What size heat-set inserts does a Voron use?

Asked 3D Content Team
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Abstract. Voron printers use M3 heat-set inserts 5 mm across and 4 mm long (M3x5x4): the hole they need, how many each build takes, and the iron temperature for ABS and ASA.

Keywords: heat-set-inserts, threads-and-fasteners, abs, asa

Table 1. The number

Insert	Outer diameter	Length	Hole diameter	Minimum wall
Ruthex M3 Voron	5.0 mm	4.0 mm	4.4 mm	1.3 mm
CNC Kitchen M3 x 5 x 4 Voron	5.0 mm	4.0 mm	4.4 mm	1.6 mm
Ruthex M3 standard (RX-M3x5.7), for comparison	4.6 mm	5.7 mm	4.0 mm	1.6 mm
Ruthex M3 short, for comparison	4.6 mm	4.0 mm	4.0 mm	1.6 mm

1 What size heat-set inserts does a Voron use?

Voron printers use M3 heat-set inserts that are 5 mm across and 4 mm long, listed as M3x5x4 in Voron Design's sourcing guide. A Voron 2.4 build lists 90 and a Trident 109. Ruthex and CNC Kitchen both call for a 4.4 mm hole, with a minimum wall of 1.3 mm (Ruthex) or 1.6 mm (CNC Kitchen).

1.1 The number

Ruthex figures from the Ruthex specification tables, the Voron one as published by 3DJake. CNC Kitchen figures from the metric dimensions table on CNC Kitchen's store. The two makers agree on the insert and the hole but not the wall: Ruthex lists 1.3 mm, CNC Kitchen 1.6 mm, so design to 1.6 mm if you don't know which brand will go in.

How many each build takes, from the Voron Design sourcing guide:

The Stealthburner has its own tab in the guide, so check whether your kit's 2.4 or Trident count already includes the toolhead. Both Voron-insert listings above come in packs of 100, enough for a 2.4 with spares but not for a Trident.

1.2 Why

The Voron manuals send you to the bill of materials for insert dimensions rather than printing them, and the bill of materials gives only the code M3x5x4. Ruthex and CNC Kitchen both read it as 5.0 mm outer diameter and 4.0 mm long. The order matters. On the Voron Design forum, a builder whose insert holes seemed oversized found the real fault: inserts 5 mm long and 4 mm wide, the reverse of what the parts need.

A standard M3 insert does not fit the job, for two reasons:

- **Too narrow.** A 4.6 mm insert in a hole drawn for the 4.4 mm spec is only 0.2 mm wider than the hole, against 0.6 mm for the Voron insert. The knurls barely bite, so the insert spins when you tighten a screw or pulls out under load.
- **Too long.** The 5.7 mm standard insert is 1.7 mm longer than the Voron one. CNC Kitchen's rule is a blind hole at least 1 mm deeper than the insert, which puts a hole for the Voron insert near 5 mm. A 5.7 mm insert bottoms out before it sits flush, or pokes out the back of a thin wall.

The Ruthex M3 short is also 4.0 mm long, but at 4.6 mm across it is still too narrow. Buy the Voron-specific insert, or a generic one sold as 5 mm outer diameter and 4 mm long.

1.3 What temperature to set the iron for Voron parts

The Trident manual's print guidelines call for ABS (acrylonitrile butadiene styrene) or ASA (acrylonitrile styrene acrylate). Neither the 2.4 nor the Trident manual gives an iron temperature; both link a one-minute video instead. CNC Kitchen's rule is 10 to 20 °C above the printing temperature.

Table 3. What temperature to set the iron for Voron parts

Material	Nozzle temperature, Prusa Knowledge Base	Iron temperature, printing + 10 to 20 °C
ABS	255 °C	265 to 275 °C (CNC Kitchen gives 265 °C)
ASA	260 °C	270 to 280 °C

Build (sourcing guide tab)	M3 inserts	Listed as	Other inserts
Voron 2.4	90	M3 Threaded Insert (M3x5mmx4mm)	none listed
Voron Trident	109	M3 Heat Set Inserts (M3x5x4)	15 M5 (M5xD7xL6)
Stealthburner toolhead	19	M3 Brass Heat Set Inserts, Short (M3x5x4)	none listed

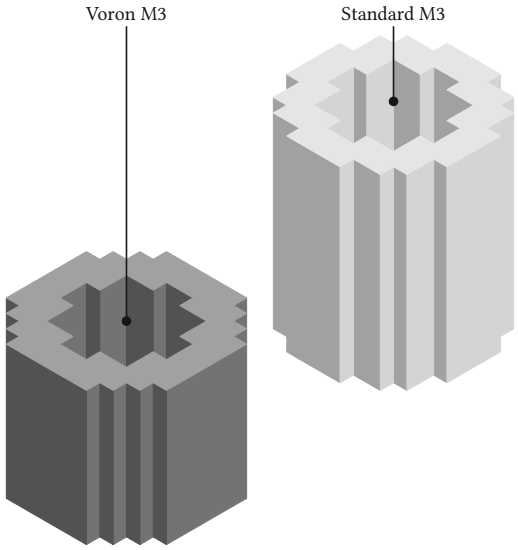


Figure 1. The Voron insert is wider and shorter than the standard M3 insert it is most often swapped for.

Start from your own spool's printing temperature, not these defaults. The Trident manual adds one install rule: the M5 inserts in the drive units must end up exactly flush and square to the surface, because even a slight tilt misaligns the bearing stacks. Inserts tend to creep back out right after melting. CNC Kitchen's fix is to melt most of the way with the iron, then press the last stretch flush with a flat tool and hold it while the plastic cools. Full steps are in How do you install heat-set inserts straight without a press?.

1.4 How to check it on your own print

1. Measure an insert with calipers before you start. You want about 5.0 mm across the knurl and 4.0 mm long. If it reads 4.6 mm across or 5.7 mm long, it is a standard M3, not the Voron size.
2. Set an insert on one printed hole by hand. It should rest on top. If it drops in, the hole is oversized or the insert is too small.
3. Set the iron to your ABS or ASA printing temperature plus 10 to 20 °C and sink one insert into a spare or non-critical part first.
4. Check that it sits flush and square, then thread in an M3 screw and tighten it. The insert should not turn. If it spins, it is too small for the hole. If it stalled high during install, raise the iron 5 °C.

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