BlueZone™ Ballast water management system

[**MICRO OZONE BUBBLE TYPE** for all kinds of vessels]

PMS
PIRAEUS MARINE SERVICES

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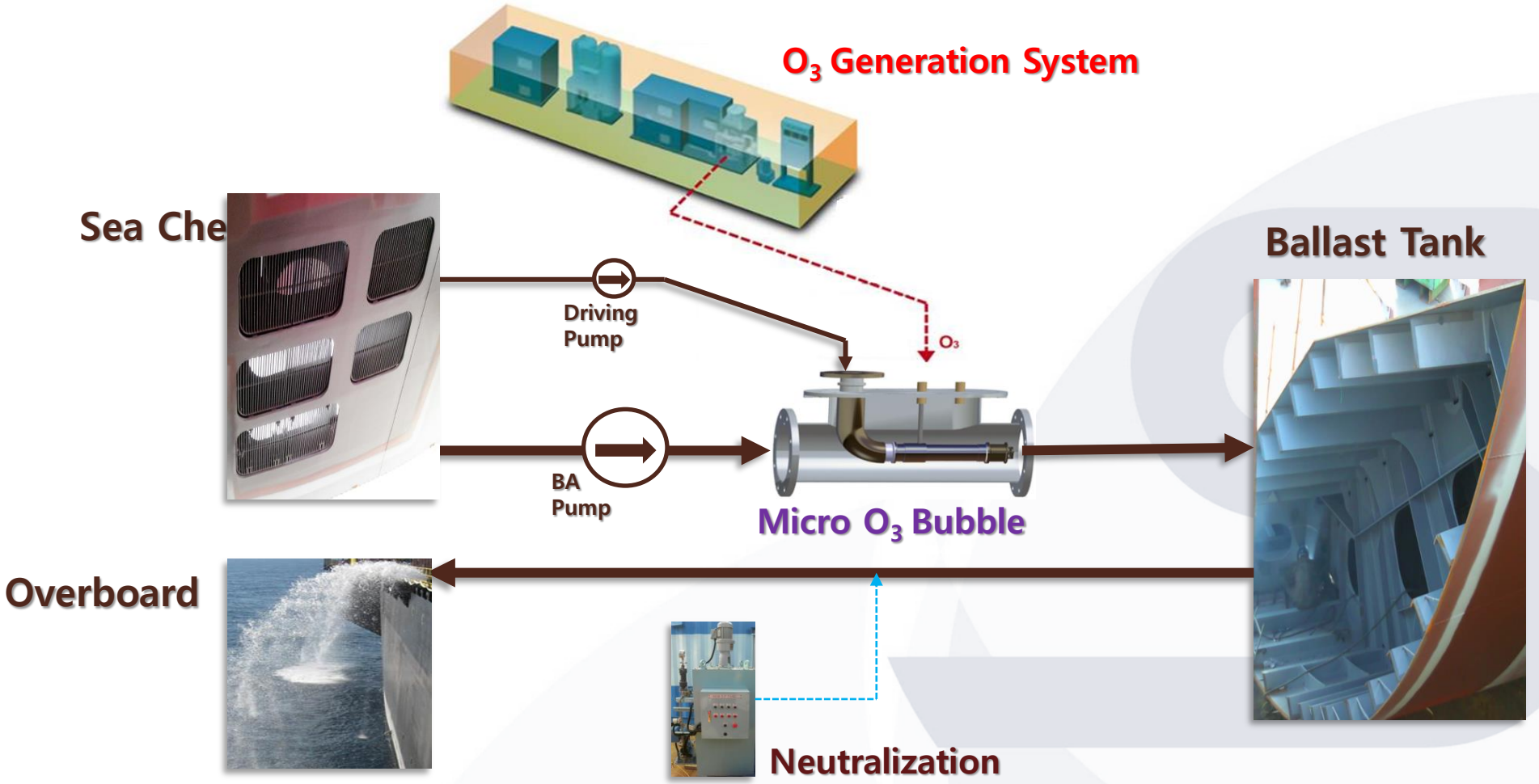
SUNBO INDUSTRIES CO., LTD.

* Configuration of BlueZone BWMS



* Major Equipment of BlueZone BWMS

● O_3 Generation System

AIR

- Compressor
- Air Dryer & Filter

O_2

- O2 Generator
- Air Filter

O_3

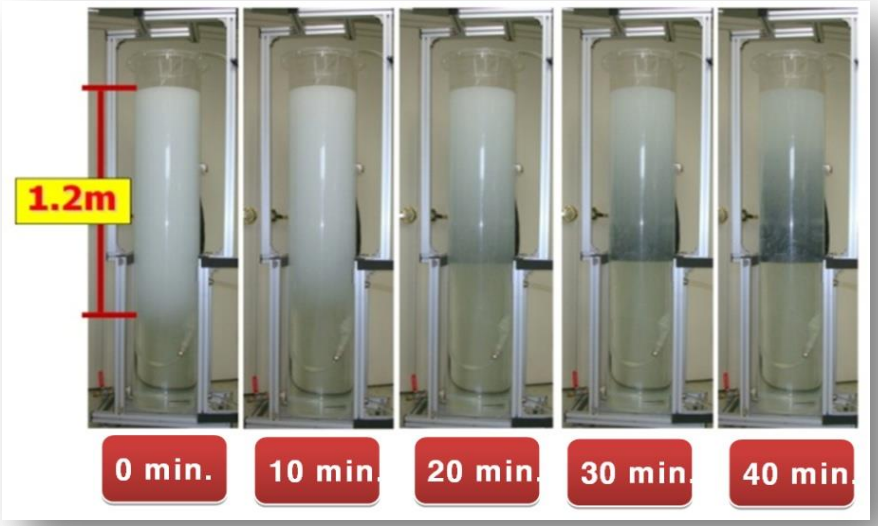
- O3 Generator
- Chiller
- Destructor

INJECT

- Micro Bubble Nozzle
- Mixing Chamber
- TRO Sensor

* The merit Micro Ozone Bubble

● Maximization of Disinfection Effect



➢ **Under 50 ㎛ Micro bubble stays for a long time in the water comparing to the general bubble.**

- **Increase the contact surface area to kill the Microorganisms**
- **improve sterilization effect**
- **A significant effect with small amount of Ozone**
- **Reduced Power consumption**

Ⅳ. BlueZone™ BWMS Advantage

SIMPLE

- Easy Installation
- The Minimum Modification of Existing Ballast System
- Easy Control by Automation System
- Easy Maintenance and Installation by One unit module

RELIABLE

- Proven Tethnology in water treatment industries for 100 years
- Optimized Solution by Marine Engineering Expert

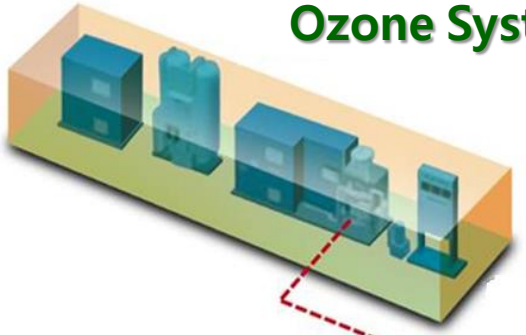
LOW COST

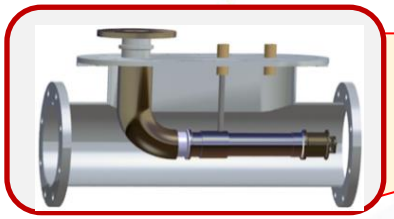
- Cost Saving by the Min. Ozone Injectin Rate
- No Filter → No Pump head Increase → Decrease Power Consumption
- The Min. Time Loss for Retrofit of Existing Vessel

SIMPLE

Easy Installation

Ozone System



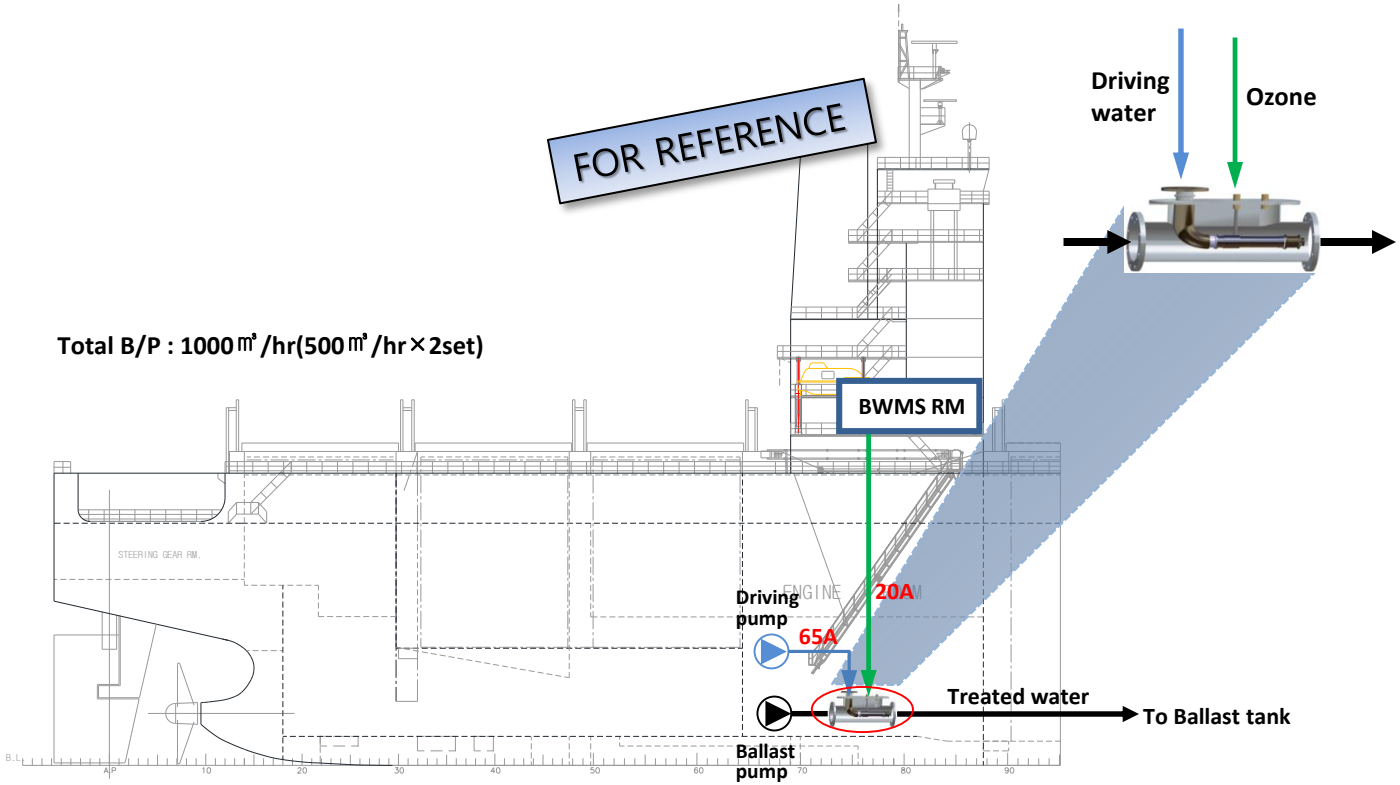


Micro O_3 Bubble Nozzle

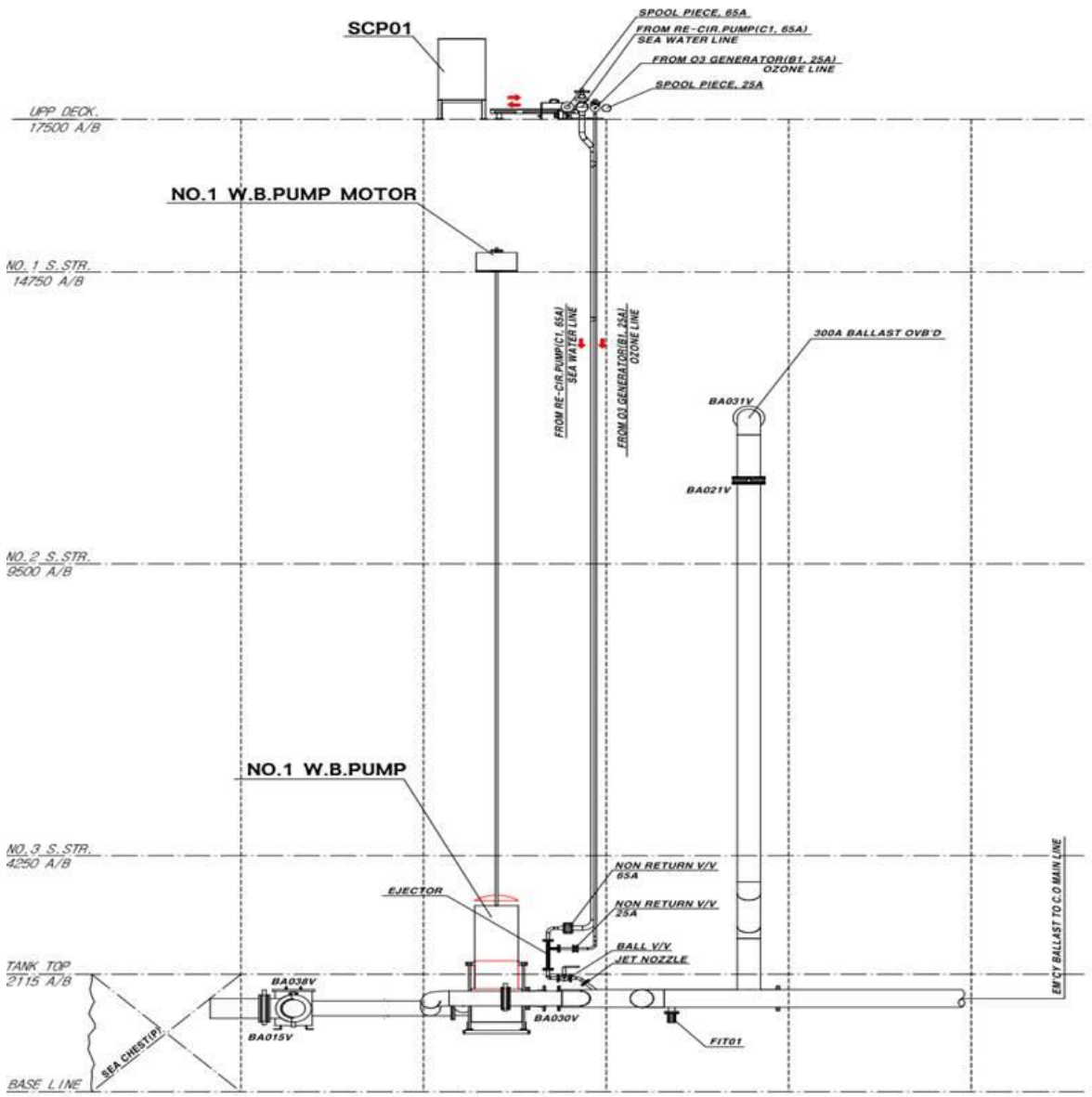
- Only Inserting the Nozzle on Main Ballast Line (One Spool Installation)
- Ozone Generation Module to be installed on idle location

Advantage – SIMPLE!

- **ONE SPOOL** (Ozone Injection Chamber) **Installation**
- **Main Components : Modules System (CONTAINER) or Discontinuous Arrangement**



Tankers with Framo-Type Ballast Pumps

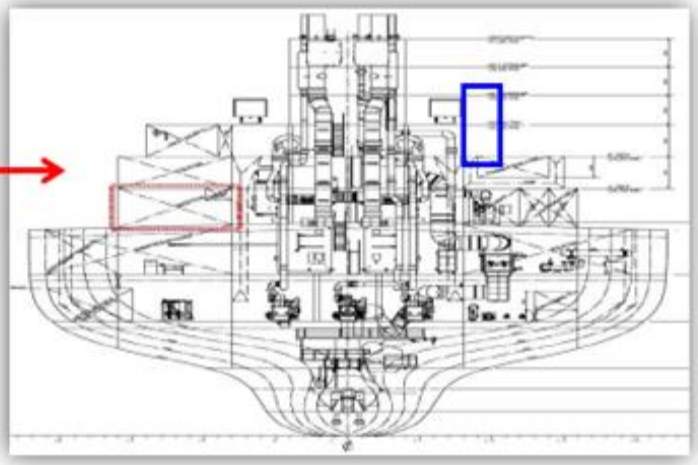


Advantage – SIMPLE!

SIMPLE

Review of Installation - Tanker

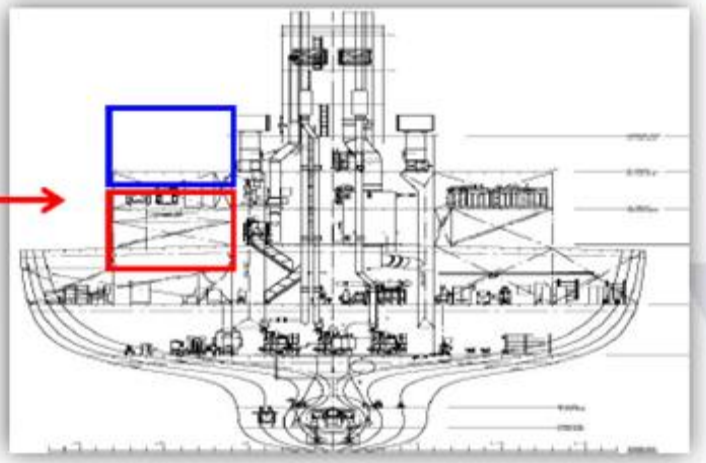
<BWMS Unit>



- New Ship : UPPER DECK, CASING AREA (RED Color)
- Existing Ship : CASING AREA (Blue Color)

Review of Installation - Bulk

<BWMS Unit>



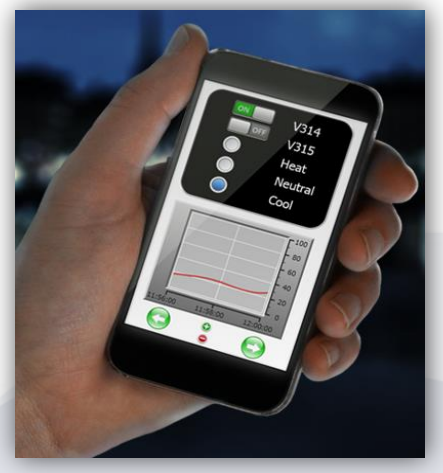
- New Ship : UPPER DECK, CASING AREA (Red Color)
- Existing Ship : CASING AREA (Blue Color)

SIMPLE

Easy Control by Automation System

< Touch Screen>

Real-Time

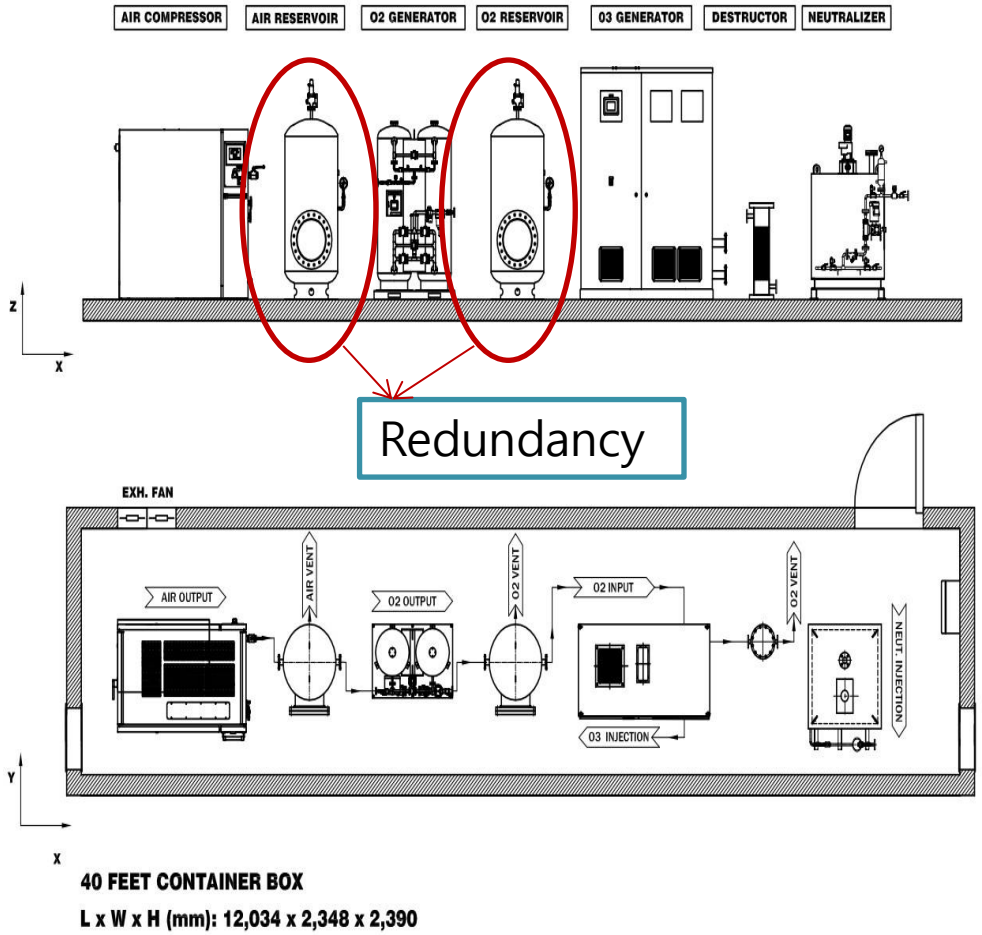


Real-Time

Ballasting Power Consumption Graph

SIMPLE

Easy Maintenance and Installation by One unit module



40 FEET CONTAINER BOX

L x W x H (mm): 12,034 x 2,348 x 2,390

■ Major equipment – Total 9 Unit

1. Air compressor
2. Air dryer
3. Air cooler & Filter Unit

→ 1 unit

1. Air receiver
2. O_2 generator
3. O_2 receiver

→ 1 unit

Simplification

3 Unit !

1. O_3 generator
2. MCP
3. Water chiller

→ 1 unit

< O2 Generator >

Before

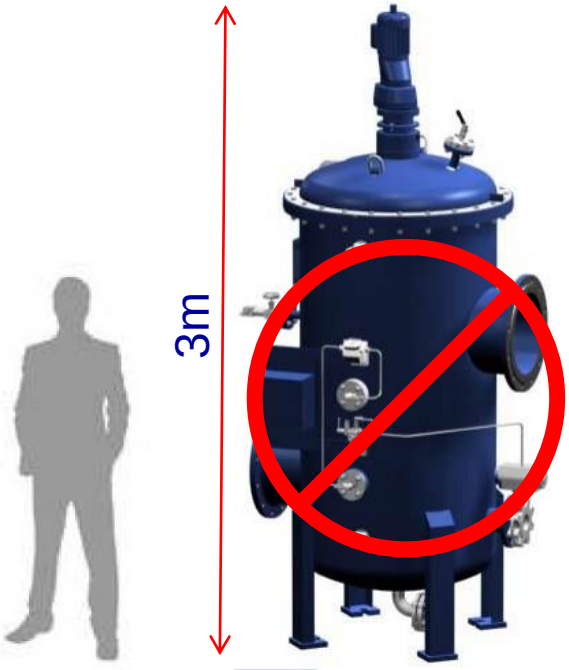
Now

Advantage – LOW COST!

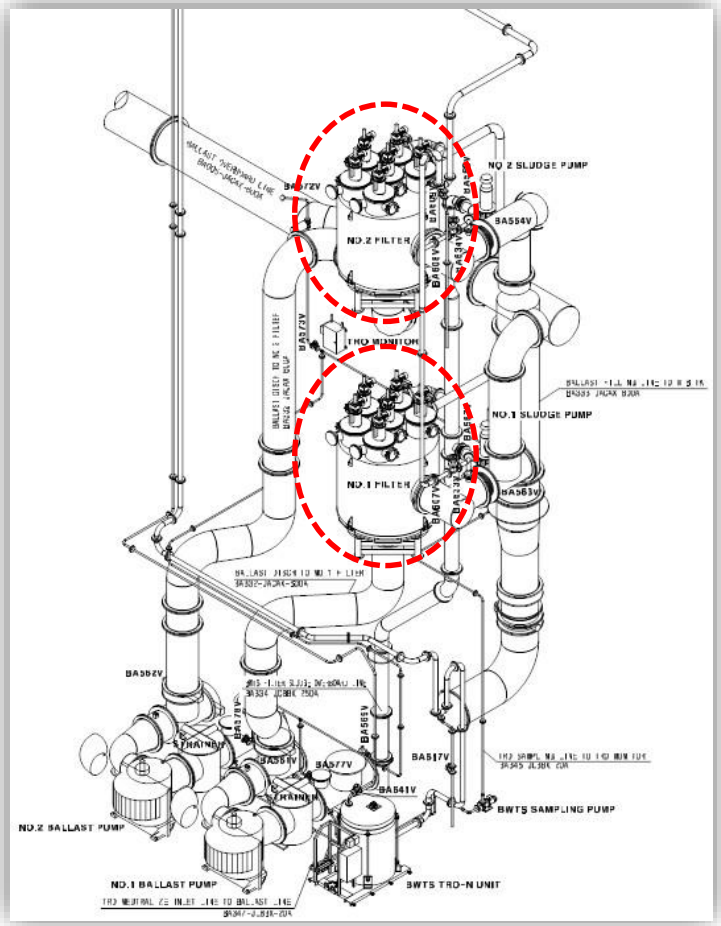
- **NO Filter – Cost Reduction to Installation & Maintenance**

  - Ozone : Removal Zooplankton by Strong Oxidants

(Cap.1000m3/hr)



Filter Size



Filter Installation in the Pump Room or Engine Room

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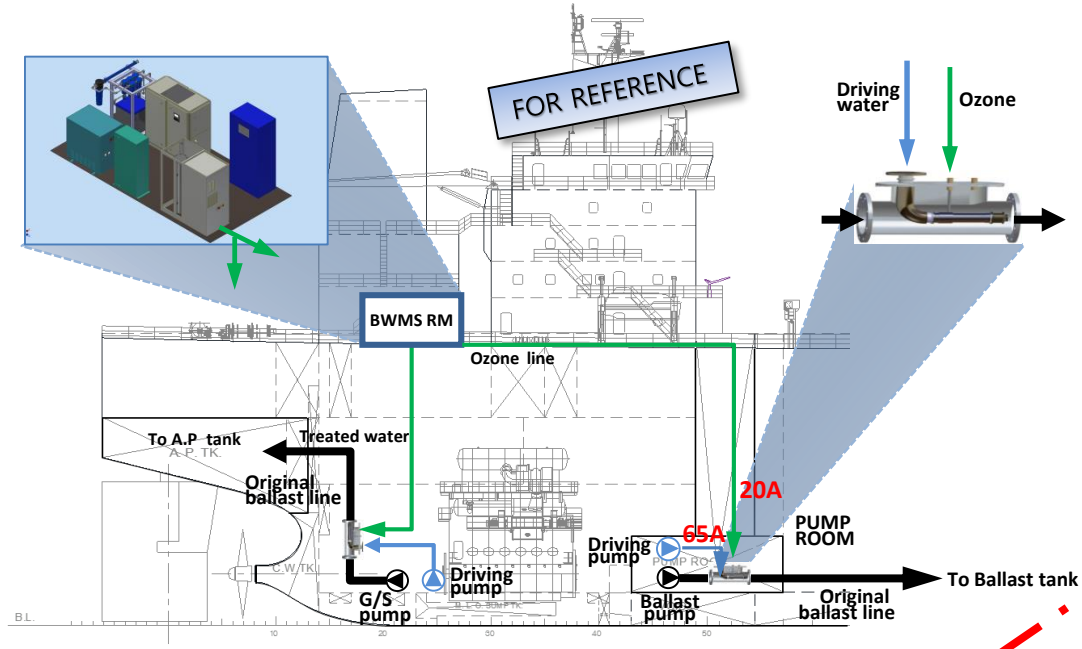
Advantage – LOW COST!

BlueZone
BALLAST WATER
MANAGEMENT SYSTEM

- **Easy Installation – Cost down of Installation Fee**

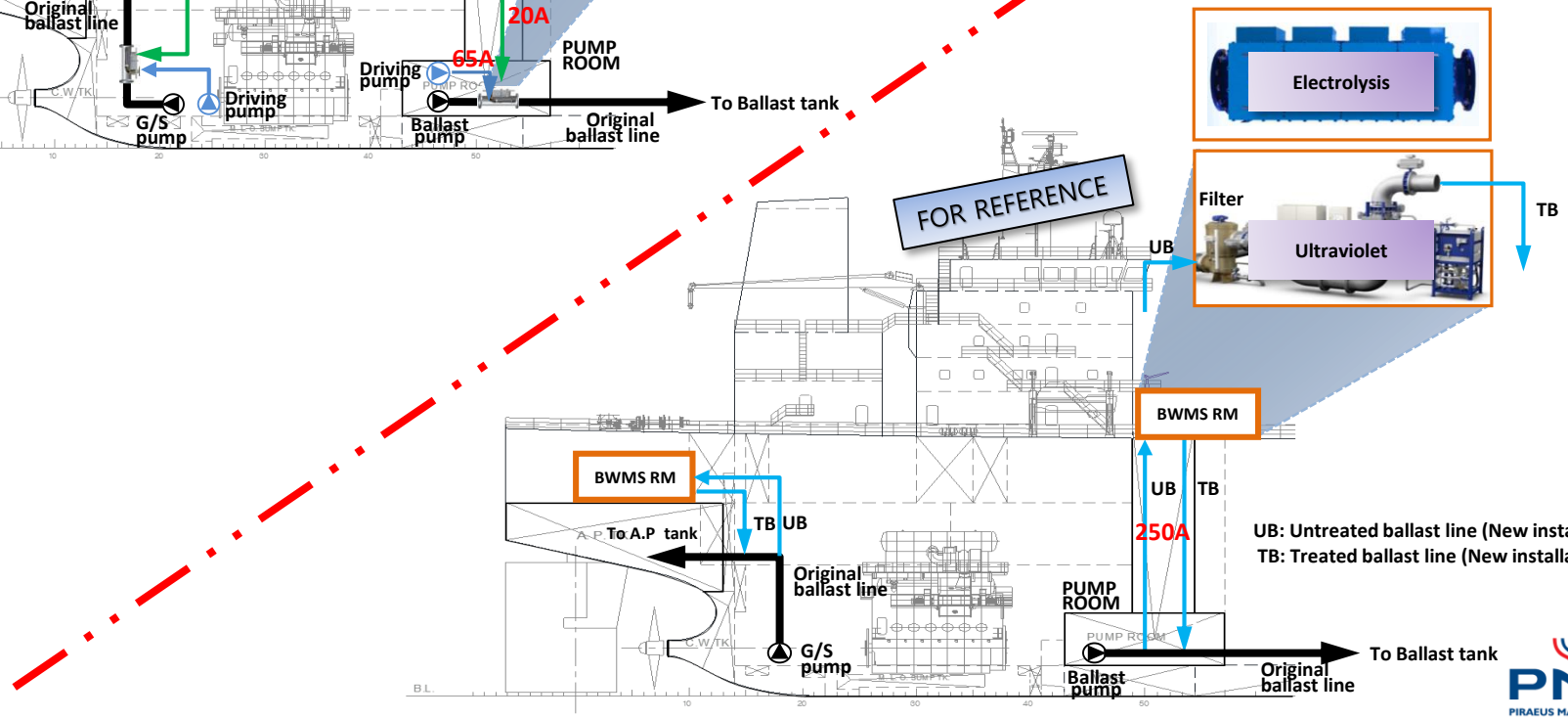
Ship Type : Tanker

Total B/P : 1000㎥/hr(500㎥/hr×2set)



BlueZone BWMS

Other BWMS



UB: Untreated ballast line (New installation)
TB: Treated ballast line (New installation)

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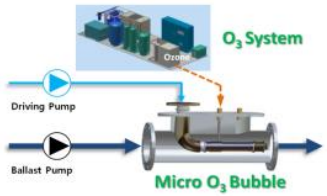
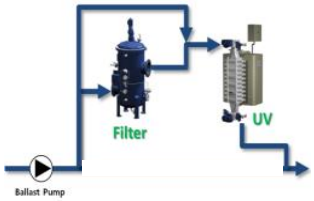
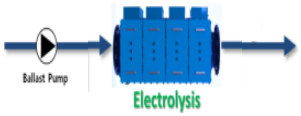
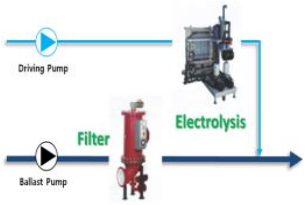
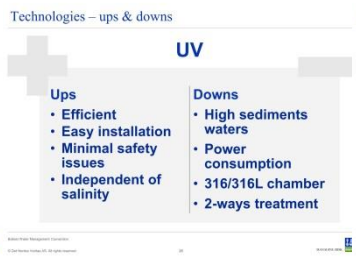
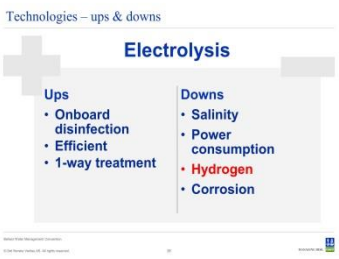
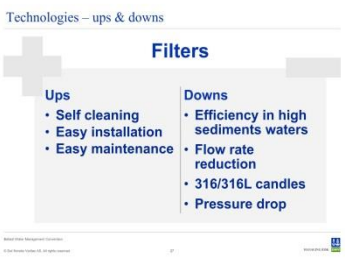
Comparison of Each Type

Description	Ozonation	Filter + UV	Electrolysis	Filter + Electrolysis
Feature				
Operating availability	Ballasting	Ballasting + Discharging	Ballasting	Ballasting
Neutralization system	Yes	No	Yes	Yes
Foot print (Main pipe line)	👣	👣👣👣	👣👣	👣👣
Energy consumption (Ballasting + De-ballasting)	💧	💧💧💧	💧💧	💧
Pressure loss (bar)				
Installation	🔧	🔧🔧🔧	🔧🔧	🔧🔧🔧







Certification of BlueZone BWMS

BlueZone
BALLAST WATER
MANAGEMENT SYSTEM

MARINE ENVIRONMENT PROTECTION COMMITTEE
65th session
Agenda item 2

MEPC 65/2/x
xx April 2013
Original: ENGLISH

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Application for Basic Approval of the BlueZone™ Ballast Water Management System

Submitted by the Republic of Korea

SUMMARY

Executive summary:	This document contains the non-confidential information related to the application for Basic Approval of the BlueZone™ Ballast Water Management System in accordance with the Procedure for approval of ballast water management systems that make use of Active Substances (G9) adopted by resolution MEPC.169(57)
Strategic direction:	7.1
High-level action:	7.1.2
Planned output:	7.1.2.5
Action to be taken:	Paragraph 6
Related documents:	BWM/CONF/36, MEPC 53/24/Add.1, MEPC 57/21, MEPC 58/2/4, MEPC 59/2/13, MEPC 61/2/15, BWM.2/Circ.13/Rev.1 and BWM.2/Circ.36;

Introduction

1 Regulation D-3.2 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments stipulates that ballast water management systems which make use of Active Substances to comply with the Convention shall be approved by the Organization, based on a procedure developed by the Organization.

2 The "Procedure for approval of ballast water management systems that make use of Active Substances (G9)", adopted by resolution MEPC.169(57), defines the principal aspects to be documented by data or testing (MEPC 57/21, annex 1, paragraph 4.2.1) and some basic principles for risk evaluation (MEPC 57/21, annex 1, paragraph 5.3). According to section 6 of Procedure (G9), the Organization should evaluate the information provided in the application.

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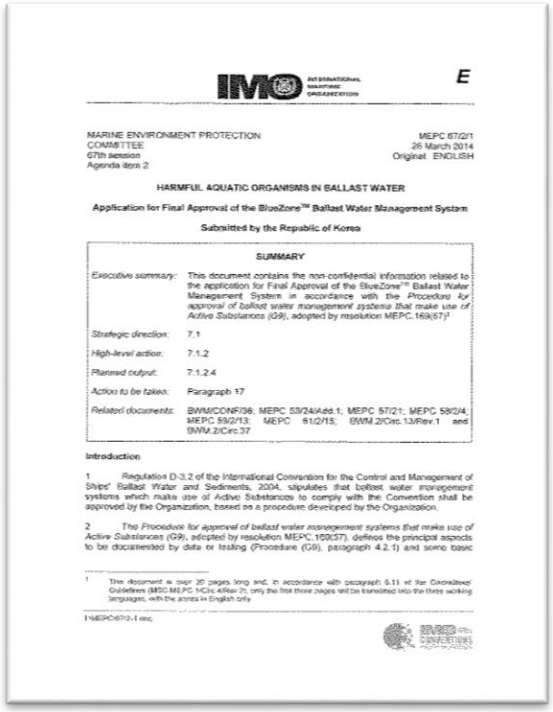

MARINE ENVIRONMENT PROTECTION COMMITTEE
67th session
Agenda item 2

MEPC 67/2/1
26 March 2014
Original: ENGLISH

E

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Application for Final Approval of the BlueZone™ Ballast Water Management System

Submitted by the Republic of Korea

SUMMARY

Executive summary:	This document contains the non-confidential information related to the application for Final Approval of the BlueZone™ Ballast Water Management System in accordance with the *Procedure for approval of ballast water management systems that make use of Active Substances (G9)*, adopted by resolution MEPC.169(57)[1]
Strategic direction:	7.1
High-level action:	7.1.2
Planned output:	7.1.2.4
Action to be taken:	Paragraph 17
Related documents:	BWM/CONF/36; MEPC 53/24/Add.1; MEPC 57/21; MEPC 58/2/4; MEPC 59/2/13; MEPC 61/2/15; BWM.2/Circ.13/Rev.1 and BWM.2/Circ.37

Introduction

1 Regulation D-3.2 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, stipulates that ballast water management systems which make use of Active Substances to comply with the Convention shall be approved by the Organization, based on a procedure developed by the Organization.

2 *The Procedure for approval of ballast water management systems that make use of Active Substances (G9)*, adopted by resolution MEPC.169(57), defines the principal aspects to be documented by data or testing (Procedure (G9), paragraph 4.2.1) and some basic

[1] This document is over 20 pages long and, in accordance with paragraph 6.11 of the Consolidated Guidelines (MSC.MEPC.1-Circ.4/Rev.2), only the first three pages will be translated into the three working languages, with the annex in English only.

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선박평형수처리설비 형식승인서

TYPE APPROVAL CERTIFICATE OF BALLAST WATER MANAGEMENT SYSTEM

대 한 민 국
REPUBLIC OF KOREA

Official stamp

김창균

Ministry of Oceans and Fisheries

8 September 2015

Thank You for Your Attention !!

PMS
PIRAEUS MARINE SERVICES

IMO **BASIC APPROVAL**
(2013. 05)

IMO **FINAL APPROVAL**
(2014. 10)

TYPE APPROVAL
(2015. 09)