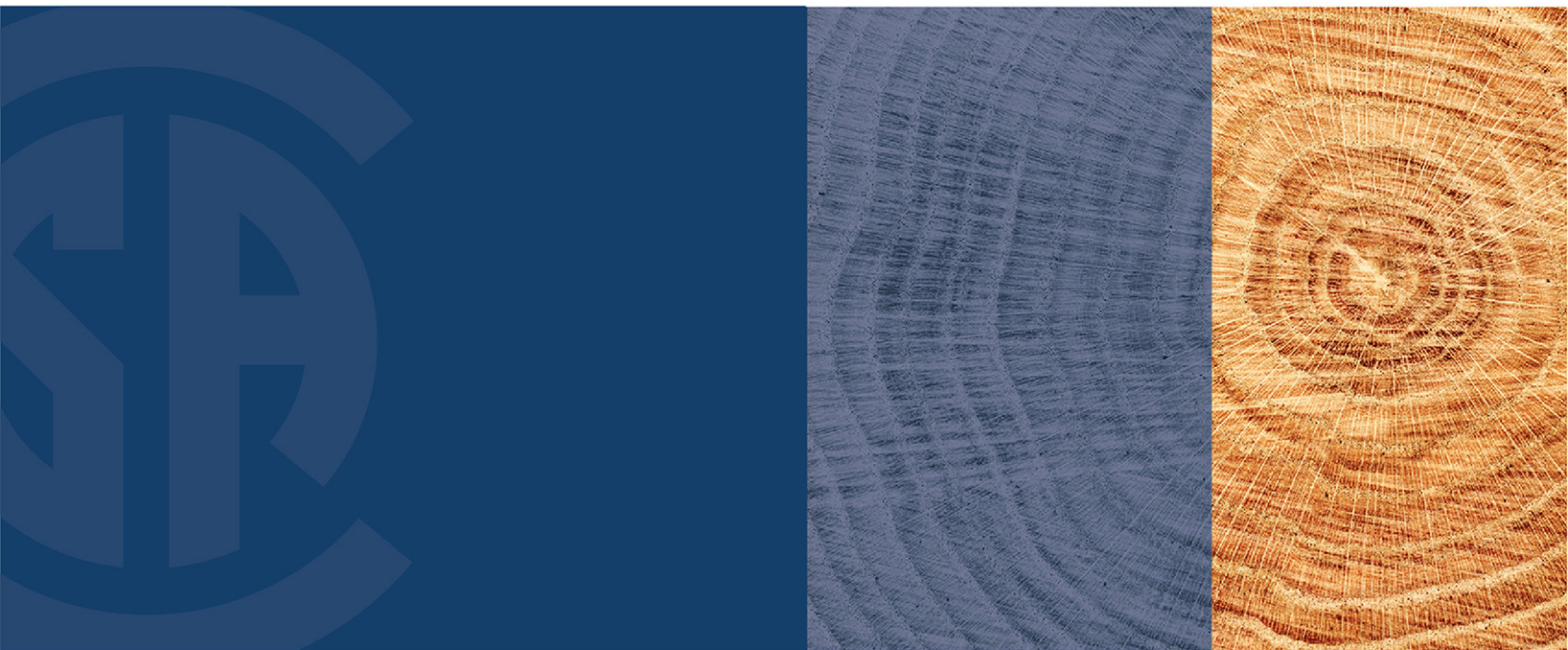




Qualification code for manufacturers of structural glued-laminated timber



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 licence 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 0177:23

May 2023

Title: *Qualification code for manufacturers of structural glued-laminated timber*

To register for e-mail notification about any updates to this publication

- go to www.csagroup.org/store/
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2430583**.

If you require assistance, please e-mail techsupport@csagroup.org or call 416-747-2233.

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

CSA 0177:23

***Qualification code for manufacturers of
structural glued-laminated timber***



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

*Published in May 2023 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/ or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 03.120.20, 79.020
ISBN 978-1-4883-4753-5*

*© 2023 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 4

Subcommittee on Glued-Laminated Timber 7

Preface 9

1 Scope 10

- 1.1 Introduction 10
- 1.2 Inclusions 10
- 1.3 Exclusions 10
- 1.4 Terminology 10
- 1.5 Dual measurements 11

2 Reference publications 11

3 Definitions 12

4 Certification 13

- 4.1 Class 13
- 4.2 Application 13
- 4.3 Examinations 13
- 4.4 Withdrawal of qualification and reinstatement 13

5 Personnel, facilities, and equipment 13

- 5.1 Personnel 13
 - 5.1.1 Organizational structure 13
 - 5.1.2 Roles 14
- 5.2 Personnel changes 14
 - 5.2.1 Notification 14
 - 5.2.2 Records 14
- 5.3 Manufacturing facilities and equipment 14
- 5.4 Thermal setting equipment 15
 - 5.4.1 Equipment 15
 - 5.4.2 Records 15

6 Quality control 15

- 6.1 Quality control organization 15
 - 6.1.1 Organizational structure 15
 - 6.1.2 Independence 15
 - 6.1.3 Supervisory qualifications 15
 - 6.1.4 Professional services 15
 - 6.1.5 Qualifications 15
- 6.2 Quality control measures 16
- 6.3 Quality control equipment 16
 - 6.3.1 Requirements 16
 - 6.3.2 Calibrations 17
- 6.4 Quality control records 17

6.5	Assessment	17
7	Manufacturing and plant manuals	17
7.1	Manufacturing	17
7.1.1	Manufacturing requirements	17
7.1.2	Fabricated products	17
7.1.3	Product labeling	17
7.2	Plant manuals	18
7.2.1	Procedures	18
7.2.2	Internal distribution	18
7.2.3	External distribution	18
7.2.4	Changes	18
8	Plant manual requirements	18
8.1	General	18
8.2	Organization charts	18
8.3	Equipment and facilities	19
8.4	Manufacturing procedure	19
8.4.1	Grading and non-destructive testing	19
8.4.2	Storage	19
8.4.3	Moisture content	19
8.4.4	Thickness	19
8.4.5	Assembly methods	19
8.4.6	End-joint checking	19
8.4.7	Glue acceptance and mixing	20
8.4.8	Glue spreading	21
8.4.9	Clamping	21
8.4.10	Curing	21
8.4.11	Block-gluing and re-gluing	21
8.4.12	Final inspection procedure	21
8.5	Routine testing	21
8.6	Records	22
8.6.1	Quality control records	22
8.6.2	Label and certificate records	22
9	Qualification requirements	22
9.1	General	22
9.2	Shear test	22
9.2.1	General	22
9.2.2	Sample	22
9.2.3	Specimens	22
9.2.4	Test	23
9.2.5	Requirements	23
9.3	Vacuum-pressure cycle tests	23
9.3.1	General	23
9.3.2	Face bond adhesive qualification test	24
9.3.3	Face bond adhesive intensive monitoring	25
9.3.4	End joint adhesive qualification test	26
9.3.5	End joint adhesive intensive monitoring	27

9.4	Bond line fire performance	27
9.5	End-joint test	27
9.5.1	General	27
9.5.2	Sample	28
9.5.3	Specimens	28
9.5.4	Test	29
9.5.5	Requirements	29
9.6	Evaluation of non-destructively tested (NDT) lumber	30
9.6.1	General	30
9.6.2	Sample	30
9.6.3	Specimens	30
9.6.4	Test	30
9.6.5	Requirements	30

Annex A (normative)	— Bond line fire performance equivalency tests	31
Annex B (normative)	— Qualification procedures for block-glued and re-glued Glulam	45
Annex C (informative)	— Certification procedures	51
Annex D (informative)	— Sample qualification certificate	52
Annex E (informative)	— Sample conformance certificate	53
Annex F (informative)	— Sample certification label	54
Annex G (informative)	— SI/Yard/pound unit conversions	55
Annex H (informative)	— Commentary	56

Technical Committee on Solid and Engineered Wood Products

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

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

N. Tarini	Wood Preservation Canada, Ottawa, Ontario, Canada	<i>Non-voting</i>
B. Yeh	APA — The Engineered Wood Association, Tacoma, Washington, USA <i>Category: Producer Interest</i>	
Z. Khalid	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

Subcommittee on Glued-Laminated Timber

K. Fargey	Western Archrib Ltd., Edmonton, Alberta, Canada	<i>Chair</i>
S. T. Craft	CHM Fire Consultants Ltd., Ottawa, Ontario, Canada	
C. Dagenais	FPInnovations, Québec, Québec, Canada	
P. Da Silva	Goodfellow Inc., Delson, Québec, Canada	
J. Estok	Elema experts-conseils, Montréal, Québec, Canada	
J. Frappier	Nordic Structures, Montréal, Québec, Canada	
J. F. Grandmont	Ministère des Forêts de la Faune et des Parcs, Québec, Québec, Canada	
F. Lam	University of British Columbia, Vancouver, British Columbia, Canada	
T. V. Leung	Thomas Leung Structural Engineering, Vancouver, British Columbia, Canada	
K. Rocchi	Element5 LP — Modern Timber Buildings, Toronto, Ontario, Canada	
N. Sills	Structurlam Mass Timber Corp., Penticton, British Columbia, Canada	
N. Tarini	Wood Preservation Canada, Ottawa, Ontario, Canada	
T. Van De Vliert	Western Archrib Ltd., Edmonton, Alberta, Canada	
C. C. Williams	Timber Systems Ltd., Markham, Ontario, Canada	

C. Winje

Kalesnikoff,
Castlegar, British Columbia, Canada

B. Yeh

APA — The Engineered Wood Association,
Tacoma, Washington, USA

Z. Khalid

CSA Group,
Toronto, Ontario, Canada

Project Manager

Preface

This is the sixth edition of CSA O177, *Qualification code for manufacturers of structural glued-laminated timber*. It supersedes the previous editions published in 2006, 1989, 1981, 1977, and 1965.

This Standard specifies the qualification procedures to be performed by manufacturers in order to produce glued-laminated timber (Glulam) in accordance with CSA O122.

The following are the major changes to this edition:

- a) Qualification procedures for block-glued and re-glued Glulam have been added to Annex [B](#).
- b) The process and requirements for qualifying adhesives have been revised.
- c) Clause [A.3](#) has been significantly modified, with the requirement of a full-scale column test eliminated and the test protocols modified to harmonize more closely with U.S. requirements.
- d) A non-mandatory commentary (see Annex [H](#)) has been added to the Standard to provide historical background and rationale for the changes made within the Standard. Additionally, the commentary provides background and technical support for those using the revised Annex [A.3](#).

This Standard was prepared by the Subcommittee on Glued-Laminated Timber under the jurisdiction of the Technical Committee on Solid and Engineered Wood Products, and has been formally approved by the Technical Committee.

We would like to thank all those who participated and supported the development of this Standard. We are fortunate to have the support of many technical organizations, universities, businesses, and individuals who have donated their time to the development of this Standard.

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 and include “Request for interpretation” in the subject line:*
 - 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) *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 the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.
- 5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:*
 - a) *Standard designation (number);*
 - b) *relevant clause, table, and/or figure number;*
 - c) *wording of the proposed change; and*
 - d) *rationale for the change.*