



Designation: A 401/A 401M - 96

Standard Specification for Steel Wire, Chromium-Silicon Alloy¹

This standard is issued under the fixed designation A 401/A 401M; 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 round chromium-silicon alloy steel spring wire having properties and quality intended for the manufacture of springs resistant to set when used at moderately elevated temperatures. This product is not meant to be used for high cycle fatigue applications (see Specification A 877/A 877M). This wire shall be provided either in the annealed and cold-drawn or oil-tempered condition as specified by the purchaser.

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

2. Reference Documents

2.1 ASTM Standards:

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

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment³

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

A 752 Specification for General Requirements for Wire Rods and Coarse Round Wire, Alloy Steel²

A 877/A 877M Specification for Steel Wire, Chromium-Silicon Alloy Valve Spring Quality²

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

2.2 ANSI Standard:

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

2.3 Federal Standards:

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

2.4 Military Standard:

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

2.5 AIAG Standard:

AIAG B-5 02.00 Primary Metals Identification Tag Application Standard⁷

3. Ordering Information

3.1 Orders for material under this specification should include the following information for each ordered item:

3.1.1 Quantity (mass),

3.1.2 Name of material (chromium-silicon alloy steel wire),

3.1.3 Dimensions (Table 1 and Section 8),

3.1.4 Condition (Section 6),

3.1.5 Packaging (Section 14),

3.1.6 Heat analysis report, if requested (5.2),

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

3.1.8 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 20 000-kg, oil-tempered chromium-silicon alloy steel wire, size 6.00 mm in 150 kg coils to ASTM A 401/A 401M dated _____, or for inch-pound units, 40 000-lb oil-tempered chromium-silicon alloy steel spring wire, size 0.250 in. in 350-lb coils to ASTM A 401/A 401M dated _____.

4. Materials and 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 from detrimental pipe and undue segregation.

5. Chemical Composition

5.1 The steel shall conform to the requirements of Grade 9254 for chemical composition specified in Table 2.

5.2 *Heat Analysis*—Each 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 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 heat of steel. The chemical composition thus determined, as to elements required or restricted, shall conform to the product analysis requirements in Table 4 of Specification A 752.

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

6. Mechanical Properties

6.1 *Annealed and Cold Drawn*—When purchased in the

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, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 01.05.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Available from the 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.

⁷ Available from the Automotive Industry Action Group, 26200 Lahar, Suite 200, Southfield, MI 48034.