

**Commercial Application of First Japanese-made Ballast Water
Management System, JFE BallastAce
– The First Retrofit of a BWMS among Japanese Carriers –**

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Nippon Yusen Kabushiki Kaisha

JFE Engineering Corporation

Nippon Yusen Kabushiki Kaisha (NYK; head office: Chiyoda-ku, Tokyo; president: Yasumi Kudo) has announced that it will install a ballast water management system^{*1} called JFE BallastAce^{*2}, which was developed by the JFE Engineering Corp. (JFE Engineering; head office: Chiyoda-ku, Tokyo; president and CEO: Sumiyuki Kishimoto), on one of its pure car carriers, *Emerald Leader*. JFE BallastAce will be the first Japanese-made system to reach commercial application after receiving type approval from Japan's Ministry of Land, Infrastructure, Transport and Tourism. The system is to be installed on *Emerald Leader* at Universal Shipbuilding Corp.'s Innoshima Shipyard while the vessel is undergoing dry-dock work in August 2010.

As part of NYK's commitment to protecting the global environment, the company began a study of installation of ballast water management systems (BWMSs) on its ships before the ballast water management convention^{*3} takes effect. A subsidiary of NYK, the Monohakobi Technology Institute (MTI), had also participated in joint testing of the JFE BallastAce system with JFE Engineering from the demonstration test stage. NYK selected the JFE BallastAce for implementation after its study concluded that the system offers total effectiveness, including reliability and future potential, on the vessel. This JFE system will be the first BWMS to be installed on an NYK fleet vessel.

The JFE BallastAce system provides a superior mix of three functions—seawater filter elements, chemical agents^{*4}, and Venturi tubes^{*5}—for treatment of aquatic organisms and bacteria contained in ballast water. The system realizes treatment reliability, ease of equipment layout, and excellent safety for the crew and environment at a low cost. JFE BallastAce is available in a complete product lineup, from small-scale units to a 3,500m³/h system that boasts the world's largest treatment capacity in a single unit, enabling installation on ships of any size.

Based on its experience with *Emerald Leader*, NYK plans to conduct a successive study of installation on other ships the company owns and manages, and will continue to contribute actively to protection of the environment. JFE Engineering will provide full, detailed technical service and after-service to clients in the shipping and shipbuilding industries, and expects to receive further orders for the new system.

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1. Main specifications of Emerald Leader

Length overall:	176 meters
Breath:	31.1 meters
Gross tonnage:	41,000 tons
Capacity:	4,750 cars

2. Main specifications of JFE BallastAce ballast water management system to be installed on Emerald Leader

Type:	Filter/chemical agent combined treatment system
Treatment rate:	700m ³ /h

*1: Ballast water management system (BWMS)

Ballast water is seawater that ships carry to maintain balance. Ballast water is normally taken on in ballast tanks in the ship's bottom at the unloading port, and then discharged at the loading port. The BWMS is a system that processes marine organisms carried by ballast water without destroying the ecosystem. Installation of BWMSs on all oceangoing ships will be required to satisfy the treatment standards provided in the ballast water management convention. When the convention takes effect, the ships that are subject to regulation will be expanded successively to include newly constructed ships and existing ships, in that order, by January 2017.

*2: History of development of JFE BallastAce

2004	Start of development
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2008	Land-based tests
2009	Onboard tests (jointly with MTI, a member of the NYK Group)
March 2010	Final approval received from the International Maritime Organization (IMO)
May 2010	Certificate of Ballast Water Management Systems (Type Approval Certification) received from Japan's Ministry of Land, Infrastructure, Transport and Tourism

*3: Ballast water management convention

An international convention for the regulation and control of ships' ballast water and sediments, for the purpose of preventing the movement of aquatic organisms and pathogens harmful to the environment, human health, and/or economic activity. The official name of the convention is the "International *Convention for the Control and Management of Ships' Ballast Water and Sediments.*" Although adopted in 2004, the convention has not taken effect at the present time.

*4: Chemical agents

The JFE BallastAce system uses the following chemical agents, which were developed by Toagosei Co. Ltd.

Biocide: "TG Ballastcleaner®"

Main ingredient: Sodium hypochlorite; used as a disinfectant for waterworks and pools and as a food additive.

Neutralizing "TG Environmentalguard®"

agent:

Main Sodium sulfite; used in producing food
ingredient: preservatives, dyes, etc.

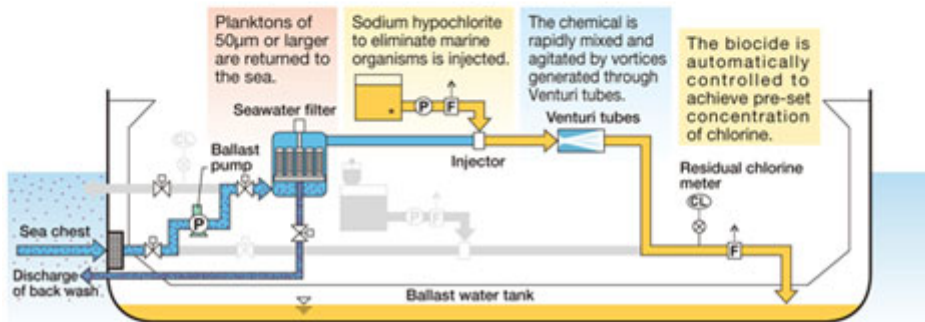
*5: Venturi tube

Device that separates bacteria from mud and sand and enhances the disinfecting power of the chemical agent by mixing/agitating the chemical agent and ballast water by power vortices generated by constriction/expansion of the piping passage.

● Treatment Flow

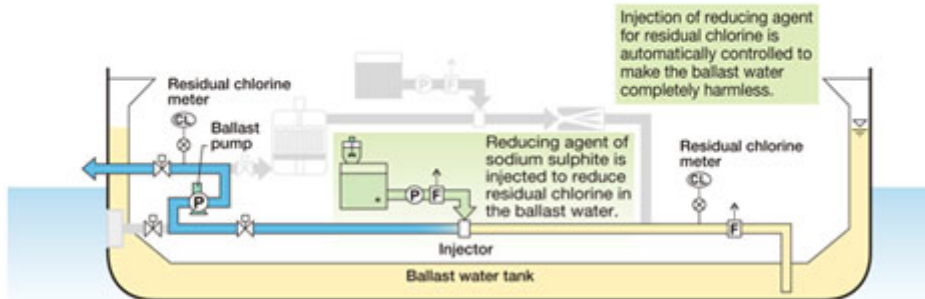
● At ballasting (at unloading ports)

- 1 Marine organisms in the seawater are returned to their habitats when the seawater passes through the high-performance filter elements.
- 2 Small plankton and bacteria, including colon bacilli, contained in the filtered seawater are treated by appropriate chemical agents, and by mixing and agitation in the venturi tubes.



● At de-ballasting (at loading ports)

- 1 Residual chemical agents in the ballast water are neutralized and made harmless by a reducing agent before discharging to the sea.



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

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