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**Timber structures — Glued laminated  
timber — Face and edge joint cleavage  
test**

*Structures en bois — Bois lamellé-collé — Essai de fendage des joints  
face à face et longitudinaux*



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Published in Switzerland

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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 19993 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

## Introduction

This International Standard was developed by TC 165 as a factory quality-assurance test used for structural glulam and applies to the face joints of each production batch. The frequency of testing and the pass/fail criteria are detailed in ISO 12578<sup>1)</sup>. However, there is nothing in principle that prevents the test method from being applied to non-structural glulam.

Dry specimens are tested under ambient conditions and wet specimens are tested under ambient conditions after a vacuum-pressure soak.

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1) To be published.

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# Timber structures — Glued laminated timber — Face and edge joint cleavage test

## 1 Scope

This International Standard specifies methods of evaluating the effectiveness of glued, laminated timber-face and edge bonds within a manufacturing plant by cleaving of the glue line in both dry and wet conditions.

## 2 Terms and definitions

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

### 2.1

#### **wood failure**

area of wood fibre remaining on the bond line following completion of the cleavage test expressed as a percentage of the total test area excluding any areas of wood defect (gum vein and similar)

### 2.2

#### **cleavage**

rupture parallel to the wood grain of a glulam face joint bond line or the adjacent adherend by the application of normal stress

## 3 Principle

A specimen consisting of a full cross-section of laminated timber is cleaved apart along the plane bond lines and wood failure is assessed after wet or dry conditioning.

## 4 Apparatus

**4.1 Chisel**, with a wedge angle and thickness such that the tip of the blade does not touch the bottom of the saw cut of the test specimen before cleavage failure begins to occur.

The width of the chisel shall exceed that of the specimen.

NOTE A bricklayer's bolster is a suitable implement.

**4.2 Hammer or mallet**, with a minimum mass 1 kg.

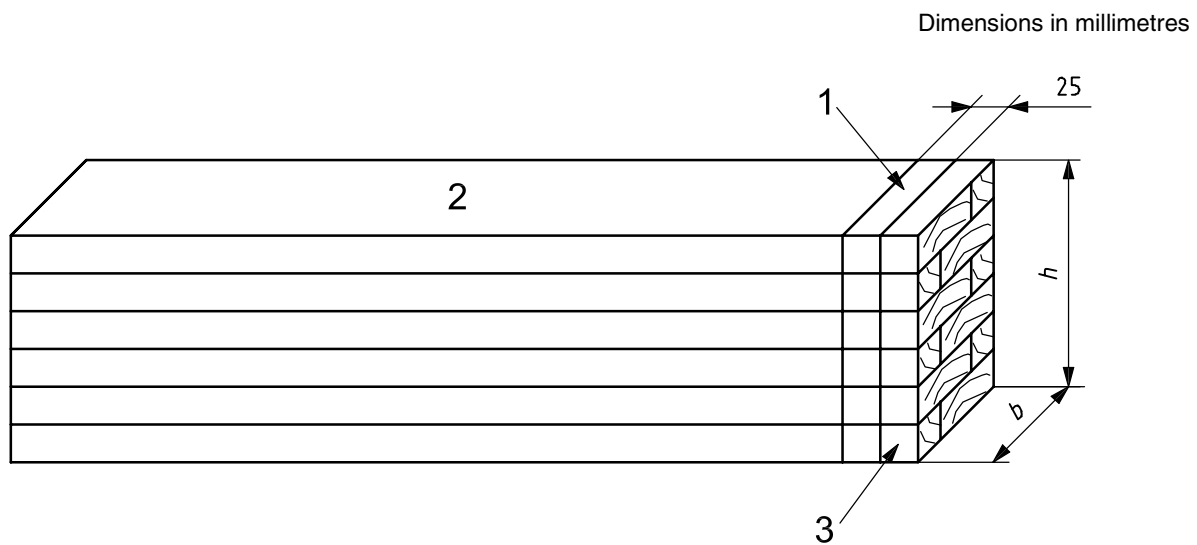
**4.3 Wood cutting equipment**, such as a panel saw, band saw or circular saw.

**4.4 Autoclave or similar vessel**, designed to withstand safely a pressure of at least 500 kPa, equipped with a vacuum pump capable of drawing a vacuum of at least 65 kPa (500 mm of mercury) in the vessel and a pump or other device to provide a pressure of at least 500 kPa.

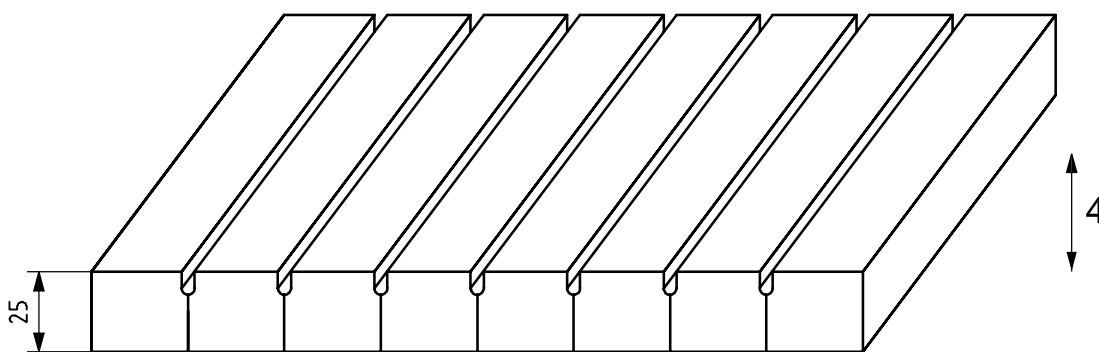
### 5 Preparation of test pieces

A member for testing shall be manufactured to a slightly longer length than specified to allow for the removal of a representative specimen or specimens at the end of the member. The specimen(s) shall be removed from the off-cut portion at the end of the member after trimming to length. Each specimen shall be marked to identify the member from which it is cut.

The specimens shall include the full cross-section of the laminated timber to be tested, perpendicular to the grain of the wood and 25 mm long measured along the grain. Each bond line of the specimen shall be cut uniformly the full width of the specimen to a depth of 10 mm from one cross-cut face. For convenience, the specimen may be divided into smaller parts, provided the cuts are perpendicular to or well away from the bond lines, and that all parts are tested (see Figure 1).



a) Composition of the test specimens



b) Cuts in the bond line

- Key**
- 1 test specimen
  - 2 member
  - 3 waste
  - 4 grain direction

Figure 1 — Details of test specimen



## 6 Procedure

### 6.1 General

Apart from the conditioning, the dry and wet cleavages involve identical procedures.

### 6.2 Conditioning for wet cleavage

The conditioning shall be undertaken as follows.

- a) The test specimens shall be placed in the autoclave and fully immersed in water between 10 °C and 27 °C. The specimens shall be restrained so that they remain fully immersed throughout the conditioning period. The specimens shall be supported in such a manner that all end grain surfaces are exposed to the water.
- b) A vacuum of at least 65 kPa shall be drawn and held for 1,5 h, then the vacuum shall be released and pressure of  $500 \pm 30$  kPa applied for 1,5 h. The vacuum-pressure cycle shall be repeated once more.

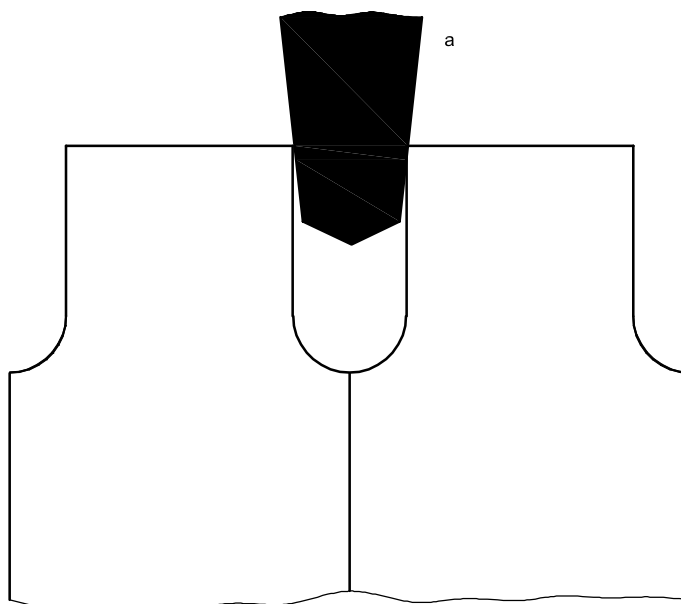
NOTE For higher-density species, longer pressure and vacuum cycles can be required to achieve total water penetration.

### 6.3 Cleaving and assessment

The following procedure shall be followed with respect to cleaving and wood failure assessment.

- a) Each bond line shall be cleaved by means of the chisel and hammer, ensuring that the tip of the chisel does not touch the bottom of the saw kerf prior to the onset of cleavage; see Figure 2.
- b) The wood failure percentage of each bond line shall be assessed to the nearest 5 %.
- c) The average wood failure percentage of all bond lines in the cross-section shall be determined from the wood failure percentage of the individual bond lines of test specimen.

NOTE Light at an oblique angle such as from a fluorescent desk lamp has been found beneficial in the assessment of wood failure.



<sup>a</sup> Chisel shall not touch bottom of saw kerf prior to onset of cleavage failure.

**Figure 2 — Details of saw kerf and chisel tip**

## 7 Test report

The following results and general information shall be reported:

- a) date and number of this International Standard;
- b) date and time of glulam production;
- c) identification mark of the test pieces and members from which they have been cut;
- d) species of timber;
- e) type of adhesive;
- f) percentage wood failure of each bond line;
- g) average wood failure for all bond lines;
- h) whether or not the timber is fire-retardant or preservative-treated;
- i) name and signature of the person responsible for the testing.

## Bibliography

- [1] ISO 12578, *Timber structures — Glued laminated timber — Component performance and production requirements*

