

Lampworking Annealing Schedules – for Bottle Glass

Lampworking, a technique of creating glass beads (and other glass objects) in the flame of a torch, introduces stresses in the glass that must be released through *annealing* if your bead is to be strong. Annealing is a process that gradually cools glass, resting it at several temperature points along the way while bringing it slowly down to room temperature. The best method of annealing is with a digitally-controlled kiln designed specifically for beadmaking. Annealing beads typically takes six to seven hours from the moment you put your last bead in the kiln until you can take your beads out of the kiln.

I developed the schedule provided here to work with bottle glass. This schedule should not be used for any type of commercial art glass (stained glass, lampworking rods, or fusing glass). These schedules have been tested on standard bottles and broken glassware from the USA, China, Israel, and Europe, with good results. They work well for me, and I hope they will work well for you. Feel free to tweak them over time, if your experience shows that a longer/shorter rate will serve you better or if your favorite glass manufacturer recommends a different temperature.

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.

The first step of each schedule is your work time, and so is quite lengthy. When you finish your lampworking session, there is no need to continue step 1: After shutting down your torch, manually SKIP your kiln to step 2 to begin the annealing process. The last step of each schedule is END, which shuts off your kiln. FULL refers to programming the kiln to change temperature as quickly as possible. Refer to your kiln's instructions on how to manually SKIP and how to program the FULL and END commands.

For information about how to make beads, how to sculpt hot glass, how to batch anneal, how to set up a lampworking studio, and much more, I'm pleased to refer you to my book, *The Glass Artist's Studio Handbook*, published by Quarry Books (June 2011).



Schedule for working in Celsius – Bottle Glass			Schedule for working in Fahrenheit – Bottle Glass	
Step	Rd Program	Rm Program	Rd Program	Rm Program
1	FULL - T535 - H7.00	FULL - T535 - H7.00	FULL - T995 - H7.00	FULL - T995 - H7.00
2	FULL - T535 - H1.00	FULL - T535 - H1.00	FULL - T995 - H1.00	FULL - T995 - H1.00
3	Rd100 - T480 - H1.00	Rm30 - T480 - H1.00	Rd180 - T896 - H1.00	Rm30 - T896 - H1.00
4	Rd100 - T300 - H0.01	Rm120 - T300 - H0.01	Rd160 - T572 - H0.01	Rm120 - T572 - H0.01
5	FULL - T65 - H0.01	FULL - T65 - H0.01	FULL - T149 - H0.01	FULL - T149 - H0.01
6	END	END	END	END

T = Target Temperature

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).

