

**Zinc-Coated
(Galvanized/Galvannealed)
Standard
Steel Doors and Frames**



STEEL DOOR INSTITUTE

30200 DETROIT ROAD - CLEVELAND, OHIO 44145

Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames

Purpose

It is the intent of this document to provide information regarding the zinc-coated sheet used in standard steel door and frame construction when a requirement for zinc-coated doors and frames is specified.

It should also be noted, that standard doors and frames of cold rolled or hot rolled steel are protected with satisfactory applied coat of rust inhibiting paint and that zinc-coated doors and frames need only be specified when they are to be exposed to corrosive atmospheric conditions.

Types of zinc-coating

Zinc-coated steel doors and frames are fabricated from steel that has been zinc-coated by the "Hot-dip" process. This process consists of submerging the steel in a bath of molten zinc. As the steel emerges various means are used to level and control the thickness of the zinc-coating to achieve a specific coating weight.

The zinc-coating produced from this method consists of an iron-zinc alloy layer with spangles of free zinc sitting on the surface. This type of coating is referred to with a "G" designation. If the steel is subjected to an additional annealing (heat treating) step the result is a completely alloyed iron-zinc coating referred to with an "A" designation.

Applicable standards

ASTM A924 specification for general requirements for steel sheet, metallic-coated by the hot-dip process.

ASTM A653 specifications for steel sheet, zinc-coated (Galvanized) or zinc-iron alloy-coated (Galvannealed) by the hot-dip process.

Coating designations

Coating designations are written to represent the coating type, either G or A, and the coating weight. The coating weight is the amount of zinc on the steel surface and is expressed to represent the ounces per square foot of zinc as the total weight on both surfaces of the steel sheet.

Although sometimes specified, the zinc-coating designation G90 or greater is not recommended for door and frame construction. In addition to the limited availability of this material, the heavier coating causes problems in the fabrication process during forming, welding, and painting operations.

Minimum coating weights

There are two coating weights used to specify zinc-coated steel doors and frames. In a coating weight of 40 there are 0.4 ounces of zinc per square foot of steel, and in 60 there are 0.6 ounces of zinc per square foot of steel.

Average coating thickness

The average coating thickness specified in table 1 is based on the conversion factor of one ounce of zinc coating per square foot of surface corresponding to an average coating thickness of 0.0017 in. (.043 mm).

This coating thickness is not significant enough to make an appreciable difference in the measurable thickness of coated or uncoated steel of the same gage.

Refer to table 1 showing the coating designations, minimum coating weights, and average coating thickness.

Whether a coating is the G or A type makes no difference as to it's ability to resist corrosion. The

G type coatings have a free zinc spangled surface and may be processed to minimize the size of the spangle resulting in a smooth dull-gray appearance. The A type coating has the zinc completely alloyed with the steel sheet and results in a dull gray surface with no spangles that is ready for painting after normal cleaning without further treatment.

Corrosion resistance is directly proportionate to coating weight. The heavier the coating weight the more zinc is present and the more corrosion protection it will provide. Therefore, under normal atmospheric conditions a 60 designation will provide 50% more corrosion protection than the 40 designation coating.

Painting

Painting zinc-coated steel is recommended. In the factory, steel is first chemically treated to ensure proper paint adhesion. Then, a factory applied coating of rust inhibiting primer is applied to the fabricated doors and frames. Care must be taken when choosing a primer for field application to insure that it is compatible with the zinc surface.

Painting over zinc-coated steel produces a synergistic effect. That is, the two coatings work together to provide greater corrosion protection than just the sum of the two coatings alone.

NOTE: ZINC-COATING AFTER FABRICATION IS NOT AVAILABLE.

Type	Coating Designation		Minimum Check Limit Triple Spot Test		Minimum Check Limit Single Spot Test		Average Coating Thickness / Side	
	in-lb	SI	oz./sq. ft.*	g/sq. m*	oz./sq. ft.*	g/sq. m*	inches	mm
Regular (Galvanized)	G60	Z180	0.60	180	0.50	150	.0005	.013
	G40	Z120	0.40	120	0.30	90	.0003	.009
Regular (Galvanized)	A60	ZF180	0.60	180	0.50	150	.0005	.013
	A40	ZF120	0.40	120	0.30	90	.0003	.009

*NOTE: The weight of coating in oz. per sq. ft. and g per sq. m refers to the total coating on both surfaces.

Table 1 – Coating designations, minimum coating weights, and average coating thickness