

Laser Engraving

Reverse Engraving & Paint Filling

Explanation

Reverse engraving refers to the process of engraving the "under-side" of a substrate – allowing the top or finished side of the substrate to remain smooth.

The process of reverse engraving is very similar to traditional first surface (top) engraving. The main differences:

- The substrate is placed "upside down" so that the backside of the material is the surface to be engraved.
- The engraving job needs to be transposed (or mirrored) horizontally before engraving begins.
- Because of the orientation of the transposed job, the motion of the engraver moves from right to left, instead of left to right in traditional engraving applications.
- Most engraving systems have software designed to aid the set-up of reverse engraving applications i.e. the mirror or "flip" function.



Laser Engraving

Reverse Engraving & Paint Filling

- Materials specially designed for this application are usually 2-ply with a thick clear surface as viewed from the front and a thin colored layer on the back. When the engraving is completed, you will be able to see completely through engraved areas of the plate.
- In most cases, acrylic paint is used to "fill" the engraved portion of the substrate. This is called back painting or color filling.

Reverse Rotary Engraving

Engraving Tools

Although any flexible engraving tool may be used, you will want to be sure that the tool is sharp. A good clean cut will eliminate extra cleanup and chip removal later. Smooth characters that are free of burrs will fill easier and will appear clearer. When engraving acrylic materials, make sure that you select a tool designed for that specific material. The cut will be cleaner and the chance for tool breakage minimized.

If you plan to engrave single stroke font text (example: Gothic, single line Helvetica), or a vectored graphic, you may want to try a ball-nose cutter. The effects can be very striking, giving an almost 3-D appearance when colored filled.

One of the problems that you may have after engraving is that you will see the tool path very clearly in the engraved cut. You may be surprised to find that the engraved area appears hazy and the tool marks show. This is caused by the rub or cut made by the tool. Before paint filling, it is strongly suggested that you first coat the engraved area with clear acrylic spray. This will smooth out the cut marks and remove the haze. If you don't take this extra step, you may notice that the paint color will be dull and less vibrant when viewed from the front.

General Engraving Techniques

In most instances, the only consideration in the set-up of a reverse-engraved job is the orientation of the plate when mounted on the



Laser Engraving

Reverse Engraving & Paint Filling

engraving table. To ensure that the left and right margins are correct when engraved, you will need to take extra caution when sizing or cutting the plate. You may want to shear your plates face down so that all of your calculations for size are correct when engraved. When you place the substrate on the engraving table, be sure to turn it face (or front) down. Remember that you are only mirroring the plate and that the top of the plate must still remain at the top of the engraving table. You will still use the upper left corner as your "home position" on most engraving systems. It is recommended that you leave the protective plastic masking (found on the front of the engraving sheet) on the plate until you have finished engraving or until any color filling has been completed. This will protect the front of the substrate during handling.

Your engraving software should allow you to flip the layout in the software and view the image as it will be engraved. Don't panic when you actually start the job because the engraving head may move to the right hand side of the plate to start the engraving process.

Unless you are doing reverse engraving in a clear piece of acrylic, you do not need to protect the back of the plate against the scratching and rub of the nosecone. A vacuum system will work well in this application and will keep the chips clear of the engraving head for proper depth control.

Most reverse engraved applications require "paint filling" of the characters. You will need to engrave to a depth of .010" - .015" for characters up to a 1/4" high. For larger height letters, plan to cut as deep as .020". It is possible to make a shallow cut less than .010," especially if you are using a laser. The challenge is keeping the paint in the cut area.

Note - When working with Rowmark's Ultra-Matte Reverse Engravable Matte/Clear products (312-101, 322-101, 342-101), be sure to do your fabricating/engraving/painting on the side with the "Rowmark" branded masking. It can be difficult determining the "front" and "back" of our clear products, but keeping this masking tip in mind will ensure you get the most out of your Rowmark material.

Reverse Engraving & Paint Filling

Reverse Laser Engraving

- It is recommended that the protective mask be removed before laser engraving. Masking can be left on for vector cutting to keep the surface protected from burn residue. Make sure the lens is accurately in focus before vector cutting.
- For fine detailed laser engraving, take time to focus the lens carefully to minimize the spot size. For general engraving, a slightly out-of-focus lens will work, as a smoother cut can be achieved.
- Multiple passes will create a smoother, glass-like appearance. Multiple passes can be used to achieve a deeper engraved area, giving a 3-D like appearance when viewed from an angle.

Methods of Adding Color

Color filling is a term used by all engravers to describe several techniques to add color or contrast to engraving. Although there are a wide variety of engraving materials to choose from, we sometimes can't find the exact color we want. If we are trying to architecturally match a color and the engraving stock is not available in that specific color, we may be able to engrave a neutral color material. Later, we can add color in the text and graphics with a PMS matched paint.

Methods of Adding Color

Paint Sticks:

Paint sticks look much like an adult size crayon. They are usually found in primary colors and are easy to use. Paint sticks are great for small areas that need to be filled, but are not recommended when coloring front engraved plates. The paint really never dries and can easily damage clothing if used on a name badge. Paint Sticks, however, work well in reversed engraved tags or small plates.

Paint sticks tend to dry out from storage, and we want to get down to the soft area of the stick for painting. Here's how to do that.

Laser Engraving

Reverse Engraving & Paint Filling

The first step is to remove the dry paint skin that has formed using a utility knife. Paint sticks can be very messy, so be prepared by having an old rag handy. Once the dry paint is removed, simply rub the paint stick over the engraved area. The paint will be forced into the material and the excess can be buffed off. The plate should then be allowed to dry overnight before use. If the paint has smeared into unwanted areas, a little paint thinner or alcohol may be used for clean up.

The areas painted will never completely dry, so take special care if you plan to use this method on name badges or any surface that can come in contact with clothing etc. If you must use this technique for a name badge, mount the badge onto another thin plate to protect clothing.

Paint sticks are very inexpensive and are great for the occasional job. Don't try these with large characters or large graphic areas because the appearance will be dull and getting a complete fill can be difficult.

Paint Filling:

Paint filling requires a little bit of technique and sometimes a great deal of clean up. The best approach is to take time to prepare the piece before painting or color filling. Mask the edges of the plate to avoid over-spray damage (this is a must for substrates that will be painted by a spray can). It is important to protect the front surface against scratches since this work will be done with the plate face down.

For reverse engraved plates, spraying works well for jobs requiring only one color of paint. Two coats of acrylic based paint are recommended. Make one pass from the direction of the plate top and the other from the plate bottom to get coverage on all of the character edges. By spraying directly over the substrate, you do not get the paint on the sides of the letters. For best coverage, hold the can a few inches away from the area and at an angle to the substrate.

Laser Engraving

Reverse Engraving & Paint Filling

Another technique is to use liquid acrylic paints. These are inexpensive and easy to use. A nice selection of colors is available in hobby shops and the application can be done with an inexpensive foam brush. Again, mask any areas where you do not want the paint to penetrate. Generally, two coats will be required to get the best coverage and block any pinholes from the first application.

In both painting processes, it is recommended that you completely cover the back of the finished sign or badge with paint to avoid any shadows as seen from the front. This is not a problem if the substrate will be mounted on another surface.

Vinyl:

A unique alternative to paint for adding color is to use colored vinyl. Available in a wide variety of colors, vinyl can be a quick and easy solution for adding color to your reverse engraved project. Simply cut your vinyl to cover the engraved portion of your laminate and tape in place to secure. Depending on the detail and size of your piece, multiple colors can be used on a single project.