Kiln Buying Guide

What you should consider & know
when buying a new electric kiln

CLAYMAN
Supplies Limited

where quality comes as standard

Who We Are

At Clayman Supplies Limited we are passionate about ceramics and we have been for the last thirty years from our inception. We believe using the best quality aids should make the job easier or the end product better. We are also passionate about the service we give our customers. Simply, we aim to be the best.

Clayman Supplies Limited started life as Nyetimber Pottery Supplies. Reg Griggs had set up a small studio pottery, and when asked by local people if they could buy the odd bag of clay, ventured into supplying more goods. Within six months of trading it was deemed that a more appropriate name was required and Clayman was chosen as the most apt for the man who sold clay. Reg now has eighteen years' experience teaching pottery and over thirty eight years potting in a full or part-time capacity. Over that time he has absorbed ceramic knowledge like a sponge and now spends each day offering technical support to amateurs and professionals alike. Having taught and worked as a professional potter he can offer advice that is applicable to the enquiry he is dealing with at any one time.

Linda Griggs started life as a practice manager for a group of doctors. For more than 20 years she has brought that desire for detail and efficiency to running the accounts and despatch sides of Clayman Supplies Limited. She also brings that personal touch to dealing with customers who visit our "Potters' Shop" or who telephone with orders.

Clayman Supplies Limited started in a small way, but it has not lost the belief that all customers are important. Service is a term that we grew up with and still want to practise on an every day basis.

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Choosing a Kiln

Choosing the right kiln

Choosing a kiln should not be a difficult task; the bricks used by most manufacturers will be the same. However the analogy that "you get what you pay for" could not be more applicable than when buying a kiln. Comparing one make with another is not necessarily comparing like with like and it is essential to research adequately before committing to what is probably the most important purchase the potter is ever going to make. Bricks will always be 9 x 4.5 x 3"; thus the sizes, in particular top-loading kilns, will be standardized. Some manufacturers will limit their range to the most popular sizes.

KILN & EQUIPMENT DELIVERY

Delivery of kilns or equipment is often the aspect that is most overlooked. **You must be aware how your kiln will arrive and what you may be responsible for.** If your front-loading kiln arrives on a pallet weighing over 250kg and the delivery company leaves it on your drive, how do you get it on the ground and into position? We would like to make all customers aware of what is included in the three services we offer.

PALLET DELIVERY

The service can be applied to the delivery of top-loading kilns and wheels or any piece of equipment with external dimensions no greater than a metre square. The equipment is strapped to a pallet and delivered by means of a lorry with a tail lift. These vehicles normally have a pallet truck that can be used to manoeuvre the pallet on flat ground, but it must be appreciated that the price given is to deliver to site and off-load.

It is the customer's responsibility to remove the kiln or equipment from the pallet and move into position.

DELIVER, OFF-LOAD INTO POSITION

This is more of a tailored service and covers all sizes and shapes of equipment. Again, it is delivered by avehicle with a tail-lift. The vehicles will always have a pallet truck and the driver will off-load and move the equipment into position. A survey is requested to give the carrier information on the surfaces and site to be encountered. This service can negotiate one step of no more than 4", but cannot easily deliver heavy equipment on uneven or soft terrain. For large or relatively unstable equipment assistance is requested from the customer. A completed kiln delivery questionnaire is required before delivery prices can be confirmed. This service is not available to all UK locations.

NORTHERN KILNS SPECIAL DELIVERY

This service is unique to Northern Kilns (Chieftain Round and Oval, Champion and Rocket Kilns) and is only provided for this manufacturer's kilns. They deliver and off-load into situ negotiating no more than one step. They will install the kiln to a suitable isolator (switch) if applicable and if it is situated within 2 metres of the kiln. They will also instruct on use of the controllers supplied with their kilns. A completed kiln delivery questionnaire is required before delivery prices can be confirmed. (Note: This service is unrivalled, but the price reflects the comprehensive package offered and the removal of stress and responsibility to the customer.)

Which Kiln?

Gas or Electric?

The first consideration when choosing a kiln is the type of firing you want; oxidation (electric) or reduction (gas). Gas refers to the use of propane or natural gas.

Gas:

Benefits	Drawbacks
Jet burner can be changed to Electric and vice versa.	Often more expensive to run as because fuel is not burnt efficiently and a large amount of heat is lost through venting.
Firing cost is not significantly different to electric (based on similar sized kilns).	Bisque firings are best done in the clean atmoshere of an electric kiln.
Reduction firing is possible	Specialised venting required, especially if sited inside.
Easier and less expensive to install for larger kilns (15 cubic feet or more)	More attention and care needed than an electric kiln to fire properly.

Electric:

Benefits	Drawbacks
Jet burner can be changed to Gas and vice versa.	Not as easy to install and more expensive than a gas kiln for 15 cubic feet or more (large electricity supply needed)
Firing cost is not significantly different to gas (based on similar sized kilns).	
Cheaper to run due to fuel efficiency and less heat loss.	
Bisque firings are best done in the clean atmoshere of an electric kiln.	
Initial heating of an electric kiln is easy to control.	
Less attention and care needed to fire properly.	

Top v Front Loading

An argument can be made for either and it is often what the individual prefers.

Top Loading:

Benefits	Drawbacks
Generally cheaper than front loading kilns.	Not as easy to load.
Cheaper than front loading (due to 2.5 - 3" walls - 2.5" being imported brands)	

Front loading:

Benefits	Drawbacks
Easier to load (although you will ve required to extend your back)	Not as easy to load.
	More expensive (due to 4.5" of kiln brick - one of the main material costs)

Round v Square

Round:

Benefits	Drawbacks
Less expensive than square kilns (easier to build and fewer bricks - on a per cubic foot comparison).	
May load more effectively than a square kiln (depends on ware being fired).	

Square:

Benefits	Drawbacks
May load more effectively than a round kiln (depends on ware being fired) - but always balance this against the initial cost difference.	More expensive to build - more bricks.

Bricks v Fibre

Bricks:

Benefits	Drawbacks
Insulating firebricks are used in the vast majority of kilns and they will always outlast fibre.	
Elements are easier to replace.	

Fibre:

Benefits	Drawbacks
Fibre heats and cools faster, which can be desirable in certain instances	Fibre is generally considered a disadvantage.
	In fibre lined kilns elements are normally supported on ceramic rods; changing is therefore more complex and can be considerably more expensive.

Temperature

Most electric kilns produced in the UK will offer a maximum firing temperature of 1300°C (Cone 10). It is essential to appreciate that although probably all manufacturers refer to temperature because of the traditions of industry they are in fact referring to heat work (the effect of temperature over a period of time). Therefore if the kiln has a maximum operating temperature of 1300° and a kiln controller is fitted this should never be set to 1300°C or it will probably irreparably damage the fabric of the kiln. The damage will be greater in a kiln where the bricks are cemented (front-loading). Experiments with pyrometric cones to make initial comparisons of temperature to heat work are essential.

Kiln Size

Too small a kiln means too many firings. Too large means either wasting energy or the frustration of waiting too long for a full load. The larger the kiln the less expensive it is per cubic foot to buy. Also it is far less expensive to fire one large kiln rather than two firings in a kiln half the size due to the differences in heat loss and the time/energy required to heat up both the kiln and the load. One way to decide what size kiln is best is to draw a circle (top-loader) or square (front or top-loader) the size you think you want on newspaper. Try placing pieces you make on the paper to see if the size is adequate and the pieces pack efficiently. Gauging the height can be assessed in a similar way.

Electricity supply

Once you have selected the model or size of kiln you would like, you need to check your electricity supply is capable of taking such an appliance. If it is a 13amp model you should not have a problem as these kilns can be plugged into any 13amp socket. Remember that they should be plugged directly into the socket, never via a "gang" plug or extension lead. A kiln with a kW in excess of 13amp will always require a dedicated supply. This involves running a cable from your main fuse or distribution board to the room where the kiln is to be sited. An "isolator" or on/off switch should be sited convenient to the kiln placement. The kiln is then wired to the isolator. This is a very similar installation to an electric cooker. A modern house has 100amps of power (approximately) supplied to it. All the appliances used within the house cannot exceed this total. If you are unsure consult your electrician to check if you have enough available amps to enable your kiln to be installed.

The voltage in your property must also be checked. Colloquially speaking, we are said to use 230 volts in the UK, but through local area demands and also internal demands the voltage can drop. If your kiln is "plated" for 230v it means it needs this amount of voltage all the time it is operating. It has been known that potters have been wrongly advised that if your tumble dryer or washing machine works your kiln should work. This unfortunately is not the case. Normal household appliances have parameters in which they can work (i.e. if the clothes in your tumble dryer are not dry you can put it back on for longer etc.) A kiln must have 230v at all times otherwise a drop off in performance will be noted especially at stoneware temperatures.

Modern, as well as more and more older properties now have electricity supplies involving residual circuit devices (RCD's). Kilns should not be wired in using an RCD as the moisture in a new kiln or from bisque firings will cause the supply to "trip". If in doubt, consult a competent electrician.

Electricity Phases

It is standard for all domestic properties to have a single phase supply. Commercial premises or institutions can have three phase electricity supplies. Depending what appliances are already in use in a domestic property, an 8 cubic foot kiln, which will be rated at about 60amps, can be installed on a domestic supply. The advantage of a three phase supply is that the amperage of a kiln can be divided into three; therefore, the 8 cubic foot at 60 amps would be divided to 20amps per phase. Any kiln over 13amps can be converted easily to operate on a three phase supply. Dividing the amps also means much larger cubic capacities can be installed.

Wall Thickness

Kilns imported from America can have walls only 2.5" thick or 3" thick and no secondary insulation (a 0.5" thickness ceramic fibre blanket sandwiched between the brick and the kiln cladding). British made kilns invariably have 3" thick walls with the ceramic fibre secondary insulation. Analysis of the energy used for heat storage in the brick (the energy absorbed by the brick itself) versus the energy lost through the bricks shows that unless you plan a soak or a long firing at very high temperatures (where energy loss becomes more pronounced) or need to cool very slowly such as in crystal glazes, then the advantage of the thicker bricks and walls is almost negligible. Again it is stated by American manufacturers that where the fibre insulation is used as secondary insulation the energy savings is minimal at low temperatures and the advantage can only be noticed at high stoneware temperature firing (cone 8-10). We strongly recommend kilns with 3.5" thick bricks and 0.5" fibre backup as they can be used for any temperature up to 1300°C (cone 10). Also, the user is not limited to only lower temperature within the earthenware range.

Elements

We are often asked how long elements last. Unfortunately there is not a simple answer. The variables are the kW of the kiln (the more power going into a kiln the longer the elements should last), the amount of ware in each firing, and perhaps most importantly the temperature the kiln is fired to. Kilns fired to stoneware temperatures will need elements replacing far more often than kilns only fired to earthenware or bisque temperatures. The difference can be surprising, six to ten times more firings at the lower temperatures is possible.

Controllers

Over the years kiln controls have varied from the Dawson Kiln-Sitter to computer based programmable controllers. The kiln-sitter was fitted to virtually to all kilns imported from the States. They worked by using a pyrometric cone or bar, which bent from exposure to heat over a period of time. These were simple reasonably reliable devices. As electronic controllers have fallen in price the kiln-sitter has faded into the distance. The modern kiln controllers permit almost unlimited hands-off control over the entire process. They are relatively simple to use and allow controlled temperature rises over one or more ramps. Some also control the cooling cycle and the majority will also allow a soaking or dwell time during the heating up process and at the end of a firing. The latest controllers are also self diagnostic and can show error messages if something has failed.

Zone Controls

Most kilns on the market have each of the elements controlled at the same time as a single zone. In kilns with large cubic capacities, achieving an even temperature distribution within the firing chamber can be a problem. To help resolve this problem, some controllers split the kiln into zones, which are then controlled individually. Having this facility adds to the overall cost of the kiln.

Kiln Positioning

A kiln should be placed on a non-flammable surface (not wood or lino). Also allow at least 12" (30cm) gap around the kiln to allow heat to dissipate. Front-loading kilns should have at least 18" (45cm) space at the rear of the kiln for servicing or element changing. If this is not possible castors should always be fitted to allow the kiln to be moved easily for access. The floor should be checked before siting to ensure it is level. Always ensure the floor can take the weight of the kiln, this will normally only apply to front-loading kilns when they are not sited on the ground floor. The kiln controller (when connected to the kiln via a cable) should be mounted at a convenient height for access and to one side of the kiln. The controller should be easily accessed without the need to touch the fabric of the kiln. A kiln will always get hot in use; therefore nothing should be sited within touching distance of the kiln or placed on top of the kiln. It is also unwise to store any materials around a kiln.

Venting

Venting has come to the fore as an important health and safety concern. When firing, a kiln can emit gases from glazes that are being fired and carbon monoxide from the clay. If a kiln is being sited in a room such as a garage and air can flow freely in and out it may be decided that ventilation is adequate, especially if the room is not occupied at times when the kiln is fired. If a kiln is for a school, college or public institution it is almost certain that mechanical ventilation is necessary. The individual establishment should carry out a risk assessment and/or contact their local authority for advice. It should be noted that for a mechanical vent to work efficiently there must be an air inlet into the room and this should be sited on a wall opposite to the wall where the vent is sited. The air inlet is essential if a fire door is fitted to the kiln room. If a kiln is sited in a classroom an adequate barrier or cage should surround the kiln to prevent unauthorised or accidental contact with the kiln.

Other Expenses

When estimating the cost of a kiln, include the cost of kiln furniture (shelves and props to stack ware on different levels within the kiln). Generally one shelf will complete one layer, but as the kiln gets bigger a layer may be made up of two or more shelves. A few points to remember are:

- A shelf should always be placed on the base of the kiln to protect the bricks.
- The largest pieces can be placed on the top shelf to avoid unstable stacking.
- At least 1" of space should be left between ware and the shelf above to allow for air circulation.
- Large shelves can be heavy and unwieldy.
- Large bottomed ware, such as platters should not be placed spanning two half shelves.

Estimating Electric Kiln Firing Costs

An estimate of the cost of firing a kiln over an eight hour cycle using a cost of 6p per kW per hour can be calculated using the example below. Remember this is an estimation only, all kilns and firings are unique.

Costing your firing

A= Kilowatt rating of kiln (taken from the kiln's data plate)
B= Firing times in hours x 0.6 (since the kiln is only on full power towards the end of the firing cycle.)
C= Cost per kilowatt/unit (taken from your electricity bill)

Example

A x B x C = 5.5kW x (8 x 0.6) x 6 = £1.58

Note: Controllers such as the ST315 can be programmed at installation with the kilowatts of the kiln and interrogated at the end of each firing to see an estimate of the number of units used for the last firing.

Practical Tips

Installation

Always use a qualifed competent electrican or engineer.

Placing your ware

Always use the recommended size kiln shelves for the kiln you have.
Ensure each shelf is supported well and is stable
Always place props directly over props on previous levels
Always use a placing medium on kiln shelves (Placing Sand)
Always allow 5cm between the ware and the kiln elements.
When inter-stacking pieces in a bisque firing always place the heavier pieces at the bottom.
Do not allow ware to touch in a glaze firing
Place your ware evenly throughout the firing chamber
Remember to wipe the feet of glazed pieces
Use stilts for ware that is glazed all over. (Note: You should never stilt stoneware)

Drying & Firing Cycles

Always ensure ware is dry prior to firing.
Never try to fast fire a bisque firing.
For ware that is even in thickness allow 100°C heat rise to 600°C in a bisque firing.
From 600°C to 1000°C a much faster heat rise is possible.
When the ware is thick or variable thickness reduce the initial heat rise to 60-80° per hour.
For a glaze firing allow an initial heat rise of 100° per hour to 300°C approx.
To mature your clay to ensure a glaze fit (no crackle lines in the glaze) you must ensure one of the firings (bisque or glaze) goes to the maturing temperature of the clay (see product details)
Soaking or holding the maturing temperature of a firing for a pre-determined time can enhance the glaze appearance.
Cooling should be done naturally.
Do not open the kiln above 100°C

Notes