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# SKUTT

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KS MANUAL KILN  
OPERATING  
MANUAL

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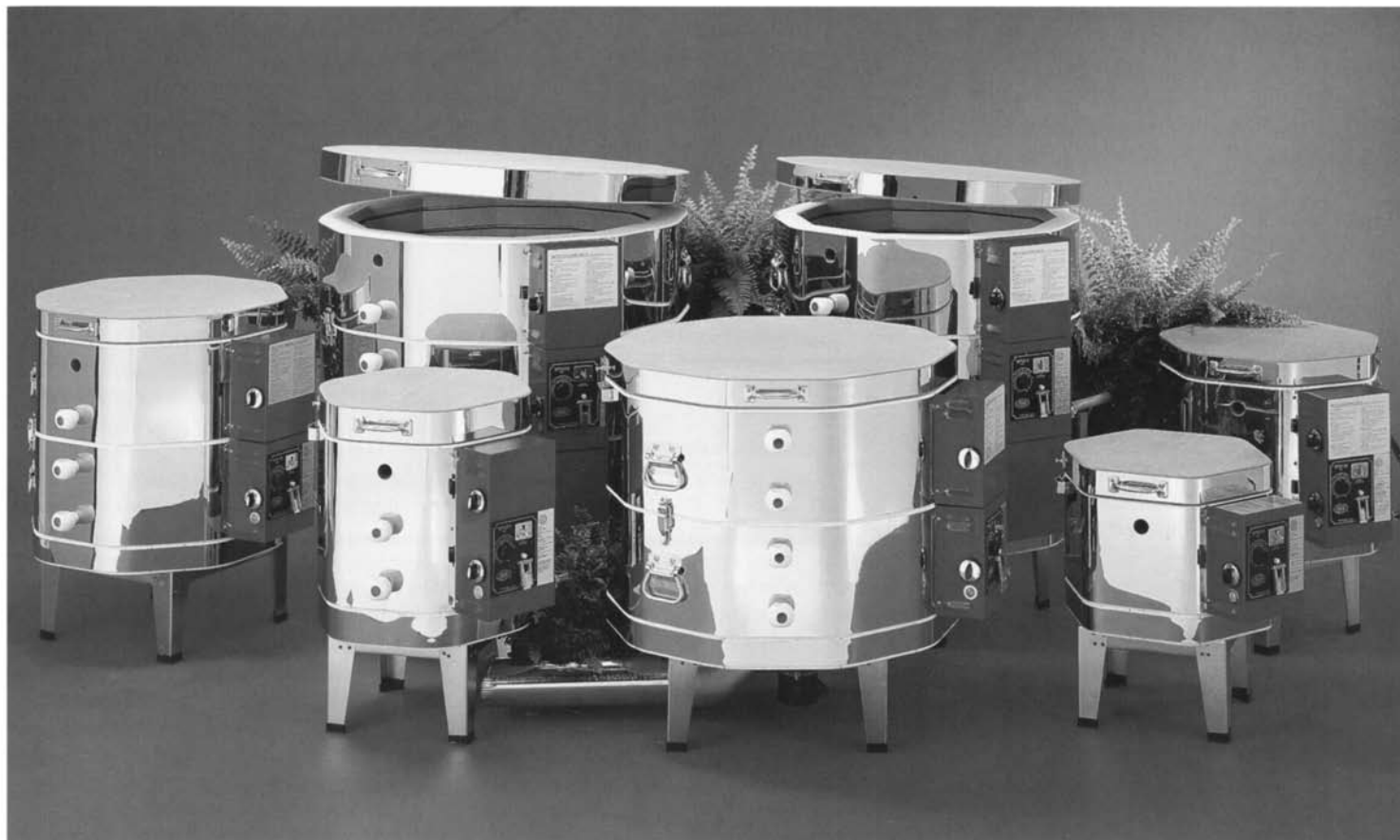
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**Warning: Kilns should not be used by unsupervised children. Read and follow all safety labels on the kiln.**

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## Congratulations!

**You've made a great choice from the proven Skutt KS kiln line.**

Skutt has improved its kiln. While the clean, sleek, aesthetically appealing look of the kiln boxes has not changed, some slight variations have taken place. Specifically, the interbox plug and receptacle that join the sections together are now history. We borrowed the patented hinge design used on our KilnMaster line of kilns to create a control box that does not need a connecting plug and receptacle. What this means to you is easier access to the element pigtails, switches and other electrical parts. We hope you will be as excited about this improvement as we are.

**First, read this entire manual before you do anything else.**

At Skutt Ceramic Products, we created and refined the multi-sided electric kiln. And although there are many imitators, frankly we still believe that no kiln is designed with more understanding or manufactured with more care.

Even so, for complete safety and consistent results, you must understand the principles behind ceramic firing and how your kiln works. Whether you have owned an electric kiln before or not, please take the time to read this manual from cover to cover. We think even the most experienced veteran will learn a few new tips.

## What you'll find in a quality Skutt kiln—and why.

**Brick.** Skutt kilns are constructed of the finest insulating fire brick available today, offering strength, cleanliness and long life. All bricks are precision cut and grooved to assure tight fit, perfect element support and ease of replacement. Because of their porous composition, insulating fire brick

are fragile. Always handle your kiln and its brick with care. The brick in your kiln may begin to show some fine cracks after the first few firings, especially after Cone 10 high firings. This is normal and does not harm the structural integrity of the kiln or impair its functioning.

**Elements.** The highest quality iron-aluminum-chromium (Kanthal-type A-1) element wires are used in all Skutt kilns. All multi-sided Skutt kilns are high fire type and are designed to reach Cone 8 or 10 (except 208V KS-1227 Cone 5 and KS-1027 Cone 6). Elements are thoroughly tested both before and after installation for assured performance and even firing. Element life will vary depending on whether the kiln is used primarily for low firing of bisque or greenware, or high firing of stoneware and porcelain.

Unpack carefully



Elements will last for many firings if treated carefully. Remember these points, 1. Keep the element groove free of debris; bits of bisque, glaze, cones, metal or high fire kiln wash will immediately fuse to an element and proceed to eat through it. Kanthal elements become brittle after repeated firings, so be extremely careful not to break them by scraping. 2. Never attempt to fire above Cone 1 without first removing the blank ring (if you use one).

**Switches.** For long life and dependability, the switches in your Skutt kiln are rated considerably higher than the electrical loads they carry.

**Pilot lights.** All Skutt automatic kilns are equipped with pilot lights to show

you when the kiln is on.

**Stainless steel jackets.** Only the finest grade stainless steel is used in Skutt kiln jackets, selected for its expansion qualities, so that the bricks are never unduly stressed, yet are fully supported during all stages of heating and cooling. Stainless steel may discolor with repeated heating.

**Lid brace.** The lid brace holds the lid securely open for loading and unloading the kiln. As you open the lid, allow the lid brace to follow over the anchor pad and screw that is attached to the side of the kiln. Simply allow the notched end of the brace to engage anchor pad and screw allowing the lid to rest in a full upright position.





## Locating and unpacking your kiln

### UNPACKING AND CHECKING.

Your kiln has usually traveled a long way by railcar or truck to get to you. Even though it was carefully packed at the Skutt factory, it could have been mishandled in shipping. If you find any problems as you unpack, do this: 1. Call your freight agent and ask for an inspection. 2. Save all the packing materials. 3. Contact the dealer where you bought your kiln. 4. Don't assemble or fire your kiln until your damage claim has been inspected. Fortunately, few Skutt owners will experience any problems.

**Location.** For safety and convenience follow these basic rules.

1. Locate your kiln near your present electrical outlet or where a new circuit can be installed with least cost. Position the kiln to the left of your electrical outlet so the cord will have an easy run and will not place a strain on the plug or outlet.

2. Install it in a well ventilated, sheltered area such as a carport that is wind protected on three sides, garage, utility or hobby room. It should be convenient to your clay working area, and out of the way of other traffic.

3. Allow at least 18" of space between your kiln and adjacent walls.

4. Keep curtains, aprons, plastic or other flammable materials away from your kiln.

5. Never fire your kiln within a four sided cabinet or closet. The fourth side

must always be open to room air to prevent the kiln from overheating surrounding surfaces. It is best to leave at least two sides open for easy access to controls and peep holes

6. If possible, locate the kiln in a room with a cement floor.

### SETTING UP THE KILN.

1. Remove the metal straps. The bottom tray of each carton is attached to a wooden pallet. The kiln rests on foam packing material which is on the bottom tray. The bottom portion of the carton is stapled to the tray. After removing the staples from the tray, the carton will lift straight up exposing the assembled kiln. There is foam packing material that will fall loose from the kiln when the carton is lifted. Remove the plastic bag and paper shields.

2. Remove the tape securing the lid brace rod. Open the lid, remove the plastic cover and carefully remove the kiln stand and "goodie bag" from the inside of the kiln. Close the lid.

3. For larger, heavier kilns you may choose to remove the lid from the top section. This will reduce the overall weight. To do this remove one cotter pin from the lid hinge rod and slide the lid rod out of the lid hinge assembly. Also remove the thumbscrew and lid brace. Place lid on a clean, flat surface.

4. Remove the black plastic feet from the "goodie bag" and put them on the stand legs. Set the stand in the location you have designated for the kiln. See the previous section on locating your kiln if you are not sure about the safety require-



ments for the kiln site.

5. If you purchased a three phase kiln, a separate box (labeled "Do Not Discard 3-Phase Contactor enclosed") containing the contactor necessary to operate the kiln is located in a corner of the carton with the kiln.

6. There are section handles on the kiln. With a partner, lift the kiln, using the lower section handles, off the kiln floor and rest on a clean, flat surface.

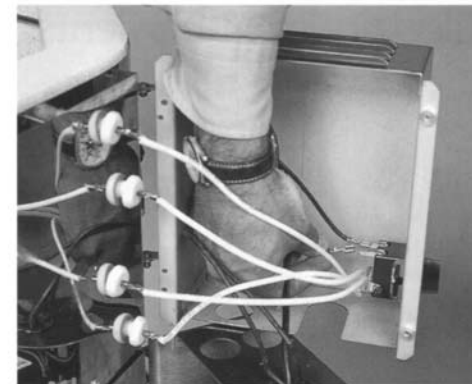
7. You may separate the kiln into sections if it is too heavy to move as described above.

- a.) The control panels of your kiln have a hinged box for easy removal. Remove the screws on the left side of the upper and lower section boxes that secure them to the kiln.

- b) Swing the panel to the side.

- c) Slide the connectors off of the switch and unscrew wing nut from the ground stud.

- d) Move the section to a clean, flat sur-



face.

7. Position the kiln floor on top of the stand making certain that the weight is evenly distributed.

8. Level the kiln. Make sure the stand and kiln floor are level and do not teeter. Leveling problems may put unnecessary stress on the kiln during firing. To level the stand, place firm shims under the legs (never above them touching the kiln). Center the kiln's bottom slab on the stand and double-check teetering.

9. Restack the kiln sections.

- a) Slide the connectors onto the switch and return lock washer and wing nut to the ground stud.

- b) Close the boxes and secure with screws.

10. If the lid was removed in step 3 above, place the lid on top of the kiln, replace the lid hinge rod with cotter pin and the lid brace.



## Electrical requirements.

Most important to proper operation of your new kiln is to make sure it has enough of the correct power to operate it. If this is done, your kiln will give you years of satisfying service; if not, your first firing could be disappointing or even disastrous for your kiln.

The following chart shows the recommended electrical specifications for each kiln model. If you are uncertain about your existing outlets, have them checked by an electrician. If you are installing a new wall receptacle, have the electrician follow this guide.

### ADDITIONAL POWER NOTES

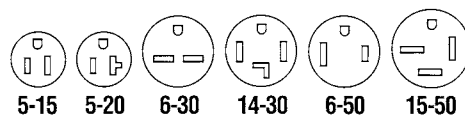
**Three-phase operation**—Only special order Model KS-1027 and KS-1227 will operate on a three-phase supply. However, any Skutt kiln can be properly powered via unbalanced connection to two of the three hot wires of a three-phase supply. Of course, the green safety ground connection provided in all Skutt power cords is also used.

**Three-phase installation**—Three-phase Models KS-1027 and KS-1227 are shipped with a special gray contactor box, measuring about 6 x 7 x 4 1/2 inches. This box is fed by wires from your breaker box, and must be wall mounted by an electrician precisely following the wiring diagram at the back of this manual. **Note:** The contactor box is in a separate package inside the kiln carton.

**208 versus 240 supplies**—As you can see from the chart, most Skutt models are available in either 208 volt or 240 volt versions. The exception is Model KS-714 which is universal, and will fire with 240V or 208V power.

The “120/208V” supply is increasingly encountered in schools and newly-built communities, because it’s more efficient for heavy 120V loads. This affects Models KS-818, KS-1018, KS-1027 and KS-1227 because their elements receive the full 208 (or 240) applied volts. The 208V versions should never be fired on a 240V supply without first installing a full set of 240V elements. Otherwise, all components will be seriously overtaxed.

### NEMA RECEPTACLE GUIDE



### Electrical requirements for Skutt KS Model Kilns

Model	Volts	Amps	Watts	Copper Wire Size*	Fuse or Breaker Size	NEMA Receptacle Configuration
KS-609	115	17	1950	10	20	5-15
KS-614-3	115	20	2300	10	30	(Canada) 5-30
KS-614-3	115	20	2300	10	30	5-20
KS-714	240-208	20	3600	10	30	14-30
KS-818P	240	21.7	5220	10	30	6-50
KS-818P	208	24	4990	10	30	6-50
KS-818PWR	240	32.6	7820	6	45	6-50
KS-818PWR	208	36	7500	6	45	6-50
KS-818	240	27.8	6660	8	40	6-50
KS-818	208	26.7	5550	8	40	6-50
KS-818WR	240	41.6	9990	6	50	6-50
KS-818WR	208	40	8320	6	50	6-50
KS-1018	240	39.4	9460	6	50	6-50
KS-1018	208	40	8320	6	50	6-50
KS-1027	240	48	11520	6	60	6-50
KS-1027	208	48	9980	6	60	6-50
KS-1027 3ph	240 3ph	29.3	11520	8	40	15-50**
KS-1027 3ph	208 3ph	31.7	11000	8	40	15-50**
KS-1227	240	48	11520	6	60	6-50
KS-1227	208	48	9980	6	60	6-50
KS-1227 3ph	240 3ph	29.3	11520	8	40	15-50**
KS-1227 3ph	208 3ph	31.7	11000	8	40	15-50**

\*For each additional 50 feet use heavier wire, numerically two numbers lower—for example, instead of #10, use #8. If you anticipate installing any larger kiln in the future, use the heavier wire.

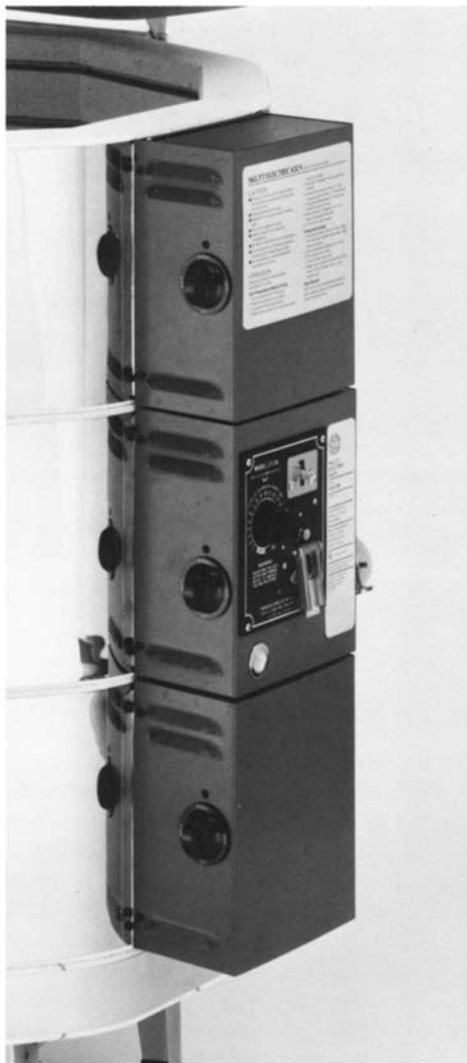
\*\*See special instructions and wiring diagram.



**Important! Connecting and testing Model KS-714.** The wall outlets for Model KS-714 must be powered by 3-wire 120/240-208V solid neutral supply—as for an electric range. Only No. 10 wire is required (or No. 8 for runs over 50 feet). 30 Amp fuses or circuit breakers only—no larger or smaller—are recommended. The U-shaped fourth blade of the 4W30 Amp grounding plug is for the pure green wire, grounding the kiln case. The blade opposite this U-shaped one takes the L-shaped white solid neutral wire. Refer to the wiring diagram on page 27 for the KS-714 plug diagram.

You must test Model KS-714. If your wall outlet should be accidentally mis-wired, 240V could be applied to some of the 120V elements in these kilns. To check, turn the 3-heat switches to Off and plug the cord into the wall outlet. Insert a Junior cone in the automatic shut-off, latch the plunger in (see Kiln-Sitter Instructions) and turn both switches to Medium. The first and third elements from the bottom should heat at the same slow rate with no heating visible for at least 30 seconds. They should glow dull to medium red within 15 minutes. If either element heats up suddenly, turning bright red or orange, turn off the kiln at once. Your wall outlet is improperly wired.

If okay to this point, leave the top switch on Medium and turn the lower to High. If the element on Medium becomes brighter than the lower one on High, your wall outlet is not properly supplied by a white neutral conductor. This must be remedied before using your kiln.

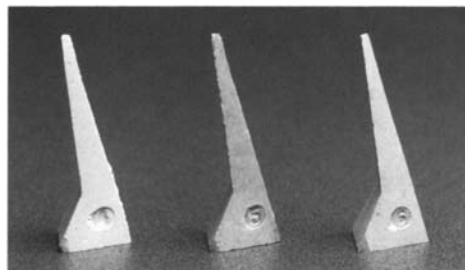


## Automatic Kiln-Sitter controls.

Your Skutt kiln comes factory equipped with the Dawson Kiln-Sitter, the standard of quality in the ceramics industry. However, the Kiln-Sitter is intended as an aid to accurate firing—not as a substitute for your attention to each firing.

As high firing heats build up, many physical changes occur in your kiln. Firebrick and jackets expand. Your ware may expand, crack, or even explode in rare cases. Loads may shift. If any of these interfere with the sensing rod inside the kiln, and should your timer somehow malfunction, an overfire could result. Properly maintained and adjusted, your Kiln-Sitter should give you years of trouble-free service.

We recommend you read the Kiln-Sitter Operating Manual that comes with your kiln for complete details. Some of that information is repeated here for your convenience.



## PYROMETRIC CONES.

Ceramic firing to the accuracy we know today would be impossible without pyrometric cones. These long pyramid shapes of controlled composition measure the combined effects of time and temperature accomplished during a firing.

There are two sizes of cones; the traditional standing Senior cone, 2 9/16" long, and the smaller Kiln-Sitter Junior cone, 1 1/8" long. Both are composed of precisely controlled raw clays and frits, and are identified by standard numbers.

Senior Cones are designed to be placed standing in angled holders or commercial cone plaques or Self Supporting Orton Cones. We recommend using the Self-Supporting Cones that have a precise 8° angle built into the base allowing the cone to bend properly. The correct firing time and temperature is reached when the cones soften and bend to the top of the base (90° is perfect). It is important that the cone is standing at the proper angle (as pre-cut at the base) for it to bend at its standard temperature.

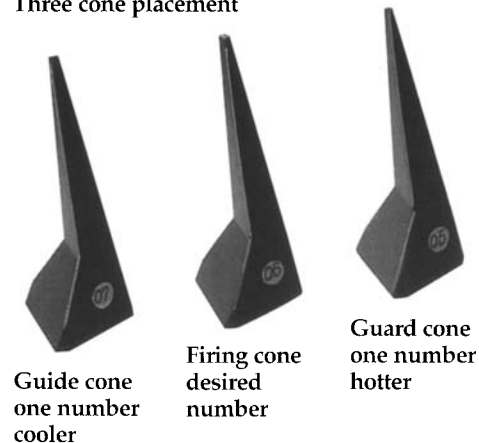
Often cones are placed at various levels to tell if the temperature variation has been caused by uneven loading or air circulation. Obviously, if you wish to monitor firing progress, cones must be visible through a peephole to verify accuracy of the Kiln-Sitter.



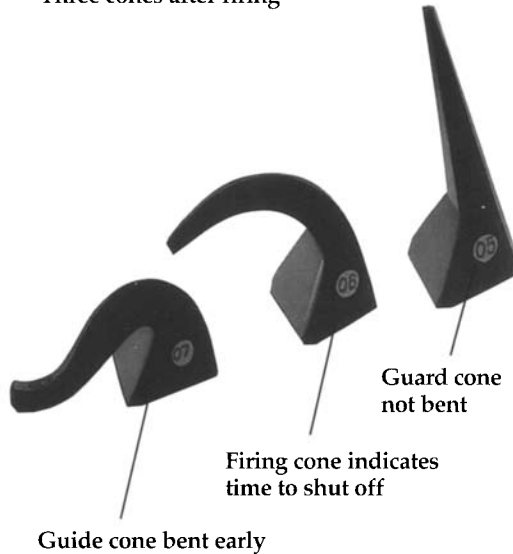
The traditional and still the most accurate method of monitoring a firing is to use three Self-Supporting Cones: the one called the guide cone should be one number cooler than your desired firing; the firing cone should be the desired heat, and the guard cone should be one number hotter. (See photos.) As your firing nears maturity, the guide cone will bend or "drop". This alerts you to watch the firing cone. If the guard cone is not straight, it is a sign of overfiring.

With today's Kiln-Sitters and Junior cones, three-cone firing is rarely necessary. However, always placing a single Senior firing cone at Kiln-Sitter level is excellent, inexpensive insurance against inadvertent misfiring. If you discover underfired ware, check the load in your kiln to ensure that it is evenly distributed from top to bottom.

#### Three cone placement



#### Three cones after firing



Cones are sensitive to moisture when stored and to drafts when firing. Keep them dry or invisible cracks may develop, causing early bending. If you have a cone problem, try fresh ones from another source. Place cones at least 3" back from peep holes to avoid a false response to cool air.

At high temperatures cones can be hard to see. Viewing through dark glasses can help. Try to keep ware back from cones as far as possible to avoid a cone melting into the ware.

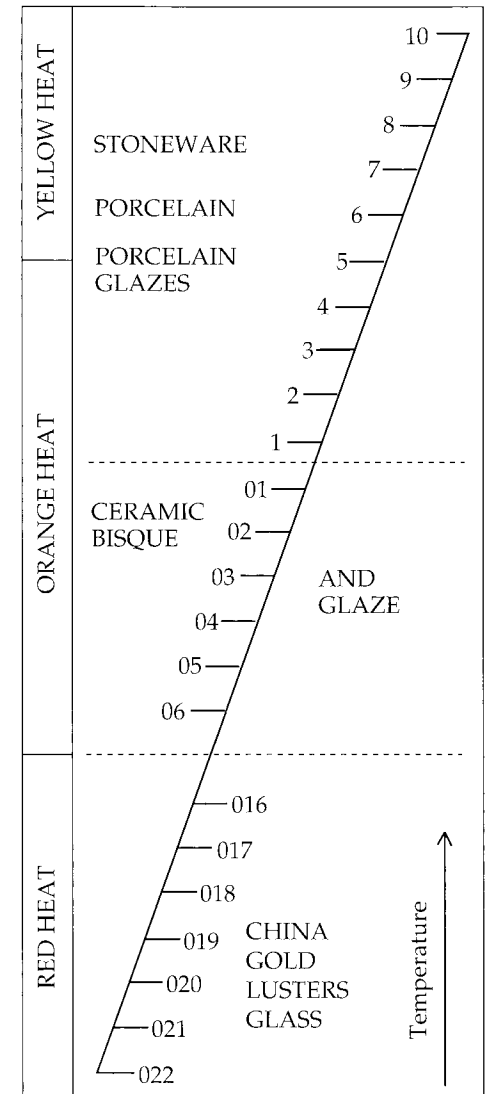
#### Orton Pyrometric Cones

Self-Supporting Regular

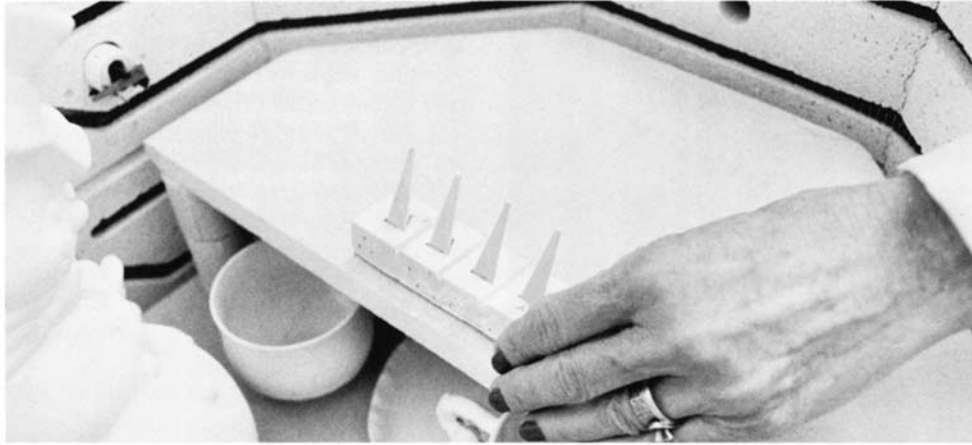
Cone Number	Final Temperature at 108° F/hr
10	2345° F
9	2300
8	2273
7	2228
6	2199
5	2165
4	2142
3	2109
2	2091
1	2080
01	2046
02	2017
03	1990
04	1944
05	1891
05 1/2	1855
06	1819
07	1787
08	1737
09	1683
010	1632
011	1607
012	1575
013	1542
014	1488
015	1452
016	1411
017	1353
018	1314
019	1243
020	1159
021	1112
022	1087

Final temperature for cone maturity depends on rate of temperature increase during final 300 to 400° of firing. Courtesy Edward Orton Jr. Ceramic Foundation.

#### Quick Reference Chart







### JUNIOR CONES AND THE KILN-SITTER.

Junior cones are not simply miniature Senior cones. They are designed to bend under the weight of the Kiln-Sitter sensing rod. Don't expect acceptable results using a Senior cone in the Kiln Sitter. The Junior's shorter length and greater composition make it stand longer than a Senior if placed on end, but when used horizontally in the Kiln-Sitter, the Junior will bend at approximately the same time as a Senior standing.

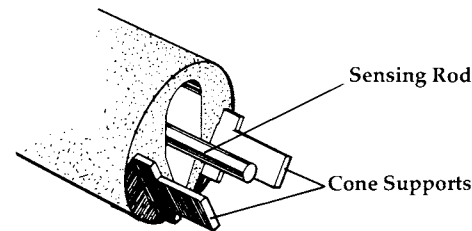
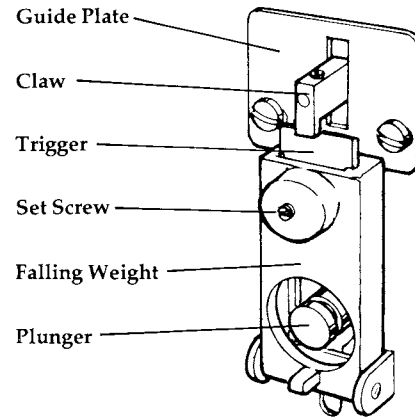
Because your electrical power and kiln location will vary, you should keep a complete firing record of every firing. You may find, as some Skutt owners do, that you get better results with a Junior cone

one step hotter than your Senior cone—that is, a Cone 6 firing may come out better with a Junior 7. If you keep accurate records, you can modify your technique to give the best results.

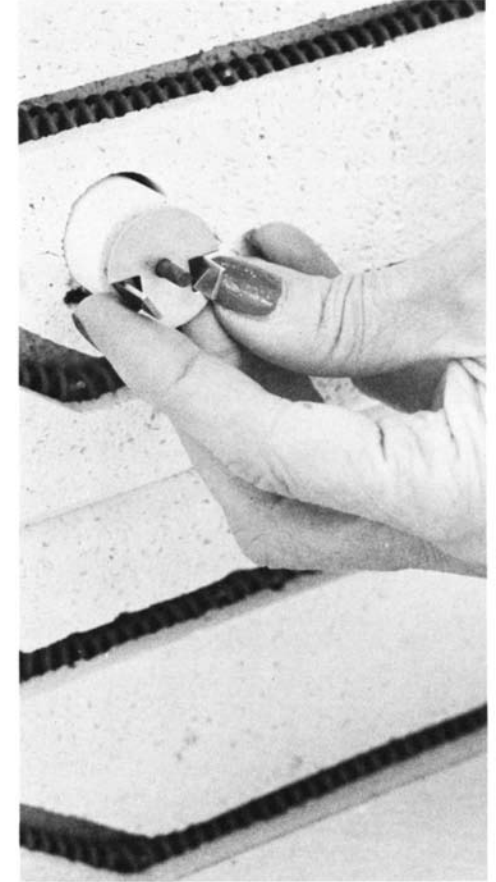
### WHAT YOUR KILN-SITTER DOES.

It may look complex, but the Kiln-Sitter is designed to be simple and reliable. There are few moving parts, and you can adjust them for perfect operation yourself. A sensing rod rests on a Junior cone inside the kiln. When the cone softens, the weight of the rod bends it down and releases the falling weight. This turns off the kiln.

The limit timer is simply a clock mechanism which you set for a time slightly longer than your anticipated firing. By keeping an accurate record of every firing,



you will soon be able to estimate the length of a firing to within a half hour or less. Then, should anything go wrong with your Kiln-Sitter, the limit timer will turn off the kiln before overfiring can do damage. For three phase kilns, be sure the three phase contactor box is connected or the kiln will not have a way to turn off at the end of the firing.



Using the firing gauge to check sensing rod position.



**Important! You must adjust and test your Kiln-Sitter on your new or repaired kiln.**

As good as your Kiln-Sitter is, you must calibrate and test it before you trust your ware solely to its control. Here's what you should do before the first firing, and periodically to keep the Kiln-Sitter in adjustment.

**1. Turn switches off.**

**2. Install the firing gauge.** This metal gauge fits over the sensing rod and cone supports, positioning the rod as it should be when the Kiln-Sitter is properly adjusted.

**3. Check the clearance of the trigger and release claw.** The trigger should just clear the release claw. If it strikes the claw, or has more than a few thousandths of an inch clearance, adjust the trigger height by loosening the trigger set screw. Tighten firmly when you are finished, because repeated falling can cause the trigger plate to jar out of adjustment.

There should be the thickness of a piece of paper distance between the trigger and the inside of the claw. This can be adjusted with the claw's set screw.



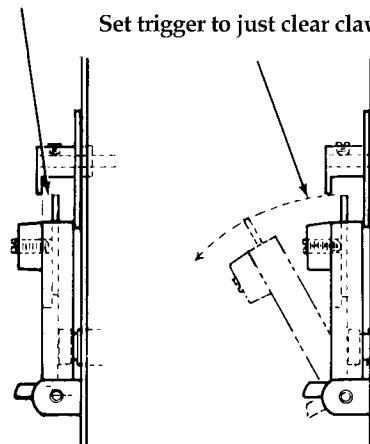
**4. Check the travel of the sensing rod.**

Remove and save your metal firing gauge. Move the sensing rod up and down. It should travel freely, without touching the sides of its tube. On the outside of the kiln, the claw should move freely within the guide plate. If there is interference, loosen the guide plate screws and center its slot so the rod and claw move freely. Tighten screws.

**5. Make the "2 o'clock" test.** To be sure your falling weight causes the plunger to pop out, press the plunger in, raise the weight to about the 2 o'clock position, and drop it. It should easily trip the plunger out.

Set claw thickness of paper from trigger.

Set trigger to just clear claw.



**Additional Kiln-Sitter notes**

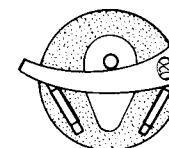
Your Kiln-Sitter is now calibrated and working properly. For trouble-free operation, just remember these points:

1. Never lubricate your Kiln-Sitter. Oils will gum up the works.

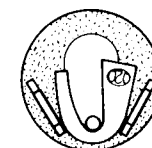
2. Keep foreign objects out of the Kiln-Sitter tube. Bits of ware or debris can stop the sensing rod from dropping. Check frequently.

3. Replace bent cone supports or sensing rods. After repeated firings, these may bend. For best firing accuracy, replace them when they look distorted.

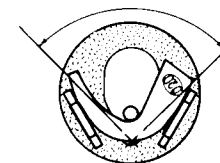
4. Use only dry Junior cones, properly positioned as shown in the first firing section. Tips from Senior cones will not work. After a firing, the cone should show about a 90° bend. Much more or less bend is a sign of incorrect adjustment, and will cause over or underfiring.



Underfired  
Incorrect adjustment



Overfired  
Incorrect adjustment



Correct adjustment  
Approximately 90° angle





## PREPARATION BEFORE FIRING

Remove any brick chips or other foreign matter from around the elements. Bits of bisque and glaze will eat through elements and our warranty cannot cover such accidents. Vacuum the inside of the kiln to remove any dust that accumulates during shipment.

Wipe all new shelves clean, and brush coat one side of each with high fire kiln wash. Apply a thin coating of kiln wash in one direction, allow to dry and apply another thin coating in the opposite direction leaving a 1/2" margin from the outside edge of the shelf. A new coat is seldom needed—just spot-patch and sand off the surface evenly with coarse sandpaper wrapped around a wooden block. A fresh coat may be needed before a porcelain firing if glaze has dripped onto the shelf.

Kiln wash the floor of the kiln, being careful to leave a 1" margin unpainted all the way around interior edge. Never kiln wash the walls or lid of your kiln!



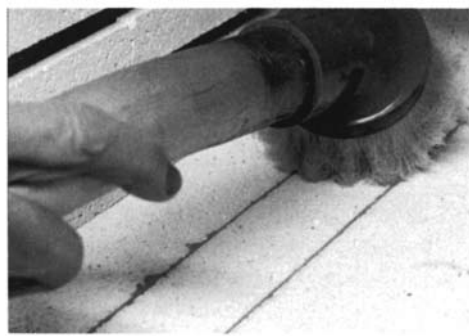
Kiln wash floor and shelves.

## Firing your new kiln.

Now you're ready to fire. Be sure to review the preceding sections, double checking for safety and correct electrical connections.

It is important to the life of your kiln that your first firing be done properly. Before you start, read this entire manual carefully, including the preceding sections and loading and firing instructions.

New elements and foreign matter like dust give off vapors that tend to discolor glazes. Therefore, your first firing should be a Cone 04 empty test fire with only your dry shelves in the kiln, propped as though ware were on them. The first time the elements are fired they will give off some smoke. This is normal and expected. This is a good time to use Self-Supporting Cones on the shelves to test the heat accuracy from top to bottom.



Keep interior clean.



Junior cone placement.

A Cone 04 is recommended for proper pre-oxidation of a new element. The steps to accomplish this firing are the following:

1. Lift the falling weight.
2. Press the claw down until it holds the weight trigger in place.



Setting the limit timer.

3. Insert a Junior cone, under the sensing rod, with the flat side down, and the number facing the inside of the kiln.

4. Place a visual cone 3" back but in line with the peep hole on the same level as the Kiln-Sitter to make sure the automatic shut off is working properly. Use cones with the same number—for example, an 05 Junior cone in the Kiln-Sitter and an 05 Senior visual cone.

5. Turn all switches off.

6. Because it is not needed for the test, set your limit timer to 10 so it will not interfere.

7. Press in the Kiln-Sitter plunger so it will lock. Review the information in the Dawson Kiln-Sitter Operating Manual that came in the "goodie bag" if you have additional questions.

8. Follow the general firing instructions and switching schedules printed on the switch box of your kiln.

9. View your visual cone by removing a peephole plug periodically. The cone should bend so the tip is level with the top of the base of a Self-Supporting Cone (3 o'clock position) and the Kiln-Sitter should turn the kiln off at about the same time. Watch your kiln throughout the firing. Don't rush through the first firing. Make notes of things that you want to remember and make visual observations of the kiln while it is firing.

Likely everything will work as it should and you're ready to go on to production firings. If things go wrong, re-read this manual and contact your Skutt distributor.



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#### General comments on infinite switches.

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Reference to “Medium” switch settings is equivalent to 4 on the infinite switch dial. Adjustments for hot and cold spots can be compensated by varying the settings on the infinite switch according to need. For example in the cooler portion of the kiln, advance the switch to a higher setting than the section that is warmer.

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#### Firing schedule for Skutt KS-614-3 with infinite switches.

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1. Turn all switches to Low for 2 hours with the lid vented. Judge the length of time by the density of the load and the thickness of the piece. Overnight on Low can ensure against explosion of thicker wheel thrown or hand formed ware.
2. Turn all switches to 4 for 2 hours with the lid vented.
3. Turn both switches to 6 setting for up to Cone 04 firings. The High setting for Cone 03 and hotter.
4. If the kiln atmosphere is already free of haze and no odor is coming from the kiln, or if you’ve fired on Low overnight, close the lid. If the kiln atmosphere is hazy, check regularly until the kiln is vapor free, then close the lid.
5. Watch visual cones set at Kiln-Sitter level for about 5 firings on new or recently repaired kiln.

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#### Firing schedule for Skutt KS-818 and KS-818P with infinite switches.

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1. Turn all switches to Low for 2 hours with the lid vented. Judge the length of time by the density of the load and the thickness of the pieces. Allow more time when the walls are thick. Overnight on Low can ensure against explosion of thicker wheel thrown or hand formed ware.
2. Turn all switches to 4 for 2 hours, lid vented.
3. Turn both switches to 6 setting for up to Cone 04 firings. Use High setting for Cone 03 and hotter.
4. If the kiln atmosphere is already free of haze and no odor is coming from the kiln, or if you’ve fired on Low overnight, close the lid. If the kiln atmosphere is hazy, check regularly until the kiln is vapor free, then close the lid.
5. Watch Senior visual cones set at Kiln-Sitter level for about 5 firings on new or recently repaired kiln.

#### Firing with a wired ring

1. Follow the same instructions for low setting.
2. It is necessary during medium heating to hold the switch in the center section to a setting of 4 on the dial to prevent too much heat build up. This will remain on 4 during High as well.
3. Advance the switches in the bottom and top sections to High, the center section remains on 4.

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#### Firing schedule for kilns with 3-heat switches, including Models KS-609, KS-714, KS-1018, KS-1027 and KS-1227.

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1. Turn all switches to Low for 2-3 hours with the lid vented. Judge the length of time by the density of the load and the thickness of the pieces. Allow more time when the walls are thick. Overnight on Low can ensure against explosion of thicker wheel thrown or hand formed ware.
2. Turn all switches to Medium for 2-3 hours.
3. Turn all switches to High.
4. If the kiln atmosphere is already free of haze and no odor is coming from the kiln, or if you’ve fired on Low overnight, close the lid. If the kiln atmosphere is hazy, check regularly until the kiln is vapor free, then close the lid. Disregard this step if using an EnviroVent®.
5. Watch Senior visual cones set at Kiln-Sitter level for about 10 firings on new or recently repaired kiln.

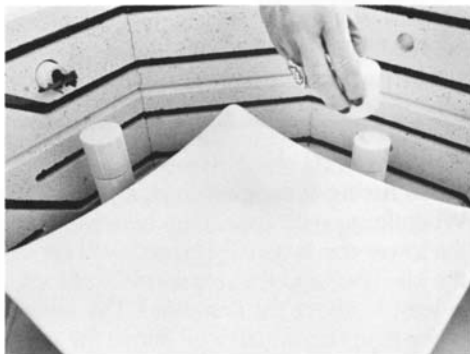


## Loading: the key to consistent results.

Remember, if this is the first firing of this kiln, or you have just replaced the elements, please fire the kiln empty to Cone 04.

Careful loading will always be repaid with satisfaction. Rushed, careless loading can bring disaster to pieces you've worked on for hours.

First, never load damp ware into your kiln! Make sure it's all bone dry first. Keep a piece of old greenware on your drying shelves. New ware should feel no cooler on your cheek or forearm than an old piece. If it does, water is still evaporating from it.



Allow clearance around posts.

Plan your load carefully. Set out all your pieces before you start loading, and pre-arrange them as you would to load them. Always load slowly—dropped ware on shelves may damage the inside of your kiln.

Balance out your load by density. If half your load consists of small, heavy pieces, and half of large thin-walled pieces, don't group the small heavy pieces in one section, but mix them so there is a balance of each type throughout the kiln. See the accompanying illustrations. Don't set pieces of ware directly on the floor of the kiln. The first shelf should be 1" off the floor of the kiln. For best results ware should not be placed within 1" of the elements. If possible, place ware so that an element groove is under the shelf.

Large flat pieces like plates that demand the full width of the kiln should have their rims positioned between two elements.

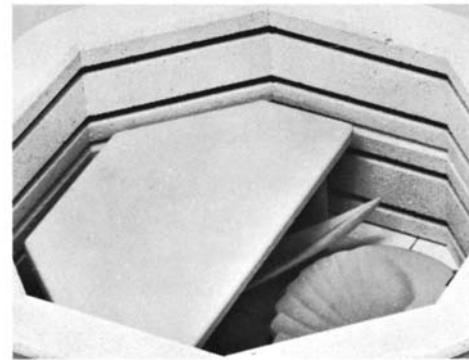
A blank ring must be entirely removed whenever firing hotter than Cone 1.

Don't crowd the Kiln-Sitter. Allow at least 2" between the sensing rod and shelves and at least 1/2" between sensing rod and ware. If your load should shift during firing, there will be less danger of jamming the sensing rod preventing it from moving to turn the kiln off.

Whenever you do test firings—as on your first firing, remember to leave room

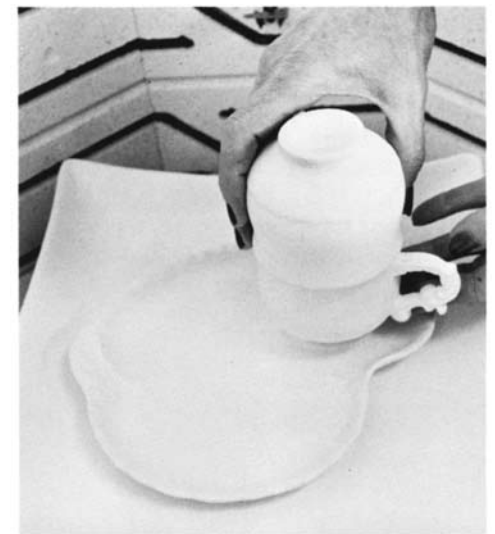
for a Senior cone that is visible through the peephole on the same level as the Kiln Sitter. Place the cone back at least 3" from the peephole so draft won't affect it.

We recommend always placing a Self-Supporting Cone with every firing. Although you normally won't watch it go down, its condition when you unload the kiln will prove your firing was correct—or alert you to possible problems if the ware displays faults.



Shelves should go between element grooves, with two grooves below the first shelf.

**Loading Earthenware for bisque firing**  
Earthenware greenware is easier to handle and load than other ware. Earthenware should be placed in the kiln in its natural position, but any large flat piece—such as a wall plaque—can go on its flat side to prevent warping. Canisters and boxes should be bisque fired with lids in place for assurance of good fit.



Stacking bisque.



### Loading for glaze firing.

Glaze firings require that you have kiln washed the bottom of the kiln and one side of each shelf. Glaze will stick permanently if you fail to keep a good coating of kiln wash on these surfaces.

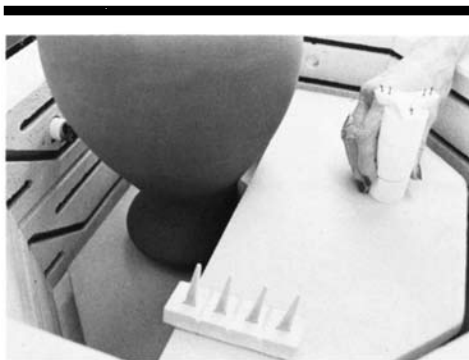
Don't let any of your pieces touch one another or the side of your kiln.

Stilts are devices used in glaze firing to elevate the fired pieces from the shelves.

There are many styles. Use those that provide the widest bearing capacity for stability. If a piece wobbles on its stilts, it may tumble during firing. Make sure you have a good solid base.

Dry-footing a glazed piece will eliminate the need to stilt your ware. To dry-foot, avoid glazing the base of your piece. Or you can apply wax resist to the base which will cause the glaze to puddle up, making it easy to remove with a damp sponge. Any part of the ware that will touch the shelf cannot have glaze on it.

Leave all possible "breathing room" between pieces for best firing uniformity. Ware should be at least 3/4" apart on the shelf or bubbles and fumes may contaminate adjoining pieces.

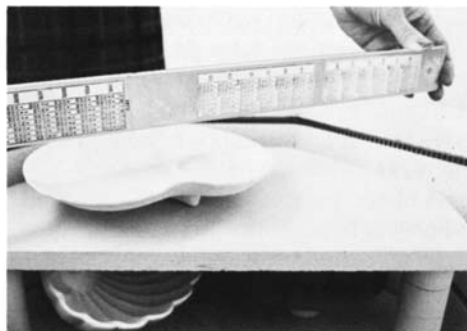


Glaze firing requires stiling and careful placement of ware to avoid discoloration from fumes.

### Porcelain and stoneware firings.

These materials differ only in purity of clays, although they appear different in color and texture. By definition, both must be fired hot enough to render the bodies waterproof (or vitreous) at which temperatures they tend to wilt.

Because the bodies become soft, they must be bisque and glaze fired resting flat on a freshly kiln washed surface, or one sprinkled with silica flour (flint). Flint must be kept out of the element grooves. Remember to vacuum the grooves periodically.



Check clearance with a ruler so pieces don't stick to your lid.

To avoid distortion, pieces must either be carefully designed or the overhangs specially supported. Figurine arms are generally supported by hollow greenware pillars, made of the same clay material. These will shrink along with the piece, which in high firings can be as much as 12%.

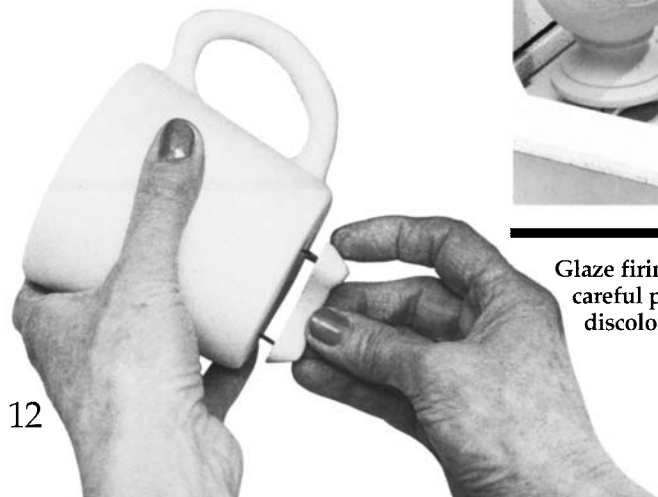
Simpler shapes such as wide plate rims are generally supported by reusable rings (setters) made of even higher firing material specifically shaped for that one article. Both porcelain and stoneware glaze firings are invariably dry-footed to prevent fusion to the shelves.

### Overglaze firings.

Stiling may be helpful because it allows heat to penetrate between the ware and the slower-heating shelves. Large double-pointed stilts can be used to hold plates apart when fired on edge.

### Glass fusing & sagging firings.

When firing with more than two shelves, the lower one is usually posted well off the kiln floor and the upper one is placed at least 3" above the first mold. The center of the load should fall a bit above the center of the kiln.





## General firing information.

Do not be tempted to rush your firing! You have invested a great deal of time, energy and money in your product and certainly don't want to ruin it by rushing the firing. Think about your clay as a cake. You can quickly bake a cake and the outside will be done, but the inside will be undercooked and not desirable. Your clay is similar in that enough time needs to elapse to allow the inside to get "done" too. In your kiln the fire brick, shelves, posts and clay all have to absorb heat; so the more clay, the longer the heating time needed before advancing the switches. The trade off is not worth the rush. So relax, think about your next project, balance your checkbook or whatever will help you resist the temptation to hurry the firing. You won't be sorry.

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.

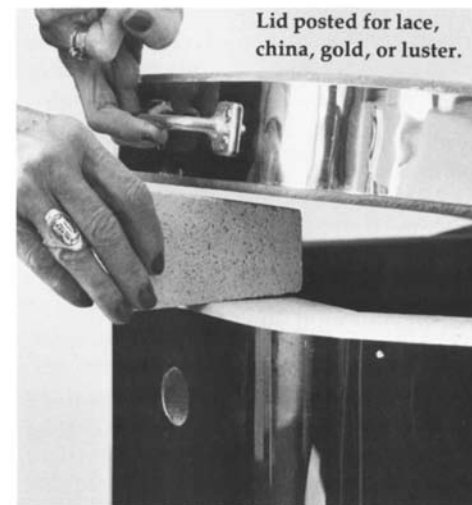
If you are ever in doubt about a firing, simply turn the kiln off or unplug it. Never chance ruining an entire load of

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 a fresh junior cone in the Kiln-Sitter, begin again.

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. Most workers prefer to take 6-8 hours for ceramic bisque and glaze firing (Cones 06-04); 8-12 hours for porcelain and stoneware (Cones 3-6). The simple switching schedules on page 10 are suitable for all full load firings for earthenware, porcelain and stoneware.

## KILN PREPARATION BEFORE FIRING.

1. Turn all switches to Off position.
2. Raise lid and lock in Up position.
3. Check Kiln-Sitter adjustments by raising falling weight, pushing plunger in and letting weight fall. This ensures that the kiln will turn off properly. Make sure the tube is free of debris; that the sensing rod is straight and not tapered at the end; that all glaze and cone particles are off the cone rests.
4. Raise the falling weight and set the proper **Junior** cone in the Kiln Sitter.
5. Load the kiln. Set Senior visual cones on shelves while loading.
6. Lower the lid and insert vent prop on side measuring 2 1/2" for an overglaze and lace fire, 1" for all other firings. Exception: If an EnviroVent® downdraft ventilation system is being used, propping the lid is not necessary. Also, plug all peep holes.
7. Plug peep holes except the top one, which is always left open when an EnviroVent is not installed. This will allow fumes to escape, and avoid fumes traveling through the Kiln-Sitter tube and gumming up the mechanism. Ventilation is needed for adequate oxygen in the kiln chamber for better color development.
8. Set limit timer for 1/2 hour beyond expected firing time. You may always change the limit timer setting simply by turning the dial.
9. Push in the Kiln-Sitter plunger until it locks in place.







## AFTER EACH FIRING.

1. Allow the kiln to cool naturally. Never unplug peepholes or prop the lid until the ware is cool enough for bare handed unloading.

2. When unloading, be sure to carefully examine the Shelf Cones and the Junior Kiln-Sitter cone.

3. There should still be 15-45 minutes left on your limit timer's dial (it stops when the Kiln Sitter trips). If not, revise your setting next firing.

If the falling weight is found upright, you know the timer shut the kiln off. Find out why immediately.

## PRE-FIRING CHECKLIST.

### Load kiln.

- ☐ Set Self-Supporting Cones while loading. See loading instructions on page 11 for more detailed information.

### Kiln ventilation.

- ☐ The lid needs to be propped 2 1/2" until the internal temperature of the kiln reaches approximately 1000° F and the atmosphere is free of haze.
- ☐ Plug peepholes except the top one, which is always left open. This will allow fumes to escape.
- ☐ The use of a positive flow down draft kiln ventilation system such as Skutt's EnviroVent 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. Follow the instructions in the EnviroVent manual with respect to peep hole plugs.

## TYPES OF FIRINGS.

This section gives you some useful tips for various types of firings.

### 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 a normal 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 05 or 04 and is properly glazed, dried, and loaded, an 06 or 05 glaze fire will normally produce a flawless surface. If not, consult the ware imperfections section of this manual.



Allow ample room for air circulation around ware and shelves during glaze firing.





Crystalline glazes often require Cone 04 firing to develop fully—or may need a soaking period at slightly reduced heat after maturity is reached.

#### **“Greenglaze” one-fire ceramics.**

With the talc clay bodies and prepared glazes available to the ceramist today, some prefer to “one-fire” their ceramics. This is not an acceptable practice for utility pieces that need to be food safe or used on containers that will hold liquid. 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.



Fire together only glazes with similar heat recommendations.

#### **Glaze soaking.**

Some glaze firings may require a soaking period after the maturing temperature of the glaze is achieved. To accomplish the soak, immediately after automatic shutoff,

1. Turn all switches to Medium.
2. Lift the Kiln Sitter falling weight half way.
3. Push the Kiln Sitter plunger in firmly making sure it is well latched.
4. Gently lower the falling weight without releasing the plunger.
5. Carefully time 20-30 minutes.
6. After the desired soak, lift the falling weight, releasing it to fall and turn the kiln off. Turn the switches off.

A soak on Medium is a safe procedure because neither your ware nor the kiln can be harmed if you exceed the suggested time. However, never allow the switches to remain on High for the soak or a serious overfire may occur.

#### **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 fire exactly to this cone with the Kiln-Sitter.

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 tem-

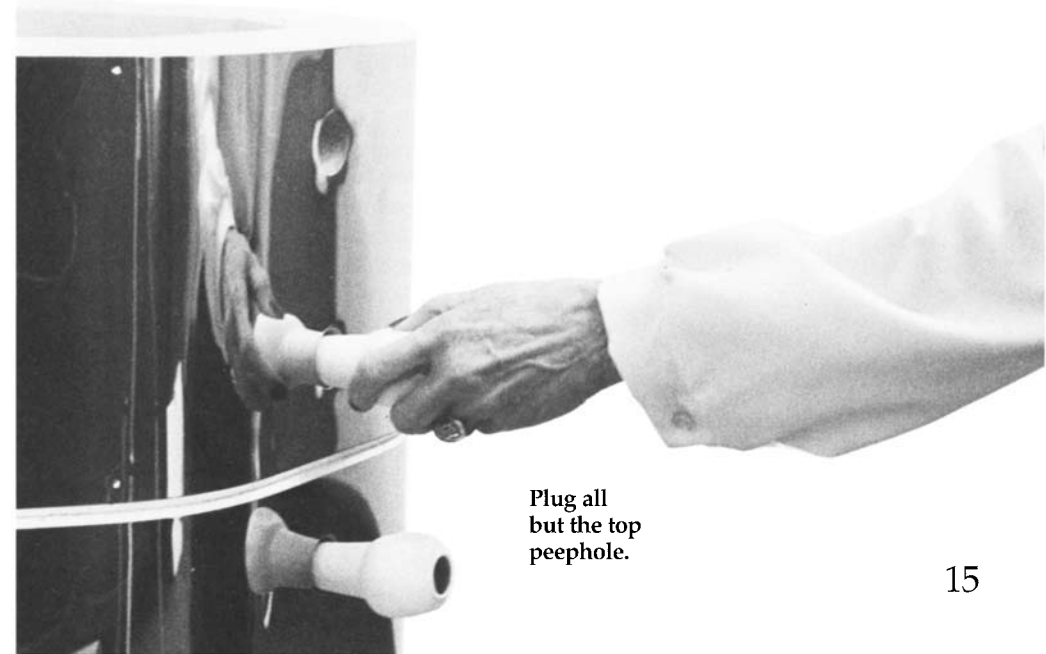
perature ones. The required temperature also varies with the softening temperature of the parent surface.

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

##### **Metallics**

**(gold, platinum, copper, and others).**

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.



Plug all but the top peephole.



### 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, therefore lid propping of 1/2" to 1" must continue 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. Ware should be loaded and supported as noted in the loading instructions. Begin lace fires with the lid propped 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 a second firing 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 Cone 6, at which temperature auxiliary supports are no longer required but 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 Models KS-1227/208, KS-1027/208, KS-609 and KS-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 trade name separators.

Fire on Low for one hour with the lid propped 1", then close the lid and switch directly to High until kiln is shut off by an 016-014 cone. This varies with the brand of glass. For best results, immediately flush the kiln by propping the lid open 1" for one to ten minutes; then close the lid and allow the kiln to cool naturally.

Glass softens very quickly and many workers prefer to use a pyrometer (thermocouple type thermometer) rather than pyrometric cones. Using a pyrometer, remain on Low until about 700° F, then switch directly to High, closing the lid as soon as odors cease. Fire rapidly to preserve the colors. Shut the kiln off and prop the lid immediately when the pyrometer reaches the desired temperature, usually in the 1450°-1525° F range for most glass.

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



Removing  
stilt.

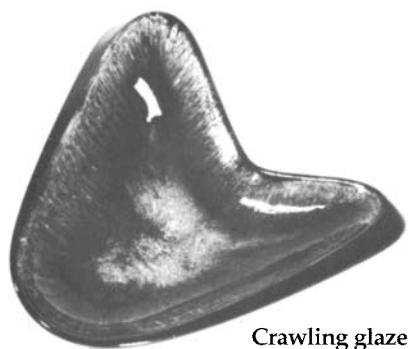


## Ware imperfections

### COMMON GLAZE FAULTS

**Crawled glaze.** In “crawling”, blank or bald spots appear in the glaze surface after firing. Crawling may be caused by having a dusty or dirty bisque surface, or applying the glaze heavily. Skin oils from excessive handling of greenware may clog clay pores, causing the glaze to be repelled. Hard spots in the clay surface created by excessive sponging or polishing of the greenware is also a cause.

To salvage such a piece, apply additional glaze to the bare spot and refire, or cover the entire piece with a textured glaze and refire.



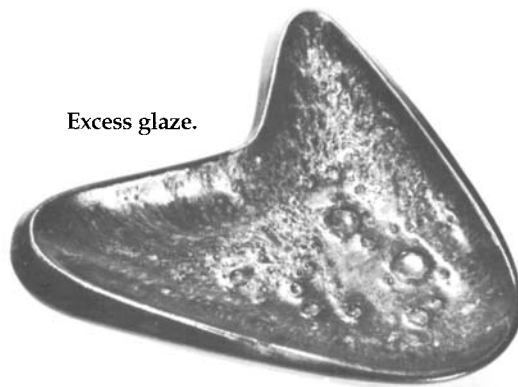
Crawling glaze.

**Cratered or bubbled glaze.** In this glaze error, the craters develop as a result of body gases erupting through the glaze and “freezing” as the kiln cools. This condition is caused by underfiring. To salvage such a piece, grind down the high spots, apply a thin coating of glaze and refire to a higher temperature.

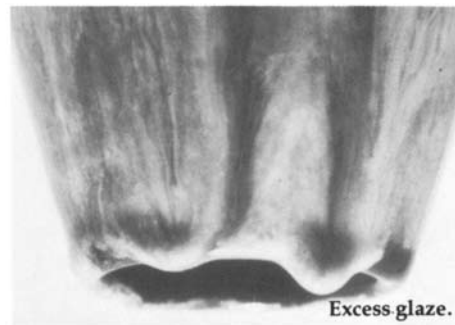
**Pinholes.** Pinholes are tiny indentations in the glaze surface which are generally no larger than the point of a pin. This fault may occur in almost any type of glaze, and is caused by underfiring. To salvage a piece, refire at a higher temperature.

**Sagging glaze on a vertical surface.** Sagging or running glaze is generally caused by too heavy an application of glaze. It is a warning sign that too much glaze is being applied. Take extra care with similar pieces.

**Excessive application of glaze.** The example shown demonstrates the type of surface which can result from too heavy an application of glaze. This error is difficult to salvage, so remember to apply less



Excess glaze.



Excess glaze.

glaze in the future. In general glaze should be the thickness of a post card when applied. Allowing the glaze to dry thoroughly between coats will assist in identifying the amount of glaze that has been applied.

**Discolored overglazes.** Underfiring occasionally leaves small pin holes or pores in the glaze that can't be seen without a magnifying glass. If there is poor ventilation in the kiln, china paint oils may seep into these pores and burn to charcoal, seriously affecting the color of the finished piece. You can sometimes repair the damage by soaking the piece for several hours at a low red heat about 1200°F/650°C, cooling and inspecting to be certain that all the carbon has been oxidized, and then giving the piece a true glaze firing.

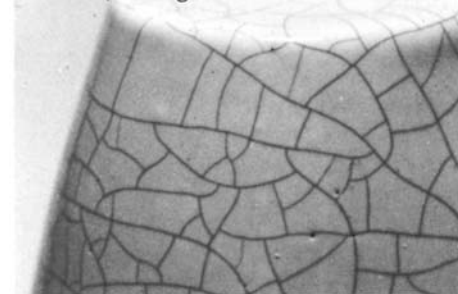
**Cracks in the body.** When a crack occurs in the body, examine the glaze at the edge of the crack. If the glaze is inside the crack or rounded over the corners, the break occurred early in the glaze firing, and was probably present in the clay body before the piece was glaze fired.

In some instances a sound appearing piece of ware will crack during a glaze or overglaze firing. This can be caused by an excess of water used in the original clean-up of the greenware. Too much moisture applied to an area of greenware causes that area to expand while the dry or slightly damp areas have already gone through normal shrinkage. Even if a piece of dry, cleaned greenware shows no visible cracks, it is possible an internal stress is there. This crack can open up during later firings.

If the glaze at the edge of the crack is sharp, the break developed after the glaze was fired. This type of crack is usually due to opening the kiln door or peepholes while the ware is still hot.

**Crazing.** Crazing is characterized by a network of fine cracks in the glaze surface. It may be caused by underfiring bisque, clay or glaze, incompatible clay and glaze, or by opening the kiln door before the ware is completely cooled. Crazing might be

Pinholes, crazing.





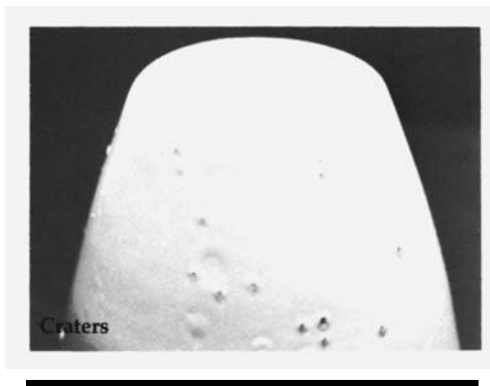
eliminated by refiring the piece to a temperature one cone higher than the original firing.

**Delayed or after crazing.** Crazing may also occur days or months after the piece has been fired. Although the finish may look perfect when it is first removed from the kiln, crazing may occur. While underfiring may not be the direct cause of immediate crazing, it is the major cause of delayed crazing. To correct it, refire the piece to the cone recommended by the manufacturer of the glaze. Allow the kiln to cool naturally.

**Shiny matte surface.** A matte glaze which becomes glossy in the glaze firing is generally caused by overfiring. It is extremely difficult to correct. Remember to fire to a lower temperature in the future.

**Textured glazes, smoothed.** A textured glaze is formulated to develop an irregular surface when fired. If it fails to do so, it is generally due to too light an application of glaze. It is extremely difficult to correct this condition. Reglazing and refiring rarely will help.

**Cloudy or discolored glazes.** This condition is characterized by a muddy or discolored appearance in the fired glaze. It may be caused by using dirty or contaminated brushes, by not leaving enough space between the glazed pieces during firing so chemical fumes jump from one glaze to another, or by placing the piece too close to the kiln elements. It is extremely difficult to correct.



**Grainy glaze.** Uneven or irregular color in the glaze surface is generally caused by too thin an application of glaze. To correct, apply a coat of glaze, then refire.

**Gray or discolored red glazes.** Gray wash out, or black areas in the red glaze may be caused by too thin an application of glaze, the red glaze being fired with colors which it is incompatible, (generally yellows and greens) or firing too hot. This may also be the result of too little oxygen present during the firing. Cone 07 to 06 is usually the best range for red glazes. To salvage, apply a heavy coat of glaze and refire.

**Underglaze peeling.** Underglaze may pull away from the clay body. This may be caused by too heavy an application, or not firing the underglaze before applying glaze. It is extremely difficult to correct this error.

*This section on glaze faults prepared in collaboration with Martin L. LaVor who assisted with information and illustrations.*

## Electrical and kiln trouble shooting

Your Skutt kiln is put under heavy load as it heats and cools. Like any electro-mechanical device, it may show signs of wear. For most home hobbyists, electrical work can be both confusing and dangerous. If this listing points to internal electrical trouble, we recommend you contact your Skutt dealer.

### Automatic shutoff.

Kiln-Sitter consistently over or underfires compared to a shelf cone at the Kiln Sitter.

1. Check Kiln-Sitter adjustments, page 8.
2. Bent Junior cones from Kiln-Sitter deeply cracked across lower faces, indicating moisture problems. Buy new cones.

Kiln equipped with infinite switches (Model KS-818) consistently firing too hot or too cool in one section.

1. Adjust infinite switch higher or lower on Medium and High settings to compensate.

### Occasional overfiring.

Occasional overfiring is usually caused by one or more of the following four conditions.

1. Sensing rod not accurately centered between cone rests.
2. Falling weight mounting bracket bent so weight rubs against it. Adjust per page 8.
3. Overglaze oils or organic matter from native clays accumulated on inner face of guide plate. Remove plate, clean with lacquer thinner. Never plug top peephole. Vent lid longer if necessary.

Shelf cone overfired, but Junior Kiln-Sitter cone bent normally.

1. Use magnifying glass to double check number on both fired cones.
2. Cones may erratically "freeze" if, near end of firing, the temperature rises less than 50° F per hour, in Skutt kilns, when more than 10-11 hours is required on High after the lid is closed. Always remove 4 1/2" blank ring when firing hotter than Cone 1 (Cone 01 in Model KS-1227-208).
3. If problem persists, see your Skutt dealer.

Kiln found with weight fallen but pilot light and all elements still on. Cones overfired.

1. Turn switches off. Protect hands with gloves. While kiln is still hot, perform 2 o'clock drop test, page 8, fifty times. Repeat when cooled. If plunger is released every time, you either forgot to latch the weight up when setting the cone, or the fall was impeded by the power cord or another obstruction.
2. If any cleanly-made 2 o'clock drop fails to release the plunger, contact your Skutt dealer.



### Electrical problems.

Only half of the kiln's elements light up on Medium.

This is normal. The medium element always occupies the lower half of the section controlled by three-heat switches.

Irregular clicking noises from models equipped with infinite switches (Model KS-818)

Normal. These switches constantly cycle on and off at all settings other than High.

Elements hum at first, later do not

Normal. Kanthal-type elements are magnetic only up to red heat.

Humming then ceases.

Fuse blows or breaker trips more than one minute after switching to High.

1. Fuse/breaker and wire size improper for the kiln.
2. Other loads on the same circuit.
3. Poor quality fuses loosely screwed in sockets.
4. Tarnished or loose connections at a breaker or fuse socket. This can increase the temperature of either device, causing unwarranted interruptions. With main switch Off, make sure all connections are bright and tight. Replace panel parts if necessary.
5. Note: Your kiln will not draw more power as it ages. Aging elements can only draw less power.

Fuse blows or breaker trips almost immediately after switching to High.

1. On Model KS-714, unit is plugged into incorrect socket. See testing, page 5.
2. Check circuit and switch box as suggested above.
3. Examine cord and plug for breaks.
4. Check with Skutt distributor regarding interiors of switch boxes.

Power interrupted during firing, kiln is still hot.

1. If still in venting stages (using the vent prop), refire as though a fresh load, using original cones.
2. If venting is completed and you know the load was never within one hour of shutoff, resume firing with the same cones. If chamber glows visibly red with power off, switch directly to High. Otherwise, first fire one hour on Medium.
3. If you suspect the load was within one hour of shutoff, cool kiln, set fresh cones, and refire as usual, except that the lid can be left closed throughout.

Abrupt increase in firing time.

1. Check your Shelf cone, and shut off kiln manually if it is down. Check Kiln-Sitter thoroughly as outlined above.
2. If your Shelf cone is still standing and you have confidence that it bears the correct number, check fuses or breakers. If temperature then begins to rise, complete firing as usual.
3. With Model KS-714, turn to High. If half of the kiln is unlighted, one side of a two pole breaker may have tripped. Reset breakers.

4. On Models KS-818, KS-1018, KS-1027 and KS-1227, one section's not heating may mean an element is dead. Unplug kiln and gently lift straight runs with a pick to find the break. See your Skutt distributor for element replacement.
5. If elements are not broken, contact your Skutt distributor about switch box connections.
6. If problems persist, ask your power company to perform a voltage test at your wall outlet with all elements on High setting.

Gradually increasing firing times, often accompanied by increasingly uneven temperatures within the kiln.

1. Wall receptacle defective. With main switch off, check connections, or call an electrician.
2. Circuit feeding wall receptacle defective. Brighten, tighten or replace screws, fuse sockets or terminals.
3. Power supply problems. Have your power company connect recording volt meter to studio wiring and also make spot check of voltage drop from main panel to kiln's wall outlet with kiln drawing full power. Start a firing at your usual time and volt meter will record voltage variations during the critical hour when your kiln should be approaching shutoff.
4. Elements need replacement. Contact your Skutt distributor.

## Kiln repairs

Happily, your Skutt kiln will give you few occasions to refer to this section. The careful "handyman" can keep a Skutt kiln operating with no difficulty. But if you are not mechanically inclined, it is best to call an authorized Skutt service person, or competent small appliance repair person or electrician. Take this owner's manual along with you. To transport your kiln, handle sections by their outer edges, and place them on a flat surface, cushioned by folded blankets.

### Wall repairs.

The premium brick used in Skutt walls will withstand thousands of firings without crumbling. Broken element grooves are usually the result of carelessness in handling the kiln sections or in loading shelves.

It's almost impossible to cement a broken groove lip back into place without contaminating the heating element. If the element starts to sag out of position, hang it on 1 1/2" element pins inclined toward the back of the groove.





Caution: elements become very brittle after a few firings, so if straightening is necessary, heat the element electrically to visible redness, unplug the kiln from the wall and immediately push the element back into position with a metal implement, reheating whenever stiffening is detected. Place your hanging pins in a straight row and the element will serve the rest of its normal life.

Replacement of wall bricks is simple in Skutt kilns.

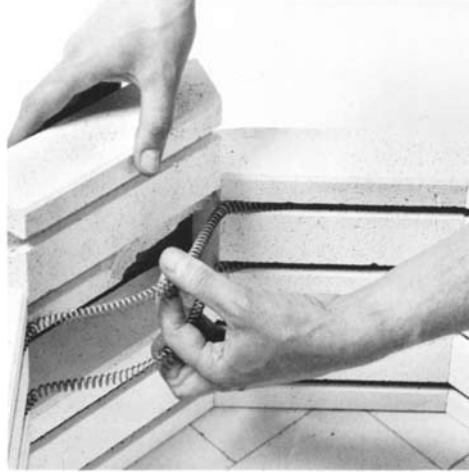
1. Order needed bricks from the parts list available from your Skutt distributor. Replacement of terminal bricks involves cutting and renewing element connectors and should normally be postponed until it's necessary to replace that element.

2. If repairing a top ring, disconnect the lid brace and remove all fittings from the body jacket.

3. Remove the screws that hold the control panel to the kiln. Swing the panel open. Slide the connectors off the switch and remove the wing nut and lock washer from the ground stud. Lift the box straight up to remove it. Place on a clean flat surface.

4. Place the ring, damaged side up, on a perfectly flat surface such as the kiln lid.

5. Pull out the straight element pins at the corners of the damaged brick.



6. Gently lift elements from troughs with a pick or long-nose pliers and gently lift them out into firing chamber just far enough to allow damaged brick to be slipped out. Remember that the elements are brittle.

7. Loosen the worm-type jacket fasteners equally, 1/2" to 3/4".

8. Make sure element troughs in the brick are proper side up. Insert the new brick. This is easiest if a helper holds the adjoining bricks away.

9. Hold the worm-type jacket fastener housings with pliers and tighten them evenly until they meet resistance. Slip elements into new grooves and pin down.

10. Use sandpaper over a wood block longer than the brick length to sand the edges of new brick down flush with its neighbors. Vacuum thoroughly when sanding is completed.

11. Replace hinges and hardware, and position the kiln so you can tighten the body jacket just before the kiln shuts off on your next Cone 06 or hotter firing.

#### **Floor repairs.**

Glaze drips on a properly kiln washed floor can easily be removed without damage to the surface below. Remember to remove all glaze drips before taking the kiln to porcelain/stoneware temperatures, where the glaze will over-fire and soak through the kiln wash.

The floor can be patched level again even if several square inches have been damaged to a depth of 5/8". Using a sharp knife or X-Acto tool, simply undercut or dovetail the edges of the area to retain a patch made by mixing dry high fire kiln wash with just enough water to form a very stiff putty. Compress the putty into place, and scrape flush with the rest of the floor. Allow to dry well before firing.

Don't forget that your kiln floor has two lives. Just turn it over to use the second side. The underside isn't pretty but it can be lightly sanded to remove any discoloration, kiln washed and put back into use to save you money.

#### **Lid repairs.**

Because your Skutt lid is so strongly cemented and well reinforced by its stainless steel band, you'll have to work hard to get it to develop a crack which will sift particles on your ware. Hairline cracking is normal and expected. Use only the contoured venting prop to raise your lid to save the dustproof coating.

If a tall glazed piece expands enough to fuse to the lid, do not attempt to fill the resulting hole, but simply smooth its interior with sandpaper and blow clean. A coating of refractory cement will prevent the brick from crumbling and falling on your ware. Your lid has a flip side if ever needed. Just remove the screws holding the hinge leaves, turn the lid over, and reattach the leaves to new 3/32" holes drilled in the lid's band.

#### **Replacing elements.**

While Skutt kiln elements are not difficult to we recommend you ask your Skutt distributor about the procedure.



## Glossary

Following is a glossary of some useful ceramic terms.

**Aftercrazing.** Glaze crazing after firing—days, weeks or months later.  
**Bisque Ware** which has passed through its first firing without benefit of glaze.

**Ceramic.** In general, any man-made solid product resulting from the fusion of mineral substances. Also used to identify a type of high-talc body which fuses at moderate temperatures—Cone 05-03.

**Clean-up.** The process of cleaning, scraping, sanding and sponging greenware to make it ready for firing and decoration.  
**Cone plaque** A stand or rest for holding cones during firing.

**Controller.** Electronic device that can be programmed for specific firing results. Can be an independent device that is wall-mounted, or built into the kiln.

**Crackle glaze.** A type of glaze which when fired is intentionally “crazed”. Stains or other colorants are often rubbed into the cracks to heighten the effect.

**Crazing.** Small hairline cracks in glazed surfaces that appear after firing. Usually caused by underfiring the body.

**Dipping.** Application of glaze to bisque or greenware by simply immersing it in a container of the glaze.

**Dry footing.** Leaving the base of a piece of ware free of glaze, or removing applied glaze from the underside of the foot by wiping. Avoids the need to stilt.

**Element.** A coil of resistance wire through which current passes, creating the necessary heat for firing.

**Element groove.** The recess in the kiln brick into which the element is placed.

**Firing.** The act of maturing clays and glazes by the application of heat.

**Firebrick.** The insulating blocks which form the chamber of your kiln.

**Foot.** The supporting rim at the base of a piece of ware.

**Glaze.** A special finely ground glass suspended in water with the aid of gum or emulsifiers. Glaze may be clear or colored; glossy, eggshell or matte; applied to bisque or greenware by brushing, spraying, pouring or dipping.

**Greenware.** Unfired, fragile clay forms, wet or dried.

**Impurities.** Minute quantities of foreign matter in clays which often cause spots in glaze.

**Incising.** Cutting through moist greenware in a desired pattern.

**Kiln-Sitter.** A registered trademark of W.P. Dawson, Inc. for their device that uses pyrometric cones to automatically and accurately shut off the kiln.

**Kiln wash.** A high heat-fusing powder to which you add water and brush onto kiln shelves and kiln floor. It allows removal of accidental glaze drips.

**Limit timer.** A device which operates by time alone, back-stopping the kiln sitter in case it is defeated.

**Lusters.** Iridescent overglaze, applied thinly.

**Mature.** A completely fired piece of ware or glaze.

**Multitester.** A combination ohm/volt meter.

**Nesting.** Placing one piece of greenware within another for bisque firing.

**Ohm meter.** An instrument for measuring resistance in elements.

**One-fire.** The practice of applying glaze to greenware and firing one time.

**Overglaze.** Decorative liquids applied over the glazed surface, such as china paints, Lusters, gold and other metallic. Fired at lower temperatures.

**Peephole.** An opening in the kiln wall which allows visual inspection of the chamber during firing.

**Peephole plug.** A piece of refractory used to plug the peephole.

**Pinholes.** Small holes in the glazed surface of ware.

**Porcelain.** A clay body which when fired to approximately Cone 6 becomes vitreous and translucent.

**Posts.** Ceramic shapes that support kiln shelves during firing. Three posts per shelf are recommended.

**Pouring.** The act of filling a mold with slip.

**Pyrometer.** A high temperature thermocouple device. Most useful in glass firing.

**Pyrometric Cone.** Slender, unfired clay pyramids which soften and bend when the kiln load has matured to the desired degree. Two sizes are available. Junior Cones are for use in the kiln sitter, Self-Supporting Cones are for visual use on shelves.

**Refractory.** Any high temperature clay material.

**Sgraffito.** The decorative technique of removing some areas of under glaze from ware with a sgraffito tool, thus allowing the color of the body to show through.

**Shelf.** A slab on which ware is placed in the kiln. Allows utilization of the full kiln height separated by posts.

**Slip.** Liquid clay slurry which is poured into molds.

**Soaking.** Holding a kiln at a given temperature.

**Stilts.** Various single and multi-pointed supports used to hold ware up off the shelves during the glaze fire, thus preventing adhesion.

**Stoneware.** A high fired ceramic body which is vitreous, not translucent, and usually made of native clays.



**Talc.** A white powder used in ceramic clay bodies.

**Terminal brick.** The kiln brick through which the twisted element ends pass into the switch box.

**Terra cotta.** A natural, low firing red clay.

**Thermocouple.** A pair of wires which are inserted into the firing chamber to serve as the temperature-sensing element of the pyrometer or controller.

**Underglaze.** Liquid coloring which is applied directly to bisque or greenware.

**Venting.** The practice of propping up the kiln lid to allow the escape of vapors during initial stages of firing.

**Vitreous.** Fully fused, waterproof ware which need not be glazed to hold water. For sanitation reasons food surfaces need to be glazed.

**Volt meter.** An instrument for measuring voltage at the kiln.

**Warpage.** The loss of ware shape during firing, usually caused by overfiring or improper placement in the kiln.

**Ware.** Any shaped piece of pottery, stoneware, earthenware or porcelain, in any state of completion.

## Skutt Ceramics Products Limited Warranty.

**Skutt Ceramic Products, Inc.** warrants this product to be free from defects in materials and workmanship for two full years from the date of the first retail purchase from an authorized Skutt dealer.

**What Skutt will do.** Skutt will repair or replace, at its expense, any defective part upon return, freight prepaid, to any authorized Skutt service center.

**What is not covered.** This warranty does not cover (1) any defect not reported to an authorized Skutt dealer or distributor within 10 days of discovery; (2) the Kiln-Sitter® which is separately warranted by its manufacturer, W.P. Dawson, Inc., 399 Thor Place, Brea, California 92621; (3) Type K Thermocouples; (4) any damage caused by overfiring; (5) products subjected to abnormal strain, freight damage, neglect, abuse, improper storage, failure to follow instructions, or products altered from factory standard condition; (6) products whose identification number has been changed; (7) failure of, or failures caused by, parts or accessories not manufactured or supplied by Skutt Ceramic Products; (8) kilns used for purposes other than firing ceramic materials; and (9) kilns used for reduction or salt firing.

**How to obtain warranty service.** Notify your Skutt dealer or distributor within 10 days of discovery of any defect. Deliver any defective part, freight prepaid, to an authorized Skutt service center. A list of Skutt service centers may be obtained from your dealer or from Skutt Ceramic Products, Inc. at the address and telephone number below.

**Other limitations.** ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING PROPERTY DAMAGE, LOST PROFITS, LOSS OF USE, OR OTHER ECONOMIC LOSS, ARE EXCLUDED TO THE FULL EXTENT PERMITTED BY STATE LAW. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you. ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THE LIMITED WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Dealers are not authorized to modify this Warranty or to make any additional commitments. Skutt may not be responsible for promises not contained in this Warranty.

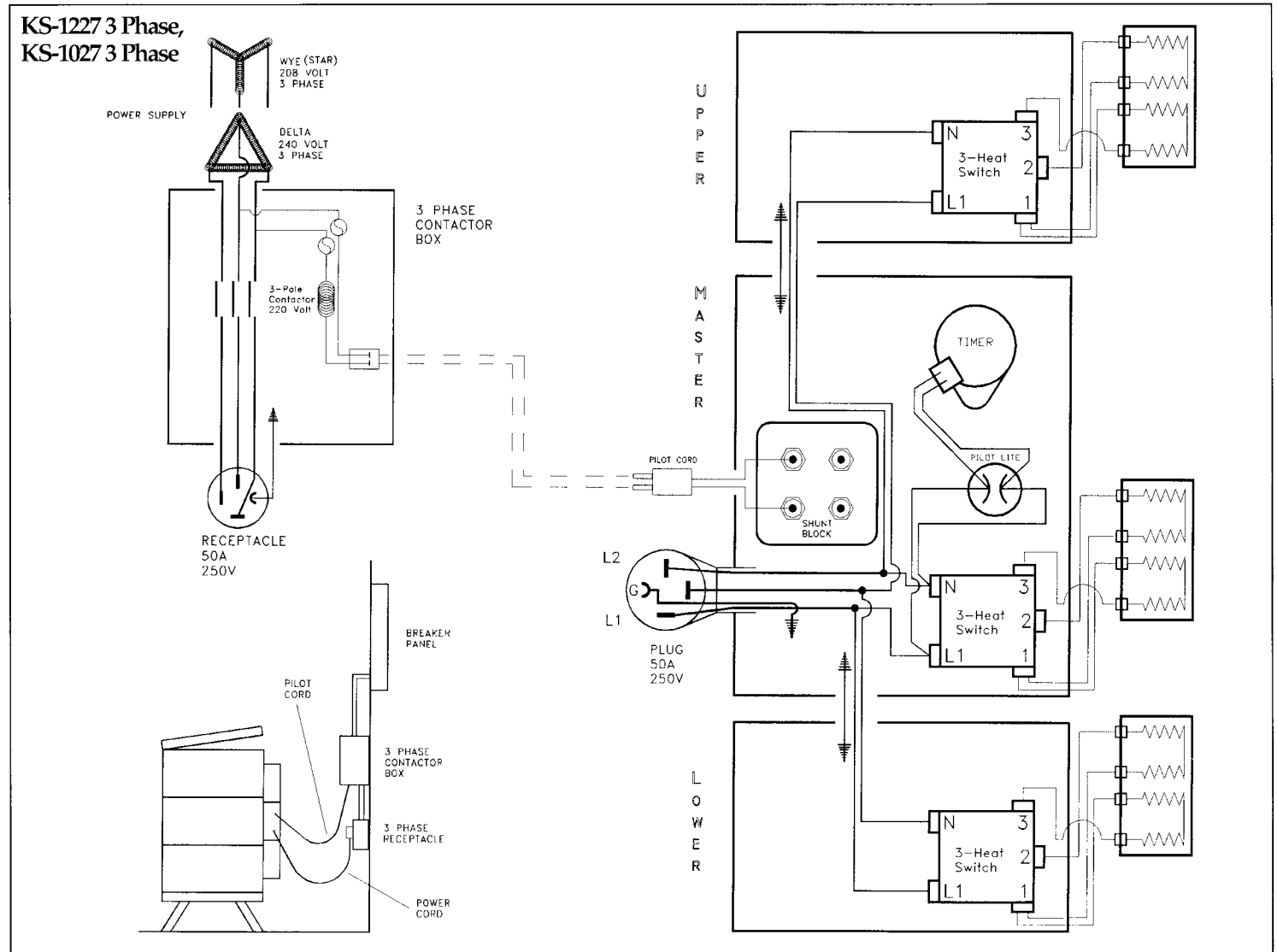
**State law rights.** This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Skutt Ceramic Products, Inc.  
2618 S.E. Steele Street  
Portland, Oregon 97202  
Telephone (503) 231-7726



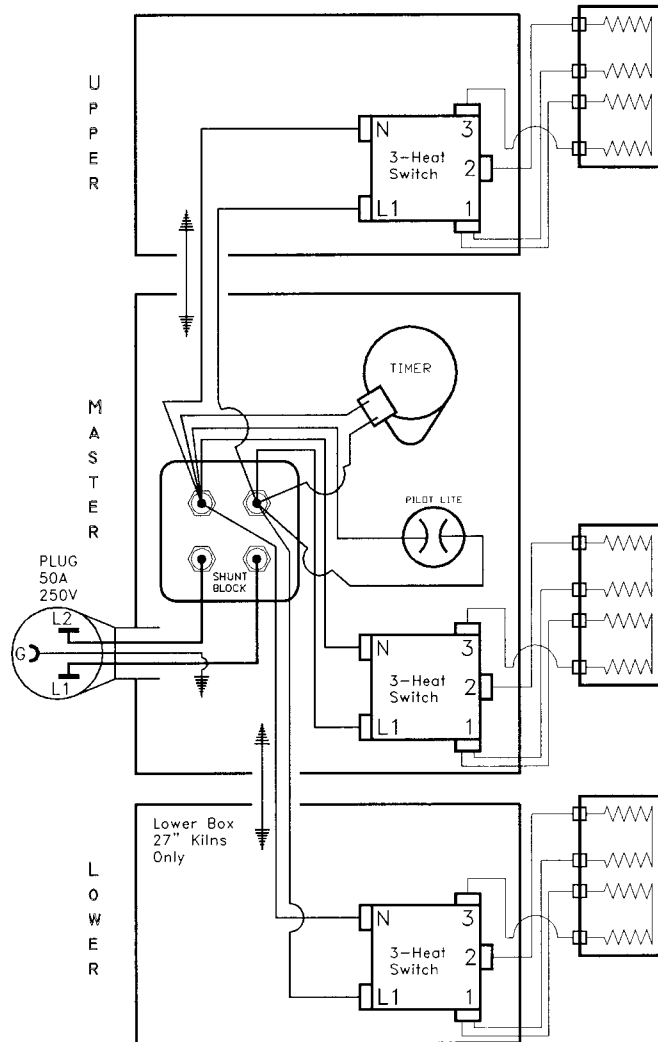


## Wiring Diagrams.

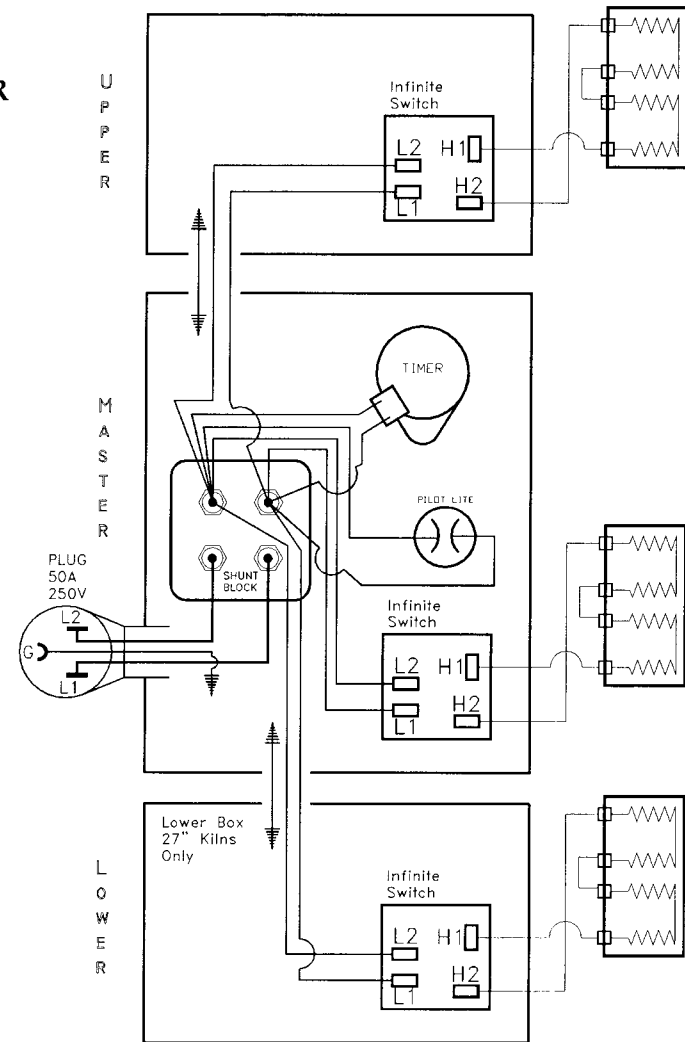




KS-1227,  
KS-1027,  
KS-1018

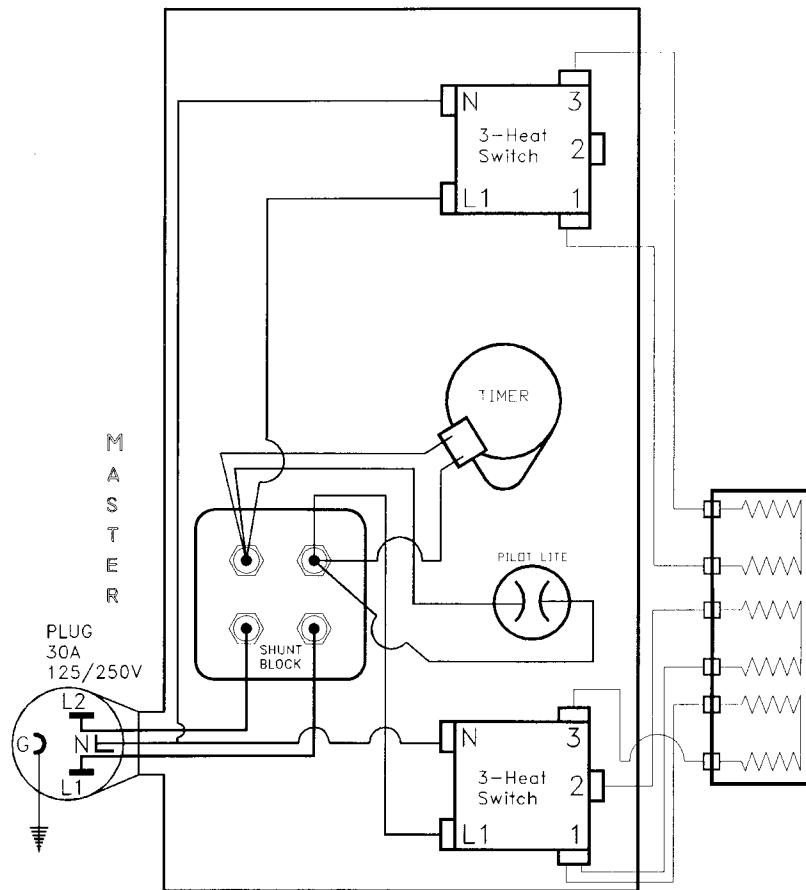


KS-818,  
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KS-818PWR

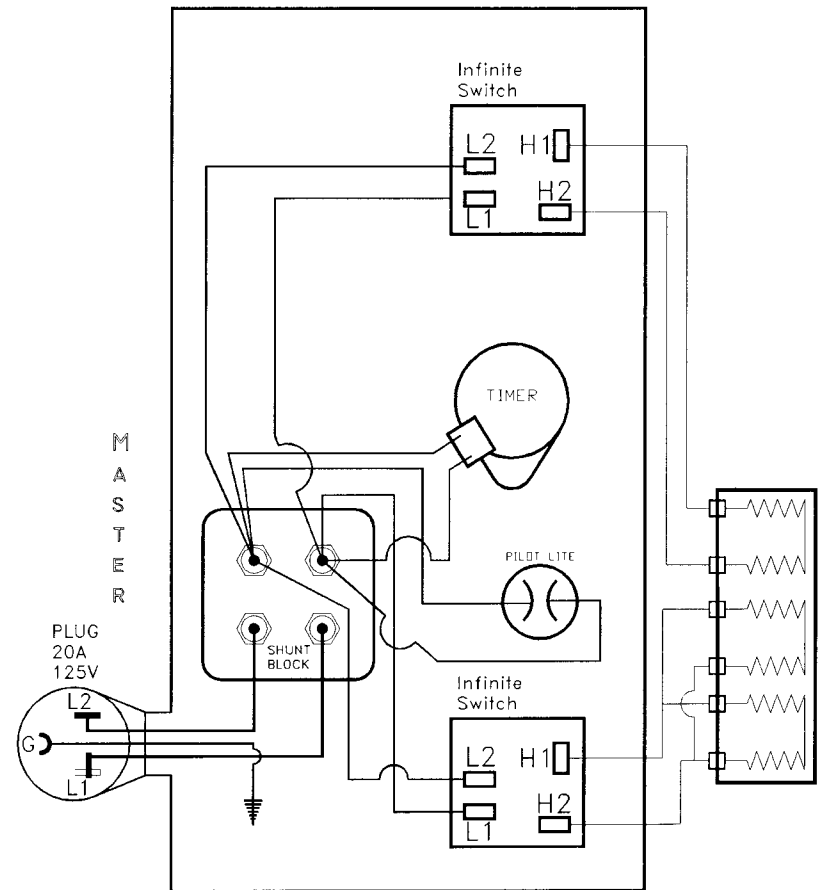




KS-714

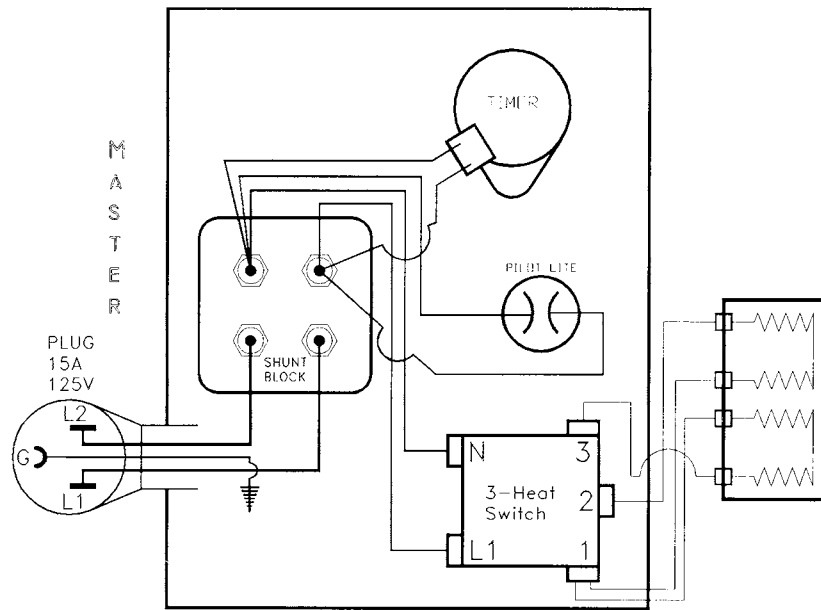


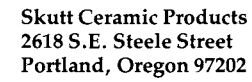
KS-614-3





KS-609



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## The Skutt System.

Below is the ultimate combination for firing convenience, control and safety: A Skutt KS-1227, an EnviroVent® downdraft ventilation system, and the KilnMaster® controller. All peep holes are plugged, there's no lid propping and no fumes in the kiln room. The Dawson Kiln-Sitter can be used as an additional safeguard against overfiring.

### THE ENVIROVENT.

Developed jointly with The Edward Orton Jr. Ceramic Foundation, the patented Skutt EnviroVent is a truly effective kiln venting system.

**Removes fumes, odors, vapors.** The EnviroVent draws out firing odors and vents them outdoors before they enter the studio or classrooms atmosphere. It's great for firing lusters, metallics and high sulfur clays.

**Improved firing consistency.** The EnviroVent creates a downdraft effect which greatly improves kiln temperature uniformity. You can now fire loads with

reds at the top of the kiln and greens on the bottom with excellent results.

**Fits popular kilns.** The EnviroVent fits Skutt 12, 10, and 8-sided kilns, as well as many other kiln brands.

**Convenient firing.** The EnviroVent makes firing much more convenient. There's no lid propping. Just put plugs in all the peepholes and begin.

**Better than hoods.** The EnviroVent pulls fumes from the kiln before they can

enter the room. It's compact and unobtrusive—no pulleys, no counterweights, no overhead installation. Flexible ducting lets you move kilns around the room. And the air-cooled motor will not overheat from normal firings.

**Certified safe.** The EnviroVent is UL listed when installed with a Skutt kiln bearing the UL mark and meets standard building codes in most jurisdictions.

### KILNMASTER CONTROLLER.

Now, the many thousands of Skutt kiln owners can add KilnMaster® electronic control to their kilns in a matter of minutes, and there's no sacrifice of traditional quality or performance. The Skutt KilnMaster may also be used with other brand kilns.

**Easy to install.** You need only to drill a small hole through your kiln's firebrick for the KilnMaster thermocouple (the stainless steel jacket is already punched on Skutt kilns) and plug your kiln into the unit.

**Wall mounted convenience.** The KilnMaster is easy to wall mount at eye level near your kiln, so you can monitor a firing without bending or stooping. The color-impregnated unbreakable housing and sealed touch pad faceplate are designed to keep clay and dust out. They're easy to wipe clean with a damp cloth.

**Two year warranty.** Like all Skutt products, KilnMaster controllers are backed by our two-year limited warranty, the best in the industry.







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# SKUTT

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