



SEGMENTS BROCHURE FOR THE AUSTRALIAN MARKET

FREUDENBERG
SEALING TECHNOLOGIES

 **FREUDENBERG**
INNOVATING TOGETHER

INDEX

1	COMPANY OVERVIEW	3
	Freudenberg Sealing Technologies Australia	4
	Values and Principles	5
	Sustainability	6
	People at Freudenberg	7
	Material Competence	8
<hr/>		
2	FLUID POWER	10
	Product Portfolio	13
<hr/>		
3	FLUID HANDLING	14
	Product Portfolio	16
<hr/>		
4	POWER TRANSMISSION	18
	Product Portfolio	18
<hr/>		
5	RAILWAY	20
	Product Portfolio	23
<hr/>		
6	PROCESS INDUSTRY	24
	Challenges in the Process Industry	24
<hr/>		
7	FREUDENBERG XPRESS®	26
	Customized seals for Heavy Industry	27
<hr/>		
8	DISTRIBUTION	28
	Distributor Categories	29

YOUR STRATEGIC PARTNER IN SEAL SUPPLY



Freudenberg Sealing Technologies is the largest business group in the Freudenberg Group with some 13,500 employees and is part of the Seals and Vibration Control Technology business area. As a technology expert and global market leader for sealing technology, Freudenberg Sealing Technologies is a reliable supplier and professional development and service partner to industry. The company acts as a trusted partner to its customers, for example in the automotive industry, civil aviation, mechanical engineering and shipbuilding, the food and pharmaceutical industries, and the agricultural and construction machinery industries.

Based on their knowledge of engineering and the market acquired over many years, the sealing experts find the right solution for all sealing requirements. Worldwide production and warehouse locations as well as a network of strong Distribution partners enable outstanding product availability. In addition, customers benefit from an extensive portfolio of product-related, logistics and online services.

The Freudenberg brand stands for more than 170 years of experience in engineering and materials, which along with top-quality and innovative sealing solutions, is the basis for Freudenberg Sealing Technologies being at the forefront of technology and innovation leadership. In addition, the Dichtomatik brand offers reliable sealing products manufactured by certified suppliers to complete its range.

OUR STRENGTHS AT A GLANCE

- Broad global competencies with an extensive knowledge of local market demands
- One of the world's largest standard programs with more than 200,000 different seals
- Unique material expertise with more than 1,800 recipes and 1,000 raw materials
- Highest quality standards for production and customized products (from raw material to finished product)
- Commitment to continuous innovation as a foundation for the future success of our customers
- Value adding services such as Freudenberg Xpress®
- Co-engineering and ongoing support for identifying various technical solutions
- Local expertise and technical support
- Globally certified materials for the food, beverage and pharmaceutical industries



COMPETENT AND STRONG LOCAL PARTNER IN AUSTRALIA

GLOBAL EXPERTISE WITH LOCAL REPRESENTATIVES

Freudenberg Sealing Technologies acquired Ludowici Sealing Solutions in 2015 which was originally founded in 1858 by Johann Carl Ludowici. In addition to the headquarters in Brisbane there are three additional offices in Australia. Freudenberg Sealing Technologies Australia is the leading seal supplier in Australia, servicing a broader range of market sectors.

By integrating into Freudenberg Sealing Technologies, the organization has joined the broad portfolio incl. Freudenberg, Dichtomatik and Corteco brands, now all available from a single source and one local warehouse in Australia for maximum availability and speed.

MULTIPLE BRAND STRATEGY TO MEET ALL CUSTOMER REQUIREMENTS

Freudenberg Sealing Technologies Australia offers catalog and customized seals from the premium Freudenberg brand for all sealing needs – providing highest and uncompromising quality, excellent performance and therefore peace of mind by full safety. The range is rounded off by complementary solutions from the Dichtomatik product brand. In addition, the Dichtomatik brand offers reliable sealing products manufactured by certified suppliers to complete its range. We also offer Automotive aftermarket seals through Corteco. This unique combination of branded product ranges enables you to capitalize on a broad-based alignment of technically complementary products.

SEALING SOLUTIONS FOR NEARLY EVERY MARKET SEGMENT

As a full service provider, Freudenberg Sealing Technologies Australia offers sealing solutions for a wide variety of market segments such as Food and Beverage, Heavy Industry, Agriculture, Hydraulics and many more.

YOUR ADVANTAGES AT A GLANCE

- Complementary product portfolio
- Full range of premium seals and seals meeting common industry standards
- Single point of contact for several Freudenberg brands
- Local warehousing
- Freudenberg Xpress® manufacturing service for machined prototypes, replacement parts or small series

VALUES AND PRINCIPLES

THESE PRINCIPLES ARE THE GUIDE TO ENTREPRENEURIAL ACTION AT FREUDENBERG

When the company's founder, Carl Johann Freudenberg, introduced his two sons as business partners in 1887, he expressed initial guidelines in his General Observations.

Modesty, honesty, financial solidity and the ability to adjust to changing conditions are fundamental values of a successful entrepreneur. In 1994, 10 Business Principles, derived from Freudenberg's successful history, were written down for the first time. These Business Principles were considered a framework and a legacy for future generations of members of the Board of Management.

The Guiding Principles are based on the Business Principles and define the value basis for all our conduct vis-à-vis employees, business partners, other stakeholders and third parties.

Since then, Freudenberg has become a more international company in many senses. Portfolio decisions, new business developments, increased regional and cultural diversity as well as rapid changes in the general business environment have challenged the group's traditional ability to adjust to new market needs. In the face of such changes, our core principles and values continue to provide guidance and orientation.

The Business Principles state that Freudenberg will remain a 100 percent family-owned enterprise. That principle goes beyond pure legal ownership. Our corporate governance

structure, with its system of checks and balances, the delegation of responsibility between the Partners, the Partners' Board and the Board of Management, ensures a strong commitment to values, responsible behavior and ethical standards. These include, among others, a ban on the manufacture and distribution of products intended to harm people. The Business Principles also state that the Freudenberg Group must remain broadly diversified. This serves as a stabilizing factor, along with the requirement to uphold a minimum equity ratio of 40 percent. Such stability, combined with Freudenberg's openness towards strategic alliances, allows us to maintain a high degree of independence.

Upholding long-term profitability serves as a precondition for achieving all other goals in a wider social context and assures sustainability: Economic efficiency, social responsibility and environmental protection are firmly linked.

The Guiding Principles reflect our common, consistent and firm value basis. To foster a better understanding and ensure consistent interpretation, further explanations entitled "Conduct and Behavior" have been added. It is our expectation that all employees will make this document a part of their daily working conduct and behavior. In doing so they set an example and spread the spirit that makes our company unique.

OUR UNDERSTANDING OF SUSTAINABILITY

As a value-based, family-owned technology group, our corporate goal is not merely financial success but always involves responsibility for society and the environment. The two goals have been inextricably linked since the company's founding.

Humanity is known for its wastefulness: If we continue on our same path and do not change our mentality, we would need the resources of three earths to cover our requirements by 2050. This scenario seems frightening and unreal. To give future generations access to finite resources and to keep the earth livable, Freudenberg Sealing Technologies, under the umbrella of the Freudenberg Group, is setting an example. Within the Freudenberg Group, sustainability is defined as follows:

We want to shrink our footprint and enlarge hand print for our customers and the end users.

What do we mean by that? The footprint represents our efforts to minimize the negative effects of our production processes on the environment. We achieve this by using natural resources more efficiently, reducing emissions, and optimizing our (transport) processes. The hand print represents the active promotion of sustainability among our customers, for example, through our products and services. We are convinced that the more innovative we are, the more sustainable our own processes and products will be.



PRODUCT AND MATERIAL COMPETENCE

ELASTOMERS WITH EXCELLENT CHARACTERISTICS – THE BASIS FOR INNOVATIVE SOLUTIONS

Well founded material know-how

Freudenberg Sealing Technologies has now been developing innovative brand products at the highest level for decades. With in-depth experience on materials, well-founded knowledge of processing and extensive product know-how, again and again we create ideal pre-conditions for your success. However, the quality of the elastomer material is decisive for the optimum operation of seals and components used in vibration control. Therefore, we are particularly proud of our pioneering role worldwide in this sector.

Deliberately targeted development of Freudenberg materials guarantees the highest possible quality and long life

Engineers and chemists worldwide are developing new Freudenberg materials every day for highest possible functional requirements in joint development ventures with various research institutions plus leading manufacturers of polymers and chemicals. The materials we develop must fulfil the respective customer-specific requirements and withstand all the loadings feasible in their branch of industry – both with regard to temperature, pressure and resistance to media and in the presence of static or dynamic loadings. The length of life of our products is constantly being improved by optimizing our materials. Constant monitoring on the road to these products becoming mass production materials also guarantees you the highest possible quality.

Uniquely wide range of standard materials

We produce more than a billion seals annually from a production volume of more than 15,000 tons. When considered as a whole, a range of material, which is unique in its quality and quantity, is available to you with more than 1,800 mixtures of 1,000 raw materials for your individual applications in seals. A large proportion of these are standardized mixtures. Of course, our competent team of experts will advise and assist you fully – from the selection of the right materials via the test phase to the start of production.

THE INDIVIDUAL FREUDENBERG MATERIALS WE HAVE DEVELOPED ARE LEADERS WORLDWIDE

Comprehensive performance package and much more

Materials manufactured individually to your wishes and requirements are unusually important in the comprehensive performance package from Freudenberg Sealing Technologies. The use of polymers, based on our own raw materials and tailored to your requirements, enables Freudenberg Sealing Technologies to develop high performance materials which satisfy the highest functional demands. We use our global materials database for the selection of application-specific materials, which groups together the know-how of our experts, working worldwide, to form a network of top technological services which we can call on at any time. Finally, the appropriate material with the optimum

characteristics for your application is manufactured using computer-controlled procedures, from the selection of the raw material to the compounding process. Of course, always adhering to the highest standards in quality and processing and complying with ecological guidelines – in the interest of your success and the environment.

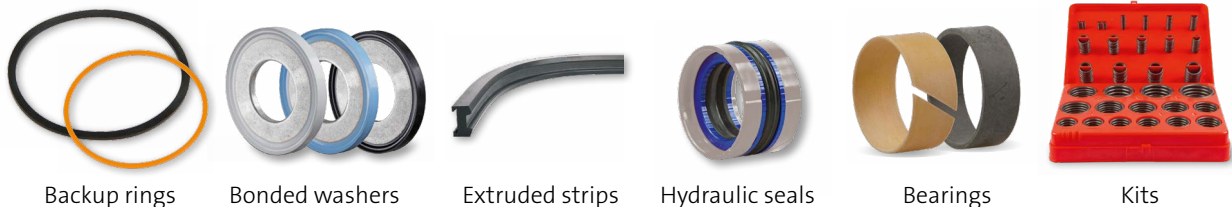
Freudenberg Sealing Technologies offers you a variety of options at www.fst.com/services to get an overview of our products and services: from technical data to CAD models to direct ordering.

EXCERPT OF TWO-BRAND PRODUCT PORTFOLIO

Freudenberg Sealing Technologies stocks an extensive range of over 25,000 off-the-shelf products in Australia

for immediate delivery. In addition to this standard range, we are able to design and produce customer specific seals.

STANDARD SEALS



Backup rings

Bonded washers

Extruded strips

Hydraulic seals

Bearings

Kits



O-rings

Pneumatic seals

Oil seals

Custom molded products

Other seals

TOOLS AND ACCESSORIES

Freudenberg Sealing Technologies also stocks a wide range of fitting, installation and removal tools as well as accessories like seal stretching tools, seal picks, greases and lubricants in our Australian warehouses.

SPECIALTY PRODUCTS

In addition to our large range of standard seals, Freudenberg Sealing Technologies offers numerous different special products like industrial spray nozzles, food and beverage manufacturing accessories, automotive accessories and more.



FLUID POWER

UNLEASH THE POWER



Explore our 3D animation for Sealing Solutions in Hydraulic Application

The fluid power industry is not only solidifying a hold on current applications, it is unleashing its knowledge into ever-increasing frontiers. Excessive temperature and diverse fluids often create problems for this field. Overall, new materials and designs are necessary to meet the increasing industry requirements. Smaller components with higher pressures combined with hotter ambient temperatures continue to drive the demand for better-performing seal systems. At Freudenberg Sealing Technologies, we create sealing solutions that offer a broad application range and thus minimize demand for equipment solely designed for specific environmental conditions.

Freudenberg knows the harsh environments that test your hydraulic projects, which is why we've developed sealing designs with materials like special PTFE and polyurethane compounds that set new industry standards. Our innovations have led to the development of accumulators with operating pressure up to 500 bar, radial shaft seals that withstand up to 170 bar (peak), along with seals and custommolded components for pneumatics that increase efficiency, providing a more reliable operation.

REAL-WORLD SOLUTIONS

Always delivering superior customer service, our network offers the world's largest product range from a single source, materials and manufacturing expertise, along with revolutionary solutions for your next sealing application. We drive

Materials like our polyurethane AU 30000 allow for operation pressures up to 500 bar, stability in temperatures from -35°C to $+120^{\circ}\text{C}$ and resistance to mineral and biodegradable fluids. Our materials expertise, coupled with our robust designs and quality standards, enable our seals to provide reliable operation and ensure long service life.

By providing engineering support, we help to diagnose your entire application system. Freudenberg's Finite Element Analysis (FEA) tests individual parts and surrounding components. Our reliable product testing includes: fluid compatibility at temperature, environmental aging, physical properties, static/dynamic testing at accelerated conditions, and durability. We have even designed customer-specific test equipment and protocols to ensure that seals are optimized for unique operating conditions.

innovation with research, development, and production teams integrated across our global operations to meet the demands of worldwide and local markets.

HYDRAULIC CYLINDERS

Achieve the ultimate in the generation, control, and transmission of power while delivering maximum reliability and durability with our reliable sealing components.

WIPERS

Our wipers deliver protection against contaminants and environmental influences. With or without metal reinforcement, as well as double wipers with or without pressure relief, we have the product for your application.



PISTON SEALS

Offered in a variety of materials, these seals provide the lowest possible friction without drift. They deliver intense strength against gap extrusion and can be precisely adjusted to a particular application.



ROD SEALS

Meeting expectations for maximum reliability, service life, and functionality, our rod seals are used in every kind of cylinder and application. Our seals assist with extreme pressurization, protection against the elements, and premature failure of the primary and secondary seals.



GUIDE RINGS

Our fabric-based laminate guide rings offer maximum reliability and longevity. They withstand the capacity to absorb strong transverse forces even over a short guide distance, while keeping frictional losses low.



HYDRAULIC PUMPS AND MOTORS

When you are working in extreme conditions, reset the bar for reliable rotary hydraulic power and exceed your customers' expectations with our innovative sealing solutions.

SIMMERRING® SHAFT SEALS

Premium quality Simmerring® seals have a proven record of durability and longevity in a variety of low- and medium-pressure applications. They provide excellent wear resistance in various environments and are the optimum choice for an affordable price without compromising reliability.



SIMMERRING® PRESSURE SEALS

These pressure Simmerring® seals are designed to prevent pressure deformation via a combination of shorter flex section, flex section support features, reinforced metal cases, defined lip geometries, and proprietary wear-resistant materials. This ensures longer service life and durability, even in high-pressure environments.



ENCODERS

Encoders utilize alternating positive and negative bands to precisely measure shaft position. Our encoders provide a constant signal at all speeds, zero speed detection, and simple assembly due to their state-of-the-art design.



STATIC SEALS

Offered in a variety of materials, our gaskets prevent leakage from contaminants. Plate seals aid in preventing premature seal degradation, and reduce the number of components needed, while simplifying housing machining.



HYDRAULIC ELEMENTS

We help you build reliable hydraulic elements that assist in the most complicated systems and will perform to the highest quality standards.

DIAPHRAGM ACCUMULATORS

Our diaphragm accumulators provide excellent energy storage with unique materials that cover wide temperature ranges and provide longer service life. The next generation of lightweight accumulators combines the effectiveness of aluminum with the functional ability of an accumulator to maximize the function/cost ratio.



O-RINGS

Whether you need specialized or off-the-shelf standard seals, we have them delivering optimum performance and value, our O-rings are offered in an assortment of materials that handle extreme temperatures and battle contaminants.



PNEUMATICS

When your application calls for increased efficiency, look to our wide range of custom and standard pneumatic seals to make a significant impact.

COMBINATION SEALS

Combining wiping and rod-sealing function in one part, the Combination Seal is the ultimate seal for enhanced dirt protection. The materials are designed for the specific demands of pneumatic applications. The seal is proven to increase service life and reduce warranty claims, and is perfect in applications with limited space.



PISTON SEALS

Freudenberg piston seals offer specialized geometries with rounded sealing edge to ensure an excellent sealing function over the cylinder's lifetime, while also maintaining the lubricating layer at a pressure up to 10 bar.



DAMP AND SEAL

Our 3-in-1 damper seal offers mechanical damping in the end position, static sealing of the cylinder, and pneumatic damping of the piston stroke by throttling the air. With its innovative design and highly stressable material, it offers outstanding damping characteristics.



CUSTOM-MOLDED COMPONENTS

Tested to meet rigorous requirements, our custom molded parts have tolerances that enable optimum performance with the possibility of miniaturization and great noise-dampening as needed. They are available in numerous elastomer materials that improve longevity and efficiency in your specific applications such as solenoid plungers.





PORTFOLIO

SEAL TYPE	HYDRAULIC CYLINDERS	HYDRAULIC PUMPS AND MOTORS (INCLUDING PISTON MOTORS)	HYDRAULIC AGGREGATS	PNEUMATICS
Wipers	● ●	● ●		
Rod Seals	● ●	● ●		
Piston Seals	● ●	● ●		● ●
Guide Rings	● ●	● ●		
Pressure Oil Seals		●		
Standard Oil Seals		● ●		
Encoders		●		
Gaskets and Face Plate Seals		● ●	● ●	
Diaphragm Accumulators			●	
O-rings	●	● ●	● ●	● ●
Combination Seals				●
Damp and Seals				●
Custom-Molded Components				●

● Freudenberg brand ● Dichtomatik brand

CERTIFICATIONS

- EN ISO 9001:2008
- EN ISO 14001:2004
- AS9100
- AS9120
- A2LA Laboratory
- EN9100
- ASME "U"
- CE/PED
- Chinese SELO
- Project-based certification for accumulators available upon request



FLUID HANDLING

CALM UNDER PRESSURE

The fluid handling world market is forecast to expand in the coming years. Growth will be healthy across the globe, although the drivers will vary by region. Rising production will cause growth in certain territories while, in others, expansion is based on a growing industrialization market and will focus on investment in water infrastructure and electricity generation. These resource process improvements will progress in developed areas along with continued advances in other manufacturing output.

As an innovative global supplier, Freudenberg is well equipped to take part in the expansion of these emerging and growing markets worldwide. We provide solutions for the most challenging applications that utilize ultimate flow control for liquids and gases. Our company offers a broad range of sealing solutions for diverse applications like pumps, valves, and compressors, along with a global support network of experts, to be your single-source sealing and service provider.

We address issues like miniaturization, rising temperature ranges, and highly corrosive materials which are just some

of the ongoing challenges in fluid handling, as are the constant threats of contamination and leaks. Ultimately, the stability of the entire manufacturing process depends on the integrity that seals the actual system. With Freudenberg Sealing Technologies you can count on high reliability, which means less downtime and less error.

In today's market, improved efficiency is also needed due to rising energy prices. We can provide precision sealing solutions that address these concerns. If your project calls for environmentally friendly materials, we have the expertise to provide material-compatible components that are compliant with global regulations.

When it comes to controlling the flow in fluid handling, Freudenberg Sealing Technologies understands exactly what's required. And we deliver just that. Every customer has specific demands for flow equipment. Freudenberg Sealing Technologies has the experts who will listen, deliver the correct solution, and remain calm under pressure.

DELIVERING GLOBAL PERFORMANCE

Freudenberg Sealing Technologies offers the world's largest product range from a single source, both materials, and manufacturing expertise, along with revolutionary solutions for your next sealing application. We provide global certifications for our products that meet the requirements for a

wide range of industries. Because we operate globally, our development and sales teams understand our customers' needs throughout the world. Whether your application calls for a standard material or a custom compound blend, Freudenberg delivers.

RELIABLE OPERATION

Whether steam, chemicals, water, or gas, we provide advanced sealing solutions that reduce maintenance and keep your equipment running longer, hotter, faster, and under higher pressures.

O-RINGS

Standard or custom-designed, our O-rings are available in several hundred materials. They provide resistance to ozone, chemicals, and temperature fluctuations. Also available are the necessary certifications for your application in any region of the world.



DIAPHRAGMS

Engineering and material expertise is our secret to virtually maintenance-free diaphragms. Freudenberg Sealing Technologies finds the right balance between pressure resistance and flexibility to assist you with extended product life. We accomplish this by providing the ability to apply PTFE foils and fabric reinforcements, insert metal parts, and provide TPU diaphragms. They are resistant against abrasive media and are used in an array of applications including slurry pumps and control valves.



SIMMERRING® SHAFT SEALS

Our robust seals handle the pressure across a wide spectrum of temperatures. Available in metric or imperial sizes, Simmerring® shaft seals come in a large range of materials that stand up to extreme operating challenges.



MINIATURIZATION

With diameters as small as five millimeters and thicknesses down to 40 microns, or the size of a matchstick head, Freudenberg is up to the challenge for your smallest application.

MICRO COMPONENTS

These pressure Simmerrings® are designed to prevent pressure deformation via a combination of shorter flex section, flex section support features, reinforced metal cases, defined lip geometries, and proprietary wear-resistant materials. This ensures longer service life and durability, even in high-pressure environments.



SOLENOID PLUNGERS

Available in numerous designs, our solenoid plungers can be utilized in various applications and are available in several coatings. Smaller solenoid plungers are possible with elastomers vulcanized into the smallest cavities and bonded to the metal part. Our product range includes lifting plungers, tilting plungers, and solenoid plungers with meander springs.



PRECISION-MOLDED PARTS

With tight dimensional tolerances and high surface quality, our precision-molded components consist completely of elastomer, or elastomer metal. When standard molded parts do not meet your requirements or size, we have the innovation to provide the solution.

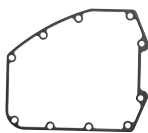


HYDRAULIC ELEMENTS

We help you build reliable hydraulic elements that assist in the most complicated systems and will perform to the highest quality standards.

GASKETS

Freudenberg’s gaskets are engineered to application specifications and are available in an array of materials for effective and durable sealing. We provide a variety of gasket technologies that support sealing solutions of fluids, temperatures and pressures found in most sealing applications.



CHEVRON SEALS

When you need ultimate resistance to pressure with high wear resistance, then you need Freudenberg chevron seals. Our seals are resistant to chemicals and high temperatures and provide reliable protection against extrusion.



DIAPHRAGM ACCUMULATORS

We meet the challenges of your application by providing accumulators that cover wide temperature ranges and provide longer service life. Our diaphragm accumulators can be used in an assortment of heavy-duty applications like large pumps and compressors.



FREUDENBERG XPRESS®

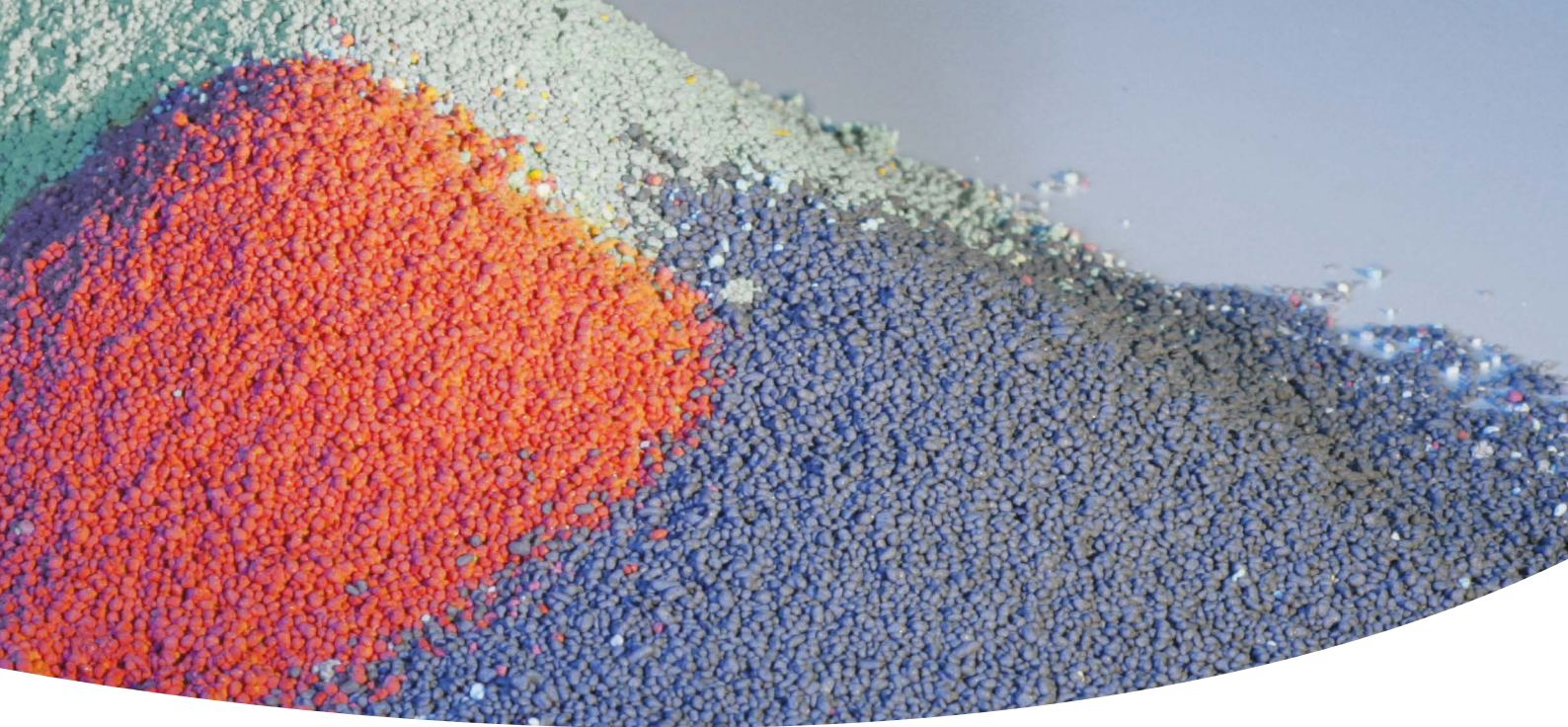
Tailor-made, economic, and fast: ordering machined seals from Freudenberg Xpress® minimizes your downtime and maximizes your production flexibility. We produce customized seals and guides—as a single piece or in economic small batches.



PORTFOLIO

PRODUCTS	GENERAL VALVES	SOLENOID VALVES	PUMPS	COMPRESSORS
Diaphragms	●		●	●
Simmerring® Shaft Seals			●	●
O-rings	● ●	● ●	● ●	● ●
Solenoid Plungers		●		
Micro Parts	●	●	●	
Precision-Molded-Components	●	●	●	●
Gaskets			● ●	● ●
Chevron Seals			●	●
Diaphragm Accumulators			●	●
Profiles			●	●
Molded Polyurethane Parts	●		●	●
Freudenberg Xpress®	●		●	●

● Freudenberg brand ● Dichtomatik brand



MATERIALS AND CERTIFICATIONS

Freudenberg constantly monitors market developments and the regulatory environment so that we'll continue to provide our customers the optimum material for your specific application. Depend on our assistance in finding the right sealing solution.

SIMRIZ®/FFKM

Simriz® features wide chemical stability, similar to that of PTFE, combined with the rubbery properties of an elastomer. Specially for the processing industry, Simriz® makes a complete product range of high-class FFKM material available which sets new standards for operational safety and durability.



EPDM

With its excellent stability in water and aqueous solutions, EPDM is one of the most widespread materials in the fluid handling industry. EPDM materials are outstanding because of their wide and extremely cost-effective use in a diverse range of applications.



PTFE

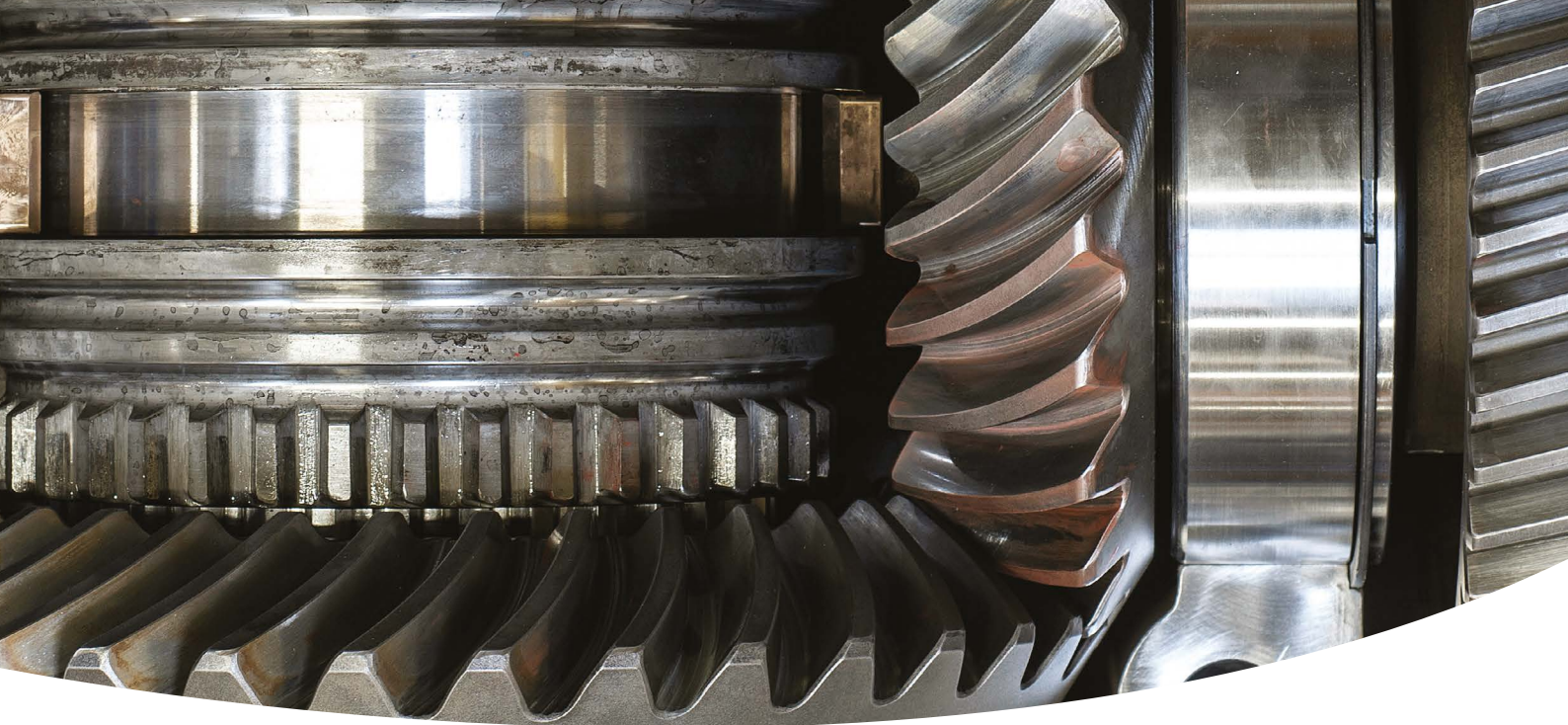
PTFE shows a series of excellent properties in fluid-handling applications. Chemical resistance is better than that of all elastomer materials and thermoplastics, providing a wide application portfolio in almost all media. The extremely large thermal range of PTFE allows it to be used even with liquid gases.



POLYURETHANE

Outstanding durability properties due to incredible wear resistance and excellent structural tenacity make Freudenberg's polyurethane top of the line. Our polyurethane material provides extreme flexibility in all temperatures, withstands chemicals, and protects against crack formation and growth.





POWER TRANSMISSION

GEARING UP FOR THE FUTURE

To keep your gearboxes turning, turn to Freudenberg Sealing Technologies for the most advanced gearbox and coupling components. Today's power transmission industry faces ever-growing challenges when it comes to increased life cycles, reduced maintenance costs, and increased fluid compatibility. We lead the way with material compounds specifically designed to reduce friction, reduce temperature, increase lifespan, and stand up to today's modified oil and grease recipes.

Our commitment to service complements our reliable products. We believe in looking at the entire tribological system to help maximize performance. This includes everything from how the shaft is prepared to how the seals are in-

stalled. In conjunction with Klüber Lubrication, another Freudenberg company, we can optimize the seal material and lubrication combination through our Lube & Seal program. Our test facilities can conduct a full range of product testing, including customer-specific testing. And once we optimize the entire system, we can provide that solution anywhere in the world through our global manufacturing and sales footprint.

SIMMERRING® SHAFT SEALS

Premium quality Simmerring® shaft seals have a proven record of durability and longevity in a variety of applications. The seals incorporate the cutting-edge materials 72 NBR 902 and 75 FKM 585 for long life and low friction, providing excellent wear resistance while handling the pressures of non-vented gearboxes. Simmerring® shaft seals are available in imperial and metric sizes.



SIMMERRING® MSS1

Comprised of a standard sealing module combined with an inner buffer, the MSS1 (Modular Sealing Solution) delivers contaminant exclusion, including particles from gear wear, with low friction. Vertical sealing applications traditionally use a primary seal and a second redundant seal. The MSS1 replaces both seals, greatly reducing friction and required installation space.



COUPLING ELEMENTS

Expertise in highly wear-resistant materials defines the Freudenberg elastomer components for flexible couplings. Typical compounds include polyurethane and nitrile rubber. For turbo couplings we have an extensive standard range of radial shaft seals and calculation programs to match the design of the spring to the centrifugal force in the application.



ADVANCED MATERIALS

Our high-tech materials 75 FKM 260466 and 75 FKM 170055 are enhanced FKM materials formulated to perform in today's synthetic oils while delivering superior high-temperature resistance. Both materials are specifically designed to extend the service lifetime of gearboxes with significant lower wear band and shaft run.



SEALING CAPS

Elastomer-covered sealing covers are used as static seals, which can even seal bores with rough surfaces. These sealing caps also handle heat expansion and can be made in a variety of materials depending on the application need. Different types of sealing caps are available.





RAILWAY

FROM ROAD TO RAIL

All around the world the focus on rail transportation continues to increase. With the physical population growth across the globe, the demand for metro, light rail, monorail, and high-speed rail (HSR) has exploded. Rail transportation, particularly in urban areas, is becoming more vital.

Transitioning from Green to SMART (zero emissions) is one key to the success of the industry. It is well known that automobiles produce high levels of emission gases; therefore, an influx of rail riders will reduce world emissions considerably. On average, HSR produces less than half the carbon dioxide per passenger mile as automobiles.

For rail companies to stay on budget while designing new trains and updating existing systems, they have to find a company that can support their needs by reducing life cycle costs. Freudenberg is your partner when it comes to railway. We offer products that handle extreme temperatures, enhance safety and comfort, and are the latest in reliable innovative technology and new materials.

GLOBAL REACH WITH LOCAL PERCEPTION

Whether you are working on a new rail project in Asia or Europe, you can find a local Freudenberg representative to assist you with your success. Always delivering superior customer service, our network offers the world's largest product range from a single source, materials and manufacturing expertise, and revolutionary solutions for your next sealing application. To satisfy demand, railway needs to incorporate high-quality, dependable, and innovative technology. Local

understanding of railway needs and technology is part of Freudenberg's way to supply you with the global reach you need to succeed.

EXTREME TEMPERATURES

Increased horsepower requirements in locomotives result in extremely high temperatures. Severe low temperature climates present operating challenges. Freudenberg’s cutting-edge materials address these demands.

DIAPHRAGMS

Our advanced generation of diaphragms provide solutions in extreme temperatures of -60°C to $+80^{\circ}\text{C}$ (-76°F to $+176^{\circ}\text{F}$). Freudenberg delivers homogeneous, fabric-reinforced, and metal/plastic insert designs that maintain their function and provide superior life service.



CASSETTE SEALS

Freudenberg’s unique cassette seal design provides no increase in power loss when increasing shaft diameter. Our seals are reliable in the most extreme working conditions and temperatures. Not only do they keep the elements out, cassette seals provide reduced friction and can even reduce CO2 emissions.



PROFILE SEALS

Whether you need to battle temperatures of -55°C or $+80^{\circ}\text{C}$ (-67°F or $+176^{\circ}\text{F}$), turn to Freudenberg as your source in profile seals for sealing cabin doors and windows. We also offer fabric-reinforced, flame-resistant profiles for your critical applications.



SIMMERRING® SHAFT SEALS

Increase the life target of your system and provide ultimate sealing in extreme temperatures. On average, our seals have 50% less wear across a wide spectrum of temperatures.



SAFETY AND RELIABILITY

Safe and reliable operation is imperative to the growth of the railway industry. From our fabric reinforced diaphragms to our innovative valve components, we cover almost every application.

BRAKE COLLARS

To meet the ongoing regulatory demands in brake systems, reliable sealing solutions are required. We address those challenges with innovative materials that withstand temperatures as low as -60°C (-76°F) and adhere to necessary standards.



DIAPHRAGMS

We have the expert engineering and materials expertise to provide the high performance diaphragms your brake system demands. To extend diaphragm life and keep the elements out, look to our high-performance, fabric-reinforced diaphragms for your next project.



VALVE COMPONENTS

When stopping is the most critical thing to do, look to Freudenberg valve components for your brake system. Produced with the latest in advanced materials, our valve components are comprised of aluminum, stainless steel, brass, or plastic, coupled with high-performance elastomers.



D-JACK SEALS

The Freudenberg D-Jack seal is a friction-optimized seal for all dry-lubricated piston applications. A variance of possible geometries provides for great design leeway. These versatile engine seals deliver very low friction, low permeation, and very low breakaway torque.



COMFORT

With more transportation options today than ever, comfort and convenience are vital to attracting rail passengers. We help create a pleasant atmosphere for passengers by reducing vibration and noise and improving climate control.

ACCUMULATORS

Freudenberg has focused on application-specific developments in advancing accumulator technology. We have mastered the ultimate in vibration control with our vast number of accumulator solutions in innovative materials, design, and functionality.



PROFILE SEALS

Equipped with the latest innovative materials and technology, we provide the ultimate profile seals for such applications as door systems for noise control and air control. We also offer fire-resistant and fire-proof profile seals along with extreme hot- or cold-resistant profile seals.



PNEUMATIC SEALS

Standard or custom, Freudenberg manufactures ultimate pneumatic sealing for applications utilizing pistons, wipers, guide bands, and more.



ISOLATION MOUNTS

Ideally suited for isolation of vibration and acoustic performance, Freudenberg Sealing Technologies mounts provide a long service life and are lightweight with exceptional durability.

MAINTENANCE

Due to the budgetary constraints of governmental agencies and private companies, total life cycle cost is critical in railway maintenance. By offering our customers longer component life, we help reduce maintenance costs.

BELLOWS

Offering over 450 different standard sizes along with custom designs, we provide the latest in advanced materials for ultimate safety, extreme temperatures, and protection against the elements.



ENCODERS

Compact design and component integration provides exceptional bearing seal and sensing packages. Because of our technology integration, our encoders allow for the reduction of parts, simpler installation, and less service.



O-RINGS

Freudenberg O-rings feature materials for the most demanding applications. Whether your project calls for an O-ring to battle low temperatures, or a special polymer O-ring for high temperature, Freudenberg Sealing Technologies is your source.



SIMMERRING® SHAFT SEALS

Freudenberg delivers sophisticated technology providing cost-effective sealing solutions for your application. Simmering® shaft seals are resistant to harsh chemical environments and temperature extremes, and deliver exceptional durability over time.



CERTIFICATIONS

- AAR
- BS OHSAS 18001
- CFR 2011
- EN 45545
- ISO 14001
- ISO 9001



PORTFOLIO

SEAL TYPE	BRAKE	LOCOMOTIVE	SUBGRADE EQUIPMENT	BOGIE	CARRIAGE	STREET CAR
Accumulators				●		
Bellows		●		●	●	●
Brake Collars		●		●	●	●
Cassette Seals		●		●		
Check Valves	●	●			●	●
D-Jack Seals	●	●				
Damper Seals				●		
Diaphragms	●	●			●	●
Encoder	●			●		
Gaskets		●				
Hydraulic Seals		● ●	● ●			
Isolation Mounts		●	●	●	●	
O-rings	● ●	● ●	● ●		● ●	● ●
Plug & Seal		●				
Pneumatic Seals	●				●	
Profile Seals		●	●		●	●
PU Moldings				●		
Simmerring® Shaft Seals	●	●	●	●	●	●
Valve Components	●					
Valve Stem Seals		●				

● Freudenberg brand ● Dichtomatik brand

PROCESS INDUSTRY

CHALLENGES FOR SEALING SYSTEMS IN THE PROCESS INDUSTRY

In our everyday life, we take it for granted that food and beverages are free of germs and have an unadulterated taste. When we use detergents and body care products or take medications, we simply assume that we are holding a high-purity product in our hands. These standards, which are commonplace for us, must be guaranteed for a system manufacturer and operator in the process industry every

single day. Due to the many different and often unique features of the systems and processes in the pharmaceutical, food and chemical industries, the challenges for a sealing system in these areas are manifold. Freudenberg Sealing Technologies has risen to these challenges and developed appropriate sealing solutions that are innovative, functional, and durable.

CHALLENGES IN THE PHARMACEUTICAL INDUSTRY

- High temperatures and pressures
- Powdery media
- Chemical resistance to various educts and solvents
- Compliance with pharma-specific approvals such as USP Class VI and FDA
- Conformity according to Hygienic Design
- Aggressive CIP/SIP media



CHALLENGES IN THE FOOD & BEVERAGE INDUSTRY

- Prevention of flavor transfer
- Conformity according to Hygienic Design
- Temperature variations
- Media that contain grease
- Abrasion
- Aggressive CIP/SIP media
- Compliance with food-specific approvals, such as EG (Reg.) 1935/2004, EU (Reg.) 10/2011, FDA, NSF 51, GB 4806 and GB 9685



CHALLENGES IN THE CHEMICAL INDUSTRY

- Aggressive and toxic chemicals
- High pressures, temperatures and temperature peaks
- The use of solvents
- Compliance with emission values according to the TA Luft regulation





SEALING SOLUTIONS FOR THE PROCESS INDUSTRY

HYGIENIC USIT®

With the EHEDG certified Hygienic Usit®, contamination at the screw connection point can reliably be prevented in open and closed manufacturing processes with direct product contact. This completely replaces metal washers that are not food-compliant due to gap formation. The elastomer bead is available in three different approved materials: 70 EPDM 291, 75 Fluoroprene® XP 45 and 70 EPDM 253815. In addition, optimally matched screws and cap nuts are available thanks to a cooperation with HEINRICH KIPP WERK.



CLAMP SEALS

As ideal sealing element for flange connections in continuously operated systems, clamp seals from Freudenberg Sealing Technologies can be used in a wide range of applications within the process industry. They are “made in Europe” and enable a simple and at the same time reliably sealed pipe connection. One big advantage is the reusability after opening the joint. The portfolio includes three different materials that all comply to the industry-specific legal regulations: 70 EPDM 291, 75 Fluoroprene® XP 41 and 70 VMQ 117055.



O-RINGS

Especially for the demanding conditions and requirements of the process industry, Freudenberg Sealing Technologies offers O-rings for aseptic flange connections according to DIN 11864. Thanks to a dead space-free sealing they guarantee hygienic manufacturing processes. The available materials, 70 EPDM 291, 75 Fluoroprene® XP 41 and 70 VMQ 117055, comply with the industry-specific legal standards.



FREUDENBERG XPRESS®

CUSTOMIZED SEALS IN ORIGINAL FREUDENBERG QUALITY

Repair demands, small series, prototyping – Freudenberg Xpress® offers machined seals in the quality of series production using state-of-the-art production technologies.

The many production possibilities at Freudenberg Xpress®, such as CNC machining and welding, provide high flexibility and avoid costly and time intensive downtimes. Thanks to the worldwide network of local Freudenberg Xpress® service centers and production partners, our customers always have a local contact person at their side and fast deliveries are possible.

Due to the use of original Freudenberg materials and sealing profiles, the Freudenberg Xpress® products boast the same quality as in series production. This ensures not only high quality and safety, but also enables you to easily exchange Freudenberg seals in your plants.

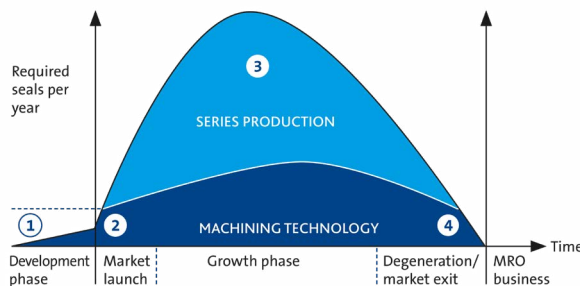
PRODUCT PORTFOLIO

The portfolio of Freudenberg Xpress® includes catalog parts, complex plastic parts, customized solutions as well as welded and cut-to-size products.

Machined seals are a particularly interesting alternative when the production of a series tool is 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. Freudenberg Xpress® also offers the right solution for other stages of the product lifecycle (see graphic on the right).

Thanks to state-of-the-art welding technologies, Freudenberg Xpress® can produce particularly large seal profiles of up to 20 meters. Extruded seal profiles produced from the original Freudenberg polyurethane materials form the basis for this.

STAGES OF A PRODUCT'S LIFECYCLE



- 1 Quick and cost effective Prototyping
- 2 Small quantities
- 3 High volume: Series production
- 4 MRO demands, "fire fighting"

YOUR BENEFITS AT A GLANCE

- Original Freudenberg profiles and materials like in series production
- Tailor-made sealing solutions
- Long service life thanks to unique material characteristics and state-of-the-art production processes
- Cost-effective small series production and prototyping
- High degree of consultancy expertise
- Fast deliveries for very urgent repair demands – if necessary and after previous consultation within 24 hours
- Rapid Prototyping



Explore our Virtual Tour through our Freudenberg Xpress® production site!



Guiding Element
made of Laminated Fabric



Elastomeric Wiper
with Aluminum Housing



Compact Piston Seal
made of NBR, PU and POM



SEGMENT-SPECIFIC SOLUTIONS

Freudenberg Xpress® provides high-quality machined seals for nearly every industry segment – from the heavy industry and the fluid technology to the process industry.

HEAVY INDUSTRY

Pressures up to 2,500 bar, aggressive media and many more – the heavy industry requires especially resistant and reliable sealing solutions. Freudenberg Xpress® is the right partner here. The portfolio includes ten product lines made from original Freudenberg materials and profiles. These are available as cut-to-size, precision-joined or endless versions. In order to allow individual diameter specifications for wipers, v-seal set packings and radial shaft seals, Freudenberg has developed a special joining method.

PROCESS INDUSTRY

The operating conditions in the process industry are very challenging. The used sealing products need to withstand aggressive cleaning and product media, high temperatures as well as extreme pressures. Additionally, they need to comply with industry- and country-specific legal regulations, such as those of the FDA or EU (Reg.) 1935/2004. Sealing solutions from Freudenberg Xpress® are tailored to these requirements and are thus suitable for use in the food, beverage, pharmaceutical and chemical industries. The portfolio includes original Freudenberg materials, such as the specially developed Fluoroprene® XP or 70 EPDM 291.



Merkel Radiamatic® RPM 41
made of NBR



Merkel V-packing set EK
made of NBR



Rapid Machined Simmerring
made of Fluoroprene® XP



O-ring
made of EPDM



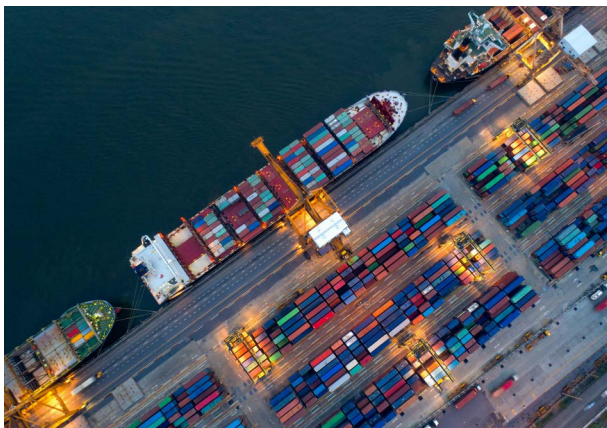
GLOBAL DISTRIBUTOR NETWORK

YOUR ADDRESS FOR OUTSTANDING SEALING TECHNOLOGY

With exclusive partnerships based on consistency, technological know-how and sound market experience, Freudenberg Sealing Technologies created a sustainable and long-term partnership with selected distributors over 70 years ago. Our partners have the same quality standards, are competent specialists and share the values of Freudenberg Sealing Technologies. Four fundamental pillars underpin this concept and offer unique benefits for customers and distributors.

1. Exclusivity in partnership

Quality before quantity. Freudenberg Sealing Technologies works worldwide with selected sales partners who live and share the same values.



2. Success through consistency

Due to the development of equal partnerships a unique range of value-added services for our customers could be created. Shared experience and competencies perfect the cooperation between Freudenberg Sealing Technologies and its partners. This consistency pays off: Many partners from the very beginning are still part of the global distributor network today.

3. Shared know-how

As the world market leader, Freudenberg Sealing Technologies has been setting standards in sealing technology and consulting for decades. With the logistical know-how and the market expertise in sales of our partners, we can offer a high-performance product and service program that represents a unique selling point in the market.

4. Reliable quality

Our sales partners and customers can rely on the Freudenberg premium quality – at all times and in every respect. Reliability and durability of sealing technology guarantee high customer satisfaction.



Find a distributor close to you!

FIRST CLASS IN SEALING QUALITY AND SELECTION OF PARTNERS

HIGHLY QUALIFIED DISTRIBUTORS WHO GIVE CONFIDENCE

Freudenberg-NOK Sealing Technologies distribution concept aims to provide customers with the ideal expert partners to build a strong relationship. Our goal is to create a sustainable and profitable long-term partnership that allows for growth. We offer you the ability to grow as a distributor by utilizing our network's unique resources and advantages. You can find step-by-step levels with clearly structured criteria in the following partnership categories:

PREFERRED PARTNER

Preferred Partners have access to the global Freudenberg Sealing Technologies product range – consisting of our premium Freudenberg brand solutions and Dichtomatik brand products that meet common industry standards. Preferred Partners combine outstanding engineering and technical material know-how with the highest level of sealing expertise. Thanks to qualified training and certified sealing knowledge – acquired, among other things, at the FST Academy – they also offer the best possible service. Partnerships and processes developed over decades ensure short response times for sealing needs in the OEM and MRO sectors.

APPROVED PARTNER

Approved Partners are granted access to the Freudenberg Sealing Technologies product portfolio – consisting of premium Freudenberg brand solutions and Dichtomatik brand products that meet common industry standards. These partners are characterized by a high level of technical sealing expertise based on qualified training and certified sealing knowledge – acquired, among other things, at the FST Academy. Freudenberg Approved Partners are reliable partners in every region.

DICHTOMATIK DISTRIBUTOR

Freudenberg Sealing Technologies' Dichtomatik distributor specialize in our complementary Dichtomatik brand. In addition, they offer a high level of technical expertise in this area, coupled with reliable logistics, high availability, and secure supply chain management.

INDUSTRIAL DISTRIBUTOR

Industrial Distributors specialize in customer-specific solutions using both Premium Freudenberg seals and materials as well as our Dichtomatik brand seals that meet common industry standards. They offer local customer services, provide secure supply chains, specifically for maintenance or repair parts and assist with the procurement of spare parts, and connect customers to technical support.

YOUR BENEFITS

A strong brand

Convincing: the world's leading supplier of sealing solutions with holistic two-product-brand approach



Reliable logistics

Dependable: reliable, fast delivery performance thanks to modern logistics and local warehouses



Customer-oriented organization

Partnership-based: active support in consulting and analysis of sealing applications – even on-site



First class quality

Unbeatable: lasting and durable "Freudenberg" product quality for total customer satisfaction



Technical competence

Unrivaled: with our innovative and market-leading seal technology we are always one step ahead



Rapid prototyping

Flexible: our Freudenberg Xpress® service offers fast and economic prototyping without the time and cost intensive tooling production



Extensive service portfolio

Supportive: Multiple services provide additional assistance in the daily handling of our seals



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