XLAM

XLam CLT Cross Laminated Timber

Sustainable, Efficient, Safe.

xlam.com.au

XLam works closely with clients and project partners to deliver inspiring and functional buildings using XLam CLT as a safe, efficient and sustainable building material.

COVER IMAGE:
CLT PANELS IN THE XLAM FACTORY.

Contents

CLT PANEL INSTALLATION

XLam CLT is Sustainable, Efficient & Safe.

Using XLam CLT increases construction and site efficiency, reduces capital and construction costs, enhances site safety, and improves project R.O.I.

XLam Cross Laminated Timber (CLT) panels are structural timber panels made with layers of finger jointed Radiata Pine lamellas arranged at right angles to one another, laminated together with a moisture cured polyurethane glue applied to the face under pressure.

The 90-degree cross lamination of alternate layers provides dimensional stability, strength, and rigidity.

CARBON SEQUESTRATION

The timber used in building, is effectively locking up the carbon it has previously stored through its growth.

RENEWABLE

XLam CLT timber feedstock is sourced locally from renewable and vertically integrated production.

LOW EMBODIED ENERGY

The lowest amount of energy consumption compared to any other building product.

DFMA, EFFICIENCY & ROI

Our experience in DfMA and rapid construction improves financial performance and project ROI.

SITE SAFETY

Less processes performed on site improves site safety.

ALL HALLOWS SCHOOL, QLD, AUSTRALIA
Architect: Fulton Trotter, Photographer: Scott Burrows

Applications

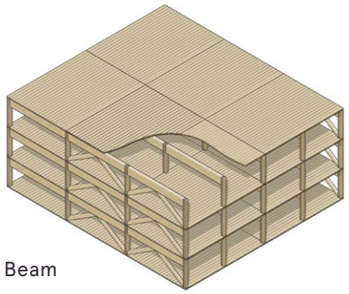
XLam CLT is suitable for use in full mass timber construction (MTC) or in "hybrid" conventional construction where CLT is used in conjunction with concrete & steel.

XLam proudly supports Government, Commercial, Industrial and Residential construction projects. Our capability and the breadth of application for XLam CLT means that we supply projects in Australia and New Zealand across all industry sectors.

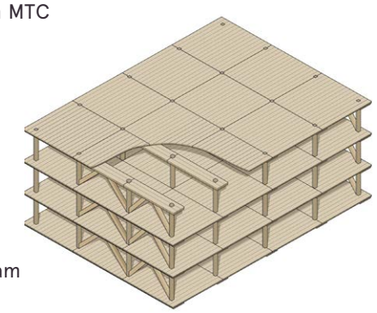
XLam CLT panels are structural building components for floors, roofs, stairs, soffits, balconies, internal and external walls. XLam CLT panels can be used in most AS/NZS 4364:2010 Service Class 1 and 2 environments for structural applications subject to project specific design requirements. We source and provide all fixings connections to support our clients and project partners.

XLam Provides;

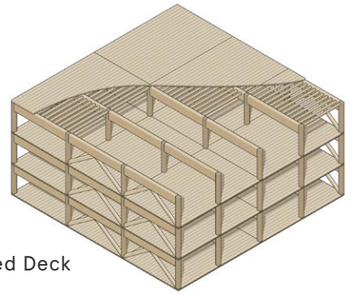
- CLT Roof Panels
- CLT Floor Panels
- CLT Wall Panels
- CLT AirStairs and Landings
- CLT Band Beams
- GLT Beams
- GLT Columns
- MTC Technical Guides
- DfMA Advice & Support
- Guidance in MTC



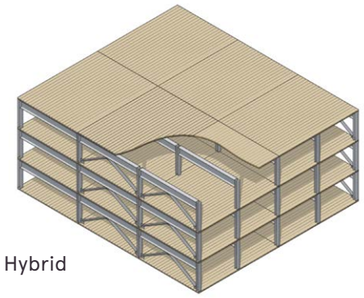
Post & Beam



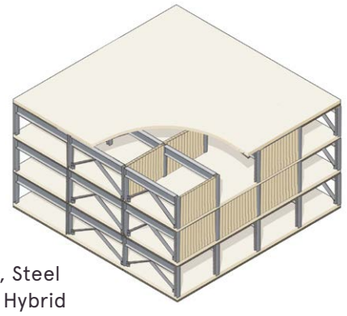
CLT Band Beam



Ribbed Deck



Steel / CLT Hybrid



Concrete, Steel
& Timber Hybrid

ADELAIDE OVAL, SA, AUSTRALIA

Technical Advice & Support Services

XLam have supported the successful delivery of projects across all key industry sectors. We draw on a broad base of engineering and construction knowledge and experience to provide advice and support to our clients in the use of mass timber and DfMA.

FEASIBILITY & ADVISORY

DESIGN & ENGINEERING

PLANNING & PERMITS

LOGISTICS & INSTALLATION

Access to our advice and expertise through each stage of the project lifecycle ensures maximum benefit and ROI from the use of XLam CLT.

XLam provides comprehensive technical documentation and a range of design services are available on a consultancy basis. We can assist with an end-to-end design or more typically, we will work as an integral part of the project team supporting the lead architects and engineers with technical information and advice.

We typically assist with considerations such as; economical panel sizes, orientation, tolerances for assembly, connections, appearance, durability, fire & acoustic performance, buildability, logistics, installation and construction sequencing.

From initial project scoping to reviewing the suitability of CLT for a project, through to complete project design and documentation of the timber including LVL, GLT and CLT elements to ensure design efficiency is maximised.

DERBY ST, NEW ZEALAND

ALL HALLOWS SCHOOL, QLD, AUSTRALIA

OAKLEY CHILDCARE CENTRE, VIC, AUSTRALIA

Manufacture

XLam CLT panels are a bespoke product, made to order based on detailed drawings which have been developed through the design and engineering phase. This will determine the specific structural considerations, panel thickness and spans, CLT layout and connection details. To maximise efficiency the billet size should be reviewed in the design phase. XLam will complete shop drawings to enable manufacture and sequence the workflow and logistics to maximise construction efficiency.

Technical Data

Width	2.4 - 3.4m
Length	6 – 15.7m
Thickness	90-310mm
Layup options	Three, five or seven
Wood Species	Radiata Pine
Moisture Content (MC)	12% ±3%
Density	500kg/m3
Bonding Adhesive	Henkel Purbond Loctite HBS Polyurethane - formaldehyde free
Thermal Resistance	0.12 W/mK at 12% moisture content
Dimensional Stability	0.2-0.25% per % change in MC across the thickness of a panel 0.01-0.02% per % change in MC longitudinally
Surface Quality	Industrial or Natural, refer to XLam Product Guide for full details
Treatment Options	XLam CLT panels are available as either untreated or treated with Hyne T3 Green Plus for protection against mould & termite attack
Global Warming Potential	-293 kg CO2-eq. per m3
Formaldehyde Emissions	Less than 0.1 mg/m2/hr when tested to ASTM D5116:2017
Joint Group	JD5
Strength Group	SD6
Timber Source	PEFC Certified, 100% Australian plantation grown & processed
Declare Red List Status	Declare Red List Free for both Treated & Untreated Panels
Specific Heat Capacity	1400 J/kg K

Please refer to XLam Product & Technical Guides for full details.

XLAM, MANUFACTURING PLANT

Physical Properties of Radiata Pine Lamellas

Structural Property	XGP1 Outer Lamellas	XGP2 Inner Lamellas
Modulus of Elasticity (parallel to the grain)	10,000 MPa	6,000 MPa
Bending Strength (parallel to the grain)	17 MPa	10 MPa
Compression Strength (parallel to the grain)	18 MPa	15 MPa
Compression Strength (perpendicular to the grain)	17 MPa	8.9 MPa
Tension Strength (parallel to the grain)	7.7 MPa	4.0 MPa
Shear Strength (parallel to the grain)	3.8 MPa	3.8 MPa
Rolling Shear Strength (perpendicular to the grain)	1.2 MPa	1.2 MPa
Shear Modulus (parallel to the grain)	670MPa	400MPa
Rolling Shear Modulus (perpendicular to the grain)	45Mpa	29Mpa
Mean Density	500kg/ m3	480kg/ m3
Available Lamella Sizes	85(w) x 42.5(t) 85(w) x 30(t) 140(w) x 35(t)	85(w) x 32.5(t) 190(w) x 45(t) 140(w) x 20(t)

Tolerances

Thickness (T)	±2mm	**Lap Depth/Width**	±2mm
Width (W)	±2mm	**Opening Location (P)**	±2mm
Length (L)	±2mm	**Opening Size**	±2mm
Squareness (A_B)	±2mm	**Hole diameter**	±1mm
Flatness (F)	±5mm	**Rebates/Recesses ®**	±2mm
Straightness	±1.5mm	**Lamella Thickness**	±1mm

Thickness, Mass, Thermal & Acoustic Property Summary

Panel designation	Panel Thickness	Layup mm	Mass kg/m2	*R Value m2K/w	# Acoustic Properties				
					$R_w + C_{tr}$	STC	$L_{n,w}$	$C_{I,}$	IIC
CL3/90	90	30/30/30	44	0.75	31	34	92	-5	18
CL3/100	100	32.5/35/32.5	49	0.83	31	35	91	-5	19
CL3/110	110	32.5/45/32.5	54	0.92	32	35	90	-5	20
CL3/120	120	42.5/35/42.5	59	1.00	33	36	89	-5	21
CL3/130	130	42.5/45/42.5	63	1.08	33	36	89	-5	21
CL5/140	140	32.5/20/35/20/32.5	68	1.17	34	37	88	-5	22
CL5/155	155	32.5/35/20/35/32.5	75	1.29	34	38	87	-5	23
CL5/170	170	32.5/35/35/35/32.5	82	1.42	35	39	86	-5	24
CL5/190	190	42.5/35/35/35/42.5	92	1.58	36	40	85	-5	25
CL5/200	200	42.5/35/45/35/42.5	97	1.67	36	40	85	-6	25
CL5/220	220	42.5/45/45/45/42.5	107	1.83	37	41	84	-5	26
CL7/240	240	32.5/35/35/35/35/35/32.5	126	2.00	38	42	83	-5	27
CL7/260	260	42.5/35/35/35/35/35/42.5	126	2.17	38	42	83	-6	27
CL7/270	270	42.5/35/35/45/35/35/42.5	131	2.25	39	43	82	-5	28
CL7/290	290	42.5/35/45/45/45/35/42.5	140	2.42	39	43	82	-6	28
CL7/310	310	42.5/45/45/45/45/45/42.5	150	2.58	40	44	81	-6	29

** Thermal Properties: Total System R values can be modelled in Speckel see https://speckel.io/. & https://nz.speckel.io/*
 # Acoustic Properties: XLam has conducted acoustic tests on a range of different construction details according to ISO 10140-2:2010, ISO 10140-3:2010, ISO 717-1:2013, ASTM E413, ISO 717-2:2013 & ASTM E989 for further information refer to the XLam Acoustic Design Guide.

Please refer to XLam Product & Technical Guides for full details.

The density & characteristics of XLam CLT provides favourable fire & acoustic performance

Fire Hazard Properties

AS 5637 Group Number: XLam CLT panels achieve a Group 3 Rating, with an Average Extinction Area less than 250m²/kg. Where Group 1 or Group 2 ratings are required, CLT panels will need to be lined with plasterboard or painted with an intumescent paint system.

AS 1530.3 Fire Hazard Indices: XLam CLT panel achieve a Spread-of-Flame Index – 8 & Smoke-Developed Index – 3.

AS ISO 9239.1 Critical Heat Flux: XLam CLT panel achieve a Critical Radiant Flux greater than or equal to 2.2 and less than 4.5 kW/m².

Fire Resistance AS 1530.4

The BCA and NZBC specify the Fire Resistance Rating (FRR NZ, FRL Australia) a building system must meet based on the building's height, occupation use and type, inclusion of sprinklers, escape pathways and other factors. To show compliance to BCA Schedule 5 requirements the FRL of building systems must be tested or assessed according to AS 1530.4 by a registered fire testing laboratory. The NZBC allows the use of both NZS/BS 476:20:1987 and AS 1530.4. XLam has conducted extensive testing and assessments on our CLT panels with accredited testing laboratories, a summary of available systems based on these tests is provided below.

These summary tables are indicative and may be used in initial project scoping only, for full details see the XLam Fire Design Guide. To be valid these systems must be installed according to the certified construction details including materials and with due consideration of span and load limitations. The Fire Load Capacity kN/m of walls will vary with wall height and CLT panel thickness. The maximum span of floors will vary with live load, dead load and CLT panel thickness. The project engineer is responsible for determining what loads will be applied and ensuring the XLam CLT panel specified meets BCA/NZBC requirements. The project fire engineer is responsible for confirming and certifying all BCA/NZBC fire performance requirements are met by the design. The project's relevant building surveyor is responsible for ensuring the design as documented by the fire engineer has been implemented.

Summary of XLam's Systems FRL/FRR

Layup	Bare Walls Australia	Bare Walls New Zealand	Bare Floors Australia & New Zealand	Protected Walls & Floors Australia & New Zealand
CL3/100	60/60/60	60/60/60	60/60/60	120/120/120
CL3/110	60/60/60	60/60/60	#90/90/90	120/120/120
CL3/120	60/60/60	60/60/60	#90/90/90	120/120/120
CL3/130	60/60/60	60/60/60	#90/90/90	120/120/120
CL5/140	*90/90/90	90/90/90	#90/90/90	120/120/120
CL5/155	*90/90/90	90/90/90	#90/90/90	120/120/120
CL5/170	*90/90/90	120/120/120	90/90/90	120/120/120
CL5/190	120/120/120	120/120/120	90/90/90	120/120/120
CL5/200	120/120/120	120/120/120	#120/120/120	120/120/120
CL5/220	120/120/120	120/120/120	#120/120/120	120/120/120
CL7/240	120/120/120	120/120/120	120/120/120	120/120/120
CL7/260	120/120/120	120/120/120	120/120/120	120/120/120
CL7/270	120/120/120	120/120/120	120/120/120	120/120/120
CL7/290	120/120/120	120/120/120	120/120/120	120/120/120
CL7/310	120/120/120	120/120/120	120/120/120	120/120/120

*90/90/90 only applies to walls with CLT floor above and below for other floor options is limited to 60/60/60

120/120/120 only applies to floors with spline joints, lap joints limited to 90/90/90

Protection for walls one layer of 16mm or two layers of 13mm Boral FIRESTOP or GIB Fyreline on both sides side, direct fix.

Protection for floors one layer of 16mm or two layers of 13mm Boral FIRESTOP or GIB Fyreline on the ceiling or fire exposed side, direct fix.

XLam CLT is a renewable & environmentally friendly building material

Environmental Product Declaration

An EPD has been completed on XLam CLT panels registration number S-P-02326 to ISO 14025 and EN 15804+A1
see EPD Australasia (epd-australasia.com)

Responsibly Sourced

PEFC Certified
XLam Australia and New Zealand operations and sales offices are certified to the chain of custody (COC) standards of the global forest and wood product certification scheme PEFC by SCS Global Services. Multi-site certificate number SCS-PEFC/COC-05795.

Certifications & Accreditations

CodeMark Certificate New Zealand
see XLam CLT T3 Plus | Product certificate (building.govt.nz)

CodeMark Certificate Australia
see JAS ANZ (jas-anz.org)

Declare Red List Free
see Declare - International Living Future Institute (living-future.org)

PEFC
see PEFC - Programme for the Endorsement of Forest Certification (pefc.org)

XLAM SUPPORTS A SUSTAINABLE FUTURE.

XLam makes an important contribution to improving environmental performance of the construction industry through the manufacture and supply of sustainable building products that create “greener” buildings.

Using XLam CLT

DfMA

XLam apply our expertise in DfMA (Design for Manufacture and Assembly) to improve efficiency, reduce site waste, and maximise ROI.

Installation/Handling

A comprehensive installation sequence for XLam CLT panels is developed as part of the design process. See the XLam Site Guide for further information.

Weather Protection

XLam CLT panels need to be installed as part of a complete envelope or roof design with adequate protection from the elements and consideration of long-term moisture control. Where panels may be exposed to periodic moisture episodes such as balconies, soffits and wet areas, the use of lamellas treated with Hyne T3 Green Plus treatment is advised. XLam CLT panels must be installed in accordance with the XLam Site Guide.

Structural Properties

XLam has developed pre-analysis span tables based on vibration limits. Refer to the XLam Structural Guide for details. Specific calculations will need to be made for design of structural capacity of XLam CLT panels for each project.

Visual Appearance

XLam have two visual grades: Natural Appearance Grade (NAT) or Industrial Appearance Grade (IND). A detailed description of these two grades is provided in the XLam Product Guide.

Operation & Maintenance

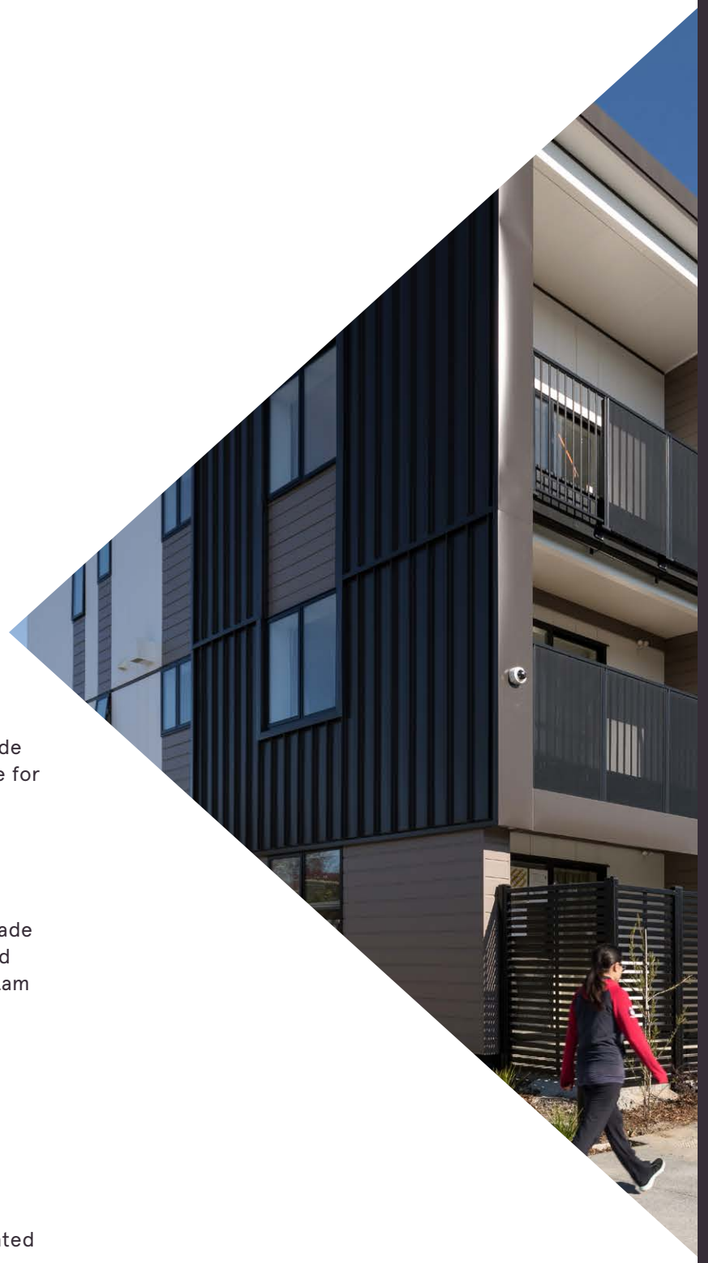
For advice of operation & maintenance of XLam CLT refer to the XLam Operation & Maintenance guide.

Treatment Options

XLam panels are available as either untreated or treated for protection against mould & termite attack.

Hyrgothermal Properties

The transport of heat and moisture through envelopes containing Xlam CLT panels can be modelled in WUFI software see www.wufi.com.au & https://nz.speckel.io/



XLam is proud to support our clients and project partners in the use of XLam CLT as an efficient, safe and sustainable building product in commercial, residential, industrial and government projects.

XLAM™

XLam Manufactures and Supplies Engineered Timber Panels (CLT) and Glue Laminated Timber (GLT) across Australasia for use in Hybrid Conventional and Mass Timber Construction Projects.

xlam.com.au