



BIRO KLASIFIKASI INDONESIA

SERTIFIKAT PERSETUJUAN TIPE *Type Approval Certificate*

No. 00032.21.SP00177

No. Persetujuan : 00375TA21
No. of Approval

Tanggal Persetujuan : 14 April 2021
Date of Approval

Dengan ini dinyatakan bahwa produk dibawah ini telah memenuhi dan disetujui berdasarkan persyaratan dari Peraturan dan/atau Standard yang tercantum dibawah ini

This is to certify that the following products has been complied and approved in accordance with requirements of the Rules and / or Standards listed below

Produk : **Ballast Water Management System**
Product

Pembuat : **OPTIMARIN AS**
Manufacturer
SANDNES, Norway

Tipe Produk : **OPTIMARIN BALLAST SYSTEM 167/72BK3-3000/3100BK3 AND 167/87FX2-3000/3000FX2**
Type Designation

Standard persetujuan : Rules for Approval of Manufacturers and Service Suppliers (Pt.1, Vol.XI)
Approval standards
IMO Resolution MEPC.300(72)

Sertifikat ini berlaku hingga tanggal yang ditetapkan di bawah dengan syarat jika terdapat perubahan atau modifikasi pada produk harus segera diberitahukan ke BKI.

This certificate remains valid until the date set below provided that if there are any alterations or modifications to the approved product, BKI shall be notified immediately.

Sertifikat ini berlaku sampai dengan : **22 Oktober 2025**

This certificate is valid until



Jakarta 16 April 2021

a.n. Direktur Operasi
Kepala Departemen Operasi Klasifikasi
a.n. Operation Director
SKP of Classification Operation Dept.



Catatan : Sertifikat ini terdiri dari 6 halaman
Note This certificate is consist of 6 pages

Jika Peraturan atau Standard yang digunakan dalam proses persetujuan mengalami perubahan pada saat sertifikat ini masih berlaku, maka produk harus dilakukan persetujuan ulang sebelum dapat dipasang dikapal dimana Peraturan atau Standard tersebut berlaku.

Should the specified Rules or Standards be amended during the validity of this certificate, the product is to be reappraised prior to it being placed on board vessels to which the amended Rules or Standards apply.

Lembar Pengukuhan

Endorsement Sheet

Harus dikukuhkan oleh Surveyor BKI
To be endorsed by BKI Surveyor

<p>Pemeriksaan periodik (22 Oktober 2022 s/d 22 Oktober 2023) <i>Periodical surveillance (22 October 2022 until 22 October 2023)</i></p> <p>No. Laporan: Report no.</p>	<p>Tanggal : <i>Date</i></p> <p>Surveyor :</p>
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Catatan : Sertifikat akan ditangguhkan secara otomatis jika tidak dikukuhkan dalam rentang waktu yang telah ditetapkan diatas.
Note The certificate will be automatically suspended if not endorsed within the specified time period above.



Lampiran

Annex to

Sertifikat Persetujuan Tipe

Type Approval Certificate

No. Sertifikat : 00032.21.SP00177
No of certificate

No. Persetujuan : 00375TA21
Approval no.

Deskripsi Produk

Product Description

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

OBS BWMS model designation: xxxx/yyyyBK3 and xxxx/yyyyFX2
where xxxx designates the below listed UV model and yyyy the below listed filter model of either the filter series manufactured by Boil & Kirch (BK3) or the filter series manufactured by Filtrex (FX2).

UV models: 167, 334, 500, 667, 834, 1000, 1167, 1334, 1500, 1667, 1834, 2000, 2167, 2334, 2500, 2667, 2834 and 3000
BK3 filter models: 72, 94, 204, 378, 518, 614, 1274, 1384, 2040 and 3100
FX2 filter models: 87, 135, 190, 225, 340, 515, 770, 1040, 1500, 2100 and 3000

A OBS BWMS model suitable for installation in hazardous area are designated with the suffix EX (e.g. xxxx/yyyyBK3EX).

Kondisi Persetujuan

Condition of Approval

1. Treatment Rated Capacity
- 72-3000 m³/h

2. Treatment sequence
- Ballast water uptake: Filtration and UV treatment
- Ballast water discharge: UV treatment

3. Temperature and Salinity
Temperature and salinity of the ballast water are not a limiting condition for the ballast water treatment system.

4. Holding time
The OBS BWMS has demonstrated performance to the discharge standard with a minimum holding time between uptake and discharge of 24 hours in land-based testing for the IMO mode. UV treatment is instant and does not require any hold time in a ballast tank to render organisms inviable. Therefore, holding time is not found to be a limiting condition for the ballast water management system.

5. Dosing
The BWMS has demonstrated performance to the discharge standard when the UV intensity (UVI) and flow rate is measured above the below parameters.

Operation mode	TRC [m ³ /h]	UVI lower limit at 24% of full flow [W/m ²]	UVI lower limit at full flow (TRC) [W/m ²]
IMO	167 per chamber	150 ⁽¹⁾	400 ⁽²⁾

⁽¹⁾ UVI below lower limit implies that the ballast water is not treated in accordance with this certificate. When targeting this UVI limit in land-based testing, the measured UVT was 45-46%. UVT may vary depending on the water quality parameters, i.e. particles and dissolved organic carbon

⁽²⁾ When targeting this UVI limit in land-based testing, the measured UVT was 54-56%.

The system has also includes UV-lamp power optimization control based on measured UV-intensity. Lamp power can be reduced when UVI measures above 800 W/m².

The system has a USCG mode of operation which applies a higher UV dose than the described IMO mode above. This type approval therefore also applies to operation in USCG mode.

6. Treatment Rated Capacity (TRC) of the BWMS

The Treatment Rated Capacities (TRC) of the designated OBS BWMS models during ballasting is limited to either on the TRC of the UV system or the TRC of the selected filter model, whichever is lowest.

During deballasting, the TRC is limited to the TRC of the UV system only. The UV system is formed by several UV chambers installed in parallel configuration using specific manifolds with the TRCs as listed below. The TRC of the filter models, BK3 and FX2 are also listed in tables below. The minimum flow rate at which designated OBS BWMS model can be operated is the minimum flow rate of the selected filter model + (10m³/h*number of UV chambers).

The OBS BWMS controls the flow rate in the ballast water line by using a flow control valve to ensure that flow rates are kept within the TRC.

Manifold model	Number of UV chambers	TRC [m ³ /h]
Type 1, DN150	1	167
Type 1, DN200	2	334
Type 1, DN250	3	500
Type 1, DN300	4	667
Type 1, DN300	5	834
Type 1, DN350	6	1000
Type 1, DN400	7	1167
Type 1, DN400	8	1334
Type 1, DN400	9	1500
Type 1, DN400	10	1667
Type 1, DN500	11	1834
Type 1, DN500	12	2000
Type 1, DN500	13	2167
Type 1, DN500	14	2334
Type 1, DN500	15	2500

Manifold model	Number of UV chambers	TRC [m ³ /h]
Type 2, DN200	2	334
Type 2, DN250	3	500
Type 2, DN300	4	667
Type 2, DN300	5	834
Type 2, DN350	6	1000
Type 2, DN400	7	1167
Type 2, DN400	8	1334
Type 2, DN400	9	1500
Type 2, DN500	10	1667
Type 2, DN500	11	1834
Type 2, DN500	12	2000
Type 2, DN500	13	2167
Type 2, DN500	14	2334
Type 2, DN500	15	2500
Type 2, DN500	16	2667
Type 2, DN600	17	2834
Type 2, DN600	18	3000

Filtrex ACB	Model designation	Flow range [m ³ /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

Boll & Kirch 6.18.3/AquaBoll	Model designation	Flow range [m ³ /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

7. Pressure

The minimum and maximum system operating pressure and the differential pressure triggering backflushing are listed below.

Filter type	Minimum inlet pressure (back-pressure)	Differential pressure triggering backflushing	Maximum operating pressure
Filtrex Type ACB, FX2	1.5 bar	≥0.3 bar	10 bar
aquaBoll 6.18.3, BK3	1.5 bar	≥0.38 bar	10 bar

8. Software version

The OBS BWMS is type approved with system control software version: 2.0x

Any change to the software is to be recorded as long as the system is in use on board. Major changes in the software, as defined in the Optimarin checklist, OM-C-59, require approval. Testing of the application functions of a revised software may be required.

9. Safety measures

The OBS BWMS is type approved with the following instruments for monitoring the safe operation of the BWMS and for activating, as necessary, an automatic shutdown of the BWMS:

- Temperature sensor (TTxx) installed in each UV chamber
- Temperature switch (TSxx) installed in each UV chamber and arranged with safety function independent of BWMS control
- Pressure sensors (PT01) installed after the filter
- Flow meter (FM01) installed after the filter

10. Hazardous area / Ex-proof

The OBS Ex BWMS has been evaluated. The filter, UV chambers, valves, backflush pump, and flowmeters have Ex-certification and can be installed in hazardous area. The cabinets are to be located in safe zone. Ex-certification is not covered by this certificate. Installation in a hazardous area are to be approved in each case according to the Rules and Ex-certification / Special Condition for Safe Use, listed in a valid Ex-certificate issued by a notified/recognized Certification Body.

Dokumentasi Persetujuan

Approval Documentation

1. BKI approval document no. 2141090009
2. BKI assessment report no. 00177-SP/C1/2021
3. Type Approval certificate issued by DNV-GL no. TAP0000271
4. Biological test reports:
 - NIVA, Land-based testing of OBS 334 Ballast Water Management system of Optimarin AS – Final Report, Report SNO 6921-2015, Final report v2.1, June 2016
 - NIVA, Shipboard testing of the Ballast Water Management System OBS1000 of Optimarin AS, Report SNO 7063-2016, Final report v2.0, June 2016
 - NIVA, Land-based testing of OBS 334 Ballast Water Management system of Optimarin AS – Final Report, Report SNO 7523-2020, Final report, August 2020
5. Environmental test reports:
 - Applica EMC and Environmental testing of Gönzheimer Elektronik GmbH Control unit F850S and power supply for Optimarin AS, Report 20226, Rev. 1
 - Applica Technical Report Optimarin AS Environmental testing of Temperatures Switches, Report No. 21250 Rev 1
 - Applica Technical Report Optimarin AS Environmental testing of Sensor Box +EXSB01 and temperature transmitter TR-34, Report No. 21356 Rev 0
 - Applica Technical Report Optimarin AS Environmental testing, Report No. 20597 Rev 0

Penandaan Produk

Marking of Product

For traceability of this type approval, each treatment system is to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Serial number

Pemeriksaan periodik

Periodical Surveillance

For retention of the approval, a BKI Surveyor shall conduct periodical surveillance to verify that approved quality system, etc. of the manufacturing works are maintained satisfactorily.

The main scope of the periodical surveillance will normally include:

- Verification of the manufacturer's production and quality system with regard to ensure continued consistent production of the Type Approved products at the manufacturer's premises
- Review of the approval documentation and that this is still used as basis for the production
- Review of possible changes to the properties of the product
- Verification of the product marking