Evac Evolution BWT System
Complexity. Made simple.
The Evac Evolution ballast water treatment (BWT) system will ensure compliance with the latest IMO G8 and U.S. Coast Guard regulations. As well as being effective in marine, brackish and fresh water, the system can handle the most challenging water conditions in ports and estuaries.

Cathelco are now part of the Finnish-based Evac Group which is the world’s leading provider of integrated waste, wastewater and water management systems for the marine, offshore and building industries.

By combining technical expertise and amalgamating sales and aftersales facilities, Cathelco Evac can respond quickly to customers’ requirements wherever they are located in the world.

Customers also have the reassurance of dealing with a company that has a strong background of marine engineering experience backed by the financial stability of a turnover amounting to 136 MEUR.

We realise that you are looking for a company which can be trusted to provide on-going support for your BWT system in the years ahead. Cathelco Evac have the experience, resources and commitment to fully meet this requirement.

Timeline - our commitment to marine engineering

1956
Company formed in Chesterfield, United Kingdom.

1963
First pipework anti-fouling system installed on Royal Navy submarine.

1990
Acquired anti-fouling business of Impalloy Ltd.

1991
1,000th seawater pipework anti-fouling system installed on British Ranger – BP tanker.

1992
Cathelco launch C-Shield ICCP hull corrosion protection system.

1995
Acquired Corrente Ltd manufacturers of ICCP systems in Winchester.

1999
Acquired anti-fouling business of Impalloy Ltd.

2001
Established Cathelco Korea to take over sales/distribution in South Korea.

2003
First pipework anti-fouling system installed on Royal Netherlands Institute for Sea Research (NIOZ).

2004
Acquired Wilson Taylor, a former competitor in A/F ICCP systems.

2007
50,000 sea water pipework anti-fouling installations on ships and offshore platforms.

2008
Established an R&D centre for Ballast Water Treatment in Kiel, Germany.

2009
Moved into a new purpose built factory in Chesterfield.

2014
Received IMO Type Approval for MK1 BWT system from Federal Maritime and Hydrographic Agency of Germany (BSH).

2015
Received USCG AMS Approval for MK1 BWT system.

2017
Acquired Echo Marine (Mallorca) service centre for water treatment systems.

2018
All land and sea based testing of Evolution BWT system completed.

2019
Acquired cathodic protection business of Norwegian based Jotun A/S.
Key features of the Evac Evolution BWT system

Precise adjustment to different water qualities
- A sample of sea water is taken before the chambers and the UVT sensor measures the UV light transmittance.
- From this data, the automation control unit calculates the correct UV dosage.
- UV intensity meters check that the correct dosage has been received. This ensures effective irradiation, but saves power whenever possible.

Helix flow through UV chambers
- The inlet manifolds are designed to make water flow in a helix.
- This ensures the maximum surface area of the water is exposed to the light for the maximum irradiation of organisms.
- At the same time, baffles create a lateral movement bringing organisms from the edge closer to the UV lamps.

Easy, intuitive control systems
- The choice of local, remote or full integration with ship’s computer systems.
- Easy to read schematics show sea water routing, plus read outs indicating the transition state of valves.
- Simplifies the process of gathering the data required to maintain a Ballast Water Record Book.
Based on a combination of filtration and UV technology, the Evac Evolution BWT system is available with capacities from 34m$^3$/h to 1,500m$^3$/h in a single unit. The equipment can be provided skid mounted or in modular form simplifying retrofit installations where there is the need to make the best use of available space.

During uptake the sea water passes through the filtration unit where the larger organisms and sediments are removed. At regular intervals, the retained material is automatically back flushed and discharged at the original ballasting site with minimal reduction of the ballast water flow during the back flushing process.

The sea water continues to UV treatment where smaller organisms, bacteria and pathogens are killed before the water passes to the ballast tanks.

During ballast water discharge, the sea water bypasses the filter unit and goes directly to the UV chambers where it is sterilised for a second time. This avoids the risk of any contamination due to re-growth in the ballast tank.

Sample of sea water taken before it reaches chamber. UVT sensor measures UV light passing through water for highly accurate dosing.

Compact 20 micron filter with automatic back flushing which does not interrupt ballasting.

Medium pressure lamps creating multiple peaks of UV-C to kill organisms.

UV chambers designed to produce a helix water flow to maximise UV irradiation of organisms. At the same time, baffles create a lateral movement bringing organisms from the edge closer to the UV lamps.
Enhanced UV chamber design
The chamber has been designed to increase the level of irradiation to meet the USCG ‘live/dead’ standard, whilst other improvements extend the exposure time with the sea water. In addition to creating a helix flow as the water enters the chamber, its path will be interrupted to cause a lateral movement. This brings organisms from the edge of the flow closer to the light emitted from the UV lamps in a repeating cycle as the water passes along the chambers.

Why measuring UVT is vital to the effectiveness of the system
It is essential that the BWT system can respond rapidly to changing water conditions with different levels of sediment. This is vital to the effectiveness of the system and ensures the most economical use of power.

To achieve this, the UVT sensor measures light transmittance through a sample of seawater taken after the filter, but before it reaches the UV chambers. This is measured at the same wavelength (UVC 254 nm) as the biocidal light emitted by the UV lamps. From this data, the automation unit control unit calculates the correct UV dosage.

In this way, the output to the lamps is continuously optimised, ensuring the correct level of irradiation and economising on power through the use of stepless power control.

UV intensity meters mounted on the edge of the chambers measure the intensity of light received during irradiation. This relationship creates a feedback loop in which the calculated dose is continuously compared with the actual dose. If the actual dose is within the prescribed range, ballast water treatment continues as normal. However, if the dose is less, then the automation system increases the power or initiates a lamp cleaning cycle.

The revised G8 Guidelines for IMO Type Approval and the U.S.Coast Guard Final Rule (Section162.060-38) on the treatment of ballast water state that the UVT level must be recorded together with the dosage during each ballasting operation.

Cathelco are the only company to provide a UVT sensor as standard. With other systems, it is necessary to purchase a UVT sensor as an extra.

Precise adjustment to different sea water qualities
The unique Cathelco UVT sensor system has already proved its value in precisely adjusting the UV dose to changing water qualities. This is achieved by sampling sea water before it reaches the UV chamber and measuring the amount of UV light actually passing through it. This works in conjunction with UV intensity meters which are mounted on the chamber and measure the intensity of light which is received.

Combined with stepless power control, all of these features ensure that power is not used excessively, only the amount needed to meet the ‘live/dead’ standard.

Less pressure demand on pumps
The pressure loss with the Evac Evolution is just 0.6 bar at 250m³, resulting in less pressure demand on the ballast pumps.
190m³/h system for luxury cruise ship

These systems have been supplied for two small cruise ships built to accommodate up to 298 people in luxurious suites. Chosen for their compact design and reliability, the units incorporate tank stripping systems to remove sediment from the ballast tanks.

250m³/h system for bunkering tanker

The height between decks was a major factor in the design of this system for a bunkering tanker. In view of the height restriction, the filter unit and UV reactor were positioned horizontally on the skid. This allows the UV lamps to be removed easily if maintenance is required.

60m³/h system for fishing vessel

The Evolution system is completely chemical free, a distinct advantage on any vessel where food products have to be handled or stored. With a footprint of just 1.6m x 0.90m x 1.7m, the system proved to be the ideal solution for installation on two freezer trawlers.

500m³/h system for ro-ro cargo ship

Space is always a major consideration in retrofit BWT installations. In the case of this vessel and her sister ship, a void area was identified close to the engine room where the filter unit, UV reactor and electrical cabinets could be installed in a linear arrangement giving good access for inspection and maintenance.
Modular BWT systems for retrofits

In retrofit installations space availability is usually a major consideration. The Evac Evolution system can be supplied in modular form enabling components and control panels to be distributed in available areas.

Easy, intuitive controls

Salt water/Fresh water operation

The system automatically compensates for the difference in UV dosage when moving between fresh and salt water. This ensures that the correct UV dose is achieved, improving the efficiency of the system and thus saving power.

Summary software file

This software simplifies the process of maintaining a Ballast Water Record Book by gathering the essential data from the log files stored in the control panel and presenting it in a form which is easily understood.

Control options

Local - functions are controlled from the single automation control unit situated close to the BWT equipment using a touch screen or screen with keypad.

Remote - a duplicate control panel is provided in a more convenient location. Operates in a master/slave relationship with the automation control panel and displays the same data.

Full integration with the ship’s computer system, enabling a single operator to control all of the functions from one location. Integration with the yacht’s IPMS system uses the standard MODBUS protocols.

Our aim has been to produce control systems which are easy to use, whilst providing the depth of information which is necessary to maintain the Ballast Water Record Book which is a requirement of IMO and U.S. Coast Guard regulations.

The automation control panel governs the operation of the Evac Evolution unit and also monitors its ‘health’ by checking the performance of the filter and UV chamber as well as initiating the cleaning cycles.

With easy to read schematics showing sea water routing, read outs showing the transition state of valves in addition to instant information from sensors, engineers can easily see how the system is performing.
Cathelco Evac
integrated water treatment systems

Global support through the Cathelco Evac sales and service network

Cathelco Evac representatives and offices

Evac systems

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