NelsonPine
Laminated Veneer Lumber LVL

STAIN & PAINT SYSTEM GUIDELINES

Nelson Marlborough Institute of Technology NMIT (Resene Aquaclear)

NPIL/JULY 2014

Introduction

This brochure has been prepared by Nelson Pine Industries Ltd as a guide to on site painting and staining systems for NelsonPine Laminated Veneer Lumber (LVL). This guide endeavours to cover a comprehensive range of finishes, with information sourced from leading paint manufacturers, as well as outlining surface preparation and application methods. More information can be obtained from the specific manufacturers listed below:

Dulux – www.dulux.co.nz

Mirotone – www.mirotone.com

Churton Pacific – www.churton.co.nz

WoodX – www.wood-x.co.nz

Resene – www.resene.co.nz

Sikkens – www.sikkens.com

Protective Paints – www.protectivepaints.co.nz

Wattyl – www.wattyl.co.nz

NelsonPine LVL material properties

NelsonPine LVL is an engineered wood product made by laminating rotary peeled radiata pine veneers laid up with parallel grain orientation using dark brown phenolic resin. The veneers are positioned in a specific sequence that improves the performance of the raw material and allows continuous long length beams to be produced. One of the improvements with laminated radiata pine is enhanced stability and homogeneous material properties in the radial (R), tangential (T) and longitudinal (L) axis. The main application of LVL is residential framing, commercial beam, joist and columns as a structural member. The product is produced to an industrial finish, similar to a D grade plywood face.

Visual appearance

NelsonPine LVL is made from a natural product. The veneers are proprietary graded according to structural properties to achieve the correct structural performance, whilst simultaneously grading the best visual quality sheets from the mix to apply to the surfaces of the product to enhance the appearance.

The surface of laminated veneer lumber may contain the following characteristics:

- Knots
- Holes
- Small amount of wane of size similar to knots and holes
- Splits
- Resin streaks
- Glue smears
- Brands/Stamps/Marks associated with production and quality control

Nelson Pine Industries grading and production process is set up to minimise the occurrence of the above characteristics on the faces of the product.

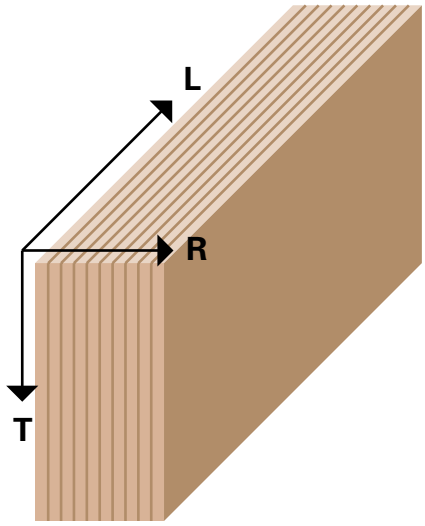
NelsonPine LVL may be re-laminated into larger structural components. In this process the LVL billets surfaces will be sanded to ensure the quality and consistency of the secondary bonds.

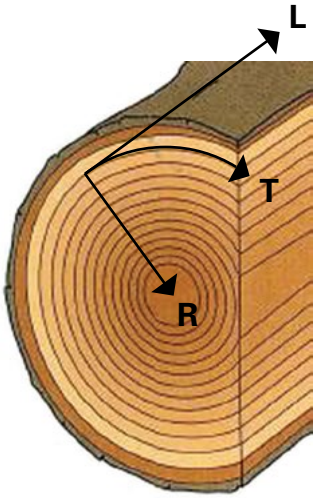
LVL dimensional axis

L - *Longitudinal*

T - *Tangential*

R - *Radial*





Surface Preparation

NelsonPine LVL billets in standard thicknesses come with an industrial type finish that can have normal timber paint and stain systems satisfactorily applied to them. Enhancement of the visual appearance and coating adhesion can be achieved by relatively coarse sanding the surface prior to the first coat. The edges and ends of both hot pressed and re-laminated LVL will have a fine saw cut or milled finish. Ensuring that any sharp timber edges are sanded to at least a 2mm radius will help paint systems resist cracking along the edges.

LVL must be dry (10-17% moisture content) and all grease, wax, dirt and foreign matter should be removed from the surface prior to coatings either mechanically or with an appropriate chemical cleaner from a coatings supplier.

Stopping/filler,

Stopping to fill holes, cracks and remedial work can be carried out with an appropriate filler. Sand smooth prior to application of the finish coats. When painting, stopping is done after first coat priming.

Application methods

The application system is to be applied as advised by the Manufacturer.

LVL Temporary Water Repellency and Industrial Finishes

Suitable one coat temporary water repellency products

Manufacturer	Product	Application	Coats	Clean up
Resene	Weathershield	Brush/Roller	1 or 2	Turpentine
Protective Paints	Rimu Oil Seal	Brush/Roller	1 or 2	Turpentine

Moisture during construction

On site procedures to minimise exposure to the elements will benefit the final finish of LVL and help the construction process. NelsonPine LVL will typically leave the manufacturing facility at 10-12% moisture content which is similar to the ambient moisture content in an air-conditioned building. If NelsonPine LVL is exposed to water it will swell mainly in the radial axis and the tangential axis (similar to standard sawn timber) which may cause issues with construction and there may be visual weathering, such as silvering and water staining.

To assist with these onsite temporary construction issues LVL may be coated prior to construction with a one coat temporary water proof clear coating to help resist weathering degradation. This type of temporary coating is also a suitable final finish for industrial applications. Should a permanent paint or stain system be required on product with a temporary coating then advice should be sought from the coating supplier to ensure the top coats are compatible.

Special attention needs to be paid to exposed cut ends of NelsonPine LVL e.g. the top or bottom of columns. During construction the exposed LVL should have additional protection (such as plastic wrapping or a flexible coating like acrylic paint) to protect NelsonPine LVL from water ingress.

Nelson Pine Industries warehouse. (two coats weathershield)

Tumu ITM Napier. (one coat weathershield)

Interior Systems

Sanded LVL finish on face

Uncoated LVL

In interior environments NelsonPine LVL can be left uncoated. It may be sanded to enhance its visual appearance and remove manufacturing marks such as glue stains, branding and dye marks. If the product is exposed to the UV from the sun it may break down parts of the wood cells, weakening and discolouring (yellowing) the surface fibres.

Natural oils

Product		Application	Coats	Clean up
Protective Paints	Murray Oil Seal	Brush/Roller	1 or 2	Turpentine
Dulux	Cabot's Oil	Brush/Roller	1 or 2	Turpentine
Resene	Danska Teak Oil	Brush/Roller	1 or 2	Turpentine
Mirotone	Finishing Oil	Brush/Roller	1 or 2	Turpentine
Wattyl	Estapol Tungoil	Brush/Roller	1 or 2	Turpentine

Modern natural vegetable oil can provide a deeper glow and bring out the natural colours of timber. Modern vegetable oils (derived from plants such as linseed) can act as feed stock for mould. Natural oils perform best when they are kept dry therefore not allowing fungi and mould to grow on the LVL surface. These oils will be broken down by oxidation and UV exposure and need to be reapplied periodically to maintain their finish.

Penetrating stains and clears

Manufacturer	First Coat/Primer	Second Coat	Third Coat	Application
Dulux	Intergrain UltraClear Interior Satin	UltraClear Interior Satin	UltraClear Interior Satin	Commercial general purpose – walls, ceilings etc
Dulux	Intergrain UltraFloor Satin	UltraFloor Satin	UltraFloor Satin	Hardwearing for floors, stairs and high traffic
Resene	Maxi Proof	Maxi Proof	Maxi Proof	Hardwearing for floors, stairs and high traffic
Resene	Colorwood	Aquaclear	Aquaclear	Commercial general purpose – walls, ceilings etc
Resene	Colorwood	Uracryl	Uracryl	Commercial general purpose – walls, ceilings etc – solvent based
Mirotone	Mirostain	Aqua Pro WB DURAPOL	Aqua Pro WB DURAPOL	Hardwearing for floors, stairs and high traffic
Protective Paints	935 NGR Stain	777 Portco Polyurethane	777 Portco Polyurethane	Hardwearing for floors, stairs and high traffic
Wattyl	Colourwood Pigmented Stain	Instant Estapol	Instant Estapol	Commercial general purpose – walls, ceilings etc
Wattyl	Colourwood Dye Stain	Estapol Speed Clear	Estapol Speed Clear	Commercial general purpose – walls, ceilings etc

The stains outlined in the table are interior timber stains that must be over coated to protect the timber. The pigmented stains have better light fastness but give a muddier appearance than the dye stains. Any area exposed to direct sunlight, even through a window, should only have a pigmented stain applied if a stained finish is desired.

Clear coatings for timber and are available in water based or solvent based formulations. Please consult with your chosen manufacturer for more specific recommendations.

Polyurethanes

Polyurethanes are suitable for clear coating timber and are available in water or solvent based formulations. Solvent based Polyurethanes can provide a tougher more durable resistant surface due to their chemical cross linking they can also yellow faster than acrylic based alternatives. Both systems will flake and bubble if exposed to long periods of UV light making maintenance harder.

Swimming pool environments

For interior swimming pool environments it is recommended to apply three coats of a solvent based polyurethane or water borne enamel paint system. Equilibrium moisture content in an interior swimming pool environment is generally controlled by air conditioning or alternatively by good ventilation design.

Interior paint systems

Manufacturer	First Coat/Primer	Second Coat	Third Coat	Application
Dulux	1 step - Acrylic Primer	Wash & Wear	Wash & Wear	Commercial general purpose – walls, ceilings etc
Resene	Quick Dry Undercoat	Enamacryl	Enamacryl	Commercial general purpose – walls, ceilings etc
Mirotone	Mirotec WB	Mirotec WB	Mirotec WB	Commercial general purpose – walls, ceilings etc
Protective Paints	A102 Duralon Acrylic	Imperlon Water Based Enamel	Imperlon Water Based Enamel	Commercial general purpose – walls, ceilings etc
Wattyl	Interior Design Acrylic Sealer Undercoat	Interior Design	Interior Design	Commercial general purpose – walls, ceilings etc

Common acrylic timber paint three coat systems are suitable to paint NelsonPine LVL and provide good quality protection for moisture, UV, mould and general wear and tear. It is common practice to specify lighter colours which attract less heat than darker colours. This minimises the amount of substrate movement due to temperature variation within the substrate which may cause higher stresses in the paint coatings. Sharp edges should be removed from timber to reduce the paint film from pulling back during application and the specified film build needs to be applied to ensure that the completed paint film can flex.

Mirostain / Mirothane Clear Brown Oak

Resene Qristal Clear True Blood

Mirotone Mirotec WB

Exterior Systems

The longevity of exterior stain and paint coat systems is influenced by the condition and stability of the substrate that the coating is applied to. The moisture content of NelsonPine LVL at the time of construction and during the life of the structure is the most critical factor affecting the coating performance. The life span of the coating system will be enhanced by paying special attention to surface preparation of the substrate ensuring a good initial coating-to-substrate bond. Due to paints providing a solid opaque film they provide better protection from the elements than a stain or clear finish.

Film forming stains can exhibit flaking and bubbling of their film in external environments due to UV degradation, which can be time consuming to prepare and recoat successfully for maintenance. Please consult with your manufacturer if you are considering a film forming stain.

Exterior oils

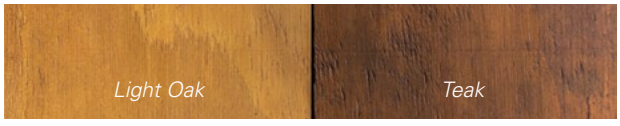
Manufacturer	First Coat	Second Coat	Third Coat	Application
Dulux	Intergrain Nature's Timber Oil	Intergrain Nature's Timber Oil	Intergrain Nature's Timber Oil	Exterior above ground exposed timber
Wood X	Wood X	Wood X		Exterior above ground exposed timber
Drydens	Drydens Wood Oil	Drydens Wood oil		Exterior above ground exposed timber
Churton Pacific	CD 50	CD 50		Exterior above ground exposed timber

Exterior mineral oils penetrate into the timber cell structure and provide good moisture resistance helping to make NelsonPine LVL more dimensionally stable. The oils may have fungicides to resist mould growth. Generally an exposed oil finish will be required to be recoated every 6-12 months to maintain a bright timber finish.

Exterior penetrating stains

Manufacturer	First Coat/Primer	Second Coat	Third Coat	Application
Dulux	Intergrain Natural Stain	Intergrain Natural Stain	Intergrain Natural Stain	Natural look finish
Dulux	Intergrain UltraDeck	Intergrain UltraDeck	Intergrain UltraDeck	Exterior decking
Resene	Woodsman	Woodsman	Woodsman (optional)	Natural look finish
Sikkens Cetol	HLSe	Filter 7 plus	Filter 7 plus	Natural look finish
Protective Paints	A072 Original Oil Satin	A072 Original Oil Satin	A072 Original Oil Satin	Natural look finish
Protective Paints	300 Durawood Aquawood	300 Durawood Aquawood	300 Durawood Aquawood	Natural look finish
Wattyl	Aquatech Oil Satin	Aquatech Oil Satin	Aquatech Oil Satin	Natural look finish

Penetrating stains are a natural looking way to develop semi transparent coatings. The oils penetrate into the outer layer of timber and the pigments offer some protection from UV light. Additionally the stains contain fungicides to help offer resistance to moulds and in some cases also contain waxes to offer additional water repellency. There is a big difference in the durability of penetrating stains when applied to unsanded or sanded LVL. Sanded LVL has had its cells cut and exposed by sanding therefore absorbing more stain and offering a longer life.



Dulux Intergrain Natural Stain

Exterior paint systems

Manufacturer	First Coat/Primer	Second Coat	Third Coat	Application
Dulux	1 Step Acrylic Primer	Weathershield X10	Weathershield X10	Exterior above ground exposed timber
Resene	Quick Dry Primer	Enamacryl	Enamacryl	Exterior above ground exposed timber
Protective Paints	Duragard Acrylic House Paint	Duragard Acrylic House Paint	Duragard Acrylic House Paint	Exterior above ground exposed timber
Wattyl	Solagard	Solagard	Solagard	Exterior above ground exposed timber

Common acrylic timber paint three coat systems are suitable to paint NelsonPine LVL and provide good quality protection for moisture, UV, mould and general wear and tear.

It is good practice to specify lighter colours, preferably with an LRV greater than 40%, which attract less heat than darker colours. This minimises the amount of substrate movement due to temperature variation within the substrate which would cause stresses in the paint film.

Ensure that any sharp timber edges are sanded to at least a 2mm radius to help paint systems resist cracking along the edges.

Specified film build need to be applied to ensure that the completed paint film reaches the advertised durability.

Typically a good quality paint system outside will last 7-15 years or longer on sheltered faces, depending on the colour applied. Modern acrylics are flexible and can cope with small amounts of movement in the LVL substrate through moisture and temperature variations.

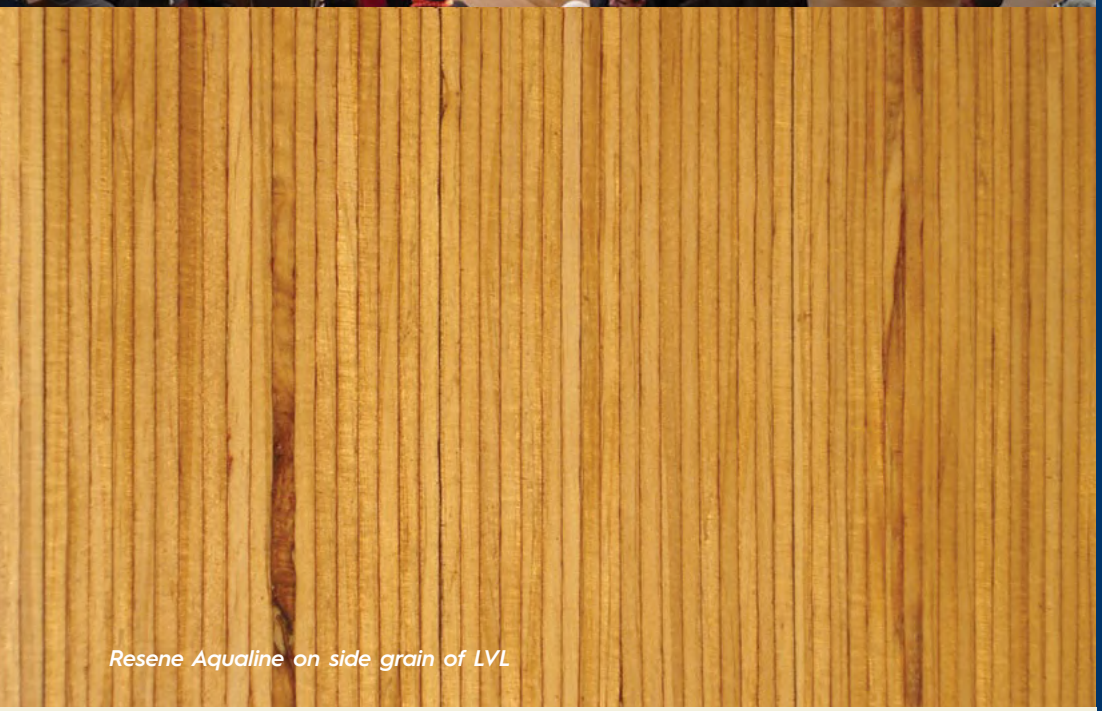
Modern paint systems also contain in film biocides that help increase the life span of paint systems.

College of Creative Arts (CoCA), Wellington (maintained two coats of Drydens wood oil for exterior exposure),

CoCA (one coat of Drydens wood oil for interior exposure).

NelsonPine®
Laminated Veneer Lumber LVL

Waitomo Visitors Centre (three coats Drydens Wood Oil)



Resene Aqualine on side grain of LVL

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PRODUCT CERTIFIED
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Plantation Grown. All veneers used in the manufacture of NelsonPine LVL are peeled from sustainable plantation grown Pinus Radiata logs.

PLANTATION GROWN • RENEWABLE RESOURCE •

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