Environmental treatment through simple and flexible solutions
IMO Ratification
September 2016

• On 8th September 2017 the IMO ratification comes into force worldwide.
• Increase in drydockings expected in 1st half of 2017 due to owners wishing to avoid installing.
• Possible bottleneck of drydockings during period of 2020-2021.
DEMAND FOR RETRO FITTING

NUMBER OF SHIPS DUE FOR RENEWAL SURVEY
(Based on original delivery date vs actual due date)

Data from IHS Fairplay ship database (January 2016), estimated approximately 34,000 ships would be required to install BWMS.
USCG Type approval 2-Dec-16

- No changes to existing OBS
- Existing customers receive USCG TA (500 systems)
- No limitation to salinity and flow
USCG - IMO Mode Switch

HOME page is showing current mode.

Click on the indication to be able to change mode.
IMO Mode

IMO mode has 100W/m² UVI limit and power regulation is ON
USCG Mode

USCG mode has 600W/m² UVI limit and power regulation is OFF
Optimarin started in 2015 on “the road to USCG type approval” and may become one of the first suppliers of ballast water systems which obtains the important “USCG type approval”.

Already in 2014 the company decided to go for USCG and the CMFDA standard using the system with full flow.

Land based testing has been done at the Norwegian Institute for Water Research (NIVA) with DNV-GL as independent laboratory/class authority. The system used for the testing has been OBS334 BK.

Environmental testing started in February 2016 at Applica, Norway.

Shipboard testing has been performed onboard Saga Future – IMO No.: 9613336 with OBS1000 BK. The test started in the Netherlands in October 2015 and continued in France, Singapore, China and Taiwan.
Optimarin AS

- 1994 Founded by Capt. Nilsen – Stavanger, Norway
- 1998 Started Development of Optimarin Ballast System
- 2000 (April) First Installation on “Regal Princess”
- 2007 Compliant to IMO Regulation D2
- 2009 Type Approval (G8 - No Additives or Chemicals)
- ISO 9001:2008 Accredited
- 2016 USCG Type Approval (No limitation to Salinity and Flow)

Committed and Continuing to Build an Efficient Worldwide Organisation to Meet the Strong Market Demand
Optimarin Ballast System (OBS)

- **Ballast in**
  - MicroKill Filter removes larger organisms / particles
  - MicroKill UV kills or inactivates life

- **Ballast out**
  - Bypass filter
  - MicroKill UV 2nd treatment kills remaining life

**NO Added Chemicals or Active Substances!**
3 Filter Options

- 40 Micron
- Self cleaned & With automatic back-flush
- Pressure differential
OBS Scalable UV

- **One UV lamp per UV chamber**
  - Each chamber treats up to 167 m³/h
  - Standard piping components

- **Parallel installation on manifold**
  - Up to any capacity (no limitation)
  - Self cleaning with no moving parts

- **Power to lamp**
  - 35 kW per UV lamp
  - IMO: Power regulation based on water quality (13-18kW)
  - USCG: No power regulation
Modulated UV

1500 m³/h

334 m³/h
Advanced UV Control

Ballast Water Treatment

Advanced UV control

Select active UV for pump no 1
- UV chamber 1
- UV chamber 2
- UV chamber 3
- UV chamber 4
- UV chamber 5
- UV chamber 6

Select active UV for pump no 2
- UV chamber 1
- UV chamber 2
- UV chamber 3
- UV chamber 4
- UV chamber 5
- UV chamber 6

Use 'Advanced UV control'...

Mode: Local  Filter in auto  Status: System standby

Back

12-09-16 14:15

Optimarin
Explosion Approval

Ex - Zone 1, IIC-T4
Stripping with ejector

Diagram showing components such as:
- Electric air release
- Mixed water to UV system
- Ejector
- Non return valve
- Water switch
- Filtered drive water
- Drive/ballast water inlet
Control and monitoring considerations

- Level of detail (Profibus or hard wire)
- Remote access and support
- Integration with Power Management System
Local Control Panel

Ballast Water Treatment

Switch to:
> Ejector view

Pressure 1 bar

Flow 0 m³/h

In > 1 hour

Start ballast

Open bypass

Start deballast

Mode: Local
Filter in auto
Status: System standby

Total UV power
0 kW

Use pump no 1
Use pump no 2
Use both pumps

12-09-16 14:34
Remote Control and Integration with IAS

M.S. SJØVEIEN

Optimarin Ballast System

Optimarin Ballast System

Flow and pressure

0.0 kW
6.0 W/m²
20.0 °C

Treatment

Advanced UV control
(shut down parts of UV system)

Start Ballasting
Start Debailing
Start Pipelining
Open bypass
Acknowledge alarm

Set values “Sea chest - OBS - Binnacle”
OBS Ballasting not active
OBS Debailing not active
OBS Pipelining not active
OBS at full treatment
OBS bypass valve open
OBS in remote mode
OBS warning
OBS near-shutdown alarm
OBS shutdown alarm! System in bypass!

Enable “Advanced UV control”
Use “Scheme 1”
Use “Scheme 2”
Use “Both schemes”
Installation considerations

• Where to Install - available space?
  – Engine room, pump room, other void spaces
  – Submerged ballast pumps (deck house)

• Optimal component selection
  – Filter type horizontal, vertical
  – UV manifold single sided or double sided
  – Horizontal or vertical

• Built together or split up
  – Skid is potential for smaller systems

Figure 3: Ballast Tank divided for BWT
500 m³/h System
500 m³/h system
1000 m³/h system
1000 m³/h system
Optimarin
Turnkey Retrofit
Practical experience - wide range of vessels
Gulf Offshore - “North Mariner”

Installed in dry dock
“Siem Garnet and Siem Amethyst”
KGJS- “Cyprus Cement”
Retrofit installed at sea
PSV – X-Bow – 250m³/h

Installed in dry dock – Orskov Yard
Saga Forrest Carriers 2000 m3/h
Retrofit - installed yard in China
Bulk Carrier “1000 m³/h”
Goltens Green Technologies modelling
Bulk Carrier “1000 m³/h”

Goltens Green Technologies modelling
Hapag Lloyd, MS Europa “167 m$^3$/h”

Retrofit - Blom & Voss
Hapag Lloyd, MS Europa “167 m³/h”

Retrofit - Blom & Voss
Hapag Lloyd, MS Europa “167 m³/h”

Retrofit - Blom & Voss
A wide range of Customers
Vessel Orders

Optimarin have acquired a number of vessels to Supply between 2009-2016 (470+ vessels to-date)

Number of vessels fitted to-date is over 280+ both In Retro and New Buildings

Optimarin frame agreements book to 2020 is over 2,700+ vessels as of end of August 2016.

Vessel Types from Offshore, Bulk Carriers, Container Vessels to Product/Oil Tankers.
Saga Forrest Carriers

1000 and 2000 m$^3$/h - 30 installations
(New building & Retrofitting)
Evergreen

1000 m³/h - 30 installations
Summary

- Planning is crucial
- Flexibility
- Available resources
- Track record
- Experience
“For Optimarin it is not enough to simply be approved, we operate in accordance with ISO 9001/2008, our vision is to have the most environmentally friendly, easiest, simplest, efficient and most cost-effective ballast water purification system in the world.”

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