



Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence¹

This standard is issued under the fixed designation A 824; 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 metallic-coated carbon steel marcellled tension wire for use with chain-link fence. Three types of coatings are covered:

1.1.1 *Type I*—Aluminum-coated (aluminized), and

1.1.2 *Type II*—Zinc-coated (galvanized).

1.1.3 *Type III*—Zinc-5 % Aluminum Mischmetal (Zn5Al-MM) alloy-coated.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

A 90/A90M Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings²

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

A 428 Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles²

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment⁴

A 902 Terminology Relating to Metallic-Coated Steel Products²

B 6 Specification for Zinc (Slab Zinc)⁵

B 750 Specification for Zinc-5 % Aluminum-Mischmetal Alloy (UNS Z 38510) in Ingot Form for Hot-Dip Coatings⁵

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁶

E 47 Test Methods for Chemical Analysis of Zinc Die-Casting Alloys⁷

E 536 Test Method for Chemical Analysis of Zinc and Zinc Alloys⁸

E 1277 Test Method for Chemical Analysis of Zinc-5 % Aluminum Mischmetal Alloys by the ICP Argon Plasma Spectrometric Method⁸

2.2 *International Lead Zinc Research Organization (IL-ZRO) Standard:*

GF-1 Standard Practice for Determination of Cerium and Lanthanum Compositions in Galfan Alloy (5 % Al-0.04 % La-0.04 % Ce Bal SHG Zn)⁹

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this specification, refer to Terminology A 902.

3.2 *Descriptions of Terms Specific to This Standard:* Description of Term Specific to This Standard:

3.2.1 *marcelling*—a process whereby either a uniform helix or a series of waves is put in a wire to facilitate tensioning the wire when installed to support the top or bottom, or both, of the chain-link fabric (see 5.2.1).

4. Ordering Information

4.1 Orders for metallic-coated steel tension wire should include the following information:

4.1.1 Quantity (expressed in number of coils),

4.1.2 Name of product,

4.1.3 Type of coating (see 5.3),

4.1.4 Class of coating if applicable (see 5.3.2 and 5.3.3),

4.1.5 Packaging requirements (see Section 14),

4.1.6 Certification or test report, or both, if specified (see Section 13), and

4.1.7 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 20 coils metallic-coated steel tension wire, Type II, Class 2, in 100-lb coils, to ASTM A 824 – ____.

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.

⁸ Annual Book of ASTM Standards, Vol 03.06.

⁹ Available from International Lead Zinc Research Organization, P.O. Box 12036, Research Triangle Park, NC 27709.

¹ This specification is under the jurisdiction of ASTM Committee A-5 on Metallic Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.12 on Wire Specifications.

Current edition approved Oct. 10, 1995. Published December 1995. Originally published as A 824 – 84. Last previous edition A 824 – 92.

² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 01.03.

⁴ Annual Book of ASTM Standards, Vol 01.05.

⁵ Annual Book of ASTM Standards, Vol 02.04.

⁶ Annual Book of ASTM Standards, Vol 14.02.

⁷ Annual Book of ASTM Standards, Vol 03.05.

5.2 The wire shall be cold-drawn, metallic-coated at finished size to produce the specified mechanical properties, then marcelled as specified in 5.2.1.

5.2.1 Marcelling shall produce a helix or series of waves in the wire with the offset distance from the wire axis to the wave peaks or the helix not less than 0.125 in. (3.18 mm) (measured to the center of the wire). The pitch (distance between successive points on the waves or helix) shall be not more than 12 in. (305 mm). Prior to making measurements of the marcelling, curvature from coiling shall be removed by the application of a 500-lbf (2225-N) tensile load. Maintain the load while measuring the offset distance and pitch. Measurements shall be made on a section of wire with a length at least two times the pitch length.

5.2.1.1 Measurement of offset distance may be performed by placing a straightedge against two adjacent peaks or corresponding points on a helix, measuring the distance to the inside of the wire 180° opposite, and dividing the value by two.

5.3 The wire shall be furnished with one of three types of coating, as specified:

5.3.1 *Type I—Aluminum-Coated (Aluminized)*, with a minimum coating weight of 0.40 oz/ft² (122 g/m²) of uncoated wire surface.

5.3.2 *Type II—Zinc-Coated (Galvanized)*, in three classes of coating weights as specified:

5.3.2.1 *Class 1*, with a minimum coating weight of 0.80 oz/ft² (244 g/m²) of uncoated wire surface.

5.3.2.2 *Class 2*, with a minimum coating weight of 1.20 oz/ft² (366 g/m²) of uncoated wire surface.

5.3.2.3 *Class 3*, with a minimum coating weight of 2 oz/ft² (610 g/m²) of uncoated wire surface.

5.3.3 *Type III—Zinc-5 % Aluminum-Mischmetal Alloy Coated (Zn-5Al-MM)*, in two classes of coating weights as specified:

5.3.3.1 *Class 1*, with a minimum coating weight of 0.60 oz/ft² (183 g/m²) of uncoated wire surface.

5.3.3.2 *Class 2*, with a minimum coating weight of 1.00 oz/ft² (305 g/m²) of uncoated wire surface.

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

5.5 The ingot or pig aluminum used for Type I coating shall conform to the following impurity limits: copper, 0.10 % maximum, and iron, 0.50 % maximum.

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

5.7 The ingot used for Type III coating shall conform to Specification B 750.

5.7.1 For a two-step coating operation where the first coating is zinc (hot-dip galvanized or electrogalvanized) the final bath may have an aluminum content of up to 7.2 %, to prevent depletion of the aluminum content of the bath.

5.7.2 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical (see Test Method E 47 for tin) ICP Argon Plasma Spectrometric (see 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.

5.7.3 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 Properties

6.1 The coated wire shall have a breaking strength of 1950 lbf (8670 N) minimum and 3200 lbf (14 230 N) maximum when tested in accordance with Test Methods and Definitions A 370.

7. Size and Tolerance

7.1 The diameter of the coated wire shall be 0.177 in. (4.50 mm), determined as the average of two readings taken at right angles to each other, and in accordance with Practice E 29.

7.2 The permissible variation from the specified diameter of the coated wire shall be ± 0.005 in. (0.13 mm).

NOTE 2—It is recognized that the surfaces of heavy metallic coatings, particularly those produced by the hot-dip process, are not perfectly smooth. If the tolerance specified is rigidly applied to such irregularities that are inherent to the product, unjustified rejections of wire that would actually be satisfactory for use would occur. Therefore, it is intended that this tolerance be used in gaging the uniform areas of the coated wire.

8. Weight of Coating

8.1 Aluminum-coated wire (Type I) shall conform to the requirements of 5.3.1.

8.1.1 The weight of aluminum coating on Type I shall be determined in accordance with Test Method A 428.

8.2 Zinc-coated wire (Type II) shall conform to the requirements of 5.3.2.

8.2.1 The weight of zinc coating on Type II shall be determined in accordance with Test Method A 90/A 90M.

8.3 Zinc-5 % Aluminum-Mischmetal alloy-coated wire (Type III) shall conform to the requirements of 5.3.3.

8.3.1 The weight of Zn-5Al-MM alloy coating on Type III shall be determined in accordance with Test Method A 90/A 90M.

9. Adherence of Coating

9.1 The length of coated wire as represented by the test specimens shall be capable of being wrapped in a close helix at a rate not exceeding 15 turns/min around a cylindrical steel mandrel having a diameter equal to three times the test specimen without cracking or flaking the coating to such an extent that any coating metal can be removed by rubbing with the bare fingers. Loosening or detachment during the adhesion test of superficial, small particles of coating metal formed by mechanical polishing of the surface of the coated wire shall not be considered cause for rejection.

10. Number of Tests and Retests

10.1 A lot shall consist of all of the coils of wire of the same size, type, and class, and shall be offered for inspection at one time. A wire sample of sufficient length, approximately 4 ft (1.2 m), shall be cut from either end of each coil selected for tests described in Sections 6, 8, and 9.