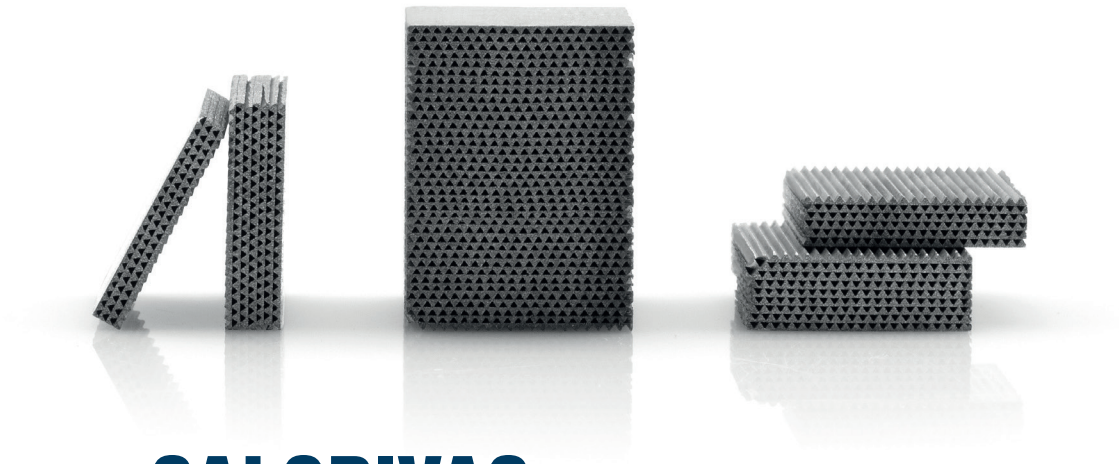


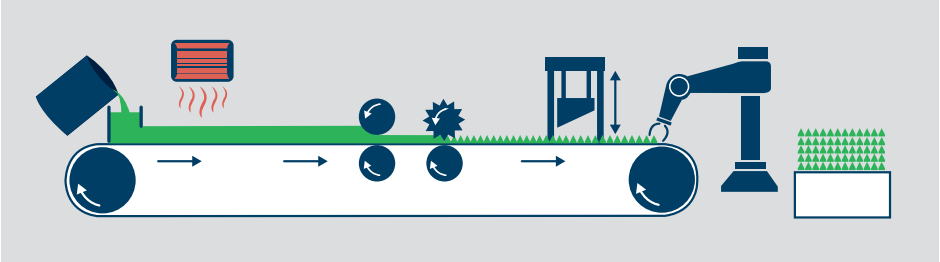
CALORIVAC

CALORIVAC® is a magnetocaloric alloy enabling solid-state energy conversion such as magnetic refrigeration.

BENEFITS

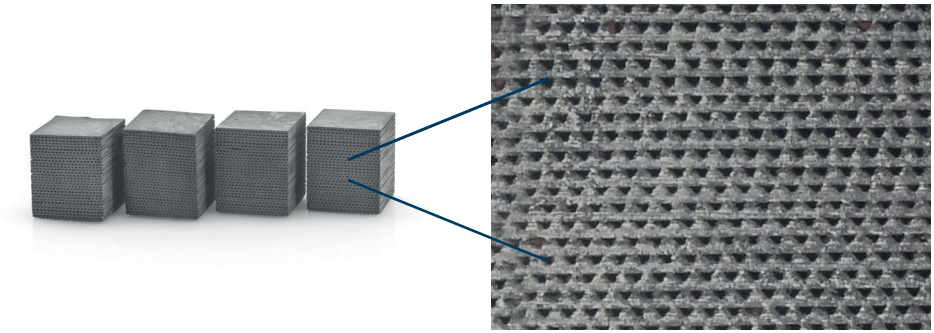
- Non-toxic, cost-efficient magnetocaloric alloy for energy conversion
- Enables the design of eco-friendly, energy efficient, gas-free refrigeration and air-conditioning devices
- All materials are compliant with environmental regulations
- Alternative areas of use are direct conversion of low-grade waste-heat into electricity

PRODUCTION OF MICROCHANNEL REGENERATORS (MCR) VIA TAPE CASTING

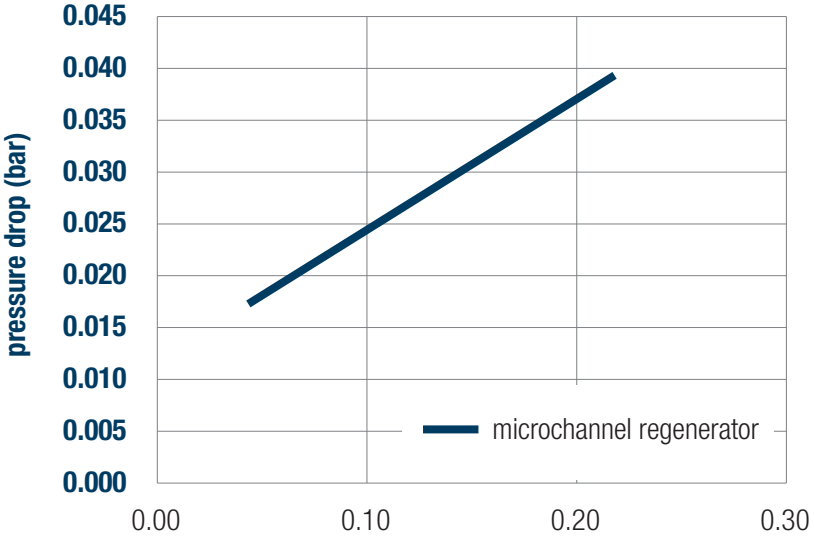


MAIN ADVANTAGES

- Preparation of CALORIVAC slurry
- Casting of slurry on to belt
- Drying of solvent yielding green tape
- Rolling and embossing of green tape to create the patterned surface
- Cutting and stacking of plates to create the microchannel regenerators
- Thermal treatment to remove organic components and reach full density



PRESSURE DROP AND MAGNETOCALORIC PROPERTIES



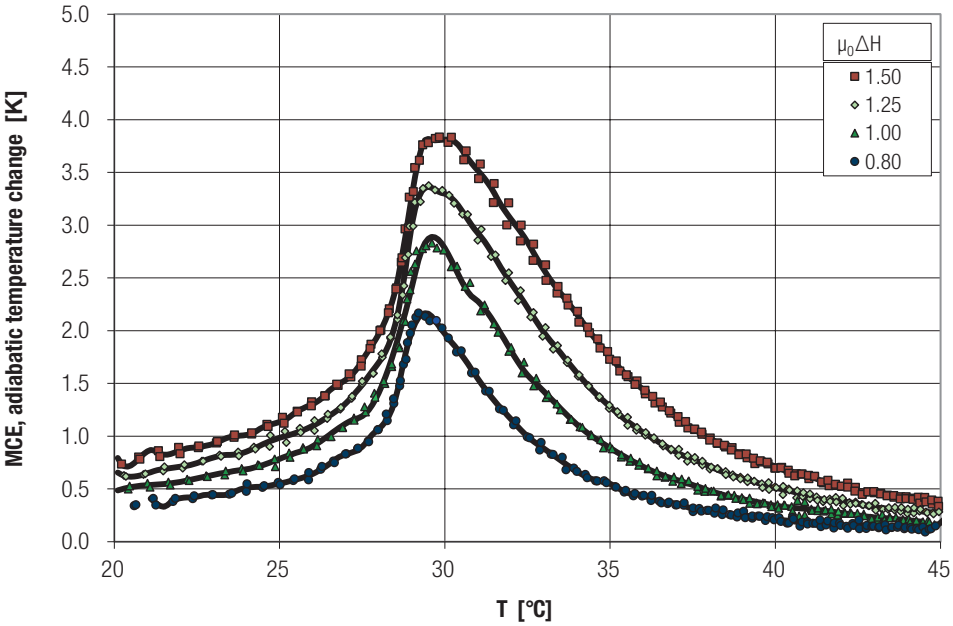
CALORIVAC C –
LOW TEMPERATURE APPLICATIONS

- Best magnetocaloric properties between -90 and -10 °C

CALORIVAC HS –
ROOM TEMPERATURE APPLICATIONS

- Best magnetocaloric properties between -10 and +50 °C

Temperature Range	Recommended alloy	deltaT, min @1 T in K	deltaT, typ @1 T in K
-80 to -50 °C	CV C	2.4 to 2.0	2.8 to 2.4
-50 to -30 °C	CV C	2.0 to 1.6	2.4 to 1.9
-30 to -10 °C	CV C	1.6 to 1.2	1.9 to 1.4
-10 to +10 °C	CV HS	1.9 to 2.2	2.2 to 2.6
+10 to +50 °C	CV HS	2.2 to 2.6	2.6 to 3.0



INTEGRATION OF CALORIVAC

VAC is your partner for integration of MCR modules into applications. We offer our expertise regarding chemical interactions with the heat transfer medium and mechanical constrains of the housing.

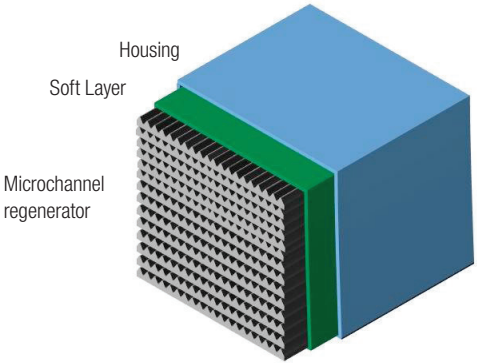


Fig. 1: MCR integrated into plastic housing (blue) with a soft buffer-layer (green)

CHEMICAL INTERACTIONS

- In contact with water, red rust occurs on the surface of CALORIVAC, similar to pure iron parts.
- Our solution: The choice of a suitable corrosion inhibitor and the MCR integration into air-tight systems.

MECHANICAL CONSTRAINTS

- At the magnetic phase transition a large volume change occurs. This leads to mechanical stress.
- Thermal shocks have to be avoided.
- A compressible layer between MCR and walls is required.

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ADVANCED MAGNETIC SOLUTIONS