



# BIRO KLASIFIKASI INDONESIA

## SERTIFIKAT PERSETUJUAN TIPE Type Approval Certificate

No. 00054.21.SP00264

No. Persetujuan : 00379TA21  
No. of Approval

Tanggal Persetujuan : 14 Juni 2021  
Date of Approval

Dengan ini dinyatakan bahwa produk dibawah ini telah memenuhi dan disetujui berdasarkan persyaratan dari Peraturan dan/atau Standard yang tercantum dibawah ini

*This is to certify that the following products has been complied and approved in accordance with requirements of the Rules and / or Standards listed below*

Produk : Ballast Water Management System  
Product

Pembuat : PANASIA CO., LTD.  
Manufacturer Busan, Republic of Korea

Tipe Produk : GloEn-Patrol 2.0 (model range P50-P6000)  
Type Designation

Standard persetujuan : Rules for Approval of Manufacturers and Service Suppliers (Pt.1, Vol.XI)  
Approval standards IMO Resolution MEPC.279(70)

Sertifikat ini berlaku hingga tanggal yang ditetapkan di bawah dengan syarat jika terdapat perubahan atau modifikasi pada produk harus segera diberitahukan ke BKI.

*This certificate remains valid until the date set below provided that if there are any alterations or modifications to the approved product, BKI shall be notified immediately.*

Sertifikat ini berlaku sampai dengan :24 Agustus 2024

*This certificate is valid until*



Jakarta 16 Juni 2021

a.n. Direktur Operasi  
Kepala Departemen Operasi Klasifikasi  
a.n. Operation Director  
SPP of Classification Operation Dept.

  
ARI BUDI PERMANA  
NUP:42896-KI

Catatan : Sertifikat ini terdiri dari 6 halaman  
Note This certificate is consist of 6 pages

Jika Peraturan atau Standard yang digunakan dalam proses persetujuan mengalami perubahan pada saat sertifikat ini masih berlaku, maka produk harus dilakukan persetujuan ulang sebelum dapat dipasang dikapal dimana Peraturan atau Standard tersebut berlaku.

*Should the specified Rules or Standards be amended during the validity of this certificate, the product is to be reapproved prior to it being placed on board vessels to which the amended Rules or Standards apply.*

## Lembar Pengukuhan

*Endorsement Sheet*

Harus dikukuhkan oleh Surveyor BKI  
*To be endorsed by BKI Surveyor*

<p><b>Pemeriksaan periodik (24 Agustus 2021 s/d 24 Agustus 2022)</b>  <i>Periodical surveillance (24 August 2021 until 24 August 2022)</i></p>  <p><b>No. Laporan:</b>  <b>Report no.</b></p>	<p><b>Tanggal :</b>  <i>Date</i></p>  <p><b>Surveyor :</b></p>
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**Catatan :** Sertifikat akan ditangguhkan secara otomatis jika tidak dikukuhkan dalam rentang waktu yang telah ditetapkan diatas.  
*Note The certificate will be automatically suspended if not endorsed within the specified time period above.*



# Lampiran

## Annex to

### Sertifikat Persetujuan Tipe

#### Type Approval Certificate

No. Sertifikat : 00054.21.SP00264  
No of certificate

No. Persetujuan : 00379TA21  
Approval No.

#### Deskripsi Produk

Product Description

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, 2500-1, 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

#### Kondisi Persetujuan

Condition of Approval

1. Treatment Rated Capacity  
50-6000 m<sup>3</sup>/h

2. Treatment sequence:  
- Ballast water uptake: Filtration and disinfection by UV treatment  
- Ballast water discharge: UV treatment

After ballasting or de-ballasting operation, the system shall be cleaned through draining of remaining water from the filter and UV unit after operation.

3. Temperature & Salinity  
Temperature and salinity of the ballast water are not limiting conditions for the ballast water management system.

4. Holding time  
GloEn-Patrol 2.0 BWMS has demonstrated performance to the discharge standard with a minimum holding time between uptake and discharge of 24 hours in land-based testing. UV treatment is instant and does not require any hold time in a ballast tank to render organisms inviable. Therefore, holding time is not found to be a limiting condition for the ballast water management system.

5. Dosing  
The system applies a UV dose controlled by flow and UV intensity. The low limit for UV intensity at full flow or half flow treatment is listed below. The system also includes UV-lamp power optimization control at higher UV intensity.

UV-reactor size [m <sup>3</sup> /h]	UV intensity lower limit in marine or brackish water at full flow (TRC) <sup>1)</sup>	UV intensity lower limit in fresh water at full flow (TRC) <sup>2)</sup>	UV intensity lower limit in all salinities at half flow (50% TRC) <sup>3)</sup>
50-6000	70 mW/cm <sup>2</sup>	90 mW/cm <sup>2</sup>	60 mW/m <sup>2</sup>

<sup>1)</sup> 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.

<sup>2)</sup> 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.

<sup>3)</sup> 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  $\leq 59$  mW/cm<sup>2</sup>.

#### 6. Treatment Rated Capacity (TRC) of the BWMS

The Treatment Rated Capacities (TRC) of the designated GloEn-Patrol 2.0 BWMS models are listed in the table below. The table also specifies the major components that shall be installed for a specific GloEnPatrol 2.0 BWMS model.

UV Reactors and filter units can be installed in parallel configuration to achieve higher flow capacities according to the design and installation guide and the table below.

The BWMS controls the flow rate in the ballast water line by using a flow control valve to ensure that flow rates are kept within the TRC of a specific model.

Model name	TRC	UV unit (number of lamps)	Filter unit
GloEn-P50	50 m <sup>3</sup> /h	PU50 (2)	PF50
GloEn-P150 (-Ex)	150 m <sup>3</sup> /h	PU250 (6)	PF250
GloEn-P250 (-Ex)	250 m <sup>3</sup> /h	PU250 (8)	
GloEn-P300 (-Ex)	300 m <sup>3</sup> /h	PU250 (12)	PF500
GloEn-P500 (-Ex)	500 m <sup>3</sup> /h		
GloEn-P700 (-Ex)	700 m <sup>3</sup> /h	PU500 (24)	PF750
GloEn-P750-1 (-Ex)	750 m <sup>3</sup> /h	PU250 (8) + PU500 (18)	
GloEn-P800 (-Ex)	800 m <sup>3</sup> /h	PU1000 (22)	PF900
GloEn-P800-1 (-Ex)	800 m <sup>3</sup> /h	PU250 (12) + PU500 (18)	2 x PF500
GloEn-P900 (-Ex)	900 m <sup>3</sup> /h	PU1000 (22)	PF900
GloEn-P900-1 (-Ex)	900 m <sup>3</sup> /h	2 x PU500 (18)	2 x PF500
GloEn-P1000 (-Ex)	1,000 m <sup>3</sup> /h	PU1000 (22)	PF1200
GloEn-P1000-1 (-Ex)	1,000 m <sup>3</sup> /h	2 x PU500 (18)	2 x PF500
GloEn-P1200 (-Ex)	1,200 m <sup>3</sup> /h	PU1250 (26)	PF1200
GloEn-P1200-1 (-Ex)	1,200 m <sup>3</sup> /h	2 x PU500 (24)	2 x PF750
GloEn-P1500 (-Ex)	1,500 m <sup>3</sup> /h	PU1500 (32)	PF1500
GloEn-P1500-1 (-Ex)	1,500 m <sup>3</sup> /h	3 x PU500 (18)	3 x PF500
GloEn-P2000 (-Ex)	2,000 m <sup>3</sup> /h	2 x PU1000 (22)	PF2000
GloEn-P2000-1 (-Ex)	2,000 m <sup>3</sup> /h	3 x PU500 (24)	3 x PF750
GloEn-P2500 (-Ex)	2,500 m <sup>3</sup> /h	2 x PU1250 (26)	PF2500
GloEn-P2500-1 (-Ex)	2,500 m <sup>3</sup> /h	4 x PU500 (24)	PF2500
GloEn-P3000 (-Ex)	3,000 m <sup>3</sup> /h	2 x PU1500 (32)	PF3000
GloEn-P3000-1 (-Ex)	3,000 m <sup>3</sup> /h	6 x PU500 (18)	PF3000
GloEn-P3500 (-Ex)	3,500 m <sup>3</sup> /h	3 x PU1250 (26)	3 x PF1200
GloEn-P4000 (-Ex)	4,000 m <sup>3</sup> /h	3 x PU1500 (32)	3 x PF1500
GloEn-P4500 (-Ex)	4,500 m <sup>3</sup> /h	3 x PU1500 (32)	3 x PF1500
GloEn-P5000 (-Ex)	5,000 m <sup>3</sup> /h	4 x PU1250 (26)	2 x PF2500
GloEn-P6000 (-Ex)	6,000 m <sup>3</sup> /h	4 x PU1500 (32)	2 x PF3000

**NOTE:**  
This table shows general system configuration as recommended by the manufacturer. 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.

#### 7. Pressure

The minimum/maximum pressure and the pressure differential triggering backflushing are listed below.

Filter type	Minimum inlet pressure (back-pressure)	Differential pressure triggering backflushing	Max operating pressure
Panasia PF	>1 Bar	≥ 0.1 Bar	10 Bar

The GloEn-Patrol 2.0 BWMS 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.

#### 8. Software version

The GloEn-Patrol 2.0 BWMS is approved with the system control software versions: V3.30, or V3.30.1 (when using alternative HMI TP1200 from SIEMENS). Any changes to the software are to be recorded as long as the system is in use onboard. Major changes in the software, require approval. Testing of the application functions of the revised software may be required.

#### 9. Safety measures

The BWMS is type approved with the following instruments for monitoring the safe operation of the BWMS:

- Temperature transmitter (TT, mounted in UV unit)
- Pressure transmitter (PT, installed at the inlet and outlet of filter unit)
- Flow meter (mounted before or after each UV unit)
- Temperature switch for non-Ex-proof UV chamber (TS, mounted on surface of UV unit)
- Flow switch for Ex-proof UV chamber (FS, mounted in UV unit)
- In case of horizontal installation of UV chamber, a vent valve is installed on top of UV unit to release possible pressure if temperature inside UV chamber is too high.



#### 10. Electrical and electronic components

The GloEn-Patrol 2.0 BWMS is type approved with the electrical and electronic components (including the above listed instruments for monitoring safe operation of the BWMS) indicated on the P&IDs and specified on the Bill of Material. Except for the components listed below, alternate models to the ones specified on the component lists may be used provided that information regarding the selected components is part of the documentation related to the specific installation, by providing either a reference to valid type approval certificate or technical documentation demonstrating that the selected component was subject to environmental testing.

For the following electrical and electronic components, the models specified in the table shall be used:

Component name	Manufacturer	Model(s)
Control panel	PANASIA	PCP-8W PCP-8S PCP-14S
UV power supply panel	PANASIA	PBP-7XEB PBP-10XEB PBP-14XEB PBP-20XEB
Repeat panel for remote control	PANASIA	PRP
UV intensity transmitter	IL Metronic	SUV20.2 Y2 C

#### Hazardous area / Ex-proof

The GloEn-Patrol 2.0 BWMS has been evaluated and found to be in compliance with standard for hazardous area installations. The filter, UV reactor, valves and flowmeters have Ex-certification. 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.

#### Dokumentasi Persetujuan

##### Approval Documentation

1. BKI Approval Document No. 2141090052
2. BKI Assessment Report No. 00264-SP/C1/2021
3. Type Approval certificate issued by DNV GL No. TAP00001VN Revision No. 1
4. Biological test plan and test reports:
  - Final Land-based Ballast Water Management Report According to USCG Final Rule - Panasia GloEn Patrol-250 BWMS, by Golden Bear Facility, US, 2017-12-19.
  - Biological efficacy performance evaluation of Ballast Water Management System GloEn Patrol in land-based test, by DHI, Denmark, 2018-03-27.
  - Biological efficacy performance evaluation of PANASIA GloEn Patrol Ballast Water Management Systems in shipboard test, by DHI, Denmark, 2018-03-28.
  - Biological efficacy performance evaluation of Ballast Water Management System GloEn-Patrol in land-based test- Supplementary Study, by DHI, Denmark, 2019-03-04.
  - TQAP GloEn P250 BWMS land-based test plan, by Golden Bear Facility, US, 2015-10-23.
  - Test Plan - Biological efficacy performance evaluation of Ballast Water Management System GloEn Patrol in land-based test, by DHI, Denmark, 2017-03-20.
  - Test Plan - Biological efficacy performance evaluation of PANASIA GloEn Patrol Ballast Water Management Systems in shipboard test, by DHI, Denmark, 2016-09-23.
5. Environmental test reports:
  - Summary for environmental testing Doc No. STA R16 0001, by SGS, 2017-12-21, Rev02.
  - Summary for environmental testing Doc No. STA R18 0001 (flow switch), by SGS, 2018-03-12 Rev.0.
  - Report on additional environmental testing for IMO TA, PU1000 Environmental test, KOMERI-P24-03(9) by KOMERI, 2014-01-16.
  - Report on additional environmental testing for IMO TA, P1250, P1500 Environmental test reports, by SGS, 2015-12-24/2016-01-06.
  - Test Report for Panasia PCP -14S, report No. SGS-R18-1520-EN00, by SGS, 2018-08-08.
  - Test report for conductivity sensor and transmitter, report No. SGS-R19-1719-EN00, 1720-EN00, 1736-EN00, 1737-EN00, dated 2019-07-30; and SGS-E19-0049, 0050, 0057 and 0058; dated July 2019.

#### Penandaan Produk

##### Marking of Product

Each Ballast Water Management system shall be marked with:

- Manufacturer's name or trade mark
- Type designation
- Serial number
- Society's brand as relevant

**Pemeriksaan periodik**

*Periodical Surveillance*

For retention of the approval, a BKI Surveyor shall conduct periodical surveillance to verify that approved quality system, etc. of the manufacturing works are maintained satisfactorily.

The main scope of the periodical surveillance will normally include:

- Verification of the manufacturer's production and quality system with regard to ensure continued consistent production of the Type Approved products at the manufacturer's premises
- Review of the approval documentation and that this is still used as basis for the production
- Review of possible changes to the properties of the product
- Verification of the product marking