



Smart System Solutions

**Desalination Systems
for
Yachts, Boats
and Motor Homes**

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DESALINATION

OVERVIEW

Desalination systems share a common process called reverse osmosis. Salt or brackish water is caused to flow across a reverse osmosis membrane at a pressure (typically around 800 psi) sufficient for some of the water molecules (up to 10%) to cross over the membrane to be recovered as virtually pure water. The remaining concentrated brine water continues to flow over the membrane thereby keeping the membrane surface clean. Membrane manufacturers specify both the flow rate and percentage recovery allowed for specific membranes.

The difference between the various reverse osmosis systems available on the market is primarily the power source and pump mechanism used to establish the high water pressure required for the membrane.

ENGINE DRIVE

These systems use the main engine to belt-drive a high-pressure pump that is similar to common high pressure wash-down pumps. The pump has a solenoid clutch like those used on car air conditioning compressors to enable the system to be turned on and off at will. They also have a pressure relief valve that must be adjusted in order to achieve the required pressure and flow rate.

Engine drive systems can produce very large amounts of water without placing any demand on the vessel electrical system. They tend to be complicated by the mechanical arrangement used to belt drive off the front of an engine. Their output is limited only by the available engine power and corresponding pump and membrane size.

AC MOTOR DRIVE

The operation of this system is identical to the Engine Drive system except that a 240-volt A.C. motor is used to drive the high-pressure pump. A generator set would be required to provide the AC power, as the pumps typically require over 1KW of energy. Their output is limited only by the available AC power and corresponding pump and membrane size.

DC MOTOR DRIVE

Identical to AC systems except that a 12 or 24 volt DC motor is used to drive the high-pressure pump. These systems place an enormous strain on the DC system and output is relatively low.

ENERGY RECOVERY SYSTEMS

Instead of using a high-pressure wash-down style pump and pressure relief valve like all of the above systems, these systems utilise a hydraulic amplification process to recover energy from the discharge water. They are easy to operate and automatically adjust the pressure required for varying temperature and salinity conditions.

Some products use a DC motor with a gearbox and crankshaft/con-rod assembly to pressurise the hydraulic amplification pump and it typically requires a lift or priming pump for reliable operation.

A new system manufactured by Spectra Watermakers uses power from a medium pressure diaphragm pump to both energise and provide water to the hydraulic amplifier. The latter system is the most energy efficient product available today producing in excess of 4-litres of product water per amp-hour from a 12-volt DC power source. Overall output is in excess of 30 litres per hour. Systems are currently available up to 4000 litres per day in both AC and DC powered versions.

SYSTEM MAINTENANCE

All reverse osmosis water makers require close attention to operation and periodic maintenance. If salt water is left in the system for longer than a day or two, bacterial growth may permanently damage the reverse osmosis membrane and corrosion may occur on metallic components.

If the system is flushed with fresh water after each use, bacterial growth may be inhibited for 2 to 3 weeks depending on temperature and water make-up. For longer periods of shut-down, a disinfectant solution must be used. If maintained and operated correctly, reverse osmosis systems can provide years of trouble free service.

DESALINATION

DESALINATION SYSTEMS

SPECTRA WATERMAKERS



Clark Pump



Feed Pump



Standard Membrane

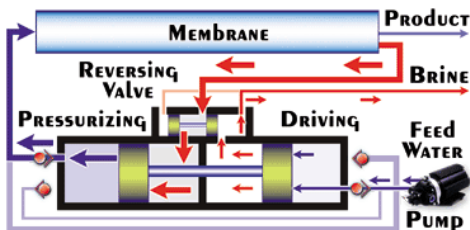
Energy Efficient Desalination

Spectra have developed a unique and patented technology that dramatically reduces energy consumption of desalination systems.

- Exceptional energy efficiency - 4-litres per amp-hour. (about the same as an anchor light for one hour)
- Ideal for solar or wind powered systems
- Quiet continuous operation
- Can be expanded for higher production
- Engineered for long term service
- System automatically adjusts for variation in sea water temperature and salinity
- No gears or crank shafts that need oil and service
- Light weight yet rugged composite design with no metallic parts to corrode
- 12-volt DC, 24-volt DC and 240-volt AC powered units available

Operation

The patented Clark Pump is a unique pressure intensifier that uses two opposing cylinders and pistons that share a single rod. The flow diagram below shows the basic process.



Water pressure from the small feed pump is used by one of the cylinders to make the other pressurise and circulate the salt water through the reverse osmosis membrane. Pressurisation is achieved when the rod, as it is forced into a cylinder, displaces water in the closed loop circuit.

The pressure instantly rises to the point where the displaced volume of water is forced out of the membrane as the fresh product. When a driving cylinder's piston touches the base, the process is instantly reversed.

SPECTRA MODULAR SYSTEMS



Spectra Ventura 150 Deluxe

- 24 litres per hour
- 12 or 24-volt versions
- Includes seawater strainer, pre-filter with 5 micron element, 12-volt feed pump, accumulator, composite Clark pressure intensifier, 24-inch RO membrane and vessel assembly, mounting brackets for the Clark Pump and membrane housing, instrument panel with low pressure gauge and flow meter, 10ft. high pressure tubing, and a hand-held salinity monitor.

Part #	Volts
SPE#150D-12	12-volt
SPE#150D-24	24-volt

SPECTRA MODULAR SYSTEMS



Spectra 200-C System

- 38 litres per hour
- 12 or 24-volt versions
- Includes seawater strainer, pre-filter with 5 micron element, 12-volt feed pump, accumulator, composite Clark pressure intensifier, 44-inch RO membrane and vessel assembly, mounting brackets for the Clark Pump and membrane housing, instrument panel with low pressure gauge and flow meter, 10ft. high pressure tubing, and a hand-held salinity monitor.

Part #	Volts
SPE#200C-12	12-volt
SPE#200C-24	24-volt



Control Panel



Spectra 380-C System

- 64 litres per hour
- 12 or 24-volt versions
- Utilizing our unique duplex feed pump system, we can almost double the output of our basic system. Accessories same as 200C model above

Part #	Volts
SPE#380C-12	12-volt
SPE#380C-24	24-volt

SPECTRA SELF CONTAINED SYSTEMS



Spectra Santa Cruz 200/380 System

- 38/64 litres per hour
- 12 or 24-volt versions
- The Santa Cruz System includes all elements of 200C or 380C modular system packaged in a self contained enclosure – simple to install and operate.
- Also includes fresh water flush system with charcoal filter and 5-micron pre-filter

Part #	Volts
SPE#SCZ20012	12-volt
SPE#SCZ38012	24-volt
SPE#SCZ20012/380	12-volt
SPE#SCZ20024/380	24-volt



Spectra Newport 400 System

- 64 litres per hour
- 12 or 24-volt DC, 110/240VAC versions
- The Newport is the world's first fully automatic desalination system
- 1/3 HP vane pump, remote control panel with 25 foot harness, automatic fresh water flush system with charcoal filter, 20-micron pre-filter

Part #	Volts
SPE#NEW40012V	12-volt
SPE#NEW40024V	24-volt



MPC 3000 Controller

DESALINATION

SPECTRA SELF CONTAINED SYSTEMS



Spectra Monterey 1000 System

- 150 litres per hour
- 12 or 24-volt DC, 110/240VAC versions
- Electronic controller for automatic operation.
- 23 amps @24VDC
- Single unit construction only 110x64x39cm for easy install (membranes may be remotely mounted)

Part # Volts
SPE#MON3500 24/120/240-volt



MPC3000 Controller



Spectra Newport 1000 System

- 150 litres per hour
- 12 or 24-volt DC, 110/240VAC versions
- Modular construction for flexible installation.
- The Newport is the world's first fully automatic desalination system
- 3/4 HP vane pump, remote control panel with 25 foot harness, automatic fresh water flush system with charcoal filter, 20-micron pre-filter

Part # Volts
SPE#NEW1000 24/120/240-volt



MPC 3000 Controller

DESALINATION OPTIONS

SYSTEM OPTIONS



24-inch Dual Membrane Option

- For the 200-C model only, two 24-inch membranes can be substituted if it is not possible to fit the 44-inch housing.

Part #
SPE#DUAL



200 to 380 System Upgrade Kit

- Includes an additional feed pump, heat sink, cooling fan kits, product flow gauge and fittings to upgrade a 200C system to a full 380C specification system

Part #
SPE#380UP12V 12V upgrade
SPE#380UP24V 24V upgrade

BIO-TREATMENT



Model Zeta 7 Shown

ZETA GUARD SYSTEM

- The Zetaguard System is the first electronic bio-fouling and scale prevention system for desalimators.
- Saves energy, extends membrane life and removes need for storage solutions.
- Can be used on any brand desalination system

Part # litres per minute
SPE#Zetarod

**Spectra Storage/Cleaning Chemicals**

- **Spectra systems must use these special compounds.** (*Sufficient chemical for one storage or cleaning procedure per container)

Part #
SPE#SC1 Storage compound
SPE#SC2 *Alkaline cleaner
SPE#SC3 *Acid cleaner

*Refer to owner's manual for details of cleaning and maintenance procedures.

FILTRATION

**Manual Fresh Water Flush System**

- Includes 3-way valve, charcoal filter and housing, and required fittings. A simple and affordable way to provide a freshwater flush system with protection against chlorine damage to membrane.
- Provides bonus charcoal filtering of drinking water when fitted before galley sink.

Part #
SPE#MANBACK

**Pre-filtration Option**

- Add an additional pre-filter housing and 20 micron filter to reduce maintenance of the filtration system. Includes six 20 micron filters. Recommended for longer time between filter changes and applications that run long cycle times.

Part #
SPE#PRE20

**Filter Elements**

- These polyester-plus cartridges are approved for Spectra filtration and are cleanable and reusable.
- 5 micron filters have white ends and 20 micron have blue ends
- Carbon filter replacements

Part #
SPE#FILT05 5-micron
SPE#FILT20 20-micron

DESALINATION

HOSE, TUBING AND FITTINGS



Additional High Pressure Tube

- High-pressure tubing for the Clark pump to membrane connections. 3 metres included with system. May be ordered by the metre.

Part #
SPE#HPHOSE

Length
per metre

Additional 5/8" Hose

-

Part #
SPE#HPHOSE

Length
per metre

5/8" Hose Fittings

-

Part #
SPE#HPHOSE

Type
Elbow

Additional 1/4" Product Tube

-

Part #
SPE#HPHOSE

per metre

1/4" Product Tube Fittings

-

Part #
SPE#HPHOSE

per metre

One Way Valve

-

Part #
SPE#HPHOSE

per metre

Tee Valves

-

Part #
SPE#HPHOSE

per metre

SPARES



Basic Cruise Kit

- Includes six standard 5 micron filters and Spectra SC-membrane storage/cleaning chemical, enough for two storage procedures. ***Spectra systems must use this special compound for storage. All other biocides will render the warranty void!***

Part #
SPE#CRUISEKIT



Offshore Kit

- Includes all seals and o-rings, pump shaft, tools, SC-2 membrane cleaning chemical and overhaul instructions.

Part #
SPE#OFFSHOREKIT



Feed Pump

- This is a special pump engineered for the Spectra system.

Part #
SPE#FEEDPUMP

SPARES

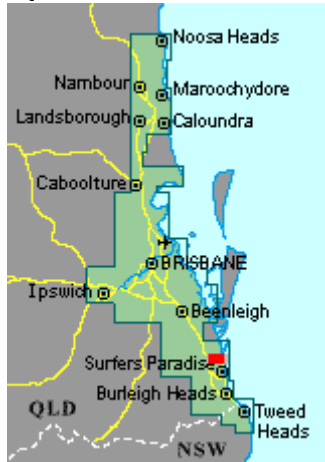
**Pump Fan Cooling Kit**

- Will extend pump life and is recommended for poorly ventilated or warm installation areas
- Standard with 380C systems.

Part #
SPE#FANKIT

WHERE TO FIND US:

Labrador on the Gold Coast, South East Queensland



3/5 Ereton Drive, Labrador QLD 4215

