Designation: A 853 – 04

Standard Specification for Steel Wire, Carbon, for General Use[1]

This standard is issued under the fixed designation A 853; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers carbon steel wire, supplied in coils, for general use. It may be produced hard drawn, annealed in process, or annealed at finish size.

1.2 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

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

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel

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

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

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

2.2 *Military Standards:*

MIL-STD-129 Marking for Shipment and Storage[3]

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage[3]

2.3 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)[3]

2.4 *AIAG Standard:*

AIAGB-5 02.00 Primary Metals Identification Tag Application Standard[4]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *annealed-in-process wire*—steel wire that was thermally treated and subsequently redrawn.

3.1.2 *annealed wire*—wire that was drawn to size and annealed at finish size.

3.1.3 *carbon steel*—steel is considered to be carbon steel when no minimum content is specified or required for aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, or zirconium or any other element added to obtain a desired alloying effect; when the specified minimum copper content does not exceed 0.40 %; or when the maximum content for any of the following elements does not exceed these percentages: manganese 1.65, silicon 0.60, or copper 0.60 (see Specification A 510).

3.1.4 *hard drawn wire*—wire drawn without the use of thermal treatment.

4. Ordering Information

4.1 It shall be the responsibility of the purchaser to specify all requirements that are necessary for material under this specification. Such requirements include, but are not limited to, the following:

4.1.1 Quantity (weight in pounds),

4.1.2 Name of material (carbon steel wire),

4.1.3 Wire diameter in inches, to the third decimal point,

4.1.4 Chemical composition grade number,

4.1.5 Condition (hard drawn, annealed in process, annealed at finished size),

4.1.6 Finish (see Section 10),

4.1.7 Packaging, and

4.1.8 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 40 000 lb, 0.148 in., Bright Hard Drawn Carbon Steel Wire, Grade 1008, in 600-lb. catch-weight coils on tubular carriers to ASTM ACSW.

5. Materials and Manufacture

5.1 The steel shall be made by any commercially accepted steel making process. The steel may be either ingot cast or strand cast.

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.03 on Steel Rod and Wire.

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

[4] Available from Automotive Industry Action Group (AIAG), 26200 Lahser Rd., Suite 200, Southfield, MI 48034.

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

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6. Chemical Composition

6.1 The grade designation shall be as specified in the purchase order.

6.2 Chemical ranges and limits, and procedures for analysis shall be in accordance with Test Methods, Practices, and Terminology A 751.

7. Mechanical Properties

7.1 The carbon steel wire shall meet the tensile strength requirements shown in Table 1 for the condition specified when tested in accordance with Test Methods and Definitions A 370.

8. Dimensions and Tolerances

8.1 The diameter and out of roundness shall not vary by more than the tolerances specified in Specification A 510.

9. Workmanship

9.1 The wire shall be free of detrimental imperfections. To ensure large continuous length coils, welds may be present in the finished wire.

10. Finish

10.1 Hard drawn wire may be furnished with a variety of finishes depending upon the drawing practices used by the manufacturer. Unless otherwise specified in the purchase order, the wire is normally produced with a common dry drawn finish, usually referred to as a bright finish. Other finishes are also available such as clean and extra smooth wire, requiring special drafting practices.

10.2 Annealed in process wire is furnished with a bright finish.

10.3 Unless otherwise negotiated between the purchaser and manufacturer, annealed at finish size wire is supplied with a black oxide finish resulting from regular annealing.

11. Sampling

11.1 Test specimens for testing mechanical properties shall be full sections and shall be obtained from ends of wire coils. The specimens shall be of sufficient length to perform tests specified in 7.1.

11.2 If any test specimen is found to contain a weld or exhibits other obvious imperfections, it shall be discarded and another specimen substituted.

12. Number of Tests

12.1 One tension test shall be made from each 10 tons (9 Mg) or fraction thereof in a lot, or a total of seven samples, whichever is less. A lot shall consist of all coils of a single size, offered for delivery at the same time.

13. Inspection

13.1 The manufacturer shall afford the inspector representing the purchaser all reasonable facilities to satisfy him that the material is being furnished in accordance with this specification. All tests and inspections shall be made at the place of

TABLE 1 Tensile Requirements

Diameter[A], in. (mm)	Tensile Strength, psi (MPa)		
	Hard Drawn Minimum	Annealed-In-Process Maximum	Annealed[B] Maximum
Grade AISI 1006 UNS G 10060			
Less than 0.035(0.89)	. . .	95 000(655)	60 000(415)
0.035–0.057(0.89–1.46)	105 000(725)	90 000(620)	60 000(415)
0.058–0.085(1.47–2.17)	90 000(620)	90 000(620)	60 000(415)
0.086–0.127(2.18–3.27)	80 000(550)	85 000(585)	60 000(415)
0.128–0.177(3.28–4.49)	70 000(485)	80 000(550)	60 000(415)
0.178–0.250(4.51–6.35)	60 000(415)	70 000(485)	60 000(415)
Grades AISI 1008 and 1010 UNS G 10080 and G 10100			
Less than 0.035(0.89)	. . .	95 000(655)	70 000(485)
0.035–0.057(0.89–1.46)	. . .	90 000(620)	65 000(450)
0.058–0.085(1.47–2.17)	100 000(690)	90 000(620)	65 000(450)
0.086–0.127(2.18–3.27)	85 000(585)	90 000(620)	65 000(450)
0.128–0.177(3.28–4.50)	75 000(515)	83 000(570)	65 000(450)
0.178–0.250(4.51–6.35)	65 000(450)	75 000(515)	65 000(450)
Grade AISI 1015 UNS G 10150			
Less than 0.035(0.89)	. . .	95 000(655)	75 000(515)
0.035–0.057(0.89–1.46)	. . .	95 000(655)	70 000(485)
0.058–0.085(1.47–2.17)	105 000(725)	95 000(655)	70 000(485)
0.086–0.127(2.18–3.27)	90 000(620)	95 000(655)	70 000(485)
0.128–0.177(3.28–4.50)	80 000(550)	85 000(585)	70 000(485)
0.178–0.250(4.51–6.35)	70 000(485)	78 000(540)	70 000(485)
Grades AISI 1018 and 1020 UNS G 10180 and G 10200			
Less than 0.035(0.89)	. . .	100 000(690)	75 000(515)
0.035–0.057(0.89–1.46)	. . .	100 000(690)	75 000(515)
0.058–0.085(1.47–2.17)	. . .	100 000(690)	75 000(515)
0.086–0.127(2.18–3.27)	105 000(725)	100 000(690)	75 000(515)
0.128–0.177(3.28–4.50)	85 000(585)	90 000(620)	75 000(515)
0.178–0.250(4.51–6.35)	75 000(515)	82 000(570)	75 000(515)

[A] Decimal size is rounded to three significant places in accordance with Practice E 29.
[B] Annealed denotes annealed at finished size.

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manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere with the operation of the works.

14. Rejection and Rehearing

14.1 Any rejection by the purchaser shall be reported to the manufacturer within a reasonable time from receipt of material.

14.2 The material must be adequately protected and correctly identified in order that the manufacturer may make a proper investigation.

15. Certification

15.1 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.

15.2 The certification shall include the specification number, year date of issue, and revision letter, if any.

16. Packaging and Package Marking

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

16.2 The size, name of product, grade and condition, ASTM specification number, weight, and name or mark of the manufacturer shall be indicated on a tag securely attached to each coil or package of wire.

16.3 When specified in the contract or order, and for direct procurement by or direct shipment to the U. S. Government, when Level A is specified, preservation, packaging and packing shall be in accordance with Level A requirements of MIL-STD-163.

16.4 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. 123 for U. S. Government civil agencies.

16.5 *Bar Coding*—In addition to the previously-stated identification requirements, bar coding is acceptable as a supplementary identification method. Bar coding should be consistent with AIAG Standard 02.00, Primary Metals Identification Tag Application. The bar code may be applied to a substantially affixed tag.

17. Keywords

17.1 annealed at finished size; annealed in process; carbon; hard drawn; wire

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue, A 853–93 (2003), that may impact the use of this standard. (Approved March 1, 2004.)

(*1*) Revised Section 4 to eliminate non-mandatory language.

(*2*) Revised Section 10.3 to eliminate obsolete terminology.

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