

## Humidifiers

High performance fumatech® humidifiers  
for fuel cell application

[www.fumatech.de](http://www.fumatech.de)

  
**fumatech**  
functional membranes for fuel cells  


FuMA-Tech – the company for functional membranes and plant technology – is one of the leading manufacturer of ion exchange membranes for fuel cell application.

The humidifier concept of the FUMATECH is based on membranes with high efficiency water transfer rate. Humidifiers are available as flat membrane sheets and hollow fiber modules with different sizes. The modules have a low pressure drop and high heat transmission. Furthermore they are easy in assembling, handling and operation.

## Humidifier Modules for Fuel Cells

The state-of-the-art technologies for humidification of PEM fuel cells are mainly related to the direct injection of water into the gas stream or to the humidification of a gas stream by flowing of the air along a wetted membrane.

The performance of the PEM fuel cell is decisively dependent on the humidity of the electrolyte membrane and the humidifier plays an important role in moisturizing the electrolyte membrane.

The FUMATECH membrane humidifiers are capable of improving the humidification efficiency while lowering the pressure loss and are adaptable as passive type to be power free and to be volumetrically optimized.

Instead of the expensive fluorinated materials the FUMATECH membrane humidifiers concept relies on non fluorinated membranes with excellent heat and moisture exchange rates.

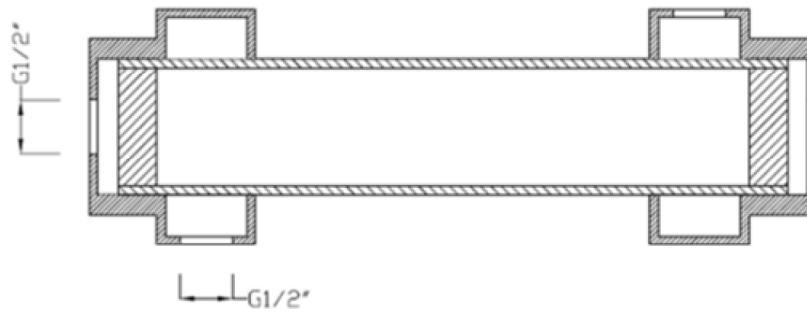
- Applicable for automotive and stationary PEM fuel cell
- Non fluorinated membrane
- Compactly and low weight
- Excellent heat and moisture exchange rate
- Low pressure drop < 20 mbar at 100 NL/min
- Designable in various shapes
- Flow configuration counter / co-current
- Maximum operating temperature 100 °C
- Minimum operating temperature 0 °C
- Housing material ABS
- Potting material PU

The fumatech<sup>®</sup> MH humidifier modules are especially developed for application in fuel cell systems. Dry and pre-heated gas flows through the hollow fiber bundles and gets humidified by adsorbing the water of the moisture interface of the hollow fiber membrane. Both flow configuration co-current and counter-current can be processed with these modules.

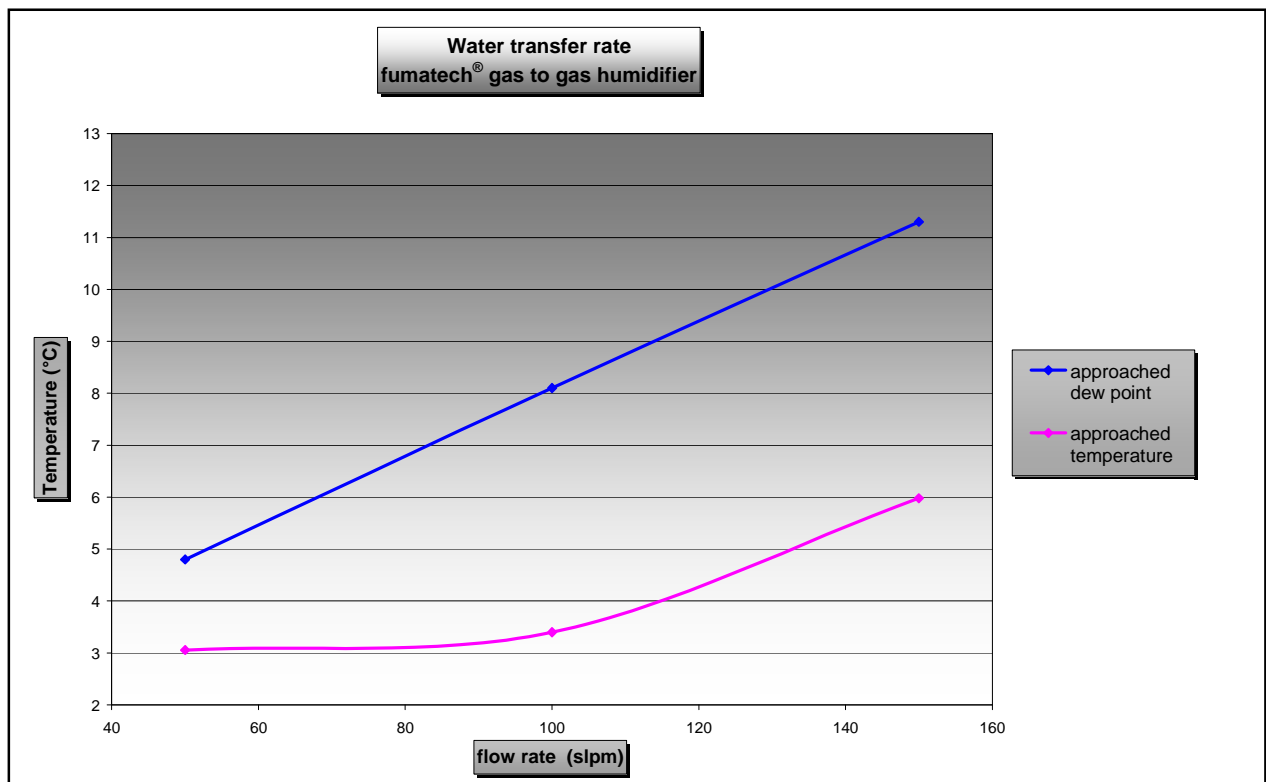
## General Specifications for fumatech<sup>®</sup> MH Humidifier Modules

fumatech <sup>®</sup>	Effective Length [mm]	Inner Diameter [mm]	Packing Density [%]	Effective Membrane Area [m <sup>2</sup> ]
MH-01	175	38	50	0,361
MH-03	235	38	50	0,484
MH-05	285	55	50	1,230
MH-10	285	70	50	1,993

The fumatech<sup>®</sup> MH humidifier can be connected with flexible tubes or pipes. The housing has ½" internal screw thread on all connections.



## Gas to Gas performance of fumatech<sup>®</sup> MH-G01



## Humidifier Membranes for Fuel Cells and Moistening Applications

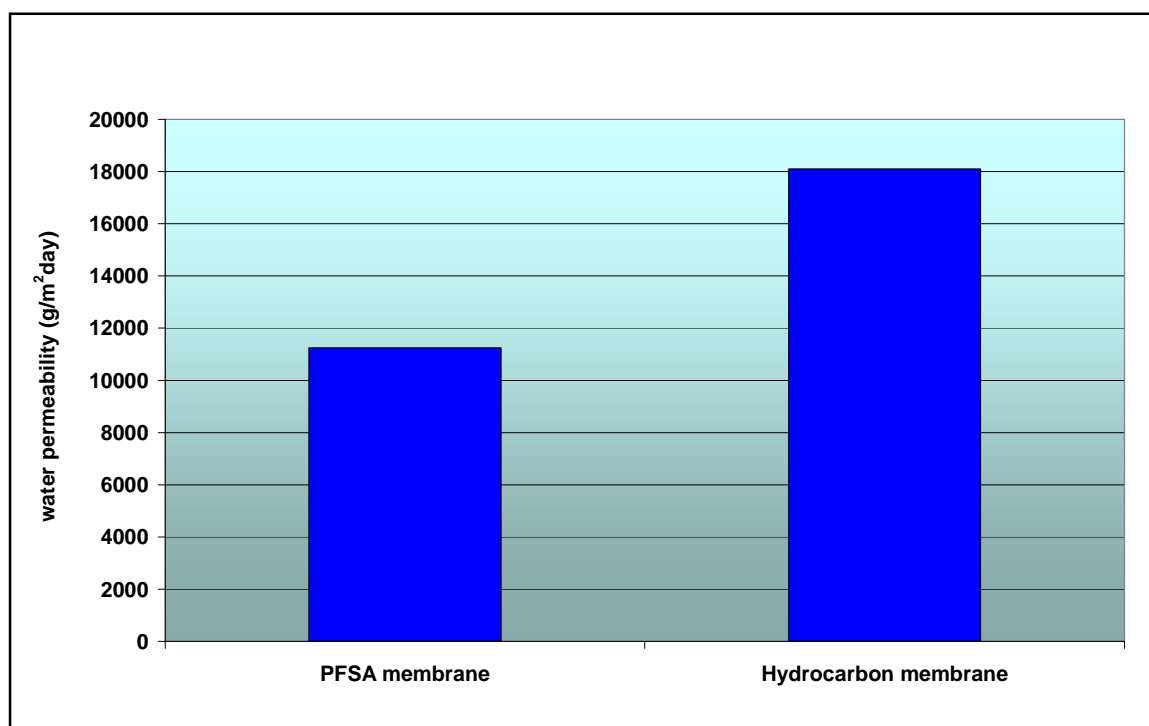
FUMATECH also produces flat membranes for water transfer applications, either made from perfluorinated sulfonic acid or from hydrocarbon polymers. The hydrocarbon polymers are optimised for very high water transfer rates in applications for fuel cells and house moistening.

The hydrocarbon membranes are available in different thicknesses and equivalent weights and can be offered as plain films and with reinforcement.

Key properties and features of the hydrocarbon based polymers are:

- High thermal and chemical resistance
- High water transport rates
- Lower in cost than PFSA

### Comparison of the water permeability between PFSA and Hydrocarbon based membrane



#### For further information:

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