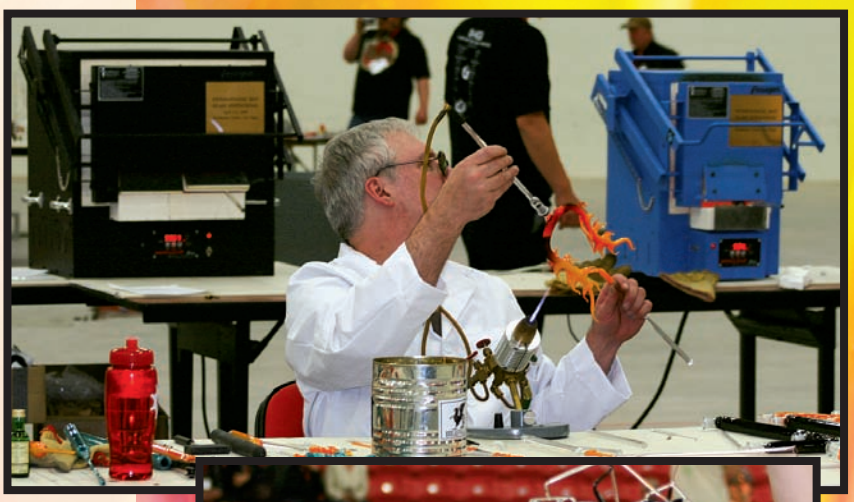
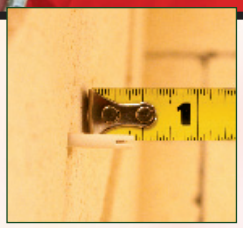
The Kiln Corner—Digital Controllers

by Arnold Howard

Though I work for Paragon Industries, L.P., the information in this column applies to all brands of glass kilns. I welcome your questions, no matter what type of kiln you own.





The thermocouple in a digital kiln is easy to recognize. It is the small rod that extends into the firing chamber.

What is a firing rate?

This is one of the most common questions I hear about digital controllers. On most brands of controllers, the rate is figured in degrees Fahrenheit per hour. For example, at a rate of 100ºF per hour, the kiln would take 10 hours to reach 1000ºF. It may be easier to understand rate if you compare it to miles per hour. Sixty miles per hour is one mile per minute. A firing rate of 60ºF per hour is 1ºF of temperature rise per minute.

Once you understand that the firing rate is figured in degrees of temperature change per hour, you can transfer a firing record from a switch-operated kiln to a digital kiln. Here is an example from a manual kiln that I test-fired:

4:00 p.m.: START

6:00 p.m.: 1876ºF

The kiln reached 1876ºF in two hours. Room temperature was about 76ºF. Subtract the room temperature from the final temperature to figure the kiln's actual temperature rise: 1876ºF minus 76ºF equals 1800ºF of total temperature rise. Divide that amount by the hours fired to figure the number of degrees of temperature rise per hour: 1800ºF divided by 2 equals 900ºF. Therefore, the rate to be programmed into a digital kiln is 900ºF.

What should I look for when inspecting the thermocouple tip in the firing chamber?

Digital kilns use a thermocouple to measure the temperature inside the kiln. The thermocouple is the small rod that protrudes into the firing chamber of your kiln.

Bumping the thermocouple with a shelf can push the thermocouple out of the firing chamber. This could cause an overfire. The controller does not contain an alarm to detect this type of failure. Bumping the thermocouple could also cause it to give inaccurate readings.

Thermocouples come in different widths. The wider the thermocouple, the farther it should extend into the firing chamber. A 1/4"- to 1/2"-diameter thermocouple should extend into the firing chamber about 1". A 1/8" thermocouple should extend into the chamber 1/2" to 5/8". Do not be concerned, however, if your thermocouple extends into the firing chamber even farther.

What is the purpose of the temperature hold on a controller?

The temperature hold helps to improve the heat distribution inside the kiln. This is especially useful when fusing glass in a ceramic kiln that has side-only heating elements. Firing to a lower temperature than normal and adding a few minutes of hold slows down the stages of glass fusing, giving you better control. You can also use the hold to squeeze out bubbles as they form in the glass.

What is the difference between the controllers on ceramic kilns and glass kilns?

The circuit board behind the keypad is the same for both types of kilns. The only real difference between the two types of controllers is that the ceramic version includes Cone-Fire mode, while the glass version does not. The other mode, Ramp-Hold, is used on both types of controllers.

Cone-Fire mode resides in the software on your glass kiln. You won't see it, however, because only Ramp-Hold mode is activated at the factory on your glass controller.

Some glass controllers also contain programs designed for specific types of fusing and slumping. These are simply Ramp-Hold profiles that you could also enter yourself into the controller. Some people prefer to enter their own glass firing profiles, because glass fusing and slumping temperatures vary from brand, color, and batch of glass.

Arnold Howard writes instruction manuals and advertisements for Paragon Industries, L.P. His glass hobbies include glass fusing and karate, but he also enjoys studying history and watching classic movies. You can reach Arnold at ahoward@paragonweb.com with questions for future columns. Sign up for his kiln newsletter at www.paragonweb.com.