HOW TO MAKE AN ALUMINIUM CASE

FOR OUR HEATER MATRIX

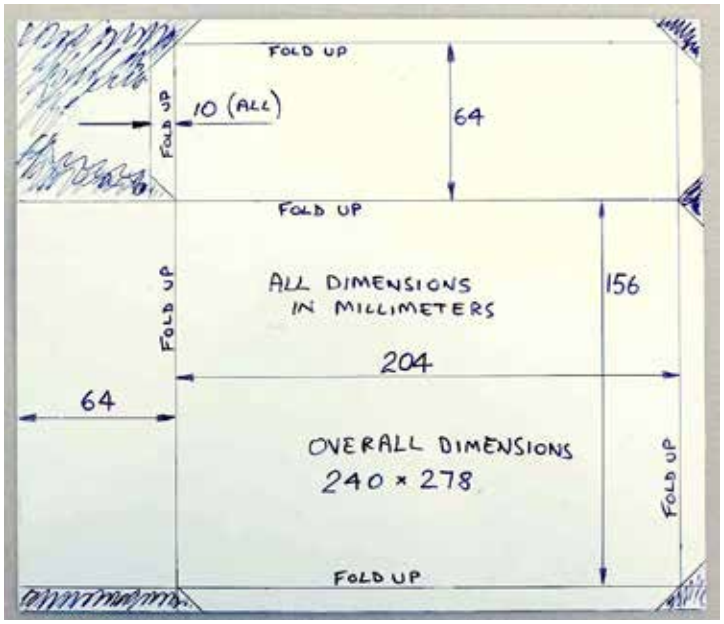
This example shows how to make a simple aluminium case for our own heater matrix but you can apply these basic instructions to any size and shape of box. If you're really into engineering you can refine the dimensions with bending allowances and material thickness allowances etc. But, using 1mm thick material this method will work fine.

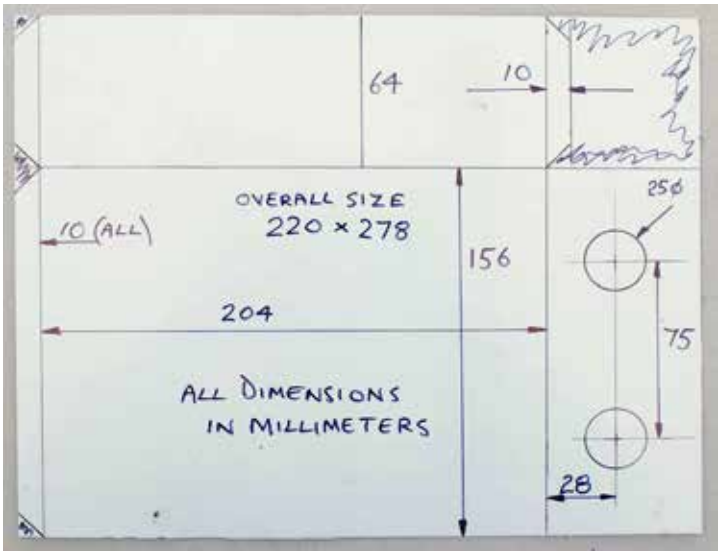
The first step is to measure your components and sketch out the shape and sizes of your box panels on paper. We chose a two-piece design for our box for ease of assembly of the matrix with it's angled inlet and outlet. If you're confident in your design you can transfer your dimensions directly to aluminium but I have never yet managed to get it right first time so I always make a cardboard mock-up first. Ideally the card should be the same thickness of your intended aluminium. Cut to the lines and score all the folds. You can even cut each side individually and tape them all together with masking tape. Or, if one dimension is wrong, cut off that panel and tape on a new one until you get it right.

Here are my two pieces of card. The big hole was an abandoned attempt to try mount the fan directly to the box as a 'sucker'.

When you're happy that your mock-ups are OK then you can cut your aluminium sheet to the overall maximum sizes and mark out all the cuts and folds.

Here are our two pieces. I've dimensioned them and shaded the waste areas.



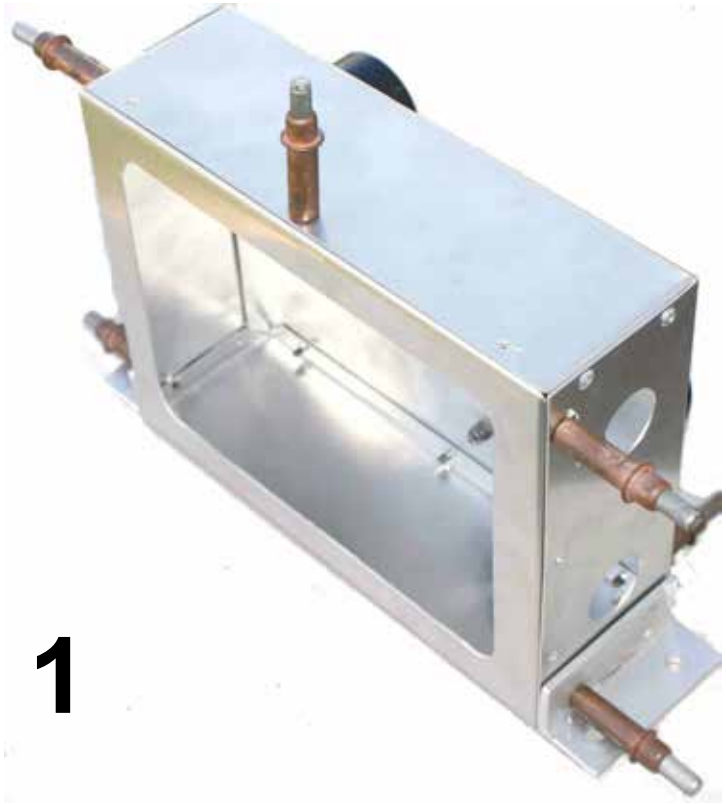


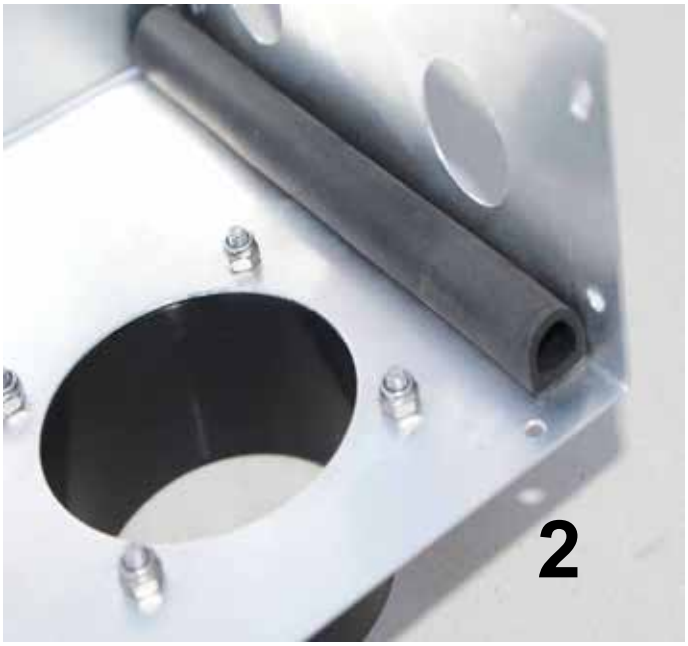
Our DVD shows you several ways to cut and shape aluminium panels. Here, I'm trimming to the line with snips. Don't cut directly to the line with the first cut or you'll distort the material. Make two or three cuts so the the final trim to the line is just a couple of millimetres. Finish with a file if necessary.

Here, I'm using a step drill for the 25mm holes. Step drills can cut very clean, accurate holes and you can deburr them by turning over the panel and making a light cut on the other side.

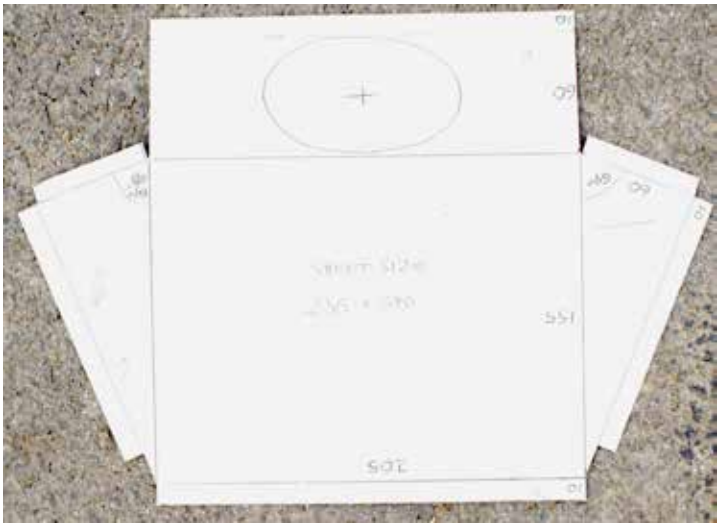
If you have access to a bench folder or even a box and pan folder it'll make the next stage very easy. If not you can make very neat folds using two pieces of angle iron in a vice. Clamp the aluminium between the angle iron on the fold line and use a piece of two by two timber, sitting on the angle and a hammer to 'dress' over the fold. For shorter folds use a short piece of angle.

Picture 1 shows the two halves of the box 'Cleko'd' together. I've cut a large hole in one side as the air inlet to the matrix and I've mounted two bulkhead flanges on the opposite side as 'outlets'. There's plenty of room to mount more as you wish.
I've also cut two pieces of 25mm x 25mm ali angle as mounting feet.
Picture 2 shows the inside of the box and the short screws and nuts used to fit the flanges. To secure and seal the matrix, I've used our #TRMDSA3 hollow 'D' section, self-adhesive trim. This locates and holds the matrix securely in position away from the box sides and any protruding fixings.
Pictures 3 and 4 show the front and rear of the assembly.

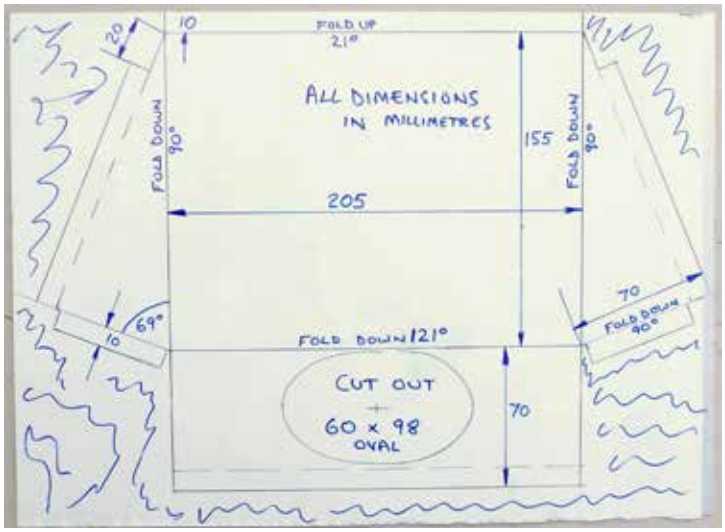




There are numerous fan options for your box. If you have room, you can mount the fan outlet directly to the rear of the heater box. For our example, I've chosen an angled plenum that will allow remote mounting of the fan and connection with lightweight ducting. This will allow much more flexibility in mounting the components in a compact cabin. Similar construction methods apply. Here's the cardboard template



And the marked-out aluminium sheet.



I decided to use 75mm flexible ducting to connect the fan to the heater box but to minimise the depth of the plenum I decided to 'squash' the inlet to an oval 60mm x 97mm. A 265mm x 60mm wide strip of 1mm aluminium will allow an 10mm overlap and a 15mm mounting flange. I used countersunk pop rivets, flattened on the inside to join the strip. Snip around the bottom edge at approximately 15mm spacing and fold up the tabs at each end with a pair of pliers. Don't fold up the tabs on the longer sides.

To cut the hole, mark around your squashed flange and using a step drill, hole saw or even a line of 3mm holes remove the waste material. Again, our DVD will show you several ways to achieve this.
Three or four rivets is sufficient to secure the flange in position. Here you can see why we leave the tabs on the long sides of the inlet oval.

You can secure the plenum with rivets or even short self tappers if you wish. If a top inlet is inappropriate for your installation, just redesign the plenum with a side inlet or simply turn the heater box on it's side.