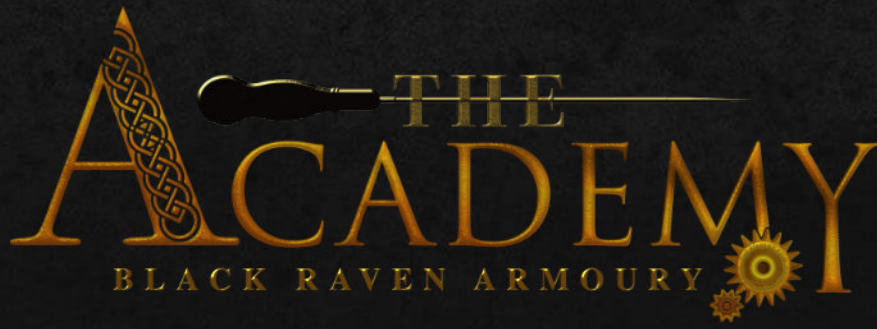




PATTERNS

HAUKSTROND SHOULDERS



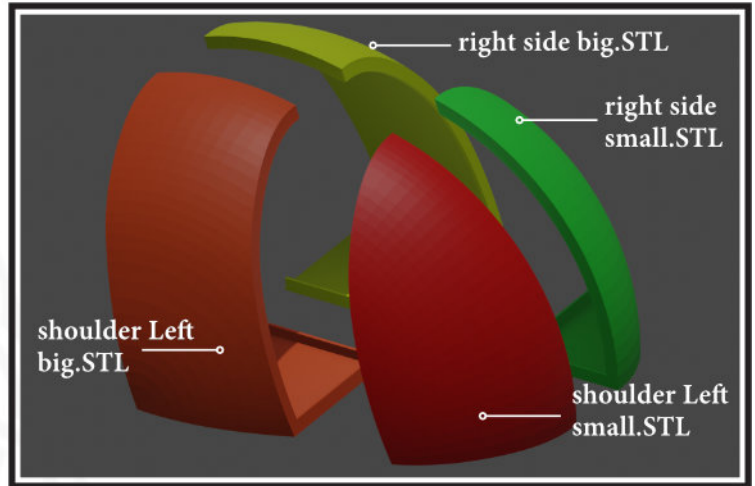
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ABOUT THE SHOULDER

We have included two variations for the shoulder:- one with sewn on borders and the other without. In all other respects they are identical. When forming the top of the shoulder, it is useful but not essential to have something to shape the leather against; we made up our former from some rigid foam carved and sanded to shape, but if you have access to a 3D printing setup we have included .stl files for the formers, should you wish to use those..



THE CONSUMABLES

VEGETABLE TANNED LEATHER

For this shoulder we suggest something around the 9oz (or 3.5mm thick) veg tanned leather. For SCA use 13oz (5mm) veg tan is preferred. If adding borders we don't recommend anything thinner than 6oz (2mm) veg tanned leather and no thicker than 9oz (3.5mm). The straps should be 6oz (2mm).

SUEDE

Choose a complementary colour; we use a little 6oz (2mm) or slightly thinner suede as hinges.

TWO PIECE TUBULAR CAP RIVETS

Choose a complementary finish; you will need 2 lengths –one that is just longer than two layers of leather and one just longer than 3 layers thick. If making SCA armour you may prefer to use solid rivets for extra strength..

THREAD

Choose a thread colour complementary to your dye – a heavyweight thread is recommended to take a lot of wear and tear.

DYE

Whatever colour you prefer.

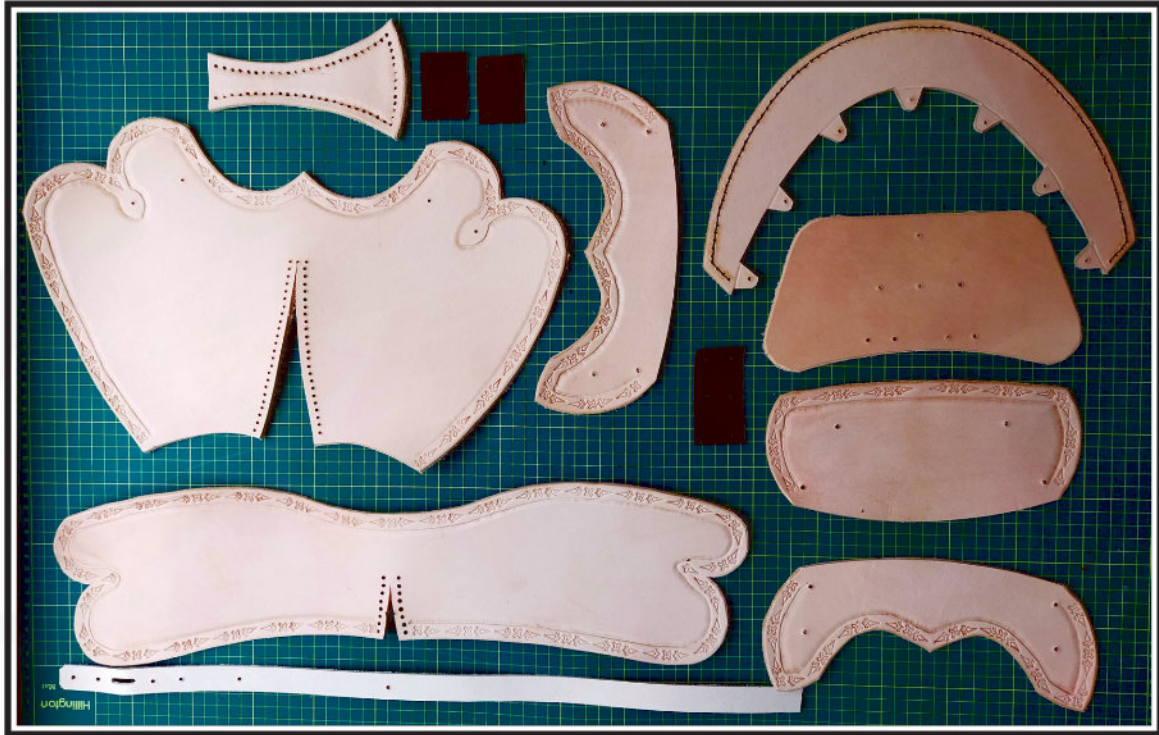
Also something to seal the surface; clear wax, dubbin or similar to give a more weather-proof finish.

GLUE

We use a high-strength contact adhesive suitable for leather.

BUILDING THE SHOULDER

Start by cutting out all the parts. The picture below shows the version without the stitched on border. Glue the two halves of the neck-guard back to back before adding the stitch holes, and use a stitch groover to join the stitch holes on both sides.. also use it along the top edge of the tabs (this will make it much easier to fold these out later).



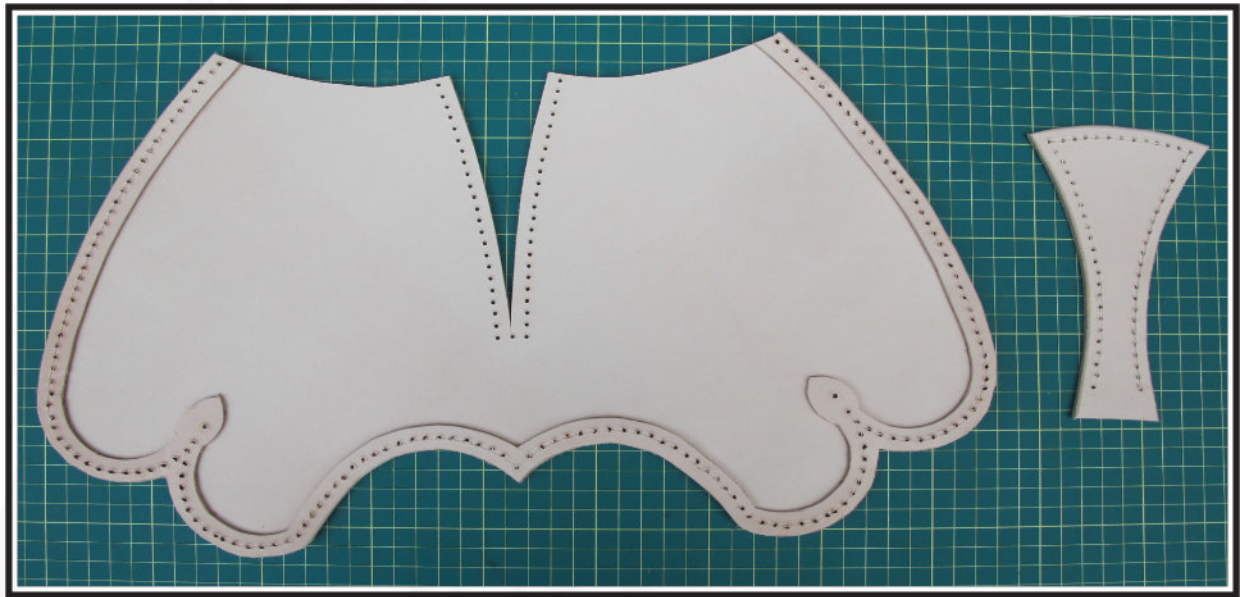
Whilst everything is still flat, now is also the time to add embossing.

If you are just using a single layer, do the edge bevelling now. If adding stitches on borders put them into place before edge bevelling and doing any embossing.

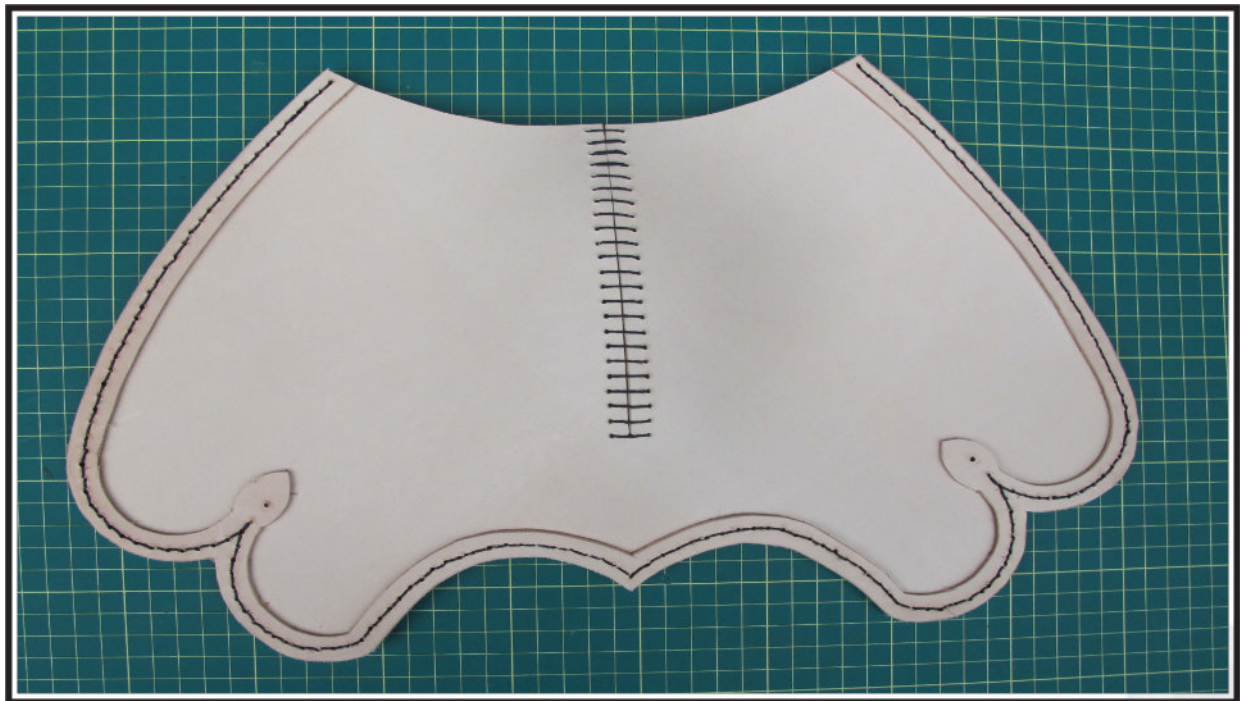
With the leather still damp from embossing we can form the panels whilst they dry.

If adding the sewn-on overlays to the panels, glue the overlay onto the backing panel first, then drill the stitch holes through both panels at once for a neat finish.

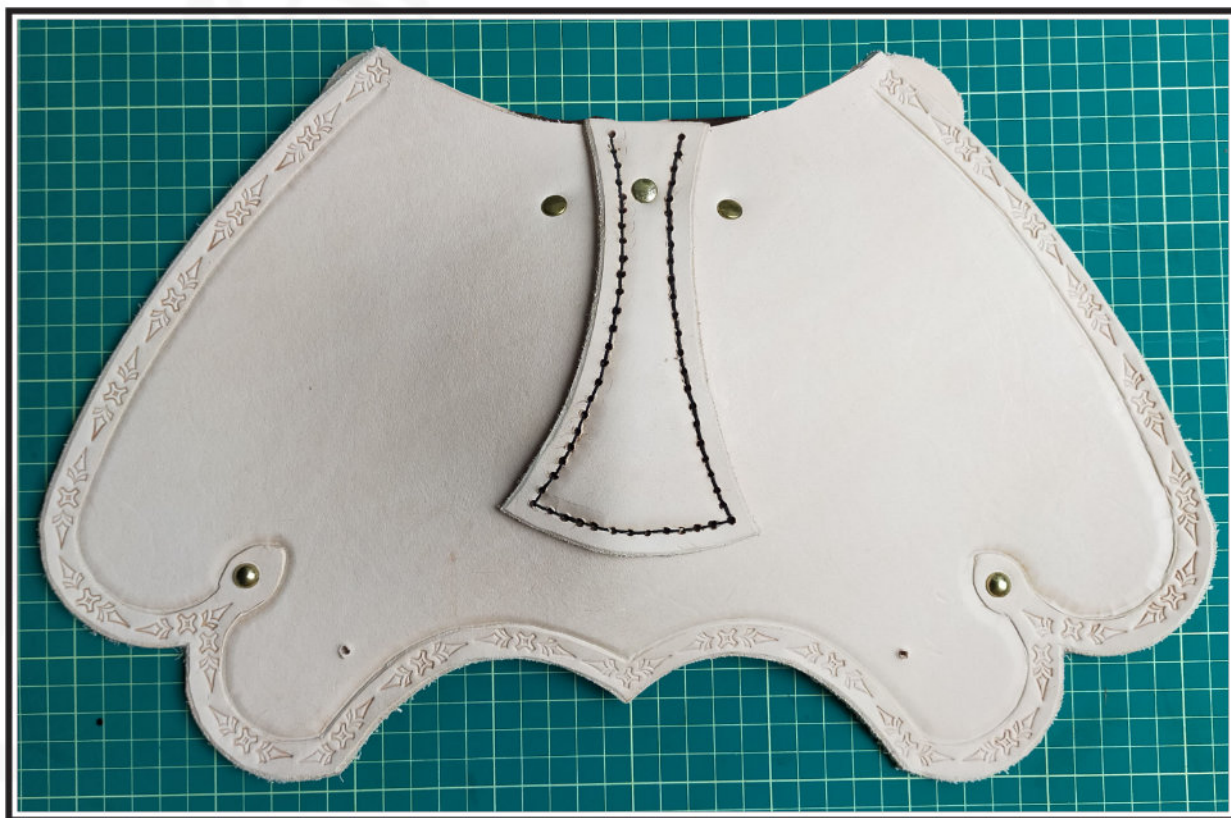
The stitch holes should be between $\frac{1}{16}$ - $\frac{5}{64}$ inches (1.5 and 2mm) in diameter.



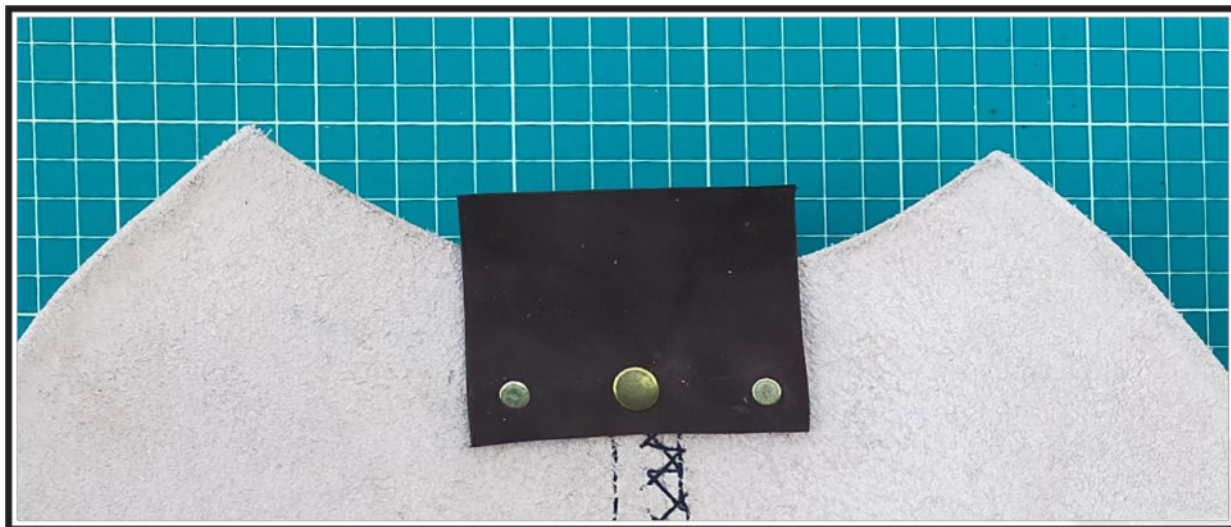
For the two panels with splits in, sew the splits tightly together as shown below (use the guide at the end of these instructions to learn how to butt stitch items).



Glue the overlay over the butt stitching – the bottom 3 holes of the butt stitching line up with those of the overlay. Once you have stuck the overlay in position, drill through and saddle stitch into place.



This is a good time to rivet the suede hinge into place and add the two decorative rivets near the lower edge. You can do this later, but it's easier to do before forming.



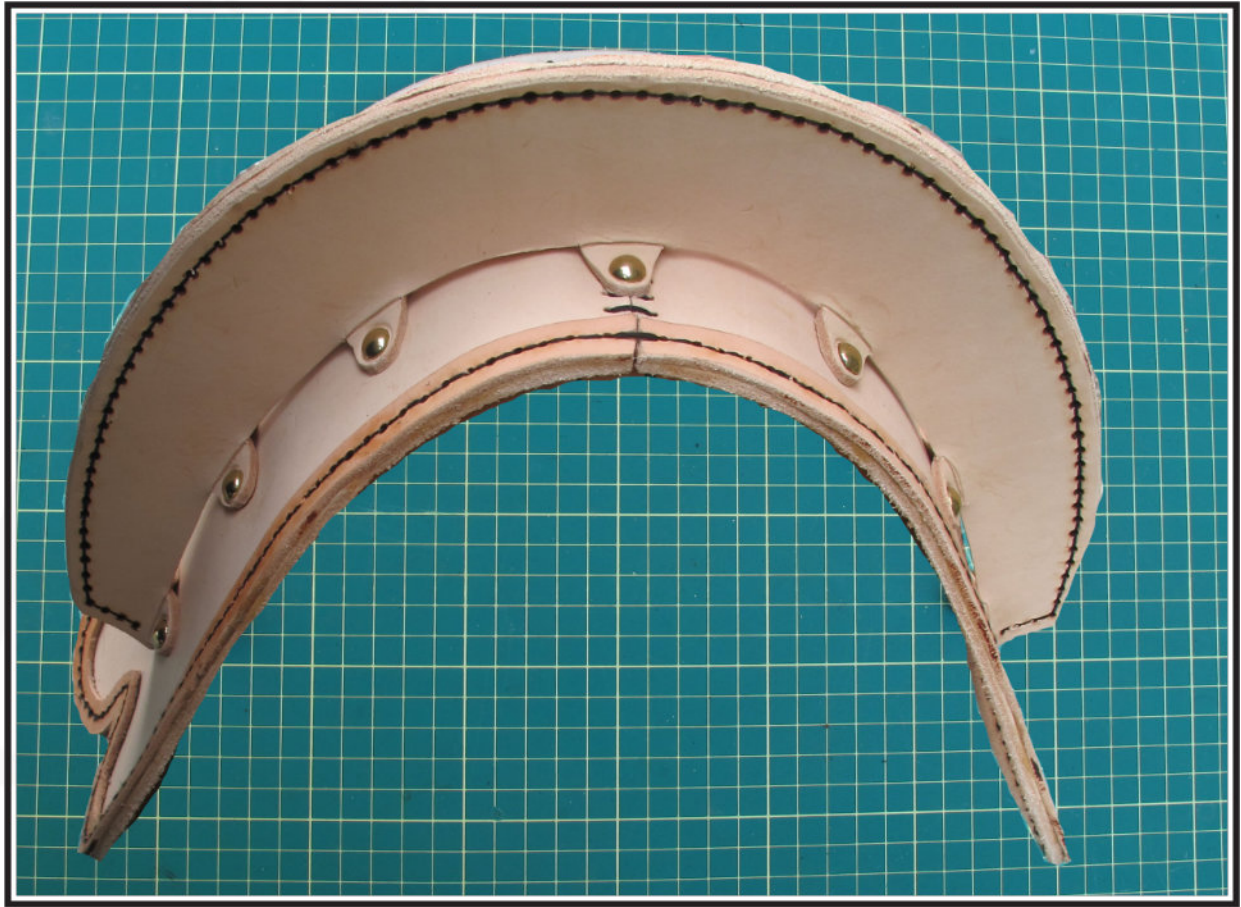
FORMING THE CURVES

For the lames just use your hands to shape them into a smooth curve. You could lay them across your thigh to get the initial rough shape.

For the upper shoulder much of the shape is formed by the stitching, but you need to work the damp leather into a nice spherical shape. You can build a former to lay it over to help (or 3D print – see earlier note on included .stl files) –ours was just carved out of foam and sanded smooth.



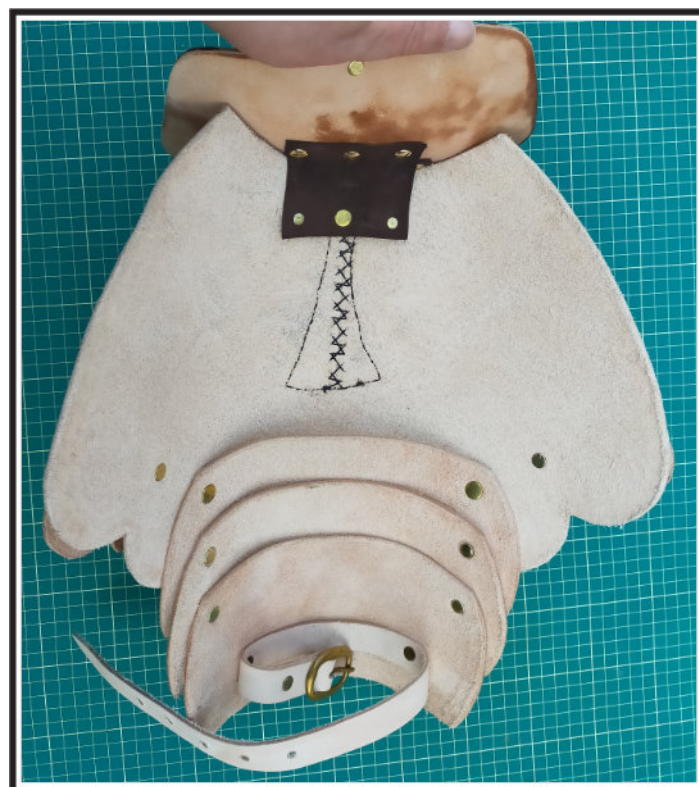
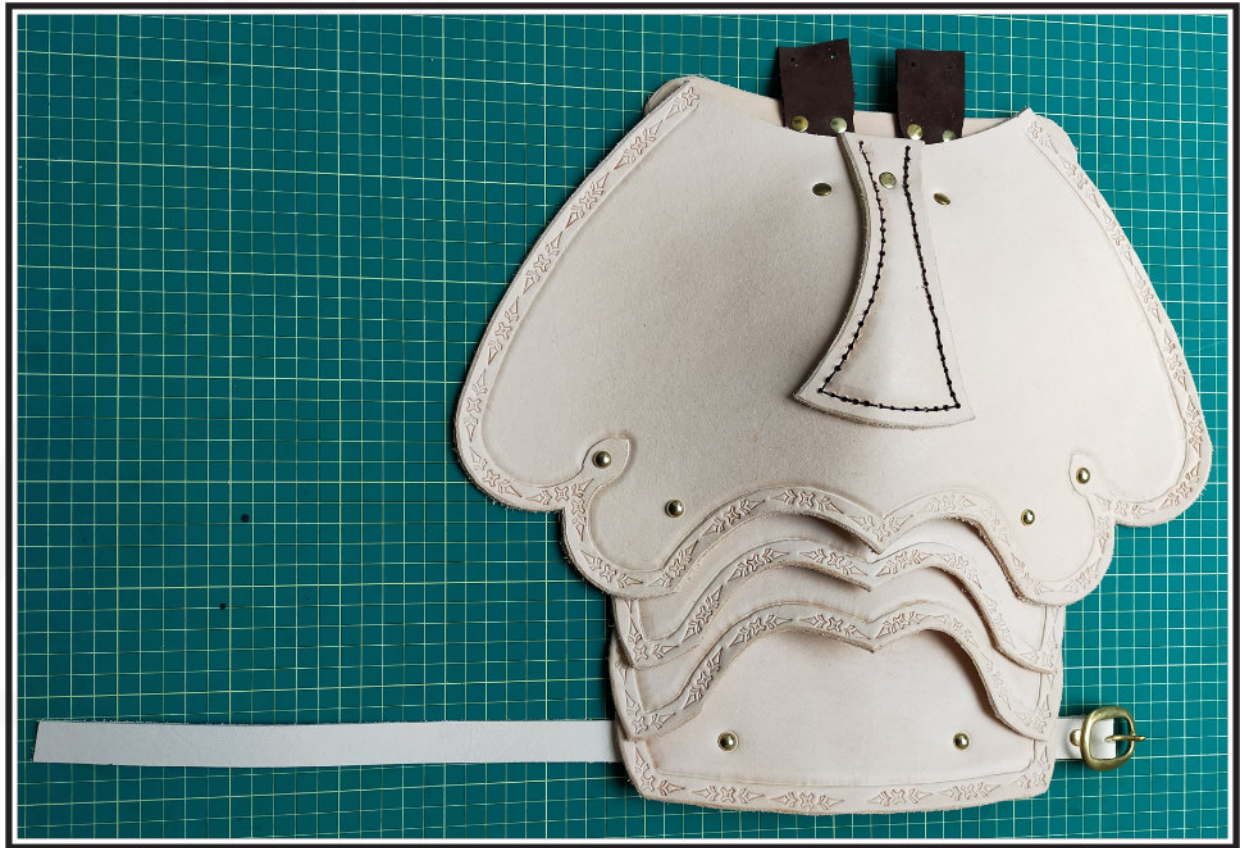
Add the neck-guard to the upper plate, fold the tabs out on the neck-guard and fasten the centre tab at the hole in the middle of the butt-stitched joint. Then, working from that point, add the holes and rivet in place to get a nice curve.



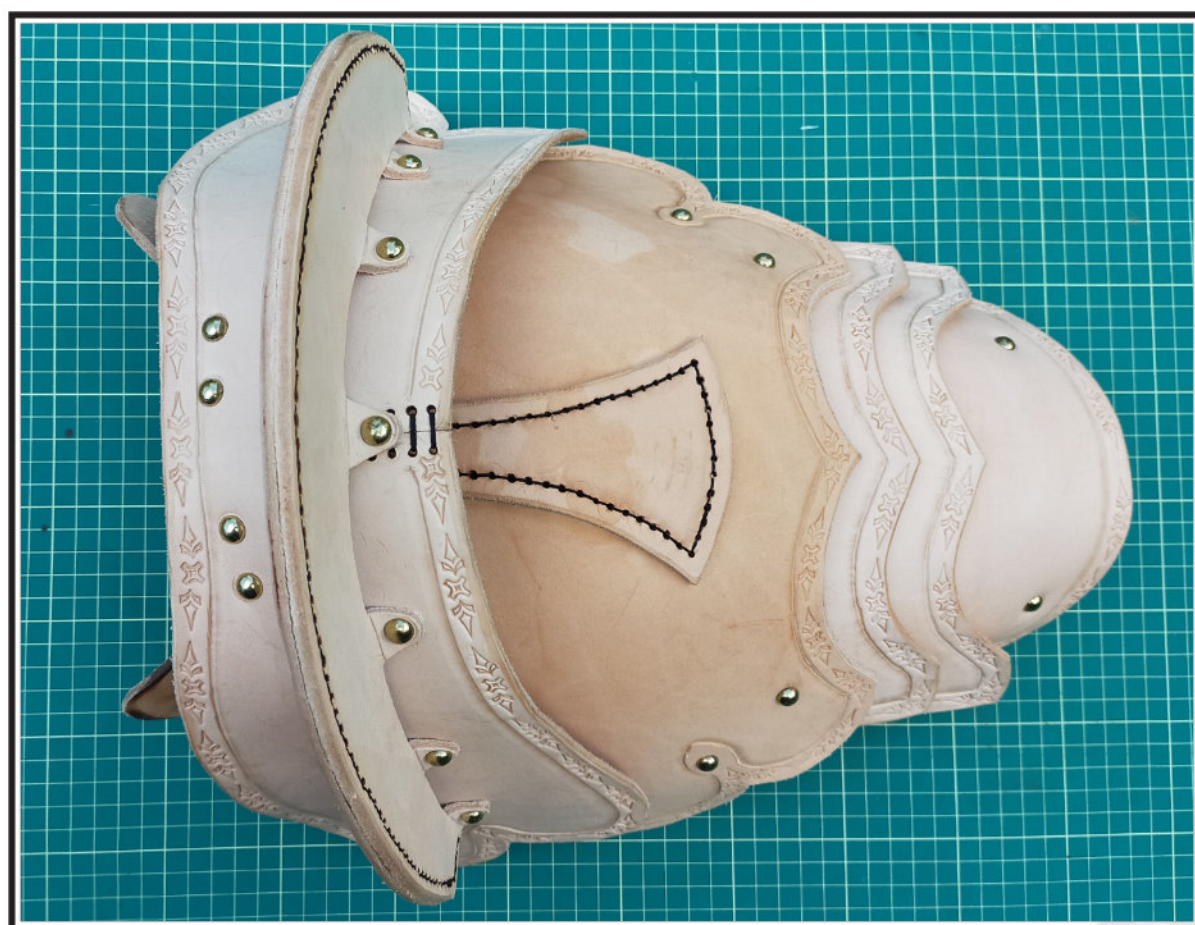
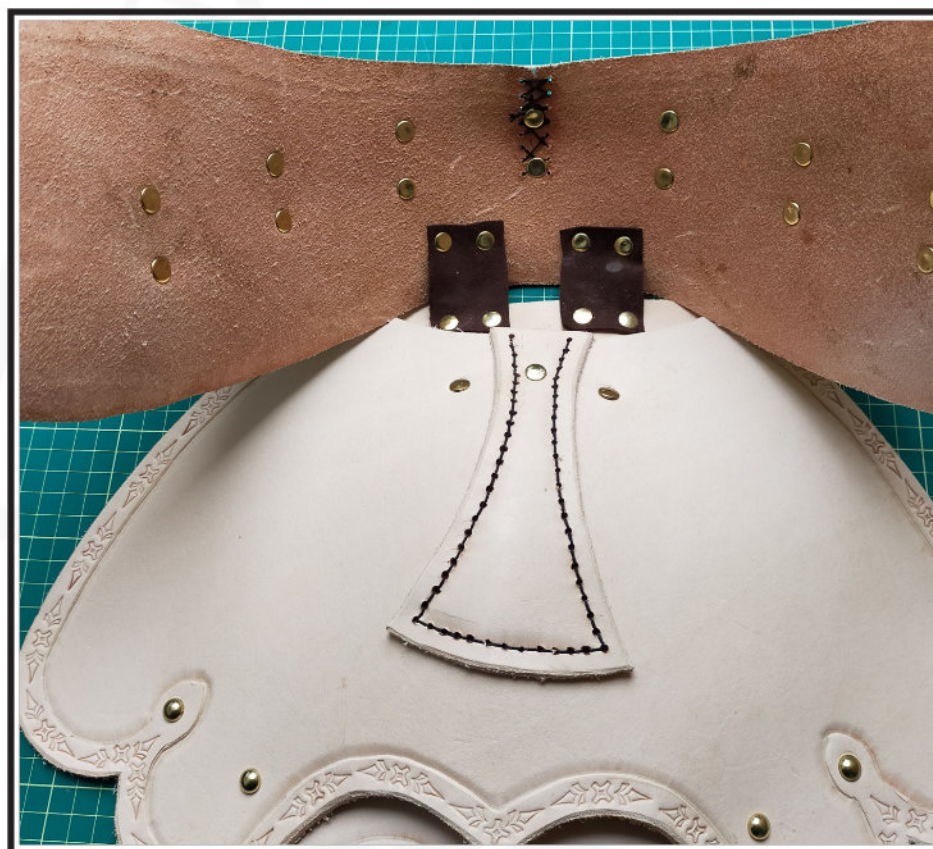
The underplate sits directly on top of the shoulder and so also needs to be formed. Before you do so, decide how you are going to secure it to the body. We used a buckle and strap to secure it to body armour, but an alternative could be a separate harness, or lacing eyelets..



Rivet the lower shoulder together as shown below. Start with the bottom lame and work up so that you can see the next set of rivet holes. As shown, each plate hinges off the one above like a lobster tail. Should you want an even more flexible armour, you can instead hang each plate from the one above with a short suede strap. Now is a good time to finish off the fastening strap and connect the underplate.

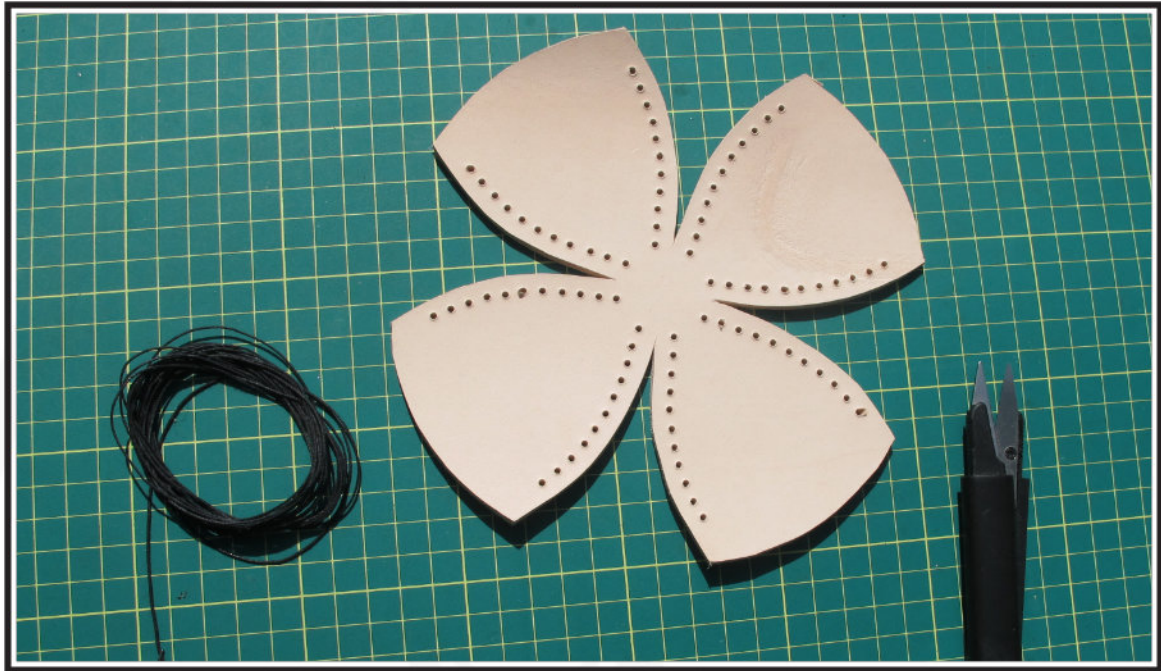


Lastly connect the upper plate to the under plate with the sueded hinges and the shoulder is finished.

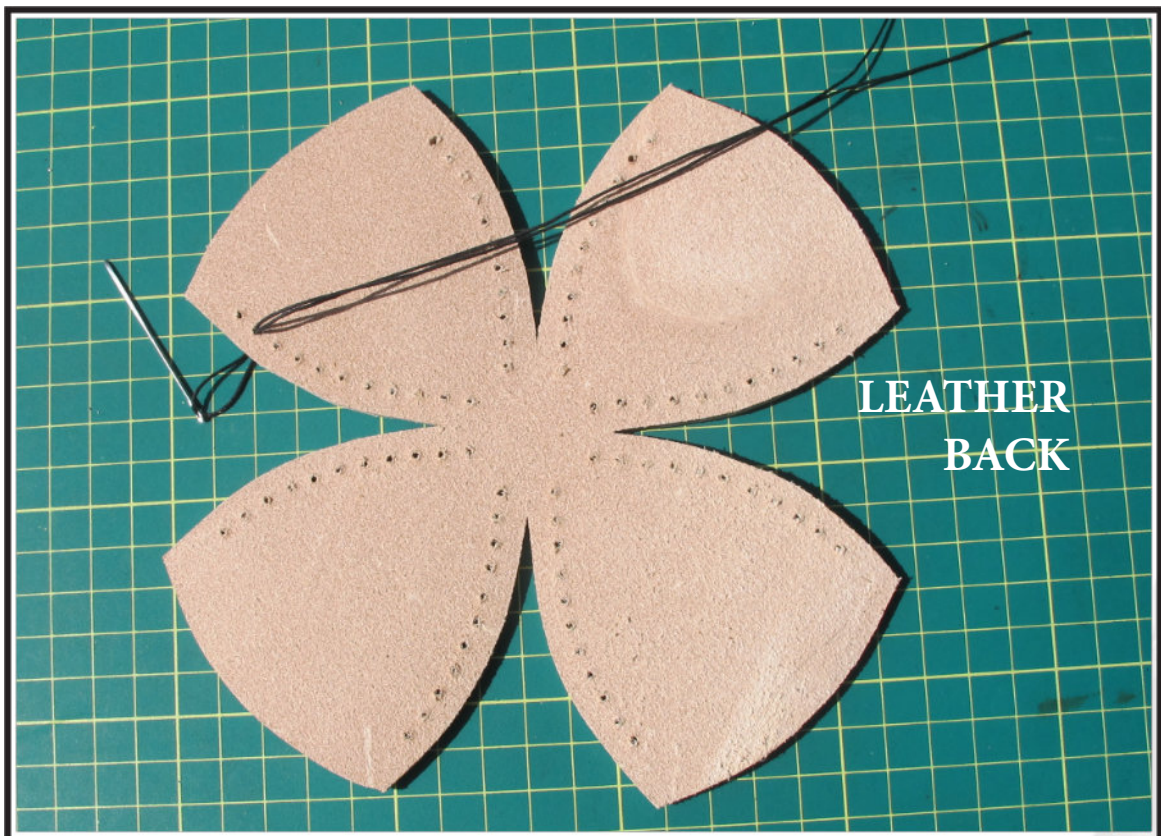


BUTT STITCHING

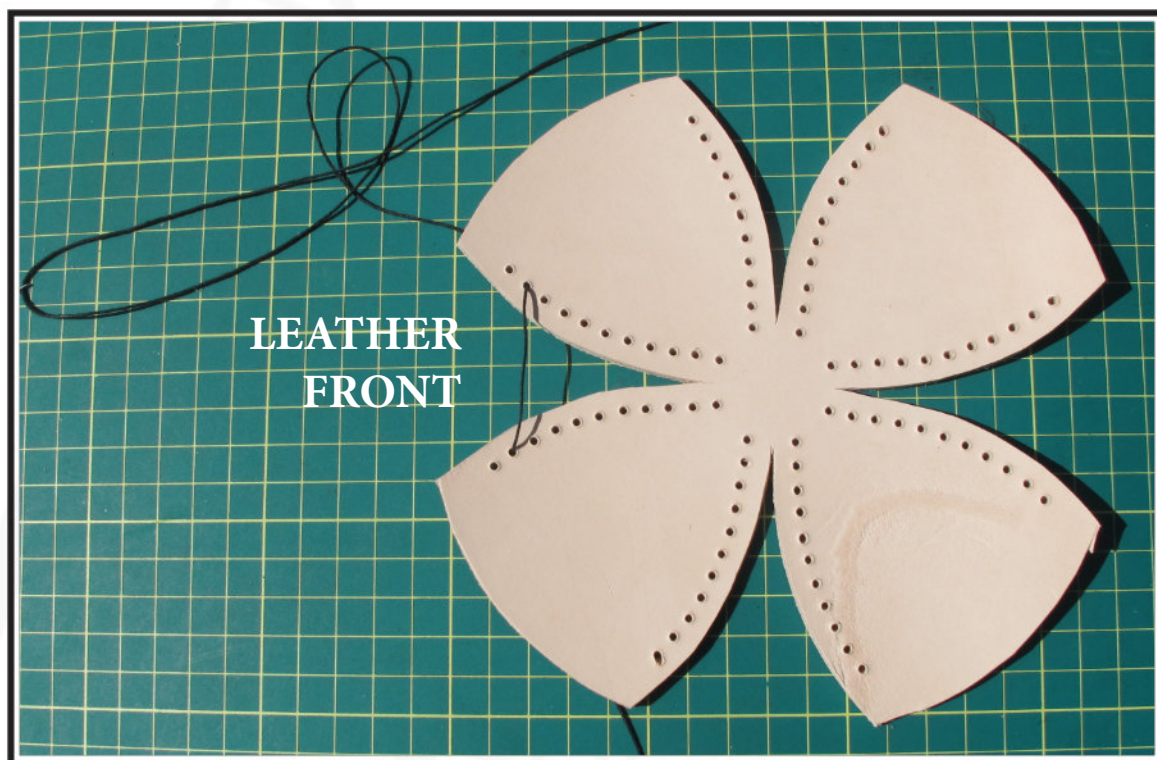
When we have two parallel edges that we wish to butt up against each other, we use a 'butt stitch'. There are many variations of this stitch –this is the one we use, demonstrated below on a bag end.



Start sewing 3 holes in from the outer edge. Start from the back, through to the front, keeping enough thread on the back to be able to have a good grip and knot later.



Go straight across the front and through to the back.



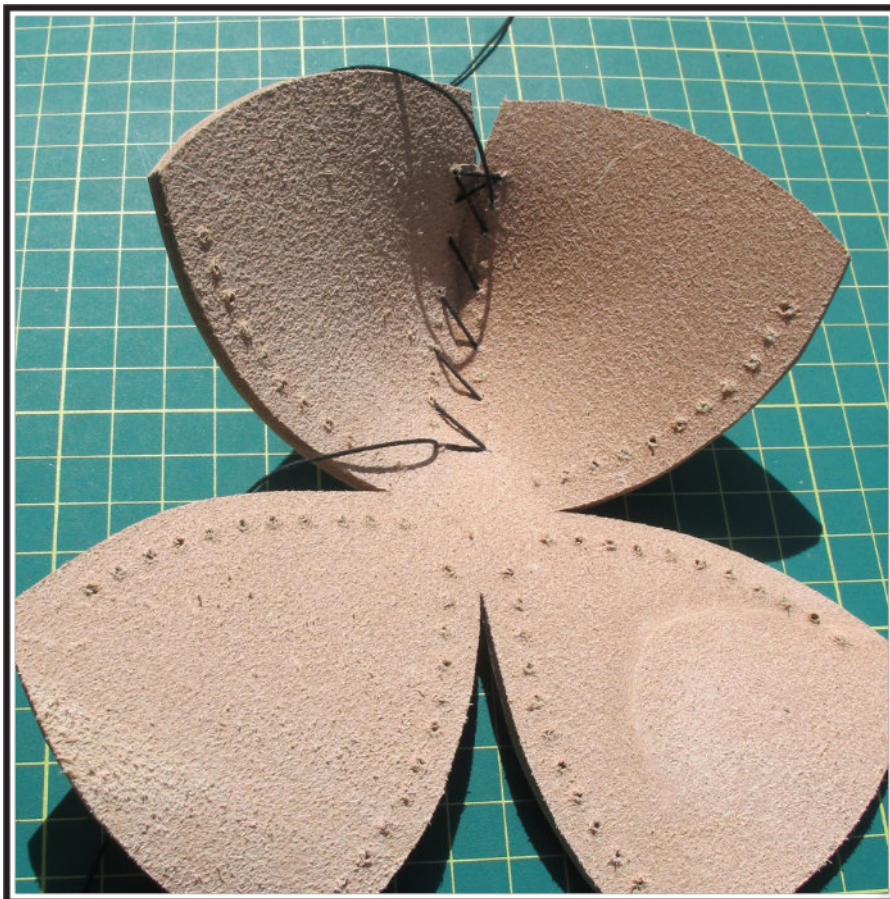
Go across the back to one hole closer to the edge and repeat.



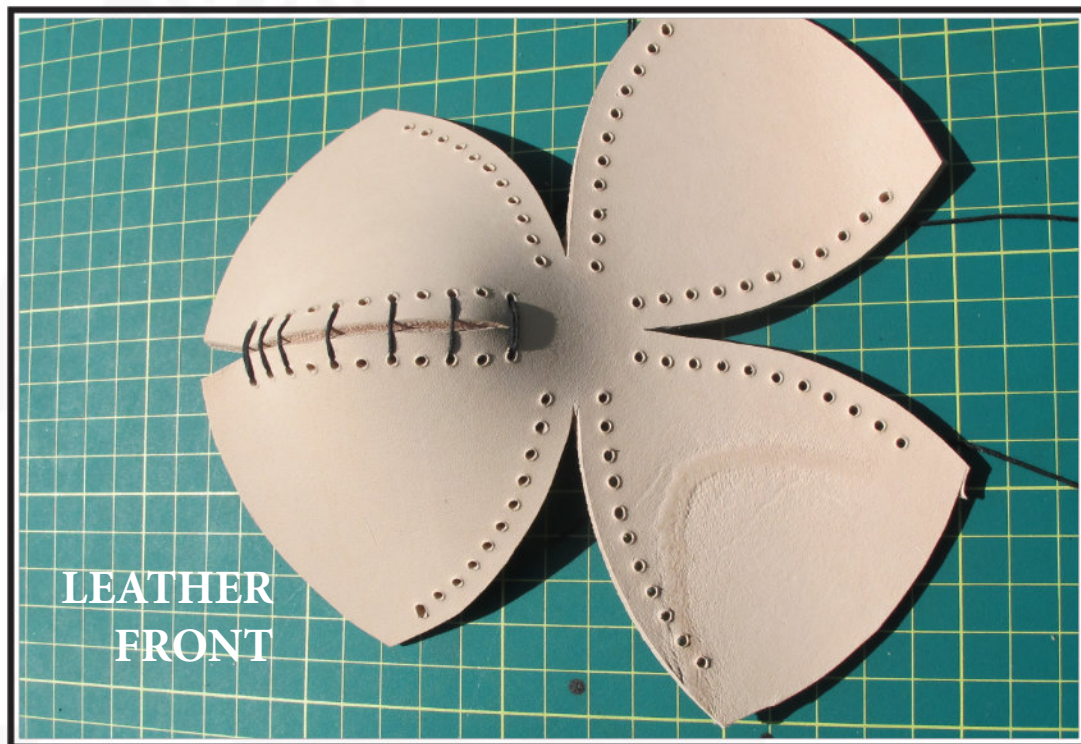
Pull the threads tight to bring the cut edges really close together, then run a second line through the outer stitch holes: This will help lock everything up.



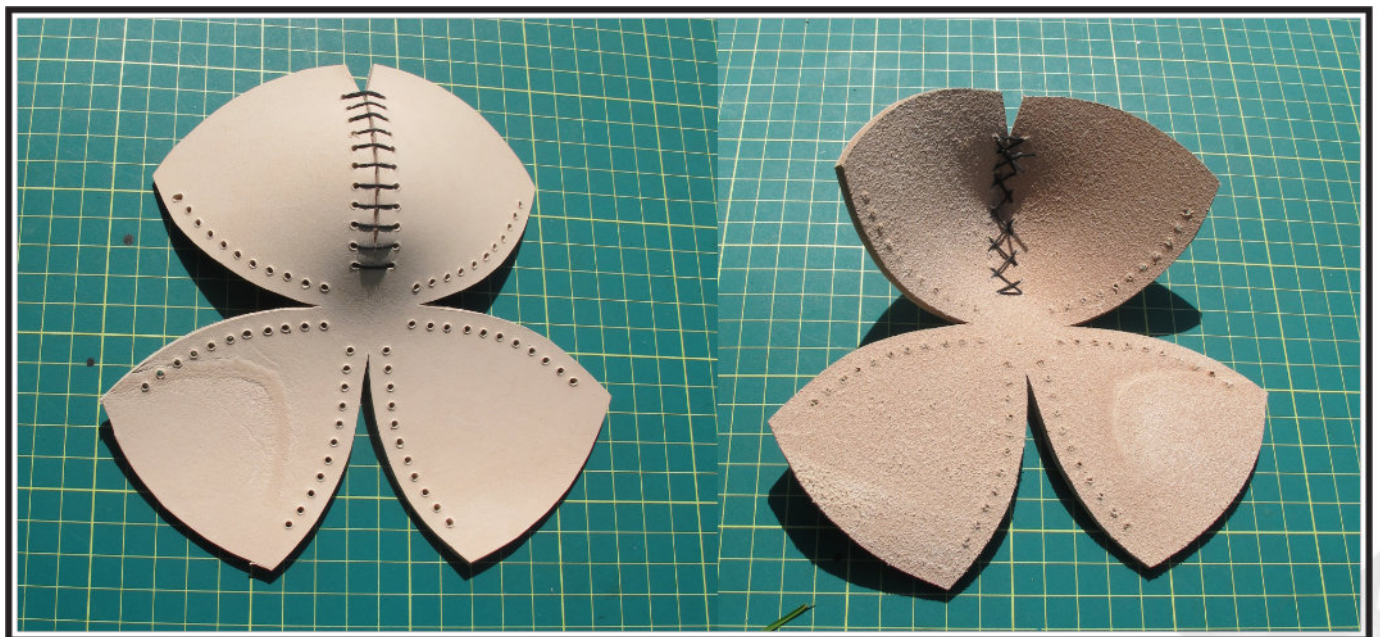
Now start down towards the centre. On the back you will be going to every other hole, whilst on the front you will be going straight across.



Here is a view of the front: When you get to the end, make sure the thread is really tight and again put it a second time through the end holes, before coming back towards where you started – this time using the empty holes.



When you get back to the starting point knot off the two ends securely.



PATTERNS

CONSTRUCTION TECHNIQUES



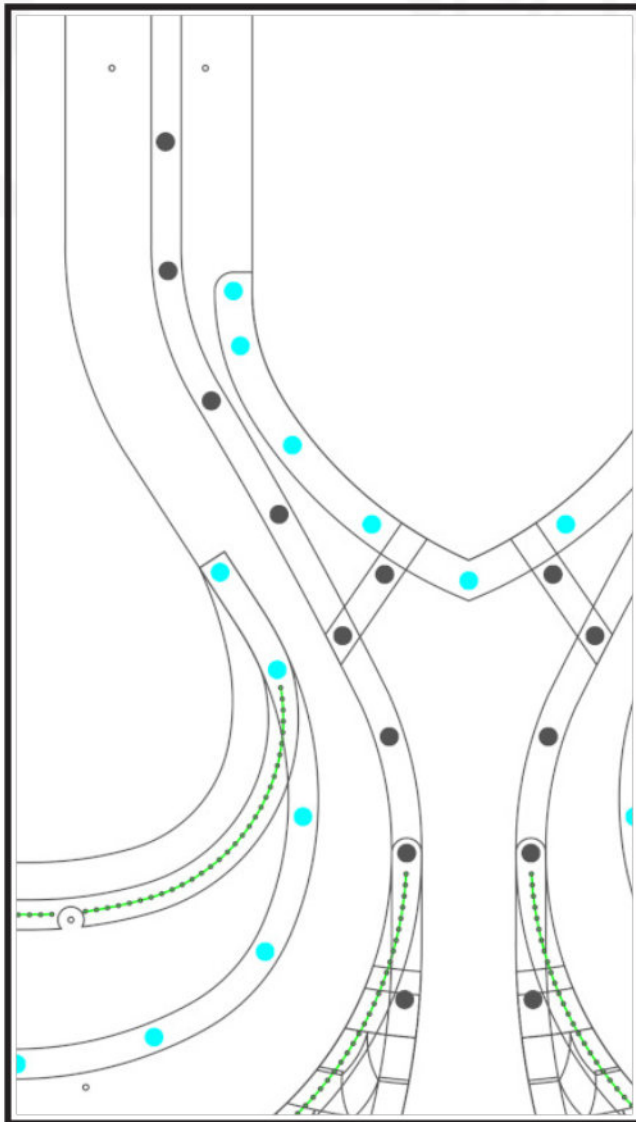
CONSTRUCTION TECHNIQUES

MAKING THE STITCH HOLES

For the larger holes such as those required for grommets we suggest a set of punches, but for the smaller rivet holes and especially the stitch holes these can be hard to achieve in heavier leather. It's perfectly acceptable to use an electric drill to form these holes; if you have a drill press you can ensure absolutely vertical holes, but even without such a press a steady hand and a small drill (Dremel or similar) will do a great job.

Stitch holes for heavy thread should be roughly two and a half times the diameter of the thread, so for example 0.7mm thread needs a 2mm hole to allow for the needle and two lots of thread for saddle stitching. Should you only need a single line of thread, something about 1.5 times the thread diameter is fine, but always allow for the needle size.

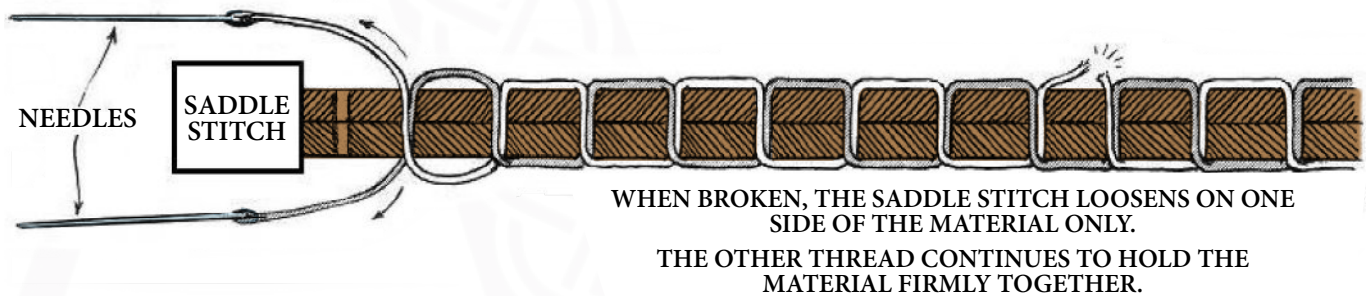
It is also acceptable to drill the rivet holes – typically we use a 3mm ($\frac{1}{8}$ th inch) hole for almost all our rivets save for a few really large ones.



SADDLE STITCHING

Saddle stitching can be done with a single needle, or as illustrated below using two needles. The aim is the same, which is to tightly lock two or more layers of leather to each other.

To use a single needle draw half the thread through and feed the thread backwards and forwards to form half the stitches. Then put the needle on the other end of the thread and do the other half of the stitching. Knot the two ends together on the rear of the leather.



BLUNT NEEDLES

Working with the heavier thicknesses of leather means using blunt needles. Whilst with thin leathers the needle makes the hole and guides the thread through it, with heavier leather you make the holes in advance by awl, punch or drill – the needle simply helps you guide the thread through each hole, so blunt needles that don't dig into either leather or fingers are what you need.



SEWING BAG & POUCH GUSSETS

Start off by cutting out the various parts and adding the stitch holes.

It's a lot easier to stitch the gusset if you hold it in place first, either using contact adhesive or a strong double-sided tape. Here we've applied double-sided tape to the back face of the leather.



Now stick the suede gusset into place. We used some toothpicks to help align the holes.

NB. with complicated shapes such as this, it is often easier to prepare half the length of stitching at a time.



Now start sewing. Start the stitching 4 or 5 holes from the end (if you start at the end you create a weak point where the knot will be right at the point where the greatest stress occurs). You want to cut a length of thread about 4 times longer than the distance you will be sewing – this allows for the fact that you will be going out and back along the stitch line, reinforcing each end, and for the thickness of the leather.

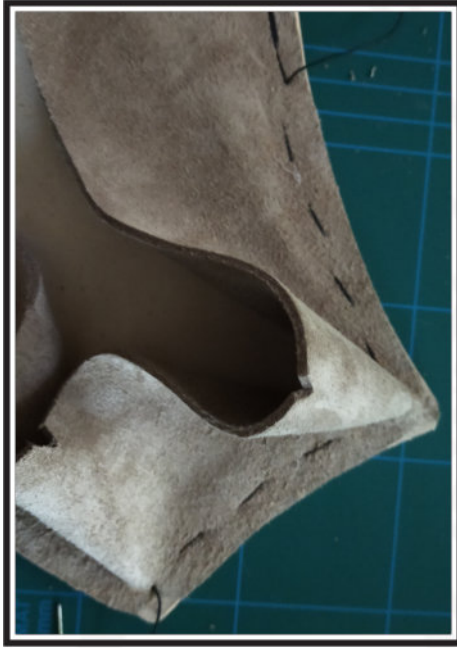
We have used a large stitch for illustration purposes here, so you can see what needs to be done. The final stitch length, however, is personal choice.



Stitch up to one end. Now for the end three holes you will put two stitches through each, to reinforce the end before going back towards the point where you started : think of it as two ‘figure of 8’s’ of thread..

Carry on sewing down to the first change in direction, ensuring the thread is kept really tight as you do so.



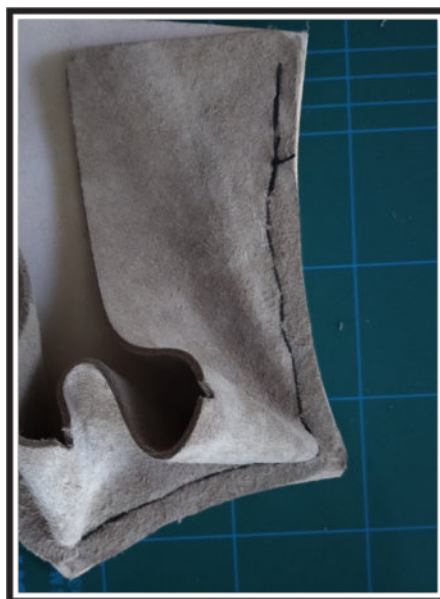
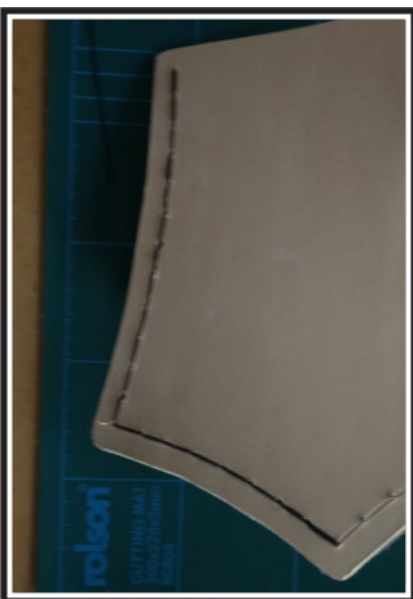
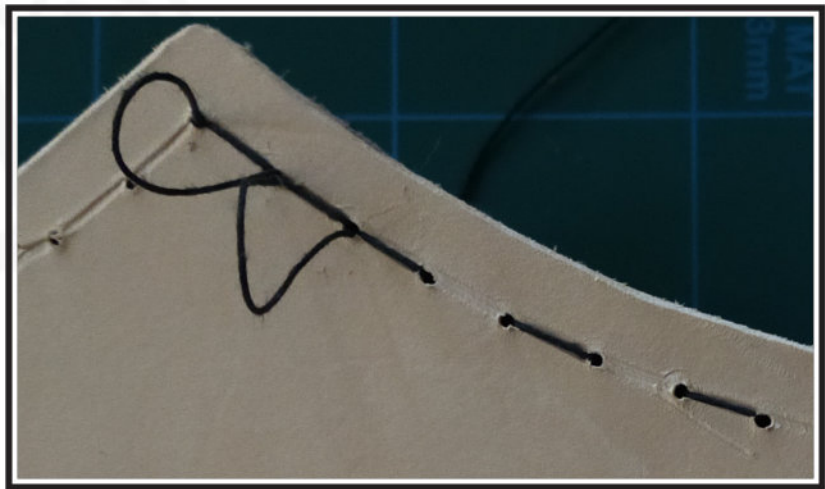


At the change in direction, the notches in the gusset will allow you to smoothly turn the corner and carry on your stitching to the mid point of the gusset

At the midpoint we again reinforce the stitching with two stitches through each of the end three holes, forming another pair of 'figure of 8's'. By only going halfway, we can reinforce the points on the gusset that have the greatest stress, so making it less likely the bag will fail.

Now return to one hole beyond where you first started and then tie off the two ends of the thread.

Briefly apply a lighter or match to the cut ends and the knot, to remove any fraying and soften the thread around the knot. Then push the knot into the leather with a metal object. The heat of the flame plus the force from the metal object (a blunt knife or screwdriver work well) will stop the knot coming undone.



Don't leave the knot in the flame too long, or it will catch fire and you will have to do the stitching again..

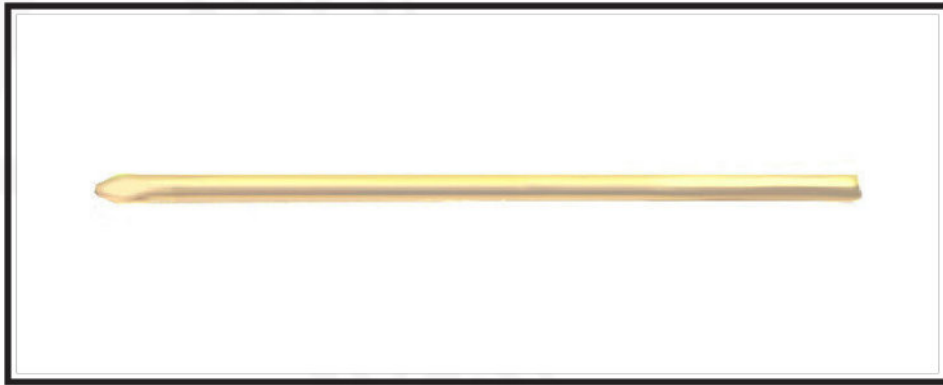
Repeat for the other half of the gusset – then do this all over again for the other side of the gusset – and you will have a really strong gusset in your bag.

LATIGO LACE

Latigo lace stitching requires special needles, there are typically two types:

PERMA LOC NEEDLE

The *Perma Loc* Needle is a hollow cylindrical shape, you twist the latigo lace up and push it into the needle. The needle has a thread on the inside which prevents the lace from simply pulling out



LOC EYE NEEDLE

The *Loc Eye* Needle (also called the 'two prong' needle and the 'hook and eye' needle) requires you to trim the end of the lace to a point. The rear of the needle is split and you feed the lace between the split legs of the needle, then tap the end with a mallet, locking it into place with a tiny hook that is inside one of the legs.



WORKING WITH EYELETS, GROMMETS AND RIVETS

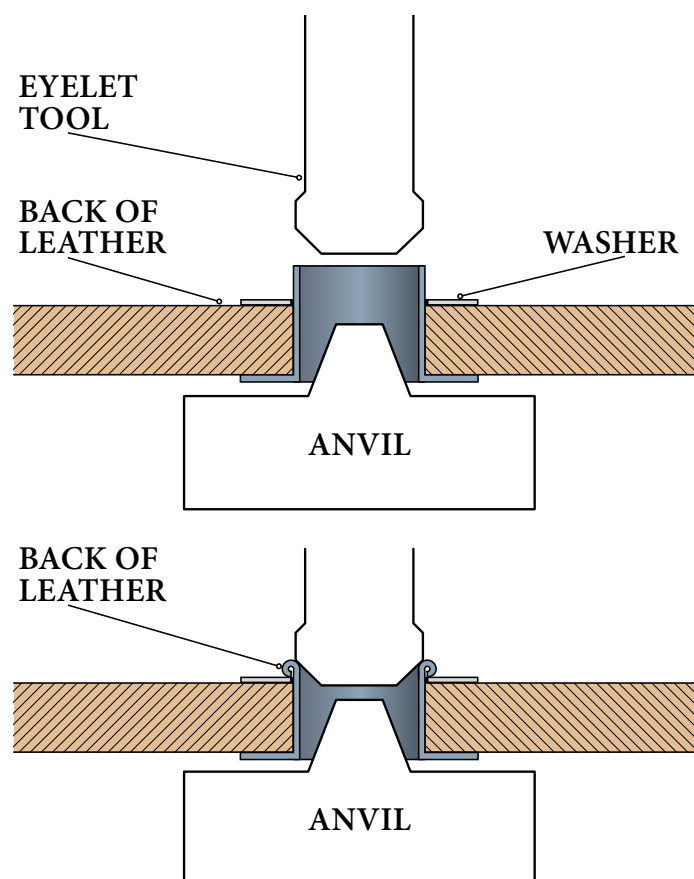
When working with hammer-set eyelets, grommets and rivets it is very important that you have a solid surface to hammer on to. Not everyone has access to an anvil, but a small steel plate at least 1cm or $\frac{3}{8}$ th inch thick will make a good surface to hammer on. It is also important, however, that this surface is placed on something that won't move: Don't put it on a lightweight table or bench which has any sort of give in the surface as you will find that the rivets will not set neatly. A solid surface is what you need – this can be a solid work table, a kitchen unit (secured to wall and floor) or even a concrete floor, though working on the floor makes it harder to hammer.

SETTING EYELETS AND GROMMETS

A grommet is essentially an eyelet with a backing washer. To set one you need an eyelet setter, which comes in two parts, an anvil and a hammer tool.

You will need one to use on $\frac{1}{4}$ inch grommets and eyelets.

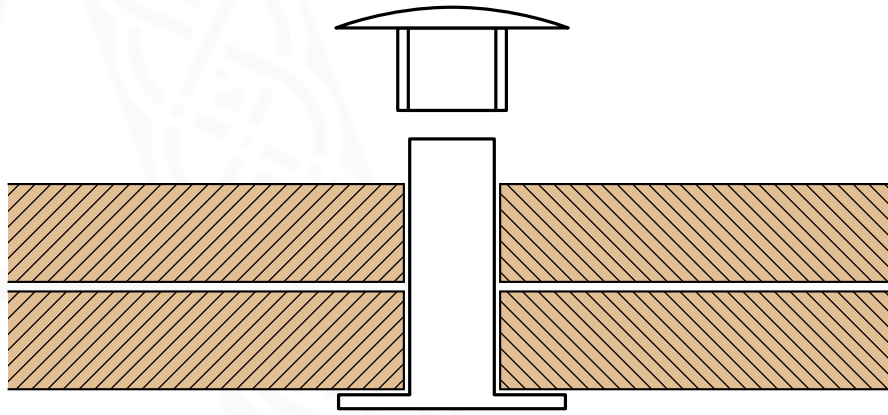
To use, push the eyelet through the leather from the front face then add the washer to the back and lay over the anvil as shown below. Place the hammer tool against the back of the eyelet and tap down with a hammer, use light blows to gently roll down the eyelet over the washer. If you use heavy blows you will tend to split the eyelet rather than roll it down.



setting eyelets & grommets

RIVETING

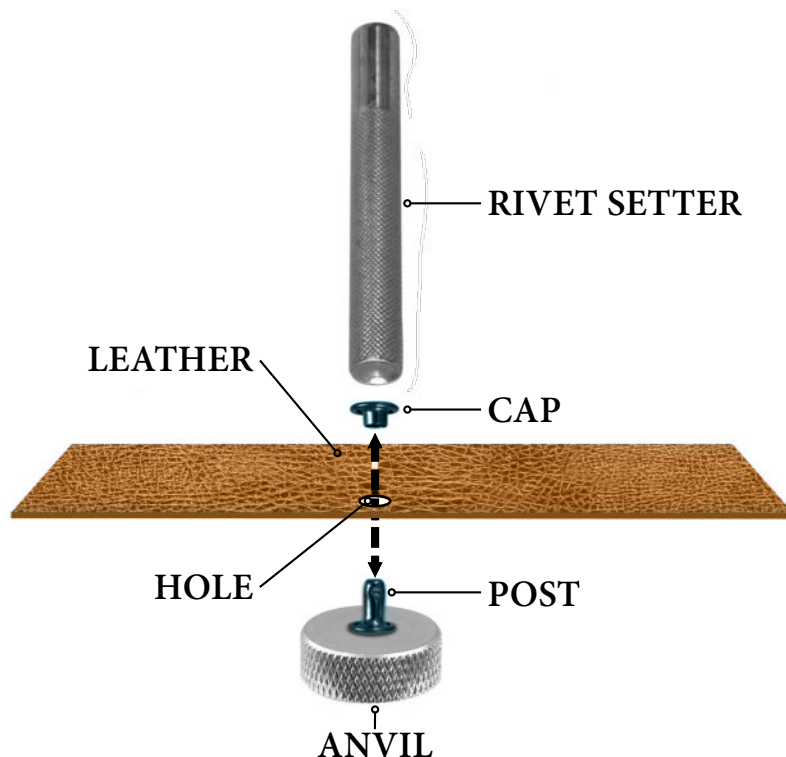
When fitting a rivet the post is pushed through the hole in the back (rough) face of the leather, passing through one or more layers. It should project 1 to 2mm beyond the front face. You then push the cap over the top and give a couple of sharp taps with a hammer on the cap to secure it. Always have the back of the rivet against a well-supported hard surface, e.g. a metal plate on a workbench or a smooth concrete floor.



fixing two layers of leather with a tubular rivet

To get an alternative finish, you can purchase a rivet setter for tubular rivets. Using this will keep the domed shape to the rivet cap, rather than flattening it when you strike it directly with a hammer.

Alternate rivets with different finishes and styles can be used instead. Once the rivet is set, a small dab of antiquing gel left overnight will create a distressed look – don't forget to coat with an acrylic varnish, lacquer or clear nail varnish to seal the look.



using a rivet setter

DOUBLE SIDED TAPE

Double sided tape can be a great help when trying to hold leather in place for sewing or riveting. Find a strong tape that will hold leather –look for narrow rolls; you don't want to leave any tape showing at the edges of your joins and using narrow tape makes this easier to achieve.

Be aware that using double sided tape can cause problems when hand sewing if you have not first cleared the path of the needle of any sticky tape..



CONTACT ADHESIVE

Great for creating a strong bond, better still for reinforcing a riveted or sewn junction.

All contact adhesives work in much the same way; you apply the glue to both pieces of leather you want to bond and then leave it until it's no longer sticky to the touch. The exact time will depend on the adhesive and the surrounding temperature, but 10 minutes is fairly typical.

Once the two adhesive coated surfaces touch each other they tend to bond at once and it will be very difficult and messy to remove if you make a mistake. Use stitch holes or rivet holes to make sure the parts are correctly aligned before touching each other.

THINGS TO BE AWARE OF

Almost all contact adhesives that work with leather give off nasty fumes. Follow the instructions about working in a well ventilated space – if it says wear a particular type of respirator then please do so! At best you will get a nasty headache from the fumes, but results can be *much* worse.

Don't get the adhesive on any leather you want to stain or dye. Even if you rub a drop of spilled adhesive off the surface it leaves behind a residue that stops the dye penetrating the surface of the leather. Often it's better to stain before gluing together.

If applying contact adhesive to the smooth top surface of the leather, roughen the surface first; this gives a much stronger bond.

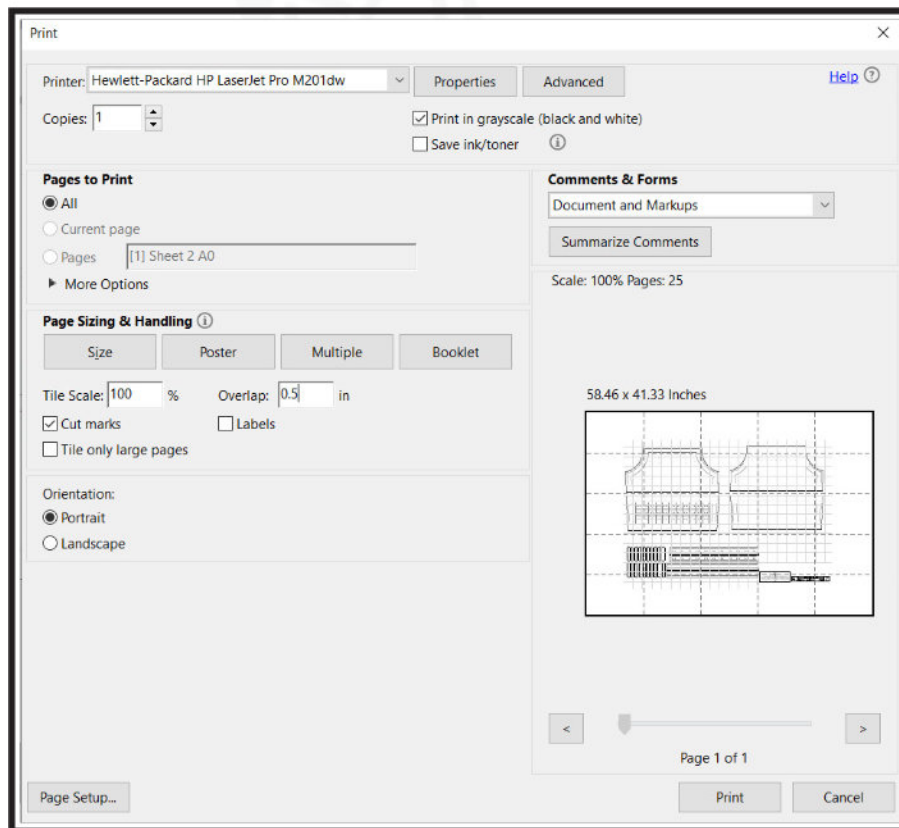
PRINTING THE PATTERNS

To allow for different sized papers around the world we have duplicated the patterns onto ISO standard paper sizes and US Architectural sizes – thus A0 and A1 etc. for ISO paper and ARCH E, ARCH D and so on for US sized paper.

Many places can print these plans at full size for you at low cost, especially if you ask for them to be printed in back and white. If using this method just take the drawings (without GRID) in ISO or Architectural format to the printers and have them print.

If you don't have access to a large printer, but can get things printed on a smaller sheet size, do not panic. Get a copy of the Adobe PDF reader [<https://get.adobe.com/reader>] – it's free and works on most computer systems (but you can't poster print from a mobile phone). N.B. only the Adobe reader [version 9 and above] gives you a **poster** print option for tiling to smaller sheets.

Now choose one of the pattern sheets with the GRID on, open it with the reader and select print (using the GRID version helps with sheet alignment).



Under *Page Size and Handling*, select POSTER.

Set *scale* to be **100%**, *overlap* to be 0.5 inches (12mm) and make sure *cut marks* is ticked.

This will now print out the pattern tiled and at the correct scale on your smaller paper. To stick the pattern back together, start at one corner and stick it with tape to a window – so the light coming through helps alignment – then stick it all together. If the window is not wide, start by making columns then join each column to the next to make the whole.



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