Carbon Fiber Filament Usage Guide

1. Filament Overview

Carbon fiber filaments are composite filaments reinforced with carbon fiber. Common types include PLA-CF, PETG-CF, ASA-CF, PA-CF, PET-CF, and PPS-CF.

PLA-CF and PETG-CF are carbon fiber reinforced versions of standard filaments. They retain the ease of printing of their base materials while offering increased rigidity and, to some extent, reduced warping.

ASA-CF is a modified ASA filament reinforced with carbon fiber. In addition to ASA's inherent aging resistance, heat resistance, and antistatic properties, it also offers excellent dimensional stability, high flexural strength, and improved resistance to warping.

Among PA-CF filaments, PA6-CF is the most common. They offer excellent dimensional stability, hardness, and interlayer adhesion. They also print well without a heated chamber and provide continuous heat resistance up to 180°C.

Flashforge PET-CF offers good heat resistance, lower shrinkage, and higher flexural strength. It prints reliably even without a heated chamber and provides continuous heat resistance up to 120°C.

Flashforge PPS-CF features low moisture absorption and produces parts with exceptional hardness and strength. It offers continuous heat resistance up to 220°C and a heat deflection temperature of 245°C. Its dimensional stability and electrical properties are minimally affected by temperature and humidity, and it can also be printed successfully without a heated chamber, making it an outstanding engineering filament.

2. Hardware Compatibility

Compatibility for common carbon fiber reinforced filaments is shown below:

Filament	Nozzle Compatibility	Build Plate Compatibility	Accessory Compatibility (IFS)
PLA-CF	Only compatible with hardened steel nozzles ≥ 0.4mm	All build plates compatible	Not compatible with IFS
PETG-CF	Only compatible	All build plates	Fully compatible

	with hardened steel nozzles ≥ 0.4mm	compatible	with IFS
ASA-CF	0.6mm hardened steel nozzles recommended	Glue required; not compatible with Cool Plate	Not compatible with IFS
PA6-CF	0.6mm hardened steel nozzles recommended	Glue required; not compatible with Cool Plate	Not compatible with IFS
PET-CF	0.6mm hardened steel nozzles recommended	Glue required; not compatible with Cool Plate	Not compatible with IFS
PPS-CF	0.6mm hardened steel nozzles recommended	Glue required; not compatible with Cool Plate	Not compatible with IFS

3. Preparation Before Printing

Health Notice: ASA-CF may release harmful fumes during printing. Do not print in an enclosed room for extended periods, and ensure the printing area is well-ventilated.

3.1 Filament Drying

All carbon fiber filaments must be dried before printing to prevent issues such as stringing, bubbles, and surface defects caused by moisture absorption. Recommended drying conditions:

Filament Type	Air Drying Oven	Heated Bed
ASA-CF	80℃ 8h 80°C, 8h	90-100℃ 12h 90-100°C, 12h
PA6-CF	80℃ 8-12h 80°C, 8-12h	90-100℃ 12h 90-100°C, 12h
PET-CF	90℃ 8h 90°C, 8h	90-100℃ 12h 90-100°C, 12h
PPS-CF	90℃ 8h 90°C, 8h	90-100℃ 12h 90-100°C, 12h

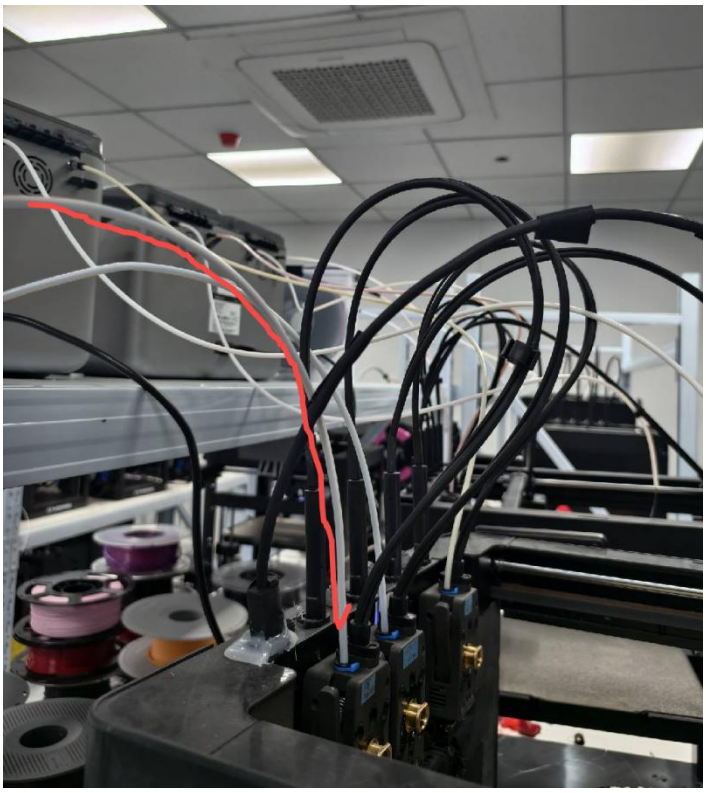
Note: When drying on the heated bed, flip the spool every 3 hours and cover the filament with its packaging box or a PC box to ensure even heating.

3.2 Heated Chamber Requirements

To reduce warping, warp-prone filaments should be printed in a heated chamber.
For ASA-CF, use a printer with a heated chamber and set the temperature to 50-60°C.
Unlike many comparable filaments from other brands, Flashforge PA6-CF, PET-CF, and PPS-CF can be printed successfully even without a heated chamber. For more stable printing, setting the chamber temperature to 40-60°C is recommended.

3.3 Feed Filament from the Top

Carbon fiber filaments offer excellent rigidity, but they are also more brittle and prone to breaking. Therefore, common carbon fiber filaments (except PETG-CF) are not recommended to be fed through the IFS.
The correct method is to place the filament above the filament inlet and keep the guide tube as straight as possible to minimize bending and prevent the filament from snapping inside the feed path.



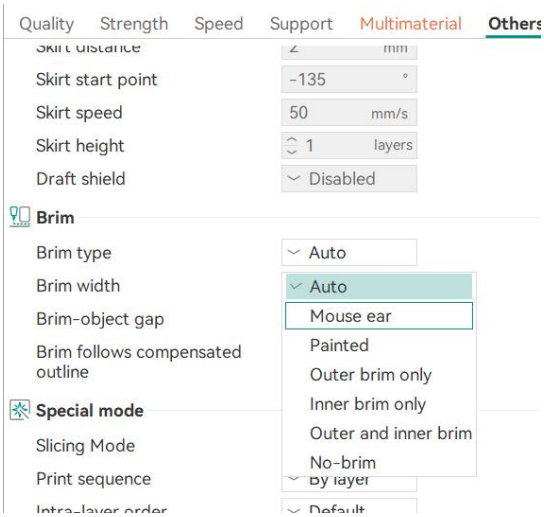
4. Common Printing Issues & Solutions

4.1 Model Warping

Filaments like ABS and ASA have higher shrinkage rates due to their unique physical properties, and ASA-CF is particularly prone to warping.

To prevent warping, try the following:

- Increase bed adhesion by applying a glue stick or bed adhesive to the build plate.
- Use a printer with a heated chamber and set the chamber temperature to 40-60°C.
- Enable a brim based on model geometry (typically choose [Outer brim only]; for sharp-cornered models that warp easily, select [Mouse ear]).



4.2 Filament Not Extruding

Carbon fiber reinforced engineering filaments typically require relatively high nozzle temperatures. When switching from a high-temperature filament to one that prints at a lower temperature, residual high-temperature filament left inside the nozzle may not extrude properly. To resolve this, raise the nozzle temperature to the printing temperature of the high-temperature filament, purge the remaining material, then continue purging for a while. Once all residual high-temperature filament has been purged from the nozzle, the lower-temperature filament will extrude normally.

4.3 Oozing

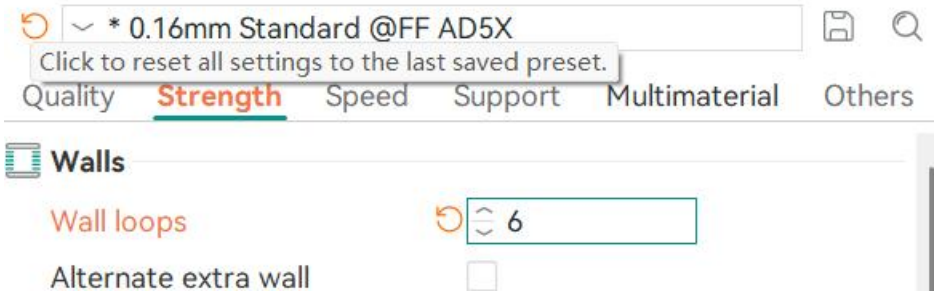
If you encounter a situation similar to what is shown in the image, it indicates the filament has absorbed moisture, causing filament to ooze from the nozzle. Dry the filament thoroughly as described in Section 3.1.

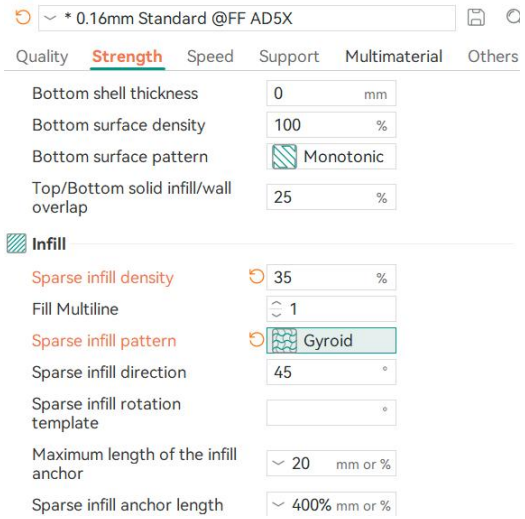
5. Advanced Print Settings

5.1 Improve Model Strength

5.1.1 Increase the Wall Loops and Sparse Infill Density, and Change the Sparse Infill Pattern

You can improve model strength by increasing the wall loops and the sparse infill density, and by selecting a stronger infill pattern. We recommend increasing the wall loops to 3-6 (default: 2), raising the infill density to 20-50% (default: 15%), and changing the infill pattern to "Gyroid" (default: "Grid"). Further increases in wall loops or infill density are not recommended, as excessive model density may increase the risk of warping.





Tip: If warping occurs with high-density prints, refer to Section 4.1 to reduce the risk.

5.1.2 Orient the Model Based on Load Direction

Due to the layer-by-layer nature of 3D printing, parts are inherently weaker along the Z-axis, where interlayer bonding is limited. As a result, fractures are more likely to occur between layers. For load-bearing parts, orient the model so that the Z-axis is not perpendicular to the primary load direction. For detailed guidance, refer to Section 6.2 of the PLA Usage Guide.

5.2 Prevent Bridge Sagging

High-temperature filaments require high extrusion temperatures and are typically printed with low cooling fan speeds to improve layer adhesion. As a result, they cool and solidify more slowly during printing. When printing bridges, noticeable sagging may occur. We recommend enabling supports during slicing to prevent bridge sagging. (Note that supports for bridges are not always generated automatically, so you may need to add them manually.)