

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



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Purpose

It is the intent of this document to provide information regarding the zinc-coated sheet used in steel door and frame construction when a requirement for zinc-coated doors and frames is specified. It should be noted that doors and frames of cold rolled or hot rolled steel are normally protected with a satisfactorily 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.

Applicable standards

ASTM A 924/A 924M – Standard Specification for General Requirements For Steel Sheet, Metallic-Coated by the Hot-Dip Process.

ASTM A 653/A 653M – Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

Types of zinc coatings

Galvanized steel doors and frames are fabricated from carbon steel sheet that has been coated with zinc on two sides by the continuous hot-dip process. The process results in a layer of zinc on each side of the steel sheet that is tightly adhered to the steel sheet through the formation of an iron-zinc alloy bonding layer that is formed by a diffusion process while the heated steel strip is in contact with the molten zinc. The relatively pure zinc coating exhibits a bright metallic color with a pronounced “spangled” appearance. These coatings have a free zinc spangled surface and may be processed in a manner that reduces spangle and results in a smooth dull-gray appearance. This type of coating is referenced with a “G” designation (or “Z” in SI Units).

Galvannealed steel doors and frames are fabricated from carbon steel sheet that has been coated by the continuous hot-dip process and further treated to convert the zinc coating into a zinc-iron alloy. The zinc coated sheet receives an in-line heat treatment immediately as the strip exits the molten zinc bath to convert the entire coating layer to a zinc-iron alloy by diffusion of iron from the sheet into the zinc coating. The galvannealed surface has a non-spangled matte finish with a nominal composition of 90% zinc and 10% iron. This type of coating is referred to with an “A” designation (or “ZF” in SI Units).

The galvannealed coating has several advantages compared to the galvanized coating: 1) improved paint adhesion; 2) the coated surface accepts paint very readily without a pretreatment (a pretreatment will enhance the performance); 3) the zinc-iron alloy coating can be welded more easily; and 4) the coating is harder and more resistant to manufacturing processes.

Coating designations

Coating designations are written to represent the coating type, either G or A (Z or ZF in SI Units), 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.

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.