CCMC CANADIAN CODE COMPLIANCE EVALUATION

CCMC EVALUATION

CCMC 13191-R

CCMC Canadian code compliance evaluation

CCMC number:	13191-R
Status:	Active
Issue date:	2005-07-06
Modified date:	2022-07-13
Evaluation holder:	**MoistureShield Inc.** 914 N. Jefferson Springdale AZ 72764 United States Telephone: 479-756-7400
Product names:	• MoistureShield® Vantage Decking • MoistureShield® Vision Decking
Code compliance:	NBC 2015, OBC
Evaluation requirements:	CCMC-TG-067314.01-15 "CCMC Technical Guide for Wood Thermoplastic Composite Lumber Exterior Decking (Solid Cross-Section)"

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

It is the opinion of the Canadian Construction Materials Centre that the evaluated products, when used as exterior decking in accordance with the conditions and limitations stated in this evaluation, comply with the following code:

National Building Code of Canada 2015

Code provision	Solution type
9.3.2.9. Termite and Decay Protection	Alternative
9.4.2.3. Platforms Subject to Snow and Occupancy Loads	Alternative
9.4.3.1. Deflections	Alternative
9.8.9.1. Loads on Stairs and Ramps	Alternative
9.23.15.5. Subfloor Thickness or Rating	Alternative

Ontario Building Code

Ruling No. 08-13-198 (13191-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 2008-12-09 (revised 2009-11-30) 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 is 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 names

- MoistureShield® Vantage Decking
- MoistureShield® Vision Decking

Product description

The products are a wood thermoplastic composite lumber (WTCL) made primarily from equal parts of reclaimed oak hardwood sawdust and reclaimed/recycled polyethylene (HDPE). Both composite products are manufactured through a continuous extrusion process in planks of solid cross-section. The planks are manufactured in nominal dimensions of 25 mm × 137 mm and are available in 3.66 m, 4.88 m and 6.1 m lengths. MoistureShield Vision decking features an exclusive capstock for added fade and scratch resistance.

The products are intended to be used as exterior decking to be installed over traditional structural wood framing, spaced at 400 mm on centre (o.c.), with stair treads installed on stringers spaced at 230 mm o.c.

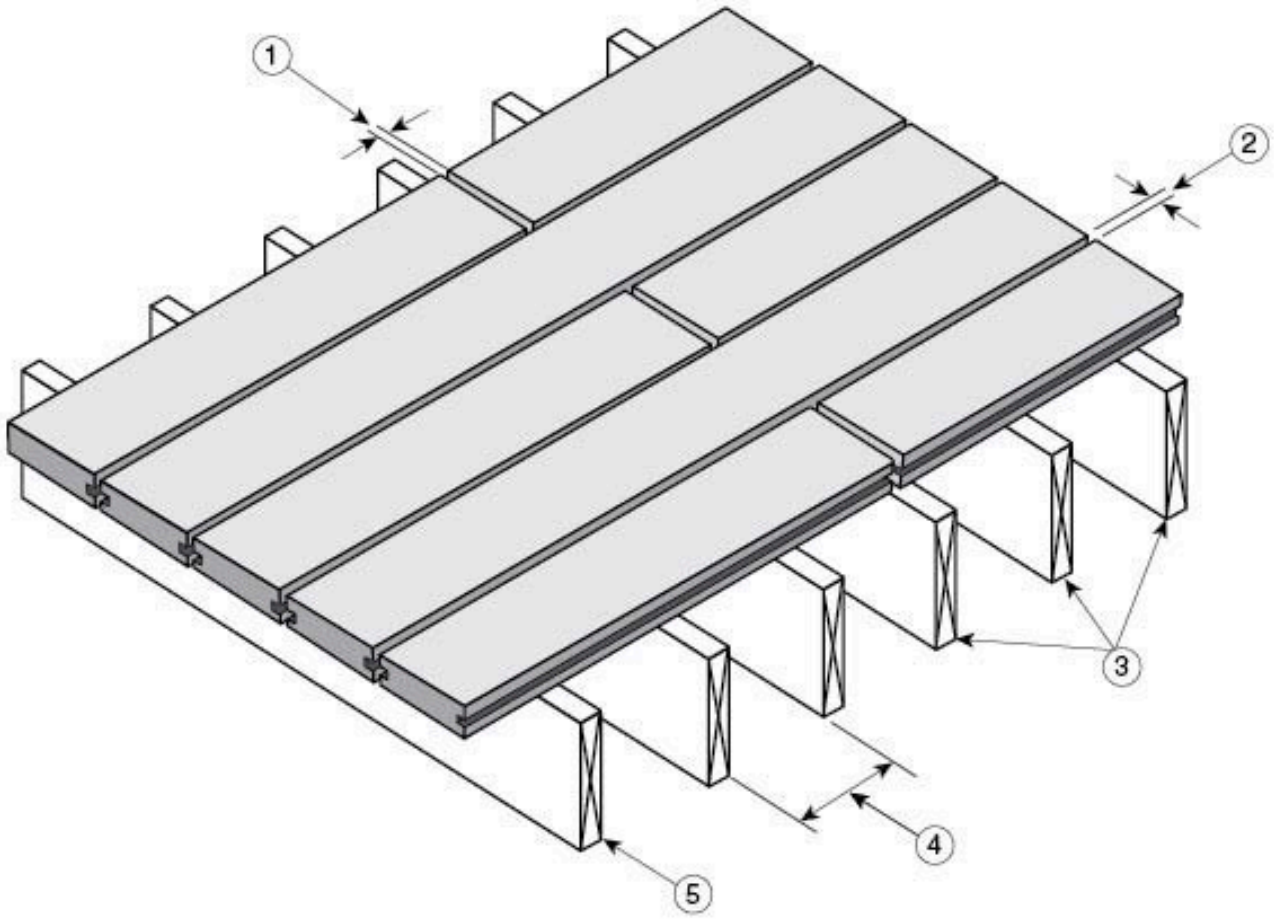

Figure 1. Installation details for the products with hidden fasteners

1. 3 mm to 6 mm minimum end-to-end gapping, depending on length of plank and temperature at installation
2. 6 mm to 10 mm minimum width-to-width gapping, depending on temperature at installation

3. minimum of three joists per plank
4. maximum joist spacing of 400 mm o.c.
5. joist designed to support applicable loads

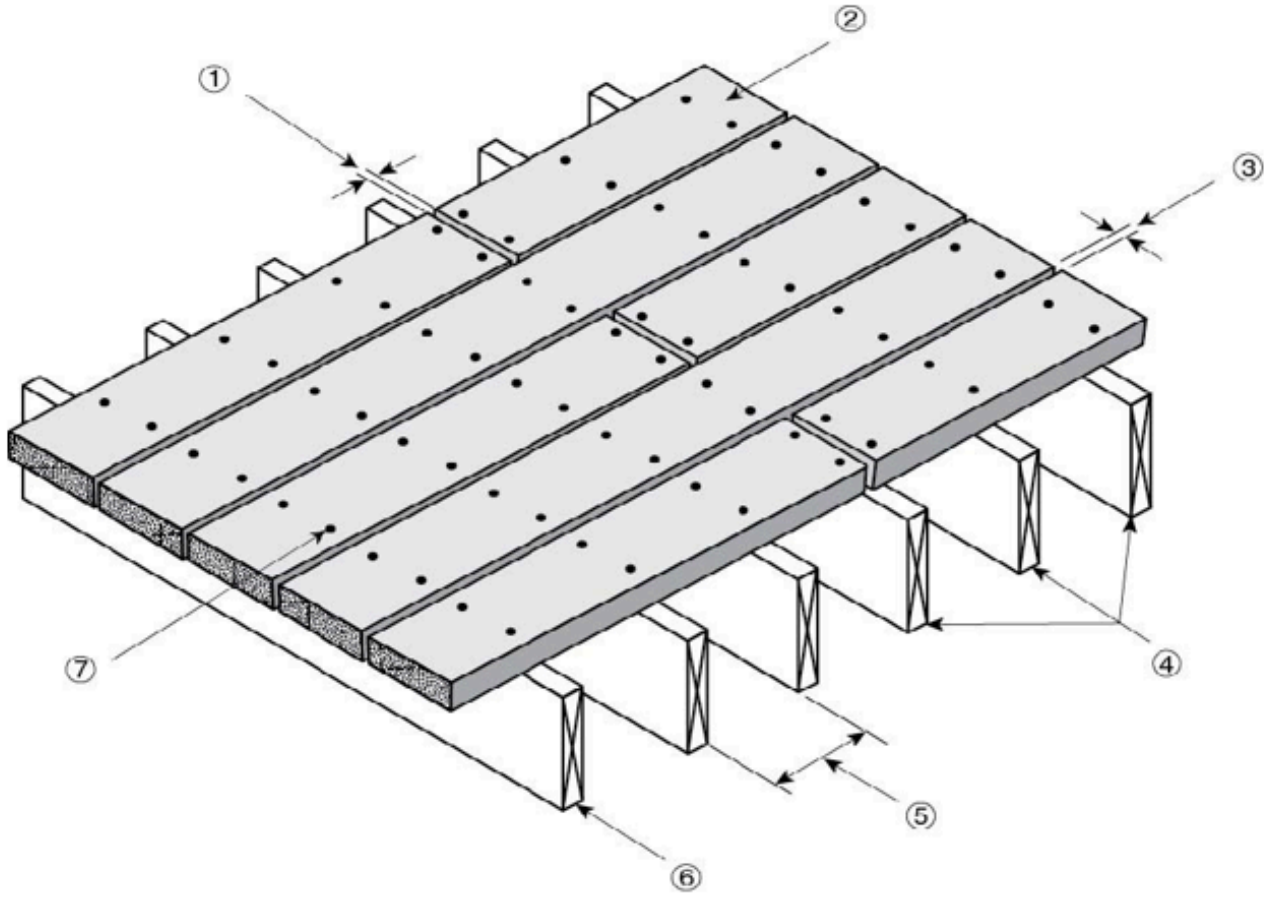

Figure 2. Installation details for the products with exposed fasteners

1. 3 mm to 6 mm minimum end-to-end gapping, depending on length of plank and temperature atinstallation
2. MoistureShield® Vantage and MoistureShield® Vision decking
3. 6 mm to 10 mm minimum width-to-width gapping, depending on temperature atinstallation
4. minimum of three joists per plank
5. maximum joist spacing of 400 mm o.c
6. joist designed to support applicable loads
7. two fasteners, 64 mm long, per support

Manufacturing plant

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

Product names	Manufacturing plant
	Springdale, AZ, US
MoistureShield® Vantage Decking	◈
MoistureShield® Vision Decking	◈

◈ 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 products must be installed with supports spaced no greater than 400 mm on centre (o.c.). Each plank must be supported by at least three supports.
- The products must be fastened to the wood joists with fasteners specified by the manufacturer that conform to Article 9.23.3.1., Standards for Nails and Screws, of Division B of the NBC 2015. The fasteners must have a corrosion-resistant coating or be made of stainless steel. The planks must be fastened with at least two 64-mm-long fasteners per support.
  Note: As of January 2004, pressure-treated lumber requires specific hot-dipped galvanized fasteners for satisfactory performance.
- The products must be gapped end-to-end based upon the length of the plank and the temperature at installation. The end-to-end gapping must be:
  - 5 mm for installations below 15°C, and
  - 3 mm for installations above 15°C.
- The width-to-width gapping must be:
  - 6 mm for installations above 5°C, and
  - 10 mm for installation below 5°C.
- The products can be used where termite protection is required as per Article 9.3.2.9., Termite and Decay Protection, of Division B of the NBC 2015.
- The products can be used as stair treads at 230 mm (9 in.) o.c. spacing.
- The products are not to be considered as an equivalent to dimensional lumber.
- The products are permitted where decay resistance is required as per Sentence 9.3.2.9.(3), 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-067314.01-15	CCMC Technical Guide for Wood Thermoplastic Composite Lumber Exterior Decking (Solid Cross-Section)

The evaluation holder has submitted technical documentation for the CCMC's evaluation. Testing was conducted at laboratories recognized by the CCMC. The corresponding technical evidence for this product is summarized below.

Material requirements

Table 1. Results of testing of basic physical and mechanical properties

Property	Unit	Requirement	Result (1) (2)
Dimensional change – coefficient of linear expansion (swelling) – oven-dry to vacuum pressure soak	%	≤ 0.5, by 80% of specimens	0.06
Strength and stiffness – modulus of elasticity (MOE) – span-to-depth ratio within 18 to 21	MPa	≥ 750	1 449
Strength and stiffness – modulus of rupture (MOR) – span-to-depth ratio within 18 to 21	MPa	≥ 9	24.42
Strength and stiffness – creep, recovery and load duration	%	≤ 25 for creep	11.3
Strength and stiffness – creep, recovery and load duration	%	≥ 75 for recovery	96.9
Strength and stiffness – creep, recovery and load duration	%	No failure	Pass
Strength and stiffness after aging – weathering – impact resistance	%	≥ 75 of non-weathered value	103
Strength and stiffness after aging – accelerated aging – MOE	%	≥ 50 of non-aged value	106
Strength and stiffness after aging – accelerated aging – MOR	%	≥ 50 of non-aged value	100
Strength and stiffness after aging – fastener holding capacity – nail withdrawal strength	N	≥ 600	3 219
Strength and stiffness after aging – fastener holding capacity – lateral nail strength	N	≥ 720	2 098

Notes:

1 Average test results of six specimens, except for the "creep, recovery and load duration", which are from three specimens.

2 Test results were obtained to classify the product and are not intended to be used as engineering design properties.

Performance requirements

Table 2. Results of testing of performance under both concentrated static loads and impact loads

Property	Requirement	Result [1]
Concentrated static load – decking at 50°C – minimum ultimate load (kN)	≥ 2.45	3.02
Concentrated static load – decking at 20°C – minimum ultimate load (kN)	≥ 2.45	4.03
Concentrated static load – decking at 35°C – minimum ultimate load (kN)	≥ 2.45	5.94
Concentrated static load – decking at 50°C – maximum deflection under 0.89-kN load (mm)	≤ 2.0	5.32 [2]
Concentrated static load – decking at 20°C – maximum deflection under 0.89-kN load (mm)	≤ 2.0	3.19 [3]
Concentrated static load – decking at 35°C – maximum deflection under 0.89-kN load (mm)	≤ 2.0	2.31 [3]
Following impact load of 102 N·m – decking at 50°C – minimum ultimate load (kN)	≥ 1.78	No break
Following impact load of 102 N·m – decking at 50°C – maximum deflection under 0.89-kN load (mm)	≤ 2.0	3.57 [2]

Notes:

1 Test results for planks with supports at 400 mm o.c.

2 Deemed acceptable. Although this result exceeds the 2.0 mm requirement, the additional deflection is not considered significant for material at 50°C.

3 Deemed acceptable. Although this result exceeds the 2.0 mm requirement, the additional deflection is not considered significant based on the creep recovery value.

Table 3. Results of testing of durability

Property	Requirement	Result – S-P-F lumber	Result – MoistureShield® Vantage and MoistureShield® Vision
Bending stiffness	Mean percentage loss in bending (MOE) after ultraviolet (UV) exposure [1] and accelerated aging [2] must be less than or equal to spruce lumber	30.8%	31.3% [3]
Bending strength	Mean percentage loss in bending stress (MOR) after UV exposure [1] and accelerated aging [2] must be less than or equal to spruce lumber	28.7%	25.8%

Notes:

1 4 500 hours of Xenon-Arc exposure following Cycle 1 of ASTM D 2565-99, “Xenon-Arc Exposure of Plastics Intended for Outdoor Applications.”

2 Five cycles of accelerated aging (wetting, freezing, thawing and drying).

3 Deemed to be acceptable based on the negligible difference between the percentage loss between composite decking and spruce lumber.

Table 4. Results of testing of decay and termite resistance

Property	Requirement	Result
Decay resistance – % loss in weight	Mean percentage loss in weight and compressive strength after exposure to decay-causing fungi must be equal to or better than preservative-treated wood conforming to CAN/CSA-O80.1-M97, “Preservative Treatment of All Timber Products by Pressure Processes”	Passed (1)
Decay resistance – compressive strength	Mean percentage loss in weight and compressive strength after exposure to decay-causing fungi must be equal to or better than preservative-treated wood conforming to CAN/CSA-O80.1-M97, “Preservative Treatment of All Timber Products by Pressure Processes”	Passed (1)
Termite resistance	Rating must be equal to or better than preservative-treated wood conforming to CAN/CSA-O80.1	Passed (1)

Notes:

1 Data presented was not in accordance with CCMC’s evaluation requirements; however, the test results submitted demonstrated a resistance to decay-causing fungi that was deemed to meet the intent of the CCMC’s requirements.

Table 5. Results of testing of performance under concentrated static load — stair tread

Property	Requirement	Result (1)
Concentrated static load – stair tread – minimum ultimate load (kN)	5 (2)	5.44
Concentrated static load – stair tread nosing – minimum ultimate load (kN)	5 (3)	7.04
Concentrated static load – stair tread – maximum deflection under 1 kN (mm)	0.75	2.50 (4)
Concentrated static load – stair tread nosing – maximum deflection under 1 kN (mm)	0.75	2.50 (4)

Notes:

1 Test results are for stair stringers spaced at 400 mm o.c. at a test condition of 50°C and 80% relative humidity (RH). Three specimens were tested for each test.

2 Applied through a 75-mm-diam disk positioned at the centreline of the plank and midway between stringers.

3 Applied through a 38-mm-diam disk positioned along the outside edge of the nosing at the stringer location.

4 Deemed acceptable as the deflection is still low at 50°C and the ultimate load is very high as well. Stringer spacing must be at 230 mm o.c.

Additional performance data

Data in this section does not form part of the CCMC's opinion.

Table 6. Results of testing of additional performance data

Property	Unit	Reference value	Result
Coefficient of linear expansion (thermal) – longitudinal	cm/cm/°C	≤ 2 x 10^{-5}	3.63 x 10^{-5} (1)
Impact resistance (Izod impact, notched)	J/m	≥ 53.4	29.9 (2)
Hardness (11.28-mm-diam ball)	kN	≥ 1.8	4.724
MoistureShield® Vantage slip resistance (longitudinal) – wet condition	Slip index	≥ 0.5	0.38 (3)
MoistureShield® Vantage slip resistance (longitudinal) – dry condition	Slip index	≥ 0.5	0.33 (3)
MoistureShield® Vision slip resistance (longitudinal) – wet condition	Slip index	≥ 0.5	0.78
MoistureShield® Vision slip resistance (longitudinal) – dry condition	Slip index	≥ 0.5	0.35 (4)

Notes:

Results provided in this table do not invalidate the CCMC's opinion concerning the products' compliance with the NBC 2015.

1 The manufacturer's gapping installation instructions must address the linear expansion values.

2 The Izod impact is a small-scale test used to characterize the material. Very low performance values show a sensitivity to a loss of impact strength when the products are significantly damaged by a notch, cut or split. The results of the large-scale impact floor tests are the primary performance indicator with respect to floor impact loads, and the products pass the large-scale impact floor tests.

3 MoistureShield® Vantage, having a tested slip resistance of 0.38 under the wet condition and 0.33 under the dry condition, did not meet the 0.5 criterion. This criterion may not meet all occupant expectations. The manufacturer may be contacted for further information.

4 MoistureShield® Vision, having a tested slip resistance of 0.35 under the dry condition, did not meet the 0.5 criterion. This criterion may not meet all occupant expectations. The manufacturer may be contacted for further information.

Administrative information

Disclaimer

This evaluation is issued by the Canadian Construction Materials Centre (CCMC), a part of the Construction Research Centre at the National Research Council of Canada (NRC). The evaluation must be read in the context of the entire CCMC Registry of Product Assessments and the legislated applicable building code in effect.

The CCMC was established in 1988 on behalf of the applicable regulator (i.e., the provinces and territories) to ensure—through assessment—conformity of alternative and acceptable solutions to regional building codes as determined by the local authority having jurisdiction (AHJ) as part of the issuance of a building permit.
It is the responsibility of the local AHJs, design professionals, and specifiers to confirm that the evaluation is current and has not been withdrawn or superseded by a later issue. Please refer to the website or contact:

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The NRC has evaluated the material, product, system or service described herein only for those characteristics stated 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 (i.e., AHJs, design professionals and specifiers). This evaluation is only valid when the product is installed in strict compliance with the stated conditions and limitations of evaluation and the applicable local building code. In circumstances where no applicable local building permit is issued and that no confirmation of compliance ‘for use in the intended field application’ is undertaken, this evaluation is null and void in all respects. This evaluation is provided without representation, warranty, or guarantee of any kind, expressed, or implied, and the NRC provides no endorsement for any evaluated material, product, system or service described herein. The NRC accepts no responsibility whatsoever arising in any way from any and all use and reliance on the information contained in this evaluation with respect to its compliance to the referenced code(s) and standard(s). 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

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

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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

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.

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