

Engraving Materials For Rotary Engraving Systems

By Natalie Whitehouse



Figure 1



Figure 2

One of the great advantages of having and using a rotary engraver in your shop is the wide variety of materials you can engrave. Although most professional engravers are familiar with using these materials, you may not have tried them all with a rotary system. For this article, we'll show examples in six categories—wood, plastics, crystal/glass, ceramics, metals, and SignFoam—and offer some suggestions for engraving each of these materials.

Editor's Note: This is the most recent installment of our new A&E How-To's. Suppliers, if you'd like to submit a How-To for A&E, please contact steve@nbn.com to discuss the details.

WOOD

Almost all types of woods can be engraved with a rotary engraver, from hardwoods such as oak and walnut to softer woods such as pine. With an engraving head on your machine, simple designs and text can be cut into the wood; with the addition of a routing head, complex designs and simulated 3D graphics can be cut out.

Standard cutters can be used with a top-loading spindle, and with a collet spindle, endmills and drill bits can be loaded from the bottom. Custom cutters such as bevellers can be used for special effects. By using masking (with vinyl or transfer tape), paint, and other techniques, possibilities for multi-colored signs are endless.

In Figure 1, we used our standard push-down clamps to hold the wood to the table. The 2.5-dimensional look was achieved using tool path (2.5D chisel). The 2.5D chisel tool path tool allows the operator to specify two different cutters—a large cutter (such as a .030" flex cutter) for removing large sections of material, and a smaller cutter (.015") for fine detail areas.

We used a vacuum to remove chips and debris while the job was in progress. Using the Cut-by-Color feature



Figure 3

in Vision Pro software, we were able to specify one color for the large cutter and one for the small cutter, allowing us to vary the depth and detail. This gave us the ability to send one color to the controller at a time, making it easy to use the right cutter for the right areas.

PLASTICS

All types of plastic can be engraved and cut on a rotary engraver, including engraver's plastic, acrylics, and PVC. With engraver's plastic, you can create a wide variety of signs, name badges, control panels, gift and promotional items, and much more (see Figure 2). With products such as Rowmark's new LaserGlow™ materials, you can create a variety of glow-in-the-dark safety and wayfinding signs using a rotary engraver, laser, or router (see Figure 3).

These photoluminescent sign-making materials are available in both a reverse-engraversable substrate and a single-ply appliqué (we used both options). The LaserGlow™ materials work by absorbing and storing energy from normal light sources, then releasing energy to emit light when the room or area is dark. For this example, we created exit signs using a .010" flex cutter and used the proximity sensor to cut to a depth of .010". We used a feed and Z-speed of 1" per second and a spindle speed of 12,000 RPM.

With acrylic, many types of awards,



Figure 4

Figure 5





Figure 6

plaques and signage can be created. Reverse-engraving in acrylics gives a special beveled look that cannot be accomplished with a laser (see Figure 4). The cutters used with a rotary engraver provide additional angles for the reflection of light, giving a multi-dimensional look. When choosing a cutter for your project, the choice depends on the desired effect and depth.

It is also important to use a cutter that is sharpened specifically for your material, and keep in mind whether or not you will be doing reverse engraving. When engraving logos and other artwork, you have the option of starting with a wider-size cutter, such as .060", and then switching to a smaller cutter for detail work. A cutter size of .015" or smaller is best for fine detail work; for deeper cutting, these smaller cutters tend to pack small chip debris into the plastic.

For acrylic, it is a good idea to start at a very low speed for the X-Y axis. A slower RPM speed, around 6,000-7,000 RPM, works best for this material. Speeds that are too high can actually create a "spin out" and cause the acrylic to burn and/or melt.

CRYSTAL OR GLASS

For this example (see Figure 5), the tool used to engrave was a .010" rotating diamond with a burnishing adaptor. We mounted the flute in the vise using the flat stop and a tapered cone. The adjustable tilt feature of the vise enabled us to engrave the tapered section of the glass.

In the Vision Pro software, we used the standard rotary driver.

When sending the job to the controller, we activated the self-circulating water system in the machine. The constant presence of water on the glass improves the quality of the engraving and helps prevent fracture. Here, we set the surface so the burnishing adaptor could maintain just the right amount of pressure on the glass.

CERAMICS

Ceramic items are typically engraved in a similar manner to glass. Rotating diamonds work best on glazed surfaces. For non-glazed surfaces, a burnishing cutter may be used. As with glass or crystal, applying water to the surface keeps the engraving area cool and reduces the chance of fracture and flaking.

For a cylindrical mug, we used Vision's Max Engraver with a standard rotary driver and held the mug using vise cones. We used a flex cutter as well as a rotating diamond (in sizes .020" and .010") to cut the letters and design (a burnishing cutter would also be a good choice). For this project, we used a feed speed of .4 inches/second, Z-speed of .6 inches/second, and a spindle speed of 12,000 RPM.

METALS

Aluminum, brass, steel, copper, bronze, and precious metals such as silver, gold, platinum, and titanium can all be engraved with a rotary engraver.

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Figure 7

A non-rotating diamond can be used for diamond-drag or scratch engraving on a variety of metals. A rotating diamond or burnisher is often used on painted metals such as coated brass for plaques and awards (see Figures 6-7).

When deep engraving metals such as stainless steel, it is necessary to use some type of coolant on the surface, such as cutting oil. This will increase the tool life of the cutter and enhance the quality of the finished product. For the detailed work in aluminum in Figure 7, we used a .020" stainless steel cutter with an RPM speed of 18,000 to create the intricate designs shown.

SIGNFOAM

SignFoam is a lightweight, high-density polyurethane board that possesses strength and durability, making it a popular material for creating both interior and exterior signage. It is easily engraved with a rotary engraver or router, and is perfect for creating 2.5 and 3D signs. Like wood, cutouts can be painted to create multi-colored signs.

In Figure 8, we show an example of a 2.5D letter cutout made of SignFoam. The cutters used for SignFoam are the

Figure 8



same as those for wood (flex cutters work well), but you can usually use a higher X-Y speed and usually go as deep as you want in one pass.

CONCLUSION

A rotary engraver—combined with the latest engraving software and a variety of materials—can offer thousands of options for your business. Your options are limited only by your imagination!

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Comments? Respond to aefeedback@nbm.com.