

Namura completes LPG-fueled LPG/Ammonia carrier PHOENIX HARMONIA



Namura Shipbuilding Co., Ltd. delivered the PHOE-NIX HARMONIA, a liquefied petroleum gas (LPG) powered very large LPG/Ammonia Carrier (VLGC), at its Imari Shipyard & Works on September 29, 2023. The vessel is the first of a newly-developed VLGC type based on knowledge and experience in building small and mediumsized LPG carriers which Namura has built since 2000, and supported by Mitsubishi Shipbuilding Co., Ltd. which has a vast amount of experience in VLGC, based on concluded technical cooperation agreements, with eco-friendly and excellent features that suggest this VLGC will become one of the main products.

Reduction in the environmental impact is one of the most important issues to realize a sustainable society through environmentally friendly shipping, so greenhouse gas emissions will be reduced in accordance with government policy of carbon neutrality by 2050, so Namura will continue to develop and supply alternative fueled vessels for a low-carbon society.

To improve the operating performance, the holding capacity of the cargo tank is increased from $83,000m^3$ to $87,000m^3$ based on the largest ship size that can enter major Japanese LPG terminals, and can transport ammonia which is clean, and expected to be one of the major marine fuels. Further improvement of propulsion performance and fuel-saving in conformity with EEDI Phase 3 can be achieved by adoption of the optimal hull shape, energy-saving devices, and electronically controlled main engine. LPG fuel can reduce CO₂ emissions by about 20%, and SO_x by about 90% in comparison with fuel oil. The vessel is also designed to transport ammonia and is presently one of the world's largest ammonia carriers.

For environmental protection, the vessel is equipped (Cntinued on Page 2)



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Naikai completes 2,900TEU containership, BRIGHT SAKURA

Naikai Zosen Corporation completed construction of the BRIGHT SAKURA, a containership with a carrying capacity of 2,900 TEUs, for delivery to MI-DAS LINE S.A. at its Innoshima Shipyards on October 26, 2023.

This ship is dedicated to container transport on maritime routes. The cargo hold of the ship is divided into five container holds, and the ship can load ISO-standard 20ft and 40ft containers in the holds and on the upper deck and hatch-covers. Moreover, the ship can load high-cube containers of three-tiers in the container holds, and 45ft containers can be loaded above ordinary containers in three tiers on the upper deck.

The hull form has increased propulsion performance that has been proven by scale-model ship tests.

Berthing and unberthing in a port are facilitated with a bow thruster. The Becker-twisted rudder with bulb has been selected for improved energy-saving performance. The main engine uses



an open-type SO_x scrubber and SCR (selective catalytic reduction) equipment to maintain clean environmental conservation.

Principal particulars

- L (o.a.) x B (mld.) x D (mld.) x d (mld.): 185.99m x 35.20m x 17.20m x 9.50m (designed)
- DWT/GT:27,853t (designed full load)/ 29,622

Container loadin	g capacity:	
2,888TEUs		
Complement:	25	
Main engine: MAN B&W 7S60ME-		
C10.5-HPSCR diesel x 1 unit		
NCR: 12	2,070kW x 94.7min ⁻¹	
Speed, service:	Approx. 18.5kt	
Classification:	ClassNK	
Registry:	Panama	
Completion:	October 26, 2023	

LPG-fueled LPG/Ammonia carrier PHOENIX HARMONIA

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with a main engine and generator engines compliant with Annex VI of the MARPOL 73/78 regulations to reduce NOx emissions, and an air seal type stern tube sealing device to reduce the risk of oil leakage. In addition, the vessel also complies with the SOLAS Chapter II-1 Regulation 3-12, Code on noise levels onboard ships to improve the environment of the living quarters. The ballast water treat ment system to control the quality of ballast water is equipped to protect the marine environment to comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments. The vessel has class notation IHM (Inventory of Hazardous Materials) for compliance with the ship recycling convention according to the Guidelines for the Inventory of Hazardous Materials.

Principal particulars

L (o.a.) x B (mld.) x d (mld.): 230.0m x	
36.6m x 12.0n	ı	
GT:	50,849	
Cargo Capacity:	87,123.104m ³	
Main engine: M	AN B&W 6G60ME-	
C10.5-LGIP-EGRBP diesel x 1 unit		
Complement:	29	
Registry:	Panama	
Classification:	ClassNK	
Completion:	September 29, 2023	



LPG/NH3 carrier under construction

Launching for outfitting

Mitsubishi Shipbuilding holds christening and handover ceremony for demonstration test ship for liquefied CO₂ transport — New vessel EXCOOL to contribute to protecting the global environment —

Mitsubishi Shipbuilding Co., Ltd., a Mitsubishi Heavy Industries (MHI) group company based in Yokohama, has held a christening and handover ceremony for a demonstration test ship to transport liquefied carbon dioxide (LCO₂). The ship will be used for the "CCUS R&D and Demonstration Related Project/Large-scale CCUS Demonstration in Tomakomai/Demonstration Project on CO2 Transportation" (the demonstration projects) being conducted by Japan's New Energy and Industrial Technology Development Organization (NEDO). The ceremony took place at the Enoura Plant of MHI's Shimonoseki Shipyard & Machinery Works in Yamaguchi Prefecture, in the presence of the ship owner Sanyu Kisen Co., Ltd. and other related parties.

CCUS (Carbon dioxide Capture, Utilization and Storage) is gaining attention as an effective means of achieving a carbon-neutral society. However, the sources of CO₂ emissions are often located distant from the sites selected for carbon utilization or storage, so demand is expected to increase for LCO₂ carriers able to transport such cargo safely and economically. MHI group utilized its expertise and advanced gas handling technologies developed through the



EXCOOL, a demonstration test ship for liquefied CO₂ transport

construction of liquefied gas carriers (both LPG and LNG types) to build the demonstration test ship, where the cargo containment system fully developed by the Engineering Advancement Association of Japan (ENAA) was incorporated.

The vessel, named EXCOOL, will be chartered by Nippon Gas Line Co., Ltd., which is jointly conducting the NEDO project, to collect and analyze operational data through CO₂ transportation demonstration tests. In addition, Kawasaki Kisen Kaisha, Ltd.



Christening and handover ceremony

("K" LINE) and Ochanomizu University will be commissioned by the ENAA, one of the consignees for the NEDO demonstration projects, as subcontractors to conduct safety assessments of LCO₂ transportation operations, along with research and development for the ship's LCO₂ pressure control and stability, as well as develop and demonstrate technologies for safe and low-cost CO₂ transport.

MHI group is pursuing strategic measures to strengthen its business for the energy transition. For its part in this initiative, Mitsubishi Shipbuilding, in its "MARINE FUTURE STREAM" growth strategy, has laid out a vision for the decarbonization of the maritime economy through renewable energy and the carbon cycle, along with a safe and secure society through autonomy and electrification, and is working to generate new ideas in marine-related innovation and make them a reality. As part of this effort, Mitsubishi Shipbuilding will actively pursue commercialization of LCO₂ handling systems, and as a marine systems integrator, aim to achieve decarbonization.

JMU completes 24,000TEU containership, ONE INSPIRATION

Japan Marine United Corporation (JMU) delivered the 24,000TEU containership, ONE INSPIRATION, at its Kure Shipyard on December 6, 2023. This is the second of the newly developed 24,000TEU type containership built by JMU, with the largest

class cargo capacity in the world, which utilizes JMU's technology to achieve a high level of both environmental and loading performance and is designed to operate in wide range of maritime areas.

The design adopts JMU's original energy saving devices, such as the SURF-BULB[®], the ALV-Fin[®] and Rupas[®] rudder, to achieve extremely high

fuel efficiency despite such a large hull size. This vessel significantly satisfies the EEDI Phase 3 (reduction rate of 50% or more from the reference line) in advance that became mandatory for vessels contracted after January 1, 2022. Brittle crack arrest technology in the extremely thick, high strength steel plates for this size of vessel has been applied for the first time in the world, which improves safety of the hull structure without sacrificing loading efficiency.

MAN-B&W's latest electronically controlled main engine Mark 10.6 and inverter-controlled cooling sea water



pump contribute to reduce fuel oil consumption. To improve performance in actual seas, the Bow Wind Cover is equipped, allowing containers to be loaded onto the mooring deck inside the Wind Cover for the first time.

The vessel is equipped with INS (Integrated Navigation System) with seats and fully enclosed Navigation Bridge, improving both convenience and safety for steering during passages and reaching/leaving the port. Voyage assistance and monitoring for the engine room by CCTV camera system is provided for improved safety. DNV Cyber Secure notation

has been allocated for greater security.

This vessel has various environmental friendly features such as a hybrid type EGCS SO_x scrubber, compliance with requirements for maintaining a list of hazardous materials, and AMP (Alternative Maritime Power) that allows the diesel generator to be shut down during cargo handling at the quay.

Principal particulars

L (o.a.) x B (mld.) x D (mld	l.) x d (mld.):
399.95m x 61.40m x	x 33.20m x
16.50m	
Main engine: MAN-B&V	V 9G95ME-
C10.6 diesel x 1 unit	
Complement:	34
Classification:	DNV

Mitsui E&S DU receives order for next-generation 7X62DF-S2.0 engines with VCR

Mitsui E&S DU Co., Ltd. (Mitsui E&S DU), a group company of MI-TSUI E&S Co., Ltd. (MITSUI E&S), has received the first order for two 7X62DF-S2.0 engines from a domestic shipyard as the next generation of engine powered by LNG. The engines will be installed in car carriers that will be able to transport 7000 vehicles. The first vessel will be completed in April 2025.

The X62DF-S2.0 series of engines has fuel consumption in gas mode of 3.7g/kWh (R1 point) better than the conventional X62DF series engines, and is more compact. The engine will be equipped with a Variable Compression Ratio (VCR) mechanism that achieves excellent specific fuel consumption. The VCR technology improves fuel use by about 3% in the gas mode and about 6% in the diesel mode by optimizing the compression ratio according to the engine output and the properties of LNG as a fuel, considering conditions such as operation load. The VCR will contribute greatly to the reduction of fuel expenses and CO₂ emissions during ship operation.

Mitsui E&S DU jointly developed the VCR technology with Winterthur Gas & Diesel Ltd. The VCR mechanism has been gradually accepted around the world and Mitsui E&S DU has contracts for four engines equipped with the VCR mechanism including the most recent orders. Mitsui E&S DU has received offers for the purchase of over 30 engines from the Republic of Korea.

The engines are also equipped with the on-engine iCER system, a modification to the system intelligently controlling the engine through exhaust recirculation (iCER) methane slip. Combining the X-DF low-pressure gas injection system with iCER and VCR achieves reduction in greenhouse gas (GHG) emissions equal to the injection DF engine.

Mitsui E&S DU will continue to support the development of a sustainable maritime shipping industry by receiving orders for eco-friendly engines.

Kawasaki completes hybrid propulsion system using gas engine for bulker

Kawasaki Heavy Industries, Ltd. (Kawasaki) has completed a hybrid propulsion system using a natural gas-fueled engine for a limestone bulk carrier operated by NS United Kaiun Kaisha, Ltd. of Japan. This hybrid propulsion system consists of a natural gas-fueled engine and a large capacity battery, and is the first such installation on a bulk carrier in the world.

This hybrid propulsion system uses a gas-fueled engine as the main engine. The gas-fueled engine can achieve approximately 24% reduction of CO₂ emissions when compared with the conventional heavy-oil-fueled diesel engine installed on a ship of the same type. Furthermore, emissions of SO_x and NO_x in the engine exhaust can be greatly reduced. The limestone bulk carrier is scheduled to enter service in March 2024, and will operate with the hybrid propulsion units consisting of the gas-fueled main engine and 2,847kWh lithium-ion battery. The LNG fuel tank for the main engine has been designed using 7%-nickel steel developed by Nippon Steel Corp. for the first time for ships.

During navigation, the Kawasaki main gas engine generates the propulsion force and inboard electric power. With only natural gas fuel, the ship can cruise over long distances and extended service under high power. When entering and leaving a port, the ship is operated by electric propulsion

Gas-engine hybrid propulsion system (below)

mode using the battery. This mode achieves ship operation with zero-emission of greenhouse gases (GHGs).

Emissions control of the main engines will become more severe in international ship operation, so main engines must adapt to the requirements for environment conservation. Gas-fueled engines can surmount such severe emission control requirements without treating the exhaust gas.

Kawasaki has developed the marine

gas engine, model L30KG, based on the technology accumulated through manufacture of gas engines for electric generator use, which demonstrate the highest power-generation efficiency in the world. The Kawasaki marine gas engine has obtained a Type Certificate of the DNV and is now marketed worldwide. Moreover, Kawasaki is now preparing the acquisition of a Type Certificate for the control system, same as the gas engine, within 2024.

Emission control reinforcement of GHGs has been promoted by the International Maritime Organization (IMO) in the marine transportation



area as well. Kawasaki, as an integrator of ship propulsion systems, will continue to develop superior propulsion systems in the environmental performance by optimal combination of the gas-fueled engine and propulsion components to contribute to reduction of load on the environment. **Outline of limestone bulk carrier** Deadweight: Apporx. 5,549t Length (o.a.): 94.0m Width (mld.): 18.2m 9.90m Depth (mld.): Main service route: Coastal line between Shiriyasaki Port and Muroran Port Cargo: Limestone

Natural-gas-fueled Reduction gear engine

Generator & motor



Large-capacity lithium-ion battery

Controllable pitch propeller



Limestone bulk carrier image

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CAPE SPENCER

Builder: Imabari Shipbuilding Co., Ltd. Ship type: Bulk carrier L (o.a.) x B x D: 182.93m x 31.00m x 15.00m DWT/GT: 35,187t/25,006 Main engine: 96UEC42LSH-Eco-D3 diesel x 1 unit Speed, service: 14.0kt Classification: ClassNK Completion: November 6, 2023



CAPT TASOS

Builder: Namura Shipbuilding Co., Ltd. Hull No.: 489 Ship type: 182,000DWT class bulk carrier L (o.a.) x B (mld.) x D (mld.) x d (mld.): 291.92m x 45.00m x 24.60m x 18.20m DWT/GT: 182,288t/93,721 Main engine: MAN B&W 7G60ME-C10.5-EGRBP diesel x 1 unit Classification: ClassNK Registry: Cyprus Completion: October 25, 2023



FEDERAL THUNDER BAY

Owner: Federal Trident Ltd. Builder: Oshima Shipbuilding Co., Ltd. Hull No.: 11051 Ship type: Bulk carrier L (o.a.) x B x D x d (ext.): 199.980m x 23.762m x 14.850m x 10.886m DWT/GT : 34,763t/21,043 Main engine: Mitsui-MAN B&W 5S50ME-C9.7-HPSCR diesel x 1 unit Speed, service: 14.15kt Classification: DNV Registry: Marshall Islands Completion: October 27, 2023



ESTEEM COWBOY

Builder: Sumitomo Heavy Industries Marine & Engineering Co., Ltd.
Hull No.: 1414
Ship type: Crude oil carrier
L (b.p.) x B x D : 239.67m x 44m x 21.55m
DWT/GT: 115,000t/abt. 60,300
Main engine: Mitsui MAN 6G60ME-C10.5 diesel x 1 unit
Speed, service: 14.5kt
Classification: LR
Registry: Panama
Completion: January 11, 2024



82,400DWT Bulk Carrier Builder: Tsuneishi Shipbuilding Co., Ltd. Hull No.: 1625 Ship type: Bulk carrier L (b.p.) x B x D : 229.00m x 32.26m x 20.15m DWT/GT: 82,400t/44,000 Main engine: MAN B&W 7G50ME-C9.6-EGRBP diesel x 1 unit Speed, service: 14.0kt Classification: ClassNK Registry: Marshall Islands Completion: October 20, 2023

KAMSARMAX



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