

**Properties of Aemion+™ 15 µm Anion Exchange Membranes****FM-7016-B**

Membrane: AF2-HLE8-15-X – Aemion+™ Reinforced Membranes - Pre-Production  
Thickness: 15 µm  
Reinforcement: Polyolefin

*Physical Properties:*

Measured at 22 °C in atmospheric condition by ASTM D882:

Tensile Strength: > 40 MPa  
Young's Modulus: > 900 MPa  
Elongation at break: > 20%

Temperature Considerations:

Max Processing Temperature: 105 °C  
Polymer Tg > 300 °C

*Hydrolytic Properties:*

Measured from dry-state to conditioned in DI water at 22 °C,

Water Uptake, wt%: < 20%  
Linear Expansion, %  
X (TD): < 3%  
Y (MD): < 3%  
Z-Expansion, % < 15%

*Chemical Stability<sup>1</sup>:*

Measured ex-situ in 2 M KOH at 100°C

Degradation 0% loss in conductivity, IEC, & Tensile in 500 h  
Calculated Lifetime > 5000 h half-life

*Electrochemical Properties<sup>2</sup>:*

Measured at 22 °C via EIS, water-wet (100% RH)

In-plane Conductivity (OH<sup>-</sup>)<sup>3</sup>: 80-100 mS/cm  
In-plane Conductivity (I<sup>-</sup>)<sup>4</sup>: 3-7 mS/cm  
Measured in-situ<sup>5</sup> 80 °C  
Conductivity, 90% RH: > 100 mS/cm

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- 1 *Based on properties of the composite membrane measured ex-situ.*
- 2 *Electrochemical properties presented for unreinforced membrane materials based on in-plane conductivity measurements by EIS.*
- 3 *Measured in Hydroxide form after exchange in KOH in a CO<sub>2</sub>-free environment*
- 4 *As-produced conductivity measured in Iodide form*
- 5 *Measured under applied current in a CO<sub>2</sub>-free environment*

*Note: These are prototype materials only intended to be used for early development activities and not intended for production items. Product information is to be used as a guide only, not as a design specification, and is subject to change at any time as part of ongoing product development. Ionomr makes no warranties, express or implied, and assumes no obligation or liability in connection with any use of this information or for results obtained in reliance thereon.*

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Revision: B	Prepared By: Shan Zhu	Effective Date: Oct. 23, 2020
	Approved By: Ben Britton	

This document is reviewed to ensure its continuing relevance to the systems and process that it describes.

**Revision History:**

Revision	Date	Description of Changes	Approved By
A	Mar. 11, 2020	Initial Draft	Tim Peckham
B	Oct. 23, 2020	Property Update	Ben Britton