What should support Z distance be?

Asked 3D Content Team
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Abstract. 0.2 mm top and bottom at 0.2 mm layers, as Bambu Studio, OrcaSlicer and PrusaSlicer ship it; finer profiles go lower. Use 0 only with soluble or support filament.

Keywords: supports, slicer-settings

Table 1. The number

Slicer and printer profile	Layer height	Top Z distance	Bottom Z distance
Bambu Studio and OrcaSlicer, every Bambu Lab 0.4 mm nozzle profile	0.20, 0.24, 0.28 mm	0.2 mm	0.2 mm
Same profiles	0.08, 0.12, 0.16 mm	Equal to the layer height	Equal to the layer height
OrcaSlicer, generic Klipper, Marlin and RepRapFirmware printers	0.20 mm	0.2 mm	0.2 mm
PrusaSlicer, Prusa MK4S and CORE One, 0.4 mm nozzle	0.20 mm	0.2 mm	Same as top
Same printers	0.10, 0.15 mm	0.17 mm	Same as top
PrusaSlicer, Prusa MK3S and MK3S+	0.15, 0.20, 0.30 mm	0.2 mm	Same as top
PrusaSlicer, SOLUBLE FULL and SOLUBLE INTERFACE profiles	0.15, 0.20 mm	0	Same as top (0)
UltiMaker Cura, Creality printers	0.20 mm (Standard)	0.2 mm	0.2 mm
Same printers	0.12 mm (Super)	0.24 mm	0.24 mm
UltiMaker Cura, UltiMaker S5 with AA 0.4 core and UltiMaker PLA	0.20 mm	0.3 mm	0.3 mm
UltiMaker Cura, its own default where a printer profile sets nothing	Any	0.1 mm	0.1 mm

1 What should support Z distance be?

Start with 0.2 mm for both top and bottom Z distance when the supports print in the same filament as the part. Bambu Studio, OrcaSlicer and PrusaSlicer ship that value in their 0.20 mm layer profiles, and Bambu Lab recommends about 0.2 mm. Raise it if supports fuse; use 0 only with soluble or dedicated support filament.

1.1 The number

Each value is read at a release tag and followed through the profile's inheritance chain: Bambu Studio v02.09.01.70 and OrcaSlicer v2.5.0, the Prusa profiles bundled with PrusaSlicer 2.9.7, and the printer definitions and quality profiles in UltiMaker Cura 5.14.0. In PrusaSlicer, a bottom value of 0 means "Same as top".

1.2 What is support Z distance, and why does the gap matter?

Support Z distance is the empty vertical space the slicer leaves between a support and the part, and it is what lets the support break away. Bambu Lab's support guide sets out the trade-off: a bigger top Z distance makes removal easier and the supported surface rougher, a smaller one the reverse. Polymaker states the limits: too low and supports fuse to the model, too high and the surface sags.

With a gap, the first layer over the support is laid down like a bridge. PrusaSlicer prints that layer with bridge flow and speed; its tooltip says a 0 gap disables both. Bambu Lab says a supported surface comes out completely free of sagging only at 0 top Z distance, but that 0 with the part's own filament leaves supports "really hard to remove".

1.3 What is the difference between top and bottom Z distance?

Top Z distance is the gap under an overhang, the one that decides how the supported face looks. Bottom Z distance is the gap where a support starts on a lower surface of the part instead of the build plate, so it only matters when supports may stand on the model. UltiMaker Cura hides Support Bottom Distance unless Support Placement is set to Everywhere.

Too small a bottom gap marks the part's surface below the support. OrcaSlicer 2.4.0 fixed classic tree supports that ignored it, so they now "stay clear of those surfaces and are easier to remove without marking the part." In PrusaSlicer, a bottom value of 0 copies the top value.

1.4 Does support Z distance depend on layer height?

Yes. Shipped profiles shrink the gap on finer layers (see the table), and makers state it as a share of layer height. Prusa's knowledge base says 50 to 75% of the layer height seems to work well; Polymaker gives 0.5 to 2 times. Slicers also round the value:

- **Bambu Studio and OrcaSlicer** round both gaps to whole layers whenever "Independent support layer height" is disabled. It ships enabled, but both slicers drop it when a prime tower (the purge tower for filament

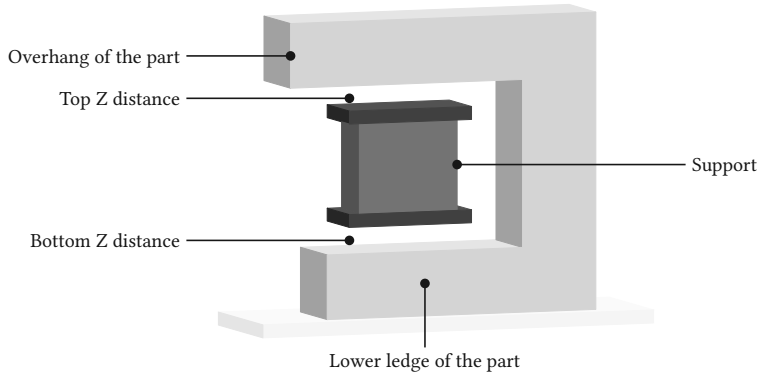


Figure 1. The support stops short of the overhang above it by the top Z distance and starts above the ledge below it by the bottom Z distance, so neither end fuses to the part.

changes) prints. At 0.28 mm layers, that turns the 0.2 mm gap into one 0.28 mm layer.

- **PrusaSlicer** keeps the exact gap for grid and snug supports and rounds it to the nearest whole layer for organic supports.
- **UltiMaker Cura** rounds Support Bottom Distance up to the next layer. It may print the topmost support layer as a fraction of a layer to hit the top value.

1.5 What support Z distance should you use for PLA?

With PLA (polylactic acid) supports under a PLA part, use 0.2 mm at 0.2 mm layers. Bambu Studio, OrcaSlicer and PrusaSlicer ship that value, and Bambu Lab advises it whenever the support interface is the part's own filament. Cura's profile for UltiMaker PLA on the S5 sets a wider 0.3 mm. With a PETG (glycol-modified polyethylene terephthalate), PVA (polyvinyl alcohol) or support-filament interface under PLA, the top gap drops to 0.

1.6 Does support Z distance change with the material?

Not in most slicers. Bambu Studio, OrcaSlicer and PrusaSlicer keep top and bottom Z distance in the process (print) profile, so switching from PLA to PETG keeps the same gap. Two exceptions ship with the software:

- **UltiMaker Cura's quality profiles are per printer, nozzle and material.** On the UltiMaker S5 with an AA 0.4 print core, generic PLA, PETG and TPU (thermoplastic polyurethane) use the smallest whole number of layers that reaches 0.3 mm. At 0.2 mm layers that is 0.4 mm; UltiMaker Tough PLA uses 0.35 mm.
- **Interface pairs get 0.** When you pick the interface filament, Bambu Studio suggests 0 top Z distance for a support or soluble filament. It does the same for PETG under PLA, PLA under PETG and PLA under TPU, and with PVA under PLA it also zeroes the bottom gap. OrcaSlicer suggests 0 for support and soluble filaments.

For PETG and TPU, see PETG supports and TPU supports. For which filament can serve as an interface under which, see support interface material.

1.7 What is support Z distance called in each slicer?

Table 2. What is support Z distance called in each slicer?

Slicer	Setting names	Where to find them
Bambu Studio	Top Z distance, Bottom Z distance	Process, Support, Advanced (Advanced mode)
OrcaSlicer	Top Z distance, Bottom Z distance	Process, Support, Advanced (Advanced mode)
PrusaSlicer	Top contact Z distance, Bottom contact Z distance	Print Settings, Support material, Options for support material and raft (Advanced mode). The list offers 0 (soluble), 0.1 (detachable) and 0.2 (detachable)
UltiMaker Cura	Support Z Distance, with Support Top Distance and Support Bottom Distance under it	Print settings, Custom, Support. Shown at Expert setting visibility or through the settings search

1.8 How to check it on your own print

1. **Read your value and your layer height** where the table above says. In Bambu Studio and OrcaSlicer, also check "Independent support layer height" in the same group. If it is off or a prime tower prints, the gap snaps to whole layers.
2. **Print a three-way test.** Slice the same small supported part three times, changing only the top Z distance: your current value, 0.05 mm less and 0.05 mm more. Polymaker adjusts in steps of 0.05 to 0.1 mm. If your slicer rounds to whole layers, step by one layer instead.
3. **Remove the supports soon after printing.** Bambu Lab says within 2 hours for nylon, PVA and Support for PA/PET, which soften as they absorb moisture.
4. **Keep the smallest gap that still breaks away cleanly.** Per Bambu Lab, each step down improves the supported face and makes removal harder.
5. **Save it in the process profile**, where the setting lives, not in the filament profile.

6. **If supports still weld on at a wide gap,** look past Z distance: why supports are hard to remove and rough surfaces under supports.

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