

Panel Marking

Plastic adhesive labels: Unprofessional, difficult to align

Water transfer decal: Easy to produce on an ink jet printer. Can also be difficult to align properly. Inexpensive. Can be covered with clear paint to increase durability. Can be fixed if an error is made.

Diamond engraving: Produces lines by scratching a line in metal with a non rotating diamond point. Cannot be used on paint. It works by displacing metal so the resulting groove has a valley with a hill on each side of it. It is useful for bare metal marking or anodized aluminum. Not to be used on any structural parts. It is very inexpensive.

Paint fill: This method typically uses a rotary cutter to cut a groove in paint, although this groove can be made with a laser as well. That groove is then filled from a paint stick or acrylic paint with contrasting color. A disadvantage of this method is that the surface being filled must be glossy in order to cleanly remove excess paint from filling. The surface can however be coated with a matte clear to provide the non glare surface. This method is relatively trouble free in that tight paint thickness is not very critical. Should you encounter a thin paint area and go clear through to the base metal, the paint fill will cover this. You want to avoid cutting deep enough to cut into the base metal as the chips may get trapped under the engraver nose and cause scratching sometimes called shadowing. Minor shadowing can be resolved by wet sanding before the clear coat. This method cannot be used with wrinkle finish or textured surfaces.

Remove the paint to expose the metal: This simply removes the surface paint to expose the aluminum underneath. When the color is not objectionable, this method is relatively trouble free, although there is some risk of shadowing where the cut chips are trapped under the nose of the engraver. Wet sanding can take care of minor shadowing. Consider a matte clear coat to avoid corrosion on the exposed aluminum.

Two Color: This method removes a top layer of paint to reveal a lower layer. This is probably the best looking of all the methods, however the thickness of the paint layers, particularly the top layer is critical. Typically a base thickness of .002 or greater is required with a very even top coat of about .001 is required. If while cutting it is discovered that the top layer is not being completely removed, a rotary engraver (EG2) can be adjusted a half thousand deeper and re-cut that area. If employing a laser however, going over an area a second time may damage the base layer paint. If you cut too deep and go through the base layer to the base metal, you will at least have to strip and repaint the panel, and possibly cut a new panel. While this method is the most difficult method, when done properly the results are stunning. This can be done with conventional paint or powder coat.

If you are doing something like a circuit breaker panel, consider using plastic engraving material. It is easily changed if the circuit breakers change, it has an even top color thickness and generous bottom color thickness so depth control is not critical. In addition if an error is made, simply make another.

Masking: cutting through a mask cannot be done with a rotary engraver. It can be done with a high power laser (60 watts or so), however low powered lasers such as the LZ series engravers do not cut the masking cleanly. Masking also requires weeding of the tiny bits of masking such as the interior of an "O or A". Masking also requires skill to remove the mask at precisely the right time. If removed when the paint is completely dry, it may remove many of the letters or insides of letter. If removed too wet, the paint may run into areas that should be masked off.

Laser: Our low power laser LZ1 or LZ2 work by burning and discoloring the surface. It works on light colored surfaces, however dark gray, brown or black do not benefit from making the surface darker. It works well on textured and wrinkle finish as well as flat or glossy surfaces. Different paint chemistry may react differently to the laser and should always be tested before committing to the job. It works well on most powder coats. The burning process produces an ash that when preserved by clear coating immediately after lasering, produces an intense black. If the ash is removed, the discoloration of the paint may still be acceptable, but not as crisp as

sealing the ash in place. The laser has a fixed spot size of about .007 inches. Large letters can be filled with a hatching process. The Laser is limited in scope, however in the applications where it is suitable, it is easy to use and relatively trouble free.

Silk screen: A process where a computer generates a screen that is aligned on a panel and then thick ink is squeegeed through the screen to mark the panel. There are many steps to preparing and reusing screens. It can be difficult to align. It requires a skilled worker to apply the ink. It is great for multiple copies, however most Aviation panel work is one off. The printing itself is susceptible to damage where fingernails can scratch it.

UV cured ink jet: This is the ultimate in panel marking technology. A flat bed ink jet printer literally prints the graphics that is almost instantly cured with UV light. There is little set up and the applied graphics are typically more durable than silk screen. The problem is an ink jet printer that can handle a 4 foot wide panel costs around \$75000

Summary:

At Buller Enterprises, Inc., we supply a modestly priced, very versatile rotary engraver, the EG2. We also supply the LZ1 laser which is very useful, but limited in scope.

Getting both the EG2 and LZ1 is a great idea and will cover all your panel marking requirements. If you are considering only one, I would recommend the EG2 engraver. Any of our accessories can be added without modification to the Panel Pro and can be purchased at the same time of the Panel Pro purchase or later.