No. SHOU-JPMT-2013004

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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5. Any questions on the report should be raised to the test organization within 15 days from the date you receive the report and the overdue is inadmissible.

6. Test results only indicate this sampling.

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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-2013004

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-016A1~A18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-14 2013-07-17	**Test date**	2013-07-14~2013-08-13
Sampling location	**Uptake**: Qingdao harbor , Shandong Province, ship: Shu nan No.328 **Discharge**: Chaoyang Harbor, Shandong Province, Ship: Shu nan 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**	485.00	610.00	150.00	0.40
					0.45
					0.60
	Middle	830.00	124.00	102.00	0.90
					0.25
					0.05
	End	940.00	815.00	201.00	0.15
					0.15
					0.25
	Mean value	751.67	516.33	151.00	0.36
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-2013004

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-016B1~B18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-14 2013-07-17	**Test date**	2013-07-14~2013-08-13
Sampling location	**Uptake:** Qingdao harbor , Shandong Province, ship: Shu nan No.328 **Discharge**: Chaoyang Harbor, Shandong Province, Ship: Shu nan 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**	2.33×10^4	2.10×10^4	4.26×10^4	3.00
					2.00
					3.00
	Middle	2.49×10^4	2.26×10^4	3.99×10^4	4.00
					4.00
					3.00
	End	2.56×10^4	2.42×10^4	5.11×10^4	1.00
					5.00
					3.00
	Mean value	2.46×10^4	2.26×10^4	4.45×10^4	3.11
Remarks	Shipboard test to OceanDoctor BWMS (500m^3/h)				

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

Ballast Water Detecting Lab of Shanghai Ocean University

Test report of bacteria test

No. SHOU-JPMT-2013004

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-016C1~C18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-14 2013-07-17	**Test date**	2013-07-14~2013-08-13
Sampling location	**Uptake**: Qingdao harbor , Shandong Province, ship: Shu nan No.328 **Discharge**: Chaoyang Harbor, Shandong Province, Ship: Shu nan 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:** Wa Haixian **Approved by:** Xue Junzeng

Wang Qiong

Ballast Water Detecting Lab of Shanghai Ocean University

Test report of bacteria test

No. SHOU-JPMT-2013004

Name	Sampling phase	Uptake S-1	Control uptake S-2	Control discharge S-4	Treated discharge S-3
Heterotrophic bacteria (cfu/mL)	Beginning	3.4×10^5	2.1×10^6	9.1×10^4	1.1×10^3
					230
					900
	Middle	2.5×10^6	2.7×10^6	7.4×10^5	420
					400
					220
	End	2.1×10^6	3.3×10^6	6.0×10^5	730
					640
					630
	Mean value	1.6×10^6	2.7×10^6	4.8×10^5	585.6
Escherichia coli (cfu/100mL)	Beginning	2.1×10^6	3.7×10^6	7.8×10^6	24
					26
					47
	Middle	3.1×10^6	2.1×10^6	4.3×10^5	20
					22
					26
	End	7.9×10^6	3.9×10^6	2.5×10^5	17
					19
					29
	Mean value	4.4×10^6	3.2×10^6	2.8×10^6	25.6
Intestinal Enterococci (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
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-2013004

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-016D1~D18
Sample	seawater	**Sampling personnel**	Liu liang,Yuan lin, Jiang jianfei,Guo zhangwei
Sample delivery date	2013-07-14 2013-07-17	**Test date**	2013-07-14~2013-08-13
Sampling location	**Uptake**: Qingdao harbor , Shandong Province, ship: Shu nan No.328 **Discharge**: Chaoyang Harbor, Shandong Province, Ship: Shu nan 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 Liuqiqun **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-2013004

Sampling point	Time phase	Temperature (℃)	Salinity (PSU)	TSS (mg/L)	POC (mg/L)
Uptake S-1	Beginning	22.4	30.6	31.0	0.67
	Middle	22.0	30.5	35.4	0.75
	End	21.9	30.5	35.4	0.72
	Mean value	22.1	30.5	33.9	0.71
Control uptake S-2	Beginning	21.9	30.6	22.4	0.61
	Middle	21.8	30.6	23.6	0.57
	End	21.7	30.8	30.4	0.71
	Mean value	21.8	30.7	25.5	0.63
Control discharge S-4	Beginning	22.4	30.6	32.4	0.49
	Middle	22.0	30.5	23.6	0.44
	End	21.9	30.5	28.8	0.43
	Mean value	22.1	30.5	28.3	0.45
Treated dischargeS-3	Beginning	21.9	29.1	18.8	0.42
		21.6	29.5	11.6	0.40
		21.6	29.4	19.0	0.33
	Middle	21.4	29.4	13.6	0.28
		21.4	29.4	15.0	0.39
		21.3	29.5	15.6	0.39
	End	21.3	29.5	15.6	0.39
		21.3	29.5	13.6	0.45
		21.3	29.5	11.6	0.42
	Mean value	21.5	29.4	14.9	0.39

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

Bacillariophyta *Eucampia zoodiacus* （230） *Hemiaulus hauckii* （195） *Coscinodiscus* sp. （5） *Chaetoceros debilis* （15） *Cerataulina pelagica* （10） *Chaetoceros affinis* *Cyclotella striata* *Diploneis bombus* *Skeletonema costatum*
Chrysophyta *Dictyocha fibula* （5） *Dictyocha speculum var. octonarium*
Pyrrophyta *Dinophysis acuminate* （20） *Gonyaulax verior* *Prorocentrum sigmoides* （5） *Prorocentrum sp.* Dinoflagellate cyst

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（2070） *Paracalanus* sp. （3840） *Microsetella norvegica*（120） *Oithona* sp. （1560） *Corycaeus* sp. （990） *Tisbe furcate*（600） *Calanus sinicus*（120） *Acartiaclausi* sp. （480）
Bacillariophyta *Coscinodiscus* sp. （5160）
Rotifera *Notholca* sp.
Annelida *Sabellaria* sp.
Chaetognatha *Sagitta* sp.
Pyrrophyta Ceratium tripos *Pleurosigma* sp. *Peridinium* sp. （8250） *Ceratium furca*（90） *Ceratium fusus*

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