

# Purtrex\*

## FACT SHEET

### Melt blown depth filter for general industrial use



#### Features and Benefits

- Exceptional value for general applications
- Progressive graded density captures particles throughout the entire filter
- Long life and lower change-out frequency
- Exceptional dirt holding capacity
- Pure polypropylene construction
- No wetting agents, solvents, antistatic agents, or binders
- Made with 90% to 100% pre-consumer recycled polypropylene material to reduce landfill waste
- Meets FDA requirements for food and beverage contact
- Made in the USA

#### Applications

- General industrial use
- Potable water filtration
- Chemical filtration
- Plating baths
- Amine filtration

#### Specifications

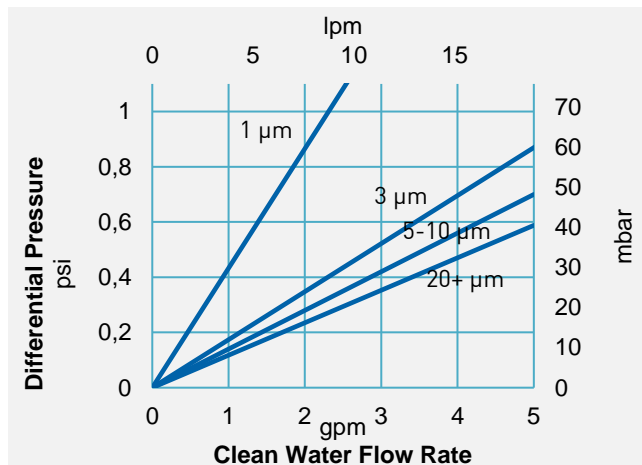
**Table 1: Specifications and performance information**

<b>Ratings</b>	1, 3, 5, 10, 20, 30, 50, 75 microns (nominal)
<b>Inner Diameter (nominal)</b>	1 in (2.5 cm)
<b>Outer Diameter</b>	2.5 in (6.4 cm)
<b>Lengths</b>	
9 3/4 in (24.8 cm)	29 1/4 in (74.3 cm)
10 in (25.4 cm)	30 in (76.2 cm)
19 1/2 in (49.5 cm)	40 in (101.6 cm)
20 in (50.8 cm)	50 in (127.0 cm)
<i>Longer lengths up to 70 in may be available upon request</i>	
<b>Materials of Construction</b>	
Filter Media	Polypropylene
Adapters	Polypropylene
Elastomer	Buna, EPDM, Silicone, Viton <sup>1</sup> Santoprene <sup>2</sup> (flat gasket only)
<b>Performance Conditions</b>	
Maximum Pressure Drop	35 psid (2.4 bar) @ 100°F (38°C)
Recommended Change-Out Pressure Drop:	20 psid (1.4 bar) @ 77°F (25°C)

## Efficiency Information

**Table 2: Removal efficiency based on a modified ASTM 795 test procedure**

Micron Rating	Removal rating ( $\mu\text{m}$ ) at various efficiencies		
	90.0%	99.0%	99.9%
1 $\mu\text{m}$	<i>Efficiency of nominal filters varies by application. See note for information on nominal filter efficiency.<sup>3</sup></i>		
3 $\mu\text{m}$			
5 $\mu\text{m}$			
10 $\mu\text{m}$			
20+ $\mu\text{m}$			



**Graph 1: Purtrex clean water flow rate based on a 10 in length filter**

## Quality

Purtrex filters are manufactured under a quality management system that has been certified to meet ISO 9001 standards. Each filter is assigned a lot code to ensure traceability of the data and materials used in the manufacturing process.

## Certifications

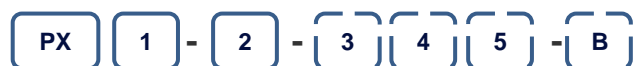
- U.S. FDA 21CFR 177.1520 food contact requirements
- Article 3 of the EU Framework Regulation No. 1935/2004/EC safety requirements
- EU Plastics Regulation No. 10/2011 (may be used as intended in compliant EU Member states)
- USP class VI-121°C Plastics criteria
- NSF 61 criteria
- ISO 9001 criteria

Veolia filter cartridges are designed and manufactured for resistance to a wide range of chemical solutions. Conditions will vary with each application and users should carefully verify chemical compatibility. Please contact your Veolia representative for more information.








## Ordering Information

Replace the numbers with your desired values from each column. Columns 3, 4, and 5 are optional depending on the desired configuration. Use “-B” if you would like bulk packaging.

**Example:** PX 05-40-EHB



**Table 3: Ordering information**

	1	2	3	4	5
Type	Micron Rating (nominal)	Cartridge Length	End #1 Adapter	End #2 Adapter	Elastomer Material
PX	01 = 1 µm	9 3/4 in (24.8 cm)	 E = 222 O-Ring	 H = Fin	B = Buna E = EPDM P = Santoprene <sup>2</sup> (flat gasket only) S = Silicone V = Viton <sup>1</sup>
	03 = 3 µm	10 in (25.4 cm)	 L = Extended Core	 K = Self Seal Spring	
	05 = 5 µm	19 1/2 in (49.5 cm)		 S = Solid End	
	10 = 10 µm	20 in (50.8 cm)	 X = Standard Plain End (no gasket)	 Y = Flat gasket	
	20 = 20 µm	29 1/4 in (74.3 cm)			
	30 = 30 µm	30 in (76.2 cm)			
	50 = 50 µm	40 in (101.6 cm)			
	75 = 75 µm	50 in (152.4 cm)			
		<i>Longer lengths up to 70 in may be available upon request</i>			

<sup>1</sup> Viton is a registered mark of The Chemours Company.

<sup>2</sup> Santoprene is licensed to Advanced Elastomer Systems, L.P.

<sup>3</sup> Absolute-rated filters have been designed and tested to reject at least 99% of particles of the listed micron size. Nominal-rated filters have a wider distribution of pore sizes and therefore a wider distribution of rejected particle sizes. The nominal rating is primarily used to compare efficiencies across a filter family and between filter manufacturers. Efficiency is dependent on particle shape, size, composition, application, and testing protocol.



# E-Cell EDI 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, with standard 3-year prorated warranty.
- 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
- Certified with UKCA
- 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 <sup>3</sup> /h (15 gpm)
Flow Rate Range	1.6 – 4.5 m <sup>3</sup> /h (7.0 – 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 <sup>Note 1</sup>	
Guarantees Available	
Resistivity	≥ 16 MOhm-cm
Sodium	≤ 3 ppb
Silica (SiO <sub>2</sub> )	As low as 5 ppb
Boron	As low as 0.08 ppb
Typical Removal Efficiencies	
Sodium	≥ 99.9% removal
Silica (SiO <sub>2</sub> )	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 <sup>Note 2</sup>	≤ 6.9 bar (100 psi)
Pressure Drop <sup>Note 3</sup>	1.4–2.8 bar (20–40 psi)

Feed Water Specifications <sup>Note 4</sup>	
Total Exchangeable Anions (TEA as CaCO <sub>3</sub> ) <sup>Note 5</sup>	≤ 63.6 ppm
Conductivity Equivalent	≤ 109 µS/cm
Temperature	4.4–40°C (40–104°F)
Total Hardness (as CaCO <sub>3</sub> ) <sup>Note 6</sup>	≤ 1.0 ppm
Silica (SiO <sub>2</sub> ) <sup>Note 7</sup>	≤ 1.0 ppm
Total Organic Carbon (TOC as C)	≤ 0.5 ppm
Total Chlorine	≤ 0.05 ppm
Fe, Mn, H <sub>2</sub> S	≤ 0.01 ppm
Boron <sup>Note 8</sup>	≤ 1.0 ppm
pH	4 to 11
Oil & Grease	None detectable
Particulate <sup>Note 9</sup>	RO permeate
Oxidizing Agents	None detectable
Color <sup>Note 10</sup>	≤ 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 CaCO<sub>3</sub>) - Total Exchangeable Anion, this represents the concentration of all of the anions present in the feed water including contributions from OH<sup>-</sup>, CO<sub>2</sub> and SiO<sub>2</sub>. 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 CaCO<sub>3</sub> feed water hardness limit applies to standard counter-current flow operation only. Allowable feed water hardness decreases to 0.1 ppm as CaCO<sub>3</sub> 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 CaCO<sub>3</sub>.
- 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.

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# E-Cell 3X Standard Systems

## FACT SHEET

### E-Cell\*-3X, 1 to 12 Stacks

#### Base System Features

- ECell3X Systems with 1 to 12 stacks for flow range of 15 – 336gpm (3.4 - 76.3 m<sup>3</sup>/h)
- Rectifier compatible with 400VAC & 50Hz or 460VAC & 60Hz
- Individual stack current monitoring
- Flow & pressure transmitters, ability to connect to SCADA system

#### System Options

- Allen Bradley Micrologix PLC with Ethernet
  - Includes Veolia 6" Color QuickPanel View HMI
- NEMA 4 Terminal Box - removal of PLC & HMI and all wiring terminated at terminal box
- Standard Instrumentation
  - Burkert Paddlewheel flow sensors on Dilute, Concentrate, and Electrode Outlet
  - Burkert pressure transmitters on all streams
  - Burkert conductivity analyzer and sensor on Dilute Outlet
- Premium Instrumentation
  - Rosemount vortex flow transmitters on Dilute and Concentrate Outlet
  - Burkert Paddlewheel flow sensor on Electrode Outlet
  - Burkert pressure transmitters on all streams
  - Rosemount conductivity analyzer and sensor on Dilute Outlet
- Inlet Divert Valve
  - Standard Instrumentation: Burkert
  - Premium Instrumentation: Rosemount
- ANSI to DIN conversion kits

#### Quality Assurance

Certification: .....UL, CSA  
 Facility: ..... ISO 9001:2000

Full Factory Acceptance Test (FAT) completed on each system before shipment.

#### Instrumentation

Flow .....	Dilute (Product) Outlet
	Concentrate Outlet
	Electrode Outlet
Pressure .....	Dilute Inlet, Dilute Outlet
	Concentrate Inlet, Concentrate Outlet
	Electrode Outlet
Resistivity .....	Dilute Inlet (optional)
	Dilute Outlet

#### Feed Water Requirements

Total Exchangeable Anions (as CaCO <sub>3</sub> ) (TEA) Including CO <sub>2</sub> as calculated by E- Calc	< 25.0 ppm
pH .....	4 – 11
Hardness .....	< 1.0 ppm (as CaCO <sub>3</sub> )
Silica (Reactive) .....	< 1.0 ppm
SDI (15 min) .....	< 1
TOC .....	< 0.5 ppm
Total Chlorine .....	< 0.05 ppm
Fe, Mn, H <sub>2</sub> S .....	< 0.01 ppm

## Operating Parameters<sup>1</sup>

Outlet (Dilute) Product Quality ..... > 16 MOhm-cm  
 Outlet Product Silica Guarantee ..... Down to < 5ppb  
 Recovery: ..... Up to 95%  
 Temperature: ..... 40 to 104°F (4.4 to 40°C)  
 Feed Pressure: ..... 60 to 100 psi (4.1 to 6.9 bar)  
 Dilute Pressure Drop: ..... 20 to 40 psi (1.4 to 2.8 bar)  
 Input Voltage: ..... 460VAC 60Hz, 400VAC 50Hz

## Material of Construction & Ratings

Welded Frame: ..... Painted Carbon Steel  
 Dilute Piping: ..... Sch. 80 PVC  
 Concentrate Piping: ..... Sch. 80 PVC  
 Flanges: ..... ANSI  
 Rectifier: ..... NEMA 4  
 Control Panel: ..... NEMA 4  
 Control Panel Power: ..... 24VDC

## E-Cell 3X Standard Systems

Model	ECell3X-2	ECell3X-4	ECell3X-8	ECell3X-12
Number of Stacks	1 - 2	3 - 4	5 - 8	10 - 12
Type of stack	E-Cell-3X	E-Cell-3X	E-Cell-3X	E-Cell-3X
<b>Flow Rates:</b>				
Product Flow Nominal	44 gpm 10 m <sup>3</sup> /h	88 gpm 20 m <sup>3</sup> /h	176 gpm 40 m <sup>3</sup> /h	264 gpm 59.9 m <sup>3</sup> /h
Range	15 – 56 gpm 3.4 – 12.7 m <sup>3</sup> /h	45 - 112 gpm 10.2 – 25.4 m <sup>3</sup> /h	75 - 224 gpm 17.0 – 50.9 m <sup>3</sup> /h	150 - 336 gpm 34.0 – 76.3 m <sup>3</sup> /h
Concentrate Outlet Flow (Depends on Recovery & Product Flow) <sup>2</sup>	0.83 - 7.67 gpm 0.19 - 1.74 m <sup>3</sup> /h	2.50 - 15.34 gpm 0.57 - 3.48 m <sup>3</sup> /h	4.17 - 30.67 gpm 0.95 - 6.97 m <sup>3</sup> /h	8.34- 46.01 gpm 1.89 - 10.45 m <sup>3</sup> /h
Electrode Outlet Flow (Nominal)	0.70 gpm 0.16 m <sup>3</sup> /h	1.40 gpm 0.32 m <sup>3</sup> /h	2.80 gpm 0.64 m <sup>3</sup> /h	4.20 gpm 0.95 m <sup>3</sup> /h
<b>Dimensions:</b>				
Overall Dimensions (Width x Length x Height)	42" x 50" x 84" 1.1m x 1.3m x 2.2m	46" x 75" x 84" 1.1m x 1.9m x 2.2m	64" x 103" x 90" 1.7m x 2.6m x 2.3m	64" x 130" x 90" 1.7m x 3.3m x 2.3m
Inlet Piping	2.0"	2.5"	4"	4"
Product Outlet Piping	1.5"	2.5"	3"	4"
Rinse Outlet Piping	1.5"	2.5"	3"	4"
Concentrate Outlet Piping	0.75"	1.0"	1.5"	1.5"
Electrode Outlet Piping	0.5"	0.5"	0.5"	0.5"
All piping sizes are provided for nominal flow rates at 90% recovery.				
Shipping Weight (Approx.)	2050 lb / 925 kg	3075 lb / 1400 kg	5250 lb / 2400 kg	6190 lb / 3125 kg
<b>Electrical:</b>				
Maximum Output @ 400VDC	10.4 Amps	20.8 Amps	41.6 Amps	62.4 Amps
Connection Requirement	13 kVA	21 kVA	36 kVA	52 kVA

1. Performance, flow rate per stack, recovery and power consumption are all dependent on inlet feed water quality and temperature. An E-Cell projection must be completed for proper system design & for any performance guarantee to be provided.
2. Concentrate outlet flow at 95% max recovery and minimal product flow of 15gpm/stack to 87% recovery and maximum product flow of 28gpm/stack.

# E-Cell\* EDI 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 with standard 3-year prorated warranty.
- 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 used in small industrial applications and 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
- Certified with UKCA
- 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 <sup>3</sup> /h (5.0 gpm)
Flow Rate Range	0.5–1.6 m <sup>3</sup> /h (2.2–7.0 gpm)
Shipping Weight	57 kg (126 lbs)
Dimensions (width x height x depth)	30 cm x 61 cm x 29 cm 12" x 24" x 12"



Product Water Quality <sup>Note 1</sup>	
Guarantees Available	
Resistivity	≥ 10 (Pharmaceutical) or ≥ 16 MOhm-cm (Industrial)
Sodium	≤ 3 ppb (industrial)
Silica (SiO <sub>2</sub> )	As low as 5 ppb (industrial)
Typical Removal Efficiencies	
Sodium	≥ 99.9% removal
Silica (SiO <sub>2</sub> )	Up to 99% removal

Operating Parameters	
Recovery	Up to 93%
Voltage	0–150 VDC
Amperage	0–5.2 ADC
Inlet Pressure <sup>Note 2</sup>	≤ 6.9 bar (100 psi)
Pressure Drop <sup>Note 3</sup>	1.4–2.8 bar (20–40 psi)
Hot Water Sanitization Cycles	160
Maximum Sanitization Temperature	85°C (185°F)
Maximum Sanitization Inlet Pressure	2.1 bar (30 psi)

Feed Water Specifications <sup>Note 4</sup>	
Total Exchangeable Anions (TEA as CaCO <sub>3</sub> ) <sup>Note 5</sup>	≤ 68.2 ppm
Conductivity Equivalent	≤ 117 µS/cm
Temperature	4.4–40°C (40–104°F)
Total Hardness (as CaCO <sub>3</sub> ) <sup>Note 6</sup>	≤ 1.0 ppm
Silica (SiO <sub>2</sub> ) <sup>Note 7</sup>	≤ 1.0 ppm
Total Organic Carbon (TOC as C)	≤ 0.5 ppm
Total Chlorine	≤ 0.05 ppm
Fe, Mn, H <sub>2</sub> S	≤ 0.01 ppm
Boron <sup>Note 8</sup>	≤ 1.0 ppm
pH	4 to 11
Oil & Grease	None detectable
Particulate <sup>Note 9</sup>	RO permeate
Oxidizing Agents	None detectable
Color <sup>Note 10</sup>	≤ 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 CaCO<sub>3</sub>) - Total Exchangeable Anion, this represents the concentration of all of the anions present in the feed water including contributions from OH<sup>-</sup>, CO<sub>2</sub> and SiO<sub>2</sub>. 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 CaCO<sub>3</sub> feed water hardness limit applies to standard counter-current flow operation only. Allowable feed water hardness decreases to 0.1 ppm as CaCO<sub>3</sub> 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 CaCO<sub>3</sub>.
- 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.

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# E-Cell\* EDI MK-3PharmHT Stack

## FACT SHEET

### Hot Water Sanitizable Electrodeionization (EDI) Stacks



Figure 1: E-Cell MK-3PharmHT Stack

### General Description

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

- Use electrical current to provide ultrapure water for the pharmaceutical and biotechnology industries.
- 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 with standard 3-year prorated warranty.
- 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-3PharmHT 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-3PharmHT stack meet FDA requirements
- Certified with UKCA
- Manufactured in an ISO 9001 and ISO 14001 facility
- E-Cell MK-3PharmHT Stacks are Halal certified by the Islamic Food and Nutrition Council of America (IFANCA®)

MK-3PharmHT Stack Specifications	
Nominal Flow	3.4 m <sup>3</sup> /h (15 gpm)
Flow Rate Range	1.6–5.4 m <sup>3</sup> /h (7.0–23.8 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 <sup>Note 1</sup>	
<b>Guarantees Available</b>	
Resistivity	≥ 10 MOhm-cm
<b>Typical Removal Efficiencies</b>	
Sodium	≥ 99.9% removal
Silica (SiO <sub>2</sub> )	Up to 99% removal

Operating Parameters	
Recovery	Up to 96%
Voltage	0–300 VDC
Amperage	0–5.2 ADC
Inlet Pressure <sup>Note 2</sup>	≤ 6.9 bar (100 psi)
Pressure Drop <sup>Note 3</sup>	1.4–2.8 bar   20–40 psi
Hot Water Sanitization Cycles	160
Maximum Sanitization Temperature	85°C (185°F)
Maximum Sanitization Inlet Pressure	2.1 bar (30 psi)

Feed Water Specifications <sup>Note 4</sup>	
Total Exchangeable Anions (TEA as CaCO <sub>3</sub> ) <sup>Note 5</sup>	≤ 63.6 ppm
Conductivity Equivalent	≤ 109 µS/cm
Temperature	4.4–40 °C (40–104 °F)
Total Hardness (as CaCO <sub>3</sub> ) <sup>Note 6</sup>	≤ 1.0 ppm
Silica (SiO <sub>2</sub> ) <sup>Note 7</sup>	≤ 1.0 ppm
Total Organic Carbon (TOC as C)	≤ 0.5 ppm
Total Chlorine	≤ 0.05 ppm
Fe, Mn, H <sub>2</sub> S	≤ 0.01 ppm
Boron <sup>Note 8</sup>	≤ 1.0 ppm
pH	4 to 11
Oil & Grease	None detectable
Particulate <sup>Note 9</sup>	RO permeate
Oxidizing Agents	None detectable
Color <sup>Note 10</sup>	≤ 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 CaCO<sub>3</sub>) - Total Exchangeable Anion, this represents the concentration of all of the anions present in the feed water including contributions from OH<sup>-</sup>, CO<sub>2</sub> and SiO<sub>2</sub>. 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 CaCO<sub>3</sub> feed water hardness limit applies to standard counter-current flow operation only. Allowable feed water hardness decreases to 0.1 ppm as CaCO<sub>3</sub> 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 CaCO<sub>3</sub>.
- 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.

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# E-Cell\* EDI MK-7 Stack

## FACT SHEET

### Industrial Electrodeionization (EDI) Stacks



Figure 1: E-Cell MK-7 Stack

### General Description

As part of the E-Cell electrodeionization product line, the E-Cell MK-7 Stack is designed to:

- Use electrical current to provide ultrapure water for power generation, solar panel production, green hydrogen generation 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 with standard 3-year prorated warranty.
- 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-7 can be relied upon to meet today's most demanding ultrapure water applications including:

- Demineralized boiler feed water for high pressure boilers found in power plants and other heavy industrial sites
- Ultrapure water for rinsing of solar panels and other microelectronics
- Ultrapure water for electrolyzer green hydrogen generation

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
- Certified with UKCA
- E-Cell MK-7 Stacks are Halal certified by the Islamic Food and Nutrition Council of America (IFANCA®)

E-Cell MK-7 Stack Specifications	
Nominal Flow	7.0 m <sup>3</sup> /h (31 gpm)
Flow Rate Range	4.2 – 7.8 m <sup>3</sup> /h (18 – 34 gpm)
Shipping Weight	165 kg (364 lbs)
Dimensions (width x height x depth)	30 cm x 61 cm x 74 cm 12" x 24" x 30"

Product Water Quality <sup>Note 1</sup>	
<b>Guarantees Available</b>	
Resistivity	≥ 16 MOhm-cm
Sodium	≤ 3 ppb
Silica (SiO <sub>2</sub> )	As low as 5 ppb
<b>Typical Removal Efficiencies</b>	
Sodium	≥ 99.9% removal
Silica (SiO <sub>2</sub> )	Up to 99% removal

Operating Parameters	
Recovery	Up to 97%
Voltage	0–400 VDC
Amperage	0–5.2 ADC
Inlet Pressure <sup>Note 2</sup>	≤ 6.9 bar (100 psi)
Pressure Drop <sup>Note 3</sup>	2.4–3.4 bar (35–50 psi)

Feed Water Specifications <sup>Note 4</sup>	
Total Exchangeable Anions (TEA as CaCO <sub>3</sub> ) <sup>Note 5</sup>	≤ 36 ppm
Conductivity Equivalent	≤ 62 μS/cm
Temperature	4.4–40°C (40–104°F)
Total Hardness (as CaCO <sub>3</sub> ) <sup>Note 6</sup>	≤ 1.0 ppm
Silica (SiO <sub>2</sub> ) <sup>Note 7</sup>	≤ 1.0 ppm
Total Organic Carbon (TOC as C)	≤ 0.5 ppm
Total Chlorine	≤ 0.05 ppm
Fe, Mn, H <sub>2</sub> S	≤ 0.01 ppm
Boron <sup>Note 8</sup>	≤ 1.0 ppm
pH	4 to 11
Oil & Grease	None detectable
Particulate <sup>Note 9</sup>	RO permeate
Oxidizing Agents	None detectable
Color <sup>Note 10</sup>	≤ 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 CaCO<sub>3</sub>) - Total Exchangeable Anion, this represents the concentration of all of the anions present in the feed water including contributions from OH<sup>-</sup>, CO<sub>2</sub> and SiO<sub>2</sub>. 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 CaCO<sub>3</sub> feed water hardness limit applies to standard counter-current flow operation only. Allowable feed water hardness decreases to 0.1 ppm as CaCO<sub>3</sub> in co-current flow operation.

- Allowable silica limit decreases above 5 m<sup>3</sup>/h flow. Allowable silica limit decreases to 0.5 ppm with feedwater hardness above 0.5 ppm as CaCO<sub>3</sub>.
- 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.

# AG Series

## FACT SHEET

### Standard Brackish Water RO Elements

The A-Series, family of proprietary thin-film reverse osmosis elements, are characterized by high flux and high sodium chloride rejection. AG Standard Brackish Water Elements are selected when high rejection and operating pressures as low as 200 psi (1,379 kPa) are desired. These elements allow moderate energy savings and are considered a standard in the industry.

**Table 1: Element Specification**

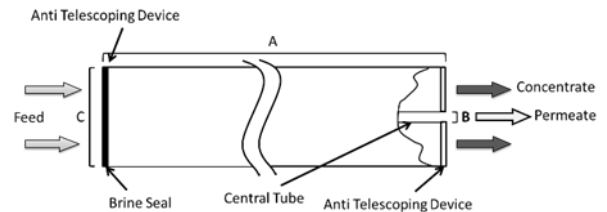
Membrane	A-Series, thin-film membrane (TFM)
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Model	Average Permeate Flow gpd (m <sup>3</sup> /day) (1)(2)	Average NaCl Rejection (1)(2)	Minimum NaCl Rejection (1)(2)
AG2540TM	750 (2.8)	99.5%	99.0%
AG4026F	1,600 (6.1)	99.5%	99.0%
AG4040C	2,400 (9.1)	99.5%	99.0%
AG4040FM	2,400 (9.1)	99.5%	99.0%
AG4040TM	2,400 (9.1)	99.5%	99.0%
AG8040F	10,000 (37.9)	99.5%	99.0%
AG8040F 400	11,000 (41.6)	99.5%	99.0%
AG8040F 440	12,000 (45.4)	99.5%	99.0%

(1) Average salt rejection after 24 hours of operation. Individual flow rate may vary ±20%.  
 (2) Testing conditions: 2,000 ppm NaCl solution at 225 psi (1,551 kPa) operating pressure, 77°F (25°C), pH 7.5 and 15% recovery.

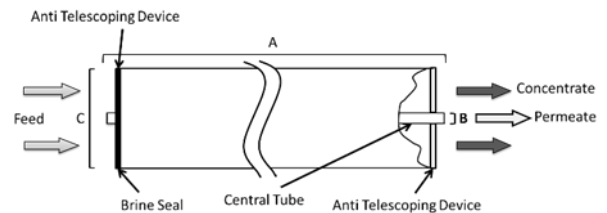
**Table 2: Element Properties <sup>(3)</sup>**

Model	Membrane Area ft <sup>2</sup> (m <sup>2</sup> )	Outer Wrap	Part Number
AG2540TM	27 (2.5)	Tape	1206729
AG4026F	60 (5.6)	Fiberglass	1206756
AG4040C	90 (8.4)	Cage	1206757
AG4040FM	85 (7.9)	Fiberglass	3032513
AG4040TM	85 (7.9)	Tape	3032514
AG8040F	365 (33.9)	Fiberglass	3032515
AG8040F 400	400 (37.2)	Fiberglass	3032518
AG8040F 440	440 (40.9)	Fiberglass	3194307



Note: \*\*4040C elements do not feature brine seal.

**Figure 1: Element Dimensions Diagram – Female**



**Figure 2: Element Dimensions Diagram – Male**

**Table 3: Dimensions and Weight <sup>(3)</sup>**

Model	Type	Dimensions, inches (cm)			Boxed
		A	B	C	Weight lbs. (kg)
AG2540*	Male	40.0 (101.6)	0.75 (1.90)	2.4 (6.1)	7 (3)
AG4026*	Female	26.0 (66.7)	0.625 (1.59)	3.9 (9.9)	9 (4)
AG4040C	Female	40.0 (101.6) <sup>(1)</sup>	0.625 (1.59)	3.9 (9.9)	11 (5)
AG4040FM	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	11 (5)
AG4040TM	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	11 (5)
AG8040F	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AG8040F 400	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AG8040F 440	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)

**Table 4: Operating and CIP Parameters <sup>(3)</sup>**

<b>Typical Operating Pressure</b>	200 psi (1,379 kPa)
<b>Typical Operating Flux</b>	10-20GFD (15-35 LMH)
<b>Maximum Operating Pressure</b>	Tape: 450 psi (3,103 kPa) Other outerwrap: 600 psi (4,137 kPa)
<b>Maximum Temperature</b>	Continuous operation: 122°F (50°C) Clean-In-Place (CIP): 122°F (50°C)
<b>pH Range</b>	Optimum rejection: 7.0-7.5, Continuous operation: 2.0-11.0, Clean-In-Place (CIP): 1.0-13.0 <sup>(5)</sup>
<b>Maximum Pressure Drop</b>	Tape: 7 psi (48 kPa) over an element, 25 psi (172 kPa) over the vessel Cage and FRP: 15 psi (103 kPa) over the element, 60 psi (413 kPa) over the vessel
<b>Chlorine Tolerance</b>	1,000+ ppm x hours, dechlorination recommended
<b>Feedwater</b>	NTU < 1 SDI <sub>15</sub> < 5

<sup>(3)</sup> Element properties and parameters are indicative numbers. Specific values by element may vary within normal element manufacturing tolerances.

<sup>(4)</sup> Includes interconnector, refer to Technical Bulletin TB1206.

<sup>(5)</sup> Refer to Cleaning Guidelines Technical Bulletin TB1194

# ZeeWeed\* Pressurized Ultrafiltration

## FACT SHEET

### Model ZW1500

#### Description and Use

As a pioneer of membrane technology, Veolia leverages decades of research, development, and operational experience in developing one of the most advanced pressurized ultrafiltration technology in the market, ZeeWeed 1500. ZeeWeed systems are proven to consistently outperform conventional filtration technology while meeting or exceeding regulatory requirements, regardless of source water quality.

#### Typical Applications

Versatile and reliable, the pressurized ZeeWeed 1500 is ideally suited for use in numerous applications including drinking water treatment, tertiary filtration and RO pre-treatment for brackish water and seawater. Compared to granular filter media, ZeeWeed membranes produce superior water quality and are virtually unaffected by variable raw water quality - all at a cost comparable to conventional filtration technology.

#### General Properties

- 0.02  $\mu\text{m}$  nominal pore diameter - for optimal removal of particulates, bacteria and viruses
- PVDF hollow fiber membrane - provides high mechanical strength and chemical resistance
- Outside-in filtration - provides uniform flow distribution and high solids tolerance



#### Storage and Handling

Modules may be stored in the original factory packaging for up to 1 year prior to installation. Modules must be stored between 5°C and 35°C (41°F to 95°F). Do not expose the membrane module to sources of heat, ignition, or direct sunlight (UV light).



## Product Specifications

Model	ZeeWeed 1500
Nominal Membrane Surface Area	55.7 m <sup>2</sup> (600 ft <sup>2</sup> )
Max Shipping Weight <sup>1</sup>	37 kg (80 lb)
Lifting Weight <sup>2</sup>	30 - 46 kg (65 - 100 lb)
Membrane Material	PVDF
Nominal Pore Size	0.02 micron
Nominal Fiber Diameter	OD: 1.2 mm, ID: 0.66 mm
Flow Path	Outside-In
Housing Material	PVC housing with GRP caps

<sup>1</sup>Packaged

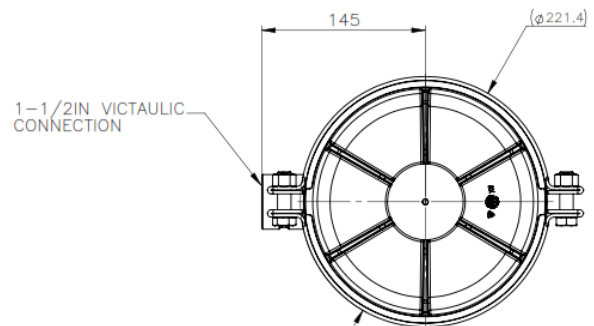
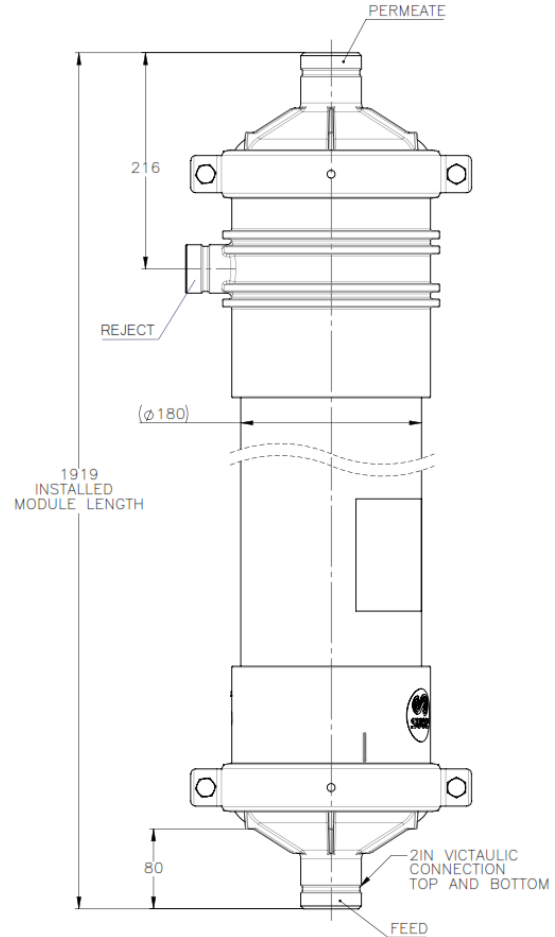
<sup>2</sup>Varies with solids accumulation

Module Dimensions & Connections	
Height	1919 mm (75.6 in)
Diameter	180 mm (7")
Feed & Permeate	2" (DN50) Victaulic
Reject	1 1/2" (DN40) Victaulic
System Integration	Module Racks

## Operating Parameters

Performance	
Flow range	45 - 180 m <sup>3</sup> /day (8 - 33 gpm)
Operating Conditions	
Max shell inlet pressure	379 kPa (55 psi)
TMP range	0 - 276 kPa (0 - 40 psi)
Max temperature	40°C (104°F)
Operating pH	5.0 - 10.0
Air scour flow	5.1 m <sup>3</sup> /h (3 dcfm)
Backwash flow	1.8 m <sup>3</sup> /hr (8 gpm)
Cleaning	
Cleaning pH range	2.0 - 12.0
Max chlorine concentration	1,000 mg/L (as NaOCl) <sup>3</sup>

<sup>3</sup>NOTE: Higher concentrations are possible depending on feedwater and pH.



### Veolia Water Technologies

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# Ozonía\* Range Ozone Systems



# Ozonia Ozone Systems

Veolia delivers oxidation, purification and disinfection equipment from our Ozonia ozone and Aquaray UV businesses. From our company's roots in Switzerland, **Ozonia** products have been the **ozone industry pioneer for over 40 years**. Veolia has thousands of Ozonia ozone installations, including **some of the world's largest oxidation systems**.

With three R&D centers and four manufacturing facilities in North America, Europe and China, Veolia can deliver to any customer's specifications.

Trust Veolia to deliver the highest quality **ozone technology solutions** to meet even the most difficult treatment challenges.

## Where Can It Be Applied?

**Ozone has many advantages over other oxidants. These advantages are the reason why ozone technology is the high-quality process standard for many applications.**

### Applications

- Disinfection
- Oxidation
- Advanced oxidation processes (AOP)



### Municipal

- Drinking water
- Wastewater
- Micropollutant removal
- Reuse



### Industry

- Industrial wastewater (COD removal, etc.)
- Pharmaceutical and ultrapure water
- Aquaculture
- Food and beverage
- Process water
- Bottling
- Ballast water treatment



## Ozone Advantages

### Strongest oxidizing agent on the market

- Lower dose requirements
- Very short contact time
- Can be used at many points in the treatment line

### Semi-selective oxidation removes a wide variety of molecules

- Micropollutants
- Microorganisms
- Bacteria and viruses
- Algae and cyanobacteria
- Color, taste and odor

### Ozone is chemical free

- Ozone technology does not add chemicals to water or air
- Environmentally friendly green technology

### Ozone dissolves naturally into oxygen

- Inherently safe after natural decay
- No harmful residuals
- Increased filter velocities
- Control of trihalomethanes (THM)

### Ozone is generated on-site

- Increased safety
- No transportation
- No storage

### Ozone optimizes the entire treatment plant

- Improvement of coagulation and flocculation
- Savings of flocculent and polymer
- No need for quenching
- Increases dissolved oxygen levels
- Improvement of effluent quality

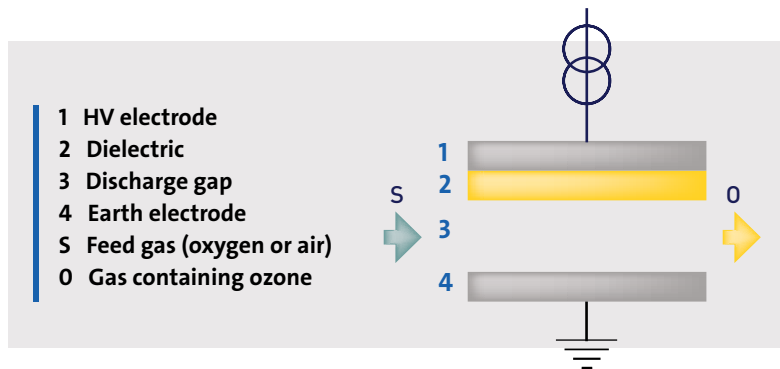
# Ozonia Ozone Technology

Veolia designs and manufactures a complete range of **Ozonia** ozone generators from laboratory scale units to the largest ozone systems in the world. **Ozonia** products are consistently ranked among the best in the global ozone industry.

## Commercial Scale Ozone Generation

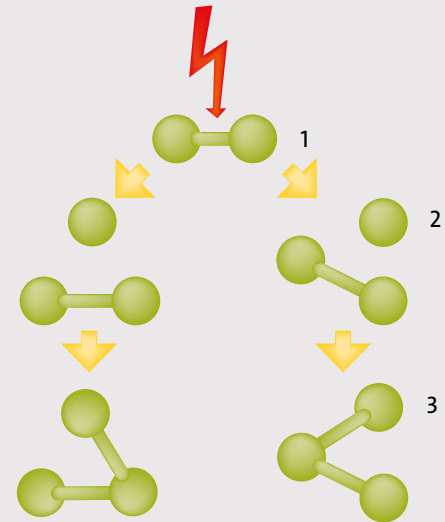
Ozone is produced when oxygen molecules ( $O_2$ ) are split into atomic oxygen (O) then recombined into ozone ( $O_3$ ). In most commercial applications, ozone is produced when a gas containing oxygen is passed through an electrical field separated by two electrodes. When oxygen molecules in the gas interact with the electrical field, they split and recombine forming ozone. This process is the Corona Discharge ozone generation method.

The **Ozonia Membrel** system uses the electrolytic process to produce ozone from water, making it the most effective method for ozone production in ultrapure water applications such as Pharmaceutical manufacturing.



Ozone has an oxidation potential which is 50% stronger than gaseous chlorine, making it one of the most powerful oxidants available in today's municipal, industrial and commercial markets.

Substance	Oxidation Potential (V)
Ozone molecule ( $O_3$ )	2.07
Hydrogen peroxide ( $H_2O_2$ )	1.78
Chlorine (Cl)	1.36
Chlorine dioxide ( $ClO_2$ )	1.27
Oxygen molecule ( $O_2$ )	1.23



Ozone is formed by splitting oxygen molecules ( $O_2$ ) into atomic oxygen (O), which combines with other oxygen molecules to produce ozone molecules ( $O_3$ ).

## Ozonia Technology Focus

- Intelligent Gap System (IGS+) technology
- The industry's most robust electrodes
- Fused dielectrics allows the industry's highest availability
- Long service life
- Laboratory testing, piloting and applications expertise
- Manufacturing facilities in Europe, China and North America
- Globally adaptable standards
- Industry-leading engineering capabilities
- Multiple redundant safety concepts

# Ozonia Ozone Product Portfolio



Features	Ozonia LAB 2B	Ozonia Membrel	Ozonia TOGC	Ozonia CFS	Ozonia M	Ozonia L	Ozonia XF*
Description	Ozone generator	Ozone generator	Ozone generator + oxygen concentrator	Ozone generator	Ozone generator	Ozone generator	Ozone generator
Ozone production with air	4 g/h	3 - 9 g/h from water	Up to 55 g/h from air via O <sub>2</sub> concentrator	Up to 1.6 kg/h	Up to 10 kg/h	Data available upon request	Data available upon request
Ozone production with O <sub>2</sub>	10 g/h			Up to 3 kg/h			
Fully assembled	x	x	x	x	x	x	
Fully tested	x	x	x	x	x	x	
Completion on-site							x
Containerized version				x	x	x	x
SS enclosure option			x				
Remote control		x		x	x	x	x

The Ozonia XF offers ozone production capacities over 250 kg/h.



## Ozonia IGS+

### Intelligent Gap System

- High ozone concentration up to 16 wt%
- Ozone production capacities greater than 250 kgO<sub>3</sub>/h
- The industry's most robust ceramic dielectric
- Higher efficiency

## Ozonia Ozone Destructors

### Thermal Ozone Destruction

- More versatile and resistant to contaminants in vent gas
- Heat recovery on larger units reduces energy consumption
- No consumables to replace
- Long service life



### Catalytic Ozone Destruction

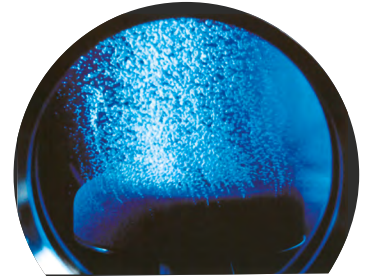
- Low energy consumption
- Very high ozone destruction efficiency
- Compact footprint
- Small pre-heater avoids condensation



## Ozonia Ozone Transfer Equipment

### Dome Diffuser

- No additional energy input for ozone dissolution
- No moving part
- Low hydraulic loss
- Simplicity and flexibility of operation



### Radial Transfer System

- High operation flexibility/turndown: from 0 to 100% gas flow
- Compact system, reduced footprint
- Easy operation
- Minimum maintenance



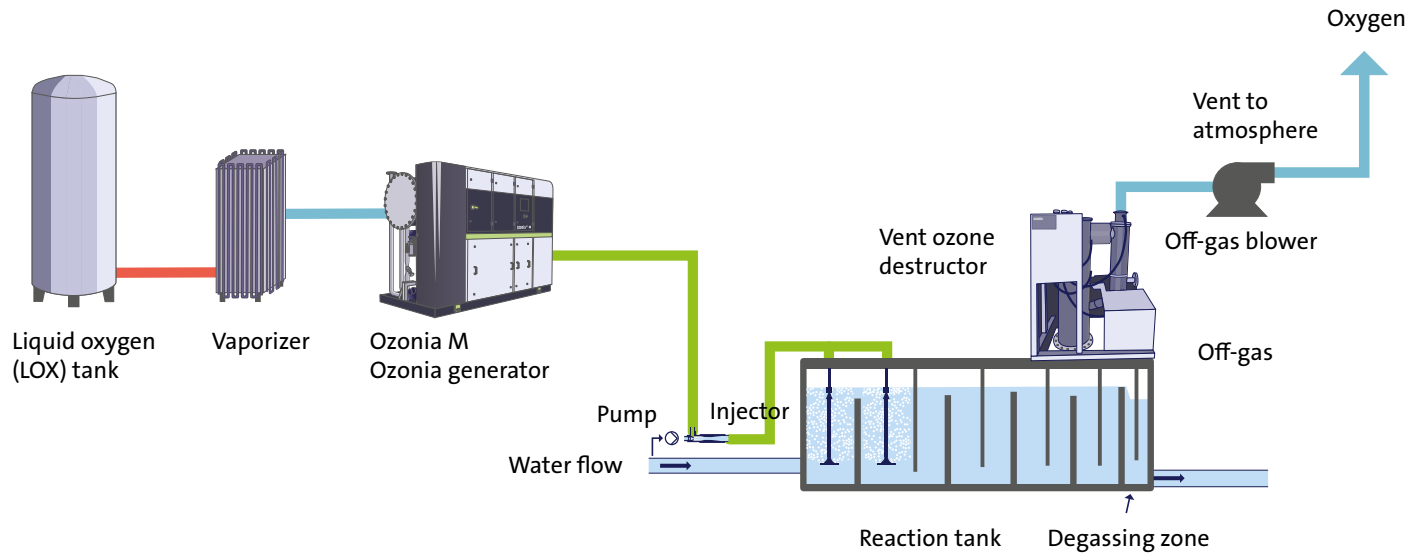
## Ozonia Containers

### Containerized Ozone Plants

- Fully assembled and tested
- Industry leading quality and reliability
- Minimize civil work
- Eliminate building costs
- Minimize installation time



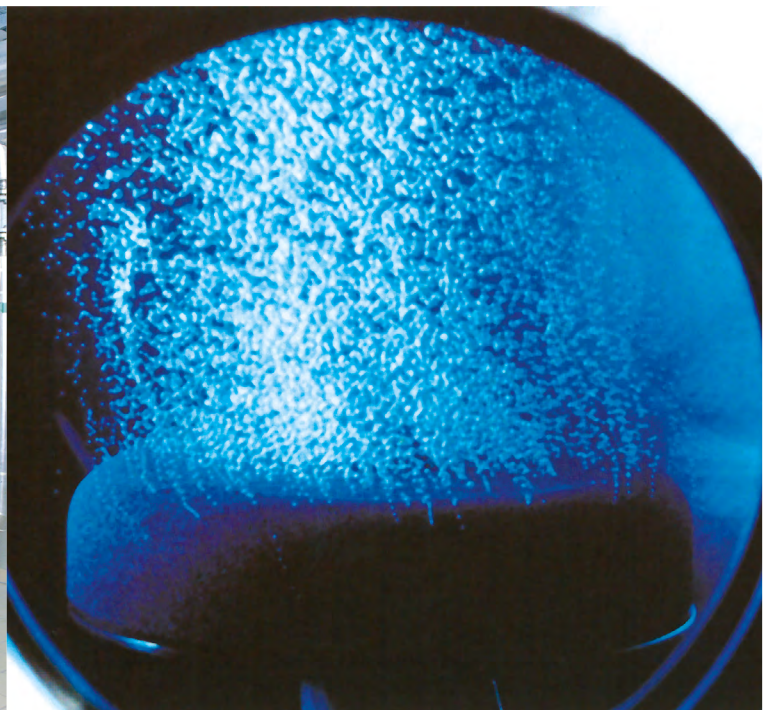
# Ozonia Ozone Systems



**Ozonia XF Ozone System**



**Ozonia Dome Diffuser**



## Skills And Expertise

### Engineering

Veolia offers unique professional expertise with **over forty years** of experience in the ozone industry. As the original ozone industry pioneer, our proven IGBT based power supply systems, combined with revolutionary dielectric materials results in industry leading performance. In addition to ozone generation equipment, Veolia offers clients unrivaled ozone application technology for **any industrial or municipal ozone application process**.

### Quality Management



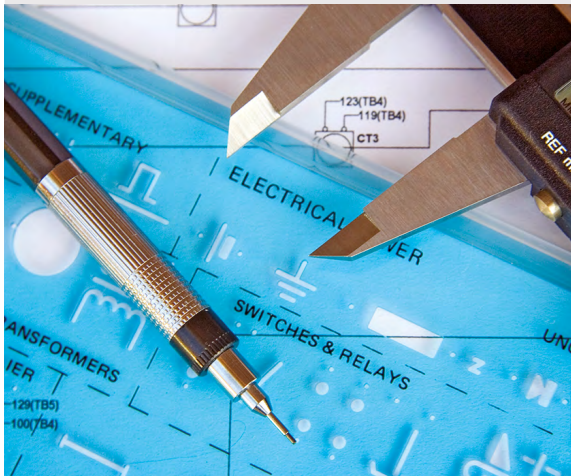
Veolia operates a **Quality Management System** covering all aspects of business activity. The system is supervised by a QA manager and is subject to regular internal audits and annual certification by the company SGS.

### Installation, Commissioning And Training

Following purchase, clients have full access to Veolia Customer Care services. These services offer: installation, supervision, inspection, commissioning and on-site training of the operator's personnel. Additionally, Veolia can organize training workshops in a classroom environment for larger groups.

### Plant Service And Maintenance

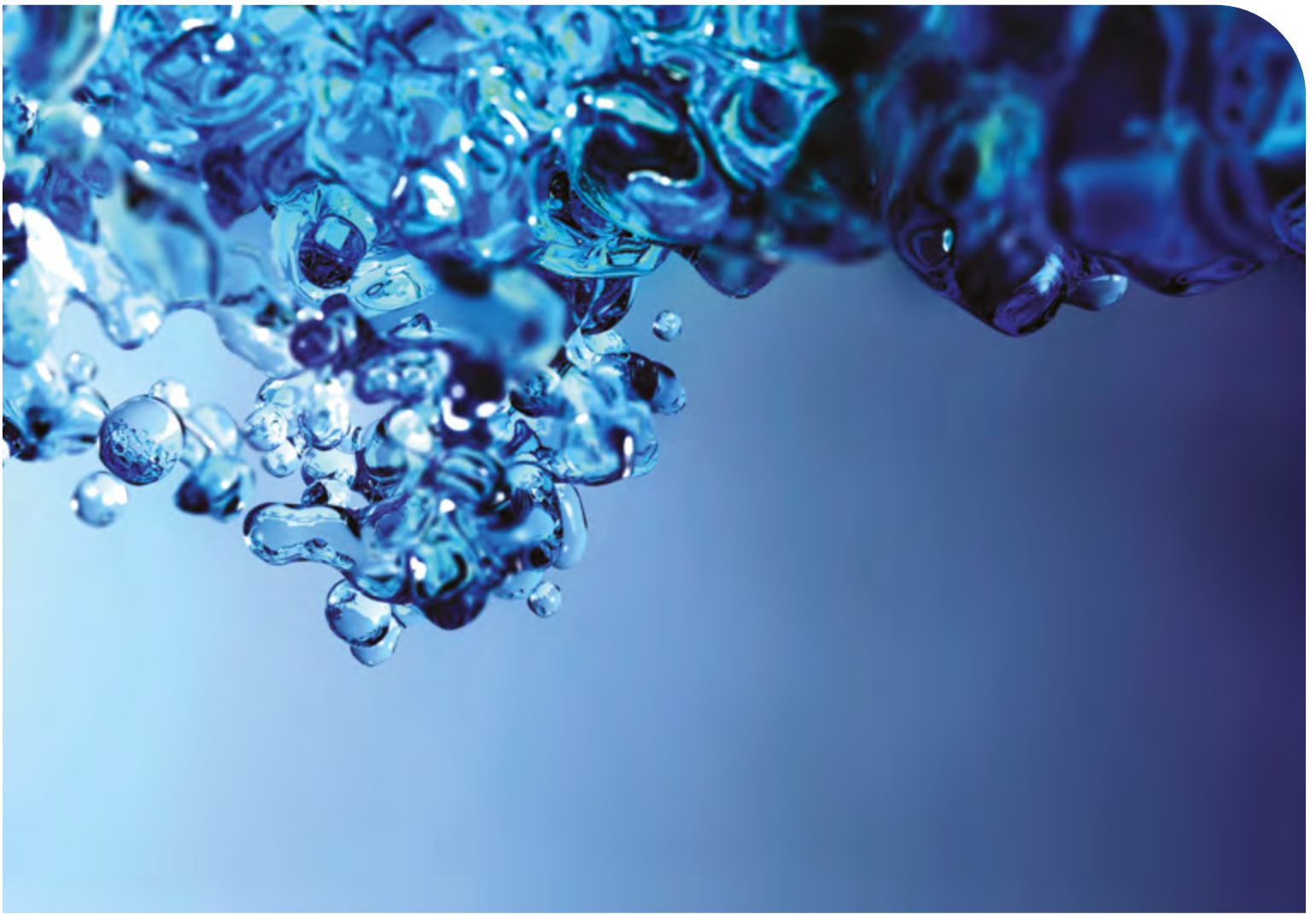
Having placed their trust in Ozonia ozone equipment, it is only logical that clients expect a professional and competent after-sales service as well as technical assistance in case of emergency. Veolia can ensure that clients get optimal support. The services offered range from a hot-line breakdown service to regular plant service contracts – everything to ensure that our clients get the very best from our equipment.





# Resourcing the world

**Veolia Water Technologies**  
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# Ozonia\* Membrel\*

Electrolytic Ozone Generators

**WATER TECHNOLOGIES**

# Electrolytic Ozone Generators

The most effective way to disinfect ultrapure water systems in industrial and pharmaceutical applications.

**Pure & Ultrapure Water**

**Purified & Highly-Purified Water**

**Water For Injection**



**Purified Water  
(PW, UPW, etc) in:**

- Pharmaceuticals
- Medical technologies
- Cosmetics & Personal care products
- Semiconductors
- Other high purity applications



# Ozone Technology: Ozonía Membrel MkV

The **Ozonía Membrel MkV** is the latest generation of electrolytic ozone generators which uses solid polymer electrolyte and state-of-the-art electronics for ozone production. The **Ozonía Membrel MkV** electrolytic process is a **unique technology which produces ozone from water** instead of gaseous air or oxygen. The ozone is generated and used directly within the pure water system after multiple treatment processes have purified the raw/source water.

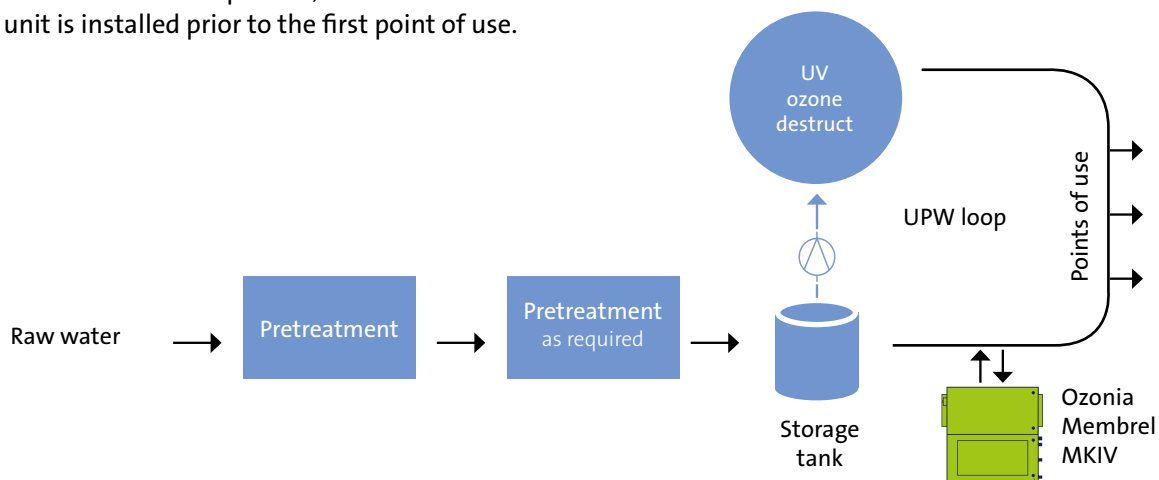
## How It Works

The feed water, taken from the main UPW loop, enters the anode chamber of the cell where it is dissociated into its two elements at the contact surface between the anode and the electrochemically stable membrane.

The hydrogen proton travels through the membrane and is reduced to hydrogen gas on the cathode side before being vented to atmosphere. On the anode side a portion of the liberated oxygen is converted into ozone which is quickly absorbed by the feed water. The water/oxygen/ozone mixture leaving the cell is reintroduced to the main body of water circulating in the loop.

The installation of an **Ozonía Membrel MkV** is an effective way of sanitizing a pure water loop. Because the ozone is produced from the water being treated there are no contaminants. The use of chemicals or additional treatment steps is not necessary.

By dosing an ozone level of 30 to 100 ppb the colony forming unit count and formation of bio-film is kept to a minimum. Should ozone be undesirable in the process, an ultraviolet irradiation ozone destruct unit is installed prior to the first point of use.



## Main Features

- Electrolytic ozone production
- Easily upgradeable from 3g O<sub>3</sub>/h to 9g O<sub>3</sub>/h
- User-friendly with individual cell controls
- Remote control capabilities
- No ionic contamination
- Easily installed, maintaining system integrity
- Integrated flow control

The Ozonia Membrel ozone generator is part of a large-scale fixed installation (LSFI) for the generation of ultrapure water.

## Technical Features

- **Power supply:**  
1 x 230 VAC +10%/-20%,  
50/60 Hz
- **Regulation range:**  
8 to 100%
- **Ambient temperature:**  
+5 to 40°C / +41 to 104°F
- **Design altitude:**  
< 1,000 m.a.s.l. / 3,280 ft.a.s.l.
- **Humidity:**  
RH < 65% (yearly average)
- **Protection class:**  
IP 54, Nema 12
- **Conformity:**  
EN, IEC, ISO, CE, UL, CSA

## Materials

- **Enclosure:**  
304 SS
- **Wetted surfaces:**  
316L SS, titanium, PTFE, PVDF,  
Viton, PSU; certifications:  
FDA & EU, EN10204 3.1
- **Process & waste connections:**  
316L SS

## Complementary Equipment

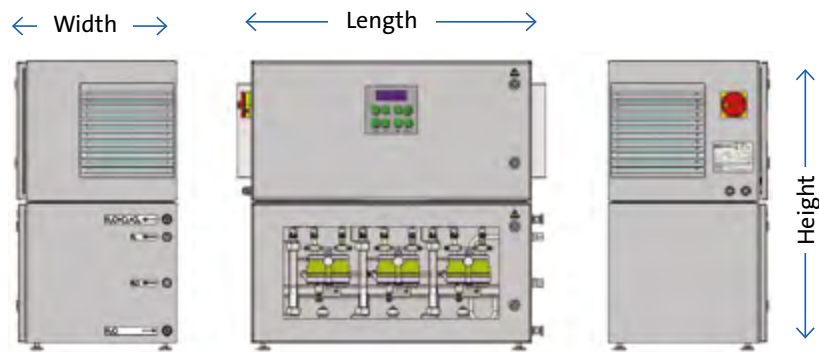
- Ultraviolet ozone destruct unit
- Residual ozone analyser
- Vent ozone destructor
- Optional triclamp for waste lines

## Remote Control And Alarms

- Ozone production ON/OFF
- Set-value (4-20 mA)
- Low flow automatic disconnect
- Voltage & temperature alarms

Model	Ozone Production	Feedwater			Electrical Rating (kW)
	g/h	Nominal Flow Rates (l/h)	Maximum Pressure (barg)	Conductivity (µS/cm)	
Ozonía Membrel MkIV/1	3	100	< 6	< 20	0.46
Ozonía Membrel MkIV/2	6	200	< 6	< 20	0.86
Ozonía Membrel MkIV/3	9	300	< 6	< 20	1.27

## Ozonía Membrel MkIV/1 - MkIV/2 - MkIV/3



Model	L x H x W		Weight	
	inch	mm	lb	kg
Ozonía Membrel MkIV/1	30.3 x 28.7 x 15.7	770 x 730 x 400	123.5	56
Ozonía Membrel MkIV/2	30.3 x 28.7 x 15.7	770 x 730 x 400	134.5	61
Ozonía Membrel MkIV/3	30.3 x 28.7 x 15.7	770 x 730 x 400	145.5	66

## Connection Data

- **Mechanical:**
  - Purified water: triclamp TC25  
10mm ID
  - Waste lines: threaded  
bulkhead fittings (10mm ID,  
12mm OD)
- **Electrical:**
  - Electrical connection in single  
phase (1 X 230V mono)

Veolia's **Ozonia** ozone technology portfolio includes products from the laboratory scale to the largest ozone systems ever built. Veolia uses our extensive ozone technology experience to provide the industry's most reliable and robust products.

Our unique ability to deliver the most reliable and robust systems is why thousands of customers around the world have chosen **Ozonia** ozone systems.

We have been the ozone industry pioneer for over 25 years. Trust Veolia to deliver the highest quality ozone solutions to meet your treatment challenges.

**7** Product Ranges  
Certified To  
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Over **10,000**  
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