

Watermakers Explained

Topping off the freshwater tanks while cruising was a constant consideration until the advent of reliable desalination equipment in a size suitable for yachts. This is possible with the use of reverse osmosis technology, which is essentially a high-pressure filtration system.

Clean raw water is drawn in well below the waterline and flows through a strainer capable of removing large solids, then to a booster or feed pump. This pump is required to keep a good supply of water at the high-pressure pump after multiple filters have removed all solids to about 5 microns. The feed pump is typically a centrifugal type, and it requires the correct plumbing so that no air is trapped in the suction side, as it is not self-priming.

The high-pressure pump elevates the raw water pressure to a level that produces the correct flow of fresh water from the membranes, with the total dissolved solids reduced to a level that is safe to drink and tastes good. This is measured in parts per million by a salinity gauge. Once the startup product water, or permeate, is diverted until a suitable level is reached, fresh water can be added to the boat's tanks. This pressure may exceed 700 psi with seawater at a typical 35,000 ppm of dissolved solids. The leftover super-saline water, known as brine, is discharged overboard.

Several environmental factors influence the required pressure to produce suitable potable water, with temperature and salinity the major variables. Although the illustration shows individual components, many units are very compact and condensed into a frame holding the complete system, including monitoring, with only the feed water pump, strainer and seacock separate.

All manufacturers have cleaning and storage procedures for best membrane life and, if properly followed, will allow years of use before production diminishes and replacement is required.

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