

相当指定書
TYPE APPROVAL CERTIFICATE OF BALLAST WATER
MANAGEMENT SYSTEM



日本国
JAPAN

ここに IMO 決議 MEPC.174(58)に包括されたガイドラインに含まれる性能要件に従い、以下のバラスト水管理システムが調査及び試験されたことを証明する。この証明書は、以下に示されるバラスト水管理システムについてのみ有効である。

This is certify that the Ballast Water Management Systems listed below has been examined and tested in accordance with the requirements of the specifications contained in the Guidelines contained in IMO resolution MEPC.174(58). This certificate is valid only for the Ballast Water Management System referred to below.

バラスト水管理システムの証明を受けた者
Ballast Water Management System supplied by Optimarin AS

名称及び型式
Under type and model designation and incorporating: Optimarin Ballast System (OBS)

バラスト水管理システムの製造者、完成図書番号及び日付
Ballast Water Management System manufactured by _____ See APPENDIX
to equipment/assembly drawing No. _____ See APPENDIX

その他装置の製造者、完成図書番号及び日付
Other equipment manufactured by _____
to equipment/assembly drawing No. _____

定格処理能力
Treatment Rated Capacity 50~3000 m³/h

この証明書の写しを、バラスト水管理システムとともに常に船上に備え置くこと。試験手順に係る参考資料及び試験結果の写しを、検査の際に利用できるよう船上に備え置くこと。この証明書を他の主管庁の認証に基づき発行した場合は、当該認証につき明記する。課された制限条件は、この証明書の附録として添付される。

A copy of this Certificate should be carried on board a vessel fitted with this Ballast Water Management System at all times. A reference to the test protocol and a copy of test results should be available for inspection on board the vessel. If the Certificate is issued based on approval by another Administration, reference to that Type Approval Certificate shall be made. Limiting Conditions imposed are described in the appendix to this document.



Signed _____
(Toru SHIGETOMI)
Director, Inspection and Measurement Division, Maritime Bureau
Ministry of Land, Infrastructure, Transport and Tourism

2017年 6 月 22 日発給した。
Dated this 22 day of June, 2017

APPENDIX

1. TECHNICAL DESCRIPTION OF MAJOR COMPONENTS

UV system	
Manufacturer	Manifold & UV chamber : SHIPPIPE Bremen GmbH UV sensor : IL Metronic UV lamp : UltraLight, Eta Plus, UV Technik
Specification	Operational Flow Range : 20 m ³ /h - 167 m ³ /h (per one UV chamber) No. of UV lamp : 1 Power of UV lamp : 35 kW

Filter				
Manufacturer	BOLL&KIRCH	BOLL&KIRCH	FILTERSAFE	FILTREX
Type	Bollfilter 6.18.2	Bollfilter 6.18.3	BS	ACB
Flow Range (m ³ /h)	Bollfilter 100 : 24 - 100 Bollfilter 220 : 74 - 220 Bollfilter 400 : 110 - 400 Bollfilter 600 : 124 - 600 Bollfilter 800 : 150 - 800 Bollfilter 1200 : 182 - 1200 Bollfilter 1600 : 204 - 1600 Bollfilter 2500 : 270 - 2500	Bollfilter 370 : 83 - 370 Bollfilter 500 : 85 - 500 Bollfilter 750 : 85 - 750 Bollfilter 1400 : 168 - 1400 Bollfilter 2100 : 205 - 2100 Bollfilter 2500 : 214 - 2500 Bollfilter 3800 : 326 - 3800	BS-025H/V : 10 - 50 BS-050H-04 : 30 - 80 BS-050H/V : 30 - 125 BS-070H/V : 30 - 180 BS-100H/V : 40 - 250 BS-150H/V : 50 - 375 BS-200H/V : 60 - 500 BS-300H/V : 60 - 750 BS-400H/V : 80 - 1000	ACB-906-100 : 15 - 87 ACB-910-150 : 25 - 135 ACB-915-150 : 35 - 190 ACB-935-200 : 35 - 255 ACB-945-200 : 45 - 340 ACB-955-250 : 50 - 515 ACB-985-300 : 65 - 770 ACB-999-350 : 95 - 1040
Filter element	40 µm mesh	40 µm mesh	40 µm mesh	40 µm mesh
Design pressure	10 bar	10 bar	10 bar	10 bar

Control Panel (CP)	
Manufacturer	Optimarin AS
Model	CONTOROL PANEL, CONTOROL PANEL MK2
Specification	Enclosure: IP66

UV Power cabinet (UVP)			
Manufacturer	Optimarin AS		
Model	NED	NED MK3	ETA
Specification	Enclosure: IP44 Operation Voltage: AC 1260V	Enclosure: IP44 Operation Voltage: AC 1260V	Enclosure: IP54 Operation Voltage: AC 2150V

2 . APPROVED RATINGS

Representative System model for specified TRC is provided in the below chart.

SYSTEM MODEL	TRC (ballasting / deballasting) [m ³ /h]	UV Unit	Filter	UV Power cabinet
With filter type Bollfilter 6.18.2				
OBS 167/100BK	100 / 167	UV chamber x 1	Bollfilter 6.18.2 100 x 1	UVP x 1
OBS 167/220BK	167 / 167	UV chamber x 1	Bollfilter 6.18.2 220 x 1	UVP x 1
OBS 334/220BK	220 / 334	UV chamber x 2	Bollfilter 6.18.2 220 x 1	UVP x 2
OBS 334/400BK	334 / 334	UV chamber x 2	Bollfilter 6.18.2 400 x 1	UVP x 2
OBS 500/400BK	400 / 500	UV chamber x 3	Bollfilter 6.18.2 400 x 1	UVP x 3
OBS 500/600BK	500 / 500	UV chamber x 3	Bollfilter 6.18.2 600 x 1	UVP x 3
OBS 667/600BK	500 / 667	UV chamber x 4	Bollfilter 6.18.2 600 x 1	UVP x 4
OBS 667/800BK	667 / 667	UV chamber x 4	Bollfilter 6.18.2 800 x 1	UVP x 4
OBS 834/800BK	800 / 834	UV chamber x 5	Bollfilter 6.18.2 800 x 1	UVP x 5
OBS 1000/1200BK	1000 / 1000	UV chamber x 6	Bollfilter 6.18.2 1200 x 1	UVP x 6
OBS 1167/1200BK	1167 / 1167	UV chamber x 7	Bollfilter 6.18.2 1200 x 1	UVP x 7
OBS 1334/1200BK	1200 / 1334	UV chamber x 8	Bollfilter 6.18.2 1200 x 1	UVP x 8
OBS 1334/1600BK	1334 / 1334	UV chamber x 8	Bollfilter 6.18.2 1600 x 1	UVP x 8
OBS 1500/1600BK	1500 / 1500	UV chamber x 9	Bollfilter 6.18.2 1600 x 1	UVP x 9
OBS 1667/1600BK	1600 / 1667	UV chamber x 10	Bollfilter 6.18.2 1600 x 1	UVP x 10
OBS 1667/2500BK	1667 / 1667	UV chamber x 10	Bollfilter 6.18.2 2500 x 1	UVP x 10
OBS 1834/2500BK	1834 / 1834	UV chamber x 11	Bollfilter 6.18.2 2500 x 1	UVP x 11
OBS 2000/2500BK	2000 / 2000	UV chamber x 12	Bollfilter 6.18.2 2500 x 1	UVP x 12
OBS 2167/2500BK	2167 / 2167	UV chamber x 13	Bollfilter 6.18.2 2500 x 1	UVP x 13
OBS 2334/2500BK	2334 / 2334	UV chamber x 14	Bollfilter 6.18.2 2500 x 1	UVP x 14
OBS 2500/2500BK	2500 / 2500	UV chamber x 15	Bollfilter 6.18.2 2500 x 1	UVP x 15
With filter type Bollfilter 6.18.3				
OBS (Ex) 167/370BK2	167 / 167	UV chamber x 1	Bollfilter 6.18.3 370 x 1	UVP x 1
OBS (Ex) 334/370BK2	334 / 334	UV chamber x 2	Bollfilter 6.18.3 370 x 1	UVP x 2
OBS (Ex) 500/370BK2	370 / 500	UV chamber x 3	Bollfilter 6.18.3 370 x 1	UVP x 3
OBS (Ex) 500/500BK2	500 / 500	UV chamber x 3	Bollfilter 6.18.3 500 x 1	UVP x 3
OBS (Ex) 667/750BK2	667 / 667	UV chamber x 4	Bollfilter 6.18.3 750 x 1	UVP x 4
OBS (Ex) 834/750BK2	750 / 834	UV chamber x 5	Bollfilter 6.18.3 750 x 1	UVP x 5
OBS (Ex) 834/1400BK2	834 / 834	UV chamber x 5	Bollfilter 6.18.3 1400 x 1	UVP x 5
OBS (Ex) 1000/1400BK2	1000 / 1000	UV chamber x 6	Bollfilter 6.18.3 1400 x 1	UVP x 6
OBS (Ex) 1167/1400BK2	1167 / 1167	UV chamber x 7	Bollfilter 6.18.3 1400 x 1	UVP x 7
OBS (Ex) 1334/1400BK2	1334 / 1334	UV chamber x 8	Bollfilter 6.18.3 1400 x 1	UVP x 8
OBS (Ex) 1500/1400BK2	1400 / 1500	UV chamber x 9	Bollfilter 6.18.3 1400 x 1	UVP x 9
OBS (Ex) 1500/2100BK2	1500 / 1500	UV chamber x 9	Bollfilter 6.18.3 2100 x 1	UVP x 9
OBS (Ex) 1667/2100BK2	1667 / 1500	UV chamber x 10	Bollfilter 6.18.3 2100 x 1	UVP x 10
OBS (Ex) 1834/2100BK2	1834 / 1500	UV chamber x 11	Bollfilter 6.18.3 2100 x 1	UVP x 11
OBS (Ex) 2000/2100BK2	2000 / 1500	UV chamber x 12	Bollfilter 6.18.3 2100 x 1	UVP x 12
OBS (Ex) 2167/2100BK2	2000 / 2167	UV chamber x 13	Bollfilter 6.18.3 2100 x 1	UVP x 13
OBS (Ex) 2167/2500BK2	2167 / 2167	UV chamber x 13	Bollfilter 6.18.3 2500 x 1	UVP x 13
OBS (Ex) 2334/2500BK2	2334 / 2334	UV chamber x 14	Bollfilter 6.18.3 2500 x 1	UVP x 14
OBS (Ex) 2500/2500BK2	2500 / 2500	UV chamber x 15	Bollfilter 6.18.3 2500 x 1	UVP x 15
OBS (Ex) 2667/3800BK2	2667 / 2667	UV chamber x 16	Bollfilter 6.18.3 3800 x 1	UVP x 16
OBS (Ex) 2834/3800BK2	2834 / 2834	UV chamber x 17	Bollfilter 6.18.3 3800 x 1	UVP x 17

OBS (Ex) 3000/3800BK2	3000 / 3000	UV chamber x 18	Bollfilter 6.18.3 3800 x 1	UVP x 18
With filter type BS				
OBS 167/50FS	50 / 167	UV chamber x 1	BS-025H/V x 1	UVP x 1
OBS 167/80FS	80 / 167	UV chamber x 1	BS-050H-04 x 1	UVP x 1
OBS 167/125FS	125 / 167	UV chamber x 1	BS-050H/V x 1	UVP x 1
OBS 167/180FS	167 / 167	UV chamber x 1	BS-070H/V x 1	UVP x 1
OBS 334/180FS	180 / 334	UV chamber x 2	BS-070H/V x 1	UVP x 2
OBS 334/250FS	250 / 334	UV chamber x 2	BS-100H/V x 1	UVP x 2
OBS 334/375FS	334 / 334	UV chamber x 2	BS-150H/V x 1	UVP x 2
OBS 500/375FS	375 / 500	UV chamber x 3	BS-150H/V x 1	UVP x 3
OBS 500/500FS	500 / 500	UV chamber x 3	BS-200H/V x 1	UVP x 3
OBS 667/750FS	667 / 667	UV chamber x 4	BS-300H/V x 1	UVP x 4
OBS 834/750FS	750 / 834	UV chamber x 5	BS-300H/V x 1	UVP x 5
OBS 834/1000FS	834 / 834	UV chamber x 5	BS-400H/V x 1	UVP x 5
OBS 1000/1000FS	1000 / 1000	UV chamber x 6	BS-400H/V x 1	UVP x 6
With filter type ACB				
OBS 167/87FX	87 / 167	UV chamber x 1	ACB-906-100 x 1	UVP x 1
OBS 167/135FX	135 / 167	UV chamber x 1	ACB-910-150 x 1	UVP x 1
OBS 167/190FX	167 / 167	UV chamber x 1	ACB-915-150 x 1	UVP x 1
OBS 334/190FX	190 / 334	UV chamber x 2	ACB-915-150 x 1	UVP x 2
OBS 334/255FX	255 / 334	UV chamber x 2	ACB-935-200 x 1	UVP x 2
OBS 334/340FX	334 / 334	UV chamber x 2	ACB-945-200 x 1	UVP x 2
OBS 500/340FX	340 / 500	UV chamber x 3	ACB-945-200 x 1	UVP x 3
OBS 500/515FX	500 / 500	UV chamber x 3	ACB-955-250 x 1	UVP x 3
OBS 667/515FX	515 / 667	UV chamber x 4	ACB-955-250 x 1	UVP x 4
OBS 667/770FX	667 / 667	UV chamber x 4	ACB-985-300 x 1	UVP x 4
OBS 834/770FX	770 / 834	UV chamber x 5	ACB-985-300 x 1	UVP x 5
OBS 834/1040FX	834 / 834	UV chamber x 5	ACB-999-350 x 1	UVP x 5
OBS 1000/1040FX	1000 / 1000	UV chamber x 6	ACB-999-350 x 1	UVP x 6
OBS 1167/1040FX	1040 / 1167	UV chamber x 7	ACB-999-350 x 1	UVP x 7

3. LAND BASED TEST SUMMARY

Marine water test cycles (> 32 PSU)						
Size category & Water parameter	Sample	Test cycle 1	Test cycle 2	Test cycle 3	Test cycle 4	Test cycle 5
Organisms ≥ 50µm(inds/m ³)	Influent	250333 ± 16790	219696 ± 21082	146375 ± 8420	117767 ± 10572	248008 ± 35848
	Control	59278±11484	58083±7062	44963±4470	48032±5853	21319±1553
	Treated	0±0	0±0	0±0	0±0	0±0
Organisms ≥ 10 and < 50µm (inds/mL)	Influent	5705±1036	2299±286	1556±412	2072±110	2013±54
	Control	5324±158	2489±180	2437±207	2057±79	1357±91
	Treated	0.7±0.6	0±0	0±0	0±0	0±0
Marine heterotrophic bacteria (cfu/100mL)	Influent	3.0±0.5 x 10 ⁴	2.1±0.05 x 10 ⁴	3.1±0.2 x 10 ⁴	2.4±0.3 x 10 ⁴	1.8±0.2 x 10 ⁵
	Control	2.9±2.9 x 10 ⁵	2.1±0.4 x 10 ⁵	3.7±0.5 x 10 ⁵	3.2±0.9 x 10 ⁵	2.9±0.8 x 10 ⁵
	Treated	1.2±0.5 x 10 ¹	6.1±0.7 x 10 ¹	5.9±0.4 x 10 ¹	5.7±1.6 x 10 ¹	1.5±0.3 x 10 ²
Coliform bacteria (cfu/100mL)	Influent	3.7±0.6 x 10 ⁰	2.3±2.3 x 10 ⁰	0±0	1.0±1.7 x 10 ⁰	1.3±0.6 x 10 ⁰
	Control	0±0	0±0	0±0	0±0	0.7±0.6 x 10 ⁰

	Treated	0±0	0±0	0±0	0±0	0±0
Vibrio cholera (cfu/100mL)	Influent	—	—	—	—	—
	Control	—	—	—	—	—
	Treated	< 1	< 1	< 1	< 1	< 1
Vibrio sp. (cfu/100mL)	Influent	0±0	4.2±0.06 x 10 ³	3.7±2.8 x 10 ³	6.6±1.4 x 10 ³	1.3±1.1 x 10 ⁴
	Control	5.6±0.5 x 10 ²	4.4±0.3 x 10 ³	5.6±1.6 x 10 ³	5.6±1.0 x 10 ³	9.9±0.6 x 10 ³
	Treated	6.8±3.4 x 10 ¹	0.6±0.5 x 10 ⁰	0.6±1.0 x 10 ¹	2.4±0.5 x 10 ⁰	0.3±0.5 x 10 ⁰
Enterococcus group (cfu/100mL)	Influent	1.3±1.2 x 10 ⁰	1.0±1.0 x 10 ⁰	0±0	1.3±1.5 x 10 ⁰	0±0
	Control	0±0	2.0±1.0 x 10 ⁰	1.0±1.0 x 10 ⁰	2.0±1.0 x 10 ⁰	0±0
	Treated	0±0	0±0	0±0	0±0	0±0
TSS(mg/L)	Influent	13.8	15.1	17.8	13.7	14.6
DOC(mg/L)	Influent	2.4	2.6	2.3	2.5	2.2
POC(mg/L)	Influent	2.1	1.9	2.5	2.0	2.5
Temperature (°C)	Influent	7.20	5.40	5.70	6.70	7.60
	Control	5.70	4.30	4.20	5.70	8.30
	Treated	5.10	3.80	3.80	5.20	8.20
Salinity (PSU)	Influent	32.00	32.10	32.90	32.60	33.00
	Control	32.00	32.10	32.90	32.60	33.00
	Treated	32.00	32.10	32.90	32.60	33.00
pH	Influent	7.96	8.01	8.03	8.04	8.01
	Control	8.04	8.16	8.05	8.00	7.94
	Treated	8.03	8.18	8.05	7.99	7.91
Dissolved oxygen(mg/L)	Influent	11.10	10.40	11.50	11.60	11.60
	Control	10.30	10.20	11.90	11.01	10.60
	Treated	10.10	10.90	12.10	11.20	10.60
Flow rate(m ³ /h)	Ballasting	332	331	331	331	335
	Deballasting	331	331	332	331	335
Brackish water test cycles (3 - 32 PSU)						
Size category & Water parameter	Sample	Test cycle 1	Test cycle 2	Test cycle 3	Test cycle 4	Test cycle 5
Organisms ≥ 50µm(inds/m ³)	Influent	232708 ±29189	253438 ±8083	265083 ±17924	262167 ±42253	260292 ±31001
	Control	64819±18440	58574±16971	49032±12602	66093±2360	14852±1587
	Treated	1.0±1.0	1.3±0.6	1.0±0	1.0±1.0	0±0
Organisms ≥ 10 and < 50µm (inds/mL)	Influent	2109±277	1776±202	2800±494	2117±264	1927±182
	Control	2083±526	2610±252	2964±226	1555±233	1279±104
	Treated	3.3±0.6	4.7±2.1	7.7±0.6	5.3±2.1	5.3±2.9
Marine heterotrophic bacteria (cfu/100mL)	Influent	3.0±0.3 x 10 ⁴	2.3±0.6 x 10 ⁴	1.8±0.2 x 10 ⁴	8.6±0.9 x 10 ⁴	1.2±0.006 x 10 ⁵
	Control	1.4±0.8 x 10 ⁶	6.0±0.9 x 10 ⁵	4.1±1.0 x 10 ⁵	4.3±0.5 x 10 ⁴	3.6±1.5 x 10 ⁴
	Treated	2.1±0.4 x 10 ²	3.4±0.3 x 10 ¹	2.0±0.9 x 10 ³	1.1±0.2 x 10 ²	3.9±1.9 x 10 ⁰
Coliform bacteria (cfu/100mL)	Influent	2.3±2.5 x 10 ⁰	1.7±0.6 x 10 ⁰	2.0±1.0 x 10 ⁰	3.3±2.1 x 10 ¹	3.0±5.2 x 10 ⁰
	Control	0±0	0±0	0.7±0.6 x 10 ⁰	2.3±2.1 x 10 ⁰	0.3±0.6 x 10 ⁰
	Treated	0±0	0±0	0±0	0±0	2±1
Vibrio cholera (cfu/100mL)	Influent	—	—	—	—	—
	Control	—	—	—	—	—
	Treated	< 1	< 1	< 1	< 1	< 1
Vibrio sp. (cfu/100mL)	Influent	1.2±0.4 x 10 ⁴	2.5±0.2 x 10 ³	1.9±0.1 x 10 ³	3.1±0.04 x 10 ³	3.0±5.2 x 10 ⁰
	Control	3.3±0.1 x 10 ³	2.3±0.5 x 10 ³	3.0±0.2 x 10 ³	1.6±0.3 x 10 ³	7.0±1.6 x 10 ²

	Treated	$0.9 \pm 0.9 \times 10^0$	$1.2 \pm 0.5 \times 10^0$	0 ± 0	$1.8 \pm 2.4 \times 10^0$	0 ± 0
Enterococcus group (cfu/100mL)	Influent	$0.3 \pm 0.6 \times 10^0$	$1.0 \pm 1.0 \times 10^0$	$1.7 \pm 0.6 \times 10^0$	$3.3 \pm 1.2 \times 10^0$	$1.3 \pm 1.5 \times 10^0$
	Control	0 ± 0	$0.3 \pm 0.6 \times 10^0$	$1.0 \pm 0.0 \times 10^0$	$2.0 \pm 2.0 \times 10^0$	$0.3 \pm 0.6 \times 10^0$
	Treated	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
TSS(mg/L)	Influent	59.3	61.9	58.0	68.4	57.0
DOC(mg/L)	Influent	5.4	5.3	6.1	6.0	6.0
POC(mg/L)	Influent	6.8	7.2	8.7	7.2	6.5
Temperature (°C)	Influent	4.10	6.30	3.20	4.90	4.80
	Control	4.30	5.60	3.10	5.30	5.50
	Treated	4.00	5.30	2.80	5.10	5.40
Salinity (PSU)	Influent	21.70	21.50	21.40	21.60	20.70
	Control	21.70	21.50	21.40	21.40	20.70
	Treated	21.70	21.50	21.40	21.40	20.70
pH	Influent	7.83	7.89	7.82	8.01	8.24
	Control	7.80	7.70	7.72	8.13	8.09
	Treated	7.60	7.80	7.75	8.15	8.11
Dissolved oxygen(mg/L)	Influent	11.43	12.40	13.33	13.10	13.30
	Control	11.50	10.70	11.90	10.90	11.50
	Treated	11.40	10.20	12.50	11.10	12.10
Flow rate(m ³ /h)	Ballasting	335	335	335	334	334
	Deballasting	334	335	336	335	335

4. SHIPBOARD TEST SUMMARY

Size category & Water parameter	Sample	Test cycle 1	Test cycle 2	Test cycle 3
Organisms $\geq 50\mu\text{m}$ (inds/m ³)	Influent	10284±6261	68758±13305	96529±42838
	Control	4558±3321	17110±4274	84242±38845
	Treated	8.4±5.5	0.8±1.6	2.1±2.8
Organisms ≥ 10 and $< 50\mu\text{m}$ (inds/mL)	Influent	204±53	937±167	1052±98
	Control	135±59	365±74	773±54
	Treated	0.1±0.3	0.3±0.7	0.7±0.8
Coliform bacteria and Escherichia coli (cfu/100mL)	Influent	0±0	49.7±15.0	20.3±3.5
	Control	0±0	28.0±5.6	24.0±5.0
	Treated	Coliform bacteria : 0±0 Escherichia coli : 0±0	Coliform bacteria : 0±0 Escherichia coli : 0±0	Coliform bacteria : 0±0 Escherichia coli : 0±0
Vibrio sp. and Vibrio cholerae (cfu/100mL)	Influent	25±19	1100±760	580±29
	Control	3.3±1.0	1200±240	1200±160
	Treated	Vibrio sp. : 1.7±0.7 Vibrio cholera : < 1	Vibrio sp. : 5.9±4.5 Vibrio cholera : < 1	Vibrio sp. : 1.3±2.3 Vibrio cholera : < 1
Entero coccus (cfu/100mL)	Influent	8.3±2.5	20.7±2.9	7.7±0.6
	Control	9.3±1.2	16.7±1.2	24.0±5.0
	Treated	13.3±1.5	19.3±3.2	8.0±3.6
Temperature (°C)	Influent	4.6	13.3	14.5
	Control	5.6	13.7	14.4
	Treated	5.6	13.8	14.9
Salinity (PSU)	Influent	20.6	25.1	24.6
	Control	20.5	26.2	24.8
	Treated	20.5	25.9	24.7

TSS(mg/L)	Influent	2.0	5.0	8.4
	Control	1.7	5.4	7.5
	Treated	2.8	4.7	5.6
POC(mg/L)	Influent	0.8	0.9	0.5
	Control	0.6	0.6	0.8
	Treated	0.6	0.5	0.6

5. APPROVAL DOCUMENTATION

DOCUMENTS	DATE
EMC & Environmental testing of Optimarin Ballast Water Control System (Report No. 2009-3397) approved by DNV on 2009/11/11	—
Mechanical and climatic test report UV POWER CABINET (Report No. 9505 330 462XX 001) approved by DNV on 2012/08/23	—
Technical Report Optimarin AS Environmental testing of Ballast Water management System (Report no. 20957)	—
Land based testing of the Optimarin ballast water management system of Optimarin AS – Final Report (Report SNO 5643-2008)	—
Additional Land based testing of the Optimarin BWMS with alternate filter (Report SNO 5840-2009)	—
Full scale filter tests of the Ballast Water Management System (BWMS) of OptiMarin AS. Final Report (Report SNO 6284-2012)	—
Shipboard testing of the Optimarin Ballast System of Optimarin AS (Report SNO 5828-2009)	—
QAPP – for full scale testing approved by DNV on 2008/02/01	—
QAPP – for Shipboard testing approved by DNV on 2009/03/06	—
QAPP – for full scale testing tests of alternate filters approved by DNV on 2009/10/01	—
QAPP for fullscale testing of the OptiMarin ballast Water Management System of Optimarin AS – additional filter test approved by DNV on 2012/05/03	—
Operation, maintenance and safety manual for Optimarin Ballast System	—

6. CONDITIONS OF CERTIFICATION

Details on all imposed limiting conditions on the operation of the BWMS are as follows,

- The equipment shall not be installed in area that flammable atmospheres may be present, except components fitted in the location of the version OBS EX.