



Designation: A854/A854M – 08 (Reapproved 2017)

Standard Specification for Metallic-Coated Steel Smooth High-Tensile Fence and Trellis Wire¹

This standard is issued under the fixed designation A854/A854M; 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 I*—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 A854) or acceptable SI units (as A854M). Inch-pound units and SI units are not necessarily equivalent.

1.3 *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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A700 Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment

B6 Specification for Zinc

B750 Specification for GALFAN

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E47 Test Methods for Chemical Analysis of Zinc Die-

Casting Alloys (Withdrawn 1997)³

E1277 Test Method for 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.

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 The last approved version of this historical standard is referenced on www.astm.org.

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.

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 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 A584.

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-5Al-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 B6.

5.6 The ingot used for Type II shall conform to Specification B750.

5.6.1 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical (Test Method E47 for tin), ICP argon plasma spectrometric (Test Method E1277), or other methods. In case of dispute the results secured by Test Method E1277 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 E1277 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 A370, 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 $2d$ for Grade 200 or $1d$ for Grades 180 and 140, where d is the coated wire diameter.

6.2.2 *Test Method*—The wrap test shall be in accordance with Test Methods and Definitions A370, 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 $4d$, 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 A370, 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/ft² [244 g/m²] of uncoated wire surface.

7.2 *Test Method*—The weight of metallic coating shall be determined in accordance with Test Method A90/A90M.

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.

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