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Kawasaki Heavy Industries, Ltd.

Tokyo Boeki Holdings Corporation

World's First Commercial-Specification 6-inch Loading Arm for Ship-to-Shore Liquefied Hydrogen Transfer Kawasaki and TBG Complete Joint Development

Contributing to the development of a global liquefied hydrogen supply chain with cargo handling equipment advanced for commercial use

Kawasaki Heavy Industries, Ltd. (Kawasaki; headquartered in Minato-ku, Tokyo; Yasuhiko Hashimoto, Representative Director, President and Chief Executive Officer) and TB Global Technologies Ltd. (TBG; headquartered in Chuo-ku, Tokyo; Masaki Takahashi, President), a group company of Tokyo Boeki Holdings Corporation (headquartered in Chuo-ku, Tokyo; Hideshige Tsubouchi, President), have completed the joint development of the world's first 6-inch liquefied hydrogen loading arm (the Equipment) for ship-to-shore liquefied hydrogen transfer.

Commercial-specification 6-inch liquefied hydrogen loading arm developed by Kawasaki and TBG

The Equipment is based on the pilot-specification loading arm first developed in 2018. In 2022, the pilot unit successfully completed the world's first liquefied hydrogen cargo handling operation at the Hy touch Kobe liquefied hydrogen receiving terminal[*1].

Since August 2023, Kawasaki and TBG have designed and developed a commercial-specification model and manufactured and inspected a prototype. From August 2025 through July 2026, the companies carried out verification testing using liquefied hydrogen at the JAXA Noshiro Rocket Testing Center, confirming the technological foundation required for the commercialization of liquefied hydrogen cargo handling equipment. Development has now been completed.

The Equipment was designed and tested in compliance with ISO 24132, the international standard for marine transfer arms for liquefied hydrogen, and has obtained ISO certification as commercial-specification equipment.

Main Features of the Commercial-Specification Equipment

1) Loading arm:
- A redesigned arm structure provides greater reach, enabling the loading arm to accommodate larger vessels.

2) Swivel joint (SJ):
- An enhanced seal structure and a newly adopted seal gas system improve equipment reliability.
- Helium gas consumption has been reduced while maintaining the internal joint pressure required to preserve sealing performance.

3) Emergency release system (ERS):
- The drip pan that collects liquid oxygen generated during an emergency release uses a gravity-drop mechanism instead of hydraulic actuation, simplifying the structure.
- A simplified clamp mechanism improves the reliability and maintainability of the emergency release system.

4) Ship-to-shore coupler (SSC):
- A flange-type connection that requires no insertion reduces operator workload and improves operability, while also enabling a lighter and more compact design.
- The SSC is designed to support ClassNK technical certification requirements[*2], strengthening its practicality and applicability for commercialization.

～Liquid hydrogen testing of key components at the JAXA rocket test site
Top left：ERS、Bottom left：SSC、
Top right：SJ strength testing machine、Bottom right：SJ durability testing machine～

The Equipment will be used in the demonstration project for the commercialization of a liquefied hydrogen supply chain under NEDO's Green Innovation Fund Project, Development of Large-scale Hydrogen Supply Chain[*3]. Three units are scheduled to be installed at the Kawasaki LH_2 Terminal, which Japan Suiso Energy, Ltd. (JSE) is constructing on Ogishima in Kawasaki-ku, Kawasaki City, Kanagawa Prefecture, for use in liquefied hydrogen cargo handling with a 40,000 m^3-class liquefied hydrogen carrier.

Going forward, Kawasaki and TBG will continue working to have the commercial-specification liquefied hydrogen loading arm adopted in projects in Japan and overseas. Through further acceleration of technology development and business development, the companies will enhance the practicality of cargo handling equipment essential for large-scale marine transportation of liquefied hydrogen and contribute to the realization of a carbon-neutral society by developing global liquefied hydrogen supply chains.

*1: Completion Ceremony Held for World's First Demonstration of Marine Transportation and Cargo Handling of Liquefied Hydrogen Produced from Brown Coal (April 9, 2022)
https://global.kawasaki.com/news_220409-1e.pdf

*2: Liquefied Hydrogen Ship-to-Shore Connection Receives Technical Certification from Nippon Kaiji Kyokai (ClassNK) — Major Step Forward Toward Commercialization of Marine Transportation of Liquefied Hydrogen — (December 1, 2025)
https://global.kawasaki.com/news_251201-1e.pdf

*3: NEDO Green Innovation Fund Project: Development of Large-scale Hydrogen Supply Chain
https://green-innovation.nedo.go.jp/en/project/hydrogen-supply-chain/

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