
**Timber structures — Laminated veneer
lumber — Structural properties**

Structures en bois — Lamibois — Propriétés structurelles

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22390 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

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Introduction

Laminated veneer lumber (LVL) is being produced in many countries under different national standards and these products are being exported from one country to another. While the national standards have many similarities, there are also many areas of dissimilarity. Thus, there is a need for the development of this International Standard to establish consistency between these standards in order to ensure the suitability of LVL for structural end-use applications, regardless of country of manufacture or country of end use. It is intended for this to have value to industry, consumers, governments and distributors.

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Timber structures — Laminated veneer lumber — Structural properties

1 Scope

This International Standard specifies requirements for establishing the characteristic properties of structural laminated veneer lumber (LVL), including 5th percentile strength values, stiffness characteristics and other performance characteristics, related to its end use as a structural product for dry use (bonding class 1). It is applicable to members used in flatwise or edgewise bending orientations.

It does not cover the assessment of formaldehyde requirements, biological durability, fire performance or manufacturing, such as quality control and marking.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10033-1, *Laminated veneer lumber — Bonding quality — Part 1: Test methods*

ISO 10033-2, *Laminated veneer lumber — Bonding quality — Part 2: Requirements*

ISO 13910, *Structural timber — Characteristic values of strength-graded timber — Sampling, full-size testing and evaluation*

ISO 16572, *Timber structures — Wood-based panels — Test methods for structural properties*

ISO 16979, *Wood-based panels — Determination of moisture content*

EN 408-03, *Timber structures — Structural timber and glued laminated timber — Determination of some physical and mechanical properties*

ASTM D143-09, *Standard Test Methods for Small Clear Specimens of Timber*

ASTM D198-09, *Standard Test Methods of Static Tests of Lumber in Structural Sizes*

ASTM D4761-05, *Standard Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material*

ASTM D5456-06, *Standard Specification for Evaluation of Structural Composite Lumber Products*

ASTM D6815-09, *Standard Specification for Evaluation of Duration of Load and Creep Effects of Wood and Wood-Based Products*

MAFF Notification No. 701, *Japanese Agricultural Standard for Laminated Veneer Lumber*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 laminated veneer lumber

LVL

composite of wood veneer sheet elements manufactured from one or more species, either separately or mixed, with wood fibres primarily oriented along the length of the member

NOTE This does not exclude laminated veneer lumber with cross-laminated veneers.

3.2 characteristic value for strength

estimate of the 5th percentile values based on a statistical distribution obtained from results of tests on the defined properties in accordance with Clauses 5 and 6 with the test duration between 60 s and 300 s

3.3 characteristic value for stiffness

estimate of the mean property from results of tests on the defined properties in accordance with Clauses 5 and 6 with the test duration between 60 s and 300 s

NOTE The characteristic values used for 3.2 and 3.3 are either an estimate of the 5th percentile value or an estimate of the mean value of the sample as determined from ISO/TC 165 draft document on the evaluation of characteristic values for structural timber products.

3.4 population

assembly of samples that are clearly defined since the characteristic properties apply only to that population

NOTE The sample size is chosen to be representative of the reference population, taking into consideration the occurrence of strength-reducing characteristics which affect the structural property being evaluated.

3.5 test specimen

specimen cut from random locations within the pieces of the LVL samples

3.6 thickness

d

least dimension of a cross-section, which is perpendicular to the plane of the veneers

See Figure 1.

3.7 width

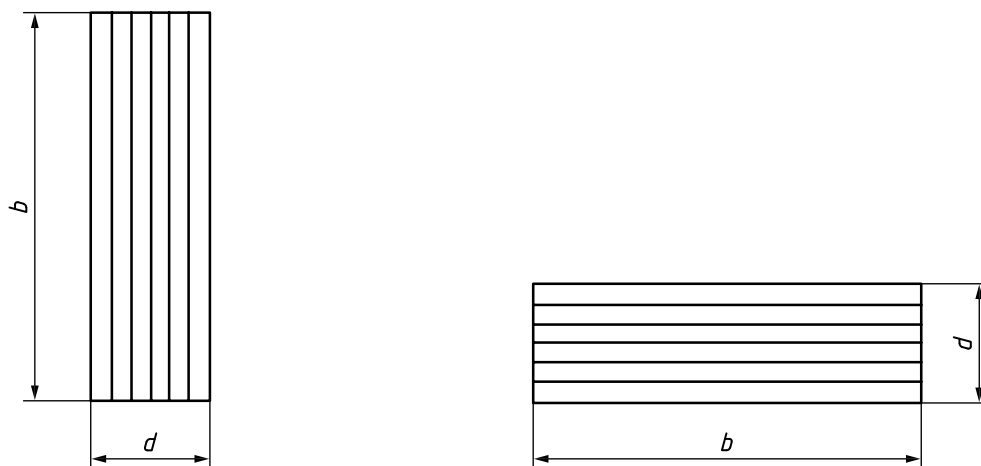
b

largest dimension of a cross-section, which is perpendicular to the thickness (or parallel to the plane of the veneers)

See Figure 1.

3.8 depth

dimension of the specimen related to the direction of the applied load, b for edgewise (joist) and d for flatwise (plank)



a) Cross-section related to edgewise bending b) Cross-section related to flatwise bending

Figure 1 — Thickness, d , and width, b , of cross-section of laminated veneer lumber

4 Requirements

4.1 Veneers

The minimum number of veneers in the cross-section shall be five. The maximum thickness of each veneer shall be 6 mm.

4.2 Bonding quality

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The LVL shall utilize a structural adhesive suitable for dry service (bonding class 1) and the bonding quality and adhesive qualification shall be determined in accordance with ISO 10033-1 and ISO 10033-2.

NOTE 1 Attention is drawn to national standards which can be applicable.

NOTE 2 Examples of applicable national standards include EN 314-1, ASTM D5456 and JAS Notification No. 701.

NOTE 3 Additional testing to cover more severe bonding service conditions (bonding classes 2 and 3) can be considered as a manufacturer's option and can be required by some national standards.

4.3 Dimensions and tolerances

The dimensions of the test specimens shall be measured to the following accuracy:

- for dimensions ≤ 150 mm: $\pm 0,1$ mm;
- for dimensions > 150 mm and ≤ 400 mm: $\pm 0,5$ mm;
- for dimensions > 400 mm: ± 1 mm.

All measurements shall be made after the test pieces have been conditioned in accordance with Clause 5. Width and thickness measurements (see Figure 1) shall be the average of three measurements taken at three different positions within the middle third of the specimen. Where possible, the measurements should not be taken within 150 mm of the ends of the test piece.

Local thickness deviations related to discontinuities of the veneers, e.g. knotholes and veneer joints, are allowed, but should be avoided in the measurement of section properties.