



Certificate No. 02-003556/024994

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:

BalClor BWMS
(model range BC-150 to BC-8000)
(model range BC-150-Ex to BC-8000-Ex)

Treatment rated capacity (TRC): 170-8500 m³/h

MANUFACTURER:

SunRui Marine Environment Engineering Co., Ltd.
Zhuzhou Road 149-1
QINGDAO
P.R. 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: **2024-06-04**

Place and date: Split, 2020-06-04

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 injection of active substance generated by electrolysis during ballast water uptake. Ballast water discharge: Neutralization

Model	Treatment rated capacity (m³/h)	Filter model <i>Filtersafe BS</i>	Filter model <i>SunRui Luoyang SRF</i>	Filter model <i>Boll & Kirch type 6.18.3</i>	Electrolysis unit model <i>(cell x number)</i>
BC-150	170	BS-025 BS-031 BS-050 BS-061 BS-061-T BS-070	SRF-100 SRF-200	Size 200	EDU-150 (E1 x 4)
BC-300	350	BS-061-ST BS-100/101 BS-100/101-T BS-101-ST	SRF-200 SRF-400	Size 200 Size 250	EDU-300 (E1 x 8)
BC-500	600	BS-150/151 BS-150/151-T BS-200/201 BS-151-ST BS-200/201-T	SRF-400 SRF-600	Size 250 Size 300	EDU-500 (E2 x 12)
BC-1000	1200	BS-201-ST BS-300 BS-300-T BS-300-ST BS-400 BS-400-T BS-400-ST	SRF-800 SRF-1200	Size 300 Size 400	EDU-1000 (E3 x 12)
BC-1500	1700	BS-603 BS-603-T	SRF-1600 SRF-2000	Size 500	EDU-1500 (E3 x 12)
BC-2000	2200	BS-603-T BS-804 BS-603-ST BS-804-T	SRF-2000 SRF-2500	Size 500 Size 600	EDU-2000 (E4 x 12)
BC-2500	2800	BS-804-T BS-1004 BS-804-ST	SRF-2500 SRF-3500	Size 700	EDU-2500 (E4 x 18)
BC-3000	3200	BS-1004-T BS-1204/1206 BS-1406	SRF-3500	Size 700	EDU-3000 (E4 x 18)
BC-3500	3800	BS-1406 BS-1204/1206-T BS-1406-T	SRF-3500 2 x SRF-2000	Size 700 Size 800	EDU-3500 (E5 x 24)
BC-4000	4300	BS-1204/1206-ST BS-1406-ST	2 x SRF-2000 2 x SRF-2500	Size 800 Size 900	EDU-4000 (E5 x 24)
BC-5000	5500	BS-1406-ST 2 x BS-1204/1206	2 x SRF-2500 3 x SRF-2000	Size 900 2 x Size 700	EDU-5000 (E5 x 32)
BC-6000	6300	2 x BS-1204/1206 2 x BS-1406	3 x SRF-2000 2 x SRF-3500	2 x Size 700	EDU-6000 (E5 x 40)
BC-7000	7300	2 x BS-1406 2 x BS-1204/1206-ST 2 x BS-1406-T	2 x SRF-3500 3 x SRF-2500	2 x Size 700 2 x Size 800	EDU-7000 (E5 x 40)
BC-8000	8500	2 x BS-1204/1206-T 2 x BS-1206-ST 2 x BS-1406-ST	3 x SRF-2500 3 x SRF-3500	2 x Size 800 2 x Size 900	EDU-8000 (E5 x 48)

APPLICATION / LIMITATIONS:

Temperature of the feed water to the electrolyser unit shall be $\geq 5^{\circ}\text{C}$.
Salinity of the feed water to the electrolyser unit shall be ≥ 15 PSU.

TRO level during ballast water uptake shall be 7,5 mg/L.
TRO level during ballast water uptake shall not exceed an average of 9 mg/L.
TRO level at discharge shall be $\leq 0,1$ mg/L.

Temperature and salinity of the ballast water are not a limiting condition for the ballast water management system.

Hold time: minimum 24 hours

Maximum working pressure: 10 bar
Ambient temperature: 0°C to 55°C

HAZARDOUS AREA/ EX-PROOF

BalClor BWTS can be installed in hazardous area zone 1, gas group IIC and temperature class T4.
Power and control cabinets are to be installed in safe zone.

TYPE APPROVAL DOCUMENTATION:

Description	Title	Drawing no.
System drawings	Flow diagram of BalClor BWMS	X1JKPIDX01QD, Rev.1.3
	Flow diagram of BalClor BWMS with Ex arrangement	X1JKPIDX02QD, Rev.1.3
	Assembly drawings of BalClor BWMS	X1JKADLX01QD, Rev.1.21
	Electrical wiring diagram of BalClor BWMS	A1JKUSCG01TZ, Rev.2.0
	Electrical wiring diagram of BalClor BWMS with Ex installation	A1JKUSCG02TZ, Rev.2.0
Component drawings	Bill of materials for BalClor BWMS	XCJKBOMD01WJ, Rev.1.23
	Bill of materials for BalClor BWMS with Ex components	XCJKBOMD02WJ, Rev.1.33

TYPE APPROVAL DOCUMENTATION:

Description	Title	Drawing no.
Report for land-based test	Performance evaluation in land based test facility of BalClor BWMS- Bollfilter 6.18.3C Performance evaluation in land based test facility of BalClor BWMS- Filtersafe Performance evaluation in land based test facility of BalClor BWMS- SunRui Model SRF-400H filter	Final report June 2017 Final report 2016-09-15 Final report January 2017
Report for shipboard test	Performance evaluation of BalClor BWMS in shipboard test	Final report January 2017

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 DNV on behalf of Norwegian Maritime Authority No. TAP00001BB, Rev.1.

Operation, maintenance and safety manual for BalClor 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:

- Electrolysis unit feed water flow meter (FT21)
- Pressure transmitter at the electrolyser (PT21, arranged with independent shutdown functionality)
- Temperature sensor at the electrolyser (TT21)
- Cl₂ gas sensor below the Electrolysis unit (CS21)
- H₂ gas sensor above the Electrolysis unit (HS21)
- Air pressure switch in the H₂ gas ventilation duct (WP21)
- H₂ gas sensor in the gas ventilation duct (HS01, arranged with independent shutdown functionality)
- Level meter for buffer tank (LS21)