

Joint News Release

June 10th, 2024

BASF and NGK release advanced type of sodium-sulfur batteries (NAS Battery) NAS MODEL L24

- **New product NAS MODEL L24 is characterized by significantly reduced degradation rate.**
- **Improved technology allows customers to save approx. 20% on their investment in NAS battery storage system compared to the previous battery type.**
- **Advanced type of NAS battery is an outcome of the joint development by BASF and NGK.**

Ludwigshafen, Germany, and Nagoya, Japan, June 10th, 2024 – BASF Stationary Energy Storage GmbH, a wholly owned subsidiary of BASF, and NGK INSULATORS, LTD. (NGK), a Japanese ceramics manufacturer, have released an advanced container-type NAS battery (sodium-sulfur battery) ^{*1}.

The new product NAS MODEL L24 has been jointly developed by NGK and BASF and is characterized by a significantly lower degradation rate of less than 1 % per year thanks to a reduced corrosion in battery cells. Another technical achievement is an improved thermal management system in battery modules, which enables a longer continuous discharge^{*2}. The new technology elements have been incorporated into the field-proven battery design.

These improvements allow projects to be implemented using significantly fewer number of NAS battery containers over project running time, and with lower maintenance costs.

“This advanced type of NAS batteries is an outstanding achievement by the joint development team of BASF and NGK, which brought together respective areas of expertise of both companies. With the NAS MODEL L24 our customers will be able to reduce their initial investment in battery storage system as well as save on long-term project costs, approx. 20% over project lifetime. We are proud to have contributed to the advancement of NAS battery technology, which is an essential building block for a successful energy transition.”, said Frank Prechtel, Managing Director of BASF Stationary Energy Storage GmbH.

Ryugo Takeda, Vice President and General Manager of Energy Storage Division of NGK, comments: “The improved performance stems from an intense and effective collaboration between BASF and NGK that started from 2019. The lower degradation rate of less than 1% per year is a remarkable result for the energy storage industry. Through BASF's global sales network, we are excited to provide solutions to more customers using this NAS MODEL L24 and thus to contribute to the promotion of global renewable energy adoption and the reduction of CO₂ emissions”.

The new concept complies with the latest safety standards for energy storage installations, such as UL1973 and UL9540A, and underlines the high degree of safety for NAS installations.

NAS batteries are long-duration, high-energy stationary storage batteries. They feature long life and enhanced safety and can provide a stable power supply over six hours or longer. In more than 20 years they have been deployed at over 250 locations worldwide, with a total output of almost five gigawatt-hours. NAS batteries are used for various use cases, including stabilizing of renewable energy and optimizing its utilization, through peak shaving and load balancing as well as emergency power supply. NAS Batteries are one of key contributors to a successful energy transition and carbon neutrality.

BASF will begin deliveries of NAS MODEL L24 in the second half of 2024.

*1: For the domestic market in Japan, NAS MODEL L24 is planned to be released once conformance with the domestic regulations is completed.

*2: In the case of discharging at 200kW-dc per NAS MODEL L24 unit, the continuous discharging duration is 6 hours.



Exterior image of NAS MODEL L24

About NAS batteries

NAS batteries are a megawatt class large-capacity storage battery, implemented practically for the first time in the world by NGK. The batteries feature large capacity, high energy density (compact), and long life, and can provide a stable supply of electric power with a high output over long periods of time. They have been installed at over 250 locations worldwide, with a total output of over 720 megawatt and total capacity of approx. 5,000 megawatt-hours installed. They are used for various applications, including peak cutting through load balancing and emergency power supply, as well as stabilization of renewable energy and construction of smart grids, thereby contributing to reduced environmental load and realization of carbon neutrality. NAS batteries have obtained the certification based on stationary storage battery safety standard UL 1973 (cell and module level) and a test report based on UL 9540A standard*, which is to verify batteries and storage battery systems fire risk, for confirming compliance with its evaluation criteria (cell, module, and installation level) through the evaluation program of UL Solutions, a global independent safety science company.

<https://www.ngk-insulators.com/en/product/nas-about.html>

About BASF Stationary Energy Storage

BASF Stationary Energy Storage GmbH (BSES) is a wholly owned subsidiary of BASF. BSES distributes NAS batteries and co-develops the NAS technology together with its Japanese partner NGK Insulators Ltd.

Further information at www.nasbatteries.basf.com

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. Around 112,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care, and Agricultural Solutions. BASF generated sales of €68.9 billion in 2023. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the United States.

Further information at www.basf.com

About NGK

NGK is the world's largest manufacturer of electrical insulators including 1,000-kV ultrahigh-voltage (UHV) transmission and substation insulators, and has a 100-year history. With foundations in exclusive ceramics technology, NGK contributes to environmental conservation, providing a wide range of products and technology in the "Triple E" growth fields: energy, ecology and electronics. NGK is also one of the largest manufacturers of ceramic catalyst carriers (HONEYCERAM) and Diesel Particulate Filters (DPF) for catalytic converters for automobiles. NGK is also the world's leading manufacturer succeeding in commercialization of large capacity energy storage system (NAS battery), which has overturned the conventional wisdom "The power cannot be stored."

To learn more about NGK, visit: www.ngk-insulators.com

Further information about NAS battery:

www.ngk.co.jp/nas/

<https://www.ngk-insulators.com/en/product/nas-about.html>