XLAM™

Australia & New Zealand Product Guide

Table of Contents

Use of this Guide

Thank you for choosing to design with mass timber. XLam manufacture Cross Laminated Timber (CLT) from one hundred percent natural and renewable radiata pine. Each lamella and panel is unique. Even with great care by XLam, slight deviations in grain pattern, knot location and colour will occur. By choosing to design in mass timber you are embracing the natural beauty of a renewable building material, its perfection is in its natural imperfection.

The information in this guide is based on testing methodology and certification owned by XLam. The information is provided for use in the design and specification of XLam manufactured Cross Laminated Timber (CLT) only. The guide is not intended as general information and guidance for all manufactured Cross Laminate Timber (CLT). The guide and information is specific to XLam CLT and no warranty is given to the suitability and application of the information to other manufacturers CLT.

Product Guide Description

The XLam Product Guide outlines what customers and contractors should expect from XLam CLT.

1. Project Timeline and Scope

During the lead up to XLam receiving a signed order, all correspondence with XLam will be through the respective XLam Business Development team member. The XLam Business Development team member is the key point of contact, ensuring you have a single point of contact throughout the sales process.

Upon receipt of a signed quote a XLam Construction team member will be appointed to oversee the project. The Construction team member will review and agree supply dates with the client and then issue a delivery programme that clearly identifies the key milestones required to meet the agreed manufacture date. As a general guide XLam lead time from signed quotation and receiving frozen architectural and structural drawings including penetrations to XLam on site is 12 weeks ± 2 weeks. This period allows for the Shop Drawing and review and approval process duration, the manufacture duration and the logistics to site duration. Naturally this duration can vary depending on the size, complexity and/or location of the site which is why we agree a delivery programme and key milestones on a project-by-project basis.

XLam must receive reasonable notice of any changes to the scope of work or construction programme which may affect agreed supply dates. Changes will be accommodated subject to availability of space in the manufacturing schedule, and may move the manufacture date out considerably more than the initially requested delivery date. Therefore it is important to ensure complete and timely information is supplied at all times.

2. Design and Construction Tolerances

Building designers must be cognisant of practical connection details including tolerances required in the assembly and fixing of large and heavy construction components. Although XLam panels are relatively easy to remediate on site, impractical connections or tight-fitting joints can make for problems and delays in assembly. Construction detailing and tolerances should allow XLam panels to drop cleanly into position.

3. Surface Layer Board Cupping and Shrinkage

Weather exposure of the XLam panels during construction can be expected to result in cupping of the exposed layer boards and opening at the board joints, particularly on floors. Gaps and steps at panel points may be more pronounced. This is of no structural consequence; however, sanding will be necessary before floor coverings are laid. Lap screws should be driven below the surface to accommodate floor sanding. Tile and vinyl type floor and roof finishes will require a plywood or cement sheet sub-base to be laid over XLam panels.

4. Planar Variations

XLam panels are in true plane when loaded at the factory, and provided they are properly stored and protected on site, should be so at the time of assembly. Any minor bowing can be pulled out during installation.

Bowing out of plane may become more pronounced if a panel is exposed to differential climate conditions (sun or moisture) on opposite sides. Heat transfer and moisture resistance should as far as practicable be equal on both sides. If panel faces receive excessive heat or moisture, they will need to be equalised and brought to "normal" in a controlled manner. Occasionally it may be necessary to install some packing at the wall battens for lining and/or cladding. Best practice is to protect panels from sun and rain and close the building in as quickly as possible.

5. Appearance of XLam CLT Panels

XLam CLT Panel Appearance Specification

This specification forms part of XLam's quality assurance framework and provides a description of the surface appearance of XLam's Cross Laminated Timber (CLT) panels.

XLam CLT is manufactured with 100% natural and renewable radiata pine from plantations in NSW and VIC. Timber is a natural and unique material, with CLT being no different. Each lamella and every manufactured panel will have natural deviations in grain pattern, knot density, size, colour and all-round natural imperfections.

XLam CLT panels can be supplied with the outer surfaces having either an Industrial (IND) or Natural (NAT) Appearance Grade. Natural Appearance Grade can apply to one or both sides of a panel with some limitations, this should be noted in the Architectural Drawings, Specification and finial approved production drawings. Natural Appearance Grade panels will require onsite sanding and application of a finishing coating. A detailed specification of XLam CLT panel appearance grades is outlined in the quality description table.

Some of the definitions in this specification are subjective and may lead to differing interpretations on what constitutes an acceptable finish. Reference samples demonstrating surface finishes are available upon request or larger panels may be viewed by request at our manufacturing sites.

Knots and imperfections will show as part of the XLam CLT panel natural character. Repairs to these imperfections such as patches, plugs and timber fillers will be evident on Natural Appearance Grade panels even after sanding. Glued finger joints are generally unobtrusive but may be more readily discernible where there are variations in grain, colour or fingering of adjacent boards. Timber fillers may be used for repairs. The colour of the filler in relation to the colour of the timber may change if left unsealed/finished for an extended period of time or left exposed to sunlight and/or excessive moisture.

Boards within a panel will be the same width, except at the panel edges where the board width will usually vary due to panel cutting. Board joints on opposite faces of a panel will not be aligned. There will be some minor and variable gapping between surface boards. When viewed in oblique light conditions, boards may show slight surface cupping due to atmospheric exposure. Timber treatment will impart a change of colour to the natural wood. Panel edges will show end grain and there will be some gaps between edges of internal boards, which may require filling.

Appearance Quality Description

	Natural Appearance Grade (NAT)	Industrial Appearance Grade (IND)
Intended Use	Where one or both faces are left exposed and will be visible	Where both faces are covered by another material and will not be visible
Requirements	Panels will need to be sanded on site Panels will need to have a finishing coating applied on site Care will need to be taken in site handling including temporary supports	Covering will need to be applied on site Coverings should not be applied until moisture level is below 18% and further exposure to moisture will not occur
Overall	Imperfections & defects greater than 10mm Ø repaired through wood patches or timber filler	No visual requirements
Limitations	Unavoidable defects due to manufacturing & handling processes may be present on two sided panels such as chain and forklift marks. These will require on site sanding Glue squeeze may be present, loose glue will be removed but sanding on site may be required If coating/finish is not applied in timely manner and or exposure to sunlight, excessive moisture occurs, colour variations between repairs & the rest of the panel may occur	Unavoidable defects due to manufacturing & handling processes may be present on two sided panels such as chain and forklift marks Glue squeeze may be present, loose glue will be removed
Surface Finish Ex-factory	Planed	Planed
Wood Species	Radiata Pine	Radiata Pine
Gap Width Ex-factory	Up to a maximum of 2mm	Up to a maximum of 2mm
Knots Tightly Inter-grown	≤ 45 mm Ø allowed	Allowed no restrictions
Knots Black	≤ 45 mm Ø allowed	Allowed no restrictions
Loose Knots	≤10mm Ø allowed unrepaired 45-10 mm Ø repaired with timber filler or timber plugs ≥ 45 mm Ø board replacement	≤45 mm Ø allowed unrepaired ≥ 45 mm Ø repaired with timber filler or timber plugs
Knot Holes	≤10mm Ø allowed unrepaired 45-10 mm Ø repaired with timber filler or timber plugs ≥ 45 mm Ø board replacement	≤45 mm Ø allowed unrepaired ≥ 45 mm Ø repaired with timber filler or timber plugs
Pitch Pockets	Permitted up to 5mm x 70mm (or the equivalent in mm2) Over 5mm x 70mm repaired with timber filler or timber plugs	Permitted No repairs required
Bark Pockets	Not Permitted	Permitted No repairs required

Piths	Permitted Repaired with timber filler	Permitted No repairs required
Wane	Board replacement	**Permitted in these circumstances** • Under 5mm deep & less than 20% board width with no repair • Over 5mm depth • + 20-50% width repaired with timber filler • Over 50% board replaced
Blue Stain	Slight Discolouration Permitted (≤ 5%)	Permitted
Black Mould	Not Permitted	Not Permitted
Insect Infestations	Not Permitted	Not Permitted
Soft Rot	Not Permitted	Not Permitted
Saw & Machining Snipe	Not Permitted	Not Permitted
Patches	Permitted	Permitted
Moisture Content Ex-Factory	Maximum 12% ± 3%	Maximum 12% ± 3%
Board Thicknesses	Outer Boards 30mm to 45mm in accordance with corresponding structural design requirements	Outer Boards 30mm to 45mm in accordance with corresponding structural design requirements
Board Widths	Outer Boards 85mm to ± 5mm in accordance with corresponding structural design requirements	Outer Boards 85mm to ± 5mm in accordance with corresponding structural design requirements
Type Of Cutting	No Restrictions	No Restrictions
Scope Of Application	For standard XLam CLT panels the natural appearance grade quality description only applies to the outer layer(s). The appearance quality of the end grain or CNC machined surface(s) cannot be specified. For stairs the natural appearance grade quality description will apply to all surfaces which will be visible	
Sanded Surfaces	The outer layer's may be sanded perpendicular to grain direction	
Crack Formation	XLam CLT is a natural solid wood product. Over time the appearance can change. These changes may include the formation of small cracks and/or fissures as a result in a change in moisture content. These changes are product and project specific and cannot be avoided.	

Cross Laminated Timber (CLT) is a monolithic primary structural building material. If the appearance and/or aesthetic quality is not acceptable as the finished surface the only alternative is to apply a selected overlay on site where the overlay species, finish, board width and gap alignment between elements can be controlled as part of a joinery package as opposed to part of a carpentry package.

6. Installation Plan

Construction efficiencies are dependent on a well-planned assembly sequence and methodology, to be agreed with XLam in advance of manufacture. The overall build programme should be planned to keep weather exposure of the panels as short as possible. Continuity of work should be maintained until the building is closed in. Any departure from the pre-agreed installation plan may have adverse impacts on the construction progress.

7. Lifting System for Panels

Panels come with pre-drilled holes threaded with slings for hooking to the crane. The slings are inspected by XLam before dispatch and should be disposed of after installation. Consult with XLam on the use of alternative proprietary lifting systems for specific appearance applications.

8. Propping and Fixing Panels

Panels must be screwed down and together immediately after placing. Where internal supporting walls are to be installed later, long floor panels will require temporary propping. Consult with the engineer over temporary propping requirements.

9. Effect of Weather on Durability and Structure

When exposed to rain and ponding water, XLam panels absorb moisture. In normal circumstances, the moisture will dry out once the building is closed in, with no adverse effect on durability, structural integrity or overall panel dimensions.

Until closed in, assembled walls should be covered at the top against water uptake. The site application of flashing tape on exposed opening edges is recommended.

Panel edges, including openings are factory-coated with a water repellent to inhibit moisture absorption through end grain. Where panels are expected to be exposed to weather for more than 4 weeks, XLam recommends that panel surfaces be re-coated on site with an end grain sealer which can be expected to inhibit water penetration for up to 3 months. For Natural Appearance Grade panels, first check the compatibility with finishing coats.

10. Protection of XLam Natural Appearance Grade Panels

Natural Appearance Grade panels require vigilance in surface and edge protection during transport, storage and construction.

On request, surfaces can be given a factory-applied temporary sealer coat. Panel and opening edges must be site-sealed against moisture penetration. Panel joints to walls and floors should be taped as soon as possible to prevent water ingress into end grain and reduce/eliminate seepage to lower levels. Water wicking into end grain will stain Natural Appearance Grade surfaces. Keep the bottom edges of wall panels clear of ponding water on floors and other horizontal surfaces. Sweep away surface water and accumulating construction debris which can absorb moisture. Any contact with metal will show surface staining. Sacrificial timber or plastic separators should be fitted between timber and temporary metal fixtures to prevent staining. Where practicable, propping should be from the industrial panel face.

Natural Appearance Grade surfaces should be continuously protected from rain and UV with a light coloured markings-free wrap, secured with plastic or stainless-steel staples through plastic washers. Hand-held staple guns should be used. Avoid using hammer tackers which can easily dint the panel on impact.

Be aware that despite all care in surface protection, Natural Appearance Grade surfaces are unlikely to survive the construction process completely free of adverse impacts and will require some remediation.

11. Preparation for Natural Appearance Grade Finishes

Plug lifting holes immediately, before any UV-related colour difference can develop. Match the grain using wood plugs supplied by XLam. Minor defects can be filled if required. A dark coloured filler is less obtrusive because it blends with Natural Appearance Grade knots in the panels. Larger defects can be machined out and a patch inserted.

Natural Appearance Grade panels will need to be sanded prior to the application of finishes.

12. Suitability of XLam Floors for Clear Finishes

The relative softness of radiata pine, effects of weather exposure and impact of construction activity make it challenging to achieve a satisfactory clear finished XLam floor. Clear finishing will require special care to be taken and an acceptance of imperfections, wear in use, and variable opening of board and panel joints as inherent architectural character. Screw fixings will be obvious unless counterbored and plugged. Note that temporary protection layers may entrap moisture and promote fungal staining of the wood. In general, XLam recommends sanding floor panels on completion and applying an overlaid flooring product.

13. Timber Treatment

XLam manufactures both fully untreated and treated Cross Laminated Timber (CLT). The timber treatment - Hyne T3 Plus is suitable for indoor, outdoor and above ground applications in domestic and commercial buildings in Australia and New Zealand.

XLam radiata pine feedstock is pressure impregnated treated with Hyne Timber T3 Plus which is a Low Odour H3 Treated No VOC Product. Hyne T3 Plus is a termite and fungal resistant timber treatment. Volatile Organic Compounds (VOC) free, the treatment is suitable for use in outdoor furniture, playground equipment, public projects and other human contact applications where CCA treated timber is restricted. Hyne T3 Plus is Kop-Coat Timbertreat™ produced under license which is CodeMark™ certified, making it fit-for-purpose and conforming with the performance requirements of the National Construction Code (NCC) Building Code of Australia and the New Zealand Building Code (NZBC) of New Zealand. Hyne T3 Plus is Declare Red List Free.

The classification of the substance or mixture is non-hazardous according to Australia and New Zealand Environmental Protection Authority criteria. Hyne Timber T3 Plus working solution consists of trace amounts of Borates, Propiconazole, Tebuconazole and Permethrin.

Relevant Technical Data

Hyne T3 Plus/Timbertreat™ timber products are Alternative Solutions and consist of timber that has been stress graded to AS/NZS 1748:2011 Timber Mechanically Stress Graded for Structural Purposes with properties determined using AS/NZS 4063.1:2010 Characterisation of structural timber and verified to NZS 3622:2004 Verification of timber properties.

In Australia when installed in accordance with industry norms it will meet the requirements of the NCC Building Code of Australia and relevant standards and codes, see CodeMark certificate CM40200.

In New Zealand when installed in accordance with industry norms it will meet the requirements of NZBC Clause B1 Structure as referenced in the Certification of Conformity, see CodeMark certificate CM70119.

The T3 Plus/Timbertreat™ product, when supplied to the end user, is a preservative treated structural timber. The SDS demonstrates that the product is safe to handle and does not give off gas, liquid, radiation or solid particles that are harmful if exposure or inhalation occurs.

The T3 Plus/Timbertreat™ product is an Alternative Solution and therefore outside NZS 3640:2003 Chemical Treatment of Round and Sawn Timber; as “Timbertreat” treatment is outside this standard, hazard classes must not be used.

CodeMark certificates are available on the XLam website and by request.

14. Warranty and Durability

Warranty

1. Unless otherwise specified in the Quotation, XLam warrants the Products manufactured by XLam (“Warranted Products”) against faulty materials or workmanship for a period of 12 months from the date of delivery of the Products to the Customer (“Warranty”).

2. The Customer shall inspect the Warranted Products as soon as is reasonably practicable following delivery of the Warranted Products.

3. Any claim by the Customer that the Warranted Products do not conform with the Warranty (or such warranty as otherwise specified in the Quotation) shall be made promptly upon discovery of the alleged fault and, in any event, within the Warranty period specified in clause 1 (or such warranty period as otherwise specified in the Quotation). No warranty claim by the Customer will be considered or allowed unless it is made in accordance with this clause 3.

4. On receipt of a warranty claim from the Customer in accordance with clause 3, the Customer shall give XLam a reasonable opportunity to inspect any Warranted Products the Customer considers to be faulty.

5. If XLam accepts that a Warranted Product is faulty following receipt of a warranty claim from the Customer in accordance with clause 3, XLam may, at its sole discretion, elect to:

a. repair or replace the Warranted Product; or
b. refund the price of the Warranted Product to the Customer.

6. Any express warranty given by XLam to the Customer in writing which applies to a Product, applies only where the Product has been used in accordance with accepted building practices and any other written instructions or guidelines provided by XLam before or at the time of delivery, including without limitation the instructions set out at clause 7.

7. No express warranty given by XLam to the Customer in writing will apply to any Product that is not used or stored in an appropriate manner. In particular, the Customer acknowledges that:

a. the Product must not be dropped at any time or loaded to more than 70% of its design load prior to the adhesive reaching full cure and strength;
b. the Product must be stored at least 300mm above ground;
c. wrappings to protect the Product from moisture or direct sunlight during storage shall be kept in place until the last practicable opportunity before the Product is incorporated in a structure providing adequate weather protection, and wrappings opened or removed for inspection on delivery shall be re-secured immediately;
d. where Products are supplied with a temporary protection sealer the Customer shall ensure that exposure to weather does not exceed the limits imposed by the specifications of the sealer;
e. where Products which have been treated with a timber preservative as part of the manufacturing specification are cut, drilled or checked on site, the freshly cut timber must immediately be re-treated with a preservative appropriate to the hazard class followed by re-coating with a temporary protection sealer if appropriate in the circumstances.

Durability

All CLT elements are treated as primary building structure requiring a 50 year durability life required by the National Construction Code (NCC) Building Code of Australia and the New Zealand Building Code (NZBC) of New Zealand.

XLam CLT comprises layers of wood planks laid in alternating directions and face-glued together under pressure to form structural building panels. The materials used are Australian grown radiata pine and Purbond one-component polyurethane glue.

XLam have a Quality Assurance framework in place covering management and staff training, health and safety, AS/NZ standards, raw materials, durability, plank processing and finger jointing, quality testing, panel machining and finishing and site protection and installation aspects of production.

Disclaimer

This Product Guide provides general information on the use, preparation and attributes of XLam's CLT panel and is not intended to be used for certification purposes. The information provided in this document is supplied in good faith and to the best of our knowledge was correct at the time of preparation. No responsibility can be accepted by XLam, its staff or its agents for any errors or omissions. Users are advised to make their own determination as to the suitability of this information in relation to their particular purposes and specific circumstances. No warranty or assurance can be given that XLam CLT panels will suit individual projects. XLam disclaims all liability and responsibility for any loss or damage, direct or indirect, which may be suffered by any person acting in reliance on anything contained in, or omitted from, this Product Guide.

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