Ballast Water Treatment Technologies:
"The Regulations, Which System and When to Install"

The MARPOL Training Institute, Inc. (www.marpoltraining.com) is sending this to you so that you may consider what you will have to accomplish with your vessels to meet the ballast water standards that are coming into force for vessels operating in the both international port waters and those of the United States.

From the U.S. Coast Guard Office of Operating and Environmental Standards:

The Coast Guard is proposing a two-phase standard for the allowable concentration of living organisms in ships' ballast water discharged in U.S. waters.

Proposed Standards and Schedule:

Table 1 compares the Coast Guard's proposed phase-one and phase-two standards. The phase-one standard is based upon the International Maritime Organization (IMO) "Regulation D-2" standard of the Ballast Water Management Convention. The phase-two standard is based on the most stringent proposed U.S. state regulations that are based on quantitative limits. Table 2 lists the implementation schedules. If a practicability review finds that no systems can meet the entire phase-two standard, but a *significant improvement* over phase-one can be practicably achieved, then the Coast Guard will propose intermediate standards and their associated timeline.

Table 1. Comparison Between Phase-One and Phase-Two Discharge Standards

Organism Size	> 50µm*	>10µm & ≤50µm	≤ 10µm	Pathogens and indicators		
				Toxicogenic *V. cholerae* O1 & O139	*E. coli*	Intestinal enterococci
Phase One	< 10 / m^3	< 10 / ml	N/A	<1 cfu / 100 ml	<250 cfu / 100 ml	<100 cfu / 100 ml
Phase Two	< 1 per 100 m^3	< 1 per 100 ml	<1,000 bacteria & 10,000 viruses per 100 ml	<1 cfu / 100 ml	<126 cfu / 100 ml	<33 cfu / 100 ml

cfu = colony forming unit

Table 2. Phase One and Phase Two Implementation Schedules

Vessel Category and BW Capacity (cubic meters, m^3)		Vessel Construction Date	Vessel Compliance Date
Phase One Implementation			
New Vessels	ALL	On or after January 1, 2012	On Delivery
Existing Vessels	Less than 1500 m^3	Before January 1, 2012	First drydocking[1] after January 1, 2016
Existing vessels	1500-5000 m^3	Before January 1, 2012	First drydocking after January 1, 2014
Existing vessels	Greater than 5000 m^3	Before January 1, 2012	First drydocking after January 1, 2016
Phase Two Implementation			
New Vessels	ALL	On or after January 1, 2016	On delivery
Existing Vessels	<1500 m^3	Before January 1, 2016	First drydocking after January 1, 2016 or 5 years after installation of BWMS meeting phase-one standard.
Existing vessels	1500-5000 m^3	Before January 1, 2016	As above
Existing vessels	>5000 m^3	Before January 1, 2016	As above

* μm: micrometer, a measurement of length, is equal to 1/1,000 of a millimeter or about 4/100,000 of one inch.

[1] Refers to scheduled drydocking which, depending on vessel type and service, could be either a 2.5, 5 or (in very rare cases) 10 year interval.

From the International Maritime Organization: Convention for the Control and Management of Ship's Ballast Water:

1. Regulation B-3.1 of the Ballast Water Management Convention provides:

"A ship constructed before 2009:

.1 with a Ballast Water Capacity of between 1,500 and 5,000 cubic meters, inclusive, shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2014, after which time it shall at least meet the standard described in regulation D-2;

.2 with a Ballast Water Capacity of less than 1,500 or greater than 5,000 cubic meters shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2016, after which time it shall at least meet the standard described in regulation D-2."

2. Regulation B-3.2 of the Ballast Water Management Convention provides:

"A ship to which paragraph 1 applies shall comply with paragraph 1 not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of delivery of the ship in the year of compliance with the standard applicable to the ship."

3. The "anniversary date of delivery of the ship in the year of compliance" specified in regulation B-3.2, refers to years 2014 and 2016 indicated in regulation B-3.1. Consequently, ships with a ballast water capacity between 1,500 m^3 and 5,000 m^3, inclusive, are required to comply with the D-2 standard not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of the ship in 2014 under regulation B-3.1.1; and ships with a ballast water capacity of less than 1,500 or greater than 5,000 m^3 are required to comply with D-2 standard not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of the ship in 2016 under regulation B-3.1.2.

Considering the table of companies, their systems and the effectiveness of treatment to be achieved, how does a vessel owner pick the right system for their vessel(s)?

For a list of BWT treatment systems click on http://www.MARPOLtraining.com/swf/BWTT.xls

This document is not intended to include a method for selecting the correct treatment system, it is however intended for vessel owners and operators to use the following questions in an attempt to clarify the steps they need to make in deciding which system to chose and when to make the installation.

1. If I choose a ballast water treatment system using a chemical additive, will it limit where my vessel can trade in the future?

2. If I choose electrochemical ballast water treatment system (i.e. Chlorine, Ozone), will the discharges later be deemed harmful to the environment and limit my trade routes?

3. If I choose an ultraviolet light ballast water treatment system, does my vessel have enough reserve electrical capacity or will I have to consider modifications to my vessel's electrical power system?

4. Which system will not create any long or short term adverse conditions for my vessel structures, cathodic protection and coating systems?

5. If I choose a system utilizing filtration or separation technology, where will I store the residue? Where can the residue be discharged, at sea or ashore?

6. If I choose a combination system, what information do I need to collect to choose the best combination of treatments?

7. Which system is compliant for the type of vessel I am operating?

8. Which system will not require excessive manpower or maintenance costs to keep operating effectively?

9. Which of the companies developing the ballast water treatment systems do I have the most confidence in for technical & warranty support?

10. Does my vessel have the physical room to install the system of my choice or do I have to look at alternative compliant systems?

11. Considering the timeline set forth for ballast water treatment compliance by the IMO, USCG, EU and other regulatory agencies, do I try to select and install a system at my next shipyard period so I do not disrupt my trade

schedule or do I wait for the latest technology and have an unscheduled shipyard period in order to meet the deadline at the last minute?

We suggest that you review the planned dry-docking schedule of your vessels and consider what action will have to be taken to meet the foregoing schedules.

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