

CCMC 13191-R

CCMC Canadian code compliance evaluation

CCMC number:	13191-R
Status:	Active
Issue date:	2005-07-06
Modified date:	2023-08-08
Evaluation holder:	<p>MoistureShield Inc. 801 N. Jefferson Street Springdale AZ 72764 United States Telephone: 479-756-7400</p>
Product names:	<ul style="list-style-type: none"> • MoistureShield® Vantage Decking • MoistureShield® Vision Decking
Compliance:	NBC 2015, OBC
Criteria:	CCMC-TG-067314.01-15 "CCMC Technical Guide for Wood Thermoplastic Composite Lumber Exterior Decking"

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

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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	<u>Alternative</u>
9.4.2.3. Platforms Subject to Snow and Occupancy Loads	<u>Alternative</u>
9.4.3.1. Deflections	<u>Alternative</u>
9.8.9.1. Loads on Stairs and Ramps	<u>Alternative</u>
9.23.15.5. Subfloor Thickness or Rating	<u>Alternative</u>

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(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 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.

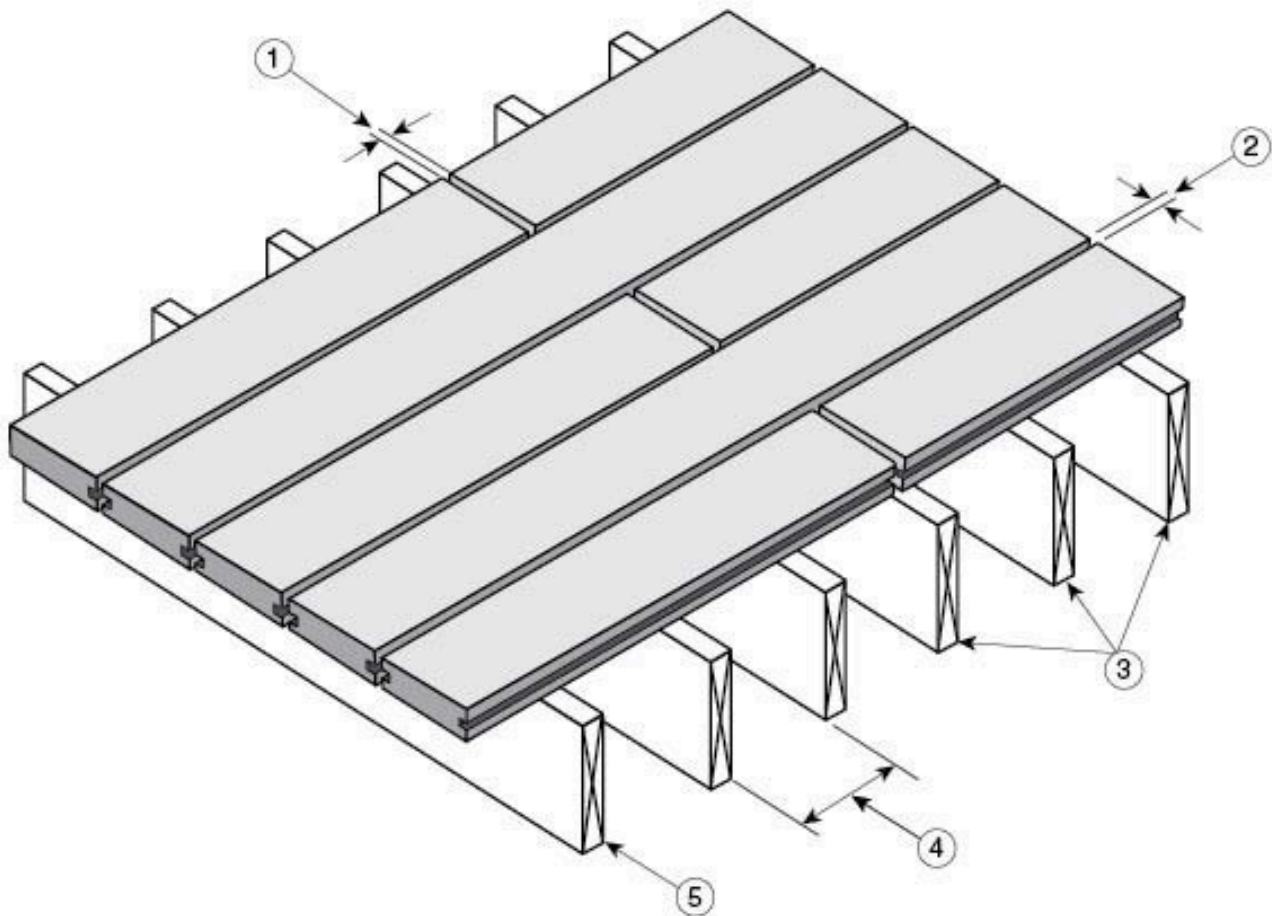


Figure 1. Installation details for the products with hidden fasteners

1. 3.2 mm to 6.3 mm minimum end-to-end gapping, depending on length of plank and temperature at installation
2. 5 mm to 6 mm minimum width-to-width gapping, depending on temperature at installation

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

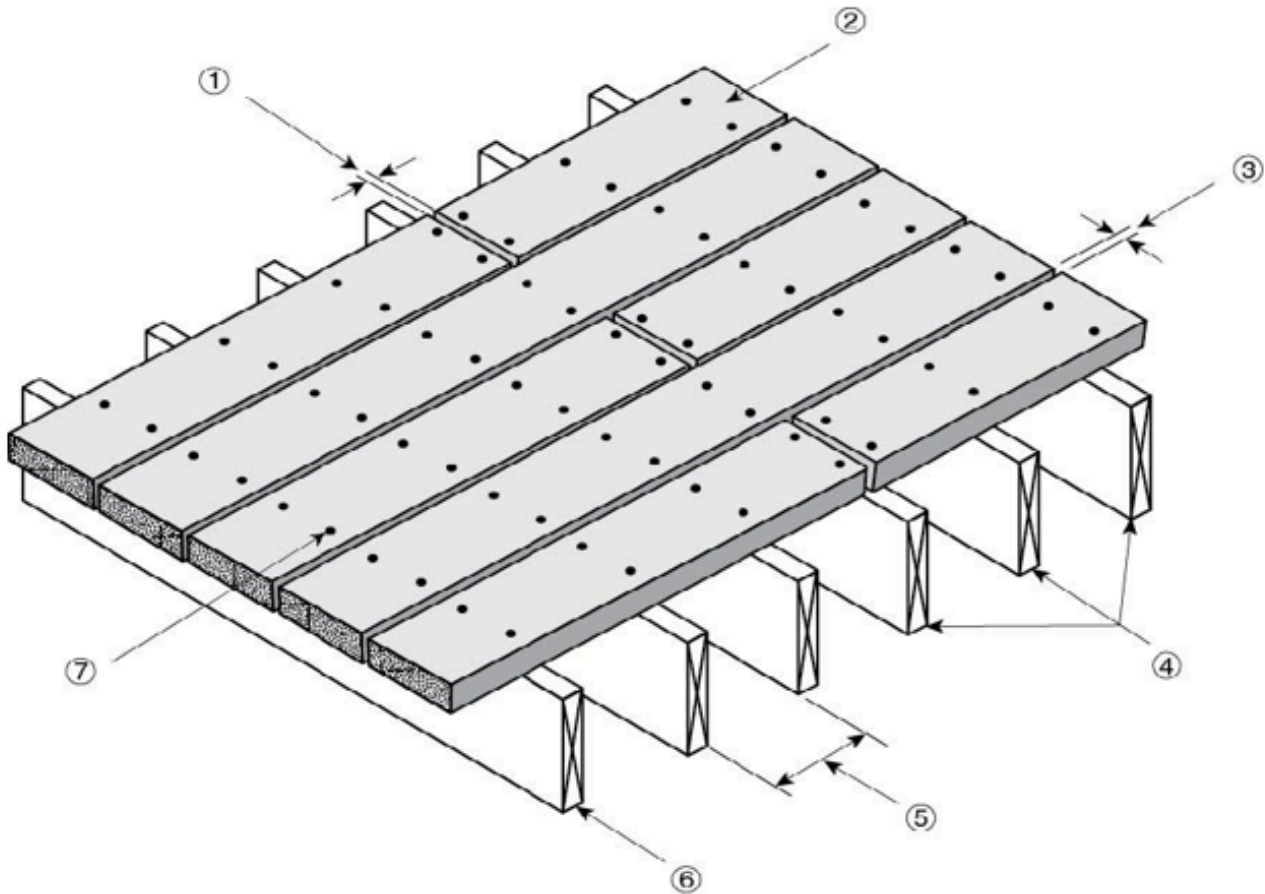


Figure 2. Installation details for the products with exposed fasteners

1. 3.2 mm to 6.3 mm minimum end-to-end gapping, depending on length of plank and temperature at installation
2. MoistureShield® Vantage and MoistureShield® Vision decking
3. 5 mm to 6mm minimum width-to-width gapping, depending on temperature at installation
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

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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. ⁽¹⁾
- The products must not be installed under 5°C.
- 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:
 - 6.3 mm for installations below 10°C,
 - 5.5 mm for installations between 10°C and 15°C,
 - 4.7 mm for installations between 15°C and 20°C,
 - 3.2 mm for installations above 20°C, and
 - If end use temperature is expected to be higher than 35°C, consult the manufacturer for gapping requirement.
- The width-to-width gapping must be 5mm to 6mm.
- The products can be used as stair treads at 230 mm (9 in.) o.c. spacing.
- Slip-resistant strips shall be provided in accordance with Article 9.8.9.6, Finish for Treads and Landings, of Division B of the NBC 2015.
- 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)(a), of Division B of the NBC 2015.
- The products are permitted where termite resistance is required, as per Sentence 9.3.2.9.(1)(b), of Division B of the NBC 2015.

Notes:

- ¹ *As of January 2004, pressure-treated lumber requires specific hot-dipped galvanized fasteners for satisfactory performance.*
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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

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 (thermal) – longitudinal	cm/ cm/°C	< 2×10 ⁻⁵	3.63×10 ⁻⁵ ₍₃₎
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
Impact resistance - Izod impact, notched	J/m	> 53.4	29.9 ⁽⁴⁾
Hardness - 11.28-mm-diameter ball	kN	> 1.8	4.72
Creep, recovery and load duration	%	≤ 25 for creep	11.3
Creep, recovery and load duration	%	≥ 75 for recovery	96.9
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
Fastener holding capacity – nail withdrawal strength	N	≥ 600	3 219
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.
- 3 Performance result allowed based on manufacturer's gapping installation instructions.
- 4 Performance result allowed based on the full-scale structural impact test results. 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.

Table 2. Results of Testing of Decay, Termite and Slip-resistance Properties of the Product

Property	Requirement	Result
Decay resistance - % loss in weight	Mean percentage loss in weight 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 - % loss compressive strength	Mean percentage loss in 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 ⁽²⁾
Slip resistance (longitudinal) - wet condition - MoistureShield® Vantage	Slip coefficient ≥ 0.5	0.38 ⁽³⁾
Slip resistance (longitudinal) - dry condition - MoistureShield® Vantage	Slip coefficient ≥ 0.5	0.33 ⁽³⁾

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 CCMC requirements.
- 2 Data presented was not in accordance with CCMC's evaluation requirements however, the test results submitted demonstrated a resistance to termites that was deemed to meet the intent of CCMC requirements.
- 3 This performance may not meet all occupant expectations. When used as stair treads, slip-resistant strips shall be provided in accordance with Article 9.8.9.6, Finish for Treads and Landings, of Division B of the NBC 2015. The manufacturer may be contacted for further information.

Performance requirements

Table 3. Results of testing of performance under both concentrated static loads and impact loads

Property	Unit	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 4. 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 stiffness (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 4 000 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 5. Results of testing of performance under concentrated static load — stair tread

Property	Unit	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⁾

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
Flame spread rating	-	≤ 200	135 ⁽¹⁾
Smoke development	-	Report value	SDC > 500 (estimated) ⁽¹⁾

Notes:

- 1 Data reported is for "MoistureShield® Vision" and no data reported for "MoistureShield® Vantage".

Administrative information

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Language

Une version française de ce document est disponible.

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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.

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(Alliance of Canadian Building Official Associations (ACBOA))

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

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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

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