



Designation: **A853 – 04 (Reapproved 2010) A853 – 04 (Reapproved 2017)**

Standard Specification for Steel Wire, Carbon, for General Use¹

This standard is issued under the fixed designation A853; 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 U.S. 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 standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 ASTM Standards:²

- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
- A700 Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
- E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 Military Standards:³

- MIL-STD-129 Marking for Shipment and Storage
- MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

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 Standard⁴

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 A510).

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:

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, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://dodssp.daps.dla.mil.

⁴ Available from Automotive Industry Action Group (AIAG), 26200 Lahser Rd., Suite 200, Southfield, MI 48033, http://www.aiag.org.

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

- 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.

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 **A751**.

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 **A370**.

8. Dimensions and Tolerances

8.1 The diameter and out of roundness shall not vary by more than the tolerances specified in Specification **A510**.

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.

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 G10150 | | | |
| 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 **E29**.

^B Annealed denotes annealed at finished size.