

TEXTILE COMPOSITES FROM ADDITIVE MANUFACTURING

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ISSUE

In order to give textiles functional properties by using additive manufacturing, plastics are deposited in layers onto the textile (fused deposition modeling, FDM). This allows a high degree of design freedom as well as functional optimization and integration. Until now, this was not possible with conventional manufacturing processes. Applications of textile composites are found in the area of sportswear and protective clothing as well as in acoustic optimization.

OBJECTIVES

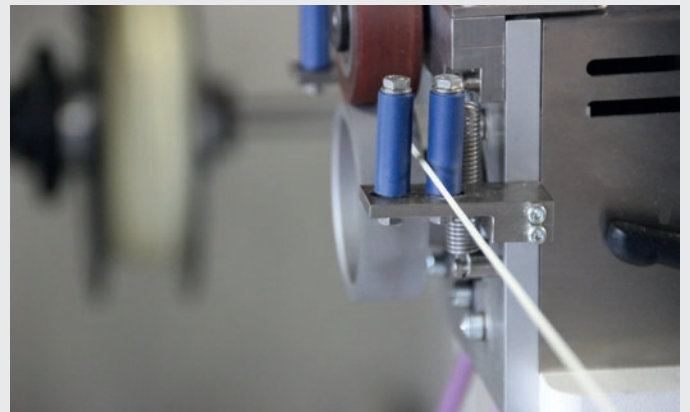
Challenges proved to be the processing of the material and the permanent adhesion to the textile. The printed plastic should form a firm bond with the fibers and at the same time be sufficiently flexible to follow the movement and expansion of the textile. A flexible, flame-retardant compound with a Shore hardness of 70A was developed for this purpose. This is particularly suitable for applications in the field of sun and noise protecting textiles and has already been successfully tested for its suitability in the industry. FDM filaments in this Shore hardness range are currently not available on the market.

In addition, a stiff, glass fiber reinforced compound has been developed and is particularly suitable for the direct printing of plug connections or for reinforcing the shape of protective and functional clothing. This is intended to save production steps and reduce costs. In the future, bio-based plastics will be tested for additive manufacturing on textiles and further applications will be developed.

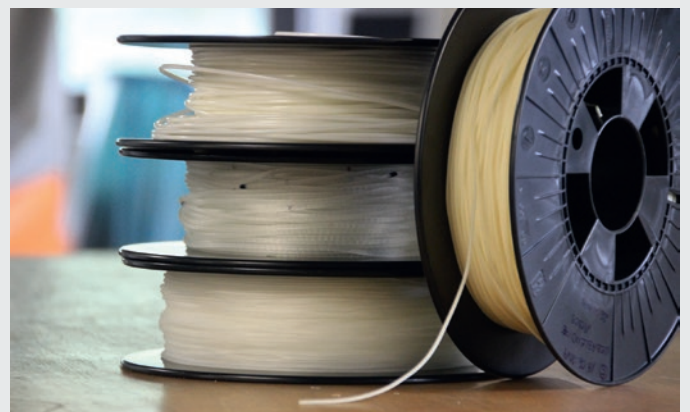
FRAUNHOFER UMSICHT

We are a partner for the realization of ideas for sustainable, industrial products. We are focused on polymer chemistry, material development, plastics processing, applications, and industrial scale-up of plastics.

MATERIAL DEVELOPMENT FOR FDM



Filament processing in the extruder.



Filaments for 3D printing with varying Shore hardness.

IN COOPERATION WITH