AEMION+ ® REINFORCED MEMBRANES FOR WATER ELECTROLYSIS

Thickness and Reinforcement Properties

Membrane Type	Typical Thickness (µm)	IEC[1] (meq/g)	Reinforcement
AF3-HWC9-70-X	70 - 75 nominal	2.1 - 2.6	Woven PEEK

Physical Properties[2]	MD	TD	Test Method
Tensile Strength, MPa	40 - 70	40 - 70	ASTM 638
Young's Modulus, MPa	600 - 850	600 - 850	ASTM 638
Elongation to break, %	> 15	> 15	ASTM 638
Hydrolytic Properties			
Water Uptake, %			
to water soaked, 22 °C	< 15		ASTM D570
to water soaked, 80 °C	< 15		
Linear Expansion, %			
to water soaked, 22 °C	< 3		ASTM D570
to water soaked, 80 °C	< 3		
Z-Expansion, %			
to water soaked, 22 °C	< 5		ASTM D570
to water soaked, 80 °C	< 7		
Electrochemical Properties			
Though-plane Cl^- Conductivity, $mS \cdot cm^{-1}$	> 5		Internal[3]
Hydrogen permeability, $N\mu L \cdot cm^{-2} \cdot min^{-1} \cdot bar^{-1}$	< 3.2		Internal[4]
Chemical Stability			
Recommended Operating Condition	1 M KOH, 70 °C		Internal[5]
Other Properties			
Maximum Processing Temperature	150 °C		Internal[6]
Polymer Tg	> 300 °C		ASTM E1131/ISO 11358
Counter-ions as produced	I^-/Cl^-		

Notes

1. Polymer IEC in the hydroxide (OH^-) counter-ion form.
2. Measured at 22 °C fully hydrated
3. Treated in 1M NaCl for 24 hours, then in DI H2O for 6 hours to ensure complete hydration. Testing conducted fully submerged in DI H2O at room temperature.
4. Not a standard test. Hydrogen permeability is measured electrochemically in internal testing condition for reference only and is not necessarily representative of customer conditions. It is recommended to verify permeability in individual systems once received.
5. Measured ex-situ by determining steady-state mechanical strength, conductivity, & IEC at specified temperature and regularly exchanged KOH electrolyte.
6. Determined by thermogravimetric analysis (TGA) at 2 °C/min in as-produced form. Polymer can be rendered stable above 200 °C, please contact Ionomr if higher temperature conditions are desired

These are prototype materials only intended to be used for development activities and not intended for production items. Product information is to be used as a guide only, not a specification & is subject to change at any time.

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AEMION+ ® IONOMERS: DRY RESIN

Ionomer Type	IEC[1] (meq/g)	Conductivity Cl^- (mS/cm)	Water Uptake[2] OH^- (%)	Water Uptake[2] Cl^-(%)
AP3-HNN9-00-X	2.1 - 2.6	4 - 9	20 - 50	10 - 15

Notes

1. IEC in the hydroxide (OH^-) counter-ion form, calculated by NMR. Recommend silver nitrate for measurement by titration.
2. Approximate swelling properties when cast into membrane form at 25 - 50 µm, at 80°C.

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Related Documents

APN-AEM-1003	Instructions on pre-treatment and activation of membranes, complete MEAs, or ionomer containing electrodes prior to use.
APN-AEM-1005	Instructions on solubility and processing of ionomer solutions.

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