



WUXI BRIGHTSKY ELECTRONIC CO. LTD.

2020

Marine Products

Address: Luoshe Town, Huishan
District, Wuxi City, Jiangsu

CONTENTS

01

Company Introduction

02

Ballast Water Management System

03

Marine Fire Alarm System

04

Voyage Data Record

PART

1

Company Introduction





Company Introduction



Wuxi Brightsky Electronic Co., Ltd.

1995 Founded

Jiangsu Famous Trademark

Respect Contracts And Keep Promises

Undertake National Torch Plan Project

Undertake National 863 Projects

Undertake Key Projects Of Jiangsu Science

296 Employees with graduate workstation

National High-Tech Enterprises

Bank Credit AAA Rating



Company Introduction



Floor Space: 27000m² Build Space: 52000m²

■ Main Product

Automatic Fire Alarm System

Automatic Gas Extinguishing System

Ballast Water Management System

Voyage Data Record (VDR)



Company Introduction

Factory



Saddle Automatic Cutting



Robot Welding



Environmental Test Facility



Research Institute



Flange pipe
Automatic
Welding



PART

2

Ballast Water Management System





BSKY™

Ballast Water Management System

Enhanced Physical Treatment (EPT) Technology with No Clogging Separation Unit

Brightsky (BSKY) is the only one in the world creating high efficient Hydrocyclone for BWMS

- No Maintenance
- No Replacement
- No Clogging

High reliability

- No one think sieve type filter wouldn't be clogged
- Who can assure a life time of filter under stringent condition?





Type Approval Certificate

Approved:



On Going:





Patent Certificate



Win

National key new product certificate

High-tech product identification certificate

Patent of invention

- China (Patent No.: 2010800041745)
- USA (Patent No.: 9181109)
- Europ (Patent No.: 2412627)
- Japan (Patent No.: 5780609)
- Korea (Patent No.: 10-0947558)
- EPT (PCT/CN2010/07750)





Unique Sell Point

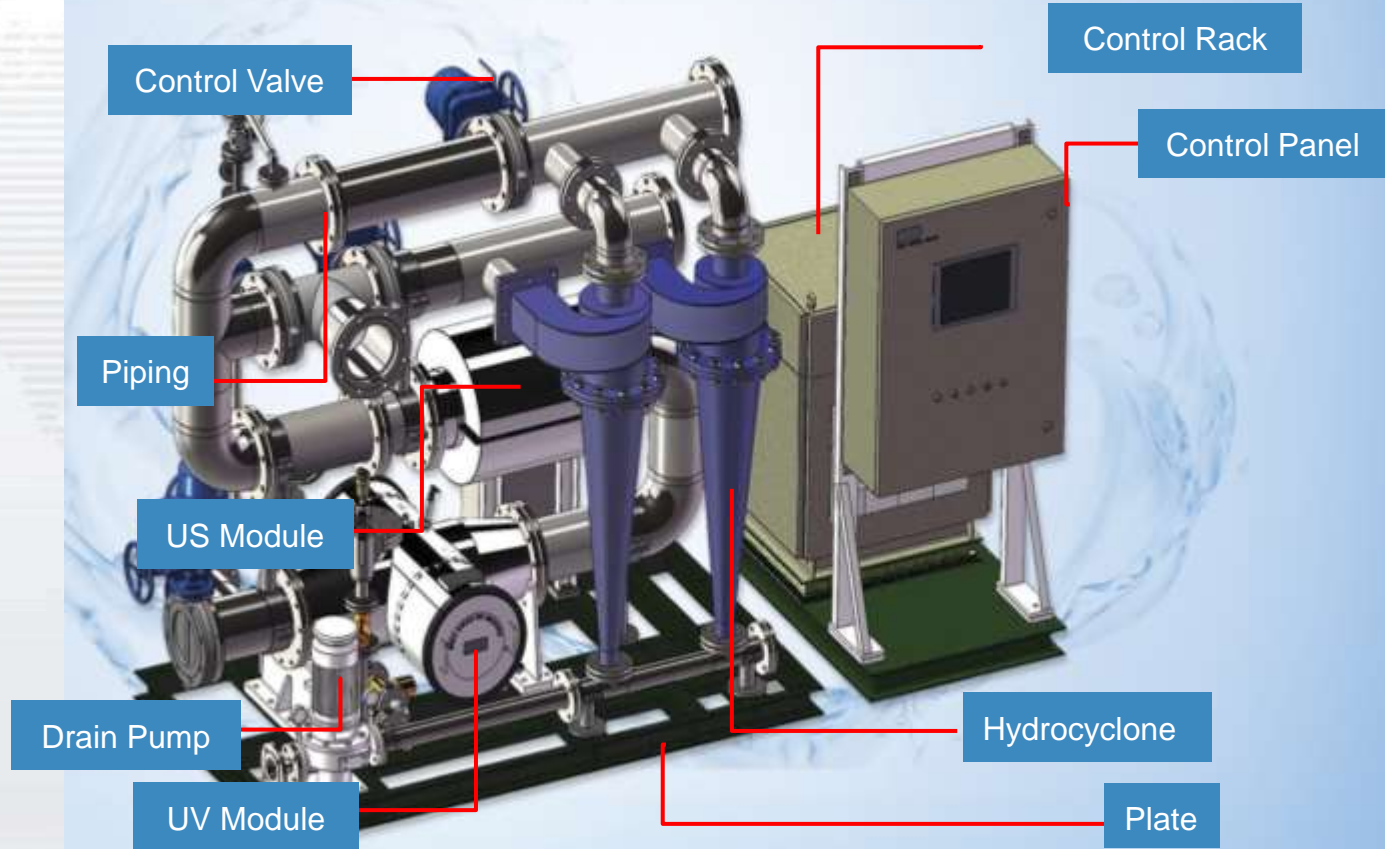
■ Enhanced Physical Treatment

Ultrasonic

Ultraviolet sterilization

■ Solving the blockage of traditional filters

Hydrocyclone Technology

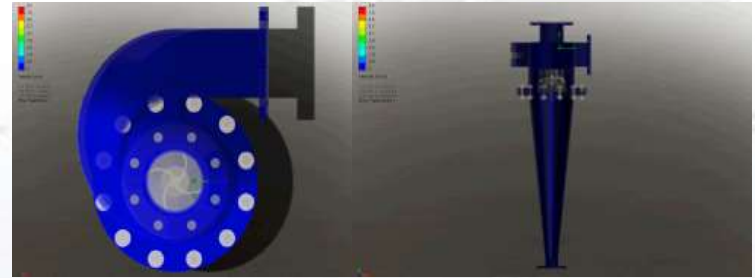




Characteristic-Hydrocyclone & Filter Comparison

The biggest worry for ship owners--Filter clogging problem

- The size of sieve in the filter of all ballast water treatment device is 20–50 μ m, less than the diameter of hair, therefore, the clogging problem is a trouble to all users.
- Filamentous, flocculent or trichosporon kinds marine microbe easily cling to a gap between protective mesh and filter screen, it causes terrible inconvenience during back flushing.
- In case ship's draft line is deep, a lot of mud and sand will be sucked from sea chest, it would clog the filter.
- This kind of a minute and fine filter brings big resistance to water flow, and it requires very high pressure to discharge water through the filter, which causes great pressure loss of ballast water pipe and great equipment pressure loss.



Revolutionary breakthrough--Hydrocyclone technology replaces traditional filters

- | | | |
|--|--|--|
| No mesh No maintenance part Simple expension | Noiseless High-and duplex stainless steel Distributed installation | No moving parts No service time limit Can be tilted for no more than 45 degrees to install |
|--|--|--|



10 μm
Outer wedge-shaped metal anti-flow mesh
Middle metal protective mesh
20-50 μm filter seat
Inner metal protective mesh

Stagnant water in the filter makes marine lives grow and adhere to the filter, a back flushing has no effect whatever at all.

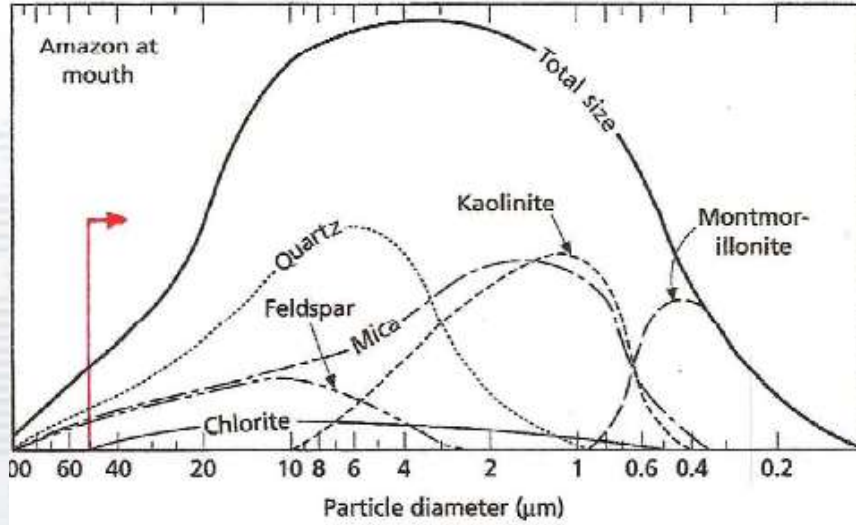
Before cleaning After cleaning

Filamentous or strip organisms hard to be cleaned become the main clogging source.

Manual cleaning sootie after backwashing fails



Characteristic-Hydrocyclone & Filter Comparison



Comparison of water samples before and after hydraulic spin separation

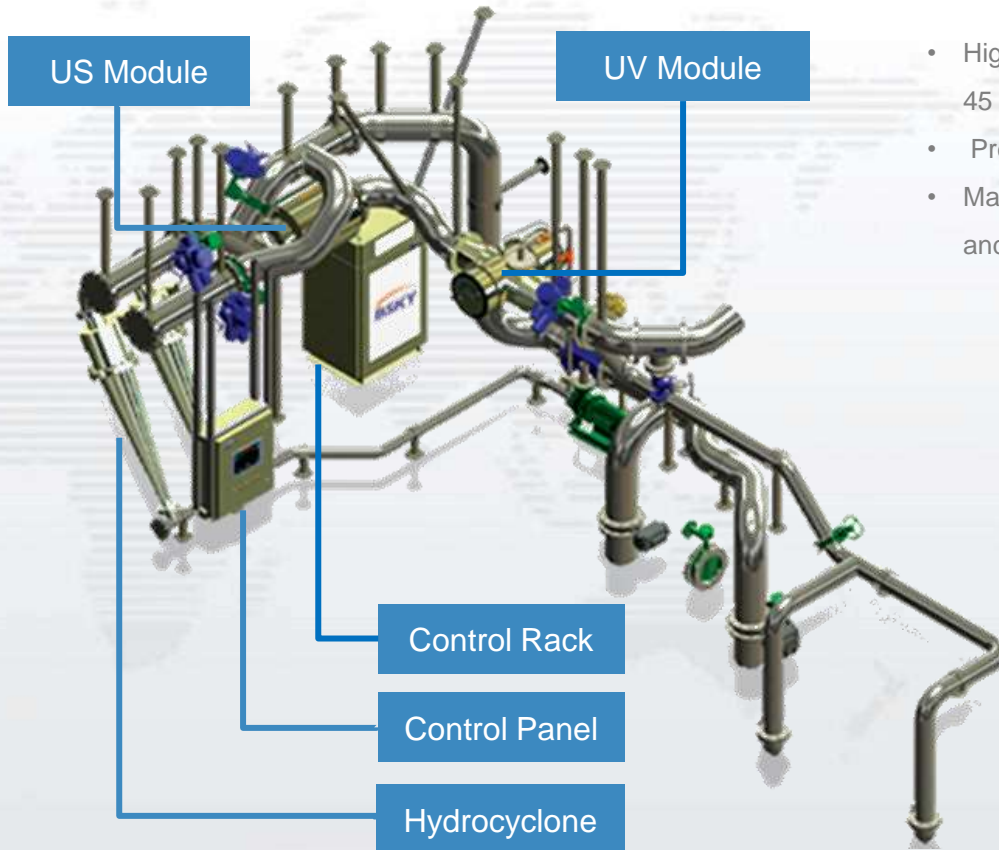
Filtration Effect

- ≥ 50 microbes and solid particles: 98%
- 20~50 microbes and solid particles: 95%
- Superstrong sediment filtration capacity



Bilge sediment

Characteristic-Hydrocyclone & Filter Comparison

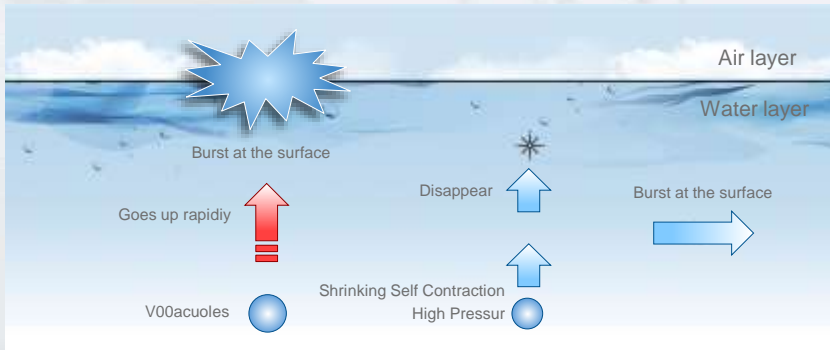


- High utilization of mounting space: tilted mounting, up to 45 degrees, side plate space between keels
- Pressure loss: ≤ 0.6 Bar
- Maintenance-free: no backwash and other transmission and power consumption mechanism





■ US Module



US Efficiency :

- The ultrasonic cavitation effect produces a high temperature of 1900-5200K and a high pressure of over 500atm. The temperature change rate is as high as 109 K / s, accompanied by a strong shock wave and a micro-jet with a speed of 110 m / s. This extreme condition is conducive to the degradation of organic pollutants in the water body.
- Suitable for a wider range of UVT, UV sterilization is the best companion
- System cleaning function
- Biological wall breaking efficiency

Targeted Special Design::

- Parallel field theory is designed to maximize efficiency
- Prolonging the Service Life of Duplex stainless Steel Module
- Customized ultrasonic oscillators and generators for ship applications
- The life of cavitation is very short Time $\leq 10^{-9}$ ns, which is not harmful to the environment and human body.



■ UV Module



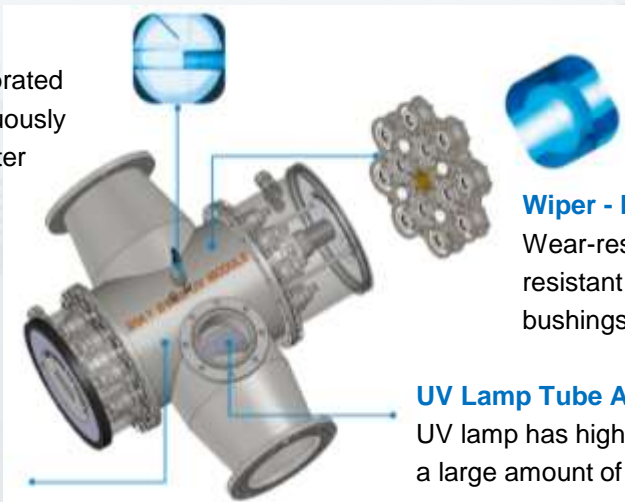
- UV reactor-floating fixed value tracking technology, which does not affect the intensity of UV and maximum utilization of energy efficiency with the change of water flow rate and turbidity
- Medium-voltage UV lamp with simple structure, wide spectrum radiation range, high intensity and most suitable ballast water treatment technology
- All lamp working status real-time monitoring, including: lamp number, UV dose, lamp operating time, and UV output, maintenance, alarm and other functions

UV Sensor

Integrated and strictly calibrated UV sensors can be continuously controlled according to water erosion

UV Radiation Chamber

Dual-phase stainless steel material, containing UV lamp, quartz casing, lamp cleaning device, UV sensor, temperature sensor.



Wiper - Mechanical Cleaning Device

Wear-resistant and high temperature resistant materials will not scratch quartz bushings.

UV Lamp Tube And Quartz Tube

UV lamp has high-quality quartz casing protection, will a large amount of ultraviolet light to income



Characteristic-Control System

- Intelligent control, one click to start and stop
- Intelligent switching of Ballast pump Servo tracking
- Real-time monitoring of UV lamp, UV lamp cleaning device
- Color LCD touch screen, rich operating interface, Chinese, English, Japanese and Korean languages
- Maintenance operation prompt in real time
- All information stored for 5 years



BSKY_CON_R Control Panel



BSKY_CON Control Panel



Control Rack

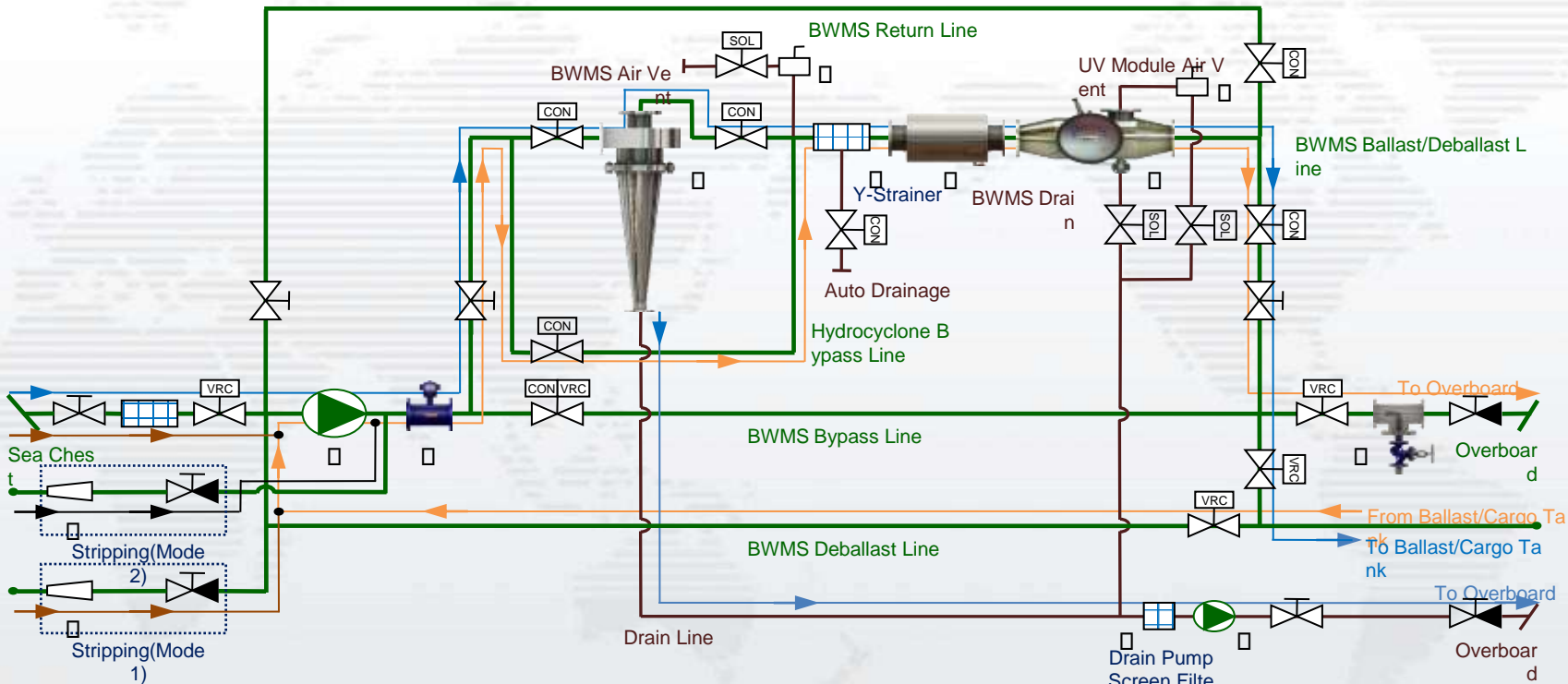


Characteristic-Control System





Diagram

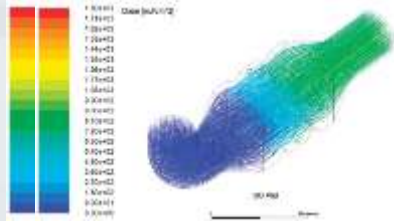
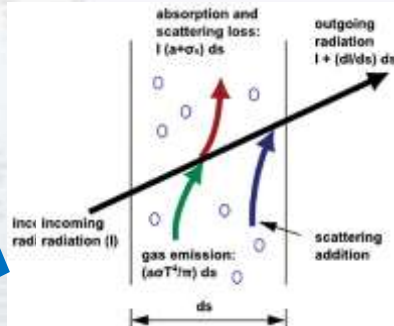
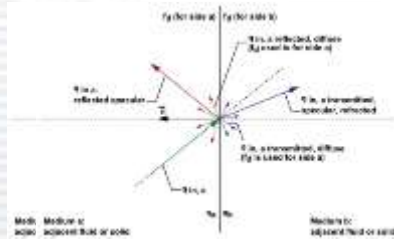


- | | | | |
|---|--|-------------------------------------|---|
| Ballasting | Deballasting & Stripping | Stripping Mode 1 (Stripping only) | Stripping Mode 2 (Stripping only) |
| <input type="checkbox"/> Sea Chest Strainer | <input type="checkbox"/> Ballast Pump | <input type="checkbox"/> Flowmeter | <input type="checkbox"/> Hydrocyclone Prefilter |
| <input type="checkbox"/> UV Module | <input type="checkbox"/> Y-Strainer(3mm) | <input type="checkbox"/> Drain Pump | <input type="checkbox"/> US Prefilter |
| <input type="checkbox"/> Air Vent | <input type="checkbox"/> Circular Screen Filter(6mm) | | <input type="checkbox"/> Eductor |



Advanced UV reactor design

By simulating each particle of the fluid in the cavity of the UV reactor, a consistent dose of UV radiation was obtained. The new generation UV reactor has been improved by 1.45 times in ultraviolet energy utilization, and it has been tested by USCG and IMO NEW G8 guidelines, and the results are very satisfactory.





Test Report On Update And Development

Test Report

Korea Marine Equipment Research Institute

Report No. KOMERI-096-072480
435, Heungdeok-ro, Yeongju-si, Gyeongsangbuk-do, 710-710, Korea
Tel +82-53-430-5000, Fax +82-53-430-5008

Name Korea Marine Equipment Research Institute



1. Applicant

- Company Name : WUXI BRIGHTSKY ELECTRONIC CO., LTD.
- Address : Lianhua Town, Wuxi City, Jiang-Su Province, P.R.China
- Date of Receipt : 2017. 07. 26



2. Equipment under Test

- Name of Product : Ballast Water Management System
- Model : BSKY300

Serial No. : -

3. Test Standards : Refer to 'I.2 TEST STANDARD'

4. Use of Report : Performance check

5. Test Period : 2017. 08. 30 ~ 2017. 08. 31

6. Environment : Temperature : (22 ± 4) °C, Humidity : (61 ± 10) % RH

7. Test Result : Refer to 'I.6 TEST RESULT'

The result shown in this test report refers only to the equipment tested unless otherwise stated.

| | | |
|----------|-------------------------------|-----------------------------------|
| Approved | Tested by Name : 최승영 KIC: 김희정 | Technical Manager Name : 이만혁 Yang |
|----------|-------------------------------|-----------------------------------|

The test results are valid only for the test equipment provided by the applicant, and cannot be reproduced in full or in part without the prior written consent of the KOMERI.

Date of Issue : 2017. 09. 27

The President of Korea Marine Equipment Research Institute: 김희정

Korea Marine Equipment Research Institute

Report No. KOMERI-096-072480
435, Heungdeok-ro, Yeongju-si, Gyeongsangbuk-do, 710-710, Korea
Tel +82-53-430-5000, Fax +82-53-430-5008

Name Korea Marine Equipment Research Institute



I.2 de-Ballasting mode (2017. 08. 20)

(1) Water parameter in the discharge treated water

| Temp. (°C) | pH | Salinity (PSU) | DO (mg/L) | Turbidity (NTU) | Transmittance (%) |
|--------------|-------------|----------------|-------------|-----------------|-------------------|
| 28.02 ± 0.02 | 8.91 ± 0.03 | 32.82 ± 0.03 | 4.12 ± 0.03 | 1.9 ± 0.06 | 64.2 ± 0.33 |

| TSS (mg/L) | BOD (mg/L) | COD (mg/L) | DBP (mg/L) | PM (mg/L) | MM (mg/L) |
|------------|------------|------------|------------|-------------|------------|
| 0.0 ± 0.1 | 0.4 ± 0.08 | 1.9 ± 0.43 | 1.4 ± 0.38 | 0.02 ± 0.43 | 0.7 ± 0.47 |

(2) Living organisms in the discharge treated water

| Organisms > 10 μm (Ind./m ³) | ≥ 10 μm and < 50 μm organisms (Ind./m ³) | | Heterotrophic bacteria (CFU/ml) | |
|--|--|-----------|---------------------------------|---------------|
| | IMO | USCG | Salt watered E. coli | Marine spp. |
| 0.0 ± 0.0 | 0.0 ± 0.0 | 0.0 ± 0.0 | 3.000 ± 1.430 | 2.000 ± 1.870 |

| Codium (CFU/100 ml) | Salinivora (CFU/100 ml) | Infectum (CFU/100 ml) | Thalassia (Ind./100 ml) |
|---------------------|-------------------------|-----------------------|-------------------------|
| 0.0 ± 0.0 | 1 ± 1 | 0 ± 0 | 0.0 |

*Data includes an estimate based on data obtained at the beginning, middle, and end of each 15-minute test period.

**See Annex

-The end-

Korea Marine Equipment Research Institute

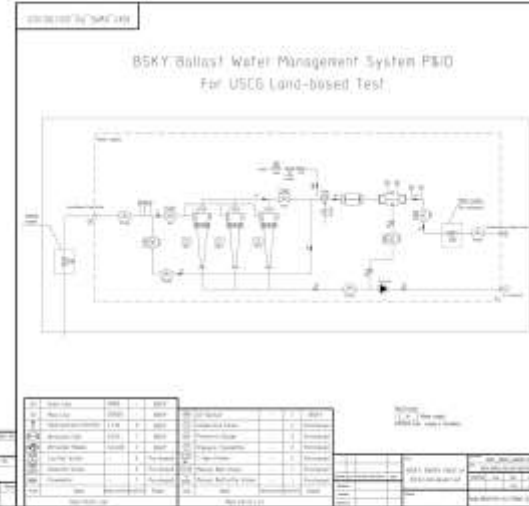
Report No. KOMERI-096-072480
435, Heungdeok-ro, Yeongju-si, Gyeongsangbuk-do, 710-710, Korea
Tel +82-53-430-5000, Fax +82-53-430-5008

Name Korea Marine Equipment Research Institute



ATTACHMENT

I. DRAWING





Comparison Of Different Products And Technologies

| Technologies | Advantages | Disadvantages |
|--|--|--|
| Filter+Electrolysis Filter+Electrocatalysis | Low power consumption under high salinity conditions | Not suit for fresh water, and power consumption increases sharply under the condition of low salinity. Need to add chemical neutralizer to ballast tank; The byproducts bring hidden trouble to the pipeline and hull; Dangerous gas escape may cause explosion; High maintenance cost: filter element replacement of TRO reagent, electrode replacement (for electrolysis) |
| Filter+Deoxidation (Inert Gas) | Low power consumption Suitable for any salinity condition | Using ultrafiltration or membrane filtration technology, it is easy to plug; The ballast tank needs to maintain a certain pressure so that the inert gas is saturated and dissolved into the water, so that the hull bears more stress than under normal conditions. Since the pressure in ballast tank will cause the original level sensor to fail, it needs to be adjusted again and will fail again with the change of the holding pressure. Need to introduce the Sui gas pipe into the power chamber alone, the construction is complicated and the volume is very large. |
| Filter+Chemical Method | Simple equipment with lower price Low power consumption Suitable for any salinity condition | Need to carry chemicals and have a special storage room; The pump precision of neutralizer is very high, and the treatment of residue is troublesome. TRO reagent is expensive; |
| Filter+Ultraviolet | Physical treatment, no secondary pollution, no need to add any neutralizer, suitable for any salinity conditions | Compared with electrolysis and chemistry, the power consumption is high. UV lamp tube is consumable, about 3-5 years replacement |



Case Study

| | | | |
|-----------------------|-----------------------------|--|------------------------------|
| Ship Owner | China | Malaysia | Singapore |
| Ship Type | Bulk Carrier | 7K PC | LPG Carrier |
| Pump Capacity | 1000m ³ / h x 2 | 200m ³ / h x 2 100m ³ / h x 2 | 300m ³ / h x 2 |
| Model | BSKY1000x2 set Skid Type | BSKY400EX x 1 BSKY100 x 1 | BSKY300 x 1 set Skid Type |
| Installation Location | Engine Room | Pump Room Engine Room | Engine Room |
| Shipyards | China | China | Japan |
| Class | DNV | ABS | BV |





Case Study

| | | | |
|-----------------------|------------------------------|---------------------------|------------------------------|
| Ship Owner | Korea | Japan | Singapore |
| Ship Type | Container | Cement Carrier | LPG Carrier |
| Pump Capacity | 300m ³ / h x 2 | 200m ³ / h x 2 | 300m ³ / h x 2 |
| Model | BSKY300 x 1 set Skid Type | BSKY 400 x 1 Skid Type | BSKY300 x 1 set Skid Type |
| Installation Location | Engine Room | Engine Room | Engine Room |
| Shipyards | Korea | Japan | Japan |
| Class | KR | NK | BV |






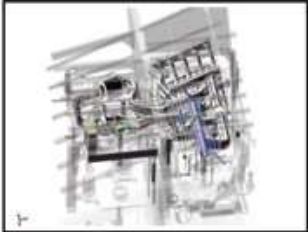
Case Study



| | | | |
|-----------------------|------------------------------|----------------------------|------------------------------|
| Ship Owner | Germany | Germany | Greece |
| Ship Type | Container | Bulk Carrier | LEG Carrier |
| Pump Capacity | 500m ³ / h x 2 | 700m ³ / h x 2 | 150m ³ / h x 2 |
| Model | BSKY500 x 1 set Skid Type | BSKY 700 x 2 BSkid Type | BSKY250 x 1 set Skid Type |
| Installation Location | Engine Room | Engine Room | Engine Room |
| Shipyard | China | China | Korea |
| Class | GL | LR | DNV |






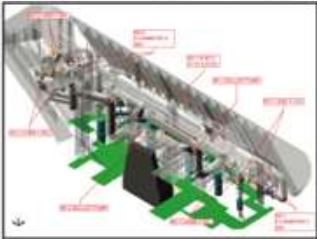
Case Study



| | | | |
|---|---|-----------------------|---------------------------|
|  |  | Ship Owner | MOL(Japan) |
| | | Ship Type | VLGC |
| | | Pump Capa. | 750m ³ / h x 2 |
| | | Model | BSKY1500Ex x 1 set |
| | | Installation Location | Engine Room |

| | | | |
|---|---|-----------------------|---------------------------|
|  |  | Ship Owner | Carl Buettner (Germany) |
| | | Ship Type | Chemical Tanker |
| | | Pump Capa. | 450m ³ / h x 2 |
| | | Model | BSKY500Ex x 1 set |
| | | Installation Location | On Deck |



Case Study

| | | | |
|---|---|-----------------------|------------------------------------|
|  |  | Ship Owner | DCKK(Japan) |
| | | Ship Type | 95K Bulk Carrier |
| | | Pump Capa. | 2000m ³ / h x 2 (Framo) |
| | | Model | BSKY2000 x 2 set |
| | | Installation Location | Engine Room |

| | | | |
|---|---|-----------------------|----------------------------------|
|  |  | Ship Owner | CP Offen(Germany) |
| | | Ship Type | 4100TEU Container |
| | | Pump Capa. | 500m ³ / h x 2(Framo) |
| | | Model | BSKY500 x 1 set(Skid) |
| | | Installation Location | Engine Room |



1. BSKY™ BWMS Maintenance Cycle

| Parts | Name | Life |
|-----------|-------------------------------------|--------------------------|
| UV Module | UV Lamp & Quartz Sleeve Replacement | Running 5000h Or 3 years |
| US Module | Periodic inspection and maintenance | Running 8000h Or 5 years |

2. BSKY™ BWMS Maintenance Cost : 500[m3/hr]

| Parts | Name | Q'ty | Cost |
|-----------|-------------------------|---------|--------------|
| UV Module | UV Lamp & Quartz Sleeve | 12 sets | US\$8,000/3Y |
| US Module | US Generator | 1sets | US\$3,000/5Y |

※ USD3,300 / Year



3. BWMS Operation Cost Comparison : 500[m³/hr]

| BSKY | Filter+UV | Filter+Electrolyze |
|---|---|--|
| <ul style="list-style-type: none">•UV Lamp•Quartz Sleeve•US Generator | <ul style="list-style-type: none">•Filter Element、 Filter Mesh•UV Lamp•Quartz Sleeve•Cleaning System | <ul style="list-style-type: none">•Filter Element、 Filter Mesh•Electrode•Neutralizer•TRO Test Kit |
| US\$3,300/1Y | 6,640+α USD/Y | 26,720+α USD/Y |

4. Operation Cost Calculation Basis

- Filter Element : 800~1,000\$/Y (Screen Filter)
- Electrode : 20,000~30,000\$/Y (Normal DSA electrode)
- Neutralize(Na₂S₂O₃) : 1.5\$/kg/1,000t, Dosage quantity 5.29~22kg/1,000t
- Residue oxide detection reagent : 5,000\$/Y(450\$/EA x 12EA)
- Cleaning Liquid: 2,500\$/Y (2.5\$/kg x 1,000kg/Y)
- UV Lamp : 470\$/EA / Quartz Sleeve: 200\$/EA



Global Service Network



| 国家 | 公司名称 | 负责人 | 电话 | 邮箱 |
|------------|--|--------------------|----------------------|--------------------------------|
| China | Guangzhou Shunhai life saving appliances Co., Ltd. | Mr.L.H.Chen | 86 2062801063 | shunhai@public.guangzhou.gd.cn |
| Japan | Nagasaki Marine Service Co., Ltd. | Mr. Nishimura | 81 95 814 1263 | nishimura@nmsco.co.jp |
| | Kunimori Engineering Works Co., Ltd. | Mr. Liu pingjian | 81 3 3437 5022 | liu@kunimori.co.jp |
| | Unitra Maritime Co., Ltd | Mr. Shu Tsuyoshi | 81 3 35957671 | shu@unitra.co.jp |
| Singapore | Bosung Engineering (Singapore) Ltd. | Mr. Steve Ho | 65 9666 3188 | steve.ho@gcd.com.sg |
| | Seadragon Technologies Pte Ltd | Mr. Wilson Wang | 65 63165830 | sdtech@singnet.com.sg |
| India | NCGB Marine Private Limited | Mr. S. S. Bosse | 91 22 6529 4618 | ssbose@ncgb.co.in |
| OMAN | Tile Marine Oman | Mr. Michael Loh | 968 2478 5818 | omanops@tilemarine.com |
| Thailand | Asian Marine Services P.C. Ltd. | Mr. Jirapon | 66 2 8152060 | mkd@asimar.com |
| | JS Maritime | Mr. Colin SEO | 66 2 320 7702~4 | mail@jsmaritime.com |
| Greece | Advanced Marine Solutions | Mr. E. Zachariakis | 30 210 96 27 185 | Info@amarsolutions.gr |
| Germany | Bosung Engineering Hamburg | Mr. James Jung | 49 40 2385 7710 | hamburg@bosung.com |
| Denmark | DME | Mr. Palle | 45 78 78 92 43 | pdk@dmeas.com |
| Finland | PACE1 Tools Ltd | Mr. Jukka Jokinen | 358 207 871 730 | jukka.jokinen@pace1tools.com |
| Netherland | STX Europe | Mr. Saverio Bae | 31 88 451 2020 | shbae@onestx.com |
| Turkey | CT Global Solution Partnership | Mr. B.Serdar Arduc | 90 (212) 777 7241~42 | serdar@marinect.com |
| USA | L.A. Maritime LA | Mr. Dieter Liebich | 1 (310) 518 1718 | dl@la-maritime.com |
| | L.A. Maritime New York | Mr. Tom | 1 310 518 1718 | info@la-maritime.com |
| | L.A. Maritime Huston | Mr. Hans Haneveld | 1 832 582 7547 | hh@gc-maritime.com |
| Canada | L.A. Maritime Vancouver | Mr. Pettzo | 1 310 518 1718 | info@la-maritime.com |
| Brazil | STX Brazil Ltda. | Mr. Mateo | 55 21 2543 4447 | ryan.jun@onestx.com |



Solution For Retrofit





Solution For Retrofit

01 Communication

02 Project Analysis

03 Project Design

04 Manufacture

05 Installation

06 Training & Service



- Vessel Information
- Configuration
- Installation
- Onboard Inspection
- Technical agreement



- Installation Period Analysis
- Cost Analysis



- Drawing approved by Class
- Drawing approved by Owner / shipyard
- Production Drawing
- Working Drawing



- Production Plan
- Purchasing Material
- BWMS Production
- Factory Acceptance test
- Delivery with owner / shipyard

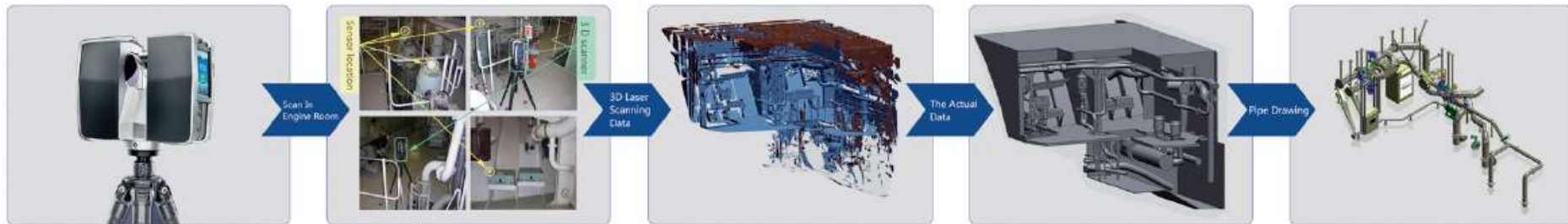


- Dry-docking
- Modify Ballast Pipe Line
- Install BWMS
- Trial Test
- Onboard Test with Class / Owner



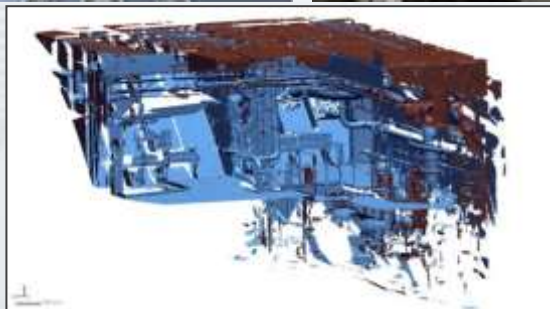
- Ship Crew Training
- Normal Operation
- Regular Visiting

Reverse engineering technology (3D Scanning) can improve the accuracy of locating the parts and pre-fitting of pipes during the installation of BWMS for ships in service, also it has the advantage of saving the time and the waste of the pipes.

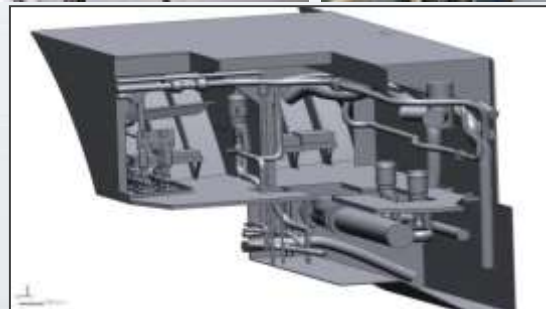




Solution For Retrofit--3D Scanning



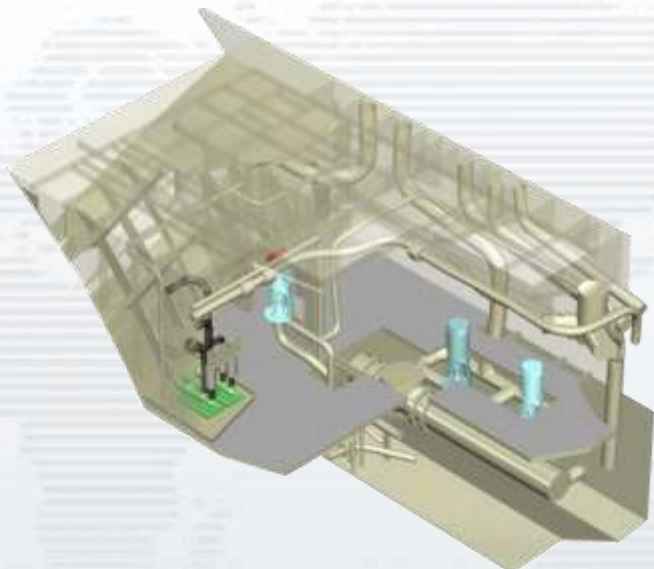
3D Mesh Data from Scanner



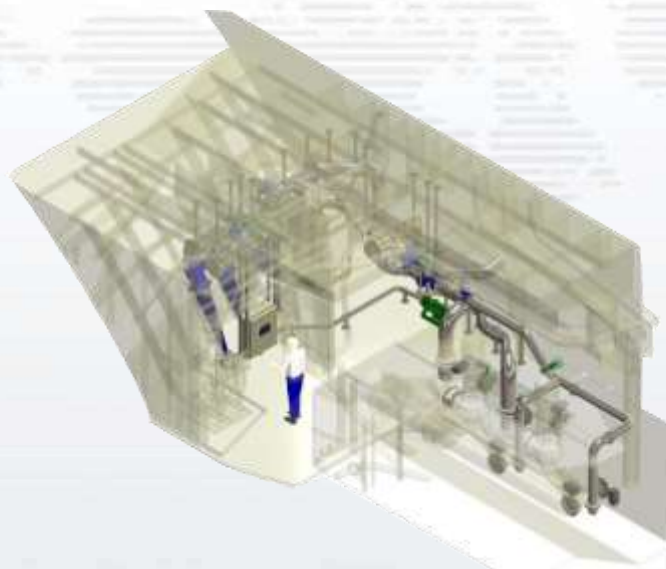
3D Solid Data by Transform



Solution For Retrofit--Model Desining



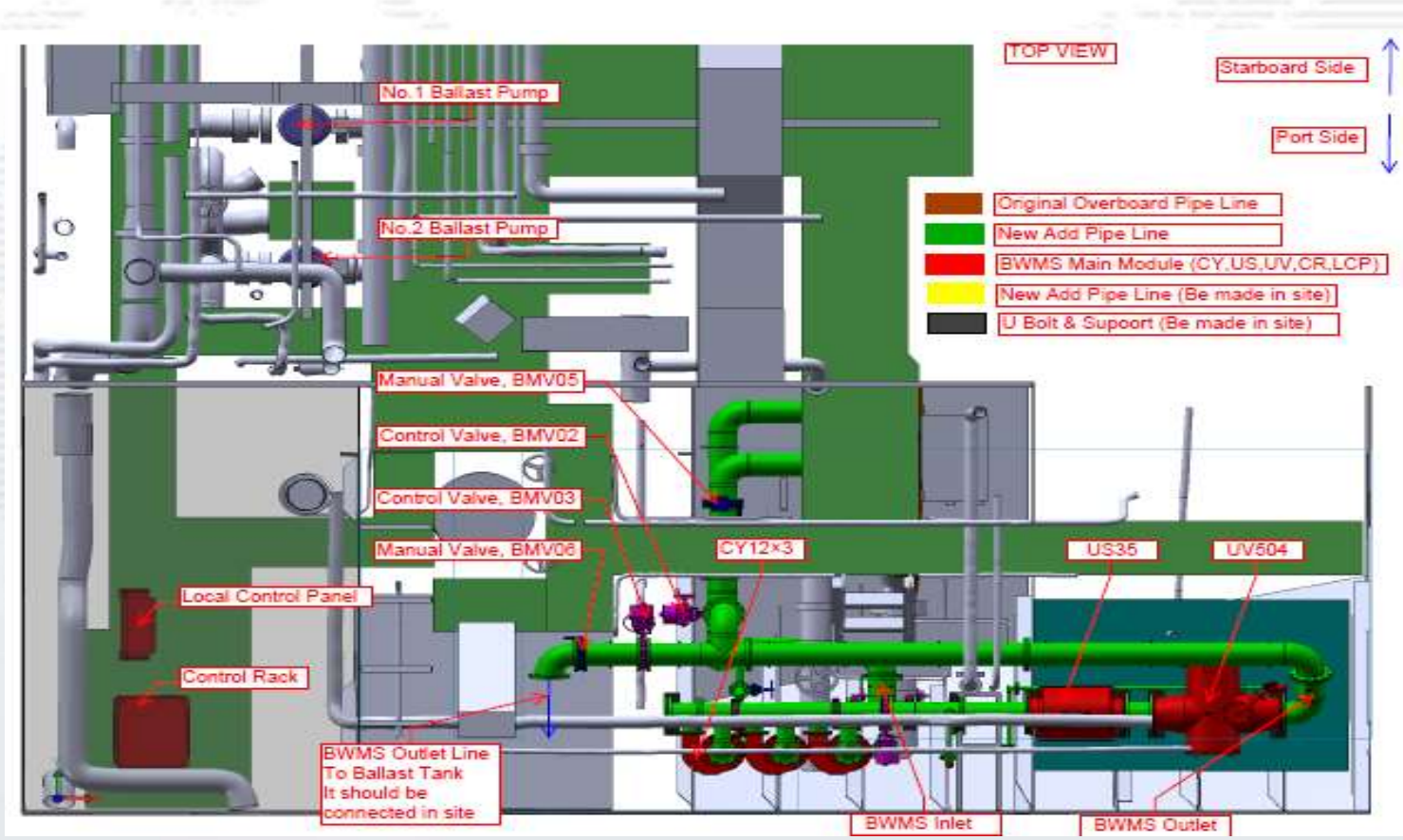
Before Installation



After Installation



Solution For Retrofit--Installation Plan





Solution For Retrofit--Bill Of Material

1-10-0-D

规格/Specification

1. 型号/Type BSKY530
2. 处理量/Rate Treated Capacity : 500 m³/h
3. 功率/Power Consumption : 363 kW
4. 重量/Weight : 23545 kg
5. 额定工作压力/Max Working Pressure : 0.5 MPa
6. 额定电压/Max Voltage Type SCW 380V/ 11315-2000
7. 控制柜/Control Panel Type SCW 6E/T 11315-2000
8. 备注/Remarks: 本设备所有材料均由业主提供, 业主应提供材料清单, 且所有 BSKY 壳体及室外管道、阀门均由业主提供, 且由业主负责提供材料清单及图纸。

| 物料号 | 物料名称 | 数量 | 单位 | 备注 |
|-----|-------------------------------------|----|----|----------|
| 25 | 管法兰/Blind Flange DN60 | 1 | 20 | -- -- -- |
| 30 | 管法兰/Slip On Flange DN60 UPPs | 1 | 20 | -- -- -- |
| 26 | 管法兰/Blind Flange DN250 | 3 | 20 | -- -- -- |
| 28 | 管法兰/Blind Flange DN250 | 1 | 20 | -- -- -- |
| 27 | 管法兰/Supply Part DN250 5B | 1 | 20 | -- -- -- |
| 29 | 管法兰/Control Rack | 1 | 20 | -- -- -- |
| 25 | 管法兰/Local Control Panel | 1 | 20 | -- -- -- |
| 24 | 管法兰/Manifold/Multi-Media Filter | 1 | 20 | -- -- -- |
| 23 | 管法兰/Date/Height/Pressure/MS | 1 | 20 | -- -- -- |
| 22 | 管法兰/Pressure Safety Valve DN25 UPPs | 3 | 20 | -- -- -- |
| 21 | 管法兰/Valve DN25(2) | 2 | 20 | -- -- -- |
| 20 | 管法兰/Solenoid Valve DN25 UPPs | 2 | 20 | -- -- -- |
| 19 | 管法兰/Solenoid Valve DN25 UPPs | 1 | 20 | -- -- -- |
| 18 | 管法兰/T-Type Filter DN25 UPPs | 1 | 20 | -- -- -- |
| 17 | 管法兰/Strain Flange | 1 | 20 | -- -- -- |
| 16 | 管法兰/Control Valve DN25 UPPs | 5 | 20 | -- -- -- |
| 15 | 管法兰/US32 6.3MPa | 1 | 20 | -- -- -- |
| 14 | 管法兰/US305 0.5MPa | 1 | 20 | -- -- -- |
| 13 | 管法兰/US305/US305 Filter/US | 3 | 20 | -- -- -- |
| 12 | CPO-12-0 管法兰/US/MS Outside Pipe | 1 | 20 | -- -- -- |
| 11 | CPO-11-0 管法兰/US/MS Support | 1 | 20 | -- -- -- |
| 10 | CPO-10-0 UV管法兰/UV Air Vent Pipe | 1 | 20 | -- -- -- |
| 9 | CPO-09-0 管法兰/US/MS Drain Pipe | 1 | 20 | -- -- -- |
| 8 | CPO-08-0 管法兰/US/MS Air Vent Pipe | 1 | 20 | -- -- -- |
| 7 | CPO-07-0 管法兰/US/MS Outlet Pipe 1 | 1 | 20 | -- -- -- |
| 6 | CPO-06-0 UV管法兰/UV Inlet Pipe | 1 | 20 | -- -- -- |
| 5 | CPO-05-0 US管法兰/US Inlet Pipe | 1 | 20 | -- -- -- |
| 4 | CPO-04-0 CY管法兰/CY Outlet Pipe 2 | 1 | 20 | -- -- -- |
| 3 | CPO-03-0 管法兰/US/MS Inlet Pipe 1 | 1 | 20 | -- -- -- |
| 2 | CPO-02-0 CY管法兰/CY Inlet Pipe | 1 | 20 | -- -- -- |
| 1 | CPO-01-0 CY管法兰/CY Outlet Pipe 1 | 1 | 20 | -- -- -- |

| 物料号 | 物料名称 | 数量 | 单位 | 备注 |
|-----|---------------------------------|----|----|----------|
| 1 | CPO-01-0 | 1 | 20 | -- -- -- |
| 2 | CPO-02-0 | 1 | 20 | -- -- -- |
| 3 | CPO-03-0 | 1 | 20 | -- -- -- |
| 4 | CPO-04-0 | 1 | 20 | -- -- -- |
| 5 | CPO-05-0 | 1 | 20 | -- -- -- |
| 6 | CPO-06-0 | 1 | 20 | -- -- -- |
| 7 | CPO-07-0 | 1 | 20 | -- -- -- |
| 8 | CPO-08-0 | 1 | 20 | -- -- -- |
| 9 | CPO-09-0 | 1 | 20 | -- -- -- |
| 10 | CPO-10-0 | 1 | 20 | -- -- -- |
| 11 | CPO-11-0 | 1 | 20 | -- -- -- |
| 12 | CPO-12-0 | 1 | 20 | -- -- -- |
| 13 | 管法兰/US305/US305 Filter/US | 3 | 20 | -- -- -- |
| 14 | 管法兰/US305 0.5MPa | 1 | 20 | -- -- -- |
| 15 | 管法兰/US32 6.3MPa | 1 | 20 | -- -- -- |
| 16 | 管法兰/Control Valve DN25 UPPs | 5 | 20 | -- -- -- |
| 17 | 管法兰/Strain Flange | 1 | 20 | -- -- -- |
| 18 | 管法兰/T-Type Filter DN25 UPPs | 1 | 20 | -- -- -- |
| 19 | 管法兰/Solenoid Valve DN25 UPPs | 2 | 20 | -- -- -- |
| 20 | 管法兰/Solenoid Valve DN25 UPPs | 2 | 20 | -- -- -- |
| 21 | 管法兰/Valve DN25(2) | 2 | 20 | -- -- -- |
| 22 | 管法兰/Date/Height/Pressure/MS | 1 | 20 | -- -- -- |
| 23 | 管法兰/Manifold/Multi-Media Filter | 1 | 20 | -- -- -- |
| 24 | 管法兰/Local Control Panel | 1 | 20 | -- -- -- |
| 25 | 管法兰/Control Rack | 1 | 20 | -- -- -- |
| 26 | 管法兰/Blind Flange DN250 | 3 | 20 | -- -- -- |
| 27 | 管法兰/Supply Part DN250 5B | 1 | 20 | -- -- -- |
| 28 | 管法兰/Blind Flange DN250 | 1 | 20 | -- -- -- |
| 29 | 管法兰/Control Rack | 1 | 20 | -- -- -- |
| 30 | 管法兰/Slip On Flange DN60 UPPs | 1 | 20 | -- -- -- |
| 31 | 管法兰/Blind Flange DN60 | 1 | 20 | -- -- -- |

| 物料号 | 物料名称 | 数量 | 单位 | 备注 |
|-----|---------------------------------|----|----|----------|
| 1 | CPO-01-0 | 1 | 20 | -- -- -- |
| 2 | CPO-02-0 | 1 | 20 | -- -- -- |
| 3 | CPO-03-0 | 1 | 20 | -- -- -- |
| 4 | CPO-04-0 | 1 | 20 | -- -- -- |
| 5 | CPO-05-0 | 1 | 20 | -- -- -- |
| 6 | CPO-06-0 | 1 | 20 | -- -- -- |
| 7 | CPO-07-0 | 1 | 20 | -- -- -- |
| 8 | CPO-08-0 | 1 | 20 | -- -- -- |
| 9 | CPO-09-0 | 1 | 20 | -- -- -- |
| 10 | CPO-10-0 | 1 | 20 | -- -- -- |
| 11 | CPO-11-0 | 1 | 20 | -- -- -- |
| 12 | CPO-12-0 | 1 | 20 | -- -- -- |
| 13 | 管法兰/US305/US305 Filter/US | 3 | 20 | -- -- -- |
| 14 | 管法兰/US305 0.5MPa | 1 | 20 | -- -- -- |
| 15 | 管法兰/US32 6.3MPa | 1 | 20 | -- -- -- |
| 16 | 管法兰/Control Valve DN25 UPPs | 5 | 20 | -- -- -- |
| 17 | 管法兰/Strain Flange | 1 | 20 | -- -- -- |
| 18 | 管法兰/T-Type Filter DN25 UPPs | 1 | 20 | -- -- -- |
| 19 | 管法兰/Solenoid Valve DN25 UPPs | 2 | 20 | -- -- -- |
| 20 | 管法兰/Solenoid Valve DN25 UPPs | 2 | 20 | -- -- -- |
| 21 | 管法兰/Valve DN25(2) | 2 | 20 | -- -- -- |
| 22 | 管法兰/Date/Height/Pressure/MS | 1 | 20 | -- -- -- |
| 23 | 管法兰/Manifold/Multi-Media Filter | 1 | 20 | -- -- -- |
| 24 | 管法兰/Local Control Panel | 1 | 20 | -- -- -- |
| 25 | 管法兰/Control Rack | 1 | 20 | -- -- -- |
| 26 | 管法兰/Blind Flange DN250 | 3 | 20 | -- -- -- |
| 27 | 管法兰/Supply Part DN250 5B | 1 | 20 | -- -- -- |
| 28 | 管法兰/Blind Flange DN250 | 1 | 20 | -- -- -- |
| 29 | 管法兰/Control Rack | 1 | 20 | -- -- -- |
| 30 | 管法兰/Slip On Flange DN60 UPPs | 1 | 20 | -- -- -- |
| 31 | 管法兰/Blind Flange DN60 | 1 | 20 | -- -- -- |

物料号: CPO-01-0

物料名称: General Arrangement Plan/总图

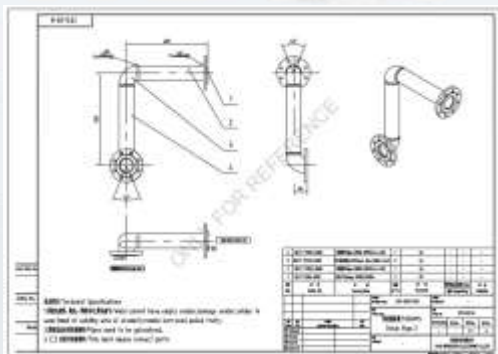
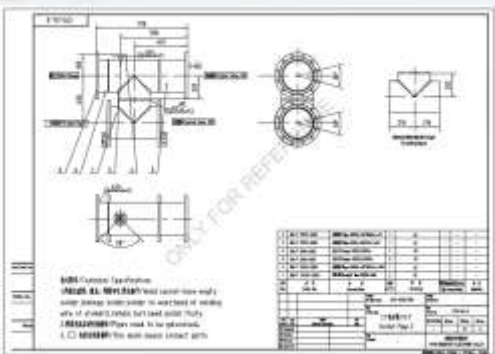
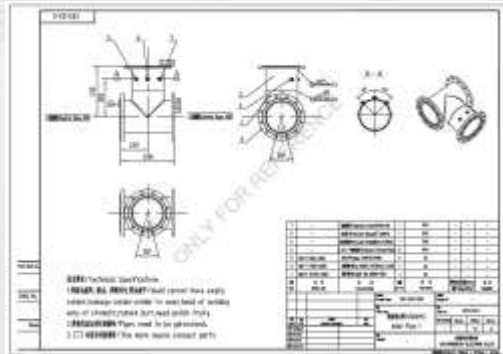
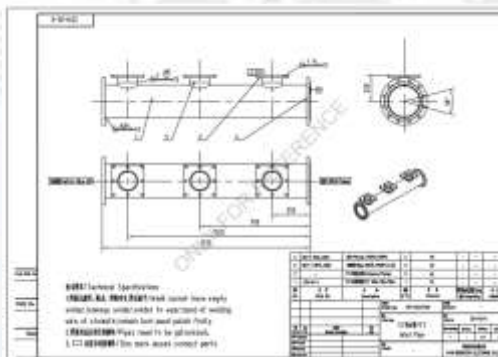
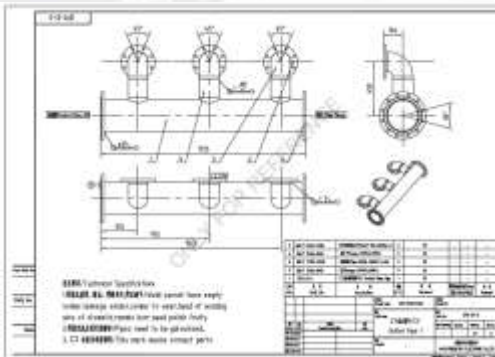
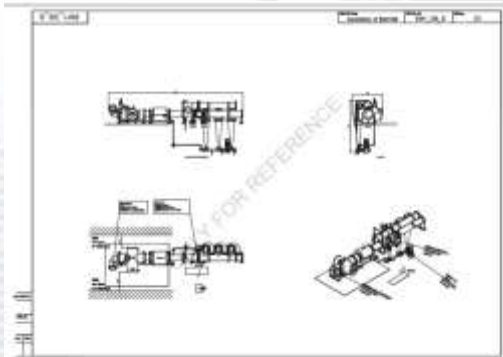
物料规格: 1/1 A

物料备注: 蓝天电子提供

物料日期: 2024-10-20




Solution For Retrofit--Production Drawings



Solution For Retrofit--Class Approval Documents

GL Reference Number
2013-02-25 13-015888



GLOBE

DOCUMENT SUBMIT FOR APPROVAL

Date : 22 Feb, 2013
Ref. No. : 12-334571/48e/Disc/Cru/Les
To : Germanischer Lloyd
Attn : Andre Duesthahn
From : 18J Kim / Team leader, Special Business Division / BOSCO Co., Ltd
Subject : Submit Document for comment reply

Dear Sir,

Thank you for your comments.
Here are reply for your comments.

Remark No. 1.1 : TRC of the UV module is 800m³/h /500m³/h on drawing page 24(1/2) is typo.
Remark No. 1.2 ~1.3 : There are two modes in BSKY BWMS. The first is BWMS priority mode. The second is pump priority mode.
In case of BWMS priority mode, Both ballast pumps cannot operate simultaneously. BSKY BWMS can control the pump-ack operate at same time by programming.
In case of Pump priority mode, Both ballast pumps can operate simultaneously. But in this case BWMS is control the flow range does not exceed by control valve automatically.
In this regard, GL surveyor can check on board.

Remark No. 1.4 : System configuration, already implemented on test run support "2-tipping mode" (this aspect) (Refer attached drawing 07-1.prd 01)

Remark No. 1.5 : We will modify operation manual including above item 1.2~1.4.

With Best Regards,

Copyrighted by Germanischer Lloyd, Date: 2013-04-22 12:28:47 GMT

Remarks in the letter to be observed

GL Preliminary Approved
Hamburg 2012-10-22 Ref. No. 12-864848

BSKY™ BWMS

APPROVAL DRAWING
(SPECIFICATION & INSTALLATION)
FOR

SHIP BUILDER : STX Offshore & Shipbuilding
SHIP TYPE : 9,000 CBM Ethylene LPG/
Ammonia VCM Tanker
SHIP NAME :
HULL No. : B5048
Class : GL
BSKY™ BWMS Model : BSKY250



WUXI BRIGHTSKY ELECTRONIC CO.,LTD.
Address: Lianhe Town, West City,
Jiangsu Province, China
Zip Code: 214187
Telephone: +86-510-83311977
Fax: +86-510-83315517
E-mail: hmwu@bsky.cn
http://www.bsky.cn

Copyrighted by Germanischer Lloyd, Date: 2013-02-27 12:18:17 GMT

INTERIM BALLAST WATER MANAGEMENT STATEMENT OF COMPLIANCE

with the regulations of the INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS (hereinafter referred to as "the Convention")

issued by GERMANISCHER LLOYD

| Name of Ship | Distinctive Number or Letters | Port of Registry | Gross Tonnage | IMO Number | Date of Construction |
|----------------|-------------------------------|------------------|---------------|------------|----------------------|
| SANTA ROSAWANA | ABR2 | Monrovia | 41803 | 922730 | 2000-11-26 |

Ballast Water Capacity (m³) : 1335.3

DETAILS OF BALLAST WATER MANAGEMENT METHOD(S) USED

Method of Ballast Water Management used : Treatment as Hydroxylone & Ultrasonic Proflifer, UV technology

Date installed (if applicable) : 2012-12-18

Name of manufacturer (if applicable) : Wu Xi Brightsky Electronic Co., Ltd.

The principal Ballast Water Management method(s) employed on the ship is/are:

in accordance with regulation D-1
 in accordance with regulation D-2 (desalination) Treatment
 the ship is subject to regulation D-4



REMARKS: Prior to issuance of Full Term Statement of Compliance by GL Head Office, GL Approval / Type Approval / Certification of all related equipment for Ballast Water Management System, Type BSKY BWMS 500 is to be completed. Any possible change of equipment per GL certification requests has to be considered in appropriate manner.

THIS IS TO CERTIFY:

- The ship has been surveyed in accordance with regulation E-1 of the Annex to the Convention; and
- The survey shows that Ballast Water Management on the ship complies with the Annex to the Convention.

This certificate is valid until receipt of the final certificate to be issued by Head Office of Germanischer Lloyd, but not longer than 2013-07-26.

Completion date of the survey on which this certificate is based: 2013-02-26
Issued at: Chongqing, China the 26th day of Feb. 2013

373

Form No. 5170 / 2010-03 Page 1 of 2



Solution For Retrofit--Installation Supervising & Training



Installation Supervising

Ship crew Training



Solution For Retrofit--Final Inspection for Shipowner & Class

BSKY™ BWMS

(Ballast Water Management System)

Onboard Test Plan & Procedure

BSKY™ BWMS Model : BSKY600
Class : GL
Ship Type : 3500 TEU CONTAINER VESSEL
Ship Name : M/V CAP MANUEL

SIGNATURE

Owner :

Class : 2013-05-04

Maker : 2013.05.04

Date : 2013 . 05 . 04
Wuxi Brightsky Electronic Co., Ltd.

INTERIM BALLAST WATER MANAGEMENT STATEMENT OF COMPLIANCE

with the regulations of the
INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS
(hereinafter referred to as "the Convention")

issued

by GERMANISCHER LLOYD

| Name of Ship | Distinctive Number or Letters | Port of Registry | Gross Tonnage | IMO Number | Date of Construction |
|---------------|-------------------------------|------------------|---------------|------------|----------------------|
| SANTA ROSANNA | ABRL2 | Monrovia | 43803 | 9227340 | 2002-11-26 |

Ballast Water Capacity (m³) 13350.1

DETAILS OF BALLAST WATER MANAGEMENT METHOD(S) USED

Method of Ballast Water Management used Treatment as Hydrocyclone & Ultrasonic Profiler, UV technology

Date installed (if applicable) 2012-12-16

Name of manufacturer (if applicable) Wuxi Brightsky Electronic Co., Ltd.

The principal Ballast Water Management method(s) employed on this ship is/are:

- in accordance with regulation D-1
- in accordance with regulation D-2 (Discharge Treatment)
- the ship is subject to regulation D-4

REMARKS: Prior to issuance of Full Term Statement of Compliance by GL Head Office, GL Approval / Type Approval / Certification of all related equipment for Ballast Water Management System, Type BSKY BWMS 500 is to be completed. Any possible change of equipment per GL certification requests has to be considered in appropriate manner.

THIS IS TO CERTIFY:

- That the ship has been surveyed in accordance with regulation E-1 of the Annex to the Convention; and
- That the survey shows that Ballast Water Management on the ship complies with the Annex to the Convention.

This certificate is valid until receipt of the final certificate to be issued by Head Office of Germanischer Lloyd, but not longer than 2013-07-26.

Completion date of the survey on which this certificate is based: 2013-02-26

issued at: Chengming, China the

26th day of Feb. 2013



373

G. Representative
(To Be)



BSKY™ BWMS Reference List



| No. | Ship' s Type | Contracted | Installed |
|-------|---------------------------------------|-------------|-------------|
| 1 | Bulker | 240 | 233 |
| 2 | Container Carrier | 48 | 47 |
| 3 | LPG/LEG Carrier | 28 | 25 |
| 4 | Cement/Naphthalene Bitumen Carrier | 20 | 18 |
| 5 | Tanker | 36 | 33 |
| 6 | Special Ships | 48 | 40 |
| 7 | Retrofit | 165 | 152 |
| Total | | 420 Vessels | 396 Vessels |



Vision to win the future



Thank You Very Much!



Address: Luoshe Town, Huishan District, Wuxi City, Jiangsu

Tel: 0510-83311597

Fax: 0510-83315517