



Evaluation Report

CCMC 13303-R

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TimberTech® Profiled Decking – Floorizon™

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “TimberTech® Profiled Decking – Floorizon™” when used as exterior decking in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code of Canada (NBC) 2005:

- Clause 1.2.1.1.(1)(b), Division A, as an alternative solution that achieves at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the following applicable acceptable solutions:
 - Article 9.23.14.5., “Subfloor Thickness or Rating,” when subjected to the loading and deflection limits implied in,
 - Subsection 9.4.2., “Specified Loads” , and
 - Article 9.4.3.1., “Deflections.”

This opinion is based on CCMC’s evaluation of the technical evidence in Section 4.1 provided by the Report holder.

2. Description

“TimberTech® Profiled Decking – Floorizon™” is a wood thermoplastic composite made primarily of high-density polyethylene and hardwood fibre/flour. The composite product is manufactured through a continuous extrusion process in planks of solid cross-section. The “Floorizon™” planks are tongue-and-groove and measure 38 mm thick x 172 mm wide. The plank finish is as follows:

- Floorizon™
 - One side is embossed with a simulated wood grain pattern that has been mechanically abraded, called “VertiGrain,” and the other side has a smooth extruded surface that has been mechanically abraded, called “Brushed,” both sides are intended as a walking surface.

“TimberTech® Profiled Decking – Floorizon™” is intended to be used as exterior decking installed over traditional structural wood framing (Figure 1).

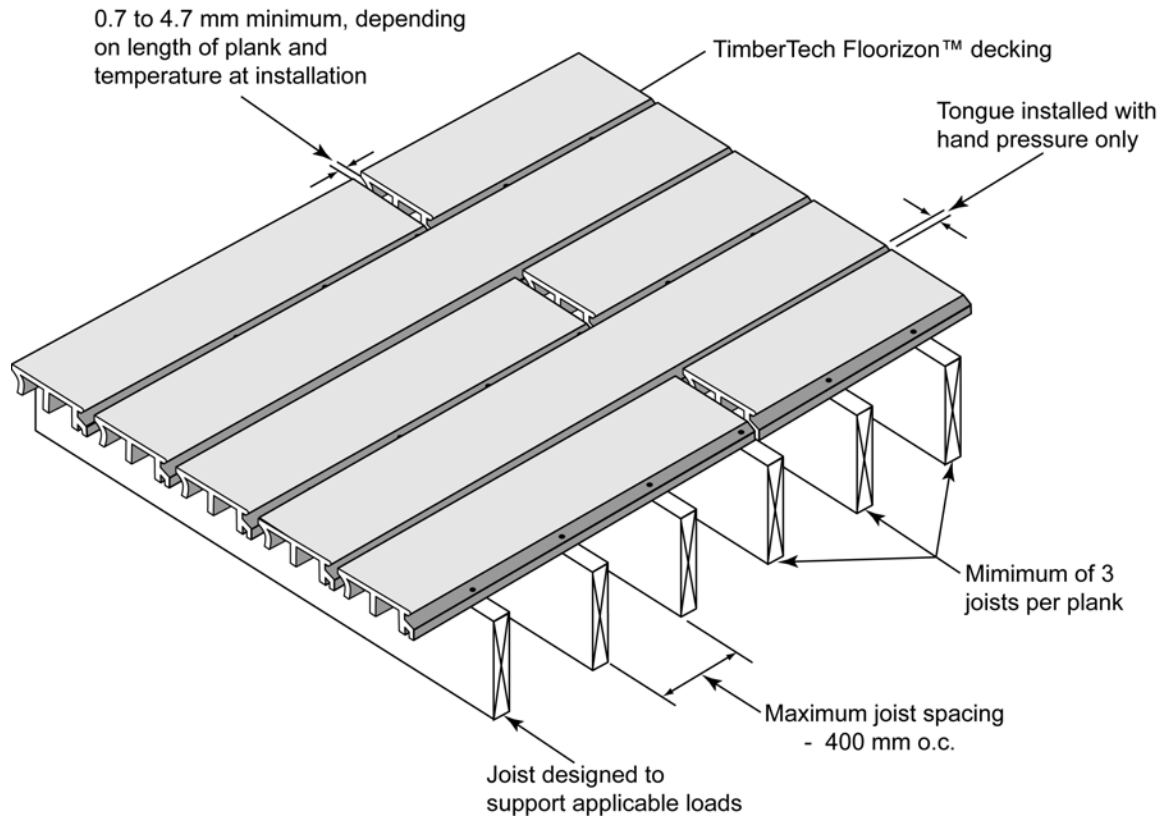


Figure 1. Installation details for “TimberTech® Profiled Decking – Floorizon™.”

3. Conditions and Limitations

CCMC’s compliance opinion in Section 1 is contingent upon “TimberTech® Profiled Decking – Floorizon™” being used in accordance with the conditions and limitations set out below.

“TimberTech® Profiled Decking – Floorizon™” may be used as exterior decking in combustible construction for light-duty applications, such as in residential occupancies, falling within the scope of Part 9 of Division B of the NBC 2005, when it is installed in conjunction with traditional structural wood framing designed to carry the applicable loads. The product must be installed in accordance with the manufacturer’s usage guidelines for the Canadian market, and in accordance with the following limitations.

- The planks must be installed with supports spaced no greater than 400 mm on centre (o.c.). In addition, with supports at 400 mm o.c., the “TimberTech® Profiled Decking – Floorizon™” planks may also be installed at a 45° angle to the joists. Each plank must be supported by at least three supports.
- “TimberTech® Profiled Decking – Floorizon™” must be fastened to the wood joists with fasteners specified by the manufacturer and conforming to Article 9.23.3.1. of Division B of the NBC 2005. The fasteners must have a corrosion protection⁽¹⁾ coating or be made of stainless steel. The planks must be fastened with at least two fasteners per support, and the fasteners must be at least 64 mm long.

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

- “TimberTech® Profiled Decking – Floorizon™” 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 4.7 mm (3/16”) for installations

below 0°C, 3.1 mm (1/8”) for installations between 0.5°C to 23.3°C and 0.7 mm (1/32”) for installations over 23.8°C. The width-to-width gapping is accomplished by installing tongue into the groove with hand pressure only. The gap from tip of tongue to back of groove will be approximately 3.1mm (1/8”).

- “TimberTech® Profiled Decking – Floorizon™” is permitted to be used where termite and decay protection is required as per Article 9.3.2.9. of Division B of the NBC 2005.
- “TimberTech® Profiled Decking – Floorizon™” is **not** to be used as stair treads.
- “TimberTech® Profiled Decking – Floorizon™” is **not** to be considered as an equivalent to dimensional lumber.

The product must be identified with the following information:

- manufacturer’s name or logo; and
- the phrase “CCMC 13303-R.”

4. Technical Evidence

CCMC’s Technical Guide for Cellulosic/Polymer Composite Exterior Decking (Hollow Cross-Section) sets out the nature of the technical evidence required by CCMC to enable it to evaluate a product as an acceptable or alternative solution in compliance with the NBC 2005. The Report holder has submitted test results for CCMC’s evaluation. Testing was conducted at an independent laboratory recognized by CCMC. The corresponding test results for “TimberTech® Profiled Decking – Floorizon™” are summarized below.

NBC 2005 Compliance Data for “TimberTech® Profiled Decking – Floorizon™” on which CCMC Based its Opinion in Section 1

Table 4.1. Basic Physical and Mechanical Properties of “TimberTech® Profiled Decking – Floorizon™”

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	0.0
Strength and Stiffness			
Flexural rigidity (EI) • span-to-depth ratio within 18 to 21	kN·mm ²	> 300 000	1 224 000
Moment capacity (Mr) • span-to-depth ratio within 18 to 21	N·mm	> 190 000	287 900
Creep, recovery and load duration	%	< 25 for creep > 75 for recovery No failure	37 ⁽³⁾ 81 Passed
Strength and Stiffness After Aging			
Weathering • impact resistance	%	> 75 of non-weathered value	101
Accelerated aging • MOE and MOR	%	> 50 of non-aged value	79 (MOE) 96 (MOR)
Fastener Holding Capacity			
• nail withdrawal strength	N	> 600	527 ⁽⁴⁾
• lateral nail strength	N	> 720	3 867
Flame-Spread Rating			
Flame-spread • smoke development	No unit	< 200 Report	61 351

Notes to Table 4.1:

- (1) Average test results of six specimens, except for the “Creep, recovery and load duration” results, 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) The product creep (deformation under constant load) will be greater than that of lumber planks for sustained loads.
- (4) The nail withdrawal value is slightly lower than the target. The manufacturer specifies screws for installation with higher capacity.

Table 4.1.2. Performance Under Both Concentrated Static Loads and Impact Loads

Property	Requirement		Result ⁽¹⁾	
	Minimum Ultimate Load (kN)	Maximum Deflection Under 0.89-kN Load (mm)	Ultimate Load (kN)	Deflection Under 0.89-kN Load (mm)
Concentrated load • decking at 50°C • decking at 20°C • decking at -35°C	2.45	2.8	2.70 2.96 3.14	3.47 2.10 3.13
	Minimum Ultimate Load Following Impact Load of 102 N·m (kN)	Maximum Deflection Under 0.89-kN Load Following Impact Load of 102 N·m (mm)	Ultimate Load Following Impact Load of 102 N·m (kN)	Deflection Under 0.89-kN Load Following Impact Load of 102 N·m (mm)
Impact load • decking at 50°C	1.78	2.8	> 1.78 ⁽²⁾	3.84 ⁽²⁾

Notes to Table 4.1.2:

- (1) Test results for profiled planks with supports at 600 mm o.c.
- (2) The profiled planks tested at 600 mm o.c. slightly exceeded the deflection criterion. For acceptable performance the installation shall be reduced to joists installed at 400 o.c. with an allowance for 45° angle plank installation for a maximum span of 575 mm.

Table 4.1.3. Durability

Property	Durability Requirement	Result	
		Spruce Lumber	TimberTech Profiled Decking – Floorizon™
Bending stiffness	Mean percentage loss in bending stiffness (EI) after ultraviolet (UV) exposure ⁽¹⁾ and accelerated aging ⁽²⁾ must be less than or equal to spruce lumber	27%	5.6% ⁽³⁾
Bending capacity	Mean percentage loss in bending capacity (M _p) after UV exposure ⁽¹⁾ and accelerated aging ⁽²⁾ must be less than or equal to spruce lumber	14%	5.4%

Notes to Table 4.1.3:

- (1) 4 500 hours of Xenon-Arc exposure following Cycle 1 of ASTM D 2565-99, “Standard Practice for Xenon Arc Exposure of Plastics Intended for Outdoor Applications.”
- (2) Five cycles of accelerated aging (wetting, freezing, thawing and drying).
- (3) Deemed as an acceptable performance in comparison to percentage loss of stiffness in lumber after aging.

Table 4.1.4. Decay and Termite Resistance

Property	Requirement	Result
Decay resistance <ul style="list-style-type: none"> • % loss in weight • 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
Termite resistance	Rating must be equal to or better than preservative-treated wood conforming to CAN/CSA-80.1-M97	Passed

4.2 Additional Performance Data for “TimberTech® Profiled Decking – Floorizon™”

Data in this section does not form part of CCMC’s opinion in section 1.

Table 4.2. Additional Performance Data

Property	Unit	Reference value	Result
Coefficient of linear expansion (thermal) <ul style="list-style-type: none"> • longitudinal • cross-sectional 	cm/cm/°C	$< 2 \times 10^{-5}$	$3.6 \times 10^{-5(1)}$ $6.1 \times 10^{-5(1)}$
Impact resistance (Izod impact, notched)	J/m	> 53.4	$31.1^{(2)}$
Hardness (11.28-mm-diameter ball)	kN	> 1.8	8.7
Slip resistance (longitudinal) <ul style="list-style-type: none"> • dry condition • wet condition 	> 0.5 ASTM F 1679-04, “Standard Test Method for Using a Variable Incidence Tribometer (VIT)”		Passed Passed ⁽³⁾

Conditions and limitations related to Table 4.2:

Failure to conform to the conditions and limitations set out hereunder does not invalidate CCMC’s opinion concerning “TimberTech® Profiled Decking – Floorizon™”’s compliance with the National Building Code 2005.

- (1) Manufacturer’s gapping installation instructions shall 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 product is 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.
- (3) All surface finishes met the 0.5 criterion except for the simulated wood grain pattern finish, which fell below 0.43 under the wet conditions. This criterion may not meet all occupant expectations. The manufacturer may be contacted for further information.

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