

Glass Fusing/Slumping Supplies

by Maria Moran

TIPS FOR SUCCESS

Just as there are scores of different types of clay bodies with different characteristics, glass is no different. Before attempting your hand at a glass project, you'll need to know a few basics about glass and glass products. Glass expert Brad Walker provides some advice.

WHAT KIND OF GLASS SHOULD YOU USE?

You can use any glass for fusing and slumping, but some glass works better than others. Ordinary window glass can be used. Colored glass similar to that used in stained glass work can also be used. It's likely that you'll want to combine more than one sheet of glass in your projects. If so, then you'll need to make sure the glass you select is compatible.

WHAT'S COMPATIBILITY?

Compatibility is a way of saying that the different pieces of glass you use will expand and contract at similar rates. Using incompatible glass weakens your project and may cause cracking or even shattering of the piece when it cools. There are many different production methods and recipes for making glass. As a result, there are almost as many different types of glass as there are glass artists who want to use them.

TYPES OF GLASS

All of these different glass types are candidates for fusing, slumping, and other kiln-forming processes. Some can be used off the shelf, but others require testing to make sure they'll work in your kiln.

- Basic window glass (called float glass)
- Brightly colored stained glass (also called art glass)



SUPPLIES NEEDED FOR GLASS FUSING AND SLUMPING:

(1) felt-tip pen, (2) glass cutting oil, (3) glass cutter, (4) grozing pliers, (5) breaking pliers, (6) circle cutter, (7) glass (many shapes and sizes), (8) bisque molds, (9) fiber molds, (10) fiber sheets, (11) pencil, (12) metal ruler, (13) heat-proof gloves, (14) kiln wash, (15) stressometer (or strain viewer). From Bettina Eberle's *Creative Glass*, AC Black Publishing.

- Many other types of glass are in numerous subtypes and categories.
- There are also many types of glass coatings, such as iridescent and dichroic, which have unique properties when applied to glass.

AVAILABLE SHAPES AND SIZES

Glass comes in a variety of shapes and sizes. Here are some of the more common ones:

- Sheet glass—relatively flat, up to 30 inches wide. Sheet glass is typically 1/8-in. (3mm) thick but thinner and thicker varieties are available
- Frit—small, irregularly shaped glass pieces, available in sizes that range from around 1/2 in. (6mm) in width to powders
- Stringer—long, thin threads of glass, about 1mm in diameter and up to around 18 in.

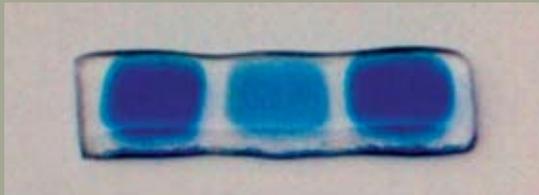
COEFFICIENT OF EXPANSION

Two glasses with considerably different COEs are said to be incompatible. They cannot be fused together and should be kept in separate areas of the studio to prevent their accidentally becoming intermingled. This is especially critical because you can't always tell incompatible glasses just by sight. All may look fine to the naked eye, but viewing the glass with a polarized film (stressometer) shows the underlying stress which may produce cracks in the future.

You can sometimes get away with using two different glasses where the COE numbers vary by only one or two (say, a 90 with a 91), but not always. There are really only two ways to know for sure if your glass is compatible:

1. Use glass that has already been "Tested Compatible" by the manufacturer.
2. Conduct compatibility testing on your own. To do this, take a base glass with a known COE and fuse small squares of the glass to be tested to it, then examine the fused strip by sandwiching it between two strips of polarized film.

Note: Whichever method you choose one point remains—keep different COEs separated and well labeled in your studio.



Base clear glass with three fused squares from two suppliers: the dark blue are 96COE Spectrum, while the middle square and the base glass are both 90COE Bullseye. To the naked eye, the glass appears to have successfully fused.



The same glass between polarized film and viewed on a light table. The halos around the Spectrum squares indicate stress due to lack of compatibility. The Bullseye square in the middle has no halo as its COE is compatible with the base glass.

(45cm) in length. Thicker stringers and related shapes (called "noodles") are also available from some manufacturers

- Rods—round cylinders of glass about 4–5mm in diameter and up to around 18 inches in length
- Shards and confetti—slices of glass that are slightly thicker than a sheet of paper
- Cullet, billets, patties, and dalle—various sizes and shapes of glass "chunks" used primarily for casting

SOURCES

There are many sources for purchasing glass. Wholesale options, such as Ed Hoy's International, exist for businesses. Hobbyists can order supplies directly from some manufacturers or from a local art glass retail store. Some ceramic supply companies also offer a full line of glass supplies.

COMPATIBILITY MEASUREMENTS

To better understand compatibility, let's consider what happens when glass is heated. Like clay, glass expands when it gets hot and contracts when it cools. This change in density occurs at the molecular level and can be measured in a laboratory. This rate, known as the coefficient of expansion (COE), is usually expressed as a whole number rather than as a long decimal figure.

- Bullseye, a glass manufacturer, makes a glass with a COE of 90, and you'll often hear glass artists refer to it as "COE90 glass".
- Spectrum, another common glass, has a COE of around 96, while Corning's Pyrex has a 32 COE.
- Standard window glass has a COE around 84-87
- Effetre (Moretti) glass, commonly used for lampworking, has a 104 COE.

These differences in expansion and contraction may not sound like much, but they're significant and can be the demise of a beautiful piece of artwork.

This tutorial is a condensed version of copyrighted material from Brad Walker's book, Contemporary Warm Glass: A Guide to Fusing, Slumping, and Related Kiln-forming Techniques. For more information on glass and glass techniques, visit Brad's site at www.WarmGlass.com.

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