
**Timber structures — Bond performance
of adhesives —**

**Part 2:
Additional requirements**

*Structures en bois — Performance d'adhérence des adhésifs —
Partie 2: Exigences supplémentaires*





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Foreword

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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 20152-2 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

ISO 20152 consists of the following parts, under the general title *Timber structures — Bond performance of adhesives*:

- *Part 1: Basic requirements*
- *Part 2: Additional requirements*

Introduction

ISO 20152 was developed by ISO/TC 165 to provide additional performance requirements for adhesive bonds formed in structural wood products. It is required only in some jurisdictions (the high temperature creep and shear strength at elevated temperatures) and under some circumstances (situations where a gap filling requirement exists).

This International Standard focuses on bond line performance and is directed principally at the evaluation of wood adhesives. When used in this manner, the tests and assessments are made against standardized wood species, but it would apply to the bond lines in wood products involving other wood species and possibly preservative and fire-retardant treated wood. It is expected that product standards (e.g. for glulam, laminated veneer timber, etc.) would insist that selected requirements be met in the establishment of a new production line or the introduction of a new product, new adhesive, new species, etc. on an existing production line as part of qualification procedures.

The matter of high temperature performance has been controversial in that various national standards have requirements for:

- strength testing at 220 °C or higher,
- creep testing at 180 °C or higher,
- creep testing at 70 °C or higher,

all purporting to deal adequately with high temperature performance. In the event, ISO/TC 165 determined that the CSA O112.9 and CEN EN 15416-2 tests at 70 °C would be placed in ISO 20152-1: Basic requirements. The tests and requirements for high temperature strength at 220 °C or higher (based on an ASTM requirement), the creep resistance at 180 °C or higher (based on CSA O112.9) together with a gap filling capacity, would be placed in this part of ISO 20152. Manufacturers of adhesive should familiarize themselves with local building regulations to determine if the “additional” requirements are necessary.

Users of this International Standard are reminded that local building regulations are a matter for determination by local and/or national governments or regulatory authorities and cannot be mandated in an International Standard.

Timber structures — Bond performance of adhesives —

Part 2: Additional requirements

1 Scope

This International Standard specifies the performance requirements of wood bond lines in prefabricated structural timber components.

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 3130, *Wood — Determination of moisture content for physical and mechanical tests*

ISO 12579, *Timber structures — Glued laminated timber — Method of test for shear strength of glue lines*

ISO 20152-1, *Timber structures — Bond performance of adhesives — Part 1: Basic requirements*

ASTM D 7247, *Standard Test Method for Evaluating the Shear Strength of Adhesive Bonds in Laminated Wood Products at Elevated Temperatures*

3 Terms and definitions

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

3.1

specific gravity

ratio of the oven dry mass of a specimen to the mass of a volume of water equal to the volume of the specimen at specified moisture content

3.2

oven dry specific gravity

expression of the specific gravity based on oven dry mass of wood and its oven dry volume after drying to constant mass in a ventilated oven at a temperature between 100 °C and 105 °C

3.3

wood failure percentage

percentage of wood fibre ruptured during the separation of an adhesive/adherend interface and used to evaluate the effectiveness of adhesive bonding

4 Application

The evaluation of the adhesive bond detailed in this part of ISO 20152 is based on the performance of the adhesive as measured by the following properties:

- resistance to creep at high temperature (180 °C or higher) (see 5.2),
- resistance to shear rupture at high temperature (220 °C or higher) (see 5.3),
- ability to provide adequate shear strength in thick bond lines (greater than 1,0 mm in thickness) (see 5.4).

The performance requirements are optional in the sense that they are not required in all jurisdictions (high temperature creep and high temperature shear rupture) and for all applications (gap filling is not required normally for finger joints, edge and face joints of glulam, plywood, or LVL). Where local building regulations specify that some of these requirements be met, it shall be necessary to test bond lines as specified herein.

5 Requirements

5.1 Adhesive details, mixing and application

The adhesive shall be mixed and applied to the wood substrate in accordance with the adhesive manufacturer's specification. The type and amount of fillers and/or extenders used in the adhesive shall comply with the adhesive manufacturer's specification.

5.2 Creep resistance at elevated temperatures

5.2.1 General

High temperature (180 °C or higher) creep resistance tests shall be carried out in accordance with 6.3 and shall meet the requirements in 5.2.2.

5.2.2 Requirements

High temperature creep resistance shall be demonstrated by testing in accordance with 6.3. The average creep displacement (see Figure 6 of ISO 20152-1 and Annex A of this part of ISO 20152) for all bonded cross-sections for each specimen shall not exceed 0,6 mm and the maximum average creep displacement at any single bonded cross-section for each specimen shall not exceed 2,9 mm after the prescribed load period.

NOTE Temperatures in the range of 180 °C to 220 °C in 5.2.2 are generally appropriate for assessing adhesives used in small cross-section members in fire-protected assemblies.

5.3 Shear strength at elevated temperatures

5.3.1 General

High temperature (220 °C or higher) shear strength resistance tests shall be carried out in accordance with 6.4 and shall meet the requirements in 5.3.2.

5.3.2 Requirements

Reference shall be made to the relevant national product standard, manufacturer of the laminated wood product, qualified agency and/or code evaluation agency to specify a combination of test temperature and exposure durations, or shear strength retention. The performance of bonded specimens shall be compared to that of solid control specimens.

5.4 Gap filling strength

5.4.1 General

Gap filling tests shall be undertaken when bond lines in structural wood products of thickness typically in excess of 1,0 mm are required to exhibit adequate strength. The test is conducted on bond lines at a thickness exceeding 1,0 mm and up to 2,0 mm, but tests at other thicknesses shall be permitted upon agreement between the manufacturer and the user.