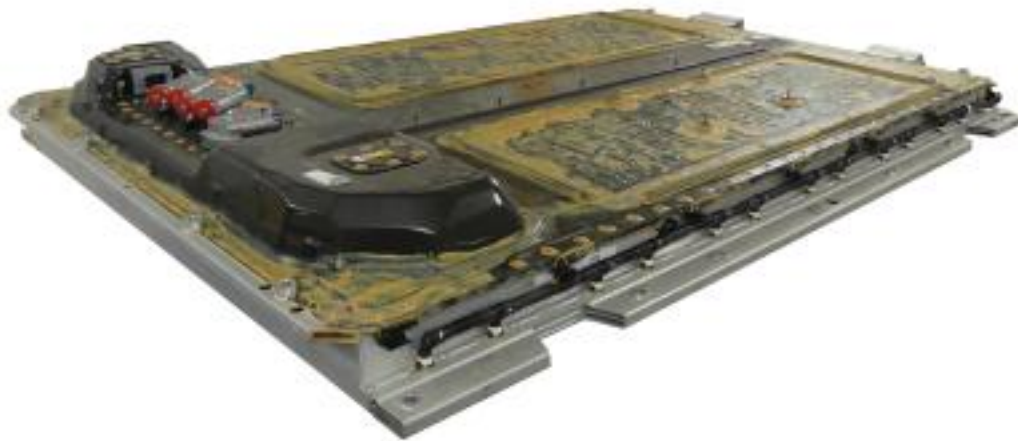


# Optimising battery housings for e-cars: with aluminium foam and more efficient production

## About this project



## COOLBat

### Optimising battery housings for e-cars: with aluminium foam and more efficient production

**Markets:**



**Material:**

Aluminium, Open-pore

This project is funded by the Technology Transfer Programme Leichtbau (TTP LB) of the Federal Ministry of Economics and Energy.

[Technology Transfer Program Leichtbau](#)

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## About this project

### Context

Electric cars can help to reduce greenhouse gas emissions in the transport sector and protect the climate. The battery system is the centrepiece of modern electric cars and a central component for sustainable mobility. With innovative design principles, materials and production processes, lightweight construction can help to make battery systems lighter, optimise their properties in use and make their production more efficient.

### Purpose

The aim of the COOLBat research project is to increase the range of electric cars by reducing the weight of the battery housing. At the same time, the researchers want to improve the performance of the batteries and enable faster charging times. In addition, the project team is investigating how the production of battery housings can be made significantly more efficient using lightweight construction approaches in order to reduce CO<sub>2</sub> emissions during production.

The battery system of an electric car being analysed serves as a reference and demonstrator for the researchers. The research results will then serve as a blueprint for the development, optimisation and scaling of specific lightweight materials and technologies for other industries and applications, such as trains, aircraft and ships or food and medical transport.

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### Procedure

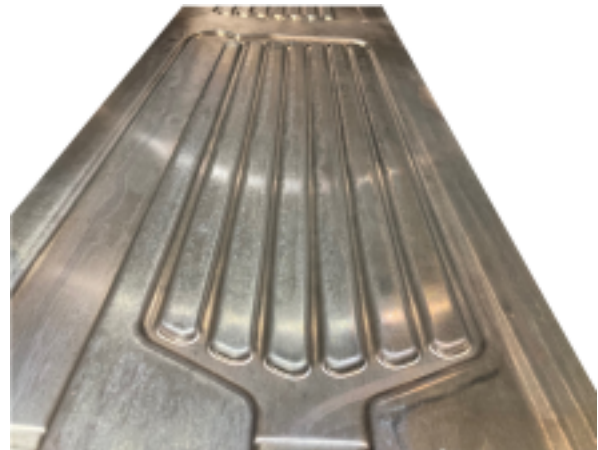
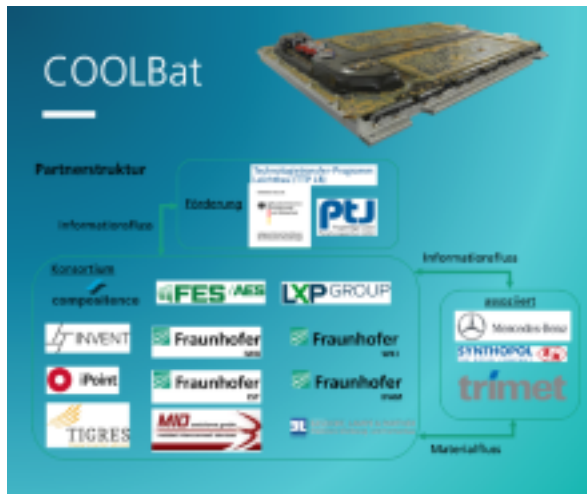
The researchers are scrutinising all development steps to see how they can contribute to CO<sub>2</sub> savings and sequestration. To do this, they look at the entire battery system. In addition to the battery module with its cells, this includes the housing with structures for load distribution and temperature control. These include frames, covers and base plates, which protect the batteries from overheating and damage.

The team combines individual systems in order to integrate more functions in a smaller space and with fewer interfaces. In future, support structures will contain directly moulded-in temperature control channels. In the floor panels, for example, the function of the cooling unit will be combined with that of crash protection in a single component.

The use of aluminium foam enables optimum load distribution and energy absorption in the event of an accident. The foam is combined with a so-called phase change material that can store heat and cold energy and release it again as required. This combination of materials also reduces the amount of energy required to cool the battery. The cover of the battery housing is designed in such a way that the housing can optimally absorb the loads acting on it. In addition, the participants are developing new heat-conducting materials to replace more expensive and environmentally harmful heat-conducting pastes. The lightweight construction solutions used should save 15 per cent CO<sub>2</sub> per battery housing.

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## About this project



Funding duration:

Funding sign: 03LB2005

Funding amount: EUR 2.9 million

Final report

Further websites

[foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2005B](https://foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2005B) - CoolBat in the federal funding catalogue

# Optimising battery housings for e-cars: with aluminium foam and more efficient production

## Project coordination

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## English (EN){ { Projektpartner } }



TIGRES GmbH

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Lightweighting classification	
	Realisation
<b>Offer</b>	
<b>Products</b> Parts and components, Machines and plants, Systems and end products, Materials, Tools and moulds	✓
<b>Services &amp; consulting</b> Testing and trials, Engineering, Validation, Simulation, Technology transfer	✓
<b>Field of technology</b>	
<b>Design &amp; layout</b> Lightweight manufacturing, Lightweight design, Hybrid structures	✓
<b>Functional integration</b> Sensor technology, Material functionalisation	✓
<b>Measuring and testing technology</b> Component and part analysis, Visual analysis (e.g. microscopy, metallography), System analysis, Materials analysis, Non-destructive analysis	✓
<b>Modelling and simulation</b> Crash behaviour, Loads & stress, Life-cycle analysis, Multiphysics simulation, Optimisation, Structural mechanics, Materials, Reliability validation	✓
<b>Plant construction &amp; automation</b> Plant construction, Handling technology	✓
<b>Recycling technologies</b> Recycling	✓

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Lightweighting classification	
	Realisation
<b>Manufacturing process</b>	
<b>Additive manufacturing</b> Others (aluminium foam)	✓
Coating (surface engineering)	
Fibre composite technology	
<b>Forming</b> Compression moulding	✓
<b>Joining</b> Adhesive bonding, Welding	✓
<b>Material property alteration</b> Thermomechanical treatment, Heat treatment	✓
Primary forming	
<b>Processing and separating</b> Drilling, Milling	✓
Textile technology	
<b>Material</b>	
Biogenic materials	
<b>Cellular materials (foam materials)</b> Open-pore	✓
Composites	
Fibres	
Functional materials	
<b>Metals</b> Aluminium	✓
Plastics	
Structural ceramics	
(Technical) textiles	