

Technical Tip #65

Tap Chamfer Length vs. Tool Life in Threading

It is important to use the longest chamfer possible for the tapped hole condition. Sometimes this includes purchasing a special. **An increase in chamfer length will result in an increase in tap life.**

To determine the longest chamfer for blind holes:

1. Subtract the full thread length required plus one pitch from the drill depth (the extra pitch enables clearance at the bottom of the hole for spindle over-spin and chips).
2. Then divide this figure by the number of threads per inch (TPI). The resulting number is the recommended chamfer length.

NOTE: Select a tap with a chamfer length no longer than this figure.

Example:

Size: 1/4-20 NC

Full thread length: .250

Drill depth: .473

Pitch: $1/20 = .050$

$.473 - .250 - .050 = .173$

(drill depth minus full thread length and one pitch)

$.173 \div .050 = 3.5$

(new drill depth divided by threads per inch (TPI))

$3.5 =$ recommended chamfer length

In the above case, select a standard tap with thread chamfer no longer than 3.5 (for a safety margin, a 3-thread chamfer may be preferable).

A 4-flute semi-bottoming tap has 12 working teeth; a bottoming tap has 8. The semi-bottoming tap has 50% more tap teeth to dramatically improve tap life. By selecting a tap with a longer chamfer length, you will reduce chip-load per tooth and tapping torque, enabling increased tapping speeds and tool life.

When tapping harder steels and space-age alloys such as nickel, titanium and stainless, a longer chamfer length may determine success or failure. Specifying the proper chamfer length will ensure greater tool life. For each chamfer tooth added, the tap life will increase exponentially.

