番 号 第 12 号
Document No. 12

バラスト水管理システム施行前試験合格証明書
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 住友電気工業株式会社
Ballast Water Management System supplied by **SUMITOMO ELECTRIC INDUSTRIES, LTD.**

型式及び名称
Under type and model designation and incorporating: **ECOMARINE**

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 **See APPENDIX**
to equipment/assembly drawing No. **See APPENDIX**

定格処理能力
Treatment Rated Capacity **100 ～ 1000** m^3/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.

(印 章)

(official stamp)

Signed 園田敏彦
(Toshihiko SONODA)
Director, Inspection and Measurement Division, Maritime Bureau
Ministry of Land, Infrastructure, Transport and Tourism

2014 年 6 月 18 日発給した。
Dated this 18 day of June, 2014

APPENDIX

1. TECHNICAL DESCRIPTION OF MAJOR COMPONENTS

FILTER UNIT		
Manufacturer	SUMITOMO ELECTRIC INDUSTRIES, LTD.	
Model	RC-100	RC-250
Maximum capacity per housing *	to 100m³/h	to 250m³/h
Max. working pressure	0.5MPa	
Max. pressure loss	0.1MPa	
Working temperature range	0 to 50℃	
Component parts	Filter motor , Pressure transmitter , Automatic air vent	

*) +10% allowance

UV UNIT	
Model	UV-200
Maximum capacity per housing *	to 200m³/h
Max. working pressure	1.0MPa
Max. pressure loss	0.005MPa
Working temperature range	0 to 50℃
Component parts	UV lamp , UV intensity sensor , Water temperature sensor , Automatic cleaning wiper

*) +10% allowance

UV CONTROL PANEL	
Model	CU-200U
Power supply	3φ 4W 440V 60Hz
Component parts	Controller , Touch keyboard , Electronic lamp driver , Cabinet temperature switch

BWTS CONTROL PANEL				
Manufacturer	SUMITOMO ELECTRIC INDUSTRIES, LTD.			
Model	CU-250	CU-500	CU-750	CU-1000
Power supply	3φ 3W 440V 60Hz		From power panel	
Component parts	PLC , Inverter , Graphic panel , Controller module			

BWTS POWER PANEL		
Manufacturer	SUMITOMO ELECTRIC INDUSTRIES, LTD.	
Model	CU-750P	CU-1000P
Power supply	3φ 3W 440V 60Hz	
Component parts	Inverter	

TRANSFORMER FOR UV					
Model	ETR-25	ETR-50	ETR-75	ETR-100	ETR-125
Capacity	25kVA	50kVA	75kVA	100kVA	125kVA
Power supply	3φ 3W 440V 60Hz				

2. APPROVED RATINGS

SYSTEM MODEL	TRC [m³/h]	FILTER UNIT		UV UNIT		BWMS CONTROL PANEL		UV CONTROL PANEL		TRANSFORMER FOR UV	
						CONTROL PANEL	POWER PANEL				
EU-100	100	RC-100	x 1	UV-200	x 1	CU-250	--	CU-200U	x 1	ETR-25	x 1
EU-200	200	RC-100	x 2	UV-200	x 1	CU-500	--	CU-200U	x 1	ETR-25	x 1
EU-250	250	RC-250	x 1	UV-200	x 2	CU-250	--	CU-200U	x 2	ETR-50	x 1
EU-350	350	RC-100 RC-250	x 1 x 1	UV-200	x 2	CU-500	--	CU-200U	x 2	ETR-50	x 1
EU-500	500	RC-250	x 2	UV-200	x 3	CU-500	--	CU-200U	x 3	ETR-75	x 1
EU-600	600	RC-100 RC-250	x 1 x 2	UV-200	x 3	CU-750	CU-750P	CU-200U	x 3	ETR-75	x 1
EU-750	750	RC-250	x 3	UV-200	x 4	CU-750	CU-750P	CU-200U	x 4	ETR-100	x 1
EU-850	850	RC-100 RC-250	x 1 x 3	UV-200	x 5	CU-1000	CU-1000P	CU-200U	x 5	ETR-125	x 1
EU-1000	1000	RC-250	x 4	UV-200	x 5	CU-1000	CU-1000P	CU-200U	x 5	ETR-125	x 1

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/m³)	Influent	$3.2x10^5$	$1.0x10^5$	$3.3x10^5$	$5.0x10^5$	$4.3x10^5$
	Control	$7.1x10^4$	$1.2x10^4$	$5.5x10^4$	$4.7x10^4$	$1.0x10^5$
	Treated	1.3	1.0	<1	N.D.	<1
Organisms ≧10 and ＜50μm (inds/mL)	Influent	$1.7x10^3$	$2.2x10^3$	$2.4x10^3$	$2.3x10^3$	$2.3x10^3$
	Control	$1.6x10^2$	$1.1x10^2$	$4.5x10^2$	$1.3x10^2$	$1.4x10^2$
	Treated	<1	N.D.	N.D.	N.D.	<1
Vibrio cholerae (cfu/100mL)	Influent	4,060	5,027	953	553	267
	Control	38,867	6,793	2,280	780,000	12,927
	Treated	40	75	8.0	19	<1
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	18	N.D.	N.D.	N.D.
	Control	N.D.	N.D.	N.D.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Coliform group (cfu/100mL)	Influent	920	1,640	1,147	207	414
	Control	40,133	3,847	3,820	80,000	16,093
	Treated	59	33	6.7	4.3	<1
Escherichia coli (cfu/100mL)	Influent	747	327	547	N.D.	128
	Control	1,000	780	227	N.D.	1,187
	Treated	6.7	16	3.5	<1	<1
Enterococcus group (cfu/100mL)	Influent	33	14	144	52	8.7
	Control	2,243	1.3	1.9	9.7	<1
	Treated	6.3	N.D.	<1	<1	N.D.
Enterococci (cfu/100mL)	Influent	14	8.3	3.1	20	1.4
	Control	31	N.D.	1.1	3.7	<1
	Treated	<1	N.D.	N.D.	<1	N.D.
Heterotrophic bacteria (cfu/mL)	Influent	38,067	81,000	14,067	13,333	11,293
	Control	962,667	546,667	334,667	609,333	420,000
	Treated	540	228	163	197	76

DOC(mg/L)	Influent	3.6	2.0	3.8	2.1	3.4
	Control	1.1	1.6	1.3	1.6	1.4
	Treated	1.1	1.8	1.9	2.1	1.5
POC(mg/L)	Influent	4.0	3.9	4.3	4.3	2.2
	Control	0.5	0.9	0.5	0.4	0.6
	Treated	0.6	0.9	0.6	0.3	0.8
TSS(mg/L)	Influent	12.7	10.3	17.2	15.3	11.9
	Control	2.8	2.8	1.8	3.5	1.6
	Treated	5.2	5.5	2.0	3.3	3.0
Temperature (℃)	Influent	21.4	22.4	16.5	17.9	18.3
	Control	21.5	20.5	16.6	18.0	16.0
	Treated	21.2	20.5	15.9	17.8	15.9
Salinity (PSU)	Influent	33.3	33.3	32.3	33.4	33.6
	Control	33.3	32.9	32.2	33.2	33.1
	Treated	32.8	33.3	32.3	33.2	33.5
pH	Influent	8.1	8.1	8.4	8.3	8.3
	Control	7.6	7.5	7.9	7.8	7.8
	Treated	7.6	7.4	7.9	7.8	7.8
Dissolved oxygen(mg/L)	Influent	6.3	4.7	6.4	6.4	5.9
	Control	4.6	4.6	5.9	6.0	5.5
	Treated	4.0	3.3	5.3	4.8	4.9
Turbidity(NTU)	Influent	27.3	19.2	29.8	17.8	36.1
	Control	32.8	19.5	16.5	24.9	11.5
	Treated	34.7	24.0	24.0	32.2	19.2
Flow rate(m^3/h)	Ballasting	202	202	201	201	202
	Deballasting	202	202	201	200	201
UV dose(mJ/cm^2)	Ballasting	107.1	107.6	106.4	106.6	107.2
	Deballasting	107.6	107.6	107.1	107.2	106.6
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	$2.8x10^5$	$2.5x10^5$	$3.2x10^5$	$3.2x10^5$	$2.7x10^5$
	Control	$1.9x10^4$	$3.3x10^4$	$3.8x10^3$	$5.3x10^3$	$4.8x10^3$
	Treated	N.D.	1.3	<1	2.3	N.D.
Organisms ≧10 and ＜50μm (inds/mL)	Influent	$2.3x10^3$	$2.2x10^3$	$1.6x10^3$	$2.3x10^3$	$1.3x10^3$
	Control	$9.1x10^2$	$1.4x10^3$	$1.1x10^3$	$9.7x10^2$	$4.1x10^2$
	Treated	N.D.	<1	N.D.	N.D.	N.D.
Vibrio cholerae (cfu/100mL)	Influent	687	120	569	313	193
	Control	207	1,373	1,053	1,513	320
	Treated	<1	1.3	<1	1.5	N.D.
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.	N.D.	N.D.
	Control	N.D.	N.D.	N.D.	<1	N.D.
	Treated	N.D.	N.D.	N.D.	<1	N.D.
Coliform group (cfu/100mL)	Influent	533	687	1,307	800	433
	Control	42,333	1,333	7,593	6,460	767
	Treated	<1	9.0	<1	3.3	N.D.
Escherichia coli (cfu/100mL)	Influent	20	100	6.7	27	20
	Control	800	N.D.	N.D.	13	N.D.
	Treated	<1	1.1	<1	<1	N.D.

Enterococcus group (cfu/100mL)	Influent	13	30	25	13	4.0
	Control	139	1.8	4.7	1.2	2.5
	Treated	<1	N.D.	1.3	<1	1.0
Enterococci (cfu/100mL)	Influent	4.2	6.5	12	3.4	2.6
	Control	104	<1	2.3	<1	2.3
	Treated	<1	N.D	1.3	<1	1.0
Heterotrophic bacteria (cfu/mL)	Influent	25,133	20,440	12,987	26,400	23,933
	Control	228,667	143,800	210,000	89,333	90,933
	Treated	100	135	60	61	128
DOC(mg/L)	Influent	8.4	8.5	8.6	11.6	9.0
	Control	6.4	6.3	7.6	8.3	4.9
	Treated	6.7	6.6	7.3	8.3	7.9
POC(mg/L)	Influent	29.0	26.2	24.1	8.3	24.4
	Control	0.7	1.2	0.8	8.1	4.2
	Treated	0.7	1.3	3.1	8.1	1.3
TSS(mg/L)	Influent	75.3	55.0	71.7	68.0	72.7
	Control	3.2	3.4	3.9	3.0	4.0
	Treated	3.7	2.2	3.1	2.9	4.0
Temperature (℃)	Influent	15.5	13.1	11.6	11.6	12.2
	Control	13.9	12.8	10.3	8.3	8.9
	Treated	13.9	12.7	10.4	8.5	8.8
Salinity (PSU)	Influent	21.3	19.9	20.6	20.6	18.0
	Control	20.1	21.5	21.3	20.7	20.7
	Treated	21.7	21.4	20.8	19.9	19.7
pH	Influent	8.1	8.1	8.3	8.3	8.2
	Control	7.8	7.9	8.2	8.1	8.0
	Treated	7.8	7.8	8.0	8.0	8.0
Dissolved oxygen(mg/L)	Influent	6.2	6.6	9.6	9.2	9.0
	Control	7.3	8.9	9.7	9.7	8.5
	Treated	7.1	8.8	8.2	9.5	8.0
Turbidity(NTU)	Influent	95.5	50.5	71.3	93.9	40.1
	Control	17.8	9.4	14.5	12.4	13.2
	Treated	28.7	14.4	12.8	14.0	15.1
Flow rate(m^3/h)	Ballasting	203	203	203	203	202
	Deballasting	203	202	203	201	203
UV dose(mJ/cm^2)	Ballasting	106.6	106.6	106.5	106.4	107.6
	Deballasting	107.2	106.4	107.4	106.4	107.6

N.D. : not detected

4. SHIPBOARD TEST SUMMARY

Size category & Water parameter	Sample	Test cycle 1	Test cycle 2	Test cycle 3
Organisms ≧50μm(inds/m^3)	Influent	$2.9x10^5$	$5.6x10^5$	$3.4x10^4$
	Control	$1.4x10^5$	$1.9x10^5$	$2.6x10^3$
	Treated	<1	<1	N.D.
Organisms ≧10 and ＜50μm (inds/mL)	Influent	$1.4x10^2$	$2.9x10^2$	$7.6x10^2$
	Control	$1.0x10^2$	$1.0x10^2$	$1.6x10^2$
	Treated	N.D.	N.D.	N.D.
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.
	Control	N.D.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.
Escherichia coli (cfu/100mL)	Influent	3,100	543	247
	Control	9,600	453	1,667
	Treated	33	<1	N.D.
Enterococci (cfu/100mL)	Influent	149	138	114
	Control	970	1,420	288
	Treated	2.9	<1	N.D.
Temperature (℃)	Influent	24.2	25.7	12.1
	Control	25.2	26.1	15.1
	Treated	25.1	25.8	14.0
Salinity (PSU)	Influent	31.6	27.2	32.0
	Control	31.4	29.1	32.4
	Treated	31.3	27.2	32.2
TSS(mg/L)	Influent	7	9	2
	Control	3	4	1
	Treated	4	8	1
POC(mg/L)	Influent	0.6	1.7	0.5
	Control	0.5	0.4	0.2
	Treated	0.7	1.5	0.4
Flow rate(m^3/h)	Ballasting	203	203	203
	Deballasting	203	204	204
UV dose(mJ/cm^2)	Ballasting	105.5	108.5	117.5
	Deballasting	109.5	108.0	104.0

N.D.: not detected

5. APPROVAL DOCUMENTATION

LIST NO.	DOCUMENTS	DATE
E-01-200	Specifications of ballast water management system	4 April 2014
E-02-200	Operation manual for ballast water management system	4 April 2014
T-01-200	Environmental test plan	21 March 2012
T-02-200	Land-based test plan	26 October 2011
T-03-200	Shipboard test plan	31 July 2013
D-01-200	Quality Management Plan (QMP) and Quality Assurance Project Plan (QAPP) of the approval testing process	28 March 2011
D-02-200	Land-based test facility	4 April 2014
D-03-200	Shipboard test facility	4 April 2014
D-04-200	Manufacturing facility	4 April 2014
D-05-200	Information on ballast water management plan	4 April 2014
D-06-200	Basic approval of active substances	4 April 2014
D-07-200	Labeling method	4 April 2014
D-08-200	Articles of incorporation	28 March 2011
R-01-200	Environmental test report	22 May 2012
R-02-200	Land-based test report	4 April 2014
R-03-200	Shipboard test report	4 April 2014
Z-01-200	Documents Requested by Administration	4 April 2014

6. CONDITIONS OF CERTIFICATION

1. Equipment of this system is non-explosion proof, should not be installed in area that flammable atmospheres may be present.
2. Details on all imposed limiting conditions on the operation of the BWMS are as follows,

   Salinity ; No limitation

   UV dose ; Min.100mJ/cm^2