Designation: A879/A879M – 12 (Reapproved 2017)

Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface[1]

This standard is issued under the fixed designation A879/A879M; 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 zinc coatings applied by the electrolytic process to hot-rolled and cold-rolled steel sheet. The coating has a smooth, spangle-free surface. The zinc-coated sheet covered in this specification is produced in a wide range of coating masses to provide coatings that are compatible with the anticipated service life required. The coating mass varies, from very thin coatings that are usually painted to provide good service, to relatively heavy masses that provide good corrosion resistance in the bare (unpainted) condition.

1.2 The product shall be coated on one or both surfaces with equal or differential coating masses on the two surfaces. Sheet coated with equal coating masses on each surface has similar levels of corrosion protection on each surface. Often, however, a higher level of corrosion protection is required on one surface than is required on the other. Thus one surface is specified to have a heavier coating mass than the other. Either surface, when specified to be painted will provide additional corrosion protection as compared to an unpainted surface.

1.3 This coating process has essentially no effect on the base metal mechanical properties and use is permitted on any grade of hot- or cold-rolled steel sheet. The coated sheet is available as Commercial Steel (CS), Drawing Steel (DS), Deep Drawing Steel (DDS), Extra-Deep Drawing Steel (EDDS), Structural Steel (SS), High-Strength Low-Alloy Steel (HSLAS), High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Solution-Hardened Steel (SHS), or Bake-Hardenable Steel (BHS), see Specifications A1008/A1008M and A1011/A1011M.

1.4 The values stated in either SI or inch-pound units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

A754/A754M Test Method for Coating Weight (Mass) of Metallic Coatings on Steel by X-Ray Fluorescence

A917 Specification for Steel Sheet, Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface (General Requirements)

A1008/A1008M Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

A1011/A1011M Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

B504 Test Method for Measurement of Thickness of Metallic Coatings by the Coulometric Method

3. Classification

3.1 Coating shall be designated in accordance with Specification A917. The letter G shall be used to designate SI units of pure zinc coatings. The letter Z shall be used to designate inch-pound units of pure zinc coating.

4. Ordering Information

4.1 Orders for products to this specification shall include the following information, as necessary to adequately describe the desired product:

4.1.1 Name of product (electrolytic zinc-coated steel sheet).

4.1.2 ASTM designation and year of issue.

4.1.3 Base metal type (hot rolled or cold rolled).

4.1.4 Base metal designation (Commercial Steel (CS), Drawing Steel (DS), Deep Drawing Steel (DDS), Extra Deep

[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 A05.11 on Sheet Specifications.

Current edition approved Feb. 1, 2017. Published February 2017. Originally approved in 1987. Last previous edition approved in 2012 as A879/A879M - 12. DOI: 10.1520/A0879_A0879M-12R17.

[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.

TABLE 1 Coating Weight and Mass per Surface,[A] for Steel Sheet, Zinc Coated by the Electrolytic Process[B]

Inch-Pound Units, oz/ft²			SI Units, g/m²		
Coating Designation[C]	Minimum	Maximum	Coating Designation[C]	Minimum	Maximum
00Z	no coating	no coating	00G	no coating	no coating
01Z[D]	0.01	0.05	03G[D]	3	15
02Z[E]	0.02	0.08	06G[E]	6	25
04Z[F]	0.04	0.10	12G[F]	12	30
07Z	0.07	0.13	20G	20	40
08Z[G]	0.08	0.16	24G[G]	24	45
13Z	0.13	0.23	40G	40	70
16Z	0.16	0.26	50G	50	80
20Z	0.20	0.30	60G	60	90
23Z	0.23	0.36	70G	70	110
30Z	0.30	0.43	90G	90	130
32Z	0.32	0.46	98G	98	140

[A]Conversion for coating weight and mass are: 1.00 oz/ft² = 305 g/m² and 1.00 g/m² = 0.00328 oz/ft².
[B]The product shall be coated on at least one surface; therefore, the combination 00Z/00Z or 00G/00G shall not be specified.
[C] See Specification A917.
[D]Formally Flash Coating
[E]Formally Intermediate Coating
[F]Formally Full Coating
[G]Formally Double Coating

Drawing Steel (EDDS), Structural Steel (SS), High-Strength Low-Alloy Steel (HSLAS), High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Solution-Hardened Steel (SHS), or Bake-Hardenable Steel (BHS).

4.1.5 Formability type, strength, grade or class, or combination, thereof, as required for structural or high-strength low-alloy steels.

4.1.6 Coating designation (see 3.1).

4.1.7 Surface treatments required (see Note 1).

NOTE 1—Steel sheet is available without surface treatment (dry) or with surface treatments designated as chemical treatment, oiled, or phosphatized. Unless otherwise specified sheet is furnished oiled.

4.1.8 Dimensions [show thickness (minimum or nominal), width, and length, if cut length].

4.1.9 Coil size requirements (specify maximum outside diameter (OD), acceptable inside diameter (ID), and maximum weight (mass)).

4.1.10 Application (part name and description).

4.1.11 Special Requirements, if applicable.

4.1.12 Certification, if required, heat analysis and mechanical property report.

5. Coating Mass

5.1 Coating mass shall conform to the requirements for coating designation (mass and type) as given in Specification A917 and in Table 1 for the specific coating designation. The mass of the coating is the single spot value on each surface of the sheet in grams per square metre for G coatings and ounces per square foot for Z coatings.

5.2 *Coating Mass Tests:*

5.2.1 The weigh-strip-weigh method (see Test Method A90/A90M) is a destructive test that determines coating mass by measuring the difference in weight between a coated and a stripped (uncoated) sample. If one surface is protected suitably during the initial stripping, coating mass can be determined for each surface independently. Conversion of the coating mass to coating thickness is possible only if the density of the coating is known precisely.

5.2.2 Coating thickness measurements by X-ray fluorescence (see Test Method A754/A754M) is a nondestructive test that determines coating mass by converting X-ray fluorescence measurements to coating mass values. This method is readily adaptable to the continuous monitoring of coating mass during coating. Thus modern electroplating facilities are frequently equipped with X-ray fluorescence gages that provide feedback to control the coating mass. These devices may be used as a basis for determining suitability for shipment provided that they have been calibrated properly.

5.2.3 Measurement by Coulometric Method (see Test Method B504) is a destructive test that determines lighter coating mass applications.

5.3 The referee method to be used shall be as agreed upon between the producer and the consumer. In the absence of such agreement, Test Method A90/A90M shall be used as the referee method.

5.3.1 Estimate the coating thickness from the coating weight (mass) by using the following relationships:

5.3.1.1 *Inch-Pound Units*—1.00 oz/ft² coating weight = 1.68 mils coating thickness (0.00168 in.); 1.00 mil (0.001 in.) coating thickness = 0.595 oz/ft² coating weight.

5.3.1.2 *SI Units*—1.00 g/m² coating mass = 0.140 micro-metre coating thickness; 1.00 micro-metre coating thickness = 7.14 g/m² coating mass.

6. Keywords

6.1 electrolytic zinc coated; steel sheet, zinc coated; zinc coated; zinc coated steel sheet