

# PLASTIC MACHINING GUIDE

## General Fabrication Guidelines

The following guidelines are presented for those machinists not familiar with the machining characteristics plastics. They are intended as guidelines only, and may not represent the most optimum conditions for all parts.

Most quality stock shape materials are stress relieved to ensure the highest degree of machinability and dimensional stability. The relative softness of plastics, compared to metals, generally results in greater difficulty maintaining tight tolerances during and after machining. A good rule of thumb for tolerances of plastic part is +/- .001 per inch of dimension although tighter tolerances are possible with very stable, reinforced materials.

### Pointers to note when machining plastics stock shapes:

- Thermal expansion is up to 10 times greater with plastics than metals
- Plastics lose heat more slowly than metals, so avoid localized overheating
- Softening (and melting) temperatures of plastics are much lower than metals
- Plastics are much more elastic than metals

Because of these differences, you may wish to experiment with fixtures, tool materials, angles, speeds and feed rates to obtain optimum results.

## Getting Started

- Positive tool geometries with ground peripheries are recommended
- Carbide tooling with polished top surfaces is suggested for optimum tool life and surface finish
- Use adequate chip clearance to prevent clogging
- Adequately support the material to restrict deflection away from the cutting tool

### Coolant Recommendations

Coolants are generally not required for most plastics machining operations (not including drilling and parting off). However, for optimum surface finishes and close tolerances, non-aromatic, water soluble coolants are suggested. Spray mists and pressurized air are effective means of cooling the cutting interface. General purpose petroleum based cutting fluids although suitable for metals and some plastics, may contribute to stress cracking of amorphous plastics such as Acrylic, Polycarbonate, Polysulfone, Ultem® PEI, and Radel® R PPSU.