


# Kiln Firing Guidelines from Paragon

This information applies to ceramic electric kilns of all brands.

## Firing Checklist

- 1 Fire clay and glaze to the correct cone number.
- 2 Make sure the power cord is plugged in all the way.
- 3 Check the power cord for heat damage.
- 4 Remove flammable materials from around the kiln.
- 5 Vacuum the kiln with a brush nozzle of a vacuum cleaner, especially for glaze firings.
- 6 Greenware must be bone dry before firing. Place it against the inside of wrist. It should feel warm.
- 7 Load the kiln following the loading guidelines.
- 8 Vent the lid by using the lid prop and leaving peep-hole plugs out. Close the lid from the vented position when vapor from the lid no longer fogs a mirror. At that point, also insert all but top peep-hole plug. 
- 9 The thicker the ware, the slower the firing. Fast firing and poor venting are the major firing reasons for disappointing results.
- 10 Monitor the kiln. Check it from time to time. Be near the kiln at the expected shut-off time.
- 11 Leave the lid closed until the kiln has cooled to room temperature.
- 12 Keep records of every firing.

## Temperature Equivalents For Orton Self-Supporting Pyrometric Cones

Cone Number	Self-Supporting Cones			Pre-Fire Color
	Heated at: 27° F Per Hour*	108° F Per Hour*	270° F Per Hour*	
022	—	1087	1094	Green
021	—	1112	1143	Fuschia
020	—	1159	1180	Orange
019	1213	1252	1283	Yellow
018	1267	1319	1353	White
017	1301	1360	1405	Pink
016	1368	1422	1465	Light Blue
015	1382	1456	1504	Violet
014	1395	1485	1540	Gray
013	1485	1539	1582	Green
012	1549	1582	1620	Fuschia
011	1575	1607	1641	Orange
010	1636	1657	1679	Dark Red
09	1665	1688	1706	Dark Red
08	1692	1728	1753	Dark Red
07	1764	1789	1809	Dark Red
06	1798	1828	1855	Dark Red
05 1/2	1839	1859	1877	Dark Red
05	1870	1888	1911	Dark Red
04	1915	1945	1971	Dark Red
03	1960	1987	2019	Dark Red
02	1972	2016	2052	Dark Red
01	1999	2046	2080	Dark Red
1	2028	2079	2109	Dark Red
2	2034	2088	2127	Dark Red
3	2039	2106	2138	Dark Red
4	2086	2124	2161	Gray
5	2118	2167	2205	Green
5 1/2	2133	2197	2237	White
6	2165	2232	2269	Fuchsia
7	2194	2262	2295	Orange
8	2212	2280	2320	Yellow
9	2235	2300	2336	White
10	2284	2345	2381	Pink

\*Rate of temperature increase during last 90 - 120 minutes of firing. Tables by courtesy of the Edward Orton, Jr. Ceramic Foundation.

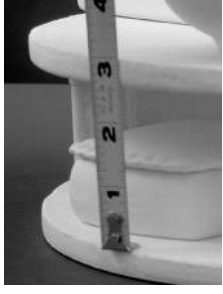
## Kiln Loading Guidelines

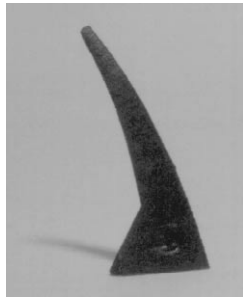
### General Guidelines

- 1 Coat the shelves with kiln wash. Keep kiln wash away from heating elements.
- 2 Use stilts only with low-fire glazed ware. Do NOT use stilts with low-fire greenware, or with stoneware and porcelain.
- 3 You can place glazed ware directly onto a kiln-washed shelf if you dry-foot the piece.
- 4 Low-fire greenware pieces can touch each other.
- 5 Glazed ware—whether low-fire, stoneware, or porcelain—must be kept separate.
- 6 Place a self-supporting cone on a shelf.
- 7 When loading ware and shelves, do not dislodge the thermocouple or Kiln Sitter tube.
- 8 Do not move the kiln or bump into it after you have loaded it. This could topple the ware inside.

### Loading the Ware

- 1 To make full use of your kiln's firing capacity, group similar sizes of ware together inside the kiln.

- 2 Place taller pieces on the top shelf.
- 3 Keep ware at least 1" away from the heating element. If the tip of a large piece of ware comes closer than 1" to the kiln wall, position that section of ware between rows of element.
- 4 For stability, stack posts so that they are directly in line with each other vertically. 
- 5 Minimum spacing between shelves is 2 1/2".
- 6 Stack shelves so there is at least 1 row of element between any two shelves.
- 7 Posts used with each shelf layer should be at least 1" taller than the ware.
- 8 Keep ware and kiln shelves 1" - 1 1/2" away from the thermocouple or Kiln Sitter tube.
- 9 Load the top shelf to a height where at least one element row is between the top shelf and the top of the kiln.



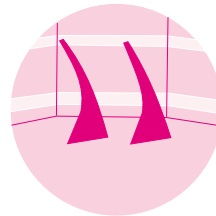
Underfired cone.



A perfect bend. Do not be concerned if the cone bends a little higher or lower than this one.



Overfired or "puddled" cone.



### How to See Cones Through a Peephole

1 Place the cones 8" - 12" away from a peephole. Positioning them closer makes them difficult to see.

2 Position cones so that when viewed from the peephole, they are silhouetted by an element on the opposite kiln wall. (Keep cones at least 2" from an element.)

3 The element that silhouettes the cones should be level with the lower part of the cone. If the element is in line with the upper part of the cone, you won't be able to see the cone when it bends.

4 Wear firing safety glasses when viewing the cones through the peephole.

## Monthly Maintenance

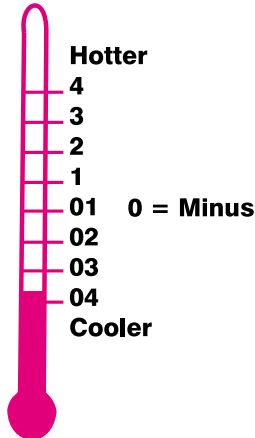
- 1 Make sure the kiln is centered on the stand.
- 2 Vacuum the kiln with a brush nozzle of a vacuum. Remember to vacuum the brick grooves.
- 3 Vacuum around and under the kiln: floor, shelves, and walls. This keeps kiln interior cleaner and adds life to the vent motor.
- 4 Check the kiln wash on shelves and kiln bottom for cracks and bare spots in the coating. Remove any glaze drips. Reapply kiln wash if needed.
- 5 Check the power cord and outlet for heat damage.
- 6 Make sure elements are not bulging out of the grooves. Repair if necessary.
- 7 Coat the inner lid surface and the top rim of firebrick with kiln coating cement every few months.
- 8 Kiln Downdraft Vent: Check the aluminum vent duct for holes.
- 9 Digital kilns: Make sure the thermocouple extends far enough into kiln. (1/4" wide: 1"; 1/8" wide: 5/8".)

### Kiln Sitter



- 1 Use the Kiln Sitter firing gauge to calibrate the trigger every 20 firings. If you do not have a gauge, order one.
- 2 Remove and examine the cone supports. Replace if warped.
- 3 Apply kiln wash to the cone supports and end of the actuating rod.
- 4 Move the actuating rod up and down. It must move freely inside the porcelain tube.

## Pyrometric Cones



Think of the cone numbers that start with "0" as minus numbers. The higher the minus number, the cooler the cone. Remember that there is a big difference between cones 6 and 06.

## Temperature Conversion

### Firing Temperature

(i.e. "Fire to 1600°F." 1600°F = 871°C)  
 $(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $(^{\circ}\text{F} - 32) \div 1.8 = ^{\circ}\text{C}$

### Firing Rate and Temperature Change

(i.e. "Fire at 200°F per hour" or "Fire 200°F hotter." 200°F = 111°C)  
 $^{\circ}\text{C} \times 1.8 = ^{\circ}\text{F}$   
 $^{\circ}\text{F} \div 1.8 = ^{\circ}\text{C}$



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