What nozzle temperature does nylon actually need?

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Abstract. Nylon data sheets put the nozzle at 250 to 300 °C: copolymers start lowest, PA6, PA12 and fiber-filled grades run 260 to 290 °C. Ranges, beds and drying by type.

Keywords: nylon, slicer-settings

1 What nozzle temperature does nylon actually need?

Between 250 and 300 °C, and the grade decides where. Across the eight data sheets checked here, PA6/66 copolymers start at 250 °C, while PA6, PA12 and most fiber-filled grades run 260 to 290 °C. One PA12 carbon-fiber grade wants 280 to 300 °C. Dry the spool first. Wet nylon prints badly at any temperature.

1.1 The numbers

Nylon is a family of plastics called polyamides (PA), and it comes in several grades. Each row below is one maker's range for one spool, copied from its data sheet or print-settings page. A range for one grade tells you little about another, so go by the sheet for the spool in your hands.

The nozzle and bed figures come from Bambu Lab's technical data sheets, Polymaker's wiki, eSUN's printing-parameter tables and the Prusa Polymers datasheet. The Prusament drying figure is from Prusa's launch post for the material. Bambu Lab also lists a second way to dry its spools: 90 to 100 °C for 12 h on an X1 heatbed.

1.2 Why nylon runs hotter, and why the sheets disagree

The melting point sets the floor. Bambu Lab measures 223 °C for its PA6-CF and starts the nozzle range at 260 °C. Polymaker's CoPA melts at 189 °C, and its sheet starts lower, at 250 °C. Copolymers and long-chain grades are different plastics from plain PA6, which is why no single number covers "nylon".

Every sheet starts with drying because nylon pulls water out of the air. Bambu Lab puts saturated water absorption at 2.35 percent for PA6-CF and 0.88 percent for PAHT-CF, both measured at 25 °C and 55 percent relative humidity.

Prusa explains its choice of PA11 for its own filament by pointing at the other two grades: "PA6 is extremely hygroscopic, making it extremely difficult to print with it even 1 day after unpacking", while "PA12 isn't as hygroscopic, but

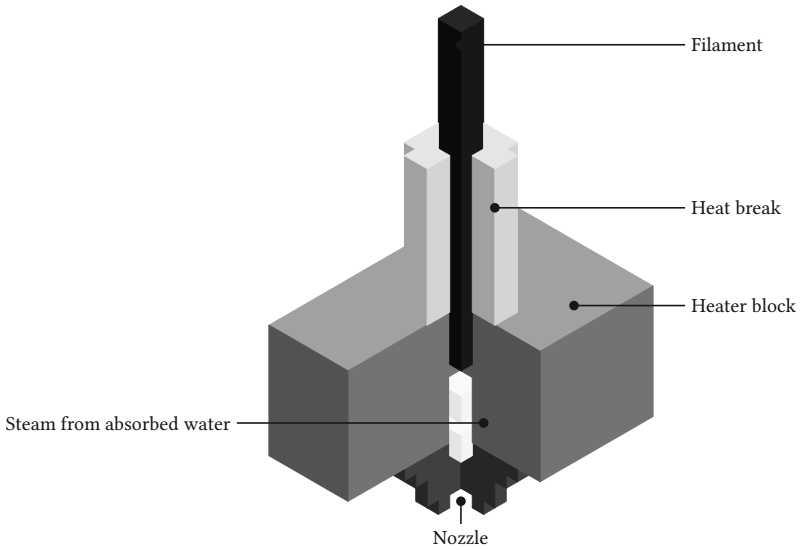


Figure 1. Nylon melts inside the heater block, and water the filament has absorbed boils off there, which is the popping Polymaker tells you to listen for.

Table 1. The numbers

Filament (data sheet)	Nylon type	Nozzle	Bed	Drying before printing	Enclosure
Polymaker PolyMide CoPA	PA6/66 copolymer	250 to 270 °C	25 to 50 °C	100 °C for 8 h	"Needed (ambient temperature)"
eSUN ePA	PA6/66 copolymer	250 to 290 °C	70 to 90 °C	70 °C for over 12 h	Enclosed chamber
eSUN ePA12	PA12	260 to 290 °C	70 to 90 °C	70 °C for over 12 h	Enclosed chamber
Bambu Lab PA6-GF	PA6, glass fiber	260 to 290 °C	80 to 100 °C	80 °C for 8 to 12 h	Chamber 45 to 60 °C
Bambu Lab PA6-CF	PA6, carbon fiber	260 to 290 °C	80 to 100 °C	80 °C for 8 to 12 h	Chamber 45 to 60 °C
Bambu Lab PAHT-CF	PA12 and other long-chain PA, carbon fiber	260 to 290 °C	80 to 100 °C	80 °C for 8 to 12 h	Chamber 45 to 60 °C
Polymaker Fiberon PA12-CF10	PA12, carbon fiber	280 to 300 °C	40 to 50 °C	Print straight from a heated dryer	Doors open, room temperature
Prusament PA11 Carbon Fiber	PA11, carbon fiber	285 ± 5 °C	110 ± 10 °C	90 °C for 4 to 6 h	Recommended

it warps extremely". Polymaker goes furthest with its PA12-CF, which it wants printed "while kept in a heated filament dryer the entire time you print."

The bed and enclosure columns are where the sheets split furthest. Bambu Lab wants the bed at 80 to 100 °C and the chamber at 45 to 60 °C for its PA6 and PA12 grades. Polymaker's PA12-CF10 page pulls the other way: "Do not set your build plate above 50°C and keep any chamber doors open." Each instruction is written for that maker's formula, and neither carries over to the other's spool.

Fiber-filled grades need the right hardware as well. For PA11 Carbon Fiber, Prusa's datasheet says "A hardened nozzle is necessary". Polymaker asks for a hardened nozzle on its PA12-CF10 too, plus an all-metal hotend that can reach 280 °C or higher. It even suggests a wear-resistant nozzle for unfilled CoPA, since brass nozzle abrasion "happens quite often" with it.

1.3 How to find the right temperature for your spool

1. **Identify the grade.** The label names the base polymer (PA6, PA6/66, PA11, PA12) and any glass or carbon fill. Look up the data sheet for that exact product.
2. **Dry it first, to the sheet's figure.** Test a wet spool and you end up measuring the moisture. Not sure a spool is wet? A wet filament checklist scores the symptoms and gives the maker's drying time. Keep it dry afterward too: Bambu Lab's sheets call for below 20 percent relative humidity, sealed with desiccant, in storage and while printing.
3. **Print a temperature tower inside the sheet's range only.** That is one tall print that changes the nozzle temperature band by band. Start in the middle of the range and step toward each end.
4. **Listen for popping.** Polymaker's test: "If you hear 'popping' or 'cracking' noises, then the filament needs to be dried."
5. **Break the tower.** Snap each band by hand. A band that tears through the plastic, instead of peeling apart along a layer line, has the stronger layer bond.
6. **Check your hotend's limit.** Several of these ranges top out at 290 or 300 °C. If your hotend or nozzle cannot hold the top of a range, that narrows the grades you can run.

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