

Gel coat - Its problems and refinishing

One of the great wonders to owners is the white stuff that coats their gliders. The stories that exist, concerning the virtues of this or that gel finish, are legendary.

As one of the country's leading specialists at refinishing gliders we will try to clear up some of the misconceptions surrounding gel and address some of the problems associated with it.

Before we start looking at the problems, and their prevention, we need to look at this material and understand what it is and why it is used.

We will cover the following as simply as possible :

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We will then go on to look at what to do when you do have a problem and what are the best ways to deal with it.



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For a more technical discussion of why we need gel coat, what it is & why we have problems

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What is gel coat and why do we use it?

Gel coat was first used back in the late forties and early fifties when most of the plastics we take for granted today were developed. Without using a gel coat glass fibre products would be little more than transparent mouldings, with the weave just below the surface.

Gel coat allows for the product to take on a colour, achieve a high gloss finish and protects the structure from the effects of UV.

So what is this magic material?

It started as ordinary resin coloured by adding various pigments. With years of development we now have highly complex gels that protect the structure and enhance its finish. However it is still based on polyester resins.

The white stuff on your glider is a highly complex material which, *given the correct care*, is capable of protecting it for many years.

Why do we have problems?

The problems with gel are due to UV from the Sun and chemical reaction with the environment.

The surface exposed to UV is subject to chemical changes which make the gel more brittle. Once a crack has started it creates a point of increased stress and the crack continues to propagate

The exposure to UV and the atmosphere also results in a colour change. This change in colour is a non-reversible process.

Under a microscope polyester gel coats appear to be porous, full of "vertical holes". Each hole creates at its boundary a sharp transition with the surface. These holes are collectors of micro-debris. This includes general dirt, buffing wax, oil or grease, all of which can react with the gel. The transition is also subject to increased attack by UV & the environment.

Some of the newer gel finishes seem particularly prone to osmosis, which is seen as small bubbles on the surface of the gel and is more noticeable in the winter damp and cold. Gel is hydroscopic by nature and if not protected then it will absorb moisture through its porous structure. In an attempt to get back out this creates bubbles. The best thing to do is leave well alone and then in the summer have the glider hard wax polished

Why do some gliders appear to be more affected than others?

Different makes of gel coat are used by different manufacturers. There have been four main types of gel coat used on gliders The current favourite is Scheufler T35 however in the past Vorgellack, Swabelack and Spar have been used.

Most gliders produced since the late eighties have been finished in Scheufler T35. Before that date Grob, DG, and Glasflugel used Swabelack while the others used Vorgellack.

Vorgellack is the most prone to cracking.

How to treat and protect gel finishes.

There are several issues in promoting longevity of gel coats

1) Minimise the effects of UV radiation

The microscopic contour of the surface plays a large role in the resistance of the gel to UV. A smooth surface will have fewer ridges and valleys therefore reducing the surface area presented to

the Sun. This can be achieved by finishing to a high standard using fine wet & dry to smooth the gel. The use of polishes also helps by filling any remaining valleys.

2) Reduce surface reactivity

Wax polishing will separate the gel from the damaging effects of the atmosphere. Polishing will also have the effect of filling and levelling the remaining surface presenting a smooth and level finish.

3) Maximise gloss retention

The reactivity of the surface will automatically be reduced if it has a high gloss finish. The better the gloss the lower the reactivity.

To maintain the highest standard of finish we would recommend having the gel cut back every 3-5 years and having the glider hard waxed regularly

Apart from hard waxing what else can I do?

Hard waxing has been around for many years and is recommended by the manufacturers of most gliders.

In recent years new products have become available on the market aimed at the glider owner and proclaiming to prolong the life of gel finishes. To prevent UV attacking the gel an inert coating is applied. Work has been done on silicon polymers to get them to bond to the gel. Unfortunately silicon tends to migrate into the surface causing adhesion problems with any subsequent repairs. Another approach is to use PTFE compounds. These are less inert than silicones but avoid the migrational problems

These may well be the materials of the future, bringing to an end the misery caused by gel coat degradation and subsequent refinishing. But for the moment we are sticking to what we know works.

Remedial action for the older glider

This really falls into two categories :-

1) The gel coat has just started to show signs of cracking

This is a common problem, where the root of the sanding valley created in the finishing process has migrated down into the gel and filled with dirt.

The best and most effective solution is to lightly sand back the surface with fine wet and dry paper, abrading away the damaged gel & creating a new surface. This new surface can then be protected by polishing. With care this process, if repeated when required, will prevent widespread cracking.

1) The gel coat is well & truly cracked

You are further down the road and are getting close to needing to have the areas affected refinished. If the cracking has not yet got to the stage that it is peeling back on itself, i.e. cupping, then you can try cutting back with fine wet and dry and polishing the affected areas. Once the gel has started to cup there is little remedial action available. From here on you are in danger of damaging the structure. Evidence from Australia suggest that the cracking in the gel can migrate through into the structure and break down the epoxy resin. Since you have effectively removed the UV blocker - the gel coat - this is quite likely to happen. Once the damage has got this far my advice would be to seal the crack with tape until such time as you can get the area refinished.

Can I use acrylic paint instead of gel for refinishing?

The simple answer to this is "Yes, you can", but we wouldn't recommend it

Some people have sung the praises of acrylic paint for refinishing gliders. I personally do not like to use acrylic as a refinishing material where gel was originally used. The arguments in its favour are usually based on not having to remove all the old gel, and acrylic being easier to polish.

If we are having to refinish the glider we know that the gel is damaged both chemically and by exposure to the Sun.

If you now put a new finish, be it acrylic or gel, over a surface like this you are asking for trouble. If the gel finish is in such a poor condition that you are considering refinishing then it needs to be removed right back to the structure.

No ifs, buts or anything else, back to the structure or not at all.

When we refinish a glider we expect to see about 80-90% glass before we repaint. This is a time consuming job requiring care and skill.

Since we have to remove all the old gel anyway, why use Acrylic?

When it comes to the choice of material for refinishing we always use Swabelack, this is the only gel coat that has stood the test of time. It doesn't seem to suffer the same way that other gel finishes do.

Refinishing is a skilled and labour intensive job best carried out by professional. We are one of the country's leading specialists. When it comes to refinishing gliders we have learned by trial and error what works and what doesn't. When it comes to something as important as your glider you want, and expect, the best.

What does refinishing cost?

This is a important question and one on which we prefer to talk directly with the customer. As a guide a refinish on a 15m glider would cost in the region of £8500 to £10000. To be honest very few require a total refinish. Most customers start with one or two components and spread the cost over several years.

If you think you need some refinishing work carried out please contact us.

Summary

Gel is pigmented polyester resin, it's hard and gives a good finish. It is the ideal surface finish for a high quality sailplane. However it is subject to an ageing process - just like us, *well me anyway* - and if exposed to strong sunlight will degrade and ultimately fail. Preserving it is much the same as looking after your own skin. Protect it with sun cream (hard wax or new PTFE polymer) and keep it clean using clean water.

Treated well it might last the life of the glider. If it doesn't talk to us and we will restore it to factory fresh condition, but it won't be cheap.