



TYPE APPROVAL CERTIFICATE
No. MAC053025PU

This is to certify that the product identified below satisfies the requirements of the standard quoted under "Reference standard"

<i>Description</i>	BALLAST WATER TREATMENT SYSTEM
<i>Type</i>	GloEn-Patrol 2.0 / 2.01 P50/P150/P150-EX/P250/P250-EX/P300/P300-EX/P350/P350-EX/ P500/P500-EX/P700/P700-EX/P750/P750-EX/P750-1/P750-1-EX/ P800/P800-EX/P800-1/P800-1-EX/P900/P900-EX/P900-1/ P900-1-EX/P1000/P1000-EX/P1000-1/P1000-1-EX/P1200/ P1200-EX/P1200-1/P1200-1-EX/P1500/P1500-EX/P1500-1/ P1500-1-EX/P2000/P2000-EX/P2000-1/P2000-1-EX/P2500/ P2500-EX/P2500-1/P2500-1-EX/P3000/P3000-EX/P3000-1/ P3000-1-EX/P3500/P3500-EX/P4000/P4000-EX/P4500/P4500-EX/ P5000/P5000-EX/P6000/P6000-EX
<i>Applicant</i>	PANASIA CO., LTD. #55, Mieumsandan 3-ro, Gangseo-gu, Busan REPUBLIC OF KOREA
<i>Manufacturer</i>	PANASIA CO., LTD.
<i>Place of manufacture</i>	#55, Mieumsandan 3-ro, Gangseo-gu, Busan REPUBLIC OF KOREA
<i>Reference standards</i>	IMO Resolution MEPC.300(72) - Code for Approval of Ballast Water Management Systems(BWMS Code)
<i>Reference documents</i>	RINA TYPE APPROVAL SYSTEM

Issued in **BUSAN** on **April 4, 2025**. This Certificate is valid until **April 3, 2030**



Ho Seok Yang
RINA Services S.p.A.

This certificate consists of this page and 1 enclosure and copy of the original test results.

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GloEn-Patrol 2.0 / 2.01

Product Description

- Type and model designations

GloEn-Patrol 2.0 : P50, P150, P150-Ex, P250, P250-Ex, P300, P300-Ex, P350, P350-Ex, P500, P500-Ex, P700, P700-Ex, P750, P750-Ex, P750-1, P750-1-Ex, P800, P800-Ex, P800-1, P800-1-Ex, P900, P900-Ex, P900-1, P900-1-Ex, P1000, P1000-Ex, P1000-1, P1000-1-Ex, P1200, P1200-Ex, P1200-1, P1200-1-Ex, P1500, P1500-Ex, P1500-1, P1500-1-Ex, P2000, P2000-Ex, P2000-1, P2000-1-Ex, P2500, P2500-Ex, P2500-1, P2500-1-Ex, P3000, P3000-Ex, P3000-1, P3000-1-Ex, P3500, P3500-Ex, P4000, P4000-Ex, P4500, P4500-Ex, P5000, P5000-Ex, P6000, P6000-Ex

- Treatment Rated Capacity (TRC) : 50 ~ 6000 m3/h

- Treatment sequence:

- Ballast water uptake : Filtration and disinfection by UV treatment
- Ballast water discharge : UV treatment
- After ballasting or de-ballasting operation, the system is to be cleaned through draining of remaining water from the filter and UV unit after operation.

- Temperature and salinity of the ballast water are not limiting conditions for the ballast water management system.

- Explosion Proof Type (-Ex) : The Ex-equipment and component which are used in GloEn-Patrol 2.0 / 2.01 BWMS are able to use in Zone 1, gas group IIC and temperature class T4, but the electrical supply and control systems are to be located in safe zone. Ex-certification is not covered by this certificate. Installation in a hazardous area are to be approved in each case according to the Rules and Ex-certification / Special Condition for Safe Use, listed in a valid Ex-certificate issued by a notified/recognized Certification Body.

Reference documents

Manufacturer's Documents

- The Booklets for PANASIA GloEn-Patrol 2.0 / 2.01 Ballast water Management System which is not for individual installation has been reviewed as below documents.

- Bill of material approved with no.PUMC-25149 on 04/04/2025.
- Detailed drawing of all main components with no.PUMC-25150 on 04/04/2025.
- BWMS All model drawing (GA) with no.PUMC-25151 on 04/04/2025.
- Piping & instrument diagram with no.PUMC-25152 on 04/04/2025.
- Electrical wiring diagram with no.PUMC-25153 on 04/04/2025.
- Instruction manual with no.PUMC-25154 on 04/04/2025.

Certificates & Reports

Biological test reports

- Final Land-based Ballast Water Management Report According to USCG Final Rule - Panasia GloEn Patrol-250 BWMS by Golden Bear Facility, US, 19 December 2017.
- Biological efficacy performance evaluation of Ballast Water Management System GloEn-Patrol in land-based test, by DHI, Denmark, 27 March 2018.
- Biological efficacy performance evaluation of Ballast Water Management System GloEn-Patrol in shipboard test, by DHI, Denmark, 28 March 2018.
- Biological efficacy performance evaluation of Ballast Water Management System GloEn-Patrol in land-based test - Supplementary Study, by DHI, Denmark, 04 March 2019.



RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000

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GloEn-Patrol 2.0 / 2.01

Environmental test report

- Summary for environmental testing Doc no.STA R16 0001, by SGS, 21 December 2017.
- Summary for environmental testing Doc no.STA R18 0001 (flow switch), by SGS, 12 March 2018.
- Report on additional environmental testing for IMO TA, PU1000 Environmental test, KOMERI-P-24-03(9) by KOMERI, 16 January 2014.
- Report on additional environmental testing for IIMO TA, P1250, P1500, Environmental test reports, by SGS, 24 December 2015 / 6 January 2016.
- Test Report for Panasia PCP-14S, report No.SGS-R18-1520-EN00, by SGS, 8 August 2018.
- Test report for conductivity sensor and transmitter, report No.SGS-E19-0049 and SGS-E19-0050 dated 8 July 2019, SGS-E19-0057 and SGS-E19-0058 dated 5 August 2019, SGS-R19-1719-EN00 and SGS-R19-1720-EN00 dated 29 July 2019, SGS-R19-1736-EN00 and SGS-R19-1737-EN00 dated 30 July 2019.

GloEn-Patrol 2.0 / 2.01				Test report no.
No	Unit	Component	Model	Electromagnetic field Radiated Emission
1.1	Filter unit	Limit switch	XCMD2145C12	SGS-RF-EMH001265
1.2		Limit switch (Ex-proof)	XCMD4145L5EX	SGS-RF-EMH001266
1.3		Pressure transmitter	LEVEL3000	KOMERI-0311-19T3379
2.1	UV unit	UV unit	PU250	SGS-RF-EMH001347
2.2		UV intensity transmitter	SUV 20.2 Y2C	SGS-RF-EMH001273
2.3		Temp. transmitter	MBT 5252-9110	SGS-RF-EMH001259
2.4		Temp. transmitter (Ex-proof)	5335D	SGS-RF-EMH001260
2.5		Temperature switch	STO-120	SGS-RF-EMH001282
2.6		Flow switch	DFS-2	SGS-RF-EMH001272
2.7		Reed switch	RS-1	SGS-RF-EMH001281
2.8		Purge & Pressurization system (Ex-proof)	6000 series	SGS-RF-EMH001294
3.1	Piping	Auto valve for drain	HQ-006	SGS-RF-EMH001314
3.2		Auto valve for air inlet	HQ-006	SGS-RF-EMH001314
3.3		Auto valve for vent	HQ-006	SGS-RF-EMH001314
3.4		Auto valve (Ex-proof)	HQ-006-EX	SGS-RF-EMH001309
3.5		Auto valve (Ex-proof) (with Solenoid valve 495900)	495900	SGS-RF-EMH001310
3.6		Auto valve (Ex-proof) (with Solenoid valve 495905)	495905	SGS-RF-EMH001295
3.7		Actuator	SA005	OT-19N-RED-083
3.8		Actuator (Ex-proof)	SA05X	OT-19N-RED-091
3.9		Conductivity Sensor	228	SGS-E19-0058
3.10		Analyzer	1056	F690501-RF-EMH000333
3.11		Analyzer (Ex-proof)	1066	SGS-E19-0057
3.12		EHS Valve (Ex-proof)	EHS series	TAA00000FG
3.13		Flow meter (Ex-proof)	FEP311/315	TAA000019B
4.1	Panel	BWMS Control Panel	PCP series	SGS-RF-EMH001346
4.2		UV power supply panel	PBP series	SGS-RF-EMH001377
4.3		BWMS repeat panel	PRP	SGS-RF-EMH001315
5.1	Alternative (for piping)	Flow meter (Ex-proof)	CN-100	INC32500-AE001
5.2		Flow meter (Ex-proof)	FEP600 series	TAA00002V3
5.3		EHS Valve (Ex-proof)	LPU series	TAA00002C9
5.4		EHS Valve (Ex-proof)	QHD-30NEX	RF-EMC002011_EN



RINA Services S.p.A.
Via Corsica, 12 - 16128 Genova
Tel +39 010 53851
Fax +39 010 5351000

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GloEn-Patrol 2.0 / 2.01

Technical Characteristics

NO.	Model	TRC (m3/hr)	Filter	UV Unit	Remark
1	GloEn-P50	50	PF50	PU50(2)	
2	GloEn-P150(-Ex)	150	PF250	PU250(6)	
3	GloEn-P250(-Ex)	250	PF250	PU250(8)	
4	GloEn-P300(-Ex)	300	PF500	PU250(12)	
5	GloEn-P350(-Ex)	350	PF500	PU250(12)	
6	GloEn-P500(-Ex)	500	PF500	PU500(18)	
7	GloEn-P700(-Ex)	700	PF750	PU500(24)	
8	GloEn-P750(-Ex)	750	PF750	PU1000(22)	
	GloEn-P750-1(-Ex)			PU250(8) + PU500(18)	
9	GloEn-P800(-Ex)	800	PF900	PU1000(22)	
	GloEn-P800-1(-Ex)	800	2 x PF500	PU250(12) + PU500(18)	
10	GloEn-P900(-Ex)	900	PF900	PU1000(22)	
	GloEn-P900-1(-Ex)	900	2 x PF500	2 x PU500(18)	
11	GloEn-P1000(-Ex)	1000	2 x PF1200	PU1000(22)	
	GloEn-P1000-1(-Ex)	1000	2 x PF500	2 x PU500(18)	
12	GloEn-P1200(-Ex)	1200	PF1200	PU1250(26)	
	GloEn-P1200-1(-Ex)	1200	2 x PF750	2 x PU500(24)	
13	GloEn-P1500(-Ex)	1500	PF1500	PU1500(32)	
	GloEn-P1500-1(-Ex)	1500	3 x PF500	3 x PU500(18)	
14	GloEn-P2000(-Ex)	2000	PF2000	2 x PU1000(22)	
	GloEn-P2000-1(-Ex)	2000	3 x PF750	3 x PU500(24)	
15	GloEn-P2500(-Ex)	2500	PF2500	2 x PU1250(26)	
	GloEn-P2500-1(-Ex)			4 x PU500(24)	
16	GloEn-P3000(-Ex)	3000	PF3000	2 x PU1500(32)	
	GloEn-P3000-1(-Ex)			6 x PU500(18)	
17	GloEn-P3500(-Ex)	3500	-	-	Glo-EnP1200 x 3 sets (PARALLEL)
18	GloEn-P4000(-Ex)	4000	-	-	Glo-EnP1500 x 3 sets (PARALLEL)
19	GloEn-P4500(-Ex)	4500	-	-	Glo-EnP1500 x 3 sets (PARALLEL)
20	GloEn-P5000(-Ex)	5000	-	-	Glo-EnP2500 x 2 sets (PARALLEL)
21	GloEn-P6000(-Ex)	6000	-	-	Glo-EnP3000 x 2 sets (PARALLEL)

TRC : Treatment Rated Capacity, Ex : Explosion Proof type



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Via Corsica, 12 - 16128 Genova
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GloEn-Patrol 2.0 / 2.01

Remarks

- Type approval of the ballast water treatment system is to be issued by the Ship's Flag Administration which applied IMO Resolution for the type approval.
- Detailed drawings for each installation of the GloEn-Patrol 2.0 / 2.01 BWMS are to be submitted for approval.
- The installation of the system on-board is to be in accordance with the Manufacturer's Instructions.

Renewal / Revision

- 02/03/2020 : initial certification. Certificate no.MAC002220PU
- 24/07/2020 : renewed with minor modification. New certificate no.MAC002220PU/001 revokes previous certificate.
- 10/08/2020 : renewed with minor modification. New certificate no.MAC101620PU revokes previous certificate.
- 04/04/2025 : renewed with modification. New certificate no.MAC053025PU revokes previous certificate.



BUSAN April 4, 2025