



Designation: A1072/A1072M – 11 (Reapproved 2020)

Standard Specification for Zinc-5 % Aluminum (Hot-Dip) Coatings on Iron and Steel Products¹

This standard is issued under the fixed designation A1072/A1072M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the requirements for zinc-5 % aluminum coated, by the hot-dip process on iron and steel products. The coating may also contain small amounts of elements other than zinc and aluminum that are intended to improve processing and the characteristics of the coated product. These metallic coatings include zinc- 5 %-aluminum (Zn-5Al), zinc-5 %-aluminum-mischmetal (Zn-5Al-MM) and zinc-5 %-aluminum-magnesium (Zn- %Al-Mg).

1.2 This specification covers both un-fabricated products and fabricated products, for example, assembled steel products, structural steel fabrications, large tubes already bent or welded before hot-dip coating, and wire work fabricated from un-coated steel wire. This specification, also, covers steel forgings and iron castings incorporated into pieces fabricated, before hot-dip coating or which are too large to be centrifuged (or otherwise handled to remove excess molten bath metal).

1.3 Fabricated reinforcing steel bar assemblies are covered by the present specification.

1.4 This specification is applicable to orders in either inch-pound units (as A1072) or SI units (as A1072M). Inch-pound units and SI units are not necessarily exact equivalents. Within the text of this specification and where appropriate, SI units are shown in parentheses. Each system shall be used independently of the other without combining values in any way. In the case of orders in SI units, all testing and inspection shall be done using the metric equivalent of the test or inspection method as appropriate. In the case of orders in SI units, such shall be stated to the hot-dip coater when the order is placed.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- A47/A47M Specification for Ferritic Malleable Iron Castings
- A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- A143/A143M Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
- A384/A384M Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
- A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
- A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- A902 Terminology Relating to Metallic Coated Steel Products
- B487 Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
- B602 Test Method for Attribute Sampling of Metallic and Inorganic Coatings
- B750 Specification for GALFAN (Zinc-5 % Aluminum-Mischmetal) Alloy in Ingot Form for Hot-Dip Coatings
- E376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Testing Methods

3. Terminology

3.1 *Definitions*—The following terms and definitions are specific to this specification. Terminology A902 contains other terms and definitions relating to metallic-coated steel products.

3.2 *Definitions of Terms Specific to This Standard:*

¹ This specification is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.13 on Structural Shapes and Hardware Specifications.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.2.1 *average coating thickness, n*—the average of three specimen coating thicknesses.

3.2.2 *black, adj*—denotes the condition of not galvanized or otherwise coated. For purposes of this specification the word “black” does not refer to the color or condition of surface, or to a surface deposit or contamination.

3.2.3 *coating thickness grade, n*—the numerical value from **Table 1** at the intersection of a material category and a thickness range.

3.2.4 *gross cross inclusions, n*—the iron/aluminum intermetallics present in a galvanized coating in a form other than finely dispersed pimples.

3.2.4.1 *Discussion*—These inclusions would create an exposed steel spot if they were removed from the coating. These inclusions are raised surfaces and are easily knocked off through contact with lifting straps or chains, tools, fixtures, or other galvanized parts.

3.2.5 *material category, n*—the general class or type of material or process of manufacture, or both, that nominally describes a unit of product, or from which a unit of product is made. For example, bar grating belongs to the category “strip,” handrail belongs to the category “pipe,” etc.

3.2.6 *multi-specimen article, n*—a unit of product whose surface area is greater than 160 in.² [100 000 mm²]. For thickness testing purposes, articles whose surface area is greater than 160 in.² are subdivided into three continuous local sections, nominally equal in surface area, each of which constitutes a specimen. In the case of any such local section containing more than one material category or steel thickness range as delineated in **Table 1**, that section will contain more than one specimen (see **Fig. 1**).

3.2.7 *sample, n*—a collection of individual units of product from a single lot selected in accordance with Section 7, and intended to represent that lot for acceptance. If a sample is taken as representing the lot for acceptance, the sample shall be taken at random from the lot without regard to the perceived quality or appearance of any individual unit in the lot being sampled. The sample consists of one or more test articles.

3.2.8 *single-specimen article, n*—a unit of product whose surface area is equal to or less than 160 in.² [100 000 mm²] or that is centrifuged or otherwise similarly handled in the galvanizing process to remove excess galvanizing bath metal (free zinc). For thickness testing purposes, the entire surface area of each unit of product constitutes a specimen. In the case of any such article containing more than one material category

or steel thickness, that article will contain more than one specimen (see **Fig. 1**).

3.2.9 *specimen, n*—the surface of an individual test article or a portion of a test article, upon which thickness measurements are to be performed, which is a member of a lot, or a member of a sample representing that lot. For magnetic thickness measurements, specimen excludes any area of the surface which is subject to processes (such as flame cutting, machining, threading, etc.) that can be expected to result in surface conditions not representative of the general surface condition of the test article, or is disqualified by the measurement method. For a unit of product whose surface area is equal to or less than 160 in.² [100 000 mm²], the entire surface area of each test article constitutes a specimen. In the case of an article containing more than one material category or steel, that article will contain more than one specimen, as appropriate (see **Fig. 1**).

3.2.10 *specimen coating thickness, n*—the average thickness from no less than five test measurements on a specimen, when each measurement location is selected to provide the widest dispersion (in all applicable directions) of locations for the steel category of the test article within the confines of the specimen volume.

3.2.11 *test article, n*—an individual unit of product that is a member of the sample and that is examined for conformance to a part of this specification.

4. Ordering Information

4.1 Orders for coatings provided under this specification shall include the following:

- 4.1.1 Quantity (number of pieces to be galvanized) and total weight.
- 4.1.2 Description (type and size of products) and weight.
- 4.1.3 ASTM specification designation and year of issue.
- 4.1.4 Material identification (see 5.1) and surface condition or contamination.
- 4.1.5 Sampling plan, if different from 7.3.
- 4.1.6 Special test requirements (see 8.1).
- 4.1.7 Special requirements (special stacking, heavier coating weight, etc.).
- 4.1.8 Tagging or piece identification method.

5. Materials and Manufacture

5.1 *Steel or Iron*—The specification, grade, or designation and type and degree of surface contamination of the iron or steel in articles to be hot-dip coated shall be supplied by the purchaser to the hot-dip coater prior to coating.

5.2 *Fabrication*—The design and fabrication of the product to be hot-dip coated are the responsibilities of the designer and the fabricator. Practices **A143/A143M**, **A384/A384M**, and **A385** provide guidance for steel fabrication for optimum hot dip coating and shall be complied with in both design and fabrication. Consultation between the designer, fabricator, and coater at appropriate stages in the design and fabrication process will reduce future problems.

5.3 *Castings*—The composition and heat treatment of iron and steel castings shall conform to specifications designated by

TABLE 1 Guide to Conversion Between Coating Weight [Mass] and Thickness
A875/A875M Zinc-5 % Aluminum Alloy-Coated Sheet

(Assume 1.00 oz/ft ² = 305 g/m ² = 1.75 mils)			
Coating Weight [Mass]		Coating Thickness	
oz/ft ²	[g/m ²]	mil	µm
1.00	305	1.75	44.6
0.00328	1.00	0.00574	0.146
0.570	174	1.00	25.4
0.0224	6.83	0.0394	1.00