



Certificate No. 02-003426/025377

TYPE APPROVAL CERTIFICATE

This is to certify that this product complies with the Rules for the classification of ships, Part 1 - General requirements, Chapter 3 - Type approval of products.

TYPE AND DESCRIPTION OF PRODUCT:

PURESTREAM BWMS
(model range Purestream 100 to Purestream 1500)
Treatment rated capacity (TRC): 10-1500 m³/h

MANUFACTURER:

ATLANTIUM TECHNOLOGIES Ltd.
11 HaMelacha St.
Har Tuv Industrial Park 9980101
ISRAEL

THE PRODUCT MEETS FOLLOWING RULES/REGULATIONS:

CRS Rules for technical supervision of sea-going ships, Part 22 – Pollution prevention
Resolution MEPC.300(72) – Code for approval of ballast water management systems

FURTHER DETAILS OF THE PRODUCT AND CONDITIONS FOR CERTIFICATION ARE GIVEN OVERLEAF.

APPROVAL IS VALID UNTIL: **2025-10-15**

Place and date: Split, 2021-10-15

Seal

Marinko Popović, dipl.ing.

NOTE: This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Croatian Register of Shipping of any modification or changes to the product in order to obtain a valid certificate.

DETAILED PRODUCT DESCRIPTION:

Ballast water management system using filtration and UV disinfection at ballast water uptake.

UV disinfection at ballast water discharge is used for fresh water and brackish water salinities.

Model	TRC (m3/ h)	Filter Amiad	UV reactor Atlantium	Number of lamps
Purestream 100	10-150	1 x APS 55	1 x RZM 200-2	2
Purestream 200	10-250	1 x APS 55	1 x RZM 200-3	3
Purestream 300	10-350	1 x APS 55	1 x RZM 200-5	5
Purestream 500	66-550	1 x APS 56	1 x RZM 350-5	5
Purestream 900	66-900	1 x APS 56	1 x RZM 350-8	8
Purestream 1200	112-1200	2 x APS 56	1 x RZMW 350-7	7
Purestream 1500	112-1500	2 x APS 56	1 x RZMW 350-11	11

Filter units are to be mounted in parallel. Filter units are fitted with automatic backwash mechanism.

Purestream BWMS is equipped with automatic and integrated clean in place (CIP) function.

Ballast water management system can be set in two different modes of operation, USCG or IMO mode.

Ballast water management system is approved for two dose levels for IMO and USCG modes.

150 mJ/cm² is the dose for IMO mode for zero to two days retention time and for USCG mode for one to two days retention time.

120 mJ/cm² is the dose for IMO mode and USCG mode for three days and more retention time.

Purestream BWMS has demonstrated a mode of operation that enables one-pass UV treatment in IMO mode. This means that UV disinfection is only required during ballasting, and not during de-ballasting.

This mode is approved only for marine (sea) water salinity. For fresh water and brackish water salinities and in USCG mode, ballast water management system will operate with two-pass UV treatment, meaning that UV disinfection is required during ballasting and de-ballasting.

Purestream BWMS is designed to control and adjust the ballast water flow to deliver a defined UV dose to the ballast water as a function of real-time measurement of the ballast water UV-T/ UV intensity and lamp intensity during ballasting and de-ballasting, for the specified UV-T and type of water.

UV reactor model	Number of lamps	TRC (m3/ h)	UV intensity lower limit in all salinities (W/m ²) ¹	UV transmittance	% value ² of TRC at 40% UVT at 120 mJ/cm ²	% value ² of TRC at 40% UVT at 150 mJ/cm ²
RZM 200-2	2 x 6,9 kW	150	7	≥ 40 %	25	20
RZM 200-3	3 x 6,9 kW	250	7	≥ 40 %	39	30
RZM 200-5	5 x 6,9 kW	350	7	≥ 40 %	67	53
RZM 350-5	5 x 12 kW	550	7	≥ 40 %	108	85
RZM 350-8	8 x 12 kW	900	7	≥ 40 %	180	142
RZMW 350-7	7 x 12 kW	1200	7	≥ 40 %	95	75
RZMW 350-11	11 x 12 kW	1500	7	≥ 40 %	179	141

1) UV intensity below lower limit, corresponding to an UV transmission of less than 40% at 254 nm, implies that the ballast water is not treated in accordance with this certificate.

Set in respect of max flow of given UV-reactor size.

2) Values represent the approximate % amount of the flow rate at 40% UVT to the max type approved TRC.

APPLICATION / LIMITATIONS:

Models are not intended for installation in hazardous areas.

Salinity: no limitation

Temperature of ballast water: no limitation

Minimum holding time between uptake and discharge:

72 hours and above with UV dose ≥ 120 mJ/cm² and 0 hours with UV dose ≥ 150 mJ/cm² in IMO mode;

72 hours and above with UV dose ≥ 120 mJ/cm² and 24 hours with UV dose ≥ 150 mJ/cm² in USCG mode

Maximum working pressure: 10 bar

TYPE APPROVAL DOCUMENTATION:

Description	Drawing no.	Rev.
P&ID Piping and instrumentation diagram	PID010000 PID020000	22 06
Filter drawing	048500-000001 048600-000001	5 4
UV reactor drawing	ICM005100 ICM000100 ICM006100	A E 4
Report for land-based test	SNO 7388-2019	12 November 2018
Report for shipboard test	SNO 7542-2020	13 November 2020
Environmental testing	118-30840-2	18 December 2020
User manual	PM55P00BE PM85P00BE PM95P00BE	January 2021

MARKING OF PRODUCT:

- Manufacturer's name or trade mark
- Type designation
- Serial number

CONDITIONS FOR CERTIFICATION:

This certificate is issued on the basis of the test reports and the documentation listed in type approval certificate issued by LR Lloyd's Register on behalf of Norwegian Maritime Authority No. LR21280338TA.

User manual for Purestream BWMS is to be carried onboard a vessel fitted with this ballast water management system.

Purestream BWMS is type approved with the following control and safety related instruments according to the P&IDs:

- UV intensity sensor (UVIS); UV transmittance sensor (UVIC)
- temperature sensors (T1, T2 and T3) in UV unit
- pressure sensors (PT-1 and PT-2) for filter unit
- flow meters (FIT-1, FIT-2 and FIT-3)
- flow control valves CV-1 and CV-2

Following switches and/or sensor points can be set-up from the screen:

CV-1 valve (in ballast line) position; FIT-1 main (ballast) line flow meter-transmitter; FIT-2 technical water flow meter-transmitter; FIT-3 backwash flow meter-transmitter; PT-1 filter inlet pressure; PT-2 filter outlet pressure; EC-1 electrical conductivity meter; LIT-1 of T-1 CIP tank level and PH-1 pH meter.

In the event of a sudden loss of power supply from the ship, the system will automatically shut-down the actuators that keep the normally closed pneumatic valves PV-2 and/or PV-4 open. This will suspend the water flow through Purestream BWMS.