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CSA O112.9:10
(reaffirmed 2019)

Evaluation of adhesives for structural wood products (exterior exposure)

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Update No. 1
O112.9-10
December 2011

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Title: *Evaluation of adhesives for structural wood products (exterior exposure)* — originally published January 2010

The following revisions have been formally approved and are marked by the symbol delta (Δ) in the margin on the attached replacement pages:

Revised	Clause B.1
New	None
Deleted	None

- Update your copy by inserting these revised pages.
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Annex A (informative)
Actions to be taken if boil-dry-freeze conditioning is interrupted

Note: *This Annex is an informative (non-mandatory) part of this Standard.*

A.1
Table A.1 indicates the actions to be taken if shear block test boil-dry-freeze conditioning needs to be interrupted (e.g., because of laboratory closure or unavailability of equipment).

Table A.1
Action to be taken if boil-dry-freeze conditioning is interrupted
(See Clause A.1.)

Last completed cycle*	Action to be taken	Next cycle
Final 4 h boil	Cool in water, drain, and store in a sealed plastic bag at 10 °C to 15 °C **Note:** *Remove the specimens from the chamber still sealed in the plastic bag and store them next to the testing machine for at least* 1 h *to bring them close to or at room temperature prior to testing.*	Testing
4 h boil (except the final 4 h boil)	Cool in water, drain, and store in a sealed plastic bag at 10 °C to 15 °C	19 h drying
19 h drying	Store in an environmental chamber at 20 °C and 65% relative humidity	4 h freezing
4 h freezing	Leave in the freezer until the next cycle begins	4 h boil
In water	Drain and wipe the surface water off the specimens. Store in a sealed plastic bag at 10° to 15 °C **Note:** *Remove the specimens from the chamber still sealed in the plastic bag and store them next to the testing machine for at least* 1 h *to bring them close to or at room temperature prior to testing.*	Testing

**Conditioning should not be interrupted during a cycle.*

Annex B (normative)
Measurement and computation of bond line creep

Note: *This Annex is a normative (mandatory) part of this Standard.*

B.1 Environments A, B_1, and B_2

Each full-length creep specimen shall have 14 bonded cross-sections (Joint 1 to Joint 14 in Figure 2). When partial-length creep specimens are used, only eight joints shall be considered (Joints 1, 2, 5, 6, 9, 10, 13, and 14 in Figure 6). Creep (D_{Jnt-n}) of a bonded cross-section shall be the average of the four creep measurements D_1, D_2, D_3, and D_4 (see Figure 5).

The calculations for each creep specimen shall be as follows:

(a) Overall creep:

$$\frac{1}{N}\sum_{n=1}^{N} D_{Jnt-n} \quad \begin{array}{l} \leq 0.05 \text{ mm (for Environments A and } B_1) \\ \leq 0.6 \text{ mm (for Environment } B_2) \end{array}$$

Δ

where

N = 14 when considering a full-length specimen
= 8 when considering a partial-length specimen
= 6 when one of the partial-length specimens is discarded

(b) Creep at any cross-section:

$$D_{Jnt-n} - \frac{D_1 + D_2 + D_3 + D_4}{4} \quad \begin{array}{l} \leq 0.25 \text{ mm (for Environments A and } B_1) \\ \leq 2.9 \text{ mm (for Environment } B_2) \end{array}$$

B.2 Environment C

Creep (D_{Jnt-n}) of the bond line of a specimen shall be the average of the two creep measurements D_1 and D_2 (see Figure 9) as shown below:

$$D_{Jnt-n} = \frac{D_1 + D_2}{2} \leq 0.25 \text{ mm}$$

The overall creep of all specimens from one assembly shall be

$$\text{Overall creep} = \frac{1}{N}\sum_{n=1}^{N} D_{Jnt-n} \leq 0.05 \text{ mm}$$

where

N = 12 when considering all specimens from an assembly
= 10 when two of the specimens from an assembly are discarded

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Contents

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Preface

This is the second edition of CSA O112.9, *Evaluation of adhesives for structural wood products (exterior exposure)*. It supersedes the previous edition, published in 2004.

Unlike the other Standards in the CSA O112 Series, which rely on CSA O112.0 for their test procedures, this Standard is not restricted to a specific class of adhesives, and its test procedures are self-contained. It is also one of the few Standards that evaluate the performance of adhesives under thermal conditions corresponding to those that would be encountered during a fire by a structural wood product used in a fire-protected wood assembly.

Users of this Standard should note that it has been developed for untreated wood only. It is solely the responsibility of the users of this Standard to decide whether they wish to apply its requirements to treated wood.

The procedures in this Standard are under continuing development by the members of the Technical Committee and the Subcommittee responsible for producing this Standard. The areas under development are described in Annex C. They include the development of a fire test for bonded wood members.

This Standard was prepared by the Subcommittee on Wood Adhesives, under the jurisdiction of the Technical Committee on Solid and Engineered Wood Products and the Strategic Steering Committee on Forest Products, and has been formally approved by the Technical Committee.

January 2010

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

(3) *This publication was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this publication.*

(4) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.*

(5) *All enquiries regarding this Standard, including requests for interpretation, should be addressed to Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.*

Requests for interpretation should

(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;

(b) provide an explanation of circumstances surrounding the actual field condition; and

(c) be phrased where possible to permit a specific "yes" or "no" answer.

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are published in CSA's periodical* Info Update*, which is available on the CSA Web site at www.csa.ca.*

O112.9-10
Evaluation of adhesives for structural wood products (exterior exposure)

1 Scope

1.1
This Standard specifies requirements for evaluating adhesives used to bond solid wood materials in structural wood products designed for exterior applications.
Note: *See Annex C for additional information on exterior exposure and other moisture exposure categories for structural wood adhesives.*

1.2
This Standard specifies requirements for evaluating the resistance of adhesives to
(a) shear caused by compression loading, under both wet and dry conditions;
(b) delamination during accelerated exposure to wetting and drying; and
(c) deformation under static shear loading during exposure to heat, high humidity, or combined heat and high humidity.

1.3
This Standard does not apply to adhesives intended for below-ground, ground-contact, or marine service applications.

1.4
This Standard is not intended for the assessment of the effects of chemical treatments of wood on adhesive performance.

1.5
In CSA Standards, "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; "should" is used to express a recommendation or that which is advised but not required; "may" is used to express an option or that which is permissible within the limits of the standard; and "can" is used to express possibility or capability. Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material. Notes to tables and figures are considered part of the table or figure and may be written as requirements. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications
This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below.

CSA (Canadian Standards Association)
CAN/CSA-O86-01 (R2006)
Engineering design in wood