What hole size does an M5 heat-set insert need?

Asked 3D Content Team
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Abstract. Hole diameter, hole depth and minimum boss wall for standard (M5 x 9.5) and short M5 heat-set inserts, from the Ruthex and CNC Kitchen size tables.

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

Table 1. The number

Manufacturer	Insert	Length	Outer diameter	Hole diameter	Blind hole depth	Minimum wall
Ruthex	M5 (RX-M5x9.5)	9.5 mm	7.1 mm	6.4 mm	10.5 mm min	2.6 mm
Ruthex	M5 Short	5.8 mm	7.1 mm	6.4 mm	6.8 mm min	2.6 mm
CNC Kitchen	M5 x 9.5	9.5 mm	7.1 mm	6.5 mm	10.5 mm min	2.6 mm
CNC Kitchen	M5 x 5.8	5.8 mm	7.1 mm	6.5 mm	6.8 mm min	2.6 mm

1 What hole size does an M5 heat-set insert need?

An M5 heat-set insert with a 7.1 mm outer diameter needs a 6.4 to 6.5 mm hole: Ruthex specifies 6.4 mm and CNC Kitchen 6.5 mm, for both their 9.5 mm standard and 5.8 mm short M5 inserts. Make a blind hole at least 1 mm deeper than the insert and leave a wall at least 2.6 mm thick.

1.1 The number

Dimensions come from the size tables on the Ruthex and CNC Kitchen M5 product pages, read 10 October 2026. Both makers set hole depth as insert length plus at least 1 mm, and the depth column applies that rule.

Hole plus two walls sets the boss: $6.4 + 2 \times 2.6 = 11.6$ mm across for Ruthex, 11.7 mm for CNC Kitchen. Ruthex lists its #10-24 and #10-32 UNF (Unified National Fine) inserts at the same dimensions as its M5, so the same hole works for those inch inserts.

1.2 Why

The hole is smaller than the 7.1 mm knurl, so the hot brass melts its way in and the knurl grips the displaced plastic. Ruthex's drawing gives the insert's narrower lead-in end as 6.3 mm. A 6.4 mm hole lets that end drop in and stand square before heating. CNC Kitchen states the same rule: the pilot sits in the hole easily, and no burr forms underneath.

The 0.1 mm gap between the two makers matches the printing error CNC Kitchen measured in its tests, where a 4.0 mm hole had to be modeled at 4.1 mm to print at size. Your printer's error decides more than the choice of table.

The hole must be deeper than the insert, because melting pushes plastic ahead of the insert. CNC Kitchen also asks for a straight hole, not tapered, and normally no chamfer.

M5 is the size where heat becomes the problem. CNC Kitchen warns that large inserts like M5 carry a lot of thermal mass and may not heat quickly enough. Its advice: a thick soldering tip, a slightly higher temperature, and as much contact with the brass as possible.

Ruthex sells an iron tip set with a tip sized for M5. Start from CNC Kitchen's rule of printing temperature plus 10 to 20 °C, about 225 °C for PLA (polylactic acid), then go slightly higher for M5 as it advises. The per-material table is in What temperature should the iron be for PLA, PETG and ABS inserts?.

1.3 How to check it on your own print

1. Print a test boss with a 6.4 or 6.5 mm hole and at least 2.6 mm of wall. Make it 10.5 mm deep for a 9.5 mm insert or 6.8 mm for a short one, in the real part's material and print orientation.
2. Measure the printed hole with calipers. If it came out under 6.4 mm, add the shortfall to the hole in your CAD (computer-aided design) model and reprint.
3. Fit an M5 insert tip, set the iron 10 to 20 °C above printing temperature, and keep the tip in full contact with the brass before you push.
4. Melt it in about 90% of the way, press the rest flush with a flat tool, and hold it for a few seconds; CNC Kitchen found inserts creep back out right after melting. For keeping it square, see How do you install heat-set inserts straight without a press?.
5. Inspect the boss for a bulge, whitening or a crack along a layer line, and check the back for a burr. Either means the hole was too small or the wall too thin.
6. Thread in an M5 screw and tighten it firmly. The insert should stay flush and not turn.

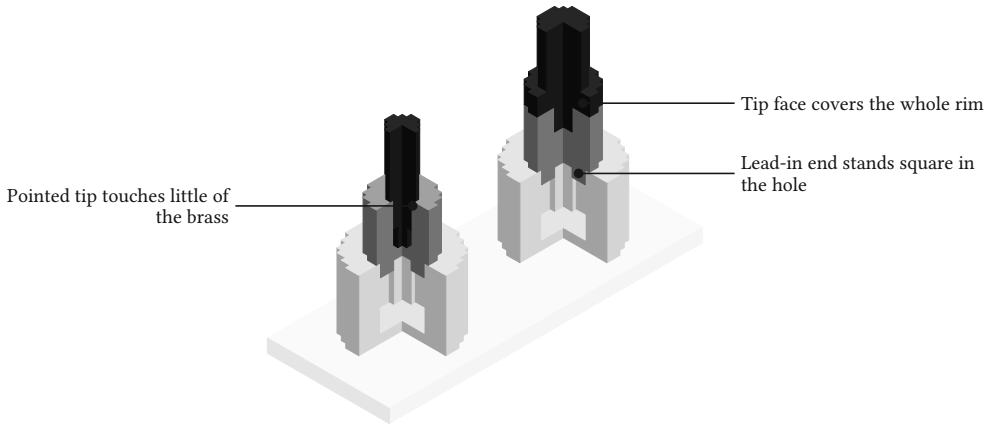


Figure 1. A large insert soaks up a lot of heat, so CNC Kitchen's advice is a thick tip touching as much of the brass as possible.

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