



# Ecochlor Specification List



## Company Information

Company Name:	Ecochlor, Inc.
Founded:	2001
Headquarters:	Maynard, Massachusetts USA
Other Offices:	North Haven, Connecticut USA; Limassol, Cyprus
Website:	<a href="http://www.ecochlor.com">www.ecochlor.com</a>
Treatment Technology:	Filtration + Chemical Injection (Chlorine Dioxide - ClO <sub>2</sub> )

## Certificates & Type Approvals

### IMO Type Approval

Certificate Date: 2011 Renewal: 4 Sept 2018 (NMA)

### IMO G9 Active Substance

Approval Date: 6 Oct 2010

### USCG Type Approval

Certificate Date: 10 Aug 2017 Revision: 26 Apr 2018 Rev. 1

### Class Approvals

ABS; BV; LR; NK; RMRS; DNV GL

### Flag State Approvals

IMO Liberian Type Approval; IMO Cyprus Type Approval; IMO Hellenic Type Approval

## USCG Type Approval Limitations

Flow Rates (TRC): 500 - 16,200 m<sup>3</sup>/hr.

Chemical Dose: 4.25 mg/L

US Flag Hazardous Approved: Yes

Minimum Hold Time: 24 hrs.

Temperature: Not Applicable

Electrolyte Feed Temp./Salinity: Not Applicable

Salinity: Not Applicable

TRO: Not Applicable - No neutralization or retreatment at discharge.

Maximum Allowable Discharge Concentration: 0.2 mg/L MADC using in-tank sample

## Additional Testing

### Tank Corrosion

Corrosion Evaluation of Test Panels Exposed to ClO<sub>2</sub> Treated and Untreated Seawater (Corrosion Testing Laboratories, Inc.); Test of ClO<sub>2</sub> on Epoxy Ballast Tank Coatings (International Paint, Inc.); Laboratory Immersion Corrosion Testing of Ballast Panels in Chlorine Dioxide Treated Artificial Seawater (NovaChem).

## Ecochlor Components

### ClO<sub>2</sub> Generator skid

Series 75, 100, 150, 200, 250, 300.

### Filter

FilterSafe (Standard option screen provided: 904L SST).

### Chemical Storage Tanks

Two self-contained chemical storage tanks. One is a vented carbon steel tank lined with Halar (ECTFE) for 78% Sulfuric Acid. The second is a vented 316L stainless steel tank for Purate™ BWT.

### Motive Water Booster Pump

Vertical, multi-stage centrifugal pump sized to supply motive water that ranges from 1.3 - 45.4 m<sup>3</sup>/hr.

### System Control Panels

Treatment System Control Panel (CP-1) is mounted on the same skid as the ClO<sub>2</sub> Generator, Filtration System Control Panels (CP-2 & CP-4 as required) are located local to the filters, Remote Panel (CP-3) is installed in the Ballast/Cargo Control Room or Deck Office for monitoring system operation.

### Piping/Components

Sulfuric acid piping is Alloy 20 or Teflon lined steel pipe. Purate piping is 316L SST. Chlorine dioxide piping is Glass Reinforced Epoxy (GRE).

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### Ecochlor BWMS Details

#### Maximum Flow Rate Capacity of an Ecochlor BWMS

One (1) BWMS required for a ballast flow rate of up to 16,200 m<sup>3</sup>/hr with an option for up to three (3) ClO<sub>2</sub> injection points.

#### Power Consumption

Power requirements include filter(s), filter cleaning suction pump, generator, control panel and motive water booster pump. Power requirements are slightly higher when including an aft peak filter in operation.

#### Power Consumption with Flow Rates from 500 - 3,000 m<sup>3</sup>/hr

Power requirements range from < 7 kW with maximum (based on continuous filter cleaning for turbid water) at < 30 kW.

#### Power Consumption with Flow Rates from 3,000 -10,000+ m<sup>3</sup>/hr

Power requirements range from <14 kW with maximum (based on continuous filter cleaning for turbid water) at <60 kW.

#### Weight

Dry weight of an Ecochlor generator and chemical tanks range from 4,100 to 12,000 kg. Chemical tank size determined by total annual ballast volume to be treated.

#### Footprint\*

\*Treatment System and FilterSafe Filter(s). Footprint ranges are based on the Ecochlor BWMS Model and varying filter sizes based on ballast flow rate.

#### Treatment System (Generator + Precursor Chemical Storage Tanks)

Range from 12.7 - 32 m<sup>2</sup>

#### One Filter (horizontal)

Range from 1.6 - 7.0 m<sup>2</sup>

#### One Filter (vertical)

Range from 0.3 to 3.1 m<sup>2</sup>

#### Filter Pressure Drop

1.6 barg is the baseline input operating pressure to support proper filter cleaning with 0.5 barg pressure drop.

#### Motive Water Source

Filtered sea water or fresh water.

#### Treatment System Precursor Chemicals

78% Sulfuric Acid and Purate™ BWT.

#### Chemical Cost

USD \$0.08 per m<sup>3</sup> of treated ballast water or one cubic meter of each precursor chemicals (priced at \$6,000) to treat 75,000 of ballast water. Price includes the chemicals, transportation, technicians and travel for the re-supply activity.

### Ecochlor BWMS Details

#### Chemical Resupply Schedule

Two to three times a year, typical.

#### Chemical Ports of Call\*

6 Regions. \*Additional ports are added as needed.

**Northern Europe:** Rotterdam; Le Havre; Donges; Amsterdam; Hamburg; Antwerp; Bremerhaven.

**Mediterranean:** Trieste; Rijeka; Marseilles; Barcelona; Valencia; Genoa; Piraeus.

**North America:** San Francisco; Houston; Baltimore; New York/New Jersey; New Orleans; Pascagoula.

**Australia:** Perth/Freemantle; Dampier; Port Hedland.

**Asia/Pacific:** Hong Kong; Singapore; Tanjung Pelepas.

**Middle East:** Fujairah.

#### BWMS Standard Delivery Timeframe

The standard delivery timeframe is 26 weeks from the signed purchase order and deposit, contingent upon receiving detailed integration engineering drawings within four (4) weeks, and does not include the delivery time (average 4-6 weeks) to the shipyard.

#### BWMS System Delivery Method

Treatment System is delivered as three skids that consist of the ClO<sub>2</sub> generator with CP-1 and two precursor chemical storage tanks. The filters, filter cleaning suction pumps, and associated valves/components are provided separately.

#### EcoCare™ Compliance Guarantee\*

Guarantee of Ecochlor system efficacy as it pertains to system performance and treatment of ballast water for invasive species. Insures against financial penalties up to \$1,000,000\* relating to fines, port charges, delays and off-hire. \*Terms and conditions apply.

#### Ballast Operation Data Storage

Up to two (2) years of operational ballast water treatment data.

#### Warranty

Two (2) years.

#### Training Options

Computer-based training program; Ecochlor Training Center; Portable HMI Simulator.

#### International Service Call Center

+44 131 322 1446 (24/7)

