Canadian Sheet Steel Building Institute

Sheet Steel Facts 6

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Metallic Coated Sheet Steel for Structural Building Products

Introduction

This bulletin is written to explain the specifications that reference metallic coated sheet steel for structural building products such as roof deck, composite floor deck, roofing, 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 55% aluminum-zinc alloy coated steel. The addition of a metallic coating to the steel base material is essential for the long term service life of these structural components.

Listed in Table 1 are the CSSBI standards for minimum 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 *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*.

55% aluminum-zinc alloy coated sheet steel for structural building products shall conform to ASTM Standard A792/A792M *Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.*

All metallic coated sheet steel must comply with the provisions of ASTM *Standard A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.*

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 surface, total both sides). Each coating class is given a coating designation. This applies to zinc coatings as well as 55% aluminum-zinc alloy coatings. Listed in Table 2 are the most common coatings presently used with 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 AZM150 (55% aluminum-zinc alloy coated). Z275 zinc coatings are normally produced with a minimized spangle suitable for both painted (coil coated) and unpainted applications. 55% aluminum-zinc alloy is available with an attractive spangle for unpainted applications or with a minimized spangle for painting (coil coating).

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 thermally alloyed as the strip leaves the zinc pot. The coating surface is matte grey in appearance and spangle-free, suitable for painting without special treatment. Widely used for interior applications like steel deck and liner panels, the zinc-iron alloy coating offers lower cost but less corrosion protection during fabrication, shipment, site storage, and erection. For long term or severe exposure in service, the heavier Z275 or AZM150 coatings should be specified as a minimum.

Thickness

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

All sheet thicknesses are expressed in millimetres to 3 decimal places. The base steel design thickness is used to establish section properties and for structural design calculations. The base steel minimum thickness is the design thickness less the maximum permissible under-tolerance. The CSA Standard S136 specifies a maximum under-tolerance for structural applications that supersedes the tolerances in the applicable ASTM material standards. The minimum thickness allowed by CSA-S136 is 95% of the design thickness. Minimum and design thicknesses are typically specified for the base steel sheet.

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, you must deduct the coating allowance to arrive at the base steel thickness.

For More Information

For more information on sheet steel building products, or to obtain other CSSBI publications, contact the CSSBI at the address shown below or visit the website at www.cssbi.ca.

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 AZM150
Interior exposed roof or floor deck(1) and interior exposed elements of wall or roof panels	ZF75 OR AZM150
Roof or floor deck with ceilings under, in buildings conditioned for human comfort	ZF75 OR AZM150
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 >AZM165
Structural steel studs (axial and/or wind loadbearing)	Z180 OR AZM150
Non-structural steel studs	Z120 OR AZM150

(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 Allowances

Metric Coating Designation	Minimum Unit Mass by Triple Spot Test (g/m^2 of coating, total both sides)	Coating Thickness Allowance, Minimum, Total Both Sides of Sheet (mm)
ZF75 (Galvanneal)	75	0.013
Z120	120	0.020
Z180	180	0.025
Z275	275	0.038
AZM150	150	0.043
AZM165	165	0.046
AZM180	180	0.051

Table 3: CSSBI Standards for Base Steel Thickness		
PRODUCT	Base Steel Minimum Thickness[1] (mm)	Base Steel Design Thickness (mm)
Steel roof deck	0.721	0.759
Composite steel deck	0.721[2]	0.759[2]
Cellular composite steel floor deck with wired raceways	0.866[2]	0.912[2]
Cladding and panels (interior and exterior exposed elements) intended for commercial, industrial, institutional and architectural applications	0.432	0.455
Cladding and panels intended for agricultural applications	0.290	0.305
Structural steel studs (axial loadbearing)	0.836	0.839
Structural steel studs (wind loadbearing)	0.836	0.879
Non-structural steel studs	0.455	0.478

(1) Minimum thicknesses are calculated as 95% of the design 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 1.12mm 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 10mm from an edge or bend.