

Eco-friendly refrigeration technology

## Magnetocaloric cooling ready for series production

The refrigeration and air conditioning industry suffers from the gradual phasing out of the use of hydrofluorocarbons. Magnetocaloric cooling offers an energy-efficient, future-proof alternative without any greenhouse gases. The magnetocaloric material CALORIVAC® developed by VACUUMSCHMELZE (VAC) is now ready for series production and available on a large scale.



The magnetocaloric effect converts mechanical energy into thermal energy. The cooling effect is achieved by repeated magnetization and simultaneous dissipation of the generated heat. CALORIVAC is available in several alloy compositions, each of which covers a temperature range of 5 °C. The alloy is available in a number of different grades. With the means of cascading, the materials are used as "heat pumps" and can thus cover individual temperature ranges from -50 °C to +100 °C. The main advantage over compressors is that

water with the addition of a corrosion agent can be used as a cooling medium. The use of toxic gases or dangerous substitutes is not necessary, and work can also be accomplished at normal pressures.

The biggest challenge in the transition from laboratory production to series production was to realize very fine structures. The new manufacturing process achieves this with a structured CALORIVAC foil, which is stacked, cut and then sintered. The breakthrough to series maturity of the microstructures has been achieved and the new manufacturing process achieves a yield of almost 100%. Driven by the potential energy savings of up to 70 % compared to conventional compressors, several large development projects were already initiated.

"CALORIVAC will revolutionize cooling technology," says Denis Rollik, Product Manager Magnetocaloric Materials at VAC. "The many advantages of CALORIVAC, combined with the long service life of the material and the low-maintenance operation of the systems, enable our customers to offer exceptional, environmentally friendly and sustainable product solutions.

VACUUMSCHMELZE (VAC) is among the world's most highly innovative developers of magnetic materials, inductive components and other related products. With a global network of Sales and Field Application Engineers, VAC designs and manufactures tailor-made solutions for a wide variety of industries, comprising renewable energies, automotive, industrial automation installation technology, and aviation.

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