

Section #3 Fluoroplastics

Variations in rake angles may be necessary to balance cutting tool pressures on the material being machined. Positive back rake angles from 0° to +5° are used when it is desirable to decrease tool pressures. Negative back rake angles from 0° to -5° are sometimes used when an increase in tool pressure is desirable.

Table II includes operational information for turning and forming. The recommended speeds and feeds are for use with both high-speed steel and carbide tools.

Thin-wall tubing is usually cut with a razor tool to prevent distortion and burrs. However, length control is difficult with this type tool.

Surface speed 600 to 800 (sfpm)	Feeds (ipr)
Cut-off003" to .006"
Plunge cut002" to .004"
Skiving015" to .025"
Rough turning005" to .010"
Finish turning001" to .003"

Drilling

Successful drilling of TFE requires sharp tools of the correct geometry, and precautions are necessary to prevent build-up of chips in the drill flute.

High speed twist drills with standard spiral flutes (30° Helix) are generally used. However, some applications such as deep holes require drills with slow spiral flutes (14° Helix) designed for plastic materials.

Point angle is dependent on the final wall thickness. Sharp points (90°-110°) are best suited for heavy walls and larger diameters which resist distortion. Blunt angles (115°-130°) are better suited for thin walls to prevent expanding the outside diameter. In some applications a flat point of 180° is used to prevent distortion in extremely thin walls. However, size and concentricity are difficult to control with this type tool.

A 16° lip clearance angle is generally satisfactory.

For larger diameter drills, grinding a negative rake on the cutting edge (reduced rake point) to thin the point is sometimes recommended to reduce pressure.

All drill angles should be machine ground to insure correct tool geometry. Hand grinding is not recommended.

Drilling feeds range from .004" to .015" ipr. Feeds from .004" to .006" are used for close tolerance drilling. Feeds up to .015" can be used where tolerances and finish permit.

In production drill press operations, the use of drill jigs is recommended to prevent part motion and out-of-tolerance holes.

When drilling a series of small holes, it is wise to insert a pin in each hole after drilling to prevent distortion which causes holes to become out-of-round.

Frequent retraction of the drill is recommended for clearing chips to prevent drill binding and tapered holes.

Threading

Self-opening die heads with high speed tangential chasers are recommended for cutting screw threads. Pull out trips in self-opening die heads are to be avoided due to the tendency of this mechanism to tear the threads. Threads should be cut with positive feed, and an external trip should be provided to open the die head.

Thread chaser geometry is shown in Tables III and IV.

Rake angle—5° to 10°
Throat angle—50°
Cutting portion—.019" to .021" Above center
Lead nut portion—.031" to .036" Above center

Although tangential chasers are recommended, other types are sometimes used when these are not available. When radial chasers are necessary, the tool geometry given in Table IV is recommended.