

July, 1995

Metallic Coated Sheet Steel for Structural Building Products

Introduction

This bulletin is written to explain the specifications which reference metallic coated sheet steel for structural building products such as roof deck, composite floor deck, cladding and similar components of steel building systems.

In general there are two types of metallic coated sheet steel available in Canada suitable for structural building products: galvanized and aluminum-zinc alloy (Galvalume®) coated steel. The addition of a metallic coating to the sheet steel base material is essential for the long term service life of these structural components.

Table 1 gives the CSSBI standards for minimum allowable metallic coatings for different applications. Where applicable, these minimums correspond to the requirements of the National Building Code of Canada.

Material Standards

Zinc coated sheet steel intended for structural building products shall conform to ASTM Standard A653/A653M *Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, Structural (Physical) Quality*. This standard replaces the earlier specification A446/A446M.

Aluminum-zinc alloy coated sheet steel for structural building products shall conform to ASTM Standard A792M *Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process, General Requirements [Metric]*.

All metallic coated sheet steel must comply with the provisions of ASTM Standard A924/A924M *General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process*. This standard replaces the earlier specifications A525 and A525M.

Metallic Coatings

Metallic coatings are applied to steel sheet by the hot-dip process and are offered in a range of coating weights (grams per square metre of sheet, total both sides). Each coating class is given a coating designation. This applies to zinc coatings as well as aluminum-zinc alloy coatings. Table 2 lists the most common coatings presently used and the coating thickness allowance for each. Heavier coating weights are available if additional corrosion protection is needed.

The most common coatings specified are Z275 (galvanized) or AZ150 (Galvalume®). Z275 zinc

coatings are normally produced with a minimum spangle suitable for both painted and unpainted applications. Aluminum-zinc alloy (Galvalume®) is available with a fine spangle which is suitable for painting without any other treatment.

Galvanneal, under the coating designation ZF75, refers to the coating of zinc-iron alloy on a steel sheet surface from which the free zinc has been either thermal alloyed or wiped as the sheet leaves the zinc pot. The coating surface is matte grey in appearance and spangle-free, suitable for painting without special treatment. Widely used for steel deck and liner sheets of insulated panels, the zinc-iron alloy coat offers short term protection to the base steel during fabrication, shipment, site storage, and erection. For long term or severe exposure in service, the heavier Z275 or AZ150 coatings should be specified as a minimum.

Thickness

For adequacy and safety in design and for aesthetic and serviceability considerations where applicable, the base steel minimum thicknesses given in Table 3 for various building products are recommended.

All sheet thicknesses are expressed in millimetres to 2 decimal places. The base steel nominal thickness is used to establish section properties and for structural design calculations. The minimum thickness is nominal thickness less the maximum permissible under-tolerance. The CSA Standard S136 specifies maximum under-tolerances for structural applications which are more restrictive than those included in the ASTM material standards. Minimum and nominal thicknesses can be specified for the metallic coated sheet or for the base steel sheet. It is important to know on what basis the thickness is being specified and what tolerances apply.

The addition of the metallic coating to the base steel will affect the measured thickness. The coating thickness allowances for the different metallic coatings are shown in Table 2. When measuring coated sheet in the field, the minimum allowable thickness is the design thickness (nominal) plus the coating allowance less the permissible under-tolerance.

For More Information

For more information on metallic coated sheet steel building products, contact the CSSBI for a Publication List and a list of the Fabricator Members in your area.

Table 1: CSSBI Standards for Minimum Metallic Coatings

PRODUCT OR ELEMENT	MINIMUM METALLIC COATING ON PRODUCT OR ELEMENT
Exterior exposed cladding and exterior exposed elements of wall or roof panels	Z275 or AZ150
Interior exposed roof or floor deck ⁽¹⁾ and interior exposed elements of wall or roof panels	ZF75 or AZ150
Roof or floor deck with ceilings under, in buildings conditioned for human comfort	ZF75 or AZ150
All products or elements exposed to a heavy industrial or otherwise corrosive environment (Consult CSSBI or a CSSBI Member Company for recommendations concerning particular conditions)	> Z275 > AZ180
Structural steel studs (axial and/or wind loadbearing)	Z180 or AZ150
Non-structural steel studs	ZF75 or AZ150

(1) Roof or floor deck which acts as an enclosure of an air-handling system should be considered as "interior exposed".

Table 2: Metric Coating Designation, Minimum Unit Mass, and Coating Thickness Allowance

Metric Coating Designation	Minimum Unit Mass by Triple Spot Test (g/m ² of coating, total both sides)	Coating Thickness Allowance, Nominal, Total Both Sides of Sheet (mm)
ZF75 (Galvanneal or Wiped Coat)	75	0.010 ⁽¹⁾
Z180	180	0.025
Z275	275	0.040
AZ150	150	0.040
AZ180	180	0.050

(1) The coating thickness allowance for Galvanneal or wiped coat is normally disregarded.

Table 3: CSSBI Standards for Base Steel Minimum Thickness

PRODUCT	Base Steel Minimum Thickness ⁽¹⁾ (mm)	Base Steel Nominal Thickness (mm)
Steel roof deck	0.71	0.76
Composite steel floor deck, structural only	0.71 ⁽²⁾	0.76 ⁽²⁾
Cellular composite steel floor deck with wired raceways	0.86 ⁽²⁾	0.91 ⁽²⁾
Cladding and panels (interior and exterior exposed elements) intended for commercial, industrial, institutional and architectural applications	0.42	0.46
Cladding and panels intended for agricultural applications	0.29	0.33
Structural steel studs (axial loadbearing)	0.90 ⁽⁴⁾	---
Structural steel studs (wind loadbearing)	0.85 ⁽⁴⁾	---
Non-structural steel studs	0.46 ⁽⁴⁾	---

- (1) Minimum thicknesses are calculated by applying the tolerances specified in CSA-S136 to the nominal thickness, except where more restrictive tolerances are required by governing codes or standards.
- (2) Flat sheet used as the lower element of a two-element section shall have a base steel minimum nominal thickness 1.12 mm where sprayed fire protection is applied to the underside unless otherwise listed by Underwriters' Laboratories of Canada for a specific assembly.
- (3) Thickness is measured at any point not less than 10 mm from an edge or bend.
- (4) Only minimum thicknesses are specified in the governing standard CGSB-7.1-M86.