What size needle cleans a 0.4 mm nozzle?

Asked 3D Content Team
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Abstract. A 0.3 to 0.35 mm needle, the size Prusa Research bundles, pushed 1 to 2 cm up from below with the nozzle hot. It must be thinner than the 0.4 mm bore.

Keywords: pla, petg, abs

Table 1. The number

Nozzle bore	Prusa Research	Bambu Lab	E3D V6 nozzles
0.2 mm	No smaller needle given; the 0.3 to 0.35 mm needle is wider than the bore	Skip the pin (X1/P1); the pin "does not work with nozzles smaller than 0.4mm" (A1)	Needle not recommended
0.4 mm	Bundled acupuncture needle or wire, 0.3 to 0.35 mm; spare needles 0.3 mm	Bundled Unclogging Pin Tool, "special unclogging tool for the 0.4 mm hotend"; diameter not published	Needle not recommended
0.6 mm	Same 0.3 to 0.35 mm needle; no separate size given	Pin step applies; only 0.2 mm is excluded (X1/P1)	Needle not recommended
0.8 mm	Same 0.3 to 0.35 mm needle; no separate size given	Pin step applies; only 0.2 mm is excluded (X1/P1)	Needle not recommended

1 What size needle cleans a 0.4 mm nozzle?

A needle 0.3 to 0.35 mm thick. That is the size Prusa Research bundles with its printers and gives in its unclogging guides, and its spare needles are 0.3 mm. Any needle you use must be thinner than the 0.4 mm bore. Push it 1 to 2 cm up from below, with the nozzle at printing temperature.

1.1 The number

Sizes come from Prusa's clogged-nozzle articles for the Core One, XL and MK4 and for the MK3.5 and MK3S+, and from the Prusa shop listing for its spare needles. The Bambu Lab rows come from its X1/P1 and A1 unclogging guides and the P1P accessory box page. The E3D column comes from E3D's V6 nozzle support page. Creality's Ender-3 V3 SE guide uses "the provided silver needle" and gives no diameter. Its general cleaning guide asks only for a needle "fine in diameter and made from stainless steel."

1.2 Why the needle has to be thinner than the bore

A partial clog is usually a small piece stuck at the tip, and Bambu Lab's fix is to "dislodge the small piece blocking the hotend" with the pin. The needle only has to knock that piece loose so fresh filament can carry it out. It never has to fill the hole. Creality warns to "only dislodge material and not scrape the inside of the nozzle."

Bore size also sets how often you need the needle at all. Bambu Lab says 0.2 mm nozzles are "much more difficult to clear clogs from," while nozzles larger than 0.4 mm "tend to clog a lot less," because larger particles pass straight through.

1.3 How do you use a nozzle cleaning needle?

Heat the nozzle first. Each maker sets the temperature differently:

Table 2. How do you use a nozzle cleaning needle?

Maker and printer	Nozzle temperature for the needle step
Prusa Core One, XL, MK4	The printing temperature of the filament you will load
Prusa MK3.5, MK3S+	260 °C after PLA, 280 °C after PETG or ABS, then wait 2 minutes
Bambu Lab X1, P1	250 °C for PLA, PETG, TPU and ABS; higher for filaments that print hotter
Bambu Lab A1, A1 mini	Slightly above the filament's temperature, 250 °C for PLA
Creality Ender-3 V3 SE	240 °C

PLA is polylactic acid, PETG glycol-modified polyethylene terephthalate, ABS acrylonitrile butadiene styrene and TPU thermoplastic polyurethane. Then:

1. **Lower the bed or raise the head** so you can reach the nozzle tip. Wear heat-resistant gloves.
2. **Insert the needle from below, into the tip.** Prusa goes about 1 to 2 cm deep. Bambu Lab warns against going too far, since that pushes molten filament higher and makes a harder clog. Prusa says never feed the needle in from the top.
3. **Move it up and down a few times** to free the debris (Bambu Lab).
4. **Pull the needle out, then extrude.** Prusa says not to load filament with the needle inserted. Clean flow runs straight down and does not curl (Bambu Lab).
5. **Repeat** the needle and extrude cycle until the strand comes out straight. Bambu Lab's A1 guide then loads a second color of the same filament and extrudes until the strand is fully the new color.

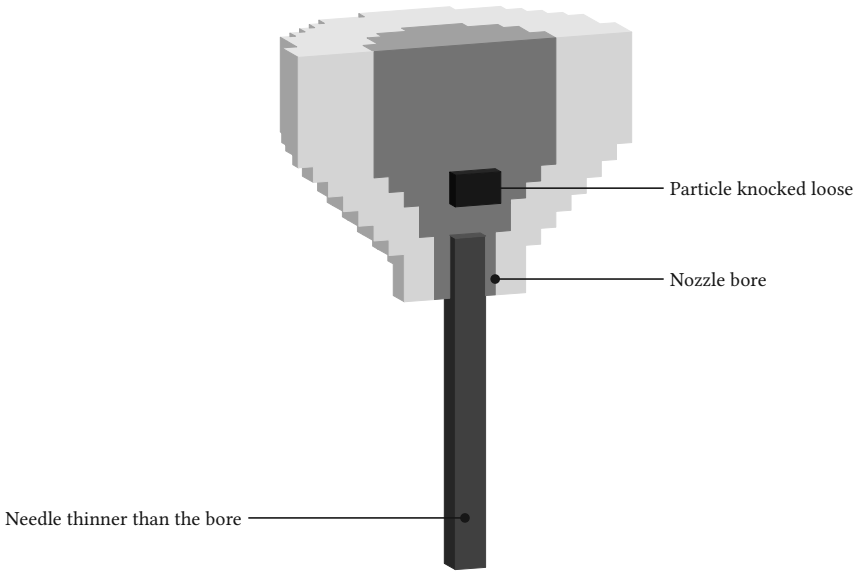


Figure 1. The needle only has to knock the stuck piece loose so fresh filament can carry it out, so it never has to fill the hole.

1.4 Which nozzles should not get a needle?

- **E3D V6 nozzles of every material.** E3D lists the needle as "non-recommended" for brass, plated copper, stainless steel, hardened steel, Nozzle X and ObXidian. For all but Nozzle X it suggests nylon cleaning filament, a warm pull or a cold pull instead.
- **E3D Nozzle X.** Nylon cleaning filament is the only recommended internal method; warm and cold pulls are also on the non-recommended list.
- **Prusa High Flow nozzles.** Prusa's needle steps "do not apply to high-flow nozzles due to their internal geometry." Push filament through hot instead.
- **Bambu Lab 0.2 mm nozzles.** Skip the pin. Extrude by hand at temperature, then do a cold pull.

1.5 How to check it on your own print

- **Confirm the bore before you pick a needle.** E3D V6 nozzles carry dots: none for 0.25 mm, 3 for 0.4 mm, 4 for 0.6 mm and 5 for 0.8 mm. On other nozzles, check the size set in your printer and slicer profile.
- **Watch the strand after each pass.** Bambu Lab counts the nozzle clear when the strand runs straight; if it still curls, go again.
- **Finish with a cold pull.** Bambu Lab strongly recommends one after every cleaning, repeated until the pulled tip comes out clean. Temperatures are on the cold pull temperature page.
- **If needle passes do not bring back flow,** the jam may sit above the tip. Prusa's next step is a 1.5 mm wire pushed down from the top; the full sequence is on the unclog a 3D printer nozzle page.
- **Clean the drive gears afterward.** Prusa clears ground filament from each groove with a toothpick or the same acupuncture needle.

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