

Finishes for Exterior Timber **2**

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Introduction

All timber, (irrespective of species, durability classification, or whether it is preservative treated or not) will undergo changes when exposed to the sun and rain. Ultraviolet light and changes in moisture will cause timber to "weather". It will lose its natural colour and fade to a silver/grey, its surface will become rough, and splits and cracks could develop.

Weathering primarily affects the appearance of timber, however in the long term could affect durability and performance.

Varying degrees of protection from weathering may be provided by the application of coatings such as paints, water repellents, water repellent preservatives and pigmented penetrating stains.

This data sheet describes the various finishing products available and the degree of protection they provide.

Note:

Preservatives used to increase durability (protection from decay and/or insects) do not permanently prevent timber from weathering.

Weathering Protection

The application and regular maintenance of coatings will reduce weathering.

Proper finishing also helps external timber fulfill its designed function.

To protect from rapid moisture content changes, finishes form a barrier between the weather and the timber, reducing water absorption on wetting, and slowing moisture loss on drying.

To protect from UV light, finishes generally should contain a pigment (light colours preferred). The pigment reflects or absorbs the UV light, and shields the timber.

Types of Finishes

Many protective finishes are commercially available. They range from clear water repellent resins and penetrating oils, through stains, to full paint systems. There are major differences between them in their appearance, cost, ease of application, ease of maintenance, degree of protection offered and frequency of re-application.

When choosing a finish it is generally a matter of deciding on an appropriate balance between maximum service life (frequency of maintenance) and maximum 'naturalness' in its appearance.

The following will help with that choice:-

Paints

Maximum protection from the effect of the environment is provided by the traditional paint systems which form surface films. Thousand of old Queensland homes with timber cladding in perfect condition after one hundred years service stand in testimony to the protective qualities of paint films.

The disadvantages of paints are that they obscure the timber colour and grain, and they require surface preparation prior to re-coating.

Paint systems give the longest interval between re-coats. Up to ten years can be expected from top quality systems.

NOTE:

Poor quality paint systems (dark colours, no primer to end grain and joints, cheap paints etc.) can actually accelerate degrade.

Dark colours absorb more solar radiation than light colours, and can deteriorate the finish and the timber faster in service. White pigments reflect the maximum amount of ultraviolet light possible, and provide the best protection to both the timber and paint film.

Solvent borne (alkyd or oil) finishes are more resistant to water vapour than water borne (acrylic) finishes. Where a high level of protection is required, a finish system with a solvent borne primer and/or undercoat should be selected.

Acrylic (water based) paints have been vastly improved in recent years and now offer service lives comparable with alkyd resin (oil or solvent based) paints. They are somewhat easier to apply but their softer films tend to retain more dirt than alkyd (solvent based) paints, and thus harbour more mould growth.

Clear Finishes

Being transparent to light, clear finishes allow the full beauty of the timber to be seen, but where exposed to sunlight they also allow UV damage, with consequent fading and surface roughening.

Water repellent preservatives (WRP) are useful in temporarily protecting certain timber species which have marginal durability for exterior use. They contain water repellent resins and waxes which penetrate about 1-2 mm into the wood to form a water barrier. They may also contain a wood preservative fungicide such as copper naphthenate, zinc naphthenate or other type, and/or an insecticide such as permethrin. While this barrier is intact, the timber is protected from rapid moisture content changes. However, the resins and waxes are degraded by atmospheric oxidation (accelerated by the action of sunlight), and usually are effective for periods of six to 18 months, depending on the degree of weather exposure. Re-application however is a simple procedure, involving a minimum of surface preparation.

Most clear film type finishes (varnishes, clear polyurethanes, epoxies etc.) generally give insufficient service life to recommend them for external use. However, water based and solvent (oil) based clear finishes, with UV absorber additives are available, which can provide good protection as long as they are regularly re-applied and maintained.

Stains

An attractive natural appearance may be achieved using penetrating stains. They allow the grain and texture of the timber to be seen, and are available in a wide range of colours to match or change the original colour of the timber species in use (as with paints, pale colours preferred).

Stains contain dyes or pigments which minimise the effects of UV light. They offer greater protection and a longer maintenance interval than clear finishes, providing they also contain some water repellent compounds. Both water based and solvent based stain formulations are available. Water based stains are generally cheaper, but do not penetrate as well as those based on light oil or organic solvents.

Penetrating stains which do not build up a surface film are easy to maintain. When they lose their effectiveness (after about two to four years, depending on exposure), a simple washing of the surface is all that is necessary before re-application.

Substrate

Timber species and timber based products have different characteristics which could influence the choice of finish. The following should be considered:-

- **density** - higher density species (e.g. most hardwoods) are less prone to absorb moisture and solvents and therefore film coatings (paints) are generally best, lower density species (e.g. softwoods) readily absorb stains.
- **texture** - fine, smooth grains and textures are best for paints, and course grains best for penetrating stains.
- **seasoning** - seasoned timber is best for paint finishes.
- **dressed timber** - painting is best on dressed timber.
- **unseasoned sawn timber** - stains perform well.
- **weathered timber** - staining is preferable on weathered and worn surfaces. (Surfaces to be brushed clean) Painting will require substantial surface preparation such as filling and sanding.

Application of Finishes

The manufacturers' recommendations with respect to surface preparation, sealing, priming, number of coats, spreading rates, frequency between coats, weather conditions at time of application etc. should be followed to achieve maximum life and performance. The following table shows typical applications.

Finishing System	Cladding*		Decking*		Joinery		Framing	
	Hardwood & Cypress	Softwood	Hardwood & Cypress	Softwood	Hardwood & Cypress	Softwood	Hardwood & Cypress	Softwood
Primer + Undercoat + minimum 2 coats solvent borne or water borne paint	•	•	•	•	•	•	•	•
Primer + minimum 2 coats water borne paint (solid stain)	•	•	•	•	•	•	•	•
WRP + 2 coats solvent borne or water borne semi transparent stain	•	•	•	•	•	•	•	•
Minimum 2 coats solvent borne or water borne semi-transparent stain	•	•	-	-	-	-	•	•
Minimum 3 coats clear exterior finish**	•	•	-	-	•	•	-	-

NOTES: *Refer to other Technical Data Sheets for more detailed finishing recommendations for decking, cladding etc. **Will require frequent re-application.

Primers provide protection to the substrate and a good base for adhesion of subsequent coats. Primers can also incorporate fungicides. Primers should be applied by brush, as this technique gives better surface wetting and penetration into grain, joints and corners. External timber products such as fascia, cladding, joinery and mouldings may be factory primed. This provides protection from weather and contamination during transport, site storage and construction. Unprimed timber products should be primed all round before installation (i.e. on all surfaces whether exposed or hidden from view) preferably as soon as they reach site. Re-priming is required after any cutting or handling which removes primer or exposes end-grain. Any primed work that has deteriorated through exposure should be cleaned down and re-primed.

Undercoats may be required to provide a bridge between primer and top coats. They are designed to bridge cracks, and ensure easy application of finishing coats. As they are opaque they obscure the background colour of the substrate and primer. Solvent and water borne undercoats are available. Undercoats should match the colour of finish coats on unseasoned cladding.

Finishing coats are available in both solvent and water borne forms. Water borne finishes have the added advantages of rapid clean-up and faster drying and re-coating times. Finishing coats are available in gloss, semi-gloss/satin and flat/matt or low sheen formulations. Undercoats and finish coats may be applied by brush, roller or airless spray system.

Surface Preparation

The surface should be free of loose material before painting or staining. All dust, sawdust, grease and surface deposits of preservative should be removed.

Sharp edges should be rounded before painting. Paint tends to pull back from sharp edges, leaving a thin film which will soon fail.

Timber should be reasonably dry before painting. Blistering will occur if excess moisture is trapped behind a cured paint film.

Before painting CCA-treated timber, ensure that the timber has had sufficient time to allow the water from the treatment solution to dry out. (A few weeks is usually sufficient) If any CCA deposits (a green to white powder) are on the timber surfaces, these should be removed before painting by scrubbing under a hose.

Before painting LOSP-treated timber, allow sufficient time for the light organic solvent to evaporate. (A week is usually sufficient) LOSP treated timber must have a solvent based primer, prior to either solvent or water based finishing coats.

Holes, depressions, mechanical damage and natural imperfections should be repaired by scraping clean or cutting out, priming and filling with putties which are compatible with the selected finish system.

End grain of all timber should be carefully sealed. Sealants should be applied to joints in cladding and joinery to prevent moisture entry. Knots in hoop pine and cypress should be sealed (e.g. with two pack polyurethane) to prevent knot bleeding.

Maintenance

All finish systems require regular maintenance to provide protection for the timber substrate. Mould and mildew should be removed before re-coating as it may spread between coats and even result in lifting of film or stain. Finish performance should be monitored to detect deterioration. Early detection and re-application will often reduce the need for surface preparation such as stripping and sanding.

Safe Working

Working with timber produces dust particles. Protection of the eyes, nose and mouth when sanding, sawing and planing is highly recommended. Refer to tool manufacturers for safe working recommendations for particular items of equipment.



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