Standard Specification for
Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

This standard is issued under the fixed designation A123/A123M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers the requirements for zinc coating (galvanizing) by the hot-dip process on iron and steel products made from rolled pressed and forged shapes, castings, plates, bars, and strips.

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

NOTE 1—This specification covers those products previously addressed in Specifications A123-78 and A386-78.

1.3 This specification does not apply to wire, pipe, tube, or steel sheet which is galvanized on specialized or continuous lines, or to steel less than 22 gage (0.0299 in.) [0.76 mm] thick.

1.4 The galvanizing of hardware items that are to be centrifuged or otherwise handled to remove excess zinc (such as bolts and similar threaded fasteners, castings and rolled, pressed and forged items) shall be in accordance with Specification A153/A153M.

1.5 Fabricated reinforcing steel bar assemblies are covered by the present specification. The galvanizing of separate reinforcing steel bars shall be in accordance with Specification A767/A767M.

1.6 This specification is applicable to orders in either inch-pound units (as A123) or SI units (as A123M). 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 galvanizer when the order is placed.

2. Referenced Documents

2.1 ASTM Standards:

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
A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
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)
A767/A767M Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
A902 Terminology Relating to Metallic Coated Steel Products
B6 Specification for Zinc
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
B960 Specification for Prime Western Grade-Recycled (PWG-R) Zinc
E376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods

*A Summary of Changes section appears at the end of this standard.
3. Terminology (See Fig. 1)

3.1 Definitions:

3.1.1 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:

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 dross inclusions, \( n \)—the iron/zinc 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

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**Multi-Specimen Articles**

Articles whose Surface Area is greater than 160 sq.in. (100,000 sq. mm)

Lot

Sample

3 Test Articles each composed of 3 Specimens

Test Article

Each Specimen (5 or more measurements widely dispersed) must have Minimum Average Coating Thickness of (Table 1) -1 grade

Each Test Article in the Sample (3 Specimens each) must have Minimum Average Coating Thickness of (Table 1)

**Single-specimen Articles**

Articles whose Surface Area is equal to or less than 160 sq.in. (100,000 sq. mm)

Lot

Sample

3 Test Articles 3 Specimens

Each Specimen (5 or more measurements widely dispersed) must have Minimum Average Coating Thickness of (Table 1) -1 grade

All Test Articles (Specimens) Together must have Minimum Average Coating Thickness of (Table 1)

FIG. 1 Single- and Multi-Specimen Articles
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.\(^2\)\([100 000 \text{ mm}^2]\). 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.\(^2\)\([100 000 \text{ mm}^2]\) 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 range as delineated in Table 1, 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 measure-
ments 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 measure-
ment method. The minimum average coating thickness grade
for any specimen shall be one coating grade below that
required for the appropriate material category and thickness in
Table 1. For a unit of product whose surface area is equal to or
less than 160 in.\(^2\)\([100 000 \text{ mm}^2]\), 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 thickness
range as delineated in Table 1, that article will contain more
than one specimen, as appropriate (see Fig. 1).

3.2.10 specimen coating thickness, n—the average thick-
ness 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 coat-
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 galvanized shall be supplied by the
purchaser to the hot-dip galvanizer prior to galvanizing.

NOTE 2—The presence in steels and weld metal, in certain percentages,
of some elements such as silicon, carbon, and phosphorus tends to
accelerate the growth of the zinc-iron alloy layer so that the coating may
have a matte finish with little or no outer zinc layer. The galvanizer has
only limited control over this condition. The mass, shape, and amount of
cold working of the product being galvanized may also affect this
condition. Practice A385 provides guidance on steel selection and dis-
cusses the effects of various elements in steel compositions (for example,
silicon), that influence coating weight and appearance.

5.2 Fabrication—The design and fabrication of the product
to be galvanized 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
galvanizing and shall be complied with in both design and
fabrication. Consultation between the designer, fabricator, and

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### Table 1 Minimum Average Coating Thickness Grade by Material Category

<table>
<thead>
<tr>
<th>Material Category</th>
<th>Steel Thickness Range (Measured), in. (mm)</th>
<th>All Specimens Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;(\frac{3}{16}) (&lt;1.6)</td>
<td>(\frac{3}{16}) to &lt;(\frac{1}{8}) (1.6 to &lt;3.2)</td>
</tr>
<tr>
<td>Structural Shapes and Plate</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>Strip and Bar</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>Wire</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>Reinforcing Bar</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
5.3 **Castings**—The composition and heat treatment of iron and steel castings shall conform to specifications designated by the purchaser. Some types of castings have been known to show potential problems with predisposition to being embrittled during the normal thermal cycle of hot-dip galvanizing. It is the responsibility of the purchaser to heat treat or otherwise allow for the possibility of such embrittling phenomena. The requirements for malleable iron castings to be galvanized shall be as stated in Specification A47/A47M.

5.4 **Zinc**—The zinc used in the galvanizing bath shall conform to Specification B6, or Specification B960, or both. If a zinc alloy is used as the primary feed to the galvanizing bath, then the base material used to make that alloy shall conform to Specification B6, or Specification B960, or both.

5.5 **Bath Composition**—The molten metal in the working volume of the galvanizing bath shall contain not less than an average value of 98.0 % zinc by weight.

**NOTE 3**—The galvanizer may choose to add trace amounts of certain elements (for example, aluminum, nickel, and tin) to the zinc bath to help in the processing of certain reactive steels or to enhance the cosmetic appearance of the finished product. The use of these trace elements is permitted provided that the bulk chemistry of the galvanizing bath is at least 98.0 % zinc by weight. The elements can be added to the galvanizing bath as part of a pre-alloyed zinc feed, or they can be added to the bath by the galvanizer using a master feed alloy.

### 6. Coating Properties

#### 6.1 Coating Thickness

6.1.1 For articles whose surface area is greater than 160 in.\(^2\) (100 000 mm\(^2\)) (multi-specimen articles), each test article in the sample must meet the appropriate minimum average coating thickness grade requirements of Table 1, and each specimen coating thickness grade comprising that overall average for each test article shall average not less than one coating grade below that required in Table 1.

6.1.2 For articles whose surface area is equal to or less than 160 in.\(^2\) (100 000 mm\(^2\)) (single-specimen articles), the average of all test articles in the sample must meet the appropriate minimum average coating thickness grade requirements of Table 1, and for each test article, its specimen coating thickness shall be not less than one coating grade below that required in Table 1.

6.1.3 No individual measurement, or cluster of measurements at the same general location, on a test specimen shall be cause for rejection under the coating thickness requirements of this specification provided that when those measurements are averaged with the other dispersed measurements to determine the specimen coating thickness grade for that specimen, the requirements of 6.1.1 or 6.1.2, as appropriate are met.

**NOTE 4**—The coating thickness grades in Table 1 represent the minimum value obtainable with a high level of confidence for the ranges typically found in each material category. While most coating thicknesses

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**TABLE 2 Coating Thickness Grade\(^4\)**

<table>
<thead>
<tr>
<th>Coating Grade</th>
<th>mils</th>
<th>oz/ft(^2)</th>
<th>µm</th>
<th>g/m(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>1.4</td>
<td>0.8</td>
<td>35</td>
<td>245</td>
</tr>
<tr>
<td>45</td>
<td>1.8</td>
<td>1.0</td>
<td>45</td>
<td>320</td>
</tr>
<tr>
<td>50</td>
<td>2.0</td>
<td>1.2</td>
<td>50</td>
<td>355</td>
</tr>
<tr>
<td>60</td>
<td>2.2</td>
<td>1.3</td>
<td>55</td>
<td>390</td>
</tr>
<tr>
<td>75</td>
<td>2.4</td>
<td>1.4</td>
<td>60</td>
<td>425</td>
</tr>
<tr>
<td>80</td>
<td>2.6</td>
<td>1.5</td>
<td>65</td>
<td>460</td>
</tr>
<tr>
<td>85</td>
<td>3.0</td>
<td>1.7</td>
<td>75</td>
<td>530</td>
</tr>
<tr>
<td>100</td>
<td>3.1</td>
<td>1.9</td>
<td>80</td>
<td>565</td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>2.0</td>
<td>85</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>3.9</td>
<td>2.3</td>
<td>100</td>
<td>705</td>
</tr>
</tbody>
</table>

\(^4\) The values in micrometres (µm) are based on the Coating Grade. The other values are based on conversions using the following formulas: mils = µm × 0.03937; oz/ft\(^2\) = µm × 0.02316; g/m\(^2\) = µm × 7.067.
will be in excess of those values, some materials in each category may be less reactive (for example, because of chemistry or surface condition) than other materials of the steel category spectrum. Therefore, some articles may have a coating grade at or close to the minimum requirement shown in Table 1. In such cases, the precision and accuracy of the coating thickness measuring technique should be taken into consideration when rejecting such articles for coating thickness below that required by this specification. Purchasers desiring a guarantee of heavier coatings than the minimum thicknesses shown herein should use the special requirements (see 4.1.6) to specify coating thickness grades higher than those shown in Table 1. In addition, the purchaser should anticipate the need for test batches or extra preparation steps, or both, such as blasting before galvanizing or other methods, to attempt to reach the higher requirements with consistency. Some higher-than-standard thicknesses may be impractical or unattainable.

6.2 Finish—The coating shall be continuous (except as provided below), and as reasonably smooth and uniform in thickness as the weight, size, shape of the item, and necessary handling of the item during the dipping and draining operations at the galvanizing kettle will permit. Except for local excess coating thickness which would interfere with the use of the product, or make it dangerous to handle (edge tears or spikes), rejection for nonuniform coating shall be made only for plainly visible excess coating not related to design factors such as holes, joints, or special drainage problems (see Note 6). Since surface smoothness is a relative term, minor roughness that does not interfere with the intended use of the product, or roughness that is related to the as-received (un-galvanized) surface condition, steel chemistry, or steel reactivity to zinc shall not be grounds for rejection (see Note 7). Surface conditions related to deficiencies related to design, detailing, or fabrication as addressed by Practice A385 shall not be grounds for rejection. The zinc coating on threaded components of articles galvanized under this specification shall conform to that required in Specification A153/A153M. Surfaces that remain uncoated after galvanizing shall be renovated in accordance with the methods in Practice A780 unless directed by the purchaser to leave the uncoated areas untreated for subsequent renovation by the purchaser.

6.2.1 Each area subject to renovation shall be 1 in. [25 mm] or less in its narrowest dimension.

6.2.2 The total area subject to renovation on each article shall be no more than ½ of 1 % of the accessible surface area to be coated on that article, or 36 in.² per short ton [256 cm² per metric ton] of piece weight, whichever is less.

NOTE 5—Inaccessible surface areas are those which cannot be reached for appropriate surface preparation and application of repair materials as described in Practice A780. Such inaccessible areas, for example, would be the internal surfaces of certain tanks, poles, pipes, tubes, and so forth.

6.2.3 The thickness of renovation shall be that required by the thickness grade for the appropriate material category and thickness range in Table 1 in accordance with the requirements of 6.1, except that for renovation using zinc paints, the thickness of renovation shall be 50 % higher than that required by Table 1, but not greater than 4.0 mils.

6.2.4 When areas requiring renovation exceed the criteria previously provided, or are inaccessible for repair, the coating shall be rejected.

NOTE 6—The requirements for the finish of a galvanized product address themselves to a visual type of inspection. They do not address the matter of measured coating thickness variations that can be encountered because of different steels or different thicknesses of a given steel being used in an assembly.

NOTE 7—Items which are prepared for galvanizing by abrasive cleaning will generally develop a thicker coating with a moderately rougher surface.

6.3 Threaded Components in Assemblies—The zinc coating on external threads shall not be subjected to a cutting, rolling, or finishing tool operation, unless specifically authorized by the purchaser. Internal threads are not prohibited from being tapped or retapped after galvanizing. Coatings shall conform to the requirements of Specification A153/A153M.
permitted. Plain holes of \( \frac{1}{2} \)-in. [12.5-mm] diameter or more shall be clean and reasonably free from excess zinc. Marks in the zinc coating caused by tongs or other items used in handling the article during the galvanizing operation shall not be cause for rejection unless such marks have exposed the base metal and the bare metal areas exceed allowable maximums from 6.2.1 and 6.2.2. The pieces shall be handled so that after galvanizing they will not freeze together on cooling.

Note 8—Depending upon product design or material thickness, or both, filming or excess zinc buildup in plain holes of less than \( \frac{1}{2} \)-in. [12.5-mm] diameter may occur that requires additional work to make the holes usable as intended.

6.5 Adherence—The zinc coating shall withstand handling consistent with the nature and thickness of the coating and the normal use of the article, without peeling or flaking.

Note 9—Although some material may be formed after galvanizing, in general the zinc coating on the articles covered by this specification is too heavy to permit severe bending without damaging the coating.

7. Sampling

7.1 Sampling of each lot shall be performed for conformance with the requirements of this specification.

7.2 A lot is a unit of production or shipment from which a sample is taken for testing. Unless otherwise agreed upon between the galvanizer and the purchaser, or established within this specification, the lot shall be as follows: For testing at a galvanizer’s facility, a lot is one or more articles of the same type and size comprising a single order or a single delivery load, whichever is the smaller, or any number of articles identified as a lot by the galvanizer, when these have been galvanized within a single production shift and in the same bath. For test by the purchaser after delivery, the lot consists of the single order or the single delivery load, whichever is the smaller, unless the lot identity, established in accordance with the above, is maintained and clearly indicated in the shipment by the galvanizer.

7.3 The method of selection and number of test specimens shall be agreed upon between the galvanizer and the purchaser. Otherwise, the test specimens shall be selected at random from each lot. In this case, the minimum number of specimens from each lot shall be as follows:

<table>
<thead>
<tr>
<th>Number of Pieces in Lot</th>
<th>Number of Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or less</td>
<td>all</td>
</tr>
<tr>
<td>4 to 500</td>
<td>3</td>
</tr>
<tr>
<td>501 to 1 200</td>
<td>5</td>
</tr>
<tr>
<td>1 201 to 3 200</td>
<td>8</td>
</tr>
<tr>
<td>3 201 to 10 000</td>
<td>13</td>
</tr>
<tr>
<td>10 001 and over</td>
<td>20</td>
</tr>
</tbody>
</table>

Note 10—Where a number of identical items are to be galvanized, a statistical sampling plan may be desired. Such a plan is contained in Test Method B602 which addresses sampling procedures for the inspection of electrodeposited metallic coatings and related finishes. If Test Method B602 is used, the level of sampling shall be agreed upon between the galvanizer and the purchaser at the time the coating order is placed.

7.4 A test specimen which fails to conform to a requirement of this specification shall not be used to determine the conformance to other requirements.

8. Test Methods

8.1 Test Requirements—The following tests shall be conducted to ensure that the zinc coating is being furnished in accordance with this specification. The specifying of tests for adhesion and embrittlement shall be subject to mutual agreement between the galvanizer and purchaser. Visual inspection of the coating shall be made for compliance with the requirements.

8.2 Thickness of Coating Test—The thickness of coating is determined by one or more of the three methods described as follows.

8.2.1 Magnetic Thickness Measurements—The thickness of the coating shall be determined by magnetic thickness gage measurements in accordance with Practice E376 unless the methods described in 8.2.2, 8.2.3, or 8.2.4 are used. For each specimen (as described in 3.2.9) five or more measurements shall be made at points widely dispersed throughout the volume occupied by the specimen so as to represent as much as practical, the entire surface area of the test specimen. The average of the five or more measurements thus made for each specimen is the specimen coating thickness.

8.2.1.1 For articles whose surface area is greater than 160 in.\(^2\) [100 000 mm\(^2\)] (multi-specimen articles as described in 3.2.6), the average of the three specimen coating thickness grades comprising each test article is the average coating thickness for that test article. A specimen must be evaluated for each steel category and material thickness within the requirements for each specimen of the test article.

8.2.1.2 For articles whose surface area is equal to or less than 160 in.\(^2\) [100 000 mm\(^2\)] (single-specimen articles as described in 3.2.8), the average of all specimen coating thickness grades is the average coating thickness for the sample.

8.2.1.3 In the case of threaded components, the thickness of coating shall be made on a portion of the article that does not include any threads.

8.2.1.4 The use of magnetic measurement methods is appropriate for larger articles, and is appropriate for smaller articles when there is sufficient flat surface area for the probe tip to sit flat on the surface using Practice E376.

8.2.2 Stripping Method—The average weight of coating shall be determined by stripping a test article, a specimen removed from a test article, or group of test articles in the case of very small items such as nails, etc., in accordance with Test Method A90/A90M unless the methods described in 8.2.1, 8.2.3, or 8.2.4 are used. The weight of coating per unit area thus determined is converted to equivalent coating thickness values in accordance with Table 2 (rounding up or down as appropriate). The thickness of coating thus obtained is the test article coating thickness, or in the case of a specimen removed from a test article, is the specimen average coating thickness.

8.2.2.1 The stripping method is a destructive test and is appropriate for single specimen articles, but is not practical for multi-specimen articles.

8.2.3 Weighing Before and After Galvanizing—The average weight of coating shall be determined by weighing articles before and after galvanizing, subtracting the first weight from the second and dividing the result by the surface area unless the
methods described in 8.2.1, 8.2.2, or 8.2.4 are used. The first weight shall be determined after pickling and drying and the second after cooling to ambient temperature. The weight of coating per unit area thus determined is converted to equivalent coating thickness values according to Table 2 (rounding up or down as appropriate). The thickness of coating thus obtained is the test article coating thickness.

8.2.3.1 The weighing before and after method is appropriate for single-specimen articles, but is not practical for multi-specimen articles.

NOTE 11—Both the stripping method and the weighing before and after method do not take into account the weight of iron reacted from the article that is incorporated into the coating. Thus, the methods may underestimate coating weight (and therefore the calculated thickness) by up to 10%. The accuracy of both methods will be influenced by the accuracy to which the surface area of the articles tested can be determined.

8.2.4 Microscopy—The thickness of coating shall be determined by cross-sectional and optical measurement in accordance with Test Method B487 unless the methods described in 8.2.1, 8.2.2, or 8.2.3 are used. The thickness thus determined is a point value. No less than five such measurements shall be made at locations on the test article which are as widely dispersed as practical, so as to be representative of the whole surface of the test article. The average of no less than five such measurements is the specimen coating thickness.

8.2.4.1 The microscopy method is a destructive test and is appropriate for single-specimen articles, but is not practical for multi-specimen articles.

8.2.5 Referee Method—In the event of a dispute over thickness of coating measurements, the dispute shall be resolved as follows:

8.2.5.1 For multi-specimen articles, a new sample shall be taken randomly from the lot of material, which has twice the number of test articles as the sample which failed to conform to this specification. If the lot size is such that the sample size cannot be doubled, then the sample size shall be as previous, but the number of widely dispersed sites at which measurements were made shall be doubled, and these sites will constitute the new sample. This new sample shall be measured using magnetic thickness gages which have been calibrated for accuracy against reference material thickness standards. If the lot is found to be nonconforming by the new sample, the galvanizer has the right to sort the lot for conforming articles by individual test, to re-galvanize non-conforming articles, or to renovate the nonconforming articles in accordance with 6.2.

8.2.5.2 For single-specimen articles, a new sample shall be taken randomly from the lot of material, which has twice the number of test articles as the sample which failed to conform to this specification. The test method for the new sample shall be selected by mutual agreement between the purchaser and galvanizer. If the lot is found to be nonconforming by the new sample, the galvanizer has the right to sort the lot for conforming articles by individual test, to re-galvanize non-conforming articles, or to renovate the nonconforming articles in accordance with 6.2.

8.3 Adhesion—Determine adhesion of the zinc coating to the surface of the base metal by cutting or prying with the point of a stout knife, applied with considerable pressure in a manner tending to remove a portion of the coating. The adhesion shall be considered inadequate if the coating flakes off in the form of a layer of the coating so as to expose the base metal in advance of the knife point. Do not use testing carried out at edges or corners (points of lowest coating adhesion) to determine adhesion of the coating. Likewise, do not use removal of small particles of the coating by paring or whittling to determine failure.

8.4 Embrittlement—Test for embrittlement shall be made in accordance with Practice A143/A143M. These tests shall not be required unless strong evidence of embrittlement is present.

9. Inspection, Rejection, and Retest

9.1 Inspection by the Galvanizer—It is the responsibility of the galvanizer to ensure compliance with this specification. This shall be achieved by an in-plant inspection program designed to maintain the coating thickness, finish, and appearance within the requirements of this specification unless the inspection is performed in accordance with 9.2.

9.2 Inspection By the Purchaser—The purchaser shall accept or reject material by inspection either through the galvanizer’s inspector, the purchaser’s inspector, or an independent inspector. The inspector representing the purchaser shall have access at all times to those areas of the galvanizer’s facility which concern the application of the zinc coating to the material ordered while work on the contract of the purchaser is being performed. The galvanizer shall afford the inspector all reasonable facilities to satisfy him that the zinc coating is being furnished in accordance with this specification.

9.3 Location—The material shall be inspected at the galvanizer’s plant prior to shipment. However, by agreement the purchaser is not prohibited from making tests which govern the acceptance or rejection of the materials in his own laboratory or elsewhere.

9.4 Reinspection—When inspection of materials to determine conformity with the visual requirements of 6.2 warrants rejection of a lot, the galvanizer is not prohibited from sorting the lot and submit it once again for acceptance after he has removed any nonconforming articles and replaced them with conforming articles.

9.5 The sampling plan that was used when the lot was first inspected shall be used for resampling of a sorted lot. By mutual agreement, the galvanizer is not prohibited from submitting the lot remaining after sorting and removing non-conforming articles without replacement of the nonconforming articles. In such case, the now-smaller lot shall be treated as a new lot for purposes of inspection and acceptance.

9.6 Materials that have been rejected for reasons other than embrittlement are not prohibited from being stripped and regalvanized and again submitted for inspection and test at which time they shall conform to the requirements of this specification.

10. Certification

10.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed by this specification and the requirements have been met.
When specified in the purchase order or contract, a report of the test results shall be furnished.

11. Keywords
   11.1 coatings—zinc; galvanized coatings; steel products—metallic coated; zinc coatings—steel products

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A123/A123M - 09) that may impact the use of this standard. (May 15, 2012)

(I) Revised Table 1.

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