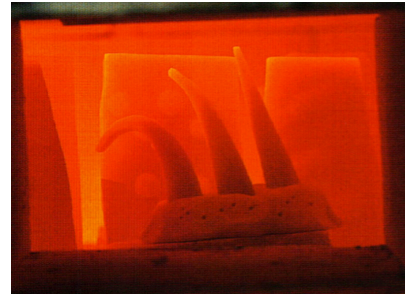


# ALTERNATIVE FIRING!

by Christy Runyan



Taking charge of your firing can seem a bit scary in the beginning. In today's world, most of us have computer controlled kilns. The manufacturers have built in lots of features that take much of the guess work out of how it operates. They offer several basic firing schedules that are based on typical usage in regards to commercial products and most effective use of the kiln.

It is necessary to realize that the kiln is most efficient in the early stages of firing and is able to bring lots of heat to the space quickly. This is not always the approach to firing your clay work. As you will realize, the clay and glaze should be your most important consideration in creating a firing schedule for your work - YOU ARE THE OPERATOR!

We work with Skutt kilns here and will refer to their operating system. These kilns have two sides, one is set up with three pre-programmed options for you to use:

The first is the **CONE FIRE** side, which offers 3 speed options - **FAST**, **MEDIUM**, and **SLOW**. **Never use FAST!** If you choose to use these, you will want to choose the **SLOW** speed for your bisque schedule and **MEDIUM** for your glaze cycle. The newer models offer a few more options with this **CONE FIRE** side of the kiln:

- You have a **HOLD** feature which will maintain the peak temperature for your specified amount of time. Always start with 15 minutes until you know if you may want more.
- You will also have a **PRE-HEAT** feature which allows the kiln to warm up to 200°F slowly and will allow you to hold at that temperature for your specified amount of time to allow for water and steam to be released.
- There is also a way to re-set this program to include a controlled cool down cycle.

The second side of the kiln set up is the **RAMP/HOLD**. This leaves the entire program up to you. The kiln remembers up to 8 programs and each program may have up to 6 segments or stops on its firing journey. Each segment has 3 categories for you to justify the sequence:

**RAMP** - how many degrees per hour do you want the kiln to achieve? This can range from 30°- 500°F, it can't go slower or faster than this. Also, as you get past 1800°F, your kiln may not be able to achieve that fast a rate.

**TEMPERATURE** - what temperature is the goal of this segment?

**HOLD** - do you want to maintain this temperature for what period of time?

I most often use this side of the kiln to do my bisque fires. There are a few variables you always want to consider; How dry are your pieces? How big are your pieces? How thick or evenly formed are your pieces?

My pieces tend to be of even thickness, but they are large. Here is my **Bisque Firing Schedule with 3 Segments**:

	<b>RAMP</b>	<b>TEMPERATURE</b>	<b>HOLD</b>
SEGMENT #1	30°F/hour	200°F (under boiling)	2 - 4 hours (depending on size)
SEGMENT #2	75°-100°F/hour	1200°F (quartz inversion)	zero
SEGMENT #3	150°-200°F/hour	1944°F	zero

By doing a slow firing, it allows all the work in the kiln to achieve uniform heat work, and I'm confident that the organics have burned out.

**Firing at Georgies with ^6 Glazes** - all of our glazes have been formulated to be fired at ^6 on **MEDIUM** speed - **NO HOLD**. That is how all of the work in this class has been fired.

## What happens when we alter the firing sequence?

First we have to expect different results! Remember our mantra? "Everything Matters and Nothing is the Same".

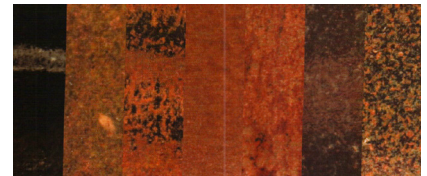
There is a lot of ongoing experimentation with long firing schedules with extended cooling cycles. There are many reasons to speculate that this may be beneficial. In trying to replicate the look of ^10 reduction firing, many potters (who out of necessity) turned to electric/oxidation ^6 firing, found the glaze surface to be not fully intergrated, seeming a bit plastic. When they review their kiln logs, certain patterns begin to develop that might trigger a better response. We know that we can't have the carbon interaction of a reduction atmosphere, but beyond that the difference in the firing is the length of time a high fire kiln is operating.

First, the kilns used in gas firing are larger and contain a greater mass. Second, the kilns and the process of firing to ^10 or above slows down considerably once the kiln reaches ^6-8 and begins to stall out. Their difference in temperature is only around 100°F, but in time it equals 2-3 hours! A third factor in this thought process is that the greater mass holds onto its heat for a longer period of time and cools at a significantly slower rate.

We need to add a fact or two about the materials we use in making our glazes. Two materials in particualar benefit from longer heat and cooling rate:

1st - **Zinc**, which has many purposes, but we know it is the essential building block of all "crystalline" glazes. These are the glazes that look like frost on a window pane ... when zinc is cooled slowly, the crystals can grow.

2nd - **Iron** is a major colorant for many of our glazes. Iron dissolves into the glaze, but has the ability to grow its crystal structure and be suspended in the viscous glaze when slowed in the cooling cycle.



Dr. Carol Marians published an article in Ceramics Monthly which is included in the book "Glazes and Glazing" which details 7 programs she did and the results produced using only one iron-rich glaze and the same clay body (G Mix 6). Carol rented space at Georgies Basic Fire before moving to Bend, OR.

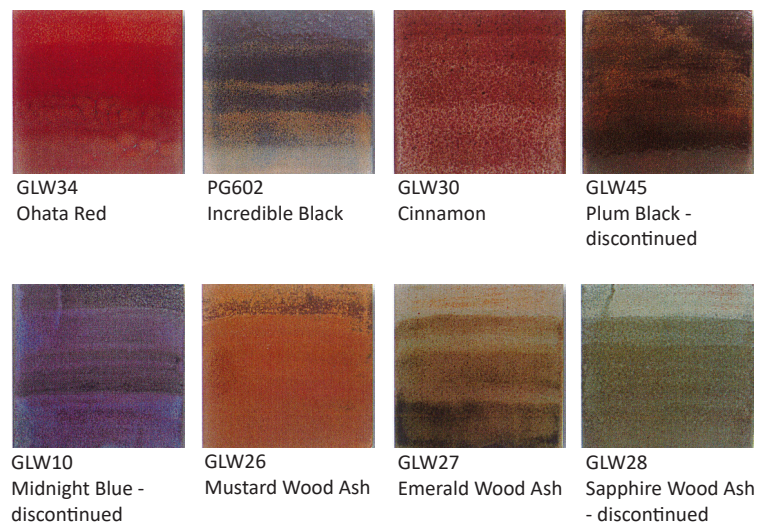


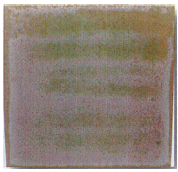
The 7 distinct looks from one glaze utilizing a varying firing cycle. This was an eye-opener for many potters!

A selection of Georgies glazes on  
Timberline Sculpture clay using  
**Firing Schedule #1 with 5 SEGMENTS:**

	RAMP	TEMP	HOLD
SEGMENT #1	100°F/hour	220°F	30 min
SEGMENT #2	350°F/hour	2000°F	0
SEGMENT #3	100°F/hour	2190°F	60 min
SEGMENT #4	*9999 (default)	1900°F	0
SEGMENT #5	50°F/hour	1400°F	30 min

\*9999 is a default code to allow the kiln to cool and then resume with the program. The firing cycle took 20 hours and 30 minutes in a KM818 kiln.





GLW36  
NW Woods Matte



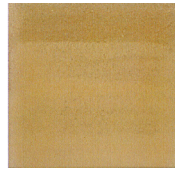
GLW47  
Kalamata Black



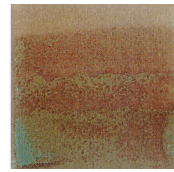
GLW33  
Crystal Topaz -  
discontinued



GLW22  
Rusty Nails



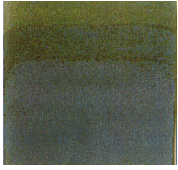
GLW21  
Raw Honey -  
discontinued



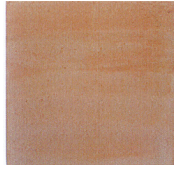
GLW03  
Avocado Ice



GLW42  
Blueberry Matte



GLW08  
Copper Patina



GLW39  
Vanilla Cream

As you can see, some things change and some things don't, but nothing is truly predictable!

There are several things you need to consider when trying an alternate firing schedule ... The Cone Temperature is based on two principles: **TIME & TEMPERATURE!** When you extend the time, you need to lower the temperature. It's very important that you consider that a glaze which may be stable at ^6 medium speed may become a runner when the time and hold times are changed. Be sure to allow for this if testing on verticle surfaces!

In the above group of tests, the result that surprised me the most was Avocado Ice ... I was expecting it to over-fire ... you just can't know until you test! There is one more consideration that is included in these tests, and that is the thickness of the glaze. Each of the tiles has 1-2-3-4 coats (top to bottom) to help assess what proper application should be in proceeding with a further test.

Each tile also represents only one glaze. As each of you are beginning to understand - when you begin to combine and overlap glazes, results are apt to change!

### Firing Schedule #2 with 6 SEGMENTS:

	RAMP	TEMP	HOLD
SEGMENT #1	200°F/hour	200°F	0
SEGMENT #2	500°F/hour	2100°F	30 minutes
SEGMENT #3	30°F/hour	2190°F	0
SEGMENT #4	*9999 (default)	1750°F	30 minutes
SEGMENT #5	50°F/hour	1600°F	1 hour
SEGMENT #6	50°F/hour	1500°F	0



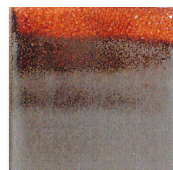
GLW34  
Ohata Red



GLW46  
Northern Lights



PG616  
Buckwheat



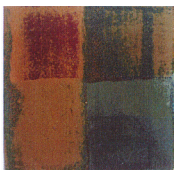
GLW06  
Liquid Luster Bronze



GLW30/GLW45  
Cinnamon  
Plum Black (discontinued)



GLW22/GLW45 (wax)  
Rusty Nails  
Plum Black (discontinued)



GLW26/GLW47  
Mustard Wood Ash  
Kalamata Black



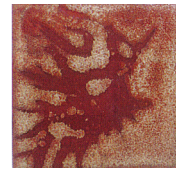
GLW32/GLW34  
Latte  
Ohata Red



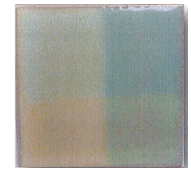
GLW32/GLW45  
Ohata Red  
Plum Black (discontinued)



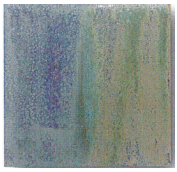
GLW22/GLW36  
Rusty Nails  
NW Woods Matte



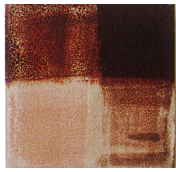
GLW22/GLW30  
Rusty Nails  
Cinnamon



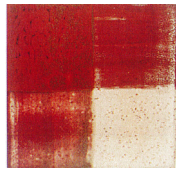
PG631/PG632  
Gold Dust (discontinued)  
Blizzard Blue



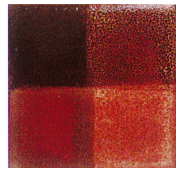
PG616 Buckwheat  
GLW08 Copper Patina  
GLW42 Blueberry Matte



GLW39/GLW45  
Vanilla Cream  
Plum Black -  
discontinued



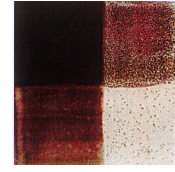
GLW32/GLW4  
Ohata Red  
Latte



GLW45/GLW30  
Plum Black -  
discontinued  
Cinnamon



GLW22/GLW32/wax  
Rusty Nails  
Latte



GLW32/GLW45  
Latte  
Plum Black -  
discontinued



PG624/PG602  
Ripe Apple Red  
Incredible Black



### GLW34 Ohata Red

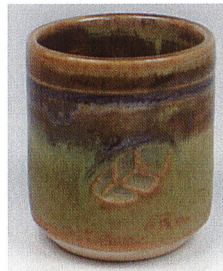
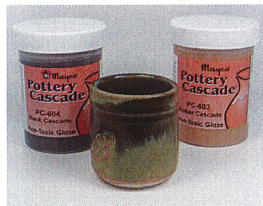
Compare the results with the same  
glaze and variations in the heat work!  
Fired ^6 MEDIUM speed with NO HOLD.



... Fired with Program #1



... Fired with Program #2



**Special Effects!** Many of you are looking for 'cascading' glazes. Since Georgies doesn't make them, I tested the Mayco products. They have four colors: Clear, White, Brown, & Black. We were out of the Clear and White, which would be the best choice for most of you. They layer between your choice of two glazes, 1-2 coats depending on how much **FLOW** you want. Keep them on the top 1/3 of your piece.

### Special Effects: Borax & Peanut Shells:

The action you see is from the Borax (10 mol) a little goes a long way.  
The peanut shells disappeared - many need a heavier application.

GLW39 Vanilla Cream  
GLW32 Latte  
GLW36 NW Woods Green Matte

