# Firing Guide

A basic guide to kiln-firing System 96® products

The charts shown on the reverse are guidelines for kilnforming projects up to 9 mm thick. Check **system96.com** for information on firing thicker projects. These are not strict rules, of course, times and temperatures may vary with equipment.

**For faster firing:** you may wish to accelerate or simplify firing for small or less consequential projects. If so, in the Fusing Chart, eliminate segments 2 and 6. In the Slumping Chart, eliminate segments 1 and 6.

## FUSING CHART (Project thickness up to 9 mm)

| Segment | Rate (ºC per hour) | Target Temp ºC | Hold/Soak Minutes |
|---|---|---|---|
| **1. Heating I** Moderate ramp up then hold to allow soft glass to settle. Soak even longer to reduce bubbles. | 148 | 621 | 30 |
| **2. Heating II** Slow ramp to squeeze out trapped air. | 93 | 743 | 20 |
| **3. Heat to Forming Stage** Heat glass to forming temperature. Consult Forming Chart. | 204 | See Forming Chart | Desired effect |
| **4. Anneal I** Fast ramp down then hold to thoroughly equalize temperatures. | 9999 | 510 | 60 |
| **5. Anneal II** Slow cool through sensitive zone, then hold to equalize. | 66 | 425 | 10 |
| **6. Cool Down** Moderate ramp down to minimize thermal shock. | 148 | 38 | 0 |

## SLUMPING CHART (Project thickness up to 9 mm)

| Segment | Rate (ºC per hour) | Target Temp ºC | Hold/Soak Minutes |
|---|---|---|---|
| **1. Heating I** Slow ramp up to 148º then hold to equalize temperature of everything in kiln (minimizes thermal shock). | 66 | 148 | 15 |
| **2. Heating II** Moderate ramp to 593º and hold. | 148 | 593 | 20 |
| **3. Heat to Slumping Stage** Heat glass to forming temperature. Consult Forming Chart | 66 | See Forming Chart | Desired effect |
| **4. Anneal I** Moderate ramp down then hold to thoroughly equalize temperatures. | 204 | 510 | 60 |
| **5. Anneal II** Slow cool through sensitive zone, then hold to equalize. | 66 | 425 | 10 |
| **6. Cool Down** Moderate ramp down to minimize thermal shock. | 148 | 38 | 0 |

**NOTE: For the Fahrenheit version of this information, please visit System96.com.**

## FORMING CHART

| Forming Stage | Definition | Forming Temp |
|---|---|---|
| **Slump** | Glass softens and slumps to take the shape of a selected form or mold. Note: small molds may need higher temperatures and/or hold times. | 657° – 677° C |
| **Tack Fuse** | Separate glass layers are fused together with little deformation beyond softening of edges. | 732° - 743° C |
| **Contour Fuse** | Separate glass layers are fused together, edges are soft and rounded, project surface retains the degree of dimension desired by the artist (any degree beyond Tack but not yet Full fused). | 760° – 788° C |
| **Full Fuse** | Separate glass layers are completely fused into a single uniform layer, top surface is smooth and void of dimension or relief. | 793° - 804° C |

**NOTE: For the Fahrenheit version of this information, please visit System96.com.**

## New to System 96? What to Expect if You're Used to "90" COE

Test-fire System 96 using the same cycle you would use with "90" COE glasses. If you note any differences in the results, they are likely to be slight. Adjust as you wish for future firings.

## Bubble Squeeze To Reduce Bubbles Between Glass Layers

To reduce bubbles between glass layers, fire to encourage a very slow relaxing of the layers, "squeezing" air outward to the edges for release. As the fusing chart indicates, we recommend a lengthy hold at about 621° C, then a slow ramp up to 743° C. Increase the effectiveness of your "squeeze" by lengthening your Hold in Segment I and slowing your Rate in Segment 2.

Bubbles are best avoided in the design stage. Large areas of uninterrupted layering invite them. For example, a 10 x 10-inch sheet atop another 10 x 10-inch sheet leaves no easy avenue of escape for the air between glass layers. Alternately, a 10 x 10-inch sheet topped with four 5 x 5-inch pieces provides seams to vent trapped air. Design to avoid bubbles for the best prevention.

## Technical Support Answers, Advice & Assistance

System 96 is the most "fuser friendly" glass ever made. It's easy to cut, exceptionally stable and predictable through the firing cycle, and remarkably consistent from run to run. Still, kilncraft is a many faceted endeavor and there are always questions, concerns and curiosities. The System 96 web site is your first stop (**System96.com**). We maintain a "Common Questions" page as well as a System 96 *Knowledge Base* where issues and concerns are posted, along with our ideas, advice and suggestions. Still stuck? If the problem is specific to System 96, send us an email at hotglass@system96.com. We'll do everything we can to help.

## The Partnership

**System 96** is a family of products made by different companies and tested to an identical standard. Spectrum Glass Company and Uroboros Glass Studios are the primary partners. Coatings by Sandberg (CBS) is the licensed manufacturer of System 96 Dichroic glass products. System 96 products undergo three rigorous test firings before receiving their "Tested" label. Each firing result is measured for color-shift, opacification, devitrification and C.O.E. change. The red System 96 triangle logo is your assurance that a glass has been "Tested Compatible" within the System 96 family.

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