

Frequently Asked Questions in the Routing of Plastics #1

Over the past year and a half as we have been discussing plastic routing, some questions keep coming back. Many questions are material specific and many are associated with several plastics. Here is a summary of the more frequently asked questions. (All reference CNC routing of plastics unless otherwise stated.)

What can be done to improve the finish on a cut part?

Vary feed rates and spindle speed, use solid carbide tooling with material specific geometry. For soft plastics, use single edge solid carbide straight or spiral plastic O flute tools. For rigid plastic, use double edge solid carbide straight or spiral standard or O flute plastic geometry tools. (Figures 1 & 2)



FIGURE 1



FIGURE 2

What causes material to weld either to the part or the tool?

Avoid dwelling in the cut by better programming techniques such as exit ramp corners rather than stop & go corners and ramp in rather than straight entry boring. Heat of course causes welding. Increased feed parts and/or decreased spindle speed helps stop heat build up.

What can be done to avoid burns or clouding of acrylic in a hand or air router application?

Use two tools, one to rough out the shape and one to trim. Both tools should be solid carbide. The roughing tool can be a straight or spiral designed for acrylic routing. The first cut should leave approximately a 1/8 margin for the second pass. The second pass should be made with a three flute acrylic finish tool. (Figures 3 & 4)



FIGURE 3



FIGURE 4

What is the solution to stacked sheet routing when the sheets become welded together?

In some instances, spiral tools can accentuate this problem. A solid carbide straight O flute is recommended, either single or double edge, depending on feed rate and spindle speed. When fixtured properly, the individual sheets become a natural chip breaker. (Figure 5)



FIGURE 5

What is the solution to small parts moving when cut from vacuum drawn sheet goods?

The cutting forces may overcome the vacuum. Reduce the cutter diameter to the same thickness as the material cut (i.e. 1/8" diameter tool for 1/8" thick material) and use straight or slow helix downcut O flute solid carbide tools.

What is the solution to poor finish on plastic window and door parts cut on a machine designed for this purpose?

Try single or double edge solid carbide straight O flute tools instead of the recommended high-speed steel spirals if finish is a problem.

What does a small sign shop do for a tool to cut many different plastic materials?

Use solid carbide slow helix or straight O flute tools. These tools will cut a range of thermoplastic materials.

What is the best tool for cutting fiberglass reinforced parts with both CNC and air routers?

Trimming fiberglass can be accomplished with standard solid carbide FGR (fiberglass router - diamond cut) tools in both environments. Routing parts in a CNC environment is best done with chipbreaker type solid carbide tools. Routing fiberglass by hand is best done with straight flute carbide tipped tools (for added cutter body strength). (Figures 7, 8, & 9)



FIGURE 7



FIGURE 8



FIGURE 9

What is the difference in routing plastic and wood materials?

Plastic materials vary in consistency and abrasiveness from soft thermoplastics to abrasive reinforced thermosets just as wood varies from soft pine to abrasive teak or MDF. One tool will not cut all plastic materials well, just as one tool will not cut all wood. Additionally, plastic materials have unique physical properties that require unique geometry for an optimum finish. It is the exception, rather than the rule, when one tool will cut both plastic and wood or wood composites well.