



AEROSPACE

FREUDENBERG  
SEALING TECHNOLOGIES

 **FREUDENBERG**  
INNOVATING TOGETHER

## GLOBAL REACH WITH LOCAL PERCEPTION

Safety, performance, and innovation in the aerospace industry rely on high-quality, dependable seals in a variety of applications. That's why aerospace leaders count on Freudenberg Sealing Technologies for reliable solutions in nearly every application, everywhere in the world.

Our company offers a broad product range and a global support network of experts to be your single-source sealing and service provider. We drive innovation with research, development, and production teams integrated across our global operations to meet the demands of worldwide and local markets.

## 01 GLOBAL QUALITY

## 02 EXTREME CONDITIONS

## 03 SAFETY AND RELIABILITY

## 04 SUSTAINABILITY

## SOARING INTO THE FUTURE

The continuous quest for faster, safer, more efficient air travel demands ongoing innovation. The industry continues to strive for improved performance, reduced environmental impact, operational efficiency, and reductions in weight and cost. Aircraft are being designed to fly higher in the atmosphere at colder temperatures, and aircraft engines will operate at higher temperatures with leaner and more environmentally friendly fuel mixtures.

Considering fuel efficiency, reduced emissions, and lightweight aircraft, emerging trends and structural changes are constant. In fact, the International Air Transport Association's (IATA)

goal of zero carbon emissions is slated to be in effect by the year 2050, thus requiring many airports to start using alternate fuels such as kerosene and biofuel. As the aviation industry evolves, efforts to produce aircraft with innovative materials and leading technology solutions will continue to advance.

Freudenberg Sealing Technologies is leading the aerospace industry into the future. With our global expertise in aerospace materials and solutions customized to nearly any application, we can support the trends of tomorrow and help you soar into the future.



### OUR QR-CODE CONNECTIONS:

Learn more about our products. Download any QR app on your smartphone and scan the QR code.

01

# GLOBAL QUALITY

Whether you need a custom-engineered solution or standard parts, our global network will rapidly supply dependable, high-quality parts to wherever you need them. We have the expertise, innovation, equipment, and materials to meet your demands and match your exact specifications.

02

## EXTREME CONDITIONS

03

## SAFETY AND RELIABILITY

04

## SUSTAINABILITY



### TECHNOLOGICAL CHALLENGES IN AEROSPACE

The story of aerospace technology is integral to the ongoing evolution of aviation. In our pursuit of traveling further, faster, and higher than was previously possible, the industry must continually find ways around severe environmental barriers. Extreme heat and cold, radical temperature fluctuation, pressure, moisture, ozone, and UV radiation are just a few of the hostile elements challenging aircraft design.

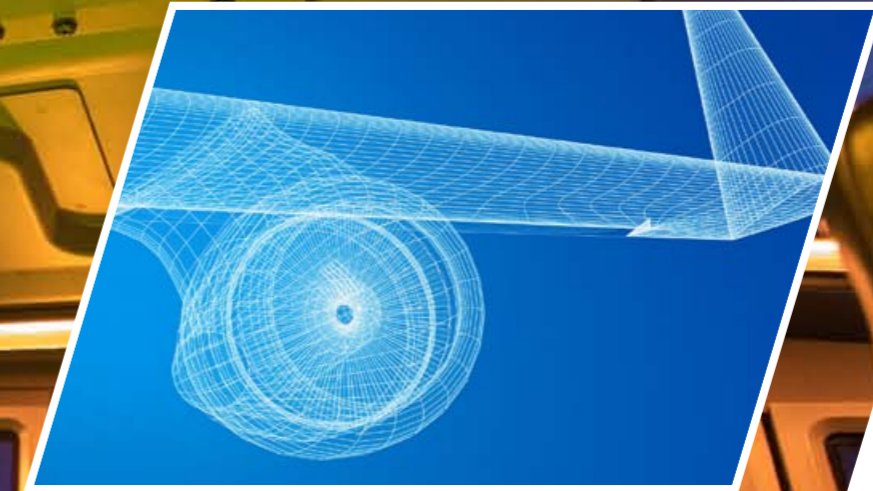
In addition, the systems themselves include man-made compromises to design integrity with corrosive oils, fuels, de-icing fluids, and other hydrocarbon and synthetic solvents that add to the test of every successful flight.

In today's business climate, economic considerations are also becoming crucial—therefore, getting the job done within budgetary restrictions, weight/size limits, and maintenance timetables is essential.

With so many critical aerospace applications dependent on the technology that seals them, and with the safety and sustainability of air travel hanging in the balance, it is clear that there can be no second guessing the quality and integrity of your sealing systems.

# Design and testing...

Our design expertise is equaled only by our extensive testing procedures that ensure the highest quality of our products. Our detailed CAD design renderings and Finite Element Analysis (FEA) computer models are verified through actual product testing.



## TEST CAPABILITIES

- Fluid compatibility
- Temperature
- Air aging
- Continuous and cyclic pressure
- Static/dynamic
- Durability, fire, and environmental
- Physical properties (tensile, elongation, modulus, compression set, etc.)

## CERTIFICATIONS

- EN ISO 9001
- EN ISO 14001
- BS OHSAS 18001
- AS9100
- AS9120
- Nadcap
- A2LA Laboratory
- EN9100
- Qualifas EASE

01 GLOBAL QUALITY

02

# EXTREME CONDITIONS

Maintaining peak performance under extraordinary operating conditions is a must for the aerospace industry. From extreme temperatures to aggressive media, we have an innovative solution to meet the demands of any application.

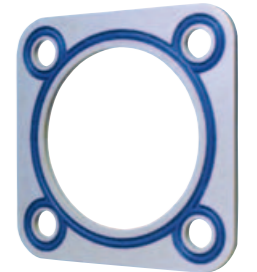
03 SAFETY AND RELIABILITY

04 SUSTAINABILITY



## FIRE-RESISTANT/ FIREPROOF SEALING

Designed for durability and long life, our fire-resistant/fireproof sealing solutions are tested to the extremes. Our seals act as a fireproof barrier, if required, to hold back a fire of 1093 °C (2000 °F), providing up to 15 minutes for necessary corrective action.



## PLATE SEALS

Cost-effective and versatile, plate seals are available in application-specific materials to withstand extreme temperatures in aircraft engines and fuel systems. Our innovative designs provide an alternative sealing methodology that improves assembly time and lowers overall cost.

# Extreme is not enough...

**When the temperature goes down** Freudenberg Sealing Technologies steps up. Our compound mixtures can be tailored to meet the temperature demands of any application. So, whether in the heat of the Sahara or the bitter cold of Antarctica, our customers trust that we have them covered.



## O-RINGS

Our O-rings provide reliable performance over a wide range of temperatures in all aircraft applications, including engines, wheels and brakes, flight controls, hydraulic actuators, and fuel controls. We offer elastomer materials available in standard AS568 and BS1806 sizes, as well as metric sizes.



## SIMMERRING OIL SEALS

With imperial and metric sizes for use in engines, gearboxes, flight controls, fuel controls, and wheels and brakes, we provide the widest selection of seals with a large choice of materials.



01 GLOBAL QUALITY

02 EXTREME CONDITIONS

# 03 SAFETY AND RELIABILITY

Because we know lives can depend on the integrity of our products, every new product has to undergo a zero-tolerance research and testing process. In other words—it will work the first time, every time.

04 SUSTAINABILITY



## SELF-FUSING SILICONE TAPE

Permanently bonded within 24 hours, this silicone tape forms an airtight, watertight seal around electrical wire harness connections. Due to unique no-adhesive technology, this allows for clean re-entry. In addition, our flame-retardant versions secure insulation to hot-air ducting.



## MATERIAL EXPERTISE

Our extensive history of materials expertise, paired with certified manufacturing processes, assure you of the safest and most effective sealing solutions. We offer more than 100 aerospace-specific compounds in conjunction with state-of-the-art FEA simulations and a variety of diagnostic test equipment to deliver fail-safe sealing.





# Safety first...

Exceed local safety standards by choosing the excellent sealing solutions from Freudenberg Sealing Technologies for your next project. We use the most advanced testing methods to deliver innovative materials, ensuring both safety and reliability, providing peace of mind to our customers.



## O-RINGS

With Six Sigma quality, we deliver O-rings with superior temperature and chemical resistance and offer a complete range of AMS-, MIL-, AS-, and NAS-approved materials including NBR, EPDM, silicone, fluorocarbon, fluorosilicone, and our proprietary SIMRIZ® perfluoroelastomer.



## DIAPHRAGMS

Our in-house application test facility allows us to design and test custom diaphragms. FEA-developed designs are attuned to customers' technical requirements to ensure precise functionality. Diaphragms are available with superior elastomer and thermoplastic polyurethane materials, custom-formulated high- and/or low-temperature compounds, and fabric reinforcement.



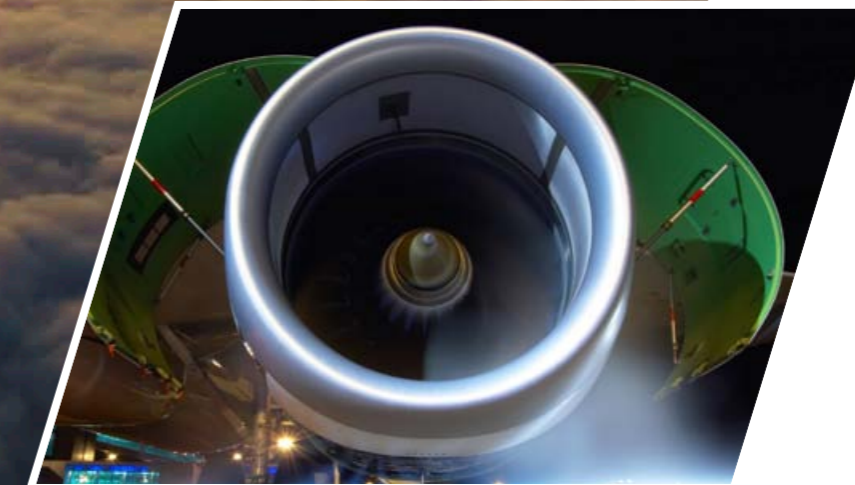
01 GLOBAL QUALITY

02 EXTREME CONDITIONS

03 SAFETY AND RELIABILITY

## 04 SUSTAINABILITY

We recognize the significance of preserving and protecting our natural resources. This is why we strive to breathe life into our products through new innovative approaches that reduce CO<sub>2</sub> emissions and support sustainability.



## RFN COATINGS

With Reduced Friction by Nanotechnology® (RFN) coatings, seal performance is maintained with no compromise to the physical properties of the elastomer. When you need a low coefficient of friction, lower torque and loading, media resistance, and flexibility down to -40°C (-40°F), look to RFN coatings.



## DUO FORSEALS

With our standard PTFE compound highly resistant to thermal influences, friction, wear, and aggressive media, Forseals are the ultimate design for any application. Duo Forseal U-packings are pressurized and feature metallic pretension springs, sealing both statically and dynamically at temperatures ranging from -200°C to 260°C.

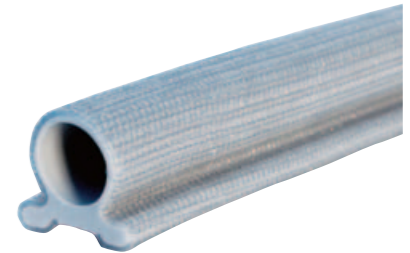
# Fuel efficiency...

Take control of fuel costs by achieving ultimate fuel efficiency. Our ingenious sealing solutions are capable of improving fuel efficiency as well as extending the life cycle of any application.



## PTFE SEALS

With dependable resistance to all fluids and media, these seals exceed the standard life cycle. PTFE seals also offer improved leakage control and optimized contact pressure, and they are designed for reduced friction.



## AERODYNAMIC SEALS

Innovative designs and materials provide comprehensive sealing for aircraft cabin doors, windows, hatches, and performance seals. By utilizing proprietary low-friction surface treatments and low-density materials, we contribute to the customer's goal of improved efficiency.

## 1 AIRCRAFT ENGINE SEALING

- Air inlet screens
- Elastomeric ducting and shrouds
- Electrical connector seals
- Electrical harness insulation
- Fire seals
- Flexible transfer tubes
- Fuel seals
- Gaskets
- Gearbox shaft seals
- Hydraulic seals
- Inlet and exhaust seals
- Lubrication seals
- Nacelle thrust-reverser seals
- O-rings
- Oil seals
- Plate seals
- Vane grommets

## 2 AIRFRAME SEALING

- Aerodynamic seals
- Door seals
- EMI seals
- Firewall seals
- Gaskets
- Hatch seals
- Interior and trim seals
- Window seals

## 3 LANDING GEAR, WHEEL AND BRAKE

- Actuator shaft seals
- Gearbox shaft seals
- Hydraulic seals
- O-rings
- Oil seals
- Wheel and brake seals

## 4 FLIGHT CONTROL SYSTEMS

- Gaskets
- Gearbox shaft seals
- Hydraulic seals
- O-rings
- Plate seals

## 5 MEDIA TRANSFER SEALING

- Air inlet screens
- DC generator inlet ducts
- Flexible couplings
- Fuel line shrouds
- Fuel seals
- Inlet plenum seals
- O-rings
- Transfer tubes
- Ventilation ducting








# AEROSPACE

Aircraft come in many different shapes and sizes—an important reason why our customers look to a sealing industry leader to meet the variety of their manufacturing demands. With one of the world's largest product ranges, expert engineering, and unmatched material development, Freudenberg Sealing Technologies is a global leader in innovation and quality in the aerospace industry. From engine seals and flight control systems to airframe and landing gear sealing, our customers trust that we have the ideal sealing solution for any application.

# AEROSPACE PORTFOLIO

## SEALING APPLICATION

		Aerodynamic seals	Air inlet screens	Cabin door seals	Control surface seals	DC generator inlet ducts	Diaphragms	Elastomeric inlet ducts	Elastomeric ducting and shrouds	Elastomeric gaskets	Electrical connector seals	EMI seals	Fire-resistant/high-temp seals	Firewall seals	Flexible couplings	Fuel line shrouds	Fuel seals	Hydraulic seals	Inlet, plenum, and exhaust seals	Loading hatch seals	Low-friction Simmerring seals	Nacelle seals	O-rings	Plate seals	PTFE seals	Self-fusing silicone tape	Thrust reverser seals	Transfer tubes	Vane grommets	Ventilation ducting	Window seals
	ENGINE	+	+				+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	FLIGHT CONTROLS						+		+	+							+		+		+	+	+	+		+					
	LANDING GEAR/WHEEL AND BRAKE								+	+							+		+		+	+	+								
	AIRFRAME	+		+	+	+	+	+	+	+	+	+	+		+	+		+	+				+		+		+		+	+	+
	MEDIA TRANSFER SEALING		+			+	+	+	+						+	+	+					+		+					+		

# PORTFOLIO

Our unrelenting drive for innovation, along with our extensive material knowledge and wide product range, allow us to offer an unmatched product portfolio for the aerospace industry.



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