



Firing Schedule/Record — Documentation

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Introduction

The Firing Schedule/Record is provided as a Microsoft™ Excel™ Workbook, for an eight-stage controller with a ramp *and* soak permitted at each stage. The Firing Schedules are intended for computer data entry and storage, and are in a format that should be acceptable to any version of Excel from 95 onwards.

The workbook was designed for an Evenheat GTS23-9 with RampMaster II controller; however it can easily be modified for other controllers with more stages or different programming schemes. If you have any problems or are not confident in modifying Excel, ask your local IT expert and give them these instructions. It should only take a few minutes.

Instructions for Use

As distributed each worksheet is unable to be altered (the cells are protected) except for (a) personalization and (b) cells where the user should enter data for each firing. Download the relevant file, open it in Excel, and edit the template to suit your name and your type of kiln. Then save and you have a template you can use in future.

The cells you can fill in for each firing are shown in **pale blue** on a colour screen. To set up a firing schedule, open the template, enter the data and save it under another name. The stage times and the real time of stage ending will be automatically calculated.

There is room for optional notes on the project and on the firing progress. Two kiln programs are catered for, to allow for a fusing and a slumping.

In practice, the sheet might be tentatively filled out and printed for ready reference. Actual information may be jotted down on the sheet as firing progresses, and the file modified afterwards to serve as an accurate record of the firing or the annotated sheet filed away. Personally, I keep all my data electronically rather than on bits of paper.

Features

- Whether the stage is up (▲), down (▼) or involves a soak (=) is shown in the first column.
- The stage times are automatically computed from the schedule part, but the kiln may not achieve them if the elements cannot achieve an up rate or cooling cannot achieve a down rate.
- The clock time is automatically computed from your start time, and also indicates when the **top temperature** is likely to be reached so you can be at the kiln to look inside and intervene if desired. You can set an alarm to be at the kiln to monitor

fusing, slumping, etc, and to do crash cooling (aka flash venting, if used). This time is slightly conservative since if the kiln cannot achieve the rates set in its program you will be early.

- The elapsed times are computed from the clock times, so if you replace a computed clock time by an actual clock time for the end of a stage after the firing, the elapsed time will alter too (but the stage time won't). This was a deliberate decision.

Modification for circumstances

Paper Size

The files will fit on either International A4 or American Letter (8½"x11") paper. A4 users can get a bit more space at the bottom of the sheet, while Letter users get wider margins. The files are distributed with A4 paper size set, so if you live in the USA you will need to do a **Page Setup** on the template before saving it.

Celsius/Fahrenheit

No change is needed, as long as your temperatures and the ramp rate are both in the same scale (°C and °C/hr for example). Celsius is called Centigrade in the USA.

Unprotecting and reprotecting (IMPORTANT)

To make any of the following changes, open the file then choose **Tools/Protection.../Unprotect Sheet**. Make the changes, then after you have finished choose **Tools/Protection.../Protect Sheet**.

AM/PM time representation

The sheet is set to the 24 hour clock by default. If you want to see an am/pm time, select all the clock time cells, and choose **Format/Cells...** Then choose Times, and an appropriate am/pm format.

Ramp data in 7minute

If your controller requires degrees per minute instead of degrees per hour, alter the heading of the ramp time column to “°/min”, then alter all the formulas for the stage time cells by deleting “*60”.

Controller with less stages

To *reduce* the number of stages, delete the appropriate number of rows from the middle of the schedule (never delete the first and last stage).

Controller with more stages

If your controller has more stages than eight, you might want to delete the second firing table to save space for comments.

To *increase* the number of stages, select row 3 of the schedule, insert enough new rows above it, then copy row 2 to all of the new rows. Note the following:

- The stage numbers and the signals should adapt automatically to the new number of stages.

- The stage times for a *Ramp+Soak* controller are computed by a formula that is essentially $(T_2 - T_1) / \text{Ramp} + \text{Soak}$.
- The clock time is computed as the time in the preceding row plus the stage time, and should need no modification if you've chosen the right kind of controller. Neither should the elapsed time, which is calculated from the clock time.
- The top temperature is calculated as the highest value in the temperature column by $\text{MAX}(\text{StartT}_m : \text{EndT}_m)$ where m is 1 or 2 depending on the table. In *Ramp+Soak* controllers this plays three roles: two in the conditional formatting in the temperature column and the notes column, and a conditional time displayed in the notes column.