番 号　第 24-2 号
Document No. 24-2

型　式　指　定　書
TYPE APPROVAL CERTIFICATE OF BALLAST WATER MANAGEMENT SYSTEM

日 本 国
JAPAN

ここにバラスト水管理システムの承認に関するコード（決議 MEPC.300(72)）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 Code for Approval of Ballast Water Management Systems (resolution MEPC.300(72)). 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名称
Name of ballast water management system : **Miura BWMS**
バラスト水管理システムの製造者　三浦工業株式会社
Ballast water management system manufactured by **MIURA CO., LTD.**
型式名
Under type and model designation(s) and incorporating: **HK**
完成図書番号及び日付
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 **200 ～ 6000** m^3/h

検査の際に利用できるよう、この証明書の写しを、バラスト水管理システムとともに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。

A copy of this Type Approval Certificate shall be carried on board a ship fitted with this ballast water management system, for inspection on board the ship. If the Type Approval Certificate is issued based on approval by another Administration, reference to that Type Approval Certificate shall be made.

課された制限操作条件は、この証明書に記す。
Limiting Operation Conditions imposed are described in this document.

水温
・Water Temperature ； 0～50℃
塩分濃度
・Salinity ； No limitation
UV 照射量
・UV dose ； >225mJ/cm2
タンク保持時間
・Hold time ； No limitation

他の制限事項は以下を含む
Other restrictions imposed include the following: －

この装置は、以下の条件で操作するよう設計されている。
This equipment has been designed for operation in the following conditions:[1]

処理流量
・Capacity range ； 10 to 120 % of TRC
水温
・Water temperater ； No freezing
フィルタ差圧上限
・Permissible differential pressure of filter ； 60kPa

(印　　章)
(official stamp)

Signed .....
(ISHIHARA Norio)
Director, Inspection and Measurement Division, Maritime Bureau
Ministry of Land, Infrastructure, Transport and Tourism

2021 年 3 月 30 日発給した。
Issued this 30 day of March ,2021

2026 年 1 月 9 日まで有効である。
Valid until this 9 day of January ,2026

[1] Insert System Design Limitations.

APPENDIX

1. TECHNICAL DESCRIPTION OF MAJOR COMPONENTS

FILTER UNIT					
Manufacturer	MIURA CO., LTD.				
Model	200F(E)A	300F(E) 300F(E)A	450F(E) 450F(E)A	600F(E) 600F(E)A	900F 900F(E)A
Treatement Rated Capacity	200m³/h	300m³/h	450m³/h	600m³/h	900m³/h
Max.working pressure	0.686MPa				
Working temperature range	0 to 50℃				

UV UNIT		
Manufacturer	MIURA CO., LTD.	
Model	06U,06UE,06UY,200U,200UE	08U,08UE,08UY,300U,300UE
Treatment Rated Capacity	200m³/h	300m³/h
Max.working pressure	0.686MPa	
Working temperature range	0 to 50℃	
UV LAMP		
Manufacturer	TOSHIBA LIGHTING & TECHNOLGY CORPORATION	
Model	H3650L/11-NW	

FLOWMETER	
Manufacturer	TOKYO KEISO CO., LTD.
Model	OPTIFLUX 2000/2100C
Working temperature range	0 to 55℃

CONTROL PANEL	
Manufacturer	MIURA CO., LTD.
Working temperature range	0 to 45℃

SOURCE PANEL	
Manufacturer	MIURA CO., LTD.
Working temperature range	0 to 45℃

2. APPROVED RATINGS

SYSTEM MODEL	TREATMENT RATED CAPACITY[m^3/h]	FILTER UNIT	UV UNIT
HK-200(E)	200	200F(E)A	06U,06UE,06UY,200U,200UE
HK-300(E)	300	300F(E)/300F(E)A	08U,08UE,08UY,300U,300UE
HK-400(E)～6000(E)	400～6000	200F(E)A 300F(E)/300F(E)A 450F(E)/450F(E)A 600F(E)/600F(E)A 900F/900F(E)A Achieved by units which maintain filtration area of TRC x 0.004m^2 or more	06U,06UE,06UY,200U,200UE 08U,08UE,08UY,300U,300UE Achieved by using multiple units in parallel or series depend on treatment capacity

＊There are 5 types of filter which the flow rate is 200m3/h, 300m3/h, 450m3/h, 600m3/h and 900m3/h.

＊ UV unit is configured by aligning 2 types of model including the model in which the flow rates are 200 m3/h and 300 m3/h in parallel or in series.

＊Miura BWMS consists of combination of 5 models filter and 2 models UV unit.

＊Up to two UV units can be installed in series. In that case, the TRC is twice the value of the TRC of the installed UV unit.
In case of installation in series, it is necessary to use same value of the UV units TRC.

＊Multiple units of control panel can be installed in parallel for treating larger than 900m3/h at ballasting operation and/or larger than 1,200m3/hr ballast water in deballasting operation.

＊The TRC for deballasting operations is dependent on the TRC of the UV units. It is therefore possible to have a larger TRC for deballasting than ballasting; several UV units can be installed which have a higher TRC than the installed filter.

3. LAND BASED TEST SUMMARY

Marine water test cycles (28-36 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	117,667	163,667	156,778	129,778	109,445
	Control	58,112	73,778	75,445	103,889	84,112
	Treated	0	0	0	0	0
Organisms ≧10 and ＜50μm (inds/mL)	Influent	1,315	1,254	1,261	1,645	1,184
	Control	898	903	1,030	688	917
	Treated	0.3	0.1	3.4	2.2	0.4
Vibrio cholerae (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	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 (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Escherichia coli (cfu/100mL)	Influent	8	3	1	7	11
	Control	6	2	1	2	9
	Treated	0	0	0	0	0
Enterococcus group (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Intestinal Enterococci (cfu/100mL)	Influent	4	7	11	9	15
	Control	7	4	5	4	30
	Treated	0	0	0	0	0
Heterotrophic bacteria (cfu/mL)	Influent	344,000	700,000	248,000	1,130,000	318,000
	Control	1,270,000	2,980,000	1,660,000	1,430,000	1,540,000
	Treated	1,550	2460	930	2,060	2,480
DOM(mg/L)	Influent	44.3	41.1	42.0	43.5	40.0
	Control	41.5	39.7	39.8	43.2	38.5
	Treated	44.1	40.6	40.2	43.5	39.1
POM(mg/L)	Influent	33.6	30.5	33.8	34.9	34.7
	Control	32.3	28.8	29.6	27.9	28.2
	Treated	34.2	33.6	34.6	33.6	34.4
TSS(mg/L)	Influent	73.1	73.1	76.5	79.7	75.3
	Control	61.1	66.7	66.1	69.4	68.2
	Treated	71.2	71.7	74.2	74.9	72.6
Temperature (℃)	Influent	13.0	14.3	15.8	17.2	18.3
	Control	14.2	14.6	16.5	18.3	19.2
	Treated	14.4	14.8	16.8	19.2	19.8
Salinity (PSU)	Influent	33.2	33.3	33.1	33.2	33.4
	Control	33.0	33.0	33.0	33.0	33.2
	Treated	32.8	32.8	32.8	32.6	32.8
pH	Influent	7.5	7.4	7.5	7.4	7.4
	Control	7.4	7.3	7.4	7.3	7.5
	Treated	7.5	7.4	7.5	7.2	7.5

Dissolved oxygen(mg/L)	Influent	9.03	8.85	8.54	8.23	8.11
	Control	8.41	8.14	7.97	7.73	7.63
	Treated	8.55	8.44	8.04	7.72	7.55
Turbidity(NTU)	Influent	36.1	35.7	38.5	38.5	37.9
	Control	44.8	44.6	39.4	39.9	40.0
	Treated	27.5	29.9	28.5	26.3	29.3
Flow rate(m^3/h)	Ballasting	294	291	245	255	279
	Deballasting	303	303	304	302	304
UV dose (Average) (mJ/cm^2)	Ballasting	250	251	276	251	280
	Deballasting	250	250	150	250	250
Holding Time (Days)	-	1	1	1	1	1
Brackish water test cycles (10-20 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	115,556	107,000	128,778	123,667	129,667
	Control	1,200	1,450	1,567	700	800
	Treated	0	0	0	0	0
Organisms ≧10 and ＜50μm (inds/mL)	Influent	1,515	1,391	2,280	1,363	2,225
	Control	884	574	1,451	575	801
	Treated	0.2	0.3	0.1	0.5	0.5
Vibrio cholerae (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	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 (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Escherichia coli (cfu/100mL)	Influent	29	21	9	9	59
	Control	22	17	17	10	49
	Treated	0	0	0	0	0
Enterococcus group (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Intestinal Enterococci (cfu/100mL)	Influent	73	28	3	3	26
	Control	9	16	128	13	4
	Treated	0	0	0	0	0
Heterotrophic bacteria (cfu/mL)	Influent	710,000	196,000	500,000	295,000	1,820,000
	Control	382,000	2,700,000	2,590,000	2,870,000	2,870,000
	Treated	400	280	820	510	259
DOM(mg/L)	Influent	41.4	43.3	40.7	42.0	37.2
	Control	36.1	35.8	36.1	35.5	31.5
	Treated	33.2	34.4	34.6	35.3	31.2
POM(mg/L)	Influent	32.4	33.0	30.8	35.2	36.1
	Control	28.6	30.9	29.4	28.7	32.6
	Treated	29.9	27.1	30.0	36.5	39.5
TSS(mg/L)	Influent	75.8	86.2	81.4	83.5	89.6

	Control	60.2	73.5	68.5	66.7	72.0
	Treated	71.6	75.4	75.9	77.3	76.3
Temperature (℃)	Influent	19.7	22.0	20.8	21.9	23.8
	Control	20.9	20.9	20.8	22.7	23.3
	Treated	21.9	21.1	21.2	23.1	23.7
Salinity (PSU)	Influent	16.8	16.5	16.7	16.4	16.1
	Control	16.8	16.2	16.6	16.3	16.0
	Treated	16.6	16.3	16.6	16.0	15.8
pH	Influent	7.5	7.5	7.3	7.5	7.5
	Control	6.8	7.1	6.8	6.9	6.6
	Treated	6.5	7.0	6.4	6.9	6.7
Dissolved oxygen(mg/L)	Influent	8.65	8.35	8.52	8.89	8.58
	Control	7.20	7.35	7.49	7.69	7.51
	Treated	6.19	6.62	6.63	6.46	6.42
Turbidity(NTU)	Influent	41.7	45.2	42.8	42.2	43.8
	Control	42.5	48.4	45.3	44.9	48.0
	Treated	30.0	35.1	32.0	33.9	33.6
Flow rate(m^3/h)	Ballasting	264	282	269	260	274
	Deballasting	263	262	271	301	304
UV dose(mJ/cm^2)	Ballasting	278	248	251	274	250
	Deballasting	263	272	276	243	240
Holding Time (Days)	-	3	3	3	3	3
Fresh water test cycles (＜1 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	105,667	122,556	404,445	112,889	182,639
	Control	88,000	92,445	89,778	4,150	5,934
	Treated	0	0	0	0	0
Organisms ≧10 and ＜50μm (inds/mL)	Influent	1,443	1,314	1,583	1,839	1,430
	Control	469	562	287	481	474
	Treated	0.1	0.2	0.1	0.2	0.2
Vibrio cholerae (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	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 (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Escherichia coli (cfu/100mL)	Influent	59	30	9	61	44
	Control	49	40	38	33	70
	Treated	0	0	0	0	0
Enterococcus group (cfu/100mL)	Influent	-	-	-	-	-
	Control	-	-	-	-	-
	Treated	-	-	-	-	-
Intestinal Enterococci (cfu/100mL)	Influent	26	2	2	12	11
	Control	4	1	2	5	3

	Treated	0	0	0	0	0
Heterotrophic bacteria (cfu/mL)	Influent	1,820,000	1,600,000	3,870,000	1,290,000	1,870,000
	Control	2,870,000	1,380,000	1,040,000	1,420,000	3,880,000
	Treated	259	79	61	110	303
DOM(mg/L)	Influent	42.3	41.4	53.0	42.5	40.7
	Control	39.4	39.8	47.2	35.6	37.1
	Treated	39.4	42.8	48.0	38.4	37.7
POM(mg/L)	Influent	27.9	31.0	25.5	21.6	22.2
	Control	30.5	26.2	23.0	20.7	25.2
	Treated	27.4	19.0	22.8	20.1	19.9
TSS(mg/L)	Influent	64.0	75.7	66.3	61.0	63.7
	Control	72.3	83.3	106.3	94.3	93.7
	Treated	44.7	50.7	66.0	53.3	60.0
Temperature (℃)	Influent	22.4	24.1	23.3	23.6	23.4
	Control	23.5	23.4	23.7	23.4	24.5
	Treated	24.8	24.0	24.3	23.6	25.0
Salinity (PSU)	Influent	0.12	0.05	0.06	0.08	0.11
	Control	0.14	0.05	0.06	0.08	0.11
	Treated	0.12	0.05	0.06	0.08	0.12
pH	Influent	7.4	7.4	7.4	7.6	7.7
	Control	6.7	6.6	6.8	6.7	6.8
	Treated	6.6	6.4	6.7	6.6	6.8
Dissolved oxygen(mg/L)	Influent	10.30	9.97	10.20	10.20	10.10
	Control	8.12	8.23	8.04	7.19	7.04
	Treated	7.19	6.23	5.65	5.90	5.48
Turbidity(NTU)	Influent	51.7	45.9	42.6	51.1	41.5
	Control	49.6	48.2	42.5	53.9	42.4
	Treated	36.1	29.1	32.8	39.9	34.5
Flow rate(m^3/h)	Ballasting	117	248	282	257	302
	Deballasting	119	226	247	226	302
UV dose(mJ/cm^2)	Ballasting	257	263	265	267	250
	Deballasting	253	265	269	261	250
Holding Time (Days)	-	3	3	3	3	3

4. SHIPBOARD TEST SUMMARY

Size category & Water parameter	Sample	Test cycle 1	Test cycle 2	Test cycle 3
Organisms ≧50μm(inds/m^3)	Influent	9,289	43,967	4,940
	Treated	0	0.5	0
Organisms ≧10 and ＜50μm (inds/mL)	Influent	149	157	131
	Treated	0	0	0
Vibrio cholerae (cfu/100mL)	Influent	-	-	-
	Treated	-	-	-
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.
Coliform (cfu/100mL)	Influent	-	-	-
	Treated	-	-	-
Escherichia coli (cfu/100mL)	Influent	2	95	52
	Treated	0	0	0
Enterococcus group (cfu/100mL)	Influent	-	-	-
	Treated	-	-	-
Intestinal Enterococci (cfu/100mL)	Influent	3	2	13
	Treated	0	0	0
Heterotrophic bacteria(cfu/mL)	Influent	-	-	-
	Treated	-	-	-
Temperature (℃)	Influent	23.0	26.3	29.7
	Treated	23.6	27.7	30.4
Salinity (PSU)	Influent	34.6	33.8	32.5
	Treated	34.6	34.0	32.4
pH	Influent	8.30	7.87	7.89
	Treated	8.61	7.79	7.80
Turbidity(NTU)	Influent	2.23	7.79	8.97
	Treated	2.28	5.22	6.25
TSS(mg/L)	Influent	9.7	14.0	13.2
	Treated	9.3	12.4	3.8
DOM(mg/L)	Influent	2.0	2.2	1.8
	Treated	1.3	1.9	1.6
POM(mg/L)	Influent	1.2	0.9	1.0
	Treated	1.1	0.8	0.8
Flow rate(m^3/h)	Ballasting	305	306	305
	Deballasting	307	306	307
UV dose(mJ/cm^2)	Ballasting	249	249	249
	Deballasting	250	250	250

5. APPROVAL DOCUMENTATION

LIST NO.	DOCUMENTS	DATE
01-M0-207	Final Report for USCG Type Approval HK-R system of Miura Co.,Ltd.	31 December 2019
01-M0-208	Verification Testing Report for Land-Based test of the HK-(E)R System	20 December 2019
01-M0-209	TQAP for Verification testing for HK-300R system	27 June 2019
01-M0-210	QAPP for Land-Based testing of BWMS	06 July 2018
01-M0-211	01-M0-100E : Procedure of Shipboard Test 01-M0-126 : Report of Shipboard Early Test	12 November 2018 05 December 2018
01-M0-212	Verification Testing Report for Shipboard testing of the HK-(E)R System	27 June 2019
01-M0-213	TQAP for Shipboard testing for HK=300R system	19 December 2018
01-M0-214	QAPP for Shipboard testing of BWMS	31 July 2018
01-M0-215A	Environmental Test Report R-16176 Rev.G : Retlif-NSF SGS-R19-2884-EN00 : SGS SGS-R19-2887-EN00 : SGS SGS-E19-0138 : SGS SGS-E19-0139 : SGS FLI 12-14-086 : Labotch LIC 12-18-017 : Labotech LIC 12-19-021 : Labotech LIC 12-20-034 : Labotech LIC 12-20-168 : Labotech	 29 October 2018 19 December 2019 19 December 2019 19 December 2019 19 December 2019 28 November 2014 08 February 2018 15 February 2019 31 March 2020 30 October 2020
01-M0-090	Readiness Evaluation test report 01-M0-089 : Type Approval Test Report 01-M0-090 : Functional Test Reprot	
01-M0-054N	OERATION MANUAL	18 December 2020
01-M0-052J	SPECIFICATIONS	19 June 2020
01-M0-040H	SPECIFICATIONS	12 April 2019
01-M0-193D	BILL OF MATERIALS (STANDARD)	18 December 2020
01-M0-192D	BILL OF MATERIALS (EXPLOSION PROOF)	18 December 2020
01-M0-106K	Electrical Eqiuipment List	18 December 2020
01-M0-170A	KR Salinity sensor functional test plan & check list	01 October 2019
01-M0-050G	CFD analysi and capacity development in Filter System of Miura BWMS	08 April 2019
01-M0-177	The calculation of irradiation dose of UV reactor	16 October 2019
01-M0-183	CFD Validation Test Report of Miura BWMS HK-R	11 December 2019
01-M0-216	Report of Regrowth Test	24 December 2020