

Type Approval Certificate

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

Manufacturer	PANASIA Co., Ltd.
Address	55, Mieumsandan 3-ro, Gangseo-gu, Busan, 46744, Republic of Korea
Place of Production	PANASIA Co., Ltd. 55, Mieumsandan 3-ro, Gangseo-gu, Busan, 46744, Republic of Korea
Type	Filtration and UV Ballast Water Management System
Description	Filtration and Ultra-Violet
Trade Name	GloEn-Patrol 2.0 Models P50-P6000
Application	For treatment of ship's ballast water
Specified Standard	Lloyd's Register Rules and Regulation for the Classification of Ships, Part 5 and Part 6 as applicable.
Ratings	See Appendix
Other Conditions	The intended installation location of the GloEn-Patrol 2.0™ Models P50 - P6000 on board ship is to be suitable and in compliance with the requirements for such location. Its connection into the ship's system, including the electrical system, is to be shown on the ship's plans to be submitted for approval. Manufacturer's instructions are to be followed.



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Where it is proposed to install equipment in areas of an explosive gas atmosphere may be present, it is generally to be of a type providing protection against ignition of the gases encountered, and certification details are to be submitted for consideration.

Components of the GloEn-Patrol 2.0™ Models P50 - P6000 BWTS outside the scope of supply from Panasia Co., Ltd are to be of type complying with Lloyd's Register Rules for Ships Part 5 and part 6 and submitted for approval prior to installation.

The maximum treated rated capacity (TRC) of each GloEn-Patrol 2.0™ Models P50 - P6000 is not to be exceeded. In the use of parallel modules, the flow is to be arranged to not exceed the TRC of the unit(s) concerned.

Installation survey and commissioning is to be conducted for each installation on board ship in accordance with IMO Res. MEPC.300(72) 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 Asia of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document LR2006496TA-02 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

Appendix

RATINGS	Model	Capacity (m³.hr⁻¹)	UV Unit (number 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)	1,000	PU1000 (22)	PF1200
	GloEn-P1000-1 (-Ex)	1,000	2 x PU500 (18)	2 x PF500
	GloEn-P1200 (-Ex)	1,200	PU1250 (26)	PF1200
	GloEn-P1200-1 (-Ex)	1,200	2 x PU500(24)	2 x PF750
	GloEn-P1500 (-Ex)	1,500	PU1500 (32)	PF1500
	GloEn-P1500-1 (-Ex)	1,500	3 x PU500(18)	3 x PF500
	GloEn-P2000 (-Ex)	2,000	2 x PU1000 (22)	PF2000
	GloEn-P2000-1 (-Ex)	2,000	3 x PU500(24)	3 x PF750
	GloEn-P2500 (-Ex)	2,500	2 x PU1250 (26)	PF2500
	GloEn-P2500-1(-Ex)	2,500	4 x PU500(24)	PF2500

	GloEn-P3000 (-Ex)	3,000	2 x PU1500 (32)	PF3000
	GloEn-P3000-1 (-Ex)	3,000	6xPU500(18)	PF3000
	GloEn-P3500 (-Ex)	3,500	3 x PU1250 (26)	3xPF1200
	GloEn-P4000 (-Ex)	4,000	3 x PU1500 (32)	3xPF1500
	GloEn-P4500 (-Ex)	4,500	3 x PU1500 (32)	3xPF1500
	GloEn-P5000 (-Ex)	5,000	4 x PU1250 (26)	2xPF2500
	GloEn-P6000 (-Ex)	6,000	4 x PU1500 (32)	2xPF3000

Note: This table shows general system configurations that the manufacturer has recommended. All possible configurations are not shown in this table. System configurations can be changed within the limit of the maximum Treated Rated Capacity (TRC) for the components concerned.

SPECIFICATIONS

Filter

Manufacturer	Panasia Co., Ltd
Capacity range	50 / 250 / 500 / 750 / 900 / 1200 / 1500 / 2000 / 2500 / 3000 m ³ .hr ⁻¹
Filter models	PF50, PF250, PF500, PF750, PF900, PF1200, PF1500, PF2000, PF2500, PF3000
Mesh size	50 microns
Maximum design pressure	10 kg.cm ⁻²
Max. working temperature	55°C
Filter housing material	A516-70

UV Chamber

Manufacturer	Panasia Co., Ltd
Type of lamps	Medium pressure UV lamps
No. of lamps per unit	<div>PU50 2 lamps</div> <div>PU250 6 / 8 / 12 lamps</div> <div>PU500 18 / 24 lamps</div>

	PU1000	22 lamps
	PU1250	26 lamps
	PU1500	32 lamps
Material	SS316L or A240-316L	
Maximum design pressure	10 kg.cm ⁻²	
UV dose	Above 60mW.cm ⁻²	
Hazardous area certification	PU250-Ex : ATEX : II 2G Ex pxb IIC T4 (-20°C ≤ Tamb ≤ +60°C)	
	IEC-Ex : Ex pxb IIC T4 Gb (-20°C ≤ Tamb ≤ +60°C)	
	PU500-Ex : ATEX : II 2G Ex pxb IIC T4 (-20°C ≤ Tamb ≤ +60°C)	
	IEC-Ex : Ex pxb IIC T4 Gb (-20°C ≤ Tamb ≤ +60°C)	
	PU1000-Ex : ATEX : II 2G Ex pxb IIC T4 (-20°C ≤ Tamb ≤ +60°C)	
	IEC-Ex : Ex pxb IIC T4 Gb (-20°C ≤ Tamb ≤ +60°C)	
	PU1250-Ex : ATEX : II 2G Ex pxb IIC T4 (-20°C ≤ Tamb ≤ +60°C)	
	IEC-Ex : Ex pxb IIC T4 Gb (-20°C ≤ Tamb ≤ +60°C)	
	PU1500-Ex : ATEX : II 2G Ex pxb IIC T4 (-20°C ≤ Tamb ≤ +60°C)	
	IEC-Ex : Ex pxb IIC T4 Gb (-20°C ≤ Tamb ≤ +60°C)	
Control Panel	Controller: Siemens PLC	
	CPU: Siemens S7-300 (Software Version 3.30), Siemens S7-1500 (Software Version 3.30.1)	
	Graphic Panel : Pro-face GP-4000 series (Software Version 3.30), Siemens TP1200 (Software Version 3.30.1)	
Power Supply	Control Panel: 1-ph, 110 / 220V, 50/ 60Hz	
	UV Power Supply Panel: 3-ph, 110 / 220 / 380/ 440V, 50/ 60Hz	