

Safe Installation of the Electric Kiln

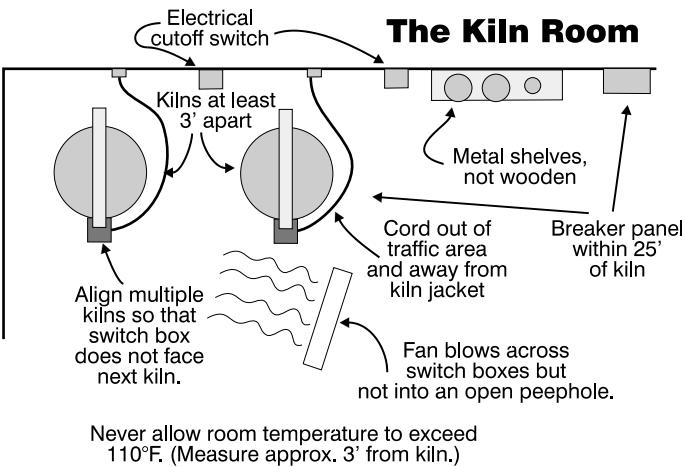
A properly installed kiln that is used with our safety precautions is very safe. Once you start firing a kiln, you will quickly realize that there is no reason to fear it. Instead, opening the lid and viewing the pieces inside will become the high point of your week.

NOTE: Your local building codes supersede our recommendations.

Selecting a Location



In most home studios, the kiln goes in the garage or basement. An alternate location is a separate storage building. It is okay to place the kiln in an unheated building in cold weather.



Room Size & Ventilation

Avoid small, enclosed spaces such as a closet or small utility room. The kiln room must be large enough to avoid heat buildup around the kiln.

The minimum spacing between the kiln and nearby walls is 12". But in addition to the 12", plan for generous space around the kiln to promote good ventilation. Include room for steel shelves to hold ceramic ware. Maintain a minimum of 3 feet of space between kilns to prevent heat buildup around the kilns. Keep flammable material, such as shipping materials, out of the kiln room.

Consult building codes for recommended non-combustible wall material for walls that are near the kiln. Cement board or masonry tile are good choices.

An Exterior Wall

Select a room with an exterior wall. You should vent the kiln, similar to the way a clothes dryer is vented, using a motorized vent. Fumes are vented outside through an exterior

wall. If your kiln room has only interior walls, you will need to vent through the ceiling or floor to the outside.

Concrete Floor

Place the kiln on a concrete floor. Avoid wood floors and, of course, carpet. If you place a kiln on a concrete floor finished with linoleum tile, place a fireproof material over the tile to protect it from discoloration.

Be sure the bottom of your kiln is covered with an outside layer of sheet metal. Overfired glazes can eat through the firing chamber insulation and drip onto the floor under the kiln. The sheet metal bottom prevents this.

Warning About Fire Safety Sprinkler Heads

In the kiln room, position sprinkler heads in the ceiling away from the kiln(s). We know of schools that were flooded because the sprinkler head, positioned above the kiln, turned on the fire alarm. Consider using a higher temperature sprinkler head in the kiln room or the type that senses smoke rather than heat. You could also install a Vent-A-Kiln vent hood, which will lower the temperature around the kiln.

Electrical Capacity

Before you order a studio kiln, measure the voltage in your building. (In the U.S. and Canada, it is usually 240 or 208. Both voltage systems use the same wall outlets, so you can't tell voltage by the type of outlet.) If you are not sure how to use a voltmeter, ask your power company to confirm voltage, or hire an electrician to check it. If you are in a commercial location, find out if you have single or 3 phase power. (Single phase: 2 hot wires and a grounding wire; 3 phase: 3 hot wires and a grounding wire.)

Besides knowing voltage and phase, be sure your building can handle the kiln's amperage. Some older sites cannot power a studio kiln without an expensive upgrade of the electrical system. See the specifications in the kiln catalog.

In some areas, the power company gives a discount for electricity consumed during the night. This is to encourage you to take advantage of excess generating capacity during off-peak hours. You might want to ask your power company if they offer this discount. If so, you will need a time-of-use meter installed.

Plan enough space and electrical capacity for additional kilns if you believe your kiln program will expand later.

Doorway Clearance

Make sure the kiln will fit through the necessary doorways to reach the kiln room. Ask your dealer for the kiln's exterior width. Some catalogs include doorway clearance for each kiln.

HVAC: Heating, Ventilating & Air Conditioning

If you are installing a kiln in a school, mall, or other location with a central heating, ventilating, and air conditioning system, the building manager may ask how much heat your

kiln will generate. A good estimate for studio kilns is 23,000 BTUs.

Electrical Installation

Please have only a qualified electrician wire your kiln circuit.

We recommend an electrical shutoff box near the kiln, in addition to having a circuit breaker at the electrical panel. The shutoff box is a must for direct wired kilns, which can't be unplugged to disconnect the power. The shutoff box is also important for kilns with plugs. We recommend disconnecting the power when the kiln is not in use. If you unplug the kiln frequently, the spring tension on the wall outlet may eventually weaken. The shutoff box disconnects the power without having to unplug the kiln.

Install the kiln within 25' of the fuse or circuit breaker panel. For every additional 50' from the panel, increase circuit wire size by one gauge.

But do not place the kiln right in front of the electrical panel. Keep the panel at least 3' - 4' away. Otherwise, the breakers may trip more easily on a hot day. This is because a circuit breaker is triggered by heat, and a nearby kiln can raise the temperature of the electrical panel.

Use a circuit wire size large enough for the wall receptacle amperage, even if the kiln amperage is less than the wall receptacle amperage. **WARNING:** changing the cord plug on Paragon kilns will void your warranty.

Use *braided* copper wire. Do not allow an electrician to use aluminum wire on your new circuit. Aluminum terminals corrode worse than copper and require greater installation care. Avoid using extension cords.

The kiln catalog lists recommended breaker and wire sizes for the circuit. Local codes, however, supersede our catalog recommendations.

You may have a 240 volt circuit conveniently located where you will keep your kiln. But do not assume that the circuit is the correct size. Dryer circuits are too small for most studio kilns. Even if you have the correct wall outlet, you should verify that the wire and breaker sizes are also correct. Make sure the equipment grounding wire is properly installed. Sometimes circuits have been installed by home owners with limited electrical experience.

Note: Do not use the circuit breaker to disconnect the kiln. Frequently switching the circuit breaker will weaken it. Instead, use a shutoff box located near the kiln.



If possible, install the kiln within 25' of the breaker panel.

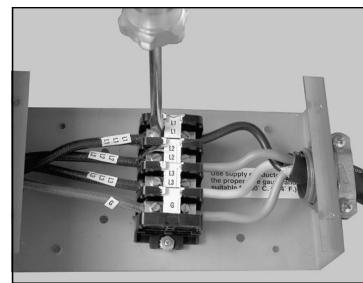
Direct Wiring the Kiln

Large studio kilns above a certain amperage are shipped without a plug and must be direct wired. This means that instead of using a plug and wall outlet, they are connected permanently to a terminal box mounted on the wall.

Direct wiring is better than a plug and outlet connection, because if the outlet corrodes, it can overheat. You can remove the plug and direct wire the kiln to eliminate this potential problem. But the kiln will no longer be portable.

Please follow these guidelines in direct wiring a kiln:

- 1** Use a supply wire size large enough for the circuit amperage even if kiln amperage is less than the circuit amperage.
- 2** The supply wire must be suitable for 90°C (194°F).
- 3** Protect the supply wire with flexible or rigid conduit. You can also direct wire a kiln by removing the plug and using the existing cord.
- 4** Connect the supply wires at the wall using a high amperage screw-down connector block. Make sure all connections are tight.
- 5** Enclose the connection block in a suitable outlet box with cover.
- 6** Place the electrical shutoff box near the kiln.



The Plug and Wall Receptacle

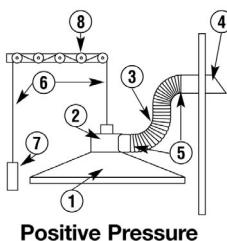
The wall outlet should be installed so that the kiln cord hangs downward—not upward—from the wall outlet. Do not place the outlet so close to the floor that the kiln cord bends at a sharp angle. In either case, the plug may not seat properly in the outlet, which will cause the plug to over-heat and corrode.

Make sure the plug is pressed all the way into the outlet. Heavy amperage plugs sometimes work their way out of the wall receptacle due to the weight and movement of the cord. This leads to poor contact between the plug and outlet.

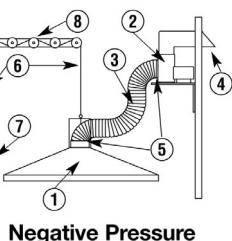
Remove the plug from the wall every few firings and check for blackened plug prongs and melted or discolored plastic. At these signs of heat damage, replace both the wall outlet and the kiln's electrical cord. Make sure the receptacle feels tight when you press the plug back into the outlet. A loose receptacle indicates worn springs, which will lead to overheating. While the kiln is firing, occasionally touch the cord near the plug, and the wall outlet cover. It is okay if they feel warm, but if they are hot, turn the kiln off. Have an electrician inspect the circuit.

Note: Some people apply a light coating of oxidation inhibitor to the prongs on the kiln plug. This helps insure good contact between the plug and wall outlet. The inhibitor is a paste available at electrical supply stores.

Venting the Kiln



1. Conical aluminum hood
2. Fan/Motor assembly: note the placement in drawings.
3. Flexible exhaust hose
4. Discharge plate
5. Exhaust hose clamps
6. 3/16" coated steel cable
7. Counterweight
8. Overhead pulley system



The Vent-A-Kiln vent hood is positioned over the kiln.

Firing ceramics produces fumes that contain small amounts of carbon monoxide, formaldehyde, and sulfur dioxide. For health reasons, we recommend—and building codes in some areas require—that kilns are vented with a motorized vent. The two vent systems available for electric kilns are the overhead system made by Vent-A-Kiln Corporation, and the down-draft system made by Orton Ceramic Foundation.

To help you plan your kiln location, we are including basic information on these systems. For additional information, contact the vent manufacturers or your ceramic supplier:

Orton Ceramic Foundation
614-895-2663 / Fax 614-895-5610
www.ortonceramic.com

Vent-A-Kiln Corporation
716-876-2023 / Fax 716-876-4383
www.ventakiln.com



The 16" Orton Platemount KilnVent fits between the kiln and kiln stand.

General Guidelines

Vent System Operation Theory

The overhead vent is positioned over the kiln with the aid of a counter-weight. As heated air rises from the kiln, the vent pulls it outside through an aluminum duct. This system also helps lower room temperature around the kiln.

The down-draft vent connects directly to the kiln. For top-loading kilns, the vent fits between the kiln and the kiln stand. A small amount of air is pulled from the kiln and mixed with room air. This lowers the temperature of the vented air to a safe level. Small holes drilled in the kiln lid and bottom regulate the amount of air that the vent pulls from the kiln.

Vented Air Volume & Temperature

Both vent systems remove air from the kiln room. Open a window or door to replace the air that is vented outside.

Many studios keep the door to the kiln room closed. In this case, you must open a window or install an intake vent so that make-up air can enter the kiln room.

| | Volume of Vented Air | Approx. Duct Temperature |
|----------------|----------------------|--------------------------|
| Orton KilnVent | 60 - 80 CFM | 100°F - 155°F |
| Vent-A-Kiln | 265 - 500 CFM | 90°F - 125°F |

Installing the Vent

The Vent Exit Point

Plan your kiln room to include an exterior wall. The fumes are vented to the outside through a clothes dryer duct. If the kiln room does not have an exterior wall, you will need to run the duct through the ceiling or floor to the outside.

Avoid placing the vent exit near windows. Otherwise the fumes may reenter the room. If you are in a multi-story building, avoid placing the vent exit under upper story windows.

If you cannot avoid placing the vent exit near a window, you can raise the vent above the level of the window. As the warm air is vented outside, it will rise past the window.

The Vent Duct

The duct size will depend on the type of vent you are installing. Several kilns can be vented to a single exit duct. The size of the exit duct depends upon the number of kilns vented and the brand of vent.

Duct Length and Width

| | Maximum Length | Width |
|----------------|-------------------------|---------|
| Orton KilnVent | 60' with 4 - 90° turns | 4" |
| Orton KilnVent | 60' with 8 - 45° turns | 4" |
| Vent-A-Kiln | 10' with 2 - 45° turns* | 5" & 6" |

*20' if you extend the duct with rigid duct.

It is okay to include vertical lengths of duct, because the warm air rises. Use aluminum flexible duct. Do not use the plastic flexible duct sometimes used on clothes dryers.

Orton KilnVent

You can use 4" PVC pipe, provided your building code approves. PVC lasts longer than aluminum duct, especially if you fire clay with a high sulfur content.

Do not connect the PVC directly to the KilnVent. Instead, use several feet of flexible aluminum duct between the vent and the PVC. This prevents vibration of the motor from transferring to the PVC.

Seal all joints with duct tape. When aluminum duct begins to deteriorate, small holes will appear, and you will begin to smell kiln fumes. At that point, replace the duct rather than attempt to repair with duct tape.

If you fire the kiln with the Orton KilnVent turned off or removed for repair, cover the air exit holes in the kiln bottom. Place a kiln shelf over the holes.

Leave the vent on throughout the kiln firing and cooling cycle. Turn the vent off when the kiln is cool enough to unload bare-handed. The vent will help remove moisture during "candling" at the beginning of the firing. The moisture in the duct and motor will dry out as the kiln heats.

When using the Orton KilnVent, leave the kiln's peephole plugs in place and lid down all the way throughout the firing. The vent operates under negative pressure, which requires that the lid and peepholes are closed.

Kiln Safety

Check the kiln from time to time. Observe the normal sounds that it makes and length of firing time. Once you are familiar with the normal operation of your kiln, you will know when something goes wrong.

Following these pointers adds very little extra time to your daily routine:

- Place the kiln on the stand recommended by the manufacturer. When a kiln is safety tested by UL, the lab fires the kiln on the stand designed for the kiln. Cinder blocks or bricks can inhibit the flow of air under the kiln. They can also change the kiln's heating characteristics.
- Place the kiln on a non-combustible surface.
- Do not install closer than 12" from any wall or combustible surface.
- Fire only in a well-ventilated, covered and protected area.
- Do not open the lid until kiln has cooled to room temperature and all switches are off.
- Dangerous voltage: do not touch the heating elements with anything.
- Disconnect kiln before servicing.
- Do not leave kiln unattended while firing. Do not leave a kiln turned on at your studio while you are at home sleeping.
- Wear firing safety glasses when looking into a hot kiln.
- Keep the kiln lid or door closed when the kiln is not in use. This keeps dust out of the kiln. Also, should someone turn on the kiln while you are away, the closed lid will keep the heat safely inside the firing chamber.
- Never place anything on the kiln lid, even when the kiln is idle. If people become accustomed to placing papers and other objects on the kiln, they may forget and do that while the kiln is firing.
- Remove all tripping hazards from around the kiln. Keep the kiln's supply cord out of traffic areas.
- Do not let the cord touch the side of the kiln, which may damage the cord.
- Avoid extension cords.
- Do not remove the ware from the kiln until the kiln has cooled to room temperature. It is possible for thermal shock to break hot ceramic pieces. The sharp edges of broken ware can injure hands.
- After firing glazed ware in your kiln, examine the shelves for glaze particles. Sharp slivers of glaze stuck to the shelf can cut hands. Before rubbing a hand over a shelf, be sure the shelf is free of glaze shards.
- Fire only approved materials purchased from a knowledgeable supplier. Do not fire marbles, pieces of concrete, rocks, and other objects. Rapid heating to high temperature can cause violent reactions in many materials.
- Avoid firing toxic materials inside the kiln, such as moth balls. Burning moth balls create toxic fumes.
- Never fire tempered glass inside a kiln. It could explode.
- Greenware, which is unfired clay, must be bone dry before firing. Moist greenware can explode inside the kiln, damaging the ware and the kiln. Place a piece of greenware against the inside of your wrist. If it feels cool, it is too wet to fire.
- Do not fire cracked shelves. They can break during firing, damaging the ware inside the kiln.
- Store kiln shelves in a dry area. Moist shelves can explode inside a kiln.
- If you smell burning plastic, turn the kiln off. Examine the wall outlet and supply cord for signs of burning.
- Never place extra insulation around the kiln in an attempt to conserve energy. The extra insulation can cause the wiring and the steel case to over-heat.
- Do not wear loose-fitting clothing around a hot kiln.
- Unplug the kiln, or turn off the electrical shut-off box or circuit breaker when the kiln is not in use, especially if you are concerned that someone could turn it on while you are away.
- Remove flammable materials from the kiln room. If you fire a kiln in the garage, park your car outside. Remove the lawn mower, gasoline, and other flammable materials. Keep packing materials such as shredded newspapers out of the kiln room.
- Keep unsupervised children away.



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