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Technical Data Sheet

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Pilot-Scale Bipolar Membrane Electrodialysis Stack





General Product Information

Captura's Bipolar Membrane Electrodialysis (BMED) pilot-scale stack is designed to support process validation, scale translation, and system-level testing prior to commercial deployment. The pilot configuration enables sustained operation at increased membrane area and throughput while maintaining architectural consistency with Captura's commercial BMED platform. This system is intended to bridge laboratory results and full-scale deployment by validating operating envelopes, material durability, and integration with balance-of-plant components under relevant conditions.

Key Features

- Three-compartment BMED architecture (BPM, CEM, AEM) aligned with Captura's commercial stack design
- Increased cell count and active membrane area relative to lab-scale systems
- Designed for operation across a wide range of current densities and feed compositions
- Proprietary Captura membranes are made with PFAS-free chemistry
- Modular construction supporting scale translation and future expansion
- Clean-in-place (CIP) compatible for simplified operation and maintenance
- Compatible with external power supplies, pumps, and instrumentation

Components and Materials Included

- Membranes (BPM, CEM, AEM) and spacers
- Platinum coated titanium electrodes
- Polypropylene end blocks
- End plates, bolts and hardware
- Electrical leads and piping connections

Not Included

- Power source
- Pumps, tanks, and filters
- Controls and sensors

These components are not included in the standard stack offering. Captura can provide guidance on selection or support in the design and build of a full system.

Technical Specifications of Captura's Pilot-Scale BMED Stack[1]

Property	Typical Value	Unit
Stack type	Three-compartment BMED	
Number of cells	10 to 50	
Full stack dimensions	11 to 18 x 18 x 38 (L x W x H)	cm
Membrane dimensions	14 x 34	cm
Effective membrane area per type	0.21 to 1.05	m^2
Operating current density	Up to 800	A/m^2
Stack voltage	Up to 80	V
HCl/NaOH generation rate	Up to 25	mol/h
HCl/NaOH concentration	0.5 to 1.0	M
Current efficiency	>80	%
Energy consumption[2]	<1.5	kWh/kg-NaOH

[1]The typical values shown in the table above are based on operation with a 0.5 to 1 M NaCl feed. Performance for alternative feeds and compositions can be evaluated on a project-specific basis.
[2]Energy consumption depends on feed salt composition and concentration, operating temperature, current density, product concentration targets, and system configuration.

Note: *Specifications and performance values provided are representative of typical operation and are subject to change based on system configuration, feed composition, and operating conditions. Final specifications are defined on a project-specific basis. This document is provided for evaluation and planning purposes only and does not constitute a final commercial specification.*

Contact

For more information, please contact
products@capturacorp.com

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