Marine & Offshore

Certificate number: 24799/B1 BV
File number: ACM 223/1404/01
Product code: 9086I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Optimarin AS

SANDNES - NORWAY

for the type of product

BALLAST WATER MANAGEMENT SYSTEM

Optimarin Ballast System (OBS)
Optimarin Ballast System Ex (OBS Ex)

Requirements:
- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore units
- IMO Res. MEPC.300(72) - Code for Approval of Ballast Water Management Systems

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 13 Feb 2022

For Bureau Veritas Marine & Offshore,
At BV OSLO, on 31 May 2021,
Rune MARSTEIN

Rune Marstein

BUREAU VERITAS MARINE & OFFSHORE INTERNATIONAL REGISTER

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Optimarin Ballast System (OBS)

Optimarin Ballast System Ex (OBS Ex)

1.1 Ballast Water Technology

- The Optimarin Ballast System consists of two treatment steps in order to comply with the IMO D2 standard:

a) Mechanical Filtration by 20 or 25 micron automatic filter which removes sediments and larger organisms, and

b) Ultraviolet disinfection by a medium pressure UV system which inactivates or kills the smaller plankton and bacteria.

- The BWMS consist of 6 main components which are part of this approval: Filter, UV-System, Flow Meter, Flow Pressure Valve, UV-Power and Control System/PLC

- The system is operated from a control panel, which starts the automated ballast and de-ballast processes

OBS Models

xxxx/yyyyBK3 for BWMS with AquaBoll filters manufactured by Boll & Kirch.

xxxx/yyyyFX2 for BWMS with filters manufactured by Filtrex.

xxxx: UV Model

yyyy: Filter designation

1.2 Filters

1) Boll & Kirch Filter (BK3)- 6.18.3 aquaBoll Series - 25 μm wire mesh

Boll & Kirch's filters listed below part of this Type approval are required to be design-approved by BV prior to their installation on board BV-classed ships. Horizontal mounting. Material of filter house: Boll Filter Type 6.18.2 carbon steel P265GH, fabricated with rubber lining protection on the inside, Boll Filter Type 6.18.3 cast iron coated

Filter Type	Designation	Flow range (m3/h)
aquaBoll 273	72BK3	19-72
aquaBoll 324	94BK3	19-94
aquaBoll 356	204BK3	24-204
aquaBoll 419	378BK3	33-378
aquaBoll 521	518BK3	33-518

Filter Type	Designation	Flow range (m3/h)
aquaBoll 600	614BK3	34-614
aquaBoll 750	1274BK3	50-1274
aquaBoll 900	1384BK3	47-1384
aquaBoll 1000	2040BK3	47-2040
aquaBoll 1100	3100BK3	69-3100

Minimum back-pressure 1 bar; Max. pressure drop allowed 0.5 bar

2) Filtrex Filters (FX2) - ACB Series - 20 μm wire mesh

Filtrex's filters listed below part of this Type approval are required to be design-approved by BV prior to their installation on board BV-classed ships. Horizontal and vertical mounting. Material of filter house Bz-Al ASTM B148 C95800 Alloy

Filter Type	Designation	Flow range (m3/h)
ACB-906-100	87FX2	15-87
ACB-910-150	135FX2	25-135
ACB-915-150	190FX2	35-190
ACB-935-200	255FX2	35-255
ACB-945-200	340FX2	45-340
ACB-955-250	515FX2	50-515

Filter Type	Designation	Flow range (m3/h)
ACB-985-300	770FX2	65-770
ACB-999-350	1040FX2	95-1040
ACB-9100-400	1500FX2	126-1500
ACB-9120-500	2100FX2	126-2100
ACB-9200-600	3000FX2	126-3000

Minimum back-pressure 1.7 bar; Max. pressure drop allowed 0.3 bar

UV-System

Operational range of one UV-chamber is 10 m3/h – 167 m3/h.

UV Models: 167 to 3000

Power Consumption: 35 kW per UV Lamp

A combination of UV-chambers is accepted under the following criteria:

a) chambers mounted in parallel (vertically or horizontally),

b) the construction of the chambers (i.e. dimensions, form and material) is exactly the same and

c) the construction of the two manifolds (i.e. dimensions, form and material) is exactly the same

Flow Meter (FM) and Flow Pressure Valve (FPV)

The control equipment has been designed and tested to keep the flow rate between 10 m3/h – 167 m3/h per UV-chamber. The FPV controls the flow to not exceed the maximum of 167m³/h per UV chamber.

Control System/PLC

Includes Control Panel, Filter Control, Sensor Box, Terminal Box, Back Flush Cabinet, Fresh Water Panel, Interlock Panel, UV Power Type TT, UV Power Type NED, UV Power Cabinet Type ETA, UV sensor, OBS control software, Ex Interlock Panel, Ex Sensor Box and El. Act. Power Distribution Panel

Materials

- UV-chambers and manifolds: CuNiFer 90/10 with hot dipped galvanized loose flanges

Software version 2.0x

2. DOCUMENTS AND DRAWINGS

- Piping & Insturmentation Diagram N° 300000 Rev. 5 dated 21/09/2020
- Electrical Wiring Diagram N° 500000 Rev. 4 dated 21/09/2020
- Bill of Materials Rev. 1 dated 14/10/2020 (including ATEX equipments and detailed drawings for the main components)
- Filter Drawings Rev. 1 (detailed models can be found in the Bill of Materials)
- Operation, Maintenance & Safety Manual Rev. 6 dated 14/10/2020
- Optimarin checklist N° OM-C-59 Rev. 3 dated 22/10/2020
- TQAP N° 0514/2019 v4.4 dated 27/04/2020
- Flow distribution in parallel UV Chambers report N° 2015-0885 Rev. 1 dated 25/09/2015

No departure from the above documents shall be made without the prior consent of the Society named on this certificate. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Certificate and reports verifying compliance with the Code for Approval of Ballast Water Management Systems (BWMS Code), Res. MEPC 300(72):

- IMO Type Approval N° TAP0000271 dated 23/10/2020 issued by DNV-GL on behalf of the Norwegian Administration.

A copy of the Type Approval Certificate of Ballast Water Management System issued by an Administration should be carried onboard ships fitted with such a system at all times. A reference to the test protocol and a copy of the test results should be available for inspection onboard ships.

3.2 - **Land-based test**, NIVA. All land-based tests were performed with a OBS334 BWMS with a Treatment Rated Capacity of 334m3/h consisting of two 167m3/h UV reactors and one Boll & Kirch 6.18.2 filter with 40 ìm mesh .

- N° SNO 6921-2015 version 2.1 dated June 2016

Land-based test, NIVA. All land-based tests were performed with a OBS334 BWMS with a Treatment Rated Capacity of 334m3/h consisting of two 167m3/h UV reactors and one Boll & Kirch 6.18.3 filter with 25 ìm mesh or Filtrex filter ACB 945-200 with 20 ìm mesh (depending on the test cycle).

- N° SNO-7523-2020 dated 14/10/2020

3.3 - **Shipboard test**, DHI. All land-based tests were performed with a OBS1000 BWMS with a Treatment Rated Capacity of 1000m3/h consisting of six m3/h UV reactors and one Boll&Kirch 6.18.2 (40µm mesh size) Filter (capacity of 1200m3/h).

- N° SNO-7063-2016 version 2.0 dated June 2016

3.4 - **Environmental testing**

- EMC & Environmental test reports N° 30486 Rev. 0 dated 30/09/2020 & N° 20984 Rev. 0

- Techincal reports N° 20226 Rev. 1 dated 11/06/2014, N° 20597 Rev. 0 dated 02/09/2016, N° 21250 Rev. 1 dated 09/02/2018, N° 21356 Rev. 0 dated 24/05/2018

- Report N° 2009-3397 Rev. 1

4. APPLICATION / LIMITATION

4.1 - This certificate is issued for the Ballast Water Management System **Optimarin Ballast System (OBS) & Optimarin Ballast System Ex (OBS Ex)** as far as the classification is concerned. The installation onboard a ship is subject to approval by the Flag Administration of that ship.

4.2 - Intended for Ballast Water Treatment systems:

- Ballast Water Uptake: Filtration + UV disinfection
- Ballast Water Discharge: UV disinfection

The system can be used in the following common ambient and water conditions:

Water temperature range	No limitation
Ambient temperature range	0 to +55°C
Water salinity range	No limitation

4.3 Operating Conditions for **Optimarin Ballast System (OBS):**

Treatment rated capacity	72 - 3000m3/h
Treatment rated capacity (per reactor)	167 m3/h
Minimum Operating Pressure	1.5 bar
Maximum Operating Pressure	10 bar
IP Rating	Systems with Nedap UVpower: IP44 Systems with ETA Plus: IP 54 Systems with UVA: IP54
Minimum holding time	No limitation

4.4 - The treatment rated capacity of the BWMS is not to be less than the operated flow rate of ballast pump(s).

4.5 - Minimum UV Intensity

UV-reactor size	UV Intensity lower limit at full flow	UV Intensity lower limit at 24% of full flow
167 m3/h	400	150

* UV intensity below lower limit implies that the ballast water is not treated in accordance with this certificate.

4.6 - Application for use in hazardous areas is to be approved in each case according to the Society's rules. Optimarin Ballast System Ex (OBS Ex) is designed for use in Zone 1 hazardous areas. The OBS Ex system requires:

- Components certified according to the ATEX regulations to be used in potentially explosive atmospheres
- The system must be installed, operated and maintained according to a selected standard used to eliminate the risk of explosion

The Ex certified components are listed in the manufacturer's document Ex OBS Rev.4 dated 02/04/2014

4.7 - Installation surveys and commissioning procedures on board BV-classed ship: To be witnessed by the Society surveyor for each on-board installation of a Type Approved OBS system. It shall be the duty of **Optimarin AS**'s customers to submit the following documents for approval to the Society for each installation intended for retrofits or new construction:

- On-board location of the BWMS unit (individual or skid-mounted);
- All connection details of interface towards ship's ballast piping systems;
- Layout of the system;
- Ballast stripping operations;
- All associated control, alarm and monitoring equipment;
- Wiring diagrams and the cable specifications;
- Pipes with associated fittings, automatic self-cleaning filter and electrical equipment including control, sensors, safety devices and cables required to be type approved are to be in conformity with the applicable Society's Rules;
- Materials list;
- Arrangement and location of Ballast Water sampling ports.

4.8 - A copy of the operating manual is to be maintained onboard.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The Ballast Water Management systems are to be supplied by **Optimarin AS** in compliance with the type and the requirements described in this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.2 **Optimarin AS** has declared to **Bureau Veritas** that some components detailed in this certificate can be manufactured/assembled at his suppliers's production sites, but however always under his full responsibility and reliability.

5.3 Production surveys requested for components:

a) Filters and Pressure Vessels are classified as Class 3 pressure vessels according to the Society's Rules Pt C, Ch 1, Sec 3 [table 2].

- Housings are to be hydraulically pressure tested to 1.5 times the design pressure under witnessing of a Society’s surveyor;
- Work’s certificate is to be provided for raw materials of shell assembly according to the Society's Rules [Class 3 vessels];
- Bureau Veritas certificate is required for final assembly according to the Society's Rules Pt C, Ch 1, Sec 3 [Class 3 vessels]

b) Electric and functional tests of Power and Control cabinets are to be performed to the surveyor satisfaction.

c) Production surveys for other components (class III piping and manifold, sensors, pumps, electrical cables...) are to be in compliance with the **Optimarin AS**'s regime and Society's Rules.

d) When components (non-skid) are manufactured at supplier or subcontractor workshops, production surveys are to be carried out by the BV local surveyor in charge of the survey.

5.4 Fabrication and welding requirements to comply with the Society's Rules Pt C, Ch 1, Sec 3 [4.10 Class 3 vessels]. Welding procedures and welding consumables are to be approved by the Society.

5.5 A Bureau Veritas product certificate is required for the complete system. Factory acceptance tests records, including functional tests and electrical test are to be provided to the surveyor satisfaction.

5.6 Functional tests of the system to be carried out after onboard installation as required by the IMO resolution MEPC.300(72).

5.7 For information, **Optimarin AS** has declared to Bureau Veritas the following production site:

Optimarin AS
Sjøveien 34
4315 Sandnes
Norway

6. MARKING OF PRODUCT

Each Ballast Water Management system shall be marked with:

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

7. OTHERS

It is **Optimarin AS**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate No. 24799/B0 BV issued by the Society.

***** END OF CERTIFICATE *****