



## INFORMATION GUIDE

### REINFORCING PROCESS – NORSYSTEM – FIBREGLASS AND COMPOSITES

#### Description

DYNEL has been used for sheathing timber boats in Australia for more than 5 decades, with **total success**. The reason for this is quite simple. Unlike glass fibre, DYNEL is a soft absorbent fibre, similar in appearance to wool. It **absorbs** Epoxy resin, just like a sponge soaks up water. When used with NORGLASS NORSYSTEM EPOXIES it has a comparable flexural rate to that of timber. This swollen mass has a bonded strength marginally greater than the shear strength of the timber itself.

This perfect adhesion creates a sound and positive base for all paint systems. The DYNEL **reinforces** the Epoxy Resin, and the resin provides the **waterproofing**. As a bonus, this swollen mass also substantially and totally increases the abrasion resistance of the paint system, and protects the timber from exposure.

To sum up, DYNEL and NORGLASS NORSYSTEM EPOXY RESIN is a permanent, waterproof, flexible membrane, with positive adhesion, making it the premium base primer for external timbers. Excluding hull damage, **further maintenance will be restricted to undercoats and finish coats for the life of the craft or surface. The completed membrane system is 2 ½ times more abrasion resistant than fiberglass.**

**NOTE:** Sheathing with DYNEL and NORGLASS NORSYSTEM EPOXY RESIN should not be used on Carvel hulls unless the planks are glue splined to prevent **excessive** movement taking place. If doubt exists seek further advice.

#### Preparation (Stage 1)

Sheathing with Dynel and NORGLASS NORSYSTEM EPOXY RESIN does not provide a cure for covering major surface irregularities or holes. Therefore, to obtain the best results the timber must be clean, dry and well prepared. If the boat has been previously painted, remove as much of this as possible by sanding, sandblasting or paint remover. If traces of primer still exist in the grain of the timber, sheathing is still possible, providing that these areas are surrounded by predominantly clean timber. If 95% of the surface is clean timber, then 95% will have **maximum adhesion**. Where traces of paint still exist, these areas will have reduced adhesion, but still be quite satisfactory provided that the paint is well adhered. All holes, cracks, screw head depressions must be filled with NORFILL EPOXY FILLER, allowed to cure for 24 hours, and then sanded smooth before continuing.

At this stage it is advisable to inspect the whole area again, using a pencil to identify any places that may have been overlooked.

Any soft or suspect timber should be removed, replaced, and faired smooth with NORGLASS NORFLEX.

Where excessive timber movement is evident, due to loose fastenings or structural weakness, it is advisable to strengthen these areas **before** sheathing, because the Dynel/Epoxy membrane will not significantly add to the hull stiffness.

When all the fairing is completed, sand the entire area to be sheathed with a coarse grit sandpaper (60 - 80 grit) at an angle of approximately 30° to the grain. This will provide a profile for the best penetration of the Epoxy Resin. Avoid sanding parallel to the grain (especially with plywood's), as this tends to polish the surface and reduce penetration. Just prior to the Dynel application, moisten a clean cloth with NORGLASS EPOXY THINNERS and wipe over the entire surface. Change the cloth frequently to ensure that sanding dust and contaminants are not transferred from one spot to another.

#### Application

If the hull is upside down, drape the Dynel fabric fore and aft along the keel, allowing a 50 mm overhang on to the transom. Follow the line of the keel and stem, and cut off, allowing a 50mm selvage. This will give a covering along the hull bottom extending from the keel towards the chine. Cut additional tailored lengths of Dynel to complete the job and store these nearby.

Repeat this run on the opposite side of the keel allowing both runs of Dynel to butt or overlap by 5mm. Next, smooth out the Dynel by hand to remove excess wrinkles.

If the hull is right side up, fasten the DYNEL fabric to the gunwale, fore and aft, using drawing pins spaced every metre along the hull. Stretch the DYNEL down onto the hull and fasten with more drawing pins. Repeat on the other side. This will hold the fabric in place whilst wetting out takes place. At this stage the DYNEL is ready for wetting out with NORGLASS NORSYSTEM EPOXY RESIN.

#### Check List

Before commencing, ensure that the following items are on hand and ready for use:

- 1-2 clean plastic buckets
- 2 mixing sticks (marked RESIN)
- 2 mixing sticks (marked HARDENER)
- 2 mixing sticks (marked MIX)
- 1 pair sharp scissors
- 2 clean mixing tins of equal size. ie Baked Bean or Soup tins, marked Resin and Hardener respectively.
- Clean rags
- 2 cheap 50mm paint brushes (New or clean)
- 1 new Mohair paint roller and tray for each person applying the mixed resin.
- Tin of NORGLASS EPOXY CLEANING FLUID for equipment clean up – spillage etc.
- Rubber gloves

#### Commencing the Job (Stage 2)

1. Each person can comfortably wet out 2 square metres of Dynel in 15-20 minutes (and within the workable potlife of the mix) 1 square metre will require 500mls of mixed resin. Maximum mixture per person should not exceed 1½ litres as the potlife may prevent some residue from being used due to gelling in the paint tray. This time will vary according to temperature. To maximise the working time of any mix it is advisable to spread the volume into several paint trays. This product is exothermic which means, **the greater the mass/volume, the shorter** the working time will be due to the heat generated. Do not leave part of a mix in the tin as the same thing applies. Decant it into shallow trays. In hot weather every effort should be made to keep the unmixed resin and hardener in a cool place, and halve the recommended mixes.

2. Pour 3 parts of NORGLASS NORSYSTEM EPOXY BASE into a plastic bucket and allow to drain for 2 minutes. Add in 1 part NORGLASS NORSYSTEM EPOXY HARDENER and stir thoroughly until blended. Immediately pour the mix into 2 or more paint trays and commence rolling this mixture on top of the **dry Dynel fabric**. A mixed litre will cover 2 square metres of Dynel. If two persons are applying the resin double the mix can be made.

3. If the hull is upside down, start at the keel in the middle and work towards the chine. If one person only is doing the job, work to the right from the centre until the mix is used up, then start back in the middle and work to the **left** until that mix is used. This means that the bottom is progressively being covered from the centre to the bow, and the centre to the stern. As the completion of the run nears a calculation can be made as to how much surface area remains. i.e. 1½ square metres. Therefore the next mix would be 750mls. Now repeat the same process for the other side of the hull. When both runs are completed, take the next tailored run of Dynel and lay this on the wet resin edge so that both selvedged edges **butt together**. For neatness, it is better to butt the Dynel runs rather than overlap. The butted edge is equally as strong as (and as permanent) and will eliminate the need for extra sanding and fairing later. During the wetting out process a moderate amount of pressure is required on the roller to impregnate the fabric. Where some seams work apart from each other, it is possible (and recommended) to use a brush with a chiselling action to push both edges together. The wetted Dynel mass can easily be manipulated into shape by compressing or stretching as it has **NO tension or memory**. To illustrate more graphically, a wetted Dynel sheet can be applied to a ball shape in **one piece** without wrinkles simply by compressing and stretching the mass.

4. Work progressively from the keel out to the gunwales on both sides and then complete the transom. By the time this area is ready for treatment, the overhanging selvedge can be trimmed back to the timber with a sharp knife and both edges butted together.

#### Completing the Sheathing (Stage 3)

1. Sand down any overlap areas until level with the surrounding area. Next, lightly sand down the entire surface to remove the high spots of Dynel fluff and vacuum clean.

2. Mix up 750 ml of NORGLASS NORSYSTEM EPOXY BASE with 250ml of NORSYSTEM EPOXY HARDENER and stir thoroughly until blended. Pour this mix into a plastic bucket and add between 500g and 1kg of NORGLASS

MICROTALC. Stir well until blended and apply to the surface by spreading with a rubber squeegee. (Spread out the mass into a shallow paint tray to lengthen the working time.

**NOTE:** This mixture can be made as a sloppy slurry or to a stiff thick paste, or anywhere in between. The variation is for the ease of the operators handling technique. This volume of mix of 1 litre will cover approximately 4 square metres. Allow overnight to cure.

3. Sand down with an orbital sander using 220-280 grit paper. At this stage only minor surface imperfections should remain. Repeating 2 above may be necessary for some areas if the sanding and filling has been insufficient to produce the desired smoothness.

On clinker hulls it is advisable to cover the internal joints of each plank with NORGLASS NORFILL EPOXY FILLER prior to the laminating process. This may be applied with the back of a teaspoon (or finger), and smoothed out by wetting the teaspoon back with clean water. If care is taken with this application no sanding of the filler will be necessary. A small paint roller, the approximate width of the planks, should be used for the Dynel application, as well as a paint brush to stipple the resin into internal joints. Dynel cloth can be cut into strips by pulling through one complete strand and use scissors to cut along the void. If this is the selected method, sheathe alternate planks and allow to cure overnight. Trim off the excess with a chisel or sharp knife, and sheathe the remaining planks. Complete as previously described.

### Sheathing Plywood Decks

**Note:** Dynel sheathing is not recommended for planked decks unless all the seams are filled with Norfill first. Where a slip resistant surface is desired, complete stages one and two as previously described and apply 2-3 finish coats of Weatherfast Marine Deck Paint directly onto the **un-sanded Dynel surface**.

Where a combination of smooth and slip resistant surfaces are required, mask off the areas that are to remain textured and sand down the rest. Complete as in stage three, remove the masking tape, then paint.

**Note:** Do **not** apply undercoats to the areas that are to be textured, as this will reduce the profile.

**Important:** Do **not** use Polyester Resins with Dynel Fabric. Use only NORGLASS NORSYSTEM EPOXY RESIN Timbers, which have been pretreated with Metal Napthanates, resinous or gummy timbers, or those that have been saturated in diesel oil, may create a problem for sheathing. If in doubt try a small test area first, or contact NORGLASS for technical advice before proceeding. NORSYSTEM HARDENERS are available in slow and fast curing units to suit various conditions and have the same mixing ratios of 1:3 by volume.

### Finishing the Process (Stage 4)

For a **perfect finish** it must be understood that the ultra-high gloss finish produced by **Northane** (or other gloss paints) will **mirror any surface defects** left behind after undercoating. To eliminate these, consider the following comments carefully.

### Undercoating

Mix up and apply 2-3 coats of NORGLASS **Shipshape Primer Undercoat**, by brush, roller or spray. If spraying all of these coats they can be applied on the same day using a "Wet on Wet" technique. For brush/roller applications allow overnight curing before the next coat is applied.

### IMPORTANT

**Shipshape** is a specifically designed product to offer high-build characteristics and finishing advantages to the user that need explaining. **Shipshape** is constructed to provide a **resin-rich** film, rather than one which is overloaded with pigments, because in the final analysis it is **only the resin** that provides **adhesion** not pigment. The cured film will produce a satin surface which has **2** key benefits for the user. (1) With a satin finish it becomes immediately obvious where the surface imperfections are. (2) In the sand-back process any remaining shiny spots are going to be "**hollows**". By continuing the sanding process until **all** the shiny spots disappear it can be assumed that the surface is now blemish-free.

**NOTE:** If 2-3 (or more) coats of Shipshape are applied, a week should elapse **before** the final sanding takes place. This is due to the solvent component slowly migrating out of the paint film. If sanding is done **too soon** and the finish coats applied, some month or so later, some defects may become noticeable. This is because of the continued contraction of the previous layers through solvent loss working through the cured paint film.

### Finishing Coats

At this point **any** product can be selected. However it would seem logical to complete the project in the recommended **NORTHANE** for the following reasons.

So far, all the system has been based on Epoxies.

These have been used for their high strength, adhesion, flexibility and filling characteristics. Whilst all of these Epoxies are compatible, and form the foundation of an excellent protection system, they also have their limitations.

As finish paints, Epoxies have relatively poor resistance to Ultra Violet radiation and tend to chalk quite quickly. Therefore, to get the optimum result, NORTHANE is recommended. This product is the highest quality, 2 pack Polyurethane paint, with outstanding gloss, fade resistance, and weathering properties. To obtain the best finish on large surfaces, NORTHANE should be applied by spray. Brush and roller applications are suitable for smaller areas ie (Clinker hulls).

### Preparation

Remove all sanding dust and vacuum the area thoroughly.

Mask up the surface to be painted, regardless of whether a brush and roller, or spray is used. If the former method is selected, masking around edges and fittings will reduce the painting time, by eliminating the need to "cut in" with the brush.

### Brush and Roller Application

Mix 2 parts of NORTHANE BASE with 1 part by volume of NORTHANE HARDENER and stir well.

Calculate the volume of paint required, at 1 mixed litre for every 10 square metres of surface. Pour the mix into a clean paint tray and allow to stand for 10 minutes. Apply the paint with a new Mohair roller using a minimum of even strikes, to cover an area no greater than half a square metre.

Use a brush to lightly feather the paint out, by working back into the coating from the wet edge. Use feather-light, even strokes, to flatten out the texture created by the roller.

Continue with the roller, overlapping the wet edge, and repeat the flattening process with the brush.

**NOTE:** Use only a short nap Mohair sleeve, and a new 75mm good quality brush for this application. In warm weather, up to 5% NORTHANE BRUSHING THINNERS may be added to assist flow.

### Spray Application

Mix up sufficient NORTHANE for the area to be coated, and add up to approximately 33 1/3 NORTHANE SPRAYING THINNERS. Stir well and allow to stand for 10-15 minutes, then strain the NORTHANE mixture into the spray pot.

Bleed the airline to extract any moisture before spraying. Spraying pressures will vary according to applicator techniques and equipment, but as a guide 55-70 psi (380-480kPa) is within normal range at this thinning ratio.

Thinning adjustments will need to be made where different spraying pressure systems are used.

Apply a thin mist coat to the surface and allow to tack off for 15-20 minutes, (or until the overspray on the masking tape seems tacky.)

Then apply a full wet coat. Repeat the same procedure for additional coats. **NOTE:** Read all can instructions carefully before use.

Note: **Breathing of spraying vapour can be dangerous**, use appropriate breathing apparatus. Do not use if you have chronic (long term) lung or breathing problems. Provide adequate ventilation during application. Northane and Shipshape data sheets are available from our website [www.norglass.com.au](http://www.norglass.com.au) and should be read prior to use.

### Alternative Finish

If desired, WEATHERFAST PREMIUM ENAMEL can be substituted for NORTHANE over the shipshape as previously described. This finish has the advantage of being easier to apply by brush, and can be recoated with less preparation.

However, as this product does not require a Hardener, its use must be restricted to above waterline areas only (if the boat is to be left in the water for more than 48 hours at a time).

### Patching A Previously Dynelled Surface

Where accidental damage occurs, the area **can be refilled with NORFILL EPOXY FILLER**, sanded smooth and repainted. If the area of damage requires new timber, plane or feather back the surrounding Dynel and patch with more fabric as described in stages two or three. Dynel can be feathered back to nothing without fear of lifting, making a patched area as permanent as the rest of the hull.

Below waterline (where continuously immersed in salt water) apply Norglass Topflight Antifouling directly over the sanded shipshape stage.