

Kiln Crafting

Hot Tips for Fusing and Slumping

by Gil Reynolds



During the 20+ years he has worked in art glass, Gil Reynolds has gained worldwide recognition as a leading innovator of fusing and kiln forming techniques. He is the author of *The Fused Glass Handbook*, a step-by-step guide to learning the art of fusing. He teaches seminars and has artwork in many locations in the U.S. and abroad.

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Frits, Enamels, Powders and Paints

Part 1: Frits

You wouldn't think that a bunch of crushed up glass would be very exciting... but it is. You would be down right flabbergasted by the number of glass artists, both new and experienced, that are getting all wild-eyed and elated about what they are able to make with glass frits, enamels, powders and paints. I'm kind of taken aback by all the attention given to some simple pieces of glass that have been stomped, crushed, pulverized, and triturated into different sized shards, chunks, granules and powders. Yet the ease in which they are applied, the fun and sense of freedom they provide and the stunning results that you can't hide, make all the excitement understandable.

I see the evidence everywhere. The manufacturers are coming out with new products; classes are being formed to teach the different techniques; new books are hitting the market that describe various ways of working with the glass; and a whole new group of artists (like yourself) are becoming involved with kiln formed glass. All this over a bunch of broken glass—the same broken glass that I used to throw away... go figure.

Well, if it's good enough for them, then it's good enough for me. But first we need to get into a bit of a name game as we look at all the different types of crushed glass that are available. There are different categories of glass with different applications which produce totally different looks when fired in a kiln and they all have different names. Although the terms can somewhat overlap, there are specific qualities that differentiate the various types of crushed glass.

"Frit" is kind of a generic term for most broken or crushed glass and it is the focus of this, the first article in our four part series. "Fritting" glass is actually a very specific process where molten glass is quenched in cold water so that uniform granules are produced. Using that for a basis, our industry has generalized the term "frit" to describe the uneven granules of glass achieved by crushing sheets of stained glass. (Chunks of crushed non-sheet glass are called "cullet.") As scraps of sheet glass are fed into a crusher, various sized pieces of broken glass usually fall into a series of sifting screens where they are sorted by particle size.

Keep in mind that all glass that is melted together in a kiln needs to be compatible or the pieces will break apart when they are cooled to room temperature. Because both Uroboros Glass Studios and Bullseye Glass Co. are the largest producers of glass that has been factory tested to be compatible for fusing, it only make sense that these two companies are the largest producers of tested compatible frit.

Uroboros offers frit in 30 colors, plus black and clear iridescent, available in five different groups defined by particle size in millimeters. "Mosaic" is the largest, ranging from 7.6–15+ mm; "coarse" is 2.5–7.6mm; "medium": .75–2.5mm; "fine": .25–.75mm; and "powder" is .13–.25mm.

Bullseye Glass Company offers 55 colors which they say, "...are crushed from top grade compatible sheet glass." Their frit comes in four sizes: "coarse": 2.7–5.2mm; "medium": 1.2–2.7 mm; "fine": .2–1.2 mm; and "powder" is .2 mm and finer.

I am also a producer of frit. I take scraps of glass, wrap them in newspaper and strike them repeatedly with my trusty Craftsman hammer. (I also wear a dust mask while doing this to avoid breathing in the fine glass dust.) I sort the sizes with a strainer and "presto"... "la frit." Just don't look for this in your local retail stained glass shop. I barely make enough for my own purposes, but you may want to try the technique yourself.

There are a lot of different ways to use frit. The ancient Egyptians and Romans (peak period 100BC to 100AD) would fuse frit into sculpted molds to make bas-relief objects. The French artist Henri Cros rediscovered this technique in the late 1890's and called it "pate-de-verre" or "paste-of-glass." Art Nouveau artists such as Emile Galle, Eugene Rousseau, and Louise & Antonin Daum further developed the pate-de-verre esthetic as they produced many museum quality pieces.

Artists today are producing traditional and experimental pate-de-verre jewelry, vases, sculptures, windows, lamp shades, lidded containers and tiles. They achieve different looks by using different particle sizes, color combinations and firing temperatures. Frit is easy to use. Because small pieces of glass can be heated quicker than large pieces without breaking from thermal shock, shorter firing cycles can be used for your frit projects.

Stack a pile of frit on a prepared kiln shelf, fire it flat and you have made your very own one-of-a-kind sheet glass with your own color pattern and design. If you cut out some specific shapes of sheet glass, place them on a kiln shelf with a space between each piece, a contrasting color of frit can be used like a "grout" to fill in the spaces and bond everything together in a process called "vitro-contruso," a Latin term for "crushed glass." This technique works really well with the larger "mosaic" sized chunks as the base and the fine frit as the filler. Shoot, you don't even have to cut a single thing, not even your finger. Just stack n'fire and you are off making priceless treasures that family members and international museums can look forward to adding to their already bulging glass collections.

It is wonderful to experience the freedom of designing with frit. You are no longer restricted to using "cutable shapes." Just arrange the frit in the pattern of your choice and you can make whatever you envision. Both in the flat or dimensional realms, fusing frit opens new doors of artistic expression. I find that I come up with more ideas than I have the time to explore. Every project seems to trigger the old "Ooooh, that's neat... what about this..." reflex that rekindles the excitement that got me working with glass in the first place. So, take my advice... *try it, you'll like it.*

Until next time,
keep a warm kiln...

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