

# LARGE FORMAT MANUFACTURING

Additive Manufacturing components with large dimensions are required for many applications in the industry, and this quickly exceeds the given build volume. However, additive manufacturing systems designed specifically for large-format components are available on the market. In this project, the focus is on large format FDM systems. It is known that with the material PLA Large Format FDM systems achieve good component qualities, but the material is not suitable for many applications. In the context of this project it should be examined whether an engineering polymer can be processed on a large format FDM printer to a dimensionally stable and reproducible component.



**FIGURE 1:** Large Format FDM Component (Source: BigRep)

## Motivation

A major limitation of Additive Manufacturing (AM) is the limited build volume of the production systems. If large format components are required, it is common practice that the components are divided into single small parts and manufactured separately. The single small parts are then joined together to form the large format component using, for example, adhesive bonding. This procedure takes a lot of time and the transition areas can be weak points and also can show visual defects. For this reason, there are also large format systems available on the market. One possibility to realize the fabrication of large format parts is the Fused Deposition Modeling (FDM) process.





Dimensional accuracy and process repeatability are properties that are highly important for AM processes of all sizes. For large format printers, deficiencies in these areas can lead to large absolute deviations. Challenges with large prints are, for example, repeatability, avoidance of warpage caused by shrinkage, high component qualities with the shortest possible printing time.

The processing of PLA on large format FDM systems is state of the art. But PLA components are often unsuitable for mechanical or thermal stress and media contact, so the focus of this project is on engineering polymers. The dimensional accuracy and process repeatability of engineering polymers has been less studied so far. In this project, the dimensional accuracy and process repeatability of large format FDM systems will be tested using the large format FDM printer from BigRep. The polymer used will be selected in consultation with the DMRC partners during the course of the project. Possible materials are fiber reinforced materials such as PET CF or other materials such as TPU 64D, etc.

## Aim

The aim of this project is the generation of process know-how for the selected engineering polymer in connection with a systematic scientific investigation of dimensional accuracy and process repeatability. In addition, a validation with use case parts provided by the DMRC partners is planned.

## PROJECT OVERVIEW

 DURATION	03/2022 – 10/2022
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 FUNDED BY	DMRC
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