



## Fusing Schedules – for COE 90 & 96

*Introduction (Skip to page 2 to view and print the schedules)*

**Fusing**, a technique of bonding layers of glass with intense heat in a kiln, introduces stresses in the glass. To keep your glass from breaking (and your project from ruin) the temperature in the kiln must rise at a specific rate, and must cool at a specific rate, resting at several temperature points along the way. The best method of fusing is with a digitally-controlled kiln designed specifically for working with glass. Most fusing sessions take 8-12 hours, plus several hours to return to room temperature before you can open the kiln.

For those interested in physics, I recommend researching the fusing process to understand what each of those rest points means. For most of us, it's enough to know that every type of glass, as represented by its COE (Coefficient of Expansion) number, requires a different fusing schedule, and the artisan must program the correct schedule into the kiln's controller.

The schedules on the following pages are my personal schedules, developed over time through experience. You'll probably find slightly different schedules on different websites, as each glass worker tends to tweak their schedules according to what works best with their kiln, and glass manufacturers occasionally publish new recommendations. These schedules work for me, and I hope they will work for you. To use them, first find the glass type – COE 90 or 96 – that you are using for your project, and select the schedule for Fahrenheit (yellow) or Celsius (blue). Two programs are available in each set: Rd and Rm.

Rd should be used for kilns that refer to rate as the number of degrees the temperature in the kiln's chamber should change in one hour. Rm should be used for kilns that refer to Rate as the number of minutes the kiln should spend reaching a target temperature. If a kiln should heat to 500 degrees in 2 hours, Rd would be 250, but Rm would be 120. The results would be the same, but obviously you must know what kind of kiln you have before selecting a schedule.

In my schedules, T = Target Temperature and H = Time, where the first value is hours, and the second is minutes. (80 minutes would be written H1.20.) If your kiln programs time only according to the number of minutes, you must change the schedule to reflect this (ie 1 hour = H60).

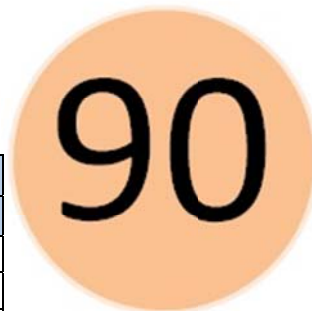
FULL refers to programming the kiln to change temperature as quickly as possible. The last step of each schedule is END, which shuts off your kiln. Refer to your kiln's instructions on how to program the FULL and END commands.

For information about how to design and make fused objects, how to prepare your kiln for firing, how to make molds, explanations of full fuse, tack fuse and slump fuse, and much more, I'm pleased to refer you to my book, ***The Glass Artist's Studio Handbook***, published by Quarry Books/Rockport Publishers (June 2011).

Sincerely,  
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**Fusing Schedules -  
Full Fuse- 90 COE Glass**



Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd530 - T932 - H0.01	Rm100 - T932 - H0.01	Rd300 - T500 - H0.01	Rm100 - T500 - H0.01
2	Rd250 - T1479 - H0.15	Rm120 - T1479 - H0.15	Rd150 - T804 - H0.15	Rm120 - T804 - H0.15
3	FULL - T968 - H2.00	FULL - T968 - H2.00	FULL - T520 - H2.00	FULL - T520 - H2.00
4	FULL - T860 - H2.00	FULL - T860 - H2.00	FULL - T460 - H2.00	FULL - T460 - H2.00
5	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
6	End	End	End	End

**Tack Firing - 90 COE Glass**

Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd530 - T932 - H0.01	Rm100 - T932 - H0.01	Rd300 - T500 - H0.01	Rm100 - T500 - H0.01
2	Rd220 - T1436 - H0.15	Rm120 - T1436 - H0.15	Rd140 - T780 - H0.15	Rm120 - T780 - H0.15
3	FULL - T968 - H2.00	FULL - T968 - H2.00	FULL - T520 - H2.00	FULL - T520 - H2.00
4	FULL - T860 - H2.00	FULL - T860 - H2.00	FULL - T460 - H2.00	FULL - T460 - H2.00
5	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
6	End	End	End	End

**Slump Firing - 90 COE Glass**

Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd280 - T932 - H0.01	Rm180 - T932 - H0.01	Rd166 - T500 - H0.01	Rm180 - T500 - H0.01
2	Rd750 - T1202 - H0.20	Rm20 - T1202 - H0.20	Rd450 - T650 - H0.20	Rm20 - T650 - H0.20
3	Rd750 - T1400 - H0.30	Rm20 - T1400 - H0.30	Rd450 - T760 - H0.30	Rm20 - T760 - H0.30
4	FULL - T1202 - H.040	FULL - T1202 - H.040	FULL - T650 - H0.40	FULL - T650 - H0.40
5	FULL - T968 - H1.40	FULL - T968 - H1.40	FULL - T520 - H1.40	FULL - T520 - H1.40
6	FULL - T961 - H1.40	FULL - T961 - H1.40	FULL - T516 - H1.40	FULL - T516 - H1.40
7	FULL - T860 - 1.40	FULL - T860 - 1.40	FULL - T460 - H1.40	FULL - T460 - H1.40
8	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
9	End	End	End	End

### Full Fuse- 96 COE Glass

Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd530 - T932 - H0.01	Rm100 - T932 - H0.01	Rd300 - T500 - H0.01	Rm100 - T500 - H0.01
2	Rd230 - T1450 - H0.10	Rm120 - T1450 - H0.10	Rd140 - T788 - H0.10	Rm120 - T788 - H0.10
3	FULL - T950 - H1.40	FULL - T950 - H1.40	FULL - T510 - H1.40	FULL - T510 - H1.40
4	FULL - T882 - H1.40	FULL - T882 - H1.40	FULL - T472 - H1.40	FULL - T472 - H1.40
5	FULL - T824 - H1.40	FULL - T824 - H1.40	FULL - T440 - H1.40	FULL - T440 - H1.40
6	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
7	End	End	End	End

### Tack Firing - 96 COE Glass

Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd530 - T932 - H0.01	Rm100 - T932 - H0.01	Rd300 - T500 - H0.01	Rm100 - T500 - H0.01
2	Rd180 - T1346 - H0.20	Rm120 - T1346 - H0.20	Rd115 - T730 - H0.20	Rm120 - T730 - H0.20
3	FULL - T950 - H1.40	FULL - T950 - H1.40	FULL - T510 - H1.40	FULL - T510 - H1.40
4	FULL - T882 - H1.40	FULL - T882 - H1.40	FULL - T472 - H1.40	FULL - T472 - H1.40
5	FULL - T824 - H1.40	FULL - T824 - H1.40	FULL - T440 - H1.40	FULL - T440 - H1.40
6	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
7	End	End	End	End

### Slump Firing - 96 COE Glass

Schedule for working in Fahrenheit (F°)			Schedule for working in Celsius (C°)	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	Rd530 - T932 - H0.01	Rm100 - T932 - H0.01	Rd300 - T500 - H0.01	Rm100 - T500 - H0.01
2	Rd950 - T1292 - H0.30	Rm20 - T1292 - H0.30	Rd600 - T700 - H0.30	Rm20 - T700 - H0.30
3	FULL - T950 - H1.40	FULL - T950 - H1.40	FULL - T510 - H1.40	FULL - T510 - H1.40
4	FULL - T882 - H1.40	FULL - T882 - H1.40	FULL - T472 - H1.40	FULL - T472 - H1.40
5	FULL - T824 - H1.40	FULL - T824 - H1.40	FULL - T440 - H1.40	FULL - T440 - H1.40
6	FULL - T165 - H0.01	FULL - T165 - H0.01	FULL - T75 - H0.01	FULL - T75 - H0.01
7	End	End		End