

From Art to Part

A Step-by-Step Guide to 3D Printing

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From Art to Part

Reinforcement Strategy

If you decide to reinforce a part with fiber, you can customize the part. Customization can completely change the behavior of the part.

You can leave reinforcement at the default setting and strengthen several layers at the top and bottom of the part with fiber.

You can also exercise extreme granular control over part reinforcement. There are two main factors to choose from:

- **Which layers to reinforce.** Single layers or groups of layers with fiber.
- **How layers are reinforced.** Choose from one of several strategies for each layer and select the orientation and amount of fiber distributed.

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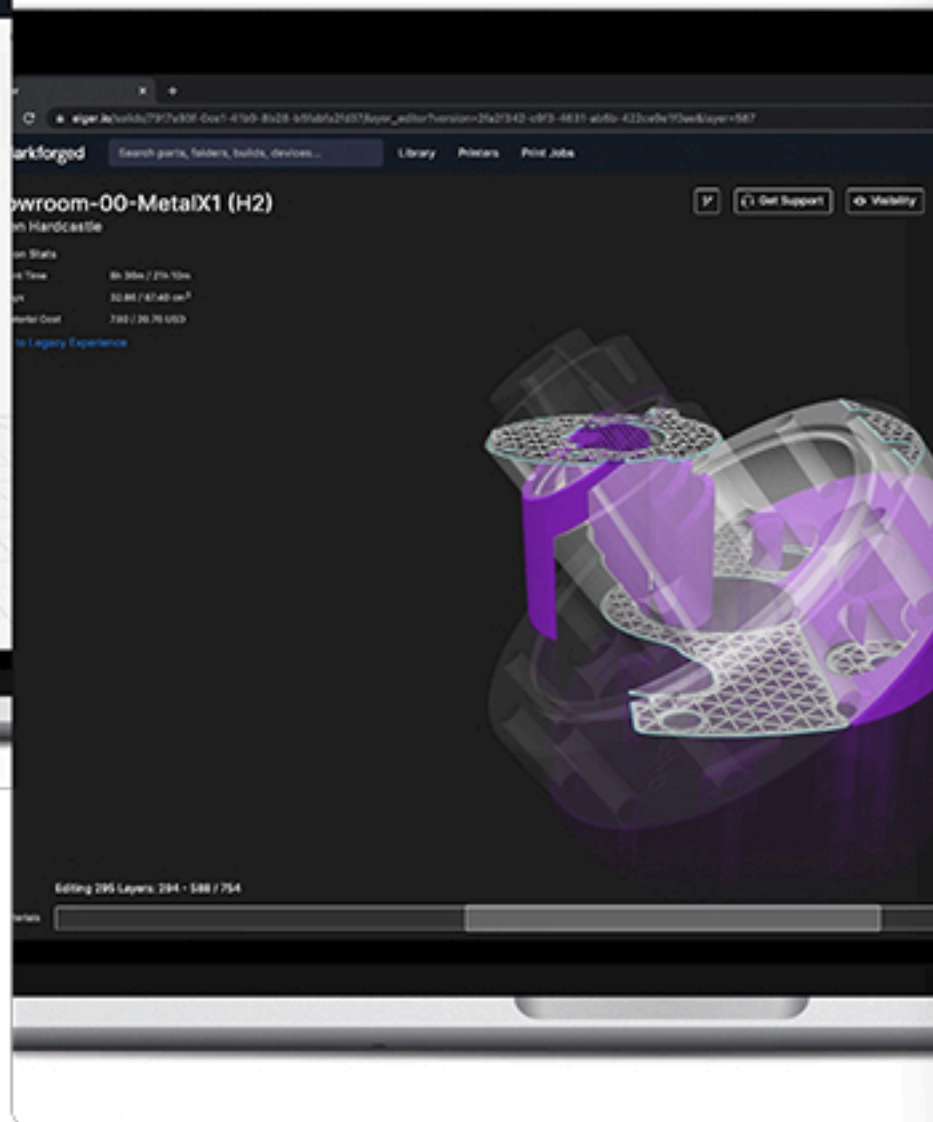
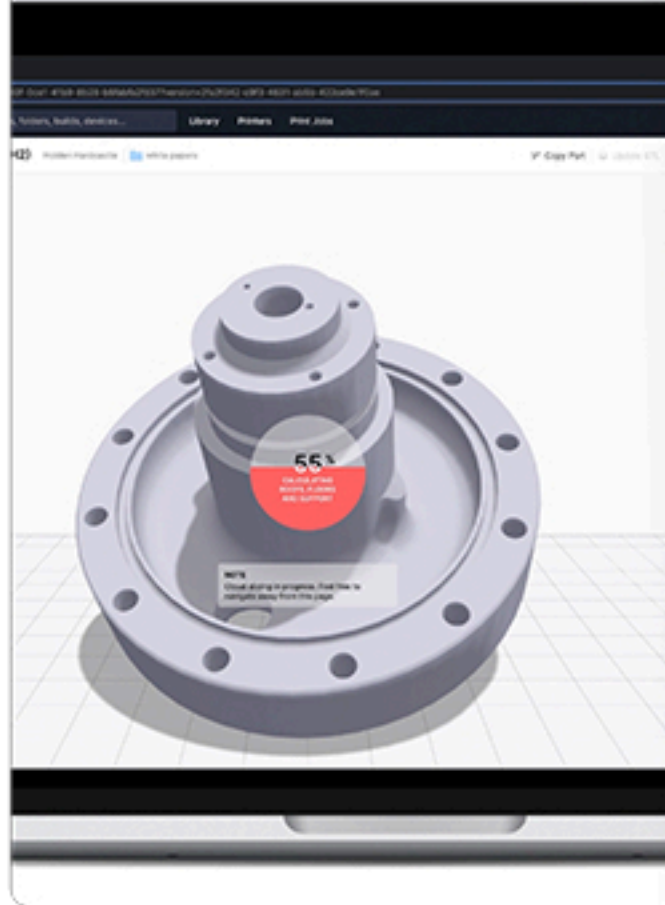
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Slice

During this stage, the slicing engine is engaged, which turns the part and print settings into a set of machine instructions. Consider using software with printing algorithms that have been refined and optimized over the years so the print settings fabricate accurate, strong, and repeatable parts.

After slicing, the 3D information around the part is converted into a set of machine instructions.

- **Part cost** — The cost for material and machine time.
- **Part dimension** — The finished part's dimensions.
- **Part print time** — The time to give you parts, it will show you the estimated time.

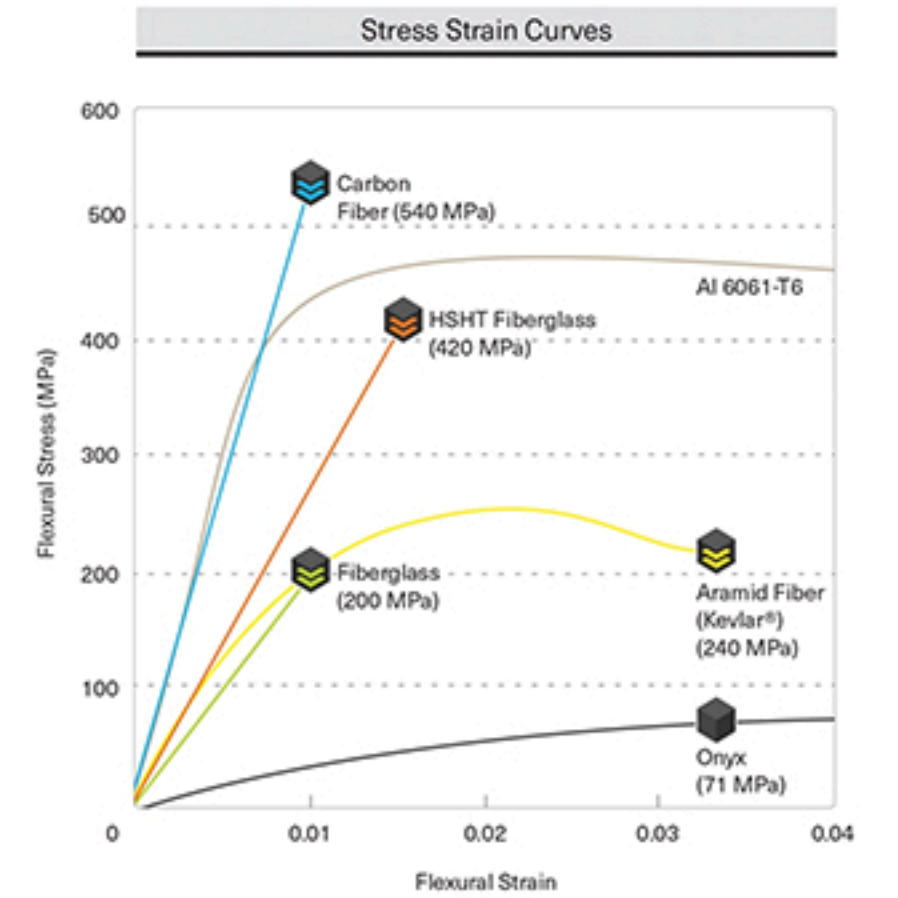


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Parts

more configuration due to the CFR. While FFF, CFR allows for on.

metal, material selection process is more composite printers can: traditional FFF filament



Recommended steps:

1. Choose a composite base filament. Markforged offers three main types of short fiber-filled nylon: Onyx™, Onyx FR™ (flame retardant), and Onyx ESD™ (ESD compliant).
2. Select a continuous fiber. You can opt not to reinforce a part or use available fibers. Markforged offers Carbon Fiber, Fiberglass, Aramid Fiber (Kevlar®)*, and High Strength High Temp (HSHT) Fiberglass. Reinforced parts inherit the specific fiber material's resistance to breaking and deforming when it is subject to a bending force measured in flexural stress and flexural strain. In order to print each part, consider what it needs in terms of strength — resistance to fracture or permanent deformation (Flexural Stress) — and stiffness — resistance to elastic deformation (Flexural Strain).

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