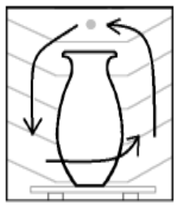
It's About the Time PLUS Temperature

Heatwork, or getting the heat's full effect on the clay, is not just a matter of reaching the optimum temperature -- even with computerized kilns. Heatwork is a combination of time and temperature. It takes a certain amount of time at peak temperature for clay to achieve complete maturity. Compare it baking a cake in your oven: just because the temperature reaches 350° does not mean the cake is done. It takes time for the heat to do its work on the batter. Heatwork is also cumulative for clay.

That's Why We Recommend Witness Cones

As clay artists we depend on our kilns to give us repeatable, reliable firings that show off our work to the best of our ability not just one time, but all the time. In all kilns, variations in temperature can and will occur. There can be hot spots or cool spots, and those variations persist even up to peak temperatures when the shut-off cone is melting or the computer reads "peak temperature" from the thermocouple. There are variables at play in every firing beyond the ones you expect, like your choice of clay or glaze. The variables not only CAN affect the outcome of your firing, they WILL affect it! It may be tempting to think of your kiln as a giant simple toaster, but it's actually a high-performance machine. Within it, the performance of critical parts like the thermocouple and elements will change as they wear down over time. Witness cones will inform you of what's happening and what's changing, so you can keep up with those pesky variations from what you expected.

Convection



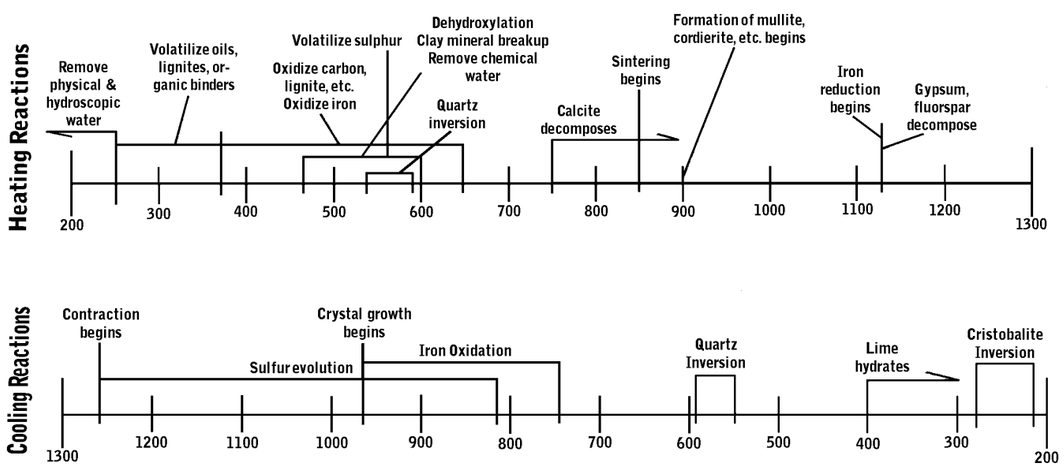
Convection is the first step in the heating process. Air is heated as it passes across the warming kiln elements. As the hot air rises and the cool air falls, air currents are created which circulate hot air to cooler places in the kiln. This heat is transferred to everything in the kiln: ware, posts, cones and shelves alike.

Conduction

Conduction occurs when heat moves through a solid material, moving from the inside to the outside of the kiln and from the outside to the inside of the ware (and shelves, posts, etc). Conduction is the main way to spread uniform heat through the kiln. It is a slow process.

Radiation

At the beginning of the firing, the elements are the hottest part of the kiln. Heat radiates out from them, like the sun warming the ground on a cool day. Eventually, the firebrick and the ware itself will get hot enough to radiate heat as well. As the temperature increases, more and more heat is transferred by radiation from the elements instead of convection or conduction.



Firing Temperatures

The Greek letter Delta, or 'Δ', is the commonly used symbol for the word "cone." During firing, cones soften and melt as they are heated, and gravity causes them to bend. It usually takes 15 to 22 minutes for cones to bend fully once they begin melting.

Cone	*°F*	*°C*	*Common Firing Temperatures*
022	1094	590	
021	1143	617	
020	1180	638	
019	1265	685	Mother-of-Pearl
018	1337	725	Gold, Lusters, China Paints, Decals, Enamel
017	1386	752	
016	1443	784	
015	1485	807	
014	1528	831	Glass Fusing
013	1578	859	
012	1587	864	
011	1623	884	
010	1641	894	
09	1693	923	
08	1751	955	Soft Bisque for Raku Work
07	1803	984	
06	1830	999	Hobby Ceramic Glazes
05	1915	1046	Hobby Ceramic Glazes
04	1940	1060	Hobby Ceramic & Pottery Bisque
03	2014	1101	*(for Δ6 - Δ10 Clay)*
02	2048	1120	
01	2079	1137	
1	2109	1154	Sanitary Ware Glaze Firing
2	2124	1162	Sanitary Ware Glaze Firing
3	2134	1168	
4	2167	1186	
5	2185	1196	Stoneware Glazes (beginning of range)
6	2232	1222	Porcelain Doll Full Bisque Maturity
7	2264	1240	Upper end of Stoneware Glaze range
8	2305	1263	
9	2336	1280	Pottery Glaze Firing *(in wood or fossil-fueled kilns and reduction atmospheres)*
10	2381	1305	
11	2399	1315	
12	2419	1326	

Temperatures are based on Self-Supporting Cones at 270°F or 132°C per hour rate of increase.

Cone numbers originally started at 1 and went to 20. Each higher cone number requires more heat to bend. Higher and lower cones were developed as demand grew. A zero was added in front of the number for cones maturing at temperatures below the original cone 1. Thus Δ01 needs less heat than Δ1, and Δ020 needs less than Δ019.

It is important not to mix up the lower maturing cones (whose numbers begin with zero) with the higher maturing cones.

-- Δ06 and Δ6 are not the same! --

Cone Prices

SRB ... Junior Cones $13.20

- Commonly used in the Dawson Kiln-Sitter.
- Tapered shape gives some flexibility in adjusting the shutoff point.
- Can be used as mini witness cones in tight spaces.
- Melt at slightly higher temperatures than SSBs or LRBs.
- Box of 50

BRB ... Mini Bars..... $15.00

- Designed especially for the Dawson Kiln-Sitter.
- Uniform shape makes consistent placement easy.
- Box of 50

LRB ... Large Cones $17.95

- The original pyrometric cones.
- Used to visually monitor firing progress and heatwork throughout the kiln through viewing (peep) ports.
- **Needs to be supported by cone plaques**, clay pats, or wire cone holders (see below).
- Uniform mounting height & angle - very important!
- We stock cones 012 - 12
- Box of 50

SSB .. Self-Supporting Cones $13.20

- Preferred for use as witness cones on kiln shelves.
- Most accurate and easiest to use cones available.
- Box of 25

CHS..... Wire Cone Holders ..... (bag of 5)

When you buy ...	**1-5 @**	**6-11 @**	**12+ @**
	$7.35	$5.88	$5.15

MS517..... 3-Hole Cone Plaque $2.49

- Use with LRB cones

Quantity discounts apply on multiples of the same item