What retraction settings should you use for PETG?

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Abstract. Shipped PETG profiles retract 0.4 to 1 mm at 30 to 45 mm/s on direct-drive printers and 2.5 to 8 mm on Bowden printers, close to each printer's PLA values.

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1 What retraction settings should you use for PETG?

Shipped PETG profiles in PrusaSlicer, Bambu Studio and UltiMaker Cura retract 0.4 to 1 mm at 30 to 45 mm/s on direct-drive printers and 2.5 to 8 mm on Bowden printers. On direct drive that is a fraction of a millimeter from the printer's PLA setting: longer in Prusa's profiles, shorter in Bambu PETG Basic. Then calibrate.

1.1 The number

All values are for a 0.4 mm nozzle. The Prusa rows come from Prusa's profile bundle 2.5.13, and PrusaSlicer 2.9.6 ships the same values. The Bambu rows are Bambu Studio v02.08.02.61′s profiles with the standard nozzle. The Creality and UltiMaker rows come from UltiMaker Cura 5.13.0′s definitions, quality profiles and material files. A ramping lift climbs gradually along the travel instead of lifting straight up, here to at most 1.5 mm.

1.2 Why do PETG profiles change retraction from PLA?

Because PETG strings. Prusa's PETG guide calls it "prone to stringing" and says stringing "can be moderated with higher retractions and lower nozzle temperature". UltiMaker's PETG material file carries a note that "PETG can ooze a lot and has long retracts", and its S5 profile pulls back 8 mm instead of PLA's 6.5 mm.

Bambu goes the other way on length. Bambu PETG Basic halves the retraction to 0.4 mm and switches Z Hop Type from Auto to Spiral, which Bambu Studio's tooltip says "can prevent stringing". Prusa's Core One and MK4S PETG profiles turn on Wipe while retracting, which stays off for PLA on those printers. On the MK3S, Prusa also cuts PETG's Lift height from 0.4 to 0.2 mm.

1.3 What retraction distance is good for PETG on direct drive?

The one your printer's own PETG profile ships, 0.4 to 1 mm in the table. Bambu Studio has two answers for the same printer: 0.4 mm for PETG Basic and the printer's 0.8 mm for PETG HF. If your printer has no PETG profile, start from its PLA length, then calibrate. Do not copy a Bowden value: every direct-drive PETG profile above stays at 1 mm or less.

Table 1. The number

Printer (extruder)	Shipped PETG profile	PETG: length, speed, Z hop	PLA on the same printer
Prusa Core One (direct drive)	Prusament or Generic PETG, PrusaSlicer	0.8 mm, 45 mm/s, ramping lift up to 1.5 mm	0.7 mm, 45 mm/s, same ramping lift
Prusa MK4S (direct drive)	Prusament or Generic PETG, PrusaSlicer	0.8 mm, 35 mm/s, ramping lift up to 1.5 mm	0.7 mm, 35 mm/s, same ramping lift
Prusa MK3S, MK3S+ (direct drive)	Prusament or Generic PETG, PrusaSlicer	1 mm, 35 mm/s, 0.2 mm	0.8 mm, 35 mm/s, 0.4 mm
Bambu Lab X1 Carbon, P1S, A1, A1 mini (direct drive)	Bambu PETG Basic, Bambu Studio	0.4 mm, 30 mm/s, 0.4 mm (Spiral)	Bambu PLA Basic: 0.8 mm, 30 mm/s, 0.4 mm (Auto)
Bambu Lab X1 Carbon, P1S, A1, A1 mini (direct drive)	Bambu PETG HF, Bambu Studio	0.8 mm, 30 mm/s, 0.4 mm (Auto): no override, so the printer's values	Same as PETG HF
Creality Ender-3 S1 (direct drive)	Generic PETG, UltiMaker Cura	0.8 mm, 40 mm/s, Z hop off (0.2 mm if turned on)	Same as PETG
Prusa MINI, MINI+ (Bowden)	Prusament or Generic PETG, PrusaSlicer	3.2 mm, 45 mm/s, 0.2 mm	3.2 mm, 70 mm/s, 0.2 mm
Prusa MINI+ with Input Shaper firmware (Bowden)	Prusament or Generic PETG, PrusaSlicer	2.5 mm, 45 mm/s, 0.2 mm	2.5 mm, 70 mm/s, 0.2 mm
UltiMaker S5 with an AA 0.4 print core (Bowden)	UltiMaker PETG, UltiMaker Cura	8 mm, 45 mm/s, Z hop off with one extruder	UltiMaker PLA: 6.5 mm, 45 mm/s, same

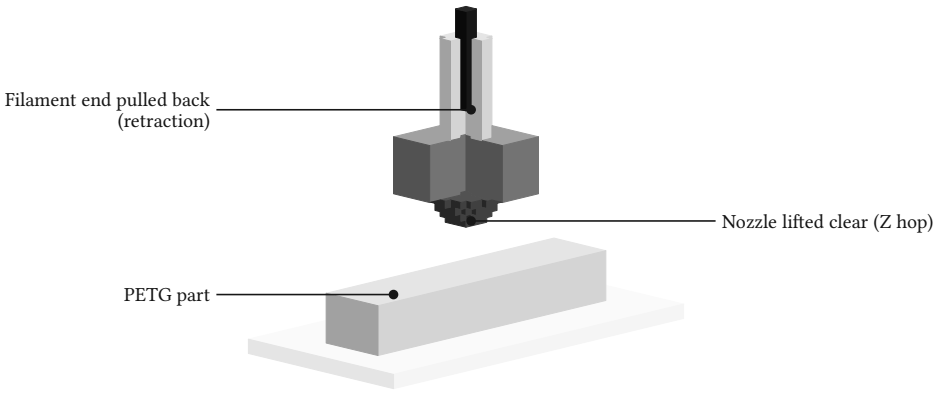


Figure 1. Retraction pulls the filament back up the hotend and Z hop lifts the nozzle off the part before a travel, the two moves the PETG profiles in the table adjust.

1.4 What retraction settings does PETG need on a Bowden printer?

A longer length or a slower move than PLA. Prusa's MINI keeps PLA's length but slows Retraction Speed from 70 to 45 mm/s and Deretraction Speed from 40 to 25 mm/s. It also retracts on travels as short as 1 mm instead of 1.5 mm (Minimum travel after retraction). UltiMaker's S5 adds length and primes PETG back at 15 mm/s instead of PLA's 45 mm/s (Retraction Prime Speed).

1.5 What retraction speed should you use for PETG?

Use your printer's own speed. No direct-drive profile in the table changes it for PETG: Bambu Lab printers stay at 30 mm/s, the MK4S and MK3S at 35, the Ender-3 S1 in Cura at 40 and the Core One at 45. Prusa's Core One and MK4S push the filament back in slower than they pull it out, at a Deretraction Speed of 25 mm/s.

1.6 How to check it on your own print

1. **Read what your PETG profile sends.** PrusaSlicer: Printer Settings > Extruder 1 (Travel lift and Retraction), then Filament Settings > Filament Overrides. A ticked value there replaces the printer's. Bambu Studio: the printer's Extruder page, then the filament's Setting Overrides page. Cura: the Travel section (Retraction Distance, Retraction Speed, Z Hop When Retracted).
2. **Dry the spool first,** so moisture is not mistaken for a retraction problem (does PETG need drying).
3. **Print a retraction test.** OrcaSlicer's Calibration > Retraction test runs 0 to 2 mm in 0.1 mm steps by default. Pick the lowest band without strings.
4. **If strings remain at your profile's length,** lower the nozzle temperature and keep part cooling on, the two other fixes Prusa names, before adding more length. The other causes are in why PETG is so stringy.
5. **Save the result in the filament profile** (Filament Overrides or Setting Overrides), so your PLA keeps its own retraction.

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