DMRC
DIRECT MANUFACTURING RESEARCH CENTER

UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

Fused Deposition Modeling (FDM)

Stratsys Fortus 400mc

Source: Stratasys GmbH

Process Information

Parts are build layer by layer in an additive process. An extrusion head deposits the molten thermoplastic filament to create each layer with a particular tool path. Thermal fusion of the material bonds with the layer beneath and solidifies, thus forming a permanent bond between two layers.

Technical Data

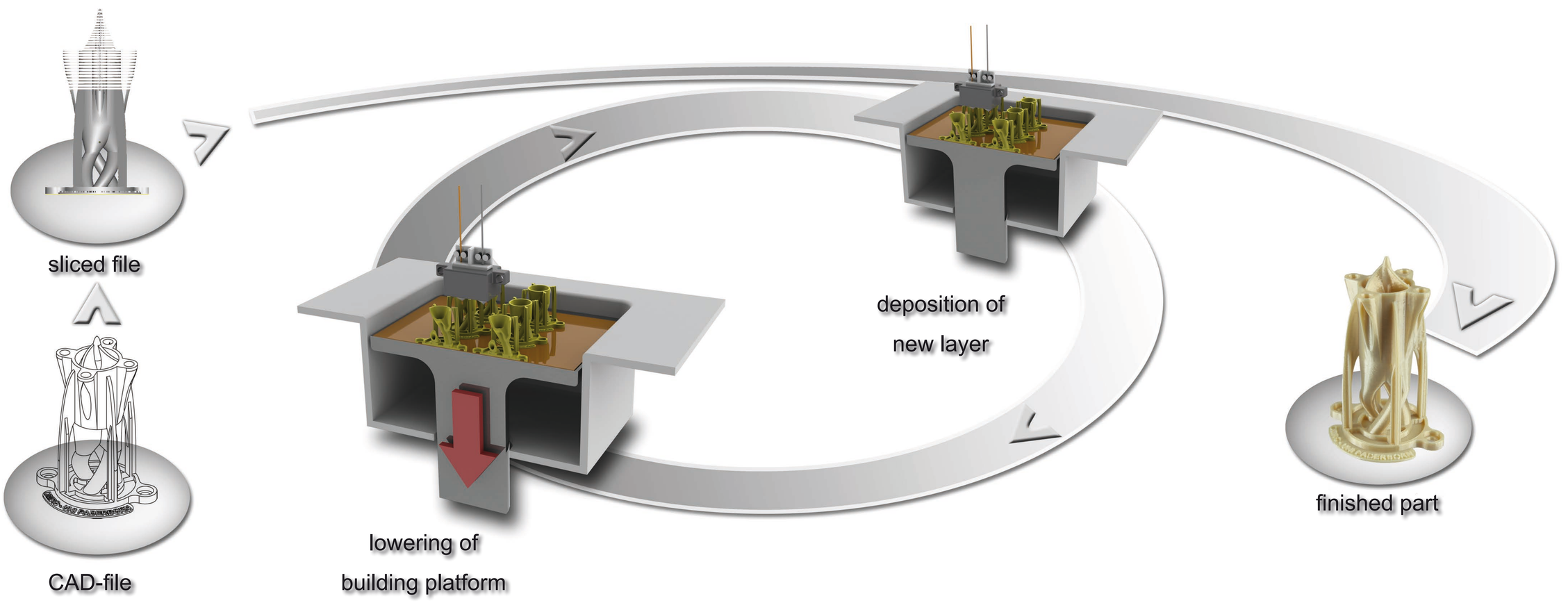
Building dimension	356 x 254 x 254 mm^3
Layer thickness	parameter-dependent
Accuracy	+/- 127 µm
Support structures	necessary
Building speed	parameter-dependent

Build Materials

Material	Layer thickness	Heat deflection
ABS	127 - 330 µm	87 °C
PC-ABS	127 - 330 µm	110 °C
PC	178 - 330 µm	138 °C
PPSF/PPSU	178 - 254 µm	189 °C
Ultem*9085	178 - 254 µm	153 °C

Source: Stratasys GmbH

Process



Advantages

Three dimensional objects of any shape can be build without restrictions on forming tools. The greatest advantages of the FDM process are the relative simplicity of the process and that there are several materials available. Because the material is provided on spools, material changes can easily be made and no material loss occurs during the process. Parts are build with an accuracy of +/- 127 µm and with only little warpage.The production time depends primary on the volume of the parts to be fabricated.

Challenges

Due to the extrusion of the material a seam line between layers exists resulting in parts having anisotropic properties. Most geometries require supports which have to be removed in a post process. Projects at the DMRC are related to increasing the process knowledge of FDM parts related to mechanical properties, material quality and repeatability of the FDM process.

Machine Components