

- Taps come individually or in sets. They also come in five basic types which define the cutting flute configuration. This is one area where buying the more expensive version is the right strategy – there are a ton of easily broken taps in the market to avoid.
- A straight tap is the most common and they come in “plug” “starting” and “bottoming” varieties which only defines how far the cutting part of the flute extends toward the tip. They look like this:



For Starting Threads



For Through-Hole Threading

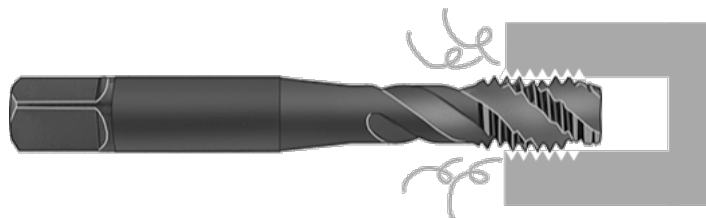


For Closed-End Hole Threading

- All three types leave the machined material in the hole to clog up in the straight side flutes. This means you have to “peck” – rotate forward, then back to break the chip, then forward again, and eventually the flutes will fill with chips and the tap will break unless you remove it completely and clean the tap and hole before going on. If you tap to the bottom of a blind hole, you will tap most of the way with a plug tap, then remove that, and do the remainder of the threading to the bottom of the hole with a bottoming tap. This style tap is very brittle and if you plan to drive the tap with a drill or the mill, buy only the highest quality versions from German or Japan (Guhring and OSG are my go-to choices).
- Spiral point taps are designed to drive the chip formed by the cutting action forward. They are only appropriate for through holes. They look like this:



- They are about twice the strength of the straight taps and my choice for machine tapping. I will often drill the hole through just to be able to use a spiral point tap even though I’m only treading part way down the hole.
- Spiral flute taps are designed to extract the chip being cut backward and out of the hole, but these taps are much easier to break than any of the others, and thus only appropriate for machine tapping with some kind of torque limiting device (loose in the chuck or with a tapping head). They look like this:



- Each tap size has a corresponding pilot drill size. After drilling the pilot hole, be sure to chamfer the hole to let the tap guide its way into the hole. In metric, the pilot drill size is often not a standard metric drill bit size, so be sure to use the precise pilot drill with the tap or you will break the tap. In SAE (Imperial), the pilot hole is often a letter sized drill bit. I have a wall chart that shows all the threads, and what size drill bit is appropriate, and I refer to it constantly.
- There's one other type of tap, called "thread forming" which doesn't cut the thread but instead molds the threads as it's wound into the hole. I have had success with these in plastics – not metals as they require coolant, or they overheat and gall/weld to the material. These taps look like this:



Notes on use:

Taps are brittle and easily broken if not used properly. Keeping the tap precisely aligned to the pilot hole is critically important. If the tap is started crooked, or tilted during the tapping operation, the tap is likely to fracture leaving a section of the broken tap in the hole. These broken tap elements are notoriously difficult to remove.

If forced to hand tap, use a tap guide to keep the tap aligned precisely to the orientation of the pilot hole. Tap guides are available in several forms, and you can make your own on a drill press. Shown below are two commercially available tap guides available for most imperial and metric tap sizes.



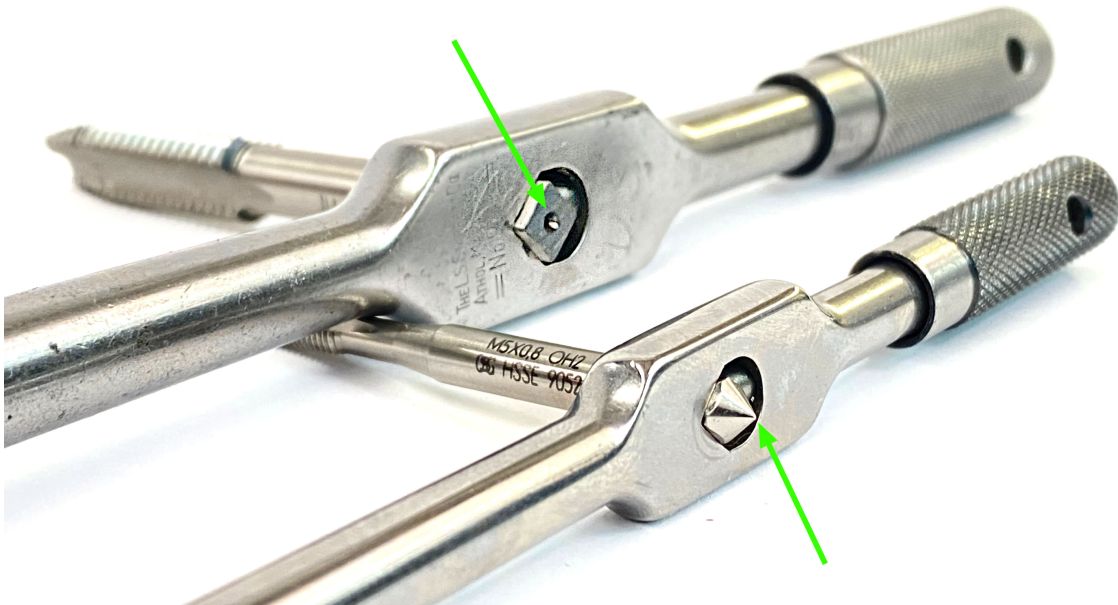
Most T-handled tap wrenches will have a drive center (small dimple) in the top of the handle that is precisely on-center with the chuck that holds the tap (green arrow below).



A pointed tap follower is spring-loaded and can be used in the center to keep the tap aligned as shown below (this example is on a lathe, but the same technique applies to drill press use).



Adjustable bar-type tap wrenches leave the end of the tap shank exposed. Some taps have a center dimple, others have a pointed end as shown below. You can use the pointed tap follower shown above on the taps with the dimple center to guide the tap and keep it vertical.



For taps that have a pointed end, there is another version of the spring-loaded tap follower with a reverse point that will fit over the pointed end of the tap. They look like this.



Special tap handles exist for use on a drill press with a shaft that can be secured in the drill chuck to guide the vertical alignment as shown below.

