



# Structural Engineered Lumber

## Design and Construction Guide

Issue 3 - July 2016



## CodeMark

A CodeMark is proof that a building product or system meets the requirements of the New Zealand Building Code.

CodeMark is a voluntary product certification scheme that provides an easily-understood and robust way to show a building product meets the requirements of the New Zealand Building Code. It is especially suitable for innovative products or where an Acceptable Solution or NZ Standard does not exist or around which there might be confusion.

CodeMark is unchallengeable and building consent authorities must accept a product certificate as evidence of compliance with the Building Code when used as specified in the CodeMark certificate.

Note: The CodeMark reference in this publication refers to Laminated Strand Lumber (LSL) only.



AQ-021116-CMNZ

### The CodeMark Advantage

✓ Assures compliance with NZBC	✓ Simplifies consenting process
✓ Provides consumer confidence	✓ Encourages innovation and raises standards
✓ Independently audited and certified by accredited product assurance bodies	

## AZOTEK™ WOOD PROTECTION

Azotek™ is an innovative wood protection technology from Lonza for the protection of veneered wood products from insects and decay.

Azotek™ is a combination of both fungicides and an insecticide added to the glue line during manufacture to deliver outstanding protection from the exterior through to the core.



### The Azotek™ Advantage

✓ Full penetration treatment	✓ No residual solvents as in LOSP treatment
✓ Leaves product dry and ready to use	✓ No effect on structural properties
✓ Meets NZS3640 (amendment 5), AS/NZS1604.3.2012 & AS/NZS1604.4.2012	✓ Post treatment cutting and drilling does not affect integrity of treatment
✓ Treatment quality accredited by third party laboratory	

## BOROGARD® ZB WOOD PROTECTION

The zinc borate treatment used in the SolidGuard LSL product is an innovative wood protection application by Rio Tinto using naturally occurring minerals for the protection of wood strand products against insect and fungal attack.



### The Zinc Borate Advantage

✓ Full penetration treatment	✓ No residual solvents as in LOSP treatment
✓ Leaves product dry and ready to use	✓ No effect on structural properties
✓ Meets AS/NZS1604.2 for H2+H3	✓ Post treatment cutting and drilling does not affect integrity of treatment
✓ Testing by Lumberworx confirms retention levels to H1.2 in NZS3640 (A5)	

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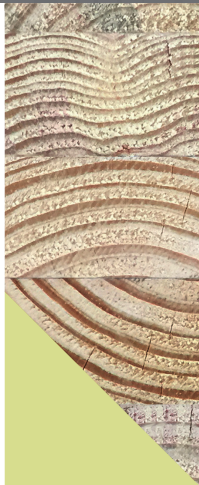
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# Products & Services



## LVL LVL 13

LVL 13 is the highest grade of laminated veneer lumber available in 45 + 63mm thickness. Product distributed by Lumberworx is manufactured by Nelson Pine Industries at its Richmond facility. LVL13 is used for joists, rafters, bearers, roof beams and lintels.



## LVL Chord

LVL 11 truss chord is sized to match SG timber. This product is primarily used in higher performing trusses but can also be integrated with SG sawn timber where a longer span is required. Uses can be rafters, joists, purlins, studs and lintels.



## LSL Boards & Beams

Laminated Strand Lumber is a versatile timber product that fills a gap between sawn SG timber grades and LVL 13 for use as light timber framing. The large section sizes in 63mm are well suited to industrial and farm structures.



## LSL LSL 10 Lintels

LSL lintels are manufactured to integrate with 90mm light timber framing. This versatile E10.6 GPa 90mm product provides good span and stability and can be designed where sawn timber, glulam or LVL lintels of up to E10.6 GPa are commonly used.



## LSL Rimboards & Boundary Joists

The LSL pre-treated rimboards are designed for use in the H1.2 hazard zone and prevent joist roll-over and help in the transfer of loads from structures above.



## Glulam GL17c Lintels & Beams

GL17c is a pre-cambered member that is the solution when you require that extra strength in your lintel, floor or roof beam. GL17c can often be used in place of steel or flitch beams and Lumberworx is happy to help with the substitution.



## Sustainability Protecting the Environment

Sustainability is behaviour that protects the environment, embraces social responsibilities, and builds economic prosperity, today and for future generations. Lumberworx only sources products manufactured from strictly managed indigenous and exotic forests, adopts low impact non-solvent treatment options, and offers fair pricing.



## Design Service Lumberworx Design Team

The Lumberworx Design Team can assist architects/designers/engineers in specification of a product using our in-house engineering software and knowledge of the building industry. To request a consultation or have a question answered, simply phone call free on 0508 IBEAMS (0508 423 267)

# Laminated Veneer Lumber

**Nelson Pine**  
Laminated Veneer Lumber LVL

## Laminated Veneer Lumber Description and Properties

### 1.0 Description

LVL is a modern engineered wood composite and high quality product that is more uniform and offers improved structural properties over sawn timber. LVL is made from rotary peeled veneers laid up with parallel grain orientation.

A primary feature of LVL is to disperse or remove strength-reducing characteristics of wood by lessening natural defects such as knots, slope of grain and splits that are inherent in sawn timber. The veneers are placed in a specific sequence or "recipe" to maximise the potential of the stiffer and stronger veneer grades.

All LVL supplied by Lumberworx is manufactured by Nelson Pine Industries. All products are stamped with Nelson Pine Industries mill number (919) and the grade of LVL for easy identification and consumer confidence. The Nelson Pine Design Specific Engineering Design Guide is available on the Lumberworx website.

Lumberworx distributes 2 grades of LVL (E11 & E13) in various thicknesses. The 'E' value identifies the grade or elasticity of the member in the same way as sawn timber is identified by an "SG" value and Glulam is identified by a "GL" value.

### 1.1 Structural Properties

The structural properties for LVL are determined by testing in accordance with the requirements of AS/NZS4357:2005 Structural Laminated Lumber.

**Table 1: Nelson Pine Limit State Design Characteristic Values (on edge – see website for more details)**

Property		Unit	LVL 13 Values	LVL 11 Values
Modulus of Elasticity	E	GPa	13.2	11.0
Modulus of Rigidity	G	MPa	660	550
Bending Strength <sup>1</sup>	(f'b)	MPa	48.0	38.0
Tension parallel to Grain <sup>2</sup>	(f't)	MPa	33.0	26.0
Compression parallel to Grain	(f'c)	MPa	38.0	38.0
Shear in Beam	(f's)	MPa	5.3	5.0
Compression perpendicular to Grain	(f'p)	MPa	10.0	10.0

<sup>1</sup> For 95mm in depth. Refer to table 2 for adjustment factor above 95mm depth

<sup>2</sup> For 150mm in depth. Refer to table 2 for adjustment factor above 150mm depth

# Laminated Veneer Lumber

## 1.2 Size Affect Factor

A size factor shall be applied to the characteristic strength of Nelson Pine LVL in bending and tension parallel to grain. For beams in bending less than 95mm in depth there is no adjustment. For beams deeper than 95mm in bending multiply the characteristic bending strength by  $(95/d)^{0.167}$ . For beams in tension less than 150mm in depth there is no adjustment. For beams deeper than 150mm multiply the characteristic tension strength by  $(150/d)^{0.167}$ .

## 1.3 Joint Group

The joint strength group for Nelson Pine LVL depends on the orientation and type of fasteners as in Table 3. For structures that require specific design of joints, this table is to be read in conjunction with NZS3603 Section 4, Joints.

**Table 2: Joint Design Classification**

Grade	Nails & screws in Lateral Load		Nails & screws in Withdrawal		Self-Drilling screws in Lateral Load such as Type 17		Self-Drilling screws in Withdrawal such as Type 17		Bolts and coach screws in Lateral Load drilled into the face	
	Edge	Face	Edge	Face	Edge	Face	Edge	Face	Edge	Face
LVL 13	J5	J4	J5	J4	J4	J4	J4/5	J4/5	J3	J2
LVL 11	J5	J4	J5	J4	J4	J4	J4/5	J4/5	J3	J2

All data supplied by manufacturer  
See Lumberworx web-site (Resources) for full NPIL references

## Application and Product Range

### 2.0 LVL 13

LVL 13 is the highest grade of LVL manufactured in New Zealand in 45mm & 63mm thicknesses for use in residential and commercial buildings. LVL13 is effectively used in floor, wall and roof applications. Nelson Pine Industries E13 LVL can be confidently substituted for other brands with a stiffness of E13.2GPa or less.

LVL13 can be fixed using the same fastenings as SG timber. For specification of fastenings please refer to NZS3604:2011 or specific project design.

Common uses for LVL13 are floor joists, floor bearers, rafters, roof beams and lintels in residential and light commercial construction.

The higher stiffness of LVL13 allows longer spans than conventional sawn lumber or limits deflection in critical load cases like lintels.

Large members are often specified in rural buildings where the higher stiffness allows long spanning rafters with wide spacing that support purlins horizontal to the building.

#### LVL13 Product Range

45mm	150x45	170x45	200x45	240x45	300x45	360x45	400x45
63mm	150x63	-	200x63	240x63	300x63	360x63	400x63

If a project requires an LVL13 45mm or 63mm member in a larger size than shown above, please contact Lumberworx for availability and assistance.

## 2.1 LVL 11 Trusschord

Trusschord is predominantly used in truss applications, or where the design requires typical timber sizes but with extra strength. LVL 11 can be substituted for SG10 timber in the same section sizes in timber framed buildings (reference NZS3604:2011 - 2-3-9).

LVL11 Trusschord can be fixed using the same fastenings as for SG timber. For specification of fastenings please refer to NZS3604:2011 or specific project design.

LVL11 Trusschord available in fixed lengths only.

LVL11 Trusschord Product Range			
45mm	90x45	140x45	190x45

## Design Considerations

### 3.0 Treatment

All LVL distributed by Lumberworx will be treated with the innovative Lonza AZOTEK™ treatment to H1.2 and is not suited to external applications where exposed to weather.

This H1.2 treated product can be used with confidence wherever H3.1 LOSP is specified or anywhere in the building envelope where H1.2 Boron treated sawn timber can be used. (Refer to MBIE/DBH Timber Treatment for enclosed framing guide).

### 3.1 Fixing of LVL

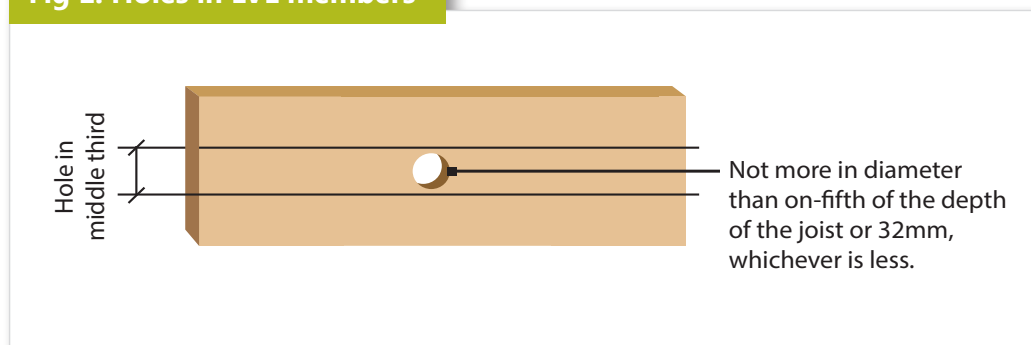
LVL can be nailed, bolted or screw fixed using the same fastenings and methods as used with standard timber. For specification of fastenings please refer to NZS3604:2011 or the specific project design.

### 3.2 Holes in LVL members

Holes in uniformly loaded floor joists (excluding overhangs) are to be in accordance with NZS3604:2011. Clause 7.1.7. In summary holes will be:

- Within the middle third of the joist depth.
- Not more than 3 times the depth of the joist from the face of the support (to the far side of the outer hole).
- Not more in diameter than one-fifth of the depth of the joist or 32mm, whichever is less.
- At minimum spacing measured along the joist between the edges of the holes of not less than the depth of the joist.

**Fig 1: Holes in LVL members**



Alternatively a rimboard may be fixed to the ends of LVL joists if holes are required in floor joists outside the scope of NZS3604:2011, specific engineering design will be required.

# Laminated Veneer Lumber

## 3.3 Permanent Blocking - Flooring Applications

To conform with NZS3604:2011 Clause 7.1.2.2 & 7.1.2.4 permanent blocking is required along all lines of support between every second floor joist spacing to assist with buckling restraint and lateral load transfer to the walls below.

## 3.4 Notches & Birdsmouths in Rafters

Notches & Birdsmouths are permitted in accordance with NZS3604:2011 Clause 10.2.1.3.6 where the net depth of the rafter at the notch shall not be less than 80% of the actual rafter depth, nor less than 65mm. The bearing width is not to be less than 32mm.

## 3.5 Deep Joist Restraint - Flooring Applications

For deep floor joists, i.e. where the depth of a floor joist exceeds four (4) times its thickness, continuous blocking or strutting is required at mid span to comply with Clause 7.1.2.3 of NZS3604:2011.

## 3.6 Short Term Exposure to Humid Conditions and Weather

Exposure of LVL to the weather for a limited time when framed into a structure is acceptable and will not result in any structural damage. Exposure to weather for longer periods could result in some swelling and discolouration.

## 3.7 Laminated Members

Laminated members exposed to weather during construction may accumulate and trap moisture between the individual sections. Lumberworx recommends a bead of elastomeric adhesive to the edge of each join and a temporary waterproof membrane covering the laminated member while the member is exposed to weather.

## 3.8 Storage and Handling of LVL

All timber, including LVL may expand when exposed to moisture. To maintain the benefits of LVL as a dry, straight and true material it is recommended that these be:

- Stacked flat and straight on evenly spaced bearers.
- Stacked clear of the ground with good ventilation.
- Stored under cover to keep dry prior to installation.
- Re-wrapped after opening packs.

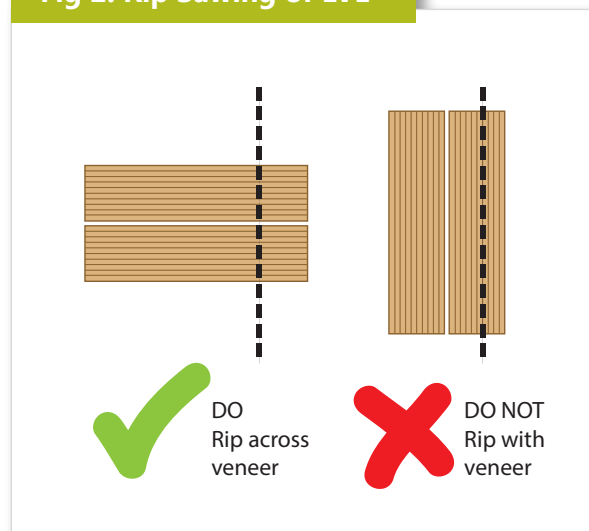
## 3.9 Rip Sawing of LVL

LVL may be ripped along the board to achieve a smaller standard section depth without affecting the basic strength properties (such as ripping a 300mm board to 240mm). It is important that the new member is not cut undersize. Never rip LVL through the thickness to achieve a narrower section size (such as ripping a 63mm member to 45mm) as this may change the structural properties of the member.

## 3.10 Span Table Information

Span tables for floor, roof and wall systems can be found on our website - [www.lumberworx.co.nz](http://www.lumberworx.co.nz). If you have any questions regarding the span tables or have project specific criteria that you require, please contact the Lumberworx team and we will assist you.

Fig 2: Rip Sawing of LVL



### 3.11 Multiple Members – Nailing/Screwing Patterns

The use of double or triple section beams (except pole bearers) relies on the effective load transfer between members to ensure the two beams act together as a single member.

The nailing pattern specified in NZS 3604:2011 at Clause 2.4.4.7 is satisfactory for top loaded laminations but for side loaded applications additional nailing will be required.

The following is recommended for side loaded beams:

#### 45mm LVL

240mm or less in depth 50mm in from ends and both edges, a row of nails 200mm apart on both sides of the laminated member (total 4 rows of nails)

Over 240mm in depth 50mm in from ends and both edges, and at the centre line, a row of nails 200mm apart on both sides of the laminated member (total 6 rows of nails)

For the purposes of lamination, the nails are to extend approximately 90% of the combined member thickness.

#### 63mm LVL

For 63mm LVL members screws will be required to achieve adequate penetration.

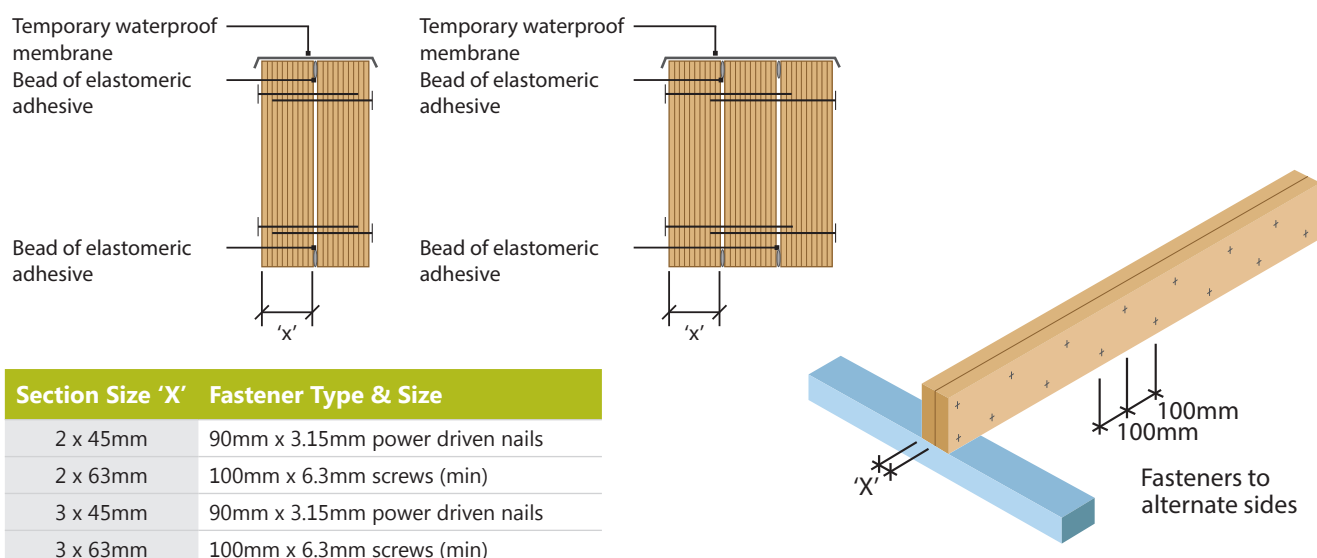
240mm or less in depth 50mm in from ends and both edges, a row of screws 200mm apart on both sides of the laminated member staggered on alternate sides (total 4 rows of screws)

Over 240mm in depth 50mm in from ends and both edges, and at the centre line, a row of screws 400mm apart on both sides of the laminated member (total 6 rows of screws)

#### Triple Sections

Laminate two sections as above then fix the third lamination with the same pattern. NOTE: Side loaded beams must be securely restrained within the floor space to ensure the member cannot rotate.

**Fig 3: Fastening Arrangement for Double and Triple Section LVL Beams**



# Span Tables

## Span Tables

### 4.0 Description

The two span tables below define the maximum allowable spans in millimetres for a residential floor or roof. These spans will provide a satisfactory floor or roof system within the requirements and recommendations of NZS1170.

Greater spans and other loadings can be achieved using certified design software. More detailed span tables are available on the Lumberworx website. A qualified and experienced design team is available to work with clients in the specification of Lumberworx products and systems.

#### Loading Data - Light Floor

**Flooring:** Plywood/Particle Board

**Ceiling:** 13mm Plasterboard

**Floor Live Load:** Domestic (1.5kPa, 1.8kN)

**Dynamic Loads:** Standard NZS1170 Dynamics for up to 2mm deflection

#### Loading Data - Snow Loads all Wind Zones

**Roof Structure:** Steel Sheet Roofing .50mm, Timber Purlins, lightweight insulation (20kg/m<sup>2</sup>)

**Ceiling:** Ceiling Battens, 13mm Plasterboard (20kg/m<sup>2</sup>)

**Wind Zone and Pitch:** All Wind Zones at up to 35° roof pitch

**Snow Zone:** N4, N5 - Snow Loads Applied to an altitude of 100m or 0.9kPa *sg*

**Table 3: LVL13 & LSL10 Floor Joists - Single Span**

Floor Joist Size	Product	Floor Joist Spacing			
		300	400	450	600
		Maximum Span (mm)			
150x45	LVL13	3500	3200	3100	3000
150x63	LVL13	4000	3600	3500	3400
170x45	LVL13	4000	3700	3500	3400
200x45	LVL13	4900	4400	4200	4100
200x63	LVL13	5400	5000	4800	4500
240x45	LVL13	5600	5300	5100	4800
240x63	LVL13	6200	5700	5600	5200
300x45	LVL13	6600	6200	6100	5600
300x63	LVL13	7300	6800	6600	6100
360x45	LVL13	7500	7100	6900	6500
360x63	LVL13	8400	7800	7600	7000
400x45	LVL13	8100	7600	7400	7000
400x63	LVL13	9100	8400	8200	7600
200x45	LSL10	4500	4000	3900	3800
240x45	LSL10	5300	4900	4800	4500
300x45	LSL10	6200	5800	5700	5300
300x63	LSL10	7000	6600	6500	6100
360x45	LSL10	6600	6200	6100	5700
400x63	LSL10	8000	7600	7400	7000

**Table 4: LVL13 & LSL10 Rafters - Single Span**

Rafter Size	Product	Rafter Spacing			
		450	600	900	1200
		Maximum Span (mm)			
150x45	LVL13	4000	3700	3300	3000
150x63	LVL13	4900	4500	4000	3600
170x45	LVL13	4500	4200	3700	3400
200x45	LVL13	5200	4900	4400	4000
200x63	LVL13	5900	5600	5200	4800
240x45	LVL13	5900	5600	5100	4800
240x63	LVL13	6700	6400	5900	5600
300x45	LVL13	6900	6500	6000	5600
300x63	LVL13	7800	7400	6900	6500
360x45	LVL13	7800	7400	6800	6400
360x63	LVL13	8800	8400	7800	7400
400x45	LVL13	8300	7900	7400	6900
400x63	LVL13	9400	9000	8400	8000
200x45	LSL10	3900	4300	3800	3500
240x45	LSL10	5500	5100	4600	4200
300x45	LSL10	6400	6100	5600	5200
300x63	LSL10	7200	6900	6400	6000
360x45	LSL10	6700	6400	6000	5700
400x63	LSL10	8100	7800	7300	6900

# Laminated Strand Lumber



## Laminated Strand Lumber Description and Properties

### 5.0 Description

SolidGuard LSL is a reconstituted wood product, and part of the wider family of engineered wood products (EWPs). It is manufactured from a mix of sustainably harvested aspen and maple hardwood strands blended with an isocyanate adhesive and formed through a steam injection press. The resulting timber boards have consistent properties and avoid the typical sawn timber behaviour of twisting and warping, and defects such as knots and splits are engineered out.

"Zinc Borate" is added during the manufacturing process as resistance to termites and decay and the treated product is known as SolidGuard LSL. This treatment is deemed to satisfy the H1.2 hazard class requirements and SolidGuard LSL may be used in applications where H1.2 hazard class applies.

The manufacturer is Louisiana Pacific Corporation (LP), and manufacturing is performed at its Houlton, Maine facility in the USA.

### 5.1 CodeMark

LumberworX has been granted a CodeMark for SolidGuard LSL. This CodeMark confirms SolidGuard LSL will meet the requirements of the New Zealand Building Code in H1.2 end use category.



### 5.2 Structural Properties

The structural properties for LSL were determined by a CPEng in accordance with NZS3603 for use in New Zealand after reviewing the structural properties contained in the APA product report PR-L280 and LP's Declaration of Performance.

**Table 5: SolidGuard LSL Structural Properties**

Property		Unit	Grade E10
Density	Kg/m <sup>3</sup>	-	740
Modulus of Elasticity	E	MPa	10,600
Bending (edge) <sup>1</sup>	(f'b)	MPa	39
Bending (flat) <sup>2</sup>	(f'b)	MPa	38
Shear in Beams (edge)	(f's)	MPa	9.0
Modulus of Rigidity (E/20)	G	MPa	530

<sup>1</sup> For 95mm depth. For beams in bending deeper than 95mm, multiply the characteristic bending strength by (95/d) <sup>^0.120</sup>

<sup>2</sup> This value is included for application such as wind beams

# Laminated Strand Lumber

## 5.3 Size Affect Factor

A size factor shall be applied to the characteristic strength of SolidGuard LSL as in note 1 above. For beams in bending less than 95mm in depth there is no adjustment. For beams deeper than 95mm in bending multiply the characteristic bending strength by  $(95/d)^{0.120}$ .

## 5.4 Joint Group

Connections may be designed using NZS3603:1993 J4 joint group properties.

## 4.5 k2 Factor for Deflection

For duration of load factor,  $k_2$  for deflection = 2 as for solid timber with a width less than 85mm and  $k_2$  for deflection for widths 85mm or greater = 1.5. (Reference note C 2.7.2 (b) + (c) NZS3603).

## Application and Product Range

### 6.0 Solid Guard LSL 10

SolidGuard LSL 10 can be used as a direct substitute for SG10 sawn timber, and as a direct substitute for other engineered wood products with an E value up to 10.6 GPa of the same section size.

SolidGuard LSL is available from Lumberworx in the following sizes:			
LSL10 45mm	LSL10 63mm	LSL10 90mm	LSL Rimboard 38mm
-	-	120x90	-
-	-	150x90	-
200x45	-	200x90	200x38
240x45	-	240x90	240x38
300x45	300x63	300x90	300x38
360x45	-	360x90	360x38
-	400x63	400x90	-
-	600x63	-	-

## Design Considerations

### 7.0 NZS3604:2011

For non-specific design applications, SolidGuard LSL must be installed in accordance with NZS3604:2011.

Design may be made using software versions which have been certified for use in New Zealand by a CPEng.

The descriptions below are of a general nature to assist the consumer.

### 7.1 Durability

All SolidGuard LSL is treated with ZB (zinc borate) and can be used with confidence anywhere in the building envelope where H1.2 is permitted. (Refer to MBIE/DBH Timber Treatment for enclosed framing guide – Pink is Tough).

## 7.2 Holes in Floor Joists

Holes in uniformly loaded floor joists (excluding overhangs) are to be in accordance with NZS3604:2011. Clause 7.1.7. In summary holes will be:

- a) Within the middle third of the joist depth.
- b) Not more than 3 times the depth of the joist from the face of the support (to the far side of the outer hole).
- c) Not more in diameter than one-fifth of the depth of the joist or 32mm, whichever is less.
- d) At minimum spacing measured along the joist between the edges of the holes of not less than the depth of the joist.

If holes are required in floor joists outside the scope of NZS3604:2011, specific engineering design will be required.

## 7.3 Permanent Blocking - Flooring Applications

To conform with NZS3604:2011 Clause 7.1.2.2 & 7.1.2.4 permanent blocking is required along all lines of support between every second floor joist spacing to assist with buckling restraint and lateral load transfer to the walls below.

Alternatively a rim-board of minimum 25mm thickness may be fixed to the ends of SolidGuard LSL joists.

## 7.4 Deep Joist Restraint

For deep floor joists, i.e. where the depth of a floor joist exceeds four (4) times its thickness, continuous blocking or strutting is required at mid span to comply with Clause 7.1.2.3 of NZS3604:2011.

## 7.5 Notches and Birdsmouths in Rafters

Notches & Birdsmouths are permitted in accordance with NZS3604:2011 Clause 10.2.1.3.6 where the net depth of the rafter at the notch shall not be less than 80% of the actual rafter depth, nor less than 65mm. The bearing width is not to be less than 32mm.

## 7.6 Short Term Exposure to Humid Conditions and Weather

Exposure of LSL to the weather for a limited time when framed into a structure is acceptable and will not result in structural deterioration. Exposure to weather for longer periods could result in some swelling and discolouration.

## 7.7 Weather Exposure of Laminated Members

Laminated members exposed to weather during construction may accumulate and trap moisture between the individual sections. LumberworX recommends a bead of elastomeric adhesive to the edge of each join and a temporary waterproof membrane covering the laminated member while the member is exposed to weather.

## 7.8 Rip Sawing of LSL

SolidGuard LSL may be ripped along the board to achieve a smaller standard section depth without affecting the basic strength properties (such as ripping a 300mm board to 240mm). It is important that the new member is not cut undersize.

## 7.9 Framing Brackets

SolidGuard LSL can be fixed with standard MITEK and PRYDA brackets (where required).

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# Laminated Strand Lumber

## 7.10 Multiple Members - Nailing Pattern

The use of double or triple section beams (except pole bearers) relies on the effective load transfer between members to ensure the two beams act together as a single member.

### 45mm LSL - Double Sections

Using 3.15mm or 3.75mm nails, nail 50mm in from ends and 22mm from both edges, a row of nails 200mm apart in accordance with the diagram below.

### 45mm LSL - Triple Sections

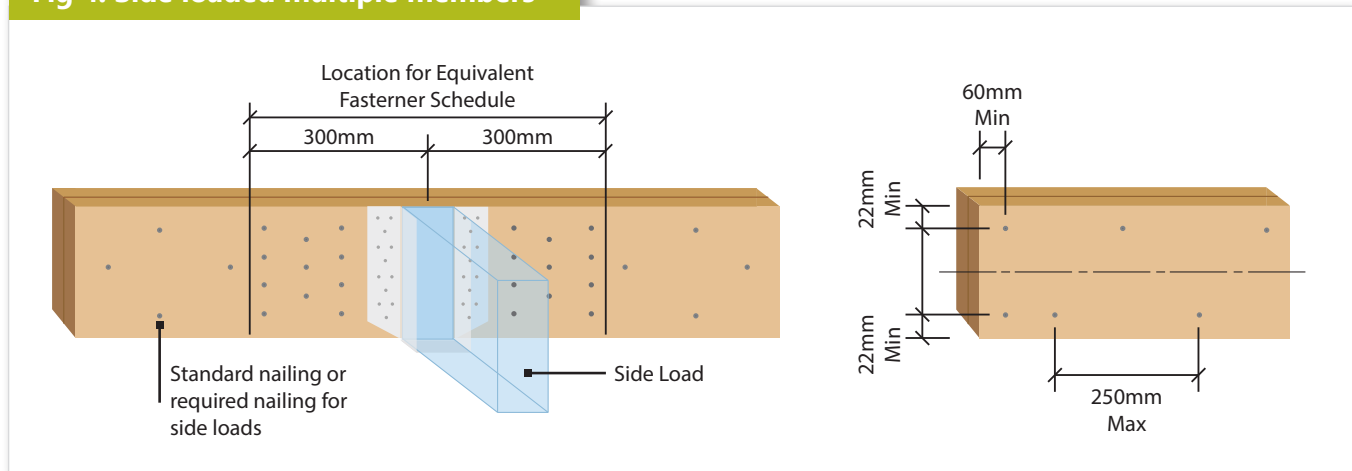
Laminate two sections as above then fix the third lamination with the same pattern.

### Side Loaded Multiple Members

Where multiple nailed up members are required to support loads to the side, additional nailing at the point or connection point will be required as shown below.

Side loaded beams must be securely restrained within the floor space to ensure the member cannot rotate.

**Fig 4: Side loaded multiple members**



## 7.11 Storage and Handling of SolidGuard LSL

Most timber will expand when exposed to moisture and this may apply to SolidGuard LSL. To maintain the benefits of SolidGuard LSL as a dry, straight and true material the product must be:

- Stacked flat and straight on evenly spaced bearers.
- Stacked clear of the ground with good ventilation.
- Stored under cover to keep dry prior to installation.
- Re-wrapped after opening packs.
- Use forklifts carefully to avoid damage

# Glue Laminated Beams



## Glue Laminated Beams Description and Properties

### 8.0 Description

Glue laminated beams (Glulam) are solid wood members manufactured by bonding multiple pieces with proven adhesives to form a larger structural member. Glulam is more uniform and offers improved structural performance over sawn timber.

Lumberworx distributes GL17c manufactured by MegaBeam. This product is manufactured from slash pine (pinus elliotti) with high stiffness and with the standard radius camber.

MegaBeam commenced trading in 2011 on the Sunshine Coast, Queensland, Australia as a Glulam manufacturing and supply business specialising in GL17c beams. Megabeams managing director, John Schwabe has been glue laminating since 1990 and consulting as an engineer since 1988. John developed much of the Glulam manufacturing standard AS/NZS 1328 and developed the current grades that exist in Australia's Timber Design Standard AS1720.1.

#### GL17c Product Range

85mm	240x85	260x85	300x85	360x85	400x85	460x85
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### 8.1 Treatment

Glulam 17c is H1.2 treated in accordance with NZS 3604 (A5)

This product is not suited to exterior unprotected situations where exposed to weather but may be used in any protected situation suited to H1.2 Boron treated sawn Radiata or Douglas Fir under NZS3602.

### 8.2 Fixing of Glulam Beams

All fixings for Glulam are to be in accordance with NZS3604:2011. Where Glulam is to be used for applications other than residential dwellings, specific design of joints is recommended.

### 8.3 Short Term Exposure to Humid Conditions and Weather

Exposure of Glulam to the weather for the period of construction is acceptable and will not result in structural damage. Exposure for longer periods may result in swelling and discolouration.

# Glue Laminated Beams

## 8.4 Structural Reliability

WTI is a long standing member of the Glue Laminated Timber Association of Australia (GLTAA) and the GLTAA logo on any laminated timber product ensures the product is fully accredited and of the highest quality.

The structural properties for Glulam are determined in accordance with AS/NZS 1328, the joint Australia New Zealand standard for Glue Laminated Timber.

**Table 6: Structural Properties for Glulam 17c**

Property		Unit	GL17c Values
Modulus of Elasticity	E	GPa	16.7
Modulus of Rigidity	G	MPa	1110
Bending	(f'b)	MPa	42.0
Tension parallel to grain	(f't)	MPa	21.0
Compression perpendicular to grain	(f'p)	MPa	15.0
Compression parallel to grain	(f'c)	MPa	35.0
Shear in Beam	(f's)	MPa	3.7

## 8.5 Performance

GL17c is the highest performing softwood beam available in New Zealand with many structural applications, particularly where high load and critical performance are required.

Builders know how practical the GL17c is for lintels over large window and door openings, garage lintels, and for roof beams.

Lumberworx 17c are manufactured to standard EWP depths for easy integration with other Lumberworx offerings and are easier to install than steel.

The example below is for an upper or single story lintel based on:

Roof load of 40kg/m <sup>2</sup>	50% of trussed roof width + overhang
Roof pitch up to 35°	10mm maximum deflection
All wind zones	Single span
All snow zones to 350m altitude	

### Glulam GL17c Lumberworx

Size	Roof Load Width		
	3.60	4.80	5.40
240x85	5000	4500	4300
260x85	5400	4900	4700
300x85	6200	5700	5400
360x85	7500	6800	6500
400x85	8300	7600	7300

Table values relate to Allowable Maximum Span in mm

Produced by QDv2 software

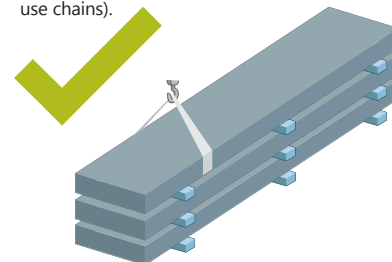


## Handling Details

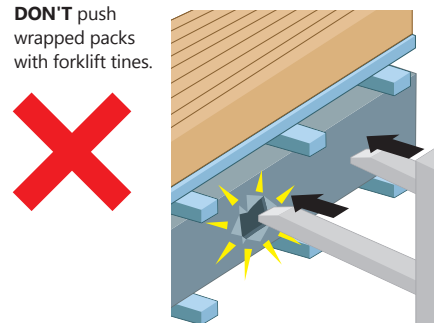
Take care not to damage members with forklifts and cranes.

- Do use soft stropps with lifting packs. Do not use chains as it may damage the product
- Do not push wrapped packs with forklift tines

**DO** use soft stropps to lift packs (don't use chains).



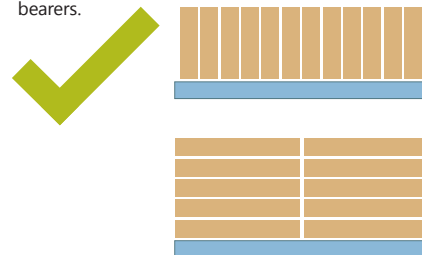
**DON'T** push wrapped packs with forklift tines.



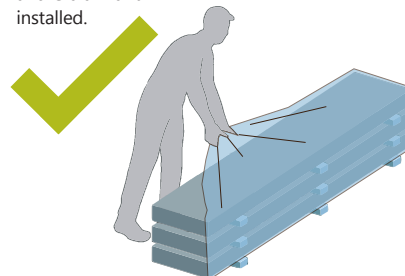
## Storage Details

- Never store members in direct contact with the ground
- Protect members from the weather until installed. It is also important to re-cover part packs during the construction period
- Do not stack packs too high or in an unstable position
- Wrap can be slippery when wet. Avoid walking on wrapped bundles.

**DO** store LVL, LSL and Glulam on bearers.



**DO** cover LVL, LSL and Glulam until installed.





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