

2. Construction Materials

The objective of the construction is to fabricate something that is practical (ie. it works), low cost, easy to build and as far as possible pleasing to the eye. In addition to create a design that anyone can build.

Other than the fundamental design of the smoker, practicality falls into three main areas:-

1. Structural – the unit is rigid and easy to man handle
2. Thermal – the food chamber maintains heat
3. Fire – the internal walls are fire retardant

The three requirements are fulfilled using a double skin design, the inner skin being made out of fire retardant material and the outer skin of plywood. For simplicity you could argue that the whole unit be made from the fire retardant material but I think that this would compromise the aesthetics.

The fire retardant material I used was a calcium silicate board because it is not only fire retardant but also moisture resistant which is ideal when thinking about the water bath and humidity in the food chamber.

You may be reading this anywhere around the globe so it's impossible for me to specify a brand of material to use because as far as I'm aware there isn't such a material available globally. If you can get calcium silicate board then great, if not you need to find a material that meets the criteria set out - fire retardant and moisture resistant.

In addition, I used 6mm ($\frac{1}{4}$ inch) thick board. Anything between this and 12mm ($\frac{1}{2}$ inch) thick will do the trick however the measurements in the plans are clearly going to vary dependent on the thickness of product you use. To help avoid confusion I've coded the measurements in drawings and referenced them to an adjacent table so that you can make the necessary adjustments to your design dependent on your choice of final materials. More detail on this point is covered in Chapter 5.

The outer skin is 9mm plywood ($\frac{3}{8}$ inch) and a minimum of 5 ply. Together with the fireproof board this is the minimum thickness to use in order to maintain structural rigidity and minimize heat loss.

The design is based on cutting from a sheet 8' x 4' (both the ply and fireproof board) but in the case of the ply you may prefer to work with 4' x 2' boards. These are easier to handle, you'll need 6 boards and you'll have little wastage however 6 boards will probably be more expensive than 2 sheets of 8' x 4'.

Pinning everything together are 21mm x 21mm ($\frac{3}{4}$ x $\frac{3}{4}$ inch) planed square edge timber battens.

The full bill of materials is below

- 5 ply plywood $\frac{3}{8}$ " thick 6 sheets of 4' x 2' or 2 sheets of 8' x 4'
- Fireproof board (calcium silicate) 6mm or $\frac{1}{4}$ inch thick - 2 sheets of 8' x 4'
- Softwood timber battens $\frac{3}{4}$ " x $\frac{3}{4}$ " - 9 lengths of 12' or 3.6m
- Softwood timber battens $1\frac{1}{4}$ x $1\frac{1}{4}$ – 2 lengths of 2' or 610mm(to mount the casters)
- 4 casters
- $\frac{3}{4}$ " dowel – 2 lengths of 2' or 610mm
- 4 Solid brass hinges - brass doesn't rust.

- Velcro® loop - Don't buy the self adhesive stuff. Gluing with PVA is much better.
- 3-Inch Barrel Bolt
- 2 Snap catches
- ¾” Screws countersunk size 6 posidrive

For more information and pictures on these materials check out this page on [my website](#).

Throughout the remainder of this book I'll refer to the fireproof board as “fire board”. This is for simplicity of typing and reading and is in no way intended to indicate or recommend any brand.

Further Information

Many of the folks who have bought this e-book in the USA recommend [Hardie Backerboard](#) as an alternative to calcium silicate for the fire board.

4. Tips 'n' Techniques

As I've gone through the build process I've noted down those little things that just make life easier and help you along the way. To the DIY experts out there this may be a little basic but I'm sure that there's plenty out there who (like me) shy away from DIY but still want to build their own smoker.....this chapter is for you!

The Instructions

When reading the diagrams you'll find the dimensions of the panels and battens on the right and bottom, the drill hole spacing on the top and left.

The measurements for spacing of drill holes are not mandatory to follow but it does ensure that everything is symmetrical to look at and there's no conflict between the drill holes for the plywood panel and the fireproof board.

Read the instructions carefully to ensure that you countersink drill holes on the correct side.

General Carpentry

Whenever cutting anything with a jigsaw, always wear a dust mask.

To cut a straight line you will need a piece of square edge batten that you can clamp to the plywood or fire board, then use the edge as a guide as demonstrated in the picture below.



Sand down at every opportunity to ensure a smooth finish to all your work.

General process for fixing battens to the plywood is to drill holes in the plywood and countersink. The batten is then positioned on the plywood and secured using the C-clamps before the screws are inserted.

Don't glue everything, screws are enough

Some fire boards have a front and reverse side ie. they are only sanded on one side. It's important to ensure when countersinking the drill holes that you get the correct side. At all points through the

book I will note if there is something different to the norm. Clearly if your fire board is sanded on both sides then you don't need to worry about this point.

When using the drill hole cutter, clamp some waste wood to the reverse side of where you are making the hole. That way you prevent damage to the reverse side. The drill hole cutter is set at 2½ inches or 63mm.

6. The Base

The first panel to construct is the base. It's the foundation to everything else in more ways than one in that it will also get you familiar with the construction materials and process that's going to shape the rest of the build. It's also easy to do because both plywood and fire board panels are the same size.

This is how the completed panel should look:



On the top is a layer of fire board, the bottom is a plywood panel and the sandwich is 4 x ¾ inch battens.

In the picture the base is lifted onto small offcuts of batten. Don't worry about this at this stage, this is important during the assembly process only.

Step 1 – Plywood & Battens

Use Figure 1 (on the next page) for the dimensions of the plywood and battens for the next step.

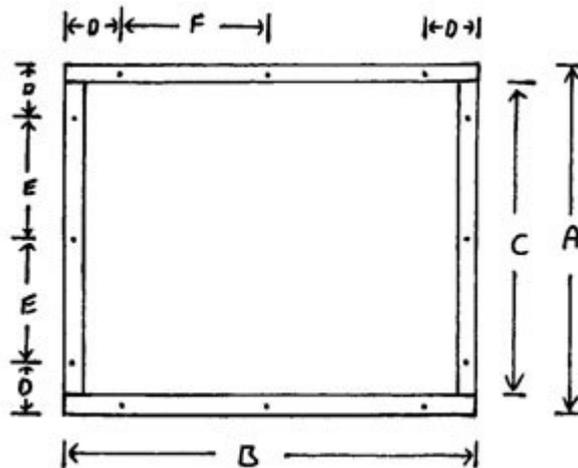
Use a jigsaw to cut the plywood to size (see Chapter 4 for how to cut a straight edge) and use a pencil to mark the drill hole points.

Now double check the measurements for the battens and cut these. When all cuts are done, sand down any rough edges.

Once you have cut the plywood and battens to size, drill the holes in the plywood, countersink on the external side and fix the battens in position.

Remember when fixing the battens in position, to make sure that you get it accurate, secure a batten to the plywood with a couple of C-clamps and then insert the screws. Once fixed, removed the C-clamps and repeat for the next batten.

Fig. 1



Plywood		Imperial ¼ inch	Imperial ½ inch	Metric 6mm	Metric 12mm
A	Plywood Width	20	20	508	508
B	Plywood & Batten Length	23 1/4	23 1/4	591	591
C	Batten Length	18 1/4	18 1/4	464	464
D	Edge To Drill Hole Center	3	3	76	76
E	Distance Between Drill Hole Centers	7	7	178	178
F	Distance Between Drill Hole Centers	8 1/2	8 1/2	216	216

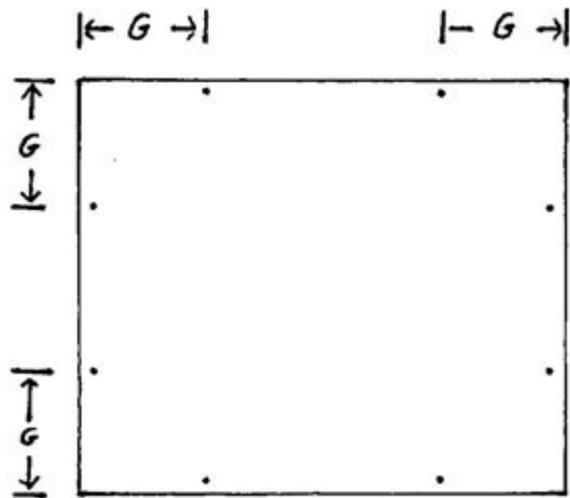
Step 2 – Fire Board

As I said at the top, the dimensions of the fire board are exactly the same as the dimensions of the plywood ie. A & B as marked on Figure 1. Sand down any rough edges.

Figure 2. (overleaf) shows the positioning of the drill holes in the fire board panel. There's not much to say other than the positioning is so that there's no conflict with the screws that secure the plywood and the holes are marked out symmetrically because this face will be visible.

If there is a front (sanded) side to your fire board then countersink the drill holes on the front side and using the C-clamps to secure, fix the fire board to the timber battens to complete the base panel.

Fig. 2



Fire Board		Imperial ¼ inch	Imperial ½ inch	Metric 6mm	Metric 12mm
A	Fire Board Width	20	20	508	508
B	Fire Board Length	23 1/4	23 1/4	591	591
G	Edge To Drill Hole Center	6	6	152	152

Further Information

Use this link to find the [corresponding web page](#) for this panel on my website.

To watch the video [click here](#)