



Evaluation Report CCMC 12678-R

HardiePanel® HZ5™ Vertical Siding, HardiePlank® HZ5™ Lap Siding, HardieShingle® HZ5™ Notched Panels and HardieShingle® HZ5™ Individual Shingle

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1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “HardiePanel® HZ5™ Vertical Siding,” “HardiePlank® HZ5™ Lap Siding,” “HardieShingle® HZ5™ Notched Panels” and “HardieShingle® HZ5™ Individual Shingle,” when used as an exterior cladding applied to vertical walls of masonry or concrete, as well as cementitious and wood sheathing that are attached to wood or steel framing, in new and retrofit construction 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)(a) of Division A, as an acceptable solution from Division B:
 - Subsection 9.27.2., Required Protection from Precipitation
- Clause 1.2.1.1.(1)(b) of 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:
 - Subsection 9.27.9., Hardboard

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

Ruling No. 95-17-36 (12678-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 1995-11-29 (revised on 2012-06-13) 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 products are fibre cement boards made primarily of hydraulic cement, silica, and other additives and reinforced integrally with cellulose fibres. The products are manufactured using the Hatschek process and steam autoclaved. They are intended for use as an exterior cladding applied to vertical masonry or concrete walls, as well as cementitious and wood sheathing that are attached to wood or steel framing, in new and retrofit construction subject to the conditions and limitations stated in Section 3 of this Report. See also the manufacturer’s installation instructions, dated February 2014, for details and restrictions.

In addition to the sizes for each of the products listed below, additional lengths and widths may be available from the manufacturer by special order.

2.1 “HardiePanel® HZ5™ Vertical Siding”

“HardiePanel® HZ5™ Vertical Siding” is available in panels that are 2 440 mm to 3 050 mm long, 1 220 mm wide and 7.5 mm thick. The panels are available in a smooth, stucco pattern or a wood grain face texture.

The panels are installed with a drained and vented air space not less than 10 mm deep behind the cladding. The vertical joints of the panels must butt over the framing members (studs).

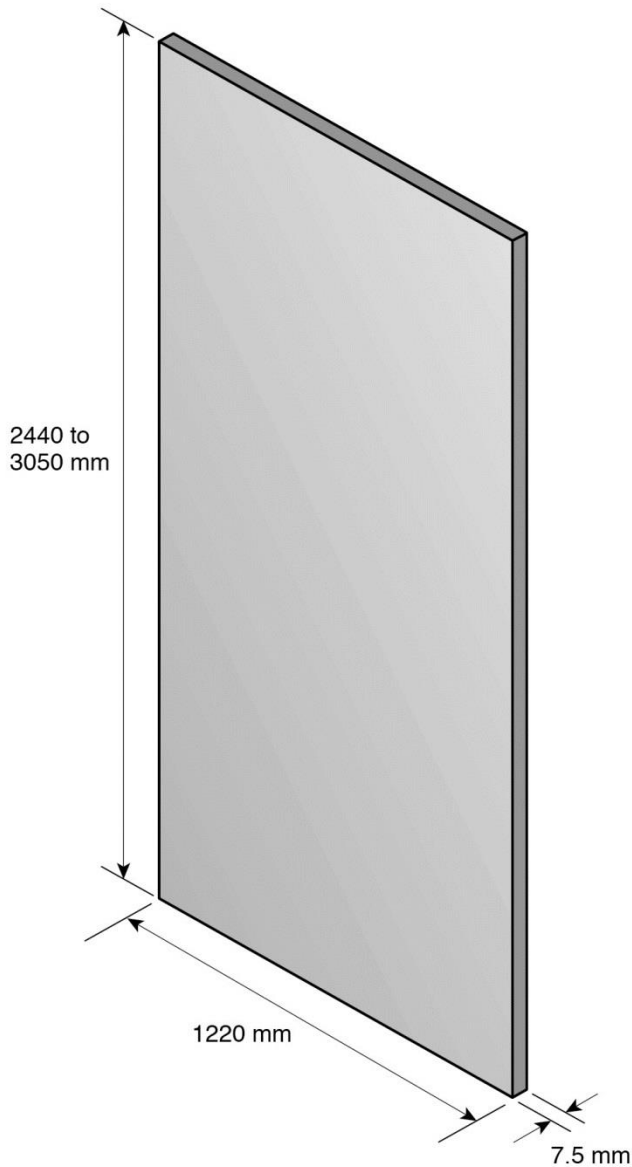


Figure 1. “HardiePanel® HZ5™ Vertical Siding”

2.2 “HardiePlank® HZ5™ Lap Siding”

“HardiePlank® HZ5™ Lap Siding” is available in planks that are 3 660 mm long, 133 mm to 305 mm high and 7.5 mm thick. The planks are available in a smooth or wood grain face texture.

The planks are installed starting at the bottom of the wall with a minimum overlap of 32 mm. The vertical joints of the planks must butt over the framing members (studs). The lap siding is fastened either through the overlapping planks (face nailed) with corrosion-resistant nails or screws, or through the top edge of the planks (blind nailed).

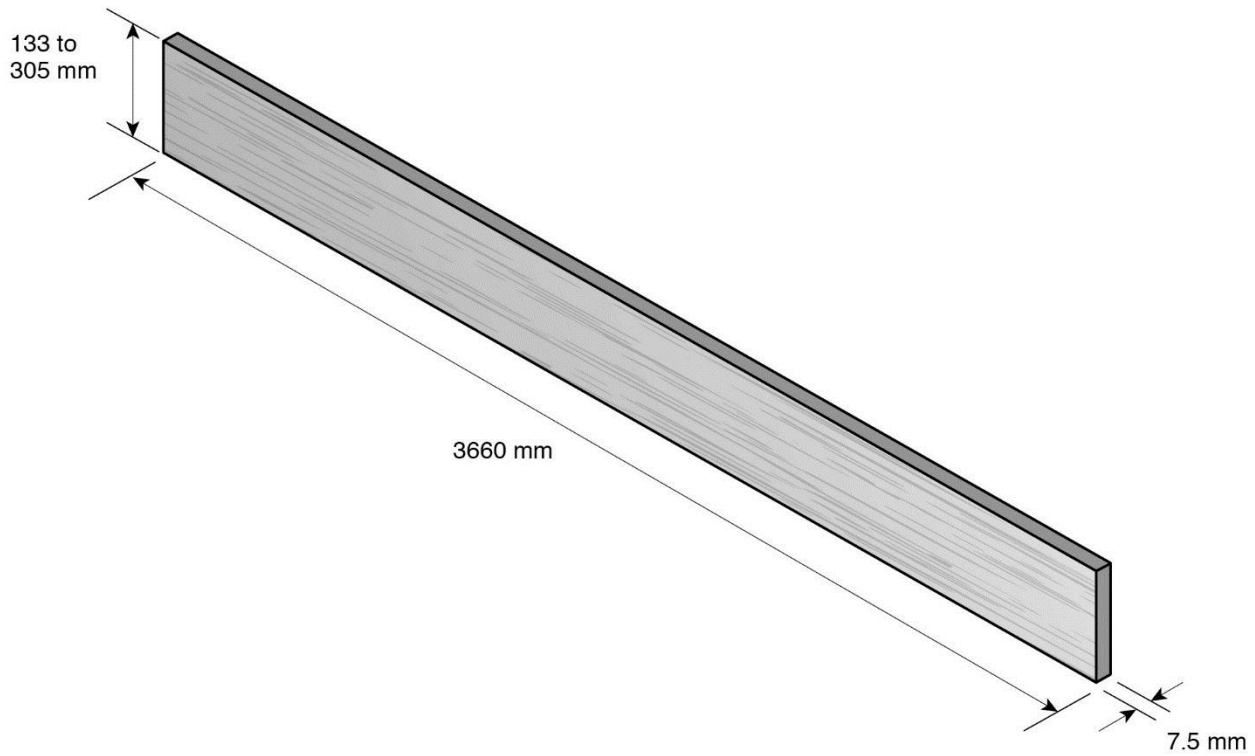


Figure 2. “HardiePlank® HZ5™ Lap Siding”

2.3 “HardieShingle® HZ5™ Notched Panels”

“HardieShingle® HZ5™ Notched Panels” are available in three variations: a straight edge panel, a staggered edge panel and a half round panel. The panels are 404 mm high, 1 220 mm long and 6 mm thick. The panels are available in a wood grain texture.

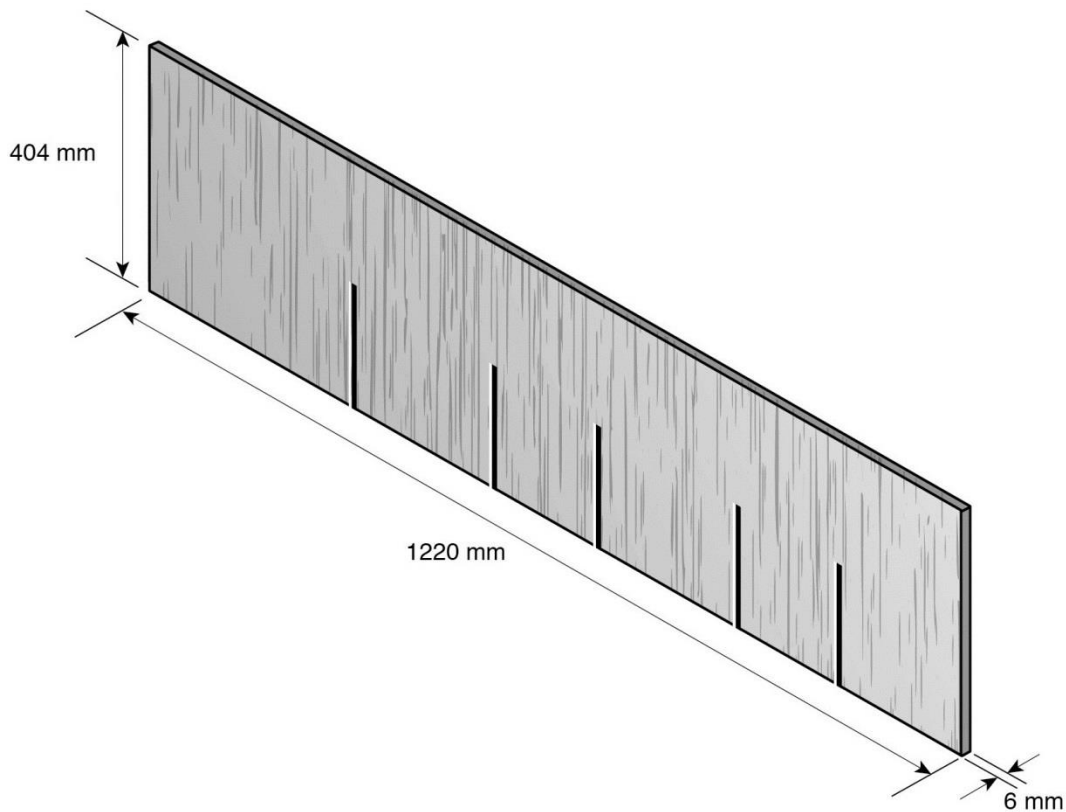


Figure 3. “HardieShingle® HZ5™ Notched Panels” – straight edge

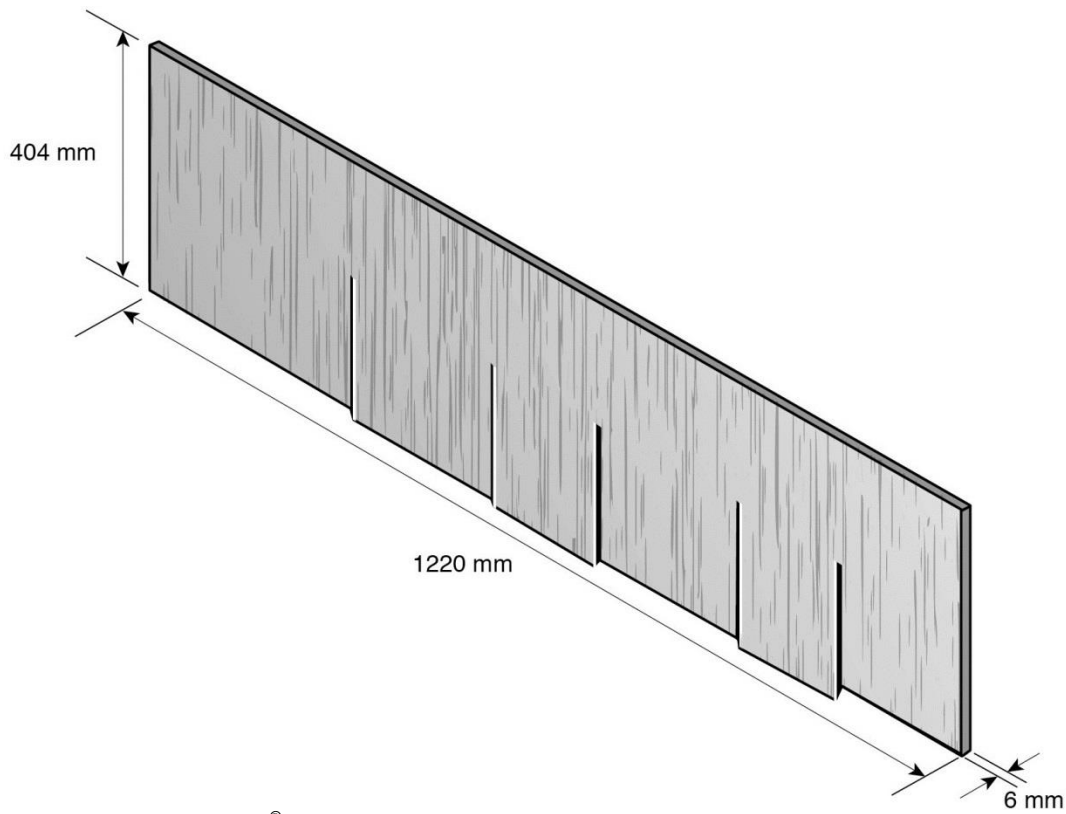


Figure 4. “HardieShingle® HZ5™ Notched Panels” – staggered edge

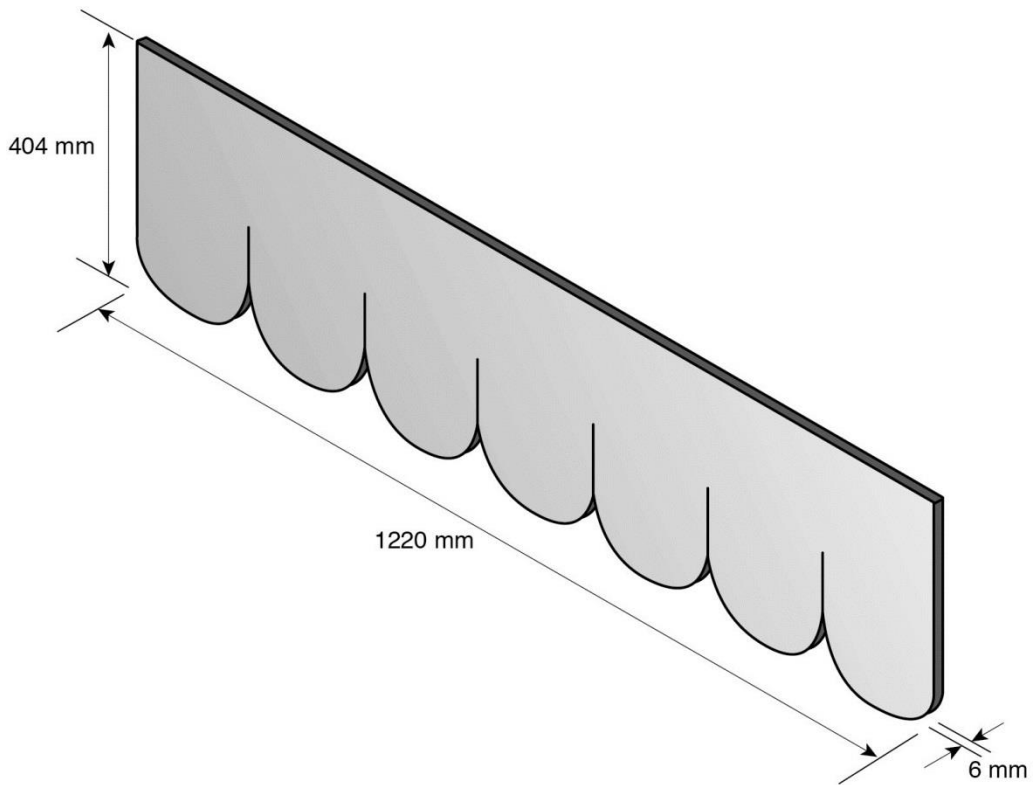


Figure 5. “HardieShingle® HZ5 Notched Panels” – half round

2.4 “HardieShingle® HZ5™ Individual Shingle”

“HardieShingle® HZ5™ Individual Shingle” is available in cladding shingles that are 381 mm high, 105 mm to 250 mm wide and 6 mm thick. The shingles are available in a wood grain texture.

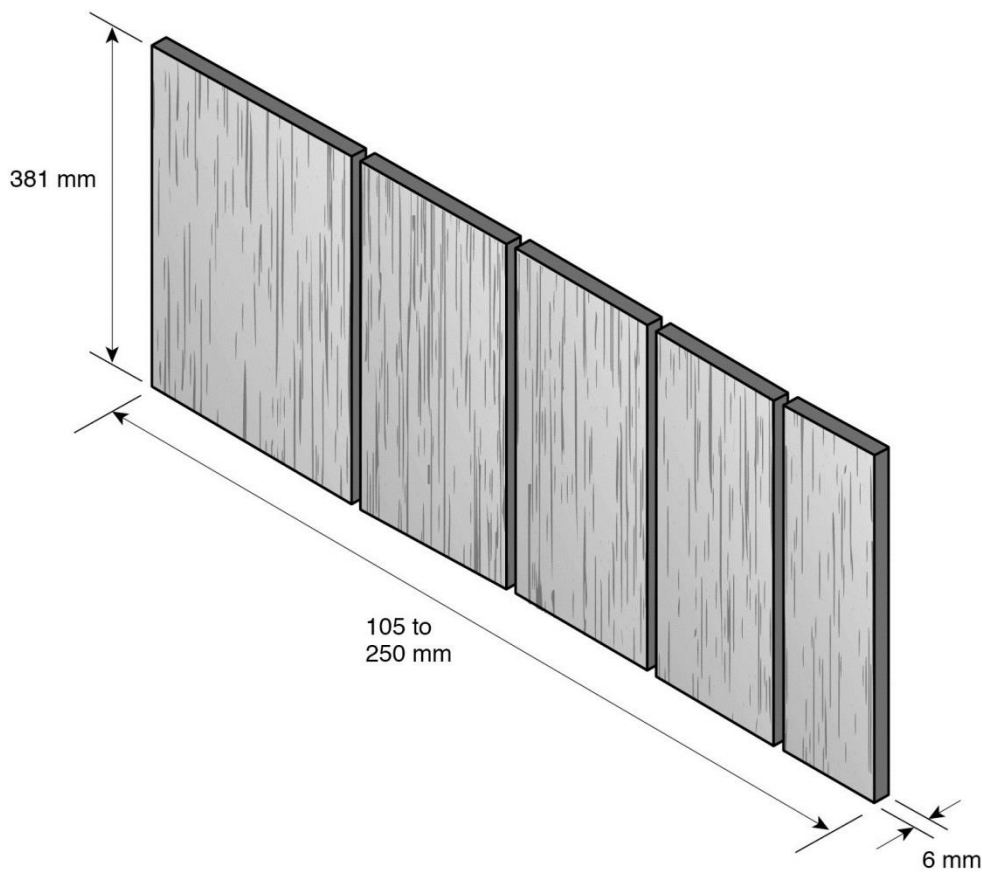


Figure 6. “HardieShingle® HZ5™ Individual Shingle”

3 .Conditions and Limitations

The CCMC compliance opinion in Section 1 is bound by the “HardiePanel® HZ5™ Vertical Siding,” “HardiePlank® HZ5™ Lap Siding,” “HardieShingle® HZ5™ Notched Panels” and “HardieShingle® HZ5™ Individual Shingle” being used in accordance with the conditions and limitations set out below.

3.1 “HardiePlank® HZ5™ Lap Siding,” “HardieShingle® HZ5™ Notched Panels” and “HardieShingle® HZ5™ Individual Shingle”

All areas:

- The products are intended for use as an exterior cladding applied over exterior walls of buildings.
- This Report covers the installation of the products limited to the geographical areas with the hourly wind pressures shown in Table 4.3.1.1 and the respective fastening schedule to a wood or steel frame.
- The performance level shown in Table 4.3.1.1 is for installations limited to non-post-disaster buildings with the maximum building height of 12 m or 20 m, depending on the geographical areas with the hourly wind pressures.
- Buildings up to three storeys high (12 m) fall under the scope of Part 9 of Division B of the NBC 2015.
- Buildings higher than 12 m fall under the scope of Part 4 of Division B of the NBC 2015. In accordance with the NBC 2015, the engineering design must be prepared by a professional engineer licensed to practice in Canada who has expertise in a relevant area.
- At least one layer of wall sheathing membrane conforming to Article 9.27.3.2., Sheathing Membrane Material Standard, of Division B of the NBC 2015, must be applied beneath the cladding products.
- Where no sheathing is used, at least two layers of sheathing membrane must be applied beneath the cladding products in accordance with Article 9.27.3.5., Sheathing Membrane in lieu of Sheathing, of Division B of the NBC 2015.

Areas defined in Sentence 9.27.2.2.(5) of Division B of the NBC 2015:

- Sentence 9.27.2.2.(5) of Division B of the NBC 2015 defines the area where the number of degree-days is less than 3 400 and the moisture index is greater than 0.90, or the number of degree-days is 3 400 or more, and the moisture index is greater than 1.00.
- For applications in the areas as defined by Sentence 9.27.2.2.(5) of Division B of the NBC 2015, all listed products must be installed over wood strapping creating a drained and vented air space not less than 10 mm deep behind the cladding in conformance with Clause 9.27.2.2.(1)(a), Sentences 9.27.2.2.(2), and 9.27.5.7.(2), Penetration of Fasteners, and Articles 9.27.5.3., Furring, and

9.27.5.4., Size and Spacing of Fasteners, of Division B of the NBC 2015.

- The drained and vented air space described in Clause 9.27.2.2.(1)(a) of Division B of the NBC 2015 must remain unobstructed.

Areas not defined in Sentence 9.27.2.2.(5) of Division B of the NBC

- For direct application in these areas,^{(1) (2)} the air space between the substrate and the products that is created as a result of the overlap of the cladding boards must remain unobstructed.

3.2 “HardiePlank® HZ5™ Lap Siding”

- For direct application of “HardiePlank® HZ5™ Lap Siding” in these areas, the butt joint must consist of factory-finished ends in conjunction with a joint flashing behind the joint, which consists of a 150-mm-wide Code-prescribed sheathing membrane⁽²⁾ that overlaps the course below by 25 mm. The butt joint must be lined up and be supported by a stud.

3.3 “HardiePanel® HZ5™ Vertical Siding”

- In all areas, “HardiePanel® HZ5™ Vertical Siding” must be installed over wood strapping creating a drained and vented air space not less than 10 mm deep behind the cladding in conformance with Clause 9.27.2.2.(1)(a), Sentences 9.27.2.2.(2) and 9.27.5.7.(2), and Articles 9.27.5.3. and 9.27.5.4., of Division B of the NBC 2015.

3.4 Cladding System Installation Details

- Installation of the products must meet the requirements of Article 9.27.3.8., Flashing Installation, and Subsections 9.27.4., Sealants, and 9.27.5., Attachment of Cladding.
- The attachment of the cladding conforms to Table 4.3.1.1 of this Report.
- The products must be installed in conjunction with materials conforming to Articles 9.27.3.2., Sheathing Membrane Material Standard, and 9.27.3.7., Flashing Materials, and Subsections 9.27.4. and 9.27.5. of Division B of the NBC 2015.
- The requirements of Article 9.10.16.1., Required Fire Blocks in Concealed Spaces, of Division B of the NBC 2015 must be met.
- The product must be installed in accordance with the manufacturer’s current installation instructions:
 - HS1235 2/14 for “HardiePanel® HZ5™ Vertical Siding”,
 - HS11118 2/14 for “HardiePlank® HZ5™ Lap Siding,” and
 - HS11120 2/14 for “HardieShingle® HZ5™ Notched Panels” and “HardieShingle® HZ5™ Individual Shingle.”
- If the fastening schedules in the manufacturer’s installation instructions differ from those tested and reported in Table 4.3.1.1 of this Report, the ones in Table 4.3.1.1. supersede.
- The technical opinion in this Report is limited to uncoated products. The manufacturer may provide primed or prepainted products. Low water vapour permeance coatings may affect the drying potential of the product as well as the substrate on which it is installed. Such a situation could lead to premature deterioration of the substrate and other elements in the wall assembly. The manufacturer’s recommendations for type and characteristics of coatings to be used in conjunction with the cladding must be followed.
- The possibility of moisture accumulation within the wall construction is mainly a function of the level of workmanship related to the elements constituting the second plane of protection as defined in Article 9.27.2.3. of Division B of the NBC 2015, such as wall sheathing membrane, flashing, caulking and attachment of siding. A high level of quality control at all stages of the exterior wall construction is imperative for obtaining an acceptable performance.
- This Evaluation Report is applicable only to products identified with “CCMC 12678-R.”

(1) A moisture management study performed on “HardiePlank® HZ5™ Lap Siding,” “HardieShingle® HZ5™ Notched Panels” and “HardieShingle® HZ5™ Individual Shingle” indicated that these products can be installed with direct application in areas other than those defined in Sentence 9.27.2.2.(5) of Division B of the NBC 2015.

(2) These direct-applied cementitious claddings were not evaluated when in contact with polymer-based sheathing membranes (see limitations in CCMC Reports of polymer-based sheathing membranes). The NBC-prescribed, asphalt-impregnated, paper-based sheathing membranes shall be used.

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 General

4.1.1 Dimensional Tolerances

Table 4.1.1.1 Results of Testing the Dimensional Measurements of “HardiePanel® HZ5™ Vertical Siding”

Property	Unit	Requirement	Result
Length	mm	±3.0	2
Width	mm	±3.0	2
Thickness	mm	±1.6	0.51
Squareness	mm/m	±4.0	1.33
Edge straightness	mm/m	±2.6	0.73

4.2 Prescriptive Requirements

Table 4.2.1 Results of Testing the Prescriptive Requirements of “HardiePanel® HZ5™ Vertical Siding”

Property		Unit	Requirement	Result	
Water absorption		%	≤ 40	29.8	
Density		kg/m ³	≥ 950	1 388	
Dimensional change		%	< 0.20	0.1	
Flexural strength	MD ⁽¹⁾	MPa	> 7.0	21.0	
	XD ⁽¹⁾		> 7.0	13.7	
Fastener pull-through resistance		N	≥ 28 × thickness	1 144	
Water vapour transmission (water method)		–	> 60 ng/m ² ·s·Pa	1 056	
Freeze-thaw resistance	loss of mass		%	≤ 3	1.42
	loss of flexural strength	MD	%	≤ 15	4.1
		XD		≤ 15	12.9
	deleterious effects		–	None	None
Watertightness		–	No drop of water	None	
Warm water resistance	loss of flexural strength	MD	%	≤ 15	–9.4 ⁽²⁾
		XD		≤ 15	–12.0 ⁽²⁾
	deleterious effects		–	No visible cracks	None

Notes to Table 4.2.1:

- (1) “MD” refers to machine direction; “XD” refers to cross-machine direction.
- (2) The negative values indicate that they gained strength after the warm water resistance test.

4.3 Performance Requirements

4.3.1 Wind Load Resistance

Table 4.3.1.1 Results of Testing the Wind Load Resistance of the Products for Non-post-disaster Buildings

Assembly ID ⁽¹⁾	Product	Cladding Dimension, mm	Frame	Sheathing	Stud Spacing ⁽²⁾ , mm	Fastener Spacing, mm	Fasteners	Maximum Building Height ⁽³⁾ , m	Hourly Wind Pressure, Q ₅₀ , kPa
1	“HardiePanel® HZ5™ Vertical Siding”	1220 × 2440 × 7.5	2 × 4 spruce-pine-fir (S-P-F) wood	None	610	305 (vertical)	6d common nail	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
2		1220 × 2440 × 7.5	2 × 4 S-P-F wood	None	610	203 (vertical)	50-mm siding nail; 2.3-mm shank; 5.7-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
3		1220 × 2440 × 7.5	2 × 4 S-P-F wood	None	610	150 (vertical)	6d common nail	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
4		1220 × 2440 × 7.5	2 × 4 S-P-F wood	None	610	150 (vertical)	38-mm ring shank nail; 2.5-mm shank; 5.7-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
5		1220 × 2440 × 7.5	20-ga steel	None	610	305 (vertical)	#8 bugle head screw; 32-mm long; 8.2-mm head	12	Q ₅₀ < 0.45
6		1220 × 2440 × 7.5	20-ga steel	None	610	305 (vertical)	38-mm ET&F pin; 2.5-mm shank; 6.2-mm head	–	Fail ⁽⁴⁾
7		1220 × 2440 × 7.5	20-ga steel	None	610	203 (vertical)	38-mm ET&F pin; 2.5-mm shank; 6.2-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
8	1220 × 2440 × 7.5	18-ga steel	None	406	150 (vertical)	38-mm ET&F pin; 2.5-mm shank; 6.2-mm head	12	Q ₅₀ < 0.75	
							20	Q ₅₀ < 0.65	
9	235 × 305 × 7.5	2 × 4 S-P-F wood	None	406	–	(blind nailing) ⁽⁵⁾ 6d common nail	12	Q ₅₀ < 0.75	
							20	Q ₅₀ < 0.65	
10	235 × 305 × 7.5	2 × 4 S-P-F wood	None	610	–	(blind nailing) 6d common nail	12	Q ₅₀ < 0.55	
							20	Q ₅₀ < 0.45	
11	235 × 305 × 7.5	2 × 4 S-P-F wood	None	406	–	(blind nailing) 32-mm roofing nail; 3-mm shank; 9.5-mm head	12	Q ₅₀ < 0.75	
							20	Q ₅₀ < 0.65	
12	235 × 305 × 7.5	2 × 4 S-P-F wood	None	610	–	(blind nailing) 50-mm siding nail; 2.3-mm shank; 5.6-mm head	12	Q ₅₀ < 0.55	
							20	Q ₅₀ < 0.45	

Table 4.3.1.1 Results of Testing the Wind Load Resistance of the Products for Non-post-disaster Buildings (cont.)

Assembly ID ⁽¹⁾	Product	Cladding Dimension, mm	Frame	Sheathing	Stud Spacing ⁽²⁾ , mm	Fastener Spacing, mm	Fasteners	Maximum Building Height ⁽³⁾ , m	Hourly Wind Pressure, Q ₅₀ , kPa
13	“HardiePlank® HZ5™ Lap Siding”	305 × 305 × 7.5	2 × 4 S-P-F wood	None	406	–	(face nailing) ⁽⁶⁾ 63.5-mm siding nail; 2.4-mm shank; 6.0-mm head	12	Q ₅₀ < 0.65
								20	Q ₅₀ < 0.55
14		235 × 305 × 7.5	2 × 4 S-P-F wood	None	610	–	(face nailing) 6d common nail	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
15		235 × 305 × 7.5	2 × 4 S-P-F wood	11.1-mm oriented strand board (OSB)	610	203 (horizontal)	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
16		184 × 305 × 7.5	2 × 4 S-P-F wood	None	406	–	(blind nailing) 6d common nail	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
17		235 × 305 × 7.5	2 × 4 S-P-F wood	None	406	–	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
18	235 × 305 × 7.5	2 × 4 S-P-F wood	None	610	–	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.45	
19	210 × 305 × 7.5	20-ga steel	None	406	–	(blind nailing) 38-mm ET&F pin; 2.5-mm shank; 6.2-mm head	12	Q ₅₀ < 0.55	
							20	Q ₅₀ < 0.45	
20	“HardieShingle® HZ5™ Notched Panels”	406 × 1220 × 6.2	2 × 4 S-P-F wood	None	610	–	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
21		406 × 1220 × 6.2	2 × 4 S-P-F wood	None	406	–	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
22		406 × 1220 × 6.2	2 × 4 S-P-F wood	11.1-mm OSB	610	356 (horizontal)	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45

Table 4.3.1.1 Results of Testing the Wind Load Resistance of the Products for Non-post-disaster Buildings (cont.)

Assembly ID ⁽¹⁾	Product	Cladding Dimension, mm	Frame	Sheathing	Stud Spacing ⁽²⁾ , mm	Fastener Spacing, mm	Fasteners	Maximum Building Height ⁽³⁾ , m	Hourly Wind Pressure, Q ₅₀ , kPa
23	“HardieShingle® HZ5™ Notched Panels”	406 × 1220 × 6.2	20-ga steel	None	610	–	(blind nailing) 38-mm ET&F pin; 2.5-mm shank; 6.2-mm head	12	Q ₅₀ < 0.55
								20	Q ₅₀ < 0.45
24	“HardieShingle® HZ5™ Notched Panels”	406 × 1220 × 6.2	2 × 4 S-P-F wood	None	406	–	(blind nailing) 32-mm roofing nail; 3.0-mm shank; 9.5-mm head	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
25	“HardieShingle® HZ5™ Individual Shingle”	150, 203, 305 × 457 × 6.2	2 × 4 S-P-F wood	11.1-mm OSB	610	Two end nails per shingle ⁽⁷⁾	(blind nailing) 32-mm roofing nail; 3.0-mm shank; 9.5-mm head	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65
26	“HardieShingle® HZ5™ Individual Shingle”	150, 203, 305 × 457 × 6.2	2 × 4 S-P-F wood	11.1-mm OSB	610	Two end nails per shingle	(blind nailing) 32-mm ring shank nail; 2.4-mm. shank; 5.6-mm head	12	Q ₅₀ < 0.75
								20	Q ₅₀ < 0.65

Notes to Table 4.3.1.1:

- (1) Some of the assemblies and fastening schedules listed in the table are not covered by the manufacturer’s installation instructions.
- (2) Stud spacing indicates the horizontal fastener spacing when no sheathing was used. When sheathing was used, the horizontal fastener spacing is shown in the table.
- (3) Buildings up to three storeys high (12 m) fall under the scope of Part 9 of Division B of the NBC 2015. Buildings higher than 12 m fall under the scope of Part 4 of Division B of the NBC 2015. In accordance with the NBC 2015, the engineering design must be prepared by a professional engineer licensed to practice in Canada who has expertise in the relevant area.
- (4) The testing lab indicated that the test failed due to the poor installation of the panel on the structure.
- (5) Blind nailing is a technique in which siding is fastened only at the top by penetrating through one sheet, and fasteners are hidden by the course above.
- (6) Face nailing is a technique in which siding is fastened at the top and the bottom by penetrating through two sheets of overlapped siding, and fastener heads are exposed to the elements.
- (7) A fastener was nailed at the side ends of the siding on the sheathing.

Table 4.3.1.2 Deflection Measurements from the Wind Load Resistance Test

Assembly ID	Maximum Wind Pressure for Deflection Measurements (Pa)	Deflection Measurements (mm)			
		Assembly ⁽¹⁾		Component ⁽²⁾	
		Negative Pressure	Positive Pressure	Negative Pressure	Positive Pressure
1	980	–5.37	5.00	–2.39	2.23
2	1 200	–4.93	4.41	–2.20	1.97
3	1 630	–4.90	4.77	–2.19	2.12
4	980	–3.27	3.18	–1.46	1.35
5	1 200	–4.12	4.04	–2.14	2.05
6	1 200	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾
7	1 200	–4.89	4.79	–2.54	2.40
8	1 200	–2.13	2.05	–0.57	0.50
9	1 630	–5.02	4.99	–0.72	0.65

Table 4.3.1.2 Deflection Measurements from the Wind Load Resistance Test (cont.)

Assembly ID	Maximum Wind Pressure for Deflection Measurements (Pa)	Deflection Measurements (mm)			
		Assembly ⁽¹⁾		Component ⁽²⁾	
		Negative Pressure	Positive Pressure	Negative Pressure	Positive Pressure
10	1 200	-6.19	5.85	-2.30	2.17
11	1 200	-5.49	5.47	-0.78	0.71
12	1 200	-5.99	5.87	-2.22	2.09
13	1 200	-4.05	3.89	-2.96	2.84
14	1 630	-7.17	6.30	-3.47	3.05
15	1 200	-4.76	4.05	-1.55	0.42
16	1 630	-5.61	5.35	-0.80	0.76
17	1 200	-3.99	3.71	-0.57	0.53
18	980	-5.17	4.73	-1.92	1.73
19	1 200	-3.76	3.44	-0.63	0.59
20	1 200	-2.70	2.64	-1.09	1.02
21	1 630	-2.31	2.27	-0.36	0.28
22	1 200	-2.31	2.19	-0.82	0.75
23	1 200	-3.20	2.95	-1.51	1.39
24	1 630	-2.31	2.24	-0.36	0.31
25	1 630	-6.21	6.09	-0.31	0.26
26	1 630	-6.66	5.98	-0.33	0.30

Notes to Table 4.3.1.2:

- (1) The deflection was measured at the mid-height of a 3 000-mm stud and determined with the averaged deflections at the bottom and the top of the stud as a baseline.
- (2) The deflection was measured at the centre point between two studs and determined with the averaged deflections at those studs as a baseline.
- (3) “N/A” = not applicable. The deflection was not measured due to the failure of the specimen.

4.3.2 Impact Resistance

Table 4.3.2.1 Results of Testing the Impact Resistance⁽¹⁾ of the Products

Assembly ID	Safety Impact		Retention of Performance				
	Large Soft 100 N·m	Small Hard 10 N·m	Large Soft 34 N·m	Smaller Soft 60 N·m	Smaller Soft 6 N·m	Small Hard 10 N·m	Small Hard 1 N·m
1	Pass	Pass	Pass	Pass	Pass	Pass	Pass
2	Pass	Pass	Pass	Pass	Pass	Pass	Pass
3	Pass	Pass	Pass	Fail ²	Pass	Pass	Pass
4	Pass	Pass	Pass	Fail ²	Pass	Pass	Pass
5	Pass	Pass	Pass	Pass	Pass	Pass	Pass
6	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾
7	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
8	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
9	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
10	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
11	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass

Table 4.3.2.1 Results of Testing the Impact Resistance⁽¹⁾ of the Products (cont.)

Assembly ID	Safety Impact		Retention of Performance				
	Large Soft 100 N·m	Small Hard 10 N·m	Large Soft 34 N·m	Smaller Soft 60 N·m	Smaller Soft 6 N·m	Small Hard 10 N·m	Small Hard 1 N·m
12	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
13	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
14	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
15	Pass	Pass	Pass	Pass	Pass	Pass	Pass
16	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
17	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
18	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
19	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
20	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
21	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
22	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
23	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
24	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Pass	Pass
25	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Fail ⁽²⁾	Pass
26	Pass	Pass	Pass	Fail ⁽²⁾	Pass	Fail ⁽²⁾	Pass

Notes to Table 4.3.2.1:

- (1) Large soft bodies are designed to transfer a significant amount of energy to the cladding and to the wall assembly. Small hard bodies are capable of causing localized impact damage without any appreciable transmission of energy to the wall assembly.
Smaller soft bodies are smaller and harder than the large soft bodies, and larger and softer than small hard bodies. They are designed to induce localized damage, as well as transmit energy to the rest of the assembly.
- (2) The product did not demonstrate capacity to retain the performance of the cladding under impact loads that induce localized damage as well as transmit energy to the rest of the assembly. The product will be limited to applications where such performance is not required or where the cladding system can be repaired or replaced easily. The CCMC Technical Guide specifies that for cladding systems that can be repaired or replaced easily, lower impact resistance values may be accepted down to 6 N·m for small soft impact and 1 N·m for small hard impact.
- (3) N/A = not applicable. Assembly 6 was not tested for impact resistance because it previously failed the wind resistance test.

4.4 Fire Performance

Table 4.4.1 Results of Testing the Fire Performance⁽¹⁾

Property	Requirement	Result
Non-combustibility	CAN/ULC-S114	Non-combustible
Flame-spread rating	CAN/ULC-S102	0
Smoke-developed classification		5

Note to Table 4.4.1:

- (1) Based on the Intertek listing information (SPEC ID: 29928) of “HardiePanel[®] HZ5[™] Vertical Siding”

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