

Title: VarioGlas – Development of a manufacturing process for glass fibers with varying diameters

Partner: Erka Maschinenbau GmbH (ERKA), Ahaus-Wüllen

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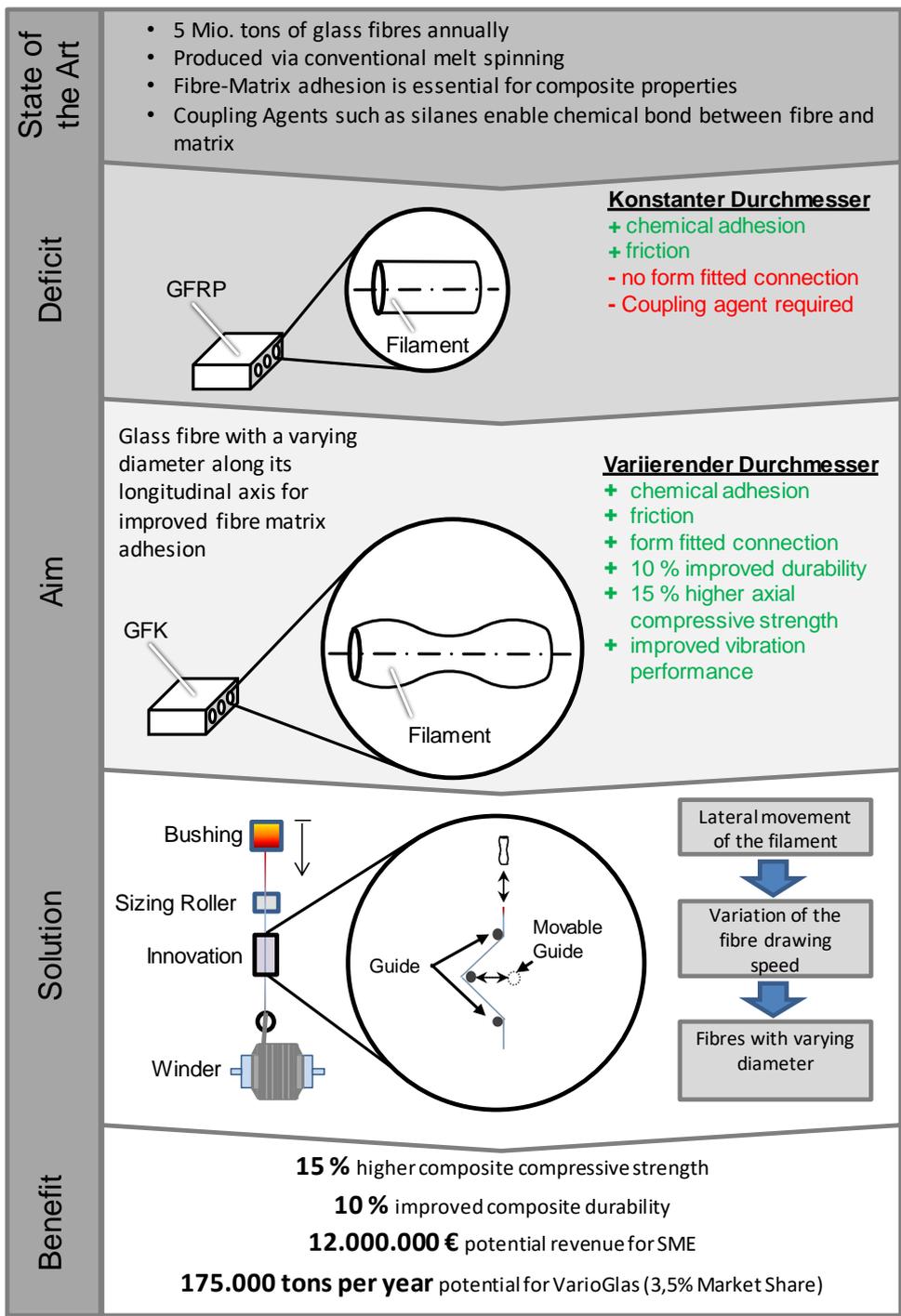
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Mission Statement

The relationship between moving mass and energy demand is increasing due to the worldwide increase in the use of fiber reinforced polymers (FRP). The Fiber and the matrix surrounding it use their material properties synergistically. The fibers determine the stiffness and strength, while the surrounding matrix fixes and protects the fibers. In addition, external forces are introduced into the fibers through the matrix.

An intact connection between these two components is therefore crucial for the quality of FRP. Currently, this connection is achieved by chemical bonding through adhesion. The fibers are coated with a so-called sizing for the implementation of chemical bonding. This is an inherent part in the production of fibers. A not yet commercially successful form of coupling fiber and matrix is a positive form locking force transmission. With a successfully implemented form locking the process steps and the resources required for coating application could be reduced. This positive fit can be achieved by varying the diameter of the fiber. Further advantages of this force transmission are improved fatigue behavior and higher axial compressive strength. With more than 95% of the reinforcing fibers used, glass fibers are the fiber material that would most likely benefit from a commercial successful implementation of a positive form fit.



Solution:

The scope of this project should range from the conception of individual glass fiber to their production and evaluation compared to conventional glass fibers. In this process, optimal parameters for the glass fibers are first determined with simulation. Subsequently, a module for the production of this glass fiber with varying diameter is developed and constructed. Afterwards, the mechanical properties of the fibers produced with this method are compared to conventional fibers.

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