

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, 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. Then divide this figure by the number of threads per inch (TPI). The resulting number is the recommended chamfer length. Select a tap with a chamfer length no longer than this figure.

Example:

Size: ¼-20 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 this 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 chipload 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.