



Ballast Water Management Systems



**Choose Ecochlor**  
**Choose Peace of Mind**



Ecochlor was founded in 2001 to provide simple, reliable, cost effective and easy to use ballast water management systems (BWMSs) that can stand up to the most stringent regulations in the world.

This year marks Ecochlor's 21st year in the BWMS marketplace. We aren't in this business for the short-term, our focus is to continue to offer shipowners systems that keep their vessels compliant both now and in the future.

Through improved efficiency of our manufacturing processes and an expanded line of products and services, we have made significant advances as a company. Our collaboration with other innovative maritime environmental technology providers has made Ecochlor a "Green Marine" solutions company, providing more than just ballast water management systems for our customers.



## ECOCHLOR® BWMS SOLUTIONS

Ecochlor's new range of BWMSs puts shipowners back in control of the ballast water management process by allowing them to choose which mode of operation is best for their vessels.

### **Ecochlor® BWMS (Filtration & ClO<sub>2</sub>)**

Vessels operating this system can operate anywhere in the world with no restrictions when it comes to temperature, salinity, or turbidity.

### **EcoOne® BWMS (ClO<sub>2</sub> alone)**

Vessels operating this system can operate anywhere in marine and brackish waters ( $\geq 1$ PSU) and with no restrictions on temperature or turbidity.

### **EcoOne® Hybrid BWMS (Filtration & ClO<sub>2</sub> or ClO<sub>2</sub> alone)**

This system will allow shipowners to operate their BWMS either with or without a filter. This option is suited for shipowners who wish to have the flexibility of unrestricted operation globally, with the convenience of a no-filter system. Vessels that already have an Ecochlor BWMS with filters installed can upgrade to the hybrid option with minimal cost.

Ecochlor technicians analyze data from every ballast operation to ensure system operability - currently 98% of Ecochlor's installed systems are operational



# Ecochlor® Ballast Water Management Systems

## ROBUST and RELIABLE

### POWERFUL TREATMENT TECHNOLOGY

Chlorine dioxide ( $\text{ClO}_2$ ) requires a very low chemical dose because it primarily reacts with living organisms, rather than reacting with all organic matter, which is the case with other disinfectants such as sodium hypochlorite. Due to its limited reaction with non-living organisms,  $\text{ClO}_2$  works exceptionally well in “dirty” water without the need for large increases in  $\text{ClO}_2$  dose to ensure efficacy protecting tank coatings and limiting power requirements – this is in stark contrast to electro-chlorination (EC) or similar hypochlorite-based treatment technologies which would need to significantly increase the chemical dose to ensure there will be sufficient hypochlorite left over to kill all the organisms.

Unlike other water treatment technologies, changes in water conditions - salinity, temperature and turbidity - do not influence the effectiveness of  $\text{ClO}_2$ . There is no need for the crew to adjust the system when faced with varying waters.

Our powerful  $\text{ClO}_2$  treatment technology has been tested extensively to ensure that it works effectively as a single pass treatment under all operating conditions with no neutralization or retreatment prior to discharge.

### SMALL FOOTPRINT — FLEXIBLE, MODULAR INSTALLATION

The Ecochlor BWMS offers the small footprint and modularity needed to optimize available space. The Generator treatment cabinet, approximately the size of a small wardrobe, does not increase in size in relation to the flow rate and it can be placed in almost any convenient location on the ship. The filtration unit is typically located in close proximity to the ballast pumps and can be placed in either horizontal or vertical configurations.

### “FIT FOR PURPOSE” ENGINEERING

Ecochlor's systems are ‘fit for purpose’ all the way down to the component level. Ensuring maximum uptime means using high-quality components within an inherently simple system, which minimizes equipment failure and extends the life of the BWMS.

Selecting one of Ecochlor's BWMSs offers a number of advantages over other treatment technologies and provides shipowners the choice of the type of system they prefer with:

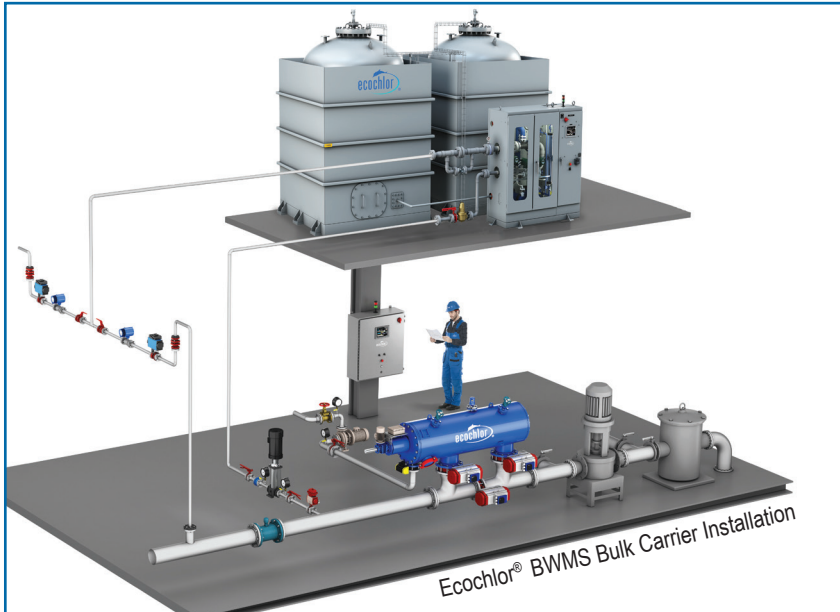
- **NO** problematic TRO sensors that can interrupt ballasting or de-ballasting operation
- **NO** electrodes
- **NO** complex power supplies
- **NO** treatment prior to discharge and no need for neutralization
- Gravity ballasting on intake (Ecochlor® BWMS; EcoOne® Hybrid [filter mode]) and on both intake / discharge (EcoOne®; EcoOne® Hybrid [filterless mode])
- Low energy use; possibly the lowest in the industry - very low carbon footprint
- Very low pumping rate in any operating conditions
- Easy cold ironing
- Treatment of flow rates up to 16,200 m<sup>3</sup>/hour
- Simple, flexible designs with filter, no-filter, and hybrid filter/no-filter options available

### USCG & IMO REGULATORY REQUIREMENTS

All of the Ecochlor® BWMSs are IMO and USCG Type Approved. This stringent testing demonstrates that our technology can meet and exceed demanding regulations for compliance.



# Ecochlor® BWMS



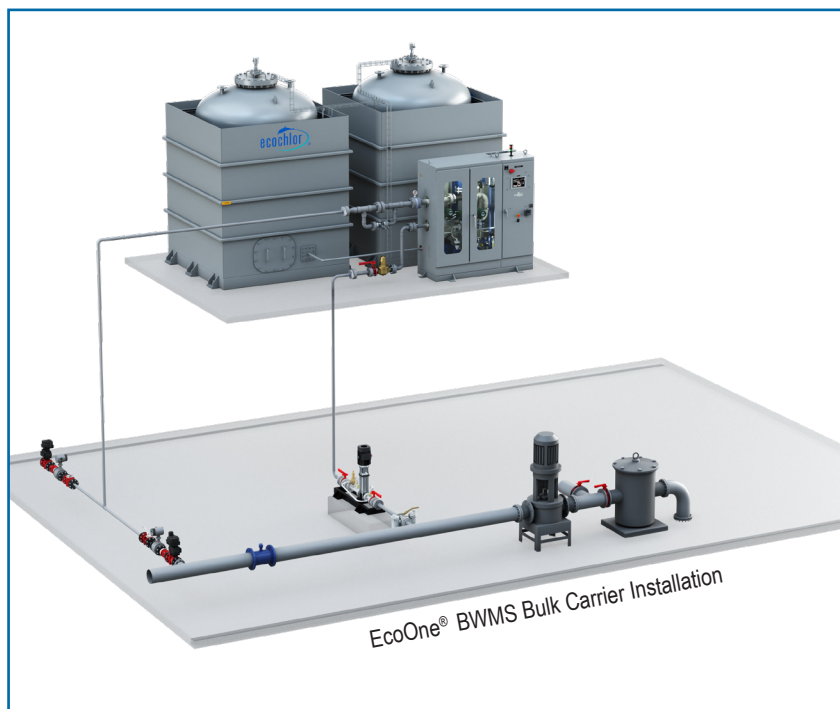
## ECOCHLOR® BWMS ANY VESSEL, ANY TRADE ROUTE, ANY PORT

There are clear benefits of installing a high quality, easy to use, reliable BWMS from Ecochlor rather than risk non-compliance with competitor's BWMSs. The elimination of this risk results in a cost-effective investment for shipowners looking for "peace of mind" every time their vessel enters into a port.

The Ecochlor® BWMS uses a two-step treatment process utilizing filtration and chlorine dioxide ( $\text{ClO}_2$ ) injection.

This Ecochlor system can operate anywhere in the world with not restrictions with temperature, salinity or turbidity.

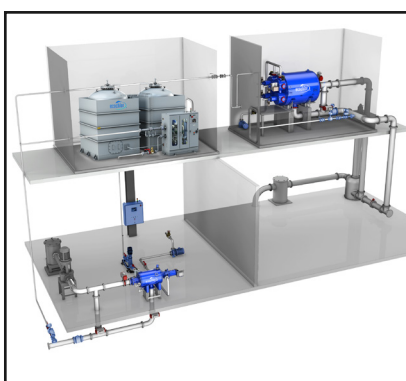
## EcoOne® or EcoOne® HYBRID BWMS



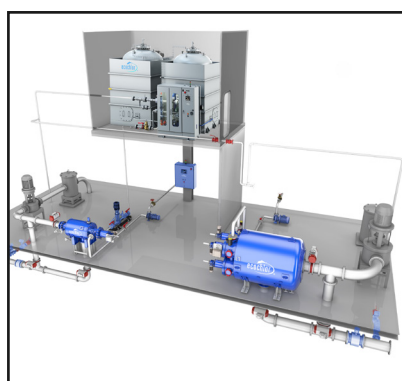
### THE EcoOne® BWMS HAS THE SAME HIGH PERFORMANCE AND RELIABILITY OF THE ECOCHLOR® BWMS BUT IS EVEN SIMPLER AND MORE RELIABLE

The EcoOne® BWMS treats with a single-step process of disinfection using chlorine dioxide ( $\text{ClO}_2$ ). The EcoOne® is a reliable BWMS that uses even less piping and no-filter, resulting in as much as a 40% reduction in the installation cost.

It is even easier for the crew to operate, has lower maintenance needs, less power requirements and lower carbon footprints. Additional features include: no filters, gravity ballasting options on both intake and discharge, reduced energy consumption and lower CAPEX & OPEX expenses.



EcoOne® Hybrid Submerged Pump Tanker



EcoOne® Hybrid Cargo Pump Room Tanker

### THE EcoOne® HYBRID BWMS IS FULLY AUTOMATED

The EcoOne® Hybrid BWMS offers the choice of the single-step or two-step process. The system is fully automated and will switch from the filter to no-filter treatment system with no crew intervention.



# OPERATIONAL PARAMETERS

Operational Parameters (Approved or Pending)	Ecochlor® BWMS with Filter Operation Only	EcoOne® Hybrid System With or Without Filter Operation	EcoOne® System Without Filter Operation Only
<b>Salinity</b>	From <1 to >36 PSU	From <1 to >36 PSU with a filter From ≥1 PSU without a filter	From ≥1 PSU
<b>Temperature</b>	From <-2 to 37°C (no limitation)	From <-2 to 37°C (no limitation)	From <-2 to 37°C (no limitation)
<b>Filter Pressure</b>	>0.4 bar	With filter: >0.4 bar Without filter: Not Applicable	Not Applicable
<b>ClO<sub>2</sub> Dose</b>	4.25 mg/L	With filter: 4.25 mg/L Without filter: 4.6 mg/L	4.6 mg/L
<b>Power Requirements</b> <small>Maximum power requirements will only occur when the filter is in continuous cleaning mode for turbid water</small>	Flow Rate: 500-3,000 m <sup>3</sup> /hour Range from 7.5 kW to 17 kW Flow Rate: 3,000-10,000 m <sup>3</sup> /hour Range from 24 kW to 60* kW	With filter: Ranges 7.5 to 60* kW Without filter: Ranges 5 to 15 kW	Flow Rate: 500-3,000 m <sup>3</sup> /hour Range from 5 kW to 7 kW Flow Rate: 3,000-10,000 m <sup>3</sup> /hour Range from 10 kW to 15 kW
<small>*The maximum power rate is because it includes 2 BS1406 filters requiring two CP-2 electrical panels</small>			



## TURNKEY INSTALLATION OPTIONS

Through a network of partners, Ecochlor offers a full range of options to provide shipowners additional support for system installations. These services include:

- Integration engineering
- Door to door shipping including assistance with ocean or air shipping, customs clearance and storage
- Installation supervision and commissioning testing attendance (with Class approval)
- Purchase and shipment of high-grade steel and plastic pipe
- Materials to support the installation
- Spare parts for redundancy on board the vessel

The installation of an Ecochlor® BWMS initiates a relationship with the shipowner and operator that will last for the life of the vessel.



## FULLY SUPPORTED

### TRAINING

Ecochlor's BWMSs are very simple to operate, but we still offer multiple training alternatives for the crew post-commissioning. While on board for our chemical resupply, we can provide shipboard training to any new crew members. This follow-on training helps ensure continued safe and reliable operation of the BWMS for years to come. We also offer computer-based training, training at the shipowner's facility, and virtual training for the crew or land-based offices.

### CHEMICAL RESUPPLY

Ecochlor has always offered unsurpassed service to clients including shipboard visits twice a year (dependent on ballasting operations) to handle chemical resupply. Ecochlor manages all the logistics for:

- Tracking chemical use with information supplied by the crew after every ballast operation
- Ordering and delivering chemicals to the nearest port or vessel
- Filling the chemical storage tanks and clean up
- New crew training and service maintenance (as time allows)

### SERVICE

Ecochlor has service engineers located throughout USA, Europe and Asia. We supply local assistance and support and have Regional Service Managers in the United States, China, Singapore and Europe. We continue to strengthen our in-house team supported by carefully selected Authorized Installation and Service providers strategically located worldwide.

Our spare parts and service network is located in multiple areas throughout the three major time zones to offer real-time response to our clients.



#### **Ecochlor Corporate Office**

285 State Street, Suite 8 ♦ North Haven, Connecticut 06473 USA  
sales@ecochlor.com    www.ecochlor.com