What should Z hop height be?

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Abstract. 0.2 to 0.4 mm on a 0.4 mm nozzle. Bambu Studio and OrcaSlicer ship 0.4 mm, PrusaSlicer 0.4 mm on the Prusa MK3S and 0.2 mm on the MINI, Cura's Creality profiles 0.2 mm.

Keywords: retraction, slicer-settings

Table 1. The number

Slicer and printer, 0.4 mm nozzle	Setting	PLA	PETG
Bambu Studio, every Bambu Lab printer (A1, A1 mini, P1S, X1 Carbon, H2D and the rest)	Z hop when retract	0.4 mm	0.4 mm, with the type set to Spiral
OrcaSlicer, field default	Z-hop height	0.4 mm	0.4 mm
PrusaSlicer, Original Prusa MK3S/ MK3S+	Lift height	0.4 mm	0.2 mm
PrusaSlicer, Original Prusa MINI/ MINI+	Lift height	0.2 mm	0.2 mm
PrusaSlicer, Original Prusa MK4S, Prusa CORE One, Original Prusa XL	Maximum ramping lift: a 1° ramp, so short travels stop below it	0.6 mm	1.5 mm
UltiMaker Cura, default	Z Hop Height	1 mm, but Z Hop When Retracted is off	1 mm, off
UltiMaker Cura, Creality printers	Z Hop Height	0.2 mm, off	0.2 mm, off
UltiMaker Cura, Sovol SV06	Z Hop Height	Twice the layer height, on	Twice the layer height, on
UltiMaker Cura, Voron 2	Z Hop Height	Half the nozzle diameter, on	Half the nozzle diameter, on

1 What should Z hop height be?

Start at 0.2 to 0.4 mm with a 0.4 mm nozzle: Bambu Studio and OrcaSlicer default to 0.4 mm, as does every Bambu Lab printer profile. PrusaSlicer sets 0.4 mm on the Prusa MK3S and 0.2 mm on the MINI; Cura's Creality profiles also use 0.2 mm. Raise the height only if the nozzle still scrapes the print.

1.1 The number

The Bambu rows come from Bambu Studio v02.08.02.61′s printer and filament profiles and the OrcaSlicer row from v2.4.2′s source. The Prusa rows come from PrusaSlicer version_2.9.6′s Prusa profiles, where PLA inherits the printer's lift, and the Cura rows from the 5.13.0 printer definitions.

1.2 Why do the profiles keep it so low?

Because the lift only has to clear whatever stands above the last layer, and more lift means more stringing. Bambu Studio's tooltip describes lifting the nozzle "a little" to create clearance. Prusa's stringing guide says a lower lift improves stringing, and warns that turning it off can let the nozzle hit the part. What the nozzle usually hits is a curled edge: Prusa's crash detection article says an overhang can warp upward into the nozzle's path.

1.3 Is Z hop height different for PLA and PETG?

Only in some profiles, and not in one direction:

- **Bambu Studio:** Bambu PLA Basic and Bambu PETG Basic both keep the printer's 0.4 mm on a 0.4 mm nozzle; PETG Basic changes only the hop type, to Spiral. With a 0.6 or 0.8 mm nozzle on the A1, P1S or X1 Carbon, PETG Basic drops to 0.2 mm while PLA Basic stays at 0.4 mm. One override goes up instead: on an X1 Carbon with a high-flow nozzle, PLA Basic rises to 0.6 mm.
- **PrusaSlicer:** PETG gets a lower straight lift on the MK3S (0.2 mm against 0.4 mm for PLA) but a higher ramp ceiling on the MK4S, CORE One and XL (1.5 mm against 0.6 mm). Those PETG profiles also set Lift height to 0.15 mm, which applies only if you untick "Use ramping lift".
- **Cura:** the Creality profiles use one height for every material.

1.4 Does Z hop height depend on nozzle size or layer height?

In some profiles. With a 0.25 mm nozzle, Prusa lowers Lift height to 0.15 mm on all five Prusa printers in the table. Bambu Studio keeps 0.4 mm on every nozzle size from 0.2 to 0.8 mm. A few Cura printer definitions calculate it from the print: twice the layer height on the Sovol SV06, half the nozzle diameter on the Voron 2.

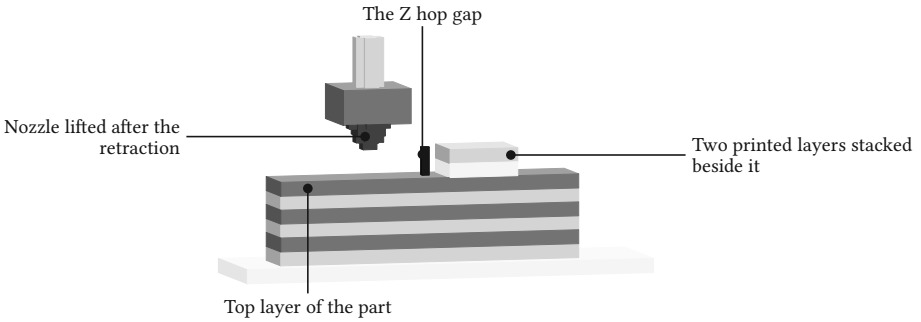


Figure 1. The Sovol SV06 profile in Cura lifts the nozzle by twice the layer height, a gap two printed layers tall above the top of the part.

1.5 How do you tune Z hop height and type?

- **The nozzle still scrapes or knocks the part:** raise the height in small steps. Fix the curling as well: Prusa pairs a higher Z hop with more print fan.
- **Strings appear between parts:** reduce the height. Prusa says a lower lift improves stringing (can Z hop cause stringing).
- **You want a different move:** a straight, sloped, spiral or ramping lift is a separate setting, the Z hop type (which Z hop type).

1.6 How to check it on your own print

1. **Find the value your slicer uses.** Bambu Studio: Printer settings, Extruder, Retraction, “Z hop when retract”. OrcaSlicer: Printer settings, Extruder, Z-Hop, “Z-hop height”. PrusaSlicer: Printer Settings, Extruder 1, Travel lift. Read “Maximum ramping lift” when “Use ramping lift” is ticked and “Lift height” when it is unticked. Cura: Travel, “Z Hop When Retracted” and “Z Hop Height”.
2. **Check the filament profile.** Bambu Studio and OrcaSlicer: the filament’s Setting Overrides page. PrusaSlicer: Filament Overrides, Travel lift. A ticked value there replaces the printer’s.
3. **Print the part that failed** and look at the top surfaces. Drag lines or scuffs across them mean the nozzle still touches: raise the height. Strings between features: try a lower height.
4. **Change one value at a time** and reprint the same part. Bambu Studio accepts 0 to 5 mm. If raising it does not stop the scraping, look for curling instead (what Z hop does).

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