



Certificate No. 02-004186/025987

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:

BLUE OCEAN SHIELD (BOS)
Ballast Water Management System
(model range BOS100 to BOS3200)
(model range BOS100(Ex) to BOS3200(Ex))
Treatment rated capacity (TRC): 100-3200 m³/h

MANUFACTURER:

COSCO SHIPPING Heavy Industry
Technology (Weihai) Co., Ltd.
No.19 Shenyang South Road, Huancui District
WEIHAI, SHANDONG
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: **2027-10-18**

Place and date: Split, 2023-10-18

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.

After ballasting or de-ballasting operation, UV system is cleaned using the Cleaning in Place (CIP) function.

The BOS BWMS is arranged with parallel installation of UV reactors for BOS2400 and BOS3200 model with one corresponding filter, dedicated flowmeter between filter and each UV reactor and flow control valve after each UV reactor.

Model	TRC (m3/ h)	Filter	UV reactor
BOS100(Ex)	100	FH100(Ex)	UV100(Ex)
BOS200(Ex)	200	FH200(Ex)	UV200(Ex)
BOS300(Ex)	300	FH300(Ex)	UV300(Ex)
BOS500(Ex)	500	FH500(Ex)	UV500(Ex)
BOS700(Ex)	700	FH700(Ex)	UV700(Ex)
BOS900(Ex)	900	FH900(Ex)	UV900(Ex)
BOS1200(Ex)	1200	FH1200(Ex)	UV1200(Ex)
BOS1200(Ex)	1200	FH1250(Ex)	UV1200(Ex)
BOS1600(Ex)	1600	FH1600(Ex)	UV1600(Ex)
BOS1600(Ex)	1600	FH1650(Ex)	UV1600(Ex)
BOS2400(Ex)	2400	FH2400(Ex)	2x UV1200(Ex)
BOS3200(Ex)	3200	FH3200(Ex)	2x UV1600(Ex)

APPLICATION / LIMITATIONS:

Salinity: no limitation

Temperature of ballast water: no limitation

Holding time: no limitation

Minimum holding time between uptake and discharge (land-based test): 2 hours in all water salinities

Minimum UV intensity: UV fraction (UVF) not less than 50% at ballast water uptake

Design pressure: 7,7 bar

Minimum filter inlet pressure: 1,5 bar

Ambient temperature: 0 to 55°C

HAZARDOUS AREA/ EX-PROOF

Blue Ocean Shield BWMS Ex (BOS Ex) can be installed in hazardous area zone 1, gas group IIB and temperature class T4. UV control cabinet, UV power cabinet and remote control system box are to be installed in safe zone.

TYPE APPROVAL DOCUMENTATION:

Description	Title	Drawing no.
System drawings	P&ID (inside OMSM Annex 4)	PID-2019-00, Rev.13
	P&ID (inside OMSM Ex Annex 4)	PIDEx-2019-00, Rev.02
	General arrangement drawing/ Assemble drawing (inside OMSM Annex 2/3)	BOS-AD-01 to 04 & BOS-AD-BW4 01 to 04 SL-2019-00, Rev.3
	General arrangement drawing/ Assemble drawing (inside OMSM Ex Annex 2/3)	BOS-AD-01 to 04 & BOS-AD-BW4 01 to 04 GAEx-2019-00, Rev.03
	Electrical schematic diagram (inside OMSM Annex 5)	BOS-ES-00, Rev.1
	Electrical schematic diagram (inside OMSM Ex Annex 5)	BOS-ESEx-00, Rev.01
Component drawings	General arrangement drawing (inside OMSM Annex 2/3)	SL-2019-00, Rev.3
	General arrangement drawing (inside OMSM Ex Annex 2/3)	GAEx-2019-00, Rev.03
	Bill of materials (inside OMSM Annex 1)	BOM-2016-00, Rev.15
	Bill of materials (inside OMSM Ex Annex 1)	BOMEx-2019-00, Rev.05
Report for land-based test	Report SHOU-BWDL Final report DHI Denmark Final report DHI Singapore	V1.2, 2022.04.15 2019.03.15 2019.06.11
Report for shipboard test	Final report DHI Denmark	2019.03.14
Environmental testing	Test report for BOS BWMS	S502A-2018, 2019.04.09
	Test report for Ex BOS BWMS	S649A-2019G1, 2020.06.05
Operation, maintenance and safety manual	BOS BWMS Operation maintenance safety manual (OMSM)	OMSM-2019-00, Rev.04
	Ex-proof BOS BWMS Operation maintenance safety manual (OMSM Ex)	ExOMSM-2020-00, Rev.04

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. TAP00001VF, Rev.2.

Operation, maintenance and safety manual for Blue Ocean Shield 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:

- control software version V2.0.0.xx
- flow meter installed after the filter unit
- two temperature transmitters mounted in UV unit
- pressure transmitter mounted in UV unit
- pressure relief valve mounted on UV unit outlet pipe

The BWMS has a flow control function according to measured UV Fraction (UVF) of inlet water by a flow control valve after UV reactor to ensure that flow rates are kept within the TRC of a specific model. The BWMS starts flow reduction at UVF 70%. An UVF low alarm will be triggered and logged when operating with UVF<50%.