



Ballast Water Management Systems



# Regulatory Approvals

## IMO & USCG Testing Parameters

### EcoOne™: The only reliable filterless BWMS

You might ask, “how can Ecochlor deliver a reliable, filterless BWMS when other makers have failed?” The answer lies in the science and the way ClO<sub>2</sub> treatment technology reacts in varying waters.

#### UV Treatment Technology

Ecochlor’s ClO<sub>2</sub> technology is not affected by suspended sediments or turbidity, meaning it is effective regardless of changes in turbidity. Therefore, filtration is not necessary to remove sediments prior to treatment, unlike UV technology which relies on the ability of UV light to penetrate and make contact with the organisms it is trying to neutralize — in waters with heavy sediments that would be incredibly difficult, if not impossible.

#### Electro Chlorination (EC) Treatment Technology

In the case of sodium hypochlorite or electro chlorination-based technologies, the science is slightly different from ClO<sub>2</sub>. Ecochlor’s ClO<sub>2</sub> technology primarily reacts with living organisms, rather than reacting with all organic matter. Due to its limited reaction with non-living organisms, ClO<sub>2</sub> works exceptionally well in “dirty” water and does not require increasing the dose to effectively treat the ballast water.

On the other hand, sodium hypochlorite or electro chlorination-based technologies react with any organic matter living or dead. This means in waters with high levels of total suspended solids the sodium hypochlorite is reacting with everything so there will not be enough hypochlorite left to kill the residual living organisms without *significantly* increasing the dose. This introduces two issues. First, the power required to produce higher levels of hypochlorite is considerable, and second, very high levels of hypochlorite are potentially hazardous to tank coatings and vessel structures.

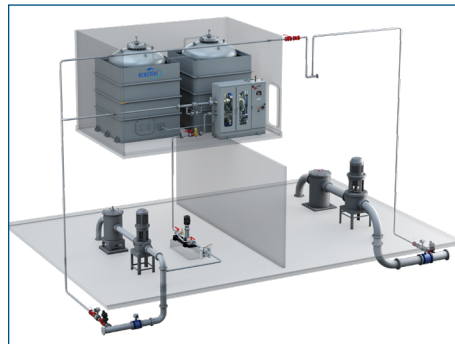
### Performance evaluation of the Ecochlor EcoOne™ Ballast Water Management System

The EcoOne™ BWMS has been tested extensively to ensure that it works effectively as a single-step treatment, without a filter, under all operating conditions in brackish and marine waters.

As the Independent Lab (IL) of choice, DNV GL was responsible for the entire process of evaluation, inspection, testing and submission of type approval applications for the Ecochlor EcoOne™ BWMS in compliance with the recent, more stringent standards for IMO BWMS Code and USCG Type Approval. This is in accordance with the USCG, *Standards for Living organisms in Ship’s Ballast Discharged Waters, Final Rule* (Final Rule) and the IMO Resolution *MEPC.300 (72), Code for Approval of Ballast Water Management Systems* (BWMS Code).

The Land-based biological efficacy tests, were undertaken by the Golden Bear Research Center (GBRC) in California, USA. GBRC performed the tests, analyzed samples, and managed test results in the required format by the IL. Whole effluent toxicity tests were also performed successfully as part of the land-based tests.

The Shipboard tests, undertaken by DHI as sub-laboratory, were completed to test the biological efficacy and related shipboard operational performance of the EcoOne™ BWMS on board a commercial vessel. DHI performed the shipboard tests, analyzed samples, managed test results in the required format by the IL. Due to global pandemic restrictions, shipboard testing was allowed to be performed on two vessels owned by Maran Tankers, a VLCC and an Aframax, during their typical vessel voyage routes within the minimum 6-month testing period.



### IMO BWMS Code Type Approval Testing Requirements

#### Land-based Testing

- Five consecutive biological efficacy tests in brackish, and marine water
- Biological efficacy tests with 24-hour and 5-day hold times (regrowth tests)
- Additional low salinity tests (2 total down to 1 PSU)

#### Shipboard Testing

- Three successful consecutive biological efficacy tests during normal vessel operations

### U.S. Coast Guard Type Approval Testing Requirements

#### Land Based Testing

- A minimum of five consecutive valid test cycles per salinity
- Hold treated water for a minimum of 24 hours
- Tested in conditions for which it will be approved related to salinity and dissolved and particulate content
- Whole effluent toxicity tests conducted in accordance with the EPA VGP requirements

#### Shipboard Testing

- Five consecutive valid test cycles performed over a minimum of six months
- Source water that has an acceptable range of geographic and seasonal variability
- Temperate, semi-tropical or tropical locations with ambient organism concentrations that will provide a significant challenge to the efficacy
- Waters that meet the minimum organism concentration requirements

Choose Ecochlor. Choose Peace of Mind.