

# CLEANTECH SOLUTIONS for navy and coast guard vessels



*Cleantech Solutions.  
Anywhere.*

Vacuum collection  
Wastewater treatment  
Ballast water management  
Fresh water generation  
Marine growth prevention  
Dry and wet waste treatment  
Corrosion protection





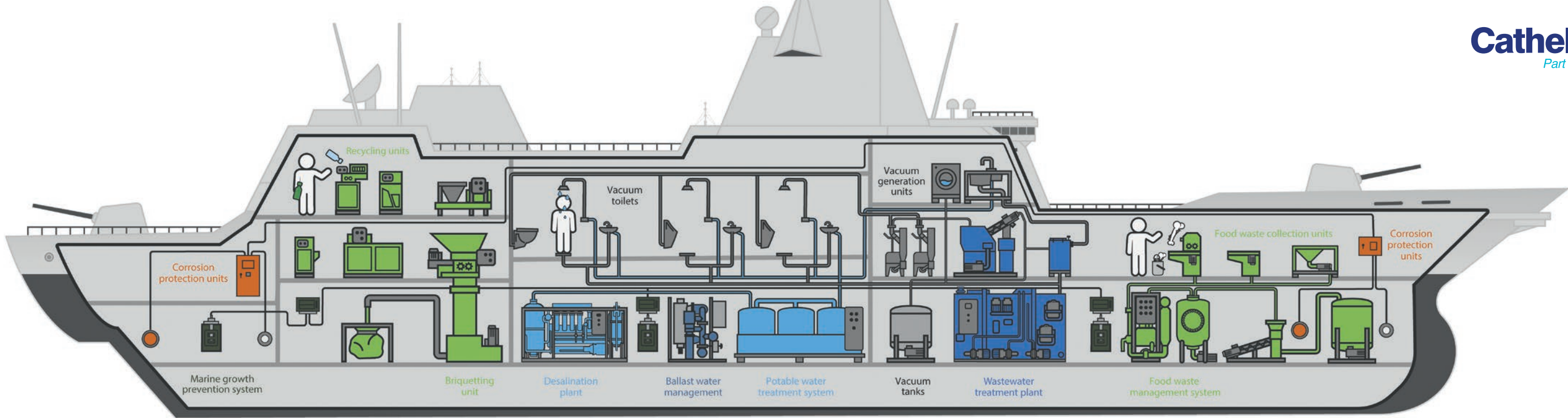
# We understand your requirements

Evac is the world's leading provider of integrated water and waste management systems, as well as corrosion protection systems, for the marine and offshore industries. We are a complete system provider whose products meet all your needs. Our worldwide navy vessel references include aircraft carriers, troop transport vessels, submarines, destroyers, coastal patrol vessels, high speed vessels, and many other applications.

## Tested and certified solutions

Our current naval portfolio includes selected equipment designed and tested to the latest and most stringent Military requirements including; Shock, EMC, Noise and Vibration, Magnetic Permeability and Fire Resistance. NATO STANAG, DEFSTAN and MILSPEC.

Evac has received the ISO 9001:2015 (Quality Management Systems), ISO 14001:2015 (Environmental Management Systems) and the OHSAS 18001:2007 (Occupational Health & Safety Management Systems) certifications.



# Evac Complete Cleantech Solution

The Evac Complete Cleantech Solution covers all your needs in terms of integrated water and waste management and corrosion protection systems. This comprehensive one-stop-shop offering is what sets us apart from the competition. We are your global service partner throughout the life-cycle of your vessels. Purchasing all your services and cleantech solutions from a single supplier simplifies coordination and integration during your shipbuilding project. Once the systems are installed, it makes managing and maintaining them easier and more efficient.

## Our tech specialists support your needs

We are an innovative forerunner with 130 patents or patents pending. Our in-house product development department is dedicated to the design of new systems and the evolution of existing models. System size and weight are typically the limiting factors in naval projects. We meet these challenges by offering a wide range of compact products. We also have our own product development specialists who can design a totally customer-specific solution that meets your exact needs. Our safe, durable, and rigorously tested solutions deliver cost savings via uninterrupted operations and lower maintenance costs.

Our products meet the strictest performance-, safety-, and documentation requirements of your industry. We also guarantee reliable deliveries, comprehensive documentation, and effective aftersales support.



## Benefits

- Fewer partners means easier communication and saves time in project coordination
- Similar user interfaces and technologies make crew training easier and more efficient
- Smooth and efficient system integration, management, and troubleshooting
- Single point of contact for after sales service and spares







# Vacuum collection

Vacuum collection units collect sewage, condensation, and food waste by vacuum pumping it into a sewage treatment plant or collection tank. Since the 1970s, Evac has designed and manufactured a variety of vacuum collection systems including water-saving vacuum toilets, food waste collection units as well as vacuum and collection units for condensation, which are typically used in conjunction with cooling equipment both on land and at sea.



## Evac stainless steel vacuum toilets

The Evac stainless steel models are durable vacuum toilets that are a natural option for installation in navy vessels. They operate in the same way as corresponding porcelain models. Featuring an optional shock and vibration proof design, the Evac stainless steel toilet was originally developed for military use. It is equipped with the proven fully pneumatic Evac discharge valve and mechanism, with flush memory and vacuum sensor technology.

## Evac Optima 5, vacuum toilets

Evac Optima 5 is the quietest vacuum toilet on the market according to independent research. It uses our proven pneumatic flush mechanism with flush memory and vacuum sensor technology. With Evac Optima 5 there are no overflows or unflushed toilet bowls. In addition, we are the sole supplier of vacuum urinals.

Evac OnlineVac is a shock tested vacuum generation unit, designed for military vessels.



## Evac OnlineVac

The Evac OnlineVac is a durable, low-maintenance online vacuum generation unit that macerates sewage and generates the vacuum required for the discharge process. Particularly suitable for vessels with medium crew capacities, it features extra-strong bearings, heavy-duty mechanical seals, and an electric motor with an IEC flange connection. The vacuum is generated and sewage pumped by means of a special liquid-ring screw pump, manufactured – along with the pump casings – from high-quality, corrosion-resistant stainless steel.

Evac OnlineVac units can be customized according to your specific water treatment needs, and are available in two different capacities (V16 and V26) and as a retrofit version. Our Evac OnlineVac 32 and Evac Online 52 systems comprise two V16 pumps and two V26 pumps respectively. The Evac OnlineVac 32M is a standardized shock tested vacuum generation unit designed specifically for military vessels.



## Evac OnlineMax R

The Evac OnlineMax R is the most powerful and energy-efficient online vacuum collection system on the market. The Max concept was designed as an energy efficient way to meet the increasing demand for larger vacuum capacity in vacuum toilet systems on large vessels. The Evac OnlineMax R offers significant long-term operational savings – the bigger the vessel, the greater the cost efficiency.



## Evac EcoVac

The Evac EcoVac vacuum tanks are ideal for black and gray water collection on board large vessels, making them a viable option for aircraft carriers. Vacuum tank systems consist of a tank with a typical capacity of 1–3 m<sup>3</sup>, vacuum pumps, and sewage discharge pumps. Excellent energy efficiency, the best feature of vacuum tanks, is today more important than ever.

## Evac Easyfit

Our durable Evac EasyFit ejector vacuum collection unit uses proven, reliable technology. Its flexible design makes it suitable for a range of different applications and also allows for a choice of holding-tank alternatives. It can be mounted directly in the ship's hull tank, or connected to a sewage treatment plant as a combined unit. Ejector Pumps can be supplied to suit shock and low magnetic permeability requirements.

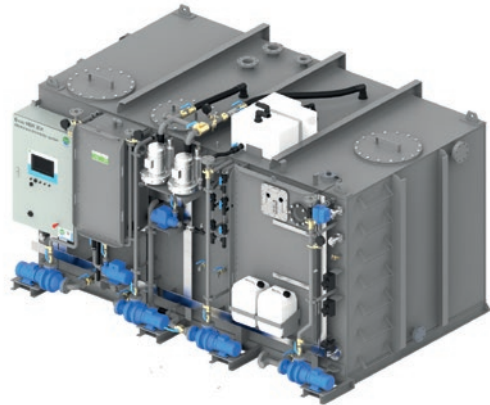






# Wastewater treatment

Wastewater treatment systems separate and neutralize organic contaminants in wastewater to comply with national and international legislation. Our offering includes biological and electrolytic wastewater treatment plants that refine black and gray water, as well as grease separators to separate grease from kitchen and galley wastewater.



## Evac EcoTreat

The Evac EcoTreat biological wastewater treatment plant makes operation and maintenance as easy and cost effective as possible as, for instance, the system requires no chemicals nor filters. Its compact footprint and low weight means it is suitable for vessels where space restrictions may be tight.



## Evac MBR

The Evac MBR membrane bioreactor is an advanced biological wastewater treatment process that can treat all wastewater streams to current standards and allow vessels to operate in environmentally sensitive areas. The compact footprint of the membrane bioreactor makes it ideal for retrofit to existing vessels, as well as for installation on new ships.

## Evac Orca IV B

The Evac ORCA IV B is a purely electrolytic wastewater treatment plant. The compact, modular design makes it ideal for both installation on new vessels and retrofitting existing vessels. It operates on a batch basis but is basically continuous, is fully automatic in normal operation, and only requires low maintenance.



Evac wastewater treatment plants are certified to meet IMO MEPC 227 (64) and U.S. Coast Guard type approval.

## Evac grease separators

The Evac grease separators, Evac EcoTrap and Evac SGT, separate grease from galley wastewater in marine and offshore applications. The Evac grease separator range includes both manually operated and automatic models.



# Ballast water management

The Evac Evolution ballast water management system (BWMS) effectively removes organisms and pathogens from ballast water. This is achieved using a combination of filtration and UV technology, processes which are entirely free of chemicals.

The space saving Evac Evolution BWMS is suitable for most navy vessels and is now in the final stages of achieving revised IMO G8 and U.S. Coast Guard Type Approval (status 12/2018).

The system developed by Cathelco has many innovative features including a unique feedback 'loop' based on the measurement of UV transmission which determines precise dosage. It automatically adjusts to different seawater conditions in harbours and estuaries, ensuring that the optimum UV dose is applied at all times, but saving power whenever possible.



Effective in fresh, brackish and seawater, the Evac Evolution BWMS enables vessels to operate without restriction. The system is available with capacities from 34m³/h to 1,500m³/h in a single unit. It can be supplied in modular form for retrofits or skid mounted for newbuild applications.

**Cathelco**  
Part of Evac Group

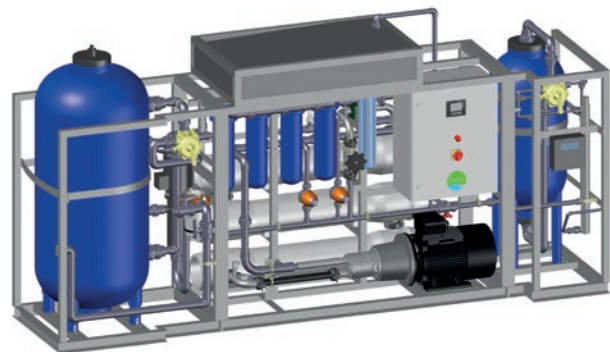






# Fresh water generation

Water treatment units turn seawater into process, service, and drinking water. The equipment also filters and disinfects water, adjusts its hardness, and mineralizes fresh water that has been created or stored. We offer seawater desalination units using reverse osmosis (RO), as well as potable water treatment equipment using mineralization and disinfection.



## Desalination plants

We offer a wide range of modular reverse osmosis plants with daily generation capacities of 5, 10, 15, 20, 25, 30, 60, 90, or 120 m<sup>3</sup>, all with the possibility to expand capacity as required. These modular plants are environmentally friendly, robust, easy to install and operate, quiet, and have an extremely small footprint. The modular design means that the plants can be custom-designed for the available space on board and made up of modules that best match the individual vessel's requirements. Our modular reverse osmosis plants can be adapted to local regulations, as well as changing operating conditions.

## Potable water treatment systems

A comprehensive range of freshwater conditioning units are available to complete your onboard water treatment systems. These include water softeners and fresh water skids which can combine a number of treatment processes, typically filtration and sterilization using UV or silver ion sterilizers. We also supply hydrophore systems to ensure smooth water pressure regulation throughout vessels. Our highly sophisticated water treatment systems produce high-quality potable water that meets all relevant regulations, including those from the WHO and USPH.



# Dry and wet waste treatment

Evac's dry and wet waste systems manage mixed or recyclable waste in a way that is safe, convenient, environmentally friendly, and energy efficient, reducing the volume through compaction and shredding. Moreover, they fulfill the regulations defined by IMO Marpol 73/78 Annex V that covers garbage waste types such as food and galley waste, dry waste and dangerous waste.

## Evac OWMS food waste management system

The Evac food waste vacuum collection system is designed for the hygienic collection and treatment of food waste in compliance with IMO Marpol 73/78 Annex V, U.S. Coast Guard and other relevant regulations. Food waste is conveyed reliably, even when it contains large amounts of bulky or starchy substances such as pasta, rice, bread or potatoes, even fish skin, seashells and large bones. The system can be supplied with a GPS Discharge Control system which ensures that food waste is discharged into the sea only when allowed.



## Evac dry waste recycling units

Dry waste produced on board vessels can be divided into recyclable and non-recyclable materials. IMO MARPOL Annex V prohibits the discharge of any dry waste into the sea, so it must be stored on board.

Evac dry waste collection and handling systems for recyclable waste significantly reduce the space needed for dry waste storage. Our range includes glass crushers, compactors, shredders, and tin can densifiers.







# Marine growth prevention

We provide systems developed by Cathelco specifically for preventing bio-fouling in the seawater pipework of naval vessels ranging from aircraft carriers and frigates to fast patrol craft and submarines.

The systems are easy to install and automatic in operation, with compact control panels and a range of anodes to suit the many different requirements of naval craft.

Military vessels generally have cupro-nickel pipework and in these circumstances, copper and ferrous anodes are used to provide effective bio-fouling and corrosion suppression.

Submarines and fast patrol craft usually have a number of small inlets which can be protected with dual purpose anodes consisting of copper, aluminium or ferrous elements in single assembly.

Systems on frigates often involve a combination of seachest and strainer mounted anodes, typically made out of copper and ferrous materials. In the case of aircraft carriers, multi-anode installations protect engine cooling water systems, refrigeration, air conditioning and fire-fighting systems. In operation, the copper anodes produce ions in concentrations of around 2ppb which are sufficient to prevent barnacles and mussels from settling in pipes. At the same time the aluminium or ferrous anodes create an anti-corrosive layer on the inside of pipes.

The most widely used marine growth prevention system in the world.



**Cathelco**  
Part of Evac Group



# Corrosion protection

Naval vessels require specialised ICCP hull protection systems which do not interfere with the electrical war-fighting capability of the ship.

Military systems provided by Cathelco combine the optimum level of control, flexibility, monitoring and data logging in the military environment. These multi-zoned systems have a low electro-magnetic signature and use an ultra-low ripple power supply. The systems are designed to meet the necessary shock, vibration and EMI requirements of the vessel type. Hull equipment is recessed to provide a smooth hull profile.

Different levels of security are available with control systems designed to protect against cyber-threats.

Reliable and technically advanced solutions to hull corrosion problems.



**Cathelco**  
Part of Evac Group

# Service

## Close to you where ever you travel

We are your global service partner throughout the life-cycle of your vessel. We have service hubs in North America, Northern Europe and Southern Europe. We offer a wide range of spare parts and exceptional service through our extensive global network of offices and representatives.

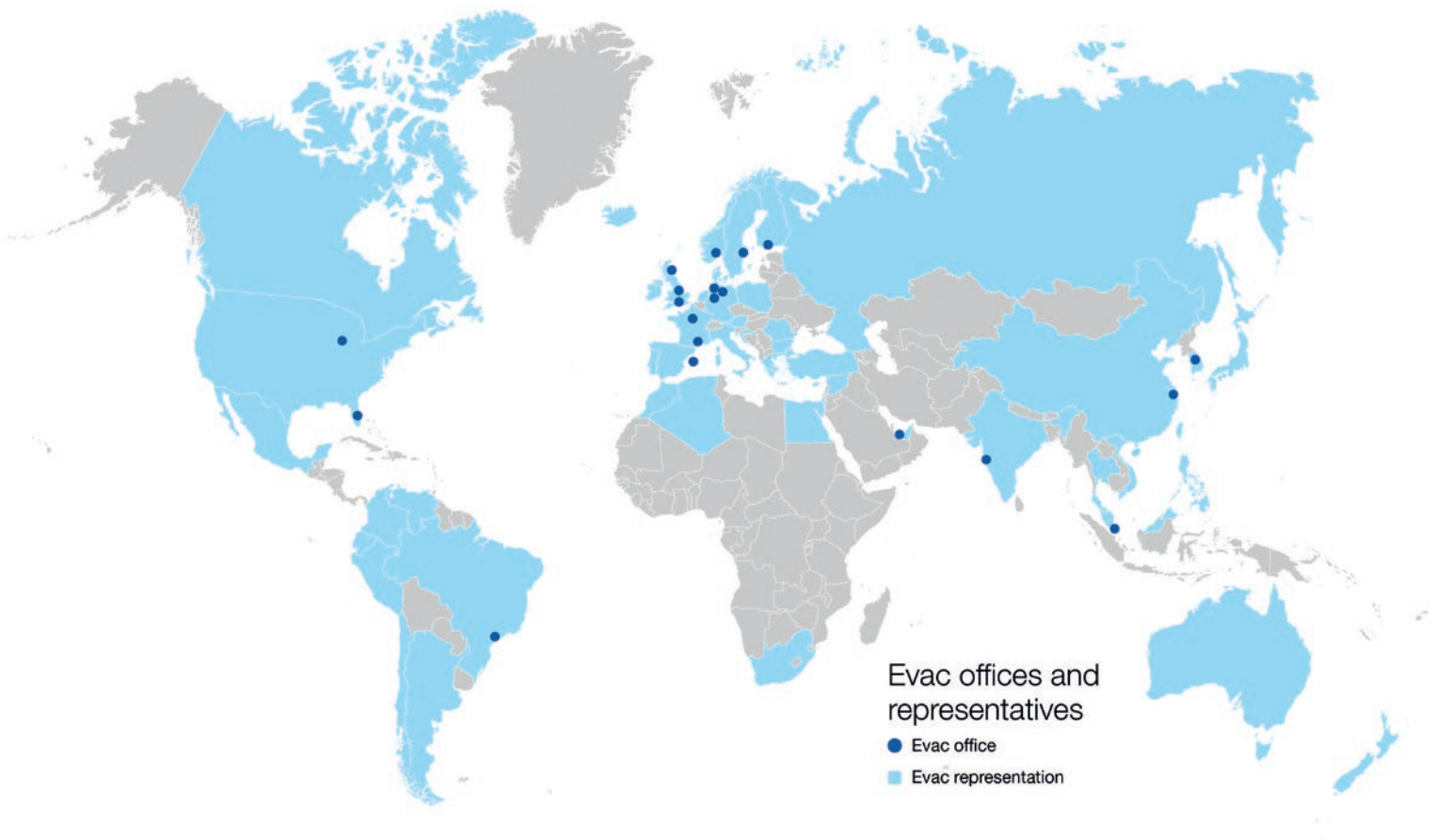
## We support our stakeholders by providing:

- Engineering and technical advice
- Supervision
- Installation and start-up
- Service and repair
- Service contracts
- Refurbishment and retrofit
- Spare and replacement parts
- Training and education
- Onboard system and spares analysis.





Cleantech Solutions.  
Anywhere.



Read more about our references on  
[www.evac.com/references](http://www.evac.com/references)



Vacuum  
collection



Wastewater  
treatment



Ballast  
water  
management



Fresh water  
generation



Marine  
growth  
prevention



Dry and  
wet waste  
treatment\*



Corrosion  
protection

Evac is the world's leading provider of integrated water and waste management systems, as well as corrosion-protection systems, for the marine, offshore, and building industries. Our cutting-edge solutions and services have been helping leading global players in these industries to significantly reduce their environmental footprint for 40 years. With offices in 14 countries across four continents and representatives in more than 70 countries, we pride ourselves on being close to our customers wherever in the world they are located.

\* Solutions for  
building industry  
customers are  
sold by Bvac

Our contact information at  
[www.evac.com/contacts](http://www.evac.com/contacts)

[www.evac.com](http://www.evac.com)

**Cathelco**  
Part of Evac Group

[www.cathelco.com](http://www.cathelco.com)

 **HEM**

[www.hemwater.com](http://www.hemwater.com)

