

## Overview

Manufacture of laminated timber structures as contained in the drawings.

## Design

The design of the timber shall be in accordance with the regulations as advised by the consultants and the following New Zealand Standards:

- NZS 3603 - Timber Structures Code
- AS 5068 - Finger Jointed Timber Code
- NZS 3631 - New Zealand National Timber Grading Code
- ASNZS 1328 - The Manufacture of Glue Laminated Timber

## Materials

Laminated Timber Structures and Material: All laminated timber members shall be supplied by TimberLab Solutions Ltd of East Tamaki, Auckland, New Zealand; licensed manufacturer under Asure Quality, Cert No PMA-09 to Australia and NZ Standard 1328 - Manufacture of Glue Laminated Structural Timber and AS 5068 - Finger Jointed Structural Timber, who are able to demonstrate extensive international experience in similar types of projects.

- Laminated structural material shall comply with AS/NZS 1328.
- Non-laminated material shall comply with NZS 3631.

## Design

Design shall be provided by a registered engineer or carried out by TimberLab Solutions Ltd who will employ the services of a specialist registered engineer, who demonstrates competence in the design of timber structures in the International market.

## Manufacture of Laminated Timber

### 1.0 General

The preliminaries section of this specification and the General Conditions of Contract shall be read in conjunction with the special clauses below.

### 2.0 Timber

**2.1 Species** - for use in glue laminated members shall be plantation grown NZ Radiata Pine.

**2.2 Treatment** - For exterior use (fully exposed), members shall be pressure treated CCA prior to laminating to Hazard class H3.2 to H5 as appropriate for protection against termite and fungal attack. For interior use, timber shall be treated to H1.2 prior to laminating.

**2.3 Grade** – The laminates shall be select grade as prescribed by the design engineer. Grading of laminations shall be as set out in ASNZS 1328:1998 (Refer table 1.2)

**2.4 Lamination Thickness** - Laminated members shall be fabricated from laminations not exceeding 45mm in thickness.

**2.5 Moisture Content** - of laminations at the time of gluing shall be between 12 to 16 per cent. The moisture content of adjacent laminations shall not vary by more than 2 percent and the total range of moisture content of all laminations in any single member shall not exceed 4 percent.

### 3.0 Service Class

The Service Class defines the environmental conditions in which the laminated beams may be used.

#### Definition of Environmental Conditions for Glulam Service Classes

Service Class	Description	Environmental Conditions
1	Interior	Service Class characterised by moisture content in the materials corresponding to a temperature of 30°C and relative humidity of the surrounding air only exceeding 65% for a few weeks per year. For example: domestic houses, commercial offices.
2	Exterior, under cover	Service Class characterised by moisture content in the materials corresponding to a temperature of 20°C and relative humidity of the surrounding air only exceeding 85% for a few weeks per year. For example: open sheds, exposed beams under soffits, porches, wool scouring plants, laundries.
3	Exterior, fully exposed	Service Class characterised by climatic conditions leading to higher moisture content than Service Class 2, or where timber is directly exposed to sun and / or rain. For example: Marine structures, bridges.

### 4.0 Adhesive

The adhesive used in fabrication shall be Type II (such as melamine fortified urea) for Service Class 1 & 2 (interior use) and Type I (such as unmodified resorcinol) for Service Class 3 (exterior use). Adhesive components shall be stored, mixed, handled, spread and cured in accordance with the adhesive manufacturer's instructions.

### 5.0 Fabrication

**5.1 General** - Fabrication shall be in accordance with recognised sound practice, using adequate plant and equipment under the supervision of qualified personnel and shall comply with the recommendations of ASNZS 1328.

**5.2 Laminations** - Laminations shall be planed within 48 hours prior to gluing.

**5.3 Joints** - Laminations shall be pre-glued to the full length required. All end joints in laminations shall be structural finger joints complying with the requirements of AS 5068. Concentrations of end joints shall be avoided. End joints shall, as a minimum, be dispersed so as to avoid stacking of joints. The average distance between finger joints in the same lamination shall be approximately 2.0m

**5.4 Assembly** - It is especially important that machining of laminations be precise, glue spread adequate and uniform, and that clamping sequences and pressures are correct.

## 5.5 Appearance of Finished Members

**5.5.1 Appearance Grade A** shall be a filled and sanded finish where appearance is important. All surface voids are plugged.

**5.5.2 Appearance Grade B** shall be a machine-planed finish with occasional skips, blemishes and voids.

**5.5.3 Appearance Grade C** is intended for use in applications where appearance is not important. All blemishes and voids are acceptable.

## 6.0 Connections / Detailing

**6.1 Connections** Where engineered timber structures are involved, prefabrication of joints and connections shall be carried out in factory.

**6.2 Pre-fitting** All joints and connection hardware shall be pre-fitted; with end-cutting, rebates, mortising, bevelling and slotting etc to be carried out in the factory, using equipment capable of providing accurate tolerances +/- 1-2mm.

## 7.0 Protection of Finished Members

**7.1** All glue-laminated members shall have a temporary weather protection with a minimum of one coat of approved sealer applied in accordance with the manufacturer's recommendations. End grain shall be sealed with a minimum of two coats of sealer. The sealer is effective for a period of up to 10 weeks from application. If left exposed for a longer period, the timber must be recoated with your chosen coating system.

**7.2** All surfaces to be coated should be clean, dry and free from all mould, fungi etc.

**7.3** Members may be individually or bulk wrapped and during handling and delivery to site, care shall be taken to avoid damage that will allow moisture penetration or impair structural efficiency.

## 8.0 Testing

**8.1 Quality Control Testing During Manufacture** - The manufacturer shall supply the results of routine tests done in compliance with requirements for checking glue quality and laminate end-joint strength.

## 9.0 Handling and Installation

**9.1** Glulam shall not be dropped, jarred or dragged. Care shall be taken to prevent damage to surfaces.

**9.2** Glulam shall be loaded, unloaded and secured during transport by means that do not damage the edges, surfaces or packaging.

**9.3** Care shall be taken not to over-stress Glulam members during transport and erection.

**Note:** Use webbing slings for lifting to avoid damaging Glulam members. Where chains or wire ropes are necessary, adequate corner protection must be used.

*Glulam should be lifted on its edge wherever possible with a suitable spreader used on long members.*

*Locate slings carefully to ensure balanced support and control the Glulam with guy lines when lifting.*

**9.4 Onsite Care** - Please refer to our Onsite Care Instructions. Copies available on our website or please contact TimberLab directly.