

Type Approval Certificate

This is to certify that the undernoted products have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

This certificate is issued to:

PRODUCER	Ecochlor Inc 14 Nason Street, Suite 309, Maynard, MA 01754, United States of America (USA)	
PLACES OF PRODUCTION	FluidTech (Shanghai) Environmental & Equipment Technology Co., Ltd; First Floor, Block 1, Henlu Modern Industrial Park, No.166 Min Dong Road, Pudong New District Shanghai, 201209, People's Republic of China.	Pro Flow Inc 303 State St. North Haven, CT.06473, United States of America (USA)
DESCRIPTION	Ecochlor® ballast water treatment system (BWTS) using 40µm mesh size filtration unit, chlorine dioxide (ClO ₂) technology which incorporates Purate® BWT and 78% Sulphuric acid for (ClO ₂) generation and disinfection of ballast water.	
TYPE	Ecochlor® BWTS series - 75, 100, 150, 200, 250, 300 Chemical metering - 5mg/L maximum dosage	
APPLICATION	For treatment of ship's ballast water	
SPECIFIED STANDARDS	Lloyd's Register Rules and Regulation for the Classification of Ships Part 5 and Part 6 as applicable.	
Certificate No.	13/00076	
Issue Date	11 September 2013	
Expiry Date	10 September 2018	
Sheet	1 of 4	


U. Okon
Marine Technology & Engineering Services, London
Lloyd's Register EMEA

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RATINGS

Ecochlor® Series	TRC m ³ /h	Filtration unit*	Chemical tank capacity m ³	ClO ₂ concentration (mg/L)
75	200 - 500	BS-050 -	0.5-1.5	5
100	400 - 1,300	BS-1204S-T	0.5-1.5	5
150	1,000 - 3,500		1.0-3.0	5
200	2,500 - 6,900		2.5-6.0	5
250	5,000-12,200		5.0-9.0	5
300	9,000-16,200		8.0-12.0	5

*Ecochlor® BWTS detailed technical summary including the filtration unit is contained in the referenced document #LR103 Rev 1.5 dated 21 Feb 2013.

TECHNICAL SPECIFICATIONS

Filtration Unit	
Capacity range	125 - 3,300m ³ /hr
Mesh size	40µm
Filter models	BS-050, BS-070, BS-100, BS100-T, BS150, BS-150-T, BS-200, BS-200-T, BS-400S, BS-400S-T, BS603S, BS603S-T, BS-804S, BS-804S-T, BS-1004S, BS-1004S-T, BS-12404S and BS-1204S-T
Max. design pressure	10 barg
Max. working temperature	55°C
Filter housing material	Carbon Steel Zinc-Phosphate coating/rich Zinc primer
Filtration Screen	Sintered screen 316L SST/904L Option
Backwash differential pressure	0.5 barg backwash setpoint

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Chlorine dioxide treatment system specification						
Series	75	100	150	200	250	300
Max ballast water pump capacity (m ³ /hr)	500	1,300	3,500	6,900	12,200	16,200
Treatment						
ClO ₂ Concentration (mg/L)	5	5	5	5	5	5
ClO ₂ Generation rate required (Kg/hr)	2.5	6.5	17.5	34.5	61.0	81.0
Motive (Supply) water flow rate (m ³ /hr)	1.25	2.73	7.72	14.08	25.89	45.42
Chemical metering						
Purate® BWT required (L/hr)	7.5	19.6	52.7	104.0	183.8	244.1
78% Sulfuric acid required (L/hr)	7.3	19.0	51.2	100.9	178.5	237.0
Metering pump Model - Grundfos	DME 60	DME 60	DME 375	DME 375	DME 375	DME 375

Control and monitoring equipment as applicable	
Programmable Logic System SIEMENS SIMATIC S7-300 ^(*)	
Programmable Logic System SIEMENS SIMATIC S7-200 ^(*)	
Power Supply SIEMENS SITOP smart 24V/5A and 24V/2.5A ^(*)	
Control Panel SIEMENS SIMATIC HMI TP700 ^(*)	
Motor Starter SIEMENS 3RA6 - 690V/0.1-32A/50-60Hz ^(*)	

^(*) Meets the requirements set in Lloyd's Register Type Approval System Test Specification Number 1:2002 for environmental category ENV2.

OTHER CONDITIONS

The intended installation location of Ecochlor® BWTS models onboard ships are to be suitable and in compliance with the requirements for such location. Its connection into the ship's system including all electrical and control engineering aspects are to be shown on the ship's plans and submitted for consideration prior to installation.

In addition, proposed installation of components in hazardous areas are to be supported with the complying Ex-certification meeting the requirements for the specific area.

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OTHER CONDITIONS (Continued)

The use of plastic pipes during installations onboard are to comply with LR Rules as per Part 5 Chapter 12 Section 5 and supported with certification taking into consideration the requirements of IMO Res A.753(18).

The ballast water treatment system components outside the scope of supply from Ecochlor Inc are to be of type complying with Lloyd's Register Rules and submitted for consideration prior to installation.

Adequate instruction is to be provided for the ventilation of the Purate and 78% Sulphuric acid tank to a safe location. This is to be reviewed on a case by case basis during ship specific installations.

Installation survey and commissioning is to be conducted for each installation onboard ship in accordance with IMO Res. MEPC.174(58) Section 8 and Lloyd's Register specific survey requirements.

"This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid certificate."

The Design Appraisal Document No. 13/00076 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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