A NEW WAY TO MAKE GEL COAT REPAIRS USING PRESTEC 27X1

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Refurbishing of gel coat by smuggler marine

Overlay on tooling gel coat to refurbish poor mpuld surface.

SURFACE PREPERATION FOR REPAIRING GELCOAT OR RAW LAMINATE

Gelcoat or Fibreglass surfaces are found in four basic forms:

1) New and aged gelcoat which is sound; free of star cracks, blisters or damage and is sound indicating good adhesion to the laminate behind.

2) Aged gelcoat that has minor surface defects that may have faded and oxidised and is still free of imperfections as stated in 1) above.

3) Heavily crazed, showing cracks and is open to the laminate behind.

4) Raw fibreglass having no gelcoat.

SURFACE PREPARATION

Most repairs involving gelcoat usually fall into categories 1) and 2) in the previous slide and therefore require very little filling or fairing and so refurbishing these surfaces requires relatively little work but the system should be as:

1) Cleaning and de-waxing the surface.

2) Sanding the surface

3) Applying a primer/surfacer. This maybe optional.

4) Application of a suitable paint topcoat or gelcoat.

Surfaces as described in categories 3) and 4) require much more extensive attention especially in abrading the surface.

SURFACE PREPARATION

The exposed raw laminating resin is very hard slick in comparison to flowcoats and gelcoats which may contain fillers and pigments making them easier to sand.

This also goes for any primer or fairing material.

Cracking or crazing usually comes from excessive flexing of the gelcoat surface and may require further structural reinforcement to reduce this movement.

CLEANING AND DE-WAXING THE SURFACE

1) Thoroughly clean and degrease the surface. Sanding alone with sandpaper does not remove wax or other contamination as sanding CAN spread the contamination from one area to another.

   Sanding often melts greases and oils into the surface making it impossible to obtain a clean surface. One can use commercial detergents, steam cleaning or pressure washers. Be sure when the cleaning process is completed that the cleaned surface is washed with virgin water.

3) When cleaning to remove surface contaminates such as salt, grease, mould release films use a Scotch-Brite or soft brush with the detergent.

TREATING THE IMPERFECTIONS

Inspect the surface for imperfections such as light scratches or pin holes.

If necessary fill any scratches, pin holes gouges or dents with an appropriate filler (not an epoxy filler) before proceeding. Typically a VE putty. Any cracks open them up a little to give the repair the best chance of seamlessly blending into the existing gelcoat. If you start cutting into the laminates, you're going too deep.

Any raw fibreglass should now be sanded with a 40-grit paper until 100% of the surface is dull. Any un-sanded areas can lead to delamination later. Do not sand excessively as this may lead to some porosity or exposed fibre

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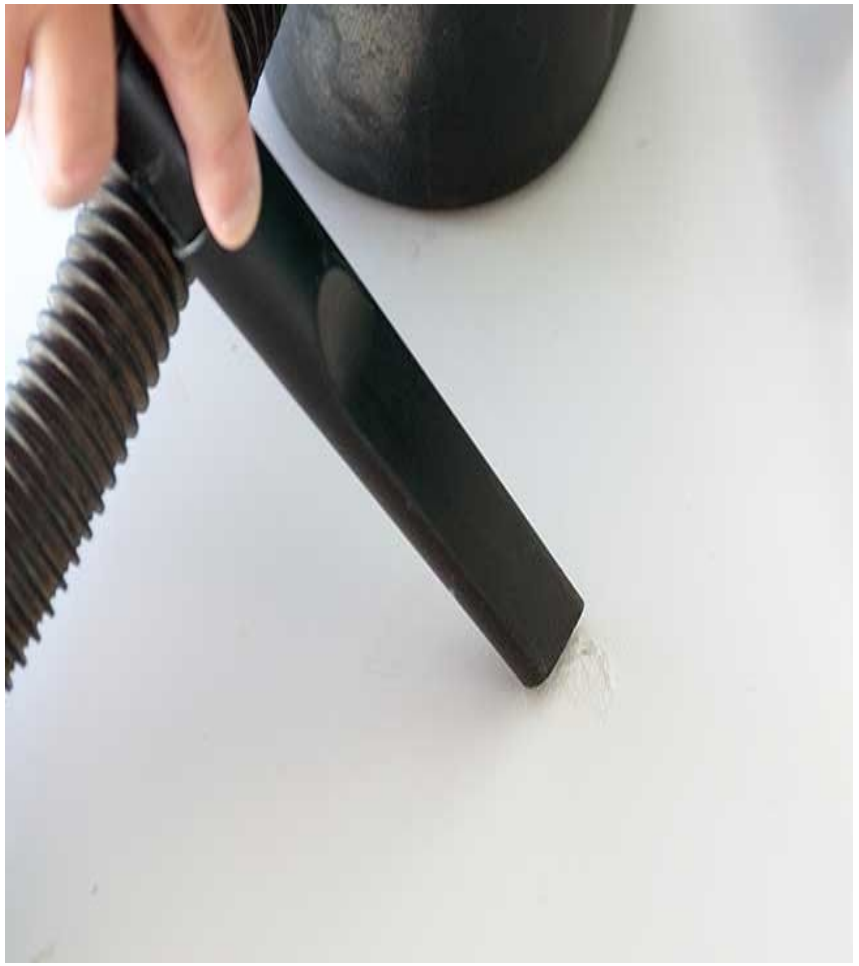
The gel coat being repaired, the surface should be sanded with 80 - 120 grit paper making sure that the edges gel coat being repaired is feathered.

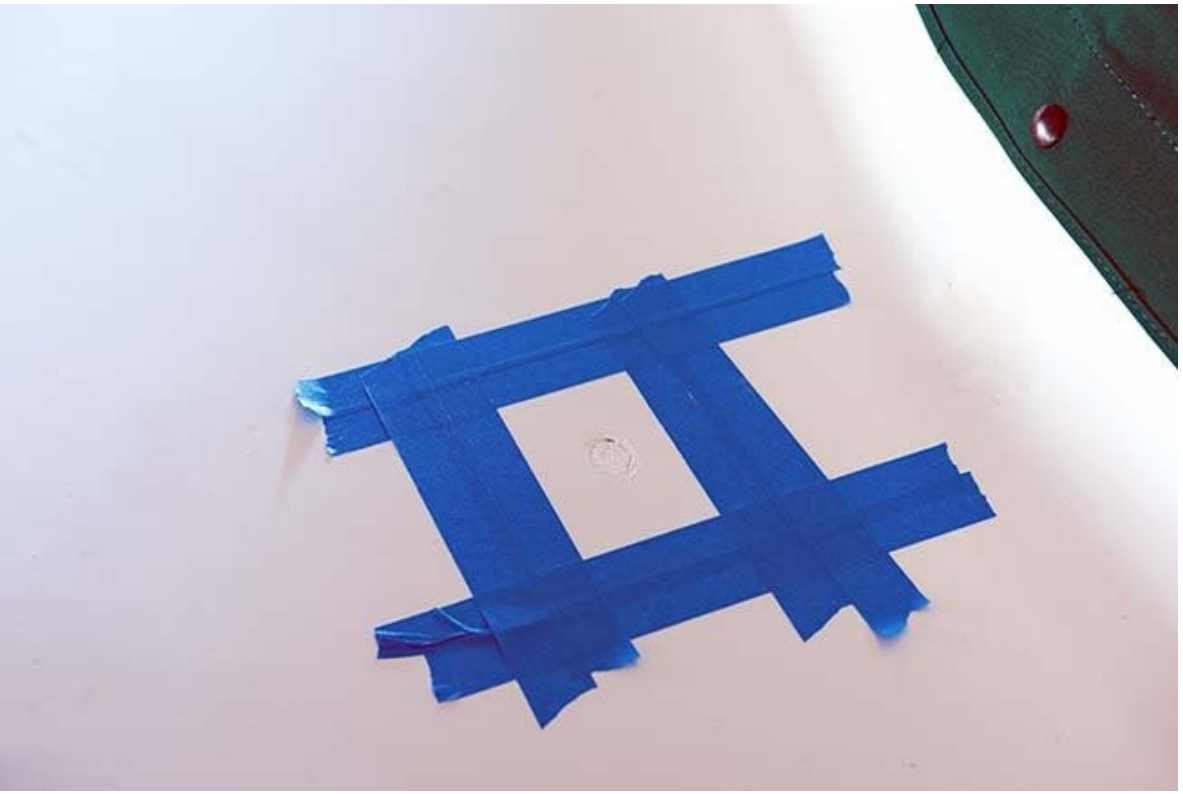
TREATING THE IMPERFECTIONS



It takes little time if you use the correct equipment and it is essential that this V-shaped groove in the gelcoat is vacuumed to pick up the dust. If you cannot vacuum, blow off the surface with clean, dry compressed air.

Then the area to be repaired should be wiped down with an acetone-soaked rag to remove any sanding dust or residue. The rag should be fresh and unused.

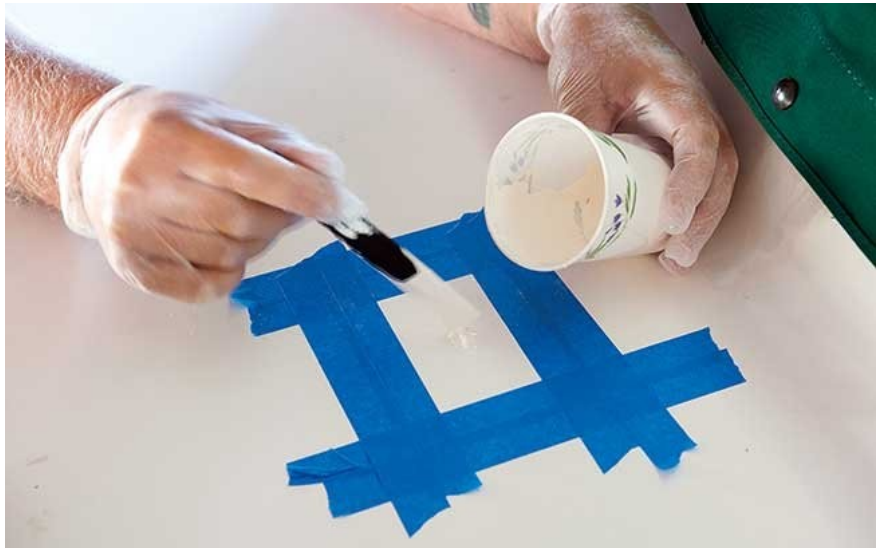
TREATING THE IMPERFECTIONS



Mask off the repair, leaving about 50 mm all the way around the area to be repaired.

Use plenty of tape and a plastic sheet to protect the boat from damage and drips.

TREATING THE IMPERFECTIONS – brush application



Mix the gelcoat thoroughly following the manufacturer's recommendations. Adding too much catalyst gives insufficient working time; too little, and the gelcoat won't properly cure.

The gel coat being used has 30% Prestec 27X1 added to it so the gel coat cures tack free even when exposed to air.

TREATING THE IMPERFECTIONS- spray application

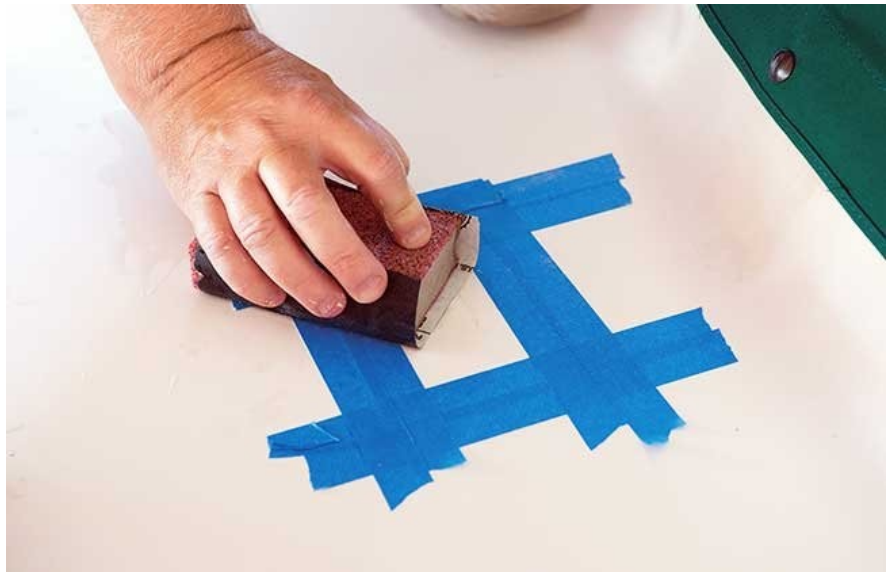
Apply the Prestec modified gel coat (see slide 12), preferably in three passes by spray, to a minimum thickness of 18-24 thou (450 – 600 microns, depending on the colour).

Allow a short period of time between passes so the gel coat laid down in the previous pass has time to set up. Too high a build too soon will cause the gel coat to run.

Note- Bright colours such as reds or yellows can be based on organic pigments. Typically these colours have poor hiding power and require higher film builds to appear adequate.

TREATING THE IMPERFECTIONS- finishing

Cut and Buff the cured gel coat repair after a minimum of 24 hours, ensuring the gel coat has cured sufficiently. The repair will be temperature dependant at the time, so any method of assisting the cure using heat (like a hair dryer) will be the best method. Any assistance with heat should be done after the gel coat has passed its gel time.



Now you can begin to sand down the repair until it's flush with the surrounding surface. Start with 180-grit waterproof paper wrapped around a block until flat and smooth. Then switch to 240-grit before finishing off with 400-grit or finer, which removes any scratches.

Remove the masking tape and plastic sheet, then finish off the repair with cutting compound followed by a layer of wax polish. You can hand-buff, but a slow-speed buffer leaves a better finish.

HOW MUCH PRESTEC 27X1 DO I USE

Testing has shown that the addition rate of 30-50% will ensure the gel coat will air dry. However an addition rate of 30% is preferred. Due to the low viscosity of the Prestec 27X1 higher levels are acceptable if the gel coat is very high in viscosity itself.

With gel coats based on organic pigments, these are usually bright colours, it is more advisable to add 30% to ensure the gel coat provides good hiding power, colour coverage.

The advantage of using the Prestec 27x1 is that the feathered edge will cure as well as the thicker parts of the repair.

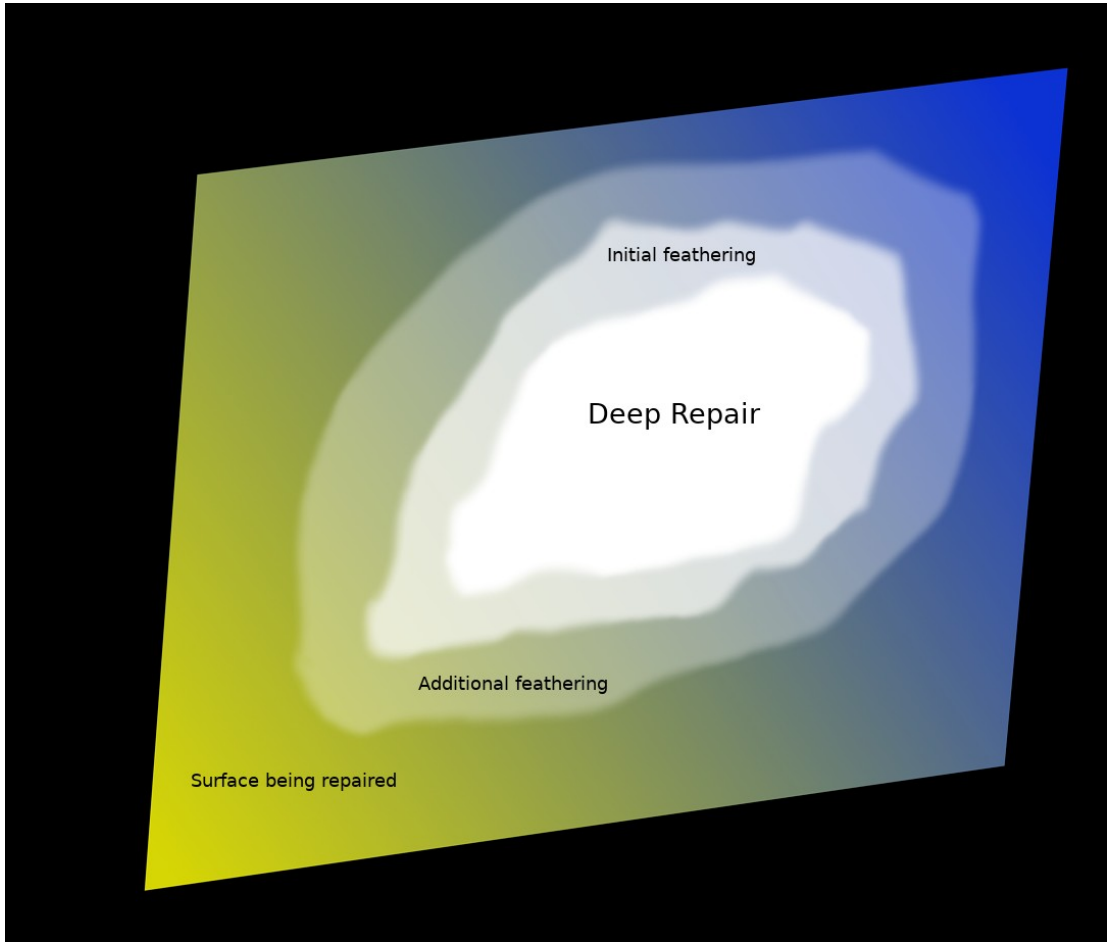
WHY PRESTEC 27X1 OVER OTHER METHODS

For many years the method of doing gel coat repairs has involved adding extra styrene for application properties, wax to remove air inhibition and allow the surface to remain tack free and also the addition of extra cobalt.

Whilst these additions to the gel coat allow you to make the repair, these products have some inherent deficiencies being:

1) Colour matching is difficult due to the wax and cobalt.

2) Achieving the correct application viscosity is also difficult.



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The cure of any areas that have thin film builds, which almost always occur, as you are trying to achieve a feathered edge with the repair, lead to poor cure and lead to poor UV resistance within a short period of time when exposed to the sun.

WHY PRESTEC 27X1 OVER OTHER METHODS

The method of adding products to modify gel coat as set out in the previous slide is not the only method. The use of wax paper, cellophane and also PVA have also been used. These methods take more time as well as being more difficult to apply.

Whilst these methods allow you to make the repair with gel coat, they present some inherent deficiencies:

1) They still require extra styrene to lower the viscosity so it is easier to spray the gel coat in a lighter film build, increasing the free styrene in the repair and therefore offering reduced UV performance.

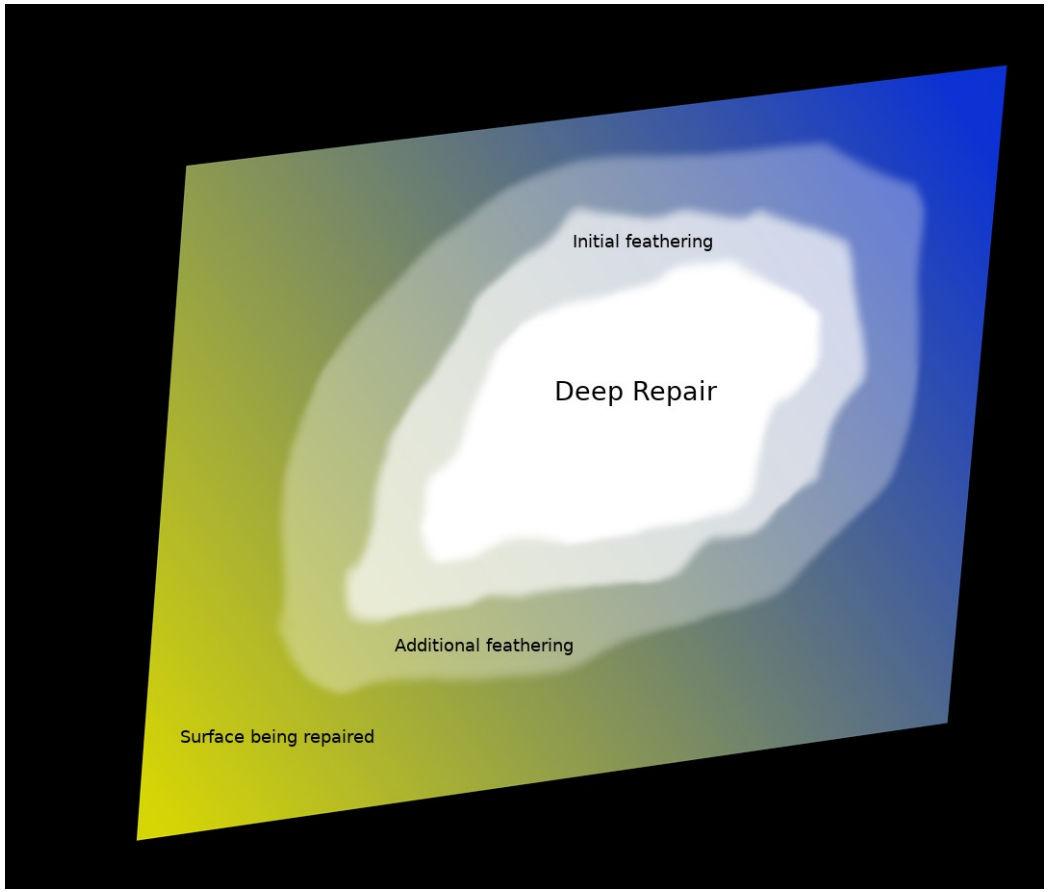
2) When using PVA the timing of spraying the gel coat in the repair, one must be careful when

WHY THE ADDITION OF STYRENE TO RESIN, GEL COAT AND FLOW COTES IS NOT A GOOD PRACTCE

The styrene levels of resins, gel coats and flow cotes have been carefully calculated to give the best performance criteria required for each product.

The end user may need to make an addition of extra styrene, usually to modify the product to a lower viscosity to make its application easier. Usually this is the case when applying by spraying.

Unlike paint which uses solvents including water as the carrier, styrene barely evaporates off and remains to be cross linked. An addition rate of 2-3% should be used and in some circumstances a maximum of 5% can be used. When using patch additives the suggested addition rates are about 30% which means the extra styrene added is well over the maximum suggested by the gel coat



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Increasing the level of styrene by dilution has the following negatives:

1) A decrease in the crosslink density therefore lowering its water resistance and its UV performance.
2) An increase in the molecular weight in the free polystyrene chains as well as the quantity of polystyrene. Polystyrene is formed when styrene cross links with itself during the addition of catalyst. Polystyrene yellows under UV.
3) The products become more brittle and therefore are less resistant to thermal movement as well as physical so are more susceptible to cracking.
4) An increase in residual styrene increasing the potential for yellowing due to UV.

IN OTHER WORDS THE REPAIR WILL SHOW ITSELF SOON AFTER THE REPAIR HAS BEEN COMPLETED

WHY THE ADDITION OF STYRENE TO RESIN, GEL COAT AND FLOW COTES IS NOT A GOOD PRACTCE

As Prestec is a low viscosity, UV resistant and good curing specialty resin product, it provides the end user with a technically sound option to use in the repair of gel coats and flow cotes. It does not:

1) Decrease in the crosslink density.

2) Increase the level of polystyrene.

3) The products do not become more brittle.

4) There is less chance of having higher residual styrene.

5) THE REPAIR WILL NOT SHOW ITSELF SOON AFTER THE REPAIR HAS BEEN COMPLETED