ELASTOMERIC SEALS FOR GAS DIFFUSION LAYERS

Gas Diffusion Layers (GDL) play a number of important roles in a fuel cell, including reactant transport, water removal, and heat conduction.

The elastomeric seal on a GDL is compressed between the bipolar plates in the fuel cell. The elastomer prevents leakage and cross-over while effectively compensating for tolerances of the adjacent components and any thermal expansion/distortion. The molded bead profile has designable contact pressure and reaction forces.

GDL and seal materials developed by Freudenberg meet all requirements of the fuel cell environment and lifetime operation. For low temperature PEMFC/DMFC applications we offer improved-lifetime polyolefin elastomer with superior hydrolysis resistance.

PEMFC/DMFC fuel cells using our materials feature in applications including: automotive drive trains and auxiliary power units, stationary and combined heat/power applications, stacks for off-grid/grid connected, and recreational vehicles.

Full service in-house engineering design team and network of locations available to support your fuel cell programs worldwide.

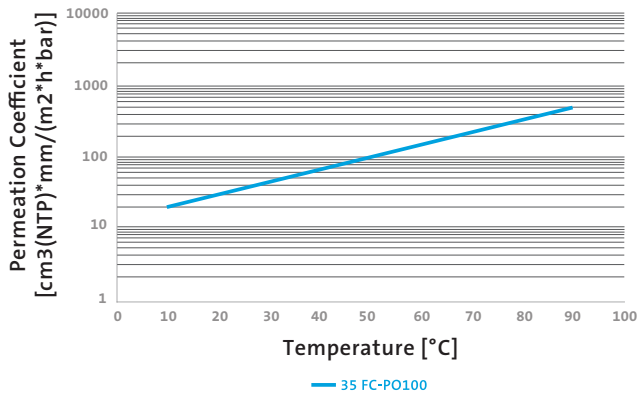
VALUES FOR THE CUSTOMER

We design and manufacture GDL layers with integrated elastomeric sealing and performance features for fuel cell applications.

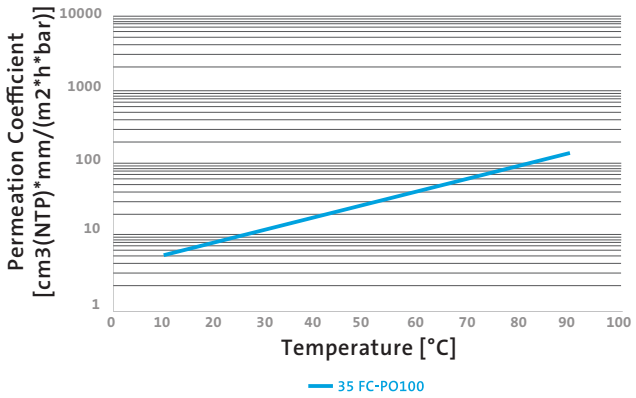
- Experience with automated series production of seals on bipolar plates since 2016
- Elastomers compatible with many nonwoven GDLs including the wide range of Freudenberg-manufactured GDL materials
- Polyolefin Elastomer with low permeation, high adhesion, and enhanced compression set to meet the durability and performance requirements of the system
- Elastomeric seals integration increases ease of handling, assembly robustness, and durability
- Three dimensional seal pattern to uniformly distribute the linear load and prevent leakage of coolant and reactant gases
- Custom designed and precision-molded seal profiles channel the flow of gases and heat in the cell
- Accurate thickness distribution combined with low durometer compound for greater compensation of manufacturing tolerances in the stack

	35 FC-PO 100
Material	Polyolefin Elastomer
Hardness (DIN 53505)	35 ± 5 Shore A
Temperature Range (°C)	- 40 ... 120
Tensile Strength (MPa ISO 37)	2
Compression Set in % (measured in air)	< 20 120° C / 25 % comp. 24 h (ISO 815) < 35 150° C / 25 % comp. 70 h (ISO 815)
Compression Set in % in 2.5 M methanol solution pH 2	< 45 90° C / 25 % comp. 1000 h (ISO 815)

Hydrogen Permeation Behavior of Fuel Cell Stack Seal Materials



Oxygen Permeation Behavior of Fuel Cell Stack Seal Materials



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