



## General Firing Information

When firing a new kiln or one that has undergone repairs or disturbance, place and watch a Self-Supporting Cone at three levels within the kiln chamber.

If you are ever in doubt about a firing, simply **press STOP or unplug it**. Never chance ruining an entire load of ware if something has toppled off its stilts, if you hear odd noises, or if the kiln has been jarred. You won't harm your ware by shutting the kiln off before maturity. Simply set fresh Self-Supporting Cones on the shelves and begin again. (If you're firing with a KM-1 wall-mounted controller, replace the Junior Cone in the Kiln-Sitter each firing.)

Because you will keep the top peephole unplugged during the entire firing, **never** unplug any of the lower peepholes for more than a few seconds. This causes a strong convection "jet-draft" which can easily fracture ware and chill the cones in the kiln, particularly visible cones placed behind that particular peephole.

To determine the adjusted end firing temperature in Cone Fire Mode, press **Enter** to get a blinking temperature, then press **Review**. (In Ramp/Hold Mode, this procedure will flash back the program just fired.)

### PRE-FIRING CHECKLIST

#### Load kiln.

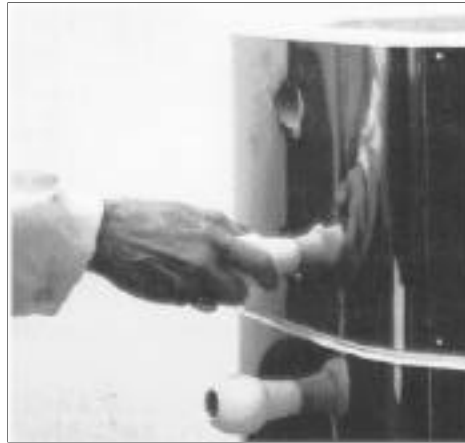
- ❑ Set Self-Supporting Cones while loading. See loading instructions for more detailed information.

#### Kiln ventilation.

- ❑ The lid needs to be propped 2 1/2" until the internal temperature of the kiln reaches approximately 1000½F, at which time it is lowered.
- ❑ If you are using a positive kiln ventilation system such as the Skutt EnviroVent, the lid does not need to be propped and peep hole plugs remain in place throughout the firing. Refer to the EnviroVent instruction manual for complete details.
- ❑ Suggestion: You may wish to place a final kiln shelf on posts above your load to deflect any cool air coming in from the top of the kiln



- ❑ Before firing, plug peepholes except the top one, which is always left open. This will allow fumes to escape. (Not necessary when using the EnviroVent.)



#### Firing speed.

- ❑ Keep in mind the heating rate for each of the speeds: slow, medium and fast. Consider that the best firing time is from 5-7 hours for a Cone 04-06 bisque or glaze firing and from 7-10 hours for stoneware and porcelain.
- ❑ Using this information, program the kiln for the firing cycle that best suits the ware you are firing. See *The KilnMaster Controller* section for detailed information regarding programming.

#### Wall mounted controllers.

- ❑ Kilns with a limit timer need to be set for 20 hours when operating with the KilnMaster controller.
- ❑ Use a Junior cone one to two cones hotter in the Kiln-Sitter as a backup for the controller. See the section on the Wall Mounted KilnMaster Controller for more specific information.

#### Caution:

While the KilnMaster has an excellent operating record, **we recommend that you do not leave the kiln unattended during firing.**

#### COLD WEATHER OPERATION

While it is possible to operate a KilnMaster-controlled kiln in cold weather, the relays which must open and close freely can tend to stick at low temperatures.

We recommend that your work space be heated to at least 40½ F for proper KilnMaster operation.

If the temperature in your kiln area is near or below freezing (32½ F), use a space heater or hair dryer to gently prewarm the controller box and thermocouple to 40½ before starting the firing program.



## TYPE OF FIRING

This section gives you some useful tips for various types of firings. Please keep this information in mind as you program the KilnMaster.

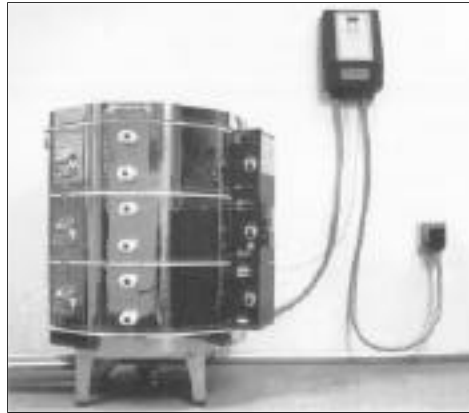
### Venting

The use of a positive flow downdraft kiln ventilation system such as Skutt's EnviroVent pictured at right keeps the lid down and all peep hole plugs in place throughout the firing. This will provide many benefits, such as:

- a healthy work environment by removing fumes from work area
- more even heat distribution from top to bottom of kiln
- less color migration between glazes
- eliminates the necessity to lower the kiln lid during firing
- improves the end firing results of red glaze.

The most convenient feature is not having to lower the kiln lid during firing.

### Underglaze firing



Greater detail can be preserved in conventional and one-stroke underglaze decoration if it is first set by an 019 firing before glazing and then glaze firing. If the decoration was applied directly to greenware, the underglaze fire acts as the bisque, and therefore should be a full Cone 04 firing.

### Ceramic glaze firing

**Warning:** Use only lead-free or lead-safe glazes on any surface which may come in contact with food or drink.

If your ware has been fired to Cone 03 or 04 and is properly glazed, dried, and loaded, an 06 or 05 low glaze fire or 6 to 10 high fire will normally produce a flawless surface. If not, consult the ware imperfections section of this manual.

Crystalline glazes often require special firing to develop fully—including a soaking period at slightly reduced heat after maturity is reached. Experimentation is generally needed to discover the correct amount of soak time and correct soak temperature for your glaze formulation. Once your firing schedule is perfected, store it in permanent memory in Ramp/ Hold mode.

### "Greenglaze" one-fire ceramics

With the talc clay bodies and prepared glazes available to the ceramist today, some prefer to "one-fire" their ceramics. In some instances you can satisfactorily glaze a piece of greenware and complete it in a single firing, maturing the clay body and the glaze at the same time. However, because there may always be residual moisture in the clay body, persistent cratering and pin holing may occur, as well as off-color spots from impurities burning out of the clay. Fire to at least Cone 05, or preferably to Cone 04.

### Overglaze fires.

**China paints.** If fired too hot, fine detail will be blurred. If fired too cool, china pigments will not be absorbed into the glaze and will quickly wear off. Fire until the paints acquire a sheen similar to the surrounding glaze. With practice, this can

be judged through the peephole. By setting a group of guide cones, you can note which cone is down when the sheen matches, so you can program exactly to this cone the next firing.

This temperature will vary over several cones if widely different colors are used. High quality will be achieved only by applying and firing the higher temperature colors first, followed by lower temperature ones. The required temperature also varies with the softening temperature of the parent surface.

For ceramic and porcelain articles other than tableware, a single Cone 019 firing will often be a good compromise.

**Metallics** (gold, platinum, copper, and other). These will fire dull if applied too sparingly, or if underfired. Overfiring, particularly of larger areas, results in reticulation or "crocking"—shrinkage of the metal, leaving a network of glaze lines exposed. Greater overfiring results first in spotty, then total disappearance of metal through vaporization. On ceramics and porcelain start with Cone 019. Metallics and green glaze are usually incompatible.



**Lusters.** Luster may flake off if applied thickly and will “frost” if overfired. To start over, fire to 06-05. Keep ware well away from kiln elements. Fire to 019 for durability, drop to 020 if frost is encountered. Lusters are extremely sensitive to contamination by kiln vapors, particularly those from greens, and lid ventilating must sometimes be continued at 1/2” or 1” throughout the firing.



**Overglaze.** Breakage of ware during overglaze firings can usually be traced to roughly-handled, unevenly-dried or unevenly-sponged greenware. In general, there is less trouble with art porcelain than with ceramic pieces, and least with high quality, pre-glazed, dry-footed imported china blanks.

Firing schedules for overglazes can usually be accelerated because the ware is entirely free of moisture. A fast firing rate will be appropriate for this type of ware. The lid remains propped until the odor from the burning medium is no longer detected. Under-ventilation is the biggest cause of problems. Of course, if you are firing with an EnviroVent, this will not be a concern.

#### **Firing porcelain.**

Art porcelain should be bisque fired to Cone 5 or 6 (not 05-06) in your Skutt kiln unless glaze is to be applied, in which case a soft 05 or 06 non-vitrifying fire is appropriate. Ware should be loaded and sup-



ported as noted in the loading instructions. Begin lace fires with the lid posted open 2 1/2”. Optimum quality can be achieved several ways:

1. By not loading the kiln very heavily with ware or extra shelves.
2. By bisque firing twice; one to the firing temperature of the clay, and another to one cone equivalent cooler. Wet-sanding with a fine grit silicon carbide paper between firings will maximize smoothness in the finished piece.
3. “Soaking” for 30-45 minutes slightly lower than the maturing temperature will add sheen to the porcelain. The process for soaking is discussed in the section about glaze firing.

Porcelain glaze is usually fired to maturity of the clay and dry-footing is still essential.

Overglaze decoration is fired exactly as with ceramics, but usually 2 to 4 cones hotter (017-015) to produce penetration, gloss and durability on the higher-softening glaze. Overglazes are also frequently applied directly to porcelain bisque that is to remain unglazed. Fire to the above cones.

#### **Firing stoneware.**

Most Skutt kilns (except a few 208V models and KM-614-3) can attain Cone 8 or Cone 10. Because stoneware shapes are designed for self-support during firing, the glaze can be matured at the same time as the body, particularly because the pinholes, sunbursts and scumming which tend to accompany one-firing are often highly prized in stoneware. Pieces are dry-footed, of course, and loaded as previously described.

The procedure for stoneware differs from that for one-fire ceramics in that the plain or decorated greenware is usually first given a low bisque firing to Cone 016-04 before glazing. Due to the ware’s thickness, the firing rate must be much slower and more prolonged than in other types of ware.

While the typical overglaze decorations are rarely considered suitable on stoneware, Cone 06-04 reds, oranges and crackles are sometimes added after firing to provide effects unobtainable at the higher temperatures. Warm (130°F/54°C) the vitrified ware to facilitate application of glaze.

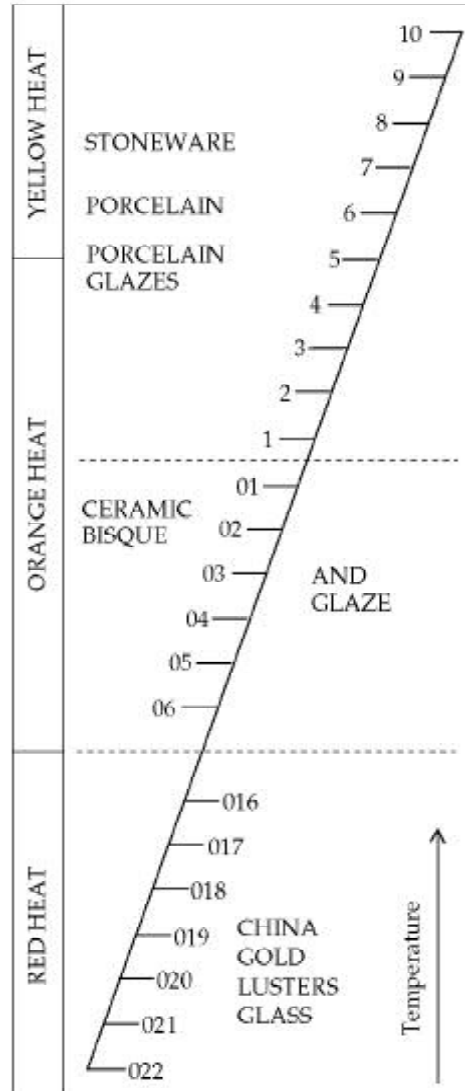


### Firing glass.

**Sagging** of sheet glass and bottles is carried out in terra cotta molds dusted with whiting (calcium carbonate) or one of several similar tradename separators. Use the Ramp/Hold Mode for glass sagging. This will allow you to program your own specific rate of climb and hold temperatures.

**Glass decoration** can often be carried out with conventional china paints, metallics, and lusters when the glass is being fired to sagging temperatures. Freestanding tumblers and other vessels can rarely be taken above Cone 022 without wilting, so at such low temperatures the special glass stains, golds and lusters produce more dependable results.

Quick Reference Chart



## The KilnMaster Controller

### DURING THE FIRING.

What you'll see is the internal temperature of the kiln displayed in the window of the controller as the temperature increases. The options available during the firing are:

- **Review** program at any time.
- **View** Current Segment of Ramp/Hold Program.
- Press **Stop** to interrupt a firing for any reason.

Please refer to the Key Functions section of the manual for detailed explanations of the functions.

### AFTER EACH FIRING.

1. When the firing is completed, the display will alternately indicate "CPLT" for complete and show the firing time in hours and minutes. Press **Enter** to display the current internal temperature. The KilnMaster will adjust the shutoff temperature to correspond to the actual heating rate the kiln can achieve. This may or may not be the programmed value. To see the adjusted value, press **Review** immediately after activating the touch pad.
2. Allow the kiln to cool naturally. Never unplug other peepholes or post the lid until the ware is cool enough for barehanded unloading, about 130½F.
3. When unloading, be sure to examine the Self-Supporting Cones on the shelf to determine if the kiln is firing correctly.