

GE Power & Water
Water & Process Technologies

**RO ED UF EQUIPMENT
CHANNEL PARTNER**

NORTH AMERICA

OCTOBER 2014



CONTENT

- Pretreatment Units
- Brackish RO Platforms
- UF RO Combo Platforms
- RO EDI Combo Platforms
- Seawater Desalination
- Electrodeionization
- Ultrafiltration

ecomaginationSM

a GE commitment

Solving our customers' toughest challenges for a cleaner future.

Green is green

"GE is committed to the success of its customers... when they win, GE wins. Our customers deal with some of society's toughest environmental and sustainability challenges. Ecomagination produces products that help customers find the right solutions to these issues. That's good for the environment and good for business." – *Jeff Immelt, Chairman and CEO, General Electric Company*

Ecomagination is a commitment to

- Reduce GE's water footprint 20 percent by 2012
- Double Investment in R&D of cleaner technologies
- Increase revenues from ecomagination products and services to \$25 billion in 2010
- Reduce greenhouse gas (GHG) emissions 1 percent by 2012 and improve energy efficiency 30 percent by 2012
- Keep the public informed with our progress

GE Water & Process Technologies

GE Water & Process Technologies is a leading global solutions provider of water, wastewater, desalination and process systems, offering chemicals, filtration equipment, monitoring and separation technologies.

We are helping companies across the globe reuse more than 21 billion gallons of water each year.

In leading by example with our own water efficiency, we also strive to:

- Measure & reduce our customer's water footprint
- Benchmark customer's water efficiency
- Advocate for sustainable water policies
- Lead a group of forward-thinking global companies to drive change

Ecomagination Water Solutions

- Desalination technology
- Advanced Membranes and separation solutions
- ZeeWeed* drinking and wastewater treatment
- HomeSpring* ultrafiltration systems
- ABMet*, the first commercially viable solution producing effluent with selenium levels below 10 ppb
- Osmo* reverse osmosis systems to improve boiler efficiency
- Electrodialysis Reversal producing potable water from undrinkable brackish sources
- MetClear* heavy metals removal
- Entrapped Air Flotation wastewater treatment
- DusTreat* road dust control reducing water needed for dust suppression at mines
- Waste to Value solution recovering biogas energy from wastewater and reusing it to improve ROI

Ask us how our portfolio can help your business improve operational and environmental performance or visit www.ge.com/water



PRETREATMENT UNITS

INDUSTRIAL RO

From 50 to 450 gpm



E-Series Pretreatment

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. Visit www.ge.com/water for more information.

General Features

- Single tank and duplex systems provide flexible flow options
- NSF 44 certified fiberglass reinforced plastic (FRP) tanks (150 psig design pressure, non-code)
- 12x40 mesh bituminous activated carbon
- GE Autotrol* multi-port valves (Performa or Magnum Cv*) with integrated flow meter
- Programmable GE Logix 764 controller for backwash sequence control
- Communication switch for downstream equipment included to prevent operation during backwash on single tank systems
- Interlock provided on duplex systems to maintain continuous flow during backwash
- No system bypass during backwash on Magnum systems
- Manual or time-initiated automatic backwash
- 120 VAC 60 Hz or 230 VAC 50 Hz models available



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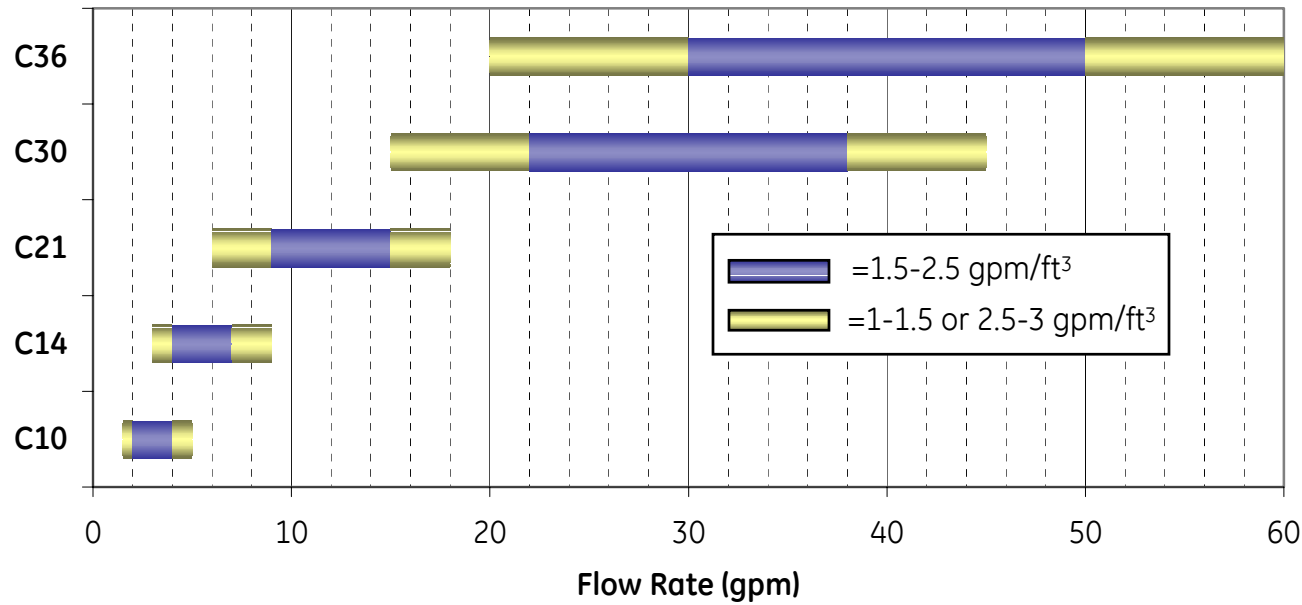
Table 1. Specifications¹

Model	Part Number ²		Connections (inches)	Valve	Tank (inches)	Overall Height (inches)	Flow (gpm)			Media Volume (cubic feet)	
	Single	Duplex					Min	Max	BkWsh	Activated Carbon	Gravel
C10	3023708	3023709	1	Performa	10 x 54	62	1.5	5	6	1.5	0.25
C14	3023710	3023711	1	Performa	14 x 65	73	3	9	10	3	0.5
C21	3023712	3023713	2	Magnum	21 x 62	78	6	18	25	6	1
C30	3023714	3023715	2	Magnum	30 x 72	83	15	45	50	15	2.5
C36	3023716	3023717	2	Magnum	36 x 72	84	20	60	75	20	5

¹ Specifications listed are per individual tank

² Part numbers listed are for 60 Hz units only

Figure 1. E-Series Activated Carbon Flow Range



E-Series Pretreatment

Multi-Media 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. Visit www.ge.com/water for more information.

General Features

- Single tank and duplex systems provide flexible flow options
- NSF 44 certified fiberglass reinforced plastic (FRP) tanks (150 psig design pressure, non-code)
- GE Autotrol* multi-port valves (Performa or Magnum Cv*) with integrated flow meter for tank size 30-inches and smaller
- Programmable GE Logix 764 controller for backwash sequence control
- GE 962 stager control with butterfly valve nest on 36-inch vessels
- Communication switch for downstream equipment included to prevent operation during backwash
- Interlock provided on duplex systems to maintain continuous flow during backwash
- Manual or time-initiated automatic backwash
- No system bypass during backwash on Magnum systems
- 120 VAC 60 Hz or 230 VAC 50 Hz models available



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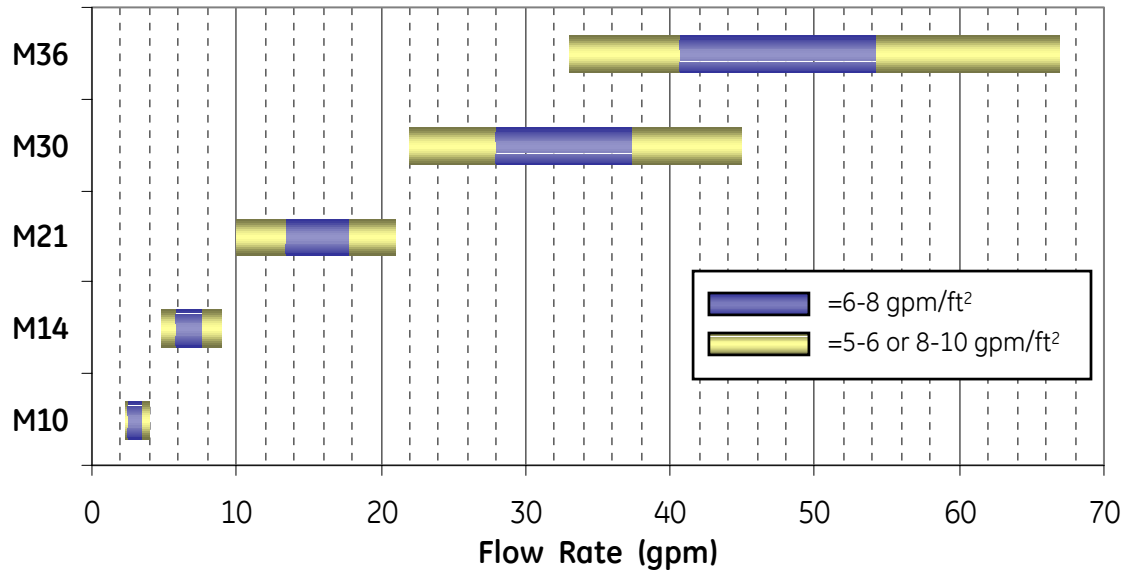
Table 1. Specifications¹

Model*	Part Number ²		Connections (inches)	Valve	Tank (inches)	Overall Height (inches)	Flow (gpm)			Media Volume (cubic feet)			
	Single	Duplex					Min	Max	BkWsh	Anthracite	Silica Sand	Garnet	Gravel
M10	3023698	3023699	1	Performa	10 x 54	62	2	4	8	0.5	0.25	0.13	0.25
M14	3023700	3023701	1	Performa	14 x 65	73	5	9	15	2	1	0.5	0.5
M21	3023702	3023703	2	Magnum	21 x 62	78	10	21	35	4	2	1	1
M30	3023704	3023705	2	Magnum	30 x 72	83	22	45	75	10	4	2	2.5
M36	3023706	NA	2	Butterfly	36 x 72	90	33	67	100	14	7	4	5

¹ Specifications listed are per individual tank

² Part numbers listed are for 60 Hz units only

Figure 1. E-Series Multi-Media Filter Flow Range



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.ge.com/water 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
- GE Autotrol* multi-port valves (Performa or Magnum Cv*) with integrated flow meter
- Programmable GE 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



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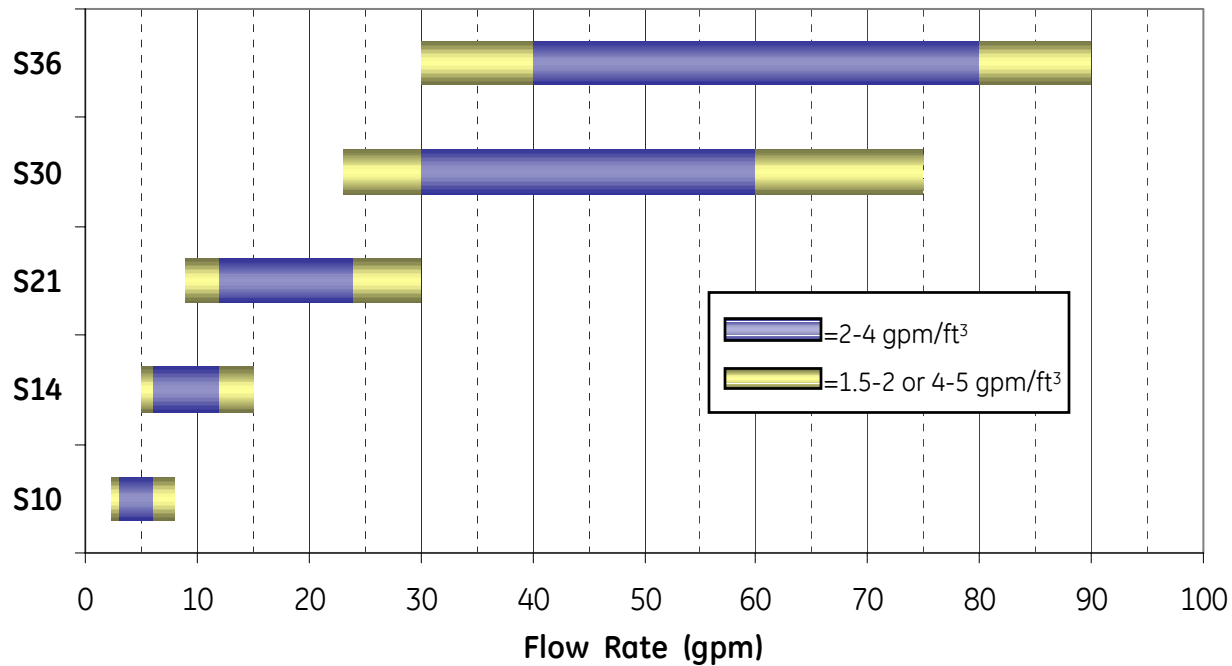
Table 1. Specifications¹

Model	Part Number ²		Connections (inches)	Valve	Tank (inches)	Overall Height (inches)	Brine Tank		Flow (gpm)			Resin Volume (ft ³)	Capacity (grains)
	Single	Alternating					Dimensions (inches)	Capacity (lbs)	Min	Max	BkWsh		
S10	3023718	3023719	1	Performa	10 x 52	62	18 x 40	700	2	8	2.5	1.5	45K
S14	3023720	3023721	1	Performa	14 x 65	73	18 x 40	700	5	15	5	3	90K
S21	3023722	3023723	2	Magnum	21 x 62	78	24 x 50	1000	9	30	12	6	180K
S30	3023724	3023725	2	Magnum	30 x 72	83	30 x 50	1500	23	75	25	15	450K
S36	3023726	3023727	2	Magnum	36 x 72	84	39 x 48	2500	30	90	35	20	600K

¹ Specifications listed are per individual tank

² Part numbers listed are for 60 Hz units only

Figure 1. E-Series Water Softener Flow Range



PRO Series Pretreatment

Activated Carbon and Multi-Media Filters

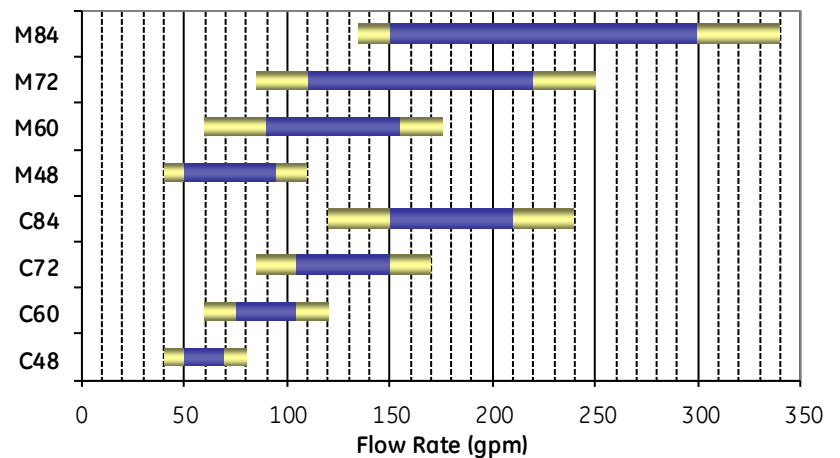
PRO Series pretreatment is designed for durable operation, easy installation and straight-forward control. PRO is ideal for your industrial filtration needs with epoxy-lined carbon steel vessels, robust materials of construction, and various configuration options to suit your specific application needs. The units are also the perfect compliment to the PRO Series line of reverse osmosis systems.



General Features

- Epoxy-lined carbon steel tanks, ASME code stamp at 100 psig
- Resilient seated butterfly service valves with nylon coated steel disc and stem; air actuated / spring-to-close
- Schedule 80 PVC face-piping
- 4-inch media clean out port on side of tank
- Sight glass on backwash line
- AquaMatic* 962 stager for backwash sequence control. Optional solenoid valve enclosure for remote control.
- AquaMatic controller includes communication switch for downstream equipment
- Manual or time-initiated automatic backwash
- Instrumentation: Service/backwash paddlewheel flow sensor, pre- / post- filter pressure gauges

Figure 1. PRO Series Flow Range



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Table 1. Multi Media Specifications

Model	Conn- ections (inches)	Tank (inches)	Overall Height (inches)	Flow** (gpm)			Media Volume (cubic feet)					
				Min	Max	BkWsh*	Anthracite	Silica Sand	Garnet	Fine Gravel	Med Gravel	Coarse Gravel
M48	3	48x72	122	40	110	185	18	12	6	2	2	Top of Under Drain
M60	4	60x72	125	60	175	290	28	19	9	3	3	
M72	4	72x72	130	85	250	400	41	27	14	5	5	
M84	6	84x72	134	135	340	570	56	38	19	7	7	

* Backwash flow rates are for 15 gpm/ft² loading at 60°F. Flow rate will increase with increase in water temperature.

** Flow rates shown are for MMF systems with no coagulant addition/air scour. Flow rates with coagulant addition must be reduced to 3-5 gpm/ft².

Table 2. Activated Carbon Filter Specifications

Model	Connas- ections (inches)	Tank (inches)	Overall Height (inches)	Flow** (gpm)			Media Volume (cubic feet)	
				Min	Max	BkWsh*	Activated Carbon	Coarse Gravel
C48	3	48x72	122	40	80	185	40	Top of Under Drain
C60	4	60x72	125	60	120	290	60	
C72	4	72x72	130	85	170	420	85	
C84	6	84x72	134	120	240	570	120	

* Backwash flow rates are for 13.5 gpm/ft² loading at 60°F for 40% bed expansion. Flow rate will increase with increase in water temperature.

** Based on Chlorine removal only. For TOC removal, the max flow should be reduced by half.

**Table 3. Part Numbers
(Media Sold Separately)**

Model	Stager / PVC
C/M48	3023927
C/M60	3023928
C/M72	3023929
C/M84	3023930

PRO Series Pretreatment Water Softeners

PRO Series pretreatment is designed for durable operation, easy installation and straightforward control. PRO is ideal for your industrial filtration needs with epoxy-lined carbon steel vessels, robust materials of construction, and various configuration options to suit your specific application needs. The units are also the perfect compliment to the PRO Series line of reverse osmosis systems.



General Features

- Epoxy-lined carbon steel tanks, ASME code stamp at 100 psig
- Brine tank with cover and air check valve
- Resilient seated butterfly service valves with nylon coated steel disc and stem; air actuated / spring-to-close
- Schedule 80 PVC face-piping; sight glass on backwash line
- 4-inch media clean out port on side of tank
- AquaMatic* 962 stager for backwash sequence control. Optional solenoid valve enclosure for remote control.
- AquaMatic controller includes communication switch for downstream equipment
- Manual or time-initiated automatic regeneration
- Instrumentation: Service/backwash flow sensor, pre- / post-softener pressure gauges

Figure 1. PRO Series Flow Range

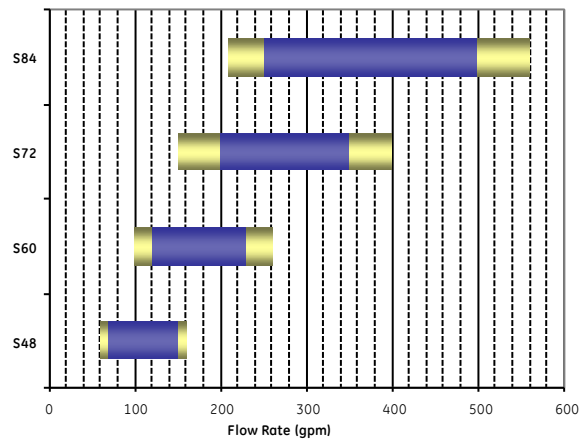


Table 1. Water Softener Specifications

Model	Part Number	Connections (inches)	Tank (inches)	Overall Height (inches)	Brine Tank		Flow (gpm)			Resin Volume (ft ³)	Capacity (grains)
					Dimensions (inches)	Capacity (lbs)	Min	Max	BkWsh		
S48	3023941	3	48x72	122	56x62	2700	60	160	100-160	40	500-1312K
S60	3023942	4	60x72	125	56x62	2700	100	260	150-260	65	826-2132K
S72	3023943	6	72x72	130	74x64	4600	150	400	220-400	100	1270-3280K
S84	3023944	6	84x72	134	86x68	9600	210	560	300-560	140	1780-4590K



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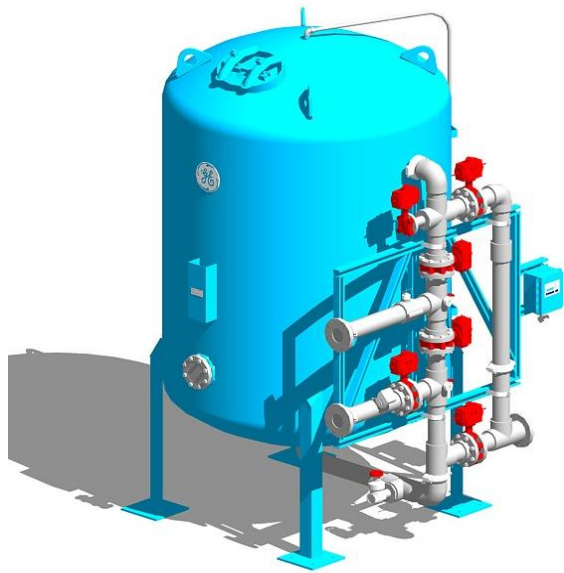
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OSMO TITAN Series Pretreatment

Activated Carbon and Multi-Media Filter

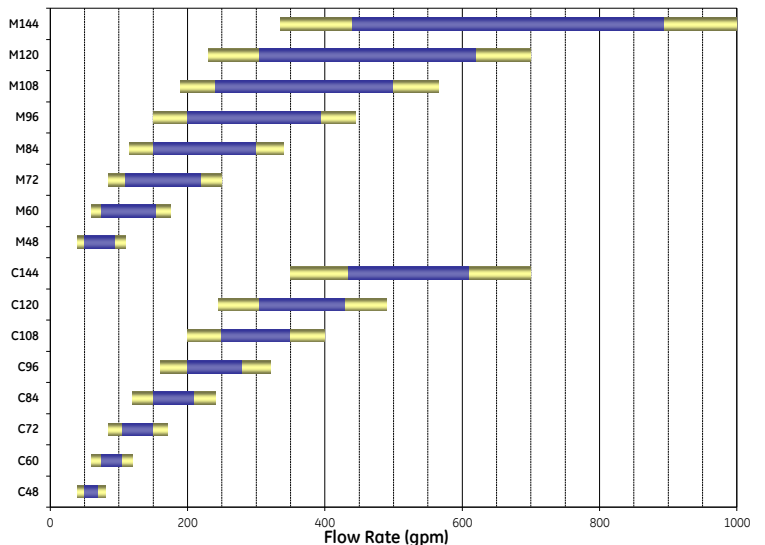
OSMO TITAN Series pretreatment is designed for durable operation, easy installation and straightforward control. OSMO TITAN is ideal for your industrial filtration needs with epoxy-lined carbon steel vessels, robust materials of construction, and various configuration options to suit your specific application needs. The units are also the perfect complement to the OSMO TITAN Series line of reverse osmosis systems. Visit www.gewater.com for more information.



General Features

- Epoxy-lined carbon steel tanks, ASME code stamp at 100 psig
- Resilient seated butterfly service valves with stainless steel disc and stem; air actuated / spring-to-close
- Stainless steel face-piping
- 4-inch media clean out port on side of tank
- Sight glass on backwash line
- Nema 4 solenoid panel with terminal strips. Optional NEMA 4 remote I/O enclosure. Controller PLC sold separately.
- Instrumentation: Service/backwash DP flow transmitter, pre- / post- filter pressure gauges

Figure 1. OSMO TITAN Series Flow Range



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Table 1. Multi Media Specifications

Model	Connections (inches)	Tank (inches)	Overall Height (inches)	Flow** (gpm)			Media Volume (cubic feet)					
				Min	Max	BkWsh*	Anthracite	Silica Sand	Garnet	Fine Gravel	Med Gravel	Coarse Gravel
M48	3	48x72	122	40	110	185	18	12	6	2	2	Top of Under Drain
M60	3	60x72	125	60	175	290	28	19	9	3	3	
M72	4	72x72	130	85	250	415	41	27	14	5	5	
M84	4	84x72	134	115	340	570	56	38	19	7	7	
M96	6	96x72	144	150	445	740	74	49	25	8	8	
M108	6	108x72	149	190	565	940	94	62	31	10	10	
M120	6	120x72	154	230	700	1160	116	77	39	13	13	
M144	8	144x72	161	335	1000	1675	167	112	56	19	19	

* Backwash flow rates are for 15 gpm/ft² loading at 60°F. Flow rate will increase with increase in water temperature.

** Flow rates shown are for MMF systems with no coagulant addition/air scour. Flow rates with coagulant addition must be reduced to 3-5 gpm/ft².

Table 2. Activated Carbon Filter Specifications

Model	Connections (inches)	Tank (inches)	Overall Height (inches)	Flow** (gpm)			Media Volume (cubic feet)	
				Min	Max	BkWsh*	Activated Carbon	Coarse Gravel
C48	3	48x72	122	40	80	185	40	Top of Under Drain
C60	4	60x72	125	60	120	290	60	
C72	4	72x72	130	85	170	420	85	
C84	6	84x72	134	120	240	570	120	
C96	6	96x72	144	160	320	750	160	
C108	6	108x72	149	200	400	950	200	
C120	6	120x72	154	245	490	1160	245	
C144	8	144x72	161	350	700	1680	350	

* Backwash flow rates are for 13.5 gpm/ft² loading at 60°F for 40% bed expansion. Flow rate will increase with increase in water temperature.

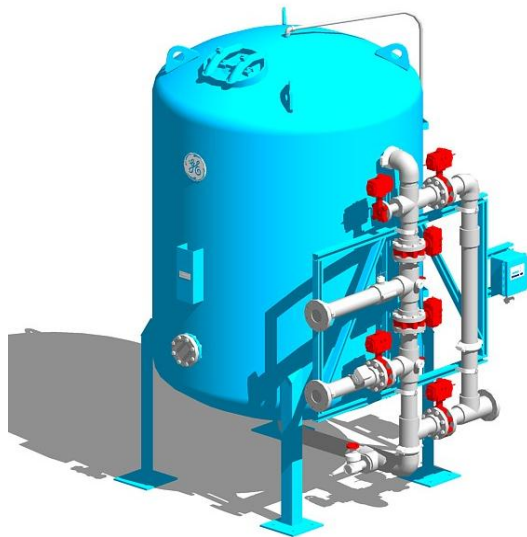
** Based on Chlorine removal only. For TOC removal, the max flow should be reduced by half.

Table 3. Part Numbers (Media Sold Separately)

Model	Solenoid / SS
C/M48	3023931
C/M60	3023932
C/M72	3023934
C/M84	3023935
C/M96	3023936
C/M108	3023938
C/M120	3023939
C/M144	3023940

OSMO TITAN Series Pretreatment Water Softeners

OSMO TITAN Series pretreatment is designed for durable operation, easy installation and straightforward control. OSMO TITAN is ideal for your industrial filtration needs with epoxy-lined carbon steel vessels, robust materials of construction, and various configuration options to suit your specific application needs. The units are also the perfect complement to the OSMO TITAN Series line of reverse osmosis systems. Visit www.gewater.com for more information.



General Features

- Epoxy-lined carbon steel tanks, ASME code at 100 psig.
- Brine tank with cover and air check valve
- Resilient seated butterfly service valves with stainless steel disc and stem; air actuated / spring-to-close
- Stainless steel face-piping
- 4-inch media clean out port on side of tank
- Sight glass on backwash line
- Nema 4 solenoid panel with terminal strips. Optional NEMA 4 remote I/O enclosure. Controller PLC sold separately.
- Instrumentation: Service/backwash flow transmitter, pre- / post- softener pressure gauges

Figure 1. OSMO TITAN Series Flow Range

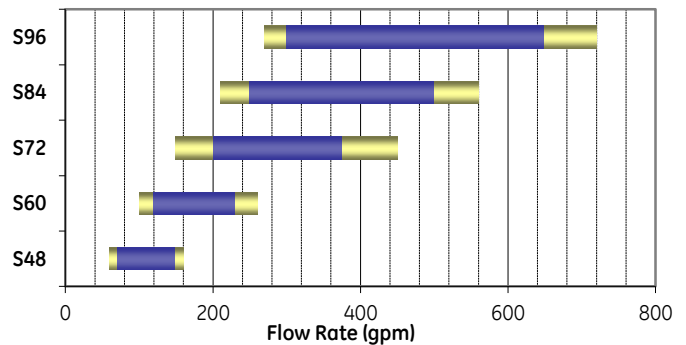


Table 1. Water Softener Specifications

Model	Part Number	Connections (inches)	Tank (inches)	Overall Height (inches)	Brine Tank		Flow (gpm)			Resin Volume (ft3)	Capacity (grains)
					Dimensions (inches)	Capacity (lbs)	Min	Max	BkWsh		
S48	3023945	3	48x72	122	56x62	2700	60	160	100-160	40	500-1312K
S60	3023946	4	60x72	125	56x62	2700	100	260	150-260	65	826-2132K
S72	3023947	6	72x72	130	74x64	4600	150	450	220-400	100	1270-3280K
S84	3023948	6	84x72	134	86x68	9600	210	560	300-560	140	1780-4590K
S96	3023950	6	96x72	144	86x68	9600	270	720	400-720	180	2280-5900K



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BRACKISH RO PLATFORMS

E-SERIES

LIGHT INDUSTRIAL RO (375 gpm to 100 gpm)

PRO SERIES

INDUSTRIAL BRACKISH RO (50 to 450 gpm)



E2 Series 60 Hz

Reverse Osmosis Machine 375 to 2535 gallons per day



Figure 1: E2 Series

When you mention reverse osmosis (RO), GE 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
- Spot free rinse water
- Ion exchange pre-treatment
- R & D lab use

Standard Economy Features

- 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



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Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	Desal AG2521TM or AG2540TM
Membrane Housing	Stainless Steel
Tubing	Polyethylene

Table 3: Pump and Motor

Pump Type	Rotary vane
Motor	1-phase, ODP, 110 VAC

Table 4: E2 Specifications - 60 Hz

Model	E2-0375	E2-0750	E2-1125	E2-1690	E2-2535
ECN	1226251	1226259	1226261	1226269	1226274
DLX	1226252	1226260	1226262	1226270	1226275
Flow Specifications					
Recovery Range:	33-50%	33-50%	33-50%	33-50%	33-50%
Permeate Rate: gpm (m ³ /h)	0.3 (0.07)	0.5 (0.11)	0.78 (0.18)	1.2 (0.27)	1.8 (0.40)
Concentrate Rate: gpm (m ³ /h)	0.3-0.2 (0.07-0.04)	0.5-0.3 (0.11-0.07)	0.78-0.5 (0.18-0.11)	1.2-0.8 (0.27-0.18)	1.8-1.2 (0.40-0.27)
Pump and Motor					
Pump	Procon Series 2 or 3			Procon Series 4 or 5	
Motor: HP (KW)	0.5 (0.37)	0.5 (0.37)	0.5 (0.37)	0.75 (0.56)	0.75 (0.56)
Membrane Elements					
Quantity	1	2	3	2	3
Array	1	1-1	1-1-1	1-1	1-1-1
Element Model	AG2521TM	AG2521TM	AG2521TM	AG2540TM	AG2540TM
Connections					
Inlet, Permeate, & Concentrate: inch (cm)	0.38 (0.95)	0.38 (0.95)	0.38 (0.95)	0.38 (0.95)	0.38 (0.95)
Dimensions & Weights					
Height: inch (cm)	30 (76)	30 (76)	30 (76)	51 (130)	51 (130)
Width: inch (cm)	18 (46)	18 (46)	18 (46)	18 (46)	18 (46)
Depth: inch (cm)	15 (38)	15 (38)	15 (38)	15 (38)	15 (38)
Shipping Weight Estimate: lb (kg)	50 (20)	55 (25)	60 (30)	75 (35)	85 (40)



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), GE 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

- 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)



Table 2: Materials of Construction

Frame	Painted carbon steel
Membrane Elements	AG2521TM or AG2540TM
Membrane Housing	Stainless Steel
Tubing	Polyethylene

Table 3: Pump and Motor

Pump Type	Rotary vane
Motor	1-phase, ODP, 110 VAC

Table 3: E22 Specifications - 60 Hz

Model		E2-0375	E2-0750	E2-1125	E2-1690	E2-2535
Part Number	ECN	1226221	1226229	1226231	1226239	1226244
	DLX	1226222	1226230	1226232	1226240	1226245
Recovery Range		33-50%	33-50%	33-50%	33-50%	33-50%
Permeate Rate	gpm	0.3	0.5	0.9	1.2	1.8
	(m ³ /hr)	(0.07)	(0.11)	(0.20)	(0.27)	(0.40)
Concentrate Rate	gpm	0.6-0.3	1.0-0.5	1.8-0.9	2.4-1.2	3.7-1.8
	(m ³ /hr)	(0.13-0.07)	(0.22-0.11)	(0.40-0.20)	(0.5-0.27)	(0.80-0.40)
Pump and Motor						
RO Motor	HP (KW)	0.5 (0.37)	0.5 (0.37)	0.75 (0.55)	0.75 (0.55)	0.75 (0.55)
Membrane Elements						
Membrane Model		AG2521TM	AG2521TM	AG2521TM	AG2540TM	AG2540TM
Number of elements		1	2	3	2	3
Array		1	1-1	1-1-1	1-1	1-1-1
Piping						
Inlet	inch (cm)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)
Permeate	inch (cm)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)
Concentrate	inch (cm)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)	.38 (0.95)
Approximate Overall Dimensions						
Height	inch (cm)	30 (76)	30 (76)	30 (76)	30 (76)	30 (76)
Width	inch (cm)	18 (46)	18 (46)	18 (46)	18 (46)	18 (46)
Depth	inch (cm)	15 (38)	15 (38)	15 (38)	15 (38)	15 (38)
Approximate Shipping Weight						
	lbs	50	55	60	75	85
	(kg)	(20)	(25)	(30)	(35)	(40)



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), GE 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)



Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	AG4040TM
Membrane Housing	Stainless Steel
Inlet Plumbing	Schedule 80 PVC
High Pressure Plumbing	Reinforced rubber hose
Permeate/Concentrate Tubing	Polyethylene, NSF approved
Control Enclosure	NEMA 1
Motor Starters	NEMA 4X
Cartridge Filter	RO,Save, 1 micron, 20-inch

Table 3: Pump and Motor

Pump Manufacturer	Tonkaflo
Pump Type	Multi-stage, centrifugal
Materials	SS shell/housing, Noryl* internals
Castings	SS inlet/discharge
Motor	3-phase, TEFC, 208-230/460 VAC

Table 4: E4 Specifications - 60 Hz

Model	E4-2200	E4-4400	E4-6600	E4-8800	E4-11000	E4-13200
ECN	1234779	1234813	1234817	1234821	1234825	1234829
DLX	1234780	1234814	1234818	1234822	1234826	1234830
Flow Specifications						
Recovery Range:	50-75%	50-75%	50-75%	50-75%	50-75%	50-75%
Permeate Rate: gpm (m ³ /h)	1.5 (0.3)	3 (0.7)	4.5 (1.0)	6 (1.4)	7.5 (1.7)	9 (2.1)
Concentrate Rate: gpm (m ³ /h)	1.5-0.5 (0.3-0.1)	3.0-1.0 (0.7-0.2)	4.5-1.5 (1-0.3)	6.0-2.0 (1.4-0.5)	7.5-2.5 (1.7-0.6)	9.0-3.0 (2.1-0.7)
Pump and Motor						
Pump Model	SS1816X	SS1816X	SS1816X	SS1816X	SS1823X	SS1823X
Motor: HP (KW)	3 (2.2)	3 (2.2)	3 (2.2)	3 (2.2)	5 (3.7)	5 (3.7)
Membrane Elements						
Quantity	1	2	3	4	5	6
Array	1	1-1	1-1-1	1-1-1-1	2-1-1-1	2-2-1-1
Connections						
Inlet: inch (cm)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Permeate: inch (cm)	0.5 (1.3)	0.5 (1.3)	0.5 (1.3)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Concentrate: inch (cm)	0.5 (1.3)	0.5 (1.3)	0.5 (1.3)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Dimensions & Weights						
Height: inch (cm)	63 (160)	65 (165)	65 (165)	65 (165)	65 (165)	65 (165)
Width: inch (cm)	27 (68)	27 (68)	27 (68)	27 (68)	27 (68)	27 (68)
Depth: inch (cm)	23 (58)	23 (58)	23 (58)	28 (71)	28 (71)	28 (71)
Shipping Weight Estimate: lb (kg)	170 (77)	185 (83)	215 (98)	235 (107)	325 (147)	345 (156)



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), GE 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)

- 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

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

Table 1: Operating Parameters

Operating Pressure	100-110 psig (6.9-7.6 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)



Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	AK4040TM
Membrane Housing	Stainless Steel
Inlet Plumbing	Schedule 80 PVC
High Pressure Plumbing	Reinforced rubber hose
Permeate/Concentrate Tubing	Polyethylene, NSF approved
Control Enclosure	NEMA 1
Motor Starters	NEMA 4X
Cartridge Filter	RO,Save, 1 micron

Table 3: Pump and Motor

Pump Manufacturer	Tonkaflo
Pump Type	Multi-stage, centrifugal
Materials	SS shell/housing, Noryl* internals
Castings	SS inlet/discharge
Motor	3-phase, TEFC, 208-230/460 VAC

Table 4: E4-LE Specifications - 60 Hz

Model	E4-2200	E4-4400	E4-6600	E4-8800	E4-11000	E4-13200
ECN	1230850	1230855	1230859	1230863	1230867	1230871
DLX	1230852	1230856	1230860	1230864	1230868	1230871
Flow Specifications						
Recovery Range:	50-75%	50-75%	50-75%	50-75%	50-75%	50-75%
Permeate Rate: gpm (m ³ /h)	1.5 (0.3)	3 (0.7)	4.5 (1.0)	6 (1.4)	7.5 (1.7)	9 (2.1)
Concentrate Rate: gpm (m ³ /h)	1.5-0.5 (0.3-0.1)	3.0-1.0 (0.7-0.2)	4.5-1.5 (1-0.3)	6.0-2.0 (1.4-0.5)	7.5-2.5 (1.7-0.6)	9.0-3.0 (2.1-0.7)
Pump and Motor						
Pump Model	SS1809X	SS1809X	SS1809X	SS1809X	SS1812X	SS1812X
Motor: HP (KW)	1.5 (1.1)	1.5 (1.1)	1.5 (1.1)	1.5 (1.1)	2 (1.5)	2 (1.5)
Membrane Elements						
Quantity	1	2	3	4	5	6
Array	1	1-1	1-1-1	1-1-1-1	2-1-1-1	2-2-1-1
Connections						
Inlet: inch (cm)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Permeate: inch (cm)	0.5 (1.3)	0.5 (1.3)	0.5 (1.3)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Concentrate: inch (cm)	0.5 (1.3)	0.5 (1.3)	0.5 (1.3)	0.75 (1.9)	0.75 (1.9)	0.75 (1.9)
Dimensions & Weights						
Height: inch (cm)	50 (127)	50 (127)	55 (139)	55 (139)	60 (152)	60 (152)
Width: inch (cm)	30 (76)	30 (76)	30 (76)	30 (76)	30 (76)	30 (76)
Depth: inch (cm)	20 (51)	20 (51)	20 (51)	26 (66)	26 (66)	26 (66)
Shipping Weight Estimate: lb (kg)	170 (77)	185 (83)	215 (98)	235 (107)	325 (147)	345 (156)



EZ4 Kit, 60 Hz

Reverse Osmosis Machine 2200 to 13,200 gallons per day



Figure 1: EZ-4 Kit

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

General Properties

Typical Applications (but not limited to)

- Process ingredient water
- Safe drinking water
- Boiler feedwater
- 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
- Alarms: Low Inlet Pressure, Motor Starter overload

Pump and Motor

- Pump¹
 - Multi-stage, centrifugal pump
 - SS Shell/Housing
 - Thermalplastic internals
 - SS inlet/discharge castings
- Motor: 3-phase, TEFC, 208-230/460VAC

¹Tonkaflo* pumps used on models 5400-10,800



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Table 1: Operating Parameters

Operating Pressure	100-110 psig
Maximum Recovery	75%
Nominal Rejection	95-98%
Operating Temperature	55°F-85°F
Minimum Inlet Pressure	30 psig
Design Temperature	77°F

Table 2: Materials of Construction

Frame	Painted carbon steel
Membrane Elements	Desal AK4040TM
Membrane Housing	Stainless Steel
Low Pressure Plumbing	Sch. 80 PVC, Nylon Hose
High Pressure Plumbing	Reinforced Rubber
Control Enclosure	NEMA 1
Motor Starters	NEMA 4X

Table 3: E24 Specifications – 60 Hz

Model		E4-2200	E4-4400	E4-6600	E4-8800	E4-11000	E4-13200
Part Number	ECN	1230877	1230881	1230885	1230889	1230893	1230897
	DLX	1230878	1230882	1230886	1230890	1230894	1230898
Recovery Range		50-75%	50-75%	50-75%	50-75%	50-75%	50-75%
Permeate Rate	gpm	1.5	3.0	4.5	6.0	7.5	9.0
	(m ³ /hr)	(0.3)	(0.7)	(1.0)	(1.4)	(1.7)	(2.0)
Concentrate Rate	gpm	1.5-0.5	3.0-1.0	4.5-1.5	6.0-2.0	7.5-2.5	9.0-3.0
	(m ³ /hr)	(0.3-0.1)	(0.7-0.2)	(1.0-0.3)	(1.4-0.5)	(1.7-0.6)	(2.0-0.7)
Pump and Motor							
RO Motor		SS1809X	SS1809X	SS1809X	SS1809X	SS1812X	SS1812X
	HP (KW)	1.5 (1.1)	1.5 (1.1)	1.5 (1.1)	1.5 (1.1)	2 (1.5)	2 (1.5)
Membrane Elements							
Number of elements		1	2	3	4	5	6
Array		1	1-1	2-1	1-1-1-1	2-1-1-1	2-2-1-1
Piping							
Inlet	inch (cm)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)
Permeate	inch (cm)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)
Concentrate	inch (cm)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)	.75 (1.9)
Approximate Overall Dimensions							
Height	inch (cm)	50 (127)	50 (127)	55 (139)	55 (139)	60 (152)	60 (152)
Width	inch (cm)	30 (76)	30 (76)	30 (76)	30 (76)	30 (76)	30 (76)
Depth	inch (cm)	20 (51)	20 (51)	20 (51)	26 (66)	26 (66)	26 (66)
Approximate Shipping Weight							
	lbs	170	185	215	235	325	345
	(kg)	(77)	(83)	(98)	(107)	(147)	(156)



E4H Series 60 Hz

Reverse Osmosis Machine 15,200 to 43,200 gallons per day

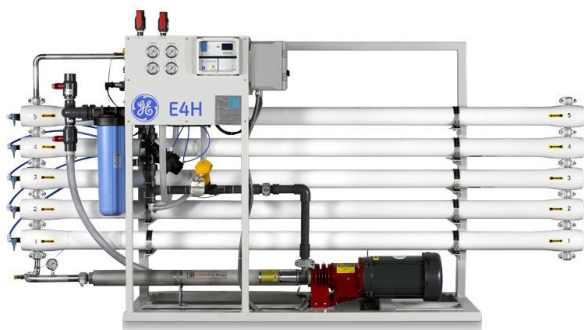


Figure 1: E4H Series 60 Hz

When you mention reverse osmosis (RO), GE 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)



Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	AK4040TM
Membrane Housing	FRP
Low Pressure Pipe	Schedule 80 PVC
High Pressure Pipe	Stainless Steel
Motor Starters	NEMA 4

Table 3: Pump and Motor

Pump Manufacturer	Tonkaflo
Pump Type	Multi-stage, centrifugal
Materials	SS shell/housing, Noryl* internals
Castings	SS inlet/discharge
Motor	3-phase, TEFC, 460/230 VAC

Table 4: E4H Specifications - 60 Hz

Model		E4H-16K	E4H-21K	E4H-27K	E4H-38K	E4H-43K
230 VAC	ECN	1163775	1163781	1163787	1163793	1163796
	DLX	1200054	1200060	1200066	1200072	1200075
460 VAC	ECN	1163776	1163782	1163788	1163794	1163797
	DLX	1200055	1200061	1200067	1200073	1200076
Flow Specifications						
Recovery Range:		75%	75%	75%	75%	75%
Permeate Rate: gpm (m ³ /h)		11.2 (2.56)	15 (3.4)	18.8 (4.3)	26.2 (5.9)	30 (6.8)
Concentrate Rate: gpm (m ³ /h)		3.4 (0.9)	5.0 (1.1)	6.3 (1.4)	8.8 (2.0)	10.0 (2.3)
Pump and Motor						
RO Pump Model		SS2823G	SS2823G	SS2828D	SS5512KA	SS5512KA
RO Motor: HP (KW)		7.5 (5.6)	7.5 (5.6)	10 (7.4)	15 (11.2)	15 (11.2)
CIP Pump Model: (DLX only)		SS2805AZ	SS2805AZ	SS2805AZ	SS5503G	SS5503G
CIP Motor: HP (KW)		2 (1.5)	2 (1.5)	2 (1.5)	5 (3.7)	5 (3.7)
Membrane Elements and Filters						
Membrane Quantity		9	12	15	21	24
Array		2-1	2-2	3-2	4-3	5-3
Pre-Filter Quantity		2	2	2	2	2
Connections						
Inlet: inch (cm)		1.5 (3.8)	1.5 (3.8)	1.5 (3.8)	1.5 (3.8)	1.5 (3.8)
Permeate: inch (cm)		1 (2.5)	1 (2.5)	1 (2.5)	1 (2.5)	1 (2.5)
Concentrate: inch (cm)		1 (2.5)	1 (2.5)	1 (2.5)	1 (2.5)	1 (2.5)
Dimensions & Weights						
Height: inch (cm)		62 (158)	62 (158)	62 (158)	62 (158)	62 (158)
Width: inch (cm)		132 (335)	132 (335)	132 (335)	132 (335)	132 (335)
Depth: inch (cm)		36 (92)	36 (92)	36 (92)	36 (92)	36 (92)
Shipping Weight Estimate: lb (kg)	ECN	1000 (500)	1050 (500)	1550 (700)	1700 (800)	1800 (820)
Shipping Weight Estimate: lb (kg)	DLX	11500 (530)	1250 (570)	1750 (800)	1900 (870)	2000 (910)



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), GE's 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 ft² (37.2 m²) 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)



Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	AG8040F
Membrane Housing	FRP
Low Pressure Pipe	Schedule 80 PVC
High Pressure Pipe	Stainless Steel
Motor Starters	NEMA 4

Table 3: Pump and Motor

Pump Manufacturer	Tonkaflo
Pump Type	Multi-stage, centrifugal
Materials	SS shell/housing, Noryl* internals
Castings	SS inlet/discharge
Motor	3-phase, TEFC, 460 VAC

Table 4: E8 Specifications - 60 Hz

Model	E8-57K	E8-86K	E8-108K	E8-144K	
ECN	1202846	1202850	1202833	1202835	
DLX	1202284	1202286	1202287	1202288	
Flow Specifications					
Recovery Range:	66-75%	66-75%	66-75%	66-75%	
Permeate Rate: gpm (m ³ /h)	40 (9)	60 (14)	75 (17)	100 (23)	
Concentrate Rate: gpm (m ³ /h)	21-13 (5-3)	30-20 (7-5)	39-25 (9-6)	52-33 (12-8)	
Pump and Motor					
RO Pump Model	SS8510KA	SS8512KB	SS12508KC	SS24006KE	
RO Motor: HP (KW)	15 (11.2)	20 (15)	25 (18.7)	40 (29.8)	
CIP Pump Model: (DLX only)	SS5504G	SS5504G	SS8504G	SS8504G	
CIP Motor: HP (KW)	5 (3.7)	5 (3.7)	7.5 (5.6)	7.5 (5.6)	
Membrane Elements and Filters					
Membrane Quantity	8	12	15	21	
Array	1-1-1	2-1-1	3-2	3-2-2	
Pre-Filter Quantity	7, RO.Zs 01-40-XK	7, RO.Zs 01-40-XK	7, RO.Zs 01-40-XK	7, RO.Zs 01-40-XK	
Connections					
Inlet: inch (cm)	2.0(5.1)	2.0(5.1)	2.0(5.1)	3.0(7.6)	
Permeate: inch (cm)	1.5(3.8)	2.0(5.1)	2.0(5.1)	2.0(5.1)	
Concentrate: inch (cm)	1.5(3.8)	1.5(3.8)	1.5(3.8)	1.5(3.8)	
Dimensions & Weights					
Height: inch (cm)	76(193)	76(193)	76(193)	76(193)	
Width: inch (cm)	153(388)	153(388)	153(388)	153(388)	
Depth: inch (cm) ECN	42(107)	42(107)	42(107)	42(107)	
Depth: inch (cm) DLX	91(231)	91(231)	91(231)	103(262)	
Shipping Weight Estimate: lb (kg)	ECN	2600(1200)	3000(1360)	3400(1500)	3800(1750)
Shipping Weight Estimate: lb (kg)	DLX	2800(1300)	3300(1500)	3700(1700)	4200(1900)



E-Series Ultra

High Brackish E-Series 50/60 Hz Reverse Osmosis Machine 5 gpm (1.14 m³/h)¹



Figure 1: E-Series Ultra²

The E-Series Ultra is a high brackish water reverse osmosis (RO) capable of handling TDS from 3,500-35,000 ppm with variable flow rates. The E-Series Ultra is designed for high quality product water production, easy installation and simple control.

¹The flow rate decreases as chlorides increase

²P&IDs and General Arrangement drawings available upon request.

General Properties

Typical Applications

- Process ingredient water
- Rinse water
- Food ingredient water
- Drinking water
- Boiler feedwater
- Ion exchange pre-treatment

Features

- 1-micron pre-filter
- Automatic inlet shut-off valve
- Permeate and concentrate flow meters
- Remote machine on/off capability
- Pre-filter, post-filter, primary, and final pressure gauges
- Low inlet pressure switch
- Digital conductivity meter with programmable relay
- Alarms: Low Inlet Pressure and Motor Starter Overload

Table 1: Operating Parameters

Max Operating Pressure	80 bar (1160 psig)
Recommended Recovery	25-45%
Nominal Rejection	99.6%
Max Design Operating Temp	86° F (30° C)
Min Recommend Inlet Pressure	2 bar (30 psig)
Design Temperature	68° F (20° C)



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Table 2: Materials of Construction

Frame	Painted Carbon Steel
Membrane Elements	AD-90
Membrane Housing	FRP (ROPV or BEL)
Inlet Plumbing	Schedule 80 PVC
High Pressure Plumbing	Reinforced rubber hose
Permeate/Concentrate Tubing	Polyethylene, NSF approved
Control Enclosure	NEMA 1
Motor Starters	NEMA 4X
Cartridge Filter	RO.Z 01-20, 1236262

Table 3: Pump and Motor

Pump Manufacturer ³	Danfoss
Pump Type	Positive displacement
Materials	Duplex 2205 SST shell/housing,
Castings	Duplex 2205 SST
Motor	3-phase, TEFC, 380VAC/50Hz 7.5 Hp

³Pump shipped loose for field installation

Table 4: E-Series Ultra Specifications: 50 Hz/60 Hz

Typical Specifications	Ultra 6
E-Series Ultra Part Number	50Hz = Part #3057250 60 Hz = Part #3058412
Typical Recovery:	25% to 45%
Permeate Rate:	2 to 5 gpm (0.45 to 1.14 m ³ /h)
Concentrate Rate:	6.1 gpm (1.39 m ³ /h)
Pump Model	APP2.5
Motor: KW (HP)	5.6 (7.5)
Quantity of Membranes	6
Array Configuration	2-2-2
Inlet: cm (inch)	0.75 inch (1.9 cm) FNPT
Permeate: cm (inch)	0.75 inch (1.9 cm) FNPT
Concentrate: cm (inch)	0.75 inch (1.9 cm) FNPT
Height:	62 inch (157 cm)
Width:	26.4 inch (67 cm)
Depth:	29 inch (74 cm)
Shipping Weight Estimate:	700 lb (317.5 kg)

Membrane Elements and Housings continued

Average membrane flux..... 16-17 gfd¹
 Membrane rejection99.0 to 99.5%
 Manufacturer.....GE
 Housing material.....316 Stainless Steel or FRP
 Housing Pressure Rating450 psi
¹ Flux can be reduced by using 400-sqft membranes.

Cartridge Filtration

Housing model..... GE HX-0740-80-V316
 Housing material 316 Stainless Steel
 Cartridge filter 1-micron nominal, ROsave.Z*s

PRO NA Models

MODEL	PRO-50-NA	PRO-100-NA	PRO-150-NA	PRO-200-NA	PRO-300-NA	PRO-450-NA
Permeate Rate ² :	50 gpm (11 m ³ /hr)	100 gpm (23 m ³ /hr)	150 gpm(34 m ³ /hr)	200 gpm (45 m ³ /hr)	300 gpm (68 m ³ /hr)	450 gpm(100 m ³ /hr)
Concentrate Rate:	13 gpm (3 m ³ /hr)	25 gpm (6 m ³ /hr)	38 gpm (8.5 m ³ /hr)	50 gpm (11 m ³ /hr)	75 gpm (17 m ³ /hr)	113 gpm (26 m ³ /hr)
Concentrate Recycle:	10 gpm (2.3 m ³ /hr)	10 gpm (2.3 m ³ /hr)	NA	15 gpm (3.4 m ³ /hr)	NA	NA
Feed Rate:	63 gpm (14 m ³ /hr)	125 gpm (28.5 m ³ /hr)	188 gpm (43 m ³ /hr)	250 gpm (57 m ³ /hr)	375 gpm (85 m ³ /hr)	563 gpm (128 m ³ /hr)
Pumps and Motors						
Model:	SS8516	SS12512	SS24009	AS40407	AS40409	AS40409
Manufacturer:	GE/Tonkafllo	GE/Tonkafllo	GE/Tonkafllo	GE/Tonkafllo	GE/Tonkafllo	GE/Tonkafllo
Quantity:	1	1	1	1	1	2
Motor Power and type:	25HP (18.6 KW) TEFC	40 Hp (30 KW) TEFC	60 Hp (45 KW) TEFC	60 Hp (45 KW) TEFC	75 Hp (56 KW) TEFC	75 Hp (56 KW) TEFC
Installed Power:	18.6 KW	30 KW	45 KW	45 KW	56 KW	112 KW
Design Flow Rate:	73 gpm (17 m ³ /hr)	135 gpm (31 m ³ /hr)	188 gpm (43 m ³ /hr)	265 gpm (60 m ³ /hr)	375 gpm (85 m ³ /hr)	563 gpm(128 m ³ /hr)
Design boost pressure:	330 psig (23 Bar)	275 psig (19 Bar)	280 psig (19.3 Bar)	240 psig (16.5 Bar)	260 psig (18 Bar)	300 psig (20.7 Bar)
Membrane Elements and Housings						
Membranes Quantity:	12	24	36	48	72	108
Memb. Housing Style:	4 element long, 4 port	4 element long, 4 port	6 element long, 4 port	4 element long, 4 port	6 element long, 4 port	6 element long, 4 port
Banking Arrangement:	1→1→1	3→2→1	3→2→1	6→4→2	6→4→2	9→6→3
Cartridge Filtration						
Housing Model:	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316
Housing Quantity:	1	1	2	2	3	4
Cartridge Filter Model:	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK
Cartridge Filter Length:	40-inch (120 cm)	40-inch (102 cm)	40-inch (102 cm)	40-inch (102 cm)	40-inch (102 cm)	40-inch (102 cm)
Cartridge Filter Qty:	7 per housing, 7/change out	7 per housing, 7/change out	7 per housing, 14/change out	7 per housing, 14/change out	7 per housing, 21/change out	7 per housing, 28/change out
Installation and Utility Requirements						
Inlet:	2.0" flange	3.0" flange	3.0" flange	4.0" flange	4.0" flange	6.0" flange
Permeate:	1.5" flange	3.0" flange	3.0" flange	3.0" flange	4.0" flange	6.0" flange
Concentrate:	1.0" flange	1.5" flange	1.5" flange	2.0" flange	2.0" flange	3.0" flange
Inlet Water Pressure:	30-60 psig	30-60 psig	30-60 psig	30-60 psig	30-60 psig	30-60 psig
Air Pressure:	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	7 bar, oil-free
Drain to be Sized for:	67 gpm (15 m ³ /hr)	133 gpm (30 m ³ /hr)	200 gpm (45 m ³ /hr)	267 gpm (61 m ³ /hr)	400 gpm (91 m ³ /hr)	600 gpm (136 m ³ /hr)
Power:	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz
Control Circuit	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
Skid						
Height:	79" (200 cm)	79" (200 cm)	79" (200 cm)	79" (200 cm)	79" (200 cm)	102" (259 cm)
Width:	46" (117 cm)	47" (119cm)	47" (119cm)	80" (203 cm)	80" (203 cm)	80" (203 cm)
Depth:	194" (493 cm)	194" (493 cm)	274" (696 cm)	194" (493 cm)	274" (696 cm)	276" (701cm)
Skid Shipping Weight Estimate Without Membranes:	3454 lb (1567kg)	4408 lb (2000 kg)	5712 lb (2591 kg)	6966 lb (3160 kg)	8624 lb (3912 kg)	13736 lb (6231 kg)
Membranes Shipping Weight Estimate:	420 lb (191 kg)	840 lb (381 kg)	1260 lb (572 kg)	1680 lb (762 kg)	2520 lb (1143 kg)	3780 lb (1715 kg)
Operating Weight Estimate:	4300 lb (1951 kg)	5650 lb (2563 kg)	7550 lb (3425 kg)	9400 lb (4264 kg)	12000 lb (5443 kg)	19600 lb (8890 kg)

² Maximum permeate rate listed at design temperature. Permeate rate can be reduced by up to 15%.



Osmo* TITAN Series

Reverse Osmosis Machines 120–700 gpm (27–158 m³/hr)

Key Benefits

- Compact treatment system for variable water quality
- Configurable process flow to meet changing water demands; two pass or two train operability in a single system on two models
- Skid mounted VFD for high pressure pump to optimize energy usage and accommodate varying water temperatures
- Designed to ANSI B31.1 specifications
- Premium instrumentation with HART protocol
- Skid-mounted; reduces onsite installation time and costs
- Easy to install
- Simple to operate

Standard Features

- Allen Bradley ControlLogix 1756 PLC with Ethernet
- Allen Bradley PanelView Plus 1000 10-inch color touchscreen interface
- ASME code housings
- Full system or Bank-by-bank cleaning
Automatic permeate flush on shutdown



Operating Parameters

Recovery.....	66-75%
Design temp.	60°F (16°C)
Operating range.....	60-77 °F (16-25°C)
Nominal System rejection.....	97-99%
Minimum inlet pressure	30 PSIG (2 bar)
Average membrane flux.....	12-14 gfd
Design TDS Basis	1500-2500 ppm

Materials of Construction

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

Membrane Elements

Membrane Model	AG8040F-400
Style	Spiral-wound elements
Membrane type	TFC (Polyamide)
Average Membrane rejection	99.5%

Cartridge Filtration

Housing material	316 Stainless Steel
Cartridge filter	1-micron nominal, ROsave.Z*



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Table 1: Standard Instrumentation

Flow	Permeate, concentrate
Conductivity	Feed, permeate
pH	Feed
Pressure Indicators	Primary, permeate, concentrate pump discharge
Pressure Switch	Permeate, concentrate
Pressure Transmitter	Pre-filter, post-filter, primary, final, permeate

Table 2: Major Component Manufacturers

Equipment	Manufacturer
Cartridge Filter	GE
Membrane Element	GE
High Pressure Pump	GE Tonkaflo
Cartridge filter housing	Filtrek
Membrane Housing	Codeline
Flow Measurement	Rosemount
Conductivity, pH	Rosemount
Pressure Transmitters	Rosemount
PLC Components	Allen Bradley
Valves	Bray

Table 3: Optional Features

Option	Description
TITAN Media Filters	Media filtration pretreatment with stainless steel internals and face piping
TITAN Clean-in-Place	Cone-bottom HDPE tank with painted carbon steel stand and CIP pump for bank-by-bank cleaning
Chemical Feed Systems	Electronic metering pump for chemical pretreatment
Motor Starters	Motor starters for CIP pumps, shipped loose for field installation

OSMO TITAN Models

MODEL	TITAN-36	TITAN-72	TITAN-90	TITAN-144	TITAN-180
Permeate rate:	130 gpm	260 gpm, 130 gpm per train	325 gpm two train, 166 gpm two pass	520 gpm, 260 gpm per train	650 gpm two train, 332 gpm two pass
Concentrate Rate:	43 gpm	86 gpm, 43 gpm per train	109 gpm two train, 65 gpm two pass	174 gpm, 87 gpm per train	217 gpm two train, 130 gpm two pass
Feed Rate:	173 gpm	346 gpm, 173 gpm per train	433 gpm two train, 217 gpm two pass	694 gpm, 347 gpm per train	867 gpm two train, 461 gpm two pass
Pumps and Motors					
Manufacturer:	Tonkaflo	Tonkaflo	Tonkaflo	Tonkaflo	Tonkaflo
Model:	AS22512	AS22512	AS40407/AS22512	AS40409	AS40407/AS40409
Quantity:	1	2	1/1	2	2/1
Motor HP and type:	50 HP TEFC	50 HP TEFC	60 HP/50 HP TEFC	75 HP TEFC	2x60 HP/75 HP TEFC
Membrane Elements and Housings					
Membranes quantity:	36	72	90	144	180
Banking Arrangement:	4→2	4→2, 4→2	6→3, 4→2	8→4, 8→4	12→6, 8→4
Cartridge Filtration					
Cartridge Filter:	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK
Filter Quantity:	12	24	31	50	57
Installation and Utility Requirements					
Inlet:	3.0-inch flange	2x3.0-inch flange	4.0-inch/3.0-inch flange	2x4.0-inch flange	6.0-inch/4.0-inch flange
Permeate:	3.0-inch flange	2x3.0-inch flange	2x3.0-inch flange	2x4.0-inch flange	2x4.0-inch flange
Concentrate:	1.5-inch flange	2x1.5-inch flange	2.0-inch/1.5-inch flange	2x2.0-inch flange	3.0-inch/2.0-inch flange
Inlet Water Pressure:	30 psig min.	30 psig min.	30 psig min.	30 psig min.	30 psig min.
Air Pressure:	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free
Drain to be Sized for:	173 gpm	346 gpm	433 gpm	694 gpm	867 gpm
Power:	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz
Control Circuit:	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
Skid					
Height:	101.7"	101.7"	102.7"	102.5"	105.6"
Width:	48"	72"	84"	92"	92"
Length:	309"	309"	309"	309"	460"
Shipping Weight:	6,500LB (2,950Kg)	11,300LB (5,126Kg)	12,800LB (5,806Kg)	16,200LB (7,350Kg)	21,200LB (9,616Kg)
Operating Weight:	8,900LB (4,037Kg)	16,300LB (7,394Kg)	18,900LB (8,573Kg)	25,200LB (11,430Kg)	32,700LB (14,832Kg)



ReNEW NA Series

Wastewater Reuse Reverse Osmosis Machines 50 to 330 gpm



The ReNEW NA has been designed at a special low-flux for wastewater reuse applications (i.e. after MBR or tertiary UF treatment).

This new platform is a perfect fit to polish GE Z-MOD*, Z-BOX and Z-PAK Series MBR and UF packaged plants effluents.

Features

- Separated Control & High Voltage Enclosures with single power disconnect
- Allen Bradley CompactLogix PLC
- Communication RS485
- HMI Allen Bradley PanelView+700 Touch Screen
- 4-20 mA Instruments on Touch Screens
- Primary and Final Pressure Transmitters
- Motor Starter: VFD (mounted on frame)
- Bank-by-bank cleaning manifolds and valves
- RO permeate Flush on Shutdown

Instrumentation

Flow Meters:..... Permeate & Concentrate
 Conductivity:..... Permeate, Feed
 pH: Feed

Pressure:..... Pre & Post Cartridge Filter
 RO Feed , Pump Outlet, Interstage (x2)
 Concentrate & Permeate
 Pressure Switch:..... Feed, Permeate, Concentrate
 ORP:..... Feed

Options Available

- GE Fanuc PLC
- Ethernet Communication
- CIP PRE with heater for advanced membranes cleaning
- DuraSlick* membrane elements for higher fouling applications (with flow & recovery decrease and pump change)

Feed water Guidelines

- BOD < 20 ppm; TOC < 5 ppm
- COD - must define what is creating COD
- Phosphate - Use Argo Analyzer to simulate scaling and calculate antiscalant dose
- NTU < 1; SDI < 5
- TDS design 2,000 ppm. Higher levels require pump size review

Operating Parameters

Design Recovery¹ 75%
 Design Temperature 60 °F (15 °C)
 Operating Temperature Range 36-87 °F (2-30 °C)
 System Inlet Pressure 30-60 psi (2-4 bar)
 System Back Pressure < 15 psi (1 bar)

¹ 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/fittingsZinc-plated

Cartridge Filtration

Housing model.....GE HX-0740-3.0-V316
 Housing material..... 316 Stainless Steel
 Cartridge filter.....1-micron nominal, ROsave.Z*s

Membrane Elements and Housings

Housing material..... FRP
 Housing Pressure Rating 450 PSI
 Average membrane flux..... 10-11 GFD
 Membrane rejection 98.0-99.0 %
 Membrane Model.....AG-400LF
 Style Spiral-wound elements
 Manufacturer GE
 Membrane type..... TFC (Polyamide) Low Fouling

GE ReNEW Models

MODEL	ReNEW-18-NA	ReNEW-36-NA	ReNEW-54-NA	ReNEW-72-NA	ReNEW-90-NA	ReNEW-108-NA
Permeate Rate ¹ :	55 gpm	110 gpm	165 gpm	220 gpm	275 gpm	330 gpm
Concentrate Rate:	18 gpm	37 gpm	55 gpm	73 gpm	92 gpm	110 gpm
Feed Rate:	73 gpm	147 gpm	220 gpm	293 gpm	367 gpm	440 gpm
Pumps and Motors						
Model:	SS8516	SS12512	SS24009	AS40407	AS40409	AS40409
Manufacturer:	GE Tonkaflo	GE Tonkaflo	GE Tonkaflo	GE Tonkaflo	GE Tonkaflo	GE Tonkaflo
Quantity:	1	1	1	1	1	1
Motor Power and type:	25 HP	40 HP	60 HP	60 HP	75 HP	75 HP
Installed Power:	39 Amps	52 Amps	77 Amps	77 Amps	96 Amps	96 Amps
Design Flow Rate:	73 gpm	147 gpm	220 gpm	293 gpm	367 gpm	440 gpm
Design boost pressure:	250 psi	250 psi	250 psi	230 psi	250 psi	230 psi
Membrane Elements and Housings						
Membranes Quantity:	18	36	54	72	90	108
Memb. Housing Style:	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port
Banking Arrangement:	2→1	4→2	6→3	8→4	10→5	12→6
Cartridge Filtration						
Housing Model:	HX-0740-3.0-V-316	HX-0740-3.0-V-316	HX-0740-3.0-V-316	HX-0740-3.0-V-316	HX-0740-3.0-V-316	HX-0740-3.0-V-316
Housing Quantity:	1	2	2	3	4	4
Cartridge Filter Model:	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK	ROZs01-40XK
Cartridge Filter Length:	102 cm (40")	102 cm (40")	102 cm (40")	102 cm (40")	102 cm (40")	102 cm (40")
Cartridge Filter Qty:	7 per housing, 7/change out	7 per housing, 14/change out	7 per housing, 14/change out	7 per housing, 21/change out	7 per housing, 28/change out	7 per housing, 28/change out
Installation and Utility Requirements						
Inlet:	2.0-inch flange	3.0-inch flange	3.0-inch flange	4.0-inch flange	4.0-inch flange	6.0-inch flange
Permeate:	1.5-inch flange	3.0-inch flange	3.0-inch flange	3.0-inch flange	4.0-inch flange	4.0-inch flange
Concentrate:	1.5-inch flange	1.5-inch flange	1.5-inch flange	2.0-inch flange	2.0-inch flange	3.0-inch flange
Inlet Water Pressure:	30 psi, min.	30 psi, min.	30 psi, min.	30 psi, min.	30 psi, min.	30 psi, min.
Air Pressure:	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free
Drain to be Sized for:	73 gpm	147 gpm	220 gpm	293 gpm	367 gpm	440 gpm
Power:	480 VAC, 3-phase, 60Hz	480 VAC, 3-phase, 60Hz	480 VAC, 3-phase, 60Hz	480 VAC, 3-phase, 60Hz	480 VAC, 3-phase, 60Hz	480 VAC, 3-phase, 60Hz
Skid						
Height:	90 inch	90 inch	92 inch	98 inch	104 inch	104 inch
Width:	274 inch	274 inch	274 inch	274 inch	274 inch	274 inch
Depth:	48 inch	48 inch	48 inch	80 inch	98 inch	98 inch
Shipping Weight Estimate:	4500 lb	5900 lb	7500 lb	9400 lb	14000 lb	16000 lb

¹ At design temperature



UF RO COMBINATION PLATFORMS

PROPAK

From 100 to 300 gpm



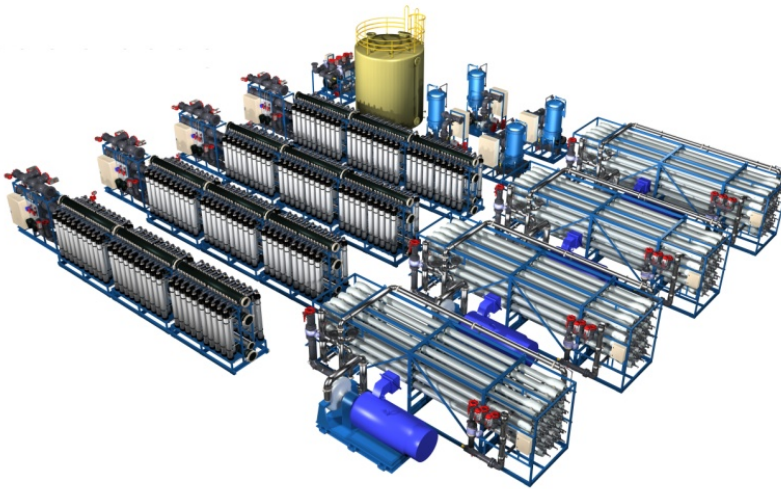
RePAK

From 220 to 440 gpm



SeaPAK

From 1000 to 10,000 m³/day



PROPAK* NA Series

Integrated UF RO Platforms 100-200-300 gpm (60 Hz)



Features

- Single compact multifunctional Tank: Break, UF backwash, UF CIP, RO CIP.
- Integrated control with single Allen Bradley PLC and HMI (Ethernet communications)
- 4-20 mA instruments
- RO permeate flush on shutdown
- UF backwash/CIP pump, RO feed pump (mounted on the tank skid), RO High pressure pump (mounted on filtration skid)
- UL/cUL Electrical Panel

System Operating Parameters

Max Design Recovery ¹	75%
Max Design Recovery ¹ (with ICR).....	85%
Design Temperature.....	60°F (15°C)
Operating Temperature Range.....	59-85°F (15-29°C)
Nominal RO rejection.....	97-99%
System Inlet Pressure.....	10-65 PSIG (0.7-4.5 bars)
UF average membrane flux.....	45 gfd
RO average membrane flux.....	20 gfd

¹Recovery Rate can vary +/- 5%

Available Options

- ICR (Integral Concentrate Recovery)
- UF flow control valve or UF Feed Pump
- Motor Starter (RO Feed, RO HP Pumps)
- VFD (UF Feed, UF backwash/CIP, RO HP Pumps)
- UF backwash aeration Blower and VFD
- 500 micron automated pre-screen
- UF modules membrane integrity test

Instrumentation

Flow Meters:.....	UF Feed, UF CIP/BW, RO Permeate, RO concentrate, ICR Permeate
Conductivity Meter:.....	RO Feed, RO Permeate, ICR Permeate
pH Meter.....	UF CIP, RO Feed (opt)
Pressure Transmitters.....	UF Feed, UF Permeate, RO Primary, RO Final
Pressure Gauges.....	UF Feed, UF Permeate, UFBW/CIP pump discharge, RO feed pump discharge, RO pre&post cartridge filter; RO HP pump discharge/primary/final, RO interstage/permeate/concentrate to drain
Pressure Switch.....	UF Feed / Backwash, RO Feed, RO Permeate, RO Concentrate, ICR Permeate
Chlorine Meter.....	UF Permeate
ORP.....	RO Feed
Temperature.....	UF Permeate, RO Feed, Tank
Turbidity Meter.....	UF Feed, UF Permeate
Level Transmitter.....	Tank

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
Cartridge housing.....	316 Stainless Steel

Membrane Elements and Housings

RO Membrane.....	AG8040F-400
Style.....	Spiral-wound elements, TFC (polyamide)
Membrane rejection.....	99.0 to 99.5%
RO Membrane Housing.....	GE, FRP
Housing Pressure Rating.....	450 psi
UF Membrane Model.....	GE ZW1500
UF Membrane Surface.....	550 ft ²



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PROPAK, Patent Pending
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PROPAK NA Models

MODEL	PROPAK-100-NA	PROPAK-200-NA	PROPAK-300-NA
RO Permeate Rate ² without or with ICR ³ :	100 gpm (23 m ³ /hr)	200 gpm (45 m ³ /hr)	300 gpm (68 m ³ /hr)
RO Concentrate Rate without ICR	33 gpm (7.5 m ³ /hr)	67 gpm (15 m ³ /hr)	100 gpm (23 m ³ /hr)
RO Concentrate Rate with ICR	18 gpm (4 m ³ /hr)	36 gpm (8 m ³ /hr)	55 gpm (12.5 m ³ /hr)
UF Feed Rate without ICR:	153 gpm (35 m ³ /hr)	307 gpm (70 m ³ /hr)	460 gpm (104.5 m ³ /hr)
UF Feed Rate with ICR:	141 gpm (32 m ³ /hr)	283 gpm (64 m ³ /hr)	423 gpm (96 m ³ /hr)
Pumps and Motors			
RO HP Pump Model:	SS12512KZE	AS40409KTE	AS40409KTE
Manufacturer:	GE/Tonkafllo	GE/Tonkafllo	GE/Tonkafllo
Quantity:	1	1	1
Motor Power and type:	40 Hp (30 kW) TEFC	75 Hp (56 kW) TEFC	75 Hp (56 kW) TEFC
Installed Power:	30 kW	56 kW	56 kW
Design Flow Rate:	135 gpm (31 m ³ /hr)	270 gpm (61 m ³ /hr)	405 gpm (92 m ³ /hr)
Design boost pressure:	280 psid (19.3 Bar)	300 psid (20.7 Bar)	245 psid (16.9 Bar)
RO Booster Pump Model:	4SH2K54C0	6SH2M52F0	22SH2Q52F0
Manufacturer:	Goulds	Goulds	Goulds
Quantity:	1	1	1
Motor Power and type:	7.5Hp (5.6 kW) TEFC	15 Hp (11 kW) TEFC	30 Hp (22 kW) TEFC
Installed Power:	5.6 kW	11 kW	22 kW
Design Flow Rate:	135 gpm (31 m ³ /hr)	270 gpm (61 m ³ /hr)	405 gpm (92 m ³ /hr)
Design boost pressure:	47 psid (3.3 Bar)	54 psid (3.7 Bar)	78 psid (5.4 Bar)
UF CIP/Backwash Pump Model:	4SH2K54C0	6SH2M52F0	6SH2N52E0
Manufacturer:	Goulds	Goulds	Goulds
Quantity:	1	1	1
Motor Power and type:	7.5Hp (5.6 kW) TEFC	15 Hp (11 kW) TEFC	20 Hp (15 kW) TEFC
Installed Power:	5.6 kW	11 kW	15 kW
Design Flow Rate:	135 gpm (31 m ³ /hr)	270 gpm (61 m ³ /hr)	390 gpm (89 m ³ /hr)
Design boost pressure:	47 psid (3.3 Bar)	54 psid (3.7 Bar)	50 psid (3.4 Bar)
Membrane Elements and Housings			
Maximum UF modules:	9	18	27
RO Membranes Quantity:	18 + 6 CR	36 + 6 CR	54 + 12 CR
RO Membranes Housing Style:	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port
Banking Arrangement:	2→1 (2→1→1 with ICR)	4→2 (4→2→1 with ICR)	6→3 (6→3→2 with ICR)
Cartridge Filtration			
Housing Model:	HX-0740-3.0-V-316	HX-0740-3.0-V-316	HX-0750-3.0-V-316
Housing Quantity:	1	2	2
Cartridge Filter Model:	GX10-40XK	GX10-40XK	GX10-50XK
Cartridge Filter Length:	40-inch (120 cm)	40-inch (102 cm)	50-inch (127 cm)
Cartridge Filter Qty:	7 per housing, 7/change out	7 per housing, 14/change out	7 per housing, 14/change out
Tank			
Tank Size:	500 gallons	1000 gallons	1650 gallons
Tank Material:	HDPE	HDPE	HDPE
Tank Style:	Dome Top, Cone Bottom	Dome Top, Cone Bottom	Dome Top, Cone Bottom
Tank Height:	80"	117"	110"
Tank Diameter:	64"	64"	86"
Installation and Utility Requirements			
UF Inlet:	4.0" flange	4.0" flange	6.0" flange
RO Permeate:	3.0" flange	4.0" flange	4.0" flange
RO Permeate ICR:	1.5" flange	2.0" flange	2.0" flange
RO Concentrate:	1.5" flange	2.0" flange	2.0" flange
UF Waste:	4.0" flange	4.0" flange	6.0" flange
Minimum Inlet Water Pressure:	10 psig	10 psig	10 psig
Air Pressure (Actuated Valve Feed):	100 psig	100 psig	100 psig
Aeration:	45 ACFM @ 10 psig	90 ACFM @ 10 psig	130 ACFM @ 10 psig
Drain to be Sized for:	200 gpm (45m ³ /hr)	400 gpm (90m ³ /hr)	600 gpm (136m ³ /hr)
Power:	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz	460-480 VAC, 3-phase, 60Hz
Control Circuit:	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
Filtration Skid			
Height x Width x Depth inch (cm)	101 x 64 x 274 inch (258 x 163 x 696 cm)	101x 66 x 276 inch (258 x 168 x 701 cm)	101 x 76 x 276 inch (258 x 193 x 701 cm)
Tank Skid			
Height x Width x Depth inch (cm)	115x 88 x 149 inch (293 x 224 x 379 cm)	136.7 x 88 x 154 inch (347 x 224 x 391 cm)	127 x 96 x 177 inch (323 x 244 x 449 cm)

² Maximum permeate rate listed at design temperature within water quality parameters (see PROPAK Water Quality Guidelines for parameters).

³ Standard configuration: ICR Permeate flow returns to the multifunctional tank.



RePAK* Series

Integrated Tertiary UF/RO Reuse Package Plant: 50-100 m³/hr (220-440 gpm) Effluent (50/60 Hz)



Features

- Single compact multifunctional Tank: Break, UF backwash, UF CIP, RO CIP.
- HMI: Allen Bradley Panelview plus, 12.0-inch color display Text and pictorial operating screens, Touch screen controls
- PLC: Allen Bradley Compact Logix, Communication: Ethernet
- 4-20 mA instruments
- RO permeate flush on shutdown
- UF backwash/CIP pump, RO feed pump (skid mounted)

Instrumentation

Flow Meters:.....UF Feed, UF CIP/BW, RO Permeate, RO concentrate
 Conductivity Meter:RO Feed, RO Permeate
 pH MeterUF CIP, RO Feed (2 sample points)
 Pressure Transmitters.....UF Feed, UF Permeate, RO Primary, RO Final
 Pressure Switch.....UF Feed / Backwash, RO Feed, RO Permeate, RO Concentrate
 Chlorine MeterUF CIP, RO Feed (2 sample points)
 Temperature.....UF Feed, Tank
 Turbidity MeterUF Permeate
 Level Transmitter.....Tank
 Temperature Transmitter.....UF Feed, Tank

Available Options

- UF Feed Pump or UF Flow Control Valve
- UF Feed turbidity Meter
- Aeration Blower
- 500 micron automated pre-screen
- RO membrane options (AG, LF,DS)
- Chemical Feed Systems

System Operating Parameters

Max Overall Design Recovery¹..... 70%
 Design Temperature..... 20°C (68°F)
 Operating Temperature Range.....15-30°C (59-86°F)²
 Nominal RO rejection.....97-99%
 System Inlet Pressure 0-10 bars (10-145 PSIG)
 UF average membrane flux..... 30 gfd
 RO average membrane flux..... 11 gfd
¹UF recovery of 90% and RO recovery of 78%. Recovery rate can vary 65-74% depending on water quality.
²Wider temperature ranges possible depending on TDS

Materials of Construction

High-pressure piping316 Stainless Steel, Sch. 10
 Low-pressure pipingPVC, Sch. 80
 Frame.....Painted blue carbon steel
 Enclosure..... IP54
 Clamps/fittings..... Zinc-plated

Membrane Elements and Housings

RO Membrane AG8040F-400
 StyleSpiral-wound elements, TFC (polyamide)
 Membrane rejection 99.0 to 99.5%
 RO Membrane HousingGE, FRP
 Housing Pressure Rating 300 psi
 UF Membrane Model.....GE ZW1500
 UF Membrane Surface550 ft² (51 m²)
³Low Fouling and Duraslick* membranes optional

Cartridge Filtration

Housing model Mey 22x40 0.6MPa
 Housing material.....316 Stainless Steel
 Cartridge filter..... ROsave.Zs* 1micron



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RePAK Models

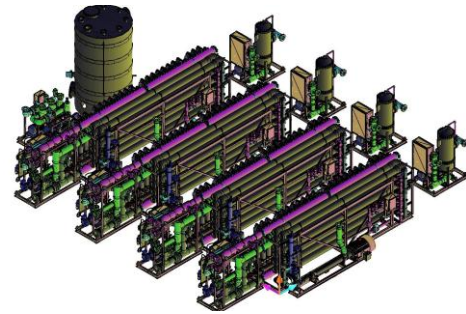
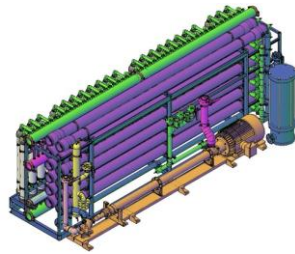
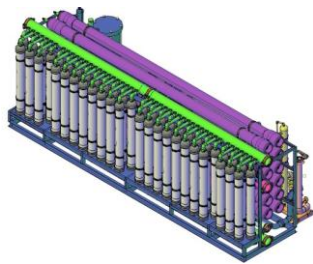
MODEL	RePAK-50	RePAK-100
RO Permeate Rate ⁴ : RO Concentrate Rate: UF Feed Rate:	50 m ³ /hr (220 gpm) 14-27 m ³ /hr (62-119 gpm) 73-93 m ³ /hr (321-410 gpm)	100 m ³ /hr (440 gpm) 28-54 m ³ /hr (124-237 gpm) 145-186 m ³ /hr (638-819 gpm)
RO HP Pump Model: Manufacturer: Quantity: Motor Power and type: Installed Power: Design Flow Rate: Design boost pressure:	CRN64-8-1 (50hz); CRN64-5-2 (60hz) Grundfos 1 45 kW (60hp) TEFC 45 kW 67 m ³ /hr (295 gpm) 18.4 Bar (267 psid)	CRN64-8-1 (50hz); CRN64-5-2 (60hz) Grundfos 2 45 kW (60hp) TEFC 90 kW 67 m ³ /hr (295 gpm) each 18.4 Bar (267 psid)
RO Booster Pump Model: Manufacturer: Quantity: Motor Power and type: Installed Power: Design Flow Rate: Design boost pressure:	SHS 65-160/110 (50hz); SHS 65-160/1106 (60hz) Xylem 1 11 kW (15hp) TEFC 11 kW 67 m ³ /hr (295 gpm) each 3.3 Bar (48 psid)	SHS 80-200/185 (50hz); SHS 80-200/2206 (60hz) Xylem 1 22kW (30hp) 50hz; 18.5kW (25hp) 60hz TEFC 22 kW (50hz); 18.5 kW (60hz) 134 m ³ /hr (590 gpm) 3.3 Bar (48 psid)
UF CIP/Backwash Pump Model: Manufacturer: Quantity: Motor Power and type: Installed Power: Design Flow Rate: Design boost pressure:	SHS 65-200/150 (50hz); SHS 65-200/1506 (60hz) Xylem 1 15 kW (20hp) TEFC 15 kW 63.5-95.5 m ³ /hr (280-420 gpm) 3.3 Bar (48 psid)	SHS80-200/300 (50hz); SHS80-200/3006 (60hz) Xylem 1 30 kW (40hp) TEFC 30 kW 127-191 m ³ /hr (560-841 gpm) 3.3 Bar (48 psid)
Maximum UF modules:	28	56
RO Membranes Quantity: RO Membranes Housing Style: Banking Arrangement:	42 + 28 7 element long, 4 port 6 → 4	84 + 56 7 element long, 3 port 12 → 8
Housing Model: Housing Quantity: Cartridge Filter Model: Cartridge Filter Length: Cartridge Filter Qty:	MEY 22x40 1 Hytrex* 1 micron 40-inch 40-inch (101 cm) 22 per housing, 22/change out	MEY 22x40 2 Hytrex 1 micron 40-inch 40-inch (101 cm) 22 per housing, 44/change out
Tank Size: Tank Material: Tank Style:	5,000 Liters (1321 gallons) PPH Flat Top, Cone Bottom	10,000 Liters (2641 gallons) PPH Flat Top, Cone Bottom
UF Inlet: UF Airscour Inlet RO Permeate: RO Concentrate: UF Waste: Inlet Water Pressure (to UF Membrane): Air Pressure (Actuated Valve Feed): Aeration: Drain to be Sized for: Power: Control Circuit:	4.0-inch (10.1 cm) Victaulic Coupling 3.0-inch (7.6 cm) Victaulic Coupling 3.0-inch (7.6 cm) flange 1.5-inch (3.8 cm) flange 4.0-inch (10.1 cm) Victaulic Coupling 0-380 kPa (0-55psig) 7 Bar (100 psig) 140ACFM @ 10 psig 420gpm (95m ³ /hr) 380 VAC, 3-phase, 50Hz 400 VAC, 3-phase, 60hz 220 VAC, 1-phase, 60Hz / 50 Hz	8.0-inch (20.3 cm) Victaulic Coupling 6.0-inch (15.2 cm) Victaulic Coupling 6.0-inch (15.2 cm) flange 3.0-inch (7.6 cm) flange 8.0-inch (20.3 cm) Victaulic Coupling 0-380 kPa (0-55psig) 7 Bar (100 psig) 279ACFM @ 10 psig 841gpm (191m ³ /hr) 380 VAC, 3-phase, 50Hz 400 VAC, 3-phase, 60hz 220 VAC, 1-phase, 60Hz / 50 Hz
Membrane Skid Height x Width x Length	2,517mm x 1,810mm x 8,100 mm 99 in x 71 in x 319 in	2,542mm x 2,720mm x 8,850mm 100 in x 107 in x 349 in
Pump Skid Height x Width x Length	2480mm X 2105mm x 2140mm 98 in x 83 in x 84 in	2,578mm x 2,300mm x 2,460mm 102 in x 91 in x 97 in
Tank Height x Diameter	3,100 mm x 1,900 mm 122 in x 75 in	4,300mm x 2,200mm 169 in x 87 in

⁴Maximum permeate rate listed at design temperature within water quality parameters



SeaPAK* Series

Integrated Ultrafiltration and Seawater Reverse Osmosis Platform for 1,000 – 10,000 m³/day



Features

- UF membranes, SWRO membranes, and equipment all manufactured by GE
- Single Control System for entire system
- Single compact multifunctional tank
- Scalable into four blocks of same capacity with same control system (qty 2, 3, or 4 X 1000 m³/day or X 2500 m³/day)

Instrumentation

Flow Meters:.....UF Feed, UF BW,RO Permeate, RO concentrate

Conductivity Meter:RO Feed, RO Permeate

pH MeterUF CIP, RO Feed (opt)

Pressure Transmitters.....UF Feed, UF Permeate, RO Primary, RO Final

Pressure Switch.....UF Feed / Backwash, RO Feed, RO Permeate, RO Concentrate

ORP RO Feed

Temperature..... Tank

Turbidity MeterUF Feed

Level Transmitter..... Tank

Available Options

- Self-Cleaning Pre-Screen Filter
- Aeration Blower
- VFD (UF Feed, UF backwash/CIP, RO HP Pump)

System Operating Parameters

Design Recovery..... 35%

Design Temperature..... 60°F (15°C)

Operating Temperature Range..... 59-85°F (15-29°C)

System Inlet Pressure1.0-4.5 bar

UF average membrane flux..... 35 gfd

RO average membrane flux..... 8.5 gfd

Materials of Construction

High-pressure piping 2205 Stainless Steel, Sch. 10

Low-pressure pipingPVC, Sch. 80

Frame.....Painted blue carbon steel

Enclosure.....Nema 4

Membrane Elements and Housings

SWRO MembraneAD-440

StyleSpiral-wound, TFC (polyamide)

Membrane rejection..... 99.3% min, 99.75% ave.

RO Membrane Housing Material FRP

RO Membrane Housing Pressure Rating1200 psi

UF Membrane Model.....GE ZW1500

UF Membrane Surface.....550 ft²

Cartridge Filtration

Housing material..... Rubber Lined Carbon Steel

Cartridge filter.....1.0-micron nom., GE Z-Plex*



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SeaPAK Models

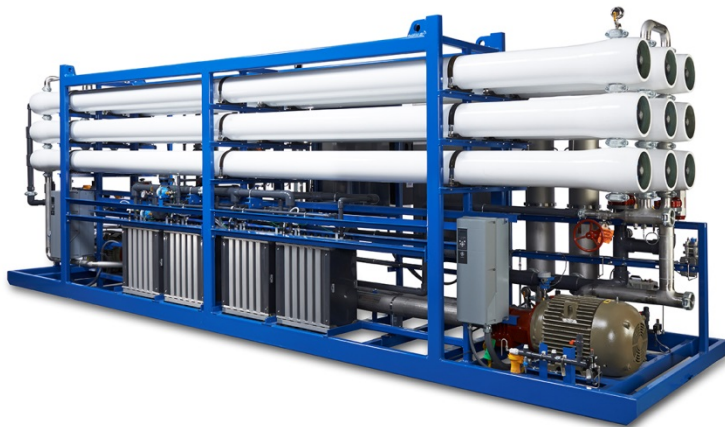
MODEL	SeaPAK-1000	SeaPAK-2500
SWRO Permeate Rate	1000 m ³ /day (185 gpm)	2500 m ³ /day (460 gpm)
SWRO Concentrate Rate	1857 m ³ /day (344 gpm)	4643 m ³ /day (854 gpm)
UF Feed Rate	2857 m ³ /day (529 gpm)	7143 m ³ /day (1311 gpm)
SWRO HP Pump Manufacturer & Model:	FEDCO MSS-16010	FEDCO SSD-500/50
Quantity:	1	1
Motor Power and type:	184 kW TEFC	371 kW TEFC
Design Flow Rate:	119 m ³ /hr (529 gpm)	298 m ³ /hr (1311 gpm)
Design boost pressure:	35.2 bar (510 psid)	35.4 bar (513 psid)
Energy Recovery Device Manufacturer & Model:	FEDCO HBPe-120	FEDCO HBPe-350
RO Booster Pump Model:	CL30707	CL50707
Manufacturer:	Grundfos	Grundfos
Quantity:	1	1
Motor Power and type:	15 kW TEFC	37 kW TEFC
Design Flow Rate:	119 m ³ /hr (529 gpm)	298 m ³ /hr (1311 gpm)
Design boost pressure:	2.8 Bar (41 psid)	2.8 Bar (41 psid)
UF CIP/Backwash Pump Model:	CL40959	CL80155
Manufacturer:	Grundfos	Grundfos
Quantity:	1	1
Motor Power and type:	30 kW TEFC	55 kW TEFC
Design Flow Rate:	164 m ³ /hr (722 gpm)	410 m ³ /hr (1804 gpm)
Design boost pressure:	3.5 Bar (51 psid)	3.5 Bar (51 psid)
Maximum UF modules:	48	120
RO Membranes Quantity:	72	182
RO Membranes Housing Style:	6 element long, 4 port	7 element long, 4 port
Banking Arrangement:	12 in parallel	26 in parallel
Housing Model:	Horizon VT-03-DN500CSR	Horizon VT-06-DN700CSR
Housing Quantity:	1	1
Cartridge Filter Model:	RFP010-40NPX-L, 1 micron	RFP010-40NPX-L, 1 micron
Cartridge Filter Length:	40-inch (100 cm)	40-inch (100 cm)
Cartridge Filter Qty:	3 per housing, 3 per change out	6 per housing, 6 per change out
Tank Size:	8000 liters (2100 gallons)	18,000 liters (4737 gallons)
Tank Material:	HDPE	HDPE
Tank Style:	Dome Top, Cone Bottom	Dome Top, Cone Bottom
Tank Height:	2.4 m (95 inch)	2.8 m (111 inch)
Tank Diameter:	2.2 m (87 inch)	3.0 m (119 inch)
Self-Cleaning Pre-Screen Filter Mode:	CBR-D-M6-RL	CTF-A60-L10-RL
Manufacturer:	Amiad	Amiad
Quantity:	1	1
Micron Rating:	200 micron	200 micron
Design Flow Rate:	142 m ³ /hr (625 gpm)	350 m ³ /hr (1540 gpm)
Motor Power:	180 Watts	550 Watts
Aeration Blower Model:	GRB-80	GRB-125
Manufacturer:	Chuanyuan	Chuanyuan
Quantity:	1	1
Motor Power:	15 kW	37 kW
UF Inlet:	8.0" flange	12.0" flange
RO Permeate:	3.0" flange	6.0" flange
RO Concentrate:	4.0" flange	8.0" flange
UF Waste:	6.0" flange	10.0" flange
Minimum Inlet Water Pressure:	0.5 bar (8 psig)	0.5 bar (8 psig)
Air Pressure (Actuated Valve Feed):	6.9 bar (100 psig)	6.9 bar (100 psig)
Power:	380 VAC, 3-phase, 50/60Hz	380 VAC, 3-phase, 50/60Hz
Control Circuit:	220 VAC, 1-phase, 50/60Hz	220 VAC, 1-phase, 50/60Hz
SWRO Skid	260 x 290 x 740 cm	260 x 458 x 823 cm
Height x Width x Depth cm (inch)	(103 x 115 x 292 inch)	(103 x 181 x 324 inch)
UF Skid	Included in SWRO Skid	278 x 150 x 969 cm
Height x Width x Depth cm (inch)		(110 x 60 x 382 inch)
SWRO Filter and Pumping Skid	268 x 183 x 128 cm	290 x 160 x 230 cm
Height x Width x Depth cm (inch)	(106 x 73 x 51 inch)	(115 x 63 x 91 inch)
UF Process / Pumping Skid	263 x 115 x 255 cm	286 x 230 x 318 cm
Height x Width x Depth cm (inch)	(104 x 46 x 101 inch)	(113 x 91 x 126 inch)
Ancillary Skid	185 x 151 x 220 cm	210 x 195 x 305 cm
Height x Width x Depth inch (cm)	(73 x 60 x 87 inch)	(83 x 77 x 121 inch)



RO EDI COMBO PLATFORMS

Pro E-Cell

From 50 to 200 gpm



PRO E-Cell* Series

Integrated RO/EDI Machines 50 to 200 gpm 60 Hz



Features

- RO and EDI mounted on common skid
- PRO E-Cell* 50 and 100 are 2 pass RO designs
- PRO E-Cell 150 and 200 are 1 pass RO designs
- RO Pump VFD(s) and EDI DC Drive mounted on skid
- RO permeate flush sequence on shutdown and divert to drain on startup
- Allen Bradley control system with Compact Logix PLC and PanelView Plus 1000 interface
- UL/cUL Electrical Panel

Instrumentation

Flow Meters.....RO Permeate, RO Concentrate
EDI Product, EDI Concentrate, EDI Electrode
Pressure Gauge..... Pre & Post Cartridge Filter
Primary, Final, Interstage, RO Permeate,
RO Concentrate, RO Pump Discharge,
Pressure Switch.....RO Feed, RO Permeate
RO Concentrate
Pressure Transmitter..... RO Primary, RO Final
RO Permeate, EDI Product, EDI Concentrate,
EDI Electrode, EDI Dilute Feed
pH Meter..... RO Feed pass 1
(also pass 2 for 50-100 model)
ORP (Optional)..... RO Feed pass1

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 RO1 75% Pass 1; 85% Pass 2
Design Recovery EDI.....90-95%
Design Temperature 60°F (16°C)
Operating Temperature Range 40-85°F (5-29°C)
System Inlet Pressure..... 30-60 PSI (2-4 Bar)
¹Recovery Rate can vary +/- 5%

Materials of Construction

High-pressure piping..... 316 Stainless Steel, Sch. 10
Low-pressure RO & EDI piping.....PVC, Sch. 80
Frame..... Epoxy-coated carbon steel
Enclosure..... Nema 4 carbon steel
Clamps/fittings Zinc-plated

Membrane Elements and Housings

Model (50-100) GE AK-400
Model (150-200) GE PRO-RO-400-HR-WT
Average membrane flux (50-100)..... 12 GFD pass 1
21 GFD pass 2
Average membrane flux (150-200)..... 14 GFD
Membrane rejection..... 99.0 to 99.5%
Housing material Fiberglass
Housing Pressure Rating 450 psi



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EDI Stacks

Model GE E-Cell MK-3
 Stack product flow rate, nom..... 16.7 gpm (3.8 m³/hr)
 Performance..... 16 MOhm-cm
 Silica Removal..... <10 ppb

Cartridge Filtration

Housing model..... GE HX-0740-80-V316
 Housing material 316 Stainless Steel
 Cartridge filter 1-μ nom, ROSave.Zs*,
 RO.Zs01-40XK

PRO E-Cell Models

MODEL	PRO E-Cell 50DP	PRO E-Cell 100DP	PRO E-Cell 150	PRO E-Cell 200
RO Permeate Rate ² :	52.5 gpm (11.9 m ³ /hr)	105 gpm (23.9 m ³ /hr)	158 gpm (36 m ³ /hr)	210 gpm (48 m ³ /hr)
RO Concentrate Rate:	21 gpm (4.8 m ³ /hr)	42 gpm (9.5 m ³ /hr)	52.7 gpm (12 m ³ /hr)	70 gpm (16 m ³ /hr)
Concentrate Recycle:	10 gpm (2.3 m ³ /hr)	10 gpm (2.3 m ³ /hr)	NA	NA
RO Feed Rate:	74 gpm (16.8 m ³ /hr)	147 gpm (33.4 m ³ /hr)	211 gpm (48 m ³ /hr)	280 gpm (63.6 m ³ /hr)
EDI Product Rate:	50 gpm (11.4 m ³ /hr)	100 gpm (22.7 m ³ /hr)	150 gpm (34 m ³ /hr)	200 gpm (45 m ³ /hr)
EDI Concentrate Rate (max):	1.6 gpm (0.36 m ³ /hr)	3.2 gpm (0.73 m ³ /hr)	4.7 gpm (1.1 m ³ /hr)	6.3 gpm (1.4 m ³ /hr)
EDI Electrode Rate:	1 gpm (0.23 m ³ /hr)	2.1 gpm (0.48 m ³ /hr)	3.2 gpm (0.73 m ³ /hr)	4.2 gpm (0.95 m ³ /hr)
Pumps and Motors				
Model:	SS8512 Pass 1 SS8512 Pass 2	SS24007 Pass 1 SS12509 Pass 2	SS24009	AS40409
Manufacturer:	GE/Tonkaflo*	GE/Tonkaflo	GE/Tonkaflo	GE/Tonkaflo
Quantity:	2	2	1	1
Motor Power and type:	20HP (15 KW) TEFC Pass 1	50 Hp (37 KW) TEFC Pass 1 30 Hp (22.5 KW) TEFC Pass 2	60 Hp (45 KW) TEFC	75 Hp (56.3 KW) TEFC
Installed Power:	20HP (15 KW) TEFC Pass 2 30 KW	60 KW	45 KW	56.3 KW
Membrane Elements and Housings				
Membrane Quantity:	20 Pass 1 ; 12 Pass 2	36 Pass 1 ; 18 Pass 2	42	54
Memb. Housing Style:	4 element long, 4 port	6 element long, 4 port	6 element long, 4 port	6 element long, 4 port
Banking Arrangement:	3→2 Pass 1 ; 2→1 Pass 2	4→2 Pass 1 ; 2→1 Pass 2	5→2	6→3
EDI Stacks				
Stack Model :	GE E-Cell MK-3	GE E-Cell MK-3	GE E-Cell MK-3	GE E-Cell MK-3
Stack Quantity:	3	6	9	12
Power (DC drive, 300 VDC):	16 A max	31.2 A max	46.8 A max	62.4 A max
Cartridge Filtration				
Housing Model:	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316	HX-0740-30-V-316
Housing Quantity:	1	2	2	2
Cartridge Filter Model:	ROSave.Zs, RO.Zs01-40XK	ROSave.Zs, RO.Zs01-40XK	ROSave.Zs, RO.Zs01-40XK	ROSave.Zs, RO.Zs01-40XK
Cartridge Filter Length:	40-inch (120 cm)	40-inch (102 cm)	40-inch (102 cm)	40-inch (102 cm)
Cartridge Filter Qty:	7	14	14	14
Installation and Utility Requirements				
RO Inlet:	3" ANSI flange	3" ANSI flange	4" ANSI flange	4" ANSI flange
RO Reject to Drain:	1.5" ANSI flange	2" ANSI flange	1.5" ANSI flange	2" ANSI flange
RO Product Dump:	1.5" ANSI flange	3" ANSI flange	3" ANSI flange	4" ANSI flange
EDI Product Outlet:	1.5" ANSI flange	3" ANSI flange	3" ANSI flange	4" ANSI flange
EDI Product Dump:	1.5" ANSI flange	3" ANSI flange	3" ANSI flange	4" ANSI flange
EDI Concentrate Outlet:	0.5" ANSI flange	0.5" ANSI flange	0.5" ANSI flange	0.5" ANSI flange
EDI Electrode Outlet:	0.5" ANSI flange	0.5" ANSI flange	0.5" ANSI flange	0.5" ANSI flange
Inlet Water Pressure:	30-60 psig	30-60 psig	30-60 psig	30-60 psig
Air Pressure:	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free	80 psi, oil-free
Drain to be Sized for:	95 gpm (22 m ³ /hr)	150 gpm (35 m ³ /hr)	220 gpm (50 m ³ /hr)	280 gpm (64 m ³ /hr)
Power:	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz	460 VAC, 3-phase, 60Hz
Control Circuit	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
Skid Dimensions and Weights				
Height:	96" (244 cm)	96" (244 cm)	90" (229 cm)	90" (229 cm)
Width:	72" (183 cm)	58" (147 cm)	80" (203 cm)	80" (203 cm)
Length:	197" (500 cm)	277" (704 cm)	282" (716 cm)	282" (716 cm)
Shipping Weight :	9050 lb. (4150 kg)	13650 lb. (6250 kg)	12350 lb. (5650 kg)	14600 lb. (6650 kg)
Operating Weight:	11150 lb. (5100 kg)	17050 lb. (7750 kg)	15200 lb. (6950 kg)	18250 lb. (8300 kg)

² Maximum permeate rate listed at design temperature. Permeate rate can be reduced by up to 15%.



PROCERA SEAWATER SOLUTIONS

SeaPRO-E Series

Value Seawater RO (92 to 460 gpm)

SeaPRO Series

Seawater RO (20 to 300 gpm)

SeaTECH Series

Containerized Seawater RO (30 to 550 gpm)

IPER

Integrated Pump and Energy Recovery Systems



SeaPRO* E-Series

500 m³/day (92 gpm) Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation and dependable operation
- Variable frequency drive (VFD) for high pressure pump optimal control, energy efficiency and constant water production
- Simple manual control for the system, and Hand/Auto control for remote starting and stopping of the system

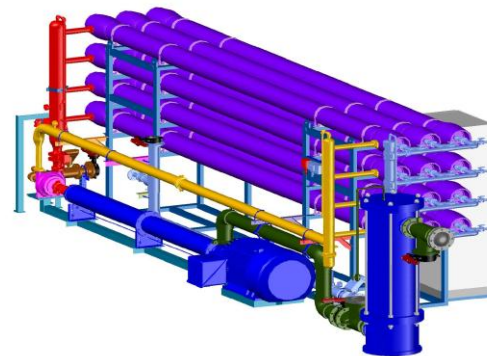


Figure 1. SeaPRO-E-36 General Layout (reference only)

Operating Parameters

Recovery	40%
Design temp.....	25°C (77°F)
Operating range	15-32°C (59-90°F) ¹⁾
Design Feed TDS	45,000ppm
System Nominal rejection.....	99%
Minimum inlet pressure	2 bar (30 PSIG)

¹⁾ Varying the operating temperature may affect permeate rate

- Standard package includes energy recovery device for operating cost savings
- Flow and Conductivity 4-20mA signals available for remote monitoring/recording

Materials of Construction

High-pressure piping.....	Sch 40 SS Duplex 2205
Low-pressure piping.....	Sch 80 PVC-U DIN PN10/16
Frame.....	Anti-corrosion treated carbon steel
Frame Finish	2-coat epoxy painted & blue finish
Enclosures.....	IP55 carbon steel
Membranes.....	AD-440
Membrane Housing	FRP 8in-1200psi-6M (82 bar)
Cartridge Filters.....	5-micron nominal, Hytrex*
Cartridge Filter Housing	PVC

Table 1: Standard Instrumentation

Flow (magnetic)	Permeate, Concentrate
Conductivity	Permeate
Pressure Switch	Feed LP, Feed HP, Concentrate, Permeate
Pressure Indicators	Pump suction, Pump discharge, ERD HP discharge, ERD LP discharge, Permeate, Concentrate

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Table 2: Pump and Motor

HP Pump Model	MSS-5035
Manufacturer	FEDCO
Quantity	1
HP Pump Motor	110 kW

Table 3: Energy Recovery Device

Model	HPBe-60
Manufacturer	FEDCO
Quantity	1

Options

Contact sales for pricing and lead time.

- 35% Recovery
- Alternate high pressure pump manufacturers
- Pressure transmitters for remote monitoring/recording
- Control circuit transformer for 110 VAC, 1-phase, 60 Hz operation

Table 4: Model SeaPRO-E-36 Specifications

Systems Flow Rates	
Permeate rate:	500 m ³ /day (92 gpm)
Concentrate Rate:	750 m ³ /day (138 gpm)
Feed Rate:	1250 m ³ /day (230 gpm)
Membrane Elements and Housings	
Membranes Quantity:	36
Memb. Housing Style:	6 housings – 6M long
Banking Arrangement:	6 in parallel
Cartridge Filtration	
Cartridge Filter Housing:	20FTPV-4 or equivalent
Filter Length:	40" (127 cm)
Filter Quantity:	20 per change out
Installation and Utility Requirements	
Inlet:	DIN DN100 PN10/16 flange
Permeate:	DIN DN65 PN10/16 flange
Concentrate:	DIN DN80 PN10/16 flange
Power:	380/420 VAC, 3-phase, 50/60Hz
General Dimensional Information	
<u>System Footprint:</u>	
Width:	7010 mm (276 inches)
Depth:	2287 mm (90 inches)
<u>Membrane Skid Size:</u>	
Height:	1950 mm (77 inches)
Width:	5968 mm (235 inches)
Depth:	1849 mm (73 inches)

SeaPRO* E-Series

1000 m³/day (184 gpm) Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation and dependable operation
- Variable frequency drive (VFD) for high pressure pump optimal control, energy efficiency and constant water production
- Simple manual control for the system, and Hand/Auto control for remote starting and stopping of the system

Operating Parameters

Recovery 45%
 Design temp..... 25°C (77°F)
 Operating range 15-32°C (59-90°F) ¹⁾
 Design Feed TDS 45k ppm
 System Nominal rejection..... 99%
 Minimum inlet pressure 2 bar (30 PSIG)

¹⁾ Varying the operating temperature may affect permeate rate

Materials of Construction

High-pressure piping..... Sch 40 SS Duplex 2205
 Low-pressure piping..... Sch 80 PVC-U DIN PN10/16
 Frame..... Anti-corrosion treated carbon steel
 Frame Finish 2-coat epoxy painted & blue finish
 Enclosures..... IP55 carbon steel
 Membranes..... AD-440
 Membrane Housing FRP 8in-1200psi-6M (82 bar)
 Cartridge Filters..... 5-micron nominal, Hytrex*
 Cartridge Filter Housing PVC

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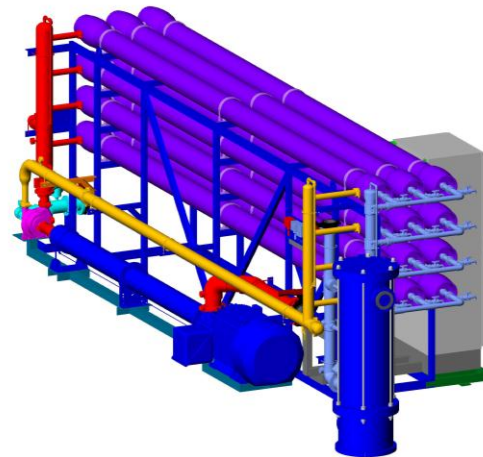


Figure 1. SeaPRO-E-72 General Layout (reference only)

- Standard package includes energy recovery device for operating cost savings
- Flow and Conductivity 4-20mA signals available for remote monitoring/recording

Table 1: Standard Instrumentation

Flow (magnetic)	Permeate, Concentrate
Conductivity	Permeate
Pressure Switch	Feed LP, Feed HP, Concentrate, Permeate
Pressure Indicators	Pump suction, Pump discharge, ERD HP discharge, ERD LP discharge, Permeate, Concentrate

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Table 2: Pump and Motor

HP Pump Model	MSS-9025
Manufacturer	FEDCO
Quantity	1
HP Pump Motor	150 kW

Table 3: Energy Recovery Device

Model	HPBe-120
Manufacturer	FEDCO
Quantity	1

Options:

Contact sales for pricing and lead time.

- 35% Recovery Design
- Alternate high-pressure pump manufacturers
- Pressure transmitters for remote monitoring/recording
- Control circuit transformer for 110 VAC, 1-phase, 60 Hz operation

Table 4: Model SeaPRO-E-72 Specifications

Systems Flow Rates	
Permeate rate:	1000 m ³ /day (184 gpm)
Concentrate Rate:	1225 m ³ /day (225 gpm)
Feed Rate:	2225 m ³ /day (409 gpm)
Membrane Elements and Housings	
Membranes Quantity:	72
Memb. Housing Style:	8 housings – 6M long, 4 port and 4 housings - 6M long 2 port
Banking Arrangement:	3 x 4, parallel
Cartridge Filtration	
Cartridge Filter:	35FTPV-5
Filter Length:	50" (127 cm)
Filter Quantity:	35 per change out
Installation and Utility Requirements	
Filter Feed:	DIN DN125 PN10/16 flange
Filter Outlet:	DIN DN125 PN10/16 flange
RO Feed:	DIN DN150 PN10/16 flange
Permeate:	DIN DN100 PN10/16 flange
Concentrate:	DIN DN100 PN10/16 flange
Power:	380/420 VAC, 3-phase, 50/60Hz
General Dimensional Information	
<u>System Footprint:</u>	
Width:	7665 mm (302 inches)
Depth:	2760 mm (109 inches)
<u>Membrane Skid Size:</u>	
Height:	2435 mm (96 inches)
Width:	7320 mm (288 inches)
Depth:	1675 mm (66 inches)

SeaPRO E-Series

1500 m³/day (275 gpm) Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation and dependable operation
- Variable frequency drive (VFD) for high pressure pump optimal control, energy efficiency and constant water production
- Simple manual control for the system, and Hand/Auto control for remote starting and stopping of the system

Operating Parameters

Recovery	45%
Design temp.....	25°C (77°F)
Operating range	15-32°C (59-90°F) ¹⁾
Design Feed TDS.....	45k ppm
Nominal rejection.....	99%
Minimum inlet pressure	2 bar (30 PSIG)

¹⁾ Varying the operating temperature may affect permeate rate

Materials of Construction

High-pressure piping.....	Sch 40 SS Duplex 2205
Low-pressure piping.....	Sch 80 PVC-U DIN PN10/16
Frame.....	Anti-corrosion treated carbon steel
Frame Finish	2-coat epoxy painted & blue finish
Enclosures.....	IP55 carbon steel
Membranes	440 sq. ft. SWRO, 99.5% rej.
Membrane Housing	FRP 8in-1200psi-7M (82 bar)
Cartridge Filters.....	5-micron nominal, Hytrex
Cartridge Filter Housing	FRP

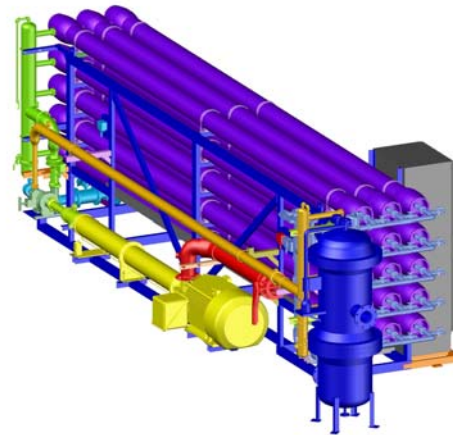


Figure 1. SeaPRO-E-105 General Layout (reference only)

- Standard package includes energy recovery device for operating cost savings
- Flow and Conductivity 4-20mA signals available for remote monitoring/recording

Table 1: Standard Instrumentation

Flow (magnetic)	Permeate, Concentrate
Conductivity	Permeate
Pressure Switch	Feed LP, Feed HP, Concentrate, Permeate
Pressure Indicators	Pump suction, Pump discharge, ERD HP discharge, ERD LP discharge, Permeate, Concentrate

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Table 2: Pump and Motor

HP Pump Model	MSS-16015
Manufacturer	FEDCO
Quantity	1
HP Pump Motor	220 kW

Table 3: Energy Recovery Device

Model	HPBe-160
Manufacturer	FEDCO
Quantity	1

Options:

Contact sales for pricing and lead time.

- 35% Recovery Design
- Alternate high pressure pump manufacturers
- Pressure transmitters for remote monitoring/recording
- Control circuit transformer for 110 VAC, 1-phase, 60 Hz operation

Table 4: Model SeaPRO-E-105 Specifications

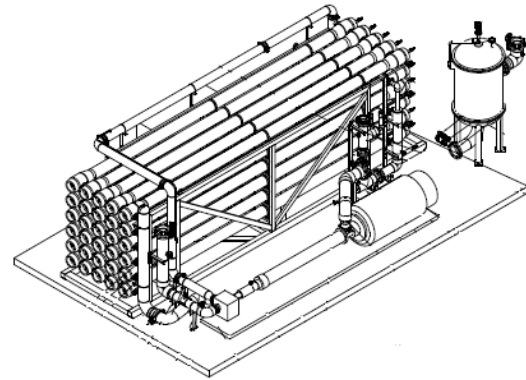
Systems Flow Rates	
Permeate rate:	1500 m3/day (275 gpm)
Concentrate Rate:	1834 m3/day (337 gpm)
Feed Rate:	3334 m3/day (612 gpm)
Membrane Elements and Housings	
Membranes Quantity:	105
Memb. Housing Style:	10 housings - 7M long, 4 port ; and 5 housings - 7M long, 2 port
Banking Arrangement:	3 x 5, parallel
Cartridge Filtration	
Cartridge Filter:	50FTP-5
Filter Length:	50" (127 cm)
Filter Quantity:	50 per change out
Installation and Utility Requirements	
Filter Feed:	DIN DN150 PN10/16 flange
Filter Outlet:	DIN DN150 PN10/16 flange
RO Feed:	DIN DN200 PN10/16 flange
Permeate:	DIN DN125 PN10/16 flange
Concentrate:	DIN DN150 PN10/16 flange
Power:	380/420 VAC, 3-phase, 50/60Hz
General Dimensional Information	
<u>System Footprint:</u>	
Width:	8130 mm (320 inches)
Depth:	2700 mm (107 inches)
<u>Membrane Skid Size:</u>	
Height:	2390 mm (95 inches)
Width:	7790 mm (307 inches)
Depth:	1655 mm (65 inches)

SeaPRO* E-Series

2500 m³/day (460 gpm) Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation and dependable operation
- Variable frequency drive (VFD) for high pressure pump optimal control, energy efficiency and constant water production
- Simple manual control for the system, and Hand/Auto control for remote starting and stopping of the system



Operating Parameters

Recovery 45%
 Design temp..... 25°C (77°F)
 Operating range 15-32°C (59-90°F) ¹⁾
 Design Feed TDS 45k ppm
 Nominal rejection..... 99%
 Minimum inlet pressure 2 bar (30 PSIG)

¹⁾ Varying the operating temperature may affect permeate rate

- Standard package includes energy recovery device for operating cost savings
- Flow and Conductivity 4-20mA signals available for remote monitoring/recording

Materials of Construction

High-pressure piping..... Sch 40 SS Duplex 2205
 Low-pressure piping..... Sch 80 PVC DIN PN10/16
 Frame..... Anti-corrosion treated carbon steel
 Frame Finish 2-coat epoxy painted & blue finish
 Enclosures..... IP55 carbon steel
 Membranes..... AD-400
 Membrane Housing FRP 8in-1200psi-7M (82 bar)
 Cartridge Filters..... 5-micron nominal, Hytrex*
 Cartridge Filter Housing FRP

Table 1: Standard Instrumentation

Flow (magnetic)	Permeate, Concentrate
Conductivity	Permeate
Pressure Switch	Feed LP, Feed HP, Concentrate, Permeate
Pressure Indicators	Prefilter, Post-filter, Pump suction, Pump discharge, ERD HP discharge, ERD LP discharge, Permeate, Concentrate

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Table 2: Pump and Motor

HP Pump Model	MSS-24012
Manufacturer	FEDCO
Quantity	1
HP Pump Motor	422 kW

Table 3: Energy Recovery Device

Model	HPBe-350
Manufacturer	FEDCO
Quantity	1

Options:

Contact sales for pricing and lead time.

- 35% Recovery Design
- Alternate high pressure pump manufacturers
- Pressure transmitters for remote monitoring/recording
- Control circuit transformer for 110 VAC, 1-phase, 60 Hz operation

Table 4: Model SeaPRO-E-210 Specifications

Systems Flow Rates	
Permeate rate:	2500 m ³ /day (460 gpm)
Concentrate Rate:	3064 m ³ /day (561 gpm)
Feed Rate:	5564 m ³ /day (1021 gpm)
Membrane Elements and Housings	
Membranes Quantity:	210
Memb. Housing Style:	30 housings - 7M long, 4 port ; and 5 housings - 7M long, 2 port
Banking Arrangement:	30, parallel
Cartridge Filtration	
Cartridge Filter:	120 FTP-4
Filter Length:	50" (127 cm)
Filter Quantity:	120 per change out
Installation and Utility Requirements	
Filter Feed:	DIN DN200 PN10/16 flange
Filter Outlet:	DIN DN200 PN10/16 flange
RO Feed:	DIN DN200 PN10/16 flange
Permeate:	DIN DN150 PN10/16 flange
Concentrate:	DIN DN200 PN10/16 flange
Power:	400 VAC, 3-phase, 50/60Hz
General Dimensional Information	
<u>System Footprint:</u>	
Width:	10 060 mm (396 inches)
Depth:	5334 mm (210 inches)
<u>Membrane Skid Size:</u>	
Height:	2540 mm (100 inches)
Width:	8077 mm (318 inches)
Depth:	2032 mm (80 inches)

SeaPRO Series 60 Hz

Seawater Desalination Machines 35,000 ppm NaCl
20-60 gpm (4.5-13.6 m³/hr)

Basic Features (BAS)

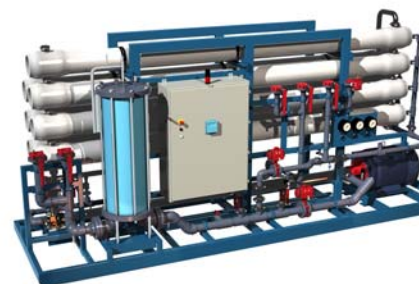
- GE Fanuc Quick Panel 6-inch, 6-inch color display, Primarily text operating screens, Touchscreen controls
- GE Fanuc Micro VersaMax Communication: RS232/DH485, Analog output: 6 points
- 4-20 mA instruments displayed on instrument center
- Variable frequency drive (VFD) for high pressure pump
- Stand alone master control enclosure, skid mounted local control enclosure with terminal strips

Premium Features (PRE)

- GE Fanuc QuickPanel 12-inch, 12-inch color display, Text and pictorial operating screens, Touchscreen controls
- GE Fanuc VersaMax Communication: RS232/DH485/Ethernet, Analog output: 4 points
- 4-20 mA instruments on PanelView
- Primary and final pressure transmitters
- Variable frequency drive (VFD) for high pressure pump
- Automated valves and control for full permeate flush upon shut down
- Stand alone master control enclosure, skid mounted local control enclosure with remote I/O

Instrumentation

Flow Meters..... Permeate, concentrate
 Conductivity..... Permeate
 pH.....Feed
 Pressure..... Pre-filter, post-filter, primary, final, permeate, concentrate, pump discharge (PRE Feature= Primary, Final transmitter)
 Pressure Switch.....Feed, permeate, concentrate
 Instrument center.....Thornton 770 MAX



Options Available

- Allen Bradley control system
- Multi-Media filters
- Clean-in-Place (CIP) units
- Chemical feed systems

Documentation Included

- Operation and maintenance manual
- Control narrative
- Drawings: piping and instrumentation, electrical and general dimensional

Operating Parameters

Recovery 40 - 45%
 Design temp..... 77°F (25°C)
 Design Feed TDS..... 35,000 ppm NaCl
 Operating range..... 35 to 85°F (1.6 to 29.4°C)
 Minimal inlet pressure 30 psi (2 Bar)

Materials of Construction

High-pressure piping Sch. 10, Duplex 2205
 Stainless Steel
 Low-pressure piping Sch. 80, PVC
 Frame.....Painted carbon steel
 Local Enclosure..... FRP, NEMA 4X
 Main Enclosure.....Painted carbon steel, NEMA 4
 VFD Enclosure Painted carbon steel, NEMA 4
 Clamps/fittings..... Zinc-plated

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Membrane Elements and Housings

StyleSpiral-wound elements
 Membrane type..... TFC HR (Polyamide)
 Element Area.....400 ft²
 Average membrane flux.....8-10 GFD
 Housing material.....FRP, 80 Bar (1200 psi)
 Housing closure type.....Ring and plate style closure

Cartridge Filtration

Housing material GRP (glass reinforced plastic)
 Cartridge filter 5-micron nominal, ROsave.Z*s

SeaPRO Models

MODEL	SeaPRO-8	SeaPRO-16	SeaPRO-28
Permeate rate:	28.8k gpd 20 gpm (4.5 m ³ /hr)	57.6k gpd 40 gpm (9.0 m ³ /hr)	86.4k gpd 60 gpm (13.6 m ³ /hr)
Concentrate Rate:	30 gpm (6.8m ³ /hr)	49 gpm (11.1 m ³ /hr)	74 gpm (16.8 m ³ /hr)
Feed Rate:	50 gpm (11.4 m ³ /hr)	89 gpm (20.2 m ³ /hr)	134 gpm (30.4 m ³ /hr)
Pumps and Motors			
Model:	MSS 1540	MSS 2026	MSS 3029
Manufacturer:	Osmonics/FEDCO SM	Osmonics/FEDCO SM	Osmonics/FEDCO SM
Quantity:	1	1	1
Motor HP and type:	40Hp (29.9 kW) TEFC	60Hp (44.7 kW) TEFC	100Hp (74.5 kW) TEFC
Design Flow Rate:	50 gpm (11.4 m ³ /hr)	90 gpm (20.4 m ³ /hr)	135 gpm (30.7 m ³ /hr)
Design boost pressure:	665 psig (45.9 Bar)	670 psig (46.2 Bar)	660 psig (45.5 Bar)
Energy Recovery Booster			
Model:	HPB 20	HPB 20	HPB 30
Manufacturer:	Osmonics/FEDCO SM	Osmonics/FEDCO SM	Osmonics/FEDCO SM
Quantity:	1	1	1
Design boost pressure:	260 psig (17.9 Bar)	255 psig (17.6 Bar)	270 psig (18.6 Bar)
Membrane Elements and Housings			
Membranes quantity:	8	16	28
Memb. housing style:	4 element long, 4 port	4 element long, 4 port	4 element long, 4 port
Banking Arrangement:	1→1	2→2	4→3
Cartridge Filtration			
Cartridge Filter:	ROZs05-40XK	ROZs05-40XK	ROZs05-30XK
Filter Length:	40" (102 cm)	40" (102 cm)	40" (102 cm)
Filter Quantity:	6 per change out	10 per change out	22 per change out
Installation and Utility Requirements			
Inlet:	1.5" flange	2.0" flange	3.0" flange
Permeate:	1.0" flange	1.5" flange	2.0" flange
Concentrate:	1.5" flange	1.5" flange	2.0" flange
Inlet Water Pressure:	30 psig, minimum	30 psig, minimum	30 psig, minimum
Air Pressure:	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free
Drain to be Sized for:	50 gpm (11.4 m ³ /hr)	89 gpm (20.2 m ³ /hr)	134 gpm (30.4 m ³ /hr)
Power:	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz
Control Circuit:	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
SeaPRO Skid			
Height:	88" (224 cm)	88" (224cm)	88" (224 cm)
Width:	52" (132 cm)	52" (132 cm)	52" (132 cm)
Depth:	199" (506 cm)	199" (506 cm)	199" (506 cm)
Weight Estimate for Shipping Purposes:	3400 lb (1542 kg)	4000 lb (1814 kg)	4500 lb (2041 kg)



SeaPRO* Series 60 Hz

Seawater Desalination Machines 45,000 ppm NaCl
20-60 gpm (4.5-13.6 m³/hr)

Basic Features (BAS)

- GE Fanuc Quick Panel 6-inch, 6-inch color display, Primarily text operating screens, Touchscreen controls
- GE Fanuc Micro VersaMax, Communication: RS232/DH485, Analog output: 6 points
- 4-20 mA instruments displayed on instrument center
- Variable frequency drive (VFD) for high pressure pump
- Stand alone master control enclosure, skid mounted local control enclosure with terminal strips

Premium Features (PRE)

- GE Fanuc QuickPanel 12-inch, 12-inch color display, Text and pictorial operating screens, Touchscreen controls
- GE Fanuc VersaMax Communication: RS232 /DH485/Ethernet, Analog output: 4 points
- 4-20 mA instruments on PanelView
- Primary and final pressure transmitters
- Variable frequency drive (VFD) for high pressure pump
- Automated valves and control for full permeate flush upon shut down
- Stand alone master control enclosure, skid mounted local control enclosure w/remote I/O

Instrumentation

Flow Meters.....Permeate, concentrate
Conductivity.....Permeate
pH Feed
Pressure..... Pre-filter, post-filter, primary, final, permeate, concentrate, pump discharge (PRE Feature = Primary, Final transmitter)

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Instrumentation (continued)

Pressure Switch.....Feed, permeate, concentrate
Instrument center Thornton 770 MAX

Options Available

- Allen Bradley control system
- Multi-Media filters
- Clean-in-Place (CIP) units
- Chemical feed systems

Documentation Included

- Operation and maintenance manual
- Control narrative
- Drawings: piping and instrumentation, electrical and general dimensional

Operating Parameters

Recovery..... 35%
Design temp. 77°F (25°C)
Design Feed TDS..... 45,000 ppm NaCl
Operating range 35 to 85°F (1.6 to 29.4°C)
Minimal inlet pressure 30 psi (2 Bar)

Materials of Construction

High-pressure piping..... Sch. 10, Duplex 2205
Stainless Steel
Low-pressure piping..... Sch. 80, PVC
Frame..... Painted carbon steel
Local Enclosure FRP, NEMA 4X

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Materials of Construction (continued)

Main Enclosure Painted carbon steel, NEMA 4
 VFD Enclosure Painted carbon steel, NEMA 4
 Clamps/fittings Zinc-plated

Cartridge Filtration

Housing material GRP (glass reinforced plastic)
 Cartridge filter 5-micron nominal, ROsave.Zs

Membrane Elements and Housings

Style Spiral-wound elements
 Membrane type AD-400
 Element Area 400 ft²
 Average membrane flux 8-10 GFD
 Housing material FRP, 80 Bar (1200 psi)
 Housing closure type ... Ring and plate style closure



SeaPRO Models

MODEL	SeaPRO-8	SeaPRO-16	SeaPRO-28
Permeate rate:	28.8k gpd 20 gpm (4.5 m ³ /hr)	57.6k gpd 40 gpm (9.0 m ³ /hr)	86.4k gpd 60 gpm (13.6 m ³ /hr)
Concentrate Rate:	37 gpm (8.4 m ³ /hr)	74 gpm (16.8 m ³ /hr)	111 gpm (25.2 m ³ /hr)
Feed Rate:	57 gpm (12.9 m ³ /hr)	114 gpm (25.8 m ³ /hr)	171 gpm (38.8 m ³ /hr)
Pumps and Motors			
Model:	MSS 1537	MSS 2030	MSS 3030
Manufacturer:	GE Osmonics/FEDCO [®]	GE Osmonics/FEDCO [®]	GE Osmonics/FEDCO [®]
Quantity:	1	1	1
Motor HP and type:	40Hp (29.9 kW) TEFC	75 Hp (55.9 kW) TEFC	100 Hp (74.6 kW) TEFC
Design Flow Rate:	60 gpm (13.6 m ³ /hr)	115 gpm (26.1 m ³ /hr)	170 gpm (38.6 m ³ /hr)
Design boost pressure:	690 psig (47.6 Bar)	660 psig (45.5 Bar)	620 psig (42.7 Bar)
Energy Recovery Booster			
Model:	HPB 20	HPB 30	HPB 40
Manufacturer:	GE Osmonics/FEDCO [®]	GE Osmonics/FEDCO [®]	GE Osmonics/FEDCO [®]
Quantity:	1	1	1
Design boost pressure:	315 psig (21.7 Bar)	340 psig (23.4 Bar)	380 psig (26.2 Bar)
Membrane Elements and Housings			
Membranes quantity:	8	16	24
Memb. housing style:	4 element long, 4 port	4 element long, 4 port	4 element long, 4 port
Banking Arrangement:	2, parallel	4, parallel	6, parallel
Cartridge Filtration			
Cartridge Filter:	RO.Zs05-40XK	RO.Zs05-40XK	RO.Zs05-40XK
Filter Length:	40" (102 cm)	40" (102 cm)	40" (102 cm)
Filter Quantity:	6 per change out	10 per change out	22 per change out
Installation and Utility Requirements			
Inlet:	2.0" flange	3.0" flange	3.0" flange
Permeate:	1.0" flange	1.5" flange	2.0" flange
Concentrate:	1.5" flange	2.0" flange	3.0" flange
Inlet Water Pressure:	30 psig, minimum	30 psig, minimum	30 psig, minimum
Air Pressure:	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free
Drain to be Sized for:	57 gpm (12.9 m ³ /hr)	114 gpm (25.8 m ³ /hr)	171 gpm (38.8 m ³ /hr)
Power:	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz
Control Circuit:	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
SeaPRO Skid			
Height:	88" (224 cm)	88" (193 cm)	88" (224 cm)
Width:	52" (132 cm)	52" (117 cm)	52" (132 cm)
Depth:	199" (506 cm)	199" (506 cm)	199" (506 cm)
Weight Estimate for Shipping Purposes:	3400 lb (1542 kg)	4000 lb (1814 kg)	4500 lb (2041 kg)

SeaPRO* Series 60 Hz

Seawater Desalination Machines

35,000 ppm NaCl 100-300 gpm (22.7-68.1 m³/hr)



Basic Features (BAS)

- GE Fanuc Quick Panel 7-inch color display. Primarily text operating screens, Touchscreen controls.
- GE Fanuc Micro VersaMax processor
- 4-20 mA instruments displayed on instrument center
- Variable frequency drive (VFD) for high pressure pump
- Motor starter for boost pump
- Stand alone master control enclosure, skid mounted local control enclosure with terminal strips
- Membrane/energy recovery device (ERD)/boost pump and HP pump/prefilter located on separate skids

Premium Features (PRE)

- GE Fanuc QuickPanel 12-inch color display. Text and pictorial operating screens. Touchscreen controls.
- GE Fanuc VersaMax processor
- 4-20 mA instruments on touchscreen
- Primary and final pressure transmitters
- Variable frequency drive (VFD) for high pressure pump
- Motor starter for boost pump
- Automated valves and control for feed flush upon shut down
- Stand alone master control enclosure, local control enclosure with remote I/O
- Membrane/energy recovery device (ERD)/boost pump and HP pump/prefilter located on separate skids

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Operating Parameters

Design Feed TDS	35,000 ppm NaCl
Maximum Recovery	45%
Nominal Rejection	95-98%
Operating Temperature	35 to 85°F (1.6 to 29.4°C)
Minimum Inlet Pressure	30 psig (2 Bar)
Design Temperature	77°F (25°C)

Instrumentation

Flow Meters.....Permeate, concentrate, low pressure (LP) ERD inlet, high pressure (HP) ERD outlet

Conductivity.....Permeate

pHFeed

Pressure.....Pre-filter, post-filter, primary, final, permeate, concentrate, LP ERD inlet, LP ERD outlet, HP ERD inlet, HP ERD outlet (PRE Feature= Primary, Final transmitter)

Pressure Switches.....Feed, permeate, concentrate, HP ERD out/boost pump in

Instrument CenterThornton M800

Materials of Construction

Frame	Painted Carbon Steel
Cartridge Filter	RO.Zs 05-40, 5-micron nominal
Cartridge Filter Housing	GRP (glass reinforced plastic)
Membrane Elements	AD-400
Membrane Housing	FRP
Low Pressure Pipe	Schedule 80 PVC
High Pressure Pipe	Duplex 2205
Enclosures	NEMA 4

Options Available

- Multi-Media filters
- Clean-in-Place (CIP) units
- Chemical feed systems
- Transfer pumps and storage tanks

Documentation Included

- Operation and maintenance manual
- Control narrative
- Drawings: piping and instrumentation, electrical and general dimensional

SeaPRO Models

MODEL	SeaPRO-42	SeaPRO-63	SeaPRO-84	SeaPRO-126
Permeate rate:	144k gpd 100 gpm (22.7 m ³ /hr)	216k gpd 150 gpm (34.1 m ³ /hr)	288k gpd 200 gpm (45.4 m ³ /hr)	432k gpd 300 gpm (68.1 m ³ /hr)
Concentrate Rate:	122 gpm (27.7 m ³ /hr)	183 gpm (41.6 m ³ /hr)	244 gpm (55.4 m ³ /hr)	367 gpm (83.4 m ³ /hr)
Feed Rate:	222 gpm (50.4 m ³ /hr)	333 gpm (75.6 m ³ /hr)	444 gpm (100.8 m ³ /hr)	667 gpm (151.5 m ³ /hr)
Pumps and Motors				
Manufacturer:	Fedco	Fedco	Fedco	Fedco
Quantity:	2	2	2	2
HP Pump HP and type:	100 HP (75 kW) TEFC	150 HP (110 kW) TEFC	200 HP (150 kW) TEFC	250 HP (186 kW) TEFC
Boost Pump HP and Type:	10 HP (7.5 kW) TEFC	15 HP (11.1 kW) TEFC	15 HP (11.1 kW) TEFC	20 HP (15 kW) TEFC
Energy Recovery Booster				
Model:	PX-140S	PX-220	PX-140S	PX-140S
Manufacturer:	ERI	ERI	ERI	ERI
Quantity:	1	1	2	3
Membrane Elements and Housings				
Membranes Quantity:	42	63	84	126
Memb. Housing Style:	7 element long, 4 port	7 element long, 4 port	7 element long, 4 port	7 element long, 4 port
Banking Arrangement:	6, parallel	9, parallel	12, parallel	18, parallel

MODEL	SeaPRO-42	SeaPRO-63	SeaPRO-84	SeaPRO-126
Cartridge Filtration				
Cartridge Filter: Filter Length: Filter Quantity:	ROZs05-40 40" (102 cm) 22 per change out	ROZs05-40 40" (102 cm) 54 per change out	ROZs05-40 40" (102 cm) 54 per change out	ROZs05-40 40" (102 cm) 80 per change out
Installation and Utility Requirements				
Inlet: Permeate: Concentrate: Inlet Water Pressure: Air Pressure: Drain to be Sized for: Power: Control Circuit:	4.0" flange 3.0" flange 3.0" flange 30 psig, minimum 100 psig, oil-free 223 gpm (50.6 m ³ /hr) 230/460 VAC, 3-phase, 60Hz 120 VAC, 1-phase, 60Hz	4.0" flange 3.0" flange 3.0" flange 30 psig, minimum 100 psig, oil-free 334 gpm (75.9 m ³ /hr) 230/460 VAC, 3-phase, 60Hz 120 VAC, 1-phase, 60Hz	6.0" flange 4.0" flange 4.0" flange 30 psig, minimum 100 psig, oil-free 445 gpm (101.1 m ³ /hr) 230/460 VAC, 3-phase, 60Hz 120 VAC, 1-phase, 60Hz	6.0" flange 4.0" flange 6.0" flange 30 psig, minimum 100 psig, oil-free 667 gpm (151.5 m ³ /hr) 230/460 VAC, 3-phase, 60Hz 120 VAC, 1-phase, 60Hz
SeaPRO Skid				
Membrane/ERD Skid Height: Width: Depth: Weight Estimate for Shipping Purposes:	82" (208 cm) 77" (196 cm) 324" (823 cm) 9850 lb (4475 kg)	83" (211 cm) 77" (196 cm) 324" (823 cm) 12,375 lb (5625 kg)	88" (224 cm) 77" (196 cm) 324" (823 cm) 15,450 lb (7025 kg)	88" (224 cm) 90" (229 cm) 324" (823 cm) 20,250 lb (9200 kg)
Pump/Prefilter Skid Height: Width: Depth: Weight Estimate for Shipping Purposes: Membranes:	78" (198 cm) 77" (196 cm) 199" (506 cm) 4900 lb (2225 kg) 1,680 lb (760 kg)	93" (237 cm) 77" (196 cm) 198" (504 cm) 5,900 lb (2,675 kg) 2,520 lb (1,140 kg)	93" (237 cm) 77" (196 cm) 229" (582 cm) 6,275 lb (2,850 kg) 3,360 lb (1,525 kg)	102" (258 cm) 78" (198 cm) 223" (566 cm) 7,095 lb (3,220 kg) 5,040 lb (2,285 kg)



SeaPRO* Series 60 Hz

Seawater Desalination Machines

45,000 ppm NaCl, 100-300 gpm (22.7-68.1 m³/hr)



Basic Features (BAS)

- GE Fanuc Quick Panel 6-inch color display. Primarily text operating screens, Touchscreen controls.
- GE Fanuc Micro VersaMax processor
- 4-20 mA instruments displayed on instrument center
- Variable frequency drive (VFD) for high pressure pump
- Motor starter for boost pump
- Stand alone master control enclosure, skid mounted local control enclosure with terminal strips
- Membrane/energy recovery device (ERD)/boost pump and pump/prefilter located on separate skids

Premium Features (PRE)

- GE Fanuc QuickPanel 12-inch color display. Text and pictorial operating screens. Touchscreen controls.
- GE Fanuc VersaMax processor
- 4-20 mA instruments on touchscreen
- Primary and final pressure transmitters
- Variable frequency drive (VFD) for high pressure pump
- Motor starter for boost pump
- Automated valves and control for feed flush upon shut down
- Stand alone master control enclosure, local control enclosure with remote I/O
- Membrane/energy recovery device (ERD)/boost pump and pump/prefilter located on separate skids

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Operating Parameters

Design Feed TDS	45,000 ppm NaCl
Maximum Recovery	35%
Nominal Rejection	95-98%
Operating Temperature	35 to 85°F (1.6 to 29.4°C)
Minimum Inlet Pressure	30 psig (2 Bar)
Design Temperature	77°F (25°C)

Instrumentation

Flow Meters.....Permeate, concentrate, low pressure (LP) ERD inlet, high pressure (HP) ERD outlet

Conductivity.....Permeate

pHFeed

Pressure.....Pre-filter, post-filter, primary, final, permeate, concentrate, LP ERD inlet, LP ERD outlet, HP ERD inlet, HP ERD outlet (PRE Feature = Primary, Final transmitter)

Pressure Switches.....Feed, permeate, concentrate, primary

Instrument CenterThornton 770 MAX

Materials of Construction

Frame	Painted Carbon Steel
Cartridge Filter	RO.Zs 05-40, 5-micron nominal
Cartridge Filter Housing	GRP (glass reinforced plastic)
Membrane Elements	AD-400
Membrane Housing	FRP
Low Pressure Pipe	Schedule 80 PVC
High Pressure Pipe	Duplex 2205
Enclosures	NEMA 4

Options Available

- Allen Bradley control system
- Multi-Media filters
- Clean-in-Place (CIP) units
- Chemical feed systems
- Transfer pumps and storage tanks

Documentation Included

- Operation and maintenance manual
- Control narrative
- Drawings: piping and instrumentation, electrical and general dimensional

SeaPRO Models

MODEL	SeaPRO-42	SeaPRO-63	SeaPRO-84	SeaPRO-126
Permeate rate:	144k gpd 100 gpm (22.7 m ³ /hr)	216k gpd 150 gpm (34.1 m ³ /hr)	288k gpd 200 gpm (45.4 m ³ /hr)	432k gpd 300 gpm (68.1 m ³ /hr)
Concentrate Rate:	186 gpm (42.2 m ³ /hr)	279 gpm (63.4 m ³ /hr)	371 gpm (84.3 m ³ /hr)	557 gpm (126.5 m ³ /hr)
Feed Rate:	286 gpm (65.0 m ³ /hr)	429 gpm (97.4 m ³ /hr)	571 gpm (129.7 m ³ /hr)	857 gpm (194.6 m ³ /hr)
Pumps and Motors				
Manufacturer:	Fedco	Fedco	Fedco	Fedco
Quantity:	1	1	1	1
HP Pump HP and Type:	100 Hp (75 kW) TEFC	150 Hp (110 kW) TEFC	200 Hp (150 kW) TEFC	250 Hp (186 kW) TEFC
Boost Pump HP and Type:	10 Hp (7.5 kW) TEFC	20 Hp (15 kW) TEFC	20 Hp (14.9 kW) TEFC	40 Hp (29.8 kW) TEFC
Energy Recovery Booster				
Model:	PX-220	PX-180	PX-220	PX-220
Manufacturer:	ERI	ERI	ERI	ERI
Quantity:	1	2	2	3
Design Flow Rate:	180 gpm (40.9 m ³ /hr)	135 gpm (30.7 m ³ /hr)	180 gpm (40.9 m ³ /hr)	180 gpm (40.9 m ³ /hr)
Membrane Elements and Housings				
Membranes Quantity:	42	63	84	126
Memb. Housing Style:	7 element long, 4 port	7 element long, 4 port	7 element long, 4 port	7 element long, 4 port
Banking Arrangement:	6, parallel	9, parallel	12, parallel	18, parallel

MODEL	SeaPRO-42	SeaPRO-63	SeaPRO-84	SeaPRO-126
Cartridge Filtration				
Cartridge Filter:	RO.Zs05-40XK	RO.Zs05-40XK	RO.Zs05-40XK	RO.Zs05-40XK
Filter Length:	40" (102 cm)	40" (102 cm)	40" (102 cm)	40" (106 cm)
Filter Quantity:	22 per change out	54 per change out	54 per change out	108 per change out
Installation and Utility Requirements				
Inlet:	4.0" flange	6.0" flange	6.0" flange	8.0" flange
Permeate:	3.0" flange	3.0" flange	3.0" flange	4.0" flange
Concentrate:	3.0" flange	4.0" flange	6.0" flange	6.0" flange
Inlet Water Pressure:	30 psig, minimum	30 psig, minimum	30 psig, minimum	30 psig, minimum
Air Pressure:	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free	100 psig, oil-free
Drain to be Sized for:	286 gpm (64.9 m3/hr)	455 gpm (103.3 m3/hr)	606 gpm (137.6 m3/hr)	909 gpm (206.4 m3/hr)
Power:	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz	230/460 VAC, 3-phase, 60Hz
Control Circuit:	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz	120 VAC, 1-phase, 60Hz
SeaPRO Skid				
Membrane/ERD Skid				
Height:	87" (221 cm)	87" (221 cm)	87" (221 cm)	87" (221 cm)
Width:	77" (196 cm)	77" (196 cm)	77" (196 cm)	90" (229 cm)
Depth:	324" (823 cm)	324" (823 cm)	324" (823 cm)	324" (823 cm)
Weight Estimate for Shipping Purposes:	8,215 lb (3,725 kg)	10,055lb (4,560 kg)	12,260 lb (5,560 kg)	15,410 lb (6,990 kg)
Pump/Prefilter Skid				
Height:	101" (257cm)	101" (257cm)	101" (257cm)	101" (257cm)
Width:	77" (196 cm)	77" (196 cm)	77" (196 cm)	77" (196 cm)
Depth:	210" (533 cm)	210" (533 cm)	210" (533 cm)	210" (533 cm)
Weight Estimate for Shipping Purposes:	4,895 lb (2,220 kg)	5,885 lb (2,670 kg)	6,270 lb (2,845 kg)	7,095 lb (3,220 kg)
Membranes:	1,680 lb (760 kg)	2,520 lb (1,140 kg)	3,360 lb (1,525 kg)	5,040 lb (2,285 kg)



SeaPRO*-210

2500 m³/day Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation
- GE Fanuc QuickPanel 12-inch color display and VersaMax processor
- 4-20 mA instruments on touchscreen
- Primary and final pressure transmitters
- Variable frequency drive (VFD) for high pressure and boost pump
- Stand alone master control enclosure, local control enclosure with remote I/O
- Standard package includes pressure exchanger type energy recovery device
- BASIC option package available including booster type energy recovery device

Operating Parameters

Recovery 35%
 Design temp..... 25°C (77°F)
 Operating range 15-32°C (59-90°F) ¹
 Design Feed TDS..... 47,000 ppm
 Nominal rejection..... 97-99%
 Minimum inlet pressure 30 PSIG (2 bar)

¹ Varying the operating temperature may affect permeate rate

Materials of Construction

High-pressure piping..... Super Austenitic/
 Super Duplex material
 Low-pressure piping..... Schedule 80 PVC

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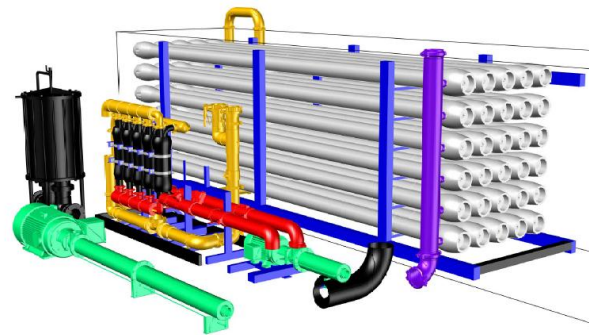


Figure 1. SeaPRO-210 General Layout (reference only)

Frame Painted blue carbon steel
 Enclosures..... NEMA 4 carbon steel
 Membranes AD-400
 Membrane Housing.....FRP, 1000 PSI (69 bar)
 Cartridge Filters..... 1-micron nominal, ROsave.Zs

Table 1: Standard Instrumentation

Flow	Permeate, concentrate, low pressure ERD inlet, high pressure ERD outlet
Conductivity/ Temp	Feed, permeate
pH	Feed
Pressure Indicators	Pre-/post-filter, primary, final, permeate, concentrate, pre-/post-ERD, pump discharge
Pressure Switch	Feed, permeate, concentrate
Pressure Transmitter	Primary, final

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Table 2: Pump and Motor

HP Pump Model	MBN80-255
Manufacturer	Sulzer
Quantity	1
HP Pump Motor	315 kW
Boost Pump Model	6x6x8A VHK
Manufacturer	Union Pump
Boost Pump Motor	37 kW
Quantity	1

Table 3: Energy Recovery

Model	PX-180
Manufacturer	Energy Recovery, Inc (ERI)
Quantity	5

Table 4: Model SeaPRO-210 Specifications

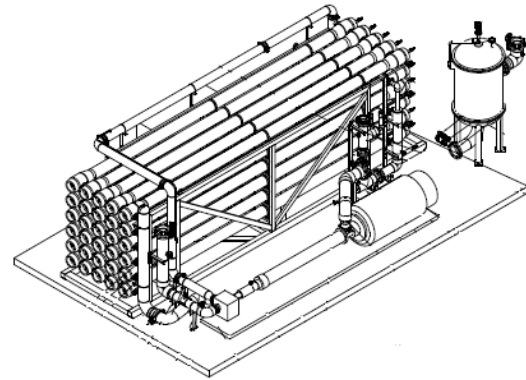
Permeate rate:		2500 m ³ /day (460 gpm)
Concentrate Rate:		4643 m ³ /day (850 gpm)
Feed Rate:		7143 m ³ /day (1310 gpm)
Membrane Elements and Housings		
Membranes Quantity:		210
Memb. Housing Style:		7 element long, 4 port
Banking Arrangement:		30, parallel
Cartridge Filtration		
Cartridge Filter:		ROZs 01-50
Filter Length:		50" (127 cm)
Filter Quantity:		100 per change out
Installation and Utility Requirements		
Inlet:		8" flange
Permeate:		6" flange
Concentrate:		8" flange
Air Pressure:		100 psig, oil-free
Power:		380 VAC, 3-phase, 50Hz
Control Circuit:		220 VAC, 1-phase, 50Hz

SeaPRO* E-Series

2500 m³/day (460 gpm) Seawater Desalination Machine

General Features

- Major components skid-mounted for easy installation and dependable operation
- Variable frequency drive (VFD) for high pressure pump optimal control, energy efficiency and constant water production
- Simple manual control for the system, and Hand/Auto control for remote starting and stopping of the system



Operating Parameters

Recovery 45%
 Design temp..... 25°C (77°F)
 Operating range 15-32°C (59-90°F) ¹⁾
 Design Feed TDS 45k ppm
 Nominal rejection..... 99%
 Minimum inlet pressure 2 bar (30 PSIG)

¹⁾ Varying the operating temperature may affect permeate rate

- Standard package includes energy recovery device for operating cost savings
- Flow and Conductivity 4-20mA signals available for remote monitoring/recording

Materials of Construction

High-pressure piping..... Sch 40 SS Duplex 2205
 Low-pressure piping..... Sch 80 PVC DIN PN10/16
 Frame..... Anti-corrosion treated carbon steel
 Frame Finish 2-coat epoxy painted & blue finish
 Enclosures..... IP55 carbon steel
 Membranes..... AD-400
 Membrane Housing FRP 8in-1200psi-7M (82 bar)
 Cartridge Filters..... 5-micron nominal, Hytrex*
 Cartridge Filter Housing FRP

Table 1: Standard Instrumentation

Flow (magnetic)	Permeate, Concentrate
Conductivity	Permeate
Pressure Switch	Feed LP, Feed HP, Concentrate, Permeate
Pressure Indicators	Prefilter, Post-filter, Pump suction, Pump discharge, ERD HP discharge, ERD LP discharge, Permeate, Concentrate

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Table 2: Pump and Motor

HP Pump Model	MSS-24012
Manufacturer	FEDCO
Quantity	1
HP Pump Motor	422 kW

Table 3: Energy Recovery Device

Model	HPBe-350
Manufacturer	FEDCO
Quantity	1

Options:

Contact sales for pricing and lead time.

- 35% Recovery Design
- Alternate high pressure pump manufacturers
- Pressure transmitters for remote monitoring/recording
- Control circuit transformer for 110 VAC, 1-phase, 60 Hz operation

Table 4: Model SeaPRO-E-210 Specifications

Systems Flow Rates	
Permeate rate:	2500 m ³ /day (460 gpm)
Concentrate Rate:	3064 m ³ /day (561 gpm)
Feed Rate:	5564 m ³ /day (1021 gpm)
Membrane Elements and Housings	
Membranes Quantity:	210
Memb. Housing Style:	30 housings - 7M long, 4 port ; and 5 housings - 7M long, 2 port
Banking Arrangement:	30, parallel
Cartridge Filtration	
Cartridge Filter:	120 FTP-4
Filter Length:	50" (127 cm)
Filter Quantity:	120 per change out
Installation and Utility Requirements	
Filter Feed:	DIN DN200 PN10/16 flange
Filter Outlet:	DIN DN200 PN10/16 flange
RO Feed:	DIN DN200 PN10/16 flange
Permeate:	DIN DN150 PN10/16 flange
Concentrate:	DIN DN200 PN10/16 flange
Power:	400 VAC, 3-phase, 50/60Hz
General Dimensional Information	
<u>System Footprint:</u>	
Width:	10 060 mm (396 inches)
Depth:	5334 mm (210 inches)
<u>Membrane Skid Size:</u>	
Height:	2540 mm (100 inches)
Width:	8077 mm (318 inches)
Depth:	2032 mm (80 inches)

SeaTECH* Series

SeaTECH-12: 163m³/day (30gpm) integrated SWRO Container

This specification defines the integrated design requirements for the SeaTECH line of containerized systems for the Industrial, Power and Municipal markets. All necessary equipment required for independent operation is provided given the necessary pretreatment precautions are taken. Design basis revolves around containerized system with high-pressure axial piston feed pump as well as a containerized media filter and cartridge filter system. Optional configuration available based on market needs.



Functional Description

A complete drinking water system comprised of Multi-Media Filters pretreatment, cartridge filtration, a single pass, single stage SWRO, followed by a remineralization system. System produces 30gpm (43,000gpd, 6.8m³/hr, 163m³/day,) of product water at 40% recovery.

Operating Parameters

- TDS.....35,000-38,000 mg/l (as NaCl) ¹
- pH.....8.0 ¹
- SDI₁₅.....< 3.0
- Temperature.....25°C (77°F)
- Recovery.....40%
- Nominal Rejection.....>98%
- Operating Pressure.....750-950 psi (52-66 bar) ²

Note:

Required 2.0-5.0 bar (29-72.5 psi) minimum customer supplied pressure to high-pressure pump

¹ TDS and pH will vary depending on feed water characteristics

² Based on 850psi operation pressure

Standard Components

All components, with the exception of the optional feed water pump and membrane CIP unit, are installed in a customized 20' ISO shipping container, pre-piped and wired.

- Pretreatment filtration includes: Two (2) 42" diameter Multi-Media Filters (manual operation); one (1) Eden Excel 24 element 5 micron filter housing
- High pressure pump: One (1) Danfoss model APP-8.2 super duplex construction high pressure pump with 25 HP TEFC (IP-54) motor
- Energy recovery system: One (1) Energy Recovery Inc. (ERI) model PX-70S. One (1) ERI model ERI 8503 Duplex construction booster pump with 5 HP TEFC motor
- VFD's for high-pressure and booster pump
- Post treatment included: CaCO₃ remineralization system; Chlorine injection metering pump and day tank
- Container insulated and designed for oversea transportation
- Valves: Permeate diversion valves, diaphragm valve for ERI reject out, isolation butterfly valves

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Control Features

- PLC/HMI: GE Fanuc Versamax Micro PLC with 6-inch color Quickpanel HMI
- Remote start/stop & alarm capabilities
- Zero recovery flush on shutdown

Instrumentation

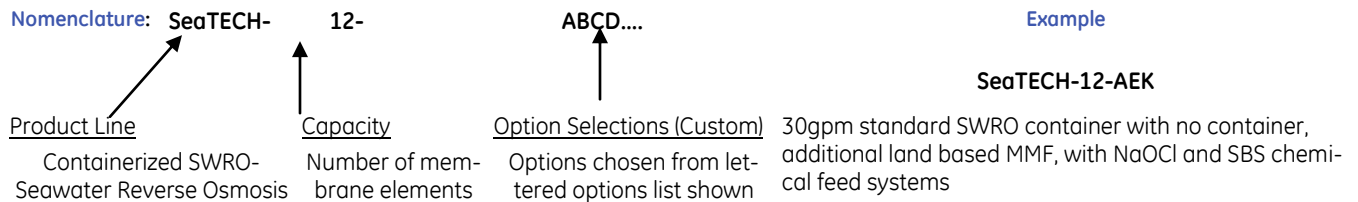
- Conductivity.....Permeate, Final product
- Flow meters.....Energy recovery feed, Permeate, Booster pump discharge
- Pressure switch.....RO pump
- Pressure gauges.....liquid filled for high and low pressures
- Gauge Panel.....four low and three high pressure readings available via 5-way valves for pressure monitoring

Membrane Elements & Housings

- Reverse Osmosis Membranes: Twelve (12) GE model AD-400 8" x 40" spiral wound
- Membrane pressure vessels: Three (3) 4-long side entry FRP vessels, rated at 1,000psi (69bar)

Materials of Construction

- Power Distribution Panels.....NEMA 12
- Control Enclosure.....NEMA 4X
- High pressure piping.....Duplex 2205
- Low pressure piping.....PVC Schedule 80
- Low Pressure Tubing.....Polyethylene
- High Pressure Tubing.....Parflex
- PVC Sample Valves on each vessel, feed, permeate and reject



Physical Data

Three (3) external piping connections;
One (1) 460V/3PH/60HZ electrical connection

Container Weight & Dimensions

- 240" L x 96" W x 96" H (6,096 mm L x 2,438 mm W x 2,438 mm H)
- Container Weight: 16,500lbs (7,500 kg) dry membranes not included
- Membrane Weight: 480lbs (218 kg)

Power Requirements & Consumption

- Power: 460V, 3 phase, 60 Hz, UL listed components

SWRO Train Power Consumption:

- ~1.9 kW hr/m³; 7.1 kWh/1000 gal

Option Package Codes

- A. No container
- B. Insight 75 point run-time SCADA package with a desktop PC to track data/historical information
- C. Intake System: pumps, piping, and eductor
- D. Feed/MMF Backwash water tank, pump and controls
- E. Land based additional multimedia filters
- F. ASME Code stamped pressure vessels
- G. Post-treatment Degasifier
- H. 380 V, 3 Ph, 50 Hz CE conversion
- I. Permeate flush system w/ tank
- J. pH meter and H₂SO₄ chemical feed
- K. FeCl₃, NaOCl, SBS chemical feeds (be specific)
- L. Mobile Clean in place system
- M. Installation and commissioning supervision/services are available
- N. Witness Factory Acceptance Test

SeaTECH* Series

SeaTECH-35: 454m³/day (83gpm) integrated SWRO Container

This specification defines the integrated design requirements for the SeaTECH line of containerized systems for the Industrial, Power and Municipal markets. All necessary equipment required for independent operation is provided given the necessary pretreatment precautions are taken. Design basis revolves around containerized system with high-pressure axial piston feed pump as well as a containerized media filter and cartridge filter system. Optional configuration available based on market needs.

Functional Description

A complete drinking water system comprised of Multi-Media Filters pretreatment, cartridge filtration, a single pass, single stage SWRO, followed by a remineralization system. System produces 83gpm (120,000gpd, 18.9m³/hr, 454m³/day,) of product water at 40% recovery.

Operating Parameters

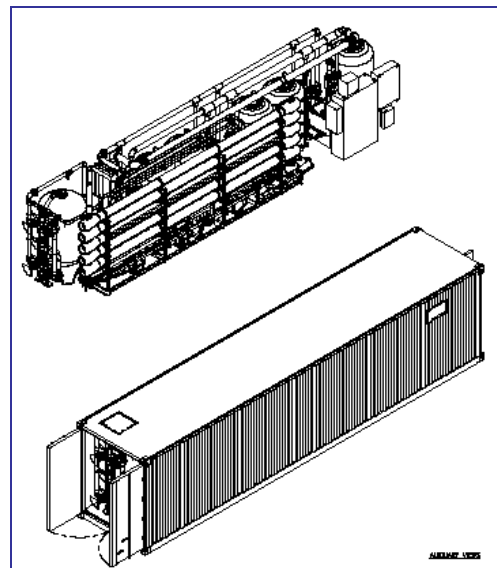
- TDS.....35,000-38,000 mg/l (as NaCl) ¹
- pH.....8.0 ¹
- SDI₁₅.....< 3.0
- Temperature.....25°C (77°F)
- Recovery.....40%
- Nominal Rejection.....>98%
- Operating Pressure.....750-950psi (52-66 bar) ²

Note:

Required 2.0-5.0bar (29-72.5psi) minimum customer supplied pressure to high-pressure pump

¹ TDS and pH will vary depending on feed water characteristics

² Based on 850psi operation pressure



Standard Components

All components, with the exception of the optional feed water pump and membrane CIP unit, are installed in a customized 40' ISO shipping container, pre-piped and wired.

- Pretreatment filtration includes: Five (5) 42" diameter Astral Multi-Media Filters (manual operation); one (1) Eden Excel 22 x 40" element 5 micron filter housing
- High pressure pump: Two (2) Danfoss model APP-10.2 super duplex construction high pressure pump with 30 HP TEFC (IP-54) motor
- Energy recovery system: One (1) Energy Recovery Inc. (ERI) model PX-140S. One (1) ERI model HP-1253 Duplex construction booster pump with 10 HP TEFC motor
- VFD's for High pressure pump and & booster pump

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- Post treatment included: 48" diameter FRP CaCO₃ remineralization system; Chlorine injection metering pump and day tank
- Valves: Permeate diversion valves, diaphragm valve for ERI reject out, isolation butterfly valves
- Container insulated and designed for oversea transportation

Control Features

- PLC/HMI: GE Fanuc Versamax Micro PLC with 6-inch color Quickpanel HMI
- Remote start/stop & alarm capabilities
- Zero recovery flush on shutdown

Instrumentation

- Conductivity.....Permeate, Final product
- Flow meters.....Energy recovery feed, Permeate, Booster pump discharge
- Pressure switch.....RO pump

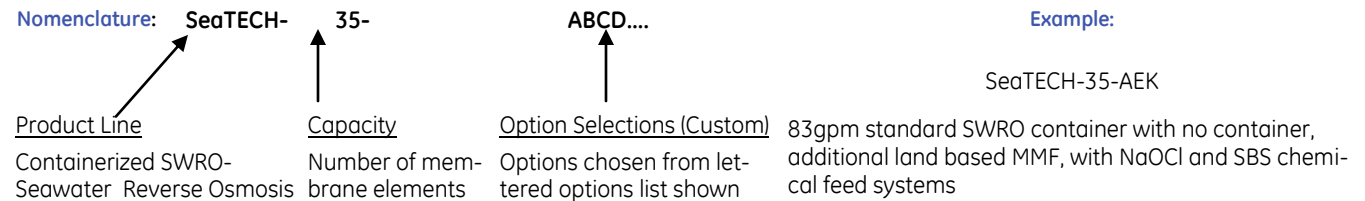
- Pressure gauges.....liquid filled for high and low pressures
- Gauge Panel.....four low and three high pressure readings available via 5-way valves for pressure monitoring

Membrane Elements & Housings

- Reverse Osmosis Elements: Thirty five (35) GE model SWRO-HR-400-WT 8" x 40" spiral wound
- Membrane pressure vessels: Five (5) 7-long side entry FRP vessels, rated at 1,000psi (69bar)

Materials of Construction

- Power Distribution Panels.....NEMA 12
- Control Enclosure.....NEMA 4X
- High pressure piping.....Duplex 2205
- Low pressure piping.....PVC Schedule 80
- Low Pressure Tubing.....Polyethylene
- High Pressure Tubing.....Parflex



Physical Data

Three (3) external piping connections;
One (1) 460V/3PH/60HZ electrical connection

Container Weight & Dimensions

- 480" L x 96" W x 96" H (12,192 mm L x 2,438 mm W x 2,438 mm H)
- Container Weight: 26,500lbs (12, 018 kg) dry membranes not included
- Membrane Weight: 1,400lbs (635 kg)

Power Requirements & Consumption

- Power: 460V, 3 phase, 60 Hz, UL listed components

SWRO Train Power Consumption:

- ~1.9 kW hr/m³; 7.1 kWh/1000 gal

Option Package Codes

- A. No container
- B. Insight 75 point run-time SCADA package with a desktop PC to track data/historical information
- C. Intake System: pumps, piping, and eductor
- D. Feed/MMF Backwash water tank, pump and controls
- E. Land based additional multimedia filters
- F. ASME Code stamped pressure vessels
- G. Post-treatment Degasifier
- H. 380 V, 3 Ph, 50 Hz CE conversion
- I. Permeate flush system w/ tank
- J. pH meter and H₂SO₄ chemical feed
- K. FeCl₃, NaOCl, SBS chemical feeds (be specific)
- L. Mobile Clean in place system
- M. Installation and commissioning supervision/services are available
- N. Witness Factory Acceptance Test

SeaTECH Series

SeaTECH-84: 1000m³/day (200gpm) SWRO Container

This specification defines the integrated design requirements for the SeaTECH line of containerized systems for the Industrial, Power and Municipal markets. All necessary equipment required for independent operation is provided given the necessary pretreatment precautions are taken. Design basis includes containerized system with centrifugal feed pump as well as a containerized media filter and cartridge filter system (SeaTECH-MMF-84x3V). Optional configurations available based on market needs.

Functional Description

Single pass, single stage, twelve pressure vessels total. Each pressure vessel contains 7 thin-film composite elements in series for a total of 84. System produces 1,000 m³/day (45 m³/hr, 200 gpm) of product water at 40% recovery.

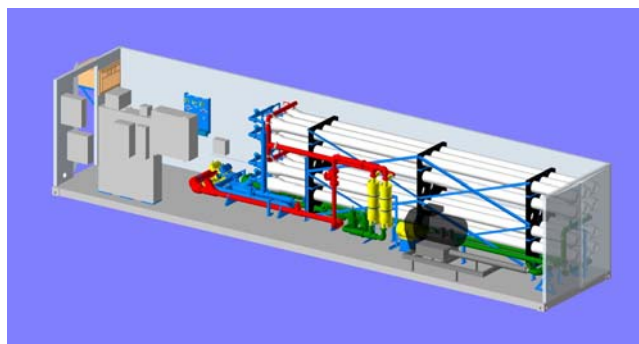
Operating Parameters

- TDS 37,000-45,000 mg/l (as NaCl)
- SDI₁₅ < 3.0
- Temperature 25 to 35°C (77 to 95°F)
- Recovery 40 to 36%
- Nominal Rejection >98%

Note: Required 3bar (45psi) minimum customer supplied pressure to high pressure RO Feed Pump. Temperatures and high salinities will reduce system productivity.

Standard Components

- Container designed for oversea transportation
- High Pressure Centrifugal RO Feed Pump w/ 400/460V 3 phase 50/60 Hz TEFC motor



- Energy Recovery Device and Booster Pump
- VFD for Booster Pump & RO Feed Pump
- Valves: Permeate diversion valves, diaphragm valve for ERI reject out, isolation butterfly valves

Control Features & Power Requirements

- GE Fanuc Versamax Micro PLC with 6-inch Quickpanel HMI
- Remote start/stop & alarm capabilities
- Zero recovery flush on shutdown
- Power: 400/460V, 3 phase, 50/60 Hz, UL listed components with CE marking

Instrumentation

- Conductivity Permeate, Final product
- Flow meters Energy recovery feed, Permeate, Booster pump discharge
- Pressure switch RO Feed pump
- Pressure gauges liquid filled for high and low pressures
- Gauge Panel four low and three high pressure readings available via 5 way valves for pressure monitoring

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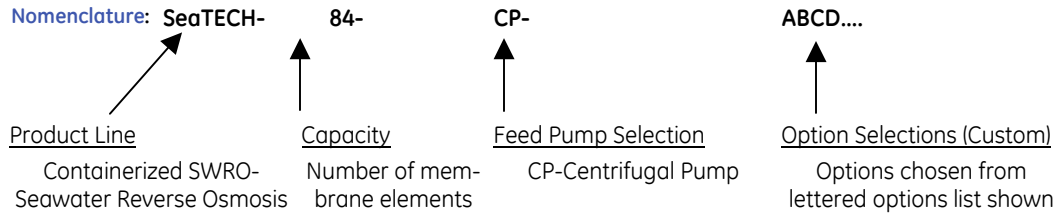
Membranes & Housings

- Multi Ported FRP pressure vessel design, 1000psi rated
- Spiral wound thin film composite membranes

Materials of Construction

- Power Distribution PanelsNEMA 12
- Control Enclosure NEMA 4X

- High pressure pipingZeron 100
- Low pressure pipingPVC Schedule 80
- Low Pressure Tubing Polyethylene
- High Pressure TubingParflex
- PVC Sample Valves on each vessel, feed, permeate and reject



Physical Data

Container Weight:

- SeaTECH-84: 16,500lbs (7,500 kg) dry membranes not included
- Membrane Weight: 3,360lbs (1,525 kg)

Dimensions

SeaTECH-84 Container:

- 480" L x 96" W x 96" H
- 12,192 mm L x 2438 mm W x 2438 mm H

SeaTECH-84 Overall:

- 480" L x 456" W x 96" H
- 12,192 mm L x 11,582 mm W x 2438 mm H

Power Consumption:

- ~3.0 kW hr/m³

Example

SeaTECH-84-CP-AG

200gpm standard SeaTECH container with centrifugal feed pump, pretreatment container, and SBS chemical feed

Option Package Codes:

- SeaTECH-MMF-84x3V, Pretreatment Container with multimedia and cartridge filters 480" L x 96" W x 96" H
- ASME Code stamped pressure vessels
- Post-treatment degasifier
- 400 V, 3 Ph, 50 Hz fuse, A/C, Lighting kit
- pH meter and H₂SO₄ chemical feed
- NaOCl pretreatment chemical feed
- SBS chemical feed
- Installation and commissioning supervision/services are available

SeaTECH* Series

SeaTECH-MMF-84x3V Container; Use with SeaTECH-84 SWRO

This specification defines the integrated design requirements for the SeaTECH-MMF line of containerized units for the Industrial, Power and Municipal markets. Optional configurations are available based on application requirements.

Functional Description

Single pass, three vertical pressure filters total. Each pressure vessel contains anthracite and sand media. System produces 3,000m³/day (125m³/hr, 550gpm) of filtrate.

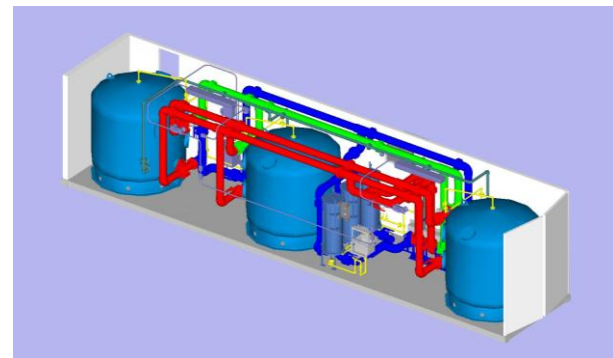
Operating Parameters

- Water temperature.....4-99F (1-37°C)
- Feed Pressure..... 70-100 psig (4.8-6.9barg)
- Product Flow550gpm
- Max Feed Turbidity..... < 10 NTU
- Feed Loading Rate 3-7 gpm/ft²
- BW Loading Rate 12-15 gpm/ft²
- Cartridge Filter Loading Rate..... 2.5 gpm/TIE

Note: Required 4.8 bar (70 psi) minimum customer constant pressure to filter inlet. Temperatures will impact BW loading rates. Exceeding the feed turbidity/TSS limit will shorten run times.

Standard Components

- Container designed for oversea transportation
- Three 84-inch (213 cm) diameter pressure vessels, rated at 100psig (6.9barg)
- Three 22-round cartridge filter housings, rated at 150psig
- Manual butterfly valves for control of service/backwash sequences
- **Option:** Air scour feature available with Chem-Aire ABS piping



Instrumentation

Flow Meter	Backwash waste outlet
Pressure	Main MMF feed, MMF outlet, and cartridge filter outlet on gauge panel; local indication at each MMF inlet

Materials of Construction

Media Filter Vessels	Neoprene lined carbon steel, 100 psig rated
Cartridge Filter Vessels	FRP, 150 psig rated
Piping	PVC, Schedule 80
Ball Valves	PVC with EPDM seats
Butterfly Valves	Nylon-11 coated ductile iron discs with EPDM seats

Physical Data

- Dimensions: 480" L x 96" W x 96" H (12,192 mm L x 2438 mm W x 2438 mm H)
- Weight: 34,500lbs (15,650 kg) dry

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SeaTECH* Series

3000 m³/day (550 gpm) Containerized Seawater Desalination System

The following defines the integrated design requirements for the SeaTECH line of containers for the Industrial, Power and Municipal markets. All necessary equipment required for independent operation is provided given the necessary pretreatment precautions are taken. Design basis includes 4 containerized systems:

- SWRO and power distribution/control system, coupled with pump and energy recovery system (2 containers): SeaTECH-252
- Cartridge filter, chemical feed system and CIP (Utilities container): SeaTECH-UTL-252
- Media filtration system: SeaTECH-MMF-80x2H

Optional configurations available based on market needs.

SWRO & Pump Functional Description

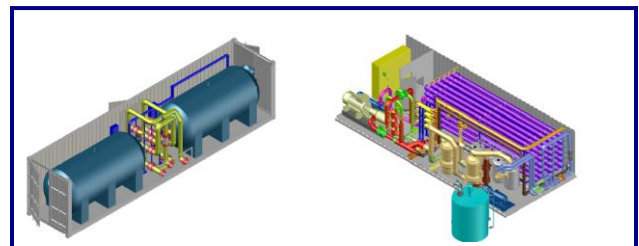
Single pass, single stage, thirty-six pressure vessels total. Each pressure vessel contains 7 thin-film composite elements in series, for a total of 252. Depending on membrane area, system produces 2,500 – 3,000 m³/day (104-125 m³/hr, 458-550 gpm) of product water at 40% recovery.

DMF Functional Description

Two horizontal pressure filters total. Each pressure vessel contains anthracite and sand media. System produces 6,250 m³/day (260 m³/hr, 1,146gpm) of filtrate based on 2,500m³/day product and 40% recovery.

CIP/Chemical Feed Functional Description

CIP system capable of 325 m³/hr includes FRP tank with mixer. Four chemical feed systems capable of feeding NaOCl, SBS, Antiscalant, and Coagulant.



SWRO & Pump Operating Parameters

TDS	37,000-45,000 mg/l (as NaCl)
SDI ₁₅	< 3.0
Temperature:	18 to 35°C (77 to 95°F)
Recovery.....	45 to 35%
Nominal Rejection:	>98%
Min/Max Supply Pressure:.....	2-4 bar

Note: Low temperatures, recoveries, and high salinities will reduce system productivity

SWRO & Pump Standard Components

- Containers designed for oversea transportation
- High Pressure RO Feed Pump 125 m³/h @ 65bar w/ 400V, 3 phase 50 Hz TEFC motor
- Three Pressure Exchange Energy Recovery Device (ERD) with room for a fourth should low recovery and/or high production be required
- High Pressure ERD Booster Pump w/ 400V, 3phase 50 Hz TEFC motor
- VFDs for ERD Booster Pump & Feed Pump
- Valves: Permeate diversion valves, diaphragm valve for ERD reject out, isolation butterfly valves

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SWRO Control Features & Power Requirements

- AB Micrologix 1200 with 8" - color HMI for Basic version. AB compactlogix with 12" - color HMI for Premium version
- VFD's for SWRO Feed and ERD Pumps
- Remote start/stop & alarm capabilities
- Zero recovery flush on shutdown
- Power: 400V, 3phase, 50Hz, CE marked panels
- Control: 24VDC, 1phase, 50Hz, CE marked panels

SWRO Instrumentation

Basic version:

ConductivityFeed, Permeate
 Flow meters.....Brine out, HP ER, LP ER, Permeate
 Pressure switch.....RO pump (LP and HP),
ERD feed (LP), ERD Booster feed (HP)
 Pressure gauges..... Liquid filled for high
and low pressures
 Gauge Panel Five low and four high pressure
readings available for pressure monitoring

Premium version (optional):

pH.....Permeate
 Flow meters.....RO pump Feed
 Pressure Transmitter.....RO pump discharge (HP)
Permeate, Feed/Concentrate differential

SWRO Membranes & Housings

- (36) Multi Ported FRP pressure vessel design, in a single stage array, 1000psi rated (1200psi optional)
- (252) Spiral wound thin-film composite membranes

SWRO Materials of Construction

Power Distribution Panels..... IP 55
 Control Enclosure..... IP 66
 High pressure piping Zeron 100
 Low pressure pipingPVC NP-10
 Low Pressure Tubing Polyethylene
 High Pressure Tubing..... Duplex
 PVC Sample Valves on each vessel, feed, permeate and reject

DMF Operating Parameters

- Product Flow (per filter)..... 500 gpm
- Max Feed Turbidity/TSS < 10 ppm
- Feed Loading Rate 13.7 m³/m²/h
- BW Loading Rate..... 20.0 m³/m²/h

Note: Required 4bar (6 psi) minimum customer constant pressure to filter inlet. Temperatures will impact BW loading rates. Exceeding the feed turbidity/TSS limit will shorten run times.

DMF Instrumentation & Components

- Container designed for oversea transportation
- Two 80inch (2.04m) diameter x 195-inch (4.96m) horizontal pressure vessels, rated at 60psig (4barg)
- **Options:** Air scour feature available

Basic version:

Pressure gauges..... Liquid filled
for high and low pressures
 Manual butterfly valves..... for control of
service/backwash sequences

Premium version (optional):

Pressure Transmitter..... Feed, Filtered water effluent
 FlowFeed, backwash effluent
 Automatic flow control valve for rinsing
 Pneumatic operated valves for control of service/backwash sequences.

DMF Control Features & Power Requirements

- Manual control. Automatic operation optional
- Power: 220V, 1phase, 50Hz, CE marked panels
- Control: 24VDC, 1phase, 50Hz, CE marked panels
- **Option:** Power for air scour blowers

DMF Materials of Construction

Control Panel.....IP 66
 Low pressure piping.....PVC NP-10
 Low pressure tubing Polyethylene

Utilities Unit Operating Parameters

CIP Flow.....	325 m ³ /h @ 3.2 barg
CIP Tank Volume.....	5,000 Liters
Chemical Pump Flow.....	0.5 to 5.0 lph
Chemical Tank Volume.....	500 Liters

Note: Chemical Pump sizes should be reviewed for all applications.

Utilities Unit Standard Components

- Container designed for oversea transportation
- Two 60-round x 40" cartridge filter housings, rated at 75psig (5barg)

Utilities Unit Instrumentation

Basic version:

Pressure switch.....	Feed
Gauge Panel	Two low pressure
.....readings for pressure monitoring	

Premium version (optional):

pH.....	Feed
ORP	Feed
Pressure Transmitter.....	Feed, Cartridges outlet

Utilities Unit Materials of Construction

I/O Remote Panel.....	IP 66
Metering Pumps.....	Polypropylene
Tanks CIP/Chemical.....	FRP/LDPE
Cartridge filters.....	FRP
Low pressure piping.....	PVC NP-10
Low pressure tubing.....	Polyethylene

Approximate Container Weights

SeaTEACH-252 (RO/Control Container):

- 30,200 lbs (13,700 kg) dry, membranes not included
- 56,250 lbs (25,500 kg) wet/operating
- 10,080 lbs (4,575 kg), membrane weight

SeaTEACH-252 (Pump Container):

- 24,700 lbs (11,200 kg) dry
- 27,230 lbs (12,350kg) wet/operating

SeaTECH-UTL-252 (Utility Container):

- 14,360 lbs (6,515 kg) dry, CIP tank not included
- 23,700 lbs (10,750 kg) wet/operating, CIP tank not included
- 12,015 lbs (5,450 kg), CIP tank wet/operating

SeaTECH-MMF-80x2H (DMF Container):

- 16,205 lbs (7,350 kg) dry, not including media
- 186,800 lbs (84,730 kg) wet/operating
- 127,870 lbs (58,000 kg), media weight

Dimensions

SeaTECH-252 (RO/Control Container):

- 480" L x 96" W x 96" H
- 12,192 mm L x 2,438 mm W x 2,438 mm H

SeaTECH-252 (Pump Container):

- 240" L x 96" W x 96" H
- 6,096 mm L x 2,438 mm W x 2,438 mm H

SeaTECH-UTL-252 (Utility Container):

- 240" L x 96" W x 96" H
- 6,096 mm L x 2,438 mm W x 2,438 mm H

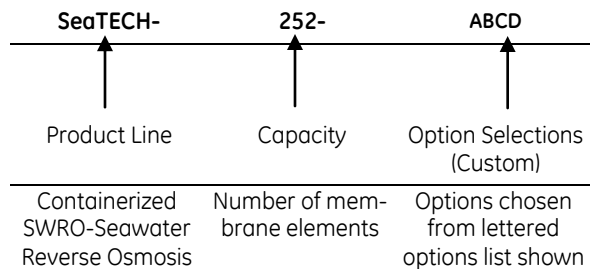
SeaTECH-MMF-80x2H (DMF Container):

- 480" L x 96" W x 96" H
- 12,192 mm L x 2,438 mm W x 2,438 mm H

Power Consumption

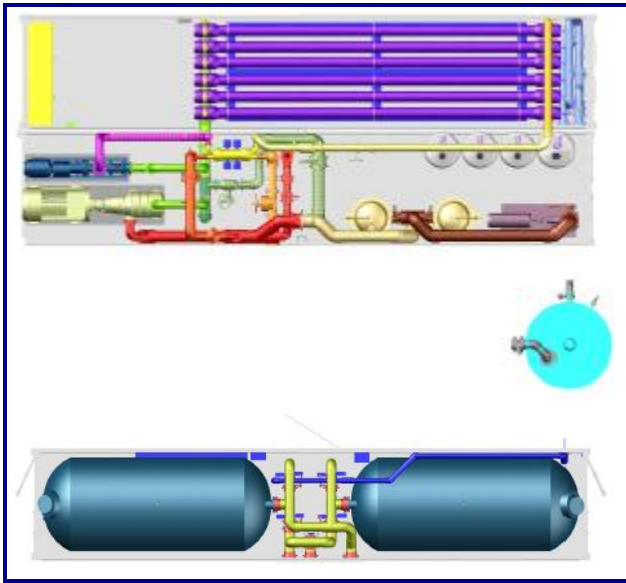
- SeaTECH-252 + Pumps no BOP ~3.0 kW hr/m³

Nomenclature



Example: SeaTECH-252-ABCD

3,000m³/d SeaTECH container with ASME Code stamped pressure vessels, centrifugal feed pump/ERD container, Utilities container and pre-treatment container, 35% recovery option and premium version.



Option Package Codes

- A. SeaTECH-UTL-252, Utilities Container (Cartridge filter/CIP/Chemical Feed)
- B. SeaTECH-252 Pump/ERD Container
- C. SeaTECH-MMF-80x2H, Pretreatment Container (dual media filters with air blowers)
- D. Premium version
- E. TFC SWRO Membranes: 370 ft² (2,500 m³/d)
- F. TFC SWRO Membranes: 400 ft² (3,000 m³/d)
- G. 35% recovery option – fourth ERD required and increased HPRO pump size to maintain 65barg at 125m³/h
- H. ASME Code stamped pressure vessels
- I. 460 V, 3 Ph, 60 Hz - fuse, A/C, Lighting kit
- J. Installation and commissioning supervision/ services are available upon request
- K. Operating services are available upon request

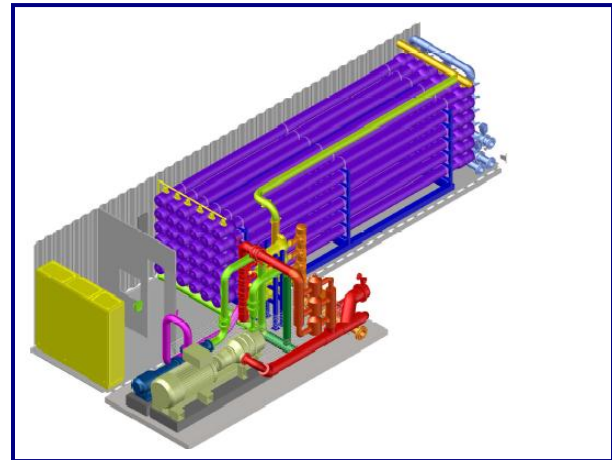
SeaTECH* Series

Pumping & Desalination Containers: SeaTECH-252 SWRO

The following information defines the design requirements for the Pumping and Desalination containers belonging to the SeaTECH-252 SWRO containerized product line. These two containers make-up the smallest possible subsystem, consisting of:

- **Desalination container:** Power distribution/control system, SWRO skid.
- **Pumping container:** High pressure and booster pumps, energy recovery system.

Optional configurations available based on market needs.



SWRO & Pump Functional Description

Single-pass, single stage, thirty-six (36) pressure vessels total. Each pressure vessel contains seven thin-film composite elements in series for a total of 252. Depending on membrane area system produces 2,500 – 3,000 m³/day (104-125 m³/hr, 458-550gpm) of product water at 40% recovery.

SWRO & Pump Operating Parameters

TDS37,000-45,000 mg/l (as NaCl)
SDI₁₅ < 3.0
Temperature: 18 to 35°C (77 to 95°F)
Recovery..... 45 to 35%
Nominal Rejection:.....>98%
Min/Max Supply Pressure:.....2/4 bar

Note: Low temperatures, recoveries, and high salinities will reduce system productivity. The system requires 5-micron safety filtration upstream.

SWRO & Pump Standard Components

- Containers designed for oversea transportation
- Air conditioning for MCC area
- High Pressure RO Feed Pump 125 m³/h @ 65bar w/ 400V, 3 phase 50 Hz TEFC motor

- Three Pressure Exchange Energy Recovery Device (ERD) with room for a fourth should low recovery and/or high production be required
- High Pressure ERD Booster Pump w/ 400V, 3phase 50 Hz TEFC motor
- VFDs for ERD Booster Pump & Feed Pump
- Valves: Permeate diversion valves, diaphragm valve for ERD reject out, isolation butterfly valves
- Flanged connections for feed, waste and product currents

Note: High pressure isolation valves for CIP are optional.

SWRO Control Features & Power Requirements

- AB Micrologix 1200 with 8" - color HMI for Basic version. AB compactlogix with 12" - color HMI for Premium version
- VFD's for SWRO Feed and ERD Pumps
- Remote start/stop & alarm capabilities
- Zero recovery flush on shutdown
- Power: 400V, 3 phase, 50 Hz, CE marked panels
- Control: 24VDC, 1phase, 50Hz, CE marked panels

Note: Other manufacturers for control equipment are available as an optional



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SWRO Instrumentation

Basic version

Conductivity.....Feed, Permeate
Flow meters.....Brine out, HP ER, LP ER, Permeate
Pressure switch.....RO pump (LP and HP),
ERD feed (LP), ERD Booster feed (HP)
Pressure gauges.....Liquid filled for high
.....and low pressures
Gauge Panel.....Five low and four high pressure
.....readings available for pressure monitoring

Premium version (optional):

pH.....Permeate
Flow meters.....Feed
Pressure Transmitter.....Feed, Permeate,
Feed/Concentrate differential

SWRO Membranes & Housings

- (36) Multi Ported FRP pressure vessel design, in a single stage array, 1000psi rated (1200psi optional)
- (252) Spiral wound thin film composite membranes

SWRO Materials of Construction

Power Distribution Panels.....IP 55
Control Enclosure.....IP 66
High pressure piping.....Zeron 100
Low pressure piping.....PVC, NP10
High Pressure tubing.....Duplex
Low pressure tubing.....Polyethylene

Container Weight

SeaTECH-252 (RO/Control Container):

- 30,200 lbs (13,700 kg) dry, membranes not included
- 10,080 lbs (4,575 kg), membranes weight
- 56,250 lbs (25,500 kg) wet/operating

SeaTECH-252 (Pump Container):

- 24,700 lbs (11,200 kg) dry
- 27,230 lbs (12,350kg) wet/operating

Dimensions

SeaTECH-252 (RO/Control Container):

- 480" L x 96" W x 96" H
- 12,192 mm L x 2,438 mm W x 2,438 mm H

SeaTECH-252 (Pump Container):

- 240" L x 96" W x 96" H
- 6,096 mm L x 2,438 mm W x 2,438 mm H

Power Consumption:

- SeaTECH-252 + Pumps no BOP ~3.0 kW hr/m³

IPER* Ultra Efficient Pump

SWRO Integrated Pump and Energy Recovery
1,000 m³/d (264k gpd) permeate

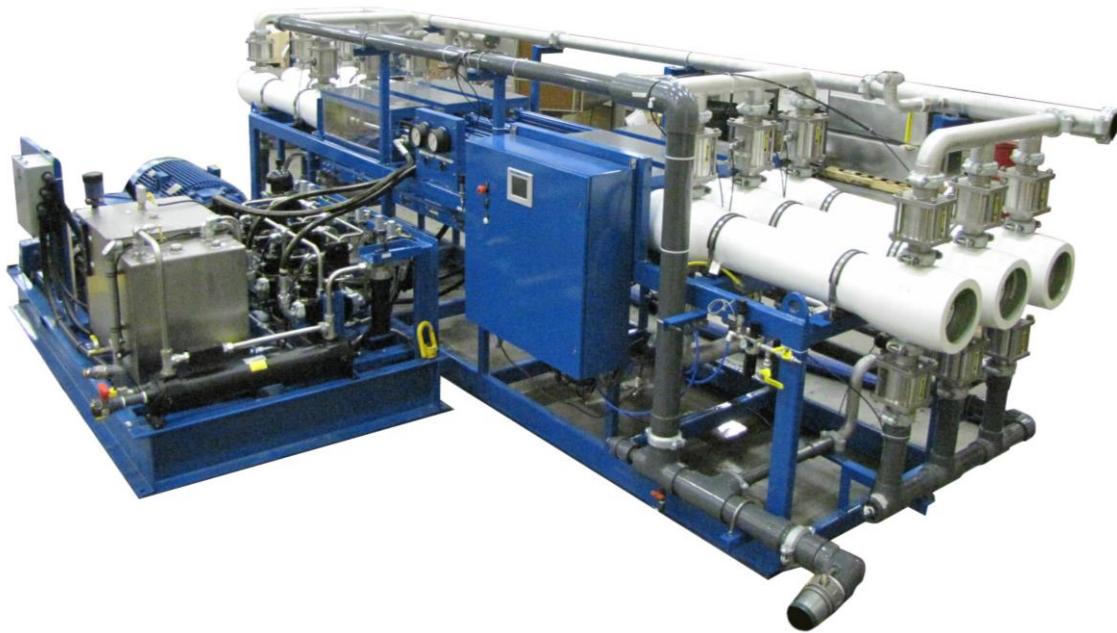


Figure 1: IPER Ultra Efficient Pump

IPER Benefits

- IPER is one of the most energy efficient pumps in the world (Figure 1). Applied to desalination reverse osmosis systems, it can reduce energy costs by 50%.¹
- Pre-engineered pumping system combines flow controls, high pressure pumping and energy recovery into one skid
- No additional controls, drives, pressure regulators, or flow balancing required
- Modular design
- Low inlet pressure requirement

¹Compared to desalination plants operating with no energy recovery. Efficiency claims based on competitors published motor and pump efficiencies.

Features

- Robust FRP water cylinders
- Dual-acting pistons transfer maximum energy
- One button start up and shut down controls
- 100 KW Nominal Operating Power
- Ultra efficient hydraulic power source
- Skid mounted master control enclosure
- Proven, reliable hydraulic power source that is scalable and adaptable
- Extremely low cycle rate compared to positive displacement pumps



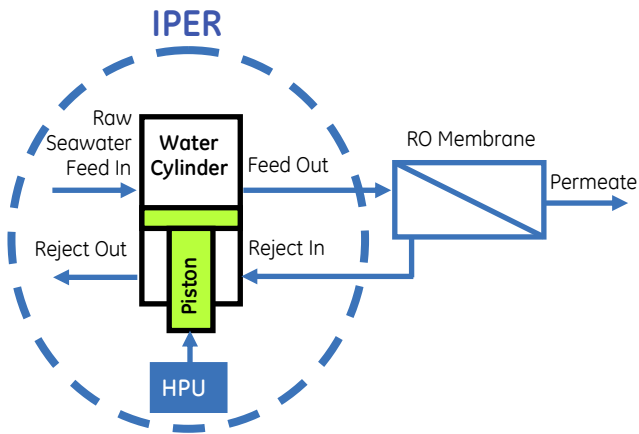


Figure 2: IPER operational flow diagram

Why is IPER so Efficient?

- Leverages highly efficient and reliable Hydraulic Power Unit (HPU) technology (Fig 2)
- Uses the hydraulic energy from the high pressure SWRO reject, combined with energy from the HPU, to deliver constant flow and pressure to membranes
- Employs piston as a barrier so there is no appreciable mixing between raw seawater feed and SWRO reject
- Eliminates secondary boost pump required by other energy recovery devices

Operating Parameters

Maximum SWRO Permeate	264k gpd 183.5 gpm (1,000 m ³ /d)
Fixed Recovery	35% to 45%
Maximum Pressure	1160 psi (80 bar)
Temperature	40 to 95°F (4 to 35°C)
Minimum Inlet Pressure	15 psi (1.0 bar)

Materials of Construction

High pressure piping	SS Duplex 2205
Low pressure piping	Sch. 80, PVC
High pressure valves	Super Duplex 2507
Frame	Epoxy painted carbon steel
Water cylinders	FRP
Enclosures	NEMA 4

IPER Skid

Water Displacement Skid	
Height	74" (188 cm)
Width	55" (140 cm)
Depth	256" (651 cm)
Weight Estimate for Shipping	3,500 lb (1585 kg)
Hydraulic Skid	
Height	48" (122 cm)
Width	68" (173 cm)
Depth	48" (122 cm)
Weight Estimate for Shipping	6,500 lb (2,950 kg)

Installation and Utility Requirements

Inlet	4.0" Victaulic
High Pressure Outlet	4.0" Victaulic
Concentrate Inlet	3.0" Victaulic
Concentrate Outlet	3.0" Victaulic
Inlet Water Pressure	15 psi (1.0 bar), minimum
Air Pressure	100 psi (6.9 bar), oil free
Power	380/460 VAC, 3-phase, 50/60Hz
Nominal Operating Power	100 KW
Control Circuit	120/220 VAC, 1-phase, 50/60Hz

ELECTRODEIONIZATION

E-Cell MK-3 Stacks
E-Cell MK-3 Systems
From 15 to 405 gpm



E-Cell-3X Stack

Industrial Electrodeionization (EDI) Stacks



Figure 1: E-Cell-3X Stack

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 (Figure 1). The product water for the E-Cell-3X is at an Ultrapure level required in today's most demanding applications.

Typical Applications

- Microelectronics
- Power Generation (NO_x, 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	2.3 – 6.4 m ³ /hr	10 – 28 gpm
Shipping Weight	135 kg	298 lbs
Dimensions (width x height x depth)	31cm x 61cm x 64cm	12" x 24" x 26"

Typical Performance

Product Quality		
Resistivity	> 16 MOhm-cm	
Sodium	< 3 ppb	
Silica (SiO ₂) Removal	Up to 99% or < 5 ppb	
Boron Removal	> 95%	
Operating Parameters		
Recovery	Up to 97%	
Concentrate Flow (vs. Product Flow)	Countercurrent, hardness ≥0.10 ppm as CaCO ₃ Cocurrent, hardness <0.10 ppm as CaCO ₃	
Voltage	0–400 VDC	
Amperage	0–5.2 ADC	
Inlet Pressure	3.1–6.9 bar	45–100 psi
Pressure Drop	1.4–2.8 bar	20–40 psi



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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	4.4–40°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

Actual performance may vary depending on site conditions.
Reference E-Calc projection software to verify actual performance.
Patents pending.

E-Cell-3XHH Stack

High Hardness Industrial Electrodeionization (EDI) Stack



E-Cell*-3XHH is designed to:

- Accept high hardness feed water, at up to 2.5 ppm as CaCO₃ at 80% recovery
- Provide ultrapure water for industrial applications including Power & 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-3XHH 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-3XHH is at an Ultrapure level required in today's most demanding applications.

Typical Applications

- Power Generation (NO_x, 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 (SiO ₂) Removal	Up to 98% or < 10 ppb	
Boron Removal	> 90%	
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

Actual performance may vary depending on site conditions. Reference E-Calc projection software to verify actual performance. Patents pending.

¹ Co-flow operation is acceptable when feed hardness concentrations are <0.1 ppm as CaCO₃.



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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)	< 2.5 mg/l	< 2.5 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-Cell Stacks						
Product Description	Application	Nominal Flow	Flow Range	Resistivity	Nominal Recovery	Hardness
E-Cell-3X	Industrial	22 gpm 5.0 m ³ /hr	10 – 28 gpm 2.3 to 6.4 m ³ /hr	> 16 MOhm-cm	87-95%	< 1.0 ppm
E-Cell-3XHH	High Hardness Industrial	22 gpm 5.0 m ³ /hr	10 – 28 gpm 2.3 to 6.4 m ³ /hr	> 16 MOhm-cm	80-95%	< 2.5 ppm
E-Cell MK-3	Industrial	15 gpm 3.4 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 16 MOhm-cm	87-95%	< 1.0 ppm
E-Cell MK-3Pharm	Pharmaceutical	15 gpm 3.4 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 10 MOhm-cm	87-95%	< 1.0 ppm
E-Cell MK-3PharmHT	Pharmaceutical Hot water Sanitizable	15 gpm 3.4 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 10 MOhm-cm	87-95%	< 1.0 ppm
E-Cell MK-3Mini	Industrial Pharmaceutical	5 gpm 1.1 m ³ /hr	2.5 to 6.5 gpm 0.6 to 1.5 m ³ /hr	> 16 MOhm-cm	78-93%	< 1.0 ppm
E-Cell MK-3MiniHT	Industrial / Pharm Hot water Sanitizable	5 gpm 1.1 m ³ /hr	2.5 to 6.5 gpm 0.6 to 1.5 m ³ /hr	> 10 MOhm-cm	78-93%	< 1.0 ppm
MK-2 Generation stacks are only provided as replacement stacks to support existing system installations.						
E-Cell MK-2E	Industrial	15 gpm 3.4 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 16 MOhm-cm	90-95%	< 0.5 ppm
E-Cell MK-2Pharm	Pharmaceutical	18 gpm 4.1 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 10 MOhm-cm	90-95%	< 0.5 ppm
E-Cell MK-2PharmHT	Pharmaceutical Hot water Sanitizable	18 gpm 4.1 m ³ /hr	7.5 – 20 gpm 1.7 to 4.5 m ³ /hr	> 10 MOhm-cm	90-95%	< 0.5 ppm
E-Cell MK-2Mini	Industrial Pharmaceutical	5 gpm 1.1 m ³ /hr	2.5 to 6.5 gpm 0.6 to 1.5 m ³ /hr	> 16 MOhm-cm	90-95%	< 0.5 ppm
E-Cell MK-2MiniHT	Industrial / Pharm Hot water Sanitizable	5 gpm 1.1 m ³ /hr	2.5 to 6.5 gpm 0.6 to 1.5 m ³ /hr	> 10 MOhm-cm	90-95%	< 0.5 ppm

Other stack details can be found on the stack specific Fact Sheets.

E-Cell MK-3 Stack

Industrial Electrodeionization (EDI) Stacks



Figure 1: E-Cell MK-3 Stack

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

Typical Applications

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

Quality Assurance

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

MK-3 Stack Specifications		
Nominal Flow	3.4 m ³ /hr	15 gpm
Flow Rate Range	1.7 – 4.5 m ³ /hr	7.5 – 20 gpm
Shipping Weight	92 kg	202 lbs
Dimensions (width x height x depth)	30cm x 61cm x 48cm	12" x 24" x 19"

Typical Performance		
Product Quality		
Resistivity	> 16 MOhm-cm	
Sodium	< 3 ppb	
Silica (SiO ₂) Removal	Up to 99% or < 5 ppb	
Boron Removal	> 95%	
Operating Parameters		
Recovery	Up to 97%	
Concentrate Flow (vs. Product Flow)	Countercurrent, hardness >0.10 ppm as CaCO ₃ Cocurrent, hardness ≤0.10 ppm as CaCO ₃	
Voltage	0 – 300 VDC	
Amperage	0 – 5.2 ADC	
Inlet Pressure	3.1–6.9 bar	45–100 psi
Pressure Drop	1.4–2.8 bar	20–40 psi



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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	4.4–40 °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

Actual performance may vary depending on site conditions.
Reference E-Calc projection software to verify actual performance.
Patents pending.

E-Cell* MK-3Pharm Stack

Electrodeionization (EDI) Stacks for Pharmaceutical Applications

E-Cell *MK-3Pharm is designed to:

- Provide Ultrapure Water for Pharmaceutical applications.
- Produce Mixed Bed quality water on a continuous basis.
- Require no caustic or acid for regeneration of mixed bed resin within the stack.
- Be leak free, guaranteed
- Eliminate brine injection and concentrate recirculation, simplifying system design.

Description and Use

MK-3Pharm E-Cell stacks are electrodeionization (EDI) stacks which use electrical current to deionize and polish reverse osmosis (RO) permeate water. The product water for the MK-3Pharm is at greater than USP quality levels required in today's Pharmaceutical applications.

Typical Application

- Pharmaceutical
- Laboratory

Quality Assurance

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

MK-3Pharm Stack Specifications		
Nominal Flow	4.1 m ³ /hr	18.0 gpm
Flow Rate Range	1.6 – 4.5 m ³ /hr	7.0 – 20.0 gpm
Shipping Weight	92 kg	202 lbs
Dimensions (width x height x depth)	30 cm x 61 cm x 48 cm	12" x 24" x 19"

Typical Performance		
Product Quality		
Resistivity	> 10 MOhm-cm	
TOC (as C)	< 500 ppb	
Operating Parameters		
Recovery	Up to 95%	
Concentrate Flow	Counter current vs. Product Flow - Standard Co-current vs. Product Flow - when fed by double pass RO	
Voltage	0 – 300 VDC	
Amperage	0 – 5.2 ADC	
Inlet Pressure	4.1 – 6.9 bar	60 – 100 psi
Pressure Drop at Nominal Flow	1.4 – 2.4 bar	20 – 35 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	4.4 – 38°C	40 – 100°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

Actual performance may vary depending on site conditions. Reference E-Calc projection software to verify actual performance. Patents pending.

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E-Cell* MK-3Mini Stack

Electrodeionization (EDI) Stacks for Low Flow Applications

E-Cell* MK-3Mini 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 mixed bed resin within the stack.
- Be leak free, guaranteed
- Eliminate brine injection and concentrate recirculation, simplifying system design.

Description and Use

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

Typical Applications

- Pharmaceutical
- Laboratory
- Semiconductor/Microelectronics
- General Industry

Quality Assurance

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

MK-3Mini Stack Specifications		
Nominal Flow	1.14 m ³ /hr	5.0 gpm
Flow Rate Range	0.45 – 1.5 m ³ /hr	2.0 – 6.5 gpm
Shipping Weight	49 kg	107 lbs
Dimensions (width x height x depth)	30 cm x 61 cm x 28 cm	12" x 24" x 11"

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Typical Performance		
Product Quality		
Resistivity	> 16 MOhm-cm	
Sodium	< 3 ppb	
TOC (as C)	< 500 ppb	
Silica (SiO ₂) Removal	Up to 99% or < 5 ppb	
Operating Parameters		
Recovery	Up to 95%	
Concentrate Flow	Counter current vs. Product Flow - Standard Co-current vs. Product Flow - when fed by double pass RO	
Voltage	0 – 150 VDC	
Amperage	0 – 5.2 ADC	
Inlet Pressure	4.1 – 6.9 bar	60 – 100 psi
Pressure Drop at Nominal Flow	1.4 – 2.4 bar	20 – 35 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	4.4 – 38°C	40 – 100°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

Actual performance may vary depending on site conditions. Reference E-Calc projection software to verify actual performance. Patents pending.

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E-Cell* MK-3MiniHT Stack

Hot Water Sanitizable E-Cell for Lab & Pharmaceutical Applications

E-Cell MK-3MiniHT is the only lab & pharmaceutical electrodeionization (EDI) stack designed to:

- Provide ultrapure water for pharmaceutical applications.
- Hot water sanitizable up to 185°F (85°C) for 160 cycles.
- Operate with no concentrate recirculation and no brine injection.
- Require no stack bolt tightening.
- Be leak free, guaranteed.
- Operate with low power, <150VDC.

Description and Use

E-Cell MK-3MiniHT stacks are hot water sanitizable EDI stacks which use electrical current to deionize and polish reverse osmosis (RO) permeate water. The product water for the MK-3MiniHT is at greater than USP quality levels required in today's Pharmaceutical applications.

Typical Application

- Pharmaceutical
- Laboratory

Quality Assurance

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

MK-3MiniHT Stack Specifications		
Nominal flow	1.14 m ³ /h	5.0 gpm
Flow rate range	0.5 to 1.52 m ³ /h	2.2 to 6.7 gpm
Shipping weights	49 kg	107 lbs
Dimension (width x height x depth)	30cm x 61cm x 28cm	12" x 24" x 11"

Actual performance may vary depending on site conditions. Consult E-Calc projection software to verify actual performance. Patents pending.



Typical Performance		
Product Quality		
Resistivity	> 10 MOhm-cm	
TOC (as C)	< 500 ppb	
Hot Water Sanitization		
No. of 1hr sanitization cycles	160 cycles	
Sanitization temperature	176 to 185°F	80 to 85°C
Max. sanitization inlet pressure	2.1 bar	30 psi
Operating Parameters		
Recovery	Up to 93%	
Concentrate flow	Counter current - Standard Co-current - <0.1ppm (as CaCO ₃) feed hardness	
Voltage	0 to 150 VDC	
Amperage	0 to 5.2 ADC	
Inlet Pressure (Counter current)	4.1 to 6.2 bar	60 to 90 psi
(Co-current)	3.1 to 6.2 bar	45 to 90 psi
Pressure drop at nominal flow	1.4 to 2.4 bar	20 to 35 psi

Maximum Feedwater Specifications		
Feedwater - Total Exchangeable Anions (TEA as CaCO ₃)	<25 mg/l	<25 ppm
Feedwater - Conductivity, NaHCO ₃ equivalent	< 43 µS/cm	< 43 µS/cm
Temperature	4.4 to 40°C	40 to 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

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E-Cell Standard Systems

MK-3, 1 to 12 Stacks

With the combination of E-Cell and Ionics EDI technology, GE Water & Process Technologies is leading the way for Electrodeionization (EDI). Our E-Cell Standard Systems with MK-3 stacks are designed for reliable, long-term trouble free operation, with straightforward control.

Standard Features

- MK-3 E-Cell stacks allow for a simplified system design, removing the need for concentrate recirculation as well as brine injection.
- MK-3 E-Cell stack's low energy design reduces electrical requirements and operating costs.
- MK-3 E-Cell stacks are hard piped directly to the system.
- Concentrate flow is in the opposite direction to the dilute flow, thus allowing systems to operate at higher hardness concentrations for longer periods of time.
- Basic and Premium models available
- GE Fanuc Micro PLC & 6" color Quick Panel HMI
- Automatic Outlet Divert Valve
- Full Owners Operation & Maintenance Manual, Factory Acceptance Test results and Stack Performance Test results

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

Feed Water Requirements

Total Exchangeable Anions..... < 25.0 ppm
 (as CaCO3) (TEA) Including CO2 as calculated by E-Calc
 pH 5 – 9
 Hardness < 1.0 ppm (as CaCO3)
 Silica (Reactive)..... < 1.0 ppm
 SDI (15 min) < 1
 TOC..... < 0.5 ppm
 Total Chlorine..... < 0.05 ppm
 Fe, Mn, H2S..... <0.01 ppm

Operating Parameters

Outlet (Dilute) Product Quality..... > 16 MOhm-cm
 Outlet Product Silica Guarantee Down to < 5ppb
 Recovery: Up to 95%
 Temperature: 40 to 100°F (4.4 to 38°C)
 Feed Pressure: 70 to 100 psi (4.7 to 6.9 bar)
 Dilute Pressure Drop:..... 20 to 35 psi (1.4 to 2.4 bar)
 Input Voltage:..... 480VAC/3/60Hz

Material of Construction

Welded Frame: Painted Carbon Steel
 Dilute Piping: 150lbs PP
 Concentrate Piping:..... Sch. 80 PVC
 Flanges:..... ANSI
 Rectifier: NEMA 3R
 Control Panel:..... NEMA 4
 Control Panel Power:..... 24VDC
 Electrode Outlet
 Resistivity Dilute (Product) Outlet

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E-Cell Standard Systems

Model	GEMK3-1	GEMK3-3	GEMK3-6	GEMK3-9	GEMK3-12
General Information:					
Number of Stacks	1	2 - 3	4 - 6	6 - 9	10 - 12
Type of stack	MK-3	MK-3	MK-3	MK-3	MK-3
Flow Rates:					
Product Flow Nominal	15gpm	45gpm	90gpm	135gpm	180gpm
Range	10-20gpm 2.3-4.5m ³ /h	30-60gpm 6.8-13.6m ³ /h	60-120gpm 13.6-27.3m ³ /h	90-180gpm 20.4-40.9m ³ /h	120-240gpm 27.3-54.5m ³ /h
Concentrate Outlet Flow	0.91-1.5gpm	2.9-4.7gpm	5.8-9.4gpm	8.8-14.1gpm	11.7-18.8gpm
(Depends on Recovery & Product Flow)	3.4-5.7lpm	11.0-17.8lpm	22.0-35.6lpm	33.3-53.4lpm	44.3-71.2lpm
Electrode Outlet Flow	0.35gpm 1.3lpm	1.05gpm 4.0lpm	2.10gpm 7.9lpm	3.15gpm 11.9lpm	4.2gpm 15.9lpm
Dimensions:					
Overall System Dimensions (Width x Length x Height)	36"x54"x72" 0.9m x 1.4m x 1.8 m	46"x86"x84" 1.2m x 2.2m x 2.1 m	46"x107"x84" 1.2m x 2.7m x 2.1 m	46"x132"x84" 1.2m x 3.4m x 2.1 m	46"x146"x84" 1.2m x 3.7m x 2.1 m
Inlet Piping	1"	2"	3"	4"	4"
Product Outlet Piping	1"	2"	3"	4"	4"
Rinse Outlet Piping	1"	2"	3"	4"	4"
Electrode Outlet Piping	0.5"	0.5"	0.5"	0.5"	0.75"
Concentrate Outlet Piping	0.5"	0.5"	0.75"	1"	1.5"
All piping sizes are provided for nominal flow rates at 90% recovery.					
Shipping Weight	1000lbs 454kg	2500lbs 1134kg	3500lbs 1588kg	4300lbs 1950kg	5000lbs 2268kg
Electrical:					
Maximum Rectifier Output (@ 300VDC)	5.2Amps	15.6Amps	31.2Amps	46.8Amps	62.4Amps
Connection Requirement	3.5 KVA	8 KVA	15 KVA	22 KVA	29 KVA
Typical Power Consumption	0.5 – 1.0 kWh/1000gal (0.13 – 0.26 kWh/m ³)				

Standard Options:

1. Premium Model – flow & pressure transmitters, ability to connect to SCADA system.
2. Premium Model Option – Allen Bradley Micrologix PLC
3. Premium Model Option – removal of PLC & HMI, all wiring terminated at a NEMA 4 Junction Box

Performance, flow rate per stack, recovery and power consumption are dependent on inlet feed water quality and temperature. An E-Calc projection must be completed for proper system design & for any performance guarantee to be provided. Patents Pending.

E-Cell Standard Systems

MK-3, 15 to 27 Stacks

With the combination of E-Cell and Ionics EDI technology, GE Water & Process Technologies is leading the way for Electrodeionization (EDI). Our E-Cell Standard Systems with MK-3 stacks are designed for reliable, long-term trouble free operation, with straightforward control.

Standard Features

- MK-3 E-Cell stacks allow for a simplified system design, removing the need for concentrate recirculation as well as brine injection.
- MK-3 E-Cell stack's low energy design reduces electrical requirements and operating costs.
- MK-3 E-Cell stacks are hard piped directly to the system.
- Concentrate flow is in the opposite direction to the Dilute flow, thus allowing systems to operate at higher hardness concentrations for longer periods of time.
- Basic and Premium models available
- GE Fanuc Micro PLC & 6" color Quick Panel HMI
- Automatic Outlet Divert Valve
- Full Owners Operation & Maintenance Manual, Factory Acceptance Test results and Stack Performance Test results

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

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

Feed Water Requirements

Total Exchangeable Anions..... < 25.0 ppm
 (as CaCO₃) (TEA) Including CO₂ as calculated by E-Calc
 pH 5 – 9
 Hardness < 1.0 ppm (as CaCO₃)
 Silica (Reactive)..... < 1.0 ppm
 SDI (15 min) < 1
 TOC..... < 0.5 ppm
 Total Chlorine..... < 0.05 ppm
 Fe, Mn, H₂S..... < 0.01 ppm

Operating Parameters

Outlet (Dilute) Product Quality..... > 16 MOhm-cm
 Outlet Product Silica Guarantee Down to < 5ppb
 Recovery: Up to 95%
 Temperature: 40 to 100°F (4.4 to 38°C)
 Feed Pressure: 70 to 100 psi (4.7 to 6.9 bar)
 Dilute Pressure Drop:..... 20 to 35 psi (1.4 to 2.4 bar)
 Input Voltage:..... 480 60Hz

Material of Construction

Welded Frame: Painted Carbon Steel
 Dilute Piping: Sch. 80 PVC
 Concentrate Piping:..... Sch. 80 PVC
 Flanges:..... ANSI
 Rectifier: NEMA 3R
 Control Panel:..... NEMA 4
 Control Panel Power:..... 24VDC

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E-Cell Standard Systems

Model	GEMK3-15	GEMK3-18	GEMK3-24	GEMK3-27
General Information:				
Number of Stacks	10 - 15	12 - 18	16 - 24	18 - 27
Type of stack	MK-3	MK-3	MK-3	MK-3
Flow Rates:				
Product Flow	225 gpm	270 gpm	360 gpm	405 gpm
Nominal Range	150-300 gpm 34.1-68.1 m ³ /h	180-360 gpm 40.9-81.8 m ³ /h	240-480 gpm 54.5-109.0 m ³ /h	270-540 gpm 61.4-122.6 m ³ /h
Concentrate Outlet Flow (Depends on Recovery & Product Flow)	0.67-28.08 gpm 3.86-106.29 lpm	0.81-33.70 gpm 3.07-127.56 lpm	1.07-44.93 gpm 4.05-170.08 lpm	1.21-50.55 gpm 4.58-191.35 lpm
Electrode Outlet Flow	5.25 gpm 19.87 lpm	6.30 gpm 23.85 lpm	8.40 gpm 31.80 lpm	9.45 gpm 35.77 lpm
Dimensions:				
Overall Dimensions (Width x Length x Height)	60" x 209" x 84" 1.5m x 5.3m x 2.1m	60" x 222" x 84" 1.5m x 5.6m x 2.1m	60" x 270" x 84" 1.5m x 6.9m x 2.1m	60" x 283" x 84" 1.5m x 7.2m x 2.1m
Inlet Piping	6"	6"	6"	6"
Product Outlet Piping	6"	6"	6"	6"
Rinse Outlet Piping	6"	6"	6"	6"
Electrode Outlet Piping	1"	1"	1"	1"
Concentrate Outlet Piping	1.5"	1.5"	1.5"	1.5"
All piping sizes are provided for nominal flow rates at 90% recovery.				
Shipping Weight	7800 lbs 3538 kg	8500 lbs 3855 kg	11000 lbs 4990 kg	12000 lbs 5443 kg
Electrical:				
Maximum Output @ 300VDC	78.0 Amps	93.6 Amps	124.8 Amps	140.4 Amps
Connection Requirement	36 kVA	42 kVA	56 kVA	63 kVA
Typical Power Consumption: 1 - 2 kWh/1000gal (0.53 – 1.06 kWh/m ³)				

Standard Options:

1. Premium Model – flow & pressure transmitters, ability to connect to SCADA system.
2. Premium Model Option – Allen Bradley Micrologix PLC
3. Premium Model Option – removal of PLC & HMI, all wiring terminated at a NEMA 4 Junction Box

Performance, flow rate per stack, recovery and power consumption are all dependent on inlet feed water quality and temperature. An E-Calc projection must be completed for proper system design & for any performance guarantee to be provided.

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

ECell3X 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
Flow Rates:				
Product Flow Nominal	44 gpm 10 m ³ /h	88 gpm 20 m ³ /h	176 gpm 40 m ³ /h	264 gpm 59.9 m ³ /h
Range	15 - 56 gpm 3.4 - 12.7 m ³ /h	45 - 112 gpm 10.2 - 25.4 m ³ /h	75 - 224 gpm 17.0 - 50.9 m ³ /h	150 - 336 gpm 34.0 - 76.3 m ³ /h
Concentrate Outlet Flow (Depends on Recovery & Product Flow) ²	0.83 - 7.67 gpm 0.19 - 1.74 m ³ /h	2.50 - 15.34 gpm 0.57 - 3.48 m ³ /h	4.17 - 30.67 gpm 0.95 - 6.97 m ³ /h	8.34- 46.01 gpm 1.89 - 10.45 m ³ /h
Electrode Outlet Flow (Nominal)	0.70 gpm 0.16 m ³ /h	1.40 gpm 0.32 m ³ /h	2.80 gpm 0.64 m ³ /h	4.20 gpm 0.95 m ³ /h
Dimensions:				
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
Electrical:				
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-Calc 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.

ULTRAFILTRATION

ZeeWeed 1500 600 Module
ZeeWeed 1500 Rack

Z-PAK Series

From 50 to 200 m³/h



ZeeWeed* Pressurized Ultrafiltration

Model ZW1500

Description and Use

As a pioneer of membrane technology, GE leverages decades of research, development, and operational experience in developing 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 μm 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

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ecomagination[™]



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 direct sunlight (UV light).

Safety Precautions

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

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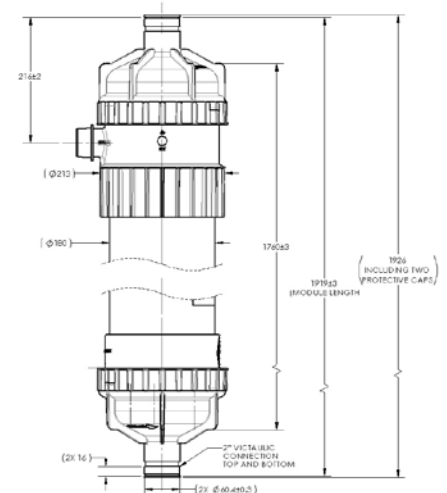
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Product Specifications

Model	ZeeWeed 1500-600
Nominal membrane surface area	55.7 m ² (600 ft ²)
Max shipping weight¹	32 kg (70 lb)
Lifting weight²	30-36 kg (65-80 lb)
Membrane material	PVDF
Nominal pore size	0.02 micron
Nominal fiber diameter	OD: 1.1 mm, ID: 0.66 mm
Flow path	Outside-in
Housing material	PVC housing with Noryl caps

¹ Packaged

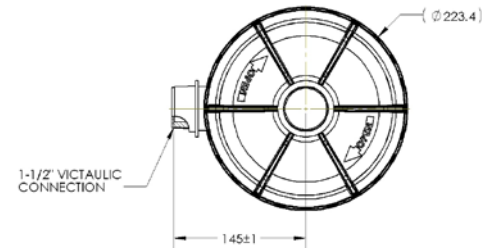
² Varies with solids accumulation



All lengths in mm

Module Dimensions		
Connections: Permeate/Feed/Reject	Height	Pipe diameter
Victaulic/Victaulic/Victaulic ³	1920 mm (75.6 in)	180 mm (7.1 in)

³ Module available with compression permeate and/or threaded reject connection(s)



Operating Parameters

Performance		
	Flow range	45 – 180 m ³ /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
	Max air scour flow	5.1 m ³ /h (3 dcfm)
	Max backwash flow	1.8 m ³ /hr (8 gpm)
Cleaning		
	Cleaning pH range	2.0-12.0
	Max chlorine concentration	1,000 mg/L (as NaOCl) ⁴

⁴ NOTE: Higher concentrations are possible depending on feedwater and pH.

Flex Rack

For large ZeeWeed* 1500 Pressurized UF membrane systems

Description and Use

- Modular rack design, allowing any combination of 48 and 64 sections, up to 192 ZW1500 UF membranes for a single rack.
- Generous sizing of feed, permeate, air and reject piping ensures low pressure losses and balanced flows through membranes across very large racks.
- Robust design, even to moderate seismic conditions (SDS 1.0 rating)
- Efficient use of space minimizes building footprint.
- Clear permeate ports to verify membrane integrity.
- Flexible coupling on module's permeate port provides up to 2 inches of vertical tolerance.
- Can be modified to accept competitor membranes.

Typical Applications

- Water treatment
- Tertiary filtration
- Pretreatment for seawater desalination.

General Properties

- Air, feed, permeate and reject headers are all constructed of FRP. Wetted components are compatible with high dissolved solids (TDS).
- Rack is shipped to site as a kit of components to minimize overall costs and facilitate onsite storage.



Figure 1: Flex Rack for Large ZW1500 Systems

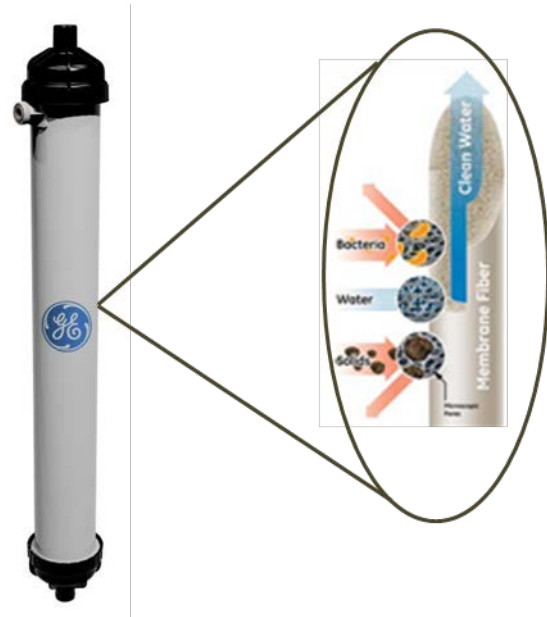


Table 1: Flex Rack Models

Membrane and Rack	
Membrane Name	ZW1500, 600 ft ²
Membrane Type	Pressurized Hollow Fibre Ultrafiltration Membrane
Membrane Surface Area (ft ²)	600

Membrane rack	48	64	96	112	128	144	160	176	192
Rack Length, in. (mm)	149 (3785)	195 (4953)	298 (7569)	344 (8738)	390 (9906)	447 (11354)	493 (12522)	539 (13691)	585 (14859)
Rack Width, in. (mm)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)
Rack Height, in. (mm)	133 (3378)	133 (3378)	133 (3378)	133 (3378)	133 (3378)	133 (3378)	133 (3378)	133 (3378)	133 (3378)
Shipping Weight, lbs. (kg) <i>(includes module weight)</i>	9700 (4400)	14400 (6550)	19400 (8800)	24140 (10950)	28880 (13100)	29100 (13200)	33840 (15350)	38580 (17500)	43210 (19600)
Operating Weight, with modules, lbs. (kg)	11905 (5400)	17415 (7900)	23810 (10800)	29320 (13300)	34835 (15800)	35715 (16200)	41225 (18700)	46740 (21200)	52030 (23600)

Header on rack	Material	Size (in.)	Type	Connections per rack	Termination ends
Feed	FRP	8	Victaulic	4	Front of rack
Permeate	FRP	8	Victaulic	4	Front of rack
Waste	FRP	12	Victaulic	2	Front for 48-144 Modules Front & back for 160-192 Modules
Aeration	FRP	4	Victaulic	4	Front and back of rack

Z-PAK Pressurized UF Systems

ZeeWeed* 1500 Ultrafiltration for 400 to 4000 gpm (6 MGD)

Description and Use

Versatile and reliable, the Z-PAK pressurized ultrafiltration system - featuring the ZeeWeed 1500 membrane - is ideally suited for use in numerous applications including drinking water treatment, tertiary filtration and RO pre-treatment. 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.

Benefits

- The ZeeWeed 1500 membrane has a 0.02 μm nominal pore diameter - for optimal removal of particulates, bacteria and viruses. Its PVDF chemistry gives mechanical strength and chemical resistance.
- Z-PAK's modular mechanical and electrical design of membrane racks and pump skids provides tremendous design flexibility while minimizing site installation.
- Z-PAK has a large flow range - 300 gpm for 1 train up to 4000 gpm for 4 trains, and allows high recoveries (up to 97% with 2 stages).
- Z-PAK operates automatically (including membrane integrity tests, cleans and neutralization). The Z-PAK membrane rack makes it easy to monitor and maintain membrane performance.
- Z-PAK is designed with high quality equipment and materials to ensure long term, robust performance. Equipment is well laid out for ease of access.
- Z-PAK has a slim, low profile to fit in buildings with low ceilings and tight spaces.



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Options Available

- Duplex CIP and Backpulse equipment with on-skid VFDs (standard is single CIP/BP)
- Membrane Integrity Test (MIT) and LRV
- Air Compressor(s) & drier(s)
- Laser permeate turbidity
- Chemical Cleaning chemicals
- CIP neutralization
- Feed Turbidity meter
- Pre-treatment (enhanced coagulation, oxidation, & pH adjustment)
- Bleed and Block Valves
- Permeate storage tank

Instrumentation

Flow	Feed, Backwash, CIP
Turbidity	Permeate
Pressure	Feed, Permeate, MIT option
Level	Permeate, CIP Tanks
pH	CIP
Chlorine	CIP

Typical Permeate Quality

Recovery Range (single stage)	90-95%
Bacteria, <i>Giardia</i> , <i>Cryptosporidium</i>	≥4-log removal
Iron	≤0.05mg/L [‡]
Manganese	≤0.02 mg/L [‡]
TSS	≤0.1 mg/L
TOC	50-90% removal [°]
Arsenic	<5µg/L [‡]
Color	<5PCU [°]

[‡]Pretreatment required

[°]dependent on water quality

Membrane Modules

Membrane	ZeeWeed 1500 Pressurized, Outside-In
Surface area	600 ft ²
Pore size	Ultrafiltration, 0.02 micron nominal
Chemistry	PVDF

Strainer

Manufacturer	Boll, automatic self-cleaning
Mesh Size	200 micron wire mesh
Filter material	Stainless Steel

Materials of Construction

Low Pressure Piping	PVC, 316 SS
Air Piping	316 SS
Skid Frames	Epoxy coated Carbon Steel

Lifecycle Services with Lifetime Support

- Most extensive service team in the industry
- Insight remote monitoring
- 24/7 technical support, free of charge during business hours.
- Upgrades to help you advance with GE's technology

System Parameters	
Membrane Type	Pressurized Outside-In Hollow Fibre Ultrafiltration Membrane
Membrane Name	ZW1500, 600 ft ²
Number of Trains	1 to 4
Flow Range	400 gpm to 4000 gpm (up to 5 MGD)
Operating Temperature Range	32 to 104°F (0 to 40°C)
Customer Feed Pressure	5 psi (35 kPa)
UF Permeate Pressure	10 psi (70 kPa)
PLC/HMI on Master Control Panel	Allen Bradley CompactLogix with Panelview 1250 HMI
Remote I/O panel locations	Process skid(s), Ancillary (CIP) skid
Communication protocol	Flex I/O Ethernet with ring topology
Power	480/600 VAC, 3-phase, 60Hz
Control Circuit	120VAC, Single phase 24VDC

Process skid model	Z-PAK 400	Z-PAK 600	Z-PAK 800	Z-PAK 1100
Maximum Permeate flow rate	400 gpm	600 gpm	800 gpm	1100 gpm
Flush Flow Limit	500 gpm	630 gpm	900 gpm	1300 gpm
Automated Strainer	200 micron mesh	200 micron mesh	200 micron mesh	200 micron mesh
Process Pump Motor	400 gpm @65 psig/ 30 HP	600 gpm @65psig/ 40 HP	800 gpm @65 psig/ 60 HP	1100 gpm @65 psig/ 60 HP
Skid Length/Width/Height	138/65/116 in.	138/65/116 in.	146/71/118 in.	146/71/118 in.
Skid Shipping/Operating Weight	4800 / 5400 lbs	4800 / 5400 lbs	4900 / 6400 lbs	4900 / 6400 lbs
Max train size at low flux (10GFD)	36 membranes	48 membranes	72 membranes	96 membranes
Max train size at high flux (55 GFD)	24 membranes	36 membranes	48 membranes	60 membranes

Connections		
Feed	6 in. flange	8 in. flange
UF permeate	6 in. flange	8 in. flange
Backpulse	6 in. flange	6 in. flange
CIP feed	4 in. flange	6 in. flange
CIP return	4 in. flange	6 in. flange
Air	6 in. flange	6 in. flange
Membrane Integrity Test (MIT)	1 in. victaulic	1 in. victaulic
Waste	8 in. victaulic	10 in. victaulic

Membrane Rack Models		24 membrane rack		36 membrane rack	
Skid Length, Width, Height		90 / 58 / 99 inches		129 / 58 / 99 inches	
Skid Shipping Weight (no membranes)		2140 lbs		3460 lbs	
Operating Weight (with membranes)		4600 lbs		7500 lbs	
Feed header		8" victaulic, 316 SS			
Air header		6" victaulic, , 316 SS			
Waste (reject) header		10" victaulic, 316 SS			
Permeate header		8" victaulic, 316 SS			
Possible train sizes		24, 36, 48, 60, 72, 84 and 96			
Ancillary skid(s) Either separate or shared backpulse and CIP	For 24 membrane train	For 36 membrane train	For 48 membrane train	For 72 membrane train	For 96 membrane train
Backpulse (BP) pump(s)	192 gpm @50 psig/10 HP	288 gpm @50 psig/15 HP	384 gpm @50 psig/20 HP	576 gpm @50 psig/30 HP	768 gpm @50 psig/40 HP
CIP pump(s)	120 gpm @13 psig/2 HP	180 gpm @13 psig/3 HP	240 gpm @13 psig/5 HP	360 gpm @13 psig/5 HP	480 gpm @13 psig /7.5 HP
CIP heater	25 kW	50 kW	50 kW	50 kW	75 kW
CIP connections	4 in. flange	4 in. flange	4 in. flange	6 in. flange	6 in. flange
BP connections	4 in. flange	6 in. flange	6 in. flange	6 in. flange	8 in. flange
Single ancillary dimensions (L/W/H)	100/59/109 in	100/59/90 in	100/59/90 in	110/68/89 in	113/68/89 in
Single ancillary weight (shipping/operating)	3950 lbs 4200 lbs	4750 lbs 5300 lbs	4850 lbs 5400 lbs	6700 lbs 7700 lbs	7750 lbs 9000 lbs
Duplex BP dimensions (L/W/H)	98/48/94 in	120/62/99 in	120/62/99 in	116/62/99 in	133/68/92 in
Duplex BP weight (shipping/operating)	2550 lbs 2700 lbs	3450 lbs 3800 lbs	3450 lbs 3800 lbs	4450 lbs 5100 lbs	5250 lbs 6350 lbs
Duplex CIP dimensions (L/W/H)	98/58/91 in	98/58/91 in	98/58/91in	117/69/91 in	117/69/91 in
Duplex CIP weight (shipping/operating)	2600 lbs 3150 lbs	2600 lbs 3150 lbs	3500 lbs 3750 lbs	3650 lbs 4700 lbs	4000 lbs 5550 lbs
CIP Tank Diameter	64 in	64 in	64 in	90 in	90 in
CIP Tank Height	104 in	104 in	104 in	131 in	131 in
Air compressor and Blower					
Air Blower motor	72 DCFM@ 15 HP	108 DCFM@ 20 HP	144 DCFM@ 25 HP	216 DCFM@ 40 HP	288 DCFM @ 50 HP
Air Compressor motor, receiver	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm
Air Dryer	75 CFM, 120 VAC				100CFM, 120VAC



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