番号 第 9 号
Document No. 9

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 to 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 三井造船株式会社
Ballast Water Management System supplied by Mitsui Engineering & Shipbuilding Co., Ltd.

型式及び名称
Under type and model designation FineBallast MF
and incorporating:

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 三井造船株式会社
Ballast Water Management System manufactured by Mitsui Engineering & Shipbuilding Co., Ltd.
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 50 ～ 900 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

2013 年 11 月 5 日発給した。
Dated this 5 day of November, 2013

APPENDIX

1. TECHNICAL DESCRIPTION OF MAJOR COMPONENTS

BWMS Unit			CIP Unit			
Manufacturer			Manufacturer			
Mitsui Engineering & Shipbuilding Co., Ltd.			Mitsui Engineering & Shipbuilding Co., Ltd.			
Model No.	Number of Cassette	Flow Rate (TRC) (m^3/h)	Model No.	Flow Rate (TRC) (m^3/h)	Circulation Tank Capacity (m^3)	Catalyst Vessel Capacity (m^3)
MF-05	3	50	CIP-01	18	0.3	0.3
MF-10	5	100				
MF-15	7	150				
MF-20	9	200	CIP-02	18	0.7	0.3
MF-25	12	250				
MF-30	14	300				
MF-40	18	400				
MF-50	24	500	CIP-03	36	1.6	0.3
MF-60	28	600				
MF-70	32	700				
MF-80	36	800				
MF-90	40	900				

TRO monitor	
Manufacturer	HOKUTO DENKO CORPORATION
Type	Total Residual Oxidants Measuring instrument 0～5ppm
Model No.	CL17

2. LAND BASED TEST SUMMARY

Brackish water test cycles (3-32 PSU)						
Size category	Sample	Test cycle 1	Test cycle 2	Test cycle 3	Test cycle 4	Test cycle 5
Organisms ≧50μm(inds/m³)	Influent	137,669	137,343	119,703	111,548	113,785
	Control	937	116,164	73,028	182	1,621
	Treated	ND	ND	ND	ND	ND
Organisms ≧10 and <50μm (inds/mL)	Influent	1,321	1,492	1,752	2,919	1,122
	Control	154	199	109	155	143
	Treated	ND	ND	ND	ND	0.3
Vibrio cholerae (cfu/100mL)	Influent	ND	ND	ND	ND	ND
	Control	ND	ND	ND	ND	ND
	Treated	ND	ND	ND	ND	ND
Escherichia coli (cfu/100mL)	Influent	17	110	66	136	423
	Control	294	393	280	1,684	1,742
	Treated	3	0.3	ND	ND	ND
Enterococcus (cfu/100mL)	Influent	287	89	51	14	62
	Control	TNTC	TNTC	TNTC	TNTC	948
	Treated	53	9	2	11	1.3
Heterotrophic bacteria (inds/mL)	Influent	$2.4x10^6$	$1.6x10^6$	$2.3x10^6$	$2.9x10^6$	$7.9x10^6$
Heterotrophic bacteria (cfu/mL)	Control	13,902	19,615	39,111	64,933	32,911
	Treated	38	253	60	69	226
pH	Influent	8.4	8.4	8.3	8.3	8.3
	Control	7.4	7.3	7.4	7.6	7.5
	Treated	7.5	7.6	7.4	7.4	7.3
Temperature (℃)	Influent	24.5	26.6	25.9	26.4	27.3
	Control	22.6	28.7	27.7	29.2	27.6
	Treated	23.0	28.8	28.1	29.4	27.2
Salinity (PSU)	Influent	21.1	21.7	21.2	21.4	20.5
	Control	20.7	21.6	21.2	21.4	20.5
	Treated	21.5	21.8	21.4	21.6	20.5
Dissolved oxygen(mg/L)	Influent	7.3	6.5	7.0	7.3	7.2
	Control	6.2	2.0	2.2	2.8	5.7
	Treated	5.6	2.0	2.4	2.1	3.0
TSS(mg/L)	Influent	54.0	74.4	79.1	56.3	59.4
	Control	33.5	22.0	17.4	15.8	13.6
	Treated	22.1	6.6	5.9	7.1	6.1
DOC(mg/L)	Influent	5.8	7.0	5.7	6.2	5.5
	Control	3.5	6.4	2.9	2.8	2.8
	Treated	3.6	4.3	3.5	2.1	2.7
POC(mg/L)	Influent	5.9	5.2	6.2	6.2	5.3
	Control	2.0	2.9	3.6	2.0	2.2
	Treated	0.4	0.5	0.5	0.4	0.3
Turbidity(NTU)	Influent	18.2	19.0	20.0	17.6	18.6
	Control	8.3	3.6	2.5	2.7	2.4
	Treated	3.9	1.4	1.1	1.2	0.9

ND : not detected.

TNTC : too numerous to count

Marine water test cycles (>32 PSU)						
Size category	Sample	Test cycle 1	Test cycle 2	Test cycle 3	Test cycle 4	Test cycle 5
Organisms ≧50μm(inds/m³)	Influent	142,192	149,101	169,957	184,743	132,669
	Control	1,152	4,048	28,715	24,640	16,014
	Treated	ND	ND	ND	ND	ND
Organisms ≧10 and <50μm (inds/mL)	Influent	1,416	1,307	1,086	1,186	1,171
	Control	111	123	138	120	109
	Treated	ND	ND	1	ND	0.3
Vibrio cholerae (cfu/100mL)	Influent	ND	ND	ND	ND	ND
	Control	ND	ND	ND	ND	ND
	Treated	ND	ND	ND	ND	ND
Escherichia coli (cfu/100mL)	Influent	82	204	175	404	387
	Control	5	73	269	1,032	1,128
	Treated	ND	ND	ND	ND	ND
Enterococcus (cfu/100mL)	Influent	6	161	29	114	143
	Control	91	81	355	1,108	1,321
	Treated	ND	ND	ND	ND	ND
Heterotrophic bacteria (inds/mL)	Influent	$1.3x10^7$	$3.0x10^6$	$1.8x10^6$	$1.5x10^6$	$1.2x10^6$
Heterotrophic bacteria(cfu/mL)	Control	45	187	1,444	3,089	1,822
	Treated	8	55	864	353	264
pH	Influent	7.9	8.2	8.2	7.9	8.1
	Control	8.0	8.1	7.9	7.7	8.0
	Treated	8.0	8.2	7.8	7.7	8.0
Temperature (℃)	Influent	21.6	24.7	22.6	21.9	20.5
	Control	17.3	21.8	22.7	21.0	18.0
	Treated	17.8	21.8	22.8	21.2	18.1
Salinity (PSU)	Influent	32.3	32.3	32.4	32.3	32.2
	Control	32.3	32.5	32.3	32.2	32.2
	Treated	32.1	32.3	32.3	32.2	32.2
Dissolved oxygen(mg/L)	Influent	6.6	6.5	7.0	7.2	7.4
	Control	8.3	6.1	5.3	5.4	5.6
	Treated	7.1	4.6	6.9	7.4	8.1
TSS(mg/L)	Influent	37.7	20.1	25.8	18.8	18.7
	Control	18.3	18.8	23.6	45.0	20.9
	Treated	13.1	15.6	6.6	8.3	7.4
DOC(mg/L)	Influent	2.8	2.3	2.8	3.2	2.9
	Control	2.9	2.3	1.7	1.7	1.5
	Treated	2.8	2.5	1.8	1.8	1.7
POC(mg/L)	Influent	1.5	1.4	1.8	2.0	1.8
	Control	1.5	1.1	0.9	1.3	1.5
	Treated	0.4	0.3	0.4	0.2	0.5
Turbidity(NTU)	Influent	11.4	3.7	5.1	3.2	3.6
	Control	2.2	2.2	4.8	9.9	4.9
	Treated	1.2	1.7	2.0	1.9	1.6

ND : not detected.

3. SHIPBOARD TEST SUMMARY

1st shipboard test summary			
	Influent water	Control discharge	Treated discharge
Organisms≧50μm(inds/m³)	10,292	52,705	0
Organisms ≧10 and ＜50μm (inds/mL)	145	29	0
Vibrio cholerae (cfu/100mL)	0	0	0
Escherichia coli (cfu/100mL)	1,120	97	1
Enterococcus (cfu/100mL)	567	31	14
Heterotrophic bacteria (inds/mL)	$4.3x10^4$	$2.8x10^5$	$1.3x10^5$
Salinity (PSU)	29.3	28.9	29.4
Temperature (℃)	26.6	25.5	26.3
POC(mg/L)	1.4	0.8	0.2
TSS(mg/L)	5	4	＜1

2nd shipboard test summary			
	Influent water	Control discharge	Treated discharge
Organisms≧50μm(inds/m³)	147,941	5,253	0
Organisms ≧10 and ＜50μm (inds/mL)	118	18	0
Vibrio cholerae (cfu/100mL)	0	0	0
Escherichia coli (cfu/100mL)	105	1,533	3
Enterococcus (cfu/100mL)	12	426	18
Heterotrophic bacteria (inds/mL)	$5.6x10^3$	$1.9x10^4$	$1.1x10^3$
Salinity (PSU)	30.9	31.8	30.9
Temperature (℃)	20.1	22.3	22.5
POC(mg/L)	0.8	0.2	0.1
TSS(mg/L)	12	2	<1

3rd shipboard test summary			
	Influent water	Control discharge	Treated discharge
Organisms≧50μm(inds/m³)	71,825	1,027	0
Organisms ≧10 and ＜50μm (inds/mL)	590	145	0
Vibrio cholerae (cfu/100mL)	0	0	0
Escherichia coli (cfu/100mL)	443	7	0
Enterococcus (cfu/100mL)	2	0	0
Heterotrophic bacteria (inds/mL)	$1.7x10^3$	$7.7x10^4$	$1.2x10^3$
Salinity (PSU)	33.7	33.3	33.5
Temperature (℃)	25.4	14.0	14.8
POC(mg/L)	0.6	0.2	0.2
TSS(mg/L)	8	<1	<1

4. APPROVAL DOCUMENTATION

G-01-00	DOCUMENT LIST	4 February 2013
G-02-00	LINEUP	3 June 2013
E-01-00	SPECIFICATIONS OF BALLAST WATER MANAGEMENT SYSTEM	17 May 2013
E-02-00	OPERATION MANUAL FOR BALLAST WATER MANAGEMENT SYSTEM	26 April 2013
E-03-00	DIAGRAM OF BALLAST WATER MANAGEMENT SYSTEM	18 January 2013
E-04-00	MEMBRANE UNIT	18 January 2013
E-05-00	MEMBRANE CASSETTE	18 January 2013
E-06-00	INSTRUMENTS	4 April 2013
E-07-00	CIP EQUIPMENT	28 February 2013
E-08-00	CONTROL PANEL	9 April 2013
E-09-00	SAMPLING EQUIPMENT	18 January 2013
T-01-00	ENVIRONMENTAL TESTING PLAN DOCUMENT	12 November 2012
T-02-00	LAND BASED TESTING PLAN DOCUMENT	19 April 2010
T-03-00	SHIPBOARD TESTING PLAN DOCUMENT	1 July 2012
D-01-01	QUALITY MANAGEMENT PLAN (QMP) AND QUALITY ASSURANCE PROJECT PLAN (QAPP) OF THE APPROVAL TESTING PROCESS (for G8 Land Base Test)	10 May 2010
D-01-02	QUALITY MANAGEMENT PLAN (QMP) AND QUALITY ASSURANCE PROJECT PLAN (QAPP) OF THE APPROVAL TESTING PROCESS (for G8 Shipboard Test)	1 February 2011
D-02-00	LAND BASED TEST FACILITY	1 April 2013
D-03-00	SHIPBOARD TEST FACILITY	18 January 2013
D-04-00	MANUFACTURING FACILITY	1 April 2013
D-05-00	LINK TO THE BALLAST WATER MANAGEMENT PLAN	1 April 2013
D-06-01	REVIEW OF PROPOSALS FOR APPROVAL OF BALLAST WATER MANAGEMENT SYSTEMS THAT MAKE USE OF ACTIVE SUBSTANCES MES Ballast Water Management System (FineBallast MF) 「GESAMP-BWWG13/7」	9 August 2013
D-06-02	ABOUT THE CHEMICAL CLEANING AND DETOXIFICATION	1 April 2013
D-07-00	INDICATION METHOD	17 May 2013
D-08-00	CONSTITUTIONAL DOCUMENT	1 April 2013
R-01-00	ENVIRONMENTAL TEST REPORT	1 April 2013
R-02-00	LAND BASED TEST REPORT	1 May 2011
R-03-00	SHIPBOARD TEST REPORT	1 April 2013

The summary of above documents can be downloaded from the Mitsui Engineering & Shipbuilding Co., Ltd. website, as follows :

http://www.mes.co.jp/english/business/ship/index.html

5. CONDITIONS OF CERTIFICATION

1) Equipment of this system is non-explosion proof; shall not be installed in area that flammable atmospheres may be present.
2) Pre-filter mesh size should be under 100μm in order to prevent membrane damage.
3) No Active Substance has been used in this system.
4) Maximum design pressure of BWMS: 0.5MPa