

HiBallast & *EcoBallast*

Ballast Water Treatment System

May 2020

Contact us!

Category	Work field	E-mail or address	Telephone
Sales	Quotation, Training	bwts-sales@hyundaiwelding.com	+82-52-283-6903
Technical	Design, Technical support	bwts-tech@hyundaiwelding.com	+82-52-283-6962
Customer Service	Commissioning, After-sales service	bwts-cs@hyundaiwelding.com	+82-52-283-6926
Head Office	-	Wework BLDG, 507, Teheran-ro, Gangnam-gu, Seoul, Korea	+82-2-6230-6042
Ulsan Engineering Center	Technical Center	406 Good prime I building, 641 Jongga-ro, Jung-gu, Ulsan, Korea	+82-52-283-6900
Pohang Factory	Manufacturing, FAT, Training center	88beon-gil 99, Yeongilmansandan-ro, Heunhar-eup, Buk-gu, Pohang, Korea	+82-54-260-0634

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Company

Introduction

Hyundai Welding

Sustainable, Reliable Business Partner



Established	1975
Employee	1,650
Global Production Plant	Korea : Pohang, Gochang Vietnam : Dongnai China : Kunshan



Vietnam - Dongnai



Head Office (Seoul)



China - Kunshan



Pohang Plant #1



Pohang Plant #2



Gochang Plant



BWTS



Welding Consumables & Machine



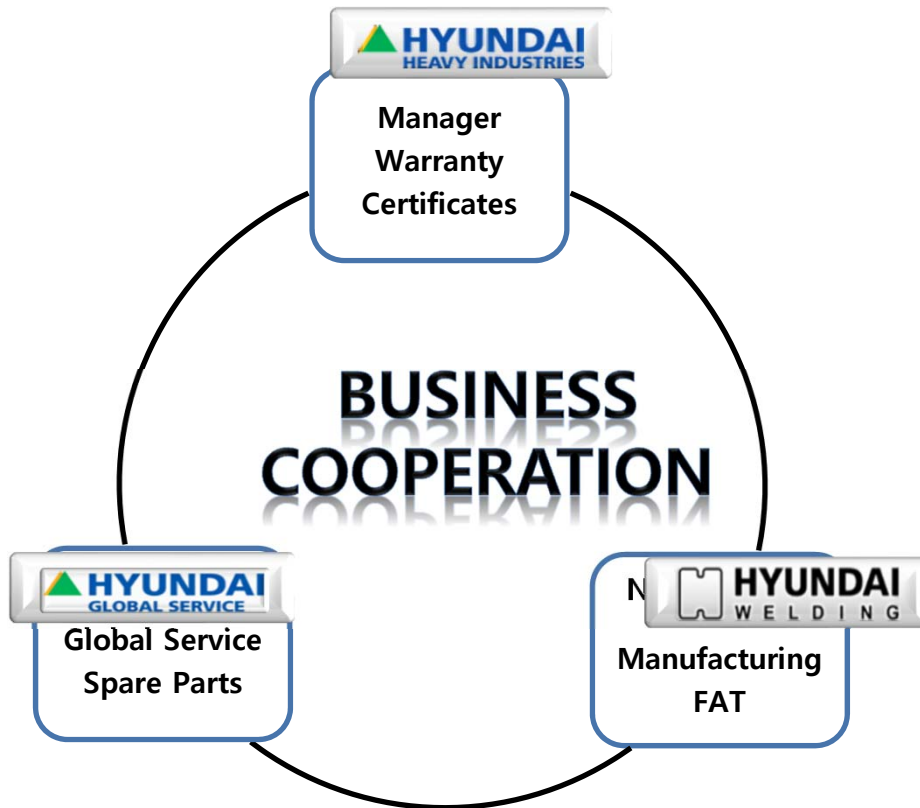
Logistics

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BWTS Business

BWTS Business Started...

Business Cooperation



Signing Ceremony for OEM on 7 Dec., 2016



Signing Ceremony for BWTS Retrofit

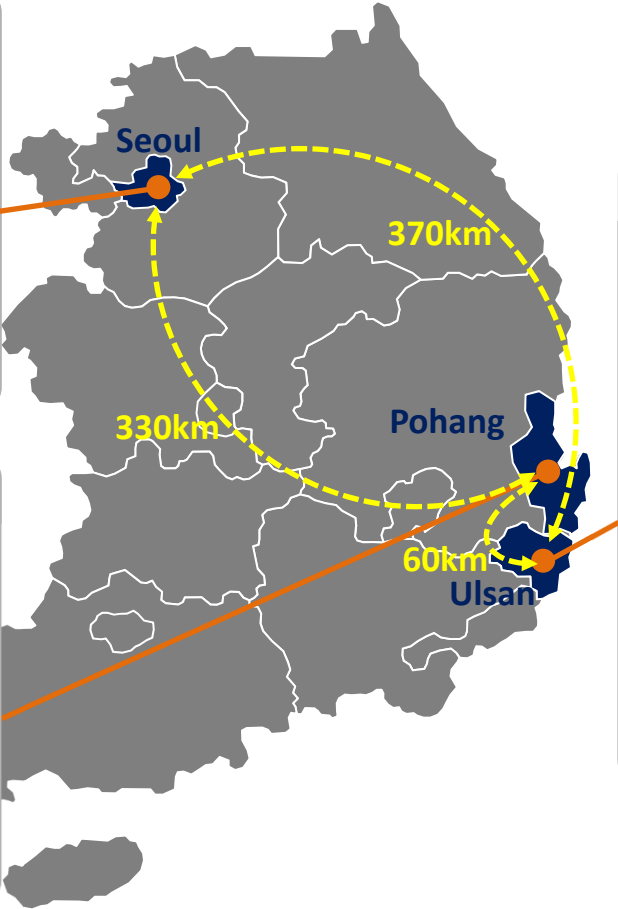
BWTS Business Company Location



Headquarter (Seoul, Korea)



- Management
- Sales(Global)
- Purchasing



Factory (Pohang, Korea)

- Manufacturing, Training and FAT

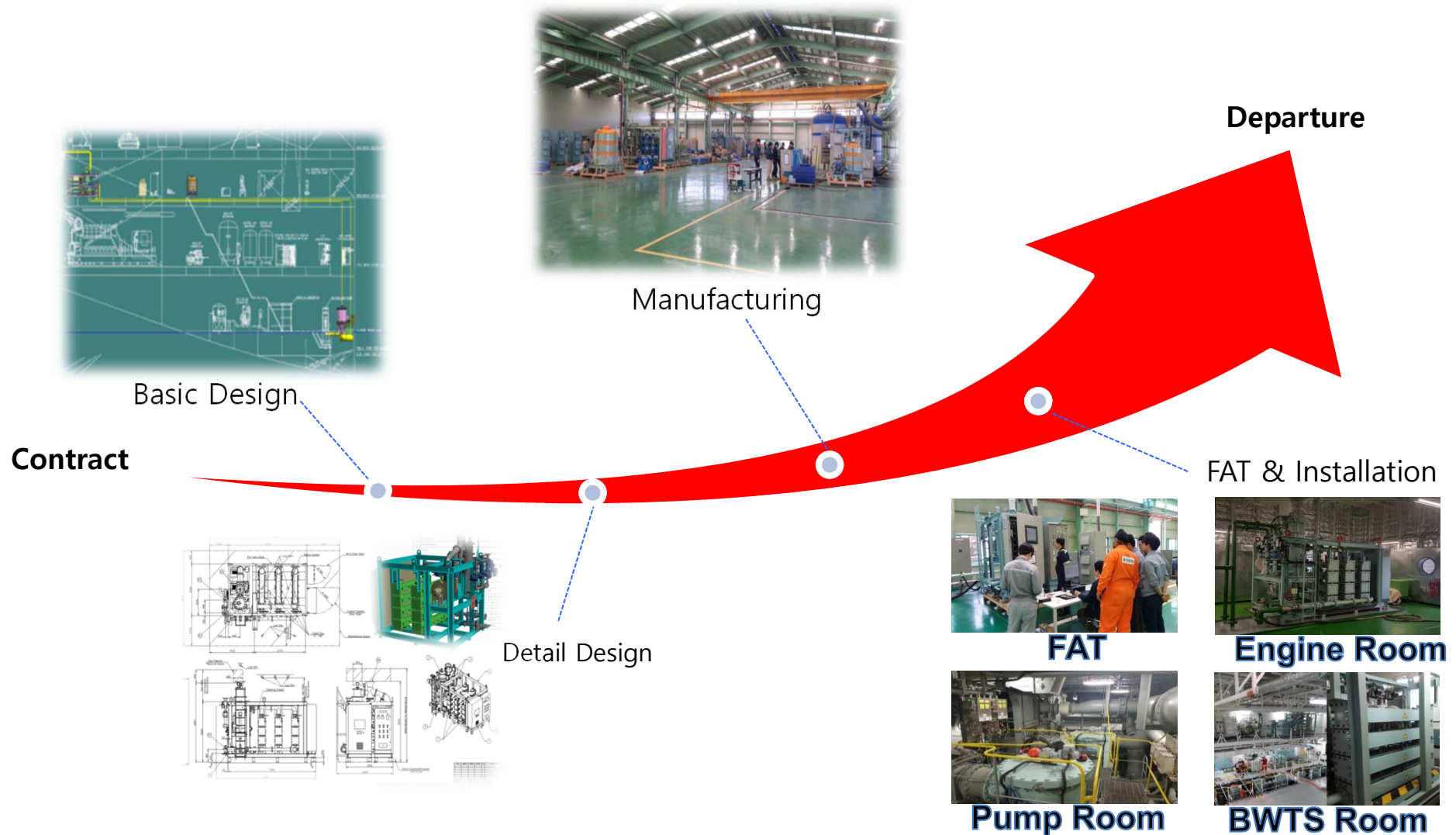


Engineering Center (Ulsan, Korea)

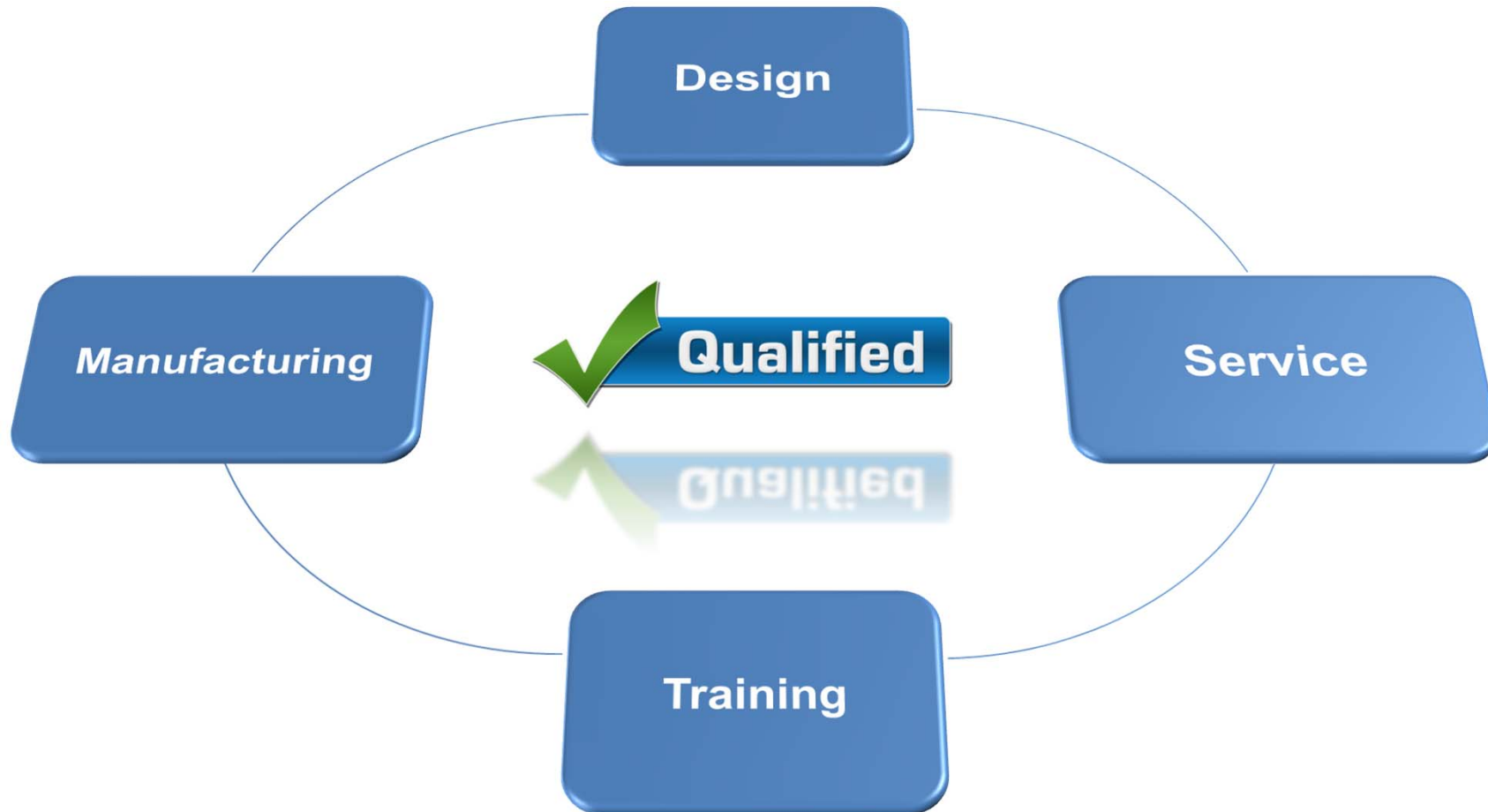
- R&D, Engineering, Commissioning, Sales



BWTS Business Working Process

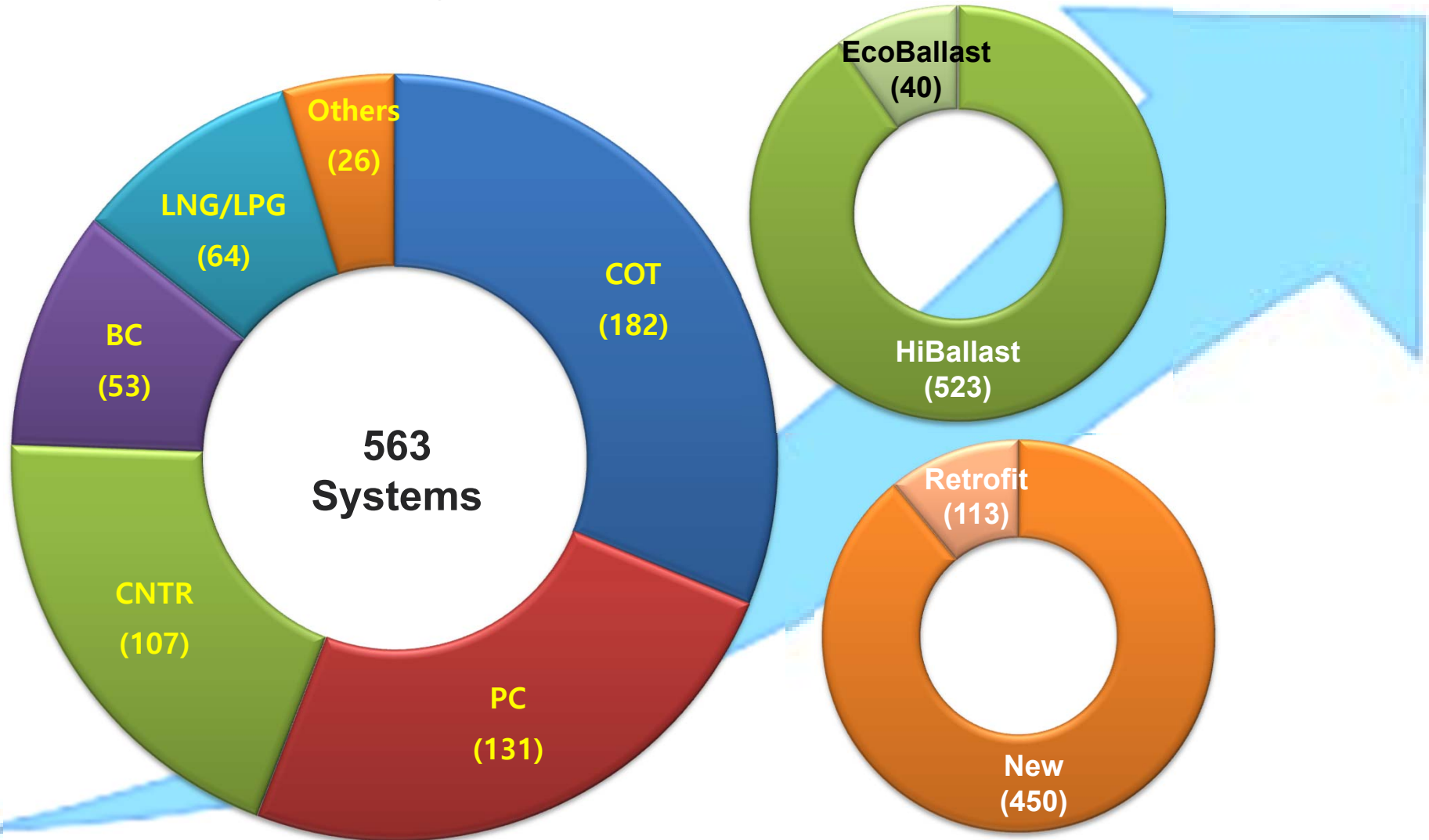


BWTS Business
Qualified Business Partner



BWTS Business

Reference list (As of May. 2020)



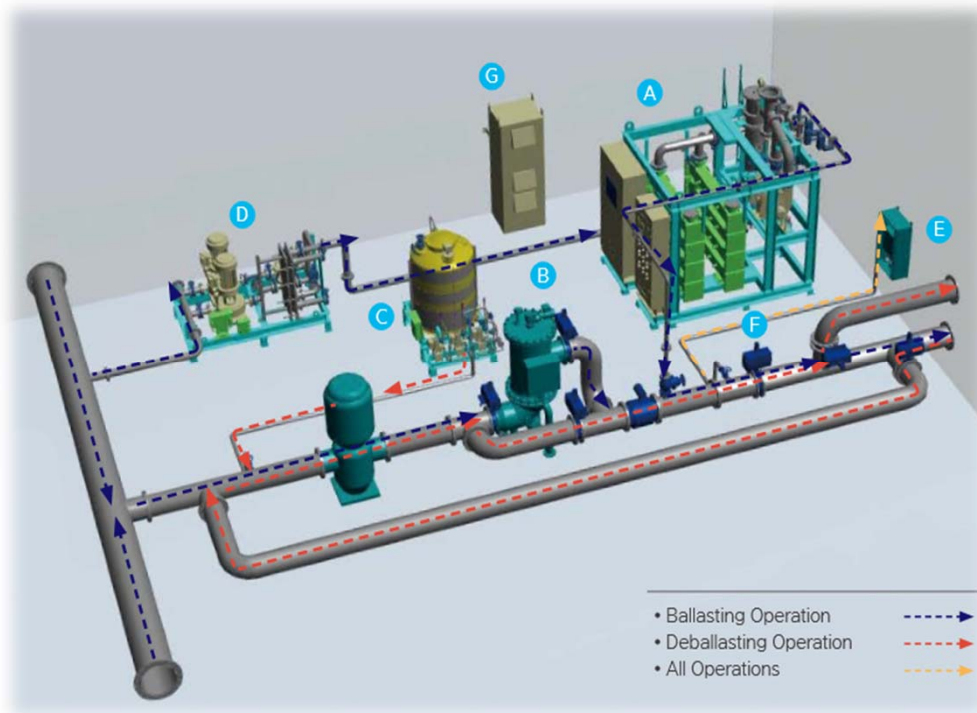
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**HiBallast
Introduction**

HiBallast is the brand name of Hyundai Heavy Industries Co., Ltd. (hereinafter HHI) BWTS, and the proprietary right belongs to HHI. Hyundai Welding Co., Ltd. is an authorized OEM company of HHI BWTS and covers sales, design, fabrication, commissioning and training.

HiBallast

System Features

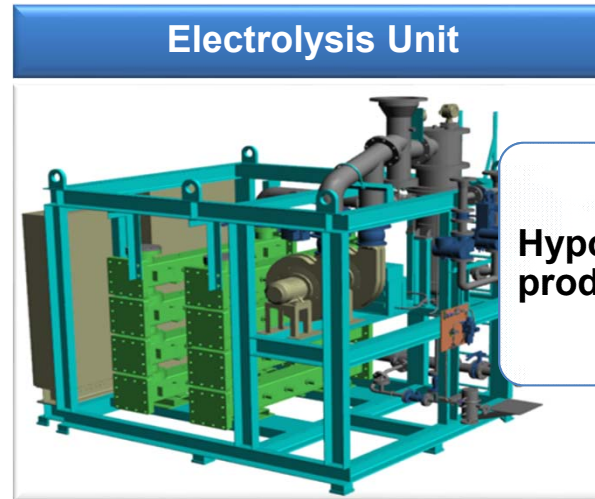
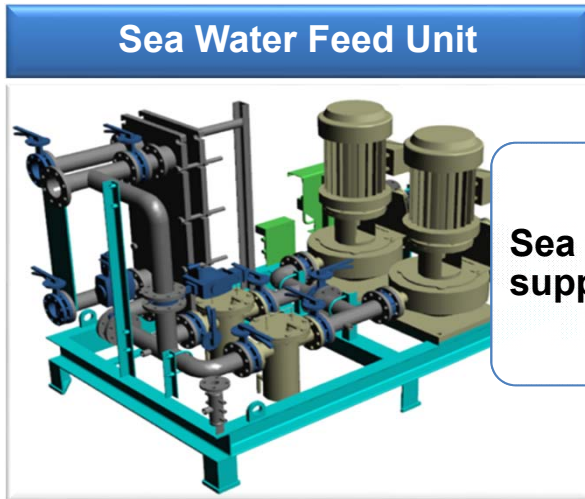


- A : Electrolysis unit
- B : Filter unit
- C : Neutralization unit
- D : Sea water feed unit
- E : TRO sensor unit
- F : Main flow control valve
- G : Rectifier

- **Electrolyte Feed Salinity : > 15 PSU**
- **Electrolyte Feed Temperature : > 4°C**
- **Total Residual Oxidant (TRO) : 8 mg/L**
- **Treatment Capacity : 75 ~ 10000 m3/h**
- **Stable Performance in Low Salinity & Temperature Seawater**
- **Filter + Electrolysis**
- **Indirect (side stream) type**
- **Low Operation Cost**
- **No Filter for Feed Water**
- **Redundancy Operation**

HiBallast

Main Components



HiBallast

Model Line-up

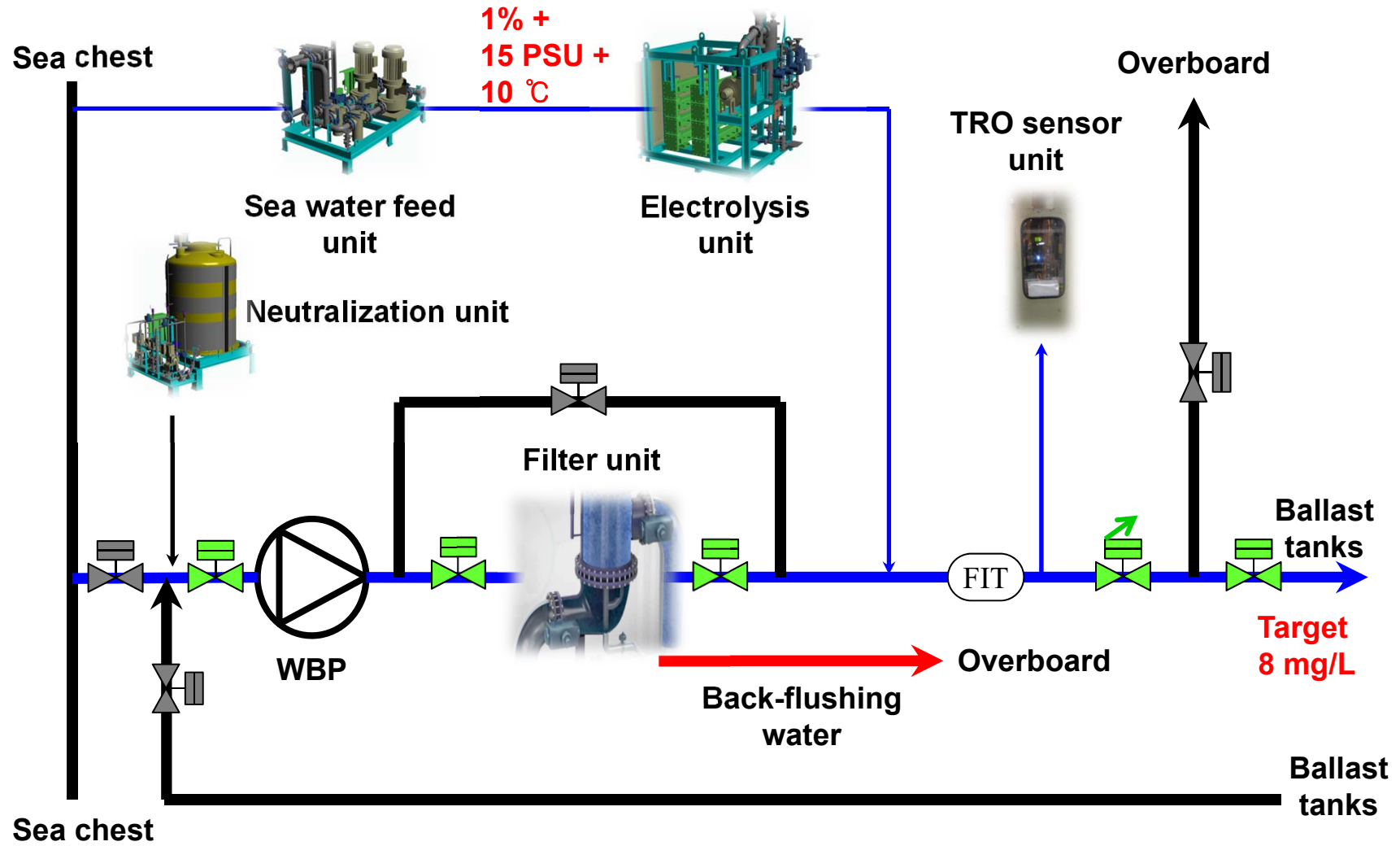


Design Standard

Model	Treatment Capacity(m3/h)	EU Dimension L x W x H (mm)	Filter Dimension L x W x H (mm)	Weight (wet, kg)	EU Power (kW) (at 30 PSU)
HiB-500	500	2800 x 2500 x 2800	650 x 650 x 2100	4000	11
HiB-1000	1000	2800 x 2500 x 2800	1100 x 1100 x 2350	4500	23
HiB-2000	2000	2800 x 2500 x 2800	1300 x 1300 x 2500	5000	46
HiB-4000	4000	3500 x 2500 x 3050	1650 x 1650 x 2700	8200	91
HiB-6000	6000	4300 x 2500 x 3200	2150 x 2150 x 3500	10000	136
HiB-8000	8000	5300 x 2700 x 3200	2200 x 2200 x 3500	13500	182
HiB-10000	10000	6100 x 2700 x 3200	2300 x 2300 x 3700	16400	227

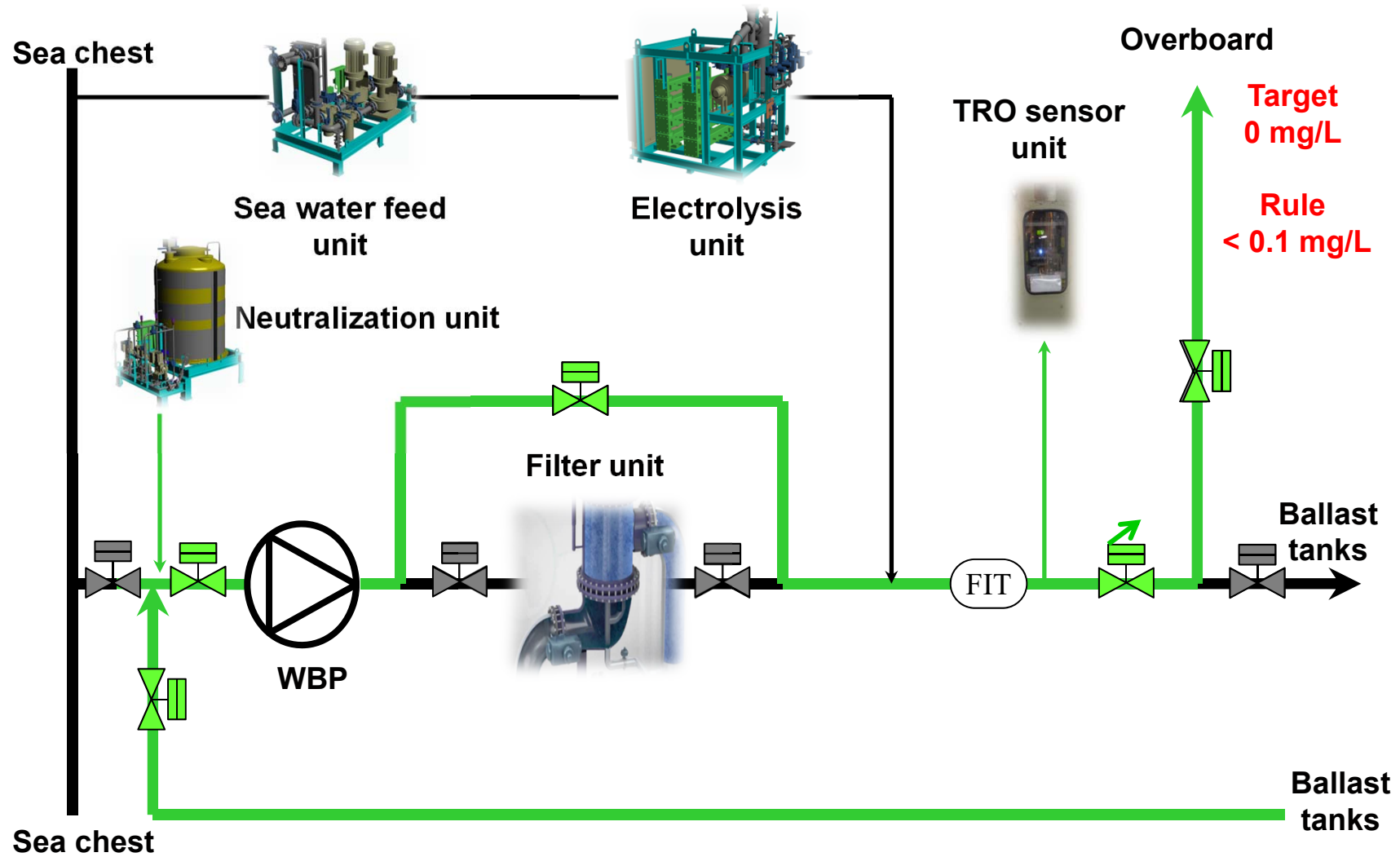
HiBallast

Working Principle - Ballasting



HiBallast

Working Principle - Deballasting



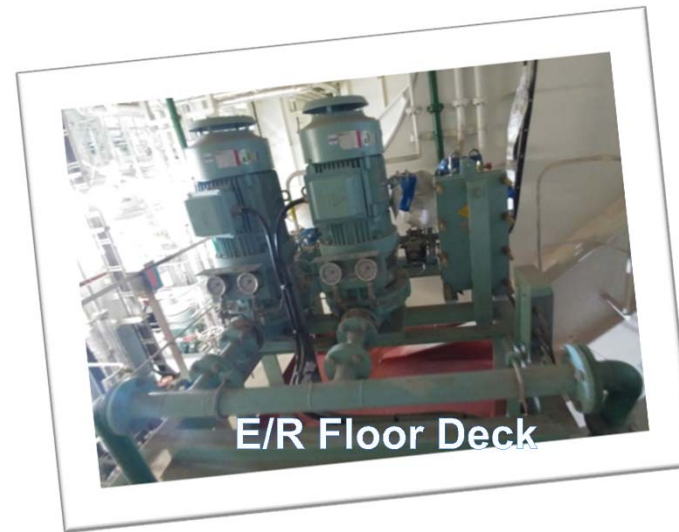
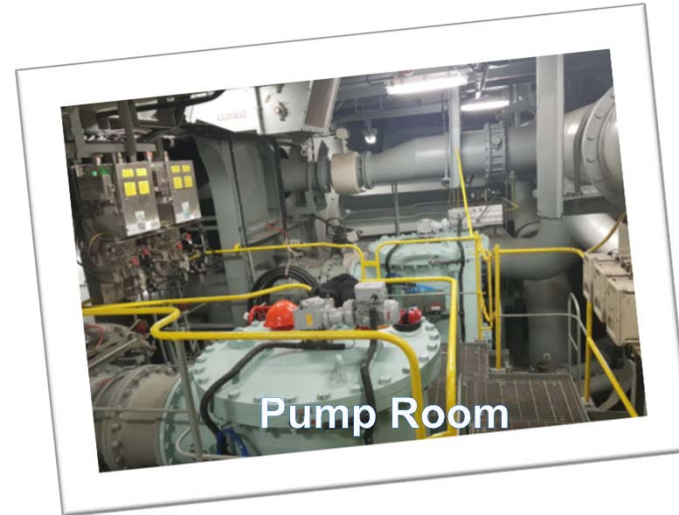
HiBallast

Applications (Case study)



Configurations	Items and Required Q'ty					CAPEX & OPEX
	Filter	Flow-meter	TRO	FCV	Chlorine Injection	
<p>Case 1</p>	2	2	2	2	2	High
<p>Case 2</p>	2	1	1	1	1	Medium
<p>Case 3</p>	1	1	1	1	1	Low

HiBallast Applications



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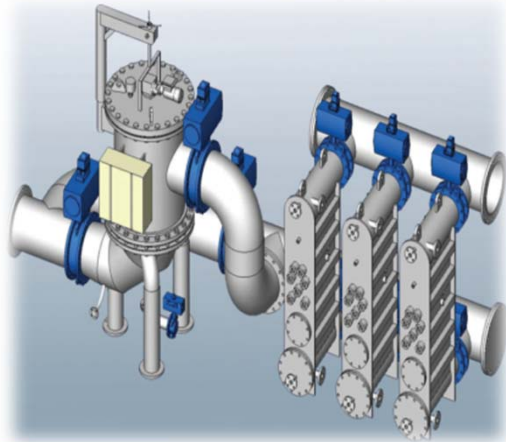
EcoBallast

Introduction

EcoBallast is the brand name of Hyundai Heavy Industries Co., Ltd. (hereinafter HHI) BWTS, and the proprietary right belongs to HHI. Hyundai Welding Co., Ltd. is an authorized OEM company of HHI BWTS and covers sales, design, fabrication, commissioning and training.

EcoBallast

System Features



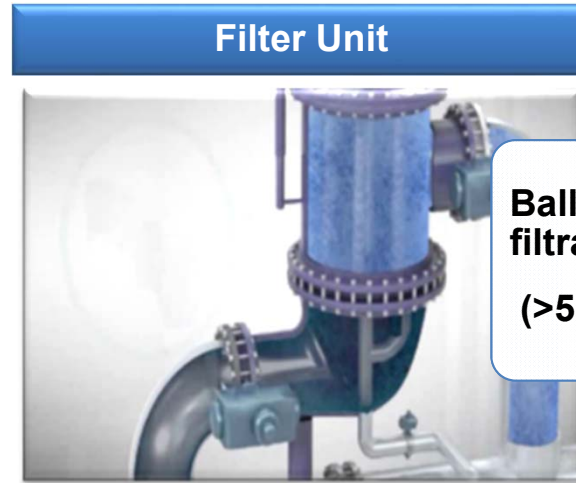
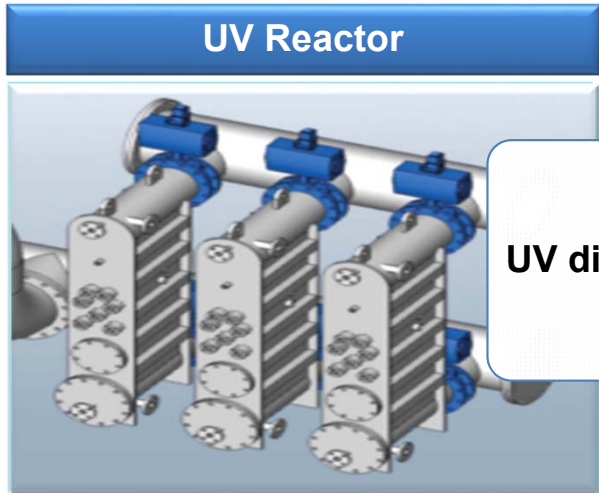
- Filter + UV
- Eco-friendly Disinfection Process
- Simple Configuration
- UV Power Control
- **UVT : > 65% , > 55% (with 56% of TRC)**
- Salinity, Temperature Free
- Treatment Capacity : 350 ~ 2100 m3/h
- Filter Outlet Pressure : > 1.5 bar
- **USCG TA completed on 7th Oct. 2019**

Design Standard

Model	Treatment Capacity(m3/h)	EU Dimension L x W x H (mm)	Filter Dimension L x W x H (mm)	Weight (wet, kg)	Power (kW) (> 80% UVT)
Eco-350	350	400 x 1100 x 1800	850 x 850 x 2300	1400	32
Eco-700	750	600 x 1100 x 1850	1100 x 1100 x 2350	2655	64
Eco-1000	1000	1700 x 1100 x 1800	1100 x 1100 x 2350	3405	96
Eco-1400	1400	1500 x 1100 x 1850	1300 x 1300 x 2500	4410	128
Eco-1800	1800	3000 x 1100 x 1800	1300 x 1300 x 2500	6340	160
Eco-2100	2100	2400 x 1100 x 1850	1350 x 1350 x 2700	6290	192

EcoBallast

Main Components

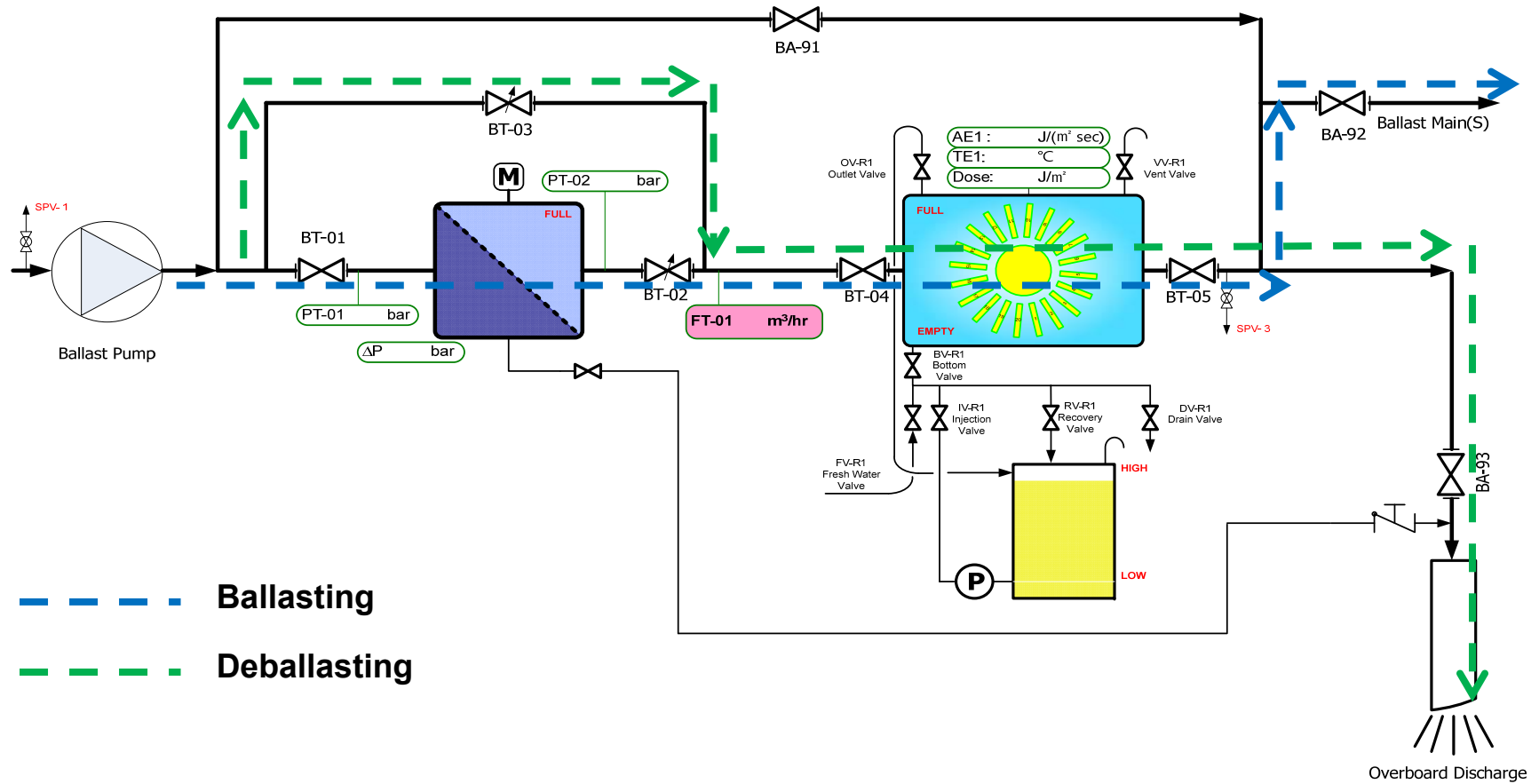


EcoBallast

Working Principle



EcoBallast™ System Flow diagram (TYPICAL)

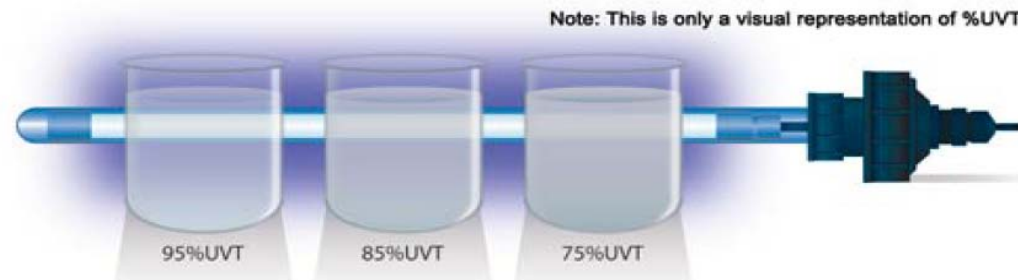


EcoBallast

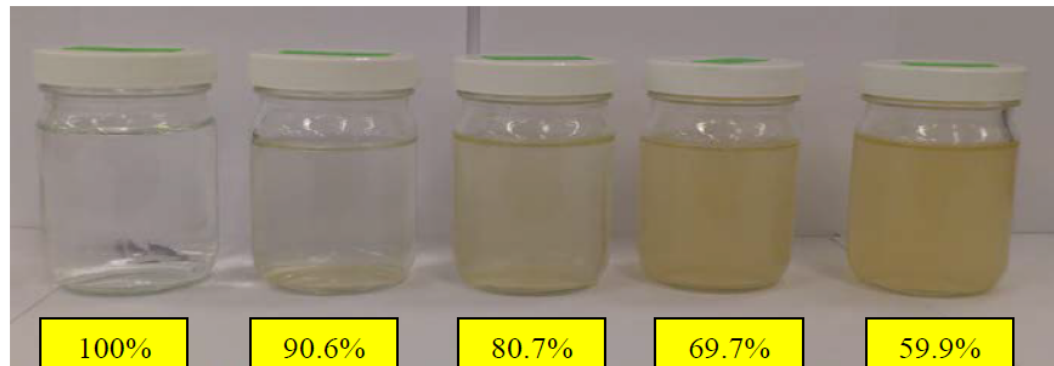


Operation Limitation: UV Transmittance/Intensity

- 1) The below demonstration is shown when different water qualities are used for the same UV power.



(Source: http://www.emperoraquatics.com/uv_transmissibility.php)



* For reference, the UV transmittance near Shanghai Yangsan port is around 5~20%.

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BWTS Controller

BWTS Controller

Reliable, Simple, User Friendly & Approved



Reliable
Stands for ICMS



User Friendly
Fault Finding (PSD)
Intuitive MIMIC



Simple
Auto Start/Stop



Approved

BWTS Controller

Human Machinery Interface

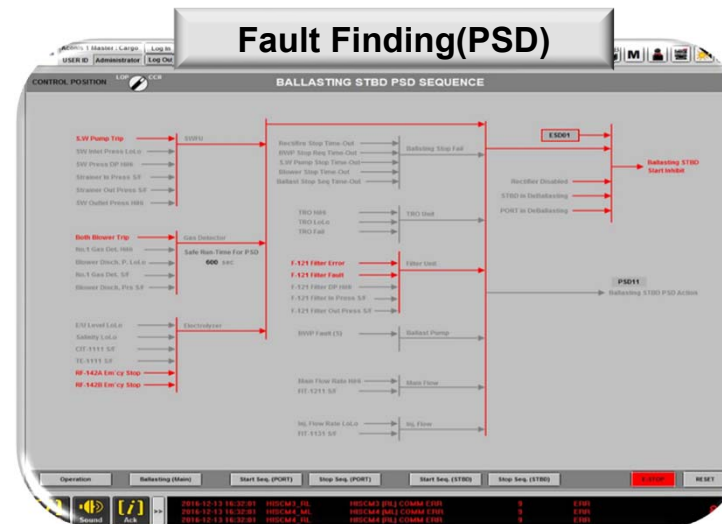
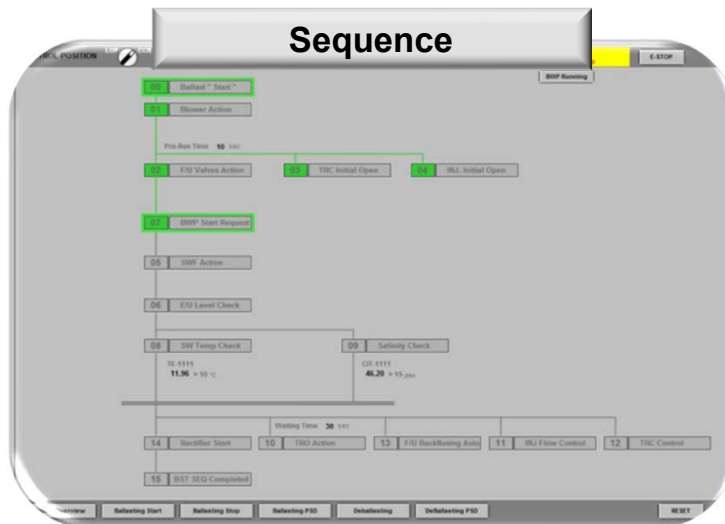
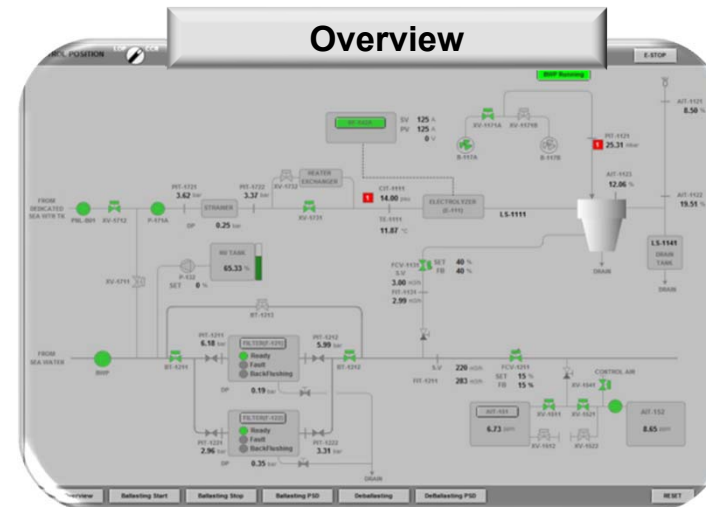


Main

NOTICE
Before Start, Select the Ballast, TRD and Filter
After Start, Don't change the selection

BALLASTING Running	START STOP	BALLAST B-117A <input checked="" type="checkbox"/> F-121 <input checked="" type="checkbox"/> TRD B-117B <input type="checkbox"/> F-122 <input type="checkbox"/> TRD <input checked="" type="checkbox"/>	Inp. Flow Rate FET 4131 11.7 ton Main Flow Rate FET 4211 11.39 ton
DEBALLASTING	START STOP	TRD AIT 414 <input checked="" type="checkbox"/> AIT 416 <input type="checkbox"/>	Ball. TR Level LIT 4211 35 % Main Flow Rate FET 4211 971 ton

Buttons: Ballasting Start, Ballasting Stop, Ballasting PSD, Debballasting, Debballasting PSD, RESET



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Certificates

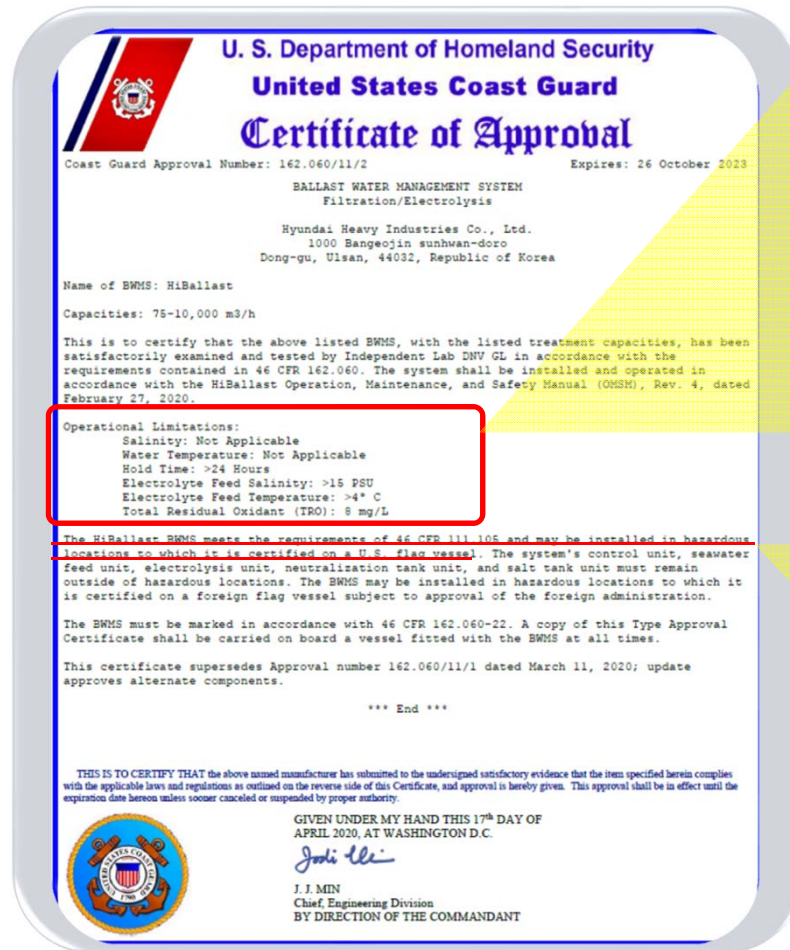
Certificates



IMO/USCG Type Approval Certificate (As of total flag : 21)

<p>IMO TA</p>	 <p>KG</p>	 <p>Greece</p>	 <p>Malaysia</p>	 <p>Liberia</p>	 <p>Norway</p>
<p>USCG TA</p>					
<p>Class TA</p>					
<p>Flag Approval</p>	<p>Malta/Panama/Cyprus/Hongkong/Singapore etc.</p>				

Certificates of HiBallast USCG BWTS TA



- ✓ Salinity : Not Applicable
- ✓ Water Temperature : Not Applicable
- ✓ Hold Time : > 24hrs
- ✓ Electrolyte Feed Salinity : > 15PSU
- ✓ Electrolyte Feed Temperature : > 4°C
- ✓ Total Residual Oxidant (TRO) : 8 mg/L

- ✓ HiBallast can be installed in hazardous location to which it is certified on a U.S. flag vessel

26th Oct. 2018, HiBallast

Certificates of HiBallast DNV-GL TA



DNV-GL
Certificate No:
TAP00001KU

TYPE APPROVAL CERTIFICATE

This is to certify:
That the Ballast Water Management System
with type designation(s)
HiBallast™ BWMS (model range HIB-75(-Ex) to HIB-10000(-Ex))

Issued to
Hyundai Heavy Industries Co., Ltd.
Ulsan, Republic of Korea

is found to comply with
IMO Resolution MEPC.279(70) - 2016 GUIDELINES FOR APPROVAL OF BALLAST WATER
MANAGEMENT SYSTEMS (G8)
Resolution MEPC.169(57)
DNV GL rules for classification - Ships
DNV GL class programme DNVGL-CP-0209 - Type approval - Ballast water management
systems

Application :
This is to certify that the Ballast Water Management System listed above has been examined
and tested in accordance with the requirements of the specifications contained in Guidelines
contained in Resolution MEPC.279(70) and DNV GL Rules stated above. This Certificate is valid
only for the Ballast Water Management System referred to above.

System Design Limitations / Limiting Operating Conditions imposed are described in this
document.

For the compliance with the resolution MEPC.279(70), the Certificate is issued on behalf of
the Norwegian Maritime Authority.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL, unless otherwise instructed by relevant Maritime Administrations.

Issued at **Hovik** on **2018-12-19**
This Certificate is valid until **2023-12-18**.
DNV GL local station: **Ulsan** for DNV GL

Approval Engineer: **Michael Lehmann**
Dag Sæle-Nilsen
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

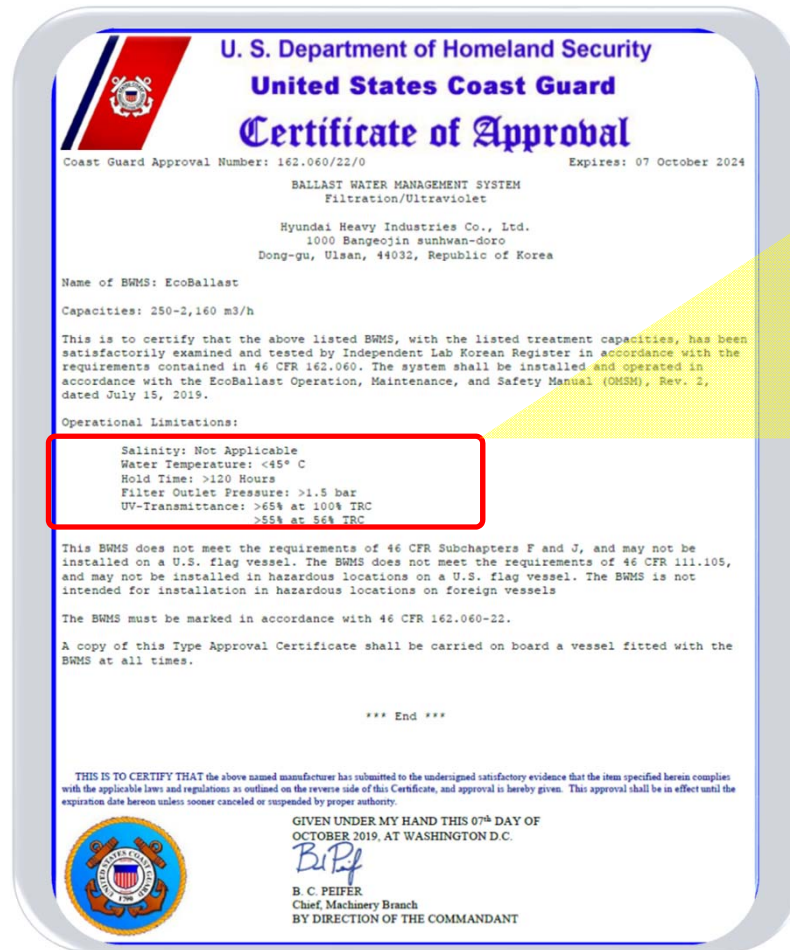
Form code: TA 251 Revision: 2016-12 www.dnvgl.com Page 1 of 9
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- Comply with (IMO Revised G8)
- ✓ IMO Resolution MEPC.279(70) – 2016 Guidelines for Approval of BWMS(G8), the latest
- ✓ Issued on behalf of the Norwegian Maritime Authority

19th Dec. 2018, HiBallast

Certificates of EcoBallast

USCG BWTS TA



- ✓ Salinity : Not Applicable
- ✓ Water Temperature : < 45°C
- ✓ Hold Time : > 120 hrs
- ✓ Filter Outlet Pressure : > 1.5 bar
- ✓ UV-Transmittance : > 65% at 100% TRC
> 55% at 56% TRC

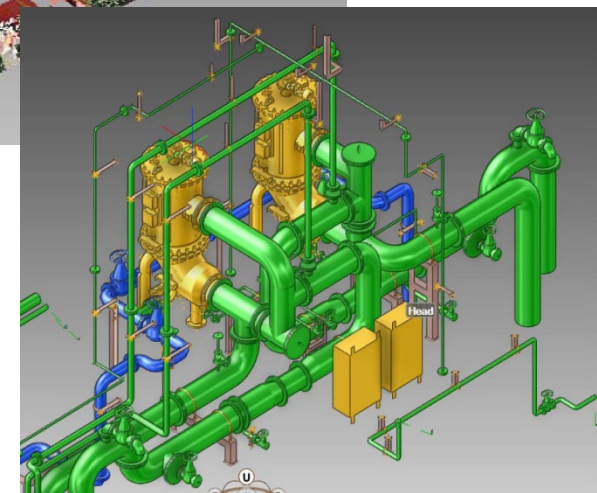
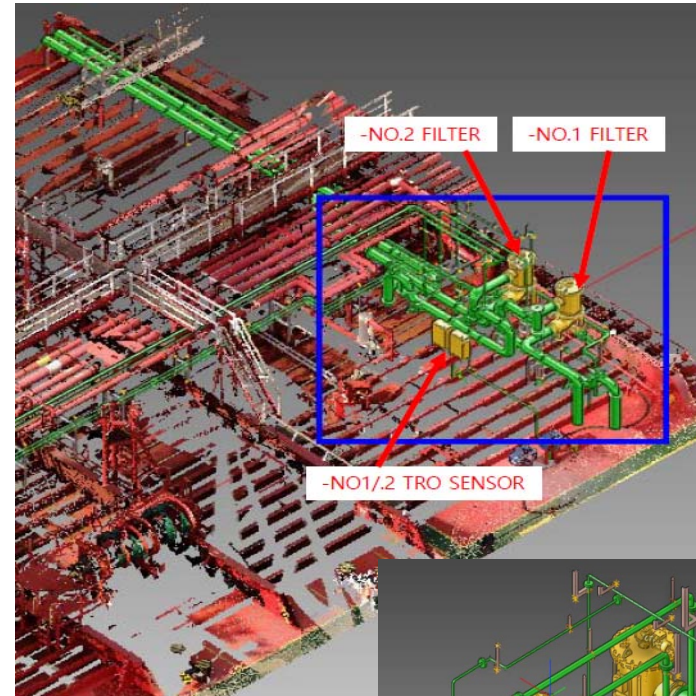
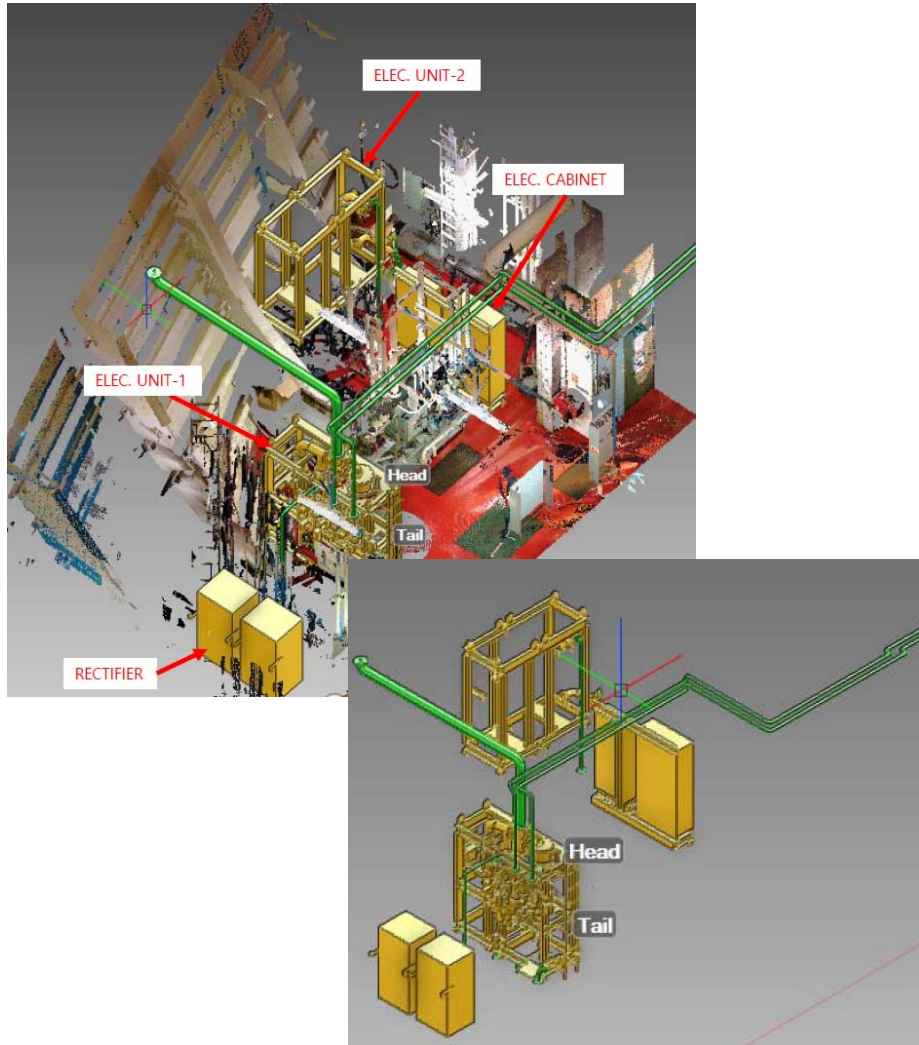
7th Oct. 2019, HiBallast

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Retrofit

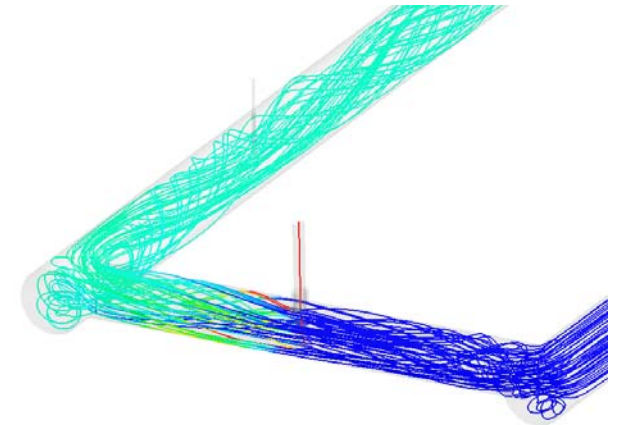
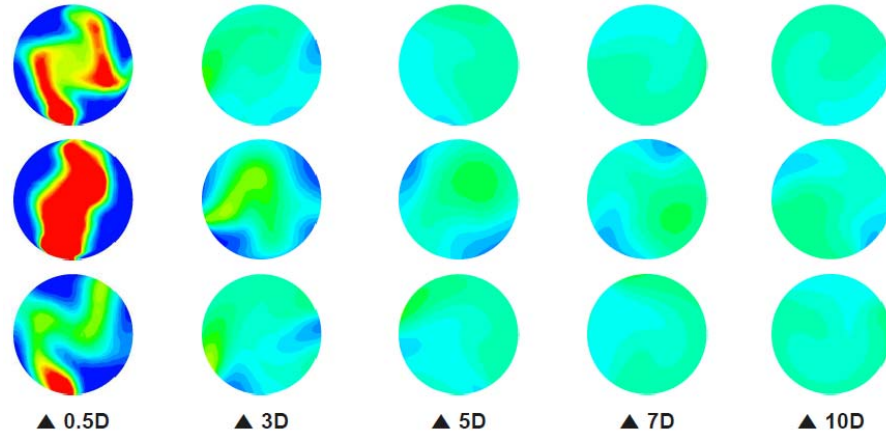
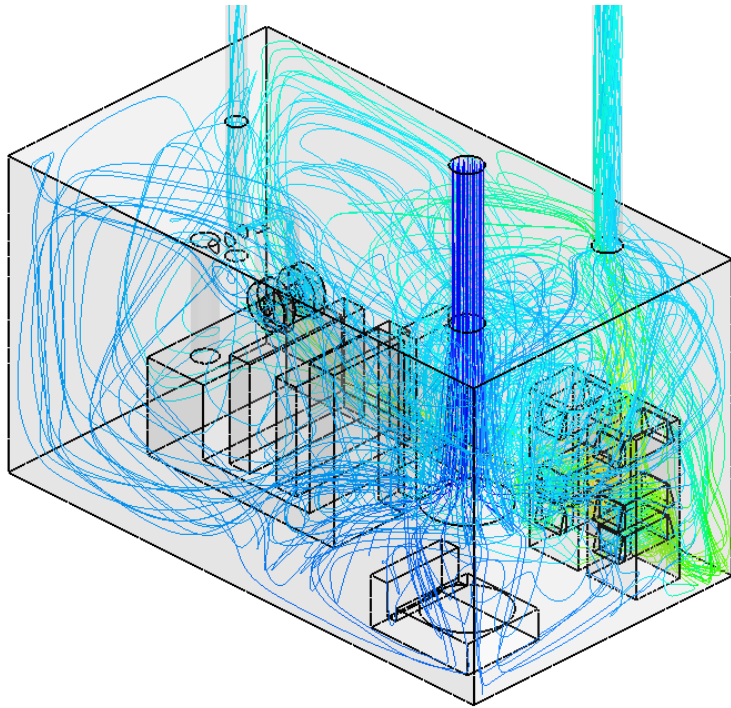
Retrofit Specialist

3D Scanning & Engineering



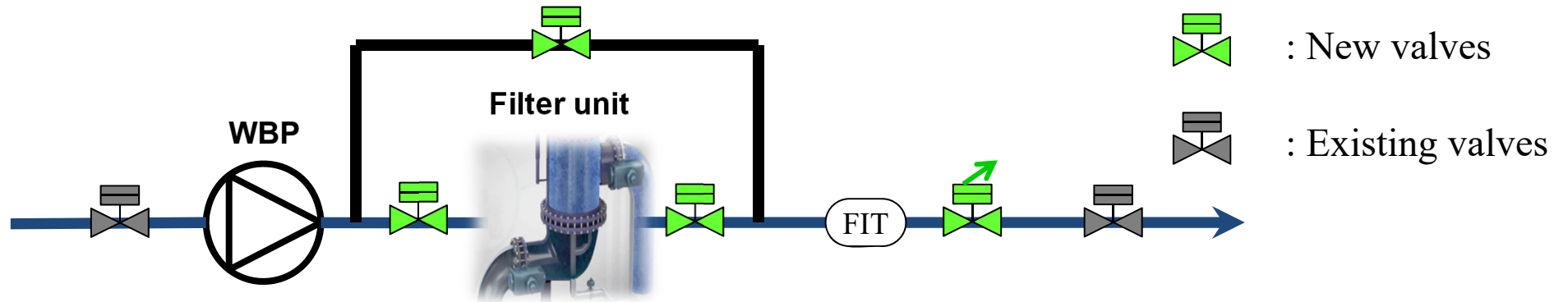
Retrofit Specialist

Optimal Design & Analysis



Retrofit Specialist

VRC Modification



Additional remote valve(s) to be installed for BWTS retrofit.
At least 6 valves to be added on the main pipe line for port/stb'd side.



If these valves are provided by VRC maker, VRC system to be modified including console.



Signal & control interface between BWTS and VRC is required.

Retrofit Specialist HWC Solution (Option)



- ✓ **No additional utilities required**
- ✓ **No VRC modification required**
- ✓ **Easy installation**
- ✓ **Fully interfaced & controlled by BWTS controller**

Cost Saving



Retrofit Specialist

Short Lead Time



Delivery : 3 months (Standard : 6 months after contract)

Description	0w	1w	2w	3w	4w	5w	6w	7w	8w	9w	10w	11w	12w	13w	14w	15w	16w	
BWTS Retrofit Overall Schedule	[Pink bar spanning from 0w to 16w]																	
Contract with fixed layout	[Yellow bar]																	
BWTS Manufacturing		[Orange bar spanning from 1w to 11w]																
Shop Test													[Green bar]					
Shipment														[Blue bar]				
Installation & Commissioning															[Purple bar]			

8

**Training
&
Global Service**

BWTS Training Training Center



Facility

- Class room
- Exercise area
- Resting room



Exercise Area

- Electrolyzer
- Filter unit
- TRO sensor
- Rectifier, and etc.



Attendees

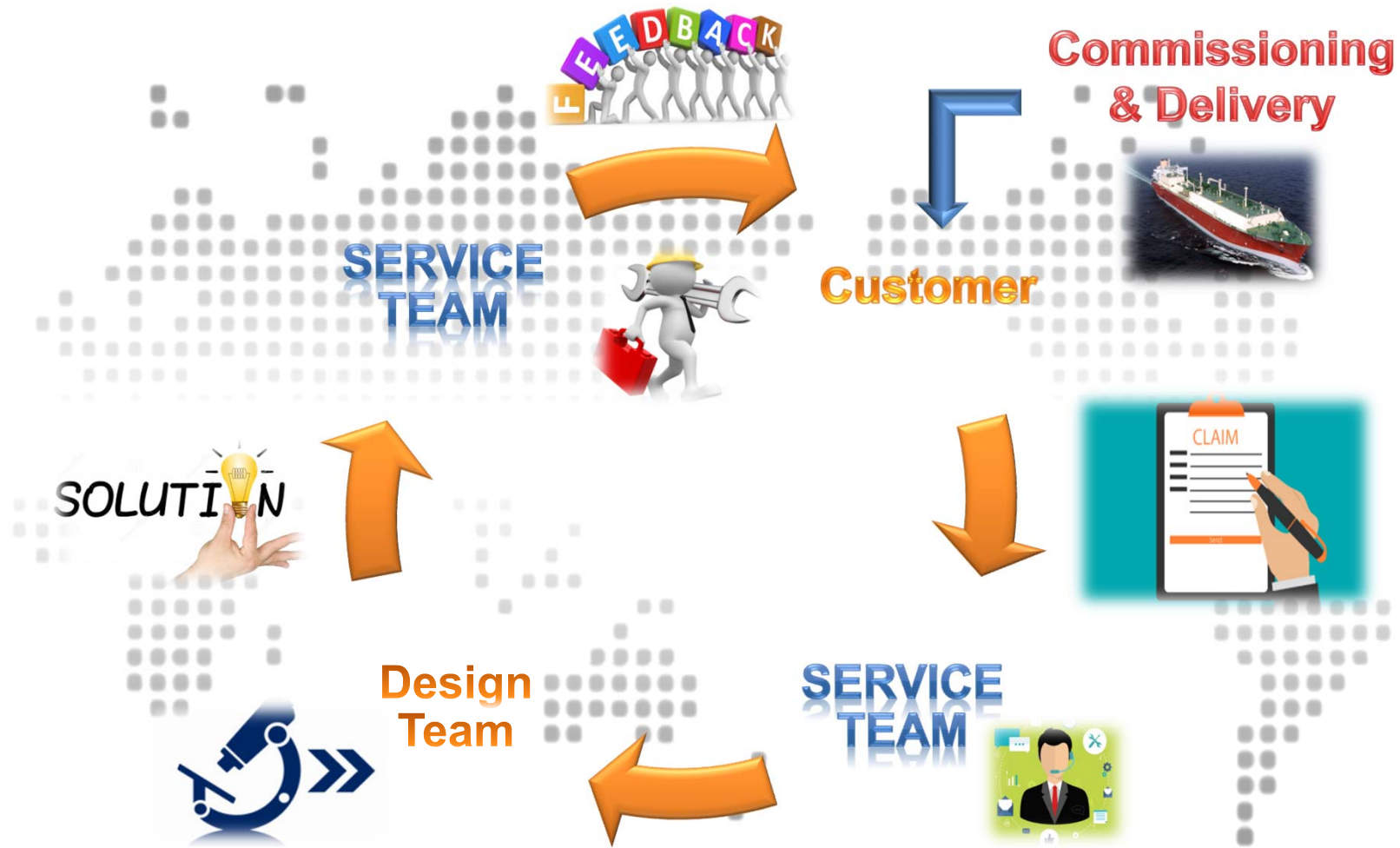
- 62 times training provided
- 5~10 persons per training
- Max. 25 persons



Global Service Global Network



Global Service After Service



9

Special Packages

Special Packages

Hi~



Hi-Service *Q*

- Special service package
- Actual inspection of major components of BWTS
- Long-term care service on a scale of 1, 3, and 5 years.
- Prevention from unexpected malfunction

Hi-Power *V*

- Electro-hydraulic valve power pack
- Modulated component for easy maintenance
- Reliable & easy installation
- Directly controlled by BWTS controller

Hi-Simul *K*

- HiBallast simulator for training
- Advanced course with various scenarios
- Can be used for crew training by owner
- Exactly same with onboard controller
- Portable case

Thank you & Q&A

