

**A ballast water treatment system
with a smaller footprint specifically
designed for superyachts**

Cathelco 

**Evolution
BWT System**

Now testing for USCG Type Approval

Cathelco Evolution – a space saving BWT system with unique features

If you are considering installing a ballast water system, the first question in your mind will probably be space availability. This is where Cathelco have taken important steps to create a smaller footprint for the Evolution system.

These include a smaller filter, shorter UV chamber and integral lamp cleaning system. What's more, it can be supplied on a compact skid for newbuild or in modular form to make the best use of available space in retrofit applications.

Next you will probably want to know how much experience Cathelco has had in the superyacht market. The answer is simple – 50 years experience fitting equipment to more than 500 superyachts around the world. Our reputation has been built on a portfolio of products including world leading marine growth prevention systems (MGPS) and impressed current cathodic protection (ICCP) systems. More recently, following the acquisition of HEM, based in Antibes (South of France) the group can offer a complete range of desalinators and water treatment systems.

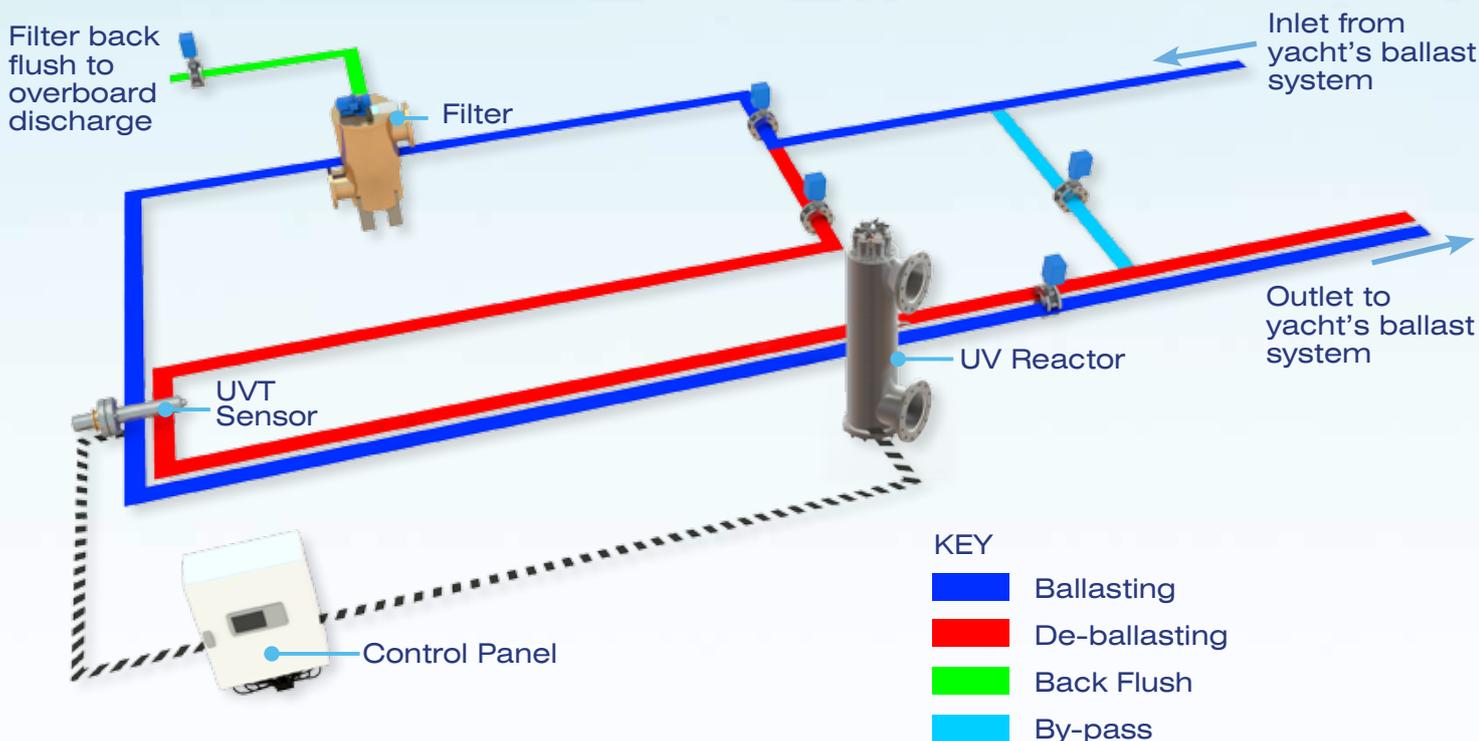
What about BWT installation? Well, the key is close co-operation and careful planning from the very beginning, something that is at the heart of everything we do in the superyacht and commercial sectors.



“From the start of this project to the final completion we appreciate the care and attention to detail from Cathelco, leading to a smooth, trouble free installation. We are very pleased with the outcome and look forward to continuing our relationship with Cathelco”, said Julian Glogowski, technical director, Carsten Rehder.

The Cathelco Evolution system is currently undergoing shipboard testing for U.S. Coast Guard Type Approval to the 'live/dead' standard. It will supersede the Mk I Cathelco BWT system which already holds IMO Type Approval and USCG AMS accreditation.

BWT Flowline Diagram



Designed to meet the U.S. Coast Guard 'live/dead' standard

Evolution - on target for 2017

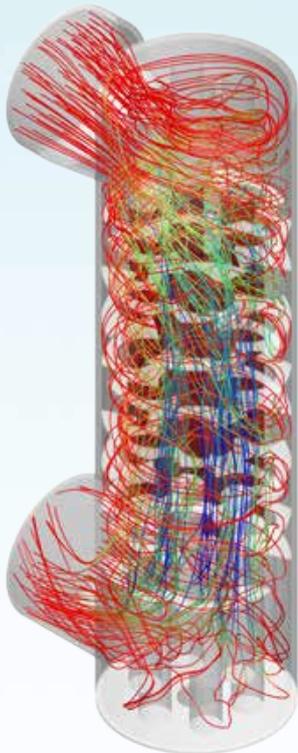
The Evolution system is currently being tested to the 'live/dead' standard demanded by the U.S. Coast Guard with the aim of gaining Type Approval by the 3rd Qtr of 2017.

The new system will supersede the Cathelco Mk I system which holds IMO Approval and AMS Certification based on organisms being viable/unviable. The independent laboratory appointed to supervise the USCG Type Approval testing programme for the Evolution is Lloyds Register.

Shipboard testing commenced in August 2016 and it is anticipated that all of the test results will be submitted to the U.S. Coast Guard for approval by the end of the 1st Qtr 2017.

Enhanced UV chamber design

The chamber has been re-designed to increase the level of irradiation to meet the '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 will bring 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.



Computer simulation of flow through Evolution UV chamber. Sea water flows in a helix to increase the exposure time with the UV light. At the same time, baffles interrupt the flow bringing organisms from the edge closer to the UV light source.

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.

BWT systems for new builds



The Cathelco Evolution system is based on a combination of filtration and UV technology. It has been specifically designed for luxury yachts with a very compact filter, shorter UV chamber and very small overall footprint. Its capacity has been tailored to the needs of yachts and it is ideally suited to treat flow rates in the range of 34-135 cubic metres per hour.

1 Filter unit

The Filtrex ACB filter has been specifically selected for its very compact size - less than half the size of filters used on commercial vessels. It has a filter mesh size of 20 microns and incorporates automatic back flushing.



2 UV reactor

These are designed with six UV lamps to achieve the level of irradiation to meet the U.S. Coast Guard 'live/dead' standard. The manifolds make the water flow in a helix, maximising the surface area that is exposed to the UV light. The chamber is 1120mm in height making it one of the smallest on the market.

5 Cleaning-in-place (CIP) wiper system

The lamp sleeves are automatically cleaned after every ballasting/de-ballasting operation using an efficient wiper system.

6 Control panel

Controls ballasting/deballasting, C.I.P cleaning and many other functions. Built in data logging ensures compliance with IMO regulations. Available as stand alone, remote or fully integrated.

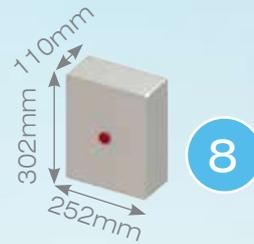
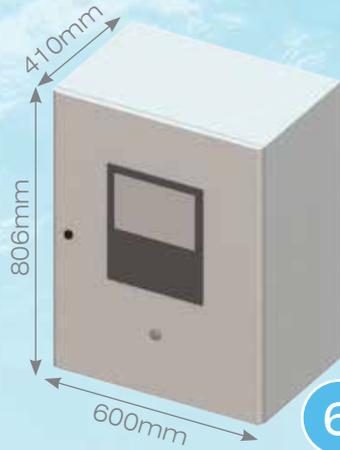


Modular BWT systems for retrofits

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

Paint finish

Control panels supplied in RAL White or any colour specified by the customer.



3 UV intensity meters

UV intensity meters are mounted on the edge of the UV chambers and measure the amount of light received during irradiation. If the amount of UV light falls below a prescribed level the automation control unit indicates that a cleaning cycle is required or that lamp renewal is necessary.



4 UVT sensor

The UVT sensor measures UV light transmittance through a sea water sample taken before it reaches the chamber. The sensor operates in conjunction with UV intensity meters in a feed-back loop ensuring that the correct dosage is being achieved.

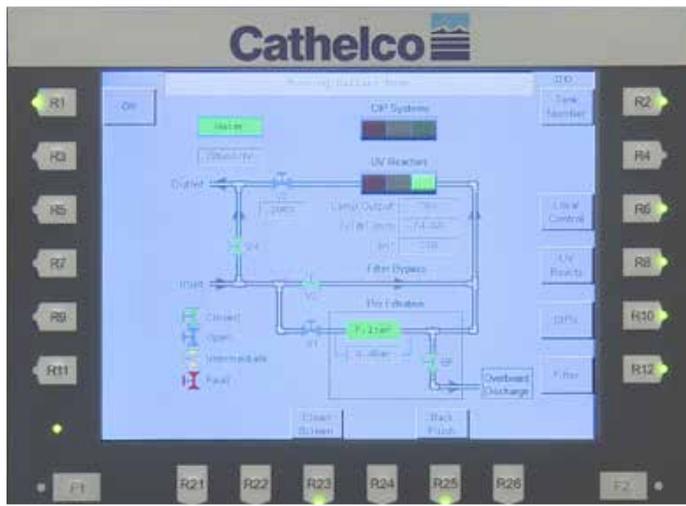


7 UV lamp cabinet

Step-less power control enables output to the lamps to be raised or lowered in small incremental steps, ensuring that power is used economically.

8 Cleaning-in-place (CIP) control panel

Easy, intuitive controls



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 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.

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 key pad.

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 yacht'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.

Surveying & Installation

Surveying

Cathelco can provide suitably qualified marine engineers to survey vessels to determine the most suitable locations for the BWT equipment and to identify the necessary access routes for installation.

In the case of retrofit installations, 3D scanning is also available to supplement the survey information allowing for ease of layout of the equipment during the planning stage.

Installation

Cathelco are familiar with working in the luxury yacht sector and understand the high standards which apply.

Careful planning is the key to trouble free installation. In the case of installation on new vessels, Cathelco can supply the system in the form of individual components or complete skid mounted units. The latter have the advantage of minimising the time taken on fitting the system.

With retrofits, space is usually a major consideration, however Cathelco can provide the equipment in modular form enabling components to be distributed within available spaces and 'void' areas.



Ballast Water Treatment systems - your questions answered

What is a BWT system required to do?

Basically, systems prevent organisms, including invasive species and pathogens from being transferred from one ocean to another in ballast water. The standards laid down for the measurement of the organisms by the U.S. Coast Guard are that vessels must:-

- Discharge less than 10 living organisms greater than 50 microns per cubic metre of ballast water.
- Discharge less than 10 living organisms in a size range from 10-50 microns per millilitre.

When do the regulations come into force?

The U.S. Coast Guard introduced legislation in 2014 for commercial vessels which is now being rigorously enforced. The same rules apply to ocean-going superyachts entering U.S. territorial waters including Puerto Rico and the U.S. Virgin Islands.

On 8th of September 2016, the IMO ballast water convention was invoked when Finland became the 52nd signatory taking the combined tonnage of contracting States above 35% of the world's merchant fleet - the level required for implementation. The convention enters into force in September 2017 when vessel owners have to be compliant.

Does my yacht come within the scope of the legislation?

If the length of your yacht is greater than 50 metres and it has a ballast water capacity larger than 8 cubic metres, then you will have to comply with the IMO regulations.

If your yacht is smaller than this, but undertakes voyages from one ocean to another, you will still have to comply with the discharge standards, but these could be achieved by methods such as ballast water exchange. However, you would still need to implement a Ballast Water Management Plan and maintain a Ballast Water Record Book.

What if I am sailing in US waters?

If your yacht is less than 25 metres in length, then it is classed as a recreational vessel and is exempt from the regulations. Superyachts are defined in a number of different ways by the US authorities, depending on the size and the number of passengers.

Under their definition, a passenger vessel will be of at least 100 gross tons carrying more than 12



The Cathelco Mk I BWT system for superyachts (shown above) will be superseded by the Evolution.

passengers, including at least one passenger for hire or it may be chartered and carrying more than 12 passengers. There are also definitions for seagoing motor vessels and small passenger vessels. Regardless of the precise definition, they all come under the U.S. Coast Guard ballast water rules and are required to treat ballast water before discharge.

Can I use my reverse osmosis watermaker to produce ballast water?

In theory, 'yes', but in practice the answer is 'no'. This is because the RO system would have to be tested and approved by the Flag State administration where the yacht is registered. This is an expensive, complicated and time consuming process which is not worth the effort.

So why have RO system manufacturers not sought IMO Type Approval for their equipment? This is because they would be faced with the combined costs of R&D, comprehensive testing for Type Approval and manufacturing set-up costs in order to serve a relatively small market. As a result, RO based BWT systems would not be commercially viable. Furthermore, the potable water system of the vessel should never be connected to any other system for hygienic reasons and to avoid contamination with bacteria from pipes or tanks used for other purposes than storage of drinking water. Therefore, the best solution is to install a BWT system from a manufacturer who has already received Type Approval for their equipment.

Is the system chemical free?

Yes. The Evolution is entirely chemical free and is classified as G8 by the IMO. It is desirable to have a G8 system because no production, storage or handling of chemicals is involved. It's also much better from an environmental perspective, particularly if this is a major aim of your overall vessel management scheme.

Beware of systems which are claimed to be chemical free, but actually involve a final process to neutralise by-products. Some BWT systems based on electrochlorination and ozone treatment fall into this category and are not truly chemical free.

After sales service

One of Cathelco's major strengths is its agent network which has been established over a period of 50 years to provide representation at major ports and yacht building centres around the world.

Cathelco's agents and engineers have received factory training in the BWT system and can provide advice and technical support to ensure it continues to operate at the highest level of effectiveness.

To provide a faster response, stocks of BWT spares and equipment are stored at strategically placed service centres around the world.

A portfolio of products for the luxury yacht market

Marine growth prevention systems



ICCP hull corrosion protection systems



Cathelco and HEM water treatment systems



Worldwide Service Network

Our worldwide network of sales and service centres can provide immediate advice and assistance on the complete range of Cathelco products. Agents' contacts details are available on our website: www.cathelco.com

Abu Dhabi	Israel
Algeria	Italy
Argentina	Japan
Australia	Korea
Belgium	Malaysia
Brazil	Mexico
Bulgaria	New Zealand
Canada (East & West Coast)	Norway
Chile	Peru
China (Hong Kong, Shanghai, Qingdao)	Philippines
Colombia	Poland (Gdansk & Szczecin)
Croatia	Portugal
Cyprus	Romania
Denmark	Russia (Murmansk, St Petersburg, Vladivostok)
Ecuador	Saudi Arabia
Egypt	Singapore
Finland	South Africa (Durban & Cape Town)
France (Atlantic & Mediterranean Coasts)	Spain
Germany	Sweden
Greece	Taiwan (Kaohsiung & Taipei)
Holland	Thailand
Iceland	Turkey
India	United Arab Emirates
Indonesia	USA (East, West & Gulf Coasts)
Iran	Vietnam
Ireland	Venezuela

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