FIBER REINFORCED DESIGN PARTS WITHOUT SUBSEQUENT FINISHING

Due to the increasing significance of lightweight design, the future demand for composite parts will continue to remain strong. New applications will particularly be driven by cost reductions and performance improvements in fiber and matrix systems, as well as improved serial processes. One of the youngest developments by NMF, called LiSA “Lightweight Sandwich Applications”, makes it possible to precisely form organosheets for fiber-reinforced parts with visible surfaces, however without the need for consecutive finishing processes.

The focus of this development lies on the production of multi-material systems with Class A surfaces, utilizing the potential of lightweight sandwich structures and increasing the functional density of thermoplastic fiber-reinforced composite parts. In addition to the thermoforming of organosheets, the LiSA forming technology provides the opportunity to locally reinforce and hybridize composite components by integrating decorative surfaces, conductor tracks and electronic elements in a single manufacturing process.

VARIOOTHERMAL PROCESS

In order to meet the increasing requirements placed on lightweight constructions, composite parts are getting thinner. In producing very thin parts, isothermal process technologies reach their limits. Using variothermal temperature control is also possible for very thin-walled and complex components. In addition, the integration of in-mold- and insert-decoration-technologies allows the variable production of visually appealing components without any subsequent finishing.

PROCESS OPTIMIZATION

The LiSA system offers the potential to be used in mass production, yet NMF primarily focuses on the process evaluation and optimization. NMF identifies the influencing variables for the forming process, derives the material and process limits and develops design guidelines for the fiber reinforcement layout and the resulting drapeability. A confocal laser scanning microscope allows for the quantitative assessment of complex surface topographies.

REALIZATION OF HIGHLY FUNCTIONALIZED LIGHTWEIGHT CONSTRUCTION

- Multi-material systems with Class A surfaces
- In-Mould and Insert-Decoration
- Electrically, thermally and optically optimized fiber composites
- Components with integrated conductive tracks and electronic elements
- Polymer-metal hybrids
- Thermoplastic fiber reinforced materials with Foam structures
- Hollow bodies with a high potential of lightweight construction
PRECISION FORMING PRESS
EQUIPMENT AND DESIGN METHODS

- Clamp force: 2000 kN
- Opening stroke: 1.000 mm
- Press area: 1.600 mm x 1.300 mm
- Conformal variothermal mold temperature up to 300 °C
- Flexible strategies for heating
- Master form with interchangeable inserts up to 800 mm x 500 mm
- Isobaric and isochoric press operation
- Procedure for multiple-component designs
- Decoration technologies
- Detailed high-resolution measurement system

WHAT DO WE OFFER?

- Production of tailor-made and functionalized organic sheets
- Process and drape simulation
- Process evaluation and optimization
- Characterization of mechanical and optical properties
- Micromechanical modelling of fiber composites with the aim of optimizing material surface characteristics

Contact

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Institutional funded by

Bayerisches Staatsministerium für Wirtschaft, Landesentwicklung und Energie

Europäische Union

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