

## The First USCG Type Approved Ballast Water Treatment System December 2016

---

On 2nd December 2016, the Optimarin OBS/OBS Ex ballast water management system (BWMS) was issued with a type approval certificate by the USCG Marine Safety Center for operation in US waters (approval number 162.060/1/0). The Optimarin Ballast System (OBS) was IMO Type Approved in November 2009 and is manufactured by Optimarin AS, a specialist ballast water management company based in Stavanger, Norway. This is the first BWMS to be approved under the USCG regime of testing for compliance with the USCG Ballast Water Discharge Standard Final Rule (46 CFR 162.060). However, under the temporary alternate management system (AMS) scheme, the OBS BWMS has been allowed to operate in US waters since June 2013, when it was first accepted as an AMS (AMS identification number AMS-2013-Optimarin Ballast System-001), with subsequent revisions accepted in May 2014 and November 2014.

The OBS BWMS consists of a pre-treatment stage followed by a UV irradiation stage. On deballasting, the ballast water is passed through the UV chamber for a second time to eliminate regrowth. There are three filter options: the Filtersafe® basket-type filter, the Boll & Kirch candle-type filter and the Filtrex ACB® basket-type filter. The robustness and efficiency of the filter component within a UV BWMS is of paramount importance, since this directly affects how much irradiation can penetrate the ballast water to disinfect the organisms.



*Skid-mounted Optimarin Ballast System for 500 m<sup>3</sup>/h flow rate (with three UV chambers in parallel) left and OBS (500 m<sup>3</sup>/h) right (courtesy Optimarin AS)*

It is interesting to note that the first BWMS to be type approved by the USCG uses UV technology, as there is a significant difference between the USCG ballast water management regulations and those from the IMO. To establish the regulatory compliance of a BWMS, the US regulations test whether organisms within the ballast water are living or dead. The IMO legislation uses viable/non-viable criteria and the newly revised IMO G8 Guidelines, agreed at MEPC 70, retained the use of viability to check for compliance, with the definition “Viable organisms are organisms that have the ability to successfully generate new individuals in order to reproduce the species”. Using the USCG’s ‘instant kill’ criteria to verify compliance is satisfactory for most types of ballast water treatment technology, but UV technology does not, typically, disinfect water by killing organisms outright. In general, UV light disrupts the DNA of the organisms and renders them unable to reproduce, thereby making them non-invasive (in line with the IMO’s viable/non-viable criteria), however higher doses of UV light can kill organisms instantly. The OBS BWMS has been tested using the ‘instant kill’ criteria and can meet the USCG standards.

The USCG testing process is very thorough and tests the system's operation on land and on board ship, as well as the components of the system. The commanding officer of the Marine Safety Center, Capt. John Mauger, has stated that *"The U.S. Coast Guard's testing requirements set strong standards for the performance and validation of ballast water management systems under a range of conditions. The issuance of the type approval certificate documents the ability of the Optimarin Ballast System to meet the U.S. Coast Guard's standards."*

USCG type approval testing is carried out by USCG approved laboratories and is a lengthy (2 year) and expensive (US\$ 4 million) process for manufacturers. There are about 9,300 individual vessels visiting US ports annually – about 10% of the world fleet. To make UV BWMS more competitive with regards to power use, it has been suggested that a vessel installed with a UV BWMS could have a 'US operation mode', whereby more power (increased by 4 to 8 times the standard levels) is used to enable the instant kill necessary for compliance with the US regulation. When operating in waters where the IMO legislation is in effect, the power to the system could be reduced and the ballast water disinfected using DNA damage.

While Optimarin AS manufactures the first BWMS to be USCG type approved, it will not be the only one. It is important that owners and operators understand that there are several ways in which they can be compliant with US BW regulations:

- Install a BWMS that has been approved by the USCG, eg the OBS BWMS from Optimarin AS, if it is suitable for the particular vessel
- use a supply of public water, such as drinking water
- use a BWMS that has been approved by a foreign Authority. These are called alternate management systems (AMS). The USCG confers a short-term acceptance for a 'grandfather period' of 5 years after a vessel's compliance date, but the manufacturer also has to apply to the USCG for Type Approval in order for ships to continue using the system after the 5 year deadline
- retain ballast on board while in US waters
- discharge ballast water and sediment to a reception facility.

It is important to note that there are many factors other than whether it has USCG type approval that should be taken into consideration when choosing a BWMS:

- **The space available on board.** For example, in the case of an existing vessel, can a modular BWMS be fitted, will it be necessary to use a port-based BWMS or to apply for an exemption?
- **ballast water capacity of the vessel.** This is important for larger vessels since not all BWMS are approved for, or capable of, ballasting large quantities of ballast water
- **amount of energy necessary to operate the system.** For example, can existing auxiliary generators cope with additional power requirements of the BWMS?
- **type of vessel.** For example, will an approved explosion proof BWMS be required?
- **compatibility with existing systems on board.** For example, can a BWMS be easily integrated into existing ballast systems?
- **crew safety.** For example, are crew trained properly with the handling and storage of any chemicals used with the BWMS?
- **operating time.** For example, does the BWMS require a long journey time for treatment to be completed?
- **CAPEX and OPEX costs.** For example, retrofitting will cost more than outfitting a newbuild, and some treatment types require more power to operate the process, such as BWMS using electrolysis or UV irradiation technologies
- **trading routes.** For example, will operations be carried out in freshwater, requiring a BWMS approved for use in freshwater? Similarly, will the vessel be ballasting in US waters, in which case, if a BWMS is used it must be approved by the USCG for use in US waters, either temporarily as an AMS or USCG type approved.

**Dr Linda Churcher**  
Senior Technical Editor  
December 2016