

# fumasep® FAA-3-PK-130

## General

*Membrane type:* Anion-exchange membrane – PK-reinforced – thickness 130  $\mu\text{m}$ , with high proton blocking capability, high selectivity, very high mechanical stability, and high stability in acidic and caustic environment.

*Application:* Alkaline fuel cells without KOH or at low KOH concentration and related application.

*Stability range:* pH = 1 – 14 at T = 25 – 50 °C.

Membranes are identified by membrane type and identification number (Lot No). Please refer to this type and identification number in case of queries.

## Delivery

The membrane is the brown foil, delivered in between paper layer. Carefully separate the membrane from the paper layers. The membrane is delivered in dry form.

## Handling and Storage

Keep membrane package closed / sealed when unused. 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. 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.

Dry form: Storage for long time scale (> 12 month) may be done in dry state (sealed container). Wet form: Storage for short and medium time scale (hours up to several weeks) may be done in unsealed containers in 0.5 – 1.5 wt% NaCl solution or comparable neutral pH electrolytes. For storage over a longer time period a sealed container is recommended using afore said electrolyte with additional sodium sulfite ( $\text{Na}_2\text{SO}_3$ ) in concentration 1 – 3 wt% to avoid biological fouling.

## Pretreatment

The membrane is delivered in bromide form and dry form. Depending on application and cell design, assembling is possible in dry (without pretreatment) or wet form. Before assembling in wet form put the membrane sample between stabilizing meshes / spacers (in order to avoid curling) in NaCl solution - e.g. 0.5 M NaCl solution at T = 25 °C for 72 hrs exchanging the solution several times. Do not let the membrane dry out since micro-cracks may likely occur during shrinkage.

As for electrolysis application, conversion to  $\text{OH}^-$  by 0.5 M KOH at room temperature over period of 12 – 20 hrs is recommended.

If you have any concerns about storage, chemical stability, pretreatment or before proceeding, please feel free to contact us for further information.

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**Physical and chemical data of fumasep® FAA-3-PK-130**

fumasep®	unit	FAA-3-PK-130
membrane type		anion exchange membrane
appearance		trans-illuminant, but not fully transparent / dark yellow to brown
backing foil		none
reinforcement		PK
counter ion		bromide (Br)
delivery form		dry
thickness (dry)	µm	115 – 145
ion exchange capacity (as chloride form, based on membrane incl. reinforcement layer)	meq g <sup>-1</sup>	0.7 – 0.9
specific conductivity in Cl <sup>-</sup> form <sup>a)</sup>	mS cm <sup>-1</sup>	> 1.5
area resistance in Cl <sup>-</sup> form <sup>a)</sup>	Ω cm <sup>2</sup>	< 9.7
selectivity 0.1 / 0.5 mol/kg KCl at T = 25 °C <sup>b)</sup>	%	> 95
uptake in H <sub>2</sub> O at T = 25 °C <sup>c)</sup>	wt %	< 14
dimensional swelling in H <sub>2</sub> O at T = 25 °C <sup>d)</sup>	%	0
Young's modulus at 23 °C / 50 % r.h. <sup>e)</sup>	MPa	> 1000
tensile strength at 23 °C / 50 % r.h. <sup>e)</sup>	MPa	> 70
elongation at break at 23 °C / 50 % r.h. <sup>e)</sup>	%	> 35
proton transfer rate <sup>f)</sup>	nmol min <sup>-1</sup> cm <sup>-2</sup>	< 1000
bubble point test in water at T = 25 °C	bar	> 3
Version <sup>g)</sup>	2.1	Valid from August 20 <sup>th</sup> 2020

a) in Cl<sup>-</sup> form in 0.5 M NaCl @ T = 25 °C, measured in standard measuring cell (through-plane)

b) determined from membrane potential measurement in a concentration cell

c) in Br<sup>-</sup> form, membrane as received stored in water for 24 hrs, reference membrane dried over P<sub>2</sub>O<sub>5</sub> *in vacuo*

d) in Br<sup>-</sup> form, membrane as received stored in water for 24 hrs, reference membrane as received

e) in Br<sup>-</sup> dry form, membrane as received, determined by stress-strain measurement at T = 25 °C and 50 % r.h., DIN EN 527-1

f) determined from pH potential measurement in a concentration cell 0.1 M HCl / 0.1 M KCl @ T = 25 °C

g) 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.