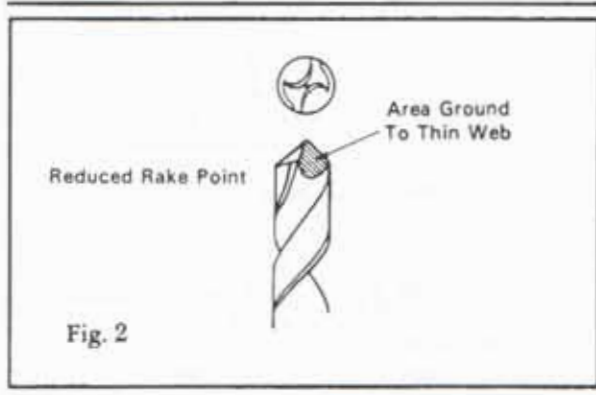


## Section #1 Acetal, Nylon #5 Polyolefins



### Drilling Large Diameter Nylon

Drill style preferred for holes up to 1/2" inclusive is a slow spiral (low helix) ground to a point angle of 90°-110° with a lip clearance of 9°-15°. As an alternate (and for all sizes over 1/2") use a general purpose drill ground to a point angle of 118° with a lip clearance of 10° to 15°.

For general purpose drills 1/2" and larger, the lip rake should be ground off and the web thinned (see Fig. 2). Note: Drill should be ground so that one cutting edge is from .005" to .010" longer than the other. Do not use an old drill or a drill that has been used on metal since the land may be worn and cause binding as the drill is advanced.

Coolant should be used. Drill should be backed off frequently and chips removed from flutes with brush dipped in coolant.

### Drilling Procedure

To prevent inducing undesirable stresses in these nylon formulations, it is recommended that first a trueing cut be made on the O.D. of the material on the chucking end.

Use standard chuck jaws that have been radiused to the contour of the work O.D. or a step collet for maximum contact on the holding surface. Chuck the rod as lightly as possible on the trued end applying only enough pressure to prevent slipping.

Drill a small (max. 1/2" dia.) hole at a speed of 800 to 1,000 RPM using a positive feed of approximately .005" per revolution. Note: Avoid hand feed-

ing the drill as this may cause the drill to "grab" and stress the material.

A secondary drilling to expand the hole to a 1" maximum diameter is required. A drill speed of 400 to 500 RPM is recommended.

Finally, bore to desired I.D. using a single point boring tool.

### Reaming

Occasionally, it becomes necessary to use a reaming operation to obtain very accurately sized holes. Satisfactory results on thermoplastics can be obtained with standard high speed stub machine reamers. It is advisable to use a reamer .001" to .002" over the size of the finished hole to allow for "fall in," a function of the resiliency of plastic. Tolerances as close as ± .0005" can be held in thru-holes 1/4" in diameter or less where the length of the hole does not exceed one drill diameter.

Fluted reamers are best for obtaining both accuracy and good finish. When properly sharpened, they insure trouble-free side wall shearing. A helical flute reamer with right hand spiral cuts should be used for interrupted cuts, such as holes with keyways, splines, etc.

Reamer speeds should approximate those used for drilling — 250 to 450 fpm. Feed rates of 10 to 20 mils per revolution are generally accepted.

Material removed per cut will vary with the hardness of the plastics and will range from 2 to 10 mils. To insure a good degree of accuracy, at least 5 mils should be removed in final reaming. To finish a hole in soft plastics to close tolerance, and where hole diameter permits, the use of a single point boring tool or a secondary drilling is good practice.

Reaming can be done dry, but the use of coolants will produce better finishes. Water is the preferred coolant for this operation, although light cutting oil can be used.

In some instances, filling the hole with wax will produce a much smoother final cut.

### Turning/Milling/Boring

Single-point turning tools can be employed to advantage in these operations. Best results are obtained by using a turning tool ground as shown in Fig.