

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 m³/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 ; >105mJ/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

Nori Ishihara

(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

2025 年 6 月 21 日まで有効である。

Valid until this 21 day of June, 2025

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
Treatment Rated Capacity	200m ³ /h	300m ³ /h	450m ³ /h	600m ³ /h	900m ³ /h
Max.working pressure	0.686MPa				
Working temperature range	0 to 50°C				

UV UNIT		
Manufacturer	MIURA CO., LTD.	
Model	06U,06UE,06UY	08U,08UE,08UY, 10U,10UE,10UY, 12U,12UE,12UY
Treatment Rated Capacity	200m³/h	300m³/h
Max.working pressure	0.686MPa	
Working temperature range	0 to 50℃	
UV LAMP		
Manufacturer	TOSHIBA LIGHTING & TECHNOLOGY CORPORATION	
Model	H3650L/11-NW	

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

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

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

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
HK-300(E)	300	300F(E)/300F(E)A	08U,08UE,08UY, 10U,10UE,10UY, 12U,12UE,12UY
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, 08U,08UE,08UY, 10U,10UE,10UY 12U,12UE,12UY 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 4 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 4 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	2.7 x 10 ⁵	3.3 x 10 ⁵	3.7 x 10 ⁵	2.9 x 10 ⁵	4.1 x 10 ⁵
	Control	37.2 x 10 ²	54.1 x 10 ²	9.0 x 10 ²	97.9 x 10 ²	10.9 x 10 ²
	Treated	< 1	< 1	N.D.	1	N.D.
Organisms ≥ 10 and < 50µm (inds/mL)	Influent	1.91 x 10 ³	1.86 x 10 ³	1.71 x 10 ³	1.99 x 10 ³	2.31 x 10 ³
	Control	4.97 x 10 ²	7.30 x 10 ²	12.86 x 10 ²	13.15 x 10 ²	15.14 x 10 ²
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Vibrio cholerae (cfu/100mL)	Influent	1,127	5,080	873	600	6,087
	Control	473	135	435	999	1,130
	Treated	N.D.	N.D.	< 1	2	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.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Coliform (cfu/100mL)	Influent	7,860	8,293	10,700	20,400	16,800
	Control	2,493	8,153	492	1,674	1,847
	Treated	N.D.	N.D.	< 1	N.D.	N.D.
Escherichia coli (cfu/100mL)	Influent	N.D.	N.D.	7	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.
Enterococcus group (cfu/100mL)	Influent	< 1	2	2	2	7
	Control	6	< 1	3	4	1
	Treated	1	N.D.	1	11	N.D.
Intestinal Enterococci (cfu/100mL)	Influent	< 1	< 1	1	N.D.	N.D.
	Control	N.D.	N.D.	< 1	< 1	N.D.
	Treated	< 1	N.D.	N.D.	11	N.D.
Heterotrophic bacteria (cfu/mL)	Influent	27,733	45,733	36,333	26,000	29,867
	Control	686,667	535,333	451,333	571,333	261,333
	Treated	25	35	191	32	11
DOC(mg/L)	Influent	2.0	2.5	3.0	1.9	2.3
	Control	1.1	1.0	1.6	1.1	1.5
	Treated	1.0	1.1	1.3	1.1	1.8
POC(mg/L)	Influent	1.8	2.5	1.8	1.6	1.6
	Control	0.4	0.5	0.5	0.5	0.6
	Treated	0.5	0.4	0.4	0.5	0.4
TSS(mg/L)	Influent	12.7	11.3	11.7	10.0	11.0
	Control	1.0	1.7	2.0	1.7	2.0
	Treated	1.7	2.0	2.0	2.3	2.0
Temperature (°C)	Influent	10.5	9.0	8.1	9.1	12.0
	Control	10.0	10.7	10.3	11.9	10.0
	Treated	9.9	10.6	10.0	11.9	9.9
Salinity (PSU)	Influent	33.0	32.6	32.7	34.3	34.4
	Control	33.1	32.6	34.1	33.2	32.9
	Treated	33.0	32.6	33.8	33.4	32.4
pH	Influent	8.1	8.1	8.1	8.3	8.2
	Control	7.9	7.9	8.0	8.0	8.0
	Treated	7.9	8.0	8.0	8.0	8.0

Dissolved oxygen(mg/L)	Influent	9.2	9.9	9.6	8.8	8.3
	Control	9.0	8.8	7.4	6.3	6.8
	Treated	8.9	8.6	7.5	6.7	7.1
Turbidity(NTU)	Influent	6.4	10.6	10.7	6.3	6.9
	Control	4.5	4.9	4.6	2.5	0.2
	Treated	4.3	4.2	5.5	2.2	1.1
Flow rate(m ³ /h)	Ballasting	212.1	208.9	209.0	213.1	211.1
	Deballasting	207.5	211.5	213.6	214.6	214.3
UV dose (Average) (mJ/cm ²)	Ballasting	135.5	135.7	135.5	135.5	136.0
	Deballasting	135.5	135.9	136.0	136.1	135.3
Holding Time (Days)	-	5 day	5 day	5 day	5 day	5 day
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 $\geq 50\mu\text{m}$ (inds/m ³)	Influent	6.8 x 10 ⁵	4.0 x 10 ⁵	4.1 x 10 ⁵	2.8 x 10 ⁵	3.8 x 10 ⁵
	Control	15.9 x 10 ²	4.3 x 10 ²	28.0 x 10 ²	10.9 x 10 ²	25.9 x 10 ²
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Organisms ≥ 10 and $< 50\mu\text{m}$ (inds/mL)	Influent	1.48 x 10 ³	1.77 x 10 ³	1.99 x 10 ³	1.99 x 10 ³	2.09 x 10 ³
	Control	13.61 x 10 ²	13.13 x 10 ²	17.76 x 10 ²	8.49 x 10 ²	15.11 x 10 ²
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Vibrio cholerae (cfu/100mL)	Influent	3,980	3,447	4,447	3,300	4,660
	Control	168	121	1,066	574	114
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.	N.D.	N.D.
	Control	< 1	N.D.	N.D.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Coliform (cfu/100mL)	Influent	5,533	6,867	10,273	2,800	6,833
	Control	390	417	741	139	159
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Escherichia coli (cfu/100mL)	Influent	N.D.	N.D.	67	N.D.	20
	Control	N.D.	N.D.	< 1	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Enterococcus group (cfu/100mL)	Influent	2	2	11	< 1	2
	Control	1	< 1	2	< 1	3
	Treated	N.D.	< 1	N.D.	3	< 1
Intestinal Enterococci (cfu/100mL)	Influent	< 1	< 1	N.D.	N.D.	< 1
	Control	N.D.	N.D.	< 1	< 1	< 1
	Treated	N.D.	N.D.	N.D.	2	< 1
Heterotrophic bacteria (cfu/mL)	Influent	74,000	230,133	39,400	268,667	70,333
	Control	186,333	917,333	258,000	1,464,000	493,333
	Treated	13	18	15	35	35
DOC(mg/L)	Influent	8.5	7.6	8.3	8.6	8.3
	Control	6.8	6.5	6.6	4.3	5.2
	Treated	6.0	6.5	6.3	3.0	4.9
POC(mg/L)	Influent	5.8	6.3	6.2	6.7	6.0
	Control	0.7	0.9	0.7	5.2	0.9
	Treated	0.8	0.7	0.7	6.4	1.1
TSS(mg/L)	Influent	55.0	59.3	52.7	59.0	72.3

	Control	2.3	3.0	2.7	19.5	3.0
	Treated	3.0	3.0	3.0	19.4	4.0
Temperature (°C)	Influent	10.1	10.5	10.5	12.4	12.6
	Control	10.1	9.9	10.5	11.3	12.4
	Treated	10.0	9.8	10.3	11.3	12.3
Salinity (PSU)	Influent	20.4	21.0	20.8	19.4	19.2
	Control	19.6	20.3	21.0	19.5	19.0
	Treated	21.0	21.1	20.2	19.4	19.5
pH	Influent	8.1	8.0	7.9	8.0	7.9
	Control	7.8	7.7	7.8	7.8	7.8
	Treated	7.7	7.7	7.7	7.7	7.7
Dissolved oxygen(mg/L)	Influent	6.5	9.5	9.1	9.2	9.1
	Control	9.5	9.8	9.0	9.6	9.1
	Treated	9.0	9.7	8.5	9.6	8.5
Turbidity(NTU)	Influent	22.4	67.7	50.8	33.2	40.4
	Control	0.3	12.5	9.8	13.2	12.4
	Treated	1.9	12.6	12.1	12.1	10.8
Flow rate(m³/h)	Ballasting	212.9	210.5	212.1	211.1	212.3
	Deballasting	213.9	215.0	212.5	214.3	214.6
UV dose(mJ/cm²)	Ballasting	135.3	135.8	134.8	137.0	136.6
	Deballasting	135.4	135.3	134.9	135.5	135.9
Holding Time (Days)	-	5 day	5 day	5 day	5 day	5 day
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 $\geq 50\mu\text{m}$ (inds/m³)	Influent	8.0×10^5	181.0×10^5	1.6×10^5	5.5×10^5	7.1×10^5
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Organisms ≥ 10 and $< 50\mu\text{m}$ (inds/mL)	Influent	10.0×10^2	13.7×10^2	12.0×10^2	22.7×10^2	11.0×10^2
	Control	-	-	-	-	-
	Treated	0.3	0.7	3.3	8.5	5.3
Vibrio cholerae (cfu/100mL)	Influent	346,000	464	5,020	1,054	113
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	310	N.D.	N.D.
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.	N.D.	N.D.
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Coliform (cfu/100mL)	Influent	552	1,100	110,800	16,780	2,460
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	16.4	N.D.	N.D.
Escherichia coli (cfu/100mL)	Influent	N.D.	N.D.	N.D.	0.4	2
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Enterococcus group (cfu/100mL)	Influent	9.4	2.8	N.D.	4	6
	Control	-	-	-	-	-
	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Intestinal Enterococci (cfu/100mL)	Influent	1.8	1.2	N.D.	0.2	0.2
	Control	-	-	-	-	-

	Treated	N.D.	N.D.	N.D.	N.D.	N.D.
Heterotrophic bacteria (cfu/mL)	Influent	10,780	67,400	112,200	86,800	10,200
	Control	-	-	-	-	-
	Treated	4	134	3,180	6	4
DOC(mg/L)	Influent	10.0	7.9	12.0	13.0	14.0
	Control	-	-	-	-	-
	Treated	11.0	11.0	12.0	18.0	15.0
POC(mg/L)	Influent	12.0	12.0	9.4	11.0	8.9
	Control	-	-	-	-	-
	Treated	2.7	5.1	4.8	6.7	6.5
TSS(mg/L)	Influent	63	80	59	110	100
	Control	-	-	-	-	-
	Treated	15	14	21	36	44
Temperature (°C)	Influent	24.4	33.0	29.8	18.6	16.6
	Control	-	-	-	-	-
	Treated	24.2	32.4	29.9	18.9	16.8
Salinity (PSU)	Influent	0.1	0.09	0.1	0.1	0.1
	Control	-	-	-	-	-
	Treated	0.1	0.09	0.1	0.1	0.1
pH	Influent	10.01	9.72	8.29	9.34	8.98
	Control	-	-	-	-	-
	Treated	9.98	9.74	8.34	9.26	9.03
Dissolved oxygen(mg/L)	Influent	10.58	8.96	7.23	9.75	9.90
	Control	-	-	-	-	-
	Treated	10.83	8.62	7.17	9.74	9.74
Turbidity(NTU)	Influent	16.3	8.8	10.3	33.5	32.8
	Control	-	-	-	-	-
	Treated	8.8	5.0	5.8	22.7	26.7
Flow rate(m ³ /h)	Ballasting	276±2.6	253±3.9	290±3.6	189±9.2	176±1.6
	Deballasting	-	-	-	-	-
UV dose(mJ/cm ²)	Ballasting	126±6.2	143±6.0	136±5.4	143±9.2	150±5.9
	Deballasting	-	-	-	-	-
Holding Time	-	< 1day	< 1day	< 1day	< 1day	< 1day

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	515,867	150,500	61,900
	Treated	< 1	1	4
Organisms ≥ 10 and $< 50\mu\text{m}$ (inds/mL)	Influent	338	111	126
	Treated	< 1	< 1	< 1
Vibrio cholerae (cfu/100mL)	Influent	8,000	7,400	6,107
	Treated	169	4,273	521
Toxicogenic Vibrio cholerae (cfu/100mL)	Influent	N.D.	N.D.	N.D.
	Treated	N.D.	N.D.	N.D.
Coliform (cfu/100mL)	Influent	5,267	7,667	8,667
	Treated	73	3,925	312
Escherichia coli (cfu/100mL)	Influent	133	133	333
	Treated	3	191	56
Enterococcus group (cfu/100mL)	Influent	N.D.	N.D.	< 1
	Treated	N.D.	N.D.	N.D.
Intestinal Enterococci (cfu/100mL)	Influent	N.D.	N.D.	< 1
	Treated	N.D.	N.D.	N.D.
Heterotrophic bacteria(cfu/mL)	Influent	292,667	72,533	56,400
	Treated	350	14,684	719
Temperature (°C)	Influent	27.0	27.7	27.4
	Treated	26.0	27.2	26.6
Salinity (PSU)	Influent	27.1	27.5	28.9
	Treated	27.8	30.0	29.6
pH	Influent	7.7	8.1	7.9
	Treated	8.1	8.1	8.0
Turbidity(NTU)	Influent	5.2	10.6	4.9
	Treated	3.4	1.2	11.6
TSS(mg/L)	Influent	4.9	5.5	5.3
	Treated	2.9	4.1	3.9
DOC(mg/L)	Influent	-	-	-
	Treated	-	-	-
POC(mg/L)	Influent	< 0.1	< 0.5	< 0.5
	Treated	< 0.1	< 0.5	< 0.5
Flow rate(m ³ /h)	Ballasting	209.2	209.8	208.0
	Deballasting	210.7	211.1	211.3
UV dose(mJ/cm ²)	Ballasting	130.0	129.0	134.0
	Deballasting	129.0	130.0	130.0

5. APPROVAL DOCUMENTATION

LIST NO.	DOCUMENTS	DATE
E-01-200-300	BWMS Manufacturing Specifications	21 May 2020
E-02-200-300	BWMS Operation Manual	March 2020
E-04-200	Drawing for performance, configuration, and structure of sampling and condensation equipment	22 December 2011
M-01-200-300	Manufacturing Facilities	16 January 2014
A-01-200-300	Information related to Ballast Water Management Plan	14 February 2014
T-01-200	Environmental Testing Plan	13 September 2013
T-02-200	Land based Testing Plan	22 February 2013
T-02-300	Land based Testing Plan (TRC300m ³ /h)	1 May 2013
T-03-200-30	Shipboard Testing Plan	30 July 2013
T-05-200	Additional Land based Test Plan	2 October 2015
T-06-300	Additional Land based Test Plan (revised filter size)	12 February 2016
T-07-300	Additional Land based Test Plan (revised filter mesh size)	18 March 2016
T-08-001	Test/Quality Assurance Plan (BWMS Code)	21 February 2020
R-01-200	Report of Environmental Testing	17 March 2021
R-02-200	Report of Land based testing	1 May 2013
R-02-300	Report of Land based testing TRC300m ³ /h	30 July 2013
R-03-200-300	Report of Shipboard Testing	28 February 2014
R-05-200	Report of Additional Land based Test	4 November 2015
R-06-300	Report of Additional Land based Test (revised filter size)	11 March 2016
R-07-300	Report of Additional Land based Test (revised filter mesh size)	18 March 2016
R-08-001	Report of Temperature Test (BWMS Code)	21 February 2020
R-08-002	Report of Regrowth Test (BWMS Code)	21 February 2020
R-08-003	Report of the Land based Test for the BWMS Code	21 February 2020
R-08-004	Report of Verification test for the concentrated effect on the aquatic organisms (BWMS Code)	21 February 2020
R-08-005	Report of Additional Land based Test 2 (BWMS Code)	21 February 2020
D-01-200	Quality management plan (QMP) and quality assurance project plan (QAPP) of the approval testing process	22 December 2011
D-02-200	Land based testing facility	22 December 2011
D-03-200-300	Shipboard testing facility	13 September 2013