



ECOCHLOR BALLAST WATER TREATMENT



Unique

Time-Tested

Reliable

Energy Efficient

12 YEARS AT SEA

The Ecochlor® Ballast Water Treatment System: proven effective and reliable for over 12 years at sea. Simple installation, simple operation, rugged construction, unique technology. Meets or exceeds USCG and IMO standards. The modular system optimizes space on both new builds and retrofits. It's easy to operate and maintain, with negligible power consumption, full automation, and technical advantages over other treatment approaches.



A Rugged System that Meets or Exceeds the Most Demanding Regulations

Ballast Water Treatment is our sole focus as an organization. We've designed systems to safely and cost-effectively eliminate the transfer of aquatic invasive species. Our systems meet or exceed IMO and USCG standards. The unique, patented technology provides installation advantages in placement flexibility and scalability, and ongoing operating advantages in efficiency and energy savings.

The system simply works. It is rugged. It lasts. We have had systems in operation since 2004. Shipowners and crews have been pleased with the technical performance and operational efficiencies of the systems.

One and Done: Treat Ballast Water Once

Quickly and effectively kill invasive species that can harm your ports of entry and coastal ecosystems. Unlike other systems, the Ecochlor® BWTS kills aquatic invasive species immediately – there is no need to treat again or neutralize during ballast water discharge.

Proven Technology: Unaffected by Salinity, Temperature, Organics

The Ecochlor® BWTS uses chlorine dioxide (ClO_2) for disinfection, a water treatment technology that has been proven effective over 70 years in land-based applications. And it is a technology that is not affected by water salinity, temperature or organics, giving you the reliable performance you need for global shipping.

Ecochlor's patented chlorine dioxide generator produces chlorine dioxide without the use of or production of aqueous chlorine or chlorine gas. Unlike other disinfection methods, chlorine dioxide does not produce harmful by-products like haloacetic acids and trihalomethanes. Rigorous studies have demonstrated that treatment with the Ecochlor® BWTS will not affect ballast tank coatings.

Retrofit Ready: Flexible, Modular Installation

For both new builds and retrofits, the Ecochlor® BWTS offers the small footprint and modularity needed to optimize space. The generator and tanks can be placed in any convenient location on a ship. The filtration system needs to be located in close proximity to the ballast pumps, but can be placed in a horizontal or vertical configuration to optimize available space. For all of our installations we can provide thorough feasibility studies with 3D scans and recommend multiple options for system placement.

Operationally Efficient: Low Energy Consumption, Automated, Crew-Friendly

The energy required to power the Ecochlor® BWTS is negligible in comparison to other ballast water treatment systems, particularly to systems that use UV technologies. Operation is simple and straightforward with an intuitive control panel. For the crew, there is no chemical handling: it's all automatic. Chemical resupply, when needed, is handled by Ecochlor at locations around the world.

Ideal for Large Bulkers and Tankers

The Ecochlor® BWTS scales well for the largest bulkers and tankers. System design options are available for vessels with hazardous areas. See the installation and feasibility case studies for bulkers and tankers on our website: www.ecochlor.com/cases.

Support for the Long Haul

It isn't just the system, unique technology and engineering – it's the support provided before, during, and after installation. We have a world-wide network of maritime engineers, partners and associates here to serve: to consult; to conduct feasibility studies; to install systems; and to provide ongoing service and support.

Our mission: help you protect our coastal ecosystems and meet regulatory requirements in the most effective and efficient way, now, 12 years from now, and longer.

ECOCHLOR® BALLAST WATER TREATMENT SYSTEM

TOUGH, MODULAR, SCALABLE



ClO₂ Generator: Unique Technology

The heart of our treatment system: a chlorine dioxide generator that delivers a dilute solution of chlorine dioxide to treat incoming ballast water. The fully automated, compact generator has few moving parts and is the same physical size for all sizes of systems. It works simply: a small amount of supply water from the ship flows through an eductor which creates a vacuum in the mixing chamber. Once the vacuum has been created, two precursor chemicals flow into the chamber; the supply water becomes a solution of chlorine dioxide that is sent to the main ballast water line. The flow path is animated on our website: www.ecochlor.com/works.

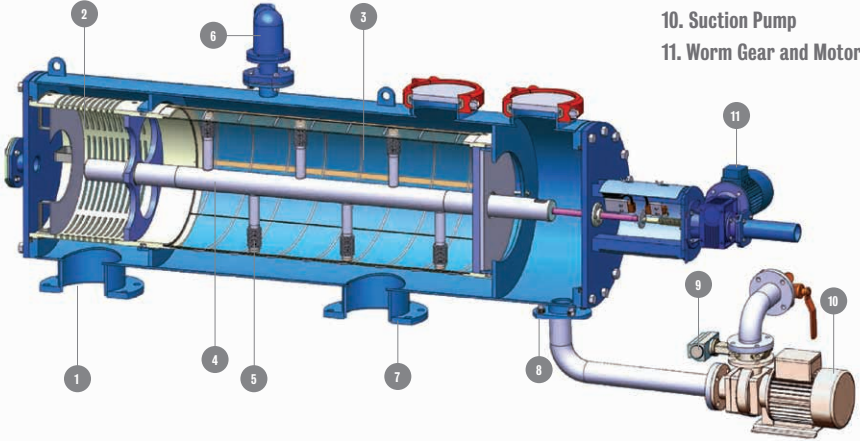
Ecochlor® Ballast Water Treatment System: Filtration and Treatment

The Filtration System removes sediments and larger organisms and the Chlorine Dioxide Treatment System eliminates smaller organisms and pathogens. The Filtration System is placed in close proximity to the ballast water pumps; the Treatment System can be placed in any convenient location on the ship. The automated system is crew-friendly and easy to operate and to verify performance. It is highly energy efficient and is engineered for long life.



Filtration System: Rugged, Self-Cleaning, Highly Efficient

The Filtration System is engineered specifically for the tough challenges of seawater filtration. It includes two stages of filtration: coarse and fine. It offers fully automatic self-cleaning operation and can handle heavy sediment loads. Another advantage: low operating pressures which translate into lower energy usage.



1. Inlet
2. Primary Coarse Screen
3. Weave-wire screen
4. Suction Scanner
5. Proximity Nozzles
6. Air Release Valve
7. Outlet
8. Flush Water Discharge Outlet
9. Flush Valve
10. Suction Pump
11. Worm Gear and Motor

Scalable: Sized to Ship and Ballast Water Needs

The ClO₂ Treatment System includes the ClO₂ generator, self-contained chemical storage tanks, associated piping and automated PLC controls. The system is easily scalable for different sizes of ships and ballast volumes. Larger systems are particularly space efficient with ten times the capacity for less than twice the footprint.



Series 100 Model: ES-500-1.5
Capacity: 500 m³/hr, Tank Size: 1.5 m³



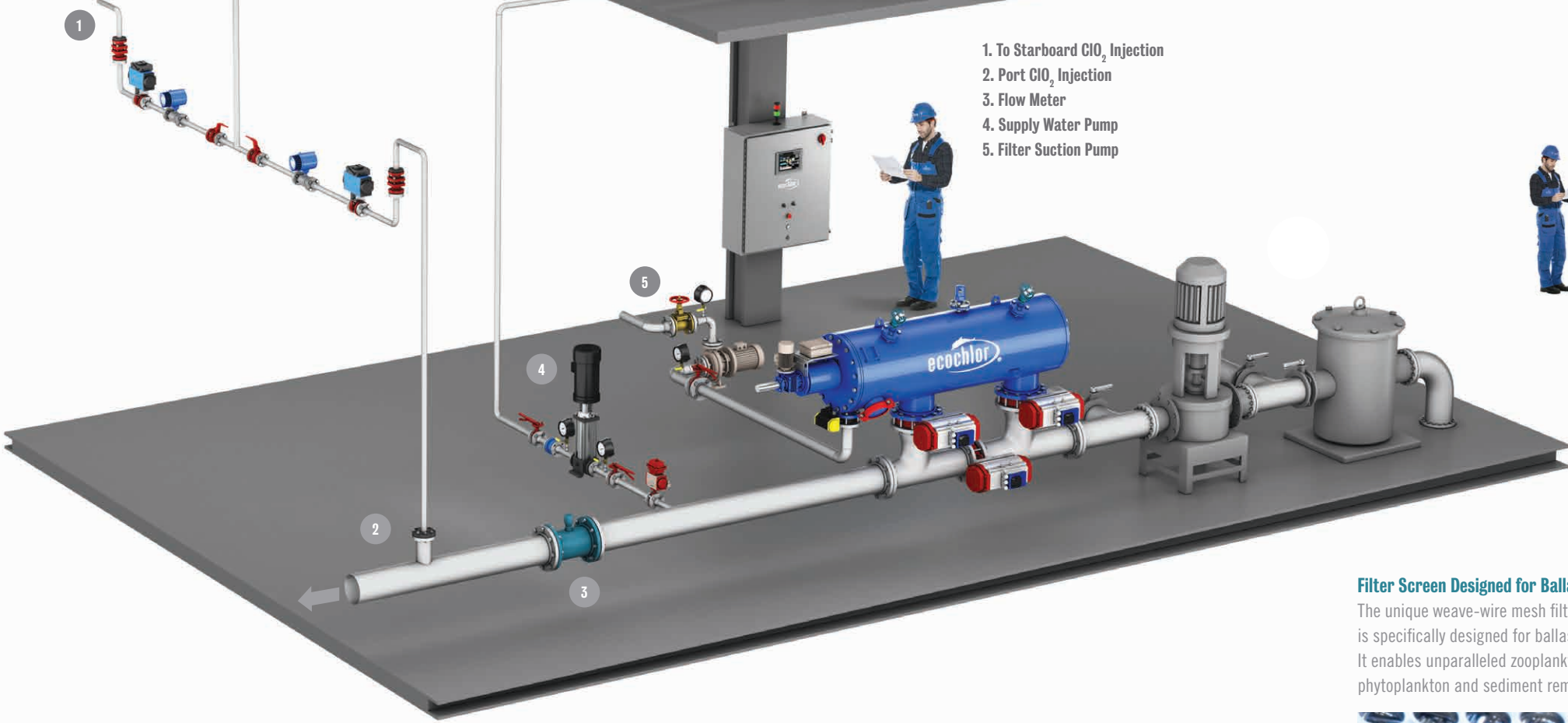
Series 150 Model: ES-1500-2.5
Capacity: 1,500 m³/hr, Tank Size: 2.5 m³



Series 200 Model: ES-3000-3.5
Capacity: 3,000 m³/hr, Tank Size: 3.5 m³



Series 250 Model: ES-5000-5.0
Capacity: 5,000 m³/hr, Tank Size: 5.0 m³



See videos and interactive tools about the Ecochlor® System on our website.
www.ecochlor.com/works



550 m³/hr



1,200 m³/hr



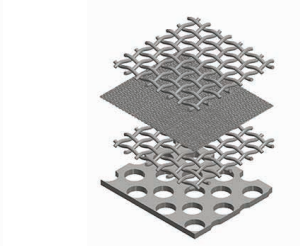
1,650 m³/hr

Scaled and Configured for Every Installation

The filters can be installed horizontally or vertically, and are configured to match the ship size and ballast water volume. Additional filter sizes available.

Filter Screen Designed for Ballast Water

The unique weave-wire mesh filter screen is specifically designed for ballast water. It enables unparalleled zooplankton, phytoplankton and sediment removal rates.



Rugged Filter Screen Structure

The filter screen is comprised of four stainless steel weave-wire screen layers. The weaves are sintered together to create a durable, reinforced filtering element that requires no additional support.

Continuous Screen Cleaning

The unique suction nozzles allow 100% cleaning of the screen after each flush cycle, ensuring continuous, uninterrupted filter operation without risk of clogging.



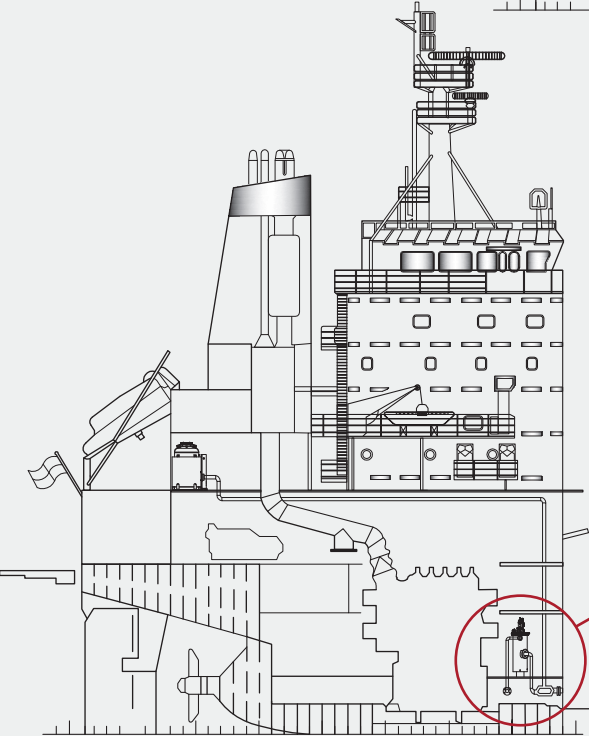
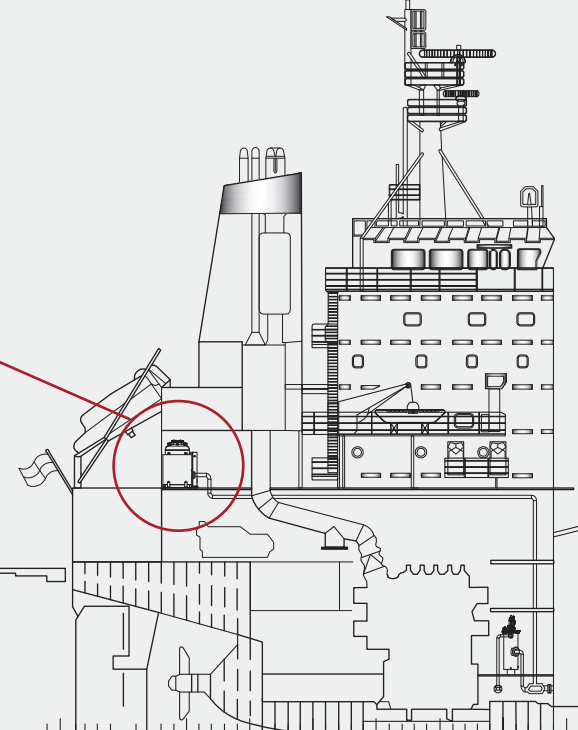
NEW BUILDS AND RETROFITS: HIGHLY FLEXIBLE, MODULAR INSTALLATION

The Ecochlor® System offers a high degree of flexibility for installation. It has a relatively small footprint compared to other ballast water treatment systems.

Installation case studies and feasibility studies are on the website: www.ecochlor.com/cases.



The ClO₂ Treatment System can be located in any convenient part of the ship. The system itself is modular to further optimize space.



Only the Filtration System needs to be installed in close proximity to the ballast water pumps.

Ecochlor® System Specifications

Series	Model	Capacity (m³/hr)	Tank Size (m³)	Footprint (m²)				Supply Water (m³/hr)	Power (kWh)	
				Filtration			Treatment ⁽²⁾		Typical ⁽³⁾	Max ⁽⁴⁾
				Qty	Vert ⁽¹⁾	Horz ⁽¹⁾				
75	ES-400S-1.5	400	1.5	1	0.3	1.7	8.5	1.2	4.8	7.0
100	ES-800S-1.5	800	1.5	1	1.0	3.5	8.5	2.7	5.5	9.1
100	ES-1200S-2.0	1,200	2.0	1	1.0	3.8	9.0	7.7	6.6	10.2
150	ES-2400-3.0	2,400	3.0	2	1.0	3.8	9.5	7.7	7.0	14.2
200	ES-3300-4.0	3,300	4.0	2	1.6	4.6	10.0	14.0	9.6	24.0
200	ES-4500-5.0	4,500	5.0	2	2.0	5.6	10.0	14.0	10.4	31.8
250	ES-6600-6.0	6,600	6.0	2	2.0	6.6	11.5	26.0	12.6	40.8
250	ES-8000-6.0	8,000	6.0	4	2.0	6.1	11.5	26.0	12.0	34.8
250	ES-10000-6.0	10,000	6.0	4	2.0	6.6	11.5	26.0	12.8	42.2
300	ES-12000-6.0	12,000	6.0	4	2.8	6.6	11.5	45.0	19.8	62.6

Alternate capacity and chemical tank sizes are available for any size ship. Design options for hazardous area installation also available.
⁽¹⁾Per filter. ⁽²⁾Modular. Can be adjusted to fit available space. ⁽³⁾Based on normal operation of filter cleaning every 15 minutes. ⁽⁴⁾Based on continuous filter cleaning.

GLOBAL SERVICE PORTS

Meets or Exceeds the Most Demanding Regulations

In land-based and sea-based studies, and in practice over the years, the Ecochlor® BWTs has met or exceeded the most stringent regulations on invasive species in ballast water.



IMO G9
Active
Substance
Approved



IMO Type
Approved
BSH Germany



IMO Type
Approved
Liberian Ship
Registry



IMO Type
Approved
Cyprus Ship
Registry




USCG STEP
and AMS
Approved



ABS Type
Approved



BV Type
Approved



Lloyd's
Register
LR Type
Approved



NK Type
Approved



US EPA FIFRA
Registered
VGP High
Quality Data
Device



US State
Reviews:
CA, NJ, NY,
MD, VA, WA



RMRS Type
Approved



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Ecochlor® Systems are patented in the US (6,773,611) & internationally.
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