



Slicing and File Types Overview

What is a slicer, what are the difference between common file types, and what slicers does the AFL use?

Written By: Evan Hutzell



Introduction

This guide introduces the 3D printing pre-process, and introduces the different associated file types. The typical workflow is shown below.

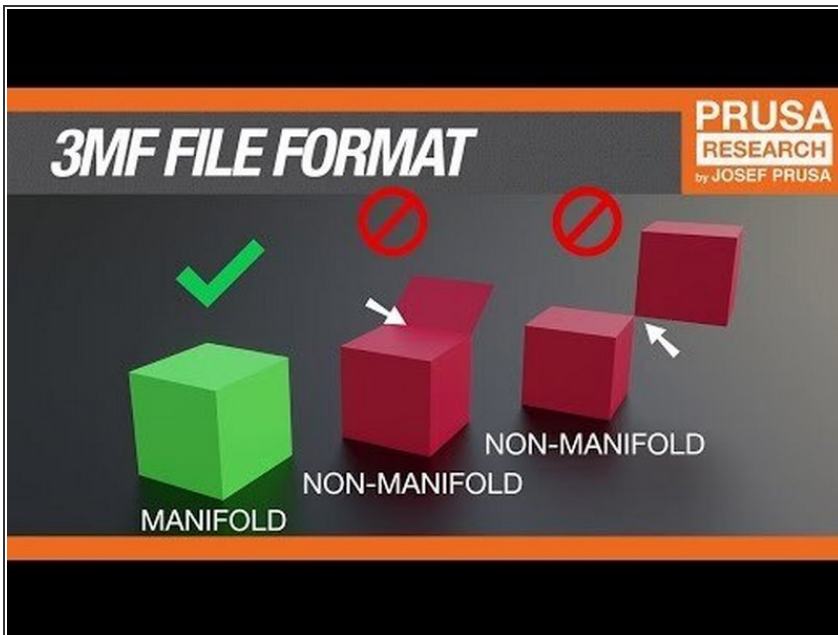
- Upload an .stl model to the slicer.
- Configure settings for the print.
- "Slice". The software will output a GCode file that can be uploaded to the printer/.

Step 1 — What is a slicer?



- A slicer takes a 3D model, typically in the form of a STL or 3MF file, slices it into layers, and creates instructions for a 3D printer in the form of GCode.
- Most FDM prints are not solid. Slicers partially hollow the models by filling internal areas with a self supporting pattern called infill, surrounded by a solid shell formed of perimeters. This will be discussed in more detail in a later guide.

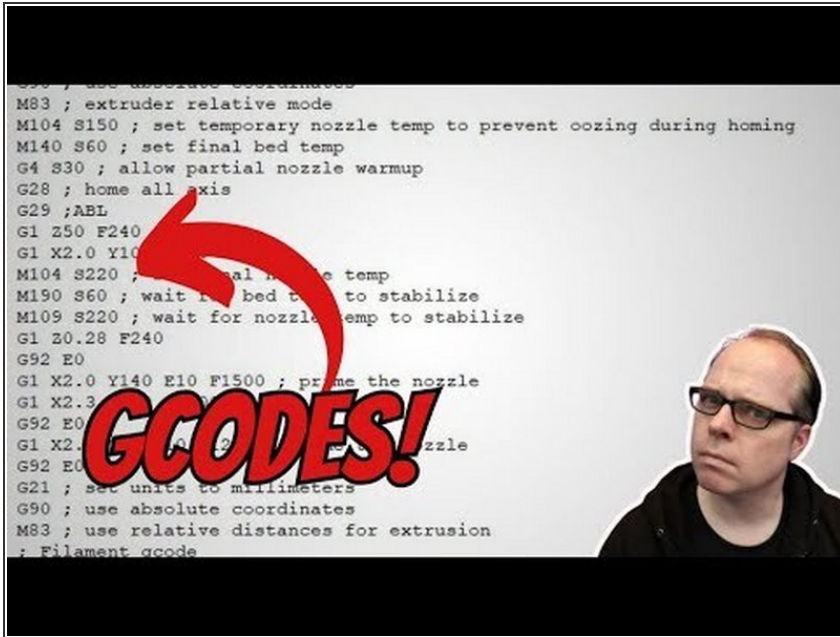
Step 2 — STL and 3MF files



- **STL files describe 3D models using interlocking triangles, often referred to as a "mesh".**
- STLs contain very little information secondary information. One of the most impactful pieces of info omitted is units. **All measurements in an STL are unitless.**
- 3MF files are a newer option. They are designed with 3D manufacturing in mind (3MF stands for 3D Manufacturing.)

- 3MF files most commonly describe geometry as a mesh of triangles, like STLs.
- **3MF files contain unit, color, and material information. Importantly, they can also contain slicer settings (printer, infill, walls, etc.)**
- Saving in a slicer outputs a 3MF file. This file will retain all configuration and settings and can be opened to continue work or edit at a later date. **When processing orders always upload the 3MF file or files.**
- **Editing geometry in an STL or 3MF is called mesh editing.** Slicers like Bambu Studio and Prusa Slicer provide some basic mesh editing tools. For more complex mesh editing, there are free programs like Blender and Meshmixer.

Step 3 — GCode files



- GCode is not a description of geometry in the same way as a STL or 3MF. Instead, **it is a list of instructions for a manufacturing machine, like a 3D printer.**
- You do not have to write GCode manually. Instead, the slicer will create it for you. It can be useful to understand and edit GCode for advanced troubleshooting.
- **When processing orders always upload the GCode file or files.**

Step 4 — CAD files



- CAD (Computer Aided Design) files are a different description of geometry than STLs, 3MFs or GCode.
- CAD is a very broad umbrella, but generally CAD files are defined by their ability to be edited with ease. CAD is how many of the models 3D printed are made.
- Some slicers will except CAD files as an input, but the standard input is a STL or 3MF.
- There are many different file extensions under the CAD umbrella, including .step, .sldprt, and .f3d.

Step 5 — What FDM slicers do we use?



- Prusa and Voron 3D Printers: *Prusa Slicer*
 - BambuLabs 3D Printers: *Bambu Studio*
 - Markforged 3D Printers: *Eiger*
-