Australian Made NORGLASS Specialty Finishes Australian Owned

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INFORMATION GUIDE

FIBREGLASS

What is Gelcoat?

A moulded fibreglass structure is designed (in most cases) to have a colour impregnated into the **outer matrix** of the resin and reinforcing. This is commonly referred to as a **GELCOAT**, which is a gelified resin (thickened) coating to which a pigment or colouring has been added.

The gelcoat product is then applied to the inside of the mould as the **first layer** so that when the structure is removed the surface is already "coated" with a smooth coloured finish. The reason for the thickener being added, is to prevent the coating from running, or sliding down the mould during the lay-up process which would otherwise leave a less than solid looking finish.

After the gelcoat has been applied, a matrix of clear polyester resin and glass fibres are applied which then fuse to the sticky gelcoat. The more layers of clear resin and glass fibre that are applied, the thicker (and the more rigid) the structure becomes. The numbers of applications are **directly related to the size of the finished article and its intended use.**

When the determined number of layers are completed, the inside will have a clear sticky surface. All of the resin applications to this stage have been made with **unwaxed** polyester resins (including the gelcoat) to ensure that **all layers** bond together perfectly. This is because the **unwaxed** resins leave some un-reacted sites or "hooks" for the next coat to adhere to. To **complete the process** a further coat of **waxed resin** is then applied to the inside. This is called **"FLOWCOAT"**. The addition of the wax solution bridges the partially under cured layer and gives a crisp hard finish to the inside. As a rule pigments are usually added to the flowcoat to give a colour and provide a completed colour scheme.

EXPOSURE

When a fibreglass structure is exposed to weather, it is like all other surfaces, it starts to degrade. Depending on the colour this degradation can become apparent in as little as 18 months from manufacture. For example a white boat with a red deck will show significant loss of gloss and colour on the red area whilst the white portion will still look new by comparison. This degradation is retarded by light reflection. White reflects 97% of all light, whereas black reflects only 3%. The greater the reflected light the less U/V (ultra violet radiation) is absorbed. The cooler the surface the slower the deterioration. When this fading occurs, the normal tendency is to cut and polish the surface. This abrasive action removes the oxidised film and leaves the remaining surface with a reduced layer of pigment and rouged (polished) resin. However, this restoration is only temporary. The more the area is treated in this manner, **the faster it will deteriorate**, this is obvious. If a faded area is left untouched, the oxidised film will form a protective skin over the surface and retard further ultra violet attack. Unfortunately, the visual appearance is so unattractive that the tendency is to clean it off and apply some polish to brighten up the finish. Eventually this constant abrading reduces the finish to such a **porous** state that further "polishing" is no longer viable… Now **replacement** of the coloured surface is essential. In selecting a suitable replacement, it would seem obvious to re-gelcoat… **a mistake!!!** Gelcoats are, as previously stated, thick stodgy coatings which **do not lend themselves to refurbishing** by anyone other than a professional applicator. Even these people will recommend a sprayed finish of polyurethane, rather than more gelcoat. The reason is obvious when it is pointed out that polyurethane paints (urethanes) have much better handling characteristics and in fact give far more protection against ultra violet, than any other coating.

What about compatibility? Well… urethanes **have** a compatibility with gelcoats and flowcoats. **NORTHANE** for instance is a polyester polyurethane and is the **perfect choice** for refurbishing a fibreglass structure.
Selecting other types of paint coatings for this job will **NOT** be satisfactory due to their relatively poor adhesion (by comparison) and will not provide the chemical and water resistance required. **NORTHANE does all this and more**. For example, the gloss level and long term durability will far exceed that of the original gelcoat, as well as providing better chemical resistance.

Why then is **NORTHANE** not used in the original construction? The answer is simple; Polyurethanes are **not** compatible with polyesters in the lay-up stage and therefore cannot be used in a moulded construction phase. Some manufacturer's lay-up in clear gelcoats and then finish with sprayed urethanes, to provide the ultimate finish and durability after the vessel is removed from the mould. But the process also increases the cost and on small to medium size vessels would make it uncompetitive.

PREPARATION ANALYSIS

In most cases fibreglass refurbishment is **only contemplated** when the original surface has deteriorated **beyond polishing.** Where this is the case, it is not enough to just re-spray with **NORTHANE** because the surface will be **so porous and pitted** that some cosmetic rebuilding will be required **before** finishing can take place. When the oxidised gelcoat has been sanded and partially removed, the surface will be cratered and have minute voids (or pinholes) in the structure. **These have to be filled** before the finish coats of **NORTHANE** can be applied. Achieving this can be difficult (and frustrating) because these tiny holes are vessels for retained solvents, moisture, loose dust particles and silicone polish solutions.
Any (or all) of these contaminants will create an ongoing problem with the refurbishment.

Applying a thick coating over this area will **NOT fill the voids** because the coating will **bridge** the holes initially **but** the air pressure within the holes (as the paint settles) will cause the paint to **contract** leaving them **open again.** A thin coating will do much the same and still resist filling the pin holes. The net result is the problem remains. What is really required, is a liquid coating than can be **physically forced** into these areas to **fill** the voids. This product is **SHIPSHAPE PRIMER UNDERCOAT**.

SURFACE PREPARATION

1. Scrub the area to be treated with a cream cleanser such as "jif" or similar domestic product using fresh water to remove contaminants and oxidised gelcoat **making sure that the surface does not dry off in the process, (caked residues of cleanser and pigment will clog the pores unless thoroughly flushed off with clean water).** When completed, lay a slow running hose on the surface to totally wet the surface down. If this table of water forms a solid uniform layer, the area is then deemed to be clean. If the water "breaks" it indicates that contaminants such as silicone polish remain. These areas must be circled with a pencil and re-treated as above. Finally wash down with NORGLASS ACETONE or NORCLEAN-PLUS**. NOTE: ANY REMAINING PRESENCE OF SILICONE WILL HAVE DISASTEROUS RESULTS ONCE PAINTING BEGINS**. Read the following carefully.

Silicone Contamination (Fish-Eyes)
Silicone presence alters the surface tension of applied coatings. For example a polished car (when wet) will **not** allow a layer of water to sit evenly all over the surface and will force the water to "bead" or push up into droplets. The water will then "ball-up" and run off. Conversely a car that has not been polished for some time will allow the water to "sheet" and lay evenly over the whole area.

When a coat of paint (of any description) is applied to a surface that has silicone on it, the silicone **pushes** the coating away from the affected area. Because the behavioural pattern of paint is unlike water, it cannot separate and "ball-up", instead it creates a **crater** by pushing the paint away from where the contamination is. This is called a "fish-eye" effect. Multitudes of tiny circular craters will immediately appear in the wet coating as the silicone **pushes** the paint away from the contaminated spots.

At this stage it is too late (short of washing all the coating off before it dries and starting again). If the paint is allowed to dry and then recoated, **exactly** the same result will occur again and again and again. Therefore it is imperative that **all traces of silicone are removed before coating commences**. Repeat the cleaning down as described previously until you are **sure that the surface is thoroughly clean.**

2. Wet sand the area with 220-320 grit paper making sure that all the residue of sanded material is washed off before it dries. Also ensure that the water "sheets" as described above. If in doubt repeat 1 above.

3. Inspect the surface for defects. Deep scratches or depressions in the gelcoat should be dried off with a hair drier (or hot air blower) and filled with **NORGLASS NORFILL EPOXY FILLER**. Do not overfill the **NORFILL** as no shrinkage will occur involving unnecessary sanding. When cured, lightly sand the area and dust off.

4. **Filling pinholes in porous gelcoat**. If the surface condition does not have these imperfections continue on to **Undercoating** (see 7). Where pinholes **are** present, circle these with a soft pencil as a means of identifying the areas to be treated. A hand held magnifying lens is ideal for identification as pinholes can be hard to detect with the naked eye.

5. Mix up a small quantity of **SHIPSHAPE PRIMER UNDERCOAT** (200mls maximum) 150mls Base and 50mls Hardener (3:1). Stir well and allow to stand for 10 minutes. Apply to the affected area with a small brush and immediately follow up with a stiff rubber squeegee, forcing the **SHIPSHAPE** into the holes covering about a square metre at a time. Wipe off the excess paint with a paper towel moistened in **NORGLASS EPOXY THINNERS** and continue the process until all of the holes have been filled. Alternatively, massage the Shipshape into the pinholes with your fingers inside a rubber glove.

6. Allow to cure overnight and wet sand the residue to a fine finish. If any pinholes still remain repeat stage 5 again. In some cases, this second application will be necessary due to shrinkage and/or missed areas.

IMPORTANT: Do not ignore stages 4-5 and 6 as the as the rectification after the finish coats have been applied can be very costly in time and extra paint.

UNDERCOATING
7. Mix up sufficient **SHIPSHAPE PRIMER UNDERCOAT** to cover the area at 10 square metres per mixed litre per coat. If spraying, multiple coats can be applied using a "wet on wet" technique. Brush and roller (short nap) applications must be left overnight to cure before repeating. Where more than 48 hours elapses before recoating a light sanding is **essential** to promote subsequent adhesion.
Note: All chemically cured products are solvent resistant and as such are resistant to themselves or other coatings… when left beyond their recoat period. The proposition of applying **SHIPSHAPE** is to act as a filling mechanism for the surface profile, **not to enhance adhesion.** For instance, if the overall condition of the surface is good, the finish coats of **NORTHANE** will adhere positively to the prepared gelcoat area. However, the **NORTHANE will mirror any defects** in the surface so the decision to paint or fill with **SHIPSHAPE,** must be made once the preparation stage is completed.

8. When the **SHIPSHAPE** has been applied and allowed to cure, the surface will be seen to have a semi-gloss finish. This is because **SHIPSHAPE** has an unusually high balance of resin to pigment ratio to **maximise adhesion**. This also has the benefit of providing a visible indicator for remaining surface defects that are to be sanded smooth before the final finishing coats are applied. After sanding down, any shiny spots showing represent "hollows:. Further sanding to eliminate them will result in a smooth surface. For a mirror finish fine sand to remove all traces of gloss using 400 grit wet and dry paper. Wash the entire area with **NORCLEAN-PLUS** before continuing.
Note: NORTHANE cannot be applied over a wet film of SHIPSHAPE, as they are incompatible in this condition. The SHIPSHAPE must be allowed to cure before continuing.

FINISHING WITH NORTHANE

9. Mix up sufficient **NORTHANE Gloss** to cover the area at a rate of 10 square metres per mixed litre, per coat. If spraying, multiple coats can be applied using a "wet on wet" technique. **Brush and roller (short nap) applications must be left overnight to cure before repainting**. Where more than 48 hours elapses before recoating, a **light sanding** is **essential** to provide adequate adhesion. If this is not done, the next coat of **NORTHANE** will not adhere satisfactorily to the previous one.
Applying NORTHANE in the open air is best done in the morning. All painting with NORTHANE should cease by midday to avoid being affected by dew. Where an early morning start is scheduled, the surface **has** to be covered up the night before to protect it from dew – contamination. A quick wipe down with **NORCLEAN-PLUS** is essential before starting to paint.

The use of yellows and oranges are notoriously difficult to obtain coverage when applied over a less than uniform background. Any patchy areas will still show through after several coats of NORTHANE or WEATHERFAST enamel. This is a problem with all yellow and orange lead free pigments regardless of manufacturer. The only solution is to make sure the background colour is completely uniform before painting i.e. uniformly white, grey, blue etc.

CURING PERIOD

NORTHANE like all other chemically cured polyurethanes will give a fast "set up" time. However, the finish will still be very susceptible to atmospheric moisture for some 6 hours after the final application. Therefore, it is essential that the coated area is adequately screened away from dew for **at least 8 hours after the job has been completed**. When applied in the open, **NORTHANE** should be left to obtain a dust free stage (usually 2 hours) then a tarpaulin or cover must be erected to protect **all surfaces that are less than vertical** otherwise the impinging moisture laden air will affect the gloss and turn the finish flat. For surfaces that are to be immersed in water, 72 hours should elapse before immersing. **Note: NORTHANE will appear to be cured the next day, but will still imprint up to 48 hours. Make sure that no pressure is applied to the surface until after that time. Remasking use fine line tape only.**

GENERAL INFORMATION

* Where **NORTHANE** is brushed and rolled it will "set up" very quickly. To avoid delays in application all areas should be suitably masked up to reduce the work time and to minimise the strokes required by brush or roller. **NORTHANE** should be applied (in these circumstances) as a full unadulterated coat with as few strokes as possible.

* Where dust or other deposits stick to the finished job, allow the coating to mature for 48 hours before carefully removing the imperfections. Use only a cutting compound such as toothpaste as any coarser abrading of the surface will reduce the gloss level **below** that of the rest of the job. No amount of polishing can restore the area to that of the original **NORTHANE** finish. If cutting and polishing is carried out a whole panel must be done otherwise the difference will be noticeable. Insects or odd bits of dust can be removed carefully with a razor blade instead of compounding.

* Where two or more colours of **NORTHANE** overlap each other use only fine line masking tape or allow 48 hours to elapse before using conventional masking tape, otherwise imprinting of the tape may result. **Note: NORTHANE surfaces must be handled carefully for the first 48 hours**.

* Brush or roller applications of **NORTHANE** do not present the same health hazards as for the sprayed finish (in well ventilated areas) and therefore only require normal good housekeeping techniques and sensible precautions being used. Observe all label instructions and wear protective clothing masks and goggles during the applications.

OSMOSIS – CAUSE AND CURE FOR MOORED VESSELS

CAUSE

By definition OSMOSIS is a permeation through a membrane. This is a natural phenomenon created by pressure trying to equalise the concentrations of two solutions through the membrane. In the case of fibreglass boats the cause begins at the time of manufacture. Glass fibre stacked or stored in an environment that does not have a humidity controlled facility runs the risk of transferring moisture contaminated strands into the moulded matrix. When these strands become encapsulated within the glass structure the moisture settles into convenient voids created by the random distribution of the mass. (See fig. 1.) To understand this process observe what happens when warm breath meets a cold glass mirror. As the condensed vapour mixes with residuals of the polyester it produces a pocket of concentrated solution.

At this stage Osmotic pressure is potentially created. Within the moulded matrix there are pockets of very concentrated **solutions whilst on the outside, the seawater (also a solution) is trying to equalise this force. Where these moisture "cells" are close to the outer surface or able to "wick" down glass strands to reach the gelcoat layers the reaction starts to take place. (See fig. 2). Because the concentration of the solution is greater within the hull, the direction of pressure is outwards into the seawater. When the pressure exceeds the containment by the membrane (gelcoat), the bubble bursts and equalises the force. (See fig. 3). At this point the reaction is over. However the seawater is now able to permeate the mass in the same "wicking" action and could theoretically find other "sites" for further osmosis cultivation. The potential for this is of minor concern and should be put into perspective. The Polyester resin crosslinking process is waterproof and structurally sound. This mass (surrounding the reinforcing fibres) ensures the integrity of the structure … In other words the "matrix" of resin and reinforcing cannot be compromised further. The waterproofing property and adhesion to the glass reinforcing fibres is not compromised and therefore does not represent a structural weakness. In a nutshell osmosis is a cosmetic condition in most cases.**

CURE

It is a waste of time, money and energy trying to build an impervious barrier against osmosis. Any “shield” layers of extra reinforcing’s, clear epoxies and the like, are normally a waste of money, because they do not take into account the practical day to day usage. Once this "shield” is broken or damaged the potential for osmosis reappears, immediately. The obvious answer is to provide a coating structure that does **not impede** the force of osmotic pressure but does act as a non-return valve. This means allowing the permeation of pressure vapour to pass through the membrane unimpeded but creating a barrier of resistance against the ingress of water. We call the product **SHIPSHAPE PRIMER-UNDERCOAT**. The coating that allows the surface to breathe.

REPAIR

Where osmosis blisters are detected the treatment should be as follows:

1. Chisel out any convex blisters with a cold chisel to produce a sound fibreglass matrix (usually 3mm minimum). Any dark acidic residue should be flushed clean using a clean cheap paint brush moistened with acetone. Whey **dry NORGLASS NORFILL** should be applied to repair the indentation, followed by **SHIPSHAPE PRIMER UNDERCOAT OR ANTI-FOULING**.

2. If the quantity of blisters appears considerable a thorough drying out process may be necessary prior to affecting the repair. After opening up and cleaning out the blisters, the remaining gelcoat should be sanded off and then the hull be placed on a concrete apron with some black plastic film attached by tape just above the waterline. This should run the full length (both sides) and be tied out at 45 degrees to create a “tent” effect, with both ends open to stimulate air movement. Periodic readings with a moisture meter will determine the rate of drying. In extreme cases this can take many weeks.
3. Fill each blister as described in 1. above. DO NOT apply **NORFILL** or any other product in an attempt to cover the whole area. By restricting the filler **to only the blisters**, any ongoing osmotic pressure will bypass the treated areas and dissipate through the **SHIPSHAPE**.
4. Sand all the filled blisters to a smooth finish and apply 2-3 coats of **SHIPSHAPE** followed by the selected anti-fouling.

