

“Glass Boiling” a.k.a. High-Fire Kiln Work

Often erroneously referred to as “glass boiling”, this kind of kiln work is more accurately known in the industry as “high temperature kiln work” or simply a “high-fire”. This is a great way to create your own unique glass design and to use those leftover glass bits that we all seem to have lurking in boxes! I have even resurrected previously fused tile designs that have not met my standards by making them part of a “high-fire” as was the case with this piece.

I want to share with you the basic process for creating your own high-fire piece. I should add at this time that this is not a process that I would recommend for a beginner, but it would be suitable for someone who has fusing experience and is very comfortable with kiln firing and annealing glass.

You would prepare your kiln as you would for any routine firing however we recommend that you use a High Fire Kiln wash on both the kiln floor and the shelf. High Fire kiln wash is designed to hold up to the higher temperatures needed for pot melts, raking, casting or “boiling” glass. The Two Lasses use (and sell) Hot-Line “Hi-Fire Shelf Primer”.

Make sure your glass is compatible (COE 90 or 96), clean and dry. You can set up a boil using a couple of different methods but I am going to explain the easiest/most foolproof method.

You will be using at least 4 layers of 3mm glass, so begin with a transparent base layer (clear) that you have cut to a specific size that you can easily dam within the confines of your kiln (in the photos, I have used 4.5 inch squares). We will need to dam the glass because at the temperatures we will use to make the glass “boil”, it will be flowing, and unless it is restrained it will flow right off the shelf, making a big mess of your kiln floor (which is another great reason why we always recommend coating your kiln floor with kiln wash and periodically “freshening” the application to protect the brick in the event of an accident).

Set the clear base glass on a piece of fiber board. The Two Lasses recommend (and sell) Kaiser-Lee Board. Then get three sides of your dam in place around the glass. It’s much easier to assemble this project IN the kiln, than it is to prepare it at your table and have to transport it to the kiln.

You will then sprinkle a layer of commercial bubble powder on top of your clear base glass (you can also use baking soda – the prescribed recipe is to make a paste-like solution with distilled water and apply it to the glass allowing it to dry fully before adding more glass to your stack). Begin layering your colored/patterned glass over your clear base layer and the layer of bubble

powder. Avoid DARK opaque colors (like black or purple) and opt for transparent shades. Also avoid red and yellow as they tend to look like a dog's breakfast (ugly browns) when "boiled". By all means vary the shades of your glass (darker and lighter) so you will have a wonderfully random contrasting effect. After I have placed my 4 (or more) colored layers, I have been placing one clear piece of glass on top so that finished piece appears to be bubbling up just underneath the top layer of glass (rather like looking at glass submerged in water).

When you have all your layers in place, you will then dam the last side and check to make sure that your dams are reinforced by kiln posts or other furniture (like hot damz) so that when the glass begins to move, it cannot spill out of the area you have created for it.

I fire from room temperature to 1000 at 600 DPH, and then soak the glass at 1000 for 15 minutes. From 1000 AFAP to 1700F and HOLD for five minutes. You will check on your glass (using your safety glasses and kiln gloves) to establish what kind of bubbling activity you are getting after the first five minutes. If you feel you want/need more "activity" in the piece, you will continue to hold at 1700F in five minute increments. Once you have achieved the desired effect, you will ramp down AFAP back to 1500F where you will soak the glass for fifteen minutes to allow the bubbles to completely settle. From 1500 ramp down AFAP back to the annealing temperature of the glass you are working with (for Bullseye it is 950F). Here you will soak the glass one last time for a full hour before ramping back to room temperature at 175 DPH.

Let's talk a bit about what is happening to the glass when we take it up to between 1600 and 1700F. Glass does not actually "boil" in the same way that we boil water but when heated to extremes in temperature, elements of the glass will begin to break down and it also becomes more reactive with other materials with which it comes in contact (like the bubble powder). Viscosity decreases and flow increases. Air that is trapped within the layers of the glass expands and will rise to the surface pulling glass from the bottom layers up, towards the top of the piece. The bubbles pop at the surface spreading the colors they have pulled up from the bottom. It is this "popping" of the bubbles at the top layer of the glass that gives it the appearance of boiling.

For those who are really interested in understanding exactly what happens as we take glass from room temperature up to fusing temperatures and beyond, I can heartily recommend Bullseye Glass' "TechNotes #4" which are (along with many other helpful articles) available on line at www.Bullseyeglass.com and clicking the "Education" tab at the top of the page or you can spend the day with me learning how to fuse.

It is important to know that this kind of heat work can alter the COE of the glass you are using because when we heat the glass to these temperatures we are altering the base elements of the original formula of the glass. It is therefore CRITICAL that you practice proper annealing of your piece based on the overall size and density.

Keep a notebook handy to record what glass you used (i.e., size of the piece, number of layers used, glass colors/patterns and the order they were placed). Sometimes I will take a photograph of my set-up before I begin firing and/or keep tiny sample pieces of the glass I've used in its cold state so that I remember the order of the layers just in case I want to try and replicate a design. However, having said that, I can promise you that no two "high-fires" will ever look exactly the same. They are uniquely different even when you use the same glass. The beauty of the "boil" is in their one-of-a-kind result.