

fumasep® FBM

General

The fumasep® FBM Bipolar Membrane consists of an anion exchange layer and a cation exchange layer manufactured using a multilayer-coating production technology.

This composite membrane is mechanically reinforced with woven PEEK. In the intermediate layer between anion exchange layer (AEM) and cation exchange layer (CEM) the water is catalytically split to OH⁻ and H⁺-ions when potential difference of approximately 0.8 V between the ionic layers is reached.

Membranes are identified by membrane type and identification number (Lot.-Number). Please refer to this type and identification number in case of queries.

Delivery

The membrane is the brown foil supplied in wet form (0.5 – 1.5 wt% NaCl solution). Do not let the membrane dry out since micro-cracks may likely occur during shrinkage.

Handling and Storage

Keep membrane package closed / sealed when unused. The package should not be exposed to direct sun light and should be stored in a well-ventilated place at temperatures between 15 – 25 °C. Unpack membrane only for direct use and process it immediately after opening. Store, handle and process the membrane in a clean and dust-free area. Use only new and sharp knives or blades, when cutting the membrane. Always wear protective gloves when handling the membrane. To assure safe handling prevent contact with skin and eyes. Apply sufficient room ventilation and avoid inhalation close to the membrane (use fume hood). Handle with care, be sure not to puncture, crease or scratch the membrane, otherwise leaks will occur. All surfaces which may get into contact with the membrane during inspection, storage, pretreatment and mounting must be free of sharp edges or angles.

Storage for short and medium time scale (hours up to several days) may be done in containers in 0.5 – 1.5 wt% NaCl solution or comparable neutral pH electrolytes. When storing the membrane for an extended time it is absolutely necessary to continuously flush the membrane sheets with DI water or NaCl solution to avoid biological fouling. Additional biozide can be used with a supporting purpose.

Pretreatment

The membrane is supplied in wet form and is ready to use, however some remaining additives / solvents can be present in the product, which can be easily removed by soaking in DI water or NaCl solution. If additional cleaning is required rinse the membrane in either the application solution or DI water according to the application requirement. Assembling is possible in wet form only. Do not let the membrane dry out since micro-cracks may likely occur during shrinkage.

The membrane is not stable in presence chlorine (Cl₂). If you have any concerns about storage, chemical stability, and pretreatment please feel free to contact us for further information.

Please pay attention that the membrane surface is not contaminated with surface active agents.

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Physical and chemical data of fumasep® FBM

fumasep®	unit	FBM
membrane type		bipolar
appearance ^{a)}		brown
backing foil		none
reinforcement		PK
counter ion		Na (CEM layer) / Cl (AEM layer)
delivery form		wet in NaCl solution
thickness (dry)	µm	110 – 160
water splitting voltage at 100 mA cm ⁻² ^{b)}	V	< 1.2
water splitting efficiency at 100 mA cm ⁻² ^{b)}	%	> 98
maximum operation temperature	°C	40
Version ^{c)}	2.2	Valid from June 19 th 2021

a) the colour of the product may vary slightly. The surface of the membrane may be structured (spots and grooves) due to interlayer composition and membrane post-treatment. This does not affect basic performance properties of the membrane.

b) in 0.5 M NaCl solution and 0.25 M Na₂SO₄ electrode rinse solution at 25 °C

c) Changes without prior notices may apply.

Note: The product is not certified for drinking water applications. The data are not measured directly on the item supplied. The data sheet does not release the customer of the necessity of a goods inwards control procedure. All information included in this data sheet is based on tests and data believed to be reliable. The data do not imply any warranty or performance guarantee. It is the user's responsibility to examine performance, suitability and durability of the product for the intended purpose. FUMATECH BWT GmbH does not assume any liability for patent infringement resulting from the use of this product. fumasep® is a trademark of company FUMATECH BWT GmbH.

Hereby, it is certified that all results of the measured item comply with the margins of the internal specification defined in the technical datasheet. All measurements and data recording are conducted in accordance with standardized procedures following the ISO 9001 certification.

Using of membrane

High attention must be given to the correct polarity when the membrane is assembled!

The membrane should be operated under forward bias conditions which may cause blistering. The CEM must be directed towards the cathode, the AEM must be directed towards the anode. Therefore, the cation side that faces cathode is marked with '**cathode side**'. If the membrane is used in the wrong direction even for short term, the interim layer may degrade (blistering), and the monolayers may delaminate. The same can happen when the membrane is operated at correct polarity excessively high current density above 100 mA/cm².

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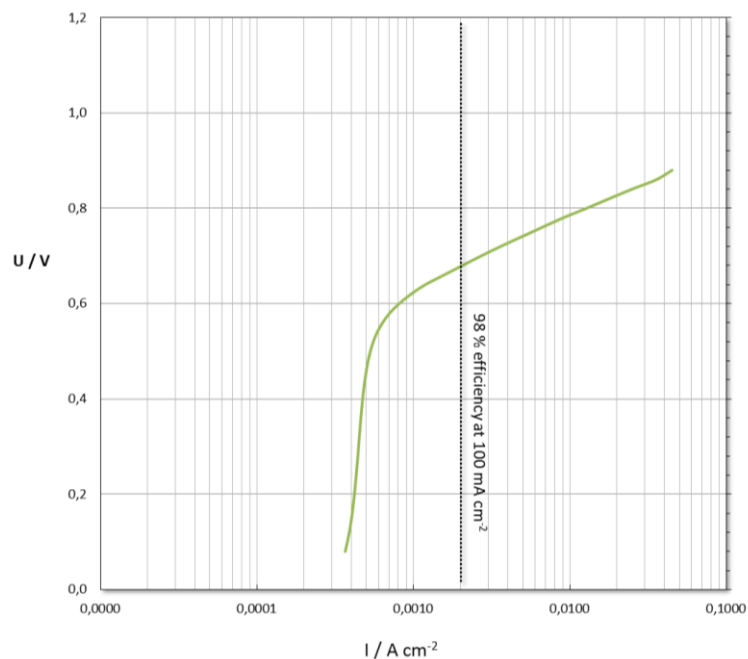
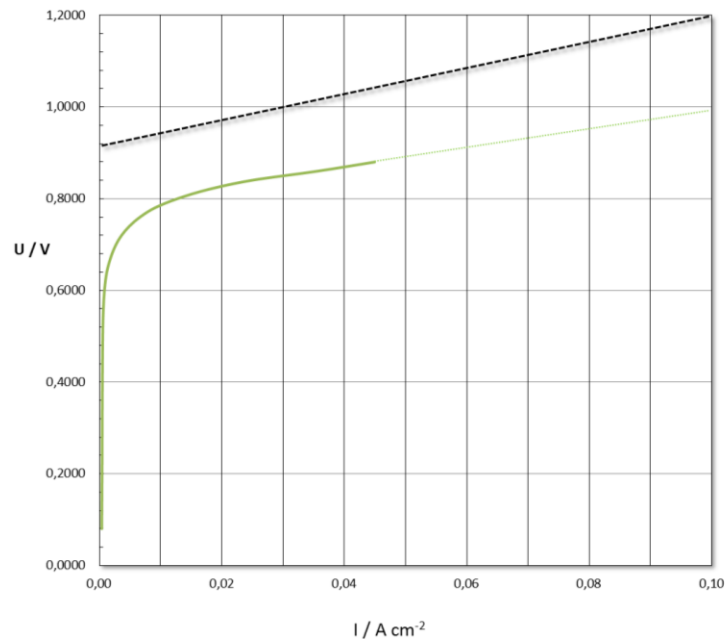
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Technical Data Sheet - fumasep® FBM

Current – Voltage Characteristics: fumasep® FBM

4-chamber set-up:	cathode – Na ₂ SO ₄ – CEM – NaCl – FBM – NaCl – CEM – Na ₂ SO ₄ solution – anode
4-probe measurement:	Haber-Luggin capillary (3 M KCl) with Ag / AgCl reference electrodes
CEM:	Cation exchange membrane FKB
electrolyte loop:	0.5 M NaCl solution / recombined
electrode loop:	0.25 M Na ₂ SO ₄ / recombined
temperature:	25 °C
	fixed scan rate, $\Delta U = 20 \text{ mV}$, $\Delta t = 20 \text{ s}$



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