About Spectra Watermakers

Company Overview

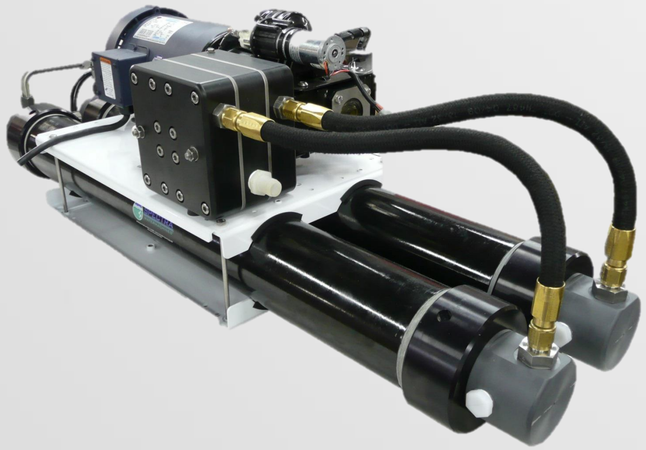
- Founded as Edinger Marine Service in 1976
- First started building watermakers in 1997
- Company founded on energy efficiency, high quality products, and customer service

About Spectra Watermakers

Company Overview

- Unique products
- Continuous product development
- Reliability in the field
- The most energy efficient
- Unrivaled customer service
- Worldwide trained distributor network
- Roving technicians

Innovation in Marine Products



Product Showcase

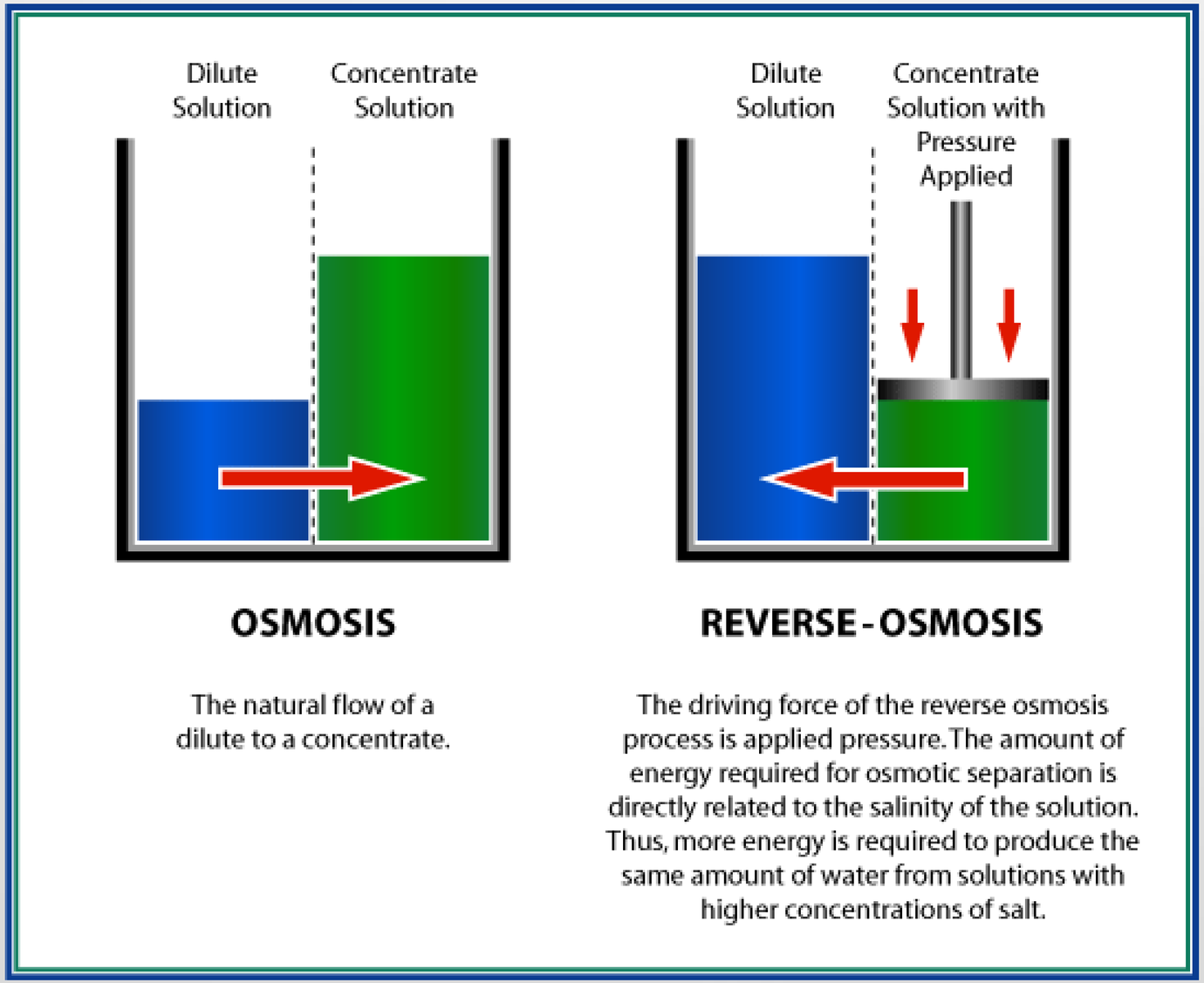
Spectra's unique, innovative products save energy, weight, fuel and headaches.

What is a Watermaker?

- Common term for small reverse osmosis desalination systems used in a marine environment
  - Reverse Osmosis Desalination
    - Osmosis is the process where solute will move from an area of lower concentration to an area of higher concentration until equilibrium is achieved.
    - With reverse osmosis, pressurizing the higher concentration solution, against a semi-porous membrane, above the osmotic pressure will cause the osmotic process to go backwards.
    - The osmotic pressure of seawater is approx. 460 PSI or 32BAR.
- So what does that mean?!
  - Semi Permeable Membrane
  - Cross Flow Filtration

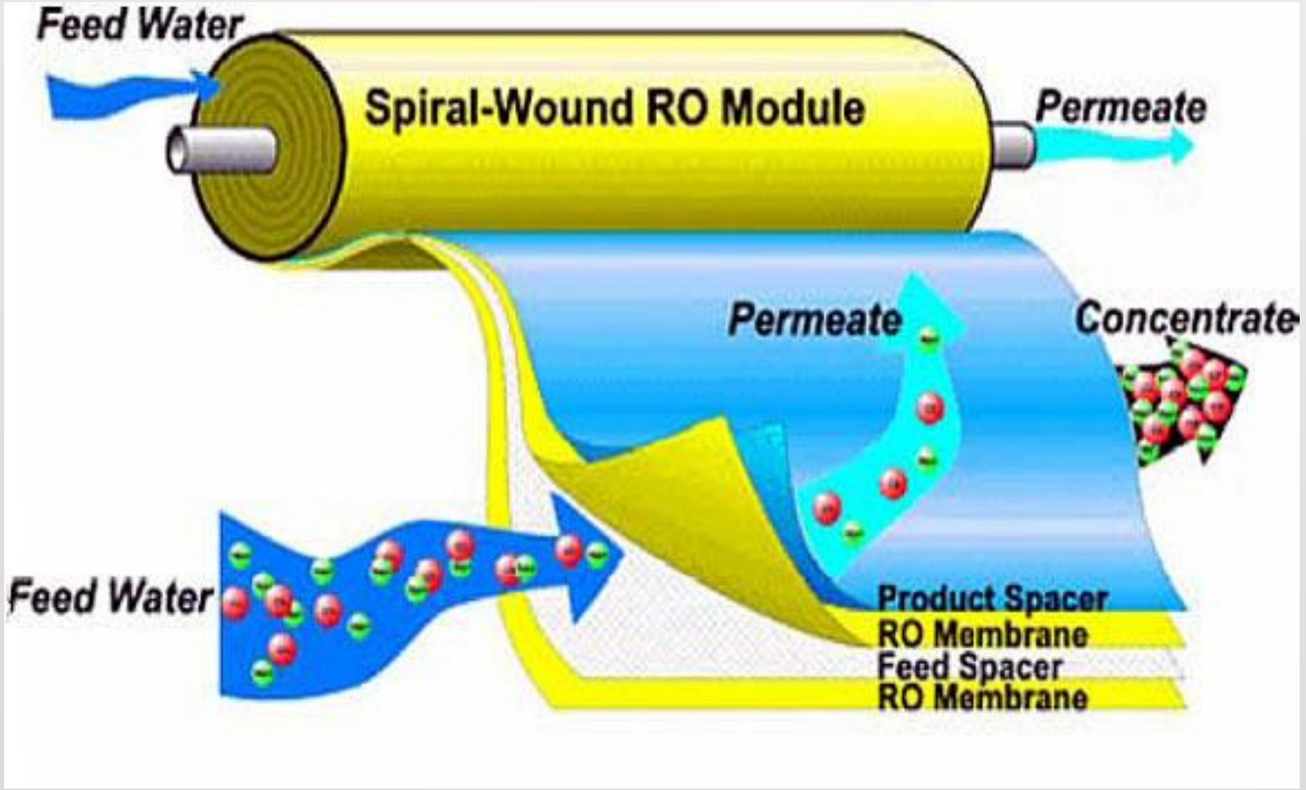
What is a Watermaker?

Reverse Osmosis Process



What is a Watermaker?

› Semi Permeable Membrane?!

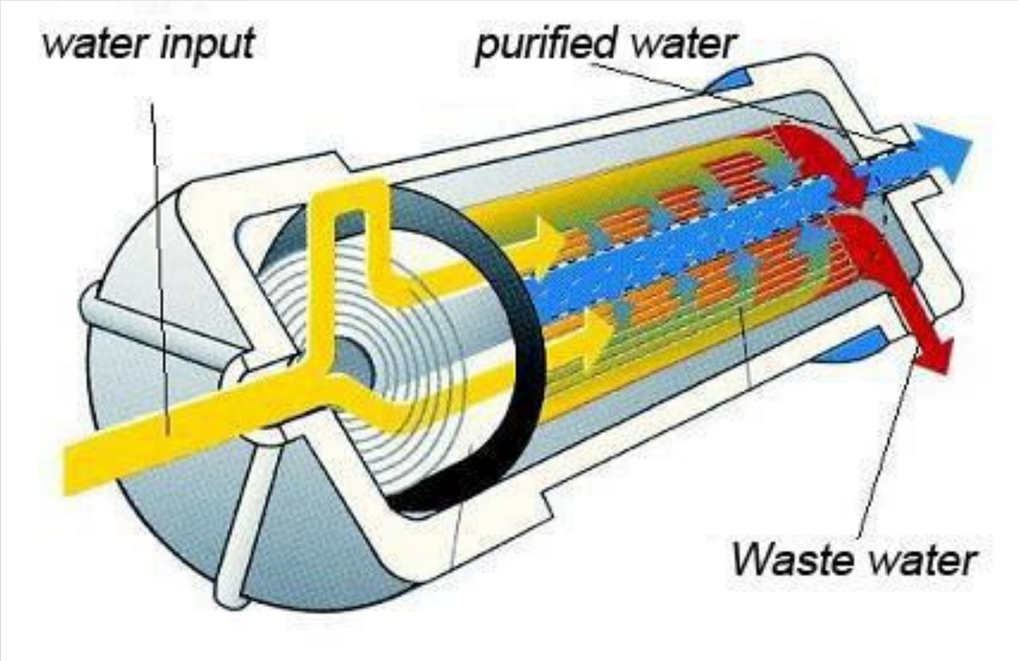


Click for Membrane Video

What is a Watermaker?

› Cross Flow Filtration: A filtration process in which only a portion of the total flow passes through the filter media. The balance of the flow provides a flushing and cleaning of the media surface

› Recovery ratio = product water volume / total flow through system



What is a Watermaker?

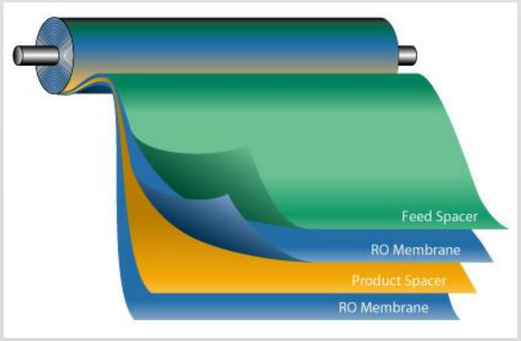
Spiral Wound Membranes – The lifeline of your watermaker

- External factors affecting membranes
  - Water temperature
    - Higher temperature lowers osmotic pressure, AND increases salt passage through a membrane
  - Pressure
    - Higher feed pressure increase recovery, AND decreases salt passage through a membrane
  - Water salinity – Feed salt concentration
    - High salinity increases osmotic pressure, AND increases salt concentration in product water
    - NOTE: Increased feed water salinity DOES NOT decrease the membrane rejection

What is a Watermaker?

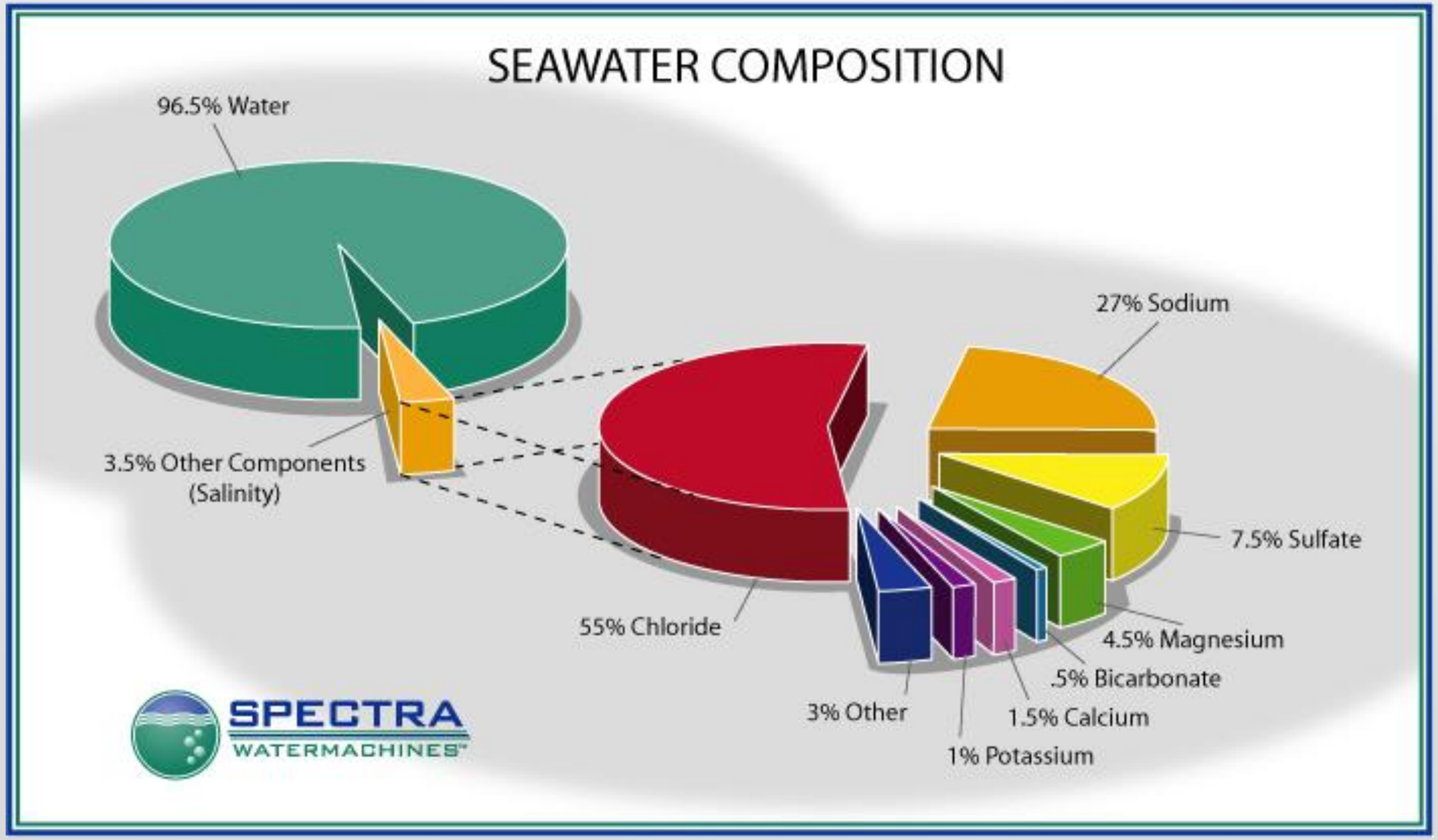
Spiral Wound Membranes – The lifeline of your watermaker

- Membrane Killers
  - Biofouling: Black or green smelly slime that grows in the membrane, filters and lines
  - Oil of any kind fouls membranes
  - Oxidants: such as free chlorine, hydrogen peroxide, etc.
  - Mineral Scale: from mineral content in the water, ie Calcium, Magnesium, etc.
  - Iron and/or Manganese – Such as common Rust from pumps, plumbing or found in natural water sources



What is a Watermaker?

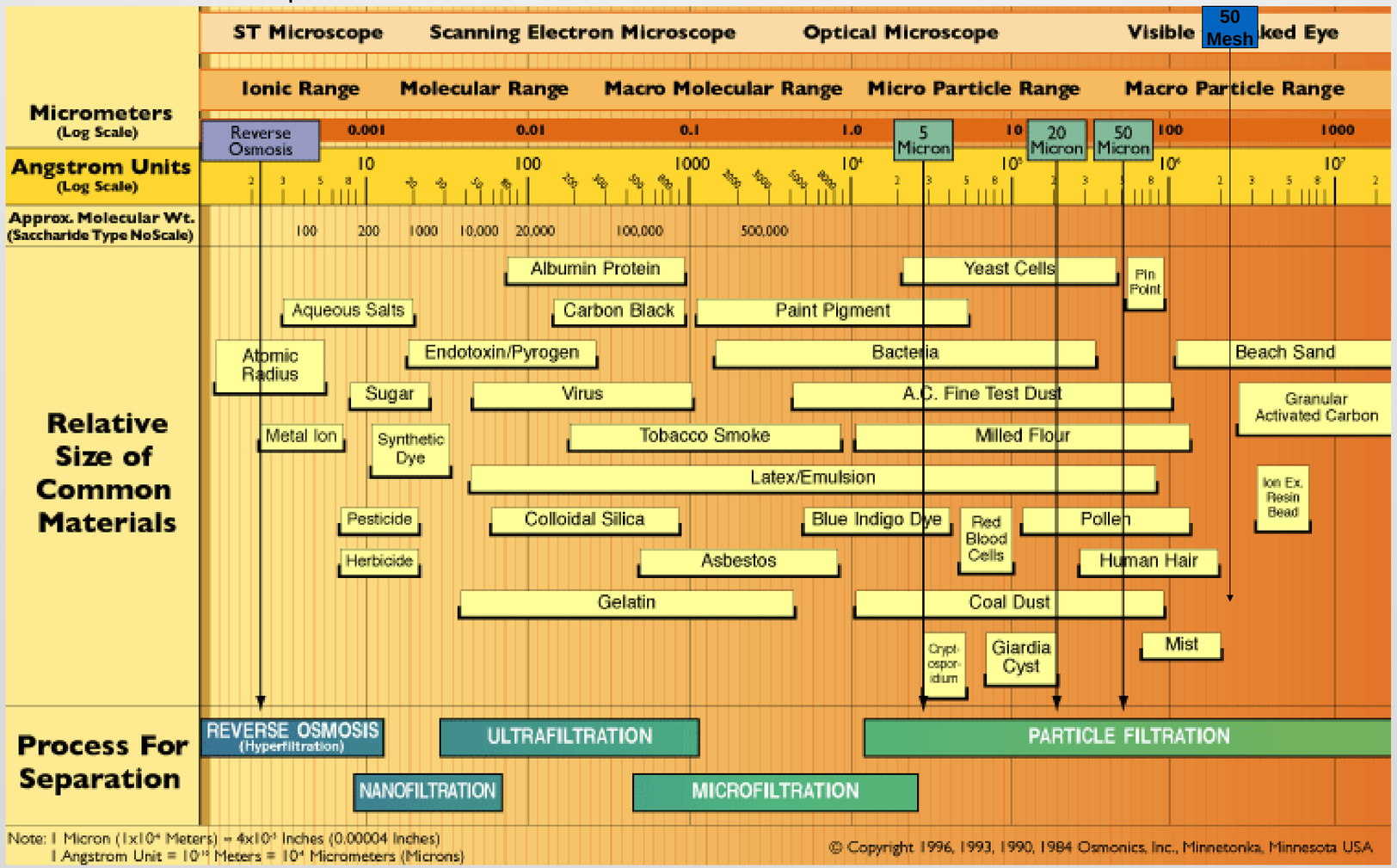
Spiral Wound Membranes – The lifeline of your watermaker



What is a Watermaker?

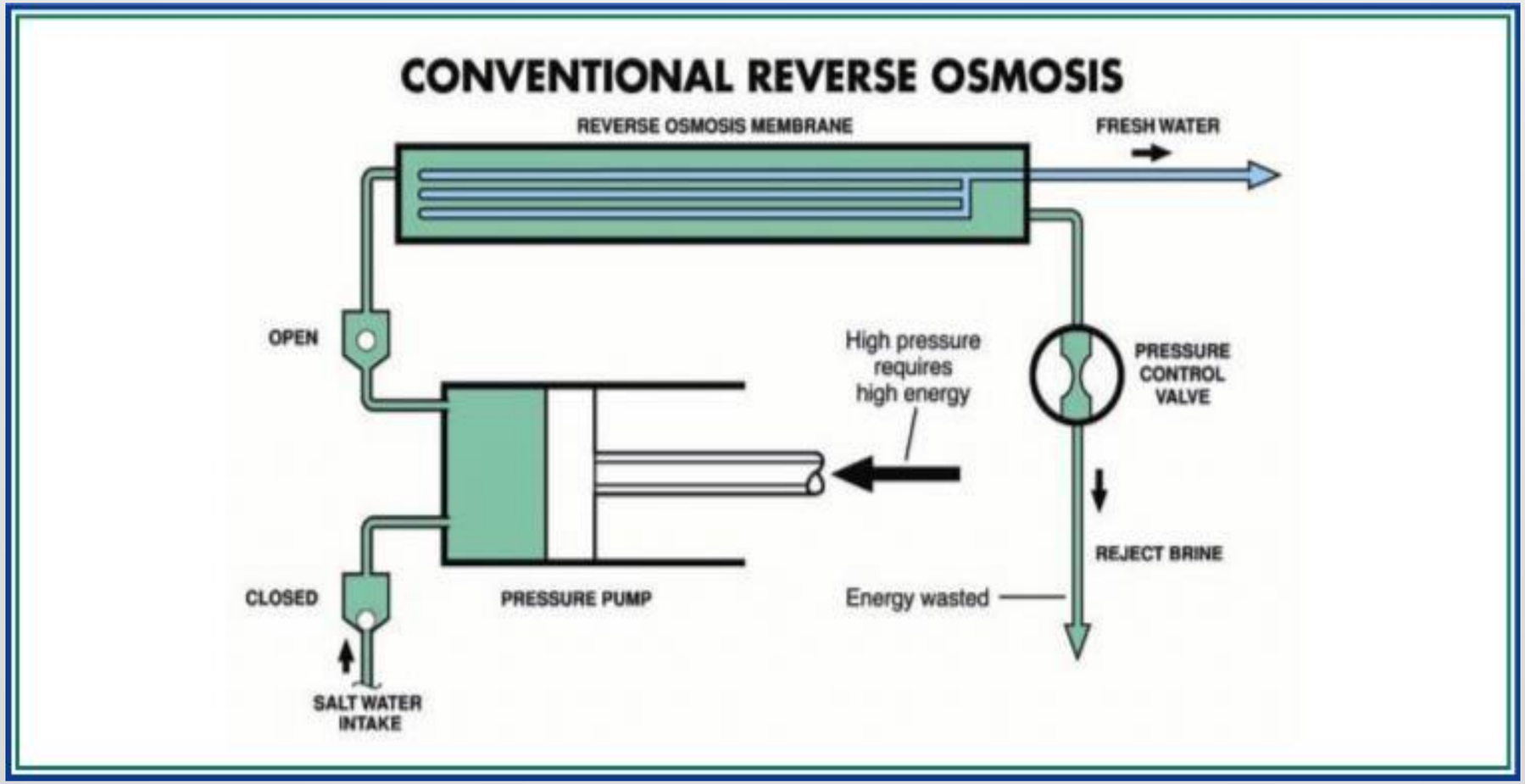
Spiral Wound Membranes – The lifeline of your watermaker

The Filtration Spectrum



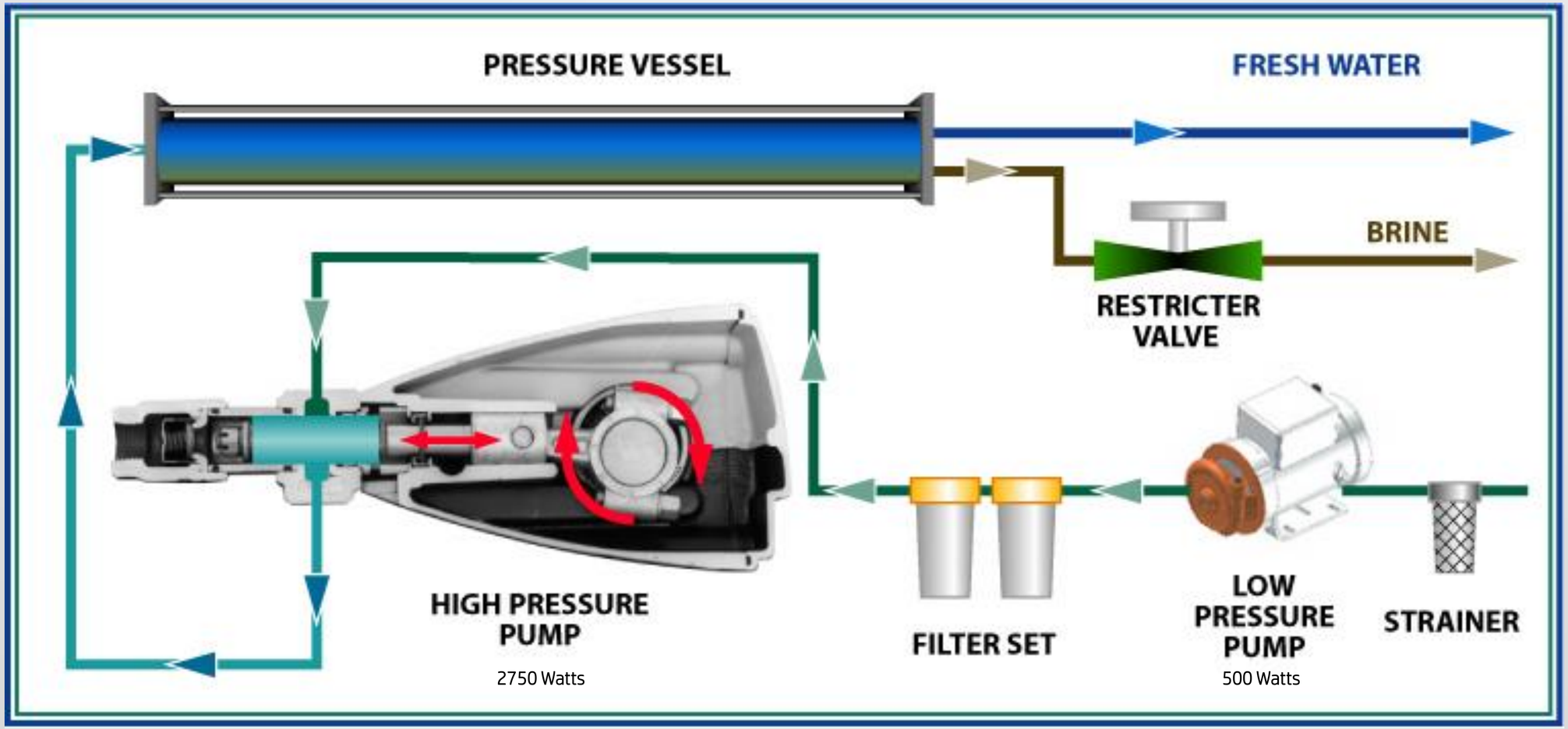
How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you



How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you



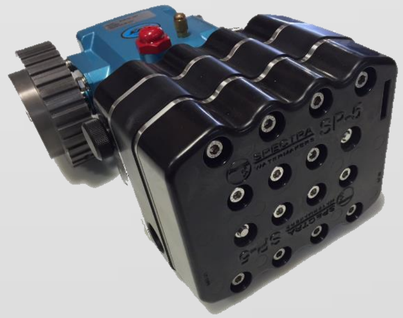
3250 Watts for 19 GPH = 171 Whrs/Gal (45 Whrs/L)

How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you

Energy Recovery: A device, or mechanism, that recovers the energy entrained in the high pressure brine stream, ultimately reducing the horsepower required to desalinate an equivalent amount of water.

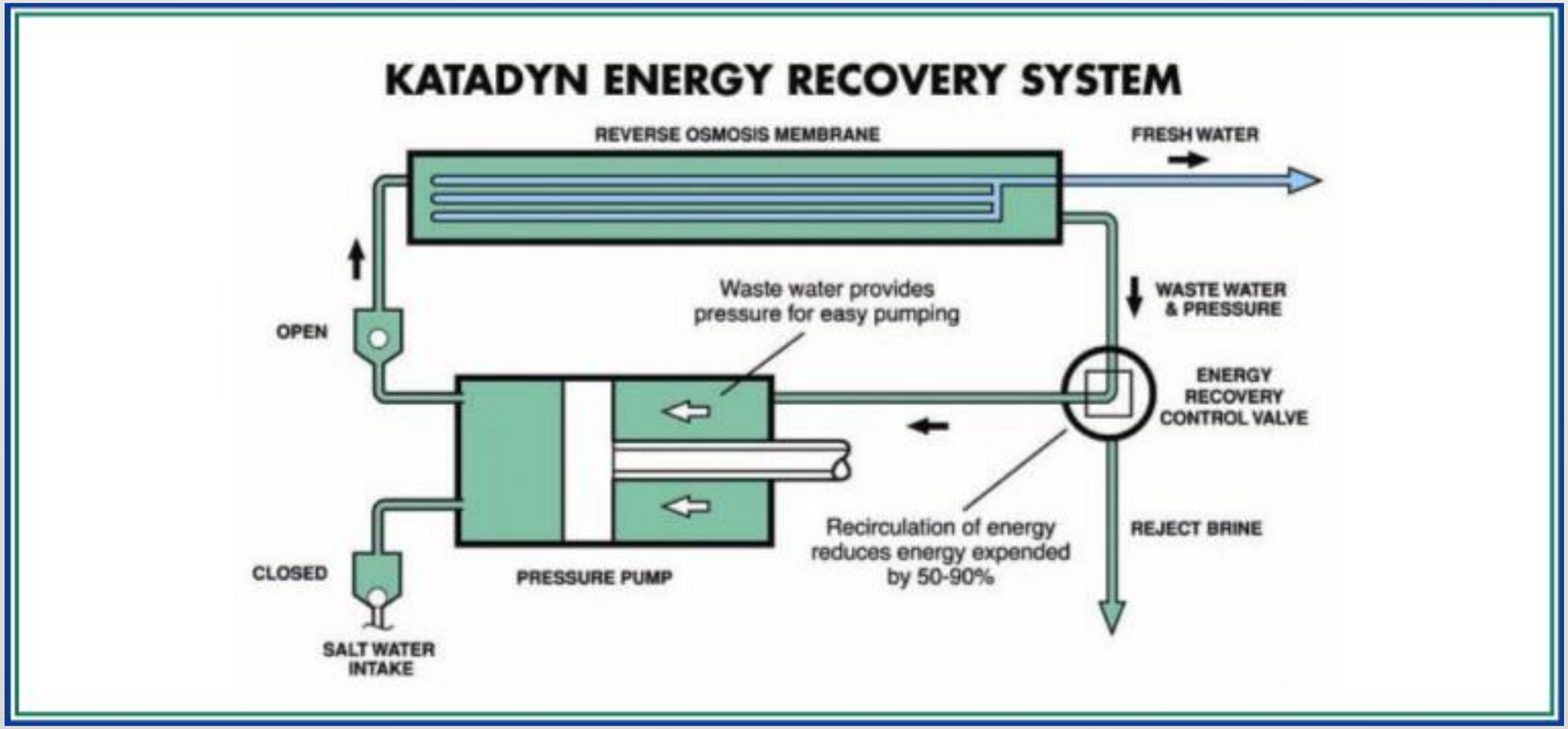
- Pelton Wheels
- Turbines
- Pressure exchangers



8 – 12+ Whrs/G (2.1 – 3.2 Whrs/L)

How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you

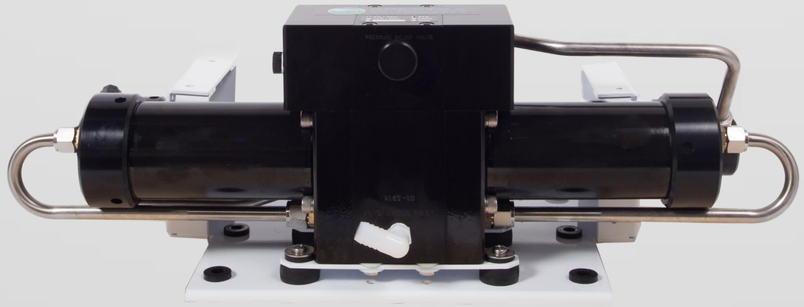


How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you

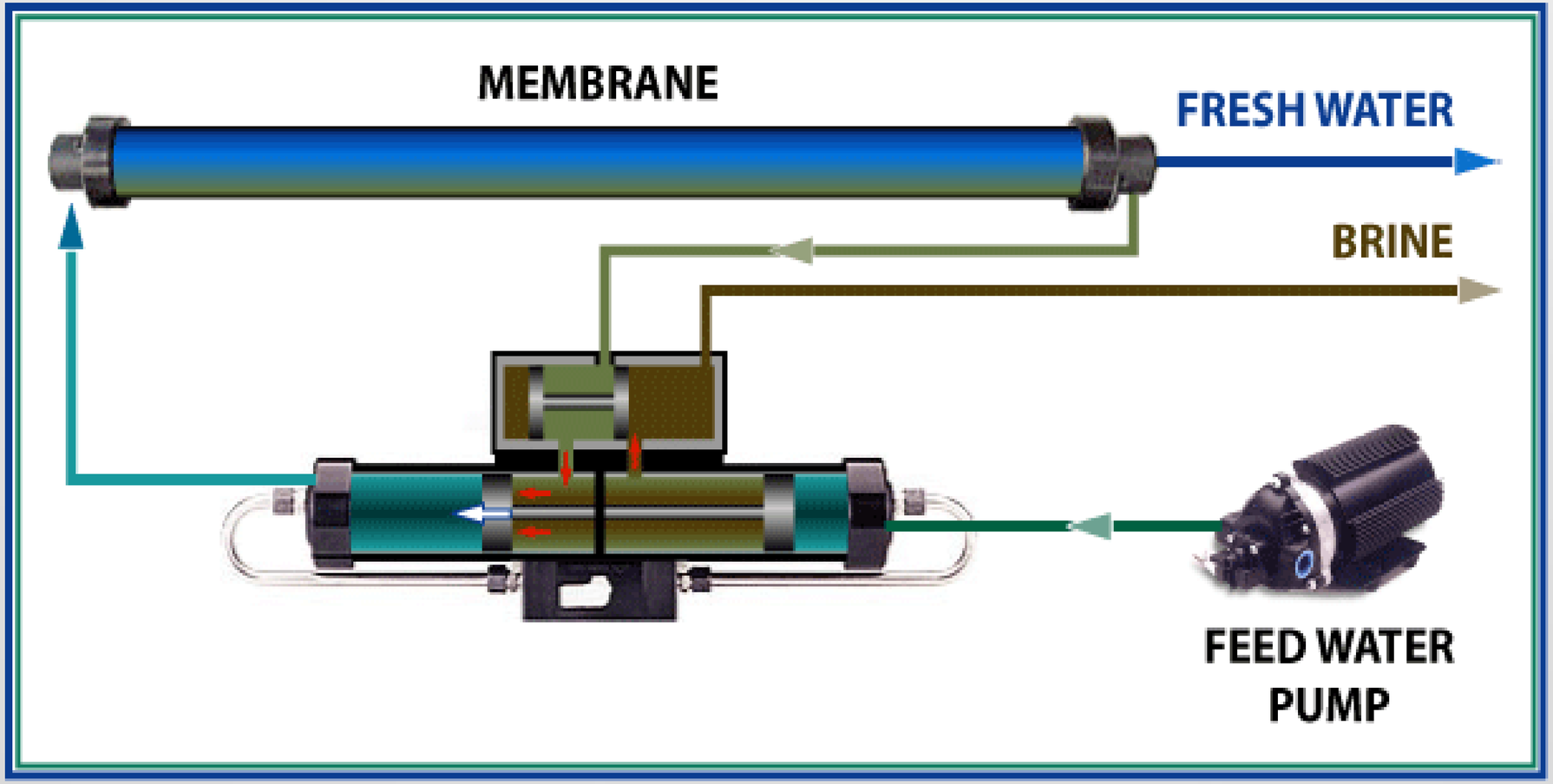
The Clark Pump

- Double acting mechanical pressure amplifier
- Patented in 1995 and commercialized in 1997 by Edinger Marine
- Years of development and refinement
- Constructed of composites and engineering plastics.
- Slow moving for low wear and long seal life
- Overall efficiency between 85-90 %



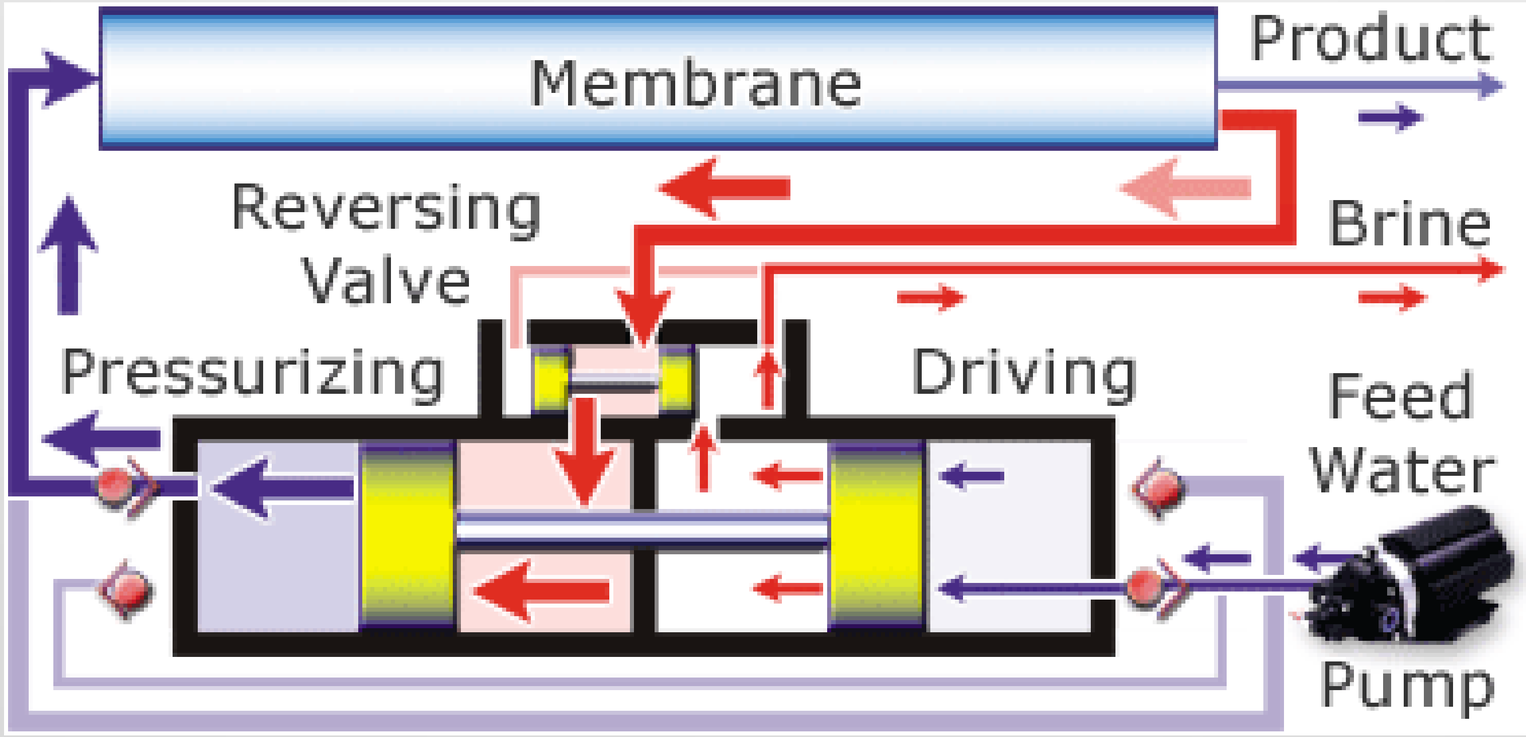
How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you

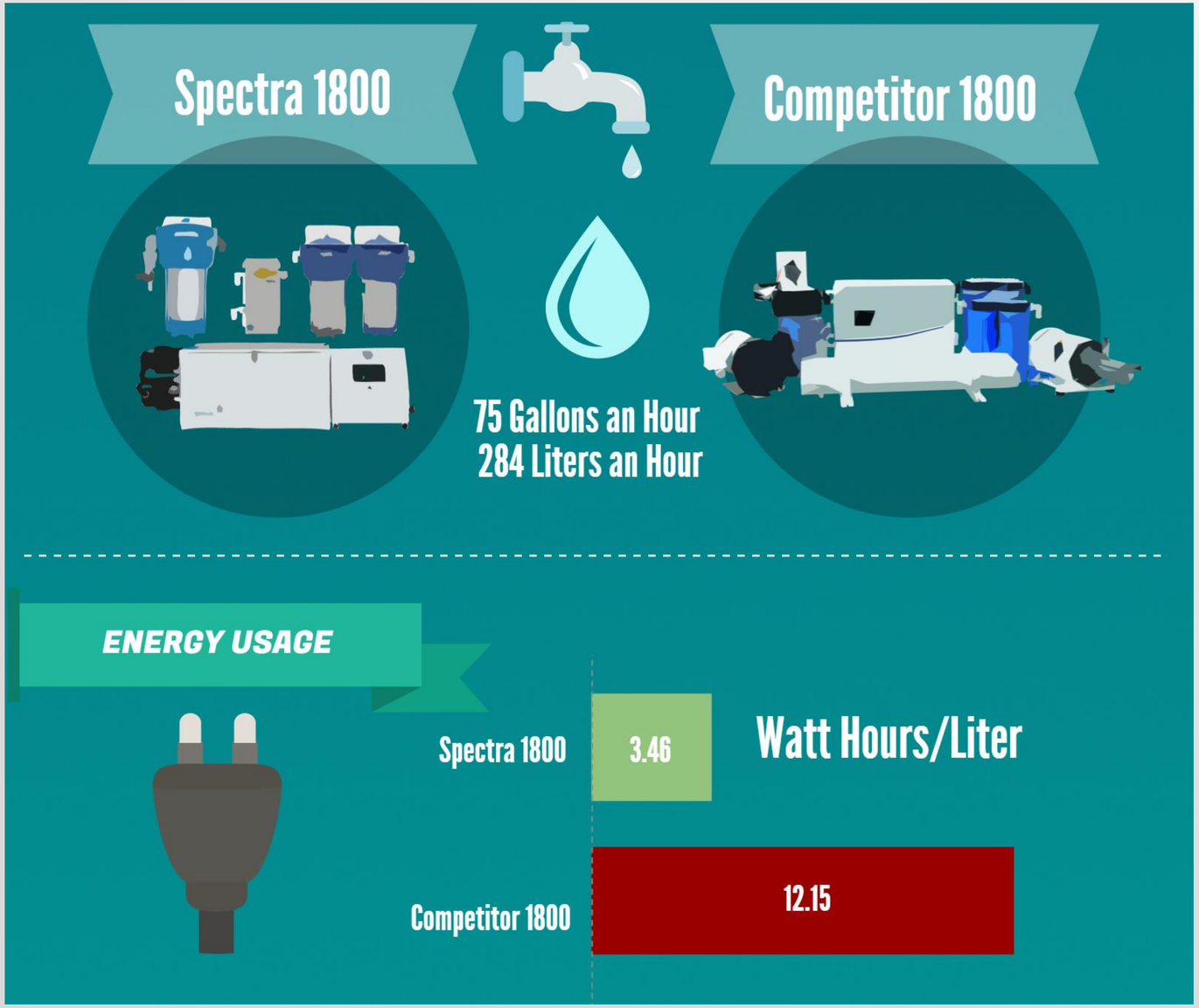


How does a Watermaker Work?

High Pressure Pumps, energy recovery, batteries and you



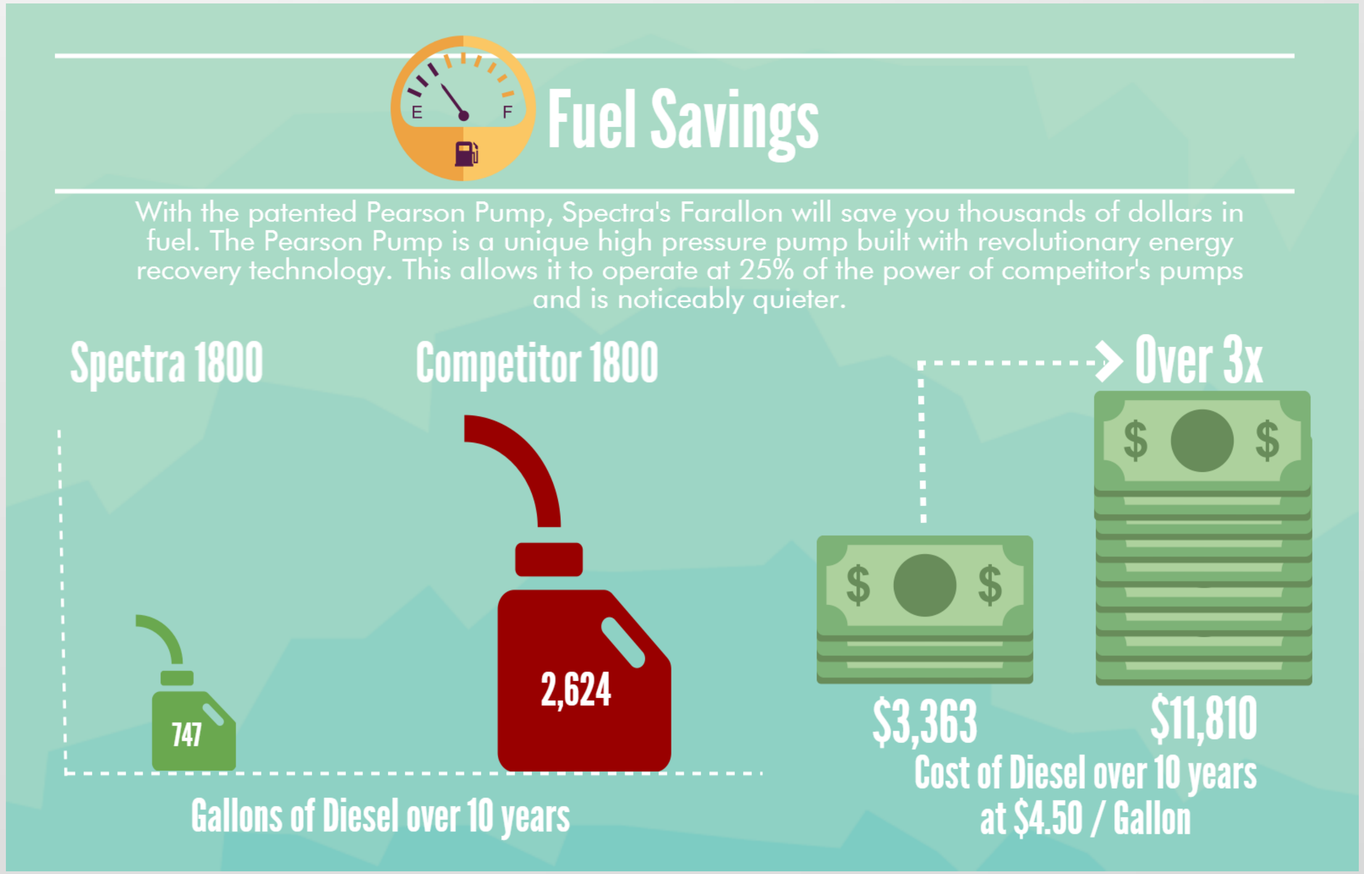
What does the Spectra Advantage mean to you?



- Revolutionary pump design drops energy requirements by up to 75% - Compare 3.5kW vs 0.9 kW
- Slower moving pumps = fewer pump repairs
- Smaller motors, lighter weight
- Quiet operation
- Modular construction for smaller footprint
- Composite, duplex and super duplex construction for corrosion resistance

What does the Spectra Advantage mean to you?

- VFD and PWM motor controls standard, no massive inrush current at startup!
- Low power and VFD start means inverter operated, smaller generators, and easy load management
- Run farther, more comfortably, and with greater reliability
- Fixed system recovery: No operator adjustments of any kind, steady output in all locations and conditions



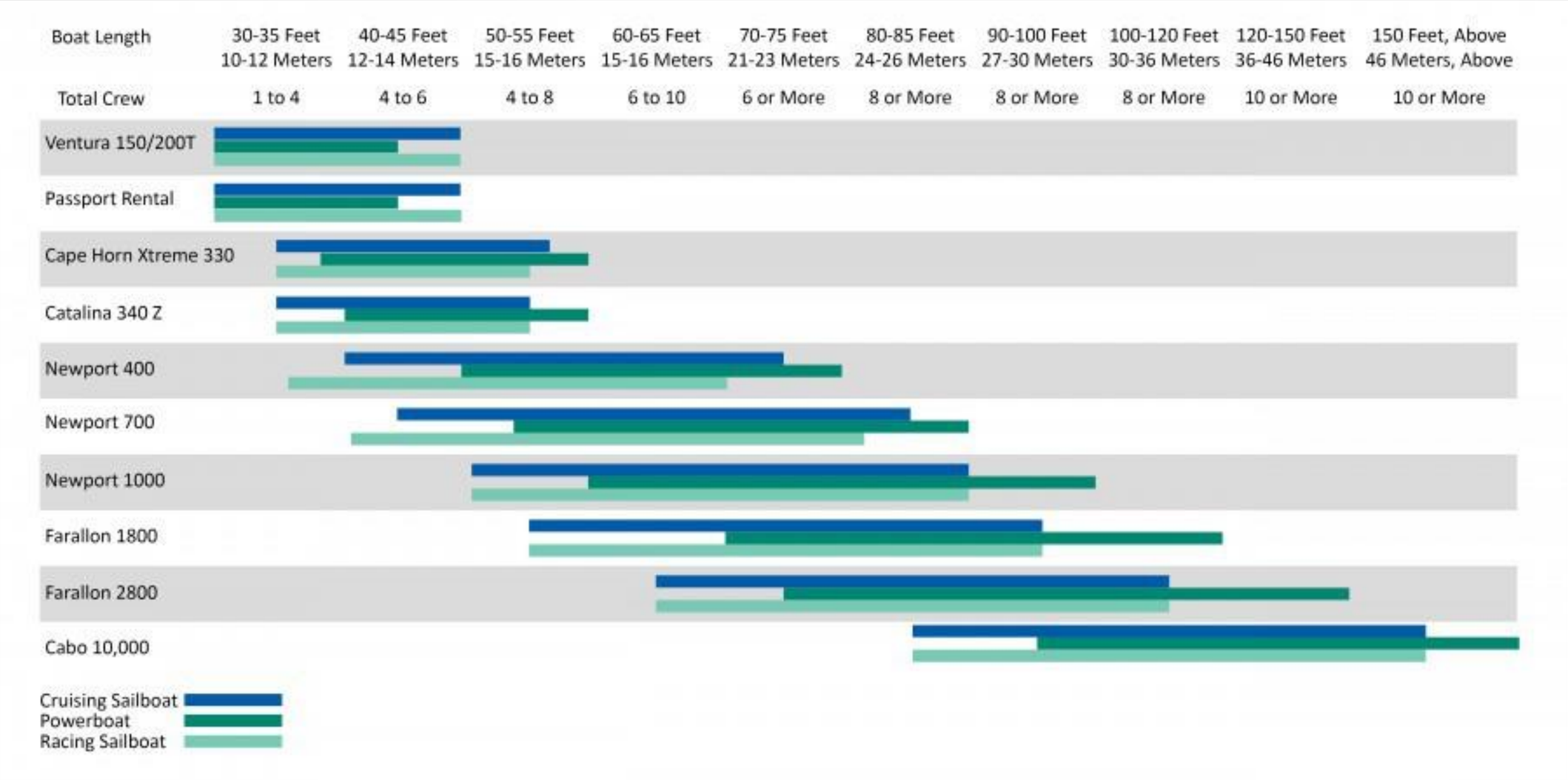
How much water do I need?

Type of need	Quantity	Comments
Survival (drinking and food)	2.5 to 3 lpd	Depends on climate and individual physiology
Basic hygiene practices	2 to 6 lpd	Depends on social and cultural norms
Basic cooking needs	3 to 6 lpd	Depends on food type, social and cultural norms
Total	**7.5 to 15 lpd**	lpd: Litres per day

1 Gallon = 3.785 Liters

- US Domestic Average – Residential
  - 80 -100 Gallons per person, per day!

How much water do I need?



› PowerSurvivor 40E: 30 – 35’ sailboat, 1 – 2 people on board, 12v battery operated

How much water do I need?

As much as you can get!

- Watermakers are named by the gallons produced per day
  - Watermakers are purchased by the gallons produced per HOUR
- Size a watermaker to refill your tanks after 2 – 4 hours of operation
  - If you use 35 gallons per day, then buy a watermaker that produces 8 - 15 gallons per hour
    - Catalina 340z = 14 GPH
    - Ventura 200T = 8.3 GPH
- You will use more water when you have a watermaker than you do right now

Care and Maintenance of a Watermaker

Watermakers are complex pieces of equipment, with electronics, high pressure pumps, motors, seawater filters and membranes. If you want it to last, these simple steps will help you get the most of your investment.

- Fresh water flush your system after every use
  - Seawater is corrosive, and full of organics that will foul membranes, hoses, pumps and everything else

- Replace your pre-filters regularly
  - The dirtier they are, the more impacted they get – and the more likely they are to allow damaging debris to pass

- Follow the installation instructions precisely – or better yet, have a professional install it for you
  - A vast majority of issues with Watermakers are a result of improper installation

- Carry spare parts like feed pumps, seal and rebuild kits

Care and Maintenance of a Watermaker

- Consider the addition of Spectra's exclusive Z-Ion system
  - Virtually eliminates biofouling, and decreases the need for chemical cleanings
- Long term storage (pickling) is easy – do it!
- Repair leaks as soon as you find them, they won't repair themselves and they'll only get worse
- Never leave your watermaker with seawater in it
- Invest in a multi-meter, a stop watch and a hand held salinity tester

KATADYN GROUP

SPECTRA
WATERMAKERS

20 Mariposa Road
San Rafael, California
United State Of America (USA)

Phone: +1 415 526 2780
Fax: +1 415 526 2787

www.spectrawatermakers.com