

MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
62nd session  
Agenda item 2

MEPC 62/INF.30  
6 May 2011  
ENGLISH ONLY

## HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

### Information on the Type Approval of the BSKY™ Ballast Water Management System

Submitted by China

#### SUMMARY

*Executive summary:* This document provides information on the Type Approval certification of the BSKY™ Ballast Water Management System manufactured by Wuxi Brightsky Electronic Co., Ltd.

*Strategic direction:* 7.1 and 13

*High-level action:* 7.1.2 and 13.3

*Planned output:* 7.1.2.5 and 13.3.1

*Action to be taken:* Paragraph 6

*Related documents:* MEPC 58/23 and MEPC 59/2/24

#### Introduction

1 Regulation D-3.1 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 stipulates that ballast water management systems must be approved by the Administration taking into account the guidelines developed by the Organization.

2 According to the decision and clarification made at MEPC 59 (document MEPC 59/24, paragraphs 2.15 to 2.17), it is for the national Administration to determine if a ballast water management system that uses UV light produces Active Substances and to decide if it needs to make a proposal for approval to the Committee. China Maritime Safety Administration reviewed the BSKY™ BWMS technical specification and type approval test plan proposal, and verified the application dossier submitted by Wuxi Brightsky Electronic Co., Ltd., for the BSKY™ BWMS. It is believed that the system satisfies the requirements of the "Guidelines for approval of ballast water management systems (G8)" adopted by resolution MEPC.174(58).

3 The Plan Approval process was reviewed by China Classification Society. All the land-based and shipboard tests required in Guidelines (G8) were conducted by the Centre of Marine Environmental Measurements, First Institute of Oceanography, SOA,

and the environmental test by China Shipbuilding Industry Environment and Reliability Test Center for Electric and Electronic Equipment. The results of the extensive tests, which were undertaken in 2010 and earlier in 2011, demonstrated that the system does not make use of an Active Substance.

4 On the basis of the above, the Type Approval Certificate was issued to the BSKY™ BWMS by China Classification Society on behalf of China Maritime Safety Administration on 28 March 2011. A copy of the Certificate is contained in the annex to this document.

5 In accordance with resolution MEPC.175(58) on "Information reporting on type approved ballast water management systems", the following information is provided:

- .1 approval date: 28 March 2011;
- .2 name of the Administration: China Maritime Safety Administration;
- .3 name of the BWMS: BSKY™ BWMS;
- .4 a copy of the Type Approval Certificate and summary of test results can be found in the annex to this document; and
- .5 description of the Active Substances: Not applicable. (No use of Active Substances – UV light).

**Action requested of the Committee**

6 The Committee is invited to note the information contained in this document.

\*\*\*

ANNEX

TYPE APPROVAL CERTIFICATE OF  
BSKY™ BALLAST WATER MANAGEMENT SYSTEM



中国船级社  
CHINA CLASSIFICATION SOCIETY

格式  
Form CP184

编号  
No. NJ10T00090\_02

压载水管理系统型式认可证书

TYPE APPROVAL CERTIFICATE OF BALLAST WATER MANAGEMENT SYSTEM

兹证明，下述压载水管理系统已经根据IMO的MEPC. 174 (58) 决议中导则的相关规范要求通过了检验和测试。本证书仅对下述提及的压载水管理系统有效。

This is to certify that the ballast water management system 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.

压载水管理系统供应方  
Ballast water management system supplied by 无锡蓝天电子有限公司  
Wuxi Brightsky Electronic Co., Ltd.

指定类型和型号  
under type and model designation BSKY250, incorporating types BSKY100 to BSKY6000

并包括：  
and incorporating:

压载水管理系统制造商  
Ballast water management system manufactured by 无锡蓝天电子有限公司  
Wuxi Brightsky Electronic Co., Ltd.

设备/组件图号  
to equipment/assembly drawing No. BSKY\_BWMS\_DWG001 R00  
日期  
date 2010-04-28

其它设备制造商  
Other equipment manufactured by ---

设备/组件图号  
to equipment/assembly drawing No. ---  
日期  
date ---

Nº 11168138



额定处理能力

Treatment rated capacity \_\_\_\_\_ 100 to 6000 \_\_\_\_\_ m<sup>3</sup>/h

本型式认可证书的副本应始终保留在安装该压载水管理系统的船舶上。船上检查时，应提供测试方案的参考文件和测试结果的复印件。如果型式认可证书是基于另一主管机关已经授予的认可签发，则应注明所依据的型式认可证书。

A copy of this Type Approval 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 the test results should be available for inspection on board the vessel. If the Type Approval Certificate is issued based on approval by another Administration, reference to that Type Approval Certificate shall be made.

限制条件的说明见本文件的附件。

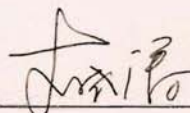
Limiting Conditions imposed are described in the appendix to this document.

公章

Official stamp

签字

Signed

 Li Xiaotao

中国船级社

China Classification Society

日期

Dated

2011-03-28

附件：原始测试结果的副本

Enc. Copy of the original test results.

注：本证书含有附页，共15页

Note: The certificate is attached with 15 additional page(s)

N<sup>o</sup> 11455879



**APPROVED RATINGS OF EACH UNIT OF BSKY™ BWMS**

Type*	Flow rate (m <sup>3</sup> /hr)	Hydrocyclone	US prefilter	UV Module
<b>BSKY100</b>	100	CY08×2 or CY10×1	US25	UV402 or UV406
<b>BSKY150</b>	150	CY08×2	US25	UV402 or UV406
<b>BSKY200</b>	200	CY08×3 or CY10×2	US25	UV402 or UV406
<b>BSKY250</b>	250	CY08×3 or CY10×2	US25	UV402 or UV406
<b>BSKY300</b>	300	CY08×4 or CY10×3	US25 or US35	UV402 or UV408
<b>BSKY350</b>	350	CY08×5 or CY10×3	US35	UV404 or UV412
<b>BSKY400</b>	400	CY08×5 or CY10×4	US35	UV404 or UV412
<b>BSKY450</b>	450	CY08×6 or CY10×4	US35	UV404 or UV412
<b>BSKY500</b>	500	CY08×7 or CY10×4	US35	UV504 or UV512
<b>BSKY600</b>	600	CY10×5	US35	UV504 or UV512
<b>BSKY700</b>	700	CY10×6	US35 or US45	UV504 or UV512
<b>BSKY800</b>	800	CY10×7	US45	UV504 or UV512
<b>BSKY900</b>	900	CY10×7	US45	UV504 or UV512
<b>BSKY1000</b>	1,000	CY10×8	US45 or US50	UV506 or UV518
<b>BSKY1100</b>	1,100	CY10×9	US50	UV506 or UV518
<b>BSKY1200</b>	1,200	CY10×10	US50	UV506 or UV518
<b>BSKY1300</b>	1,300	CY10×10	US50	UV506 or UV518
<b>BSKY1400</b>	1,400	CY10×11	US50	UV506 or UV518
<b>BSKY1500</b>	1,500	CY10×12	US45×2	UV506×2 or UV512×2
<b>BSKY2000</b>	2,000	CY10×16	US45×2 or US50×2	UV506×2 or UV518×2
<b>BSKY3000</b>	3,000	CY10×24	US45×3 or US50×3	UV506×3 or UV518×3
<b>BSKY4000</b>	4,000	CY10×31	US50×3	UV506×3 or UV518×3
<b>BSKY5000</b>	5,000	CY10×39	US50×4	UV506×4 or UV518×4
<b>BSKY6000</b>	6,000	CY10×47	US50×5	UV506×5 or UV518×5

\* Each BSKY™ BWMS model have explosion proof model of UV module and US prefilter. The representation of explosion proof model is written “-EX” at the end of model name. For example, BSKY250EX means the explosion proof model of BSKY250.

**TEST RESULTS SUMMARY OF BSKY™ BWMS**

Test	Salinity	Parameter	IMO Standard (G8 D-2)		USA Standard*	Test Result		
			Influent Water	Treated Water	Treated Water	Influent Water	Control Water	Treated Water
Land-based Test	High Salinity (Avg. 32.56)	≥50 μm (ind./m <sup>3</sup> )	>10 <sup>5</sup>	<10	No living organism	1.3×10 <sup>6</sup>	2.7×10 <sup>3</sup>	No living organism
		10-50 μm (cells/mL)	>10 <sup>3</sup>	<10	<0.01	2.2×10 <sup>3</sup>	2.02×10 <sub>2</sub>	No living organism
		<10 μm Bacteria (CFU/100 mL)	>10 <sup>4</sup>	-	<10 <sup>3</sup>	11.6×10 <sub>6</sub>	3.43×10 <sub>6</sub>	0.086
		Escherichia coli (CFU/100 mL)	N/A	<250	<126	3.39×10 <sub>3</sub>	3.47×10 <sub>3</sub>	1.2
		Intestinal Enterococci (CFU/100 mL)	N/A	<100	<33	3.3×10 <sup>2</sup>	3.77×10 <sub>2</sub>	0.2
		Vibrio cholerae (CFU/100 mL)	N/A	<1	<1	2.3×10 <sup>3</sup>	2.2×10 <sup>2</sup>	0
	Low Salinity (Avg. 17.04)	≥50 μm (ind./m <sup>3</sup> )	>10 <sup>5</sup>	<10	No living organism	5.6×10 <sup>5</sup>	7.6×10 <sup>4</sup>	No living organism
		10-50 μm (cell/mL)	>10 <sup>3</sup>	<10	<0.01	2.6×10 <sup>3</sup>	1.74×10 <sub>2</sub>	<0.01
		<10 μm Bacteria (CFU/100 mL)	>10 <sup>4</sup>	-	<10 <sup>3</sup>	3.53×10 <sub>6</sub>	2.49×10 <sub>6</sub>	0.16
		Escherichia coli (CFU/100 mL)	N/A	<250	<126	3.63×10 <sub>3</sub>	4.36×10 <sub>3</sub>	4.4
		Intestinal Enterococci (CFU/100 mL)	N/A	<100	<33	4.08×10 <sub>2</sub>	3.85×10 <sub>2</sub>	0.2
		Vibrio cholerae (CFU/100 mL)	N/A	<1	<1	3.11×10 <sub>2</sub>	4.15×10 <sub>2</sub>	0
Shipboard Test	≥50 μm (ind./m <sup>3</sup> )	>100	<10	No living organism	1.82×10 <sub>4</sub>	1.77×10 <sub>3</sub>	No living organism	
	10-50 μm (cell/mL)	>100	<10	<0.01	2.6×10 <sup>3</sup>	6.3×10 <sup>2</sup>	<0.01	
	<10 μm Bacteria (CFU/100 mL)	N/A	-	<10 <sup>3</sup>	1.8×10 <sup>6</sup>	1.48×10 <sub>6</sub>	5.28	
	Escherichia coli (CFU/100 mL)	N/A	<250	<126	3.03×10 <sub>3</sub>	2.27×10 <sub>3</sub>	<1	
	Intestinal Enterococci (CFU/100 mL)	N/A	<100	<33	1.31×10 <sub>3</sub>	8.0×10 <sup>2</sup>	<1	
	Vibrio cholerae (CFU/100 mL)	N/A	<1	<1	5.5×10 <sup>2</sup>	6.2×10 <sup>2</sup>	0	

\* USA Standard: California and New York Standard.

## Summary of land-based trials

1 The 10 land-based trials of 250 m<sup>3</sup>/h BWMS (BSKY™ BWMS) produced by Wuxi Brightsky Electronics Co., Ltd., were conducted onboard **M.V Fenghai 20#** Tanker berthing at the wharf in Zhoushan Dongpeng shipyard from May to June 2010. As the result from the land-based tests, it can be concluded as follows:

- .1 The salinity of testing water was 32.5 PSU and 17.04 PSU, respectively, for the two salinity regimes, the TSS, POC and DOC all met the Guidelines (G8) well.
- .2 Organisms ( $\geq 50 \mu\text{m}$ ) indicator was well above the requirements of at least five species from at least three different phyla/divisions contained in Guidelines (G8). It included, *inter alia*, the added species *Brachionus plicatilis*, Copepoda, *Oithona* sp, heterotrophic dinoflagellates (*Ceratium tripos*) and some large diatoms, for example, *Coscinodiscus* spp. The density of this size fraction at intake of reference was between  $10^5 \sim 10^6 \text{ ind/m}^3$ ,  $1.3 \times 10^6 \text{ ind/m}^3$  on average. Five days later after a second UV treatment, the density of organisms larger than 50  $\mu\text{m}$  at discharge was reduced by one order of magnitude, not so apparently as high salinity testing. Still no viable organisms existed during the five test runs at discharge, which met the requirements of Guidelines (G8) and the D-2 standard completely.
- .3 The majority of the phytoplankton (10-50  $\mu\text{m}$ ) consisted of *Prorocentrum dentatum*, *Skeletonema costatum* and *Isocrysis galbana*, the dominant species at low salinity testing series were *Euglena* (*Trachelomonas crebea*), Chlorophyta (*Palmella mucosa*, *Scenedesmus dimorphus*), diatoms (*Nitzschia* spp.), all met the requirements of density contained in Guidelines (G8). The density of cells at intake fluctuated between  $1.24 \times 10^3$  and  $4.04 \times 10^3 \text{ cells/mL}$ . The density of survivals after treatment at high salinity test series was 0 cell/mL, which was better than the 0.004 cells/mL at low salinity tests. Both of the densities met the requirements of Guidelines (G8) and D-2 standard.
- .4 Heterotrophic bacteria were abundant at intake before treatment, the densities of all samples were above  $10^6 \text{ CFU/100 mL}$ , which met the requirements of Guidelines (G8) well. Although there was not a clear definition of the bacteria number after treatment, the death rate after the treatment was nearly 100%.

## Summary of shipboard trials

2 The four shipboard trials of 250 m<sup>3</sup>/h BWMS (BSKY™ BWMS) produced by Wuxi Brightsky Electronics Co., Ltd., were conducted on board **M.V. Hua Chang 8#** Liquefied Gas Carrier (3,200 m<sup>3</sup>) from July 2010 to January 2011. Trials took place during the vessel's regular summer and winter schedule in the Yellow Sea, the East China Sea, intersection between Pearl River and South China Sea. As the result from the shipboard test, it can be concluded as follows:

- .1 The organism densities for different size fraction of four cycles of the shipboard trials were different from each other: for the large size fraction ( $> 50 \mu\text{m}$ ), the density fluctuated between 1,693 ind/m<sup>3</sup> and 58,922 ind/m<sup>3</sup>; while the value for small size fraction (10-50  $\mu\text{m}$ ) was from 119 cells/mL

to 9,323 cells/mL. All the densities were more than 10 times of the greatest number defined by D-2 standard, as a result, all the four cycles of trails were valid.

- .2 Only one sample of the second cycle was positive for the viable organisms (>50  $\mu\text{m}$ ) in the effluent water of treated tank during the four cycle of trails, but the living activity was very weak, it died within several hours, no survivals were observed for the other three cycles. All the results met the D-2 standard well.
- .3 For the viable plankton (10-50  $\mu\text{m}$ ), only two samples of the second cycle were proved positive in the effluent water of treated tank, the average density for the four cycles of trails was only 0.009 ind/mL, which met the D-2 standard.
- .4 The separate number of heterotrophic bacteria for each cycle was 2.89 CFU/100 mL, 12 CFU/100 mL, 6.22 CFU/100 mL and 0 CFU/100 mL on average. There were no viable *Vibrio cholerae* observed after an incubation of sample bottles to the treated water from the four cycles. The number of *Intestinal enterococci* and *Escherichia coli* colonies were all less than 1 CFU/100 mL after treated, which met the D-2 standard and the requirements of Guidelines (G8).

---