What temperature should you do a cold pull at?

Asked 3D Content Team
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Abstract. Pull PLA at 70 to 100 °C after heating to 200 to 270 °C. UltiMaker pulls ABS and cleaning filament at 140 to 160 °C; Creality gives 120 °C for PETG.

Keywords: pla, petg, abs, nylon

Table 1. The number

Material	Heat and push at	Pull at	Who publishes it
PLA	200 to 270 °C	70 to 100 °C	Prusa, Bambu Lab, UltiMaker, Flashforge, Snapmaker, Creality (per-printer table below)
PETG (glycol-modified polyethylene terephthalate)	About 250 °C (Bambu Lab H2S flush)	120 °C	Creality; the H2S sets its own pull temperature and does not publish it
ABS (acrylonitrile butadiene styrene)	240 to 260 °C (UltiMaker); about 290 °C (Bambu Lab H2S flush)	140 to 160 °C (UltiMaker); 120 to 160 °C (Creality)	UltiMaker, Creality, Bambu Lab
Nylon (PA, polyamide)	About 290 °C (Bambu Lab H2S flush)	140 to 160 °C	Creality; Bambu Lab says nylon works but gives no pull figure
Cleaning filament	240 to 260 °C (UltiMaker); 270 °C or the filament maker's figure (Prusa MINI)	140 to 160 °C (UltiMaker); 90 to 95 °C (Prusa MINI)	UltiMaker, Prusa

1 What temperature should you do a cold pull at?

For PLA (polylactic acid), pull at 70 to 100 °C after heating to 200 to 270 °C; Prusa, Bambu Lab and UltiMaker publish values in that band. Materials that print hotter pull hotter: UltiMaker gives 140 to 160 °C for ABS and cleaning filament, and Creality gives 120 °C for PETG and 140 to 160 °C for nylon.

1.1 The number

A cold pull has two temperatures: the heat at which you push filament through, and the lower one at which you pull it out.

Pull and heat figures come from the UltiMaker 2+ nozzle cleaning article (UltiMaker's hot and cold pull, once called the Atomic method), Creality's cold pull guide, the Bambu Lab H2S cold pull page and the Prusa MINI cold pull article. Creality gives one heat range for every material, 220 to 260 °C "depending on what's loaded." The two cleaning filament rows disagree because Prusa's MINI article runs the same steps for PLA and cleaning filament. Prusa defers to the cleaning filament maker for the heat figure, so check the packaging first.

1.2 Cold pull temperature for PLA, printer by printer

Most makers write their guide around PLA. "Stop pushing" is where the guide says flow stops or feeding should end.

Figures come from each maker's own cold pull or unclogging page, listed under Sources. Some printers set the temperatures for you: Prusa's MK4/S and MK3.9/S from firmware 6.0.0, the XL from 6.1.3, and Bambu Lab's H2S under Toolbox. The Bambu steps are on the Bambu Lab cold pull page.

1.3 Can you cold pull with PETG, ABS or nylon?

Yes, but the makers split on whether you should. Prusa found that PLA works best because other filaments "do not retain

Table 2. Cold pull temperature for PLA, printer by printer

Printer and guide	Heat and push at	Stop pushing	Pull at
Prusa MK3/S/+, MK2.5/S, MK3.5/S	270 °C	Around 170 °C	85 °C
Prusa MK4/S, MK3.9/S, XL, CORE One	270 °C	Around 170 °C	100 °C
Prusa MINI/MINI+	270 °C	160 to 170 °C	90 to 95 °C
Bambu Lab X1/P1 unclogging guide	220 °C	Not stated	100 °C
Bambu Lab P1S cold pull guide	230 °C	Around 150 °C, when the extruder skips	70 °C
UltiMaker 2+	200 to 220 °C	About 50 °C above the pull temperature	80 to 100 °C
Flashforge Creator 5	250 °C	When flow slows	80 °C
Snapmaker U1	230 °C	Not stated	70 °C

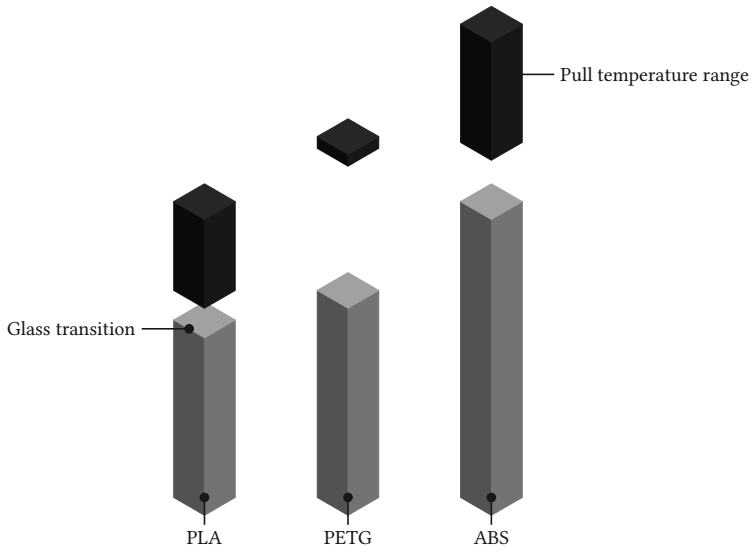


Figure 1. Each material's pull temperature, the dark band, sits above its glass transition, the top of the gray column, so the pull figure climbs with it.

the tip as PLA does and they will either tear or melt too much." Bambu Lab's H2S page names PLA and PETG as the best choices and warns that others "may snap or leave residue inside the nozzle." Creality calls nylon "the gold standard because of its strength and flexibility." UltiMaker says any non-flexible material will work.

Whichever filament you pull with, heat it above its normal print temperature first. Bambu Lab's P1S guide says "slightly higher than the regular printing temperature." Prusa takes PLA to 270 °C, where Bambu Lab's PLA Basic data sheet lists 190 to 230 °C for printing. The H2S flushes at about 250 °C for PLA and PETG and about 290 °C for ABS, nylon and PC (polycarbonate). To pull with ABS or nylon, use the UltiMaker or Creality pull figures in the chart above.

1.4 Why the pull temperature matters

The filament has to be solid enough to come out in one piece but soft enough to let go of the nozzle wall. Bambu Lab picked 100 °C on its X1/P1 guide so the filament is "just soft enough to be pulled away from the hotend, but still not soft enough to get damaged." During cooling it acts as a plug that bonds with the residue inside, and the pull drags that debris out.

Every published pull temperature for PLA, PETG and ABS sits above the material's glass transition, the point where it turns from rigid to rubbery. Bambu Lab's data sheets put that at 60 °C for PLA and 69 °C for PETG, and Polymaker lists 101 °C for ABS. The pull figures climb with it: 70 to 100 °C for PLA, 120 °C for PETG, 120 to 160 °C for ABS. Creality's guide describes both failures: too cold and the filament snaps, too hot and it feels mushy and stretches.

1.5 How to check it on your own print

- **Read the tip.** A good pull comes out with a cone matching the inside of the nozzle. Black specks, burnt bits or uneven marks mean you should repeat it until the tip comes out clean, per Bambu Lab.
- **Filament snapped inside: go hotter.** Creality says to raise the pull temperature 5 to 10 °C. Bambu Lab's advice is the same: raise it slightly if the filament breaks.
- **Filament stretched or slid out with no tip: go colder.** Bambu Lab says to lower the temperature if it slides out too easily; Creality says to let the nozzle cool further if it feels mushy.
- **Keep pushing while it cools.** Prusa says the nozzle has to be filled for the pull to work. UltiMaker says to keep pressure on until about 50 °C above the pull temperature.
- **Use a contrasting color.** Prusa suggests a different color from the last print, so residue on the tip is easy to see.
- **Skip it on a coated nozzle.** Prusa says to use only cleaning filament on its coated Nozzle X, because a cold pull can damage the nozzle.
- **No flow at all: unclog first.** If filament cannot reach the nozzle, Prusa says a cold pull will most likely not fix it. Start with unclogging the nozzle instead.

The full step-by-step method, including pull speed and how to hold the extruder, is on how to do a cold pull.

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