KENNAMETAL®
Engineering Your Competitive Edge

Technical Tip #41 – Tap Chamfers in Threading

A tap must have a chamfer to create a thread. Chamfers are the tapered or incomplete threads at the front of the tap.

The major diameters of the threads are ground to a smaller diameter at the front. This is known as the point diameter and is slightly smaller that the pre-drilled hole size or tap-drill size.

When the tap enters the hole and begins to cut, each tooth in the chamfer gradually enlarges the thread in the part. Only the first full thread behind the chamfer produces the finished size of the thread. The teeth beyond the first full thread guide and support the tap as it completes the threaded depth of the tapped hole.

The most common lengths of standard chamfers are taper, plug, and bottoming. The taper chamfer has 7 to 10 threads tapered; plug has 3 to 5 threads tapered; and bottoming has 1 to 2 threads.

A taper chamfer, often called a starter tap, is used for roughing or heat-treated material. Plug is the most common and preferred chamfer for most tapping applications. Bottoming chamfers are used when there is not enough depth of hole for the taper or plug.

Chamfer lengths are selected based upon the type of hole to be tapped. If the hole goes completely through the part or if the drill depth is considerably deeper than the required thread depth, a taper or plug chamfer is used. A bottoming chamfer should be avoided, and used only when the threads must come close to the bottom of the drilled hole. A bottoming tap creates the greatest amount of torque, requires slower speed (RPM), produces a rougher finish, and reduces tool life substantially.

In addition to taper, plug, and bottoming chamfers, there are semi- and modified-bottoming chamfers found on specialty taps (such as high-performance taps and some cast iron taps used in the automotive industry). Semi-bottoming chamfers are typically 2 to 2-1/2 threads in length; modified-bottoming chamfers range between 2-1/2 and 4 threads in length depending on the tap style. The additional length helps to reduce chip load, add tool life in difficult-to-machine materials, and enable higher tapping speeds.