Designation: A 817 – 07

Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire[1]

This standard is issued under the fixed designation A 817; 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 wire used in the manufacture of chain-link fence fabric and marcelled tension wire. Three types of coatings are covered:

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

1.1.2 *Type II*—Zinc-coated (galvanized), and

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

1.2 The chain-link fabric woven from wire in this specification is covered separately by Specifications A 491 for Type I, A 392 for Type II, and F 1345 for Type III.

1.3 The marcelled tension wire manufactured from wire in this specification is covered separately in Specifications A 824 and F 1664.

1.4 This specification does not cover the wire used for Specification A 392 when the chain-link fence producer applies the coating after the weaving process.

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

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 392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

A 428/A 428M Test Method for Weight [Mass] of Coating on Aluminum-Coated Iron or Steel Articles

A 491 Specification for Aluminum-Coated Steel Chain-Link Fence Fabric

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

A 824 Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence

A 902 Terminology Relating to Metallic Coated Steel Products

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 536 Test Methods for Chemical Analysis of Zinc and Zinc Alloys

F 1345 Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric

F 1664 Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence

2.2 *International Lead Zinc Research Organization:*

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)[4]

3. Terminology

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

4. Ordering Information

4.1 Orders for metallic-coated steel wire for chain link fence fabric or marcelled tension wire shall include the following information:

4.1.1 Quantity.

4.1.2 Name of product.

4.1.3 Coated wire diameter.

4.1.4 Type of coating (see 5.3).

4.1.5 Class of coating, if applicable (see Table 1 or Table 2).

[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 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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TABLE 1 Minimum Weight of Metallic Coating

Specified Diameter of Coated Wire, in. [mm]	Minimum Weight of Coating, oz/ft² [g/m²] of Uncoated Wire Surface					
	Type I	Type II, Class 3	Type II, Class 4	Type II, Class 5	Type III, Class 60	Type III, Class 100
0.192 [4.88]	0.40 [122]	1.00 [305]	1.20 [366]	2.00 [610]	0.60 [183]	1.00 [305]
0.177 [4.50][A]	0.40 [122]	0.90 [275]	1.20 [366]	2.00 [610]	0.60 [183]	1.00 [305]
0.148 [3.76]	0.40 [122]	0.90 [275]	1.20 [366]	2.00 [610]	0.60 [183]	1.00 [305]
0.135 [3.43]	0.40 [122]					
0.120 [3.05]	0.35 [107]	0.85 [259]	1.20 [366]	2.00 [610]	0.60 [183]	1.00 [305]
0.113 [2.87]	0.30 [92]	0.80 [244]	1.20 [366]	2.00 [610]	0.60 [183]	1.00 [305]

[A]Size 177 in. is only used for tension wire, not chain-link fabric.

TABLE 2 Breaking Strength

Specified Diameter of Coated Wire, in. [mm]	Breaking Strength, min, lbf [N]
0.192 [4.88]	2170 [9650]
0.148 [3.76]	1290 [5740]
0.135 [3.43]	1290 [5740]
0.120 [3.05]	850 [3780]
0.113 [2.87]	750 [3340]

4.1.6 Packaging requirements (see Section 14).

4.1.7 Certification or test report, or both, if specified (see Section 13).

4.1.8 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 80 000-lb steelwire for chain-link fence fabric, 0.148-in. diameter, Type II, Class 2, in 500 to 600-lb catchweight coils on tubular carriers to ASTM A 817 – _____.

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 specified mechanical properties.

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

5.3.1 *Type I—Aluminum-Coated (Aluminized)*, in one class of coating weight as specified in Table 1.

5.3.2 *Type II—Zinc-Coated (Galvanized)*, with coating weights as specified in Table 1.

5.3.3 *Type III—Zn-5Al-MM Alloy Coated*, with coating weights as specified in Table 1.

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

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

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 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical methods (Test Methods E 47 or E 536), or other methods. In case of dispute, the results secured by Test Methods E 47 shall be the basis of acceptance.

5.7.2 A standard practice for X-ray fluorescence spectrometry for determination of cerium and lanthanum in a Zn-5Al-MM alloy has been established by the International Lead Zinc Research Organization (as Standard Practice GF-1).[4]

6. Mechanical Properties

6.1 The metallic-coated wire for chain-link fence fabric shall meet the minimum breaking strength shown in Table 2 when tested in accordance with Test Methods and Definitions A 370.

6.2 The metallic coated wire for marcelled tension wire shall have a breaking strength of 1 950 lbf [8 670 N] minimum and 3 200 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 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 Coating weights for Types I, II, or III shall conform to the requirements of Table 1.

8.2 *Coating Weight Determination*:

8.2.1 The coating weight for Type I shall be determined in accordance with Test Method A 428/A 428M.

8.2.2 The coating weight for Types II or III shall be determined in accordance with Test Method A 90/A 90M. Individual results not more than 10 % below the minimum values specified in Table 1 are allowed if the average of at least two samples from the same coil are equal to or greater than the minimum value specified in Table 1. For example: Type II, class 4, weight of coat is 1.2 oz/ft² minimum, individual results shall be not less than 1.08 oz/ft².

9. Adherence of Coating

9.1 The undeformed 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

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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.

10.2 The number of test specimens taken from the ends of coils during production to ensure compliance with Sections 6 and 7 varies with the quality-control procedures and the manufacturing facilities of each manufacturer, but is generally not less than 10 % of the coils produced. For the purpose of final product testing, one specimen from every ten coils or fraction thereof in a lot shall be selected at random, or a total of seven specimens, whichever is less.

10.3 If one or more of the wire specimens fail any requirement, the lot shall be retested. For retest purposes the original lot shall be regrouped into 50 coil lots or fraction thereof. Each lot shall be tested for the property in which the original sample failed to comply at a frequency of 10 % or more so that the total number of tests is at least double the original. Any lot that exhibits a failure shall be rejected. If during retesting an additional quality parameter is observed to be defective, the lot of 50 is subject to rejection for that cause. The manufacturer is permitted to test each coil in the failed lot for the property in which failure occurred and reject only the nonconforming coils.

11. Inspection

11.1 Unless otherwise specified in the contract or purchase order, the producer is responsible for the performance of all inspection and test requirements of this specification. Except as otherwise specified in the contract or purchase order, the producer shall 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 shall be rejected. Rejections shall 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 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 contract or purchase order, a report of the test results shall be furnished.

14. Packaging, Marking, and Loading

14.1 Marking shall be by a tag securely attached to each coil of wire and shall show the identity of the producer, size of wire, type of coating, class of coating (if applicable), and ASTM designation.

14.2 Packaging of the coils of wire shall be by agreement between the producer and the purchaser. This agreement may include coil dimensions and weight.

14.3 Unless otherwise specified, the packaging, marking, and loading shall be in accordance with Practices A 700.

15. Keywords

15.1 chain-link fencing materials; fence fabric; fencing material; metallic-coated steel wire; steel wire; tension wire; wire

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A 817 – 03) that may impact the use of this standard. (November 1, 2007)

(*1*) Revised 8.2.2 to clarify maximum allowable deviations for individual test result.

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