



IMO Final Approval (G9)
[March 2010]

Type Approval (G8)
[May 2010]

JFE BallastAce

(Ballast Water Management System)



NYK Line's Pure Car Carrier, "Emerald Leader"
on which JFE BallastAce is installed.

JFE Engineering Corporation

JFE BallastAce

**Simple, sure and safe
system available with
low price**

Features of JFE BallastAce

The system is simple and easy to install and operate.

- The System's components are compactly arranged for easy installation.
- Easy operation and maintenance; operation of Chemical Pump is the only thing for human action.

Meeting the requirements of regulation D-2 is ensured.

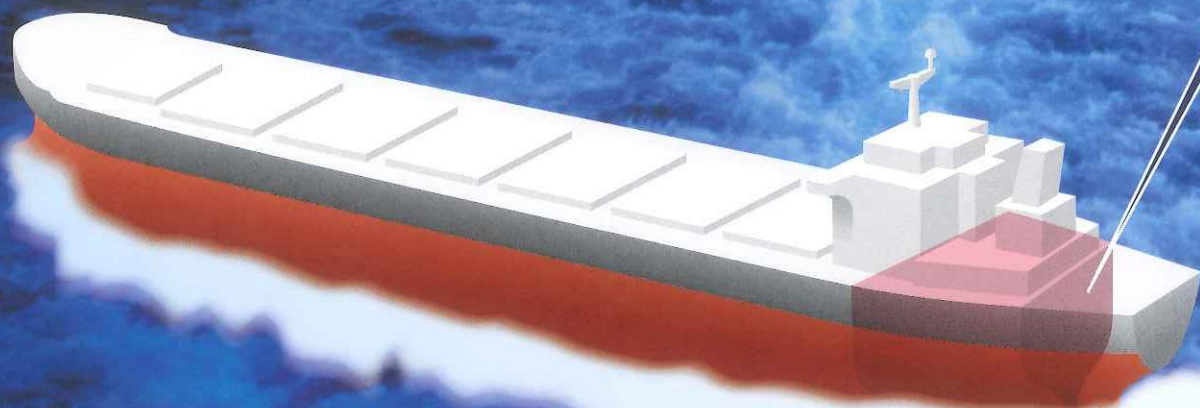
- High rate of elimination of marine organisms is possible due to combined use of precision filter, chemical and Venturi tubes.
- Concentration of the biocide (sodium hypochlorite) can be as high as 20mg/l to be effective even in the area where the pollution load is heavy.

Chemical is safe for use and easy for handling.

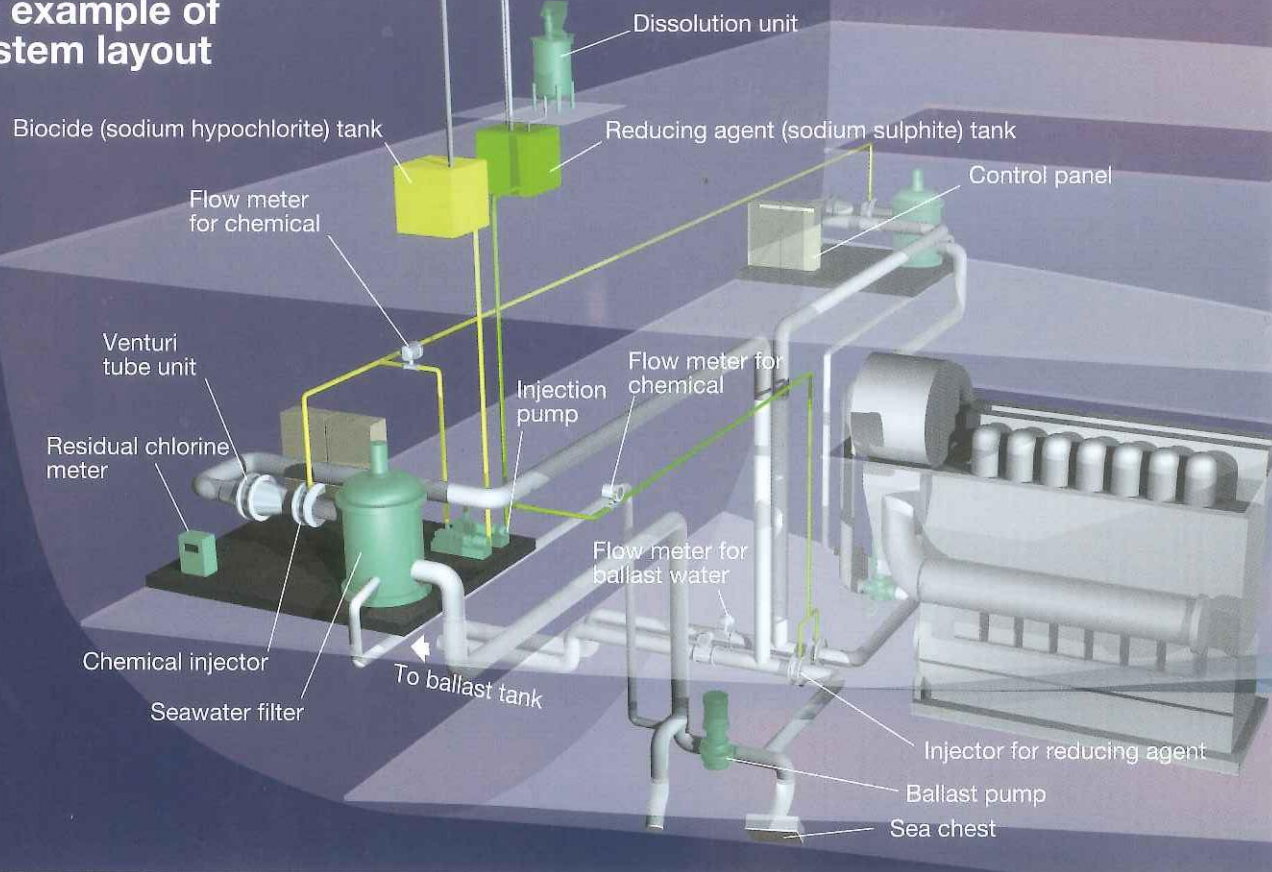
- The biocide (sodium hypochlorite) is widely used for water and sewage treatment in the world. It is safe for use and easy for handling.
- Naturalization by the use of reducing agent (sodium sulphite) effectively prevents harmful influence to the marine environment.

Cost of the system and its maintenance is minimized.

- The system is offered with a simple structure, minimum energy consumption and low price.
- The chemicals is widely available with low price. Maintenance cost is low as well.

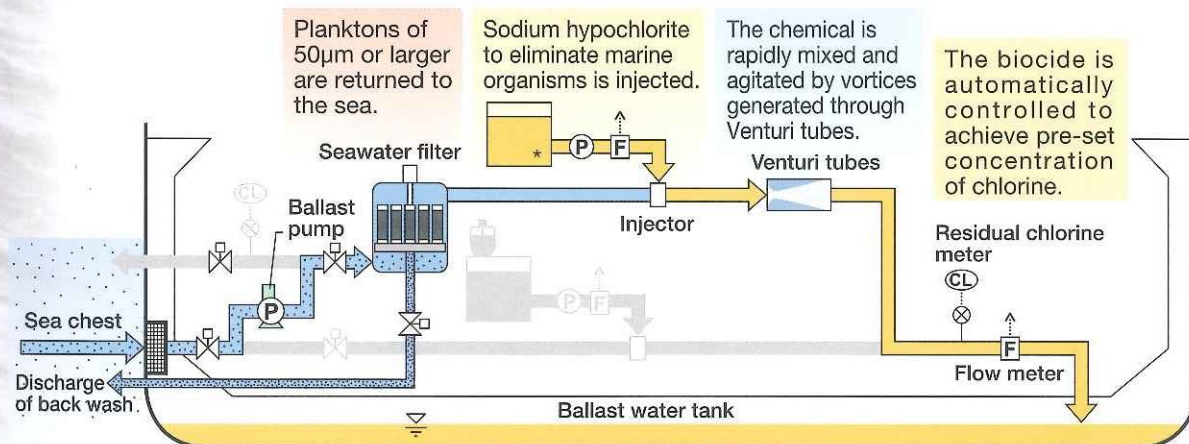


An example of system layout

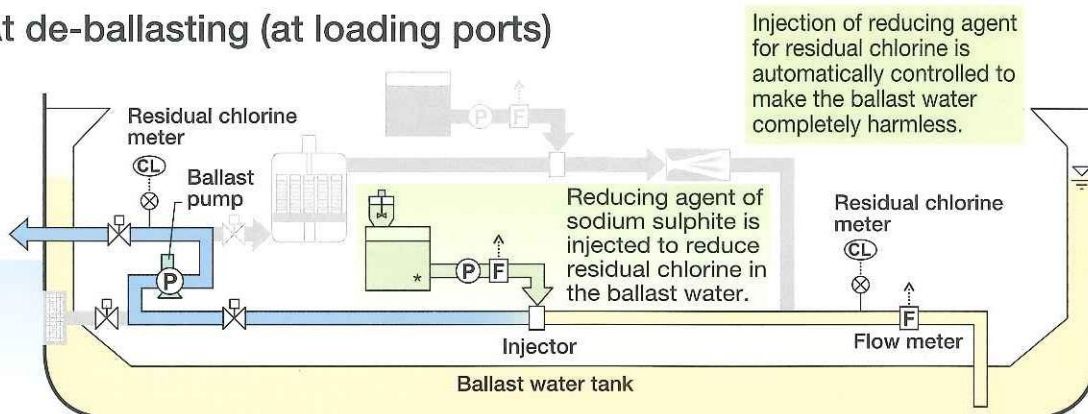


Ballast water flow

●At ballasting (at unloading ports)

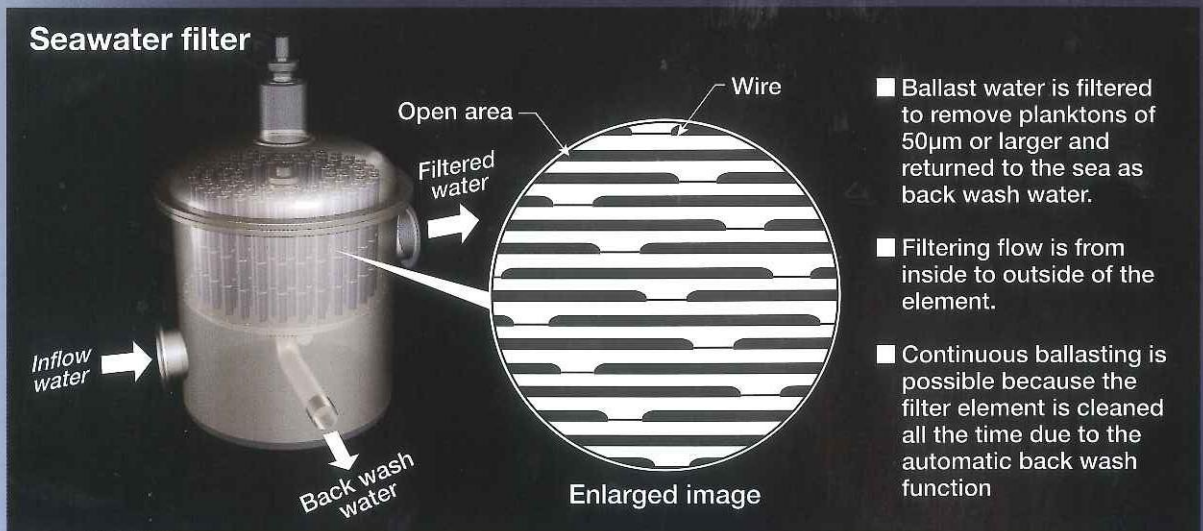


●At de-ballasting (at loading ports)

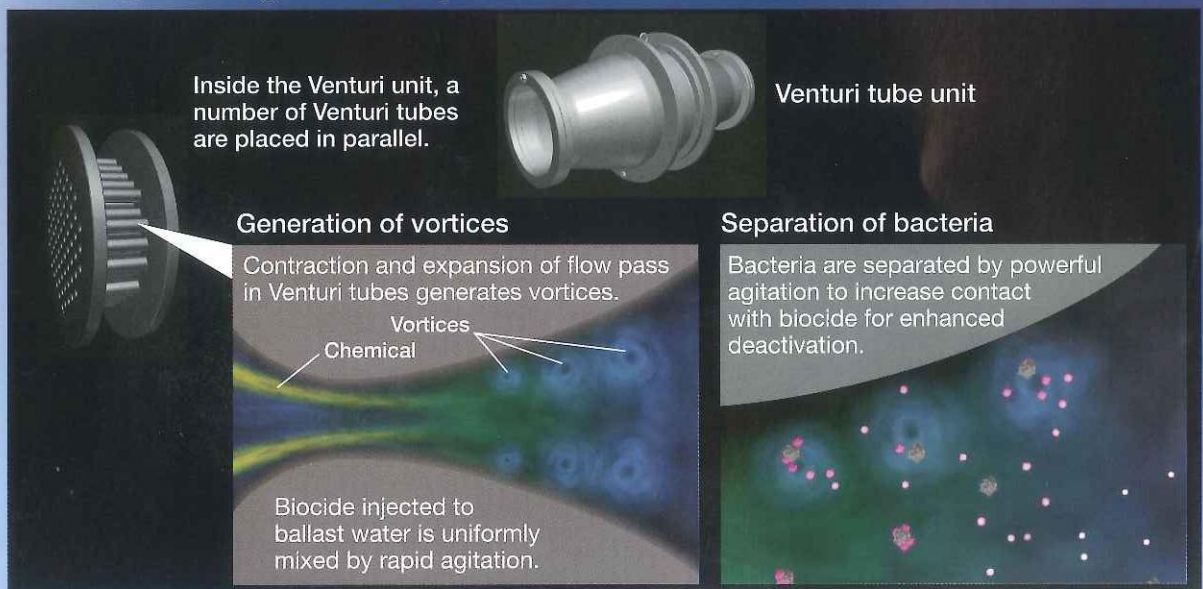


* TG Ballastcleaner® (biocide, sodium hypochlorite) and TG Environmentalguard® (reducing agent; sodium sulphite) are both registered trademarks of Toagosei of Japan.

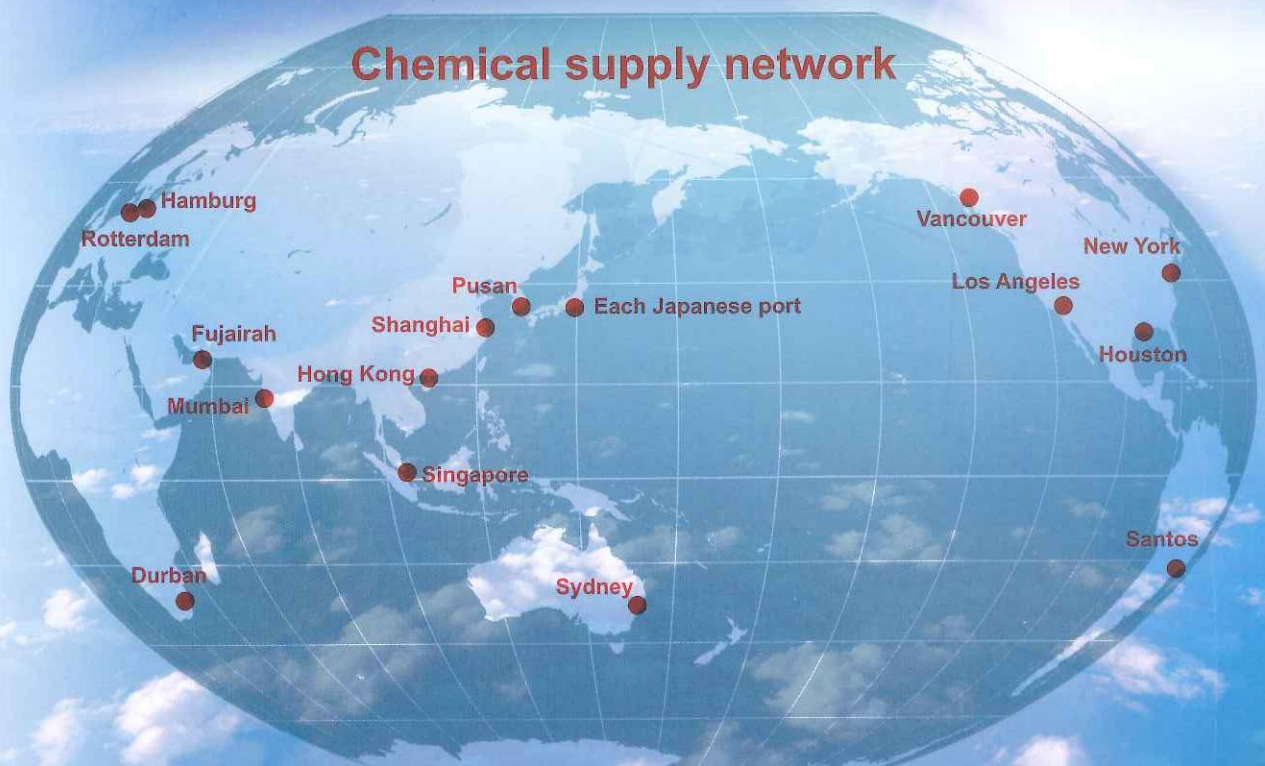
Function of seawater filter



Mixing and agitation by Venturi tubes



Chemical supply network



Problem of marine pollution due to ballast water discharge

Recently marine pollution is becoming a new problem. This is caused by the migration of marine organisms from their original residential areas to other new areas. These organisms are contained in the ballast water of the ship. When the ballast water is discharged at the loading ports, the organisms are now migrated to a new area. This causes generation of poison from seashells and destruction of the ecosystem.

What is BWMS?

It is the abbreviation of Ballast Water Management System, which is the system installed on board the ship to treat ballast water. To meet the requirement of the D-2 regulation adopted by the IMO (International Maritime Organization), a specialized agency of the United Nation. JFE Engineering has successfully developed a system installed on board the ship to eliminate marine organisms contained in the ballast water.

Ballast water treatment guideline (D-2 standard)

		Guideline	Remark
Reproductive life forms of 50µm or larger		below 10 ind./m ³	about 1/10,000 of that in coastal area
Reproductive life forms of 10 - 50µm		below 10 ind./ml	about 1/100 of that in coastal area
Microbes	Escherichia coli	below 250cfu/100ml	admissible level in sea bathing areas
	Intestinal Enterococci	below 100cfu/100ml	
	Vibrio Cholerae	below 1cfu/100ml	

Application timetable for Ballast Water Performance Standard (Regulation D-2)

	Volume of ballast water [m³]	Year of D2 standard application									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ships built in 2008 or before	1,500~5,000							D-2			
	~1,500 or 5,000~									D-2	
Ships built in 2009 or later	~5,000		D-2								
Ships built in 2010 or 2011	5,000~									D-2	
Ships built in 2012 or later					D-2						

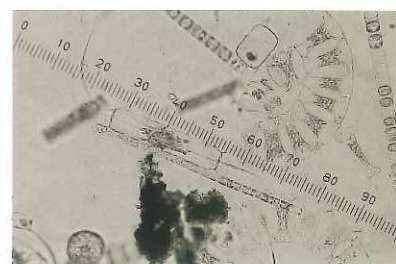
Aquatic Organism (Example of planktons)



Zooplankton of 50µm or larger (Copepoda)

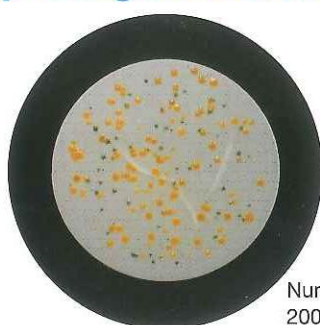


Zooplankton (Nematoda); this can survive against 10mg/l chlorine. To be eliminated by filter.

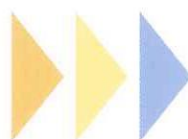


Phytoplankton of 10 - 50µm

Example of germ treatment by JFE BallastAce (Medium of vibrio vulnificus)



Number before treatment :
20000cfu/100ml



Number after treatment by
BallastAce:
0cfu/100ml