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Mitsubishi Shipbuilding Acquires AiP from Classification Society for Basic Design of OCCS

AiP Presentation Ceremony Held at ClassNK

ClassNK
NIPPON KAIJI KYOKAI

Document No. KF25MC0135SH
Date: 09 April 2025

APPROVAL IN PRINCIPLE

Onboard Carbon Capture and Storage system
developed by
MITSUBISHI SHIPBUILDING CO., LTD.

THIS IS TO CERTIFY THAT Approval in Principle is granted to MITSUBISHI SHIPBUILDING CO., LTD.

The AIP is for the design concept of Onboard Carbon Capture and Storage system, and it is based on "Guidelines for Shipboard CO_2 Capture and Storage Systems (Edition 1.1)".

The documents/drawings specified in the annex to this letter have been reviewed and it is verified that the conceptual design of the system is feasible for the intended application.

Details of this approval are described in the Annex to cert KF25MC0135SH.
For final approval of the system, a complete set of documentation is to be approved by the Society in accordance with relevant class rule.

(Shinya Oishi)
General Manager of Machinery Department
NIPPON KAIJI KYOKAI

Form CLS (21.01)

AiP Certificate

Mitsubishi Shipbuilding Co., Ltd., a part of the Mitsubishi Heavy Industries (MHI) Group, has acquired an Approval in Principle (AiP) from Nippon Kaiji Kyokai (ClassNK) for an Onboard Carbon Capture and Storage system (OCCS) that it has developed to capture and store CO_2 emitted from ships.

The OCCS, for which the AiP has been granted, captures, liquefies, and stores CO_2 after pretreatment of the exhaust gas emitted from ships. It is attracting attention as a solution to promote the decarbonization of ships.

Mitsubishi Shipbuilding has developed the system by centering on CO_2 capture technologies of MHI, which has a wealth of experience with onshore facilities, and by combining them with exhaust gas pretreatment as well as CO_2 liquefaction, storage, and handling technologies in order to establish an onboard system. Going forward, Mitsubishi Shipbuilding will accelerate the development of this system to bring it into market.

The MHI Group is currently pursuing strategic measures to strengthen its business for the energy transition. In conjunction with this initiative, Mitsubishi Shipbuilding is making efforts to contribute to the advancement of the maritime industries in Japan and around the world by utilizing its shipbuilding-based marine engineering technologies in addition to its conventional shipbuilding. Mitsubishi Shipbuilding will actively contribute to the decarbonization of ships, continuing its efforts to reduce greenhouse gas (GHG) emissions from ships, which is becoming an increasingly urgent priority around the world.

About MHI Group's CO_2 Capture Technologies

The MHI Group has been developing the "KM CDR Process™" (Kansai Mitsubishi Carbon Dioxide Recovery Process) and the "Advanced KM CDR Process™" in collaboration with the Kansai Electric Power Co., Inc. since 1990. As of April 2025, the group has delivered 18 plants adopting these technologies. The "Advanced KM CDR Process™" adopts the "KS-21™" solvent, which incorporates technological improvements over the amine-based "KS-1™" and offers superior regeneration efficiency and lower deterioration than the "KS-1™", and it has been verified to provide an excellent energy saving performance, reduce operation costs, and result in low amine emissions.

For further information please contact:
Website: https://www.jsea.or.jp
JSEA
JAPAN SHIP EXPORTERS' ASSOCIATION
15-12, Toranomon 1-chome, Minato-ku, Tokyo 105-0001 Tel: (03) 6206-1661 Fax: (03) 3597-7800 E-Mail: sea-japan@jsea.or.jp

Gakken Publishes New Book on Secret of Shipbuilding from Easy-to-Understand Educational Manga Series

Gakken Inc. released a new book on the "Secret of shipbuilding" in May 2025. Imabari Shipbuilding Co., Ltd. had been interviewed, provided photos as well as other materials and so on to help the publisher produce it, which comes from a series of easy-to-understand educational manga for elementary and junior high school students.

Gakken has distributed some 30,000 copies to all elementary, junior high and special needs schools and 4,000 copies to all public libraries and some children's centers across Japan. It is hoped that the new publication will encourage more people to take an interest in the role shipbuilding plays in society.

Being not for sale, the series of educational manga is not available at local bookstores. From the QR code below, it can be viewed in an electronic edition.

Delivery of 'AESOP,' 'SIENA,' JMU's Next-Generation Suezmax Tankers

Last April and June, Japan Marine United Corporation (JMU) delivered the "AESOP" and "SIENA", the first and second vessels of JMU's newly developed next-generation suezmax tankers. By gathering JMU's latest technologies and all of the expertise on oil carriers that it has accumulated over a long period of time, the sisters achieve more energy saving and environment friendly performances. Their fuel consumption is improved compared with previous vessels, SOx scrubber is equipped, comply with both the NOx Tier III and EEDI Phase 3 requirements.

In addition, a lot of advanced technologies are applied to the sisters which contribute to improving their performances. The latest engineering analysis has helped pursue higher propulsion efficiency utmost in developing their hull form. The sisters not only have high efficiency propellers, but also JMU's original energy saving devices, such as "Super Stream Duct®," "SURF-BULB®" and "ALV-Fin®," all of which are optimized to this particular hulls. Those technologies significantly improve propulsion performance and reduce fuel oil consumption. Moreover, both "Ax- Bow®," which reduces wave resistance, and a low wind-resistance accommodation are applied to improve their performances on actual sea conditions.


"AESOP"


"SIENA"

In order to comply with various environmental regulations, the sisters have electronically controlled engines, ballast water management systems and an inventory of hazardous materials, and their NOx emissions are lower than the NOx Tier III requirements. Furthermore, low friction paints are applied to their hulls. Also, their cargo oil and ballast water tanks are both coated in accordance with the IMO PSPC requirements that improve their anticorrosive performances.

<Principal Particulars>

L (o.a.) x B (mld) x D (mld): 274.30m x 48.00m x 23.15m
GT / DWT: 83,175/Approx. 158,930
Service Speed: 14.5kt
Main engine: Mitsui MAN-B&W 7S60ME-C10.6-EGRBP
Complement: 25
Classification: DNV
Registration: Bahamas

Joint Study on Construction Scheme for Liquefied Hydrogen Carriers

Kawasaki Heavy Industries, Ltd. (Kawasaki), Imabari Shipbuilding Co., Ltd., and Japan Marine United Corporation will commence a joint study (Study) to establish a construction scheme for liquefied hydrogen carriers.

This Study will examine the feasibility of a collaborative construction scheme that efficiently utilizes the partners' respective resources, such as facilities and human resources, for the construction of liquefied hydrogen carriers following the first commercial carrier to be designed and built by Kawasaki.

Liquefied hydrogen carriers are expected to play an essential role in the establishment of a liquefied hydrogen supply chain by transporting large volumes of hydrogen.

This Study will reinforce the cooperative relationship among the partners for the commercialization of a liquefied hydrogen supply chain who will work toward the realization of a carbon-neutral society.

MHI Marine Machinery Begins Demonstration Testing of Methane Oxidation Catalyst System for Marine LNG Engines

Mitsubishi Heavy Industries Marine Machinery & Equipment Co, Ltd. (MHI-MME) of the Mitsubishi Heavy Industries (MHI) Group, has begun demonstration testing of a methane oxidation catalyst system for LNG-fueled marine vessels, being jointly developed with Daihatsu Infinearth Mfg. Co., Ltd.

The demonstration testing, which began in May this year in cooperation with KEYS Bunkering West Japan Ltd. (KEYS), involves installing demonstration equipment on the LNG bunkering vessel KEYS Azalea, owned and operated by KEYS. The KEYS Azalea was built by Mitsubishi Shipbuilding Co., Ltd.

The KEYS Azalea, an LNG bunkering vessel equipped with the demonstration system

The catalyst system for the demonstration test oxidizes slip methane (unburned methane) contained in exhaust gas from marine engines. Methane has a high greenhouse effect among GHGs so suppressing it is a significant advantage of this system.

The methane oxidation catalyst system was developed with MHI-MME's catalyst design and manufacturing technology at its core, combined with Mitsubishi Shipbuilding's

(Continued on Page 4)

Onshore test equipment for methane oxidation catalyst system for marine LNG engines

MITSUI E&S' Biofouling control service 'FALCONs' certified for Innovation Endorsement by ClassNK

MITSUI E&S Co., Ltd.'s new biofouling control service "FALCONs" has been certified for Innovation Endorsement for Products & Solutions (P&S) by ClassNK.

Four elemental technologies that have been certified for IE for P&S are as follows.

(1) Quantification of fuel savings and CO_2 reduction specifically through hull cleaning

By creating a model that integrates data from 'Fouling Evaluation' and 'Propulsion Performance Analysis', fuel consumption can be compared between when hulls are cleaned and not to quantify the amount of fuel and CO_2 saved through hull cleaning.

(2) Patternization of differences in fuel reduction effects of cleaning variations

By using the model that integrates 'Fouling Evaluation' and 'Propulsion Performance Analysis', fuel efficiency predictions are suggested in four patterns: propeller cleaning, hull cleaning, propeller and hull cleaning, and no cleaning. This enables users to quantitatively determine the appropriate timing and area for cleaning.

(3) Tracking and predicting the progress of biofouling through AI-powered quantitative evaluation

Underwater inspection images of the propeller and hull are evaluated by AI, classified into five fouling scales, and compared at fixed points. This provides a quantitative view of biofouling conditions and progression shown in the different color coding and graphing, as well as future predictions.

(4) Propulsion Performance Analysis only using engine and operational data without external disturbances

Engine data (main engine RPM, engine room temperature, turbocharger RPM and scavenging air pressure) and operational data (positions, water depth, heading, vessel speed, and rudder angle based on VDR) are analyzed for each voyage, and propulsion performance results with disturbances removed are calculated. Comparing the results for each voyage enables the quantification of resistance increases that result from biofouling as fuel consumption.

FALCONs is a service that integrates 'Fouling Evaluation' based on the AI assessment of underwater inspection images with 'Propulsion Performance Analysis' based on engine operation and voyage record data. FALCONs makes it possible to quantitatively understand and predict the deterioration of propulsion performance from biofouling and improvements from cleaning. Thus, MITSUI E&S provides ' background data to determine effective timing and area of cleaning' and 'quantitative reductions in fuel consumption and CO_2 emissions' to shipping operators who previously relied on other methods including experience and intuition for cleaning decisions and want to quantitatively evaluate cleaning effects.

MITSUI E&S will work to expand its FALCONs service as a highly reliable solution, with a view to obtaining various certifications and statements of fact from ClassNK, as well as other certifications related to CO_2 reduction.

(Continued from Page 3)

shipboard installation technology, and Daihatsu Infinearth's engine optimization technology. Since an initial methane oxidation rate of 70% or higher has been verified in an onshore engine test, the demonstration testing will be conducted continuously for one year.

The MHI Group is making strategic efforts to strengthen its energy transition business. MHI-MME and Mitsubishi Shipbuilding are both part of this strategy, and amid increasing urgency for global decarbonization, will continue to work to reduce GHG emissions from marine vessels, and contribute to improving the environmental performance of ships on a global scale.

Shin Kurushima Toyohashi Shipbuilding Co., Ltd. Receives HSE Management System Certification from ClassNK

Shin Kurushima Toyohashi Shipbuilding Co., Ltd., based in Toyohashi City, Aichi Prefecture, has obtained certification for a Health, Safety, and Environment (HSE) Management System following a formal audit by Nippon Kaiji Kyokai (ClassNK). The certification affirms that the company's HSE initiatives are aligned with internationally recognized standards and reflects a growing emphasis on third-party validation of corporate responsibility in safety and environmental practices.

Obtaining ISO 45001 certification in 2022, the company continues to enhance its safety management framework in compliance with Japan's Labour Safety and Health Act. However, due to a document-heavy approach, the company had faced challenges in communicating its on-the-ground safety efforts, leading to limited recognition from clients who prioritize robust HSE governance.

In response, Shin Kurushima Toyohashi Shipbuilding voluntarily underwent an independent evaluation by ClassNK, which assessed both its organizational systems and on-site operational practices. The assessments recognized the company's efforts to embed HSE principles at every level of its operations, resulting in the awarding of the certification.

The company views this certification not as a conclusion but as a foundation for further progress. Over the next three years, it aims to upgrade its HSE system to a nextier, with a strategic focus on eliminating serious incidents and minimizing overall risk. These efforts are part of a broader initiative to create a safer, more resilient workplace and to bolster the company's competitiveness in markets where safety and sustainability are key procurement criteria.

By reinforcing its commitment to responsible shipbuilding, Shin Kurushima Toyohashi Shipbuilding intends to foster long-term trust among stakeholders and contribute to sustainable growth through enhanced operational excellence and business development.

Sumitomo Heavy Industries Signs Contract with MODEC to Build FPSO Hull Block for Shell

Sumitomo Heavy Industries has signed a contract with MODEC to build a hull block of a Floating Production, Storage and Offloading (FPSO) unit for British energy giant Shell's Gato do Mato project in the pre-salt oil field of the Santos Basin in Brazil.

Under this contract, the forward block of the hull will be constructed at Sumitomo Heavy Industries Marine & Engineering's Yokosuka Shipyard and then towed to a shipyard in China. At the Chinese shipyard, the aft section and topside will be integrated to finalise the FPSO unit.

For the first time, an FPSO hull of this size will be built in a modular fashion across two countries. This unique scheme will become a solution to respond to the current challenges of drydock availability and aims to optimise delivery times.

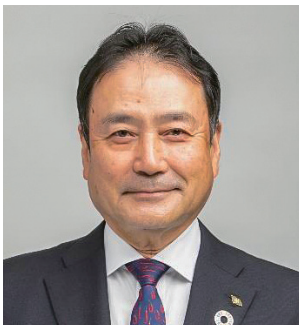
Sumitomo Heavy Industries is responsible for the phase of constructing the forward block of the hull, which is scheduled to be completed in June 2026.

This is the First large-scale project that Sumitomo Heavy Industries has undertaken since announcing withdrawal from commercial shipbuilding.

Sumitomo Heavy Industries will advance the construction project in cooperation with MODEC.

Unit Name	Gato do Mato FPSO
Field	Gato do Mato field
Country	Brazil
Hull	Newly built
Water Depth	2,000m
Mooring Type	SOFEC Spread Mooring
Storage Capacity	850,000bbls
Oil Production	120,000bopd
Gas Production	384mmscfd
Water Production	80,000bwpd
Gas lift / re-injection	360mmscfd
Produced water re-injection	125,000bwpd

New JSEA President appointed



New President Kanehana

The 130th Annual General Meeting of the Japan Ship Exporters' Association (JSEA) in Tokyo selected 28 directors and 2 auditors on May 26, 2025. The subsequent 664th Directors' Meeting selected Mr. Yoshinori Kanehana, Chairman of the Board of Kawasaki Heavy Industries, Ltd. as new President. Mr. Kanehana's tenure will last two years as usual. Mr. Kanehana completed his two-year term as Chairman of the Shipbuilders' Association of Japan (SAJ) on June 19, 2025, which he assumed in 2023. The same meeting reappointed its four Executive Vice Presidents: Mr. Yukito Higaki, President, Imabari Shipbuilding Co., Ltd.; Mr. Takao Kusaka, Managing Executive Officer, Sumitomo Corporation; Mr. Hirokazu Fujimoto, Junior Executive Officer, Itochu Corporation; and Mr. Kotaro Chiba, Executive Adviser, Japan Marine United Corporation. Standing officers of JSEA, Mr. Satoshi Ito, Senior Managing Director and Mr. Shinzo Tsuruoka, Managing Director and concurrently, Secretary General, were both reappointed as well.

New SAJ Chairman appointed

New Chairman Higaki

The 91st annual general meeting of the Shipbuilders' Association of Japan (SAJ) took place on June 19 and elected 20 new directors. Subsequently, the 697th board of directors' meeting was held, and Mr. Yukito Higaki was appointed as the 40th Chairman of SAJ. Mr. Higaki is currently President of Imabari Shipbuilding Co., Ltd.

TSUNEISHI Delivers World's First Methanol Dual-Fuelled Ultramax Bulker

TSUNEISHI SHIPBUILDING Co., Ltd. (Fukuyama, Hiroshima, Japan) is pleased to announce the delivery of the world's first methanol dual-fuelled bulk carrier in the 65,700-deadweight-ton class, the TESS66 AEROLINE (hereinafter referred to as TESS66), at its TSUNEISHI Factory on 13 May. This vessel maintains the high cargo capacity and fuel efficiency characteristic of the TESS66 series, while enabling more sustainable operations through the use of methanol as fuel.

Pioneering Methanol Dual-Fuel Technology

By using methanol, the vessel is able to reduce emissions of nitrogen oxides (NOx) by up to 80%, sulfur oxides (SOx) by up to 99%, and carbon dioxide (CO_2) by up to 10% compared to conventional heavy fuel oil. When green methanol is used, the vessel also contributes to carbon neutrality, significantly reducing environmental impacts.

A methanol fuel tank is positioned at the vessel's stern deck to maximise safety and facilitate smooth cargo handling while maintaining loading efficiency. With a deadweight of 65,700mt and a cargo hold capacity of 81,500m^3, the vessel inherits the exceptional loading performance of TESS66, which ranks among the highest in the Ultramax category. It is also equipped with a fuel-efficient main engine and TSUNEISHI's proprietary AEROLINE technology to reduce wind resistance, delivering superior fuel performance.

Message from the President

Mr. OKUMURA Sachio, Representative Director, President & Executive Officer of TSUNEISHI SHIPBUILDING Co., Ltd. commented:

"It is both an honour and deeply meaningful milestone for us to deliver the world's first methanol dual-fuelled bulk carrier, the TESS66 AEROLINE. This vessel embodies TSUNEISHI SHIPBUILDING's vision for the future and reflects our commitment to pioneering environmentally responsible shipbuilding technologies. This achievement would not have been possible without the unwavering support of our customers, partners, and all those involved in the project, as well as the dedication and technical expertise of our employees. I extend my sincere appreciation to all. This delivery is just a beginning. We will continue constructing methanol dual-fuelled vessels at our overseas facilities and remain steadfast in our pursuit of technological innovation to contribute to a more sustainable maritime industry and global environment."

ONE SINGAPORE

Builder: Imabari Shipbuilding Co., Ltd.
Ship type: 13,900TEU Type Very Large Container Ship
L (o.a.) x B x D: 335.94m x 51.00m x 30.10m
GT: 140,233
Main engine: 7G95ME-C10.6 x 1 unit
Speed, service: 22.0kts
Classification: LR
Completion: June 30, 2025

MAERSK EL BOSQUE

Builder: Japan Marine United Corporation
Hull No.: 5454
Ship type: 12,800TEU Container Ship
L (o.a.) x B x D x d: 335.0m x 51.00m x 27.10m x 16.00m
GT: 127,814
Main engine: MITSUI-MAN-B&W 7G95ME-C10.5-EGRTC
Complement: 30
Classification: NK
Registration: Republic of Panama
Completion: March 19, 2025

BELLE CONFIDENCE

Builder: THE HAKODATE DOCK CO., LTD.
Hull No.: 922
Ship type: 40,000DWT Type Bulk Carrier
L (o.a.) x B x D x d: 182.94m x 31.6m x 14.80m x 10.37m
DWT/GT: 40,381t/24,465t
Main engine: J-ENG 6UEC42LSH-Eco-D3-EGR
Speed, service: about 13.6kts
Classification: NK
Registration: Portugal
Completion: February 21, 2025

GREEN YOKOHAMA

Owner: XIN YIN CHUANG YUAN 3 (TIANJIN) SHIPPING LEASING CO., LTD.
Builder: Oshima Shipbuilding Co., Ltd.
Hull No.: 11096
Ship type: General Cargo Carrier
L (b.p.) x B x D: 206.00m x 36.00m x 19.54m
DWT/GT: 73,674t/45,030t
Main Engine: Mitsui MAN B&W 5S60ME-C 10.5 EGRBP (Derating)
Speed, service: 14.5 kts
Classification: NK
Registration: Panama
Completion: March 31, 2025

NEW TAIWAN FUEL

Owner: Taiwan Fuel & Energy Supply Co., Ltd.
Builder: Sasaki Shipbuilding Co., Ltd.
Hull No.: 725
Ship type: Oil Bunker tanker
L (b.p.) x B x D: 63.00m x 12.00m x 5.00m
DWT/GT: 1,441t/996t
Main engine: IHI 6L22HX (1,029kW x 2sets)
Speed, service: 10.50kts
Classification: CR
Registration: Republic of China
Completion: April 18, 2025

Information from JSEA

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sea-japan@jsea.or.jp

with the following information of yourself for identification:

1. Full name;
2. Company name/occupation, or freelance/others;
3. Your company address, or your country; and
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