



Pall Corporation

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Shipboard Freshwater Generators

Operate Anywhere with
Pall Integrated Membrane Systems



Operate Anywhere Freshwater Generators

Industry leading technology from Pall Corporation enables shipboard water purification from virtually any water source. Locations such as littoral waters, estuaries, rivers and harbours can exhibit extremely high-suspended solids and other contaminants which often deter ship operators from making water in these areas.

Pall's Integrated Membrane System (IMS) freshwater generators are a combination of hollow fiber micro-filtration (MF) membranes with reverse osmosis (RO) desalination membranes in a fully automatic system.

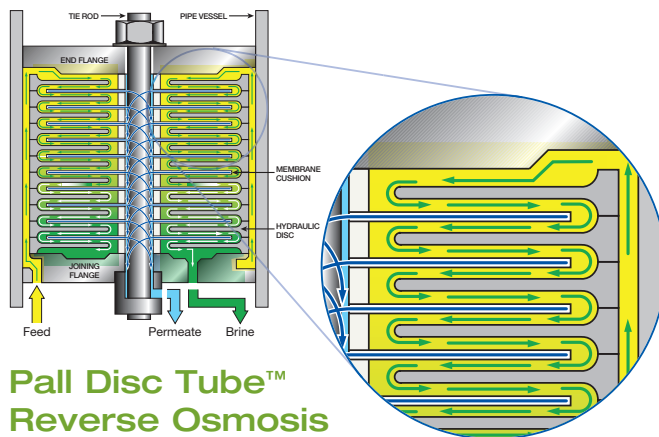
These systems are especially suited for many types of marine platform including cruise ships, commercial and military vessels.



Pall Microfiltration Modules

Suspended solids, bacteria, protozoan cysts and viruses in the feedwater are removed by a 0.1 micron hollow fibre membrane filtration system. The pore size of the membrane controls the fraction of the particulate matter that is removed. These robust PVDF microfiltration (MF) membranes retain particulate matter, while the water and its soluble components pass

through the membrane as filtrate, or filtered water. The retained solids, in concentrated form, are discharged from the membrane system as a waste stream periodically during a reverse filtration flush. This technology allows the system to cope with feedwater, which has a high concentration and wide range of suspended solids, without the need to use replaceable cartridge filters.



Pall Disc Tube™ Reverse Osmosis Modules

Reverse osmosis (RO) membranes are used to remove the dissolved salts contained in the sea or brackish feedwater. The membrane technology enables the reduction of dissolved salts in excess of 98.5 % while the Pall Disc Tube (DT) configuration with short open channel feed flow paths impart turbulent flow to minimise concentration polarisation and hence reduce membrane scaling and fouling. The compact and flexible construction gives long membrane life, easy access and lower replacement costs.



Pall Spiral Wound Reverse Osmosis Modules

Spiral wound RO modules perform the same function as DT modules but are typically applied in larger applications where flow rates are in excess of 70 m³/day. These modules feature an extremely high membrane surface area to hold-up volume ratio. Feedwater is optimally pre-treated by microfiltration in an IMS, enabling spiral wound modules to provide excellent reliability with greatest output of potable water and smallest footprint together with minimal energy use.

Pall Freshwater Generators

Pall Microfiltration (MF) Stand-alone Water Treatment Systems

For vessels that already have reverse osmosis systems fitted on-board, Pall offers an MF stand alone system as an upgrade to achieve full IMS capability.



- ▶ 'Make Water Anywhere' capability, greatly increasing your availability of fresh water
- ▶ Enables ships to remain 'on-station' rather than transiting out further from shore to make water. This results in a considerable saving in fuel costs
- ▶ Fully automated and easy to operate via HMI touchscreen panel
- ▶ Low maintenance and through life cost of ownership
- ▶ Significantly extended RO membrane life
- ▶ Fully regenerable MF membranes providing extended periods between maintenance
- ▶ Reduced reliance on Port Authority or bunker water, reducing associated costs
- ▶ Purification of Port Authority and bunker water using MF stage if necessary
- ▶ Short return on investment
- ▶ Systems can be supplied in sections to aid transit through vessel for retrofit purposes
- ▶ Military designs available meeting relevant shock, vibration and EMC levels to Naval standards
- ▶ Second and third stage treatment options for technical and de-ionised water
- ▶ Disaster and humanitarian relief capability
- ▶ World-wide support network with over 25 years RO experience

Pall IMS Freshwater Generators

Pall's IMS systems combine MF and RO technologies arranged in a self contained automated package.



The Pall IMS technology promotes an enhanced ship board **capability, availability** of fresh drinking water and **lower through-life cost of ownership** for fresh water generation.

Integrated Logistic Support (ILS)

Pall Corporation has a broad installation base of over 2000 RO units operating in Military and Commercial shipping applications with a worldwide service structure providing complete Integrated Logistics Support and technical assistance.

NATO codified sub components.

Fully documented training packages that can be tailored to individual customer needs.

With Pall, your operations are supported by a company with the experience, commitment, R&D, people and service you deserve.

Pall Corporation is a filtration, separation and purification leader providing solutions to meet the critical needs of customers across a broad spectrum of industrial markets.

Our expertise is in defining the correct filtration or fluid processing solution for your marine systems and customizing our products to suit your applications.

Research and Development

Working with equipment and component manufacturers in these markets, Pall custom designs products and purification systems that are fully integrated into marine applications. These optimised products extend component service life, enhance safety of occupants, and improve the operating reliability of all fluid systems.

Scientific and Laboratory Services

A principal element in Pall's customer support operations is our Scientific and Laboratory Services (SLS) Department. Filtration problems arising at sea can be assessed and simulated in the laboratory. Close monitoring by Pall scientists can determine the engineered solution to your filtration, separation and contamination problems and advise accordingly.



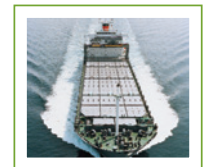
Sales and support

The sales and support team comprises a group of experienced specialists located in Europe, Australia, Asia and the Americas and distributors and representatives worldwide. We offer a comprehensive sales and support service to all manufacturers and operators of marine and associated dockside support equipment, wherever their location.

Quality

The policy of Pall Marine is to endeavour to design and manufacture products to the highest standards of quality, safety and reliability.

Please contact Pall for details of applicable ISO 9001 certificates.



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Pall Marine

10540 Ridge Road
New Port Richey, FL 34654
+1 727 849 9999 telephone
+1 800 933 3111 toll free US

Portsmouth - UK
+44 (0)23 9230 2281 telephone
+44 (0)23 9230 2509 fax
a&twaterenquiry@pall.com




ENABLING A GREENER FUTURESM To see how Pall is helping enable a greener, safer and more sustainable future, visit www.pall.com/green.

Visit us on the Web at www.pall.com/marine

Pall Corporation has offices and plants throughout the world. For Pall representatives in your area, please go to www.pall.com/contact

Please contact Pall Corporation to verify that the product conforms to your national legislation and/or regional regulatory requirements for water and food contact use.

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