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# AZL successfully completes project on battery casings together with 46 industrial partners

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### Multi-material solutions open up high potential for cost and weight savings for battery casings

Together with a total of 46 industrial partners, several different concepts for plastic-based multi-material battery casings were developed, with which significant savings in weight and costs are possible. In the course of the project, two important core topics emerged that will be dealt with separately in follow-up projects: Bottom impact protection and fire resistance. These two follow-up projects will start on January 26, 2022. A project for the development and realisation of prototypes is planned for the middle of the year in 2022.

Battery casings are among the key components in e-vehicles and are currently usually made of aluminium. It is precisely this component that the AZL analysed in the now finished project with a large consortium of car manufacturers, automotive suppliers, raw material producers and machine suppliers. "The enormous response from industry underlines the relevance of the topic," says project leader Warden Schijve, who is also very pleased with the progress and results. After all, up to 36 % of the weight and up to 20 % of the costs can be saved if multi-material composites based on plastics are used instead of conventional solutions.

To obtain the results, the AZL, with the cooperation of its partner companies, which included Audi, Asahi Kasei, Covestro, DSM, EconCore, Faurecia, Formosa, Hengrui, Hutchinson, IPTE, Johns Manville, Magna, Marelli and Teijin, first defined five sub-components of a battery casing: The enclosure tray, the bottom protection plate, the crash frame, the cross beams and the enclosure lid. In addition, the partners analysed a total of 44 market-relevant, existing series components and concepts in more detail and compiled a comprehensive overview of the various standards and requirements at national, international and OEM level. The premise was to achieve the same or even better mechanical performance than conventional solutions. For example, at least the same stiffness, safety in case of side impact, EMI shielding and flame protection should be available. In order to determine the alternative solutions, the AZL developed 20 design concepts with different material combinations. To analyse and design the different concepts, more than 500 FEM models were created and more than 1,500 CAE simulations were performed.

"Battery housings are a key component in e-vehicles. In the joint project, the AZL comprehensively investigated the demanding requirements and developed concepts on how plastic-based multi-material solutions can save weight and costs compared to status quo solutions made of metals," says Dr.-Ing. Florian Meyer, project management mentor on the part of Audi AG's Technical Development. "The collaboration with the cross-value chain and cross-material class consortium enabled a creative exchange and new impulses. As Audi AG, we were able to use the project voucher included in our AZL Business+ partnership efficiently in this project initiative."

"The project and the enormous response from industry do not only show us the relevance of the topic, but also the potential of alternative multi-material composites," Warden Schijve summarises the project and refers to the follow-up projects, " In addition to individual development projects we will start on 26 January 2022 with two follow-up activities in the format of jointly funded Joint Partner Projects and invite new companies to participate in these projects."

While follow-up project 1 deals with an application-related test method and the investigation of the safety of different material combinations for bottom impact protection, follow-up project 2 focuses on the fire resistance

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Your Contact:

Maren Daniels | AZL Aachen GmbH | Communications and Event Management | Tel: +49 241 475735 13 |  
Maren.daniels@azl-aachen-gmbh.de | www.azl-lightweight-production.com

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of different materials and material combinations. The aim is to develop test methods that allow the impact/fire resistance to be investigated at material level, taking into account the specific requirements of a battery casing in comparison with standard materials.

For more information and first details of the projects, please see the following links:

- One-pager Bottom Impact Resistance
- One Pager Fire Resistance

Companies with interest in production of battery casing can contact Philipp Fröhlig and Alexander Knauff:

Philipp Fröhlig | AZL Aachen GmbH | Senior Project Manager | Tel.: +49 241 475 735 14 | Mobile: +49 176 804 88799 Email: [philipp.froehlig@azl-aachen-gmbh.de](mailto:philipp.froehlig@azl-aachen-gmbh.de)

Alexander Knauff | AZL Aachen GmbH | Manager Industrial Services | Tel: +49 241 475735 16 | Mobile: +49 177 283 5184 | [alexander.knauff@azl-aachen-gmbh.de](mailto:alexander.knauff@azl-aachen-gmbh.de)

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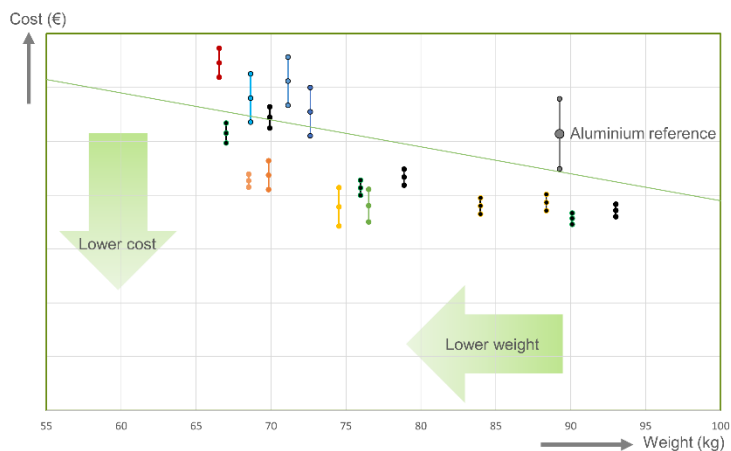


Image 1: Weight and cost saving potentials for different multi-material battery casings compared to aluminum reference casing.  
Copyright: AZL

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Your Contact:

Maren Daniels | AZL Aachen GmbH | Communications and Event Management | Tel: +49 241 475735 13 |  
[Maren.daniels@azl-aachen-gmbh.de](mailto:Maren.daniels@azl-aachen-gmbh.de) | [www.azl-lightweight-production.com](http://www.azl-lightweight-production.com)

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*Image 2: Exemplary Battery Casing Concept. Copyright: AZL*



*Image 3: Dr. Florian Meyer, Audi AG.*

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*Image 4: Warden Schijve, AZL Aachen GmbH.*

### **About AZL Aachen GmbH**

AZL stands for excellence in lightweight production. As a one-stop shop for market- and technology know-how, the senior-staff of AZL brings together experts and decision-makers from academia and industry to support business and technology development for the lightweight industry. AZL supports companies, regardless of their position in the value chain, in the development, benchmarking and improvement of design methodologies, manufacturing techniques and products. AZL assists with innovation workshops, market- and technology analysis, trend identification and technology monitoring, feasibility studies, concept development, CAE design/optimization and production layout planning. Located in the heart of one of the leading high-tech ecosystems, RWTH Aachen University, AZL assist in experimental evaluation of all relevant technologies related to composite-based multi-material technologies with decades of technology expertise and cutting-edge infrastructure for the development of products and production systems. In addition to individual cooperation, the AZL Business, Business-Plus and Premium Partnership framework contracts offer access to services and an open-innovation network of more than 80 international companies along the lightweight value chain. With the three pillars advisory, engineering and partnership network, the AZL develops competitive innovations for economically highly relevant market segments and finds suitable partners for industrial implementation and establishment in the market.

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