



Evaluation Report

CCMC 13379-R

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Crosstimbers[®] Professional Grade

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Crosstimbers[®] Professional Grade,” 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

“Crosstimbers[®] Professional Grade” is a thermoplastic composite lumber made primarily of polypropylene and rice hull flour. The “Crosstimbers[®] Professional Grade” planks are manufactured by an extrusion process and are produced as decking 25 mm (1.0”) high by 140 mm (5.5”) wide with six (6) 15.5-mm-diameter (0.61”) longitudinal voids and 6.9-mm-wide (0.27”) by 5.3-mm-high (0.21”) longitudinal grooves on each side for concealed fastener attachment. The product is available in lengths of 3.66 m (12 ft), 4.88 m (16 ft) and 6.10 m (20 ft). The walking surface textures are an embossed simulated wood-grain pattern and a smooth as-extruded surface. The four (4) colours addressed herein are New Cedar, Pewter Grey, Sandalwood and Weatheredwood.

“Crosstimbers[®] Professional Grade” is intended to be used as exterior decking installed over traditional structural wood framing.

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is contingent upon "Crosstimbers™ Professional Grade" being used in accordance with the conditions and limitations set out below.

"Crosstimbers® Professional Grade" 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.

All deck boards have arrows imprinted on the side indicating the orientation. To obtain a uniform look, the boards must be installed such that all orientation arrows are pointing in the same direction.

The product must be installed in accordance with the manufacturer's usage guidelines for the Canadian market, and in accordance with the following limitations:

- "Crosstimbers® Professional Grade" must be attached to the supporting construction using the "EZ Build Deck Fastening System" provided by the manufacturer.
- "Crosstimbers® Professional Grade" should be pre-drilled and countersunk prior to face fastening.
- "Crosstimbers® Professional Grade" 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 planks must be fastened with at least two fasteners per support.
- "Crosstimbers® Professional Grade" must be gapped end-to-end, based upon the ambient temperature at installation. The end-to-end gapping must be 4.7 mm (3/16") for installations below 60°C and 3.1 mm (1/8") for installations above 60°C. The width-to-width gapping is accomplished by installing the tongue into the groove with hand pressure only. The gap adjacent to the structure must be 6.4 mm (1/4") for installations below 60°C and 9.5 mm (3/8") for installations above 60°C.
- "Crosstimbers® Professional Grade" 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.
- "Crosstimbers® Professional Grade" is not to be used as stair treads.
- "Crosstimbers® Professional Grade" is not to be used as components of a substructure.
- "Crosstimbers® Professional Grade" is not to be considered as an equivalent to dimensional lumber.
- The product must be identified with the manufacturer's name or logo and the phrase "CCMC 13379-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 "Crosstimbers® Professional Grade" are summarized below.

4.1 NBC 2005 Compliance Data for “Crosstimbers® Professional Grade” on which CCMC Based its Opinion in Section 1

Table 4.1.1 Basic Physical and Mechanical Properties of “Crosstimbers® Professional Grade”

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	0.1
Strength and Stiffness			
Flexural rigidity (EI) • span-to-depth ratio within 18 to 21	kN·mm ²	> 300 000	875 000
Moment capacity (Mr) • span-to-depth ratio within 18 to 21	N·mm	> 190 000	360 000
Creep, recovery and load duration (610-mm span)	%	< 25 for creep > 75 for recovery No failure	31 ⁽³⁾ 83 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	77 (MOE) 87 (MOR)
Fastener Holding Capacity			
• nail withdrawal strength	N	> 600	2927
• lateral nail strength	N	> 720	2 529
Flame-Spread Rating			
• flame-spread • smoke development	No unit	< 200 Report	95 >450

Notes to Table 4.1.1:

- (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.

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	2.0	3.49 4.14 5.82	1.83 1.44 1.56
	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	2.0	> 1.78	1.8 ⁽²⁾

Notes to Table 4.1.2:

- (1) Test results are for profiled planks with supports at 406 mm o.c.
- (2) The profiled planks tested at 406 mm o.c. slightly exceeded the deflection criterion. For acceptable performance, the installation shall be reduced to joints installed at 203 mm (8") o.c.

Table 4.1.3 Durability

Property	Durability Requirement	Result	
		Spruce Lumber	“Crosstimbers [®] Professional Grade”
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	47%	51% ⁽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	61%	32%

Notes to Table 4.1.3:

- (1) 4 061 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-O80.1-M97	Passed

4.2 Additional Performance Data for “Crosstimbers® Professional Grade”

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

Table 4.2.1 Additional Performance Data

Property	Unit	Result
Coefficient of linear expansion (thermal) <ul style="list-style-type: none"> • longitudinal • cross-sectional 	cm/cm/°C	2.7×10^{-5} 5.5×10^{-5}
Impact resistance (Izod impact, notched)	J/m	21.2 ⁽¹⁾
Hardness (11.28-mm-diameter ball)	kN	3.4
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

Conditions and limitations related to Table 4.2

Failure to conform to the conditions and limitations set out hereunder does not invalidate Comic's opinion concerning “Crosstimbers® Classics” with the National Building Code 2005.

- (1) The IZOD impact is a small-scale test used to characterize the material. Very low performance values show a sensitivity to a loss of strength following impact when the 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

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