

Tooling Tips

Tooling tips for the Sign Guy

What types of cutting tools/router bits do I need?

There are specific tools for specific applications, here is a general guide to aid you in future tool selection.

Signmaking and the processing of plastics, acrylics, wood etc. you should use single flute spiral upcutters made from solid carbide. In some cases a dual flute tool can be of used (e.g. large tool diameters in aluminum). For some applications, coatings are recommended (e.g. cutting steel). High speed steel (HSS) tools with or without coating or tools with more than two flutes are not recommended at all. They are usually used for milling steel at low spindle speeds on conventional milling machines. With materials used in signmaking and the processing of plastics it is more important to remove the chips from the cutting slot. The best solution for this is a single flute spiral upcut. Regarding the length of the tool (cutting edge length) it is recommended to use tools as short as possible. For acrylic sheets with 10 mm thickness you should not use a 30 mm cutting edge length if there are also 20 mm or shorter tools available. The tool diameter should

be selected as large as possible. If it is possible to do a cutting job with a 6 mm tool, you should use it instead of a 4 mm tool. Thicker or shorter tools cause less vibration and are more solid than thinner or longer tools.

If you want to reduce tooling costs, consider insert tooling. As well as having inserts for profiling, there are also insert tooling for plunging and for V groove cutting. There is no need to ever resharpen an insert cutter as you normally get 2 or 4 cutting sides on an insert, and the blades are an excellent value.

To get the best edge finish, make sure that you are using as short a bit as possible for cutting out parts, and that you are not operating the tool above the speed that it is balanced to.

If you want to get the best hold down while cutting Acrylic or any other sheet plastic that has a paper backing, set your maximum depth to the top of the paper. This will cause the machine to not cut the backing paper and to stay held down when you finish cutting out a part.

Bull end mills are effective for producing a corner radius between a wall and a floor on a given part feature. They also add to the strength of an end mill. When machining hard, tough to cut materials, the sharp corners on a standard end mill tend to chip and wear faster than an end mill with a corner radius. The radius on a bull end mill provides a more gradual shearing entry in to the work piece.

Although manufacturer references for tool speed and feed are provided for your convenience, they are intended for reference as a starting place to cut. In many situations the numbers given are under ideal conditions and will not always work. Experience will be valuable to tune the cutter to the conditions of the cut. Chatter and vibration may occur, to overcome these conditions alteration of the speeds and feeds will be required.

There are many variables that effect the running time of a 3D job, bit diameter, # of passes, overlap, and machine performance. Normally when creating 3D images with a Ball Nose Cutter, it is tricky to get the best performance without sacrificing on finish. To get your best performance you should try to use as large a bit as possible, which will give you an acceptable amount of detail in your job.