in the food and beverage industry.

**Materials available:**
- POM 23023

**PROPERTIES AT A GLANCE**
- Very good wear resistance
- Very good friction behavior
- Low water absorption
- High media resistance (e.g. to acids, diluted lyes, oils and greases)

**POLYAMIDE | GENERAL PROPERTIES**

Polyamide (PA) is a family of amides, like, for example, PA 6, PA 66 and PA 46. Mostly, it is a semi-crystalline thermoplastic polymer. It stands out for its high wear resistance, good damping capacity and emergency running properties. It shows a low tendency to creep as well as a good friction behavior and mechanical strength. This means, it offers a high rigidity and durability. These properties can be further improved by adding fillers, such as glass or carbon fibers. Additionally, the material is resistant to different chemical media, and convinces with a low water absorption as well as a wide temperature range from -40 °C to +110 °C.

**Areas of application**

Due to its high strength, PA is suitable for mechanical elements, such as gears, friction bearings or guide rails. In this area it is mostly used for back-up rings for a wide variety of sealing elements. Furthermore the material is a good choice for chemical applications as it shows a very good resistance to different chemical media.

**Materials available:**
- PA 23013

**PROPERTIES AT A GLANCE**
- High mechanical strength (rigidity, durability)
- Very good wear resistance and friction behavior
- Good damping power and emergency running properties
- Good dry running properties
- Low tendency to creep
- Excellent media resistance
- Wide temperature range from approx. -40 °C to +110 °C
GENERAL PROPERTIES

Polyethylene (PE) is a semi-crystalline thermoplastic material that shows a very good wear resistance and friction behavior as well as good isolation properties. It is able to withstand different media, such as acids, diluted lyes, oils and greases. Additionally, PE offers a low water absorption, which makes it a suitable material for the process industry. The temperature range is from approx. -200 °C to +80 °C.

Areas of application
PE is mostly used for applications in the process industry. There, it is an especially good choice for the food sector as its water absorption is extremely low. In addition, it is a suitable material for the agricultural industry.

Materials available:
- PE 23200

PROPERTIES AT A GLANCE

- Very high wear resistance
- Excellent friction behavior
- Low tendency for a stick-slip-effect
- Very good isolation properties
- Low water absorption
- High media resistance (e.g. to acids, diluted lyes, oils and greases)
- Higher flexibility than other thermoplastics, like for example PA, POM and PEEK

STORAGE CONDITIONS FOR SEALS

GENERAL PRINCIPLES
The physical properties of seals made of elastomeric materials and technical plastics can change during long-term storage. Due to the aging process, surface changes can sometimes lead to defects. Measures can be taken to minimize influencing factors such as humidity, heat, light, oxygen and ozone. These are laid down in international standards, such as ISO 2230.

STORAGE DURATION
Different types of sealing materials have different storage and service lives. It is important to check the materials after these periods. If there is no damage, the storage time can be extended. Depending on the geometry, pre-assembled parts must be checked at least every six months. To achieve the longest possible service life for seals, they should be stored and shipped in packaging made of PE-coated wrapping paper, aluminum foil or opaque PE film.

INFLUENCE FACTORS

HUMIDITY
No condensation is to be allowed to occur in storage rooms for seals. A relative humidity of less than 70 % is ideal.

TEMPERATURE
Sealing materials should be stored at a temperature of +5 °C to +25 °C. Parts should not be exposed to sources of heat or cold, to prevent stiffening, for example.

LIGHT
Direct sunlight and artificial ultraviolet light are harmful to sealing materials. It is therefore important to use UV-protected bags for packaging.

OXYGEN AND OZONE
Airtight packaging can protect the seals from harmful oxygen and ozone.

GREASES
It is recommended that you protect the materials from contact with incompatible greases. These can lead to swelling.

LIQUIDS
Contact with liquids, such as solvents, must be avoided.

PROPERTIES AT A GLANCE

- Excellent wear and temperature resistance
- Very high durability
- Electrical insulating
- Very good media resistance
- High flexibility
- Favorable friction behavior
- Wide temperature range from approx. -40 °C to +120 °C

LAMINATED FABRIC

FABRIC

Laminated fabric is a fiber-plastic-composite that is able to withstand different aggressive media. Besides its very good wear and temperature resistance (approx. -40 °C to +120 °C) it offers a very high durability, flexibility and electrical insulating. Additionally, the material offers an outstanding friction behavior showing nearly no stick-slip-effect.

Areas of application
Due to its very good chemical and dynamic properties, laminated fabric is suitable for many different challenging applications. It is mostly used for guiding elements in the heavy industry, for example in hydraulic cylinders.

Materials available:
- HG 527

PROPERTIES AT A GLANCE

- Favorable friction behavior
- High slip-effect
- Outstanding durability
- High stability
- Thermal shock resistance
- Water absorption is extremely low

PE is mostly used for applications in the process industry. There, it is an especially good choice for the food sector as its water absorption is extremely low. In addition, it is a suitable material for the agricultural industry.

Materials available:
- PE 23200

PROPERTIES AT A GLANCE

- Favorable friction behavior
- High slip-effect
- Outstanding durability
- High stability
- Thermal shock resistance
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Contact with liquids, such as solvents, must be avoided.

PROPERTIES AT A GLANCE

- Favorable friction behavior
- High slip-effect
- Outstanding durability
- High stability
- Thermal shock resistance
- Water absorption is extremely low
Piston seals are used for sealing the piston against the cylinder wall in pneumatic and hydraulic cylinders. This guarantees that the cylinder tube moves reliably with least possible friction and no drift and prevents the fluid from leaving the application. Piston seals from Freudenberg Xpress® meet high quality standards and offer a long lifetime. With their high functionality they are suitable for various requirements in all kinds of industry sectors.

**ADVANTAGES AT A GLANCE**
- Minimum friction and no drift
- Long lifetime
- High functionality
- Suitable for different industry sectors

**ORIGINAL FREUDENBERG PROFILES**
- N1-FX, N100-FX, NA150-FX, NA250-FX, NA300-FX, NA400-FX, AU N1-FX, AU N100-FX, FOA-FX

**FREUDENBERG XPRESS® STANDARD PROFILES**
- DK 102, DK 102R, DK 103, DK 104, DK 104R, DK 105, DK 107, DK 109, DK 109D
- DK 109H, DK 109N, DK 310-132, DK 118, DK 120, DK 122, DK 123, DK 123D, DK 123H
- DK 139, DK 141, DK 142, DK 144, DK 145, DK 199, DK 216

Additional profiles on demand
Rod seals are used for sealing the reciprocating movements of the cylinder rods in pneumatic and hydraulic cylinders. They ensure that the operating medium stays within the cylinder and thus prevent contamination. Freudenberg Xpress® offers rod seals with a high efficiency and long lifetime, making them a good choice for various industries.

**ADVANTAGES AT A GLANCE**
- High efficiency
- Long lifetime
- Suitable for different industry sectors

**ORIGINAL FREUDENBERG PROFILES**
- N1-FX
- N100-FX
- N1150-FX
- N1250-FX
- N1300-FX
- N400-FX
- AU N1-FX
- AU N100-FX
- F01-FX
- OMS-MR-FX
- OMS-MR-DW-FX
- OMS-S-FX
- T20-FX
- T22-FX
- T23-FX
- TFMI-FX
- TFW-FX
- TMP 20-FX
- H m. F.-FX
- H a. F.-FX
- LF300-FX
- ES-FX
- KI310-FX

**FREUDENBERG XPRESS® STANDARD PROFILES**
- DS 101
- DS 102
- DS 102R
- DS 103
- DS 104
- DS 104R
- DS 105
- DS 106
- DS 107
- DS 110-112
- DS 118
- DS 119
- DS 138
- DS 139
- DS 199

There are different kinds of rotary seals, which are used for reliably sealing axles and shafts under high pressure and with very good seal tightness. For example, the task of a radial shaft seal is to seal a rotating shaft against the housing of an assembly. Providing a static and dynamic sealing function at the same time it is suitable for different industry sectors, such as the heavy, agricultural or process industries.

**ADVANTAGES AT A GLANCE**
- Very good seal tightness
- Withstand high pressure loads
- Easy to assemble
- Suitable for different industry sectors

**ORIGINAL FREUDENBERG PROFILES**
- M15-FX
- M16-FX
- RPM 41-FX
- Enviromatic EA-FX
- 9489-FX
- RMS-FX
- RMS SL-FX

**FREUDENBERG XPRESS® STANDARD PROFILES**
- DR 104
- DR 106
- DR 108
- DR 113
- DR 118
- DR 201
- DR 202
- DR 204

Additional profiles on demand
WIPERS

In different challenging applications, wipers reliably protect the inside of the cylinder in pneumatic and hydraulic cylinders from contamination. Freudenberg Xpress® offers wipers with a very long lifetime. The portfolio also includes customized products and double wipers. These are available with or without metal reinforcement or pressure relief.

ADVANTAGES AT A GLANCE

- Customized versions available
- With or without metal reinforcement or pressure relief
- Long lifetime
- Suitable for different industry sectors

ORIGINAL FREUDENBERG PROFILES

FREUDENBERG XPRESS® STANDARD PROFILES

GUIDES

Guides are used for guiding rods and pistons in pneumatic and hydraulic cylinders to ensure a distance between these and the metallic cylinder housing. Depending on the load, a wide range of materials can be suitable – PTFE, PA, laminated fabric etc. Guides from Freudenberg Xpress® are able to withstand high transverse forces and provide the advantage of a good durability and reliability. The portfolio includes guide rings and guide bands.

ADVANTAGES AT A GLANCE

- Various materials available
- Good durability and reliability
- Withstand high forces

ORIGINAL FREUDENBERG PROFILES

FREUDENBERG XPRESS® STANDARD PROFILES

Additional profiles on demand
With the help of static rings, dynamic applications as well as static machine parts are sealed against liquids and gases. The application area is very diverse. As the products can be optimized in different ways, they are suited to nearly every industry sector. Even though the classic static ring in form of an O-ring is round, it is also available in other shapes, like X-rings. Static rings can be produced in various materials, such as NBR, EPDM, Fluoroprene® XP or FKM. Freudenberg Xpress® offers different shore hardnesses, down to 70 Shore A. The portfolio of Freudenberg Xpress® includes ISO3601-certified O-rings in various sizes – standardized in conformity with different norms, such as DIN 11864 for pipe connections, or intermediate.

**ADVANTAGES AT A GLANCE**

- Various materials available
- Support of radially sealing O-rings
- Suitable for different industry sectors

**ORIGINAL FREUDENBERG PROFILES**

SPR-FX
PU82-FX
PU83-FX

**FREUDENBERG XPRESS® STANDARD PROFILES**

DST 108  DST 109  DST 111  DST 113  DFL 108

**CUSTOMER-SPECIFIC SOLUTIONS**

Some complex applications with special operating conditions require customized sealing solutions with individual sizes and design. This makes a precise match to the respective application possible. A tailor-made seal can be produced by either modifying a standard component, like an O-ring, or by designing a completely new solution. In order to comply with the Hygienic Design Standards and prevent dead spaces or microfilms, special adjustments are possible. The materials can vary greatly – from elastomers like EPDM, Fluoroprene® XP or NBR to high-performance plastics such as PTFE or PEEK. At Freudenberg Xpress®, customized sealing solutions up to 2,500 mm can be machined. The portfolio of Freudenberg Xpress® also includes flat gaskets in different materials, dimensions and thicknesses.

The Freudenberg Xpress® service is the solution when the manufacturing of a series tool is too expensive or not possible because of the special design of the seal. A sample or drawing is enough for the experts to develop a seal according to your individual needs. This makes prototyping easier and faster. The samples or sometimes even the first small series are available for use in the respective machines in a very short time.

Additionally, an in-house test plant makes a range of technical tests possible during the sampling phase. A competent consulting during the whole development process is also provided. The team of experts even visits your plant in order to get the best possible impression of your applications and requirements.

**ADVANTAGES AT A GLANCE**

- Unique machining and milling methods make the realization of individual designs possible
- Cost-effectiveness and faster production due to missing tooling costs
- Faster and easier prototyping
- Production based on a drawing or sample possible
- Various dimensions and materials available
- Highly competent consulting and testing service

**DEVELOPMENT AND PRODUCTION PROCESS**

**DEVELOPMENT**

- SAMPLE
- DRAWING
- TECHNICAL DISCUSSION

**PRODUCTION**

- MILLING
- MACHINING
- WELDING
- CUTTING
With the innovative Merkel Radiamatic® RPM 41, Freudenberg Xpress® offers an optimized customer-specific sealing solution for work rolls in steel mills. It is made of a specially developed NBR-material with integrated steel element, offering very good resistance to oil and fatty media.

The sealing lip, which is made of pure elastomer, does not need any spring support. The clamping part enables additional outside lubrication by featuring radial and circumferential grooves. Due to an integrated reinforcing element, it provides a self-retaining fit. With the Merkel Radiamatic® RPM 41, minimized friction and a maximum sealing effect can be guaranteed. Dimensions of 200 to 1,000 mm are plausible. With the innovative Merkel Radiamatic® RPM 41, Freudenberg Xpress® offers an optimized customer-specific sealing solution.

For very large sealing profiles welding technology is the optimal production method. Extruded or machined seal profiles are the basis here. Using this process even profiles with a diameter of 20 meters or more can be produced. Besides standard profiles, customized solutions are possible.

Freudenberg Xpress® provides you with welded TPU seals in nearly every dimension – very fast and meeting highest quality standards. These TPUs are original Freudenberg materials and suitable for a wide range of different temperatures and media. Thanks to a specially developed advanced welding technology, the welded seams are of extremely high quality. This ensures a long lifetime and excellent mechanical properties.

**AVAILABILITY OF PROFILES**

<table>
<thead>
<tr>
<th>S [mm]</th>
<th>L [mm]</th>
<th>S [mm]</th>
<th>L [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0</td>
<td>16.0</td>
<td>15.0</td>
<td>16.0</td>
</tr>
<tr>
<td>19.1</td>
<td>16.0</td>
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<td>19.1</td>
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<tr>
<td>22.0</td>
<td>20.0</td>
<td>25.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

**ADVANTAGES AT A GLANCE**

- Customized sealing solution
- Original Freudenberg profile and material
- Self-retaining fit
- Optimized wear resistance
- No spring needed
- Very good resistance to oil and fatty media
- Broad portfolio of dimensions available at short notice

**MARKET-SPECIFIC SOLUTIONS**

**HEAVY INDUSTRY**

Pressures of up to 2,500 bar or aggressive media are only some of the many challenging conditions in the heavy industry. This makes especially durable and reliable customized sealing solutions necessary.

The portfolio of Freudenberg Xpress® for the heavy industry includes ten product lines based on original Freudenberg designs and made from original Freudenberg materials. These can be produced as endless, cut-to-size or precision-joined version. While the basic rings come from series production, the guide belts and v-seal set packings are delivered as open versions, after being cut-to-size. Thanks to a specially developed joining method from Freudenberg individual diameter specifications are possible for wipers, v-seal set packings and radial shaft seals.

**PROCESS INDUSTRY**

The challenging operating conditions in the process industry include aggressive cleaning and process media as well as extreme temperatures and high pressures. Additionally, sealing solutions in the food, beverage and pharmaceutical sectors have to comply with the Hygienic Design Standards and country-specific legal regulations, such as those of the FDA (Food and Drug Administration) or EU (Reg.) 1935/2004.

Freudenberg Xpress® offers specially developed original Freudenberg materials for the demanding requirements of the different areas of the process industry. They are highly resistant to CIP/SIP (Cleaning in Place/Sterilization in Place) processes using aggressive cleaning agents and water vapor, fatty media, high temperatures and many more. For usage with direct contact to foods and pharmaceuticals the high-performance materials conform to all relevant legal requirements, even the Chinese GB 9685 and GB 4806.
INSTALLATION RECOMMENDATIONS

PISTON SEALS
(EXAMPLE NA300)

<table>
<thead>
<tr>
<th>SURFACE ROUGHNESS</th>
<th>$R_{\text{max}}$</th>
<th>$R_z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running surface</td>
<td>≤ 2.5 µm</td>
<td>≤ 0.05 - 0.3 µm</td>
</tr>
<tr>
<td>Bottom of groove</td>
<td>≤ 6.3 µm</td>
<td>≤ 1.6 µm</td>
</tr>
<tr>
<td>Sides of groove</td>
<td>≤ 15 µm</td>
<td>≤ 3 µm</td>
</tr>
</tbody>
</table>

Download the installation videos!

ROD SEALS
(EXAMPLE T20)

<table>
<thead>
<tr>
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<th>$R_z$</th>
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</tr>
</tbody>
</table>

Download the installation videos!
**WIPPERS (EXAMPLE ASOB)**

- **SURFACE ROUGHNESS**
  - Running surface: ≤ 2.5 µm, 0.05-0.3 µm
  - Bottom of groove: ≤ 6.3 µm, ≤ 1.6 µm
  - Sides of groove: ≤ 15 µm, ≤ 3 µm

**GUIDES (EXAMPLE KB)**

- **SURFACE ROUGHNESS**
  - Running surface: ≤ 2.5 µm, 0.05-0.3 µm
  - Bottom of groove: ≤ 6.3 µm, ≤ 1.6 µm
  - Sides of groove: ≤ 15 µm, ≤ 3 µm

**RADIAL SHAFT SEALS (EXAMPLE M16)**

- **SURFACE ROUGHNESS**
  - Running surface: ≤ 2.5 µm, 0.6 µm
  - Bottom of groove: ≤ 15 µm, ≤ 4 µm

**O-RINGS**

- **SURFACE ROUGHNESS**
  - Running surface: ≤ 2.5 µm, 0.6 µm
  - Bottom of groove: ≤ 15 µm, ≤ 4 µm

The O-ring Configurator helps you to find the right O-ring for your application. In order to define the relevant data, such as media selection, groove position and design space, the online assistant guides you through different steps and choices.
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