

Kiln Crafting

Hot Tips for Fusing and Slumping

by Gil Reynolds



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Frits, Enamels, Powders and Paints Part 2: Enamels

In the 13th century, a group of Syrian glass artists discovered a way to paint on glass. As a variation of the enamels that had been used on precious metals since pre-Christian times, they developed a form of enamels that were compatible with their glass vessels. The craftsmen melted a special glass with very intense coloration by adding a large quantity of metallic oxides. When the glass was cooled, it was crushed into a very fine powder. The densely colored powdered glass was then mixed with a liquid binder such as honey or powdered gums and water, so that the powders could be painted onto a glass vessel. The decorated vessel was then heated in an oven to the point that the glass powders melted enough to fuse to the surface of the vessel. Thus, a new art form was developed—enameled glass.

Being compatible with the base glass was a big achievement. Enamels that were used with metals were not compatible and would crack or pop off as the vessel cooled, or even worse, several months after it was presented to some royal leader. Ow... that could be bad. These new powders were also able to mature at a temperature lower than the base vessel's softening point, thus preventing the vessel from deforming as the enamels were being fused. This quality also proved useful later on when the enamels were applied to sheet glass, because at higher temperatures the sheets would soften and their beautiful patterns and transparency would be replaced with the less desirable kiln shelf texture.

Enamels are different from paints. (Part 4 of this series of articles will address paints in detail.) Although both are finely ground glass that is fired onto a base glass, they are used for different purposes. Traditionally, stained glass "paints" refer to the black, gray and brown glass powders that are mixed with gum arabic and water so that they can be applied to colored glass to form dark lines, shading and matting. The object here is subtractive in so much as the paints are used to block out or remove the light coming through the glass. Painted lines visually read like the bold black lead lines. Matted and shaded areas also darken the glass by not letting as much light pass through the glass.

Enamels, on the other hand, are usually colored and can be thought of as adding a very thin layer of stained glass to a piece of base glass. Instead of blocking out the light you are adding extra color to it. The main thing that sets enamels apart from other forms of glass is the intensity of their colors. A very thin layer of enamels can have more color density than a sheet of colored stained glass. Because the color is so intense, it is easy to produce rich additions of color by applying a relatively thin coating of the enamels.

A similarity between enamels and paints is their fine particle size. This makes them conducive to many different methods of application. Enamels can be brushed on like paint, but because they are so fine, they can also be applied with an air brush to create some stunning visual effects. It is also common to silk screen the enamels which is a great process to use when you want to make multiple copies of the same image. Some artists even screen print onto decal paper so they can add the images to the base glass at a later date. Because most enamels are sold as powders, they can also be dry sifted over a stencil.

How you choose to apply the enamels will dictate which medium or binder you add to them. The medium

has two main purposes. The first is to get the powders into a solution for application. The second is to allow the enamels to adhere to the base glass. Air brushing requires a very watery medium with a light adhesion. There is at least one commercial air brush medium on the market that I am aware of, designed specifically for this purpose.

Silk screen printing uses a very thin medium to hold as much pigment as possible without having the colors bleed or run out of the intended areas. Squeegee oil, pine oil, and water base screen medium are some of the more popular choices. It is best to experiment. I like the water base medium because it cleans up easily with water, as opposed to the paint thinner or turpentine required for the others. Also, it is durable enough in its dry, unfired state to allow multiple layers to be applied before firing. This is a real time saver if your finished piece will have more than one color application.

The binders for painting also fall into the water base/ oil base categories. Some artists prefer the slow drying time of the oil base binders such as clove oil, squeegee oil, pine oil, and lavender oil. I usually use Fuse Master Water Friendly Medium. It adheres well without making the dried enamels brittle and prone to chipping like gum arabic does. It also gives the gritty powders a smooth,

creamy consistency which makes it easy to paint long, fluid brush strokes. Some of the other water based mediums worth exploring are honey, Karo syrup, and, believe it or not... flat 7-Up. (I'm sure Sprite would work just as well.) The constant in this group is the sticky sugar found in each.

When choosing some enamels to start with, you will want to

consider maturing temperature, opacity, transparency, lead content, particle size, color pallet, and compatibility. Do not use any lead bearing enamels on food bearing surfaces such as plates or drinking glasses. The enamels you buy should have a label that states whether they are food safe or not.

And while I'm on the subject of safety, it is always a good idea to wear a dust mask when working with any of these glass powders. The body does not like to ingest glass dust whether it has lead, cadmium, or any of the other nasty components found in colored glass. Also, keep your work area spotless. I know all of your studios would pass the white glove treatment of any restaurant inspector, but still I need to mention it.

Enamels can be a great addition to most any stained glass project. They are great for adding detail and extra coloration. If you play with them a little, I'm sure you will find many creative and exciting uses. But, because most enamels are not acid resistant, keep flux and patinas away from them. Some of these chemicals will remove the fired on enamels, which can be a design element, but instead is usually a heart breaker.

If you are fusing and bending glass, then look out. A little time spent playing with enamels will have you hooked in no time at all. There are so many fun ways to use these rich colors, you will amaze your friends and neighbors as well as yourself.

Don't limit yourself to using enamels on only flat glass sheets. Try painting them on some old ash trays, old windshields, pop bottles, wine glasses, or glass blocks. If it's glass, it's fair game.

Until next time,
Keep a warm kiln...

"There are so many fun ways to use these rich colors, you will amaze your friends and neighbors as well as yourself."