

E-Cell MK-3 Stack

FACT SHEET

Industrial Electrodeionization (EDI) Stacks



Figure 1: E-Cell MK-3 Stack

General Description

As part of the E-Cell* electrodeionization product line, the E-Cell MK-3 Stack is designed to:

- Use electrical current to provide ultrapure water for semiconductor fabrication, power generation, solar panel production, and many other heavy industries.
- Deliver premium performance including both the highest levels of product water quality and the lowest energy consumption.
- Minimize cleaning requirements at higher feed water hardness levels using counter-current operation.
- Be leak free, guaranteed.
- Operate continuously and require no caustic or acid for regeneration of ion exchange resin within the stack.
- Require no brine injection or concentrate recirculation.

Typical Applications

The product water from the E-Cell MK-3 can be relied upon to meet today's most demanding ultrapure water applications including:

- Ultrapure water for rinsing of semiconductor chips, solar panels, and other microelectronics
- Demineralized boiler feed water for high pressure boilers found in power plants and other heavy industrial sites

For ease of design and additional confidence in your EDI application, E-Cell performance projections and guarantees are available in the Winflows* software or by contacting Veolia.

Quality Assurance

- CE, RoHS, CSA and EAC marked
- Manufactured in an ISO 9001 and ISO 14001 facility
- E-Cell MK-3 Stacks are halal certified by the Islamic Food and Nutrition Council of America (IFANCA®)

MK-3 Stack Specifications		
Nominal Flow	3.4 m ³ /h	15 gpm
Flow Rate Range	1.7 – 4.5 m ³ /h	7.5 – 20 gpm
Shipping Weight	100 kg	220 lbs
Dimensions (width x height x depth)	30 cm x 61 cm x 54 cm	12" x 24" x 22"

Product Water Quality ^{Note 1}	
Guarantees Available	
Resistivity	> 16 MOhm-cm Lower guarantees also available
Sodium	< 3 ppb
Silica (SiO ₂)	As low as 5 ppb
Boron	As low as 0.08 ppb
Typical Removal Efficiencies	
Sodium	> 99.9% removal
Silica (SiO ₂)	Up to 99% removal
Boron	Up to 96% removal

Operating Parameters		
Recovery	Up to 96%	
Voltage	0–300 VDC	
Amperage	0–5.2 ADC	
Inlet Pressure ^{Note 2}	< 6.9 bar	< 100 psi
Pressure Drop ^{Note 3}	1.4–2.8 bar	20–40 psi

Feed Water Specifications ^{Note 4}		
Total Exchangeable Anions (TEA as CaCO ₃) ^{Note 5}	< 60 mg/l	< 60 ppm
Conductivity Equivalent	< 103 µS/cm	< 103 µS/cm
Temperature	4.4–40°C	40–104°F
Total Hardness (as CaCO ₃) ^{Note 6}	< 1.0 mg/l	< 1.0 ppm
Silica (SiO ₂) ^{Note 7}	< 1.0 mg/l	< 1.0 ppm
Total Organic Carbon (TOC as C)	< 0.5 mg/l	< 0.5 ppm
Total Chlorine	< 0.05 mg/l	< 0.05 ppm
Fe, Mn, H ₂ S	< 0.01 mg/l	< 0.01 ppm
Boron ^{Note 8}	< 1.0 mg/l	< 1.0 ppm
pH	4 to 11	
Oil & Grease	None detectable	
Particulate ^{Note 9}	RO permeate	
Oxidizing Agents	None detectable	
Color ^{Note 10}	< 5 APHA	

Notes:

- Actual performance may vary depending on site conditions. Reference Winflows projection software to verify expected product water quality as well as the resistivity, sodium, and silica performance guarantees that are offered for the design conditions. To obtain boron or other guarantees, contact Veolia.
- Inlet pressure is determined by the downstream pressure requirements for the product and concentrate streams, the choice of counter-current or co-current operation, and stack pressure drop.
- At nominal flow and 25°C. Reference Winflows projection software to verify for design conditions.
- Reference the Winflows projection software and the E-Cell Stack Owner’s Manual to verify feed water specifications for the design conditions.
- TEA (ppm as CaCO₃) - Total Exchangeable Anion, this represents the concentration of all of the anions present in the feed water including contributions from OH⁻, CO₂ and SiO₂. Winflows must be used to confirm the feed water TEA is acceptable at the specific applications’ operating conditions. Table value is at minimum flow and maximum temperature.
- 1.0 ppm as CaCO₃ feed water hardness limit applies to standard counter-current flow operation only. Allowable feed water hardness decreases to 0.1 ppm as CaCO₃ in co-current flow operation.

- Allowable silica limit decreases above nominal flow. Allowable silica limit decreases to 0.5 ppm with feedwater hardness above 0.5 ppm as CaCO₃.
- The boron feed level is limited to 0.3 ppm as B whenever there is a silica guarantee requirement or resistivity guarantee requirement above 10 MOhm-cm, as higher boron levels could impact performance. Without these requirements the limit is 1.0 ppm boron.
- Reverse Osmosis (RO) or equivalent feed water: RO provides EDI feed water that is substantially free of particulate matter, colloidal material and high molecular weight organic substances, which can foul ion exchange media. RO permeate quality is specified since EDI stacks contain packed beds of ion exchange medium that cannot be backwashed/fluidized to remove particulate matter. Systems with an open system between a RO system (or other source) and E-Cell (ex. tank, decarbonator) must be fitted with filters immediately preceding the E-Cell, to protect the E-Cell against contamination with particulate matter. Generally, a 5 µm absolute or 1 µm nominal filter will be acceptable.
- APHA - color standard/scale named for the American Public Health Association and defined by ASTM D1209.