

# Patty Gray: Combing with System 96<sup>®</sup>



Left: Patty Gray demonstrates her combing process. Above: Finished piece by Patty Gray made using the combing technique described in this tutorial, then rimmed in Black.

## Equipment/Supplies

- Kiln
- Kiln washed shelf
- Ceramic fiber (not kiln shelf paper)
- 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" stainless steel rods with wooden handles)
- Heat/flame resistant jacket
- Face shield
- Container 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.

I arrange the glass strips on edge 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). Damming works well also to keep the strips in place.

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.



### Schedule A (Use when firing a Clear Base topped with ¼-inch strips on-edge)

Step	Rate per hour (F)	Temp (F)	Time (Min)
1	150°	1000°	10 min.
2	AFAP	*1700°	20 min.
*Begin combing at 1650°. Turn Kiln off – manipulate glass When finished, turn Kiln back on to smooth out surface of glass. When temp reaches 1650, flash vent to 1100° then continue program.			
3	AFAP	960°	3-4 hours
4	100	750°	30 min.

### Schedule B (Use when firing ¾ – ½-inch strips on-edge *without* Base glass)

Step	Rate per hour (F)	Temp (F)	Time
1	AFAP	*1700°	20 min.
*Begin combing at 1650°. Turn Kiln off and manipulate glass. When finished, turn Kiln back on to smooth out surface of glass. When temp reaches 1650, flash vent to 1100° then continue program.			
2	AFAP	960°	2-4 hours
3	100	750°	30 min.

\*I set the program for 1700° but I start combing at 1650°. Using 1700° as the target allows for opening the kiln, combing and shutting the kiln to recapture the heat that was lost while combing.

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.

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.

Note: Glass sticks to hot combing rods. If the glass starts to stick, stop combing and hold the rods above the glass for a few seconds to let the glass cool, then pull the rods out of the kiln. Dip the tips of the combing rods in water to cool them. Make sure they are dry before starting the next combing.

### 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** which melt quickly and can 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