No. SHOU-JPMT-2013006

Test Report

Product Name: Ballast water

Applicant: Jiujiang Precision Measuring Technology Research Institute

Test Category: Shipboard Test

Delivered Data of Report: 26/10/2013

Ballast Water Detecting Lab of Shanghai Ocean University

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6. Test results only indicate this sampling.

Adress; No.999, Huchenghuan Rd , Nanhui New City, Shanghai, P.R. China

Tel.; +86-021- 61900428

Fax; +86-021-61900428

Code; 201306

Email; hxwu@shou.edu.cn

Contact; Wu huixian

Ballast Water Detecting Lab of Shanghai Ocean University

Testing report of viable organisms greater than or equal to 10 micrometres and less than 50 micrometres in minimum dimension

No. SHOU-JPMT-2013006

Sample name	ballast water	**Applicant**	Jiujiang Precision Measuring Technology Research Institute
Test category	shipboard test	**Address of the applicant**	No,83 Jiurui Avenue, Jiujiang, Jiangxi, China
No. of samples	18	**Sample ID number**	SHOU-BWDL-JPMT-018A1~A18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-17 2013-07-18	**Test date**	2013-07-17~2013-08-20
Sampling location	**Uptake:** Yantai port，Shandong Province, ship: Shun an No. 328 **Discharge**: Lvshun port，Liaoning Province ship: Shun an No. 328		
Test item	viable organisms of 10~50μm in minimum dimension		
Reference standard	GB 17378.7-2007/5.3.2.3 concentration counting method		

	Sampling time phase	**Untreated S-1 at uptake**	**Control S-2 at uptake**	**Control discharge S-4**	**Treated discharge S-3**
Test result cell/mL	**Beginning**	206.00	165.00	270.00	0.20
					0.45
					0.50
	Middle	315.00	245.00	205.00	0.05
					0.10
					0.35
	End	267.00	197.00	108.00	0.35
					0.10
					0.15
	Mean value	262.67	202.33	194.33	0.25
Remarks	Shipboard test to OceanDoctor BWMS (500m^3/h)				

Main operator: Liu Liang **Checked by:** Wang Qiong **Approved by:** Xue Junzeng

Ballast Water Detecting Lab of Shanghai Ocean University

Testing report of viable organisms greater than or equal to 50 micrometres in minimum dimension

No. SHOU-JPMT-2013006

Sample name	ballast water	**Applicant**	Jiujiang Precision Measuring Technology Research Institute
Test category	shipboard test	**Address of the applicant**	No,83 Jiurui Avenue, Jiujiang, Jiangxi, China
No.of the samples	18	**Sample ID**	SHOU-BWDL-JPMT-018B1~B18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-17 2013-07-18	**Test date**	2013-07-17~2013-08-20
Sampling location	**Uptake:** Yantai port，Shandong Province, ship: Shun an No. 328 **Discharge**: Lvshun port，Liaoning Province ship: Shun an No. 328		
Test item	Viable organisms of ≥ 50μm in minimum dimension		
Reference standard	GB17378.7-2007/5.3.3.3 individual counting method		

	Sampling point	**Uptake S-1**	**Control uptake S-2**	**Control discharge S-4**	**Treated discharge S-3**
Test result ind/m^3	**Beginning**	8.30×10^4	4.66×10^4	3.10×10^4	3.00
					3.00
					5.00
	Middle	8.05×10^4	4.66×10^4	3.57×10^4	4.00
					4.00
					2.00
	End	6.23×10^4	4.44×10^4	3.56×10^4	1.00
					4.00
					3.00
	Mean value	7.53×10^4	4.59×10^4	3.41×10^4	3.22
Remarks	Shipboard test to OceanDoctor BWMS (500m^3/h)				

Main operator: Yuan Lin **Checked by:** Liu Liang **Approved by:** Xue Junzeng

Ballast Water Detecting Lab of Shanghai Ocean University

Test report of bacteria test

No. SHOU-JPMT-2013006

Sample name	ballast water	**Applicant**	Jiujiang Precision Measuring Technology Research Institute
Test category	shipboard test	**Address of the applicant**	No,83 Jiurui Avenue, Jiujiang, Jiangxi, China
No.of the samples	18	**Sample ID**	SHOU-BWDL-JPMT-018C1~C18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-17 2013-07-18	**Test date**	2013-07-17~2013-08-20
Sampling location	**Uptake:** Yantai port，Shandong Province, ship: Shun an No. 328 **Discharge**: Lvshun port，Liaoning Province ship: Shun an No. 328		
Test item	Heterotrophic bacteria, *Escherichia coli* , Vibrio cholerae, *Intestinal Enterococci*		
Reference standard（**all valid except for those specified**）	The Specification for Marine Monitoring—Part 7:Ecological survey for offshore pollution and biological monitoring GB17378.7-2007/10.1-plate count method Standard examination methods for drinking water—indicator microbes GB/T5750.12-2006/1.1 -plate count method The Specification for Marine Monitoring—Part 7:Ecological survey for offshore pollution and biological monitoring GB17378.7-2007/9.1-fermentation method; 9.2 -filter membrane method Standard examination methods for drinking water—indicator microbes GB/T5750.12-2006/4.1-multiple-tube fermentation method;4.2-filter membrane method Diagnosis Standard for *Vibrio cholerae* WS289-2008; Water Quality - Detection and Enumeration of Intestinal Enterococci in Surface and waste water - Membrane Filtration Method. ISO 7899-2:2000		
Test result	Refer to the following table for the detailed information on the test results		
Remarks	Shipboard test to OceanDoctor BWMS (500m^3/h)		

Main operator: Liu Liang **Checked by:** **Approved by:**

Wang Qiong

Ballast Water Detecting Lab of Shanghai Ocean University

Test report of bacteria test No. SHOU-JPMT-2013006

Name	Sampling phase	Uptake S-1	Control uptake S-2	Control discharge S-4	Treated discharge S-3
Heterotrophic bacteria (cfu/mL)	**Beginning**	1.1×10^6	1.3×10^6	5.7×10^5	1.1×10^3
					1.0×10^3
					990
	Middle	1.1×10^6	1.4×10^6	4.0×10^5	900
					840
					910
	End	9.6×10^5	1.0×10^6	4.1×10^5	970
					1.1×10^3
					1.0×10^3
	Mean value	1.1×10^6	1.2×10^6	4.6×10^5	978.9
***Escherichia coli* (cfu/100mL)**	**Beginning**	6.3×10^6	7.2×10^6	7.8×10^5	25
					15
					27
	Middle	6.0×10^5	6.1×10^6	8.1×10^5	22
					13
					30
	End	8.4×10^6	7.4×10^6	7.2×10^5	17
					32
					13
	Mean value	5.1×10^6	6.9×10^6	7.7×10^5	21.6
Intestinal Enterococci (cfu/100mL)	**Beginning**	2	ND	1	ND
					ND
					ND
	Middle	ND	1	ND	ND
					ND
					ND
	End	3	ND	ND	ND
					ND
					ND
	Mean value	<2	<1	<1	ND
Vibrio cholerae (cfu/100mL)	**Beginning**	ND	ND	ND	ND
					ND
					ND
	Middle	ND	ND	ND	ND
					ND
					ND
	End	ND	ND	ND	ND
					ND
					ND
	Mean value	ND	ND	ND	ND

Note: ND represents not detected

Ballast Water Detecting Lab of Shanghai Ocean University

Test report of water quality test

No. SHOU-JPMT-2013006

Sample name	ballast water	**Applicant**	Jiujiang Precision Measuring Technology Research Institute
Test category	shipboard test	**Address of the applicant**	No,83 Jiurui Avenue, Jiujiang, Jiangxi, China
No. of the samples	18	**Sample ID**	SHOU-BWDL-JPMT-018D1~D18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-17 2013-07-18	**Test date**	2013-07-17~2013-08-20
Sampling location	**Uptake:** Yantai port，Shandong Province, ship: Shun an No. 328 **Discharge**: Lvshun port，Liaoning Province ship: Shun an No. 328		
Test item	Water temperature; salinity; TSS; POC		
Reference standard（**all valid except for those specified**）	The Specification for Marine Monitoring - Part 4: Seawater Analysis GB17378.4-2007/25.1: surface temperature method, 27: gravimetric method, 29.1: salinometer method, Gulf Ecosystem Observation Methods (China Environmental Science Press, 2005/4.5.14.1) - Spectrophotometer Method		
Test result	Refer to the following table for the detailed information on the test results		
Remarks	Shipboard test to OceanDoctor BWMS (500m^3/h)		

Main operator: Liu Liang Yuan Lin **Checked by:** Yuan Lin. **Approved by:** Xue Junzeng

Ballast Water Detecting Lab of Shanghai Ocean University
Test report of water quality test

No. SHOU-JPMT-2013006

Sampling point	Time phase	Temperature (℃)	Salinity (PSU)	TSS (mg/L)	POC (mg/L)
Uptake S-1	Beginning	24.0	28.4	23.0	0.54
	Middle	23.6	28.2	24.2	0.61
	End	23.3	28.3	32.8	0.46
	Mean value	23.6	28.3	26.7	0.54
Control uptake S-2	Beginning	23.7	28.5	32.6	0.49
	Middle	23.5	28.3	30.8	0.48
	End	23.4	28.3	32.2	0.54
	Mean value	23.5	28.4	31.9	0.50
Control discharge S-4	Beginning	24.0	28.4	19.4	0.47
	Middle	23.6	28.2	23.6	0.29
	End	23.3	28.3	29.4	0.32
	Mean value	23.6	28.3	24.1	0.36
Treated dischargeS-3	Beginning	22.7	28.7	26.4	0.24
		22.6	28.7	14.4	0.42
		22.6	28.7	22.6	0.29
	Middle	22.6	28.7	26.2	0.45
		22.6	28.7	16.4	0.26
		22.6	28.3	22.4	0.29
	End	22.5	28.7	23.6	0.32
		22.5	28.7	27.4	0.46
		22.5	28.7	21.6	0.37
	Mean value	22.6	28.7	22.3	0.34

Appendix 1 :list of the viable organisms of 10~50μm in minimum dimension

Bacillariophyta
Cyclotella sp. （105）
Cyclotella striata （5）
Melosira sp.
Eucampia zoodiacus （20）
Chaetoceros curvisetus
Cerataulina sp.
Pinnularia sp.
Asterionellopsis glacialis
Navicula sp.
Amphora commutata
Amphora sp.
Coscinodiscus minor
Coscinodiscus marginato-lineatus
Coscinodiscus decrescens
Coscinodiscus subtilis
Coscinodiscus sp.
Biddulphia sp.
Actynoptychus undulatus
Rhizosolenia sinensis
Skeletonema costatum
Licmophora sp.
Thalassionema nitzschioides
Pinnularia microstauron
Leptocylindrus danicus
Ditylum brightwellii
Pyrrophyta
Alexandrium tamarense
Alexandrium affine
Alexandrium sp.
Prorocentrum triestinum
Prorocentrum minimum
Prorocentrum micans
Lingulodinium polyedrum （50）
Peridinium thorianum
Peridinium sp.
Dinophysis acuminata
Gonyaulax spinifera
Gonyaulax sp.
Peridinium achromaticum （10）

Chlorophyta *Platymonas* sp. *Pediastrum* sp. *Scenedesmus quadricanda*
Chrysophyta *Dictyocha fibula* *Dictyocha speculum* var. *octonarium*
Protozoa *Ciliophora* sp. （16） *Tintionnopsis* sp.

Note : the number in the bracket following the plankton name represents the density of organisms in influent water(unit: cell/mL)

Appendix 2 : list of organisms of ≥ 50μm in minimum dimension

Arthropoda Copepodid larva Nauplius（40800） *Paracalanus* sp. （31800） *Oithona* sp. （5400） *Corycaeus* sp. （960） *Acartiaclausi* sp. （600） *Limnoithona tetraspin*a（480）
Rotifera *Notholca* sp.
Bacillariophyta 属 *Coscinodiscus* sp. （2520）
Chaetognatha *Sagitta* sp. （450）
Pyrrophyta *Ceratium tripos* Pleurosigma *Peridinium* sp.

Note : the number in the bracket following the plankton name represents the density of organisms in influent water(unit:ind/m^3)