PA/PC Usage Guide

1. Filament Overview

PA (Nylon/Polyamide) is a tough, wear-resistant, and heat-resistant engineering filament. It is commonly used for printing parts such as gears, hinges, and bearings that are subject to frequent friction and wear.

PC (Polycarbonate) is an impact-resistant, highly transparent, and heat-resistant engineering filament. It is typically used for protective covers, electronic enclosures, and similar applications.

Both filaments exhibit high shrinkage rates and significant internal stress, making them highly prone to warping and therefore more difficult to print. For this reason, they are covered together in this guide.

2. Hardware Compatibility

Both PA and PC are compatible with 0.4mm and larger nozzles. However, due to their strong tendency to warp, glue must be applied to the build plate.

Filament	Nozzle Compatibility	Build Plate Compatibility	Accessory Compatibility (IFS)
PA、PC PA, PC	Only compatible with nozzles ≥ 0.4mm	Glue required; not compatible with Cool Plate	Compatible with IFS

3. Preparation Before Printing

3.1 Filament Drying

PA must be dried before printing to prevent issues such as stringing, bubbles, and surface defects caused by moisture absorption. PC is less hygroscopic, but drying before printing is still recommended. Recommended drying conditions:

Filament Type	Air Drying Oven	Heated Bed
PA	80℃ 8h 80°C, 8h	100℃12h 100°C, 12h
PC	80℃ 8h 80°C, 8h	100℃12h 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

For both PA and PC, an enclosed printer with active chamber heating is required. Set the chamber temperature to 60°C. A higher chamber temperature helps reduce internal stress during printing, preventing warping or cracking.

4. Common Printing Issues & Solutions

4.1 Model Warping or Cracking

Due to their unique physical properties, PA and PC have higher shrinkage rates and are more prone to warping. To prevent warping or cracking, 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 60°C.
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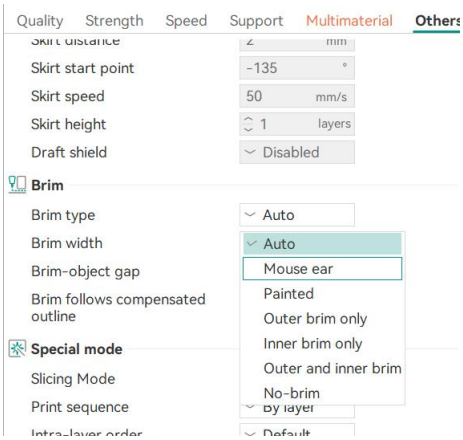
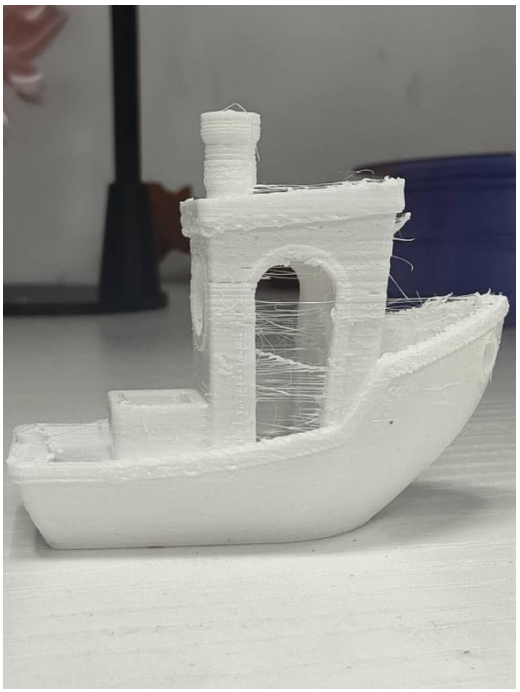
- Enable a brim based on model geometry (typically choose [Outer brim only]; for sharp-cornered models that warp easily, select [Mouse ear]).



4.2 Filament Not Extruding

Engineering filaments such as PA 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 and Stringing



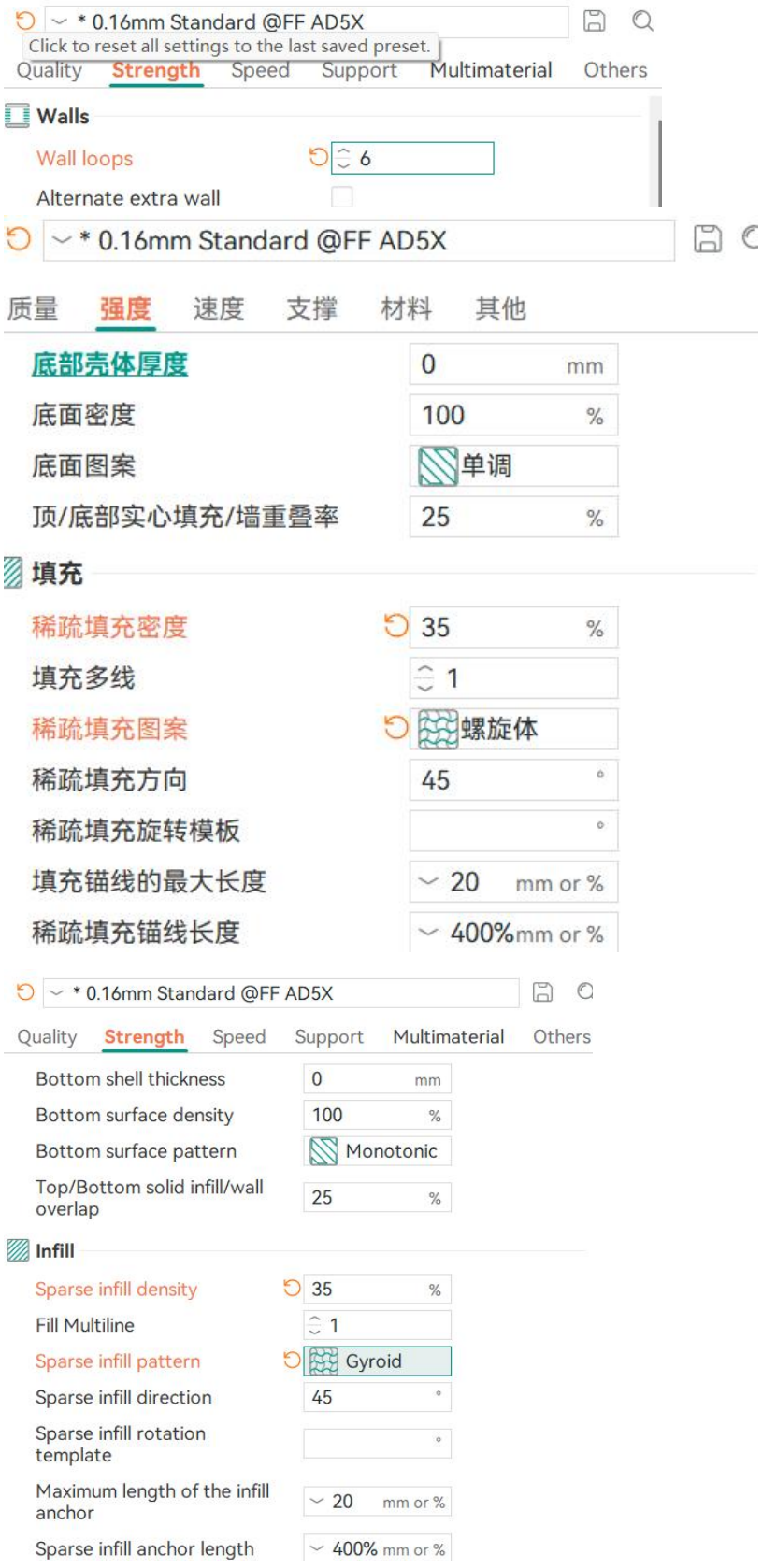
If you encounter a situation similar to what is shown in the image, it indicates the filament has absorbed moisture, causing filament to ooze from the nozzle. Dry the filament thoroughly as described in Section 3.1.

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 Improve the Transparency of PC Transparent

PC offers excellent transparency (85-90%). However, achieving maximum clarity requires fine-tuning your process parameters and optimizing model geometry. For detailed guidance, refer to Section 6.3 of the PLA Usage Guide.

5.3 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.)