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EVALUATION
REPORT

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Delta Aluminum Roofing Shingles

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1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that "Delta Aluminum Roofing Shingles" can serve as a roofing 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 "Delta Aluminum Roofing Shingles" comply with CCMC's Technical Guide for Metal Roofing Systems, Masterformat number 07323, dated 1999-09-05, and provides a level of performance equivalent to that required with respect to health and safety in:

- NBC 1995, Subsection 9.26.2.

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

3. Description

“Delta Aluminum Roofing Shingles” consist of 240 mm x 460 mm shingles that are formed from 0.50-mm-thick, pre-painted aluminum sheets. The top edge and bottom edge of each shingle are lipped 19 mm and 16 mm, respectively, while the side edge is lipped 15 mm. The lipped edges provide the interlocking mechanism that, in turn, provides resistance to the penetration of wind and water.

The system includes accessories such as hip and ridge caps, drip edges, valley flashing, and strips. Typical installation details are shown in Figure 1.

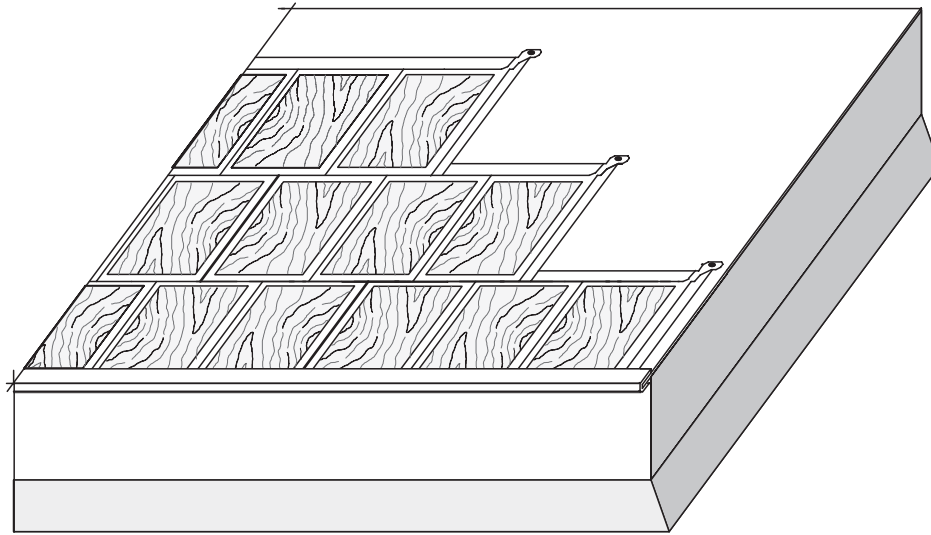


Figure 1. “Delta Aluminum Roofing Shingles”

4. Usage and Limitations

This product is intended to be used in new and existing construction falling under the provisions of Part 9 of the NBC 1995, subject to the following conditions:

- The shingles must be installed on roofs having a minimum slope of 1 in 4.
- This product is limited to installations where no fire-resistance rating is required.
- This product is limited to installations where the specified wind pressure (factored) does not exceed those indicated in tables 3 and 4.
- The shingles must be installed over solid sheathing complying with the requirements of Subsection 9.23.15. of the NBC 1995.
- An underlayment consisting of two layers of Type 15 organic felt, or one layer of Type 30 organic felt, must be used in conjunction with the shingles.
- “Delta Aluminum Roofing Shingles” must be installed by licensed installers in strict conformance to the manufacturer’s current instructions.
- Only aluminum nails must be used in conjunction with “Delta Aluminum Roofing Shingles.”
- This product is for use in locations where access is limited for maintenance or repair purposes.
- This Evaluation Report is applicable only to products identified on the packaging with the following: the manufacturer’s name or logo; and “CCMC # 10475-R.”

5. Performance

Testing was conducted at independent laboratories recognized by CCMC. The test results

for “Delta Aluminum Roofing Shingles” are summarized in tables 1, 2, 3, and 4.

Table 1. Basic Physical and Mechanical Properties of “Delta Aluminum Roofing Shingles”

Property	Unit	Requirement	Result
Coating quality	no units	Finish coat shall be uniform, free of cracks, pinholes, blisters or flaking	passed
Colour	no units	Uniform	passed
Gloss	gloss units	± 5 gloss units < 80 ± 10 gloss units > 80	passed
Coating thickness	μm	≥ 20	passed
Impact resistance	no units	No crack or damage under a 2.25 J reverse impact energy	passed
Film adhesion	no units	No removal of coating	passed
Flexibility	no units	No cracking or flaking of coating	passed
Traffic load	N	900	passed

Table 2. Dynamic Pressure Water Infiltration Test of “Delta Aluminum Roofing Shingles”

Wind Speed (km/h)	Duration (min)	Requirement	Results
80	10	No leakage or damage	No fluttering or loosening of shingles. No leakage on underside of shingles.
120	10	No leakage or damage	No fluttering or loosening of shingles. No leakage on underside of shingles.
160	10	No leakage or damage	No fluttering or loosening of shingles. No leakage on underside of shingles.
200	10	No leakage or damage	No fluttering or loosening of shingles. No leakage on underside of shingles.

**Table 3. Wind Uplift Test for “Delta Aluminum Roofing Shingles”:
Without Secondary Fastening Clips⁽¹⁾**

Pressure (kPa)	Requirement	Results
0.5	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.0	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.4	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.9	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
2.9	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
3.8	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
4.1	No evidence of deformation or permanent damage	Nails lifting out of substrate.

**Table 4. Wind Uplift Test for “Delta Aluminum Roofing Shingles”:
With Secondary Fastening Clips⁽²⁾**

Pressure (kPa)	Requirement	Results
0.5	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.0	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.4	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
1.9	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
2.9	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
3.8	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
4.3	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
4.8	No evidence of deformation or permanent damage	No damage or permanent deformation after pressure released.
8.5	Report failure pressure.	Fails at horizontal seams. Secondary clips bent at 45° angle. Shingle tabs intact. Shingle maintains flat profile.

Notes to tables 3 and 4:

- (1) The “Delta Aluminum Roofing Shingles” system was first tested without secondary fastening clips. The shingles were nailed to the deck using 25.4-mm aluminum roofing nails.
- (2) When tested using secondary fastening clips, the clips were 76 mm long x 32 mm wide, with a 19-mm “hooked end” that hooked over the horizontal tab of the shingle. They were positioned 102 mm on centre from the nail in the shingle tab. The clip was secured with two 25.4-mm nails. The nail holes on the clip were 32 mm and 64 mm from the hooked end of the clip.

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