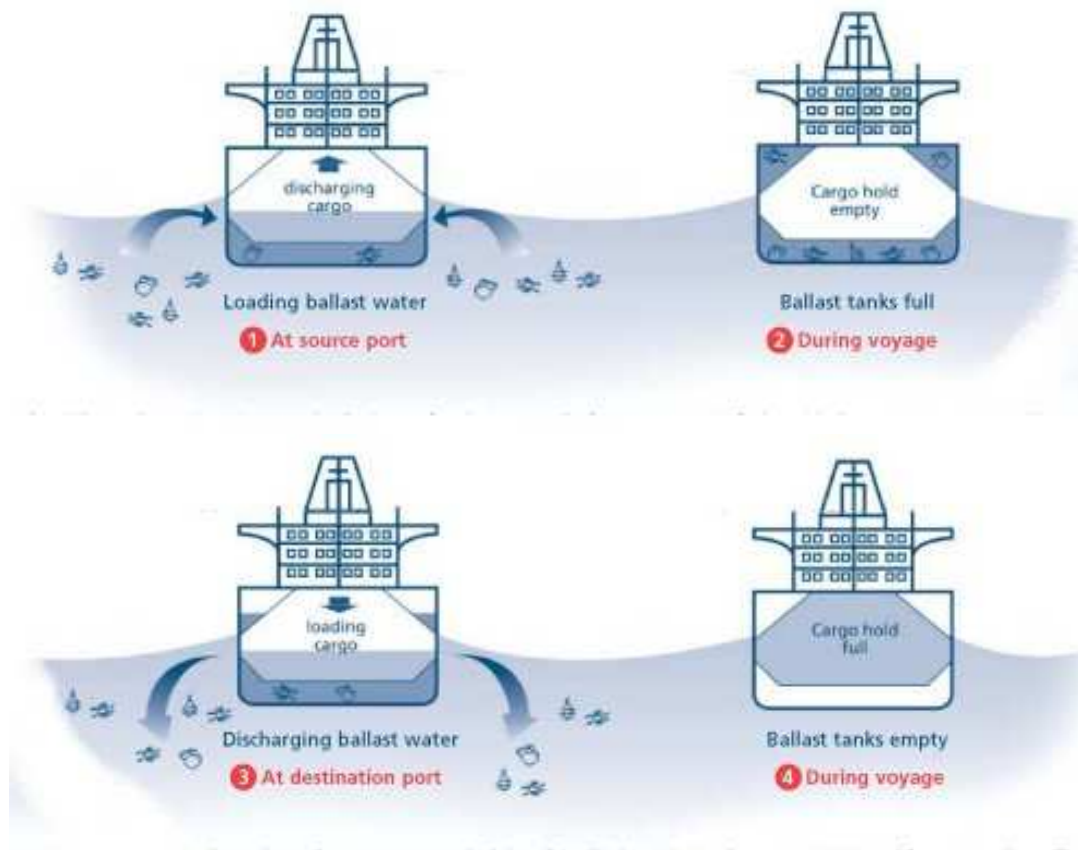


BALLAST WATER TREATMENT April 25th 2012



General Concept



Ballast water capacities for different types of ships

VESSEL TYPE	DWT	BALLAST CONDITION			
		NORMAL (tons) % of DWT		HEAVY (tones) % of DWT	
Bulk carrier	250,000	75,000	30	113,000	45
Bulk carrier	150,000	45,000	30	67,000	45
Bulk carrier	70,000	25,000	36	40,000	57
Bulk carrier	35,000	10,000	30	17,000	49
Container	40,000	12,000	30	15,000	38
Container	15,000	5,000	30	n/a	
General cargo	17,000	6,000	35	n/a	
General cargo	8,000	3,000	38	n/a	
Passenger/RORO	3,000	1,000	33	n/a	

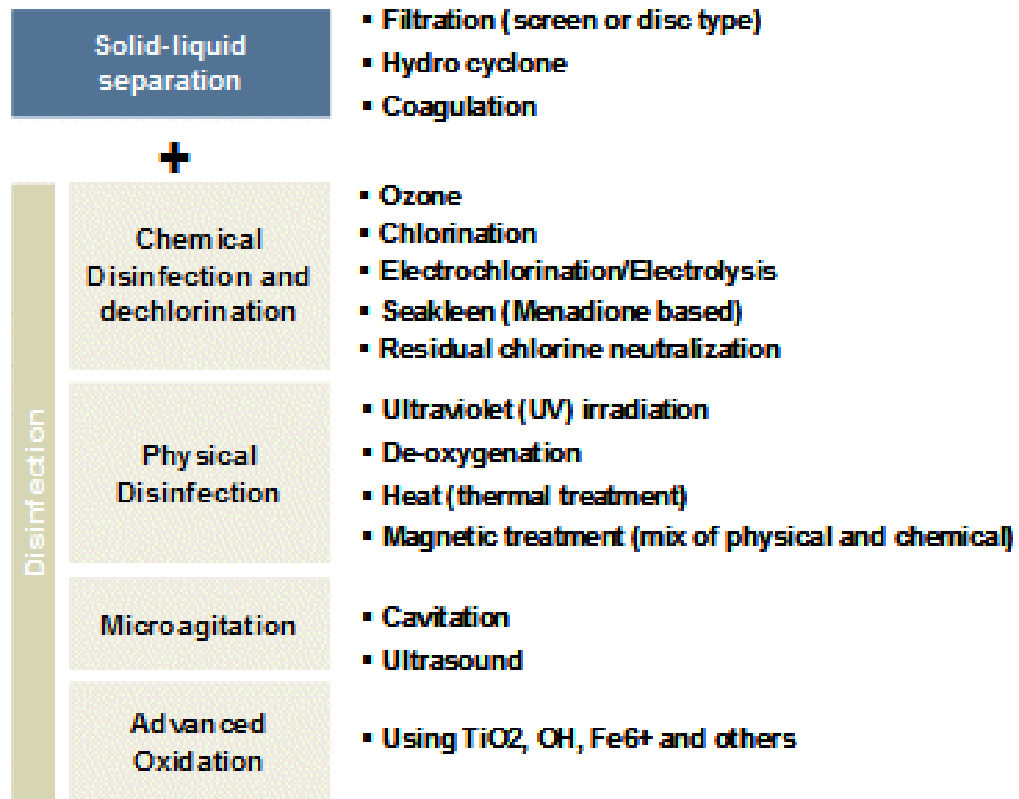
Typical Pumping Rates

Ballast needs	Vessel types	Typical pumping rates (m ³ /h)
Ballast replaces cargo Ballast required in large quantities, primarily for return voyage.	Dry bulk carriers	5,000–10,000
	Ore carriers	10,000
	Tankers	5,000–20,000
	Liquefied-gas carriers	5,000–10,000
	Oil bulk ore carriers	10,000–15,000
Ballast for vessel control Ballast required in almost all loading conditions to control stability, trim, and heel.	Container ships	1,000–2,000
	Ferries	200–500
	General cargo vessels	1,000–2,000
	Passenger vessels	200–500
	Roll-on, roll-off vessels	1,000–2,000
	Fishing vessels	50
	Fish factory vessels	500
	Military vessels	50–100
Ballast for loading/unloading operations Ballast taken on locally in large volumes and discharged in same location.	Float-on, float-off vessels	10,000–15,000
	Heavy lift vessels	5,000
	Barge-carrying cargo vessels	1,000–2,000



Ballast Water Treatment Technologies

Ballast Water Treatment Technologies



Legislation

- Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA)
- National Invasive Species Act of 1996 (NISA)

Department of Homeland Security

Coast Guard

Standards for Living Organism in Ship's Ballast Water Discharged in U.S. Waters

Federal Register / Vol. 77, No.57 / Friday, March 23, 2012

Legislation

Standards for Living Organism in Ship's Ballast Water Discharged in U.S. Waters

Effective from June 21, 2012

The Coast Guard is establishing a standard for the allowable concentration of living organisms in ship's ballast water discharged in the US, together with regulations for engineering equipment for Ballast Water Management systems.

Ballast Water Discharge Standard Rule

Applicability

“...all non-recreational vessels, U.S. and foreign, that are equipped with ballast tanks that, after operating on the waters beyond the Exclusive Economic Zone during any part of its voyage, enter the Snell Lock at Massena, New York, or navigates north of the George Washington Bridge on the Hudson River, regardless of other port calls in the United States or Canada during that voyage...”

Ballast Water Management Requirements

1. Carry out an exchange of ballast water on the waters beyond the U.S. Exclusive Economic Zone (EEZ), from an area more than 200 nautical miles from any shore, and in waters more than 2,000 meters (6,560 feet) deep, such that, at the conclusion of the exchange, any tank from which ballast water will be discharged contains water with a minimum salinity level of 30 parts per thousand, unless the vessel is required to employ an approved ballast water management system (BWMS)
2. Install and operate a BWMS that has been approved by the Coast Guard
3. Use only water from a U.S. public water system (PWS)

Ballast Water Discharge Standards

Vessels employing a Coast Guard approved ballast water management system (BWMS) must meet the following BWDS:

- (1) For organisms greater than or equal to 50 micrometers in minimum dimension: discharge must include fewer than 10 living organisms per cubic meter of ballast water.
- (2) For organisms less than 50 micrometers and greater than or equal to 10 micrometers: discharge must include fewer than 10 living organisms per milliliter (mL) of ballast water.
- (3) Indicator microorganisms must not exceed:
 - For Toxicogenic *Vibrio cholerae* (serotypes O1 and O139): a concentration of less than 1 colony forming unit (cfu) per 100 mL.
 - For *Escherichia coli*: a concentration of fewer than 250 cfu per 100 mL.
 - For intestinal enterococci: a concentration of fewer than 100 cfu per 100 mL.

Ballast Water Management for Control of Nonindigenous Species

1. Install and operate a ballast water management system (BWMS) that has been approved by the Coast Guard.
2. Use only water from a U.S. public water system (PWS)
3. Do not discharge ballast water into waters of the U.S.
4. **Discharge to a facility onshore or to another vessel for purposes of treatment**

Discharge of Water Ballast to a onshore facility

“Any vessel owner/operator discharging ballast water to a facility onshore or to another vessel must ensure that all vessel piping and supporting infrastructure up to the last manifold or valve immediately before the dock manifold connection of the receiving facility or similar appurtenance on a reception vessel prevents untreated ballast water from being discharged into waters of the United States.”