



FREUDENBERG SEALING TECHNOLOGIES

Aerospace Division Overview

- Key Figures Freudenberg Group
- Portfolio – General Components
- Aerospace Seal Applications – Market Products
- Solutions for e-mobility Applications
- LC/CC Capabilities – General Overview

Key Figures for the Freudenberg Group



~€ 12.00 bn
Sales in 2024



~50,000
Employees



Global presence
in approx. 60
countries
worldwide



Highly diversified
Group of companies,
some companies with
>€ 1 bn in sales



5.0%
R&D ratio



€ 670 million
Operating profit

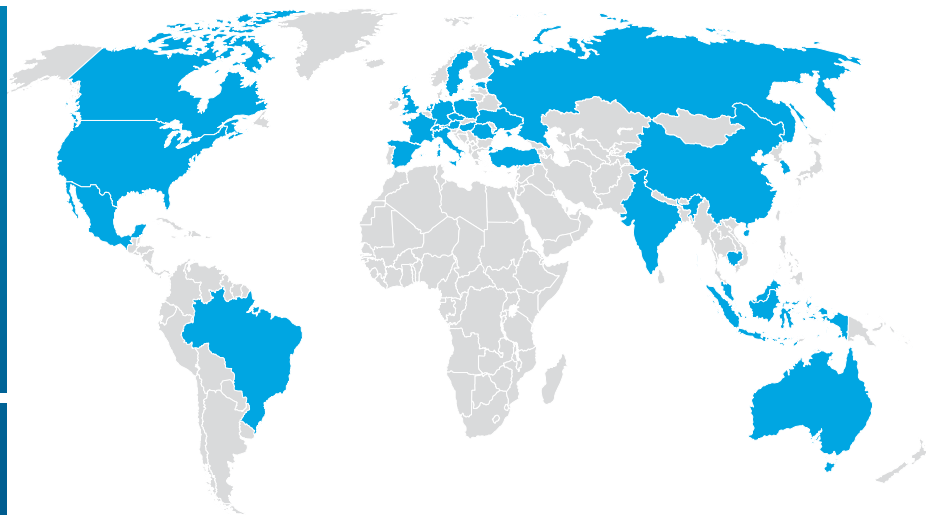


100%
Family owned



Founded by
Carl Johann
Freudenberg
in 1849

A Global Corporation Doing Business on a Regional Basis



FREUDENBERG-NOK SEALING TECHNOLOGIES

- Joint Venture with Nok Corp. (Japan)
- Headquartered in Plymouth, Michigan. (USA)
- More than 20 sites in North and South America.

FREUDENBERG SEALING TECHNOLOGIES

- Headquartered in Weinheim (Germany)
- More than 50 sites across Europe
- More than 20 sites in Asia/Australia

Portfolio

Components+



DIAvent®
Pressure
Management



Encoder



Conductive
Seals



EMI Shielding
2K Covers



3D Gap Pad
(Thermal
Interface)



Plug & Seal
with Sensor

Components



Static
Seal



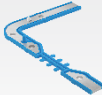
Dynamic
Seals



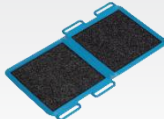
Plug & Seal



Accumulators



Gaskets



Seal on Gas
Diffusion Layer

Services



Testing



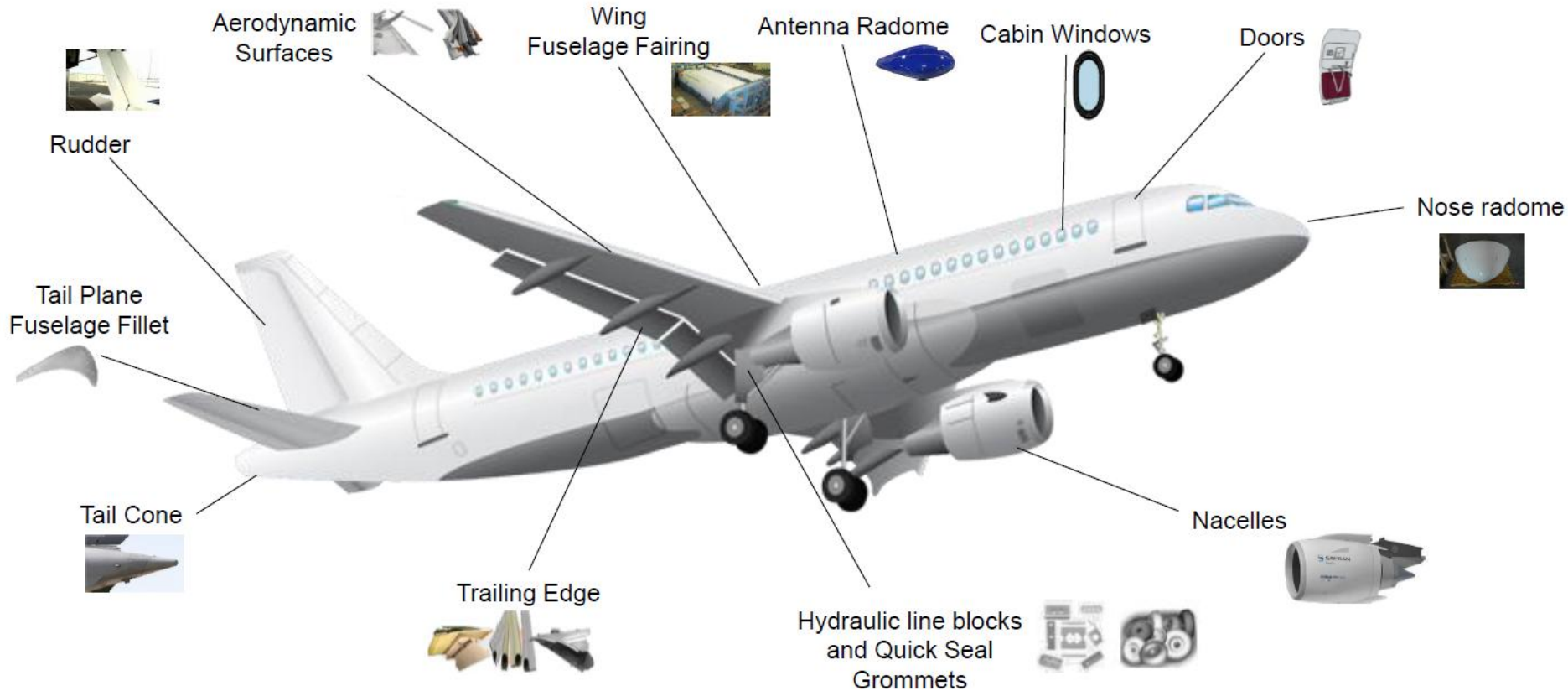
Simulation



Rapid Prototyping

Aerospace Seal Applications

Key Application Areas of Aerodynamic Seals in an Aircraft

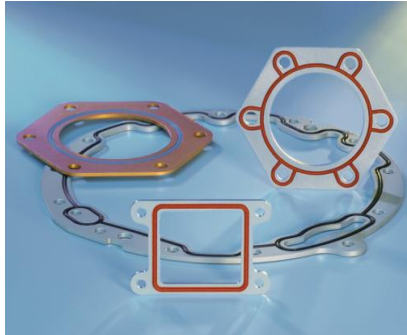


Aerospace Market – Products

O-rings



Plate Seals
and Gaskets



Oil Seals (Simmerring®)



Aerodynamic Airframe
Components



Fire Resistant /
High Temperature

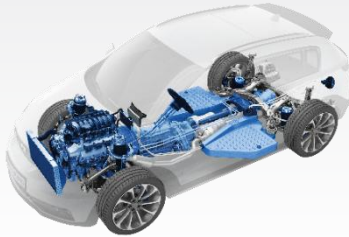


Diaphragms

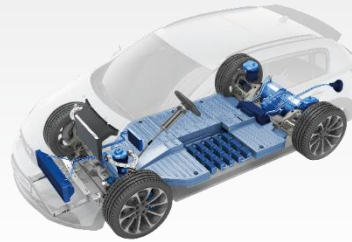


eMobility Components/Components+

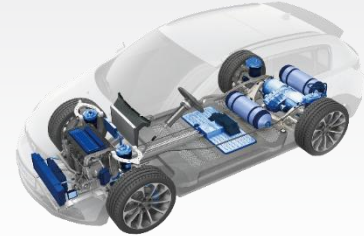
Plug-in hybrid



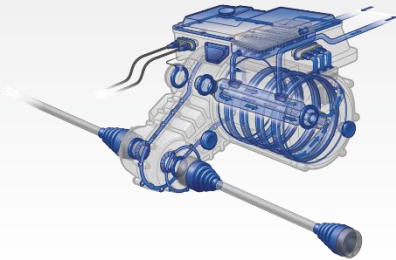
Battery-electric



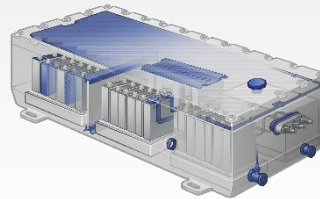
Fuel cell-electric



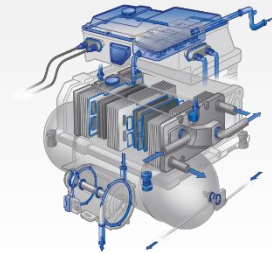
eMobility powertrain



Battery system



Fuel cell aggregate



Solutions for eMobility applications



We are shaping the future of mobility with know-how, high quality standards and innovative, forward-looking products. Less is often more – especially in terms of friction, weight, consumption and emissions.

Gaskets – eMobility app.

Elastomers compatible with multiple fluid combinations (coolant, oils, ATF, salt water) in a wide range of temperatures and other challenging conditions.

We offer industry-leading design and manufacturing expertise with a global network of production locations



Plug & Seal

VFDs generate shaft voltages that damage bearings through electrical erosion. Freudenberg developed a conductive nonwoven material that diverts these currents, preventing damage and extending system life



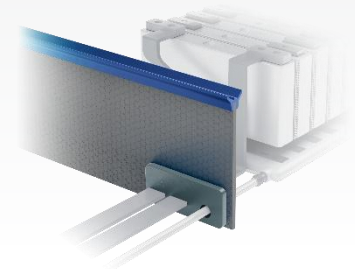
DIaVent®

Versatile pressure equalization element and problem solver for electromobility, ranging from bidirectional pressure equalization to emergency degassing during thermal runaway of a cell - to alternate venting of an oily environment.



Thermal Barrier

Innovative products and materials to optimize heat protection in electrically powered vehicles, consisting of special plastics or silicones, some of which are reinforced with fireproof fabric layers.



O-Ring Division

Industry Products: Santa Ana, California



- Established: 1975 (as ISC, acquired by FNGP 1998)
- Plant Size: 39,000 sq. ft.
- Total Employees: Over 170
- Certifications: AS9100, EN9100, Nadcap25, A2LA Lab EASE (European Aerospace Consortium), NSF
- 12,000 active part numbers, 5,000 tools,

Products Manufactured:

- O-Rings
- Molded shapes

Molding Technologies:

- Compression
- Injection

Compounds:

High quality standard and custom seals in:

- Simriz® Perfluoroelastomer
- Fluorocarbon
- EPDM
- Silicon / Fluorosilicone
- NBR / HNBR

Markets Served:

- Aerospace
- Energy
- Processing industry
- Oil & Gas
- Power Engines / Trans.
- and other industries

Fluid Power Industry

Industry Products: Troy, Ohio



- Founded in 1980's as PTFE seal producer
- Total Employees: Over 120
- Materials: PTFE (~70), PA (6), TPU (8), TPE (2)
- Certifications: ISO9001, ISO/TS 16949, ISO 14001, ISO 45001
- Services: Application Engineering



Manufacturing Processes:

Primary Processes

- Compression Molding
- Extrusion PTFE Rod
- Injection Molding
- Injection Metal Overmolding
- Precision Net Molding
- Post Curing

Markets Served:

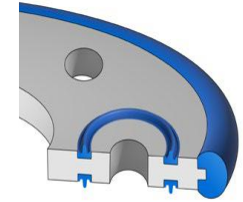
- Aerospace
- Automotive
- Industrial
- Agriculture
- Energy
- and other industries

PTFE Products:

- Banded Pistons
- Piston Banding Washers
- Pistons and Rod Seals
- Ball Valve Seals
- Internal Rotary Seals
- Machined Shapes
- and other industries

Precision Low Pressure Industry

Industry Products: Tillsonburg, Ontario, Canada



- Established: 1951, Greenfield in 1976, 60+ years
- Plant Size: 44,000 sq. ft.
- Total Employees: 130
- Certifications: AS9100 Rev C, ISO9001 for design, Nadcap Approved
- 1,200 active part numbers



Products Manufactured:

- Fire seals
- Airframe seals
- Protection products
- Media transfer
- Plate seals and gaskets

Molding Technologies:

- Injection molding
- Compression molding
- Extrusion

Performance

- Quality – 0.6ppm
- OTD – 98.6%

Markets Served:

- Aerospace
- Energy
- Off Road
- Automotive
- Appliance
- Other Industries

Often invisible – Always Essential



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