Can you use tree supports with TPU?

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Abstract. Yes, but supports printed in TPU tend to string, collapse and stick. Bambu Lab advises PLA supports at a 0 mm top Z gap; for TPU on TPU, Prusa widens it to 0.3 mm.

Keywords: supports, tpu

1 Can you use tree supports with TPU?

Yes, but print them in PLA (polylactic acid) if you can. Supports printed in TPU itself tend to string, collapse and stick: Bambu Lab's TPU guide recommends PLA as the support filament, and on single-hotend printers normal supports with a Rectilinear grid base. With PLA, Bambu Studio's X2D preset sets tree(auto) with a 0 mm top Z distance.

1.1 The number

The slicer rows are read from the source at release tags: Bambu Studio v02.09.01.70 (`Tab.cpp`, `SupportComboAdvisor.cpp`, `support_recommended_params.json`), OrcaSlicer v2.5.0 (`Tab.cpp`, `GUI_App.cpp`) and the UltiMaker S5 quality profiles in UltiMaker Cura 5.14.0. The other rows quote each maker's TPU guide and the Polymaker Wiki. NinjaTek's printing guidelines give speeds and temperatures but no support settings.

1.2 Why are TPU supports so hard to remove?

Because TPU (thermoplastic polyurethane) bonds across the gap and then stretches instead of letting go. Supports come off only because the slicer leaves space above them, the top Z distance; Bambu Lab's support guide says "there must be a gap". Prusa says supports close to a flexible model "might stick to it too strongly". Polymaker says its TPU's "amazing layer adhesion" makes supports in the part's own material "very difficult".

Then the material resists the pull. Bambu Lab says TPU can "bend, stretch, and spring back easily". UltiMaker rates its TPU 95A at up to 580% elongation at break, and Omni3D's guide to TPU on PLA supports says supports in the same flexible material "can stretch rather than snap cleanly". Bambu Lab adds that TPU self-supports often stick and can string or deform the surface, and forcing them off may damage the model.

Harder grades may let go more cleanly. Siraya Tech says its 64D TPU "might make supports snap off more cleanly than softer TPUs", and Bambu Lab exempts its 68D TPU for AMS from its warning about TPU supports. Both are Shore D grades, which Bambu Lab's hardness ranking puts above every Shore A grade such as 95A. For the general causes in any material, see why supports are hard to remove.

Table 1. The number

Source	Support printed in	Support type	Top Z distance	Other settings
Bambu Lab, TPU Printing Guide	PLA; TPU only for its TPU for AMS	Normal on single-hotend printers	Not stated	Rectilinear grid base pattern on single-hotend printers
Bambu Studio v02.09.01.70, PLA support under TPU	PLA, base and interface	Unchanged; tree(auto) in the X2D preset	0 mm	Top interface spacing 0, Support/object xy distance 0, Rectilinear Interlaced interface, Independent support layer height off
OrcaSlicer v2.5.0, PLA interface under TPU	PLA, base and interface	Unchanged	0 mm	Top interface spacing 0, Rectilinear Interlaced interface, Independent support layer height off
Prusa Knowledge Base, flexible materials	Not stated	Not stated	0.3 mm	XY separation at least 100%
UltiMaker Cura 5.14.0, S5 with AA 0.4 core, generic TPU	TPU	Normal (Cura's default)	0.3 mm at 0.1 and 0.15 mm layers, 0.4 mm at 0.2 mm	Support interface on; Support Overhang Angle 50°, against the printer's 45°
UltiMaker, TPU 95A guide	PVA, Breakaway, Tough PLA or PLA, all experimental; or TPU 95A	Not stated	Not stated	No combination officially supported
Polymaker, PolyFlex TPU90, TPU95 and TPU95-HF	PolyDissolve S1 or PolySupport	Tree: lower branch density for TPU	Not stated for TPU	Design the part to need as little support as possible

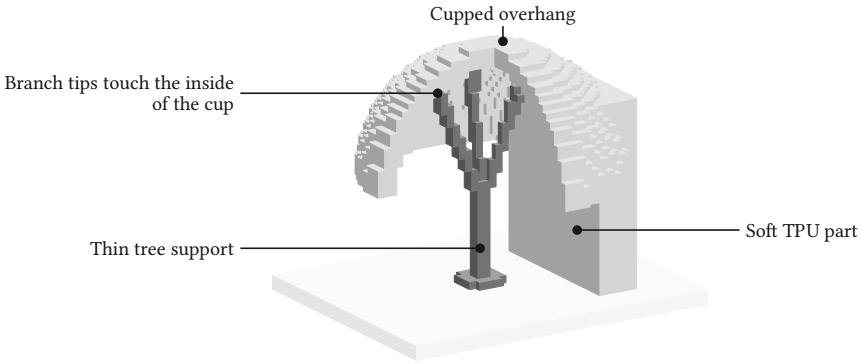


Figure 1. A thin tree support touches the inside of a cupped TPU overhang only at its branch tips, where supports printed in TPU string, collapse or stick.

1.3 Do tree supports work with TPU?

In PLA, yes; in TPU alone, Bambu Lab steers you to normal supports. A tree meets the part only at thin tips, and Bambu Studio prints tree bases hollow by default (its Hollow base pattern means "no infill at all"). Bambu Lab's TPU guide warns that supports printed in TPU can develop tangled strings, collapse or deform. On single-hotend printers it switches Type to normal(auto) and Base pattern to Rectilinear grid, which alternates direction every layer for "much better" strength.

- **Trees in TPU:** Polymaker's advice for TPU trees is a lower branch density. UltiMaker says tree support "is not suitable for all materials" but names none.
- **Trees in PLA:** Bambu Studio's preset for PLA under TPU on the X2D sets Type to tree(auto). Every Bambu Lab process profile already inherits tree(auto) from its base profile.

How the two families differ: tree vs normal supports. Where to switch them on: how to add tree supports.

1.4 What support interface works for TPU?

PLA, the one pairing for TPU that Bambu Studio and OrcaSlicer build in. Bambu Lab recommends PLA as the support filament, in a color close to the TPU's or Jade White PLA, so the support does not stain the part. Other makers list:

- **Polymaker:** PolyDissolve S1, a water-soluble support it rates "++" (supports the model very well) on its TPU. PolySupport for PLA gets "+": it supports the model depending on geometry.
- **UltiMaker:** Four experimental options with TPU 95A: PVA (polyvinyl alcohol), Breakaway, Tough PLA and PLA. UltiMaker supports no TPU 95A combination officially, because the material oozes.

For TPU, both slicers put PLA in the whole support, not just the interface. Bambu Studio's suggestion reads "use PLA for both support interface and support base", and OrcaSlicer sets the base to the interface's PLA. Both skip their usual warning against a non-soluble support base when the plate holds TPU. Bambu Lab's H2D guide, with TPU in the right hotend and rigid filament in the left, also sets the support base to the rigid filament.

On a single-filament printer, Polymaker says to reorient the part so it needs less support, or to put supports where they will not show. Pairs for other filaments: support interface material.

1.5 What support Z distance should you use for TPU?

With PLA supports, 0 mm, which Bambu Studio and OrcaSlicer set when you accept their suggestion. With TPU supporting itself, widen the gap:

- **Prusa:** Set 0.3 mm, with an XY separation of at least 100%, which PrusaSlicer reads as a share of the external perimeter width.
- **UltiMaker Cura:** The S5′s TPU profiles use the smallest whole number of layers that reaches 0.3 mm: 0.3 mm at 0.1 and 0.15 mm layers, 0.4 mm at 0.2 mm. Its generic PLA and PETG (glycol-modified polyethylene terephthalate) profiles use the same rule, so this is not a TPU-specific value.
- **Bambu Studio and OrcaSlicer:** Neither has a TPU value. Top Z distance lives in the process profile, 0.2 mm in Bambu Lab's base profile, so picking a TPU filament leaves it unchanged.

Polymaker's general fix for supports that will not come off is 0.05 to 0.1 mm more Z distance or a lower interface density. Every slicer's shipped gap: support Z distance.

1.6 How to check it on your own print

1. **Put the supports in PLA if your printer can print two filaments.** Bambu Studio: Process > Support > Support filament, set Support/raft base to the PLA slot and accept the "When using PLA to support TPU" suggestion. OrcaSlicer: Process > Support > Filament for Supports, set Support/raft interface to the PLA and accept.
2. **With TPU alone, switch to sturdier supports.** Bambu Studio: Process > Support, Type normal(auto),

then Base pattern Rectilinear grid in the Advanced group. PrusaSlicer (Advanced mode): Print Settings > Support material, Top contact Z distance 0.3 and "XY separation between an object and its support" 100%. UltiMaker Cura: Custom > Support > Support Z Distance.

3. **Cut travel between parts.** Bambu Lab says several models printed By layer cause severe stringing between models and their supports; print By object. For stringing in general, see TPU retraction settings.
4. **Check the preview** at the top of each support. A TPU-only print should show a gap under the overhang; in a PLA setup, PLA should appear only in the support.
5. **Peel, don't yank.** Bambu Lab lifts one corner at the TPU and PLA seam, sprays alcohol into the gap, lets it soak in, then pulls gradually. Do it off the printer: alcohol is flammable. Siraya Tech uses needle-nose pliers and flush cutters; cut away from your hand.

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