



Designation: A 229/A 229M - 91

Standard Specification for Steel Wire, Oil-Tempered for Mechanical Springs¹

This standard is issued under the fixed designation A 229/A 229M; 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 specification has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This specification covers two classes of oil-tempered steel spring wire intended especially for the manufacture of mechanical springs and wire forms.

1.2 The values stated in either SI (metric) units or inch-pound units are to be regarded separately as standard. The values stated in each system are not exact equivalents; therefore, each system must be used independent of the other.

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel³

A 510M Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel [Metric]³

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment²

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁴

2.2 American National Standard:

B32.4M Preferred Metric Sizes for Round, Square, Rectangle, and Hexagon Metal Products⁵

2.3 Military Standard:

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage⁶

2.4 Federal Standard:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁶

3. Ordering Information

3.1 Material furnished under this specification should conform to the applicable requirements of the current edition of either specification A 510 or A 510M.

¹ This specification is under the jurisdiction of ASTM Committee A-1 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 Annual Book of ASTM Standards, Vols 01.03, 01.04 and 01.05.

³ Annual Book of ASTM Standards, Vol 01.03.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Available from American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

3.2 Orders for material under this specification shall include the following information for each ordered item:

3.1.1 Quantity (mass or weight),

3.1.2 Name of material (oil-tempered steel mechanical spring wire) and class (Table 1),

3.1.3 Dimensions (Section 7),

3.1.4 Chemical composition (Table 2), if required,

3.1.5 Packaging (Section 12),

3.1.6 Cast or heat analysis report, if desired (see 5.2),

3.1.7 Certification or test report, or both, if specified (Section 12), and

3.1.8 ASTM designation and date of issue.

NOTE 1—A typical metric ordering description is as follows: 10 000 kg oil-tempered steel mechanical spring wire, Class I, 8.00 mm diameter, in 250-kg coils to ASTM A 229M - xx, or for inch-pound units, 20 000 lb oil-tempered steel mechanical Spring Wire, Class I 0.315 in. diameter, in 500-lb coils to ASTM A 229 - xx.

4. Manufacture

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

4.2 The finished wire shall be free of detrimental pipe and undue segregation.

4.3 The wire shall be hardened and tempered to produce the desired mechanical properties.

5. Chemical Composition

5.1 The steel shall conform to the requirements for chemical composition prescribed in Table 2.

5.2 *Cast or Heat Analysis*—Each cast or heat of steel shall be analyzed by the manufacturer to determine the percentage of elements prescribed in Table 2. This analysis shall be made from a test specimen preferably taken during the pouring of the cast or heat. When requested, this shall be reported to the purchaser and shall conform to the requirements of Table 2.

5.3 *Product Analysis*—An analysis may be made by the purchaser from finished wire representing each cast or heat of steel. The chemical composition thus determined, as to elements required or restricted, shall conform to the product analysis requirements specified in Table 10 of Specification A 510 or A 510M.

5.4 For referee purposes, Test Methods, Practices, and Terminology A 751 shall be used.

6. Mechanical Properties

6.1 Tension Test:

6.1.1 *Requirements*—The material as represented by ten-