Do you need a special soldering iron tip for heat-set inserts?

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Abstract. No, a clean ordinary tip works, but insert tips keep inserts square and lift out cleanly. Which tip sets fit which irons, which iron works and how to use one.

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

1 Do you need a special soldering iron tip for heat-set inserts?

No. CNC Kitchen says most inserts can be set with a clean ordinary soldering tip. An insert tip makes it easier and straighter: a centering pin sized to the insert's bore holds it square, a flat shoulder pushes on its rim, and a straight wall lets the iron lift out without dragging the insert back up.

1.1 The number

Fit and sizes come from each maker's product page, read 10 October 2026: the CNC Kitchen store, Ruthex on 3DJake, McMaster-Carr and Adafruit. Rows are grouped by maker, in no order of preference. The CNC Kitchen store also lists sets for Weller XT, Weller LT, Ersa 102, Ersa 832 and 842, EP5 and AP2 irons. It sells a narrow 900M & T18 set with slim M2 to M3 tips for tight spaces and a 90° tip for M2 to M3 inserts. Adafruit's page gives a pin diameter of 2.1 mm for its M3 tip; the other product pages list none in their text.

1.2 Why

A plain soldering tip is cone-shaped, and that causes two problems. It sits in the insert's bore at an angle you cannot see, so the insert goes in tilted. Adafruit's tip page notes that a square shoulder shows whether the insert sits straight, something a conical tip makes hard to judge.

The cone can also wedge. Hackaday's guide explains that the insert cools as it melts into the part, shrinks onto the tapered tip, and comes back out with the iron. The author put it at about 1 ruined print in 5 before switching to an installation tip with straight sides.

Table 1. The number

Tip set	Irons the maker names	Metric insert sizes	Imperial insert sizes	Mount
CNC Kitchen, TS100 & TS101 set	TS100, TS101, and irons like Pinecil or Miniware	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	Adapter with M5 copper thread
CNC Kitchen, T12 set	Irons that take T12 cartridges	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	T12 cartridge with M5 copper thread
CNC Kitchen, C245 set	JBC stands (ADS, CTS), YIHUA 982, Quicko T245, KSGER T245, Sequre T245	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	C245 cartridge with M5 copper thread
CNC Kitchen, C210 set	Miniware TS21, Fanttik T1 Max, YIHUA 992D-II, other C210 irons	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	C210 cartridge with M5 copper thread
CNC Kitchen, 900M & T18 set	Hakko, Lonovo, Sremtch and other 900M or T18 irons	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	Adapter with modular tips
CNC Kitchen, Weller ET set	Weller WES50/51, WESD51, PES50/51, WE1010, LR21; not WTCP	M2, M2.5, M3, M4, M5, M6, M8	#2-56, #4-40, #6-32, #8-32, #10-24, 1/4″, 5/16″	Not stated
Ruthex soldering tip set	900M and T18 irons, Hakko among them; a separate Ruthex adapter fits TS100, TS101 and Pinecil	M2, M2.5, M3, M4, M5, M6, M8	1/4″ on the M6 tip	Screw-on tips, adapter included
McMaster-Carr 92160A315	Plug-in tip with a 1/4″ shank; McMaster lists a separate adapter set for the Hakko 900M	M2.5, M3	4-40	1/4″ shank, plug
Adafruit (Virtjoule) #4-40/ M3 tip	Irons that use Hakko tips; ATTEN 50 W and 65 W named	M3	#4-40	Replaces the soldering tip; listed as no longer stocked

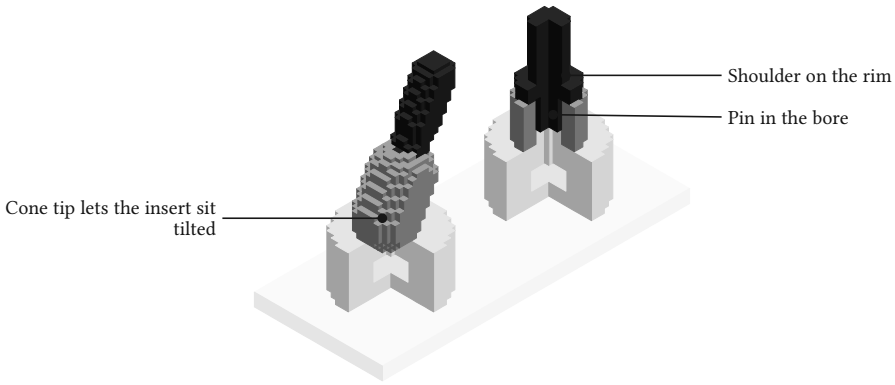


Figure 1. The cone sits in the bore at an angle you cannot see, while the pin centers the insert and the flat shoulder pushes on its rim.

CNC Kitchen's own tips have a centering pin sized to the insert's bore, so the insert sits square on the tip and enters the hole straight. The flat shoulder behind the pin pushes on the rim of the insert, not on the plastic around it.

Heat transfer matters most on large inserts. CNC Kitchen warns that M5 and 1/4″-20 inserts hold so much heat that a pointed tip struggles to melt them in. It suggests a thick tip, a slightly higher temperature and as much contact with the brass as possible. Its installation tips help most here, it says, because their large contact area moves far more heat into the insert than the point of a general-purpose tip.

The last reason is your soldering tip. SparkFun's page for its insert tips warns you to keep plastic off any tip you still use for soldering. A dedicated insert tip leaves your soldering tip clean for electronics.

1.3 What soldering iron works

Any standard soldering iron works, CNC Kitchen says, and an adjustable one makes the job easier. With an adjustable iron, set it 10 to 20 °C above your printing temperature: about 225 °C for PLA (polylactic acid), 245 °C for PETG (glycol-modified PET) and 265 °C for ABS (acrylonitrile butadiene styrene). Ruthex gives 10 to 15 °C above the hotend temperature. The per-material table is in What temperature should the iron be for PLA, PETG and ABS inserts?.

A fixed-temperature iron works too, with more care. CNC Kitchen notes such irons often run hotter than its recommended temperatures, which can decompose the plastic. Lift the iron away early and press the warm insert the rest of the way with a tool. Hackaday's author used a budget 40 W iron with no temperature control. Adafruit's insert press rig lists a 60 W iron. None of these sources gives a minimum wattage.

Before buying tips, find out which tip standard your iron takes: 900M or T18 (the Hakko style), T12, JBC C245 or C210, Weller ET, or the TS100 type that Pinecil also uses. Buy the set or adapter made for that standard. The table above shows which irons each published set fits.

1.4 How to use an insert tip

1. Pick the tip by thread size, not insert length. Ruthex says its short M3S, M4S and M5S inserts use the M3, M4 and M5 tips, and a 1/4″ insert uses the M6 tip. CNC Kitchen's sets cover both short and standard inserts.
2. With the iron cold, swap the soldering tip or cartridge for the adapter, then screw the insert tip on by hand. Adafruit notes its tip may sit slightly loose on the iron and still work fine.
3. Heat to printing temperature plus 10 to 20 °C, per CNC Kitchen.
4. Set the insert on the hole, put the pin into its bore, and let the iron's weight sink it about 90 % of the way, per CNC Kitchen. Lift straight up, press it flush with a flat tool and hold for a few seconds. The full procedure is in How do you install heat-set inserts straight without a press?.
5. Wipe any plastic off the pin before the next insert, so it does not end up in the next insert's thread.
6. Check the result: the insert sits flush and square, and a screw starts straight by hand. If the insert keeps lifting out with the iron, the tip is gripping its bore. A straight-walled tip is the fix.

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