

E-Cell MK-3MiniHT Stack

FACT SHEET

Hot Water Sanitizable Electrodeionization (EDI) Stacks



Figure 1: E-Cell MK-3MiniHT Stack

General Description

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

- Use electrical current to provide ultrapure water for the pharmaceutical and biotechnology industries, as well as laboratories.
- Be hot water sanitizable up to 185°F (85°C) for 160 cycles
- 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-3MiniHT can be relied upon to exceed USP, EP and other pharmacopeia required quality levels in applications such as:

- Water for injection
- Pharmaceutical purified water
- Laboratory purified water systems

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
- Materials in contact with fluids processed by the E-Cell MK-3MiniHT stack meet FDA requirements
- Manufactured in an ISO 9001 and ISO 14001 facility
- E-Cell MK-3MiniHT Stacks are halal certified by the Islamic Food and Nutrition Council of America (IFANCA®)

MK-3MiniHT Stack Specifications		
Nominal Flow	1.14 m ³ /h	5.0 gpm
Flow Rate Range	0.57–1.52 m ³ /h	2.5–6.7 gpm
Shipping Weight	52 kg	115 lbs
Dimensions (width x height x depth)	30 cm x 61 cm x 29 cm	12" x 24" x 12"

Product Water Quality ^{Note 1}	
Guarantees Available	
Resistivity	> 10 MOhm-cm Higher and lower guarantees also available
Sodium	< 3 ppb
Silica (SiO ₂)	As low as 5 ppb
Typical Removal Efficiencies	
Sodium	> 99.9% removal
Silica (SiO ₂)	Up to 99% removal

Operating Parameters		
Recovery	Up to 93%	
Voltage	0–150 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
Number of 1 Hour Sanitization Cycles	160 cycles	
Maximum Sanitization Temperature	85°C	185°F
Maximum Sanitization Inlet Pressure	2.1 bar	30 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.

Veolia Water Technologies
Please contact us via:
www.veoliawatertechnologies.com