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## Kiln Building Course

**Build your own warm glass kiln!**



### Key features

- Chamber size 440 mm x 440 mm x 190 mm – (37 litres).
- Comfortably takes 400mm x 400mm shelf.
- Operates on a standard household power point - 240V AC 10 amps.
- Designed temperature range 650° ~ 850 °C – perfect for warm glass. [But we are aware of people who bisque fire their moulds in these kilns (around 1050 °C) although it takes a lot of power and reduces element life]. All refractories are rated to at least 1100°C.
- Fully enclosed in a solid stainless-steel box (we moved away from Galvanised) – unlike most imported kilns which rely on their kiln bricks for strength. These kilns can even ship on a small pallet without any need for external protective packaging.
- Added insulation reduces firing costs (equivalent to 6" of fire brick) compared with most designs at 2.5".
- Square interior.

- Fully complies with Australian Safety standards – i.e. power cuts off when lid opened – unlike a number of imported models. If you are playing in the kiln when it is hot, you don't need to worry about electrocuting yourself.

## **Background**

We work full time with glass art and have a well-equipped studio which permits us to engage in our art without too many limitations. We also teach others about the warm glass crafts and offer use of our studio facilities to those we have taught. Many would like to have their own studio set up at home but until now could not afford the often-high cost of the most basic piece of equipment required for glass fusing and slumping – the kiln.

We presently have 8 or so kilns, 5 in regular operation – with firing chambers ranging in size from 1.8 m x 1.5 m down to 20 cm square. In 2005, after having spent a large sum of money on a new kiln with a “top of the line” brand name digital controller which simply didn't perform to our requirements - we decided that we needed to know more about kilns and, in particular, their control systems.

We initially worked with an electrician (who specialises in kilns) repairing and eventually building several. Concurrently, we spent a lot of time, effort (and money) in evaluating and testing a variety of process control systems which could be used with a kiln.

What we discovered through this was that kilns and their control systems were not necessarily overly complex and didn't need to cost the earth to be effective. We even got our very expensive new kiln to work properly by replacing the \$1200 controller with a \$400 one – but that's another story.

Over time, many of our students have sought our advice as to buying a used kiln and, seeing as though good used glass kilns are few and far between, we conceived the idea of designing a specialised warm glass kiln for the home studio user.

We set to work with what we considered to be essential specifications-

- Effectiveness in warm glass techniques with either Bullseye or System 96 glasses.
- Ease of operation.
- Electrical efficiency.
- Capable of operating from a standard household power point – just like a toaster or kettle.
- Safety in use in a non-industrial/commercial environment.
- Durability and a long life.
- Capable of working with projects up to 400 mm square.

During 2006 we developed, prototyped and refined a design which met these specifications. We built 2 of these kilns for our own use and thoroughly tested them. Even today they continue to be in daily use and have proved themselves to be real workhorses and given us great flexibility.

Since 2007 we have offered kiln building courses where participants built their own kilns to these designs. To date in excess of 100 of these kilns have been built and all of the feedback we receive has been positive.

One of the beauties of building your own kiln is not only the sense of achievement but also the ability to take the skills you learn to either upscale or downscale another kiln.

In these courses we teach you a little about the relevant concepts so you can later do your own experiments if you wish and build proportionally bigger or smaller kilns. We will introduce you to some of the “science” of power, heat and insulation and the most useful concepts and materials. But best of all, you will take home your own kiln built as part of the course.

## **Why are we offering these courses rather than selling kilns ourselves?**

There are several simple reasons why we want to make the kilns – and this information – more widely available by way of these courses.

- Firstly, we want to see more people able to explore their art in this area and that is more likely to occur if there is better and cheaper access to kiln capacity.
- Secondly, the greater understanding an artist can have about their essential tool, the better the work they produce – we have got to the point where we are quite comfortable designing and building a specific kiln for a specific job – rather than making the inevitable compromises.
- Thirdly, firing services which we and other studios provide are necessarily limited - it is better for all concerned for people to have their own kiln.
- But most importantly, we don't want to be kiln manufacturers – everyone can be one.

## **What are the disadvantages of this design?**

The kiln will only work for glass – it is incapable of reaching ceramic firing temperatures. The maximum size of a piece of work is 400 mm square which ought to be sufficient for most purposes. But it is a bit large and perhaps a bit slow if all you want to do is make jewellery.

Of course, you will also need to buy your own shelves, molds, washes and accessories that are currently provided as part of studio or firing fees. For example, shelves of this size cost in the order of \$90; molds range from \$10 to \$40; kiln wash is \$30 per bucket; fibreboard is \$55 per sheet. Coupled with running costs, you may not think it a worthwhile investment.

And working at home alone isn't necessarily as much fun as being in the studio with others for ideas, inspiration, advice and the occasional glass of wine ....

## **How much does it cost?**

If you are able and willing to construct your own metal body kit – base, body shell and lid – and make your own kiln controller system, then the materials for the kiln could cost you from \$843 but for most we expect it to be \$1750. A commercially built kiln of this size would normally cost you in the vicinity of \$3-4000.

The course has no additional fee per participant - whilst one person can assemble or build the kiln, you may benefit from an extra pair of hands and it should be a fun time to drag someone else along to.

To build a kiln, you need relatively basic skills – Nothing that has been beyond anyone who has taken the course so far:

- do some fine cutting/adjusting of pre-machined bricks and boards.
- rivet body together.
- fit elements into bricks.
- attach fibre to lid.
- fit handle and hinges on lid.
- attach cut-out mechanism to lid.
- attach controller to body.

In our experience this is a reasonably comfortable half day for most people. All materials and tools are supplied. Students will need personal protective supplies – safety glasses whilst drilling/riveting – disposable gloves/respirator when working with fibre. We can supply a kit comprising gloves, safety glasses and respirator for \$10 per person.

## **What about standards and safety?**

A very important issue. We believe that the kilns do comply with relevant Australian and international standards – but we are not willing to pay the cost of a formal independent laboratory evaluation. We can provide you copies of the relevant standards for inspection if required.

We believe that the kilns are safe to use – with common sense – after all they generate heat and use electricity – both of which are inherently dangerous.

You can be assured of electrical safety because a licensed electrician will assemble relevant components as part of the course. Additionally, we undertake a full safety check (test and tag) of each kiln in accordance with Australian Standard 3760. The cost of this safety check is included in the course.

## **Controllers**

We supply a controller (including thermocouple) pre-wired by licensed electrician which makes up approximately \$500 of the course fee, or you can use your existing controller for this new kiln. The recommended controller has

- 4 programs x 8 steps each comprising ramp/temp/soak.
- full PID capacity
- capability of adjusting program even whilst firing – increase temperature, increase time, etc.

Greater or lesser functionality in controllers is available at slight changes (+/-) in cost.

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## **The (not so fine) print**

Kilns are dangerous.

We aim to teach you the mechanics of kiln construction and have gone through a process of trial and error to come to this design which we use ourselves.

We guarantee any materials and equipment which we sell to you, but we can't accept responsibility for any faults arising from your construction of the kiln or what you do with it once you have built it.

Most importantly you will need to install it and use it in a safe environment. The kiln gets hot and is hot enough to cause a fire or contact burns. You must therefore install it in a non-flammable environment, away from children and others who might not realize it is hot. And you must never, ever, fire it unattended.