

Press Information

January 23, 2024

Development of a liquid ammonia pump for thermal power generation

**Market launch in 2026, Contributing to decarbonization
and the stable supply of electricity**

Nikkiso has developed a pump for liquid ammonia, which is attracting attention as a carbon-free fuel because it does not emit carbon dioxide(CO₂) during combustion.

The pump is compatible with the use of liquid ammonia for thermal power generation, which aims to both reduce CO₂ emissions and ensure a stable supply of electricity by gradually converting the fuel for coal-fired power generation, one of the main power sources in Japan, to ammonia, and will be launched on the market in 2026.

Nikkiso will contribute to decarbonization and the stable supply of electricity through the development of pumps for liquid ammonia.



■Background to the development

Thermal power generation accounts for more than 70% of Japan's power generation composition (preliminary figures for FY2022, Ministry of Economy, Trade and Industry), and sustains Japanese economy and society. On the other hand, it is known for its high CO₂ emissions, and countermeasures are required. Ammonia co-firing, in which ammonia is mixed with boilers for

coal-fired thermal power generation, can reduce CO2 emissions in accordance with the co-firing rate, and is therefore considered one of the techniques for achieving both reduced CO2 emissions and stable supplies of electricity.

According to the "Green Growth Strategy for 2050 Carbon Neutral" (2021), which was prepared mainly by the Ministry of Economy, Trade and Industry, the short-term target (up to 2030) is to introduce and popularize 20% ammonia mixed firing in coal-fired power plants, and the long-term target (up to 2050) is to improve the mixed firing rate (50%) and to commercialize the sintered firing technology. Domestic demand is expected to be 3 million tons per year in 2030 and 30 million tons per year in 2050.

In response to these social demands, Nikkiso developed a pump for liquid ammonia.

■Features of the developed pump

- **Submerged structure, immersed in liquid up to the motor section to prevent external leakage**

Due to the toxic and odorous nature of liquid ammonia, leakage to the outside must be prevented. For this reason, all parts other than the pipework, including the motor, are immersed in the liquid.

- **Canned motor pump construction with the motor built into the pump and hermetically sealed to prevent corrosion.**

To prevent the motor from deteriorating due to exposure to the corrosive liquid ammonia, a canned motor pump design has been adopted in which the motor is built into the pump and sealed off from the liquid flow path.

Nikkiso has already delivered several thousand liquid ammonia canned motor pumps for ammonia refrigeration and agricultural fertiliser production plants worldwide, and is using this experience.

- **Cryogenic pump technology is applied to achieve high pumping capacities.**

In the development of ammonia pumps for fuels requiring high pumping capacity, the technology of cryogenic pumps, which are used in LNG terminals and other facilities, has been adopted, as they can pump high heads and large flow volumes. Cryogenic pumps were successfully produced domestically for the first time in 1985, and now account for approximately 50% of the global market share.

Nikkiso's ammonia pumps take a development approach that crosses the advantages of canned motor pumps for special liquids and cryogenic pumps, where manufacturing know-how is abundant.

■Future development

In addition to fuel co-firing applications, the pumps are also being considered for use in receiving and discharging applications at ammonia terminals, where higher heads and higher flow rates are required than in fuel co-firing, based on the pumps' experience in LNG terminal. In addition to the sale of pumps, we will also focus on the sale of packaged products that combine pumps with the necessary equipment to suit the application.

We are looking at applications not only for thermal power generation, but also for receiving and discharging applications at ammonia terminals, which require even higher heads and higher flow rates than thermal power generation, by utilising our experience with pumps for LNG terminals.

This pump meets potential of the global market, and will make a significant contribution to realizing a decarbonized society.

<About Nikkiso>

Company Name: NIKKISO CO., LTD.
Head Office: YebisuGardenPlaceTower22ndFloor,20-3,Ebisu4-Chome,Shibuya-ku,Tokyo
150-6022, Japan
Date of Establishment: December 26, 1953
President & CEO: Toshihiko Kai
Business Overview: Nikkiso provides specialized pumps and systems in the Industrial Business,
CFRP (carbon fiber reinforced plastic) aircraft parts in the Aerospace
Business and hemodialysis related products in the Medical Business.
URL: <https://www.nikkiso.com/>

For inquiries, please contact:

PR and IR Section, Corporate Planning Department,
Corporate Planning Division, NIKKISO CO., LTD.
E-mail: nikkiso-pr@nikkiso.co.jp