Hitz Green SCR Mk-II 117

Hitachi Zosen Corporation

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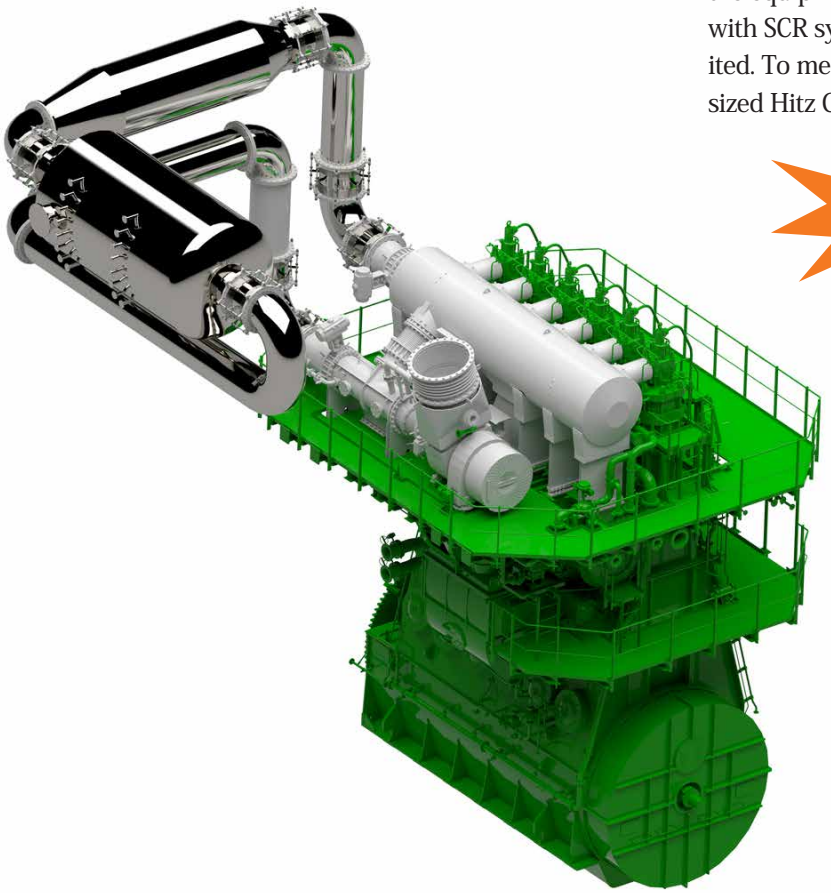
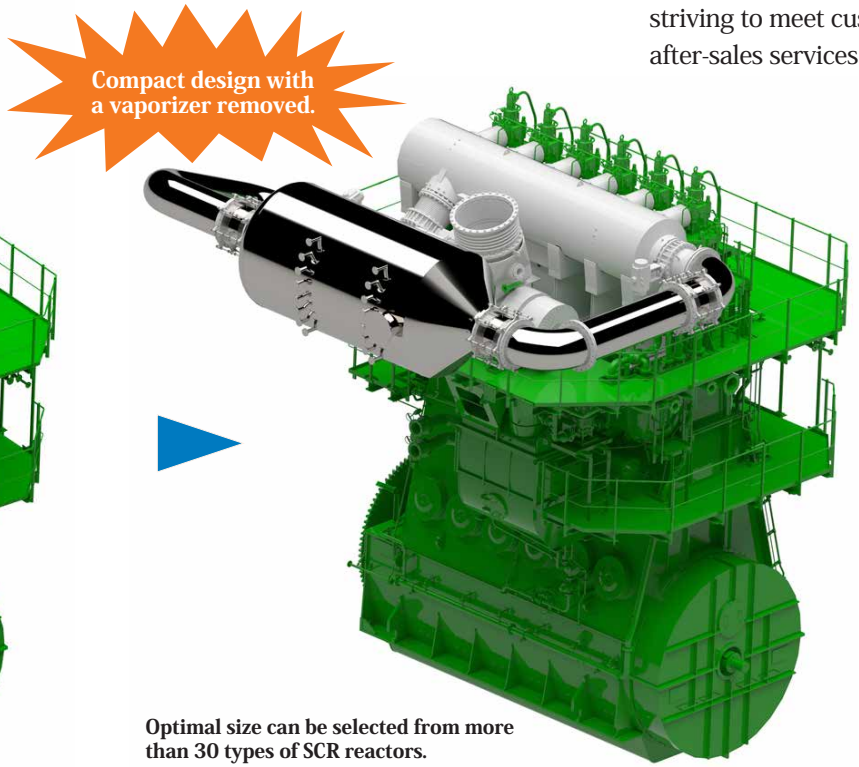
Hitachi Zosen's newly-developed High pressure SCR (Hitz Green SCR Mk-Ⅱ) has successfully been in service from 2021. Hitz Green SCR (Mk-Ⅱ) can be smaller and more compact compared to the previous model (Mk-Ⅰ). SCR system is used for decomposing NOx into harmless nitrogen and water with the aid of catalyst and urea solution. Tier III NOx regulations of the International Maritime Organization (IMO) require 80% reduction of nitrogen oxides (NOx) emission from Tier Ⅱ regulations, that means it is necessary for marine vessels to be equipped with any decomposing NOx technology.

Hitz Green SCR (Mk-Ⅱ) was developed to meet demands from our customers. There was a great demand to downsize the equipment for ships which will be additionally equipped with SCR system because the space of engine rooms is limited. To meet this demand, Hitachi Zosen developed small-sized Hitz Green SCR (Mk-Ⅱ) which has greatly reduced the installation area compared to the previous model and is applicable to various vessel types.

By the end of 2021, Hitachi Zosen received more than 40 orders for Hitz Green SCR (Mk-Ⅱ) and 3 of them are already in service. Until now Hitachi Zosen has also received more than 100 SCR systems in total and more than 50 SCR systems (including both Mk-Ⅰ and Mk-Ⅱ) are already in service. Some sets of our SCR systems have already recorded more than 10,000 hours commercial operation. With these records and experiences, Hitachi Zosen continues striving to meet customers' requirements also through after-sales services.





Optimal size can be selected from more than 30 types of SCR reactors.

Urea Dilution Skid for Marine SCR

Since its market launching in 2019, Urea Dilution Skid (hereafter called “UDS”) for SCR systems has successfully in service from 2020, and over 8 UDSs are in service by the end of 2021.This device produces urea solution, used as a reducing agent for SCR systems that decomposes NOx (nitrogen oxide), from urea prill and the distilled water obtained from shipboard water production equipment. The urea solution storage tank is more compact and can produce high-quality urea solution at low cost on board, contributing to the stable decomposition of nitrogen dioxide.

Features

1. A wealth of experience in producing urea solution on-board for more than 10,000 hours.
2. Enabling required volumes of urea solution for navigation in regulated area.
3. Anti-shock function good enough to survive sloshing caused by ship listing or drop of urea prill.
4. Easy maintenance enabled by simply-configured machinery.
5. Contributes to short installation period enabled by all the machinery installed on compact skids.
6. After urea prill is added, urea solution is automatically produced. No special operators are required.

Main specification

Model number	: UDS-1000	UDS-500	UDS-300
1. Max input volume	: 1,000 kg	500 kg	300 kg
2. Max production volume	: 2,500 kg	1,250kg	750 kg
3. Production concentration	: 40% (equivalent to ISO18611)		
4. Required production time (Approx.)	: 4hours	3hoiurs	3hours (Batch production)

Hitachi Zosen is also working to expand sales of this device for marine SCR systems, which is currently the most popular measures for the Tier III Regulations on NOx emissions during ship operation as set out by the International Maritime Organization.

Kawasaki Develops New LNG Dual-fuel System for Medium-sized Tankers 119

Lloyd's Register (LR) has granted approval in principle (AiP) for a medium-sized oil tanker, developed by Sumitomo Heavy Industries Marine & Engineering Co., Ltd., that uses a liquefied natural gas (LNG) dual-fuel system developed by Kawasaki for medium-sized tankers. This was the first AiP received for a ship built outside of the Kawasaki Group and equipped with Kawasaki's LNG dual-fuel system.

As the industry faces increasingly strict gas emission regulations from the International Maritime Organization, LNG fuel and other clean fuels are gradually gaining popularity as alternatives fuels. Amid such changes, Kawasaki has obtained various AiPs for LNG dual-fuel systems designed for its own ships.

The Sumitomo Heavy Industries Marine & Engineering medium-sized oil tanker which received this recent AiP had its placement of the LNG fuel tank and other elements adjusted to enable the use of a dual-fuel (LNG and heavy fuel oil) supply and usage system without sacrificing cargo tank capacity. Based on the IGF Code* and ship classification rules that need to be observed for LNG fuel use, Kawasaki conducted technical reviews for the LNG fuel supply system, LNG fuel tank and safety measures required for using LNG fuel, leveraging its experience in the field to assist Sumitomo Heavy Industries Marine & Engineering in obtaining the AiP for their vessel.

Based on technological capabilities cultivated through the construction of LNG carriers over the years, Kawasaki has fostered a range of LNG-related applied technologies through the development of the world's first LNG-fueled pure car and truck carrier (PCTC) delivered in 2016, a newly developed LNG bunkering vessel, and various LNG-fueled ships. Utilizing this technological background, the company applies its LNG fuel supply systems and LNG fuel tanks for LNG-fueled vessels, as well as LNG-related technologies and knowledge to in-house shipbuilding and the provision of LNG dual-fuel systems for other companies' vessels, thus contributing to the reduction of emission gases in the marine shipping industry.

* **IGF Code: International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels. This code came into effect in January 2017.**

Kawasaki Completes first LPG-powered dual-fuel ME-LGIP engine 120

Kawasaki Heavy Industries, Ltd. completed of a Kawasaki-MAN B&W 7S60ME-C10.5-LGIP engine, an LPG-powered marine diesel engine to be used in a large LPG carrier being built at Sakaide Works for delivery to Kumiai Navigation (Pte) Ltd. This engine is the first MAN B&W S60 type LPG-powered engine to be produced in the world.

This dual-fuel engine design can use both LPG fuel and marine diesel oil, and includes the Kawasaki-ECO System (K-ECOS Lite), which simultaneously reduces fuel consumption and enables the engine to meet NOx Tier 3 regulations. The Kawasaki-ECO System (K-ECOS Lite) is an environmentally friendly low-emission system consisting of an exhaust gas recirculation (EGR) system, a turbocharger cut-out system, and a waste water treatment system, which complies with IMO NOx Tier 3 regulations and achieves low fuel consumption and low running costs. When using LPG fuel, the ME-LGIP engine cuts sulfur oxide (SOx) emissions by more than 90% compared with conventional two-stroke diesel engines that operate on heavy oil, and also greatly reducing carbon dioxide (CO_2) and nitrogen oxide (NOx) emissions.

The International Maritime Organization (IMO) has been establishing stricter emission regulations for SOx, NOx, CO_2 and other emissions in marine shipping throughout Europe, the United States and other parts of the world. LPG, which provides a clean-fuel alternative much like liquefied natural gas (LNG), has been the subject of increasing attention amid these changes. In response, Kawasaki is actively pursuing the sale and manufacture of Kawasaki-MAN B&W ME-LGIP engines as one of the next-generation of main engines intended to help operators meet updated emission regulations.

Kawasaki-MAN B&W 7S60ME-C10.5-LGIP engine

Rated output:	12,850kW
Rated speed:	84rpm
Cylinder bore:	60cm
No. of cylinders:	7

Kawasaki Heavy Industries, Ltd.

Kawasaki Receives AiP for LPG Fuel Supply System 121

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Kawasaki Heavy Industries, Ltd. has obtained approval in principle (AiP) from Nippon Kaiji Kyokai (ClassNK) and the American Bureau of Shipping (ABS) for a liquefied petroleum gas (LPG) fuel supply system that enables LPG to be used as ship fuel.

As the industry faces increasingly strict gas emission regulations from the International Maritime Organization, LPG fuel is receiving increased attention as a clean-fuel alternative to heavy fuel oil. Particularly in the LPG trade market, increasing emphasis is being placed on transitioning to LPG fuel sources. By using LPG fuel, Kawasaki's LPG carriers achieve emission reductions for CO_2, sulfur oxides (SOx) and other harmful substances in exhaust gases and comply with EEDI Phase 3 regulations.

Kawasaki's fuel supply system was developed using knowledge gained through LPG carrier, liquefied natural gas (LNG) carrier, and LNG-fueled vessel design and construction, as well as marine engine design and manufacturing operations. The LPG fuel supply system received AiP from more than one classification society, which proves its high reliability. Kawasaki has started building Japan's first LPG-fueled LPG carrier equipped with this system at its Sakaide Works, with the support of ClassNK and relevant supervisory agencies.

Kawasaki plans to continue developing and providing environmentally friendly ship technologies for LPG-fueled LPG carriers, LNG-fueled vessels, liquefied hydrogen carriers (liquefied hydrogen is gaining increasing attention as a next-generation energy source), and other vessels with the aim of achieving low carbon emissions throughout society.

The main features of Kawasaki's LPG fuel supply system are as follows:

1. Cyclical system design that is compatible with propane and butane and circulates LPG in a pressurized state capable of usage at normal ambient temperature
2. Features a control system with established high safety performance based on a risk assessment conducted in accordance with the IGC Code
3. Consists of equipment that can be used in LPG carriers and any other type of vessel