

# Kiln Firing Chart

Firing converts ceramic work from weak greenware into a strong, durable permanent form. As the temperature in a kiln rises, many changes take place at different temperatures and understanding what happens during the firing can help you avoid problems with a variety of clay and glaze faults related to firing.

Temperature		Cone	Incandescence	Event
°C	°F	(approx.)		
1400	2552	14 13 12 11	Brilliant white	End of porcelain range.
1300	2372	10 9 8 7 6	White Yellow-white	End of stoneware range.
1200	2192	5 4 3 2 01 02	Yellow	End of earthenware (red clay) range.
1100	2012	03 04 05	Yellow-orange	1100–1200°C: Mullite and cristobalite (two types of silica) form as clay begins to convert to glass. Particles start melting together to form crystals, and materials shrink as they become more dense. Soaking (holding the end temperature) increases the amount of fused material and the amount of chemical action between the fluxes and the more refractory materials.
1000	1832	06 07 08 09 010	Orange Red-orange	
900	1652	011 012 013 014 015	Cherry red	
800	1472	016 017 018	Dull red	300–800°C: Carbonaceous materials (impurities in the clay along with paper, wax, etc.) burn out. The kiln requires ample air during this stage since after 800°C sintering begins and the clay surface begins to seal off, trapping unburned materials and sulfides, which can cause bloating and black coring.
700	1292	019 020 021	Dark red	
600	1112	022		
500	932		Dull red glow Black	573°C: Quartz inversion occurs where the quartz crystals change from an alpha ( $\alpha$ ) structure to a beta ( $\beta$ ) structure. The inversion is reversed on cooling. This conversion creates stresses in the clay so temperature changes must be slow to avoid cracking the work.
400	752			Between 480–700°C chemical water (“water smoke”) is driven off.
300	572			
200	392			Upon cooling, cristobalite, a crystalline form of silica found in all clay bodies, shrinks suddenly at 220°C. Fast cooling at this temperature causes ware to crack.
100	212			Water boils and converts to steam at 100°C. Trapped water causes clay to explode so keep the kiln below 100°C until all water has evaporated.