IONOMR INNOVATIONS

IONOMR PRODUCT DATA SHEET

Membrane: AF3N-HWC9-75-X

Ionomer: AP3-HNN9-00-X & AP3-HNN0-00-X

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Document ID: APN-AEM-1024-B

AEMION® REINFORCED MEMBRANES FOR WATER ELECTROLYSIS

Thickness and Reinforcement Properties

Membrane Type	Typical Thickness (µm)	IEC[1] (meq/g)	Reinforcement
AF3N-HWC9-75-X	75 ± 5	2.1 - 2.6	Woven PEEK
Physical Properties[2]	**MD**	**TD**	**Test Method**
Tensile Strength, MPa	50 - 60	50 - 60	ASTM 638
Young's Modulus, MPa	600 - 900	600 - 900	ASTM 638
Elongation at break, %	> 20	> 20	ASTM 638
Hydrolytic Properties[3]			
Water Uptake, %			
to water soaked, 22 °C		< 20	ASTM D570
to water soaked, 80 °C		< 20	
Linear Expansion, %			
to water soaked, 22 °C		< 3	ASTM D570
to water soaked, 80 °C		< 3	
Z-Expansion, %			
to water soaked, 22 °C		< 15	ASTM D570
to water soaked, 80 °C		< 15	
Electrochemical Properties			
Through-plane Cl^- Conductivity, $mS \cdot cm^{-1}$		> 4	Internal[4]
Hydrogen permeability, $N\mu L \cdot cm^{-2} \cdot min^{-1} \cdot bar^{-1}$		< 3.6	Internal[5]
Chemical Stability			
Recommended Operating Condition		1 M KOH, 70 °C	Internal[6]
Other Properties			
Maximum Processing Temperature		180 °C	Internal[7]
Polymer Tg		> 300 °C	ASTM E1131/ISO 11358
Counter-ions as produced		NO_3^- (nitrate)	

Notes

1. Polymer IEC in the hydroxide (OH^-) counter-ion form.
2. Measured at 22 °C fully hydrated.
3. Measured in native ionic form.
4. Treated in 1 M NaCl for 24 hours, then in DI H_2O for 6 hours to ensure complete hydration. Testing conducted fully submerged in DI H_2O at room temperature.
5. 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.
6. Measured ex-situ by determining steady-state mechanical strength, conductivity, & IEC at specified temperature and regularly exchanged KOH electrolyte.
7. 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.

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AEMION® IONOMER: DRY RESIN

Part Number	IEC (meq/g)	Conductivity Cl^- (mS/cm)	Water Uptake[3] OH^- form (%)	Water Uptake[3] NO_3^- form (%)	Recommended for
AP3-HNN9-00-X	2.1 - 2.6[1]	4 - 7	20 - 30	5 - 15	Anode
AP3-HNN0-00-X	0.1[2]	N/A	< 2	N/A	Cathode

Notes

1. Polymer IEC in the hydroxide (OH^-) counter-ion form, calculated by ^1H NMR.
2. Polymer IEC measured by silver nitrate titration.
3. Approximate swelling properties when cast into membrane, tested in hydroxide (OH^-) and nitrate (NO_3^-) forms at 80 °C.

Related Application Notes

APN-AEM-1001	AEM Catalyst Coated Membranes and Gas Diffusion Electrodes Data Sheet
APN-AEM-1005	3rd Gen Aemion® Ionomr Dispersions and Ink Formulations Application Note
APN-AEM-1011	Aemion® AEM Water Electrolyzer Reference Design Application Note
APN-AEM-1018	Aemion® AF3N Membrane Pre-treatment & Activation Procedure Application Note
APN-AEM-1019	Aemion® Cell & Stack Compression Application Note

ORDERING INFORMATION

Part Number	Width	Length	Core	Orientation
AF3N-HWC9-75-034	34 cm	Up to 45 m	76 mm (3") ID 38 cm width	Membrane inside PET backing sheet Recommended rough side facing cathode (see below)
AF3N-HWC9-75-068	68 cm		76 mm (3") ID 72 cm width	
AF3N-HWC9-75-0A4	20 cm	30 cm	A4 x 1 pack A4 x 5 pack	
AP3-HNN9-00-X AP3-HNN0-00-X	Dry resin, MOQ 10 g			Bottles up to 100 g Anti-moisture bag 100-1000 g

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REMOVAL OF THE MEMBRANES FROM THE BACKING LAYER:

Primary method

1. With clean gloved hands, hold the membrane on its backing layer.

2. Using a thumb or a finger, rub against the corner edge of the membrane to produce separation from the backing layer.

3. Once corner separation from the backing layer is achieved, carefully and gently, begin to pull the membrane from the backing layer whilst holding the backer down on a clean dry surface.

4. As the backing layer is released, support the membrane as it is removed from the backing layer, until all of the membrane has been removed.

Secondary method

1. With clean gloves, wet a portion of the membrane/backing layer edge with de-ionized water; this should aid in separation of the membrane from the backing layer. Repeat the steps in the primary method

2. If the membrane does not separate upon initial wetting, spritz a small amount of water area close to the edge of the membrane and repeat the primary method.

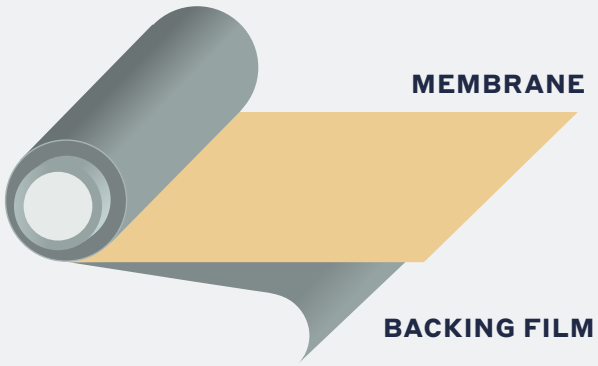
FOR COATING AEMION® MEMBRANES AFTER REMOVING FROM THE BACKING LAYER

Ensure that the membrane remains flat.

A powder coating masking tape (e.g. 3M™ Polyester Tape 8992, https://www.3mcanada.ca/3M/en_CA/p/d/b40070623/) to overlap the edges of the membrane prior to coating procedures to stabilize the membrane in place. This will help maintain the membrane positioning, and eliminate stress lines that may develop. Use caution when removing tape from membrane after the coating process as tears may occur. Cutting off taped area is an alternative.

Use caution to remove tape from membrane after the coating process.

ROLL UNWIND ORIENTATION (BASE FILM FACING OUT)



FOR ASSEMBLY OF THE MEMBRANE INTO ELECTROLYZER AFTER REMOVING FROM THE BACKING LAYER

The membrane has a rough side (facing out), and a smooth side (against backing film). It is recommended to assemble the membrane into the water electrolyzer with the **smooth side facing the anode and the rough side facing the cathode.** Or as a general rule, the rough side is recommended to face the side which will experience higher pressure.

Note: this may not be true for all systems and it is recommended to try the material in both orientations in your specific system.

Document Change History

Document ID	
APN-AEM-1024	AF3N-HWC9-75-X Properties of Aemion® Pre-Exchanged Water Electrolysis Membranes

Revision History:

Revision	Date	Description of Change
A	Feb. 11th, 2026	Preliminary specifications of AF3N-HWC9-75-X
B	Feb. 26th, 2026	Formal release and replacement of APN-AEM-1013