



# CSSBI 23M-2016:

## Standard for Residential Steel Cladding

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### PREFACE

One of the objectives of the Canadian Sheet Steel Building Institute is the development of product standards to promote safety and sound construction practices. This Standard is intended to assist specifiers, designers, buyers, manufacturers, and erectors of sheet steel cladding by providing information which can be adopted by reference where desired.

The requirements contained herein are in accordance with sound engineering principles, augmented by experience. They include recommended minimum requirements for such factors as grade of steel, thickness, metallic coating designation, loading and deflections, as well as design, fabrication and erection in general. While the material is believed to be technically correct and in accordance with recognized practice at the time of publication it does not obviate the need to determine its suitability for a given situation. Neither the Canadian Sheet Steel Building Institute nor its members warrant or assume liability for the suitability of the material for any general or particular application.

### 1. SCOPE

- 1.1 This standard applies to hot dipped metallic coated sheet steel prefinished with colours of proven durability and suitable for exterior exposure as steel siding, soffits and fascia and related components, for exterior cladding of housing and small buildings.

### 2. REFERENCE DOCUMENTS

#### 2.1 American Society for Testing and Materials

ASTM A653/A653M, Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

ASTM B117, Standard Specification for Operating Salt Spray (Fog) Apparatus

ASTM D523, Standard Test Method for Specular Gloss

ASTM D714, Standard Test Method for Evaluating Degree of Blistering of Paints

ASTM D1005, Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers

ASTM D2244, Standard Test Method for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

ASTM D2247, Standard Test Method for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D3363, Standard Test Method for Film Hardness by Pencil Test

ASTM D4145, Standard Test Method for Coating Flexibility of Prepainted Sheet

ASTM D4214, Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films

ASTM D5402, Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs

ASTM G85, Standard Practice for Modified Salt Spray (Fog) Testing

#### 2.2 Canadian Standards Association

CAN/CSA-S136 North American Specification for the Design of Cold-Formed Steel Structural Members

#### 2.3

Where reference is made to another publication, such reference shall be considered to refer to the latest revision or edition approved by the organization issuing that publication, unless otherwise noted.

### 3. DEFINITIONS

- 3.1 **Cladding** means those components of a building exposed to the outdoor environment and intended to provide protection against wind, water and vapour.

- 3.2 **Design Thickness** means the thickness of the base steel that is used in the calculation of section properties on which the load carrying capacity is based. The **Minimum Thickness** shall not be less than 95% of the Design Thickness as permitted by CAN/CSA-S136.
- 3.3 **Fasteners** refer to nails, screws, staples and similar devices.
- 3.4 **Manufacturer** means a manufacturer of sheet steel cladding.
- 3.5 **Prefinished** refers to material in coil form factory-coated with a paint system, or laminate system, prior to delivery to a manufacturer.
- 3.6 **Sheet Steel Cladding** means those components of sheet steel that form the exposed exterior surface of a wall of a building.
- 3.7 **Wall** means a surface that is vertical or inclined not more than 20 degrees from the vertical.

## 4. SHEET STEEL REQUIREMENTS: CLADDING AND FLASHING

### 4.1 Materials

- 4.1.1 Sheet steel cladding shall be manufactured from one of the following material specifications:
- 4.1.1.1. Zinc coated sheet steel shall conform to ASTM Standard Specification A653/A653M, minimum Grade 230, minimum zinc coating designation Z275. The base steel design thickness shall be 0.29 mm (0.33 mm metallic coated thickness) or greater.
- 4.1.1.2. 55% aluminum-zinc alloy coated sheet steel shall conform to ASTM Standard Specification A792/A792M, minimum Grade 230, minimum 55% aluminum-zinc alloy coating designation AZM150. The base steel design thickness shall be 0.29 mm (0.33 mm metallic coated thickness) or greater.
- 4.1.2 The prefinish system shall consist of a primer and silicone modified polyester (SMP) or polyvinylidene fluoride (PVDF) topcoat continuously applied and cured within the paint manufacturer's specifications on cleaned, pretreated, metallic coated substrate. The pretreatment specified shall be micro-crystalline zinc phosphate for galvanized steel and metal oxide pretreatment for aluminum-zinc alloy coated steel, applied in accordance with the pretreatment manufacturer's specifications. The prefinished coating shall meet the quality and performance requirements listed in Section 5.

- 4.1.3 Alternative prefinish systems may be used provide they meet the quality and performance requirements listed in Section 5.

- 4.1.4 Fasteners for attaching cladding to structural framing or other structural supports, for attaching flashing to cladding, and for joining cladding components together shall be as recommended by the manufacturer.

### 4.2 Minimum Thickness

- 4.2.1 The base steel design thickness of sheet used for cladding and flashing shall be at least 0.29 mm (0.33 mm metallic coated thickness) or greater, but not be less than 95% of the specified design thickness as permitted by CAN/CSA-S136.

## 5. QUALITY AND PERFORMANCE SPECIFICATION FOR PREFINISHED SHEET STEEL

### 5.1 Paint Qualification Tests

#### 5.1.1 Film Thickness

- a) The exposed surface shall have a dry film thickness of  $25 \pm 3 \mu\text{m}$ .
- b) The unexposed or reverse side shall have a dry film thickness that can be customized to meet customer requirements (i.e. wash coat only, primer + wash coat, or full coat).
- c) Test Method: ASTM D5796.

#### 5.1.2 Film Cure

- a) The baked film shall withstand 100 double methyl ethyl ketone (MEK) rubs in accordance with ASTM D5402.

*Editorial Note - April 8, 2020: 150 MEK was corrected to 100 MEK.*

#### 5.1.3 Film Hardness (Pencil Method)

- a) The hardness of the paint film may be measured by means of Eagle/Berol turquoise T-2375 or equivalent pencils using a flat cylindrical head applied at a 45° angle to the paint film. A minimum hardness of HB shall be obtained. Pencil Hardness is specified as the first pencil number that will not rupture the paint film when tested as described above.
- b) Test Method: ASTM D3363.

#### 5.1.4 Formability/Adhesion Test

- a) When using a representative sample at  $20 \pm 1.5^\circ\text{C}$  using #610 Scotch brand cellophane tape, the paint system will show no loss of adhesion when subjected to a 3T 180° bend and tape pull test.

- b) This requirement does not apply to Grade 550 material that is ordered as ASTM A653/A653M or ASTM A792/A792M.
- c) Test Method: ASTM D4145.

#### 5.1.5 Gloss

- a) The specular gloss shall be within 5 units of the agreed upon specified target when measured with a Gardner 60° Glossmeter. When other than the standard gloss is ordered, the gloss range shall be mutually agreed upon prior to purchase.
- b) Test Method: ASTM D523.

#### 5.2 Exterior Exposure (Weathering)

Each proven colour of proven durability shall successfully meet the following weathering standards for applications in Canada (in the absence of aggressive fumes and/or other chemicals not normally encountered in the atmosphere) and shall be tested in North America.

##### 5.2.1 Film Integrity

During the first 40 years of exterior exposure, the paint film shall have no evidence of cracking, chipping, peeling, crazing, spotting or loss of adhesion.

##### 5.2.2 Chalking

During the first 30 years of exterior exposure, the chalk rating in vertical applications shall not be worse than #8 (ASTM D4214 Method A).

##### 5.2.3 Colour Change

During the first 30 years of exterior exposure, the colour change in vertical applications shall not exceed 5 colour units. (ASTM D2244, Hunter L, a&b Units)

#### 5.3 Accelerated Corrosion Tests

##### 5.3.1 Prohesion (Modified Cyclic Salt Spray)

- a) After 500 hours, typical average cut-edge corrosion of production samples shall not exceed 3 mm.
- b) Test Method: ASTM G85, Method A5. The Prohesion test is a cyclic test incorporating corrosive sulphates, which has been demonstrated to correlate well with natural exposure testing.

##### 5.3.2 Salt Spray Resistance

- a) After 1000 hours the surface shall show only a few #8 blisters, and less than 3 mm creep from the scribe line.
- b) Test Method: ASTM B117.

##### 5.3.3 Humidity Resistance

- a) The humidity resistance test shall be conducted at 100% relative humidity at a temperature of 38°C.
- b) After 1000 hours of exposure, the surface should have no field blisters (per ASTM D714).
- c) Test Method: ASTM D2247.

## 6. COLLATERAL MATERIAL

### 6.1 General

- 6.1.1 All collateral materials used in wall systems employing sheet steel cladding shall be of a nature, style and form which will not damage or impair the serviceability of, nor in the case of exposed surfaces the appearance of, sheet steel cladding. Collateral material may include, but is not limited to, air barrier, convection barrier, vapour barrier, insulation, interior steel liner, sub-girts, and studs.

### 6.2 Field Painting

- 6.2.1 Metallic coated sheet steel that is supplied unpainted is usually chemically treated (passivated) at the mill to minimize wet storage stain. Passivated material is generally not suitable for painting without special procedures. Where it is intended to field paint sheet steel cladding or other components after erection check with a reputable paint supplier for recommendations.