

CROATIAN REGISTER OF SHIPPING



Certificate No. 02-004572/026299

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:

LEESGREEN BWMS
(model range LS-150 to LS-1500)
(model range LS-150Ex to LS-1500Ex)
Treatment rated capacity (TRC): 150-1500 m³/h

MANUFACTURER:

**SHANGHAI LEE'S FUDA
ELECTROMECHANICAL TECHNOLOGY Co. Ltd.**

No.145, Pengfeng Rd., Xiaokunshan, Songjiang
SHANGHAI; PEOPLE'S REPUBLIC OF CHINA

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: **2028-08-09**

Place and date: Split, 2024-08-09

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 and UV disinfection at ballast water discharge.

Model	Max TRC (m ³ /h)	Filter unit	UV unit	Rated power (kW)
LS-150/LS-150Ex	150	LSF-150/LSF-150Ex	LSV-150/LSV-150Ex	18
LS-250/LS-250Ex	250	LSF-250/LSF-250Ex	LSV-250/LSV-250Ex	26
LS-350/LS-350Ex	350	LSF-350/LSF-350Ex	LSV-350/LSV-350Ex	38
LS-500/LS-500Ex	500	LSF-500/LSF-500Ex	LSV-500/LSV-500Ex	50
LS-700/LS-700Ex	700	LSF-700/LSF-700Ex	LSV-700/LSV-700Ex	62
LS-850/LS-850Ex	850	LSF-850/LSF-850Ex	LSV-850/LSV-850Ex	74
LS-1150/LS-1150Ex	1150	LSF-1150/LSF-1150Ex	LSV-1150/LSV-1150Ex	98
LS-1500/LS-1500Ex	1500	LSF-1500/LSF-1500Ex	LSV-1500/LSV-1500Ex	123

UV reactors can be combined in parallel for higher TRC.

Filtration degree: 50 micron

Control unit: IP44 (indoor use); 220 VAC; 50-60 Hz; 1-phase

Power unit: IP44 (indoor use); 380-440 VAC; 50-60 Hz; 3-phase

APPLICATION / LIMITATIONS:

Salinity: no limitation

Temperature of ballast water: no limitation

Holding time:

LeesGreen BWMS has demonstrated performance to the discharge standard D-2 with a holding time between uptake and discharge of 24 hours in land-based testing for the IMO BWMS Code.

UVT: $\geq 50\%$ (100% TRC); UV intensity: $\geq 250 \text{ W/m}^2$ (100% TRC)

Maximum working pressure: 8 bar

Maximum working temperature (control and power unit): 55°C

Maximum working temperature (filter unit and UV unit): 60°C

TYPE APPROVAL DOCUMENTATION:

Description	Drawing no.	Rev.
System drawings	LFS-YL LFS-GY LFS-LC	2015.3.20
Component drawings	LFG/ LFG Ex LFU/ LFU Ex LFK-WX LFY-WX	R3 R3 2015.3.20 2015.3.20
Electrical/ wiring drawings	LFK-DL LFY-DL LFS-LJ	2015.3.20 2015.3.20 2020.9.6
Land-based test report	SHOU-LSFD-2015018 SHOU-LSFD-2019001	2015.12.30 2019.09.05
Shipboard testing report	SHOU-LSFD-2015019 SHOU-LSFD-2015020	2015.12.30
Environmental testing report	S654A-2019 S081-GW-2015; S081-DW-2015; S081-SR-2015; S081-ZD-2015; S081-QY-2015; S081-DXN-2015	2020.01.20 2015.04.07
Operation, maintenance and safety manual	-	V2.4.3 V2.3

HAZARDOUS AREA/ EX-PROOF:

LeesGreen Ex BWMS installation in a hazardous area is to be approved in each case according to CRS rules and Ex-certification issued by a recognized Certification Body.

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 China Classification Society on behalf of People's Republic of China No. SH23PTB00216_02.

Operation, maintenance and safety manual for LeesGreen BWMS is to be carried onboard a vessel fitted with this ballast water management system.

BWMS is type approved with the following control and safety related instruments:

- flow transmitter in flow meter unit
- temperature transmitter mounted on UV unit
- pressure transmitter on filter unit inlet/ outlet
- UV intensity transmitter mounted on UV unit