

# Type Approval Certificate



[ Ballast Water management System ]

**Initial Approval** 1st April, 2019  
**Manufacturer** Optimarin AS  
 Sjoveien 34, 4315 Sandnes, Norway

**Product Description** Ballast Water Management System  
 - Type : Optimarin Ballast System(OBS)  
 Optimarin Ballast System Ex(OBS Ex)  
 Treatment sequence:  
 - Ballast water uptake : Filtration and UV Disinfection  
 - Ballast water discharge: UV Disinfection  
 " See Appendix 1 "

**Approval Condition** " See Appendix 1 "

**THIS IS TO CERTIFY** that the above-mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows.

Resolution MEPC.300(72) - Code for Approval of Ballast Water Management Systems, Part 9 Rules for the Classification of Steel Ships and Guidance of Approval of Manufacturing process and Type Approval, Etc.

This Certificate is valid until 31st March, 2024

Reissued at Busan, Korea on 8th February, 2021



This certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No(ME21004125345) and certificate No.(CPH39327-BT001).



**KOREAN REGISTER**

**General Manager of  
Marine & Ocean Equipment Team**

- Note :**
1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.
  2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.
  3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.
  4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

## Product Description and/or Approval Condition

Date of Issue : 8th February, 2021

### A. Product Description

#### 1. Product Specification

##### 1) System Description (Type: OBS and OBS Ex)

The Optimarin OBS and OBS Ex is a ballast water management system. The treatment sequence of OBS and OBS Ex under ballast water uptake mode is filtration and UV disinfection and UV disinfection mode is operated at the discharge mode without filtration.

##### 2) BWMS model designation : Normal Type – xxxx/yyyyBK3 and xxxx/yyyyFX2 Explosion proof Type – xxxx/yyyyBK3EX and xxxx/yyyyFX2EX

- a) xxxx designates the below listed UV model
- b) yyyy the below listed filter model of either the filter series manufactured by Boll & Kirch (BK3) or the filter series manufactured by Filtrex (FX2)
- c) UV models: 167, 334, 500, 667, 834, 1000, 1167, 1334, 1500, 1667, 1834, 2000, 2167, 2334, 2500, 2667, 2834 and 3000
- d) BK3 filter models: 72, 94, 204, 378, 518, 614, 1274, 1384, 2040 and 3100
- e) FX2 filter models: 87, 135, 190, 255, 340, 515, 770, 1040, 1500, 2100 and 3000

##### 3) System Design Limitation

- Treatment Rated Capacity : 72 ~ 3,000 m<sup>3</sup>/h
- Operating Salinity condition : N/A
- Temperature of Ballast Water : N/A
- Holding Time : N/A

##### 4) Treatment Rated Capacity (TRC) of the BWMS

- a) During Ballasting : Max. TRC of UV Chamber or Max. Flow Range of Filter, whichever is lowest
- b) During De-ballasting : Max. TRC of UV Chamber
- c) During Stripping : Max. TRC of UV Chamber

##### 5) UV Intensity

TRC (m <sup>3</sup> /hr)	Lower limit UVI at 24% of Full Flow (W/m <sup>2</sup> )	Lower limit UVI at Full Flow (W/m <sup>2</sup> )
167 per chamber	150	400

##### 6) UV Chamber

Manifold Model	Number of UV Chamber	TRC (m <sup>3</sup> /hr)	Manifold Model	Number of UV Chamber	TRC (m <sup>3</sup> /hr)
Type 1, DN150	1	167	Type 2, DN200	2	334
Type 1, DN200	2	334	Type 2, DN250	3	500
Type 1, DN250	3	500	Type 2, DN300	4	667
Type 1, DN300	4	667	Type 2, DN300	5	834
Type 1, DN300	5	834	Type 2, DN350	6	1000
Type 1, DN350	6	1000	Type 2, DN400	7	1167
Type 1, DN400	7	1167	Type 2, DN400	8	1334
Type 1, DN400	8	1334	Type 2, DN400	9	1500
Type 1, DN400	9	1500	Type 2, DN500	10	1667
Type 1, DN500	10	1667	Type 2, DN500	11	1834
Type 1, DN500	11	1834	Type 2, DN500	12	2000
Type 1, DN500	12	2000	Type 2, DN500	13	2167
Type 1, DN500	13	2167	Type 2, DN500	14	2334
Type 1, DN500	14	2334	Type 2, DN500	15	2500
Type 1, DN500	15	2500	Type 2, DN500	16	2667
			Type 2, DN600	17	2834
			Type 2, DN600	18	3000

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### 7) Filter

#### a) ACB filter series with 20 $\mu\text{m}$ mesh manufactured by Filtrex (FX2)

- Mesh Size : 20  $\mu\text{m}$
- Minimum Filter Inlet Pressure :  $\geq 1.5$  bar
- Maximum Working Pressure : 10 bar
- Differential Pressure Triggering Back flushing :  $\geq 0.3$  bar

Type	Model Designation	Flow Range (m <sup>3</sup> /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
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

#### b) 6.18.3 aquaBoll filter series with 25 $\mu\text{m}$ mesh manufactured by Boll & Kirch (BK3)

- Mesh Size : 25  $\mu\text{m}$
- Minimum Filter Inlet Pressure :  $\geq 1.5$  bar
- Maximum Working Pressure : 10 bar
- Differential Pressure Triggering Back flushing :  $\geq 0.38$  bar

Type	Model Designation	Flow Range (m <sup>3</sup> /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
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

### 8) Control Equipment & Monitoring Equipment

Tag ID	Description	Item	Manufacturer
+CP	CONTROL PANEL MK3	150876	Optimarin AS
+SCP	SUB-CONTROL PANEL MK3	152052	Optimarin AS
+FC	FILTER CONTROL MK3	150737	Optimarin AS
	FILTER CONTROL EX MK3	151199	Optimarin AS
	FILTER CONTROL EX MK3 MTL	152706	Optimarin AS
+SBx	SENSOR BOX OVA MK3	151128	Optimarin AS
	SENSOR BOX 250VA MK3	151114	Optimarin AS
	SENSOR BOX 700VA MK3	151058	Optimarin AS
	SENSOR BOX MK3	151135	Optimarin AS
	SENSOR BOX OVA EX MK3	151215	Optimarin AS
	SENSOR BOX 250VA EX MK3	151231	Optimarin AS
	SENSOR BOX 700VA EX MK3	151763	Optimarin AS
	SENSOR BOX EX MK3	151207	Optimarin AS
	SENSOR BOX OVA EX MK3 MTL	152695	Optimarin AS

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	SENSOR BOX 250VA EX MK3 MTL	152700	Optimarin AS
	SENSOR BOX 700VA EX MK3 MTL	152702	Optimarin AS
	SENSOR BOX EX MK3 MTL	152704	Optimarin AS
+EXIP	EX INTERFACE PANEL MK3	151142	Optimarin AS
+IP	INTERLOCK PANEL MK3	151859	Optimarin AS
+FWP	FRESH WATER PANEL MK3	151779	Optimarin AS
+ACP	ACTUATOR CONTROL PANEL 700VA MK3	151822	Optimarin AS
	ACTUATOR CONTROL PANEL 1600VA MK3	151813	Optimarin AS
	ACTUATOR CONTROL PANEL 3600VA MK3	151804	Optimarin AS
+PDP	POWER DISTRIBUTION PANEL SMALL MK3	152053	Optimarin AS
+GPS	GPS JUNCTION BOX MK3	152057	Optimarin AS
	GPS JUNCTION BOX 230VAC MK3	152058	Optimarin AS
+UVPxx	UV POWER CABINET TYPE NED MK3	145923	Nedap N.V.
	UV POWER CABINET TYPE ETA	145128	Eta plus electronic GmbH
	UV POWER CABINET TYPE UVA	150431	Uvantech AS
+TBxx	TERMINAL BOX MK3	148644	Optimarin AS
	TERMINAL BOX MK2 TYPE TRA	148540	R. Stahl Tranberg AS
	TERMINAL BOX MK2 EX TYPE TRA	145956	R. Stahl Tranberg AS
+EXJBxx	JUNCTION BOX EX TYPE TRA	148640	R. Stahl Tranberg AS
	JUNCTION BOX EX TYPE BAR	145466	Bartec Technor AS
UVxx	UV SENSOR 2300W_m2 TYPE ILM	117079	IL Metronic Sensortechnik
	UV SENSOR 2300W_m2 EX2C EX TYPE ILM	149352	IL Metronic Sensortechnik

### 9) Software Version : V2.0X

\* All changes in software are to be recorded as long as the system is in use onboard and major changes to the software are to be approved before its installation in the computer.

## 2. Approved Drawings and Documents

### 1) Approved Document

- Optimarin Ballast Treatment System Flow Diagram Dwg. No. 30000 Rev.5 dated 2020-09-21
- Internal Wiring Diagram Dwg.No. 50000 Rev.4 dated 2020-09-21
- BOM of Standard OBS system and common components Rev.2

### 2) Reviewed Document

- Operation, maintenance and safety Manual Rev. 6 for BK3, dated 2020-10-14
- Operation, maintenance and safety Manual Rev. 6 for BK3 EX, dated 2020-10-14
- Operation, maintenance and safety Manual Rev. 6 for FX2, dated 2020-10-14

## 3. Test Reports, etc.

### 1) Land-Based Testing Report

- Final Report No. SNO 5643-2008 issued by NIVA, dated 2008-07-02
- Additional Land-Based Testing Report No. 5840-2009 issued by NIVA, dated 2009-09-07
- Additional Land-Based Testing Report No. 6284-2012 issued by NIVA, dated 2012-02-09
- Land-Based Testing Report No. 6921-2015 V.2.1 issued by NIVA, dated on June 2016
- Land-Based Testing Report No. 7523-2020 Final issued by NIVA, dated on August 2020

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- 2) Shipboard Testing Report
  - Final Report No. SNO 5828-2009 issued by NIVA, dated 2009-08-18
- 3) Environment Testing Report
  - Test Report No. 20597 issued by Applica, dated 2016-09-02
  - Test Report No. 20226 issued by Applica, dated 2014-06-11
  - Test Report No. 2009-3397 approved by DNVGL, dated 2009-11-11
  - Test Report No. 9505 330 462XX 002 issued by THALES NEDERLAND, dated 2012-06-27
  - Test Report No. 9505 330 462XX 001 issued by THALES NEDERLAND, dated 2012-07-16
  - Test Report No. 30486 issued by Applica, dated 2020-09-30
  - Test Report No. 21356 issued by Applica, dated 2018-05-24
  - Test Report No. 21250 issued by Applica, dated 2017-12-20
  - Test Report No. 20984 issued by Applica, dated 2016-12-13
- 4) Simulation Tests have been performed on 12 December, 2018 and 1 March, 2019 witnessed by this Society's Surveyor.
- 5) ETC
  - Installation Manual Rev. 6 for BK3, dated 2020-10-14
  - Installation Manual Rev. 6 for BK3 EX, dated 2020-10-14
  - Installation Manual Rev. 6 for FX2, dated 2020-10-14
  - Report for Replace flow-pressure valve with new type Rev.01, dated 2020-03-13
  - Filter Comparison Data For TYPE BK and FX
  - Calculation for Flow Distribution in Parallel UV chambers, Report No. 2015-0885 Rev.1, dated 2015-09-25

## B. Approval Condition

### 1. Application & Limitation

- 1) This approval is granted on the basis of the test reports and the documentation type-approved by Norway Administration (Date: 23 Oct, 2020 / Certificate No : TAP0000271)
- 2) Degree of protection shall be compliant with the Rule Pt.6, Ch.1, Sec.2, Art.201.2. (5).
- 3) Unless specially directed by the Administration, this approval is not to be construed as a substitute for a flag Administration's approval. This certificate may not be used for Korea flagged vessels.
- 4) This certificate will be automatically revoked when the type approval certificate issued by Norwegian Administration is not valid.
- 5) The manufacturer should inform this Society of all kinds of revisions of the equipment including software. If the changes are recognized to affect functionality of the approved equipment, type test to confirm the reliability of the revised equipment may be performed in the presence of our surveyor.
- 6) Any latest conventions or requirements settled by International Maritime Organization or Administrations should be retroactively applied at the earliest possibility, if necessary.
- 7) The above models may be installed on board in parallel, provided that the ultimate functioning and effectiveness of the system on board a ship of the type and size for which the equipment will be certified will not be adversely affected.
- 8) Explosion-proof certification by a notified/recognized certification body is not covered by this certificate. Ratings and special condition for safe use in hazardous areas are to be obtained from the relevant valid Ex-certificate.

### 2. Individual Product Cert. and Drawing Approval Requirement

- 1) Individual product certification is required in accordance with Rule Pt.9 Ch.10 Sec.306.4.

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- 2) For the BWMS intended to undergo a Classification survey during construction or retrofit, the following documents for individual vessel are to be submitted to the Society.
- Ballast Piping Diagram
  - Electrical Schematic Drawings of BWMS
  - Operation and Maintenance Manual (if required by Administration)
  - Any other documents deemed necessary by the Society and/or Administration

### 3. Marking

- 1) The product or packing is to be marked with the manufacturer's name and type designation on a suitable position.

### 4. Others

- 1) Test condition of Electric Equipment

Test	Condition	Remark
EMC	All locations excluding the bridge and deck zone	-
Temperature	+5 ~ +55°C	-
Vibration	Acceleration $\pm 0.7g$	-

< End of Certificate >