Flatwork and Open Face Molds: Firing Deviation Factors

There are many reasons and factors for deviating from standard firing tables. A few common ones are outlined below.

Double the maximum finished glass thickness to slow down heating and cooling ramps:

Uneven load on refired slab: When frit or other components are mounded on a prefired slab
Thickness variations: When the maximum thickness of the design is more than twice the thinnest
Irregular edges: When the edges of the work are wavy, inconsistent, or have long tapered points
If your kiln has top elements only, and you want to fire over 1 inch / 25mm thick anyway
Heavy molds: When firing in molds over 2" thick, especially dense ones such as plaster

Add 50% to the maximum finished glass thickness for each factor listed below to slow down ramp rates:
(Add 100% when both factors apply):

Very full kiln: If the kiln is very full, and air circulation area is limited
Color variations: This guide is based on experience with works combining colors. However, for works containing strong colors or extreme color variation, slow ramp rates to an assumed 50% thicker rate.

To decrease devit or limit bubble rise: speed up the ramp-up rate from 1200F (649 C) to peak temp

Color variations:
To limit open bubbles on the top surface: If mold details are filling OK, simply decrease soak time at peak temperature. If mold details are not filling well, add to the soak at 100F/538C, and slow the ramp up to peak.

Drying plaster molds: Predry by ramping slowly to 200 F (93 C), holding, then continuing ramp to 600 F (316 C). This will drive out the moisture and minimize surface scum on the glass. If you must dry the mold during a glass firing, add a hold to your up-ramp at 200 F (93 C) to dry the mold. Vent the kiln until mold is dry. Larger molds require slower ramps and longer hold times.

When speed is important: Increasing speed from these recommendations is certainly possible in certain situations, such as faster heat ups for first firings of frit, for very small objects (under 6 inches/152 mm diamter), or for single color/consistent thickness/smooth edged shapes. The best procedure is to use caution when shaving time off any ramp: take small sequential steps, and test for success before investing a lot of time or materials into a final piece. Measure temp differentials between the immediate top and bottom of the work during annealing and cooling to determine a maximum ramp rate. A good rule of thumb is that there should be less than 10 °F (5.5°C) differential during anealing, and less than 20°F (11°C) differential durring cooling ramps. If you record bigger differentials, choose slower ramp rates. Richard Whiteley's article and sketches on this topic in the 2008 GAS Journal are helpful.

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