

Vedanta Aluminium deploys innovative cooling system to boost smelter efficiency

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Advanced thermal management solution demonstrates strong operational results in Jharsuguda

VEDANTA Aluminium, India's largest producer of aluminium, has deployed a state-of-the-art cooling system, termed the Forced Cooling Network (FCN), at its mega aluminium plant in Jharsuguda. Developed in-house, the innovation uses advanced 3D Computational Fluid Dynamics (CFD) modelling to enhance thermal management in aluminium induction cells (commonly known as pots). The FCN technology has been recognised with a Certificate of Merit at the National Energy Conservation Awards 2023 by the Ministry of Power's Bureau of Energy Efficiency.

CFD uses numerical algorithms to simulate fluid behaviour, such as airflow, pressure, and temperature, allowing engineers to optimise system performance without relying solely on physical testing. In aluminium smelting, this precision is critical for preventing sidewall overheating, maintaining protective layers, reducing energy loss, and ensuring stable, efficient pot operations.

Leveraging detailed digital replicas of pot structures, cooling ducts and airflow pathways, the FCN uses CFD simulations to optimise heat dissipation before installation. The sys-

tem has been commissioned on a section of a potline at Vedanta Aluminium's Jharsuguda plant, with plans underway to scale it across the entire potline. By ensuring precise sidewall temperature control, the FCN enables stable high ampere operations, better thermal balance and enhanced overall performance. It has already delivered measurable gains, including energy savings of 15.3 kWh per tonne of aluminium produced. Its contribution to advancing energy efficient, sustainable operations led to its recognition at the National Energy Conservation Awards.



Commenting on the initiative, C. Chandra, CEO, Vedanta Jharsuguda, said, "Innovation is at the heart of everything we do at Vedanta Aluminium. By combining digital precision

with practical engineering, we have not only strengthened the stability of our potlines but also improved the overall energy efficiency of our operations. This achievement is a testament

to the ingenuity of our teams and sets a new benchmark for sustainable aluminium production in India."

Vedanta Aluminium continues to focus on deploying technology-driven solutions that enhance industrial safety and support sustainable business growth. It is now harnessing the potential offered by Industry 4.0 technologies such as Artificial Intelligence and Machine Learning to achieve operational excellence and global competitiveness in every aspect of its operations.

Vedanta Aluminium, a business of Vedanta Limited, is

India's largest producer of aluminium, manufacturing more than half of India's aluminium (i.e., 2.42 million tonnes in FY25). It is a leader in value-added aluminium products that find critical applications in core industries. Vedanta Aluminium ranks 2nd in the S&P Global Corporate Sustainability Assessment 2025 world rankings for the aluminium industry, a reflection of its leading sustainable development practices. With its world-class aluminium smelters, alumina refinery and power plants in India, the company fulfils its mission of spurring emerging applications of aluminium as the 'Metal of the Future' for a greener tomorrow.