Designation: A 854/A 854M – 08

Standard Specification for Metallic-Coated Steel Smooth High-Tensile Fence and Trellis Wire[1]

This standard is issued under the fixed designation A 854/A 854M; 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 12 ½-gage (0.099-in.) [2.5-mm] Class 3 metallic-coated steel wire suitable for use in parallel–wire fence, trellis, and similar structures that are typically nonelectrified. Two types of coatings are covered, as follows:

1.1.1 *Type 1*—Zinc-coated (galvanized), and

1.1.2 *Type II*—Zinc-5 % aluminum mischmetal (Zn-5Al-MM) alloy coated.

1.2 This specification is applicable to orders in either inch-pound units (as A 854) or acceptable SI units (as A 854M). Inch-pound units and SI units are not necessarily equivalent.

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 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment

B 6 Specification for Zinc

B 750 Specification for GALFAN (Zinc-5 % Aluminum-Mischmetal) Alloy in Ingot Form for Hot-Dip Coatings

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 47 Test Methods for Chemical Analysis of Zinc Die-Casting Alloys[3]

E 1277 Test Method for Chemical Analysis of Zinc-5 % Aluminum-Mischmetal Alloys by ICP Emission Spectrometry

2.2 *Military Standards:*[4]

MIL-STD-129 Marking for Shipment and Storage

2.3 *Federal Standard:*[5]

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

2.4 *International Lead Zinc Research Organization Standard:*[6]

Gf-1 Standard Practice for Determination of Cerium and Lanthanum Compositions in Galfan Alloy (5 % Al-0.04 % La-0.04 % Ca-Bal/SHG Zn) Class 3 Coating

3. Classification

3.1 The wire is furnished in Class 3 coating.

3.2 The wire is furnished in three grades according to tensile strength, as follows:

3.2.1 *Grade 200*—Minimum tensile strength, 200 ksi [1380 MPa].

3.2.2 *Grade 180*—Minimum tensile strength, 180 ksi [1240 MPa].

3.2.3 *Grade 140*—Minimum tensile strength, 140 ksi [970 MPa].

4. Ordering Information

4.1 Orders for material purchased under this specification shall include the following information:

4.1.1 Quantity (number of coils or weight).

4.1.2 Name of material (high-tensile fence wire).

4.1.3 Coated wire diameter (Section 8).

4.1.4 Type of Coating (1.1.1 or 1.1.2),

4.1.5 Class of coating (3.1).

4.1.6 Grade or tensile strength (3.2).

4.1.7 Nominal weight or length of coils and tolerance.

4.1.8 Packaging, marking, and loading, if other than standard (Section 14).

4.1.9 Certification, if required (Section 13).

4.1.10 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 400 coils

[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 A05.12 on Wire 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] Withdrawn

[4] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

[5] Available from U.S. Government Printing Office, Washington, DC, 20402.

[6] Available from International Lead Zinc Research Organization, P.O. Box 12036, Research Triangle Park, NC 27709.

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

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high-tensile fence wire, 12½ gage, 0.099 in., zinc-coated, Class 3, Grade 200, in 100-lb plus 5 minus 0 lb weight coils, to ASTM A 584.

5. Materials and Manufacture

5.1 The steel rod from which the wire is drawn shall be manufactured by the open-hearth, electric-furnace, or basic oxygen process.

5.2 The wire shall be cold-drawn then metallic-coated at finished size to produce the specific mechanical properties.

5.3 The wire shall be furnished with one of two types of coatings, specified as follows:

5.3.1 *Type I*—Zinc-coated (galvanized) with coating weight as specified in 7.1.

5.3.2 *Type II*—Zinc-5 % aluminum-mischmetal alloy coated (Zn-5A1-MM) with coating weight as specified in 7.1.

5.4 Type I coating may be produced by either a hot-dip or an electrolytic process at the option of the producer. Type II coating shall be produced by a hot-dip process.

5.5 Slab zinc, if used for Type I coating, shall be one of the appropriate grades that are described in Specification B 6.

5.6 The ingot used for Type II shall conform to Specification B 750.

5.6.1 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical (Test Method E 47 for tin), ICP argon plasma spectrometric (Test Method E 1277), or other methods. In case of dispute the results secured by Test Method E 1277 shall be the basis of acceptance.

5.6.2 A standard practice for X-ray fluorescence spectrometry for determination of cerium and lanthanum in a zinc-5 % aluminum-mischmetal alloy has been established by the International Lead Zinc Research Organization (Standard Practice Gf-1). In case of dispute, the results secured by Test Method E 1277 shall be the basis of acceptance.

6. Mechanical Requirements

6.1 *Tension Test*:

6.1.1 *Requirements*—The material as represented by the test specimens shall have tensile strengths and meet elongation requirements as shown in Table 1.

6.1.2 *Test Method*—The tension test shall be made in accordance with Test Methods and Definitions A 370, Annex 4.

6.1.3 The diameter used in calculation of tensile strength shall be the actual diameter, including the coating, determined in accordance with 8.3 of this specification.

6.2 *Ductility Test*:

6.2.1 *Requirements*—The material as represented by the test specimens shall not fracture when wrapped at a rate not exceeding 15 turns/min in a close helix of at least two turns around a cylindrical mandrel with a diameter of 2*d* for Grade 200 or 1*d* for Grades 180 and 140, where *d* is the coated wire diameter.

TABLE 1 Tensile Strength and Elongation

Grade	Minimum Tensile Strength		Permanent Elongation in 10 in. [250 mm], min, %
	ksi	[MPa]	
200	200	[1380]	2.5
180	180	[1240]	3.0
140	140	[970]	3.5

6.2.2 *Test Method*—The wrap test shall be in accordance with Test Methods and Definitions A 370, Annex 4.

6.2.3 Any cracking or flaking of the coating material during this test shall not be construed to constitute failure of the test.

6.3 *Adherence of Coating Test*:

6.3.1 *Requirements*—The material as represented by the test specimens shall withstand wrapping at a rate not exceeding 15 turns/min in a close helix around a cylindrical mandrel with a diameter of 4*d*, without cracking or flaking the coating to such an extent that any of the coating metal can be removed by rubbing with the bare fingers.

6.3.2 *Test Method*—The adherence of coating test shall be made in accordance with the wrapping test of Test Methods and Definitions A 370, Annex 4.

6.3.3 Loosening or detachment during the adherence test of superficial, small particles of coating material formed by mechanical polishing of the surface of the coated wire shall not be considered cause for rejection.

7. Weight of Coating

7.1 *Requirements*—The material as represented by the test specimens shall have a minimum weight of metallic coating of 0.80 oz/ft^2[244 g/m^2] of uncoated wire surface.

7.2 *Test Method*—The weight of metallic coating shall be determined in accordance with Test Method A 90.

8. Dimensions and Tolerances

8.1 *Size*—The diameter of the coated wire shall be 0.099 in. [2.5 mm].

8.2 *Tolerance*—The permissible tolerance in the coated wire shall be ±0.004 in. [±0.10 mm].

8.3 *Test Method*—Using a micrometer or other suitable instrument, determine the greatest and least measurement at the same cross-section, with each measurement to the nearest 0.001 in. [0.01 mm]. The average of these two measurements shall be considered the diameter of the test specimen.

9. Workmanship, Finish, and Appearance

9.1 The coated wire shall be free of slivers, scale, and other imperfections not consistent with good commercial practice. The coating shall be continuous and reasonably uniform.

9.2 Electric-welded butt joints are permitted during the drawing process.

9.3 No welds are permitted after drawing.

10. Number of Tests and Retests

10.1 A lot for the purpose of testing shall consist of all the coils of wire of the same diameter, class, and grade offered for shipment at one time.

10.2 One test specimen shall be taken from each 10 000 lb [4540 kg] or fraction thereof. Test specimens shall be taken from either end of coil. Each specimen shall be tested for compliance with Sections 6 and 8. At least half of the specimens shall be tested for compliance with Section 7.

10.3 If any test specimen exhibits obvious imperfections or shows the presence of a weld, it shall be discarded and another specimen substituted.

10.4 Should one or more of the test specimens fail any of the tests specified, the nonconforming coil or coils may be

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removed and the balance of the lot subjected to retests. For retest purposes two additional coils for each 10 000 lb [4540 kg] in the lot shall be sampled and tested for the property in which the original sample failed to comply.

10.5 Should any of the retest specimens fail to meet the mechanical or coating properties specified, the lot represented by the test specimens may be rejected.

10.6 Instead of rejecting the entire lot as provided in 10.5, the producer may test specimens from every coil in the lot for the property in which failure occurred and resubmit those coils meeting the specification requirements.

11. Inspection

11.1 Unless otherwise specified in the contract or purchase order, the manufacturer is responsible for the performance of all inspection and test requirements specified in this specification. Except as otherwise specified in the contract or purchase order, the manufacturer may use his own or any other suitable facilities for the performance of the inspection and test requirements unless disapproved by the purchaser at the time the order is placed. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification when such inspections and tests are deemed necessary to ensure that the material conforms to prescribed requirements.

12. Rejection and Rehearing

12.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

12.2 The material must be adequately protected and correctly identified in order that the producer or supplier may make a proper investigation.

13. Certification

13.1 When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

14. Packaging and Marking

14.1 The coil weight, dimensions, and methods of packaging shall be agreed upon between the manufacturer and the purchaser.

14.2 Unless otherwise specified, packaging, marking, and loading for shipment shall be in accordance with Practices A 700.

14.3 When specified in the contract or order, and for direct procurement by or direct shipment to the U.S. Government, marking for shipment, in addition to requirements specified in the contract or order, shall be in accordance with MIL-STD-129 for U.S Military agencies and in accordance with Fed. Std. No. 123 for U.S. government civil agencies.

15. Keywords

15.1 fencing material; metallic-coated steel wire; steel wire—high tensile; steel wire—zinc-5 % aluminum alloy coated; steel wire—zinc coated; zinc coatings—steel wire products; zinc-5 % aluminum alloy coatings—steel wire products

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A 854/A 854M - 98 (2003)) that may impact the use of this standard. (May 1, 2008)

(*1*) Removed reference to Mil Std 163 since this standard is now obsolete.

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