Why is my filament still stringing after drying?

Asked 3D Content Team
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Abstract. Once the spool is dry, stringing comes from settings: Prusa says lower the nozzle 5 to 10 °C, Bambu Lab adds retraction up to 2 mm and shorter travel.

Keywords: petg, pla, slicer-settings

1 Why is my filament still stringing after drying?

Dried PETG or PLA that still strings points to settings, not moisture, unless the spool has re-absorbed water. Prusa's temperature fix is a nozzle 5 to 10 °C cooler. Bambu Lab adds more retraction, kept at 2 mm or less, and parts placed closer together. PETG strings by nature: Polymaker calls a few strings nearly unavoidable.

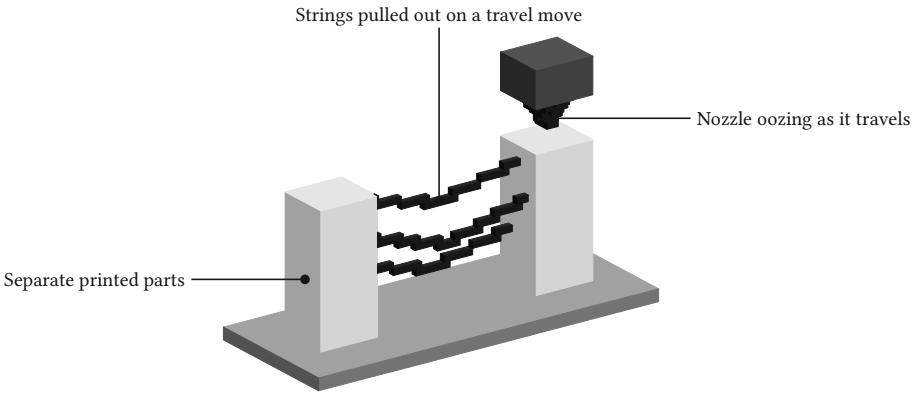


Figure 1. Stringing is molten filament that seeps from the nozzle on a travel move and gets pulled into thin strands, and drying removes only one cause of that seep.

1.1 The number

Table 1. The number

Cause	What points to it	The maker's fix
Nozzle too hot	Wisps on every travel move, with the profile near the top of the filament's range: Bambu PETG Basic runs 230 to 260 °C, PLA Basic 190 to 230 °C	Prusa: drop the nozzle 5 to 10 °C and reprint. Bambu Lab: lower it, because heat thins the melt
Retraction too short or too slow	Strings even on short hops between walls	Bambu Lab: raise the length or the speed, length no more than 2 mm. Prusa: 2 mm maximum on the direct-drive MK2.5 and MK3 series, 3.2 mm default on the Bowden MINI. Faster retraction helps until the motor skips steps
Long travel moves	Strings bridging separate parts or open gaps	Bambu Lab: move parts closer and turn on Avoid crossing wall. Prusa: Avoid crossing perimeters, or sequential printing. Polymaker: travel at 200 mm/s or more, with about 2,500 mm/s² acceleration on CoreXY machines
Retraction skipped on short moves	Strings on parts with many small, separate features	Prusa: leave Minimum travel after retraction at its 1 mm preset. Raising it adds oozing and stringing
PETG film on the nozzle	Strands that stick to the print's surface after a long run of one PETG	Prusa: clean the nozzle thoroughly before printing
Worn or mismatched nozzle	Visible wear on the tip, or a slicer profile for a different nozzle size	Bambu Lab: replace a worn nozzle and match the profile to the nozzle fitted
Low-density PLA, such as Bambu PLA Aero	A foaming grade oozing at normal PLA settings	Bambu Lab: dry it, lower the temperature, set the flow ratio to 0.5 to 0.7
Water back in the spool	Popping or hissing at the nozzle	Bambu Lab: at about 55 % RH, dried filament can take up enough water to hurt quality within 2 to 12 h. Dry it again and print from a sealed box below 20 % RH

Causes and fixes come from Prusa's "Stringing and oozing" article, Bambu Lab's Stringing and Oozing wiki and Polymaker's Hairy or Stringy Prints page. The temperature ranges come from Bambu's PETG Basic and PLA Basic data sheets, the popping sign from Polymaker's Wet Filament page, and the humidity figures from Bambu Lab's drying wiki.

1.2 Why

Bambu Lab defines stringing as molten filament seeping from the nozzle during travel and getting pulled into thin strands. Water is one source of that seep. Drying removes the water and leaves every other cause in place.

Prusa traces stringing to "very high printing temperatures and/or using incorrect retraction settings." Bambu Lab adds that a hotter nozzle lowers the melt's viscosity, which leads to abnormal extrusion. Prusa also notes that "some filaments are naturally more stringy than others." Polymaker names PETG (glycol-modified polyethylene terephthalate) as more likely to string than PLA (polylactic acid).

1.3 Does wet filament cause stringing, and why?

Yes. Prusa says filament that has "gathered moisture" will "cause a lot of stringing." Bambu Lab explains the mechanism: water "rapidly vaporizes inside the hot nozzle, causing the molten filament to expand, extrude erratically, and form bubbles." Stringing and oozing follow.

The pops or sizzling you hear are that vapor escaping, per Polymaker. If a dried spool runs quiet at the nozzle, look for the cause in the table above. Moisture's other effects in the hotend are covered in can wet filament clog a nozzle.

1.4 Did the drying actually work?

First compare what you ran with the makers' settings. Bambu Lab's forced-air oven setting is 50 °C for 8 hours for PLA Basic and 60 to 65 °C for 8 hours for PETG. Prusa dries Prusament PLA at 45 °C and PETG at 55 °C, both for 6 hours.

Then ask where the spool sat afterward. Bambu Lab says that in a typical room at about 55 percent RH (relative humidity), freshly dried filament absorbs enough moisture to affect print quality within 2 to 12 hours. Below 20 percent RH, it stays dry for 2 to 7 days. So a spool dried overnight and left on an open holder can be wet again by the next print.

1.5 Why does dry PETG still string?

Because PETG strings even when everything else is right. Polymaker says PLA can be printed without strings by honing settings, but "it is just about impossible to avoid some strings when printing in PETG."

Prusa's PETG guide calls the material "prone to stringing." It says stringing "can be moderated with higher retractions and lower nozzle temperature," and that the print fan helps prevent "stringing and oozing."

The fan costs toughness: Prusa says to switch it off when the part must be as tough as possible. Polymaker adds coasting for Bowden printers, where the extruder sits away from the hotend. Coasting replaces the last part of each extrusion path with travel, so the oozing plastic finishes the line.

1.6 Why is dry PLA stringing?

Dry PLA that strings needs retraction or temperature tuning. Prusa says PLA is "sometimes prone to stringing and oozing," which proper retraction reduces. OrcaSlicer says that for

low-oozing filaments like PLA, a retraction of 0.2 to 0.4 mm should suffice.

Then check the nozzle temperature. Prusa recommends 215 °C for the first layer and 210 °C after, inside Bambu's 190 to 230 °C range for PLA Basic.

1.7 Do PETG and PLA need different stringing settings?

Table 2. Do PETG and PLA need different stringing settings?

Setting	PLA	PETG
Nozzle, Prusa	215 °C first layer, 210 °C after	230 °C first layer, 240 °C after
Nozzle range, Bambu Lab data sheet	190 to 230 °C (PLA Basic)	230 to 260 °C (PETG Basic)
Retraction length, Bambu Lab data sheet	0.6 to 1.0 mm	0.4 to 0.8 mm
Retraction speed, Bambu Lab data sheet	20 to 40 mm/s	30 to 60 mm/s
Part cooling fan	Bambu Lab: on	Bambu Lab: 0 to 60 %. Prusa: off for the first few layers, then half power

Nozzle and fan figures come from Prusa's PLA and PETG guides and Bambu's PLA Basic and PETG Basic data sheets. The makers split on PETG retraction. Prusa says higher retraction moderates PETG stringing, while Bambu's PETG Basic sheet lists a shorter range than its PLA Basic sheet.

Start from your own filament's data sheet, then tune with the towers below.

1.8 How to check it on your own print

- **Listen first.** Pops or sizzling during extrusion mean water is still there, per Polymaker. Dry it again and print from a sealed box with desiccant below 20 percent RH, as Bambu Lab advises. Prusa's quick test is loading a different spool.
- **Look at where the strings run.** Strings only between separate parts point to travel, so move the parts closer and turn on Avoid crossing wall or Avoid crossing perimeters. Strings on every move point to temperature or retraction.
- **Drop the nozzle 5 to 10 °C and reprint,** as Prusa says, and stay inside your filament's data sheet range. An OrcaSlicer temperature tower tests several settings in one print. OrcaSlicer warns that going too low can also cause stringing.
- **Run a retraction tower.** OrcaSlicer's default sweeps 0 to 2 mm in 0.1 mm steps for direct drive. For Bowden, it suggests 1 to 6 mm in 0.2 mm steps. Pick the cleanest section. If the top of the tower still strings, OrcaSlicer says to dry the filament and check that the nozzle is installed correctly with no leaks.
- **Clean the nozzle** after a long run of PETG, per Prusa.
- **Remove what's left on PETG** with a heat gun set to around 200 °C, aimed at the strings for one or two seconds. Prusa warns that holding it longer can deform the part.

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