

Paint>General

Objectives of this task:

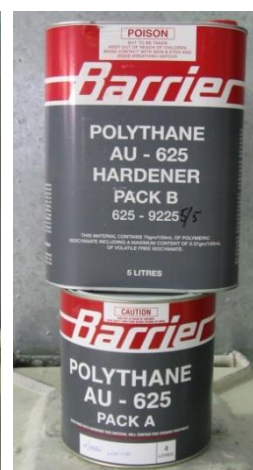
To paint the aircraft, which involves disassembling the fuselage, empennage and wings, then the preparation – filling, sanding, priming and so forth, and finally application of the topcoat. Body filler adds weight to your aircraft and Q-Cell is the lightest filler available so we suggest that you use Q-Cell for the larger fills and finish off with a lightweight body filler.

Paint also adds weight to your aircraft and so we recommend that you keep the amount of paint to the minimum necessary to achieve a good finish: just enough of a light-coloured undercoat to cover filler and all of the bare spots, followed by a single topcoat.

The topcoat **must be white** for heat rejection purposes, and any coloured striping or detail can only be applied to vertical surfaces – **all horizontal surfaces must be plain white**.

Filler and paint:

In general we use automotive grade paint preparation products and automotive grade 2-pack epoxy paint. The specific brands that we use here in Australia may not be available where you live and you may have to find similar products locally.



Lightweight body filler	2 tins	"K&H Mercury" brand or similar (photo #1)
Spot putty	4 tubes	"Ever-Glaze" brand or similar (photo #2)
2 pack epoxy primer undercoat	5 litres	"Protec Autofleet" brand or similar (photo #3)
2 pack polythane white topcoat	12 litres	"Protec Barrier" brand or similar (photo #4)
Q-Cell and polyester resin lightweight body filler – a 3-part mix consisting of:		
Q-Cell microspheres	1 kg	mix with resin as required, about 20% by weight
Polyester resin	4 litres	
40% M.E.K.P. solution	20ml	catalyst for the polyester resin/Q-Cell mixture
Etching primer	250ml	for priming metal parts: noseleg, etc
Wax and grease remover	1 litre	for final washdown prior to topcoat
Thinners, retardant, etc as required to suit the chosen products and conditions		
Tack cloth – available from automotive paint suppliers, removes fine dust prior to the application of the topcoat.		

Sandpaper:

Generally we recommend and use “3M” brand (or 150mm “Stickit” brand pads for a random orbital sander) aluminium oxide sandpaper in the following grades and quantities:

- First all over sand 180-grit 1 box
- Filler sand 80 and 120-grit 1 box of each
- Spot putty and final sand 240-grit 2 boxes

Equipment required:

Cork or rubber sanding blocks, flat and curved.

150mm random orbital sander, either electric or pneumatic, preferably with dust extraction.

Compressor and spray gun – we use a low-pressure pot gun (~80psi) in the factory, but follow the instructions of your chosen paint supplier.

Half-face respirator with suitable painting filters.

Disposable coveralls, gloves, boots and safety glasses or goggles.

Assorted saw stools, wire hooks and trestles will be required to support individual parts while they are being prepared and painted. In the paint booths at our factory we hang smaller parts in rows from roof-mounted rails, while wings are fitted to purpose-built supports that hold the wing root and support the outer end with a hook through the flap brackets.

Disassembly

Preparation and painting is done with the aircraft completely disassembled - all parts will be prepared and painted separately and then reassembled after the paint has cured.

We suggest that you bag all the hardware (bolts, nuts, washers, clips, etc) for each component separately and clearly label what each bag is for – this will make your life so much easier during reassembly.

Remove the ailerons and flaps from the wings, then remove the wings and wing struts.

Remove the elevator, rudder and ventral fin from the empennage.

Remove the wheel spats and any other fairings.

Remove the doors and the engine cowlings.

Remove the noseleg assembly and place a saw stool or prop under the attach point, or alternately leave the noseleg in place and mask around it.

Remove any other small items such as ventilation doors, oil door and so on.

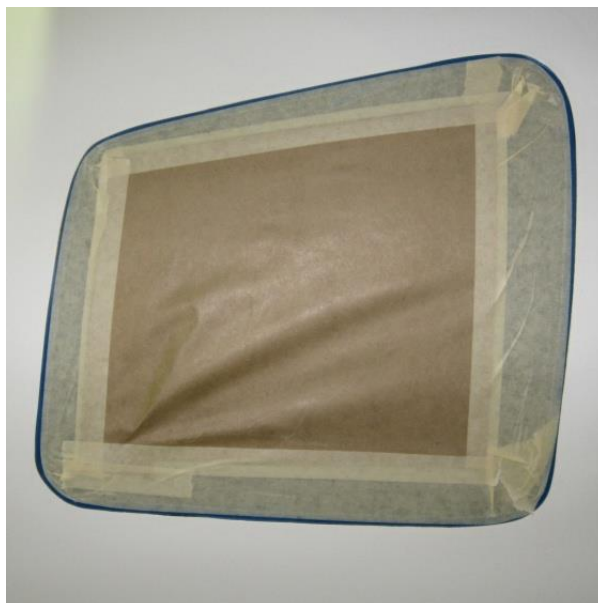
Clean everything thoroughly

The entire aircraft should be disassembled (see above) and then everything should be blown out thoroughly with compressed air and then vacuumed out to remove dust and debris from every part of the airframe. You do not want dust being blown into the finish because it didn't get cleaned out properly beforehand.

While you are cleaning, take the time to clean out your work area too – blow and sweep all dust and rubbish from the walls, benches and floor and get into the habit of doing this at the end of every work day so that when you come to apply the paint the work area will be substantially clean to start with and you won't get any little “surprises” in the finish.

Paint>Masking

General: we recommend and use regular automotive masking tape and brown masking paper. We do **not** recommend the use of newspaper for masking due to its porous/absorbent nature. We recommend and use “*Fine Line*” brand edging tape (photo below left) to define the edges of windscreen and windows then follow up with normal 1” wide tape and brown paper to fill.



The windscreen, door and side windows will all need to be masked very carefully, paying particular attention to the shape of the masked area, which should closely match the shape of the underlying glass fibre structure. Use the “*Fine Line*” tape and mask slightly (~5mm) inside of the structure line and then use a folded piece of 240-grit paper and sand right up to the tape to provide a good key for the paint to adhere to. Take your time with this – you will see the shape of your windscreen and windows every time that you fly so make them even and pleasing to the eye. The photo above right shows a side window fully masked – note the blue “*Fine Line*” tape defining the edge and the regular masking tape and paper infill.

Do not rush the masking stage, but rather take your time and do it carefully: care at this stage will save you a lot of time and grief later – overspray is **not** easy to remove, particularly with 2-pack paint, so mask up very carefully. Overspray will sneak though the smallest gaps.

Mask all control surface hinges on both the control surface and on the adjoining structure.

Mask the VHF antenna and static tube.

Mask inside the door openings so that the door opening will be painted but overspray will not get inside the cabin and foul the inside of the windows.

Mask the engine and engine bay back to the outside edge of the firewall – wrap the entire engine and engine mounts in masking paper and seal off at the firewall.

Mask the main wheels and brakes.

Mask the suspension rubbers on the noseleg.



Masked and undercoated J170 fuselage

Paint>Surface preparation

It is true that any paint job is only as good as the preparation – shiny paint will most definitely **not** hide anything, and in fact shiny paint will only magnify any lack of preparation so surface preparation will be the most time-consuming (and ultimately rewarding) part of the painting process. If you want a slick-looking finish this is how to get it: prepare carefully!

The surface preparation process is: sand everything with 180 grit paper; fill where required (Q-Cell for larger areas and lightweight body filler for smaller areas, nicks etc); sand the filler smooth with 80 and then 120 grit paper; apply undercoat; fill pinholes and small nicks with spot putty; sand spot putty with 240 grit paper; touch up with undercoat; final sand with 240 grit paper; wash with wax and grease remover, dry off and wipe over with a tack cloth.

Wear your half face respirator all the time during the sanding and painting process – there will be a lot of fine dust generated and your lungs will thank you for it.

Lets get started!

Sand the entire surface of the aircraft and all parts to be painted with 180-grit sandpaper – we use a random orbital sander for this task and for most of the sanding in the factory. This will provide a key for filler and undercoat to bond to. Be careful not to sand through the gelcoat and into the structural glass fibre – if you do go through the gelcoat do **not** sand any deeper. Filler is used to fill imperfections in the surface to be painted, so you will use filler for things such as filling in ripples or dents. When filling large areas we have found that the use of a very wide (~9”) spatula (make your own from plastic) provides a good finish with little waste.

Mix up a large batch of Q-Cell and polyester resin to a creamy consistency and keep it in a sealed tin: this mix will last about 5 days. Stir the Q-Cell mix thoroughly before each use and then scoop out one hand-sized amount at a time onto a flat mixing board, add 3% of M.E.K.P. catalyst/hardener and mix it in thoroughly - this will give you about 15 minutes working time - and apply with a wide spatula. Allow to cure for a few hours until it cannot be scratched with your fingernail and then sand back to a smooth finish with 80 and 120 grit paper.

Smaller areas can be filled with lightweight body filler and sanded back in the same manner. You might find it easier to work on one area at a time when applying filler so that you don't lose track of where you are. If you decide that this way or working appeals to you, you might want to consider working on a specific area until you are happy with the finish and then undercoating that area before moving on to the next area. Working in this manner means that you are less likely to miss anything and the undercoat allows you to see where you have been. Metal surfaces such as the noseleg must be cleaned and primed with an etching primer.

Now spot putty can be used to fill smaller imperfections such as pinholes and the like. Spot putty is applied with a spatula, left to dry and sanded back with 240-grit paper. Work your way around all surfaces in this manner and then apply undercoat to all spot puttied areas.

By now many days will have passed and all surfaces should be smooth and undercoated.

All surfaces can now be hand-sanded with 240-grit paper as the final stage in surface preparation, then all dust can be blown away and everything can be wiped down with a clean cotton cloth. Wash everything with warm water and detergent and then with automotive wax and grease remover and then allow all surfaces to dry off completely.

At this point the entire work area must be thoroughly cleaned and the floor and walls washed with water to wash away and damp down any dust.

Paint>Topcoat

This is what you have been working towards – the application of the topcoat.

This is a critical task where you only get one chance to get it right. If you are unsure of your ability to apply the topcoat then you may want to hire a professional painter – perhaps the local car painter would do the final coat for you on an hourly rate, or maybe you have a friend who is good at such things. You could even find someone who can teach you how to paint; perhaps there is an adult education facility near you who could help.

The work area should have all dust and debris removed and then be thoroughly wetted down to minimise the chance of dust settling into the final finish. Hose the floor and sweep it out. All parts should be supported or suspended in such a way that you can paint them and leave them to dry (it might be necessary to paint the fuselage separately from the smaller parts if you are working in cramped conditions).

Ensure that you have plenty of ventilation while painting and that any air being directed over the work surface is clean air – in our paint booths we use automotive grade air filtration across the inlets to each booth with large extractor fans that vent above the booth, however you should be able to achieve a reasonable level of filtration by drawing air from openings that are above ground level and screening them with clean insect screens with muslin or similar open weave cloth placed over them. If using the prevailing breeze you may have to wait for a day when the wind is blowing in the right direction before painting, or perhaps you could use an industrial fan as an extractor fan to draw clean air over the work surface.

It bears repeating here that the topcoat **must be white** – under no circumstances must any other colour be used, and any coloured trim can only be applied to vertical surfaces: never use any colour other than white on the horizontal surfaces.

Finally all surfaces should be wiped over carefully with a new tack cloth.

It is not possible to give written instructions regarding painting technique and so all that can be written has to be this: read the directions from your chosen paint supplier very carefully and follow them to the letter. Expect to use about 4 litres for the fuselage, 4 litres on the wings and 3 litres on the remaining parts.

Mix your paint and hardener together thoroughly and in the exact ratio given in the paint manufacturers instructions, clean and lay out your air hoses so that you will not trip over them and make sure that you wear your coveralls and respirator at all times while painting.

Take your time, apply the paint in an even pattern and good luck!

Once you have finished painting leave the area and keep the ventilation system running for a few hours. Leave the paint to cure undisturbed – read the manufacturers directions for guidance on how long to wait – and resist the temptation to rest anything on the newly painted surface for at least a few days as it might make a mark in the still curing paint.

Peel the “*Fine Line*” tape back very carefully from around the windscreen and windows, taking care to peel back along the masked line, which will give you a nice clean edge.

Unmask the engine and the door openings, refit the noseleg and nose wheel and remove all other masking. In general peel masking back away from the painted surface.

Reassembly will be addressed in the next major section of this manual: *Post-Paint*.

This completes the *Painting* task.