

# Lightweight design for multilayer composites with damping properties

## Field of application

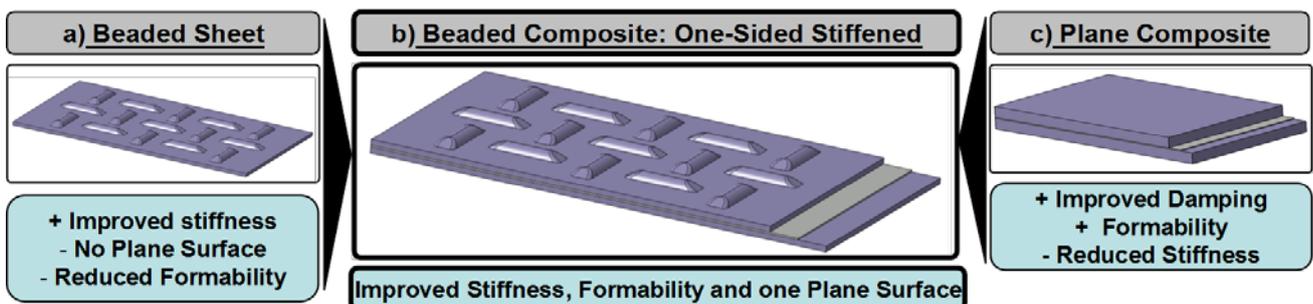
The newly developed sheet metal composite material can be used for a wide range of applications in the automotive sector as well as in the field of mechanical engineering and manufacturing of deep-drawn part. In relation to its weight, the material possesses a high level of rigidity which can be adjusted to meet specific requirements. Combined with its excellent damping characteristics it is the ideal semi-finished material for the production of large-format parts. Large, unbonded bottom areas of deep drawn components can thus be reinforced in a targeted manner. The semi-finished material is perfectly suited for flat customized lightweight components used for structural components, machine housings, household appliances or in the packaging industry.

## State of the art

According to the state of technology, sheet metal composite materials can be divided into two broad categories. The first one is lightweight composites, which ideally combine a high level of rigidity and low weight, but cannot be re-shaped easily. The other category covers damping panels, which can be re-shaped more easily, but are less rigid.

## Innovation

Scientists at the Institute for Metal Forming Technology, Stuttgart University, have now succeeded in combining the advantages of both types of material. The new hybrid material consists of two individual panels bonded via a viscoelastic layer, preferably an adhesive. The latter has damping properties which can be adjusted by specifying the type and thickness of the viscoelastic material. Moreover, it is used to join the two panels together firmly. The viscoelastic layer can be rather thin which has a positive effect on sheet formability. One of the panels has shaped elements, whose size, quantity and distribution can be selected according to the scope of application. As a result, noise emissions can be reduced further. At the same time stiffness of the entire composite structure is increased significantly. Since the panel with the plane surface is used as supporting element, it is possible to integrate deeper form elements into the other panel. Test runs showed that the level of rigidity of the composite can be doubled when using 2 mm wide beads and almost tripled with 3 mm wide beads. Additionally, functional components such as electrical wiring could be added to the form elements.



(Source: IFU Stuttgart)

## Your benefits at a glance

- ✓ Excellent formability combined with light weight
- ✓ Adjustable sound and vibration damping properties
- ✓ Plane (outer) surface; Paint finish can be applied and flow properties can be enhanced by adding nanostructures, for example.
- ✓ Particle velocity can be reduced using cross-beaded sheets (-5 dB) and filled beads (-2 dB).

## Patent portfolio

European patent EP 2 444 244 B validated in Germany, Italy and France.

## Technology transfer

Technologie-Lizenz-Büro GmbH is responsible for the exploitation of this technology and assists companies in obtaining licenses.

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