

CCMC 12904-R

CCMC Canadian code compliance evaluation

CCMC number:	12904-R
Status:	Active
Issue date:	1999-03-11
Modified date:	2024-03-11
Evaluation holder:	<p>Sundre Forest Products Inc. A Subsidiary of West Fraser Mills Ltd.</p> <p>1250 Brownmiller Road Quesnel BC V2J 6P5 Canada</p> <p>Website: www.westfraser.com/company/locations/sundre-forest-products Telephone: 250-991-5350</p>
Product name:	West Fraser™ LVL
Compliance:	NBC 2015, OBC
Criteria:	CCMC-TG-061710-15A, "CCMC Technical Guide for Structural Composite Lumber"

In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.

[Learn more about CCMC recognition](#) [Look for the trusted CCMC mark on products to verify compliance.](#)

Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as structural composite lumber (SCL) in accordance with the conditions and limitations stated in this evaluation, complies with the following code:

National Building Code of Canada 2015

Code provision	Solution type
4.3.1.1.(1) Buildings and their structural members m ...	<u>Acceptable</u>
9.23.4.2.(3) Spans for built-up wood and glued-lamina ...	<u>Alternative</u>

Ontario Building Code

Ruling No. 09-08-206 (12904-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 2009-04-16 (revised 2015-09-28) pursuant to s.29 of the Building Code Act, 1992 (see Ruling for terms and conditions). This Ruling is subject to periodic revisions and updates.

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

West Fraser™ LVL

Product description

The product is a laminated veneer lumber (LVL) (see [Figure 1](#)) that is manufactured by laminating veneers of Lodgepole Pine, Douglas Fir, Aspen and White Spruce singularly or in combination at the Rocky Mountain House plant. The grain of the veneer is oriented parallel to the length of the member. The 3-mm-thick veneers are bonded with an exterior-type phenolic resin (phenol-formaldehyde) complying with CSA O112.10-08, “Evaluation of adhesives for structural wood products (limited moisture exposure)” (see CCMC [13192-L](#)). The veneer joints are scarfed or lapped and staggered with a minimum distance between joints of not less than 100 mm. The lengths and widths are cut in square edges.

Five grades of the product (1700Fb-1.3E, 2750Fb-1.7E, 3000Fb-1.8E, 3000Fb-1.9E and 3100Fb-2.0E) are available in 25.4-mm to 89-mm thicknesses, 89-mm to 1 219-mm depths, and a maximum length of 24.38 m.

Quality control and testing is conducted by [APA – The Engineered Wood Association](#) (APA-EWS) as an independent third-party monitoring and inspection agency accredited by the [Standards Council of Canada](#).

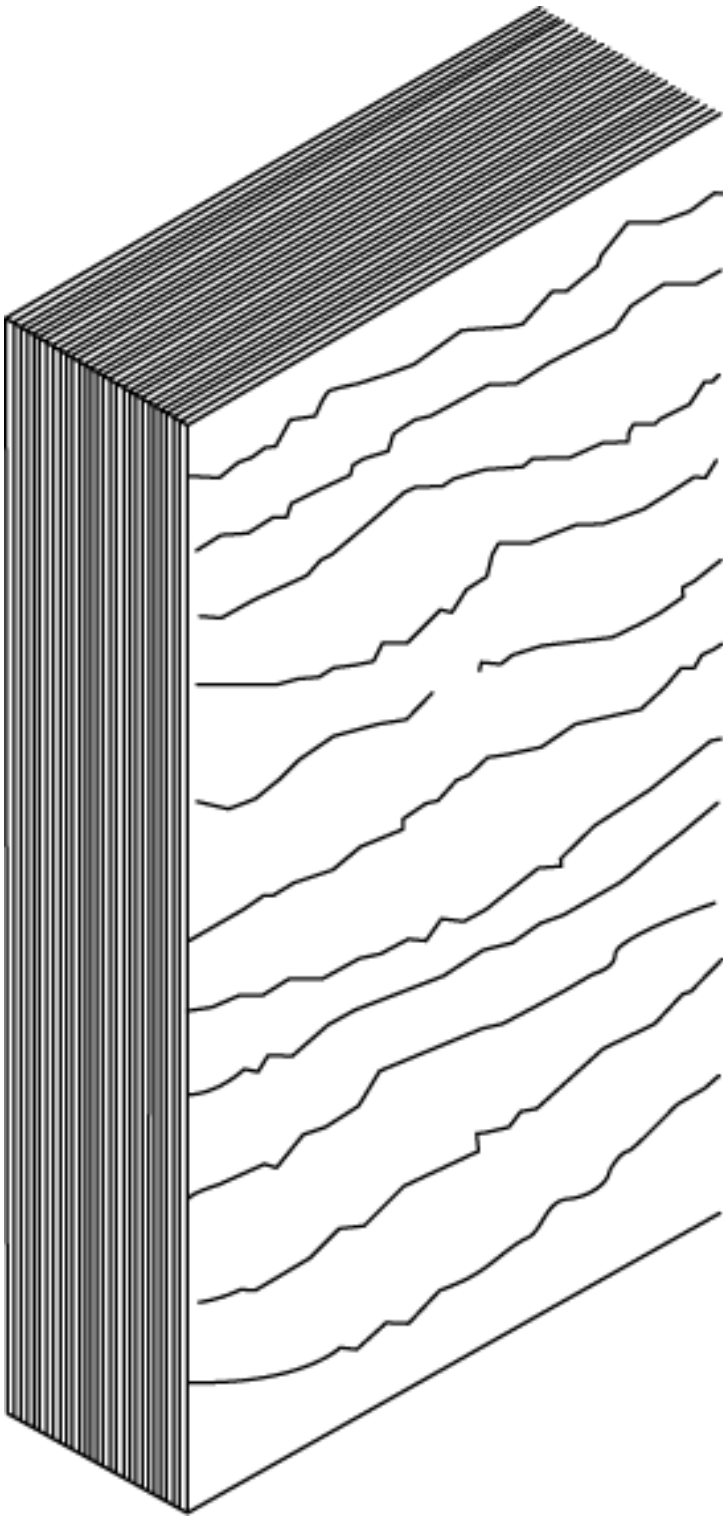



Figure 1. Laminated veneer lumber

Manufacturing plant

This evaluation is valid only for products produced at the following plant:

This PDF is an alternative version. This document was published on 2024-03-11 and may not be the latest version of this evaluation. Users should consult the latest [published assessment](#) on the [CCMC Registry of Product Assessments](#), which contains the most up to date information. This PDF is intended for use as a record, not the latest information available.

Product name	Manufacturing plant
West Fraser™ LVL	Rocky Mountain House, AB, CA 

 Indicates that the product from this manufacturing facility has been evaluated by the CCMC

Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The product, as with all SCL, is intended for dry service applications only. ⁽¹⁾
- The product is intended for use in construction as an alternative material to lumber. Proprietary design values presented for the product are to be used by professional engineers for design in accordance with CSA O86-14, "Engineering Design in Wood," for structural applications such as beams, headers, joists, rafters and columns as intended by the product manufacturer. The specific application must be qualified through specific testing and validated by the manufacturer. Applications such as I-joist flanges, studs and metal-plated truss chords are beyond the scope of this evaluation.
- The pre-engineered tables in the literature outlined below have been provided to the CCMC by the manufacturer to demonstrate compliance with Part 9 buildings for acceptance by the local authority having jurisdiction (AHJ):
 - i. **Manufacturer's pre-engineered tables** ⁽²⁾
 - When the product is used as floor beams in simple spans supporting uniform loads only, the installation must be in accordance with the content of the manufacturer's publication:
 - West Fraser™ LVL User's Guide, version Canada v0415v3
 - The product must be installed in accordance with the manufacturer's installation guidelines noted in this document for those applications falling within the scope of the document. Applications outside the scope of these installation guidelines require engineering on a case-by-case basis.
 - ii. **Manufacturer's installation details**
 - Nails and bolts in the attachment of the product must be used and installed in accordance with the manufacturer's size and spacing specifications.
 - The ends of all beams must be restrained to prevent rollover.
 - The compression edges of all beams must be continuously laterally supported.
 - iii. **Engineering required**
 - For applications beyond the scope/limitations of the above-referenced publication, or when required by the AHJ, the drawings or related documents must bear the seal of a professional engineer.
 - The product must be designed in accordance with the requirements of CSA O86 and Part 4 of Division B of the NBC 2015. The specified strengths and fastener limits for the product must not exceed the values set out in Table 1 and Table 2 in this evaluation.
 - iv. **Engineering support provided by manufacturer**
 - West Fraser Mills Ltd., through Sundre Forest Products Inc., provides engineering support and may be consulted at:
Telephone: 250-991-5350
Fax: 250-991-5351

¹ All lumber, wood-based panels and proprietary engineered wood products are intended for dry service conditions. "Dry service" is defined as the in-service environment in which the average equilibrium moisture content (MC) of lumber is 15% or less over a year and does not exceed 19% at any time. Wood contained within the interior of dry, heated or unheated buildings has generally been found to have a MC between 6% and 14% according to season and location. During construction, all wood-based products should be protected from the weather to ensure that the 19% MC is not exceeded in accordance with Article 9.3.2.5., Moisture Content, of Division B of the NBC 2015.

2 The pre-engineered tables present the pre-engineered factored resistance of the beam. The AHJ may require further engineering to determine the factored load in accordance with Part 4 of Division B of the NBC 2015.

Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-061710-15A	CCMC Technical Guide for Structural Composite Lumber

Table 1. Product specified strengths for dry-service conditions ⁽¹⁾

Mechanical properties	Specified strengths for product grades ⁽²⁾ (MPa)				
	1700Fb-1.3E	2750Fb-1.7E	3000Fb-1.8E	3000Fb-1.9E	3100Fb-2.0E
Flexural stress, f_b ⁽³⁾ - joist	21.7	35.1	38.2	38.2	39.5
Tension parallel to grain, f_t ⁽⁴⁾	14.3	21.5	21.5	21.5	23.1
Compression parallel to grain, f_c	19.8	25.9	25.9	27.5	33.0
Compression perpendicular to grain, f_c - parallel to the glue line (joist)	7.5	9.4	9.0	9.0	9.0
Horizontal shear, F_v - perpendicular to the glue line (joist)	2.8	3.7	3.7	3.8	3.8
Shear-free modulus of elasticity (MOE), E_{true}	8 960	11 720	12 400	13 100	13 790
Modulus of elasticity (MOE), $E_{apparent}$	8 512	11 134	11 780	12 445	13 101
MOE column, E_{05}	7 405	9 687	10 249	10 827	11 397

Notes:

1 For uniformly loaded simple span beams, the deflection must be calculated as follows:

$$\Delta = \frac{156WL^4 \times 10^6}{Ebd^2} + \frac{2400WL^2}{Ebd}$$

where:

Δ = deflection, mm

E = modulus of elasticity (shear-free), MPa

W = specified uniform load, N/m

L = span, m

b = beam width, mm

d = beam depth, mm

2 Lodgepole Pine, Douglas Fir, Aspen and White Spruce, singularly or in combination in these grades.

3 Tabulated values are based on loads of a normal duration and a reference depth of 305 mm. For depths of 89 mm and deeper that are loaded edgewise, the specified bending strength must be modified by $(305/d)^{1/9}$ for 1.3E, 1.7E and 2.0E grades as shown in the following table:

1.3E, 1.7E and 2.0E grades $(305/d)^{1/9}$									
Depth (mm)	89	140	185	241	305	356	407	458	610
Multiply by	1.15	1.09	1.06	1.03	1.00	0.98	0.97	0.96	0.93

For 1.8E and 1.9E grades, the specified bending strength must be modified by $(305/d)^{1/7.35}$ as shown in the following table:

1.8E and 1.9E grades $(305/d)^{1/7.35}$									
Depth (mm)	89	140	185	241	305	356	407	458	610
Multiply by	1.18	1.11	1.07	1.03	1.00	0.98	0.96	0.95	0.91

4 Tension values for 1.3E, 1.7E, 1.8E, 1.9E and 2.0E grades are adjusted to a specified length of 6 096 mm (20 ft.). For applications with shorter lengths, $(6\ 096/L)^{1/11}$ should be used to adjust f_t for the actual in-service length.

Table 2. Product fastener capacities

Fastener properties		Nail orientation or bolt size	Load direction	Specific gravity (SG) of equivalent species for design purposes
Nail withdrawal	1.3E LVL	Edge	Withdrawal	Hem-Fir, SG = 0.43
	1.3E LVL	Face	Withdrawal	Hem-Fir, SG = 0.43
	1.7E, 1.8E LVL	Edge	Withdrawal	Hem-Fir, SG = 0.43
	1.7E, 1.8E LVL	Face	Withdrawal	Hem-Fir (north), SG = 0.46
	1.9E, 2.0E LVL	Edge	Withdrawal	Hem-Fir, SG = 0.43
	1.9E, 2.0E LVL	Face	Withdrawal	D Fir-L, SG = 0.50
Lateral nail capacity	1.3E LVL	Edge	Parallel to grain	Hem-Fir, SG = 0.43
	1.3E LVL	Edge	Perpendicular to grain	Hem-Fir, SG = 0.43
	1.3E LVL	Face	Parallel to grain	Hem-Fir, SG = 0.43
	1.3E LVL	Face	Perpendicular to grain	Hem-Fir, SG = 0.43
	1.7E, 1.8E LVL	Edge	Parallel to grain	Hem-Fir, SG = 0.43
	1.7E, 1.8E LVL	Edge	Perpendicular to grain	Hem-Fir, SG = 0.43

This PDF is an alternative version. This document was published on 2024-03-11 and may not be the latest version of this evaluation. Users should consult the latest [published assessment](#) on the [CCMC Registry of Product Assessments](#), which contains the most up to date information. This PDF is intended for use as a record, not the latest information available.

Fastener properties		Nail orientation or bolt size	Load direction	Specific gravity (SG) of equivalent species for design purposes
	1.7E, 1.8E LVL	Face	Parallel to grain	D Fir-L, SG = 0.50
	1.7E, 1.8E LVL	Face	Perpendicular to grain	D Fir-L, SG = 0.50
	1.9E, 2.0E LVL	Edge	Parallel to grain	Hem-Fir, SG = 0.43
	1.9E, 2.0E LVL	Edge	Perpendicular to grain	Hem-Fir, SG = 0.43
	1.9E, 2.0E LVL	Face	Parallel to grain	D Fir-L, SG = 0.50
	1.9E, 2.0E LVL	Face	Perpendicular to grain	D Fir-L, SG = 0.50
Bolt bearing capacity (installed in face)	1.3E LVL	12.5 mm	Parallel to grain	Northern species, SG = 0.34
	1.3E LVL	12.5 mm	Perpendicular to grain	Northern species, SG = 0.43
	1.3E LVL	19.0 mm	Parallel to grain	Northern species, SG = 0.34
	1.3E LVL	19.0 mm	Perpendicular to grain	Northern species, SG = 0.43
	1.7E, 1.8E, 1.9E, 2.0E LVL	12.5 mm	Parallel to grain	Hem-Fir, SG = 0.43
	1.7E, 1.8E, 1.9E, 2.0E LVL	12.5 mm	Perpendicular to grain	Hem-Fir, SG = 0.43
	1.7E, 1.8E, 1.9E, 2.0E LVL	19.0 mm	Parallel to grain	Hem-Fir, SG = 0.43
	1.7E, 1.8E, 1.9E, 2.0E LVL	19.0 mm	Perpendicular to grain	Hem-Fir, SG = 0.43

This evaluation is applicable only to the product labelled with the APA-EWS certification mark and the phrase “CCMC 12904-R” on each beam or header member.

The manufacturing quality assurance program has been updated to include requirements specified in ASTM D5456-14b, “Standard Specification for Evaluation of Structural Composite Lumber Products,” and has been verified by APA-EWS as part of the product certification. APA-EWS conducts monthly audits of the manufacturing plants and the quality assurance program.

Additional information

The design values specified in this evaluation were obtained from testing in conformance with ASTM D5456-14 and are summarized below. The manufacturer's published pre-engineered beam and header spans were designed in accordance with CSA O86-14.

Table 3. Additional test information for the product

Property	Test information
Bending	Bending of multiple sizes to establish volume effects. A parametric, 5% tolerance limit with 75% confidence level approach was used to determine the characteristic value. Test data were used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.
Shear	Specimens were tested edgewise as full-size specimens (ASTM D5456-03). A non-parametric, 5% tolerance limit with 75% confidence level approach was used to determine the characteristic value. Test data were used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor for full-size specimens from CSA O86 was used to determine the specified strength.
Compression parallel to grain	Specimens were tested and a non-parametric, 5% tolerance limit with 75% confidence level approach was used to determine the characteristic value. Test data were used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.
Compression perpendicular to grain	Specimens were tested and the average stress for a 1-mm deformation was determined. This value was divided by 1.67 to establish the design value.
Tension parallel to grain	Specimens were tested in tension for establishing the characteristic value and volume effects. A parametric 5% tolerance limit with 75% confidence level approach was used to determine the characteristic value.
Nail withdrawal	Nail withdrawal values were established following ASTM D1761-88, "Standard Test Methods for Mechanical Fasteners in Wood," for an 8d common nail having a 31.75-mm penetration. Twenty specimens were tested and equivalent species capacity was determined in accordance with ASTM D5456-01, Appendix A2.4.
Nail bearing	Dowel bearing strength was determined in accordance with ASTM D5764-95, "Standard Test Method for Evaluating Dowel-Bearing Strength of Wood and Wood-Based Products," using 10d common nails with a nominal diameter of 3.76 mm and a lead hole diameter of 2.77 mm. Forty specimens (ten specimens for four combinations of load direction) of each LVL were tested and the mean bearing capacity was used to establish the equivalent species capacity in accordance with ASTM D5456-01, Appendix A2.5.
Bolt bearing	Bolt bearing capacity was determined in accordance with ASTM D5764-95 using 12.5-mm and 19.0-mm bolts. One hundred and twenty specimens (30 specimens for each bolt and LVL face combination) were tested and the mean bolt bearing capacity was used to establish the equivalent species capacity in accordance with ASTM D5456-01, Appendix A2.5.
Creep and recovery	Specimens of the product were tested in accordance with a 90-day creep and recovery test, resulting in acceptable performance.
Adhesives	APA has confirmed that the adhesive, Hexion Cascophen MX-06C, complies with CSA O112.10-08, "Evaluation of adhesives for structural wood products (limited moisture exposure)." See CCMC 13192-L .

Administrative information

Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire [CCMC Registry of Product Assessments](#), any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the [Canada Consumer Product Safety Act](#), the [Canadian Environmental Protection Act](#), etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the [CCMC Registry of Product Assessments](#).

Disclaimer

The National Research Council of Canada (NRC) has evaluated only the characteristics of the specific product described herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (such as authorities having jurisdiction, design professionals and specifiers). This evaluation is valid when the product is used as part of permitted construction, respecting all conditions and limitations stated in the evaluation, and in accordance with applicable building codes and by-laws.

This evaluation is provided without representation, warranty or guarantee of any kind, expressed or implied, and the NRC provides no endorsement for any evaluated product. The NRC accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained herein or the use of any evaluated product. The NRC is not undertaking to render professional or other services on behalf of any person or entity nor to perform any duty owed by any person or entity to another person or entity.

Language

Une version française de ce document est disponible.

In the case of any discrepancy between the English and French version of this document, the English version shall prevail.

Copyright

© His Majesty the King in Right of Canada, as represented by the National Research Council of Canada, 2024

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the CCMC.

This PDF is an alternative version. This document was published on 2024-03-11 and may not be the latest version of this evaluation. Users should consult the latest [published assessment](#) on the [CCMC Registry of Product Assessments](#), which contains the most up to date information. This PDF is intended for use as a record, not the latest information available.

CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

CCMC assessments are recognized by construction authorities across Canada:

Alliance of Canadian Building Official Associations (ACBOA)



(Alliance of Canadian Building Official Associations (ACBOA))

First Nations National Building Officers Association (FNNBOA)



(First Nations National Building Officers Association (FNNBOA))

Canadian Home Builders' Association (CHBA)



(Canadian Home Builders' Association (CHBA))

Alberta Building Officials Association (ABOA)



(Alberta Building Officials Associations (ABOA))

Saskatchewan Building Officials Association (SBOA)



(Saskatchewan Building Officials Association (SBOA))

Manitoba Building Officials Association (MBOA)



(Manitoba Building Officials Association (MBOA))

Ontario Building Officials Association (OBOA)



(Ontario Building Officials Association (OBOA))

New Brunswick Building Officials Association (NBBOA)



(New Brunswick Building Officials Association (NBBOA))

Nova Scotia Building Officials Association (NSBOA)



(Nova Scotia Building Officials Association (NSBOA))

The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. [Learn more about how the CCMC provides a unique service for Canada.](#)

For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

NOTICE

The information presented on this webpage (in HTML format) is the most up-to-date information available from the CCMC about this assessment.

By downloading this PDF you acknowledge that:

- this PDF is intended for record-keeping purposes only,
- it represents the information as it was available at the time of downloading, and
- it may not reflect the latest available information at some future date.

References to this CCMC assessment (in product literature, on websites, etc.) must be made by linking to the evaluation webpage. **This PDF must not be used as a means of distributing this assessment to an audience.**

[View PDF \(Portable document format\)](#)

Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

Where a design differs from the acceptable solutions in Division B, then it should be treated as an **"alternative solution."** A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.