Do you need to dry PLA?

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Published October 17, 2026 · Last verified October 17, 2026

Abstract. Not from a sealed bag. Dry PLA once an opened spool has sat in room air or it pops and strings: Bambu Lab says 55% RH air re-wets filament in 2 to 12 hours.

Keywords: pla

Table 1. The number

Source	What it says about drying PLA	Storage it asks for	PLA's water uptake
Bambu Lab, PLA Basic and PLA Matte	Drying before use "Recommended"; dry first "if the filament's storage condition is uncertain"	Desiccant during use "Not required but recommended"; data sheet: below 20% RH, sealed with desiccant	0.43% at saturation, 25 °C and 55% RH
Bambu Lab, PLA Wood	Drying before use "Required"	Desiccant during use "Required"	not listed
Prusa, Prusament PLA	PLA "doesn't change properties too much by uptaking humidity"; dry before printing on the Original Prusa XL	A closed box with desiccant, with the more hygroscopic filaments stored first	0.13% in 24 h and 0.19% in 7 days, at 24 °C and 22% humidity
Polymaker	Every spool pre-dried and vacuum-sealed with desiccant; "ready to print straight out of the bag" while the seal is intact	Once dried, airtight bags or dry boxes with desiccant	Rated "Low Sensitivity"; nylon, PVA (polyvinyl alcohol), TPU and PETG are "Highly Hygroscopic"

1 Do you need to dry PLA?

Not from a sealed bag: Polymaker says its pre-dried, vacuum-sealed PLA (polylactic acid) prints with no extra drying. Dry it once an opened spool has sat in room air, where Bambu Lab says filament takes up enough water to hurt prints within 2 to 12 hours at 55 percent relative humidity (RH), or when it pops or strings.

1.1 The number

Bambu Lab's rows come from its Filament Drying Recommendations wiki and PLA Basic data sheet, Prusa's from the Prusa Knowledge Base drying article and the Prusament PLA data sheet, and Polymaker's from its pre-drying and wet-filament pages.

1.2 Why

Filament pulls water from the air. In the hot nozzle that water flashes to steam. Bambu Lab blames the steam for bubbles, stringing, oozing, holes, rough surfaces and weaker parts.

PLA takes up little of it, and slowly. On Bambu Lab's data sheets, tested at 25 °C and 55 percent RH, PLA Basic saturates at 0.43 percent water. PETG (glycol-modified polyethylene terephthalate) Basic reaches 0.45 percent and PA6-CF, a carbon-fiber nylon, 2.35 percent.

Prusa Polymers' test shows the pace: 0.13 percent in a day and 0.19 percent in a week, at 22 percent humidity. So PLA soaks up about as much as PETG and far less than nylon. Prusa adds that the water PLA does absorb barely changes its properties.

1.3 When should you dry PLA?

- **When you don't know how it was stored.** Bambu Lab says to dry first if the storage condition is uncertain, especially before a print where appearance matters.
- **When it has sat open.** Bambu puts typical indoor air at 45 to 65 percent RH, where freshly dried filament takes up enough water to affect prints in 2 to 12 hours. No maker gives a limit for PLA alone.
- **When it shows the signs.** Polymaker lists pops or sizzling at the nozzle, stringing, bubbling, pitted extrusion and weak, brittle layers. Prusa says the first signal is usually a poor surface.
- **When it's PLA Wood.** Bambu marks drying as required for it, against recommended for PLA Basic.
- **When you print on the Original Prusa XL.** Its idle toolheads stay at 70 °C by default, and Prusa says even PLA can then "absorb enough moisture to create printing issues."

1.4 Does PLA need a dry box?

It's optional but recommended. Bambu Lab lists desiccant during use as "not required but recommended" for PLA Basic, against "required" for TPU (thermoplastic polyurethane), PC (polycarbonate) and nylon. Its data sheet asks for below 20 percent RH, sealed with desiccant.

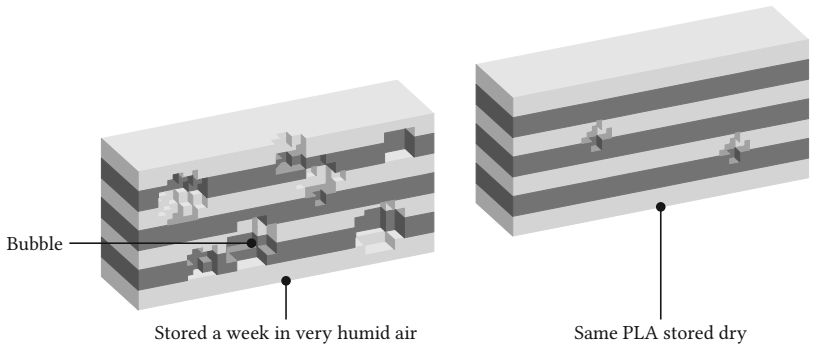


Figure 1. In Valerga and colleagues' test, PLA stored for a week in very humid air printed with more and larger bubbles than the same PLA stored dry.

A dry box buys time, not forever: Bambu says filament generally stays dry for 2 to 7 days at 20 percent RH. If box space is short, Prusa says to store the more hygroscopic filaments first and PLA after.

1.5 Is a filament dryer necessary for PLA?

No. Any heat source that holds a low, steady temperature works. Bambu Lab lists a forced-air oven, the heated bed of an enclosed printer, and its AMS 2 Pro and AMS HT filament units. It warns against microwaves and kitchen ovens, whose uneven heat can damage the spool or filament.

Prusa adds food dehydrators. It says to check any home oven with an external thermometer, because oven swings can damage low-temperature filaments like PLA. The printer method is covered in drying filament on the heated bed.

1.6 Does drying PLA help?

Only when the spool is wet. In a 2018 study in Materials, Valerga and colleagues stored PLA for a week at 25 °C and 98 percent RH. It printed with more and larger bubbles, and broke at lower tensile force than the same PLA stored at 16 percent RH. Drier storage gave stronger but more brittle breaks.

Drying won't cure stringing that has another cause: Prusa notes that some filaments are naturally stringier. It also says to stick to its drying times to prevent over-drying.

1.7 How to check it on your own print

- **Check the bag.** If the vacuum seal is intact, print it as it comes, per Polymaker.
- **Purge and listen.** Popping or hissing and a bubbly strand mean water.
- **Read the spool's heat rating.** Bambu's PLA Basic spool is ABS (acrylonitrile butadiene styrene) rated to 70 °C. Prusa says older black Prusament spools with a cardboard core loosen above 45 °C, and that going over its temperatures makes filament "soften and stick together."
- **Dry it at the maker's setting.** Prusa uses 45 °C for 6 hours, Bambu Lab 50 °C for 8 hours and Polymaker 55 °C for 6 hours.
- **Reprint the same file.** If the pops and strings are gone, moisture was the cause. For clogs, see whether wet filament can clog a nozzle.
- **Seal it.** Store it with desiccant and a hygrometer, aiming for Bambu's below 20 percent RH.

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Cite as: Asked 3D. "Do you need to dry PLA?." October 17, 2026. https://asked3d.com/answers/do-you-need-to-dry-pla. Last verified October 17, 2026.