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수신: PANASIA

발신: INDIAN REGISTER OF SHIPPING

- 1) 귀사의 무궁한 발전을 기원합니다.
- 2) 인도선급에서 발급된 귀사의 "BALLAST WATER MANAGEMENT SYSTEM" TYPE APPROVAL CERTIFICATE 원본을 동봉합니다.
- 3) 인증서번호: 2023TAC014
- 4) 발급일자: 2023년 01월 26일
- 5) 만료일자: 2028년 01월 25일
- 6) 감사합니다.

Sayak Chatterjee 드림

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# Indian Register of Shipping

CERTIFICATE NO: 2023TAC014

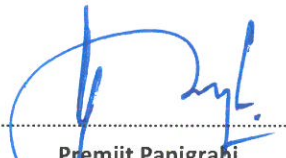
## TYPE APPROVAL CERTIFICATE

*This is to certify that the product is in accordance with the applicable rules/standards/codes as described below.  
The product is considered to be suitable for use in marine applications and is **included** in the list of approved products.*

MANUFACTURER	PANASIA.CO.,LTD.
REGISTERED OFFICE & WORKS	55, Mieumsandan 3-ro, Gangseo-Gu Busan, Republic of Korea
PRODUCT NAME	BALLAST WATER MANAGEMENT SYSTEM
MODEL NO. / TRADE NAME	GloEn - Patrol 2.0
PRODUCT DESCRIPTION	Ballast Water Management System Using: Filtration and UV treatment during ballast water uptake UV Treatment during ballast water discharge
APPLICABLE RULES/STANDARDS/CODES	- IRS Rules and Regulations for Construction and Classification of Steel Ships - MEPC 300 (72) - BWMS Code - IRS Classification Notes - Type approval of electrical equipment used for control, monitoring, alarm and protection, systems for use in Ships
CONDITIONS OF APPROVAL	See Annexure - I
VALIDITY	The Certificate is valid until 25/01/2028

ISSUE DATE: 26/01/2023

PLACE: MUMBAI

  
Premjit Panigrahi  
Sr. Principal Surveyor

This Certificate is issued upon the following terms and conditions as laid down in the Society's Regulations:-

Whilst Indian Register of Shipping, a Classification Society, along with its subsidiaries and associates (hereinafter referred to as the Society) and its Board/Committees use their best endeavors to ensure that the functions of the Society are properly carried out, in providing services, information or advice neither the Society nor any of its servants or agents warrants the accuracy of any information or advice supplied. Except as set out herein neither the Society nor any of its servants or agents (on behalf of each of whom the Society has agreed this clause) shall be liable for any loss damage or expense whatever sustained by any person due to any act or omission or error of whatsoever nature and however caused of the Society, its servants or agents or due to any inaccuracy of whatsoever nature and howsoever caused in any information or advice given in any way whatsoever by or on behalf of the Society, even if held to amount to a breach of warranty. Nevertheless, if any person uses services of the Society, or relies on any information or advice given by or on behalf of the Society and suffers loss damage or expenses thereby which is proved to have been due to any negligent act omission or error of the Society, its servants or agents or any negligent inaccuracy in information or advice given by or on behalf of the Society then the Society will pay compensation to such person for his proved loss up to but not exceeding the amount of the fee charged by the Society for that particular service, information or advice.

Any notice of claim for loss, damage or expense, as referred to above, shall be made in writing to the Society's Head Office within six months of the date when the service, information or advice was first provided, failing which all the rights to any such claim shall be forfeited and the Society shall be relieved and discharged from all liabilities.



**ANNEXURE – I**

**(TO CERT. NO. 2023TAC014 DATED 26<sup>th</sup> JANUARY 2023)**

**Models and Range**

GloEn-Patrol 2.0:

TRC: 50 – 6000 m<sup>3</sup>/h

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

**Major Components**

Filter	Panasia PF filter series with 50 µm mesh and automatic backflushing
UV Reactor / UV Unit	50-6000 m <sup>3</sup> /hr
UV Intensity Transmitter	SUV20.2 Y2 C manufactured by IL Metronic
UV Lamp	Panasia PUL_3.5_1
Control panel	PCP-8W PCP-8S PCP-14S
UV power supply panel	PBP-7XEB PBP-10XEB PBP14XEB PBP-20XEB
Repeat panel for remote control	PRP
Software Version	V3.31. or V3.31.1 (when using alternative HMI TP1200 from SIEMENS).

**Terms and Conditions**

1. Basis of approval and reference test reports:
  - 1) IMO Type approval TAP00001VN dated 15.06.2022 issued by Norwegian Maritime Authority
  - 2) Land Based Tests Report by DHI Denmark (2018-03-27)
  - 3) Shipboard Tests Report by DHI Denmark (2018-03-28)
  - 4) Environmental Tests Reports
  - 5) Works assessment and functional tests on representative model GloEn-P350, witnessed by IRS Surveyor





## 2. System Design Limitations:

2.1. Temperature & Salinity: No limitation

2.2. Holding Time: There is no limitation in respect of Holding Time. The BWMS has demonstrated performance to the discharge standard with a minimum holding time between uptake and discharge of 24 hours in land-based testing.

2.3. Dosing

Table 3: UV Intensity

UV-reactor size [m3/h]	UVI lower limit in marine and brackish water*	UVI lower limit in fresh water at full flow (TRC)**	UVI lower limit in all salinities at half flow (50% TRC) ***
50-6000	70 mW/cm2	90 mW/m2	60 mW/m2

Notes:

\* UV intensity set point for full flow treatment in marine and brackish water, corresponding to an UV transmission of approx. 55-60%. Below this UV intensity limit, ballast water will automatically be treated with a reduced flow of 50% TRC.

\*\* UV intensity set point for full flow treatment in fresh water, corresponding to an UV transmission of approx. 70%. Below this UV intensity limit, ballast water will be treated with a reduced flow of 50% TRC.

\*\*\* UV intensity set point for lower limit, corresponding to an UV transmission of approximately 50-55%. Below this UV intensity limit, the ballast water is not treated in accordance with this certificate and alarm will be triggered at 59 mW/cm2.

2.4. Pressure:

Filter type	Minimum inlet pressure (back-pressure)	Differential pressure triggering backflushing	Maximum operating pressure
Panasia PF	>1 bar	>0.1 bar	10 bar

2.5. Treatment Rated Capacity (TRC): The BWMS controls the flow rate by using a flow control valve to ensure that flow rates are kept within the TRC as listed in below table. To achieve higher flow capacities, the UV reactors can be installed in parallel configuration according to the OEM design and installation guide and the Table 4.

BWMS model	TRC [m3/h]	UV Unit (No. of Lamps)	Filter Unit
GloEn-P50	50	PU50 (2)	PF50
GloEn-P150 (-Ex)	150	PU250 (6)	PF250
GloEn-P250 (-Ex)	250	PU250 (8)	
GloEn-P300 (-Ex)	300	PU250 (12)	PF500
GloEn-P350 (-Ex)	350		
GloEn-P500 (-Ex)	500	PU500 (18)	
GloEn-P700 (-Ex)	700	PU500 (24)	PF750



GloEn-P750 (-Ex)	750	PU1000 (22)	
GloEn-P750-1 (-Ex)	750	PU250 (8) + PU500 (18)	
GloEn-P800 (-Ex)	800	PU1000 (22)	PF900
GloEn-P800-1 (-Ex)	800	PU250 (12) + PU500 (18)	2 x PF500
GloEn-P900 (-Ex)	900	PU1000 (22)	PF900
GloEn-P900-1 (-Ex)	900	2 x PU500 (18)	2 x PF500
GloEn-P1000 (-Ex)	1000	PU1000 (22)	PF1200
GloEn-P1000-1 (-Ex)	1000	2 x PU500 (18)	2 x PF500
GloEn-P1200 (-Ex)	1200	PU1250 (26)	PF1200
GloEn-P1200-1 (-Ex)	1200	2 x PU500 (24)	2 x PF750
GloEn-P1500 (-Ex)	1500	PU1500 (32)	PF1500
GloEn-P1500-1 (-Ex)	1500	3 x PU500 (18)	3 x PF500
GloEn-P2000 (-Ex)	2000	2 x PU1000 (22)	PF2000
GloEn-P2000-1 (-Ex)	2000	3 x PU500 (24)	3 x PF750
GloEn-P2500 (-Ex)	2500	2 x PU1250 (26)	PF2500
GloEn-P2500-1 (-Ex)	2500	4 x PU500 (24)	PF2500
GloEn-P3000 (-Ex)	3000	2 x PU1500 (32)	PF3000
GloEn-P3000-1 (-Ex)	3000	6 x PU500 (18)	PF3000
GloEn-P3500 (-Ex)	3500	3 x PU1250 (26)	3 x PF1200
GloEn-P4000 (-Ex)	4000	3 x PU1500 (32)	3 x PF1500
GloEn-P4500 (-Ex)	4500	3 x PU1500 (32)	3 x PF1500
GloEn-P5000 (-Ex)	5000	4 x PU1250 (26)	2 x PF2500
GloEn-P6000 (-Ex)	6000	4 x PU1500 (32)	2 x PF3000

Notes:

- (1) TRC is the net flow out of the treatment system, a net flow exceeding the given value implies that the ballast water is not treated in accordance with this certificate.
- (2) During ballast water discharge, the size and number of UV reactors limits the systems TRC.
- (3) The table shows general system configuration as recommended by the manufacturer.
- (4) A GloEn-Patrol 2.0 BWMS model may be used with a larger filter unit than specified above. The maximum TRC of any configuration is determined by either the maximum capacity of the UV unit or the filter unit, whichever is smaller.

3. The manufacturer is to maintain effective quality system complying with the most current version of ISO 9000 series.
4. The filter and UV unit are classified as Pressure Vessel Class III. Certificate of the pressure vessel shall be provided for each installation according to class requirements.
5. Any change to approved design or construction are to be intimated and approved by IRS.
6. The records of all software changes are to be submitted to IRS for record. Major changes in the software which may affect the performance of the BWMS will require approval.



7. Ship specific modification drawings including piping, electrical, structural support/foundation, stability and other statutory plans as applicable are to be submitted for approval and installation survey onboard are to be carried for each installation. Installation in hazardous area is to be approved in each case.
8. Commissioning test is to be carried out for each installation in accordance with latest revision of BWM.2/Circ.70
9. Any additional requirement as specified in the Purchase Order regarding identification and test/trials is to be complied to the satisfaction of attending Surveyor.

  
**Premjit Panigrahi**  
**Sr. Principal Surveyor**