

# Standard for Sheet Steel Cladding

OBSOLETE  
HISTORICAL REFERENCE ONLY



CANADIAN

## Sheet Steel Building

INSTITUTE

Crestview Plaza, South Service Road, Mississauga, Ontario

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*The purpose of this Standard is to:*

- 1. Update Sheet Steel Cladding standards.*
- 2. Set minimum quality standards.*
- 3. Assist in the design, specification and application of Sheet Steel Cladding.*

## *Preface*

One of the precepts of the Members of the Canadian Sheet Steel Building Institute is the development of, and adherence to, product standards to promote safety and sound construction practices.

This Standard is designed to assist 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, nominal core thickness, zinc coating, deflections, etc., as well as design, manufacture and erection.

## *Reference Publications*

This Standard makes reference to the following:

### **American Iron and Steel Institute (AISI).**

Design of Cold-Formed Steel Structural Members.

Design of Light Gage Cold-Formed Stainless Steel Structural Members.

### **American Society for Testing and Materials (ASTM).**

A167 — Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

A446 — Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality.

A525 — Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, General Requirements.

A606 — Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Corrosion Resistance.

### **Canadian Standards Association (CSA).**

S136 — Design of Light Gauge Steel Structural Members.

### **Canadian Sheet Steel Building Institute (CSSBI).**

Technical Bulletin No. 3—Zinc-Coated (Galvanized) Sheet Steel for Structural Building Products.

Technical Bulletin No. 4—Stainless Sheet Steel for Structural Building Products.

Technical Bulletin No. 5—Coil Coated Galvanized Sheet Steel for Structural Building Products.

# STANDARD

for

# SHEET STEEL CLADDING

## 1. SCOPE

**1.1** This Standard covers the design and installation of wall and roof cladding made from zinc coated (galvanized), coil coated (pre-painted) galvanized, stainless, or weathering steel sheet, for use on buildings with low internal humidity, and includes the necessary closures, gaskets, caulking, flashing and fasteners required to make a weathertight installation in accordance with the job plans and specifications.

**1.2** This Standard does not cover items which are normally outside the scope of work of the Sheet Steel Cladding Manufacturer and/or Erector such as, but not limited to—structural steel girts and wall supports, structural steel purlins and roof supports, field painting, base angles and caulking of same, doors, sash and louvers, structural framing or reinforcement for doors, sash, louvers and other openings, cant or parapet flashing, (1) and other flashing associated with other trades.

**1.3** This Standard does not cover roof deck where built-up roofing is applied. (2)

**1.4** This Standard does not cover roof cladding used on a flat roof. (2)

**1.5** Where reference is made to other publications, such reference shall be considered to refer to the latest edition or revision approved by the organization issuing that publication.

(1) *Sheet steel material suitable for exposed flashing, etc., usually can be supplied to other trades by arrangement with the Manufacturer. This is recommended where appearance is important.*

(2) *See CSSBI Standards for Steel Roof Deck.*

## 2. GENERAL

**2.1** This Standard is to govern in those cases where the provisions of building codes, architects' and engineers' plans and specifications are not specific. In the event of any conflict between this Standard and any

legal building regulation, such regulation shall apply and this Standard shall only amplify.

**2.2** When the details of the design are not clearly specified in the plans and specifications furnished by the Buyer, the Manufacturer shall furnish all materials required in accordance with the current specifications and standards of the Canadian Sheet Steel Building Institute.

**2.3** CSSBI Technical Bulletions No. 3, "Zinc-Coated (Galvanized) Sheet Steel for Structural Building Products", No. 4, "Stainless Sheet Steel for Structural Building Products", and No. 5, "Coil Coated Galvanized Sheet Steel for Structural Building Products" are a part of this Standard.

**2.4** When Sheet Steel Cladding is required to support loads other than those specified herein, or is to be employed in applications not covered by this Standard, supplementary rules or requirements may be necessary.

**2.5** Where abnormal corrosion conditions occur, consult the Manufacturer regarding suitable materials selection.

**2.6** Zinc-coated (galvanized) steel, when stored under certain conditions of humidity and temperature fluctuations, may exhibit white staining of the coating surface where moisture has accumulated. A nominal amount of white staining is not detrimental to the functioning of the product and is usually considered acceptable.

### 2.7 Definitions:

**2.7.1** Buyer means the person, firm or company contracting with the Manufacturer or Erector for the supply and installation of Sheet Steel Cladding.

**2.7.2** Erector means an installer of Sheet Steel Cladding who may also be a Manufacturer.

**2.7.3** Manufacturer means a company which fabricates Sheet Steel Cladding.

- 2.7.4 Roof means a surface which is inclined less than 70 degrees from the horizontal.
- 2.7.5 Sheet Steel Cladding means those components of sheet steel which form the exposed surfaces of the wall or roof on the exterior of a building.
- 2.7.6 Span means the lesser of the distance between centres of supports, or the clear distance between supports plus the depth of the cladding profile being used.
- 2.7.7 Wall means a surface which is inclined 20 degrees or less from the vertical.

### 3. MATERIALS

#### 3.1 Zinc Coated (Galvanized) Steel

- 3.1.1 The steel used for cladding and flashing shall conform to ASTM Standard A446 (latest revision) "Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality", minimum Grade A.
- 3.1.2 Minimum core nominal thickness shall be 0.018 inches. (See CSSBI Technical Bulletin No. 3 for thickness tolerances and mechanical properties.)
- 3.1.3 Minimum zinc coating designation shall be G90 as defined in ASTM Standard A525 (latest revision) "Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, General Requirements". (See CSSBI Technical Bulletin No. 3 for minimum zinc coating designations for typical product exposure.)
- 3.1.4 Fasteners for attaching cladding to structural steel framing or other structural supports, or for attaching flashing to cladding shall be as recommended by the Manufacturer.

#### 3.2 Coil Coated (Prepainted) Galvanized Steel

- 3.2.1 The steel used for cladding and flashing shall conform to ASTM Standard A446 (latest revision) "Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality", minimum Grade A, minimum zinc coating designation G90, coated in coil form in accordance with CSSBI Technical Bulletin No. 5.
- 3.2.2 Minimum core nominal thickness shall be 0.018 inches. (See CSSBI Technical

Bulletin No. 3 for thickness tolerances and mechanical properties).

- 3.2.3 Fasteners for attaching cladding to structural steel framing or other structural supports, or for attaching flashing to cladding, shall be as recommended by the Manufacturer.

#### 3.3 Stainless Steel

- 3.3.1 The steel used for cladding and flashing shall conform to ASTM Standard A167 (latest revision) "Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip". (See CSSBI Technical Bulletin No. 4 for types of alloy).

- 3.3.2 Exposed surfaces shall have a finish as specified by the plans and specifications. (See CSSBI Technical Bulletin No. 4 for description of finishes).

- 3.3.3 Fasteners for attaching cladding to structural steel framing or other structural supports and for attaching flashing to cladding shall be made from chromium-nickel alloys.

#### 3.4 Weathering (Atmospheric Corrosion Resisting) Steel

- 3.4.1 The steel used for cladding and flashing shall conform to ASTM Standard A606 (latest revision) "Steel Sheet and Strip, Hot-rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Corrosion Resistance", Type 4, having a chemical composition recommended by the steel producer for weathering applications.

- 3.4.2 Minimum nominal thickness of material shall be 0.048 inches.

- 3.4.3 Exposed surfaces shall be free of oil, paint, lacquer and other coatings which would inhibit weathering.

- 3.4.4 Fasteners for attaching cladding to structural steel framing or other structural support, and for attaching flashing to cladding shall be as recommended by the Manufacturer.

### 4. COLLATERAL MATERIAL

- 4.1 All collateral material supplied by others shall be of a nature, style and form which will not damage or impair the servicability of, nor - in the case of exposed surfaces - the appearance of, the Sheet Steel Cladding.

## 5. SAFETY

### 5.1 General

The following are minimum safety requirements pertaining to Sheet Steel Cladding installation. In the event of any conflict between these requirements and any legal regulations, the latter shall apply and these requirements shall only amplify.

### 5.2 Hoisting

All cladding components being hoisted to the working level shall be tightly banded and carefully slung employing steel wire rope. All bundles shall be tag lined during the ascent of the hoisting operation. Precaution shall be taken to avoid damage to cladding components and to prevent marring of exposed surfaces.

### 5.3 Securing

All cladding components, after being positioned, shall be adequately secured in place as quickly as possible and in all cases prior to leaving the jobsite at the end of the working day. All loose bundles of cladding components shall be adequately secured at the completion of each working day.

### 5.4 Scaffolds

All scaffolds, platforms, ladders, etc., required by the Erector for installation of cladding components shall at all times be properly secured to prevent accidental movement or collapse.

### 5.5 Clean Up

All cuttings, strapping, packaging materials and other debris pertaining to cladding components shall be cleaned up each working day and disposed of in a suitable manner.

## 6. SPECIFICATION FOR SHEET STEEL CLADDING

### 6.1 General

The General Conditions shall be and are hereby made a part of this Division.

### 6.2 Work Included in this Division

- 6.2.1 Furnishing all labour, materials and equipment necessary to fabricate and erect the Sheet Steel Cladding as shown or called for by the tender documents.

- 6.2.2 Supplying and installing, where shown or called for by the tender documents, accessories such as cell closures and flashings.

- 6.2.3 Cutting and flashing of wall penetrations shown or called for by the tender documents.

### 6.3 Work Not Included in this Division

- 6.3.1 All collateral materials including, but not limited to:

- (a) Structural steel girts and wall supports
- (b) Structural steel purlins and roof supports
- (c) Field painting
- (d) Base angles and caulking of same
- (e) Doors, sash, louvers, ventilators
- (f) Structural framing or reinforcement for doors, sash, penetrations or other openings
- (g) Cant or parapet flashings, and flashings associated with other trades
- (h) Steel roof deck and cellular steel floor.

### 6.4 Materials

- 6.4.1 Zinc coated (galvanized) steel cladding and flashing shall be formed of steel conforming to ASTM Standard A446 (latest revision) "Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality", minimum Grade A with minimum steel core nominal thickness of \_\_\_ inches. The minimum zinc coating designation shall be G90 as defined in ASTM Standard A525 (latest revision) "Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, General Requirements".

- 6.4.2 Coil coated (prepainted) galvanized steel cladding and flashing shall be formed of material coated in coil form with colours of proven durability for exterior exposure. Base material shall be zinc coated steel sheet conforming to ASTM Standard A446 (latest revision) minimum Grade A with minimum steel core nominal thickness of \_\_\_ inches. The minimum zinc coating designation shall be G90 as defined in

ASTM Standard A525 (latest revision).  
The paint coating shall be - - - - -  
(specify series, colour, etc. as applicable).

- 6.4.3 Stainless steel cladding and flashing shall be formed of steel conforming to ASTM Standard A167 (latest revision) "Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip", and be type\_\_\_\_\_. Exposed surface shall have\_\_\_\_\_finish.
- 6.4.4 Weathering (atmospheric corrosion resisting) steel cladding and flashing shall be formed of steel conforming to ASTM Standard A606 (latest revision) "Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Corrosion Resistance", Type 4, having a chemical composition recommended by the steel producer for weathering applications. Minimum nominal thickness of material shall be 0.048 inches.
- 6.4.5 Fasteners for attaching cladding to structural steel framing or to other structural support and for attaching cladding to flashing shall be to the Manufacturer's standards.

## 6.5 Drawings and Specifications

- 6.5.1 The Buyer shall provide complete architectural and structural drawings and specifications, showing the correct location of all cladding support members. Should the span between the support members vary from the original architectural and structural design drawings, this shall be brought to the attention of the Buyer.
- 6.5.2 Erection drawings, furnished by the Manufacturer, shall show clearly the location of various sheet lengths and quantities, and shall designate protective coatings or surface finishes. Quantities and lengths of cladding sheets shall be the responsibility of the Manufacturer.
- 6.5.3 A total of\_\_\_\_\_copies of erection drawings shall be submitted to the Buyer for approval. The Buyer shall return one copy with his approval or with such corrections as he may deem necessary. The Manufacturer shall not start work

prior to final approval of drawings unless approval is waived by the Buyer.

- 6.5.4 Changes in the contract made by the Buyer subsequent to tendering, affecting quantities and/or installation of Sheet Steel Cladding shall be the basis of extras or credits to the contract sum.

## 6.6 Design

- 6.6.1 In the absence of laws, regulations, ordinances and specifications to the contrary, the structural design of Sheet Steel Cladding shall be in accordance with the following:
  - 6.6.1.1 Structural properties shall be calculated using CSA Standard S136 (latest revision) "Design of Light Gauge Steel Structural Members", or AISI Specification (latest revision) "Design of Cold-Formed Steel Structural Members", or AISI Specification (latest revision) "Design of Light Gauge Cold-Formed Stainless Steel Structural Members", whichever is applicable.
  - 6.6.1.2 Wherever structural support layout permits, and subject to reasonable limitations for handling, Sheet Steel Cladding shall be designed and fabricated to span continuously over at least three spans.
  - 6.6.1.3 Design loads due to wind, snow or other forces shall be as indicated by the plans and specifications.
  - 6.6.1.4 Sheet Steel Cladding components shall be adequately interconnected and adequately fastened to structural supports to support the design loads.
  - 6.6.1.5 Deflection of Sheet Steel Cladding components due to uniform wind or snow load shall not exceed 1/90 of the span for walls, or 1/180 of the span for roof cladding.
  - 6.6.1.6 Allowable live load due to deflection limitations shall be computed by means of the following formulas:

For Single Spans:

$$W_L = \frac{384 K E I}{5 \times 144 L^3}$$

For Two Equal Spans:

$$W_L = \frac{384 K E I \times 2.4}{5 \times 144 L^3}$$

For Three or More Equal Spans:

$$W_L = \frac{384 K E I \times 1.89}{5 \times 144 L^3}$$

Where:

$W_L$  = Allowable Live Load (wind and/or snow load) psf.

$E$  = Modulus of Elasticity  
=  $29.5 \times 10^6$  psi for carbon and low alloy steel  
=  $28.0 \times 10^6$  psi. for stainless steel

$K$  = 1/90 for wall cladding  
= 1/180 for roof cladding

$I$  = Moment of Inertia at the design stress with exterior surface in compression for positive wind, or snow loads; or with exterior surface in tension for negative wind loads, in.<sup>4</sup>/ft. of width

$L$  = Span, ft.

6.6.1.7 Allowable total load due to stress limitations shall be computed by means of the following formulas:

For Single Span:

$$W_T = \frac{Sf}{1.5 L^2}$$

For Two Equal Spans use the lesser of:

$$W_T = \frac{S_1 f}{1.5 L^2} \quad W_T = \frac{32 S f}{27 L^2}$$

For Three or More Equal Spans use the lesser of:

$$W_T = \frac{S_1 f}{1.2 L^2} \quad W_T = \frac{25 S f}{24 L^2}$$

Where:

$W_T$  = Allowable Total Load normal to the cladding surface, psf.

$S$  = Section Modulus at design stress with exterior surface in compression for positive net total load; or with exterior surface in tension for negative net total load

$S_1$  = Section Modulus at design stress with exterior surface in tension for positive net total load; or with exterior surface in compression for negative net total load, in.<sup>3</sup>/ft. of width

$f$  = Allowable design stress for the type and grade of steel to be used, psi.

$L$  = Span, ft.

## 6.7 Erection

6.7.1 When under a supply and erection contract, all erection work shall be the responsibility of the Manufacturer and such erection work shall be carried out by the Manufacturer's trained erection crews or Manufacturer's approved Erector, all in accordance with the Manufacturer's specifications.

6.7.2 Sheet Steel Cladding shall be adjusted to final position before being permanently fastened to structural supports. If such supports are improperly aligned, levelled or plumbed, the problem shall be reported to the Buyer in order that the Buyer may perform the necessary corrections before the erection of the cladding proceeds.

6.7.3 Endlaps shall be located over supports. Minimum endlaps shall be:

- 2 inches for wall cladding
- 4 inches for roof cladding used on roofs with a slope of 3:12 or more
- as per Manufacturer's specification for roofs sloping less than 3:12.

6.7.4 Sidelaps, if used, shall be connected at intervals not exceeding 24 inches.

6.7.5 Openings, and any necessary flashing, shall be provided as indicated on the tender documents.

6.7.6 If additional openings not shown or called for on the tender documents are required, such openings shall be cut and flashed under the work of this division, but the cost of such extra work shall be charged to the Buyer.

6.7.7 When field cutting is undertaken, care shall be exercised to ensure that cuttings do not remain on exposed cladding surfaces. Where practicable, cutting shall be undertaken away from cladding surfaces so that cuttings do not strike or accumulate on exposed cladding surfaces.

#### 6.8 Limitations

6.8.1 Any damage or alterations by others to the Sheet Steel Cladding shall not be the responsibility of the Erector or Manufacturer.

#### 6.9 Storage of Materials on Site

6.9.1 Sheet Steel Cladding shall normally be delivered to the jobsite as required for erection, but if site storage becomes necessary, suitable storage areas shall be provided by the General Contractor. Where practicable this storage shall be under cover.

6.9.2 When stored, all bundles of Sheet Steel Cladding shall be stacked on wood blocking, clear of the ground and tilted sufficiently to ensure that no water remains on the material. All bundles shall be opened on the underside to allow drainage from leaks or condensation.

#### 6.10 Clean Up

6.10.1 Remove all debris of this trade and leave work ready for other trades.

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