

Laminating

Before you attempt to start any GRP work it is essential that the workshop is at a constant temperature ideally between 15-20 °C. The room should not be damp and adequately ventilated, the floor space should be tidy and divided into areas for preparation of reinforcements, mixing of resins, moulding and finishing. Direct sunlight on moulds should be avoided. Cleanliness is imperative for the health and safety of the operators and for potential contamination of any materials.

Personal protection should be worn at all times, safety spectacles, gloves, apron, and coveralls. Read all hazard labels on containers and on site, if you are unsure about anything call us on 0191-4975134.

A guide for laying up (laminating) fibreglass reinforcement into a pre- prepared mould

Apply a layer of catalysed Gelcoat (2 - 3% by volume) to the mould at a recommended thickness of 0.4 – 0.6mm, this works out approximately at 1kg covers 1.6 sq mt. Once the gelcoat hardens to a tacky finish, but does not rub off onto fingers (1-2 hours at room temp), you can begin adding layers of glassfibre matting. Be aware that although the gelcoat can seem to have fully cured, some corners and crevices can be still wet, wait for these to dry.

Have all your materials and equipment ready before starting lay-up procedure, to calculate the approximate amount of resin needed simply multiply the chopped strand matt weight by 2.5, i.e. 1 kg of matt = 2.5 kg of resin, but only mix resin as required and not too much at one time. Using catalysed resin, wet out gel coated area, lay over first sheet of fibreglass matting and using a stipple motion wet out this first layer (do not paint side to side this will cause the fibres to separate). Apply more resin if necessary, making sure the mat is totally wet through. Using a metal paddle roller work out any air and consolidate the matting to the gelcoat. When the first layer is completely laid nice and flat to the gel coat repeat this action for the remaining layers, it is not necessary to wait for each layer of matt/resin. It is recommended that if applying more than three layers it is best to let the first layer cure to prevent heat being generated by the curing process as this can cause pre-releasing and warping to the item.

Whilst laying-up the resin it is already going through its curing stage and it is advisable that if the resin begins to appear thicker and unworkable while laminating, that you flatten out any matting and clean tools thoroughly with acetone to prevent the laminate and tools being ruined by premature curing, mix a fresh batch of resin then continue. Be careful of excess resin in bucket curing as it will give off a toxic smoke, immediately fill bucket with cold water and move to a safe area. Remember also that acetone is highly flammable – DO NOT smoke near or expose acetone to sparks or flames.

When the finished laminate is cured but still green (not too hard) it can sometimes be trimmed using a Stanley knife, hardened, it can be cut using a hack saw or diamond wheel cutter (safety gear and breathing masks must be worn while cutting GRP). Remove from the mould using wooden or plastic wedges but be careful to avoid scratching the laminate or the mould, alternatively careful use a pair of mole grips and a tyre lever is effective (place grips above mould on excess material). If the mould has been properly waxed the laminate should quite easily be removed. Keeping a mould sufficiently waxed should make removing further laminates easy and prolong the life of the mould. A GRP mould can be easily repaired by filling with Gelcoat, if your mould has a piece broken away carefully grind away with diamond tipped router the area in question just skimming the surface to create a key, if you can get the tip in at 45 degrees undercutting the surface slightly, this technique holds the repair in. Then carefully wipe area with acetone. Mix a small amount of Gelcoat and add only a few drops of catalyst, basically area of a 50p coin would require only 2 – 3 drops of catalyst, mix in and carefully using a tool with a point, spoon into repair and leave slightly proud as the mix will shrink during curing, you can use a good quality cello tape or masking tape to hold the repair in position, economy brands do not fare as well. Leave overnight to fully cure then treat with wet and dry paper starting from 240 grit up to 1200 grit, do not rub in one direction but alternate in order not to rub a groove in mould, if it's a small repair on a flat area use a small piece of flat material i.e. wood for a base for the paper, any complicated shapes may warrant a makeshift rubbing block in order to keep the mould in shape, you may find on the occasion that you will have to add more Gelcoat due to air entrapment, no need to regrind out just make sure there is no water from wet and dry paper in void, using a Stanley blade just etch hole first then fill again. When you are satisfied with your work you can use a cutting compound to regain shine on mould surface. You must treat this repair as you would a new mould, apply at least 10 coats of wax at 1 hour intervals, it is also a good idea on the first few lifts to wipe PVA release agent on repair as well as waxing. The repaired area will never be as strong as the original mould so it is important to apply wax on at least every other lift, failure to do this will lead onto regular repairing this area. Life expectancy of a well-made Fibreglass mould, which is well looked after, should be approximately 3000 lifts. After a certain point in its life the gelcoat surface breaks down leading to porosity / cracking / dulling.

A laminate will have a smooth side (side nearest the mould) and a rough side, the rough surface can be made smoother by adding a surface tissue or flow-coat, (gel coat with a wax additive), you also may want to give it a different look with a glass cloth or similar fabric which must be added whilst the laminate is still wet for best results.

If you are laying up a part with no radii it is a good idea to sprinkle chopped strands in position to prevent any air voids, use a radius roller / corner roller too to ensure material is consolidated. Do not over stipple matting, if you get air trapped roll from one side to the edge of the matt and it will get out there, if the air bubble will not move just snip it with a pair of scissors and roll carefully back down.

Of course you can design your laminate with many different materials that are freely available, such as Woven Roving, Carbon Fibre, Kevlar, Coremat, Diolen, and many more that all have different characteristics and strengths for different applications. For example the above laminating guide is general for making smaller non-critical items such as motorcycle parts or small covers ect.

Sheathing a wooden structure – i.e. Cockpit / deck house.

Sheathing (covering a surface with a protective glassfibre skin) used to be a popular method of renovating a wooden hull. It is less commonly used nowadays for this purpose, but the technique is still appropriate for protecting cockpits, deckhouses and other wooden structures. All softwoods can be successfully sheathed – hardwoods are less suitable, for the resin does not penetrate the wood and the laminate therefore does not bond well.

1) The surface should be first thoroughly stripped with a sander or similar tool (NOT a chemical stripper), cleaned and dried. 2) Mix a primer coat of Lay up resin thinned with styrene (one part styrene to 19 parts Resin, 5ml / litre) and catalysed with 20ml catalyst per kilo of primer. Apply generously – the wood must be totally impregnated. G4 is an alternative, used to coat the wood and within 4 hours the main laminate can be applied. 3) When it becomes tacky, cover with a coat of unthinned Lay up resin, catalysed at the normal ratio (10ml per kilo resin – minimum). 4) Apply strips of glassfibre mat, or glassfibre tape, to any areas, which will need extra reinforcement. Use a brush to stipple resin into these strips, working them into angles or corners. Consolidate with a metal roller. 5) Cover the surface with pieces of glassfibre mat, overlapping the pieces by at least 50mm and cutting darts where necessary to avoid wrinkles. Where possible, lay pieces the entire length of the cockpit, to minimise the number of joins. Again, stipple the mat down with a brush, adding more resin if needed to impregnate the glassfibre thoroughly. 6) Use a metal roller to work out any air bubbles or wrinkles, especially in awkward corners, overlaps can be made invisible by rolling carefully the double layer and feathering edges with brush. 7) Repeat steps 5 and 6 to apply further layers of mat as required, ensuring that joins in each layer are overlapped by the succeeding layer, start your 2nd layer in a different place to minimise joint build up, generally 2 layers of 450g matt is suffice for most applications. 8) Before the last layer sets you can cover it with surface tissue to give a better finish. 9) When the laminate has become firm rub down with abrasive paper, then wipe lightly with acetone to remove any dust. 10) For final surfacing coat use Flowcoat, if self-colouring add 100mg pigment per kilo of mix, stir thoroughly, then catalyse with 20ml of hardener per kilo of Flowcoat. It is important to achieve a good finish to condition the Flowcoat to at least 15 °C, Brush the mix carefully over the surface, leave to harden and sand down any high spots. It is important to apply the surface coat in a warm, dry, well-ventilated area. The final coat should be set with a smooth surface, but it can be improved if necessary by going through the grades with wet and dry paper and polishing with cutting compound and an electrically powered polishing mop. 11) The laminate should be fully cured in about 10-14 days at 21°C. Curing will take much longer at lower temperatures, but this is not recommended – the curing temperature should certainly never be less than 15°C.

As always, if working outside plan your work in a dry period, do not even attempt during unsettled weather.

This advice and information is given in good faith for guidance only. and is given without warranty, users should determine information given and using their own judgment to determine suitability.