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TUD-TNO recent projects;  
Vacuum forming of TP  
composites.

## Press Room Archive

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### *Vacuumforming of thermoplastic composites.*

*A joint project of Centre of Lightweight Structures TUD-TNO , deSterACS and Voges Verpakking.*

Vacuum forming of thermoplastics is a cheap, rapid and clean technique for the production of a.o. large-scale panels and structures. Due to the large deformations the material has to undergo, the technique so far has been limited to unreinforced thermoplastics.

A similar technique, however, is also suitable for the forming of continuous-(CFRPs), long- (LFTs/GMTs) and short fibre (SFRPs) reinforced thermoplastics. This will open vacuum forming as a production method for semistructural and structural parts due to the high material stiffness and strength associated with fibre reinforced thermoplastics. Furthermore, vacuum forming has some additional advantages over the traditional forming methods of composite materials:

- \* short cycle times
- \* low mould and tooling costs
- \* low machine costs
- \* environmentally friendly production method (compared to thermoset composites)

All of the above can add to a significant cost reduction over traditional forming methods of thermoset and thermoplastic composites whilst maintaining their elevated properties.

Due to the inherent advantages of the technique, vacuum forming of thermoplastic composites is a promising new technique for the rapid and low-cost production of large-scale panels and structures for application in the automotive and other industries, as an alternative for the current, costly techniques. However, in order to make optimum use of the potential this technique offers, a more thorough knowledge of the production process and the resulting properties of the final products is needed.

#### **What do we want to achieve?**

We are aiming in this joint project at acquiring and transferring expertise on the vacuum forming process for thermoplastic composites, application of the process to a final product and further development of the process to an industrial level. The project will focus on the following items:

#### \* Cost-savings

The several cost-saving benefits that vacuum forming of thermoplastic composites offer will be extended by further investigating and developing the prototype production process, thus making full use of the cost-effectiveness of the process.

#### \* Increased properties and freedom of forming

The increased mechanical properties of thermoplastic composites, will be optimally combined with the low-cost processing and forming freedom of thermoplastic materials, by investigating the opportunities thermoplastic composites with different fibre length, fibre content and fibre-matrix combinations offer, and the geometrical detail, the surface quality and final material and product properties that can be attained.

#### \* Controlled processing

A better control of process and resulting properties, leading to an overall higher product quality reproducibility, will be achieved by investigation of the processing windows of different composites (and if needed modelling of) the process and its relation to the final product properties.

#### **What is our approach?**

The current project is planned to cover further development and up-scaling to an industrial level of the vacuum forming process and determination of opportunities the different thermoplastic composites offer.

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