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CCMC 12886-R

CCMC

*EVALUATION
REPORT*

DIVISION 07481

Issued 1999-06-22

Revised 2002-10-23

Re-evaluation due 2002-06-22

Re-Evaluation
in process

Stonetile

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1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that "Stonetile" can serve as a cladding system in compliance with the intent of the National Building Code of Canada (NBC) 1995.

2. Opinion

Subject to the limitations and conditions stated in this report, test results and assessments provided by the proponent show that "Stonetile" complies with CCMC's Technical Guide for Prefabricated, Concrete Brick/Tiles, Exterior Cladding System, Masterformat number 07481 dated 96-10-10, and provides a level of performance equivalent to that required in:

- NBC 1995, Part 5, Sentences 5.6.1.1.(1), and 5.6.1.2.(3) Part 9, Articles 9.27.2.1. and 9.20.2.1.

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Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

3. Description

“Stonetile” is a cladding system consisting of concrete tiles that are attached to the substrate through steel strip anchors that are embedded in the tile. The strip anchors are made of galvanized steel or stainless steel depending on the intended application. The strip anchors are 0.5 mm thick, 25 mm wide, punched to have a spine 6 mm wide and 6 mm deep and gang nails that protrude into the concrete. The top of the strip anchor protrudes 10 mm above the tile with a hole for a screw that would fasten the tile to the substrate. The bottom part of the strip anchor protrudes 5 mm below the tile so that it would slide into the strip of the tile below it.

Once installed, the joints between the tiles are sealed with a sand-coated flexible caulking.

The tiles are 16 mm thick and manufactured in the following dimensions, (width in mm x height in mm): 450 x 300, 450 x 450. The tiles offer a quarry faced surface in the following colours: Travertine, antique gray, sandstone, jasper, and charcoal.

“Stonetile” unit is illustrated in Figure 1.

The “Stonetile” system construction is shown in Figure 2.

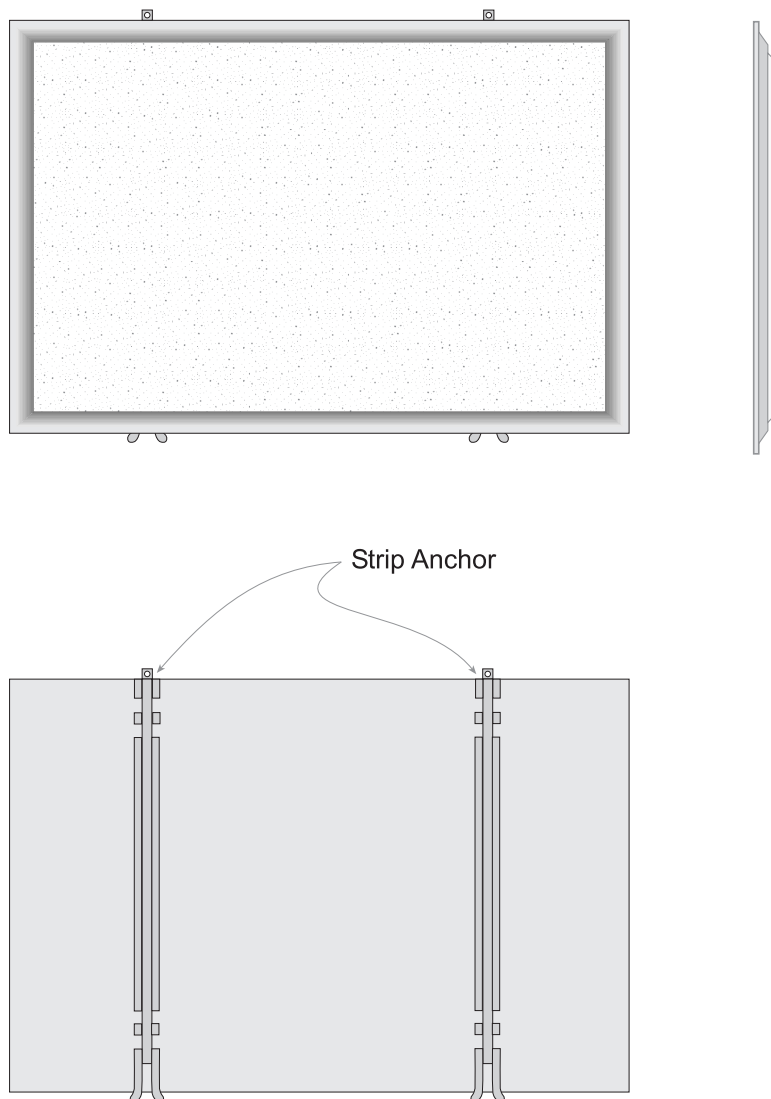


Figure 1. Stonetile

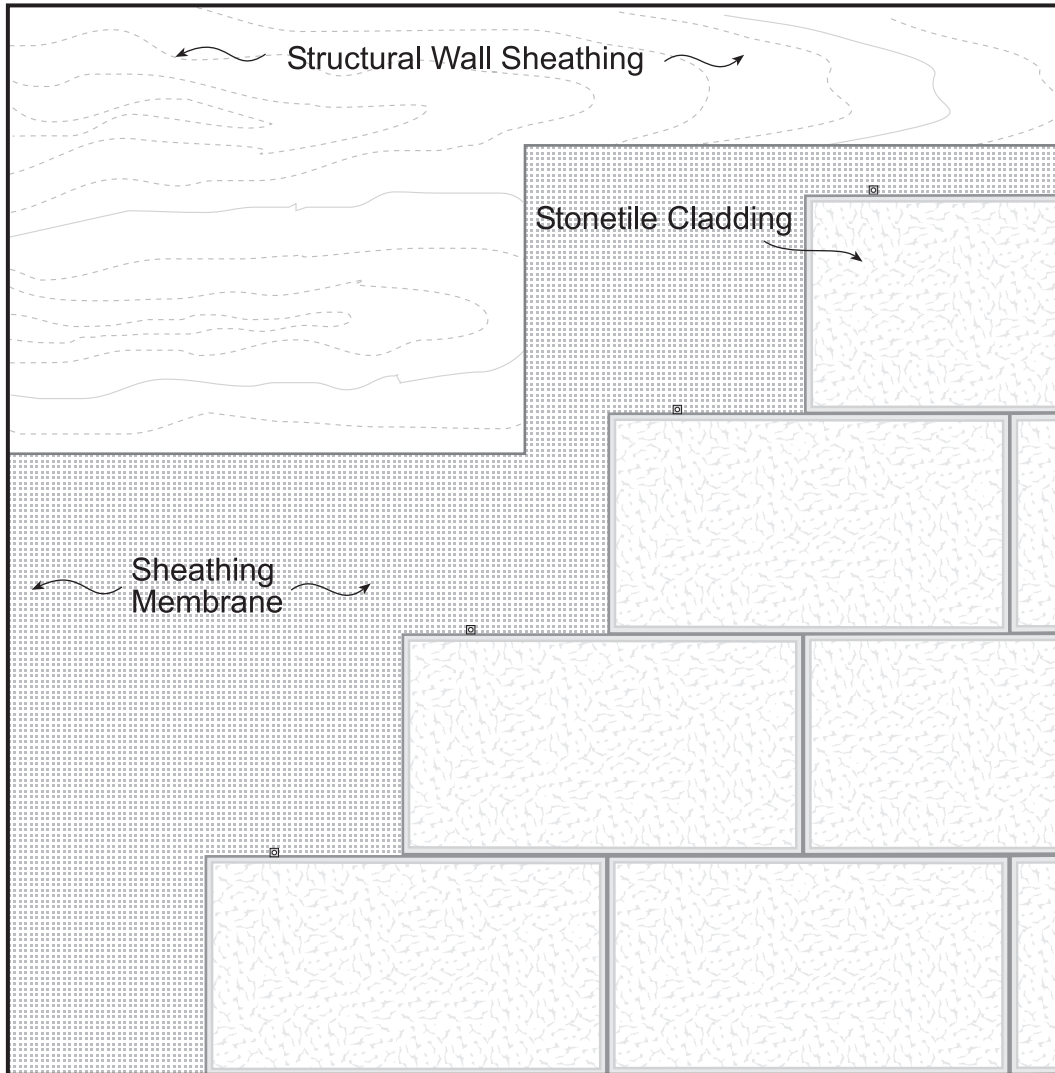


Figure 2. Stonetile system construction

4. Usage and Limitations

The “Stonetile” cladding system is intended to be used in new and retrofit construction over concrete, masonry, and Plywood or OSB sheathing.

“Stonetile” is acceptable for use in buildings required to be of non-combustible construction in accordance with the National Building Code of Canada.

Strip anchors

The metal strip anchors shall have a corrosion resistance in accordance with CSA A370-94, “Connectors for Masonry.”

For installation on buildings not exceeding 11 meter in height, the strip anchors shall have a zinc coating with a minimum coating thickness of 305g/m² on each surface of the anchor.

For installations exceeding 11 m in building height the strip anchors shall have a minimum zinc coating thickness of 460 g/m² on each surface of the anchor.

For installations in areas having severe climatic conditions, the strip anchors shall be made from austenitic stainless steel (Type 304, or 316).

For installations in areas having high chloride exposure, it is recommended that the strip anchors be of stainless steel, type 316.

Screws

Fastening screws used to secure the “Stonetile” cladding to the substrate shall be 25 mm # 6 screws.

Screws for use with zinc-coated anchors shall have a zinc coating of 305g/m².

Screws for use with stainless steel strip anchors shall be austenitic stainless steel (Type 304, 305, or 316).

“Stonetile” shall be limited to installations in geographical areas where the wind design value is $Q_{10} < 0.80$ kPa, subject to the following restrictions:

- the building height is 12 m or less from grade to the uppermost roof, and
- the building is not in an exposed location such as a hilltop or the shore of a large body of water.

The wind design value has been validated for “Stonetile” installed over Plywood or OSB structural sheathing having a minimum thickness of 9.5 mm (3/8”), and conforming to their applicable standards.

For applications over concrete, or masonry, the wind design value corresponding to the type and size of fasteners recommended by the manufacturer shall be determined by a professional engineer skilled in structural design and licensed to practice under the appropriate provincial or territorial legislation.

The 6 mm air space that is created by the anchors shall remain unobstructed to form a clear drainage layer behind the “Stonetile” cladding.

At least one layer of sheathing membrane conforming to Article 9.23.17.1. of the NBC 1995 must be applied beneath the “Stonetile” cladding.

“Stonetile” shall be installed with suitable flashing to drain water from the drainage layer to the exterior and to protect the exposed top edge of the cladding.

Flashing installed shall be in accordance with the requirements of the National Building Code of Canada, Subsection 9.27.3.

The impact resistance of “Stonetile” makes it susceptible to hard and soft body impacts. However, the ease of replacement of the product makes it suitable for normal use in upper floors and protected ground floors. When used at ground floors exposed to high impacts, special precautions must be taken such as guardrails, or raised gardens.

“Stonetile” cladding shall be installed according to the manufacturer’s current requirements

5. Performance

Testing was endorsed by a laboratory recognized by CCMC. The results of testing “Stonetile” are summarized in Tables 1 through 3.

Table 1. Test Results for the “STONETILE”

Test	Requirement	Result
Dimensional Tolerances (mm)		
width	± 3.0	± 1.0
height	± 2.0	±2.0
thickness	± 2.0	±1.0
Compressive Strength (MPa)	15	38.2
Water Absorption (%)	≤ 8	6
Linear Shrinkage (%)	≤ 0.1	0.09
Freeze-Thaw	100 cycles*	passed

* The Freeze-Thaw Test was conducted in accordance with ASTM C 67-94. Each cycle consists of 20 hours at -18°C with specimens sitting in 25 mm of water, and 4 hours at 22°C in submersed water. At the completion of the 100 cycles, no significant physical damage to the tiles was observed. A slight surface blotch did appear at the early stage of the test, nevertheless the surface blotch did not appear to be significant from a performance perspective.

Table 2. Rain Penetration Resistance Test

Air-pressure difference (Pa)	Water-spray rate (L/m/h)	Requirement	Results
500	25	Prevent ingress of precipitation into interior space	Passed*

* The test specimen consisted of the “Stonetile” cladding and did not include any window or penetrations

Table 3. Impact Resistance Test

Impact Body	Dynamic Mass (kg)	Energy (Nm)	Result
Safety Impact			
Large Soft	50	100	Pass
Hard	1	10	Impact at the tile corner resulted in a break of a small piece. Particles from the tile were not dislodged. Impact at mid tile resulted in tile cracking vertically into two equal sections. The two sections remained well attached to the structure.

Table 3. Impact Resistance Test (cont'd)

Impact Body	Dynamic Mass (kg)	Energy (Nm)	Result
Retention of Performance Impact			
Large Soft	50	34	Pass
Small Soft	3	60	Impact at the tile corner resulted in a break of a small piece. Particles from the tile were not dislodged. Impact at mid tile resulted in tile cracking vertically into two equal sections. The two sections remained well attached to the structure.
Hard	1	10	Impact at the tile corner resulted in a break of a small piece. Particles from the tile were not dislodged. Impact at mid tile resulted in tile cracking vertically into two equal sections. The two sections remained well attached to the structure.

For more information contact:

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Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC's Registry of Product Evaluations, of which this report is part.

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