



1 Left: general design of a battery casing with aluminum foam core (closed pores) and FRP outer shell; right: closed pore aluminum foam with open pore structure on one side; closed pore aluminum foam infiltrated with PCM; aluminum foam with aluminum casting skin on one side (from top to bottom)
2 Section cut out presentation of a wishbone with aluminum foam

ALUMINUM FOAM SANDWICH WITH INTEGRATED FUNCTIONS

Objective

Sandwiches are often used in lightweight design due to their high bending strength and low weight. These structures are usually available as flat semi-finished products, whereby the sandwich core mainly acts as a spacer for the top layers.

Solution

Metal foam as a sandwich core enables the integration of a variety of functions, such as intrusion protection and thermal management. The installation space is thus used effectively. The 3D-contour foamable metal foam core can be combined with any cover layer materials. This also makes it possible to produce geometrically complex multi-material lightweight composites from aluminum foam and thermoplastic fiber-plastic composites (FRP).

Examples

- Subshell of battery casing for electric vehicles**
- Stiffening of the body and sealing downwards
 - Intrusion protection, energy absorption in case of crash
 - Mass reduction (about. 20 % in comparison to the current state)
 - Optional: Integration of the thermal management by a phase change material (PCM) integrated in metal foam
 - Increase of the range
- Wishbone**
- Mass reduction (about. 30 % in comparison to the current state), unsprung mass
 - Integration of inserts
 - Complex geometry
 - More good-natured failure behavior compared to pure FRP

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