



SEALING SOLUTIONS FOR THE PROCESS INDUSTRY

FREUDENBERG
SEALING TECHNOLOGIES

 **FREUDENBERG**
INNOVATING TOGETHER

INDUSTRY KNOW-HOW AND SPECIFIC SEALING SOLUTIONS THROUGH MARKET SEGMENT ORIENTATION

SOLUTIONS FOR THE FOOD INDUSTRY

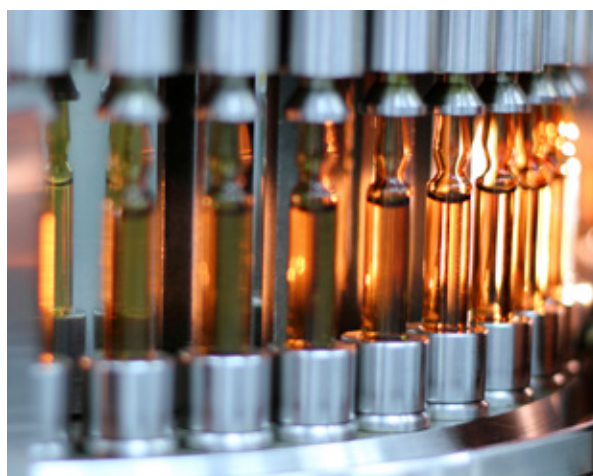
The food industry includes a wide variety of applications with distinct requirements. The diversity of products and the use of numerous flavors can have varying effects on sealing materials. Furthermore, equipment is increasingly operated at full capacity, which requires more frequent product changes and cleaning cycles. Freudenberg offers materials that prevent flavor transfer and reduce the impact of frequent product changes.

SOLUTIONS FOR THE PHARMACEUTICAL INDUSTRY

In the pharmaceutical industry, sealing solutions are in demand that avoid process contaminants and even catalytic changes, over and above the excellent media resistance that they offer. The requirements for seal robustness are very high, e.g. in tablet production where powders are processed.

SOLUTIONS FOR THE CHEMICAL INDUSTRY

Processes in the chemical industry involve especially high temperatures and pressures that conventional seals cannot withstand. Aggressive process media such as ammonia, acids and bases can dissolve seals. Freudenberg has developed extremely resistant materials to meet these requirements.



HIGH-PERFORMANCE MATERIALS FOR DEMANDING APPLICATIONS

Demanding applications in the process industry require specific know-how and well-founded materials expertise. Apart from a broad product range, Freudenberg also offers specific materials with international approvals such as FDA, USP Class VI, NSF and regulation (EU) 1935/2004, as well as seals based on hygienic design.

EPDM

Due to its outstanding resistance to water and water-based systems, EPDM is one of the most frequently used sealing materials. In addition to black materials, Freudenberg also offers a white, mineral-filled version.

FLUOROPRENE® XP

This highly-fluorinated premium material is considered to be universally applicable due to its resistance to water- and fat-based media. Fluoroprene materials prevent flavor transfer and are suited to CIP/SIP processes and steam sterilization.

FKM

Our various compounding processes for FKM enable precise formulations for the required media resistance and low-temperature flexibility. The temperature range from $-25\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$ ($-13\text{ }^{\circ}\text{F}$ to $+392\text{ }^{\circ}\text{F}$) allows for use in demanding applications.

SIMRIZ®

Simriz perfluoroelastomers are suited to extreme operating conditions due to their unique media and temperature resistance. As a result, they are mainly used in the chemical industry. Aside from various carbon black-filled materials, Freudenberg also offers a white, mineral-filled Simriz.

NBR AND HNBR

NBR and HNBR materials are distinguished by their good low-temperature flexibility and their low abrasion. As a result, they are suited for applications involving a high input of energy into the seal.

VMQ

Silicone rubber (VMQ) has been traditionally used in applications where especially pure materials are required. Furthermore, it can be used in a wide range of temperatures.

PTFE

PTFE materials are impressive for their extremely high resistance in nearly all media and their capacity for individual adaptations. The flat gasket material ePTFE (expanded PTFE) is distinguished by its unique flexibility and purity.



OUR SEALING TECHNOLOGY FOR THE PROCESS INDUSTRY



PRECISION MOLDED PARTS

A competent partner is indispensable if individual sealing solutions, so-called high precision molded parts, are needed. Freudenberg designs and manufactures seals based on customer specifications. Whether the items are bottle head seals, butterfly valve seals based on DIN, ISO or customized, or profile seals for separators, there are hardly any limits to our development work. Multifaceted test facilities and the most advanced simulations and analytical processes allow verified evidence of functionality before the regular production of newly-designed equipment and components is launched.



O-RINGS

Thanks to their multifaceted materials and configurations, O-rings can be used nearly universally and guarantee an outstanding sealing function in static as well as dynamic applications. O-rings are available in all measurements, in accordance with DIN ISO 3601, as well as in numerous special sizes starting with external diameters of 500 mm.



FEP/PFA ENCAPSULATED O-RINGS

Encapsulated O-rings combine the elasticity of an elastomer with the high media resistance of a fluorinated thermoplast. The FKM or VMQ core provides elastic contact pressure, and the encasement made of FEP or PFA simultaneously offers extraordinary media and temperature resistance. As a result, encapsulated O-rings are ideal for applications with demanding cleaning conditions or severe thermal loads (-60 °C to +200 °C / -76 °F to +392 °F). Thanks to their existing approvals, encapsulated O-rings can also be used in the food and pharmaceutical industries.



FLAT GASKETS

Typically in the chemical industry, flat gaskets play an important role in the static sealing of flange connections. To meet the needs of the processing industry, Freudenberg has developed a variety of flat gaskets with extremely high media resistance. Freudenberg's stamped flat gaskets made of FA, PTFE and ePTFE cover all processing industry applications thanks to their sector-specific approvals.



DIAPHRAGMS

Diaphragms provide a flexible separation of component spaces with different volumes. They are available in a wide variety of materials and offer numerous options for use in actuators, fittings, hydraulic accumulators, pumps, valves and regulators. Individual adjustments using fabric reinforcement, metal inserts or film facings ensure optimal media resistance and functional reliability. Freudenberg offers diaphragms with a diameter of 5 to 1,000 mm as well as larger dimensions upon request.



HYGIENIC USIT®

The Hygienic Usit guarantees dead-space-free sealing of screw heads and permits equipment cleaning with CIP, SIP and WIP processes. The sealing bead material 70 EPDM 291 meets the requirements of the FDA and Regulation (EU) 1935/2004 and complies with 3-A® Sanitary Standards, USDA, NSF 51 and USP Class VI. In combination with a standard hexagon screw with flange according to DIN EN 1665, the Hygienic Usit prevents the formation of bacteria. But the surface properties are not compliant to Hygienic Design standards.

A better variant is the combination with a hexagon screw with flange and increased requirements concerning the surface. A perfect cleanability is only secured with the electropolished screws from NovoNox. The combination of seal, hexagonal screw with flange and flange cap nut prevents microbial contamination under the screw head. Outside the area in contact with the product, the Hygienic Usit ensures the ability to safely clean the internal and external equipment areas and prevents corrosion.



SEALS FOR PIPE CONNECTIONS

Clamp seals and other seals for pipe connections are used to link pipes in accordance with DIN 11851 and DIN 32676. Pipe connections with an aseptic O-ring in accordance with DIN 11864 also comply with hygienic design standards. Seals for pipe connections are used when equipment must be opened on a regular basis. Other products to seal pipe connections, such as rectangular formats, are available on request.



STUFFING BOX PACKINGS

Thanks to their multifaceted types of stranding, such as 2-plait, 3-plait or 4-plait, and numerous variations in materials, such as graphite varieties, Freudenberg stuffing box packings can be used in an extremely wide variety of applications. The Valtec product variant, made of a PTFE-impregnated nonwoven, is especially impressive for its very low leakage rates and its long service life.



PTFE U-PACKINGS

PTFE U-packings are used in rotating and translatory motion applications, such as ball valves and fittings. Numerous PTFE designs and product variations, as the integration of a metal spring, offer substantial resistance to media and high pressure and also offer the opportunity for hygienic applications. Special materials, including elastomers, and the use of stainless steel springs are options for especially hygienic applications.



PTFE ROTARY SHAFT SEALS

Industry-specific developments make Freudenberg rotary shaft seals the ideal choice for applications in the food and pharmaceutical industries. Their features include resistance to media and innovative seal lip designs that eliminate dead space in accordance with hygienic design, and material variations like those in the pictured Simmerring® Radiamatic® HTS II. Thanks to the principle of modular design, the right solution can be found for every application.



PTFE BELLOWS

PTFE bellows reliably seal moving machine parts against environmental influences and process media. Freudenberg offers a number of modified PTFE blends for individual applications:

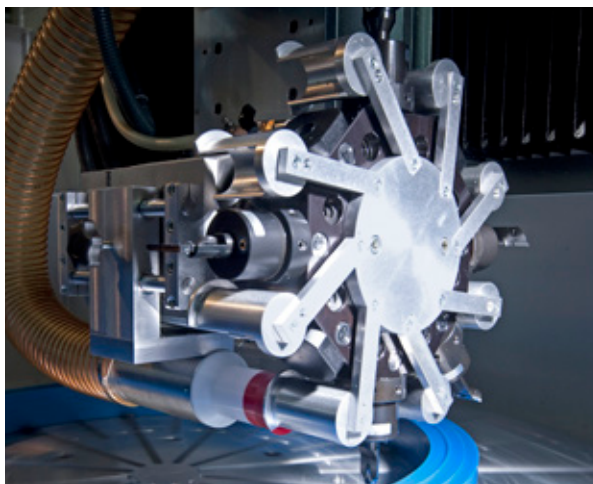
- pure for applications in the chemical industry,
- conductive to avoid static charging, and
- glass- or carbon-fiber-reinforced for greater toughness.



V-SEAL SET PACKINGS

V-seal set packings are multi-element sealing kits consisting of a pressure ring, V-seals and a back-up ring. PTFE and PTFE-carbon compounds are distinguished by their outstanding temperature resistance. For applications involving high pressures, variations made of polyethylene, PEEK, the high-performance PTFE graphite compound Univerdit and PTFE-impregnated Nomex fabric, are used.

SECTOR-SPECIFIC SERVICES FOR THE PROCESS INDUSTRY



MARKET-SPECIFIC TECHNOLOGIES AND SERVICES

Our innovative, sector-specific technologies, materials and services offer added value that goes beyond sealing functionality. The possibility of using FEA (Finite Element Analysis) in combination with our custom developed material formulations leads to innovative product designs.

RFN SURFACE TREATMENT

“Reduced Friction by Nanotechnology” creates surfaces with low coefficients of friction and adhesion forces, to protect against wear for maximum working lives.

FREUDENBERG XPRESS

The Freudenberg Xpress Service delivers machined seals, customized seals and formed parts for prototypes, short-term needs and small production runs made from original materials, with approvals within the shortest possible time.



CIP-/SIP TEST PLANT

Individualized sealing tests in CIP/SIP media, steam and hot water sterilization or in coolants and pressure feeds for a perfect adjustment of seals to the respective process.

“SAFE” LASER MARKING

The highest degree of transparency and retraceability by applying a forgery-proof code with laser technology without any affects on the material properties.

FREUDENBERG

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