

fumasep® FBM

General

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

This composite membrane is chemically stable and 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 delivered in wet form.

Handling and Storage

Keep membrane package closed / sealed when unused. 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. Handle with care, be sure not to puncture, crease or scratch the membrane, otherwise leaks will occur. All surfaces in contact with the membrane during handling, inspection, storage and mounting must be smooth and free of sharp projections.

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

The membrane should be stored in 1 M NaCl-solution and placed in a closed container. For storage over a longer time period, it is recommended using of a sealed container that has inside afore said electrolyte with additional Natrium Sulfite (Na₂SO₃) in concentration 1-3% wt% to avoid biological fouling.

Pretreatment

The membrane is delivered in wet form and ready to use. An additional cleaning is required by rinsing the membrane either in the application solution or a NaCl solution 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.

Physical and chemical data

fumasep®		FBM
membrane type		bipolar
appearance / colour ^{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
dimensional swelling H ₂ O at T = 25 °C ^{b)}	%	0
water splitting voltage at 100 mA cm ⁻² ^{c)}	V	< 1.2
water splitting efficiency at 100 mA cm ⁻² ^{c)}	%	> 98
maximum operation temperature	°C	40

a) the color and the surface of the product may vary slightly.

b) reference membrane as received

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

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.

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 right polarity when using the membranes!

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 position 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, but at excessively high current density above 100 mA/cm².

Current – Voltage Characteristics: fumasep® FBM

4-chamber set-up: cathode – Na₂SO₄ – CEM – NaCl – FBM – NaCl – CEM – Na₂SO₄ 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 Na₂SO₄ / recombined

temperature: 25 °C

fixed scan rate, $\Delta U = 20 \text{ mV}$, $\Delta t = 20 \text{ s}$

