Designation: A 917 – 08

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

This standard is issued under the fixed designation A 917; 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 hot-rolled and cold-rolled steel sheet coated by the electrolytic process. Coatings can be comprised of pure metals or metal alloys. For specific coatings, refer to Specifications A 879/A 879M and A 918.

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. In these situations, one surface shall be specified with 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-rolled 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).

1.4 The values stated in SI units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 90/A 90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products

A 754/A 754M Test Method for Coating Weight (Mass) of Metallic Coatings on Steel by X-Ray Fluorescence

A 879/A 879M Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface

A 902 Terminology Relating to Metallic Coated Steel Products

A 918 Specification for Steel Sheet, Zinc-Nickel Alloy Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface

A 1008/A 1008M Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

A 1011/A 1011M 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

B 504 Test Method for Measurement of Thickness of Metallic Coatings by the Coulometric Method

[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.

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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.

***A Summary of Changes section appears at the end of this standard.**

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3. Terminology

3.1 *Definitions*—For definitions of terms and abbreviations used in this specification, see Terminology A 902.

4. Ordering Information

4.1 Ordering information for all products is shown in the individual product specifications.

5. Coating Designation (Mass and Type)

5.1 The following seven-character format shall be used to identify the coating mass required:

5.1.1 *First and Second Characters*—Minimum coating mass of the surface with the less critical surface quality requirements;

5.1.2 *Third Character*—A letter, as designated in the appropriate product specification, to denote the kind of coating; G for pure zinc and N for zinc-nickel alloy;

5.1.3 *Fourth and Fifth Characters*—Minimum coating mass of the surface with the more critical surface quality requirements;

5.1.4 *Sixth Character*—A letter, as designated in the appropriate product specification, to denote the kind of coating; G for pure zinc and N for zinc-nickel alloy;

5.1.5 *Seventh Character*—Either E or U, designating an exposed or unexposed application, respectively.

Example:	60	G	20	G	E
	↓	↓	↓	↓	↓
See Section:	5.1.1	5.1.2	5.1.3	5.1.4	5.1.5

NOTE 1—The terms "exposed" and "unexposed" describe the intended application as either hidden or exposed to view and is an indicator of the degree of freedom from surface imperfections that affect the cosmetic characteristics of the coated surface.

6. Chemical Requirements

6.1 The heat analysis of the steel shall conform to the requirements of the specification for the steel ordered or as specified by negotiations.

7. Base Metal Requirements

7.1 The steel shall conform to all of the requirements of the appropriate specification listed as follows for the steel ordered. Where reference is made to a combined standard (such as Specification A 1011/A 1011M), conformance shall be to the metric portion, using SI units of measurement as standard.

7.1.1 *Hot Rolled*:

7.1.1.1 *Commercial Steel (CS), Drawing Steel (DS), Structural Steel (SS), High-Strength Low-Alloy Steel (HSLAS), and High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F)*—Specification A 1011/A 1011M.

7.1.2 *Cold Rolled*:

7.1.2.1 *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), and Bake-Hardenable Steel (BHS)*—Specification A 1008/A 1008M.

7.2 *Base Metal Specimens*:

7.2.1 Test specimens shall be prepared from finished material and tested in accordance with Test Methods and Definitions A 370.

7.2.2 In determining the base metal mechanical properties, one of the following methods shall be used. Unless specified in the order, the producer shall determine the method to be used; however, in the event of a dispute the method in 7.2.2.1 shall be used.

7.2.2.1 The base metal thickness shall be measured after stripping the coating from the ends of the specimen contacting the grips of the tension testing machine before testing.

7.2.2.2 The base metal thickness shall be determined by subtracting the coating thickness from the measured thickness of the tension test specimen. The coating thickness shall be calculated from the coating mass test.

7.2.3 When the percent elongation in the tension test is less than the specified minimum and any part of the fracture is outside the middle half of the gage length as scribed before the test, the test shall be discarded and a retest shall be permitted.

7.3 *Retests for Base Metal Mechanical Properties*—If one test fails for base metal mechanical requirements, retesting shall conform to the provisions of the applicable base metal specification.

8. Coating Mass Requirements

8.1 *Coating Mass*:

8.1.1 Coating mass shall conform to the requirements prescribed in the individual coating specification.

8.1.2 The mass of the coating is the single spot value on each surface of the sheet expressed in grams per square metre.

8.2 *Coating Mass Tests*:

8.2.1 *Test Method A 90/A 90M*—The weigh-strip-weigh method 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 to coating thickness is only possible if the density of the coating is known precisely.

8.2.2 *Test Method A 754/A 754M*—Measurement by X-ray fluorescence is a nondestructive test that determines coating mass by converting X-ray fluorescence measurements to coating mass values. This test method is readily adaptable to the continuous monitoring of coating mass during the electroplating process. Thus, modern electroplating facilities are frequently equipped with X-ray fluorescence gages that provide feedback to control the coating mass. These devices are used as a basis for determining suitability for shipment provided that they have been calibrated properly.

8.2.3 *Test Method B 504*—Measurement of the coating mass by the coulometric method is a destructive test that determines coating mass or thickness, or both, electrochemically. This test method is rapid and versatile for lighter coating mass applications.

8.2.4 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 A 90/A 90M, the weigh-strip-weigh method, shall be used as the referee method.

8.3 *Sampling for Coated Mass Test*:

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8.3.1 One test specimen shall be taken from the lift of cut lengths or coils such that no portion of the specimen is closer than 25 mm to the edge of the as-received sheet.

8.3.2 The coating mass of this specimen shall conform to both the minimum and maximum values shown in the applicable coating specification for the coating mass specified. If either of these values is not met, the material represented shall be subject to retest in accordance with the procedures given in 9.4.

8.4 *Retest for Coating Mass Values*:

8.4.1 When it is desired to retest to determine compliance to the coating mass values, two test specimens shall be selected at random from the same lift of cut lengths or coil, such that no portion of either sample is closer than 25 mm from the as-received edges.

8.4.2 When tested, each of the two retest specimens shall conform to both the minimum and maximum values shown in the specification for the coating mass specified.

9. Coating Bend Test Requirements

9.1 For all steel designations other than structural steel, high-strength low-alloy steel and high-strength low-alloy steel with improved formability, the coated sheet shall be capable of being bent flat through 180° in any direction without flaking of the coating on the outside of bend only.

9.2 Coated cold-rolled structural steel sheet in Grades 25, 30, 33 Types 1 and 2, and 40 Types 1 and 2, coated cold-rolled solution-hardened steel sheet in Grades 26, 31, 35, 41, and 44, coated cold-rolled bake-hardenable steel sheet in Grades 26, 31, 35, 41, and 44, and coated hot-rolled structural steel sheet in Grades 30, 33, 36 Types 1 and 2, 40, 45, 50, and 55 shall be capable of being bent through 180° in any direction without flaking of the coating on the outside of the bend only. The coating bend test inside diameter shall have a relationship to the thickness of the specimen as prescribed in Table 1. There is no coating bend test applicable to cold-rolled structural steel Grade 80.

TABLE 1 Coating Bend Test for Structural Steel

Ratio of the Bend Diameter to the Thickness of the Specimen[A]						
Cold-Rolled Sheet, Grade[B]						
25	30	33 Types 1 and 2			40 Types 1 and 2	
1½	2	2½			3	
Hot-Rolled Sheet, Grade						
30	33	36 Types 1 and 2	40	45	50	55
1	1½	1½	2	2½	3	3

[A] These ratios are applicable for all coating designations.

[B] Grade 80 is not subject to any bend test requirement; therefore, there is no coating bend requirement for this grade.

9.3 Coated cold-rolled and hot-rolled high-strength low-alloy steel, and high-strength low-alloy steel with improved formability sheet shall be capable of being bent through 180° in nay direction without flaking of the coating on the outside of the bend only. The coating bend test inside diameter shall have a relationship to the thickness of the specimen as prescribed in Table 2.

9.4 Flaking of the coating within 6 mm of the edge of the bend specimen shall not be cause for rejection.

9.5 Coating bend test specimens shall be cut 50 to 100 mm wide. The specimen shall be cut not less than 50 mm from the edge of the test sheet.

9.6 Electrolytic coatings are usually tightly adherent, even when used for difficult forming operations. However, powdering is possible if the material is severely formed or coined during forming.

9.7 *Retests for Coating Bend Tests*:

9.7.1 If the specimen fails the coating bend test, two retests shall be taken on random samples from the same lot of any specific item.

9.7.2 Both retests must conform to the requirements of this specification.

10. Certification

10.1 When specified in the purchase order or contract, the purchaser shall be furnished with certification that samples representing each lot have been either tested or inspected as directed in 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. The report shall include the purchase order number, the ASTM designation number, and the heat or lot number correlating the test results with the material represented.

11. Keywords

11.1 coatings, metallic; coatings, zinc; electrodeposited coatings; steel products; steel sheet; steel sheet-zinc coated; zinc coated (electrolytic process); zinc-coated iron/steel articles; zinc coatings

TABLE 2 Coating Bend Test for High-Strength Low-Alloy Steel and High-Strength Low-Alloy Steel with Improved Formability

Ratio of the Bend Test Diameter to the thickness of the Specimen[A]					
High-Strength Low-Alloy Steel Sheet, Grade, Classes 1 and 2					
45	50	55	60	65	70
1½	2	2	2½	2½	3
High-Strength Low-Alloy Steel with Improved Formability Sheet, Grade					
	50	60	70	80	
	2	2½	3	3	

[A] Ratios are applicable for all coating designations.

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SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue, A 917 - 06a, that may impact the use of this standard. (May 1, 2008)

(*1*) Revised 7.2.2.

(*2*) Added 7.2.2.1 and 7.2.2.2.

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