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

*Structures en bois — Bois lamelle-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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 19993:2007), which has been technically revised.

The main changes compared to the previous edition are as follows.

- The acceptance criteria have been amended so that they are now contained in [Annex A](#) in keeping with the fact that this document deals only with a testing method.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document was developed by TC 165 as a factory quality assurance test to be used for structural glulam and applied to the face and edge joints of each production batch. Advisory acceptance criteria are included in Annex A so that ISO 19993 is an independent document. The test is intended for use in establishing the effectiveness of inter-laminar face and edge bond in structural glued laminated timber of each production batch. It is not intended for use in initial type testing or to establish the effectiveness inter-laminar bond brought about by major changes of a production process such as change of adhesive, cramping pressures, adhesive curing or similar where cyclic delamination or block shear is preferred. There is nothing in principle that would prevent 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 under circumstances defined within the document.

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

1 Scope

This document 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. It is not intended that it be used for initial type testing where cyclic delamination or block shear is preferred. It is based on the principle that, provided minimum wood failure percentages are met, then the bond strength exceeds the perpendicular to the grain tension strength of the under-lying substrate and therefore the bond is not the weak element limiting the integrity of a glulam assembly.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

wood failure

area of wood fibre remaining on the bond line following completion of the *cleavage* (3.2) test expressed as a percentage of the total test area excluding any areas of wood defect (gum vein and similar)

3.2

cleavage

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

4 Principle

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

Cleavage is achieved by cutting a saw kerf that straddles the bond line then using a chisel, usually a bricklayer's bolster, that is placed in the saw kerf and is struck with a hammer to produce stresses perpendicular to the grain, in other words, to induce cleavage. If there is sufficient wood failure it means that the adhesive bond is stronger than that of the wood and that there is no loss of strength perpendicular to the grain at the interface between laminations.

5 Apparatus

5.1 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; see [Figure 2](#).

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

NOTE A bricklayer's bolster is a suitable implement.

5.2 Hammer or mallet, with a minimum mass of 1 kg.

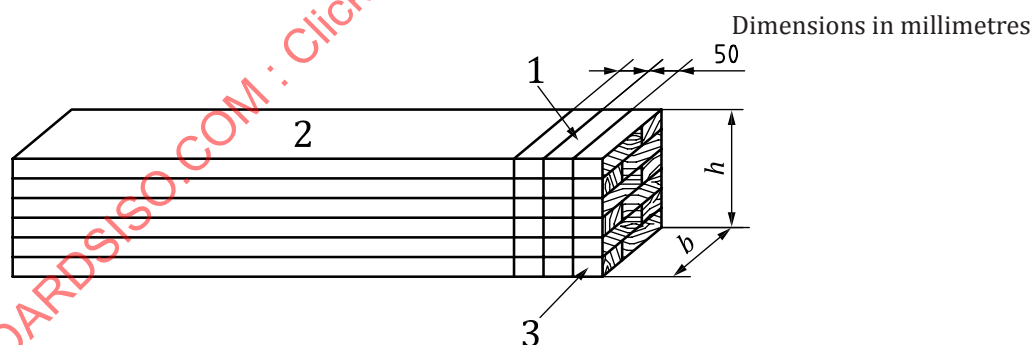
5.3 Wood cutting equipment, such as a panel saw, band saw or circular saw.

5.4 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.

6 Preparation of test pieces

A member to be tested shall be manufactured to a slightly longer length than specified to allow for a representative specimen or specimens to be removed 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.

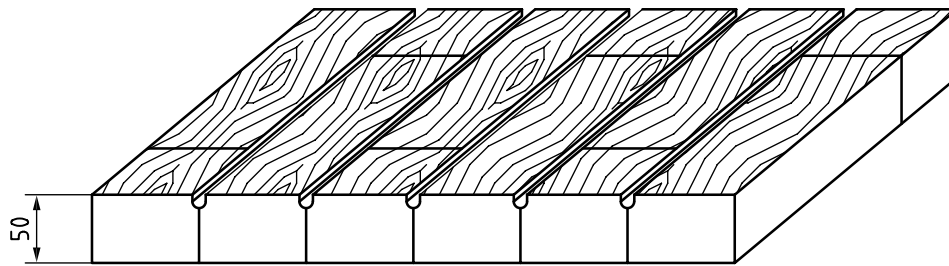
The specimens shall include the full cross-section of the laminated timber to be tested, perpendicular to the grain of the wood and 50 mm long measured along the grain. Each bond line of the specimen shall be cut uniformly the full width of the specimen to a depth of 10 mm from one cross-cut face. For 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) Cutting of test specimen from glulam member



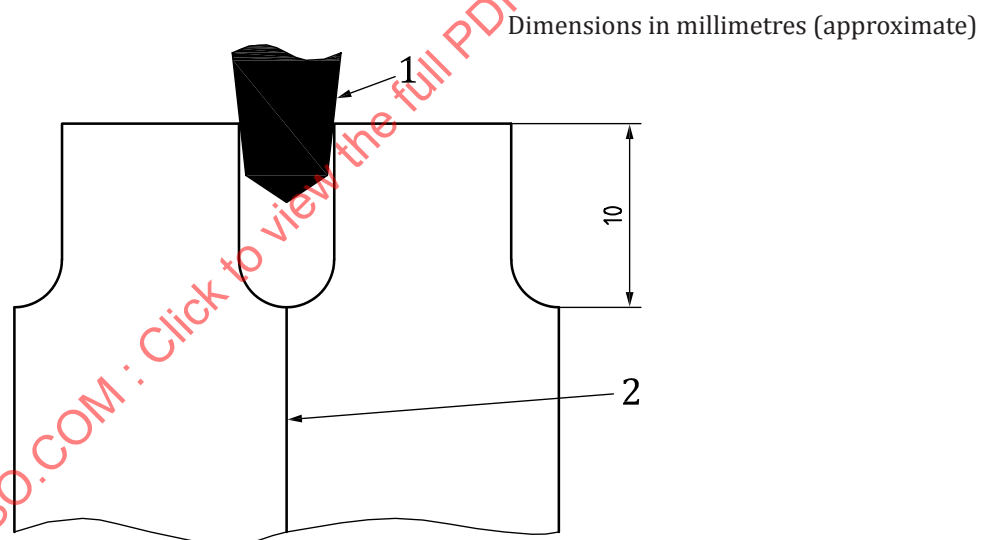
b) End grain



c) Test piece and bondline saw kerfs

Key

- 1 test pieces – one wet, one dry
- 2 glulam member
- 3 off cut not used as a test piece
- b width
- h height

Figure 1 — Details of test specimen**Key**

- 1 chisel (not touching bottom of saw kerf prior to onset of cleavage)
- 2 bondline subject to cleavage by chisel wedging action

Figure 2 — Details of saw kerf and chisel tip**7 Procedure****7.1 General**

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