

fumapem[®] F-14100

General

Membrane type: Fluorinated cation-exchange membrane - non-reinforced - thickness 100 µm, with low resistance, high mechanical stability, and high stability in acidic environment.

Application: DMFC, electrolysis, Redox-Flow Battery, e.g. Vanadium-Redox-Flow Battery (VRB), using aqueous acidic conditions. Membrane is not stable under alkaline conditions.

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 colourless, transparent foil, delivered on a backing foil (colourless rigid PET foil). Pull off carefully the membrane from the backing foil. For DMFC application the membrane must be activated before use.

Handling

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.

Pretreatment (activation)

The membrane is delivered in H-form and dry form.

DMFC: For optimum performance and lowest resistance it is necessary to pretreat the membrane according to the following prescription: Put the membrane sample in an aqueous 10 wt% HNO₃ solution or in 5 vol % H₂SO₄ solution at minimum T = 80 °C for at least 12 h. After rinsing with demineralized water (pH ~ 7) the membrane is ready for use (activated). Membranes will expand and contract based on moisture content.

VRF battery: The membrane does not need any pretreatment and is ready for use. Please assemble the membrane in dry form.

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

Technical Data Sheet - fumapem® F-14100

Physical and chemical data of fumapem® F-14100

fumapem®		F-14100
membrane type		cation exchange membrane
appearance / colour		transparent, colourless
backing foil		PET foil
reinforcement		none
counter ion		H-form
delivery form		dry
thickness (dry)	µm	100 – 120
IEC (ion exchange capacity)	meq g ⁻¹	0.6 – 0.8
area resistance in H ₂ O at T = 25 °C in H-form ^{a)}	Ω cm ²	0.2 – 0.3
conductivity in H ₂ O at T = 25 °C in H-form ^{a)}	mS cm ⁻¹	60 – 70
selectivity 0.1 / 0.5 mol/kg KCl at T = 25 °C ^{b)}	%	> 96
uptake in H ₂ O at T = 25 °C in H-form ^{c)}	wt %	15 - 25
dimensional swelling in H ₂ O at T = 25 °C in H-form ^{d)}	%	4 – 6
Young's modulus at 23 °C / 50 % r.h. ^{e)}	MPa	250 – 400
yield strength at 23 °C / 50 % r.h. ^{e)}	MPa	10 – 20
tensile strength at 23 °C / 50 % r.h. ^{e)}	MPa	20 – 40
elongation at break at 23 °C / 50 % r.h. ^{d)}	%	> 300
bubble point test in water at T = 25 °C	bar	> 4
pH stability range	pH	0 - 10

a) measured in two-electrode cell (through-plane), sample activated in 10 % H₂SO₄, T = 80 °C, 24 hrs.

b) determined from membrane potential measurement in a concentration cell.

c) reference membrane dried over P₂O₅ *in vacuo*, sample activated in 10 % H₂SO₄, T = 80 °C, 24 hrs before measurement.

d) reference membrane dried at ambient conditions (25 °C, 50 % r.h.), sample activated in 10 % H₂SO₄, T = 80 °C, 24 hrs before measurement.

e) determined by stress-strain measurement at T = 25°C and 50 % r.h., according to DIN EN 527-1, sample activated in 10 % H₂SO₄, T = 80 °C, 24 hrs before measurement.

Please note: The data are not measured directly on the item supplied.
Date: August 2016

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