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VliesComp – Nonwoven innovations for resource-efficient and cost-optimised, semi-structural composite structures

Objective

Currently, the industrial use of lightweight solutions often fails due to the high material and manufacturing costs. There are also unanswered questions about the ecological aspects of recycling and reuse. Innovative approaches were developed in the VliesComp project in this area of conflict. However, the focus was not set on finding the highest mechanical structural potential, but on generating ecological and cost-efficient, multifunctional added value through the use of recycled materials for selected applications.

SIEMENS

INVENT

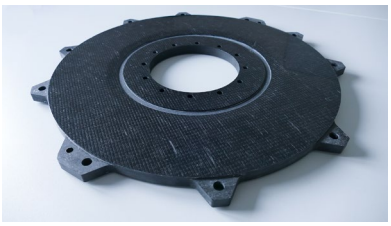
TENOWO NONWOVENS

Approach and results

In the course of the project, four main areas were prioritised:

- Definition of requirements for materials, processes and components
- Technology development in the field of material and process technology
- Technology development in the area of digital value creation and ecology
- Demonstration of technology usability through component realisation and evaluation

The application areas of e-machines for the energy transition, e-mobility and aviation were considered as examples. Hybrid nonwovens and nonwovens based on 100 % recycled reinforcing fibres were used in the development of damping elements for e-machines and housing covers for e-motors.



Housing cover made from 100 % recycled carbon fibres

After several optimisation loops, damping elements based on hybrid nonwovens with improved damping properties and comparable stiffness to the reference were developed. By means of these new and better damping support elements, any occuring vibrations can be reduced much more quickly leading to a reduction in the load on the conductor rails and thus extends the service life of the insulation system.

For the prototypical production of housing covers with a 100 % recycled fibre content, a tool for manufacturing the component was first developed on the basis of a structural analysis. The analyses revealed a possible reduction in CO_2 equivalent of 14 % with the same performance compared to the variant made from primary fibres using the RTM process. The calculation for the use of the prepreg process using a bio-resin system shows a potential for reducing the CO_2 equivalent by almost 70 %.

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