

# Evaluation of adhesives for structural wood products (limited moisture exposure)



# Legal Notice for Standards

Canadian Standards Association (operating as “CSA Group”) develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

## Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document’s fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party’s intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document’s compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

## Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group’s and/or others’ intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by treaty or by law, CSA Group reserves all intellectual property rights in this document.

## Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

## Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way, or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.



# ***Standards Update Service***

***CSA 0112.10:24  
November 2024***

**Title:** *Evaluation of adhesives for structural wood products (limited moisture exposure)*

To register for e-mail notification about any updates to this publication go to [updates.csagroup.org](https://updates.csagroup.org).

The **List ID** that you will need to register for updates to this publication is **2431595**.

If you require assistance, please e-mail [techsupport@csagroup.org](mailto:techsupport@csagroup.org) or call 416-777-2233.

Visit CSA Group's policy on privacy at [www.csagroup.org/legal](https://www.csagroup.org/legal) to find out how we protect your personal information.

**Canadian Standards Association (operating as “CSA Group”)**, under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

More than 10 000 members indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in fourteen countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to  
CSA Group  
178 Rexdale Boulevard  
Toronto, Ontario, M9W 1R3  
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at [www.scc.ca](http://www.scc.ca).

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada’s economic competitiveness and social wellbeing, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at [www.scc.ca](http://www.scc.ca).

Standards Council of Canada  
600-55 Metcalfe Street  
Ottawa, Ontario, K1P 6L5  
Canada



Cette Norme Nationale du Canada n’est disponible qu’en anglais.

*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 to judge its suitability for their particular purpose.*

®A trademark of the Canadian Standards Association, operating as “CSA Group”

*National Standard of Canada*

*CSA 0112.10:24*

***Evaluation of adhesives for  
structural wood products (limited  
moisture exposure)***



*®A trademark of the Canadian Standards Association,  
operating as "CSA Group"*



*Published in November 2024 by CSA Group  
A not-for-profit private sector organization  
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at  
[www.csagroup.org/store/](http://www.csagroup.org/store/) or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 83.180, 79.080  
ISBN 978-1-4883-5194-5*

*© 2024 Canadian Standards Association  
All rights reserved. No part of this publication may be reproduced in any form whatsoever  
without the prior permission of the publisher.*

# Contents

Technical Committee on Solid and Engineered Wood Products 3

Subcommittee on Wood Adhesives 6

Preface 8

Sustainable Development Goals (SDG) Foreword 10

## 1 Scope 11

- 1.1 Requirements for evaluating adhesives used in bonding 11
- 1.2 Requirements for evaluating the resistance of adhesives 11
- 1.3 Assessment of chemical treatments 11
- 1.4 Terminology 11

## 2 Reference publications 11

## 3 Definitions 13

## 4 General requirements 16

- 4.1 General 16
  - 4.1.1 Limitations 16
  - 4.1.2 Safety 16
- 4.2 Adhesive ingredients 17
- 4.3 Adhesive mixing and application 17
- 4.4 Fillers and extenders 17
- 4.5 Anti-fungal properties 17
- 4.6 Cured adhesive film pH 17
- 4.7 Block shear strength 17
- 4.8 Percent wood failure 17
  - 4.8.1 Specimen eligibility 17
  - 4.8.2 Test requirements 17
- 4.9 Delamination resistance 17
- 4.10 Creep resistance 18
  - 4.10.1 A and B<sub>1</sub> Test requirements 18
  - 4.10.2 B<sub>2</sub> Test requirements 18
  - 4.10.3 Partial length test requirements 18

## 5 Specimen preparation and test procedures 18

- 5.1 Anti-fungal properties 18
- 5.2 Cured adhesive film pH 18
- 5.3 Wood species 18
  - 5.3.1 Wood substrate 18
  - 5.3.2 Wood density 18
  - 5.3.3 Wood grain 19
- 5.4 Wood moisture content 19
  - 5.4.1 General 19
  - 5.4.2 Moisture content variation 19

5.5	Block shear test and percent wood failure assessment	20
5.5.1	Preparation of test assemblies	20
5.5.2	Preparation of test specimens	21
5.5.3	Test procedures	21
5.6	Delamination resistance test	24
5.6.1	Preparation of test assemblies	24
5.6.2	Preparation of test specimens	25
5.6.3	Delamination cycle	26
5.6.4	Interpretation of results	27
5.7	Creep resistance test	27
5.7.1	Preparation of test assemblies	27
5.7.2	Preparation of test specimens	28
5.7.3	Conditioning of test specimens	29
5.7.4	Test procedure	29
5.7.5	Interpretation of results	31
<b>6</b>	<b>Adhesive sample</b>	<b>31</b>
<b>7</b>	<b>Rejection</b>	<b>31</b>
7.1	General	31
7.2	Alternative qualification	31
7.2.1	Reporting	31
7.2.2	Adhesives not meeting the Environment C creep resistance test of CSA O112.9	32
7.2.3	Adhesives not meeting other requirements of CSA O112.9	32
<b>8</b>	<b>Test report</b>	<b>32</b>
8.1	General	32
8.2	Product details	32
8.3	Specimen preparation and testing	33
8.3.1	General	32
8.3.2	Block shear test — Boil-dry-freeze/dry test	33
8.3.3	Creep test	33
8.4	Test results	33
8.4.1	General	33
8.4.2	Block shear test	33
8.4.3	Delamination test	33
8.4.4	Creep test	33
<hr/>		
	Annex A (informative) — Actions to be taken if boil-dry-freeze/dry conditioning is interrupted	41
	Annex B (informative) — Form for reporting delamination test results and calculation procedure for percent delamination	42
	Annex C (informative) — Measurement and calculation of bond-line creep	44
	Annex D (informative) — Commentary	45

# Technical Committee on Solid and Engineered Wood Products

<b>R. Desjardins</b>	National Lumber Grades Authority (NLGA) Ottawa, Ontario, Canada <i>Category: Producer Interest</i>	<i>Chair</i>
<b>Y. H. Chui</b>	University of Alberta Edmonton, Alberta, Canada <i>Category: Regulatory Authority/General Interest</i>	<i>Vice-Chair</i>
<b>K. D. Below</b>	Douglas Consultants Québec, Québec, Canada <i>Category: User Interest</i>	
<b>S. T. Craft</b>	CHM Fire Consultants Ltd. Ottawa, Ontario, Canada <i>Category: User Interest</i>	
<b>P. Da Silva</b>	Goodfellow Inc. Delson, Québec, Canada <i>Category: Producer Interest</i>	
<b>C. Dagenais</b>	FPIInnovations Québec, Québec, Canada <i>Category: Regulatory Authority/General Interest</i>	
<b>K. Fargey</b>	Western Archrib Ltd. Edmonton, Alberta, Canada <i>Category: Producer Interest</i>	
<b>A. S. Garden</b>	Canfor Wood Products Marketing Ltd. Vancouver, British Columbia, Canada	<i>Non-voting</i>
<b>J. F. Grandmont</b>	Ministère des Ressources naturelles et des Forêts Québec, Québec, Canada	<i>Non-voting</i>
<b>S. D. Henry</b>	WoodSci Consulting Collingwood, Ontario, Canada <i>Category: User Interest</i>	
<b>M. Humphries</b>	Mott MacDonald Canada Ltd. Toronto, Ontario, Canada	<i>Non-voting</i>

<b>R. J. Jonkman</b>	Canadian Wood Council Ottawa, Ontario, Canada <i>Category: Producer Interest</i>	
<b>F. Lam</b>	University of British Columbia Vancouver, British Columbia, Canada <i>Category: Regulatory Authority/General Interest</i>	
<b>D. Lavoie</b>	Boise Cascade Co. Saint-Jacques, New Brunswick, Canada <i>Category: Producer Interest</i>	
<b>D. Lefebvre</b>	PolyDM Québec, Québec, Canada <i>Category: Producer Interest</i>	
<b>M. Legault</b>	Hexion Inc. Lévis, Québec, Canada	<i>Non-voting</i>
<b>T. V. Leung</b>	Thomas Leung Structural Engineering Vancouver, British Columbia, Canada <i>Category: User Interest</i>	
<b>C. Lum</b>	FPInnovations Vancouver, British Columbia, Canada	<i>Non-voting</i>
<b>J. B. McFadden</b>	National Research Council of Canada Ottawa, Ontario, Canada <i>Category: Regulatory Authority/General Interest</i>	
<b>N. J. Nagy</b>	FRNICKS Enterprises Vancouver, British Columbia, Canada	<i>Non-voting</i>
<b>J. Neels</b>	National Lumber Grades Authority (NLGA) Vancouver, British Columbia, Canada	<i>Non-voting</i>
<b>M. S. Reid</b>	Revive Engineering Inc. Oakville, Ontario, Canada <i>Category: User Interest</i>	
<b>M. Rocchi</b>	Element5 LP — Modern Timber Buildings Toronto, Ontario, Canada	<i>Non-voting</i>
<b>A. Salenikovich</b>	Université Laval Québec, Québec, Canada <i>Category: Regulatory Authority/General Interest</i>	

<b>G. Stapf</b>	Henkel Engineered Wood Adhesives Sempach Station, Luzern, Switzerland	<i>Non-voting</i>
<b>N. Tarini</b>	Wood Preservation Canada Ottawa, Ontario, Canada	<i>Non-voting</i>
<b>B. Yeh</b>	APA — The Engineered Wood Association Tacoma, Washington, USA <i>Category: Producer Interest</i>	
<b>S. D'Addese</b>	CSA Group Toronto, Ontario, Canada	<i>Project Manager</i>

# ***Subcommittee on Wood Adhesives***

<b>D. Lavoie</b>	Boise Cascade Co. Saint-Jacques, New Brunswick, Canada	<i>Chair</i>
<b>R. C. Casilla</b>	RCC Consulting Ltd. Vancouver, British Columbia, Canada	
<b>F. Chan</b>	University of New Brunswick Fredericton, New Brunswick, Canada	
<b>P. Da Silva</b>	Goodfellow Inc. Delson, Québec, Canada	
<b>C. Dagenais</b>	FPIinnovations Québec, Québec, Canada	
<b>R. Desjardins</b>	National Lumber Grades Authority (NLGA) Ottawa, Ontario, Canada	
<b>W. Gareis</b>	Bostik Inc. Mars, Pennsylvania, USA	
<b>D. Lefebvre</b>	PolyDM Québec, Québec, Canada	
<b>M. Legault</b>	Hexion Inc. Lévis, Québec, Canada	
<b>J. D. Linville</b>	Weyerhaeuser Federal Way, Washington, USA	
<b>W. McCauley</b>	Hexion Inc. Springfield, Oregon, USA	
<b>J. B. McFadden</b>	National Research Council of Canada Ottawa, Ontario, Canada	
<b>W. Nkeuwa</b>	Henkel Mississauga, Ontario, Canada	
<b>N. Tarini</b>	Wood Preservation Canada Ottawa, Ontario, Canada	

**S. Wendler**

Arclin Inc.  
Springfield, Oregon, USA

**B. Yeh**

APA — The Engineered Wood Association  
Tacoma, Washington, USA

**S. D'Addese**

CSA Group  
Toronto, Ontario, Canada

*Project Manager*

# Preface

This is the second edition of CSA O112.10, *Evaluation of adhesives for structural wood products (limited moisture exposure)*. It supersedes the first edition published in 2008.

The following are the major changes to this edition:

- a) addition of definitions to Clause [3](#);
- b) clarification of moisture content in Clause [D.1.4.1](#);
- c) clarification of exposure in Clause [D.2](#); and
- d) clarification of moisture content limits in Clause [D.4.6.2](#).

This Standard recognizes new levels of adhesive performance under additional service conditions to those covered in CSA O112.9.

Structural bond lines in wood are usually evaluated for use under wet service. This Standard is targeted at adhesives for use in wood products restricted to dry service conditions.

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 the responsibility of the users of this Standard to decide whether they wish to apply its requirements to treated wood as well.

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.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

## 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 Standard 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 Standard.*
- 4) *To submit a request for interpretation of this Standard, please send the following information to [inquiries@csagroup.org](mailto:inquiries@csagroup.org) and include “Request for interpretation” in the subject line:*
  - a) *define the problem, making reference to the specific clause, and, where appropriate, include a graphical image;*
  - b) *provide an explanation of circumstances surrounding the actual field condition; and*
  - c) *where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.*

*Committee interpretations are processed in accordance with CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at [standardsactivities.csagroup.org](http://standardsactivities.csagroup.org).*