

## Evaluation Report CCMC 13378-R

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# ***Latitudes (Veranda) Wood/Plastic Composite Deckboard***

## ***1. Opinion***

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Latitudes (Veranda) Wood/Plastic Composite Deckboard” when used as both exterior decking planks and as stair treads in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 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 9.3.2.9. Termite and Decay Protection
  - Subsection 9.4.2. Specified Loads
  - Article 9.4.3.1. Deflections
  - Subsection 9.8.9. Construction
  - Article 9.23.14.5. Subfloor Thickness or Rating

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

Ruling No. 10-16-253 (13378-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 2010-08-05 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.

## ***2. Description***

The product is a wood thermoplastic composite made primarily from wood fibre, virgin and reclaimed polyethylene, and talc. The product is a rectangular solid deck board with rounded corners and slotted edges. The product has an average thickness of 23.4 mm and an average width of 132.5 mm. It is intended to be used as exterior decking installed over traditional structural wood framing (see Figure 1&2).

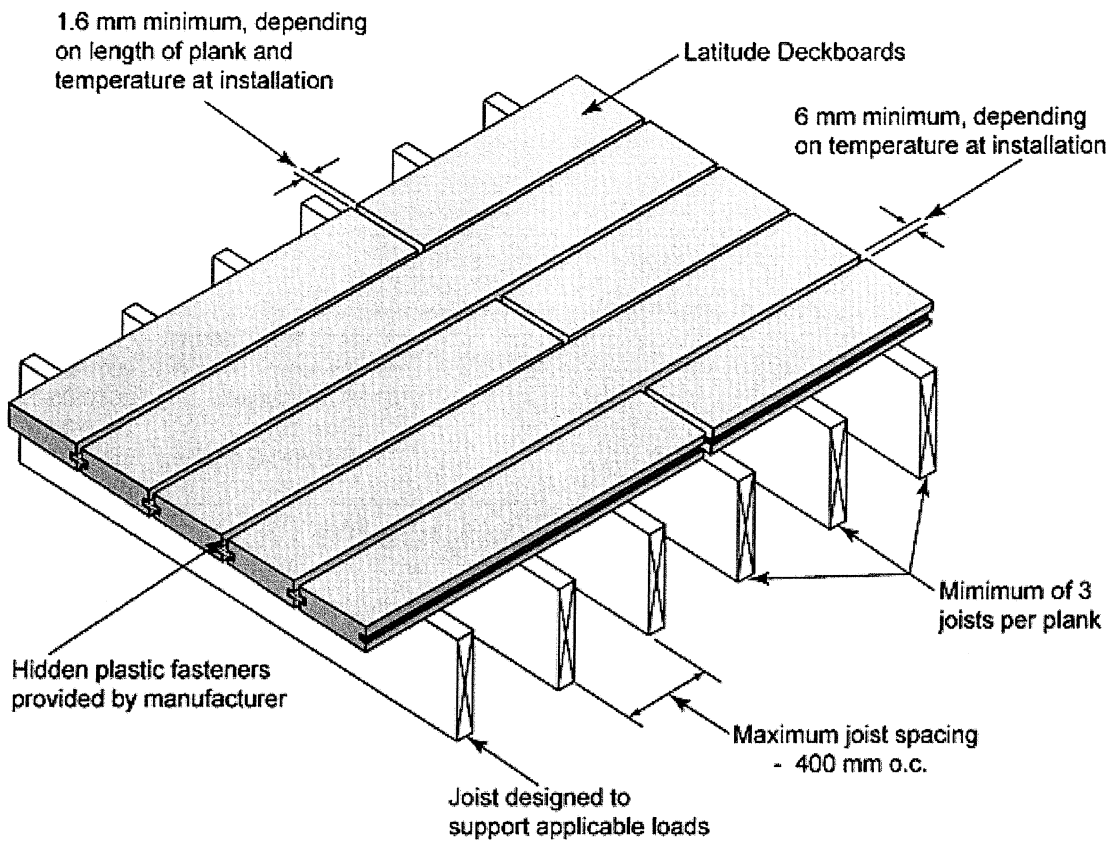
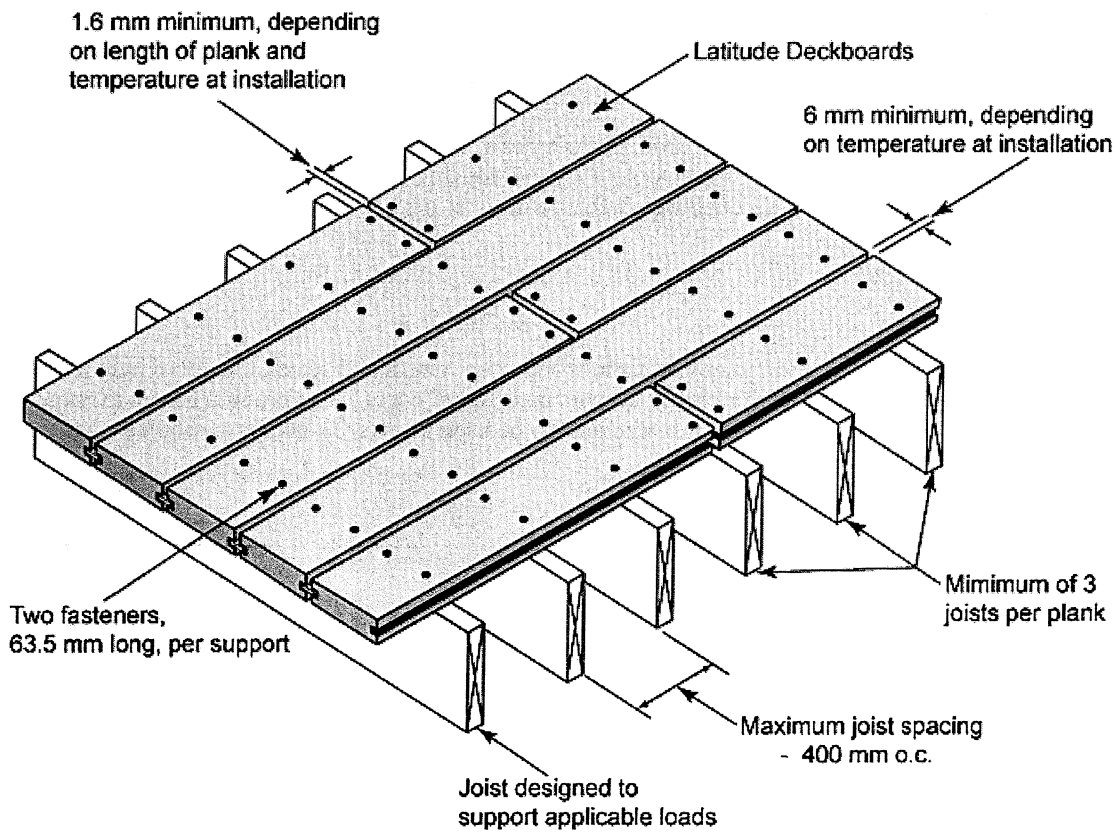


Figure 1. "Latitude Wood/Plastic Composite Deckboard with hidden fastener system"



**Figure 2. “Latitude Wood/Plastic Composite Deckboard with fasteners”**

### **3. Conditions and Limitations**

CCMC's compliance opinion in Section 1 is bound by the “Latitudes (Veranda) Wood/Plastic Composite Deckboard” being used in accordance with the conditions and limitations set out below.

- When the product is installed in conjunction with traditional structural wood framing designed to carry the applicable loads it may be used as exterior decking and as stair treads in combustible constructions for light-duty applications such as residential occupancies that fall within the scope of Part 9 or for light commercial application within the scope of Part 4 of Division B of the NBC 2005.
  - 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 23.8-mm x 133.35-mm planks must be installed with supports spaced at no greater than 400 mm on centre (o.c.).
    - The product must be fastened to the wood joists with fasteners conforming to Article 9.23.3.1., Standards for Nails and Screws, of Division B of the NBC 2005. The fasteners must have a corrosion protection coating<sup>(1)</sup> or be made of stainless steel. The planks must be fastened with a minimum of two fasteners of at least 76 mm in length per support.
- (1) As of January 2004, pressure-treated lumber requires specific hot-dipped galvanized fasteners for satisfactory performance.*
- Product can also be installed using plastic hidden fastening system as supplied by the manufacturer.
  - The product must be gapped end-to-end based on the length of the plank and the temperature at installation. The end-to-end gapping must be a minimum of 1.5 mm for every 11°C difference between the installation temperature and the hottest expected temperature. The width-to-width gapping must be 6 mm.
  - The product may be installed by a person familiar with the product installation guide.
  - This product is permitted to be installed where decay and termite resistance protection is required.
- Where possible the product label or packaging must be identified with the following information:
  - manufacturer's name or logo; and
  - the phrase “CCMC 13378-R.”

### **4. Technical Evidence**

CCMC's Technical Guide for “Latitudes (Veranda) Wood/Plastic Composite Deckboard” 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 laboratory test results for CCMC's evaluation. Testing was conducted at independent laboratories recognized by CCMC. The corresponding test results for “Latitudes (Veranda) Wood/Plastic Composite Deckboard” are summarized below.

#### **4.1 NBC 2005 Compliance Data for “Latitudes (Veranda) Wood/Plastic Composite Deckboard” on which CCMC Based its Opinion in Section 1**

##### **4.1.1 Performance Requirements**

#### 4.1.1.1 Basic Physical and Mechanical Properties

**Table 4.1.1.1**

Property	Unit	Requirement	Result
Dimensional change – coefficient of linear expansion (thermal)	°C <sup>-1</sup>	< 2 x 10 <sup>-5</sup>	1.86 <sup>-6</sup>
Dimensional change – coefficient of linear expansion (swelling)	%	< 0.5 (by 80% of specimens)	0.26
Strength and stiffness – modulus of elasticity(MOE)	MPa	> 750	3418
Strength and stiffness – modulus of rupture (MOR)	MPa	> 9	21
Strength and stiffness – impact resistance	J/m	> 53.4	22.2 <sup>(1)</sup>
Strength and stiffness – hardness	kN	> 1.8	10
Strength and stiffness – creep, recovery and load duration	%	< 25% for creep > 75% for recovery No specimen failure in step 6	51.4 <sup>(2)</sup> > 92.2 No specimen failure <sup>(2)</sup>
Strength and stiffness (after weathering) – impact resistance	%	> 75% of non-weathered value	98.2
Strength and stiffness (after accelerated aging) – MOE and MOR	%	> 50% of non-aged value	97.3 (MOE) 104 (MOR)
Fastener holding capacity – fastener withdrawal strength:  ·proprietary clip system with screws only  ·proprietary clip system  ·deck screws	N	> 600	2813 (R) 3774 (WR)  1123 (R) 1147 (WR)  3691 (R) 3762 (WR) (3)
Fastener holding capacity – lateral fastener strength:  ·deck screws  ·proprietary clip system	N	> 720	4097(R) 3830 (WR)  1313 (R) 1287 (WR) (4)

**Notes to Table 4.1.1.1**

(1) Deemed acceptable based on the full-scale structural impact test result.

- (2) The product creep (deformation under constant load) will be greater than that of lumber planks for sustained loads.
- (3) Sample preparation designation as per CAN/CSA-0325.1-88, (R2003)“Construction Sheathing,” R - Redry WR - Wet/Redry
- (4) Sample preparation designation as per CAN/CSA-0325.1-88, (R2003)“Construction Sheathing,” R - Redry WR - Wet/Redry

#### 4.1.1.2 Performance Under Concentrated Static and Impact Loads

**Table 4.1.1.2(a) Performance under concentrated static loads<sup>(1)</sup>**

Property	Requirement		Result <sup>(2)</sup>	
	Minimum Ultimate Load (kN)	Maximum Deflection under 0.89-kN Load (mm)	Ultimate Load (kN)	Deflection under 0.89-kN Load (mm)
Concentrated load:	2.45	2.0		
• decking at 50°C			3.03	3.23 <sup>(3)</sup>
• decking at 20°C			4.18	1.96
• decking at –35°C			5.31	1.30

**Notes to Table 4.1.1.2(a):**

(1) Testing as per ASTM E 661-03(2009), “Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads,” was modified for the testing of planks.

(2) Test results for 23.8-mm x 133.35-mm planks with supports at 400 mm o.c.

(3) Deemed acceptable. Although 3.23 mm is greater than the 2.0 mm requirement, the additional deflection amount of 1.23mm is not considered significant.

**Table 4.1.1.2(b) Performance under impact loads<sup>(1)</sup>**

Property	Requirement		Result <sup>(2)</sup>	
	Minimum Ultimate Load following Impact Load of 100 N·m (kN)	Maximum Deflection under 0.89-kN Load following Impact Load (mm)	Load of 1.78 kN following Impact Load of 100 N·m	Deflection under 0.89-kN Load following Impact Load (mm)
Impact load:	1.78	2.0	No break	
• decking at 50°C				2.42 <sup>(3)</sup>

**Notes to Table 4.1.1.2(b):**

(1) Testing as per the methodology outlined in ASTM E 661 and modified for the testing of planks.

(2) Test results for 23.8-mm x 133.35-mm planks with supports at 400 mm o.c.

(3) Deemed to be acceptable. Although 2.42 mm is greater than the 2.0 mm requirement, the additional deflection amount of 0.42 mm is not considered significant.

**4.1.1.3 Durability**

**Table 4.1.1.3**

Property	Requirement	Result
MOE and MOR	Mean percentage loss in MOE and MOR after UV-exposure <sup>(1)</sup> and accelerated aging <sup>(2)</sup> must be less than or equal to spruce lumber	Passed

**Notes to Table 4.1.1.3:**

(1) 4000 h of Cycle 1 as outlined Appendix X3.1 of ASTM G 155-05a, "Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials."

(2) 5 cycles of accelerated aging (wetting, freezing, thawing, and drying).

**4.1.1.4 Walking Surface Finish Quality and Slip Resistance**

**Table 4.1.1.4**

Property	Reference Value	Results
Slip resistance (longitudinal): <ul style="list-style-type: none"> <li>• dry condition</li> <li>• wet condition</li> </ul>	>0.5 ASTM F 1679-04	Passed Passed <sup>(1)</sup>

**Note to Table 4.1.1.4:**

(1) The Combed finish met the 0.5 criteria under the wet condition. The Embossed / Combed combination finish fell to 0.46 and 0.47 respectively under the wet condition. The Embossed finish fell to 0.47 and 0.48 respectively under wet conditions. These criterion may not meet all occupant expectations. The manufacturer may be contacted for further information.

**4.1.1.5 Decay Resistance**

**Table 4.1.1.5**

Property	Requirement	Result
% loss in weight and compressive strength	Mean percentage loss in weight and compressive strength after exposure to decay-causing fungi must be equal or better than preservative-treated wood conforming to CAN/CSA-O80.1-M97	passed <sup>(1)</sup>

**Notes to Table 4.1.1.5:**

(1) Data presented was not in accordance with CCMC's evaluation requirements, but demonstrated a resistance to decay-causing fungi that was deemed to meet the intent of the CCMC's requirements

#### 4.1.1.6 Termite Resistance

Table 4.1.1.6

Property	Requirement	Result
ASTM D 3345 rating	Rating must be equal to or better than preservative-treated wood conforming to CAN/CSA-O80.1-M97	Passed <sup>(1)</sup>

**Note to Table 4.1.1.6:**

<sup>(1)</sup> Data presented was not in accordance with CCMC evaluation requirements, however data did demonstrate a termite resistance that was deemed to meet the intent of CCMC's requirements.

#### 4.1.1.7 Flame-spread Rating and Flammability

The flame-spread rating of the product is 81, which is in accordance with CAN/ULC-S102.2-M88, "Surface Burning Characteristics of Flooring," whose requirement is < 200, and whose smoke development is 100.

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Plant(s): Prairie du Chein, WI, U.S.A.

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