



Evaluation Report CCMC 14129-R CANAMOULD™ Exterior Mouldings

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1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that "CANAMOULD™ Exterior Mouldings," when used as exterior mouldings that are designed to provide architectural details to building facades, where combustible cladding is permitted in combustible construction, in accordance with the conditions and limitations stated in Section 3 of this Report, comply with:

- Clause 1.2.11.(1)(a) of Division A of the National Building Code (NBC) of Canada 2015, using the following acceptable solutions in Division B:
 - Subsection 9.27.5., Attachment of Cladding⁽¹⁾
 - Article 9.27.13.3., Design and Installation (of Exterior Insulation and Finish Systems (EIFS))⁽¹⁾
 - Subsection 5.1.4., Resistance to Loads and Deterioration⁽²⁾
 - Article 5.2.2.1., Determination of Structural Loads and Effects⁽³⁾
 - Article 5.2.2.2., Determination of Wind Load⁽³⁾

- (1) The attachment of these proprietary architectural exterior mouldings, which are attached/applied over an existing NBC-compliant cladding, must meet the functional statement - to support and withstand expected loads and forces, of Division A of the NBC 2015, as was required to be met by the underlying cladding/substrate.
- (2) Cladding elements not covered in Part 9, Housing and Small Buildings, of Division B of the NBC 2015 and buildings beyond Part 9 are to follow the Part 5, Environmental Separation, of Division B of the NBC 2015 design requirements for strength and durability (i.e., resistance to deterioration) for anticipated Part 9 building loads and service life.
- (3) The cladding element is to meet loads from ice buildup and wind loads anticipated for a building (functional statement - to support and withstand expected loads).

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

2. Description

"CANAMOULD™ Exterior Mouldings" are prefabricated EIFS mouldings manufactured under factory-controlled conditions in different architectural profiles. The mouldings are intended to provide architectural details that project from the underlying NBC-compliant cladding. The mouldings are in the form of trims, sills, cornices and pediments applied on the surface of exterior walls that are clad in either EIFS, stucco, monolithic concrete, cement boards and/or masonry systems (see Figure 1 examples). The mouldings are adhered to the substrate cladding and are mechanically attached to support the moulding until the adhesive is cured.

The mouldings are Type 1 or Type 2, pre-cut, expanded polystyrene (EPS) foam insulation profiles that are made from 100% virgin EPS blocks that are manufactured and packaged by a Canamould Inc.-approved and licenced manufacturer/moulder. The external surface of the profiles is pre-coated in-plant with "CMOLD™," a proprietary, extruded, polymer-modified base coat in which "Canamould Glass Fibre Mesh" (an alkali-resistant, glass fibre reinforcement mesh) is embedded. "Canamould Finish" (a ready-mix, polymer-based finish coat) is applied in-plant or on-site to the desired colour and texture.

The mouldings are manufactured in different classical architectural profiles that are up to 4 880 mm long, up to 305 mm deep, and up to 610 mm high (See Figure 1 for the generic description of dimensions).

EPS

The Types 1 and 2 EPS insulation used for "CANAMOULD™ Exterior Mouldings" is cut from blocks conforming to CAN/ULC-S701-11, "Thermal Insulation, Polystyrene, Boards and Pipe Covering," and has an average density of 16 kg/m³ and 24 kg/m³, respectively, along with a flame-spread rating of 25 to 500, as per CAN/ULC-S102.2-10, "Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies."

Glass Fibre Mesh

The "Canamould Glass Fibre Mesh" used in conjunction with "CANAMOULD™ Exterior Mouldings" is an alkali-resistant, self-adhering, glass-fibre reinforcing fabric that has a minimum nominal weight of 145 g/m² (4.28 oz./yd²) and is manufactured by Saint-Gobain-ADFORS. The mesh is green in colour and is available in rolls that are 1 m wide and 50 m long.

Adhesive

"Canamould Adhesive" is a dry mix, polymer-based adhesive field-mixed with water.

Exterior Finish Coatings

All finish coats are colour-tinted to the desired colour.

Two finish coats, "Canamould Finish" and "Gemstone Finish," are applied in-plant onto the mouldings. "Canamould Finish" consists of a ready-mix, polymer-based finish coat that is tinted to the desired colour. "Gemstone Finish" is a ready-mix, polymer-based finish coat that consists of coloured quartz aggregates in a clear polymeric resin that could include metallic flakes for architectural purposes. If needed to be applied on-site, "Canamould Finish" and "Gemstone Finish" are supplied in 19-L/27-kg and 19-L/30 kg pails, respectively, and are available in an array of factory-tinted colours. The finish coats provide a texture that is governed by the aggregate size, as well as the trowel motion used to render the moulding surface.

Note: Adhesive and finish coats that form part of current and valid CCMC EIFS Evaluation Reports could be used on-site in conjunction with "CANAMOULD™ Exterior Mouldings."

Field Application

On-site, "CANAMOULD™ Exterior Mouldings" are applied over the base coat of an existing EIFS cladding, or over monolithic concrete, stucco or masonry cladding using a continuous layer of a CCMC-evaluated EIFS adhesive coating and glass fibre reinforcement mesh and/or corrosion-resistant mechanical fasteners. The mechanical fasteners consist of corrosion-resistant anchoring screws that incorporate low-profile, high-density, polypropylene or polyethylene washers (38 mm or 51 mm in diameter) that are used to secure the mouldings. The spacing and frequency of the fasteners will vary depending of the type of substrate and size of the moulding.

When adhesives are installed over an EIFS base coat, the adhesive shall be applied continuously over the base coat. However, in the event the adhesive is applied over the EIFS' water-resistant barrier, the adhesive shall be applied with a 9.5-mm stainless steel-notched trowel held at a 30° angle and rendered in such a way as to align the adhesive in vertical ribbons to form part of the second plane of protection.

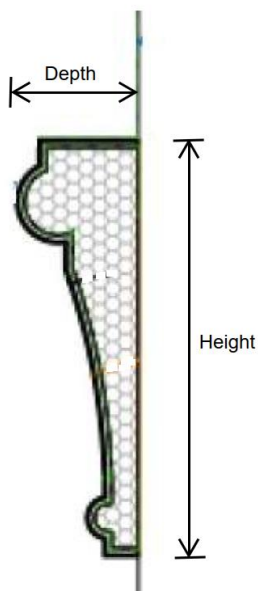


Figure 1. Dimensions of a generic profile



Figure 2(a). "CANAMOULD™ Exterior Mouldings"



Figure 2(b). "CANAMOULD™ Exterior Mouldings"



Figure 2(c). "CANAMOULD™ Exterior Mouldings"



Figure 2(d). "CANAMOULD™ Exterior Mouldings"



Figure 2(e). "CANAMOULD™ Exterior Mouldings"



Figure 2(f). "CANAMOULD™ Exterior Mouldings"

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the "CANAMOULD™ Exterior Mouldings" being used in accordance with the conditions and limitations set out below.

Intended Use

- The products are intended to provide architectural details on the surface of exterior walls of new and retrofit combustible construction, where combustible cladding is permitted in combustible construction.
- The products are intended to be applied directly to vertical walls of EIFS, brick, masonry, monolithic concrete walls, stucco and/or fibre cement boards.
- The products are acceptable for use on new and existing exterior, vertical walls. The systems are not acceptable for use on horizontal surfaces.
- "CANAMOULD™ Exterior Mouldings" are essentially non-loadbearing elements, intended only to be subjected to possible snow accumulation and ice buildup that could occur on cornices or sills.

Engineering Required

- "CANAMOULD™ Exterior Mouldings" in the profile of large cornices shall be designed, along with their fixing techniques, by a professional engineer who will establish the installation methods and fastening techniques, as well as any potential accessories for such installations. The engineer shall sign and seal the plans associated to that specific design.
- Shear load resistance values in Table 4.1.14 have been determined based on the following assumptions:
 - ice density: 900 kg/m³;
 - wind reference pressure: 0.50 kPa;
 - ice wraparound thickness (around the moulding): 50 mm, for 50-year return period at 10 m above ground over flat, open terrain;
 - height of icicles:
 - large: 1 500 mm;
 - small: 300 mm; and
 - sheeting ratio: 0.50, ratio of large to small icicles.
- The temporary mechanical fasteners used in conjunction with "CANAMOULD™ Exterior Mouldings" shall conform to Canamould Extrusions Inc. specifications for the intended substrates and size of mouldings.

Combustible Cladding

- The polystyrene insulation must be protected from the inside of the building in accordance with Clauses 3.1.4.2.(l)(c), Protection of Foamed Plastics, and 9.10.17.10.(l)(c), Protection of Foamed Plastics, of Division B of the NBC 2015.
- As no fire testing has been undertaken, the product may only be installed on buildings where combustible cladding is permitted whereby the ratio of maximum permitted area of unprotected openings is:
 - 50% to 100% in accordance with the requirements of Sentences 3.2.3.7.(1) and 3.2.3.7.(2), Construction of Exposing Building Face, or 9.10.14.5.(1), Construction of Exposing Building Face and Walls above Exposing Building Face, of Division B of the NBC 2015; or
 - 25% to 50% in accordance with the requirements of Clauses 3.2.3.7.(4)(a) or (b), Construction of Exposing Building Face, or 9.10.14.5.(3)(a),(b) or (c), Construction of Exposing Building Face and Walls above Exposing Building Face, of Division B of the NBC 2015.
- With respect to combustible projections, the product must be installed as per the requirements of Article 3.2.3.6, Combustible Projections, or Sentences 9.10.14.5.(6) or 9.10.14.5.(7) and (8) for 1 or 2 dwelling units, detached garages and accessory buildings, Construction of Exposing Building Face and Walls above Exposing Building Face, of Division B of the NBC 2015.
- Specifically, for single-family houses where there is no dwelling unit above another dwelling unit, the provisions of Subsection 9.10.15 shall be met where combustible cladding is permitted.
- The system should be kept at least 50 mm from heat-emitting devices such as recessed light fixtures and chimneys—or as required in building regulations and safety codes.
- The polystyrene thermal insulation must have a flame-spread rating of not more than 500 when tested in accordance with the requirements of CAN/ULC-S102.2.

- Products installed on combustible buildings shall comply with the requirements of Articles 3.2.3.14., Wall Exposed to Another Wall, 3.2.3.15., Wall Exposed to Adjoining Roof, 3.2.3.16., Protection of Soffits, and Section 9.10.12., Prevention of Fire Spread at Exterior Walls and between Storeys, of Division B of the NBC 2015.

Installation Requirements

- The products should terminate at least 200 mm above grade level.
- The installation of the products shall not impact the function of the secondary plane of protection of the cladding system in which it is applied, particularly the second plane of protections having capillary breaks.
- When used in conjunction with EIFS, the drained airspace behind the insulation board of the EIFS shall remain unobstructed so as to form a clear drainage cavity behind the insulation boards, and it shall terminate in such a way as not to obstruct the dissipation of incidental rainwater to the exterior.
- Flashing around doors and windows must be installed in accordance with the requirements of the NBC 2015 prior to the installation of the "CANAMOULD™ Exterior Mouldings." The installation of the "CANAMOULD™ Exterior Mouldings" must not adversely impact the performance of the flashing.
- The use of the products is limited to geographical areas where the wind design value is $Q_{50} < 1.00$ kPa.
- The polystyrene thermal insulation used in manufacturing the products must be in conformance with the requirements of CAN/ULC-S701.
- The polystyrene thermal insulation must be aged for a minimum of five weeks or kiln-dried before installation.
- The products must be installed according to Canamould Extrusions Inc.'s installation manual.
- Wet "Canamould Finish" applied on-site shall be applied at temperatures above 4°C and maintained above 4°C for a period not less than 24 hours. The substrate receiving "Canamould Adhesive" must be maintained above 4°C for a period not less than 24 hours. Cool and humid climatic conditions may extend drying time beyond 24 hours. Temporary protection and heat must be provided during colder conditions. Adhesive and Finish coatings used in conjunction with "CANAMOULD™ Exterior Mouldings" must be stored at temperatures between 4°C and 40°C. Previously frozen materials must not be used.
- Wet, finished surfaces must be protected from rain and wind-driven moisture until the materials have set and hardened.
- Specification of surface sealers must be provided by the manufacturer.
- Expansion/movement joints must be carried through the cladding. The joints are required to accommodate expansion and contraction of building materials due to thermal changes, moisture, wind, gravity, vibration and seismic activity. Expansion/movement joints in the cladding must be used in the following situations:
 - at joints that occur in the substrate;
 - at any abutment of the system with other materials;
 - where changes in the substrate may create deflection or movement;
 - where significant structural movement occurs;
 - where deflections in excess of L/240 are expected; and
 - at the floor line in wood-frame construction (may not be required where fully engineered framing and floor systems are used).
- Closed-cell backer rods should be used at expansion/movement joints so that the low-modulus sealant may be installed as per the sealant manufacturer's instructions.

4. Technical Evidence

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

4.1 Material Characterization

Table 4.1.1 Ash Content

	Property	Unit	Requirement	Result
Ash content	base coat (CMOLD™)	%	Report value	12.38
	adhesive (Prep-Coat)			59.9
	finish coat (Canamould Finish)			23.12
	finish coat (Gemstone Finish)			90.14

Table 4.1.2 Infrared Analysis of Coating Chemistry

Property		Unit	Requirement	Result
Infrared analysis	base coat (CMOLD™)	No unit	Report value	Report on file of chemistry signature
	finish coat (Canamould Finish)			
	finish coat (Gemstone Finish)			

4.2 Physical and Mechanical Properties

Table 4.2.1 Physical Characteristics

Property		Unit	Requirement	Result
Dimensional tolerances	length	mm	± 5	5.00
	width		± 5	1.74
	thickness		± 3	1.91
Shape tolerances	edge straightness	%	≤ 0.3	0.30
	edge squareness		≤ 0.4	0.20
Base coat dry thickness		%	≤ 5 of nominal	-0.30
Base coat density		g/cm ³	Report value	2.02
		%	≤ 1 of nominal	1.00

Table 4.2.2 Results of Testing of Lamina Bond Strength (Base coat/Finish Coat/Insulation)

Property			Unit	Requirement No detachment at bonding plane @	Result
Adhesion bond	CMOLD™/Canamould Finish to EPS	dry state	MPa	0.08	0.28
		2 h drying		0.08	0.12
		7 d drying		0.08	0.23

Table 4.2.3 Results of Testing of Water Absorption of the Base Coat

Property		Unit	Requirement	Result
Water absorption of base coat	CMOLD™	%	≤ 20 of the dry weight	8.4

Table 4.2.4 Results of Testing of Impermeability to Water of the Base Coat

Property		Unit	Requirement	Result
Impermeability of water of base coat	CMOLD™	h	No water penetration in less than 2 h	Pass

4.3 Resistance to Deterioration

Table 4.3.1 Results of Testing Mildew and Fungus Resistance

Property	Unit	Requirement	Result
Mildew and fungus resistance of finish coat	No unit	No growth	Pass

Table 4.3.2 Results of Testing of Accelerated Weathering Resistance

Property	Unit	Requirement	Result
Accelerated weathering resistance of lamina @ 2000 hrs	CMOLD™ / Canamould Finish	No cracking, flaking or deleterious effects	Pass

Table 4.3.3 Results of Testing of Salt-spray Resistance

Property	Unit	Requirement	Result
Salt-spray resistance @ 300 hrs	CMOLD™ / Canamould Finish	No cracking, flaking or deleterious effects	Pass

Table 4.3.4 Results of Testing of Durability Under Environmental Cyclic Conditions (CMOLD™/Canamould Finish)

Property	Unit	Requirement	Result
Environmental cycling (60 cycles)	No unit	No cracking, blistering or sagging of base coat, and	Pass
Adhesion bond strength after environmental cycling	base coat	0.08	0.27
	finish coat		0.25
Loss of adhesion strength after environmental cycling	base coat	≤ 10%	-9.3
	finish coat		-6.4

Table 4.3.5 Results of Testing of Reinforcement Mesh Breaking-strength Resistance⁽¹⁾

Property	Unit	Requirement	Result	
Ash content	%	Report value	15.4	
Mass per unit area	g/m ²	Report value	145	
Tensile Strength	N/mm	≥ 35	Weft	Warp
Initial strength			43.3	36.2
Loss of tensile strength after	28-day 3 ion soak	≤ 50	26.7	22.4
Residual tensile strength after	28-day 3 ion soak	≥ 20	31.8	28.1
Elongation @ break	initial	Report value	4.1	4.1
	after 28-day 3 ion soak		2.9	2.9

Note to Table 4.3.5:

(1) The results for the reinforcement mesh breaking strength resistance test are based on the following mesh characteristics:

- Designation: Saint-Gobain-ADFORS 0038
- Weight: 145.0 g/m²

4.4 Resistance to Structural Loads and Effects

Table 4.4.1 Test Results of Testing of Impact Resistance

Property		Unit	Requirement	Result
Impact resistance of CMOLD™ with min. 140 g/m ² mesh	10 joules	No unit	Six of 10 free-fall drops shall show no perforation (broken mesh)	Pass
	3 joules		Six of 10 free-fall drops shall show no cracks	Pass

Table 4.4.2 Results of Testing of Wind Load Resistance

Reference Wind Pressure (kPa)	Sustained		Cycling		Gust		Deflection Test		
	P ₁ , P' ₁ (Pa)		P ₂ , P' ₂ (Pa)		P ₃ , P' ₃ (Pa)		Test Pressure (Pa) 2.18 P ₁ , P' ₁	Measured Maximum Net Mid-span Deflections (mm)	
								Stud Span 3050 mm	Sheathing Span 406 mm
Q ₅₀ ≤ 0.45	±450	Pass	±660	Pass	±980	Pass	+980	5.8	1.1
							-980	-5.4	-1.6
Q ₅₀ ≤ 0.55	±550	Pass	±800	Pass	±1 200	Pass	+1 200	7.1	1.3
							-1 200	-6.7	-1.9
Q ₅₀ ≤ 0.60	±650	Pass	±950	Pass	±1 410	Pass	+1 410	8.3	1.5
							-1 410	-7.8	-2.2
Q ₅₀ ≤ 0.75	±750	Pass	±1 090	Pass	±1 630	Pass	+1 630	9.7	1.8
							-1 630	-9.1	-2.6
Q ₅₀ ≤ 0.85	±850	Pass	±1 240	Pass	±1 850	Pass	+1 850	11.0	2.0
							-1 850	-10.3	-2.9
Q ₅₀ ≤ 1.00	±1 000	Pass	±1 460	Pass	±2 180	Pass	+2 180	12.9	2.4
							-2 180	-12.1	-3.5
Maximum test pressure @ L/180 deflection							+2 852	16.9	-
							-3 042		
Ultimate structural test pressure							+3 650	Passed	
							-3 650	Sheathing separation from steel studs occurred	

Table 4.4.3 Resistance to Loads (Minimum Vertical and Moment Loads)⁽¹⁾

Property	Unit	Profile - $(D_u \times D_l \times H)^{(2)}$ – (mm)					
		45 × 13 × 152	89 × 25 × 165	102 × 19 × 152	96 × 30 × 202	70 × 20 × 254	146 × 70 × 235
Anticipated maximum vertical load due to ice build-up	kN/m	0.96	1.62	1.81	1.82	1.52	2.72
Maximum anticipated design moment	kN.m/m	0.46	0.62	0.67	0.69	0.61	1.06
Resisted moment from tests	kN.m/m	1.14	1.34	1.14	1.90	2.68	2.40
Ratio of tested (resisted) moment / design moment load	-	2.5	2.1	1.7	2.7	4.4	2.3

Notes to Table 4.4.3:

- (1) Vertical load and exerted moment due to ice build-up for profile dimensions other than the ones indicated herein must be calculated by the testing organization recognized for this special testing.
- (2) (D_u) refers to the top depth of the moulding, (D_l) refers to lower depth of the moulding and (H) refers to the height of the moulding.

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