



Evaluation Report CCMC 13125-R Trex® Transcend® Decking

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1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Trex® Transcend® Decking,” when used as both exterior decking and as stair treads in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code (NBC) of Canada 2015:

- 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
 - Article 9.8.9.1., Loads on Stairs and Ramps
 - Article 9.23.15.5., Subfloor Thickness or Rating

This opinion is based on the CCMC evaluation of the technical evidence in Section 4 provided by the Report Holder.

Ruling No. 04-09-113 (13125-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 2004-07-20 (revised on 2015-04-24) 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 wood thermoplastic composite lumber (WTCL) made primarily from equal parts of reclaimed hardwood sawdust and reclaimed/recycled low-density polyethylene. The composite products are manufactured through a continuous extrusion process into planks of solid cross sections. The product is available in 23.7 mm × 137 mm cross sections. The product is intended to be used as stair treads or as exterior decking installed over traditional structural wood framing.

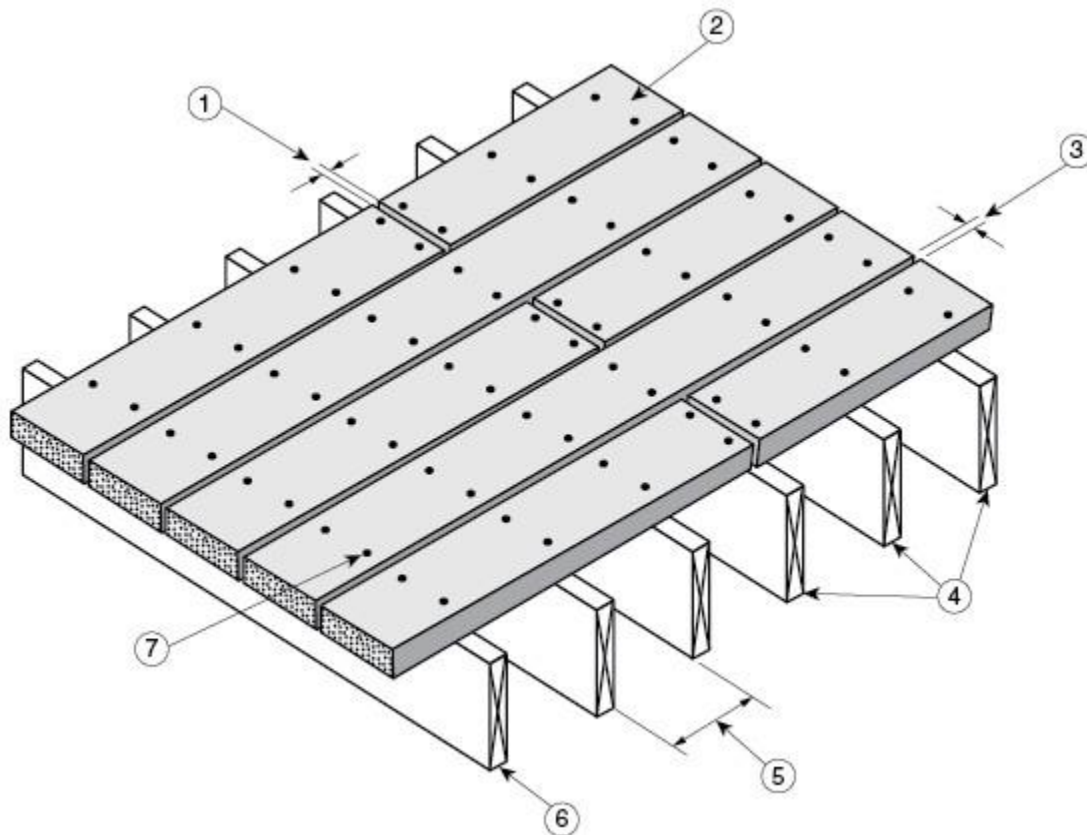


Figure 1. “Trex® Transcend® Decking”

1. 3 mm to 5 mm minimum spacing between ends of the planks, depending on the length of the plank and temperature at installation
2. “Trex® Transcend® Decking”
3. 6 mm or 10 mm spacing between sides of the planks, depending on the temperature at installation
4. minimum of 3 joists per plank
5. maximum joist spacing of 400 mm o.c. for 23.7 mm × 137 mm planks
6. joist designed to support applicable loads
7. two 76-mm-long fasteners per plank at each intersecting joist

3. Conditions and Limitations

The CCMC compliance opinion in Section 1 is contingent on “Trex® Transcend® Decking” being used in accordance with the conditions and limitations set out below:

- The product must be installed with supports spaced no greater than 400 mm on center (o.c.). Each plank must be supported by at least three joists.
- When used as stair treads, the product must be installed with supports spaced no greater than 305 mm.
- The products 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 2015 that have a corrosion protection coating¹ or are made of stainless steel. The planks must be fastened with at least two fasteners per joist and the fasteners must be at least 76 mm long.
- The product must be installed according to the manufacturer’s installation instructions.
- The products must be gapped end to end, based on the length of the plank and the temperature at installation in accordance with the manufacturer’s recommendations. 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 installations below 5°C.
- The products should be installed by a knowledgeable person familiar with the product installation guide.
- The product’s label or packaging must be identified with the manufacturer’s name or logo and the phrase “CCMC 13125-R.”

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

4. Technical Evidence

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

4.1 Material Requirements

Table 4.1.1 Results of Testing the Physical Properties of the Product

Property			Unit	Requirement	Result ^{1,2}
Dimensional change	coefficient of linear expansion (thermal)	longitudinal	cm/cm/°C	< 2×10^{-5}	$5.2 \times 10^{-5\text{a}}$
		cross sectional			$7.1 \times 10^{-5\text{a}}$
	coefficient of linear expansion (swelling): oven dry to vacuum pressure soak		%	< 0.5 by 80% of specimens	0.0
Strength and stiffness	modulus of elasticity (MOE)	span to depth ratio within 18 to 21	MPa	> 750	2 980
	modulus of rupture (MOR)			> 9	30
Impact resistance (Izod impact, notched)			J/m	> 53.4	41 ^d
Hardness (11.28-mm-diameter ball)			kN	> 1.8	3.8
Creep, recovery and load duration			%	< 25 for creep	49.1 ^e
				> 75 for recovery	68.7 ^e
				No failure	Pass
Strength and stiffness after aging	weathering: impact resistance		%	> 75 of non-weathered value	92
	accelerated aging	MOE	%	> 50 of non-aged value	60
		MOR			71
Fastener holding capacity	nail withdrawal strength		N	> 600	761 (standard deviation = 35)
	lateral nail strength			> 720	518 ^f (standard deviation = 100)
Flame-spread rating	smoke development		-	< 200	120
				Report	> 500

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 products and are not intended to be used as engineering design properties.
3. Performance result allowed based on the manufacturer’s gapping installation instructions.
4. Performance result allowed based on the full-scale structural impact test results.
5. Performance result allowed for decking application based on test results obtained in full-scale structural testing. The product’s creep (deformation under constant load) results will be greater than that of lumber planks.
6. Performance result allowed based on the full-scale structural test results and fastening detail test results.

Table 4.1.2 Results of Testing the Durability, Decay, Termite and Slip Resistance Properties of the Product

Property		Requirement	Result		
Durability	MOE	Mean percentage losses in MOE and MOR after UV exposure and accelerated aging must be less than or equal to spruce lumber.	Pass		
	MOR				
Decay resistance	% loss in weight	Mean percentage losses in weight and compressive strength after exposure to decay-causing fungi must be equal to or better than spruce heartwood.	Pass		
	compressive strength				
Termite resistance		Rating must be equal to or better than preservative-treated wood conforming to CSA 80.1-M97.	Pass		
Slip resistance	dry condition	longitudinal planks	> 0.5 ASTM D2394 (05)	Parallel to Planks	Perpendicular to Planks
				0.43 ¹	0.52
	wet condition			0.32 ¹	0.39 ¹

Notes to Table 4.1.2:

1. These criteria may not meet all occupant expectations. Performance result allowed for the intended use, as the slip resistance is less than the reference value. The manufacturer may be contacted for further information.

4.2 Performance Requirements**Table 4.2.1 Results of Testing the Performance of the Product under 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 static load	decking at 50°C	2.45	2.4	3.88	2.71
	decking at 20°C			4.20	2.7 ²
	decking at -35°C			4.14	1.06
Impact load of 102 N·m	decking at 50°C	1.78	2.4	> 1.78	2.3
	decking at -35°C				1.12

Notes to Table 4.2.1:

2. Test results are for 38 mm × 140 mm planks with supports at 500 mm o.c.
3. Performance result allowed for the intended use, as the 0.3 mm deflection above the 2.4 mm requirement was not considered significant.

Table 4.2.2 Results of Testing the Performance of Stair Treads under a Concentrated Static Load

Property		Requirement		Result ¹	
		Minimum Ultimate Load (kN)	Maximum Deflection under 1 kN (mm)	Applied Ultimate Load (kN)	Deflection under 1 kN (mm)
Concentrated static load	stair tread	5 ²	0.75	8.75	1.4 ³

Notes to Table 4.2.2:

1. Test results are for 50°C and 80% relative humidity (RH) test condition for stair stringers spaced at 305 mm o.c. Three specimens were submitted for each test.
 2. Applied through a 75-mm-diameter disk positioned at the center line of the plank and midway between stringers.
 3. Although the deflection is slightly higher than the allowed limit, the applied ultimate load was 75% higher than the minimum required ultimate load. Therefore, this deflection result was deemed acceptable.
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Report Holder

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