ABOUT FREUDENBERG PERFORMANCE MATERIALS

Freudenberg Performance Materials is a leading global manufacturer of innovative technical textiles. Our products are used in hundreds of applications across a broad range of market segments, including Apparel, Automotive, Construction, Energy, Building Interiors, Hygiene, Medical, Shoe and Leather goods as well as Specialties.
The company has 25 manufacturing sites in 14 countries and more than 3,700 employees. Freudenberg Performance Materials attaches great importance to social and ecological responsibility. For more information, please visit www.freudenberg-pm.com

As part of the global Freudenberg Group with 48,000 employees in more than 30 market segments, Freudenberg Performance Materials benefits from a unique network of expertise. For more information, please visit www.freudenberg.com

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GAS DIFFUSION LAYERS

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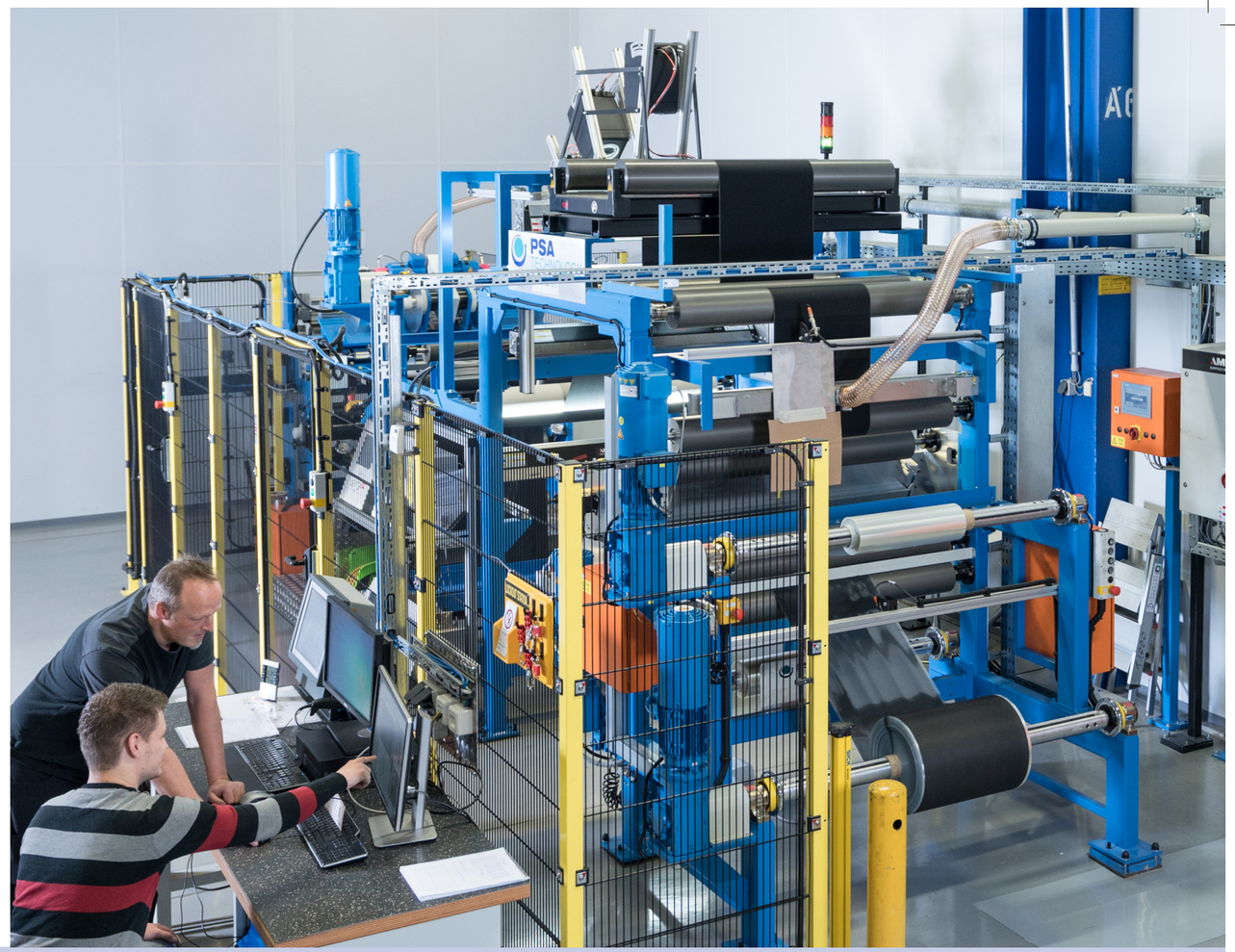
THE FLEXIBLE APPROACH FOR GAS DIFFUSION LAYERS.

Freudenberg produces a comprehensive range of **Gas Diffusion Layers** (GDL) designed to meet all operative conditions and requirements in **Hydrogen** (PEMFC) and **Direct Methanol Fuel Cells** (DMFC).

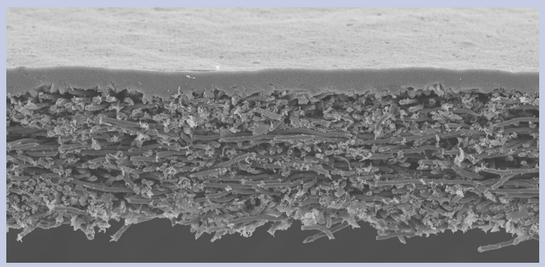
The Gas Diffusion Layers are manufactured using Freudenberg's proprietary nonwoven technology. This enables a high degree of design flexibility to meet the specific needs of our customers.

Based on fully industrialized GDL manufacturing lines and continuous investments in quality improvements and new GDL products, Freudenberg offers dedicated in-house production expertise and the capacity to meet current and future high volume demands.

The company will continue to supply top-quality products that will fully meet the demands of a commercialized fuel cell market.



THE ADVANTAGES OF FREUDENBERG'S GDLS



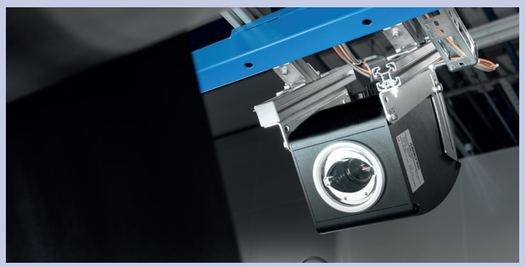
Electron microscope picture of a Freudenberg GDL

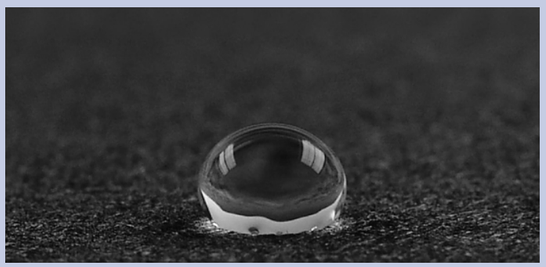
PERFORMANCE

Freudenberg offers specific GDLs to ensure consistent performance at the highest level in all PEMFC and DMFC applications. Smooth MPLs of uniform quality ensure that we are able to meet our customers' specific performance requirements for the intended application.

PROCESSING

Freudenberg's flexible GDLs are ideally suited for continuous post-treatment and roll-to-roll lamination. Our approach creates GDLs with outstanding crack and tear resistance. This enables them to withstand high tensile stresses without deforming or cracking. It also gives them excellent fatigue resistance to ensure safe functioning throughout the entire operational life of the fuel cell. They are also the preferred material for GDLs and MEAs with integrated seals.





Surface of a Freudenberg GDL

QUALITY

Freudenberg's production process is fully integrated, from the fibrous raw material to the final product, guaranteeing consistent quality and performance. To ensure that our products meet the highest quality requirements, statistical process controls, fully automated camera-assisted inspections, in-line and off-site measurements are all standard procedures. Depending on the needs of our customers, we also offer a range of special GDL characterization methods either on request or for joint development projects. Regular internal and customer audits confirm the quality of our GDLs.

RESEARCH & TECHNICAL SUPPORT

The rapid development of this technology means that it is essential to keep pace with changing requirements and applications. Our global GDL sales and technical team of highly qualified experts support our customers in selecting the best possible solutions for their specific GDL needs. Our extensive application research expertise plays a vital role in our ability to develop the next generation of GDLs. Our laboratories are equipped with most modern equipment, which has been specially developed to produce and characterize GDL materials. We also routinely apply statistical analysis, design of experiments and simulations to support dedicated customer development programs.