

# Fused Deposition Modeling (FDM)

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Need a plastic functional part? A prototype or model? Thin walls? Need it now? Able Prototype can realize your dreams in a matter of hours.

Using a technique know as Fused Deposition Modeling (FDM), a three dimensional part, in the form of scan data, topographic data, CAD files, or a computer-generated solid model, can be transformed into an actual physical part without the need for tooling.

## How is the FDM part built?

Using the computer, the 3-D data is first sliced into cross-sectional planes. These planes are used by the rapid prototyping machine to build the part, layer-by-layer. The first layer of the part is bonded, by the FDM machine, to a platform via an extruded path defined by the shape of the first computer-slice area. The FDM platform retracts a preset distance after the first layer has been laid down. The new material is then extruded over the surface of the first layer and bonded to form the second layer. The process repeats until the part is complete.



## Advantages of FDM:

By using inexpensive ABS material, typical FDM parts are safe, resistant to deformity, and extremely cost effective. Functional plastic parts can be used to solve many design problems. Because the FDM machine can fabricate parts by extruding the cross-sectional area, thin-walled parts can be fabricated over incredibly short times. The end result is a shortened product development cycle that reflects higher profits and lower processing costs. Able Prototype can produce FDM part with the following configurations:

- ABS-20 (ABS Plastic with road width of 0.020 inches)
- ABS-16 (ABS Plastic with road width of 0.016 inches)
- ABS-10 (ABS Plastic with road width of 0.010 inches)
- ABS-Thin-Wall (ABS Plastic for thin-walled parts: less than 0.010 inches)

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## What Does Able Prototype Use FDM For?

### 1) ABS Models or Prototypes

ABS is a common end-use thermoplastic material with considerable durability. This material is ideal for a variety of modeling and prototyping activities due to its stiffness and ease of finishing. ABS Materials Specifications:

- Tensile Strength 5,000 psi
- Tensile Modulus 360,000 psi
- Elongation 50.00%
- Flexural Strength 9,500 psi
- Rockwell Hardness R105
- Vicat Softening Point 220 (v)
- Specific Gravity 1.05 g/cc

## 2) Rapid Molds and Tooling

Able Prototype has demonstrated the use of rapid prototyping to rapidly create molds and tooling. These include:

- Molds for urethane parts: Applicable when up to 100 plastic parts or more are required. The material is excellent in the heat range for curing. Urethane parts are easily ejected from the ABS mold.
- Molds for injection molded parts: Molds can be prepared that are generally suitable for up to 100 plastic parts. ABS is easily machined for pins and clamps. The material exhibits excellent compressive strength.
- Core patterns and molds: ABS materials have a longer wear cycle than wood patterns. This material is suitable for the higher temperatures of sand casting. Excellent compressive strength and is easily machined.



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## 3) FDM for Form Fit Functions:

Prototype your ideas accurately, inexpensively, and quickly via FDM. Don't lose support from your marketing group, customers, senior managers, or even tooling vendors because of poor design communication.

Parts fabricated by FDM are an excellent way to communicate a design to other people who may not be able to visualize the actual part. FDM prototyped parts can be used to accelerate a variety of design situations such as reference checks, fits, draft evaluation, and snap-and-join constraints.



To get more information about FDM Technology, please go to [Stratasys Inc. Homepage](#)

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