Pre-Treatment: Softeners, Multimedia, Carbon Activated, EDI

Multi-Media Filters Ideal for commercial and light industrial applications – E-Series Pretreatment is designed for durable operations, easy installation, and straight forward control. These units are also the perfect complement to the E-Series line of reverse osmosis systems.

Service Deionization (SDI) Products – Provide water from 1.0 to 18.2 MegOhm. They require no permanent installation, chemical handling, or customer maintenance. GE's service DI reps exchange your tanks with regenerated tanks from the local GE Service Center. This Exchange service is useful for applications including analytical labs, automotive dealerships, car washes, beverage plants, hospitals, microelectronics, metal fishing, power plants, photo finishing, pharmaceutical, refineries, and window washers.

Activated Carbon Filters – Ideal for commercial and light industrial applications, E-Series pretreatment is designed for durable operation, easy installation, and straightforward control. The units are also the perfect compliment to the E-Series line of reverse osmosis systems.

EDI Technology – Removes residual salts and ionizable aqueous species such as carbon dioxide, silica, ammonia, and boron from your water sources. The EDI systems operate chemical-free, achieve 97% water recovery, and consume only electricity. They are ideal for multiple applications including power generation for boiler feed and N0x control, semiconductors, microelectronics, food and beverage, and pharmaceuticals.

E4 Series 50 Hz

reverse osmosis machine 0.3 to 2.1 cubic meters per hour

figure 1: E4 Series

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (figure 1) for are designed durable operation, high quality product water production, easy installation and straightforward control.

general properties

typical applications

- Process ingredient water
- Rinse water
- Food ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

standard economy features (ECN)

- 1-micron pre-filter
- Automatic inlet shut-off valve
- Permeate and Concentrate flow meters
- Remote machine on/off capability
- Thermal Motor Protection
- Pre-filter, post-filter, primary, and final pressure gauges
- Flow control center including concentrate and recycle valves

deluxe (DLX) features – in addition to ECN features

- Autoflush system
- Low inlet pressure switch
- Digital conductivity meter with programmable relay
- Alarms: Low Inlet Pressure, Motor Starter overload

table 1: operating parameters

Operating Pressure	15 bar (220 psig)
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	13-30 °C (55-85 °F)
Minimum Inlet Pressure	2 bar (30 psig)
Design Temperature	25 °C (77 °F)

E4H Series 50 Hz

reverse osmosis machine 2.6 to 6.8 cubic meters per hour

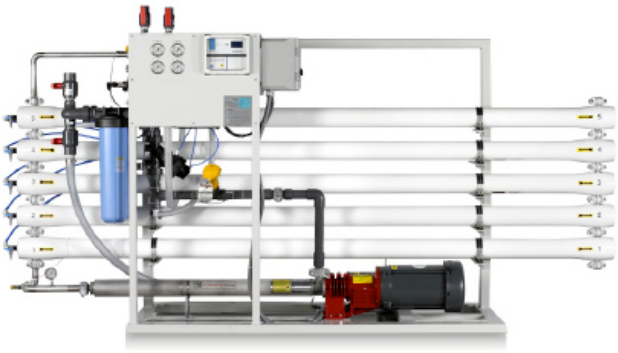

figure 1: E4H series

general properties

typical applications

- Process ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

standard economy features

- 5-micron pre-filter and housing, 20-inch (50.80 cm)
- Automatic inlet shutoff valve
- Motor thermal protection
- Pre/Post-filter and primary/final pressure gauges
- Permeate and concentrate flow rotameters
- Permeate conductivity meter
- ALARMS: Low inlet pressure, high amp draw
- Feed water flush on shut down

deluxe (DLX) features – in addition to ECN features

- Accutrak RO microprocessor controller
- SD card for collection of operating data
- Permeate and concentrate paddlewheel flow sensors
- Inlet pH sensor
- Permeate tank level monitoring
- Chemical dosing pump for antiscalant dosing or pH adjustment
- Clean in Place (CIP) system, 5 HP (3.7 KW)
- ALARMS: Low inlet pressure, high concentrate and permeate pressure, high temperature, high permeate conductivity, high/low pH, motor fault, and fill-time exceeded

table 1: operating parameters

Operating Pressure	14-15 bar
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	13-30 °C (55-85 °F)
Minimum Inlet Pressure	2 bar (30 psig)
Design Temperature	25 °C (77 °F)

E8 Series 50 Hz

reverse osmosis machine 9 to 23 cubic meters per hour

Figure 1: E8 Series

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation, and straightforward control.

general properties

Typical Applications

- Process ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

Standard Economy Features

- Energy saving 37.2 m^2 (400 ft^2) membrane elements
- SS high-pressure piping
- 1-micron pre-filter with SS housing
- Automatic inlet shut-off valve
- Accutrak RO microprocessor controller
  - Permeate and concentrate paddlewheel flow sensors
  - Permeate conductivity sensor
  - Permeate tank level monitoring
  - SD card for collection of operating data
  - ALARMS: Low inlet pressure, high concentrate pressure, high temperature, high permeate conductivity, motor fault, and fill-time exceeded
  - Remote machine on/off capability
- Feed water flush on shut down
- Panel-mounted pre-filter, post-filter, primary, and final pressure gauges

Deluxe (DLX) Features – in addition to ECN features

- Inlet pH sensor
- Chemical dosing pump for antiscalant dosing or pH adjustment
- Clean-In-Place pump plumbed, wired, and mounted; remote tank
- ALARMS: Same as above plus high/low pH, high permeate pressure

Table 1: Operating Parameters

Operating Pressure	14-15 bar
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	13-30 °C (55-85 °F)
Minimum Inlet Pressure	2 bars (30 psig)
Design Temperature	25 °C (77 °F)

E2 Series 50 Hz

reverse osmosis machine 0.06 to 0.33 cubic meters per hour

figure 1: E2 Series

description and use

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (figure 1) are designed for durable operation, high quality product water production, easy installation and straightforward control.

general properties

typical applications

- Process ingredient water
- Safe drinking water
- Spot free rinse water
- Ion exchange pre-treatment
- R & D lab use

standard economy features (ECN)

- 5-micron pre-filter
- Automatic inlet shut-off valve
- Remote machine on/off capability
- Operating pressure gauge
- Brass pump
- Flow control center including concentrate and recycle valves

deluxe (DLX) features – in addition to ECN features

- Low inlet pressure switch
- Conductivity meter
- Stainless steel pump
- Permeate and concentrate flow meters

table 1: operating parameters

Operating Pressure	14-15 bar
Maximum Recovery	50%
Nominal Rejection	95-98%
Operating Temperature	13-30 °C
Minimum Inlet Pressure	2 bar
Design Temperature	25 °C

E4 Series 50 Hz

reverse osmosis machine 0.03 to 2.1 cubic meters per hour

figure 1: E4 Series

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (figure 1) for are designed durable operation, high quality product water production, easy installation and straightforward control.

general properties

typical applications

- Process ingredient water
- Rinse water
- Food ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

standard economy features (ECN)

- 1-micron pre-filter
- Automatic inlet shut-off valve
- Permeate and Concentrate flow meters
- Remote machine on/off capability
- Thermal Motor Protection
- Pre-filter, post-filter, primary, and final pressure gauges
- Flow control center including concentrate and recycle valves

deluxe (DLX) features – in addition to ECN features

- Autoflush system
- Low inlet pressure switch
- Digital conductivity meter with programmable relay
- Alarms: Low Inlet Pressure, Motor Starter overload

table 1: operating parameters

Operating Pressure	15 bar (220 psig)
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	13-30 °C (55-85 °F)
Minimum Inlet Pressure	2 bar (30 psig)
Design Temperature	25 °C (77 °F)

EZ2 Kit, 60 Hz

reverse osmosis machine 375 to 2535 gallons per day

Figure 1: EZ-2 Kit 60 Hz

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation, and straightforward control.

general properties

Typical Applications

- Process ingredient water
- Safe drinking water
- Spot free rinse water
- Ion exchange pre-treatment
- R & D lab use

Standard Economy Features

- 1-micron pre-filter
- Automatic inlet shut-off valve
- Remote machine on/off capability
- Operating pressure gauge
- Flow control center including concentrate and recycle valves
- Brass pump

Deluxe (DLX) Features – In addition to ECN Features

- Low inlet pressure switch
- Conductivity meter
- Stainless steel pump
- Permeate and concentrate flow meters

Table 1: Operating Parameters

Operating Pressure	200-220 psig
Maximum Recovery	50%
Nominal Rejection	95-98%
Operating Temperature	55-85 °F (12-29 °C)
Minimum Inlet Pressure	30 psig
Design Temperature	77 °F (25 °C)

E4-LE Series 60 Hz*

reverse osmosis machine 2,200 to 13,200 gallons per day

Figure 1: E4-LE Series 60 Hz

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation, and straightforward control.

typical applications

- Process ingredient water
- Rinse water
- Food ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

standard economy features (ECN)

- Low energy design reduces electrical requirements and operating costs
- RO Save.Zs*, 1 micron pre-filter
- Automatic inlet shut-off valve
- Permeate and Concentrate flow meters
- Remote machine on/off capability
- Thermal Motor Protection
- Pre-filter, post-filter, primary, and final pressure gauges
- Flow control center including concentrate and recycle valves

deluxe (DLX) features – in addition to ECN features

- Auto flush system
- Low inlet pressure switch
- Digital conductivity meter
- Alarms: Low Inlet Pressure, Motor Starter overload

safety precautions

A Material Safety Data Sheet containing detailed information about this product is available on request.

E2 Series 60 Hz

reverse osmosis machine 375 to 2535 gallons per day

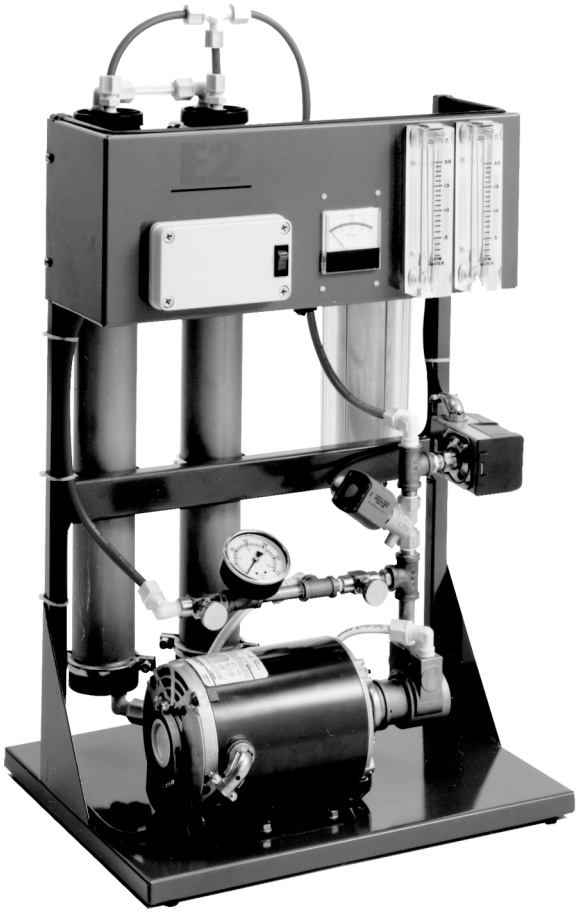

figure 1: E2 Series

When you mention reverse osmosis (RO), Veolia is the first name to come to mind. Our E-series RO machines (figure 1) are designed for durable operation, high quality product water production, easy installation and straightforward control.

general properties

typical applications

- Process ingredient water
- Safe drinking water
- Spot free rinse water
- Ion exchange pre-treatment
- R & D lab use

standard economy features (ECN)

- 5-micron pre-filter
- Automatic inlet shut-off valve
- Remote machine on/off capability
- Operating pressure gauge
- Brass pump
- Flow control center including concentrate and recycle valves

deluxe (DLX) features – in addition to ECN features

- Low inlet pressure switch
- Conductivity meter
- Stainless steel pump
- Permeate and concentrate flow meters

table 1: operating parameters

Operating Pressure	200-220 psig
Maximum Recovery	50%
Nominal Rejection	95-98%
Operating Temperature	55-85 °F
Minimum Inlet Pressure	30 psig
Design Temperature	77 °F

E4H Series 60 Hz

reverse osmosis machine 15,200 to 43,200 gallons per day

Figure 1: E4H Series 60 Hz

When you mention reverse osmosis (RO), Veolia Water & Process Technologies is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation and straightforward control.

General Properties

Typical Applications

- Process ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

Standard Economy Features

- 5-micron pre-filter and housing, 20" (50.80 cm)
- Automatic inlet shutoff valve
- Motor thermal protection
- Pre/Post-filter and primary/final pressure gauges
- Permeate and concentrate flow rotameters
- Permeate conductivity meter
- ALARMS: Low inlet pressure, high amp draw
- Feed water flush on shut down

Deluxe (DLX) Features – In addition to ECN Features

- AccuTrak* RO microprocessor controller
- SD card for collection of operating data
- Permeate and concentrate paddlewheel flow sensors
- Inlet pH sensor
- Permeate tank level monitoring
- Chemical dosing pump for antiscalant dosing or pH adjustment
- Clean in Place (CIP) system, 5 HP (3.7 KW)
- ALARMS: Low inlet pressure, high concentrate and permeate pressure, high temperature, high permeate conductivity, high/low pH, motor fault, and fill-time exceeded

Table 1: Operating Parameters

Operating Pressure	220 psig (15 bar)
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	55-85 °F (13-30 °C)
Minimum Inlet Pressure	30 psig (2 bar)
Design Temperature	77 °F (25 °C)

E8 Series 60 Hz

reverse osmosis machine 57,000 to 144,000 gallons per day

Figure 1: E8 Series 60 Hz

When you mention reverse osmosis (RO), Veolia Water & Process Technologies is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation and straightforward control.

General Properties

Typical Applications

- Process ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

Standard Economy Features

- Energy saving 400 ft^2 (37.2 m^2) membrane elements
- SS high-pressure piping
- 1-micron pre-filter and SS housing
- Automatic inlet shut-off valve
- AccuTrak* RO microprocessor controller
  - Permeate and concentrate paddlewheel flow sensors
  - Permeate conductivity sensor
  - Permeate tank level monitoring
  - SD card for collection of operating data
  - ALARMS: Low inlet pressure, high temperature, high permeate conductivity, motor fault, and fill-time exceeded
  - Remote machine on/off capability
- Feed water flush on shut down
- Panel-mounted pre-filter, post-filter, primary, and final pressure gauges

Deluxe (DLX) Features – in addition to ECN features

- Inlet pH sensor
- Chemical dosing pump for antiscalant dosing or pH adjustment
- Clean-In-Place pump plumbed, wired and mounted; remote tank
- ALARMS: Same as above plus high/low inlet pH, high permeate pressure

Table 1: Operating Parameters

Operating Pressure	200-250 psig (13.8-17.2 bar)
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	55-85 °F (13-30 °C)
Minimum Inlet Pressure	30 psig (2 bar)
Design Temperature	77 °F (25 °C)

E4 Series 60 Hz

reverse osmosis machine 2,200 to 13,200 gallons per day

Figure 1: E4 Series

When you mention reverse osmosis (RO), Veolia Water & Process Technologies is the first name to come to mind. Our E-series RO machines (Figure 1) are designed for durable operation, high quality product water production, easy installation and straightforward control.

General Properties

Typical Applications

- Process ingredient water
- Rinse water
- Food ingredient water
- Safe drinking water
- Boiler feed water
- Ion exchange pre-treatment

Standard Economy Features (ECN)

- 1-micron pre-filter
- Automatic inlet shut-off valve
- Permeate and Concentrate flow meters
- Remote machine on/off capability
- Thermal Motor Protection
- Pre-filter, post-filter, primary, and final pressure gauges
- Flow control center including concentrate and recycle valves

Deluxe (DLX) Features – in addition to ECN features

- Autoflush system
- Low inlet pressure switch
- Digital conductivity meter with programmable relay
- Alarms: Low Inlet Pressure, Motor Starter overload

Table 1: Operating Parameters

Operating Pressure	220 psig (15 bar)
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	55-85 °F (13-30 °C)
Minimum Inlet Pressure	30 psig (2 bar)
Design Temperature	77 °F (25 °C)

E-Cell-3X Stack

Industrial Electrodeionization (EDI) Stacks

E-Cell*-3X is designed to:

- Provide Ultrapure Water for industrial applications including Power, Semiconductor, and General Industry.
- Produce Mixed Bed quality water on a continuous basis.
- Require no caustic or acid for regeneration of ion exchange resin within the stack.
- Be leak free, guaranteed.
- Eliminate brine injection and concentrate recirculation, simplifying system design.

Description and Use

E-Cell-3X stacks are electrodeionization (EDI) stacks which use electrical current to deionize and polish reverse osmosis (RO) permeate water. The product water for the E-Cell-3X is at an Ultrapure level required in today's demanding applications.

Typical Applications

- Microelectronics
- Power Generation (NOx, Boiler Feed)
- General Industry

Quality Assurance

- CE, UL & CSA marked
- Manufactured in a ISO 9001:2000 facility

E-Cell-3X Stack Specifications		
Nominal Flow	5.0 m^3/hr	22.0 gpm
Flow Rate Range	2.27 – 6.36 m^3/hr	10 – 28 gpm
Shipping Weight	135 kg	298 lbs
Dimensions (width x height x depth)	31cm x 61cm x 66cm	12" x 24" x 26"

Typical Performance		
Product Quality		
Resistivity	> 16 MOhm-cm	
Sodium	< 3 ppb	
Silica (SiO2) Removal	Up to 99% or < 5 ppb	
Boron Removal	> 95%	
Operating Parameters		
Recovery	Up to 95%	
Concentrate Flow	Counter current to Product Flow[1]	
Voltage	0–400 VDC	
Amperage	0–5.2 ADC	
Inlet Pressure at Nominal Flow	4.1–6.9 bar	60–100 psi
Pressure Drop at Nominal Flow	1.4–2.8 bar	20–40 psi

Maximum Feed Water Specifications		
Feed Water - Total Exchangeable Anions (TEA as $CaCO_3$)	<25 mg/l	<25 ppm
Feed Water – Conductivity, $NaHCO_3$ equivalent	< 43 µS/cm	< 43 µS/cm
Temperature	5–40˚C	40–104˚F
Total Hardness (as $CaCO_3$)	< 1.0 mg/l	< 1.0 ppm
Silica (SiO_2)	< 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

E-Series Pretreatment

Water Softeners

Ideal for commercial and light industrial applications, E-series pretreatment is designed for durable operation, easy installation and straightforward control. The units are also the perfect compliment to the E-Series line of reverse osmosis systems. Visit www.suezwatertechnologies.com for more information.

general features

- Single tank and alternating systems provide flexible flow options
- NSF 44 certified fiberglass reinforced plastic (FRP) tanks (150 psig design pressure, non-code)
- Brine tank with cover and air check valve
- SUEZ Autotrol* multi-port valves (Performa or Magnum Cv*) with integrated flow meter
- Programmable Veolia Logix 764 controller for regeneration sequence control
- Communication switch for downstream equipment included to prevent operation during regeneration on single systems
- Hardwater bypass during regeneration for single Performa softener units only
- Interlock provided on alternating systems to maintain continuous flow during regeneration
- Manual or volume-initiated automatic regeneration for salt savings
- 120 VAC 60 Hz or 230 VAC 50 Hz models available

Osmo Pro NA Series

60 Hz Reverse Osmosis machines from 50 to 450 gpm

specific basic features (BAS)

- GE Fanuc[1] QuickPanel 6.0-inch monochrome display Touch screen controls
- GE Fanuc Versamax Micro Communication: RS232
- 4-20 mA instruments displayed on instrument center
- UL/cUL Electrical Panel

specific premium features (PRE)

- GE Fanuc Quickpanel, 12.0-inch color display Text and pictorial operating screens, Touch screen controls
- GE Fanuc Versamax, Communication: Ethernet
- 4-20 mA instruments on QuickPanel
- Primary and final pressure transmitters
- RO permeate flush on shutdown
- UL / cUL Electrical Panel
- pH Meter on RO Feed

instrumentation

Flow Meters ..... Permeate & Concentrate
Conductivity..... Permeate
Pressure ..... Pre-& Post Cartridge Filter
RO Feed, Pump Outlet, Interstage (x2)
Concentrate & Permeate
Pressure Switch.... Feed, Permeate, Concentrate
pH (Optional) ..... Feed
ORP (Optional)..... Feed
Instrument Center (BAS) ..... GF Signet 8900
Multimeter

options available

- Allen Bradley CompactLogix PLC Control Package
- Membrane Options:
  - 400 Square Foot Elements
  - High Rejection Elements
- Motor Starter
- Variable Frequency Drive
- ORP Meter
- pH Meter (Option for basic)

PRO NA accessories

- PRO Multi-Media filters
- PRO Activated Carbon and Softeners
- PRO Clean-in-Place units
- PRO Chemical Feed Systems
- Transfer Pumps and Storage Tanks

operating parameters

Design Recovery[2]..... 80%
Design Temperature..... 60ºF (16ºC)
Operating Temperature Range..... 35-85ºF (2-29ºC)
Nominal rejection 97-99%
System Inlet Pressure ..... 30-60 PSI

[2] *Recovery Rate can vary +/- 5%*

materials of construction

High-pressure piping..... 316 Stainless Steel, Sch. 10
Low-pressure piping..... PVC, Sch. 80
Frame..... Painted blue carbon steel
Enclosure ..... NEMA 4

Clamps/fittings ..... Zinc-plated

membrane elements and housings

Membrane Model..... AG8040F
Style ..... Spiral-wound elements
Manufacturer ..... SUEZ
Membrane type ..... TFC (Polyamide)

Pro Series 60 Hz

Reverse Osmosis Machines
50-450 gpm (11.4-102.2 m^3/hr)

Basic Features (BAS)

- Allen-Bradley PanelView 300
  3-inch monochrome display
  Primarily text operating screens
  Compact keypad terminal
- Allen-Bradley MicroLogix 1200
  Communication: DH485
  Analog output: 2 points
- 4-20 mA instruments displayed on instrument center
- UL 508 listed

Premium Features (PRE)

- Allen-Bradley PanelView Plus 700
  6.5-inch color display
  Text and pictorial operating screens
  Keypad and touchscreen controls
- Allen-Bradley SLC 5/04
  Communication: DH+
  Analog output: 4 points
- 4-20 mA instruments on PanelView
- Primary and final pressure transmitters
- RO permeate flush on shutdown
- UL 508 listed

Instrumentation

Flow Meters	Permeate, concentrate
Conductivity	Permeate, (PRE Feature = Added Feed Sensor)
pH	Feed
Pressure	Pre-filter, post-filter, primary, final, permeate, concentrate, pump discharge
Pressure Switch	Feed, permeate, concentrate
ORP	Feed
Instrument Center	Thornton 770 Max

Options Available

- GE Fanuc Control Package
- PRO Multi-Media filters
- PRO Clean-in-Place units
- PRO chemical feed systems
- Transfer pumps and storage tanks

Documentation Included

- Operation and maintenance manual included and also available online at www.gewater.com
- Drawings: piping and instrumentation, electrical and general dimensional

Operating Parameters

Recovery	65-85%
Design temp.	60°F (15.6°C)
Operating range	35 to 85°F (1.6 to 29.4°C)
Nominal rejection	97-99%
Minimal inlet pressure	30 psi

SIRION™ Mega
Reverse Osmosis Systems

Veolia's SIRION™ Reverse Osmosis Systems produce high purity water, removing up to 97% of dissolved inorganics and over 99% of large dissolved organics, colloids and particles.

Flow rates from 40 to 600 GPM.

Applications

- Boiler feed
- Industrial process water
- Cooling water
- Reuse/recycling
- Utility water
- Purified water
- High purity water

Features & Benefits

- Low energy membranes result in lower operational costs
- Frequency controlled variable speed pumps save electricity vs conventional systems
- 5µ pre-filtration included for membrane protection
- Programmable user interface
- Dry run monitor; pump protection
- Cleaned by stage design
- Ethernet IP communication
- Permeate sample valves on each membrane housing
- Antiscalant injection point
- Sodium bisulfite injection point
- Veolia Vision* cloud based integration and reporting

* Veolia Vision is a cloud-based program that allows you to monitor your system performance, day or night, with secure, real-time data available over any internet or cellular connection.

Options

- Concentrate flush
- Concentrate recirculation
- Permeate divert
- Feed ORP measurement
- Interstage permeate back pressure
- Auxiliary flush (must include concentrate flush)
- CIP

Markets

- Food & Beverage
- Chemical
- Healthcare
- Cosmetics & Personal Care
- Institutional
- Primary Metals
- General Manufacturing

Related Services

Veolia's service and support teams offer preventative and corrective maintenance programs to ensure efficient, long term operation.

Hydrex™ Chemicals

For efficient operation, Veolia recommends the use of Hydrex™ water treatment chemicals.

SIRION™ Mega Reverse Osmosis Systems

System Capacity

Mega RO Model #	1104M	2105M	3204M	3205M	6307M
Permeate* (GPM)	40	75	100	130	300
Feed (GPM)	54	100	134	174	400
Typical Salt Rejection (%)	99	99	99	99	99
Pump Motor Size (HP)	15	20	30	40	100

* Flow rates are dependent on feed water quality and temperature. The above values are based on 1000 ppm TDS, 50°F & SDI <3.

System Dimensions

Mega RO Model #	1104M	2105M	3204M	3205M	6307M
Height (in)	102	103	103	103	102
Depth (in)	48	48	48	48	60
Width (in)	192	232	193	233	315
Feed Connection (in)	2	3	3	4	6
Permeate Connection (in)	1½	2	3	3	4

Feed Water Supply Quality

Supply Pressure	min. 20 psi	max. 40 psi
Operating Temperature	min. 35°F	max. 110° F

Materials of Construction

Pressure Vessels	FRP
High/Low Pressure Pipework	304 Stainless Steel/PVC, Sch. 80
Frame	Painted Carbon Steel
Enclosure	NEMA 4 Painted Carbon Steel

Utility Requirements

480V, 3 phase, 60Hz Motor Supply
120V, 1 phase, 60Hz, 10 Amp Control Supply
80 psig instrument air.

For additional flow rate applications, consult your local Veolia Water Technologies company, contact details below.

Veolia Water Technologies - R16- 05/5/2017

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dayton.info@veolia.com • www.veoliawatertech.com

VEOLIA

Orion™

Reliable and proven purified water technology with intelligent innovation in the age of sustainability.

WATER TECHNOLOGIES

The latest generation of innovative purified water treatment systems for the pharmaceutical, generics, healthcare and biotechnology markets.

The Orion™ is a premier, fully-validated standard system.

Meeting the quality standards of the current USP and Ph Eur for purified water and cold WFI

Fully compliant with FDA, cGMP and GAMP requirements

Manufactured and designed in accordance with the current ISPE guidelines for water and steam

Delivering critical high-performance in a sustainable manner is key for this high-technology product. Energy and water saving technology combined with operator friendly HMI information will be displayed to allow cumulative key operational parameters to be measured. Our improved skid design with easy to identify operational modes brings health and safety for user to the next level.

Multi-technology unit

The Orion comes as a skid mounted multi-technology system:

- Comprising of softening, reverse osmosis and continous electrodeionization (CEDI) as its core technologies which can be fully or partially hot water sanitized above 80° C.
- A diverse range of options are available including pre and post UV, UF for cold WFI, filtration and degassing.
- All systems follow our stringent sustainability manufacturing guidelines and are FAT tested prior to delivery.

Validation

Our validation package covers everything you require for your system to meet the manufacturing criteria such as cGAMP and in accordance with the current ISPE guidelines, as well as inspection bodies, including the FDA, MCA. The documentation follows the regimes, protocols and guidelines laid out by the regulatory authorities for a smooth progression from design qualification right through to successful completion of the performance qualification.

This range truly is a differentiated modular system offering the broadest flexibility by providing enhanced features and options to compliment each model. The Orion can meet your diverse range of product manufacturing requirements along with your evolving sustainability requirements.

Gamp MCA FDA ISPE Connecting Pharmaceutical Knowledge usp™

Models

Sustainability is at the core of the Orion. Energy and water efficiencies are displayed on all models and all materials of construction have been selected for optimum reuse and recyclability at the end of life.

Available in three models with a range of flow rates from 0.5 to 20 m³/h, the Orion is an evolution in modular water treatment.

The Orion combines compendial purified water and cold WFI through tried and tested process excellence with additional sustainability features at its core, creating an unrivalled water technology package.

C-SERIES

This is our classic Orion offering the core technology within the most economic investment package.

E-SERIES

Our mid-range Orion provides the standard features of reduced water-to-waste during recycle and conserves both water and energy use during recycle, meeting good environmental practices.

S-SERIES

Is our premier Orion meeting the ultimate requirements for sustainability. Optimizing our technology we can offer overall reduced energy and water consumption combined with long-term operational savings.

Environmental excellence and product efficiency

Embracing sustainable innovation

The Orion technology helps to address today's environmental challenges by helping you to reduce your water and energy consumption. All products and materials have been selected for optimum recyclability.

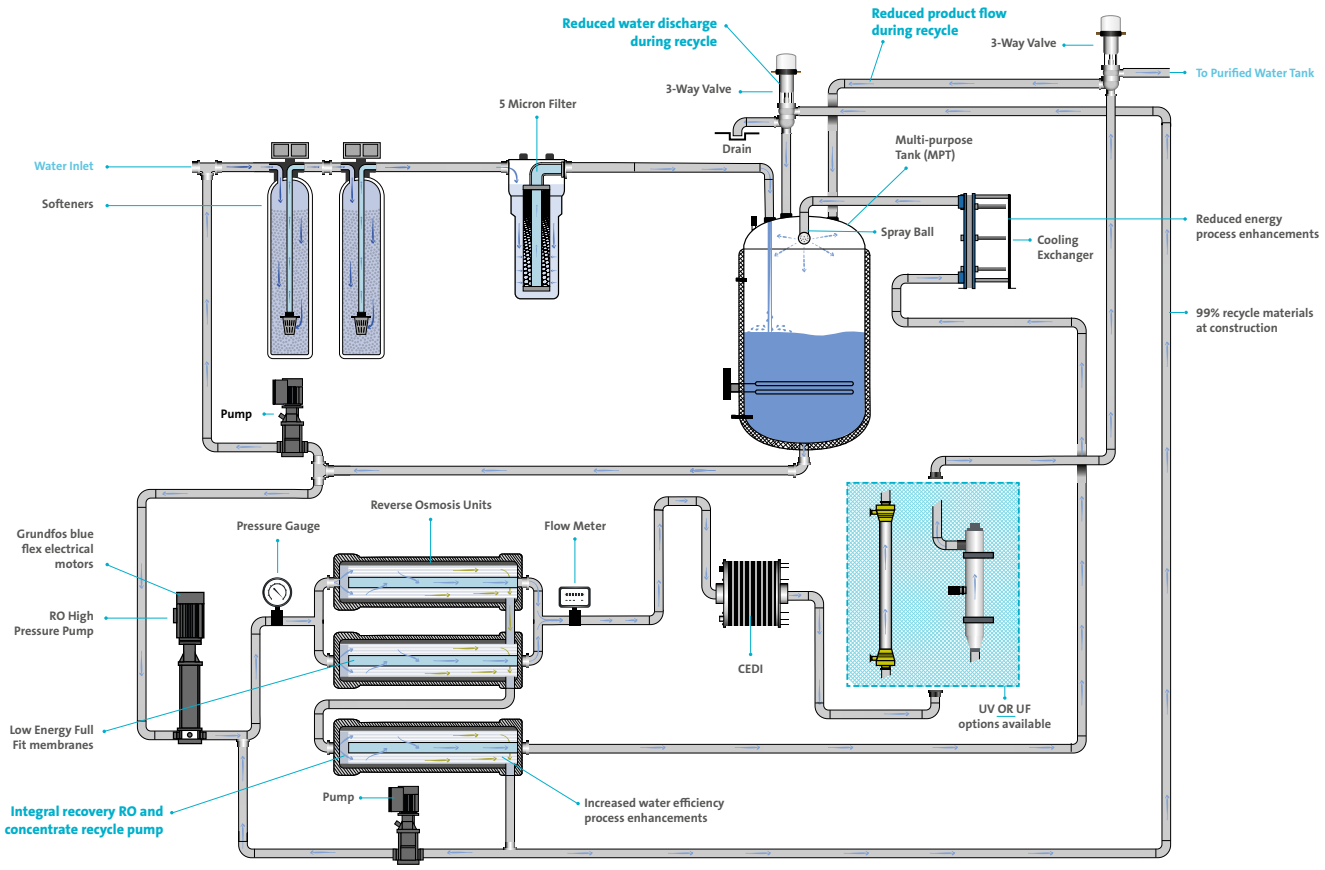
Carbon footprint: up to 30% reduction of CO_2 released during operation

Water footprint: up to 40% recovered

Environmental footprint: 99% of materials used with recyclable potential

Chemical footprint: minimal chemicals used during operation

Sustainability enhanced performance



- Health and safety operational status lights
- Manufactured within environmental ISO9001:2015
- Chemical free sanitization
- End of life components recycle guide

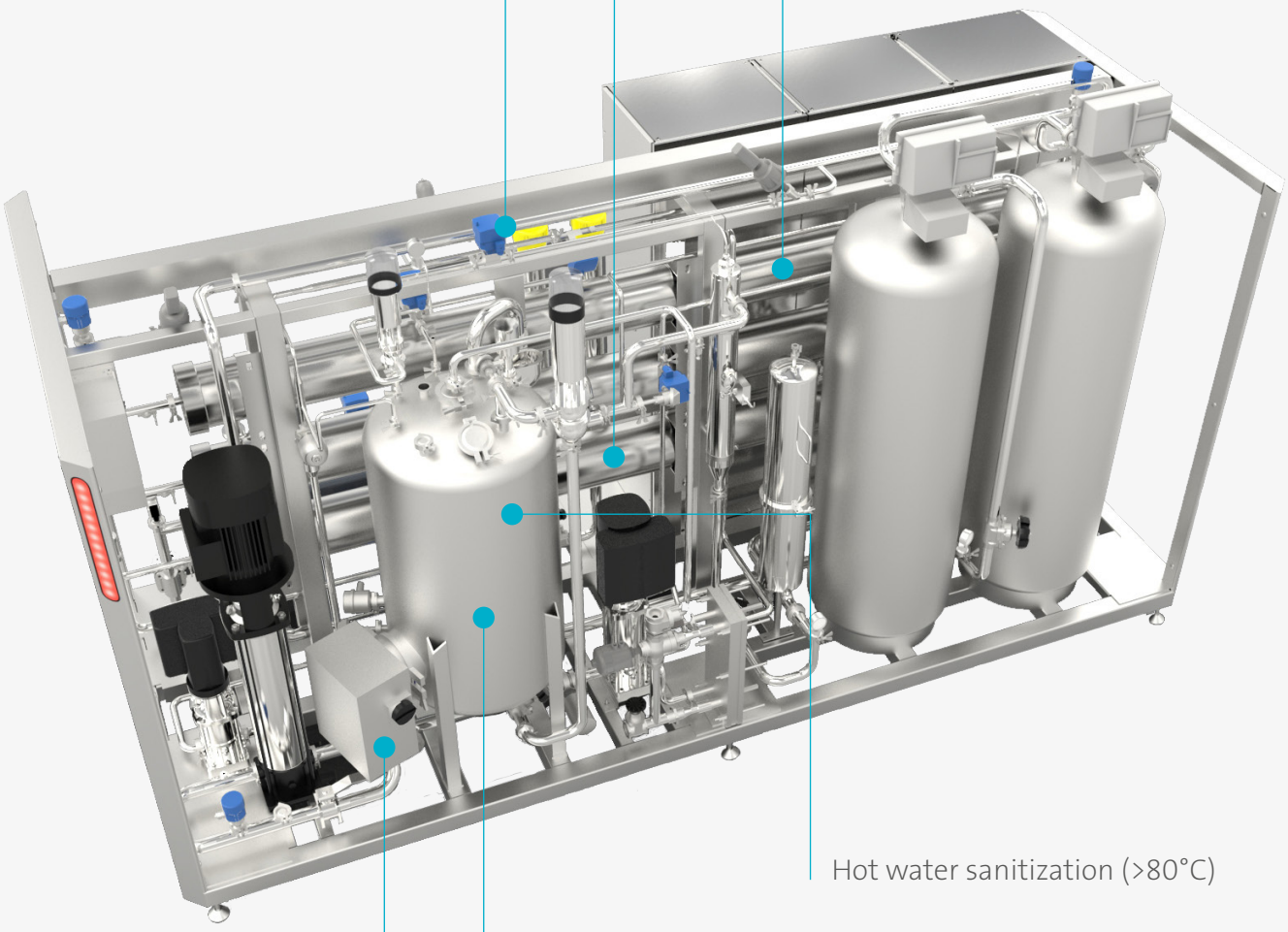
A sustainable product

Control and instrument features

Reliable and proven purified water technology with intelligent innovation in the age of sustainability.

- Colored operational status lights
- HMI & PLC: Allen Bradley plus S7 Siemens options
- Sustainability display for energy savings with trending
- Multi-level service access button
- Ethernet communication card
- Hubgrade digital solutions portal and remote monitoring

Process and mechanical features



System operating parameters

Model	Unit	500	1000	2000	4000	6000
Permeate nominal flowrate	m³/h	0.5	1	2	4	6
Nominal feed flowrate	m³/h	0.625[1] - 0.560[2]	1.25[1] - 1.12[2]	2.5[1] - 2.24[2]	5[1] - 4.48[2]	7.5[1] - 6.72[2]
RO recovery	%	75 - 90				
Typical design flux	l/h/m²	21 to 45 (depending on source water)				
Typical salt rejection	%	RO >96% - CEDI >99%				

Model	Unit	9000	12000	15000	20000
Permeate nominal flowrate	m³/h	9	12	15	20
Nominal feed flowrate	m³/h	13.5[1] - 10[2]	15[1] - 13.35[2]	18.75[1] - 16.70[2]	25[1] - 22.25[2]
RO recovery	%	75 - 90			
Typical design flux	l/h/m²	21 to 45 (depending on source water)			
Typical salt rejection	%	RO >96% - CEDI >99%			

[1] C Series. [2] S Series.

System dimensions

Model	Unit	500	1000	2000	4000	6000
Total installed length	m	1.40	1.40	1.40	1.60	1.60
Total installed width	m	3.60	3.60	3.60	4.00	4.00
Total installed height	m	2.10	2.10	2.10	2.35	2.35
Weight	kg	2100	2300	2600	4700	6000

Model	Unit	9000	12000	15000	20000
Total installed length	m	1.80 - 1.41	1.80 - 1.49	2.00 - 1.81	2.00 - 1.89
Total installed width	m	5.00 - 1.82	5.00 - 1.98	5.00 - 2.45	5.00 - 2.60
Total installed height	m	2.30 - 2.70	2.30 - 2.75	2.30 - 2.45	2.30 - 2.60
Weight	kg	5600 - 3600	6400 - 4500	7200 - 5500	8000 - 7000

For models 9000 and above: Orion main skid - softening skid.

System dimensions

Model	Unit	500	1000	2000	4000	6000
Feed	in	1	1	1	1½	1½
Treated water	in	¾	¾	1	1½	1½
Instrument air	mm	8				
Drain	OD	63	63	63	63	63
Cooling water	in	1 (for E or S Series only)				

Model	Unit	9000	12000	15000	20000
Feed	in	1	1	1	1½
Treated water	in	¾	¾	1	1½
Instrument air	mm	8			
Drain	OD	75	75	110	110
Cooling water	in	1 (for E or S Series only)			

Materials of construction

Softeners	Plastic or stainless steel
Soft water tank	HDPE/GRP/ABS
Skid	Stainless steel
Multi-purpose tank	Stainless steel
Control cabinet	Stainless steel or painted carbon steel

Feed water requirements[3]

Parameter	Unit	Value
Minimum water temperature	°C	5
Maximum water temperature	°C	30
Minimum supply pressure	barg	4
Maximum supply pressure	barg	6
Max silt density index (SDI)	-	<3
Maximum inlet turbidity	NTU	<1
Maximum inlet TDS	mg/l	Up to 800 ppm
Max inlet total hardness	mg/l $CaCO_3$	<500 (with softeners) <10 (feed to the RO membranes) <1 (feed to the CDI modules)
Max inlet CO_2	mg/l	Up to 30 ppm if treated through membrane degasser (option)
Max inlet silica	mg/l	Up to 20 ppm
Max inlet TOC	mg/l	<1
Max inlet free chlorine Cl_2	mg/l	< 0.25

[3] Orion system design program (SDP) must be performed based on specific water analysis and project data.

Typical treated water quality

Parameter	Unit	Value
Average conductivity	µS/cm	< 0.2
TOC	ppb	<100
Bacteria	cfu/100 ml	< 10
Endotoxins	EU/ml	< 0.125

Environmental conditions

Parameter	Unit	Value
Minimum ambient temperature	°C	5
Maximum ambient temperature	°C	40
Maximum humidity	%	80

Power requirements

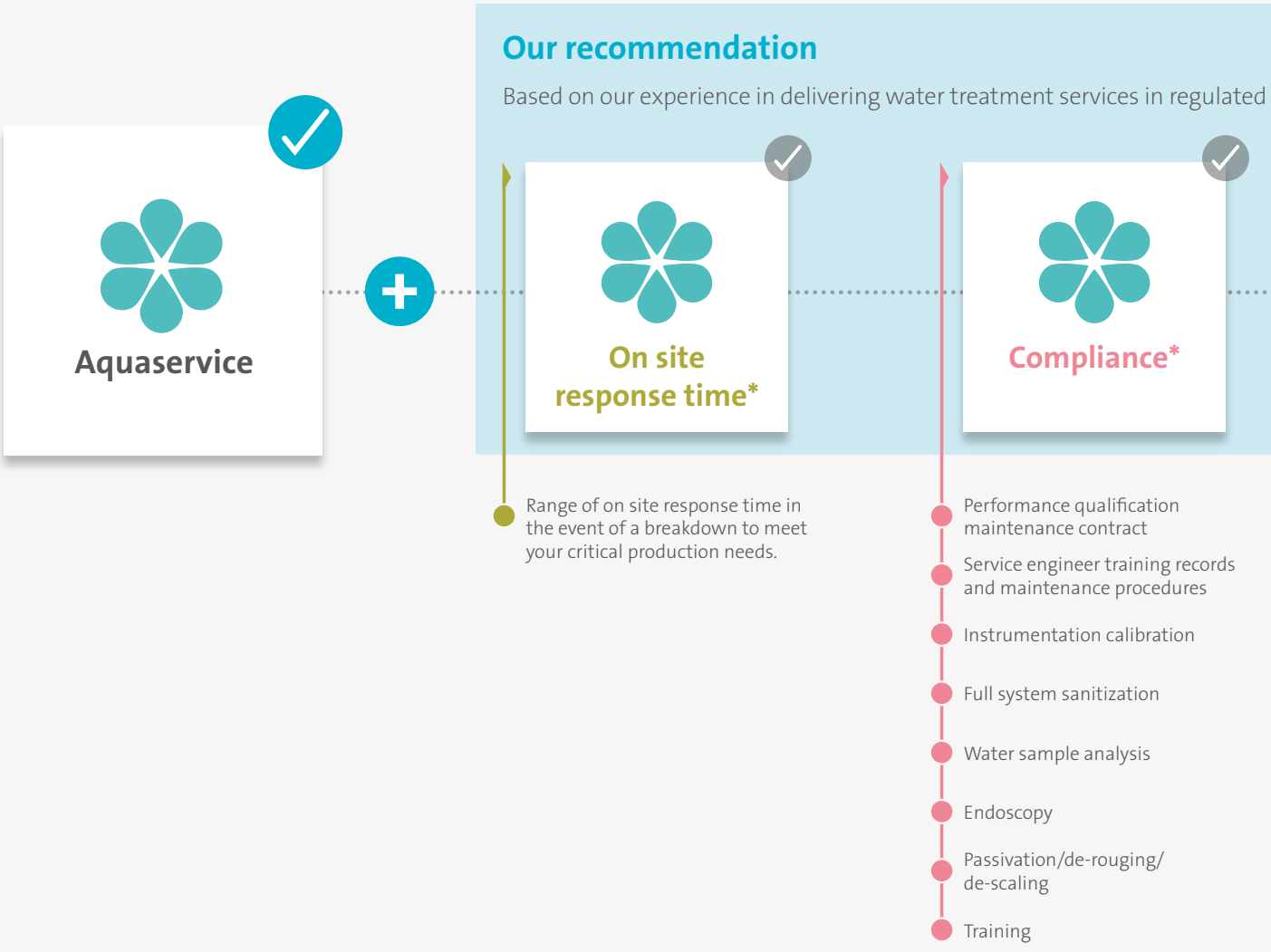
Parameter	Unit	Value
Voltage	V	380-420
Frequency	Hz	50-60
Phases	-	3

Our services made simple

Aquaservice™ will support you to maintain ongoing system compliance with regulations and maximize system uptime. Our engineers and technical support team are GMP trained and used to working in regulated environments.

Your bundle, your choice

All the benefits of Aquaservice are included as standard. Flexible service bundles provide lifetime cover for your system and the peace of mind that comes with having a reliable regulated water treatment service that you can trust.



Note: additional ad-hoc services may be included based on installed system requirements.

** Subject to local capabilities. Please contact your local Veolia Water Technologies representative to confirm available services.*

"Our commitment to achieve environmental excellence and product efficiency"

Our vision

Our commitment to sustainability is at the heart of everything we do. This is reflected not only in our effort to embed environmental and socially responsible business practices but by taking the opportunity to adapt and improve our products and services to meet the needs of our environmentally-conscious customers looking to achieve a sustainable future. Being the benchmark company for ecological transformation, we support our customers in achieving their sustainable goals and this is demonstrated by the new Orion.

Embracing sustainable innovation

The new Orion helps address environmental challenges by enabling customers to reduce water and energy use. With up to 40 percent of water recovered, customers see a tangible benefit of reusing water in their process stream while improving the environmental performance of their operations. The Orion is a sustainable solution for pharmaceutical applications offering the potential to reduce overall water consumption through its water reuse cycle and energy consumption owing to more energy-efficient pumps. An additional benefit is the product's recyclability for when it reaches the end of its life.

industries.

Consumables and parts*

- Specified consumables
- Specified seals
- Specified chemicals
- Specified critical parts

Remote support*

- Manual data upload and monitoring
- Remote monitoring and alarm managed by our in-house experts
- Access to our specialists for process expertise support
- Data analytics, performance improvement recommendations and technical reports
- Customizable KPIs and algorithms to monitor and predict performance

Enhanced response (all inclusive)*

- All parts included
- Breakdown - priority response and labor included

To learn more

Resourcing the world

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www.veoliawatertechnologies.com

SOLYS VEOLIA

TERION™

Plug & Play RO-CEDI Demineralisation Solution for the Power Industry

WATER TECHNOLOGIES

Meeting the water challenges in the Power Industry

Today's challenge of generating sustainable power at competitive prices is growing right along with the worldwide demand.

Continuous challenges include improvement of plants' productivity, protecting valuable assets and maintaining consistent, uninterrupted operation.

Owners need to minimize their capital, installation and operating expenses while providing quality product water for high-pressure boilers and/or gas turbine injection, among other applications.

In a sector where both cost reduction and the quality of demineralized water is key to prevent scaling and corrosion of generation assets, more and more plants are using other source waters instead of potable to avoid rising costs.

A greater flexibility and the latest digital innovations to guarantee security and simplicity is the winning combination for them.

Veolia Water Technologies, as an expert in industrial water treatment solutions, has developed TERION™, its range of plug and play standard integrated RO CEDI systems, which meet the needs of the power industry players when they have to produce high quality demineralized water to protect their revenue generating assets!

Industry Requirements

- Constant high product water quality meeting the low level of conductivity, silica, sodium, TOC and potassium required by the Power Industry
- Production continuity
- Cost effectiveness
- Easy installation and maintenance
- Security and reduced risks

Applications

The TERION range produces high purity water, particularly suitable for:

- Power applications
  - Boiler feed
  - Turbine injection
- Industrial process water (microelectronics, f&B, Utilities....)

TERION™

The Plug & Play single-skid RO CEDI solution for demineralised water production

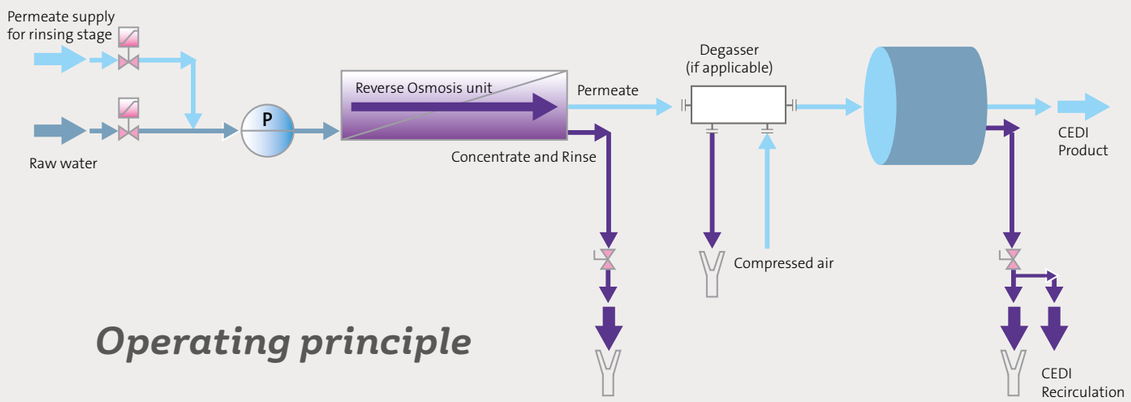
Fully designed and standardized thanks to Veolia Water technologies proven expertise, the new product TERION combines a single pass reverse osmosis and continuous electrodeionization to **produce high grade demineralized water** adapted for power applications and especially for **boiler feed and turbine injection**.
Including high quality RO and CEDI technologies, instrumentation and control panel **on one single skid**, Terion differs from most of the products in the marketplace offering separate RO and EDI skids,hence higher costs of installation.

Cost effectiveness
- Low installation and operation costs
- Standardized design
- Reliability of operation
- High quality products
- Short lead and delivery time (optimized supply chain)
- Easily duplicable
- Technical and engineering documents available from tender phase

High availability and performance
- Nearly a continuous process since no need to stop for regeneration
- No Acid or Caustic regeneration chemicals required -> improved safety on site
- Filter to protect RO of possible risk coming from raw water
- High efficiency motors and VFD (Variable Frequency Device) pumps to save up to 50% on electrical power
- Individual Power panel for each CEDI modules -> high reliability
- Easy access for maintenance, specific measurement and operation
- Global service offer

Plug & Play unit
- Reduced installation time and commissioning
- Pre-assembled and pre-tested in the workshop
- 100% containerized
- Quicker start of demin water

Remote Monitoring
- AQUAVISTA™ enabled for remote monitoring and in depth operator training
- Easy access to information and simple operation thanks to advanced programing of the PLC
- User friendly HMI



Operating principle

A full TERION™ range to suit your needs

Terion enables to remove over 99.9% of dissolved inorganics and over 99% of large dissolved organics to produce demineralized water meeting the most stringent specifications in silica, sodium, potassium and TOC levels.

Pre-treated water feeding the TERION unit will initially pass through a 5µm cartridge filter to protect RO from any possible solid matter. The water will then pass through an array of high rejection low energy RO membranes for removal of organics and main dissolved salts before salinity polishing through enhanced performance CEDI stacks. When required, 2 inlet injection points allow easy pretreatment conditioning from the customer.

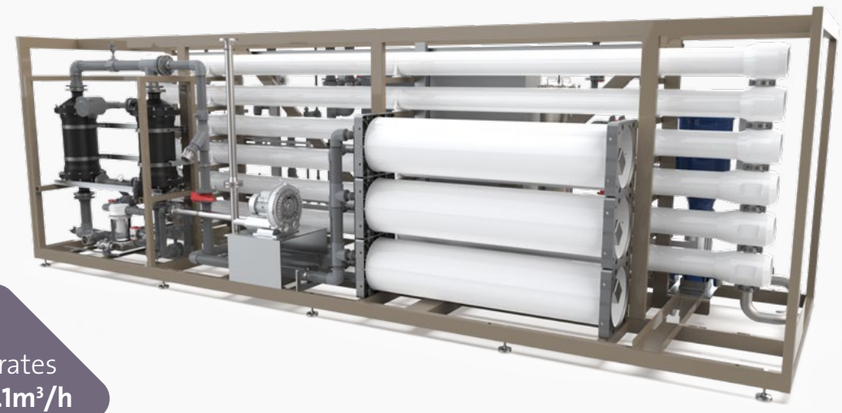
A chemical free alternative may be possible using CO_2 membrane degasser and pretreated softened water.

Terion is available in five skid mounted units ranging from **5.1 m³/h to 52.7 m³/h** (depending upon inlet water quality) and in two different versions - standard and premium- as a function of the treated water targets. With Terion, Veolia Water Technologies offer a **larger range of product than the main competitor** (6 to 50m³/h for VWT vs 9-26m³/h).

With a modular frame, Terion takes advantage of common components and piping layout across different models to harmonize skid configuration.

Flexibility given by options

- Different versions, well water or surface water inlet, standard or premium product water quality
- Ready for manual CIP
- Two chemical injection points (no dosing sets)
- CO_2 removal membrane degasser. including a blower for the biggest units
- Feed water pH probe
- Automatic Valve for RO Flushing using permeate
- Witnessed Factory Acceptance Test (FAT) incl wet tests to reduce on site testing



Flow rates from **5.1m³/h** to **52.7m³/h**

Key Features and Performances

System Operating Parameters

Model	Unit	6200	12500	25000	37500	50000
Permeate flowrate @ 12°C*	m³/h	5.1-6.6	10.1-13.2	20.9-26.4	30.1-39.5	45-52.7
Feed water flowrate @ 12°C*	m³/h	7.5-9.2	14.9-18.5	30.9-37	44.5-55.5	66.7-74
Typical Design flux	l/m²/h	Well Water : 28 -Surface Water : 25				
RO Recovery(2)	%	75-80				
CEDI Recovery(2)	%	90-95				
Installed power(2)	kW	21	25	53	77	87

(1): Typical flow rates mentioned here are based on surface water (for the minimum flow) and well water (for the maximum flow).
(2): Flow rates and installed power depend on feed water quality and temperature. RO and CEDI projections to be performed based on project data.

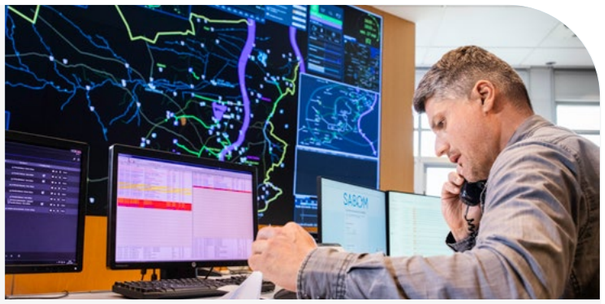
System Dimensions

Model	Unit	6200	12500	25000	37500	50000
Length	mm	5800	7450	7450	7450	7450
Width	mm	1750	1750	2150	2150	2150
Height	mm	2270	2270	2420	2420	2420
Empty weight	kg	2048	2919	4884	6295	7673
Operating Max weight	kg	2781	3608	6160	7725	9434
Configuration RO-CEDI		110X3- VNX28X1	210X4 - VNX55X1	320X5 - VNX55X2	420X6 - VNX55X3	630X6 - VNX55X4

** These dimensions are given for unit in operation. All units are suitable for transportation in a container*

Pipes Connections

Model	6200	12500	25000	37500	50000
Feed water	DN40	DN50	DN80	DN100	DN100
CEDI Product (outlet and divert)	DN32	DN50	DN65	DN80	DN100
Product CEDI reject	DN10	DN15	DN15	DN25	DN25
RO Concentrate	DN32	DN32	DN40	DN40	DN65



A global service Offer

Terion, like all Veolia SOLYS standardized plug and play solutions, is delivered, installed and commissioned quickly , enabling industrial manufacturers and Power manufacturers in particular, to reduce their infrastructure and civil engineering costs.

- Most engineering tasks done in advance at the product development stage
- Highly reduced cost of engineering in execution
- Short lead times
- Controlled supply-chain ISO 9001:2015
- Experienced and certified staff for assembly and commissioning

Customer care

Witnessed FAT by end-user :

Final Factory Acceptance Test of the fully pre-tested product are often organised in our workshops with the end-user.

Commissioning support

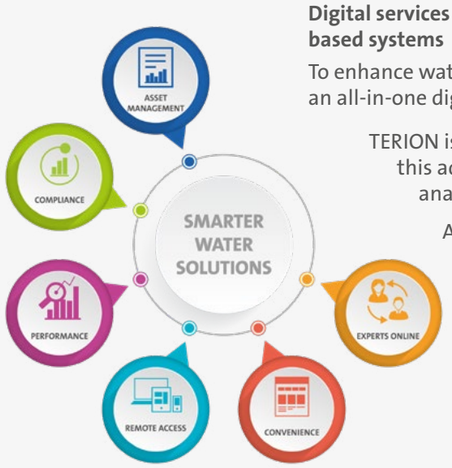
Veolia Water Technologies can offer on-site commissioning support and in-depth operator training.

After-sales service

Local aftermarket service and support teams offer preventive and corrective maintenance programs to ensure the long-term, efficient operation of installed plants.

AQUAVISTA™ for TERION

DIGITAL SERVICES



Digital services for plant performance optimisation. Run on today's most secure cloud-based systems

To enhance water treatment at your facility, Veolia Water Technologies has developed an all-in-one digital service called–AQUAVISTA™.

TERION is AQUAVISTA enabled, which means, that you can decide to benefit from this advanced service (Portal , Insight and Assist) relying on IOT, advanced analytics and Veolia's water treatment expertise.

AQUAVISTA allows for

- remote monitoring of more than 50 parameters of your equipment
- efficient water management thanks to real-time 24/7 alarm
- KPI monitoring for compliance & stable operation
- online support regarding your processes or for troubleshooting and emergency

AQUAVISTA™ will optimise water, energy and chemical consumptions of your equipment while reducing your production downtimes and your non compliance events.

Also available at Veolia Solys

Full standard treatment line TERION + pretreatment

SOLYS can provide the appropriate standard technologies to be used as pre-treatment line upstream of the Terion™, according to the inlet water quality (river, well water, potable water, reuse water).

Raw water →

ACTIFLO Pack
Clarification

possible alternatives: Multiflo Pack , Idraflot

FILTRAFLO Pack
Filtration

possible alternative: Uflex

Ionsoft
Softening

if required

Sirion Mega HF
1 pass RO

if required

NEW TERION

TERION™ complementary products

Cleaning in Place (CIP)
SOLYS can provide the appropriate standard CIP station for cleaning of fouled or scaled RO membranes or CEDI of TERION.

Chemical dosing sets including pump, accessories and tanks, for pretreatment line, antiscalant, acid or soda if applicable

Consumables, spare parts and emergency service kits
A complete set of consumables is available eg. FILO cartridge filters, RO membranes, etc.

HYDREX® chemicals
Hydrex 4000 water treatment chemicals from SOLYS are recommended for optimised operation.

Tonkaflo AS Series Pumps

The AS Series combines the benefits of Tonkaflo's industry-leading pump with the durability of all stainless-steel construction. The AS Series is a multi-stage, centrifugal pump with an all stainless-steel liquid end mounted on a high thrust bearing frame. Engineered to be efficiently driven by a standard motor, each of the AS Series pumps offers dependable performance and long life. And with over 200 standard models, there is an AS Series pump to fit almost any 50 Hz or 60 Hz application.

Especially designed to meet tough industrial demands, AS Series pumps tolerate the most punishing applications and harshest environments. Ideal for membrane system applications, AS Series pumps also excel in industrial boost applications such as water-soluble machine coolants, sanitizing systems, and higher temperature water recirculation.

features and benefits

- All Stainless-Steel Construction makes AS Series pumps more durable and less susceptible to operator error. AS Series pumps are also chemically compatible with hydrocarbons, and can perform within a greater temperature range than the standard Tonkaflo SS Series.
- Fabricated Sheet Metal Stages require less maintenance, and eliminate the need to balance pump impellers. The end result is smoother operation, less vibration and longer pump life.
- Separate Bearing Frame increases pump reliability and life because there is no thrust load on the motor. In addition, this feature allows AS Series pumps to be powered by standard motors.
- Modular Liquid End allows service of the mechanical seal without disassembling the liquid end of the pump. The AS Series' modular design facilitates service of both pump and bearing frame, and promotes flexibility when positioning piping.
- Industry Standard Mechanical Seal on pump inlet delivers higher boost pressure capacity and longer seal life, and simplifies the specifying and finding of replacement parts.
- Victaulic Connections reduce piping stress and make the installation of AS Series pumps easier.

general specifications

connections

- 1.25-inch Victaulic (400-2500 Series)
- 2.0-inch Victaulic-Inlet, 1.5-inch Victaulic-Discharge (4000 Series)
- 3.0-inch Victaulic (9000, 14000 Series)
- 4.0-inch Victaulic-Inlet, 3.0-inch Victaulic-Discharge (22500 Series)
- 4.0- or 6.0-inch Victaulic-Inlet, 4.0-inch Victaulic-Discharge (30000, 40000 Series)

power[1]

- 60 Hz - 3 phase (208-230/460 volt)
- 60 Hz - 1 phase (115/208-230 volt)
- 50 Hz - 3 phase (190/380 volt)
- 50 Hz - 1 phase (110/220 volt)

[1] 575 volts and 380 volt 60Hz as well as 220 and 415 volt 50Hz are available on request.

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us."

Tonkaflo Pumps
SS Series

Figure 1: Tonkaflo SS Series pumps

As the industry standard for reverse osmosis (RO), Tonkaflo SS Series pumps (Figure 1) are backed by years of proven experience. The SS Series is a stainless steel multi-stage centrifugal pump with Noryl* plastic impellers. To reduce pump wear, SS Series pumps operate at lower speeds than single-stage pumps while achieving equivalent boost pressures. The SS Series' flexible, multi-stage design allows users to achieve their exact pressure requirements by adding or removing stages.

Specifically designed to meet the challenges of industrial membrane systems, SS Series pumps excel in any high-pressure application. TONKAFLO SS Series pumps are ideal for water boost and recirculation in buildings, high-pressure transfer, and spray applications.

Features and Benefits

- **Corrosion-Resistant Construction** including Noryl plastic diffusers and impellers and 316 stainless steel pump case and shaft ensure long-lasting performance.
- **Modular Liquid End** allows service of the mechanical seal without disassembling the liquid end of the pump. The SS Series' modular design also simplifies service of both pump and bearing frame, and permits design flexibility when positioning piping.
- **Wide Selection** of pump models is available. There is an SS Series pump to fit any pressure or flow.
- **Separate Bearing Frame** increases pump reliability by eliminating thrust load on the motor. In addition, this feature allows the SS Series pumps to be powered by standard motors.
- **Customized** SS Series pumps are available on a pre-approved and limited basis. Contact your local sales office for availability and pricing.
- **Industry Standard Mechanical Seal** on pump inlet delivers higher boost pressure capability and longer seal life, and simplifies specifying and finding replacement parts.
- **High Pressure Reverse Osmosis** - The SS Series pumps feature the K-Bearing frame which eliminates alignment problems by close-coupling the pump to motors up to 100 Hp.

Table 1: Operating Specifications

Motor	Standard Air-Cooled NEMA Motors (3500 rpm)
Capacity	1.4 to 300 gpm (5.3 to 1136 Lpm)
Pressures	up to 700 psid (48.3 bar)
Total Discharge Head Pressure	up to 1000 psig (69 bar)
Maximum Operating Temperature	Standard: 125°F (52°C)
Mounting	Horizontal (all), Vertical (limited)

VEOLIA

E-Cell* Electrodeionization (EDI) Stack

WATER TECHNOLOGIES

Evolution Of Demineralization

Electrodeionization (EDI) For Industrial Use

For many years, operators of pure water production systems were trying to find a technology to replace mixed bed ion exchange for final demineralization. The operating cost as well as the complexity and risks associated with acid and caustic regeneration were frustrations to these operators. EDI became established as the innovative alternative solution by reducing operating costs, improving site environmental, health, and safety risk profiles, and producing a continuous and steady supply of pure and ultrapure water.

Production of pure water has evolved from conventional pretreatment with multiple stages of ion exchange in initial and final demineralization to the following membrane based operations, including EDI, that are now considered to be best practice by many customers around the world:

Pre-treatment – (MF)/ (UF) → Reverse osmosis → EDI

EDI utilizes both traditional ion exchange resin and ion exchange membrane to remove contaminants, including those that are uncharged or lightly charged in the feed water such as silica and boron. The biggest advantage lies in the fact that EDI technology employs direct current to drive contaminants out of the feed water and through the ion exchange membranes into the concentrate channels. The direct current also splits water into hydrogen and hydroxyl ions which act as continuous regenerating agents so that contaminants do not accumulate on the ion exchange resin. Therefore, EDI can continuously and predictably produce high-purity and ultrapure water with equal or better quality than mixed bed ion exchange.

Advantages Of EDI Compared To Mixed Bed

- More advanced technology
- No regeneration chemicals or neutralization systems needed
- Much lower operating cost
- Continuous and simplified operation
- A smaller footprint and reduced building height requirement

Typical EDI Applications

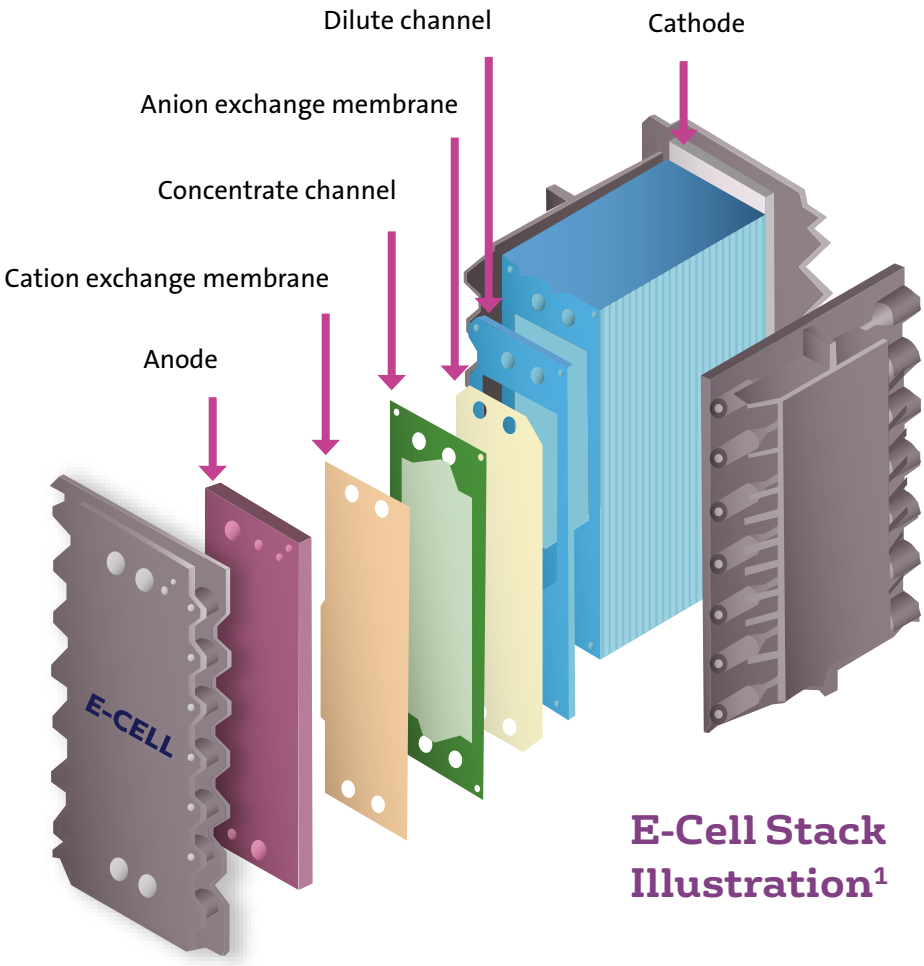
- Semiconductor, microelectronic and solar panel production rinse water
- Boiler feed water for power generation or the chemical, steel, and metallurgical industries
- Various pharmaceutical industry waters
- Laboratory water

EDI System

E-Cell EDI Stack

E-Cell EDI technology provides industry leading product water quality, energy consumption, and reliability from time-tested manufacturing practices. Veolia reputation for performance has enabled a leading market share and deep experience in EDI applications globally.

E-Cell EDI technology employs a modular stack-and-rack design that can adapt to project requirements with varying capacity. Veolia is also willing to offer performance guarantees when extra confidence in the quality of the pure and ultrapure water is desired.



E-Cell Stack Illustration[1]

[1] **Details modified for simplicity**

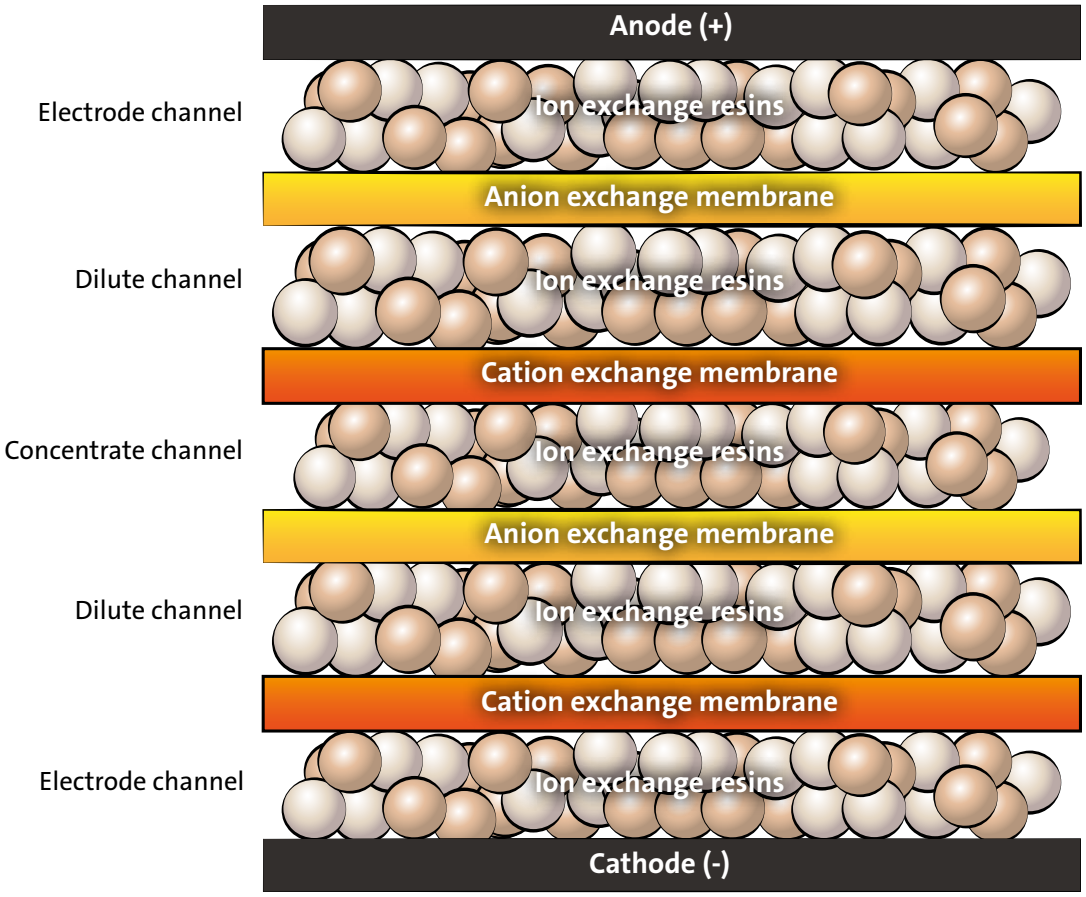
E-Cell EDI Stack Features And Benefits

- Low energy consumption
- Leading product water quality, in part due to ion exchange resin filled concentrate and dilute channels as well as a patented ion exchange resin arrangement
- Counter-current operation reduces the possibility of scale formation
- Strong reputation for reliable operation
- Simplified system design does not require degassing the concentrate, a concentrate recirculation loop, or added salts

Quality Assurance

- CE, RoHS, and CSA marked
- FDA compliant (pharmaceutical modules)
- Manufactured in an ISO 9001 and ISO 14001 certified facility
- Halal certified. E-Cell stacks are manufactured in accordance with the Islamic Food and Nutrition Council of America (IFANCA) standards

Simplified E-Cell Stack Design



General Industrial Stacks†

	Stack Name	MK-7	E-Cell-3X	MK-3
Weight	Shipping weight (kg)	136	135	92
Dimensions	Dimensions (cm as width x height x depth)	30 x 61 x 74	30 x 61 x 72	30 x 61 x 54
Feed Water Quality Specifications	Total exchangeable anions (ppm as $CaCO_3$)	< 14	< 25	< 25
	Conductivity (µS/cm)	< 24	< 43	< 43
	pH	4-11	4-11	4-11
	Temperature (°C)	4.4-40	4.4-40	4.4-40
	Hardness (ppm as $CaCO_3$)	< 1.0	< 1.0	< 1.0
	Silica (ppm as SiO_2)	< 1.0	< 1.0	< 1.0
	TOC (ppm)	< 0.5	< 0.5	< 0.5
	Turbidity (NTU)	< 1.0	< 1.0	< 1.0
	Color (APHA)	< 5	< 5	< 5
	Chlorine (ppm)	< 0.05	< 0.05	< 0.05
	Fe, Mn, H_2S (ppm)	< 0.01	< 0.01	< 0.01
	Oxidant	Not detected	Not detected	Not detected
	Oil and grease	Not detected	Not detected	Not detected
	SDI_{15}	< 1.0	< 1.0	< 1.0
Product Water Quality	Resistivity (MOhm-cm)	> 10	> 16	> 16
	Silica (SiO_2) removal	Up to 99%	Up to 99% / < 5 ppb	Up to 99% / < 5 ppb
Operating Parameters	Maximum water production (m^3/hr)	7.8	6.4	4.5
	Minimum water production (m^3/hr)	4.2	2.3	1.7
	Typical designed water production (m^3/hr)	6.0-7.8	4.0-6.4	2.0-4.5
	Recovery	Up to 97%	Up to 97%	Up to 96%
	Voltage (VDC)	0-400	0-400	0-300
	Amperage (ADC)	0-5.2	0-5.2	0-5.2
	Inlet pressure (bar)	Counter-current: 4.1-6.9 Co-current: 3.1-6.9	Counter-current: 4.1-6.9 Co-current: 3.1-6.9	Counter-current: 4.1-6.9 Co-current: 3.1-6.9
	Dilute inlet/outlet standard pressure drop (bar)	1.0-3.1	1.4-2.8	1.4-2.8
	Minimum pressure difference between dilute outlet and concentrate inlet (bar)	0.34	0.34	0.34

†Actual feed water quality specifications and performance may vary depending on flow rate through each stack and site conditions. Entries here based on nominal flow. Reference fact sheets and Winflows projection software to verify actual performance.

Hot Water Sanitizable Stacks‡

	Stack Name	MK-3PharmHT	MK-3MiniHT
Weight	Shipping weight (kg)	92	52
Dimensions	Dimensions (cm as width x height x depth)	30 x 61 x 54	30 x 61 x 29
Feed Water Quality Specifications	Total exchangeable anions (ppm as $CaCO_3$)	< 25	< 25
	Conductivity (µS/cm)	< 43	< 43
	pH	4-11	4-11
	Temperature (°C)	4.4-40	4.4-40
	Hardness (ppm as $CaCO_3$)	< 1.0	< 1.0
	Silica (ppm as SiO_2)	< 1.0	< 1.0
	TOC (ppm)	< 0.5	< 0.5
	Turbidity (NTU)	< 1.0	< 1.0
	Color (APHA)	< 5	< 5
	Chlorine (ppm)	< 0.05	< 0.05
	Fe, Mn, H_2S (ppm)	< 0.01	< 0.01
	Oxidant	Not detected	Not detected
	Oil and grease	Not detected	Not detected
	SDI_{15}	< 1.0	< 1.0
Product Water Quality	Resistivity (MOhm-cm)	> 10	> 10
	TOC (ppb)	< 500	< 500
Operating Parameters	Maximum water production (m^3/hr)	4.5	1.5
	Minimum water production (m^3/hr)	1.6	0.5
	Typical designed water production (m^3/hr)	2.0-4.5	0.5-1.5
	Recovery	Up to 96%	Up to 93%
	Voltage (VDC)	0-300	0-150
	Amperage (ADC)	0-5.2	0-5.2
	Inlet pressure (bar)	Counter-current: 4.1-6.9 Co-current: 3.1-6.9	Counter-current: 4.1-6.9 Co-current: 3.1-6.9
	Dilute inlet/outlet standard pressure drop (bar)	1.4-2.8	1.4-2.8
	Minimum pressure difference between dilute outlet and concentrate inlet (bar)	0.34	0.34
	Number of 1 hour sanitization cycles	160	160
	Maximum sanitization temperature (°C)	85	85

‡Actual feed water quality specifications and performance may vary depending on flow rate through each stack and site conditions. Entries here based on nominal flow. Reference fact sheets and Winflows projection software to verify actual performance.

E-Cell EDI Technology Performance Examples

E-Cell EDI technology has been successfully applied in various industries such as power, petroleum, chemical, steel, pharmaceutical, and electronics.

Location: Singapore

Industry: Semiconductor

Capacity: 1000 m^3/h

Application: Ultrapure water

Location: China

Industry: Power

Capacity: 360 m^3/h

Application: Boiler feed water

Location: Australia

Industry: LNG

Capacity: 84 m^3/h

Application: Boiler feed water

Location: China

Industry: Coal chemical

Capacity: 480 m^3/h

Application: Boiler feed water

Location: USA

Industry: Pharmaceutical

Capacity: 6.8 m^3/h

Application: USP purified water

Location: China

Industry: Solar energy

Capacity: 300 m^3/h

Application: Ultrapure water

Location: Canada

Industry: Steel

Capacity: 100 m^3/h

Application: Boiler feed water

Memtrex* FE

FACT SHEET

Pleated Filters with PTFE Membrane

Figure 1: Memtrex FE Filters

Description and Use

Memtrex FE (MFE) filters (Figure 1), with absolute rated Polytetrafluoroethylene (PTFE) membranes, offer broad chemical compatibility with minimal extractables in a wide range of fluids and applications. The inherently hydrophobic PTFE membrane is ideally suited for the filtration of compressed air and other process gases. Constructed in a clean room environment using thermal welding techniques, the MFE filters do not contain any adhesives or additives. As part of the manufacturing process, the MFE filters are individually integrity tested. The effectiveness and purity of your filtration process is preserved.

The MFE filter is just one example of our dedicated commitment to fluid filtration. Our extensive portfolio includes filters for every stage of processing, and we can offer custom solutions for your unique applications. Veolia Water Technologies is your complete source for filters, housings, and other filtration equipment.

Typical Applications

MFE filters offer exceptional filtration characteristics, including reliable particle retention, and high purity in harsh process conditions. Typical applications include filtration of:

- Aggressive solvents such as alcohols, esters and ketones
- Corrosive acids and bases
- Vents/exhausts for autoclaves, fermenters, and storage tanks
- High purity chemicals and water used in electronics manufacturing

General Properties

Memtrex FE filters are available the following absolute pore size micron ratings: 0.1, 0.2, 0.45, and 1.0 µm. Tables 1, 2, 3, 4, 5, and 6 shows further details on materials of construction, dimensions, operational limits, integrity testing, and flow performance in air and water.

Table 1: Materials of Construction

Filtration Media	Hydrophobic PTFE
Support Layers	Polypropylene Microfiber
Core and Cage	Polypropylene
End Caps and Adapters	Polypropylene

Table 2: Dimensions

Nominal O.D.	Nominal I.D.	Effective Filtration Area
2.75” (70 mm)	1.25” (31 mm)	5.9 ft^2 (0.55 m^2)

Flotrex* PN

FACT SHEET

Pleated filters with polypropylene microfiber media

Figure 1: Flotrex PN Filters

Description and Use

The Flotrex PN (FPN) microfiber filters (Figure 1) offer an economical filtration solution to protect final filters. The all polypropylene construction of the FPN filters provides superior chemical compatibility. The gradient density, thermally bonded polypropylene media has excellent dirt holding capacities and reliable retention characteristics. FPN filters do not contain any adhesives or additives as sleeve and end caps are thermally bonded.

Typical Applications

FPN filters are an economical alternative to membrane filters in a broad range of applications, Including:

- Filtration of liquid polymers, coatings, and inks
- Filtration of bulk chemicals
- Beer trap filtration
- Post Carbon bed and DI bed filtration
- Pre-filtration to protect expensive final filters

General Properties

Flotrex PN filters are available in the following nominal pore size micron rating: 0.2 0.45, 1, 2, 3, 5, 10 and 30 µm. Tables 1, 2, 3, and 4 show further details on materials of construction, dimensions, operational limits, and flow performance.

Table 1: Materials of Construction

Filtration Media	Polypropylene Microfiber
Support Layers	Polypropylene Microfiber
Core and Cage	Polypropylene
Endcaps and Adapters	Polypropylene

Table 2: Dimensions

Filter Model	Nominal O.D.	Nominal I.D.	Effective Filtration Area
FPN92	2.75” (70 mm)	1.25” (31mm)	4.8 ft^2 (0.45m^2)
FPN94	2.75” (70 mm)	1.25” (31mm)	5.5 ft^2 (0.51m^2)
FPN03, FPN05	2.75” (70 mm)	1.25” (31mm)	5.5 ft^2 (0.51m^2)
FPN01, FPN02	2.75” (70 mm)	1.25” (31mm)	6.4 ft^2 (0.59m^2)
FPN10, FPN30	2.75” (70 mm)	1.25” (31mm)	7.3 ft^2 (0.68m^2)

Table 3: Operational Limits

Maximum Forward Differential Pressure	60 psi (4.1 bar) at 70ºF (21ºC)
Maximum Reverse Differential Pressure	30 psi (2.1 bar) at 70ºF (21ºC)
Maximum Operating Temperature	180ºF (82ºC) at 10 psid (0.69 bar) in water

Hytrex* RX

FACT SHEET

Melt blown depth filter for oil & gas applications

Features and Benefits

- Engineered specifically for oil and gas applications
- Combines efficiency, long life, and strength
- Continuous manufacturing process assures consistent and reliable performance
- Wide chemical compatibility
- Pure polypropylene construction
- True depth media traps particles throughout the filter

Typical Applications

- Oil and gas industry
- Hydrocarbon applications

Specifications

Table 1: Specifications and performance information

Ratings	1, 3, 5, 10, 20, 30, 50, 75 microns (nominal)
Inner Diameter (nominal)	1 in (2.5 cm)
Outer Diameter	2.75 in (7.0 cm)
Lengths	36 in (91 cm)
	Longer lengths up to 70 in may be available upon request
Materials of Construction	
Filter Media	Polypropylene
Adapters	Polypropylene
Elastomer	EPDM, Silicone, Santoprene[1] (flat gasket only)
Performance Conditions	
Maximum pressure drop:	35 psid (2.4 bar) @ 77°F (25°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 (µm) at various efficiencies		
	90.0%	99.0%	99.9%
1 µm	*Efficiency of nominal filters varies by application. See note for information on nominal filter efficiency[2]*		
3 µm			
5 µm			
10 µm			
20+ µm			

Pure HiTemp* Depth Filter

FACT SHEET

Meltblown Nylon for extremely high temperature and high viscosity applications

Features and Benefits

- 100% nylon media with nylon core for greater strength and temperature resistance
- No resin binders, lubricants, antistatic or release agents and melt bonded exterior ensure no media migration
- Large chemicals compatibility

Applications

- High temperature and high viscosity solutions
- Paints, coatings, printing inks
- Fuels and lubricating oils
- Solvents
- Hot, non-aqueous fluids

Efficiency Information

Table 1: Removal efficiency based on a modified ASTM 795 procedure

Micron Rating	Removal Rating (µm) at various efficiencies		
	90.0%	99.0%	99.9%
1 µm – 200 um	*Efficiency of nominal filters varies by application. See note for information on nominal* filter efficiency[2]		

Specifications

Table 2: Specifications and performance information

Ratings	1, 5, 10, 25, 50, 75, 100, 125, 150, 200 microns (nominal)
Inner Diameter	1.1 in (2.8 cm)
Outer Diameter	2.5 in (6.4 cm)
Lengths	9 ¾ in (24.5 cm) 10 in (25.4 cm) 19 ½ in (49.5 cm) 20 in (50.8 cm) 29 ¼ in (74.3 cm) 30 in (76.2 cm) 39 in (99.1 cm) 40 in (101.6 cm)
Materials of Construction	
Filter Media	Meltblown Nylon
Adapters	Nylon
Elastomer	Buna, Silicone, Viton[1]
Performance Conditions	
Maximum pressure drop: Nylon Core: 60 psid (4.0 bar) @ 122°F (50°C) 15 psid (1.0 bar) @ 176°F (80°C) 7.5 psid (0.5 bar) @ 302°F (150°C) Recommended change-out pressure drop: 25 psid (1.4 bar) @ 77°F (25°C)	

Selex*

FACT SHEET

Melt blown depth filter for general industrial use

Features and Benefits

- Absolute retention ratings for high precision filtration
- Fast rinse-up in high purity applications
- Strict quality control ensures consistent product performance and filtration quality
- Automated packaging for a clean finished product
- Wide chemical compatibility

Applications

- Micro-electronics
- Chemical process industry
- Pure water
- Food and beverage
- Metal finishing
- Potable water
- Pharmaceuticals
- Oil and gas

Specifications

Table 1: Specifications and performance information

Ratings	1, 3, 5, 10, 20, 30 microns (absolute)	
Inner Diameter (nominal)	1.0 in (3.1 cm)	
Outer Diameter	2.5 in (7.0 cm)	
Lengths	9 3/4 in (24.8 cm) 9 7/8 in (25.1 cm) 10 in (25.4 cm) 19 1/2 in (49.5 cm)	20 in (50.8 cm) 29 1/4 in (74.3 cm) 30 in (76.2 cm) 40 in (101.6 cm)
Materials of Construction	Filter Media Adapters Elastomer	Polypropylene Polypropylene Buna, EPDM, Silicone, Viton (1), Santoprene (2) (flat gasket only)
Performance Conditions	Maximum pressure drop: 35 psid (2.4 bar) @ 77°F (25°C)	
	Recommended change-out pressure drop: 20 psid (1.4 bar) @ 77°F (25°C)	

Removal Efficiency

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

		Removal rating (µm) at various efficiencies	
		90.0%	99.0%
E	1 µm	0.8	1.8
G	3 µm	1.3	3.5
D	5 µm	4.1	7.3
A	10 µm	7.0	10.0
C	20 µm	15.6	20.7
F	30 µm	20.4	28.3

Aquatrex* Large Diameter Filter

FACT SHEET

Figure 1: Aquatrex filters

Description and Use

Aquatrex Filters combine innovative depth filter technology, quality, and cost effectiveness to provide excellent filtration value in residential and light commercial applications.

Expanding its product line

Veolia is continuing to expand its product line to meet current market demand with the introduction of our new large diameter (LD) filter. Manufactured with our world-renowned melt-blown microfiber technology, the engineered graded density feature of this cartridge provides exceptional dirt-holding capacity and long life compared to our equivalent rated standard filters. The LD filter, with its three-to-eight times greater dirt-holding capacity and life, will reduce change-out frequency, adding more value in applications where high capacity and infrequent change-outs are desired.

This product is ideally suited to be used in AMETEK's Big Blue and Keystone's Blue Giant housing units. (Big Blue is a trademark of US Filter/Siemens. Blue Giant is a trademark of Metpro Keystone Filter Division.) The LD filter has pure FDA compliant polypropylene construction and is manufactured using ISO 9001 certified process.

Typical Applications

- Whole House Filtration
- Spa and Pool Filtration
- Restaurant and Food Service
- Water Filtration

General Properties

- Unique dual-graded density design of the extended media captures particles throughout entire filter depth
- High dirt-holding capacity means longer life and fewer change-outs, which translates into money saved
- Precision final filter results in consistent high-performance filtration
- Large media area allows for high flow rates (Maximum recommended flow rate is 10 gpm for 10, 20, 30, and 50 microns, 5 gpm for 1, and 5 microns per 10-inch length. Change-outs recommended at 25 psid)

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

Ratings	1, 3, 5, 10, 20, 30, 50, 75 microns (nominal)
Inner Diameter (nominal)	1 in (2.5 cm)
Outer Diameter	2.5 in (6.4 cm)
Lengths	
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)
Longer lengths up to 70 in may be available upon request	
Materials of Construction	
Filter Media	Polypropylene
Adapters	Polypropylene
Elastomer	Buna, EPDM, Silicone, Viton [1] Santoprene [2] (flat gasket only)
Performance Conditions	
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)

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 03 = 3 µm 05 = 5 µm 10 = 10 µm 20 = 20 µm 30 = 30 µm 50 = 50 µm 75 = 75 µm	9 3/4 in (24.8 cm) 10 in (25.4 cm) 19 1/2 in (49.5 cm) 20 in (50.8 cm) 29 1/4 in (74.3 cm) 30 in (76.2 cm) 40 in (101.6 cm) 50 in (152.4 cm) *Longer lengths up to 70 in may be available upon request*	 E = 222 O-Ring  L = Extended Core  X = Standard Plain End (no gasket)  Y = Flat Gasket	 H = Fin  K = Self Seal Spring  S = Solid End  Y = Flat gasket	B = Buna E = EPDM P = Santoprene [2] (flat gasket only) S = Silicone V = Viton [1]

[1] Viton is a registered mark of The Chemours Company.

[2] Santoprene is licensed to Advanced Elastomer Systems, L.P.

[3] 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.

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

Hytrex*

FACT SHEET

Melt blown depth filter for high purity water system

Features and Benefits

- Well-suited for high purity applications with fast rinse-ups due to superior construction
- Automated packaging and manufacturing processes ensure a clean, reliable product every time
- Meets stringent requirements for most critical processes
- Pure polypropylene construction
- Wide chemical compatibility
- Combines efficiency, long, life, and purity

Applications

- High purity chemicals
- Potable water filtration
- Food and beverage
- Reverse osmosis prefiltration
- Electronics

Specifications

Table 1: Specifications and Performance Information

Ratings	1, 3, 5, 10, 20, 30, 50, 75, 100 microns (nominal)
Inner Diameter (nominal)	1 in (2.5 cm)
Outer Diameter	2.5 in (6.4 cm)
Lengths	
4 7/8 in (12.4 cm)	29 1/4 in (74.3 cm)
9 3/4 in (24.8 cm)	30 in (76.2 cm)
10 in (25.4 cm)	40 in (101.6 cm)
19 1/2 in (49.5 cm)	50 in (152.4 cm)
20 in (50.8 cm)	
Longer lengths up to 70 in may be available upon request	
Materials of Construction	
Filter Media	Polypropylene
Adapters	Polypropylene
Elastomer	Buna, EPDM, Silicone, Viton[1], Santoprene[2] (flat gasket only)
Performance Conditions	
Maximum pressure drop:	35 psid (2.4 bar) @ 77°F (25°C)
Recommended change-out pressure drop:	20 psid (1.4 bar) @ 77°F (25°C)

[1]Viton (trademark of The Chemours Company)

[2]Santoprene (licensed to Advanced Elastomer Systems, L.P.)

Table 3: Ordering information

	1	2	3	4	5
Type	**Micron Rating (nominal)**	**Cartridge Length**	**End #1 Adapter**	**End #2 Adapter**	**Elastomer Material**
GX	01 = 1 µm 03 = 3 µm 05 = 5 µm 10 = 10 µm 20 = 20 µm 30 = 30 µm 50 = 50 µm 75 = 75 µm 100 = 100 µm	4 7/8 in (12.4 cm) 9 3/4 in (24.8 cm) 10 in (25.4 cm) 19 1/2 in (49.5 cm) 20 in (50.8 cm) 29 1/4 in (74.3 cm) 30 in (76.2 cm) 40 in (101.6 cm) 50 in (152.4 cm) *Longer lengths up to 70 in may be available upon request*	 E = 222 O-Ring  F = 226 O-Ring  L = Extended Core  X = Standard Plain End (no gasket)  Y = Flat Gasket	 H = Fin  K = Self Seal Spring  S = Solid End  X = Standard Plain End (no gasket)  Y = Flat Gasket	B = Buna E = EPDM P = Santoprene[2] (flat gasket only) S = Silicone V = Viton[1]

[1]Viton (trademark of The Chemours Company)

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[3]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.

ISO 9001 registered

NSF

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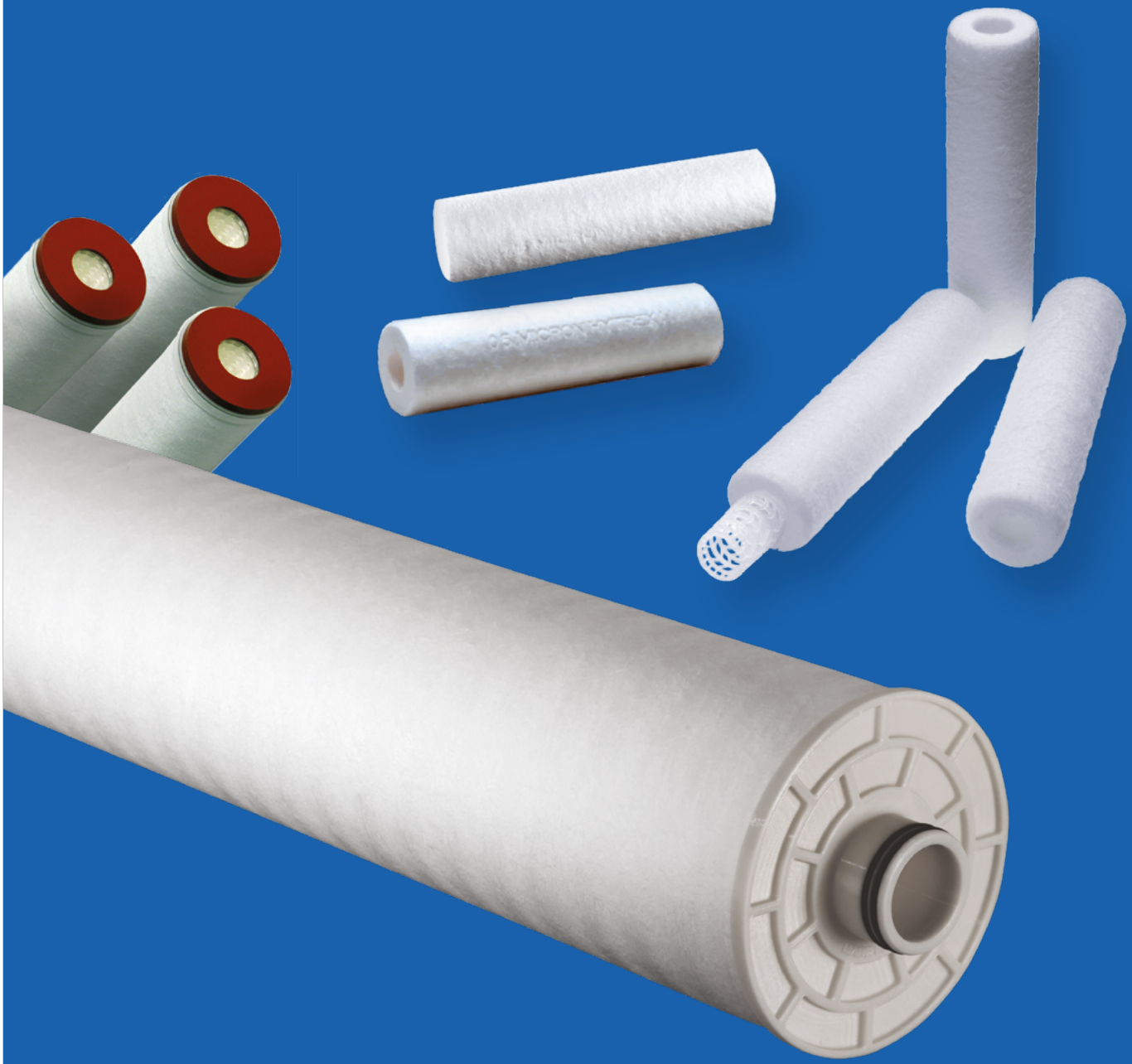
VEOLIA

Veolia's Depth Filters



WATER TECHNOLOGIES

Advanced Depth Filter Manufacturing Technology

Veolia has a long-term commitment to developing manufacturing technology that advances the performance of depth filters. Beginning with the Hytrex filter technology developed in the 1980s, and more recently with the introduction of the Z.Plex* filter technology, research and development around improved filtration technology has been a priority. Veolia has improved existing designs and enabled a whole new series of depth filters designed to meet the challenges of today's applications. At our Minnetonka, Minnesota Filtration Center of Excellence we are working to develop the next generation of depth filters to meet the ever increasing demands of industry.

Hytrex* Filter Manufacturing Technology

Hytrex, the original polypropylene depth filter, provides purity and reliability to ensure consistent results. Both Hytrex and Z.Plex are produced using a patented, continuous process that provides consistent product performance. Lot-to-lot, order-to-order, strict quality control assures repeatability and high quality products.

In Hytrex filters, thermally bonded micro fibers create a strong, secure cartridge matrix that traps and holds particles throughout its depth. Its pure polypropylene construction assures fast rinse-up in high purity applications, and it carries the NSF 61 certification and is FDA compliant. Hytrex is ideally suited for applications where purity is the primary consideration, such as microelectronics and food and beverage.

Hytrex depth filters are also one of the strongest filters available, which makes them appropriate for the most demanding industrial filtration. Hytrex is the choice where greater efficiency such as fluid clarification is needed, and severe conditions such as high flow rates and pressure drops will be encountered. Filtration applications in chemical process, oil and gas, and produced water are typical of Hytrex filter usage.