Australian Made NORGLASS Specialty Finishes Australian Owned

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Jan 2023

INFORMATION GUIDE

TIMBER

Introduction

Due to the vast variety of timbers available and methods of treatment there is no simple universal coating system for this substrate. Grain densities, oil/sap/resin absorption values and so on will all play a part in dictating what type of treatment is best.
The selection of a protective system is also compounded by the elements the timber is subjected to. A cool damp environment can be equally as destructive on a paint system as a hot dry location in outback Australia – but for different reasons.
With modern changes in technology, came improvements to adhesive compounds (glues) and equipment to prepare timber better. The results were plywood, particle board, MDF, copper impregnated pine, and scores of other processes, all designed with different strengths, textures and characteristics.

PREPARATION OF TIMBER (GENERAL)

Sealing timber

The first consideration of any timber surface paint job, is to **stabilise** the moisture level within the Wood. Once sealed off, the surface will remain constant, enabling a cosmetic coating process to be truly effective. For example, painting a door without sealing the top and bottom edges will still allow the door to buckle and warp. In summer it opens freely, because the timber contracts with the evaporation of moisture and in winter takes in, moisture causing the door to swell and stick. This distortion also stresses the paint layers causing splits and cracking to occur, resulting in paint breakdown. This is normally evident at the bottom of the door where moisture is drawn up into the surface behind the paint (or clear) and causes swelling and product failure. The common belief, of not coating all sides of timber to allow it to "breathe" **is a myth**. The dimensional stability of wood that has been encapsulated completely by petrification is the classic illustration of preservation.

To achieve this state **NORSEAL EPOXY WOOD TREATMENT**, applied liberally to all bare timber surfaces will seal it off and prevent moisture ingress. **NORSEAL** is a "water-thin" epoxy solution designed to penetrate into the wood where it then cures gluing fibre to fibre, **below the surface.** If gluing or filling is required this process should be carried out **after** gluing and filling with **STAYBOND EPOXY GLUE** and **NORFILL EPOXY FILLER**. The reason for this is to ensure that the maximum bond strength of glue and filler, is to the wood **rather** than to a coating of **NORSEAL.** Any screws or other fastenings added **after** the **NORSEAL** application must be countersunk and filled with **NORFILL** or alternatively recoated with **NORSEAL**. Screwing through **NORSEAL** treated timber, and leaving the head exposed can allow moisture to track down the thread into **unsealed territory**.

Where a clear natural finish is desired consult "The good oil on clear coatings" information guide on the NORGLASS WEBSITE www.norglass.com.au

To maximise the lasting properties of a wooden paint system, the answer is to radius all internal corners with **NORFILL EPOXY FILLER** at the commencement stage. However it can also be done in a repair/repainting operation providing that 20mm each side of the internal corner is sanded back to show a predominance of bare wood. Once this area is coved out and painted, water cannot lay there and as a bonus both pieces of wood are strengthened by the gluing action of the **NORFILL** which in turn will prevent cracking of the paint layers - the major cause of paint deterioration.
If a clear finish is desired over **NORSEAL, Please note:** This is **only suitable** for areas that are screened away from direct sunlight because **NORSEAL** (and all clear epoxies) have poor U/V resistance and will degrade quickly beneath varnishes and clears. Once they begin to oxidise the clear coatings will crack and delaminate causing a total failure of the system. However if used internally or covered up **NORSEAL** does not require any further treatment. On internal panelling, clear polyurethanes or varnishes are suitable finishes over **NORSEAL.**

PRIMING AND UNDERCOATING (TIMBER)

The selection of a primer should be determined by the finish paint. For example if **NORTHANE** (2 pack polyurethane) is the desired finish because of its tough chemical and abrasion resistance, then **SHIPSHAPE PRIMER-UNDERCOAT** will be needed to prepare the surface. This product is balanced in favour of the **resins** rather than the pigments, making it suitable as **both** a primer **and** an undercoat. Because it is **chemically cured**, it will not be reactive to the strong solvents that are used in **NORTHANE,** whereas other air dried primers or undercoats would be. With **SHIPSHAPE** applied over the **NORSEAL,** the surface is now inert and **either single or 2 pack finishes** can be applied.
However, where a single pack finish is desired the alternative Primer-Undercoat to **SHIPSHAPE** is **PRi-COAT.** This paint, does the job of 2 products in one. It is suitable for all areas except those of continuous immersion and can be fine sanded to produce a smooth profile for **WEATHERFAST PREMIUM ENAMEL.** This breakthrough in development offers the same benefits for single pack paint systems as **SHIPSHAPE** does for chemically cured ones. PRi-COAT is off white in colour, and is low odour when used on interior surfaces. It has excellent filling characteristics and is fast drying.
Where filling of the grain is required it may be necessary to apply several coats of PRi-COAT. A light sanding between coats will help to reduce the high and low spots and the number of coats needed.

SELF LEVELLING

It is important to understand that **all** primers/undercoats are designed to seal and/or fill the surface profile. As such – they **do not** flow out to a self-levelling state like finish coats, and require more attention to detail. This means, if applied by brush or roller the surface profile will be exaggerated by the contour created by the bristles or roller nap, whereas spraying will give a more uniform layer. To end up with a smooth surface, it will require some sanding between all coats, to progressively reduce the profile.
The final sanding is best left for a few days to allow all of the paint layers to fully contract (shrink back). Because **all** paints (and clear coatings) have solvents in them to make them more mobile, it also takes some time for these solvents to migrate through the film. **The general rule:** The higher the solvent level, the greater the film shrinkage will be. Solvent evaporation relates directly to the products integrity – the more solvent used in the manufacture the weaker the product will be. Thinning for spray painting is an entirely different proposition, as the volatile nature and atomisation ensures most of the solvent evaporates **during** the process.

TO RECAP

Where filling **is** necessary to obliterate the timber grain several coats of **PRi-COAT** will need to be applied. If applied by brush or roller, a light sanding between coats will cut back the high spots and make for easier filling. If this is not done, the next coat builds on the high spots as well as the hollows, which means the contour or surface profile remains the same. This is not helped by the brush and roller marks which build on each other as the task progresses. Where the **PRi-COAT** is sprayed on, a more even distribution of paint will leave a less corrugated surface which translates into less sanding.

FINISH COATS

If **SHIPSHAPE PRIMER-UNDERCOAT** has been used as the foundation product then **either NORTHANE or WEATHERFAST PREMIUM ENAMEL** can be used.

However if **PRi-COAT** was selected, then the finish paint should be **WEATHERFAST PREMIUM ENAMEL** because the stronger solvents in **NORTHANE** can have a reactive effect on the **PRi-COAT.**

The choice of finish coats should be made with regard to the ultimate performance required. For example, **WEATHERFAST PREMIUM ENAMEL** is only water **resistant not waterproof.** If a concrete fish pond was to be painted, **NORTHANE** (over **SHIPSHAPE**) would be fine, but all single pack paints such as **WEATHERFAST PREMIUM ENAMEL** would fail. **NORTHANE** is not only a food safe coating for eating surfaces, but is a non-toxic product for fish ponds, cool rooms etc. and has excellent chemical resistance in shower rooms, laboratory surfaces and factories. It is also a superb coating where graffiti is a problem. Removal of the graffiti with caustics or solvents will not damage the **NORTHANE.**

WEATHERFAST PREMIUM ENAMEL is an uncomplicated, ready to use product with easy flow and high gloss characteristics. It is also low in odour and fast drying. Because of the **ultra-high** resin levels in **WEATHERFAST PREMIUM ENAMEL** the exterior durability is significantly enhanced. As the product eventually starts the oxidising process (powdering) a quick wipe over with some water and a proprietary cream cleanser will restore the initial high gloss.

This can be repeated again and again as the paint ages without loss of adhesion or integrity.

BOAT CONSTRUCTION (TIMBER)

The following information is aimed at the timber boat owner and embraces the use of the above products.

In boatbuilding there are 2 main types of timber used. Planks and plywood. Originally planks of wood were fastened to a skeleton of timber ribs held in place by long battens called "stringers". These were nailed on with copper nails (and later with screws). The cracks between the planks then had to be filled with something called oakum (a resin) and cotton (hemp) to create a tight seam. This form of boatbuilding was called carvel construction or more commonly referred to as a "planked hull".

The problems associated with carvel boats were many… If the planks dried out too much the vessel would take in water and could sink. If the nails worked loose, the plank movement then became exaggerated causing the paints to crack. When this happened, bare timber became exposed and became subject to attack from a salt water worm called Teredo. They enter a plank about pinhead size and once inside a plank a Teredo worm would devour the wood in a honeycombing fashion going up and down the full length of the plank and growing to the length of more than a metre and as thick as a man's thumb. At no stage would the worm break the outer surfaces until the plank finally collapsed. Many a vessel has gone to Davey Jones Locker through Teredo worm attack.

In more recent times planks of wood are still used but they are fastened together with waterproof glues and layered in different directions similar to plywood. This is called cold moulded construction.

The other popular boatbuilding medium is plywood, where thin veneers of timber are glued together at alternate 90 degrees until a "sandwich" of 3-5-7 or 9 layers are formed. The adhesive used to bond these layers is a waterproof material called Resorcinol Formaldehyde. When finished, plywood is a very tough material (weight for weight as strong as steel). However, the Achilles heel of plywood is the end grain. (See Norseal information on stopping the rot in timber.) If left exposed, the inner alternate layers create a "wicking" environment for moisture intake (just the same way a tree sucks up water). Once the moisture laden interior is warmed up and reaches a threshold of 25% moisture content the ever-present mould spores become active and devour the woods cellulose to create the condition commonly called "Dry Rot". At that point the strength of the plywood is compromised and has to be cut out and replaced. However if the end grain is **totally sealed off** with a waterproof coating in the beginning, plywood is a very durable substrate.

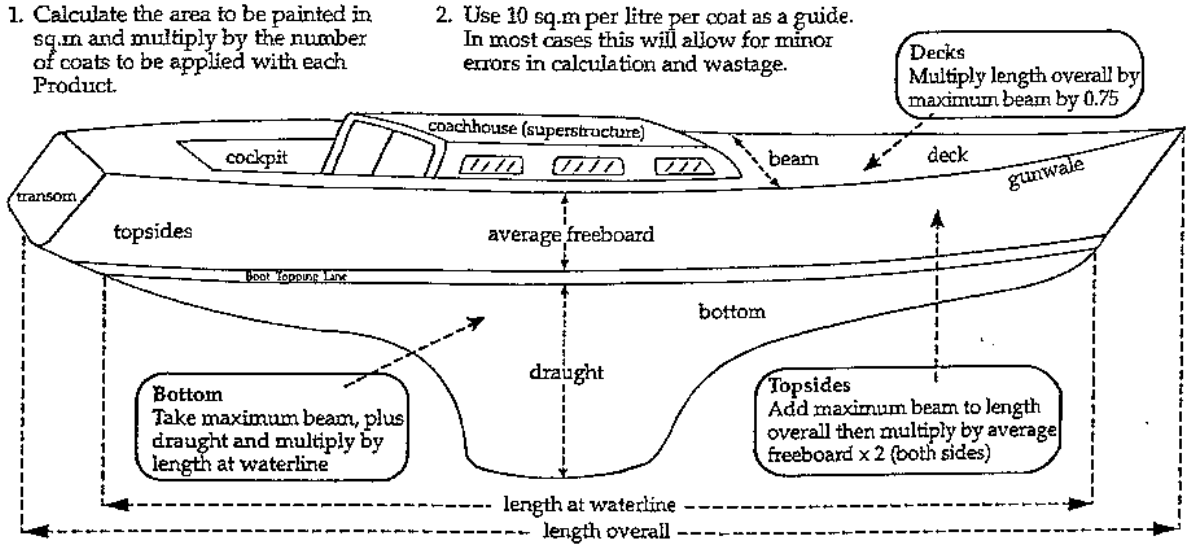
Externally the exposed plywood consists of only a couple of millimetres before a waterproof glue line is encountered. By definition "Marine Ply" means that the outer layers of the timber have a 100% covering of the waterproof glue so that any moisture cannot penetrate into the inner cores from the face. Theoretically this should safeguard the timber from breakdown but with insufficient attention to the end grain the whole surface becomes vulnerable, as is the case when screws are driven into the ply. Water can track down the thread into the unprotected core.
The commonly held idea of fibre glassing over ply with polyester resin and glass has had disastrous consequences for the boating industry. By adding a rigid reinforced polyester membrane to the 2mm timber veneer the resulting failure is a foregone conclusion. The, shear strength of the reinforced matrix is always going to be **significantly greater** than that of the timber. This means that as tension/stress forces are applied, the timber must separate from the rigid layer, shedding the whole reinforcing.

Alternatively, other reinforcing systems based on more flexible epoxy resins and glass cloth (as opposed to chopped matt) can provide a more harmonious relationship and be less inclined to failure. However care and research into the structural suitability is most important because the shear strength of the epoxy/glass membrane is always going to be greater than the wood. The optimum reinforcement for wood is DYNEL cloth and Norglass NORSYSTEM Epoxy Resin. (See Dynel & Epoxy reinforcing Information Guide).

ESTIMATING PAINT QUANTITIES (Power or sail)

To establish volumes use the following formulae:

1. Calculate the area to be painted in sq.m and multiply by the number of coats to be applied with each Product.
2. Use 10 sq.m per litre per coat as a guide. In most cases this will allow for minor errors in calculation and wastage.



USEFUL METRIC CONVERSIONS

Conversion Factors (Approximate)

	Imperial to Metric Units	Metric Unit
LENGTH	1 in=25.4mm	millimetre (mm)
	1 ft=30.5cm	centimetre (cm)
	1 yd=0.914m	metre (m)
	1 fur=201m	metre (m)
	1 mile=1.61km	kilometre (km)
int nautical mile	1 n mile=1852m	metre (m)
MASS	1 oz=28.3g	gram (g)
	1 lb=454g	gram (g)
	1 stone=6.35kg	kilogram (kg)
	ton=1.02t	tonne (t)

	Imperial to Metric Units	Metric Unit
AREA	1 in²=6.45cm²	square centimetre (cm²)
	1 ft²=929cm²	square centimetre (cm²)
	1 yd²=0.836m²	square metre (m²)
	1 p=25.3m²	square metre (m²)
	1 rd=0.101ha	hectare (ha)
	1 ac=0.405ha	hectare (ha)
	1 square mile=2.59 km²	square kilometre (km²)

	Imperial to Metric Units	Metric Unit
VOLUME	1 in³=16.4cm³	cubic centimetre (cm³)
	1 ft³=0.0283m³	cubic metre (m³)
	1 yd³=0.765m³	cubic metre (m³)
	1 bus=0.0364m³	cubic metre (m³)
VOLUME (fluids)	1 fl oz=28.4ml	millilitre (ml)
	1 pt=568ml	millilitre (ml)
	1 gal=4.55 litre	litre (l)

For more information on our products and “How to” guides visit our website at: www.norglass.com.au