

RAILWAY

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FREUDENBERG
SEALING TECHNOLOGIES

 **FREUDENBERG**
INNOVATING TOGETHER



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 TEMPERATURE

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 CO_2 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

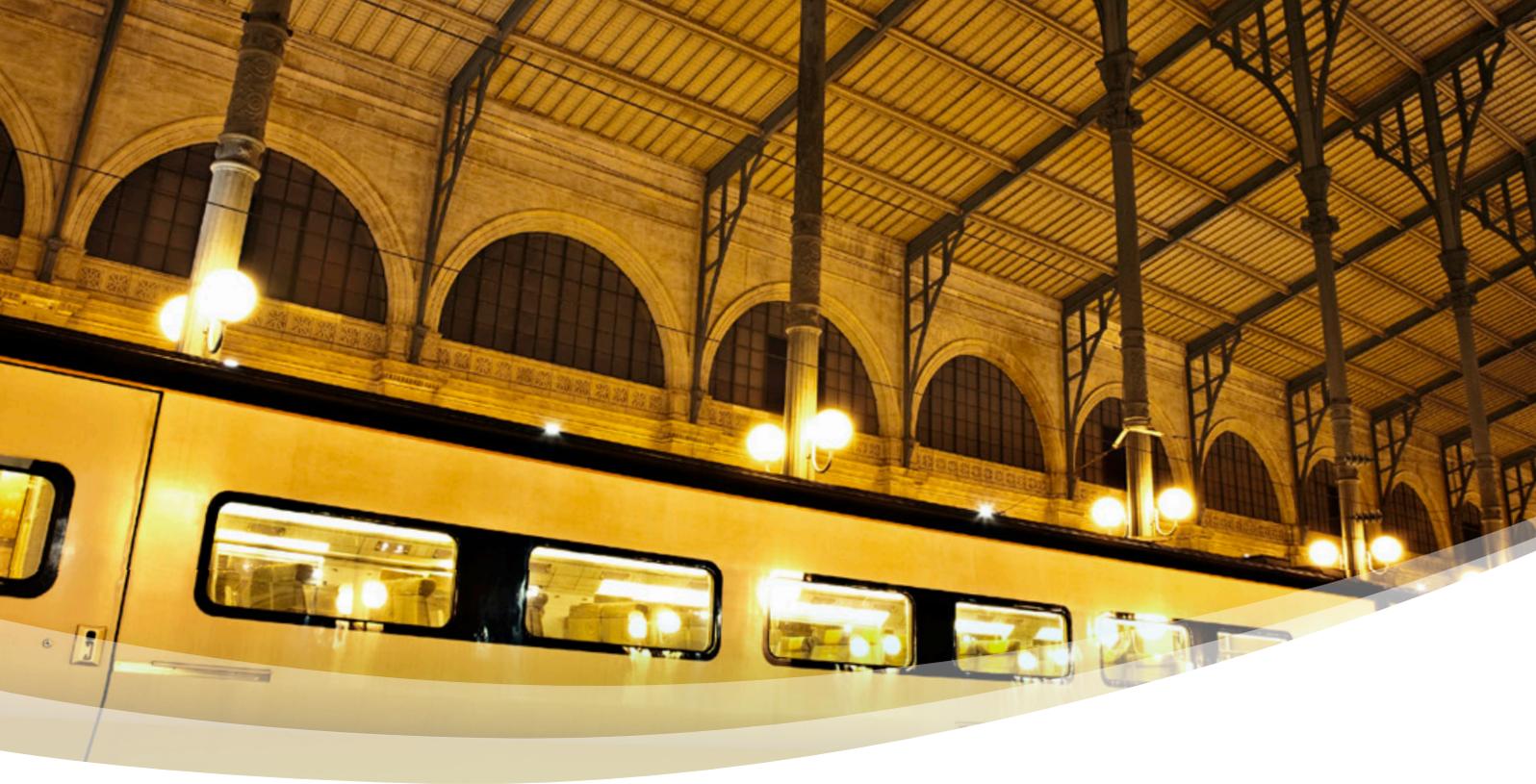
When stopping is the most critical thing to do, look to Freudenberg valve components for your brake system. Produced with the latest in advanced materials, our valve components are comprised of aluminum, stainless steel, brass, or plastic, coupled with high-performance elastomers.



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 fireproof 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. Simmerring shaft seals are resistant to harsh chemical environments and temperature extremes, and deliver exceptional durability over time.



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	+	+			+	+
Encoders	+			+		
Gaskets		+				
Hydraulic seals		+	+			
Isolation mounts		+	+	+	+	
K-Rings	+	+		+	+	+
O-Rings	+	+	+		+	+
Plug & Seal		+				
Pneumatic seals	+				+	
Profile seals		+	+		+	+
PU moldings				+		
Simmerring® shaft seals	+	+	+	+	+	+
Silicone tape		+				
Valve components	+					
Valve stem seals		+				

CERTIFICATIONS

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

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