

# the futurebuild® range

## DESIGNING FOR DURABILITY AND MOISTURE



Information contained in this document is specific to the CHH Woodproducts range of Laminated Veneer Lumber (LVL) products and cannot be used with any other LVL products no matter how similar they appear.

For further information contact customer services.

0800 326 759  
[www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz)



CHH Woodproducts Futurebuild® range of Laminated Veneer Lumber ('LVL') products are manufactured and branded to the joint Australian and New Zealand Standard AS/NZS 4357. This document details considerations in developing fit for purpose durable structural solutions.

### DURABILITY

The durability of Futurebuild® LVL products relies on a number of factors including the wood fibre and the adhesive bond as well as external factors such as building design, ventilation, moisture exposure and insect attack.

### Adhesive Bond

The adhesive bond in Futurebuild LVL has a durability level in excess of 50 years in the levels of exposure which are described within this document.

Futurebuild LVL uses a Type A bond as required for structural LVL products by AS/NZS 4357. This bond is made with a phenolic adhesive that is distinctively dark in colour. The bond is tested by regular sampling in the factory under a third party quality assurance programme carried out by the Engineered Wood Products Association of Australasia ('EWPA'). Tests have been proven to simulate over 50 years of actual exterior exposure without glueline breakdown.

### WOOD FIBRE

The wood fibre used in Futurebuild LVL is Radiata Pine. The wood fibre may be untreated or treated to either H3.1 or H1.2 treatment level. The treated range of CHH Woodproducts Futurebuild LVL products are either treated to:

- H1.2 level applied as a glueline additive to each glueline followed by a surface treatment with Triadimefon and cyproconazole, or:
- H3.1 using an LOSP process with Tebuconazole and Propiconazole (azoles) as the active ingredients.

Note: Preservatives and their solvents can sometimes interfere with coatings or the adhesives used with coverings. Always consult with the relevant coating or finishing manufacturer to ensure compatibility with treated materials.



## VENTILATION AND MOISTURE DESIGN CONSIDERATIONS

Good ventilation and the avoidance of moisture are important design considerations for a wood product applications, including LVL. The durability of LVL can be affected in applications where the temperature may be above 50°C for prolonged time periods, or if the LVL is used in poorly ventilated spaces that can develop very high temperatures and moisture levels. For roof ceiling applications using LVL, CHH Woodproducts recommends a minimum vent area of 1/300<sup>th</sup> of the ceiling plan area (approx 3350 mm<sup>2</sup> per square metre of ceiling) equally distributed at the eaves and ridge.

## INSECTS

If kept dry, untreated Radiata Pine LVL will have structural durability in excess of 50 years at normal in-service interior temperatures. The term “dry” with respect to decay hazards means an environment where the equilibrium moisture content of wood in service is permanently below 18%. In such a dry environment, the likelihood of attack from the common household borer will be at an acceptably low level.

The likelihood of insect attack in Radiata pine depends on dampness and possible sources of infection. For most interior applications, a dry environment means that untreated Radiata pine LVL may be used.

Termite attack must be controlled by detailing and building maintenance. This minimises the risk of attack to building contents as well as structural elements. Termites are not normally a problem for buildings in New Zealand.

H2 glueline treatment is available for Futurebuild LVL destined for at risk parts of Australia, south of the Tropic of Capricorn.

Insect attack can also be controlled by fumigation treatment of the environment, or by treatment of the Futurebuild® LVL. If there is likelihood of dampness and an obvious source of infection, it is recommended treated product is used.

## CONSTRUCTION CONSIDERATIONS – MOISTURE

### *Rain during Construction:*

Where appearance is critical, Futurebuild LVL and its fastenings must be protected from moisture both during construction and in service. If it is not possible to fully protect the LVL during construction then some surface remedial work may be required in order to remove water stains and construction damage.

Where appearance is not critical, untreated Futurebuild LVL can withstand some rain wetting during construction or occasional wetting in service without significant structural degradation, however water staining and mould growth is possible. Wood must return to the dry condition (below 15% moisture content is considered dry for structural purposes) before installation with moisture sensitive materials, to avoid moisture problems with other building elements such as wall linings, floor coverings coatings or adhesives.

Wide members may require judicious dampening to recover straightness and flatness. Wide members may also change width or depth significantly in response to moisture, and attachments and coverings should be detailed for movement to avoid cracks in the building envelope that allow ingress of moisture.



The building contractor must liaise with the structural engineer for the project to determine the propping requirements that may or may not be required. These requirements will be dependent on the design philosophy adopted by the engineer around managing the creep deflections associated with moisture.

CHH Woodproducts recommends the application of a construction sealer (or similar) to all primary members during fabrication to limit moisture uptake during construction.

#### **DESIGN CONSIDERATIONS – MOISTURE**

##### ***Rain during Construction:***

Where it is not possible to keep the LVL dry during construction then the appropriate creep factors  $k_2$  specified in NZS 3603 Table 2.5 should be used in the design of the members.

Note – LVL is considered to be dry for structural purposes at a moisture content of 15% or less. Alternatively the structural engineer may opt to prop the LVL sections until such time as the moisture content returns to below 15%.

##### **Permanently Damp Conditions in Relation to Structural Considerations:**

Where the moisture content will be permanently above 15%, the appropriate moisture modification factor  $k_{14}$  specified in NZS 3603 Figure 6.1 should be applied for ultimate limit state design, in addition to the creep factor  $k_2$  mentioned above.

##### **Dampness in Relation to a Decay Hazard:**

In some applications where there is a possibility of condensation or solar driven moisture, with the effect that the moisture content of the LVL could be 18 % or more, untreated LVL can become infected with decay fungi. In these applications LVL should be treated. Occasional wetting of untreated LVL can be tolerated without degradation of structural properties, but treatment can provide long term assurance.

The key to the durability of LVL is good ventilation and the avoidance of moisture.

#### **INTERNAL APPLICATION USE**

##### **Residential Construction**

The use and specification of LVL in Residential applications should be completed to the requirements of the New Zealand Building Code Clause B2 Durability. B2 provides Acceptable Solutions for treatment levels of LVL including the use of untreated LVL, H1.2 glueline and surface spray treated LVL, and H3.1 Azole LOSP treated LVL options.

LVL can be applied untreated in situations where it is protected from weather (with no risk of moisture penetration conducive to decay) such as mid floors, and sub floors, as identified in Sections C and E of Table 1 of NZS 3602.

With regard to treated LVL, citing of NZS 3604:2011 in NZBC Clause B2/AS1 dictates that if LVL is not specifically addressed in NZS 3602 the LVL can be preservative treated to the same level as that required for kiln dried Radiata Pine.



Clause B2/AS1 allows for treatment to be to either a H1.2 or H3.1 LOSP Azole level to cater for this. This includes situations covered by NZS 3602 Table 1 Section D, “Members protected from the weather but with a risk of moisture penetration conducive to decay” for example enclosed external framing situations including lintels, studs, and boundary joists

Two Acceptable Solution options exist specifically for treated LVL in Clause B2/AS1:

1. H3.1 Azole LOSP treatment satisfying the minimum requirement of H1.2, or
2. H1.2 glueline treated with a surface spray as per NZS 3640.

#### **Commercial Construction**

When used inside the cladding envelope of commercial construction the preservative treatment for Futurebuild® LVL shall comply with NZS 3602 “Timber and Wood-based Products for use in Building”.

The applications listed in NZS 3602 generally describe building components that are commonly used in residential housing, which may be applicable for some types of commercial construction, but not all.

For timber-based building components not listed in NZS 3602, CHH Woodproducts recommends the following for non-residential commercial building applications:

- Untreated LVL for Futurebuild LVL building components that are open to the interior space of the building where good ventilation exists, and where the moisture content of the Futurebuild LVL will be below 15%.

Typical applications where Futurebuild LVL may be suitable for use include rafters, beams, columns, portal frames, purlins, girts, exposed to the interior of the building, i.e. permanently visible to the interior.

- Treated LVL for Futurebuild LVL building components that are built integrally to the cladding envelope of a building and are not permanently visible.

Treated Futurebuild LVL is supplied by CHH Woodproducts in both H1.2 glueline treatment and H3.1 LOSP treatment. Typical applications include rafters, beams, columns, portal frames, purlins, girts, not exposed to the interior of the building, i.e. hidden behind internal linings (including acoustic or fire linings) and not visible to the interior of a building and/ or unable to be easily inspected for signs of cladding failure and moisture ingress.

#### **EXTERNAL APPLICATION USE**

***CHH Woodproducts does not recommend the use of Futurebuild LVL products without “protection” from the weather. Refer to Figure 1 below for what “protected” means.***

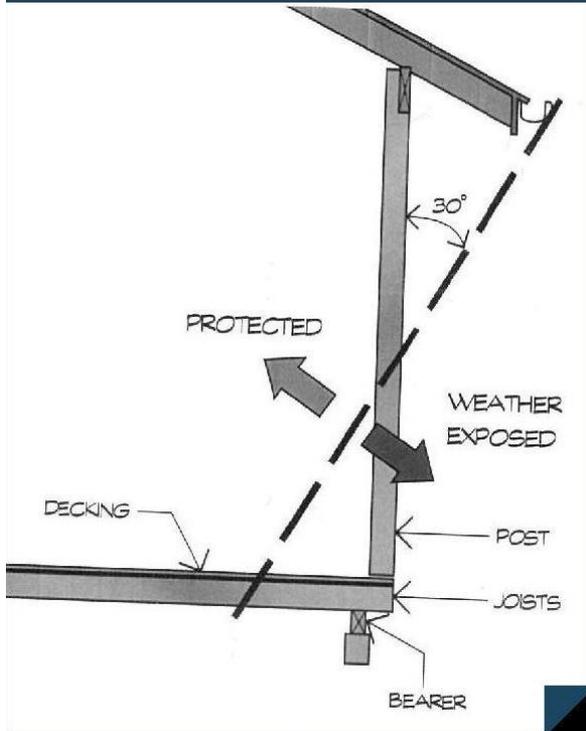
#### **Occasional Surface Wetting in a “Protected” Environment**

Futurebuild LVL (both treated and untreated product options) in a “protected” external environment can achieve a 50 year durability, however if left uncoated or uncovered may have a risk of mould growth. CHH Woodproducts recommends that Futurebuild LVL is covered and/or painted and maintained.



For ends or parts of Futurebuild LVL members that fall outside the protected exterior 30 degree line (see Figure 1), flashings or cladding must be utilised. Typical applications include structural elements protected from direct sun and rain, but subjected to occasional ground or atmosphere moisture such as subfloor beams, veranda beams, eaves beams, and beams over well-ventilated areas with high moisture levels (such as swimming pools).

Figure 1: Futurebuild LVL "Protected" from weather (not directly exposed to rain or sun)



The effects of exterior exposure can be minimised by the use of coatings, preservative treatment, and surface texture and detailing. Uncoated members will discolour over time and will support mould growth. Untreated, H1.2 glueline treated or H3.1 LOSP Azole treated Radiata pine with properly applied and maintained light coloured flexible acrylic paint system should last 50 years in "protected" exterior exposure (see Figure 1). Do not use dark colours. Preservative treatment can only protect the wood from decay or insect attack. It cannot prevent mechanical wear or degradation by sun and rain.

Designers can minimise potential durability problems by careful detailing to avoid moisture and dirt or dust traps on the wood surface. Trim should be bevelled to shed moisture, and flashings should be detailed with gaps that do not trap water on the Futurebuild LVL.

#### Soil

Futurebuild LVL (untreated or treated) must not be allowed to come in contact with soil, and surfaces should be detailed to avoid the risk of trapping detritus and moisture.

#### Limitations

*The information contained in this document is current as at March 2015 and is based on data available to CHH Woodproducts at the time of going to print.*

*CHH Woodproducts reserves the right to change the information contained in this document without prior notice. It is important that you visit [www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz) or call 0800 808 131 to confirm that you have the most up to date information available.*

*CHH Woodproducts has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document and, to the extent permitted by law, will not be liable for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.*