

# Patty Gray's Combing Instructions

## Combing Glass

### Equipment/Supplies

- kiln
- kiln washed shelf
- ceramic fiber (not thinfire)
- cleaned 3/8" to 1/4" glass strips
- Green, welder's safety glasses
- Zetex gloves (up to 2000°)
- cotton clothing
- 2 combing rods (3/16" SS rods with wooden handles)
- heat/flame resistant jacket
- face shield
- cup of water to cool combing rods after combing

Combing is an exciting process of manipulating hot glass in a kiln. Make sure you have all the proper equipment, clothing, glass, etc.

The temperatures that I use work well for the System 96 glasses. For COE 90 glasses, the combing temperatures will need to be somewhat higher. You may need to experiment a bit, but start between 1700° and 1750°.

I normally use 18" long x 1/4" wide glass strips for standard 20" kiln shelves. I use a base of 18" x 18" clear glass.

I arrange the glass strips vertically so that I can get really tight lines, lots of color/pattern. These vertical strips are supported with two strips stacked flat on each end (this really is helpful when transporting the kiln shelf to the kiln).

Since kiln wash breaks down at high temperatures, I use ceramic fiber under the glass. If you want to do the combing directly onto kiln washed shelves I recommend using irid glass as a base (irid side down) which will release from the kiln wash.

My firing schedule for 18" x 18" base glass with the 18" long x 1/4" wide strips on it is: 300° for 45 minutes, 750° for 45 minutes, 1000° for 45 minutes, and I set the program for 1700° for 2 hours but I start combing at 1650°. Setting the 1700° target allows the opening of the kiln, combing and shutting the kiln to recapture the heat that was lost while combing.

If using strips directly on the ceramic fiber (no base glass) you can begin a regular fuse firing. You can heat the glass quickly until it reaches 1650°.

Once the glass is 1650° I can begin combing. I turn off the kiln just prior to opening the door of the kiln, and begin the combing process. I use two combing rods which allows me to pull and push the glass strips and it also allows me to manipulate the glass more before the glass stiffens (gets too cold to comb). After each combing I shut the kiln, turn power back on and wait for the temperature to reach 1650° and repeat the combing of the glass until the desired pattern is achieved.

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If the glass sticks to the tips of the combing rods, hold the rods above the glass for a few seconds to let the glass cool, then pull the rods out of the kiln.

Glass sticks to hot combing rods. If the glass starts to stick, stop combing and cool the combing rods. Dip the tips of the combing rods in water to cool them. Make sure they are dry before starting the next combing.

When I'm satisfied with the combing, I take the temperature back up to 1650° to level out the glass (the valleys made from the combing fill in). I do not hold the temperature at 1650° at all.

I flash vent the combed piece to 1100°. Dropping the temperature back to this level will prevent further fusing and prevents devitrification. If you drop the temperature below 1100° you run the risk of warping the glass sheet or possibly cracking the glass itself.

I set the anneal for 4 to 6 hours at 960° then set 2 hours at 850°. At this point my firing is done and the kiln remains shut until room temperature is reached.

Resist the temptation to open the kiln too soon! The only times I have experienced breakage (thermal shock) wasn't because of the glass or the annealing schedule - just impatience!

## **Combing Safety:**

- The kiln needs to be turned off when combing glass, if not you may get an electrical shock
- If there are elements in kiln door, don't stand too close
- Cotton clothing is recommended, no synthetic materials
- Synthetic materials can melt quickly and burn into your skin
- Green welder's glasses are recommended to protect from infrared rays
- An ordinary safety shield can be used to protect your face from the heat