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SAE-AMS5672, "STEEL WIRE, CORROSION RESISTANT 11.8CR - 8.5NI - 0.30(CB & TA) - 1.1TI - 2.0CU PRECIPITATION HARDENABLE, SPRING TEMPER", was adopted on 17-MAR-89 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Commander, Defense Supply Center Philadelphia, ATTN: DSCP-ILEA, 700 Robbins Avenue, Philadelphia, PA 19111-5096. Copies of this document may be purchased from the Society of Automotive Engineers 400 Commonwealth Drive Warrendale, Pennsylvania, United States, 15096-0001. <http://www.sae.org/>

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# AEROSPACE MATERIAL SPECIFICATION



AMS 5672B

Issued MAY 1970  
Revised OCT 1987  
Reaffirmed AUG 2000

Superseding AMS 5672A

Steel Wire, Corrosion Resistant  
11.8Cr - 8.5Ni - 0.30(Cb + Ta) - 1.1Ti - 2.0Cu  
Precipitation Hardenable, Spring Temper

UNS S45500

## 1. SCOPE:

### 1.1 Form:

This specification covers a corrosion-resistant steel in the form of wire.

### 1.2 Application:

Primarily for springs requiring corrosion resistance and high strength up to 600 °F (315 °C).

## 2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

#### 2.1.1 Aerospace Material Specifications:

- AMS 2248 Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
- AMS 2350 Standards and Test Methods
- AMS 2371 Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

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## 2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

ASTM A370 Mechanical Testing of Steel Products

ASTM E353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

## 2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

## 2.3.1 Military Standards:

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

## 3. TECHNICAL REQUIREMENTS:

## 3.1 Composition:

Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353 or by spectrochemical or other analytical methods approved by purchaser:

|                      | min   | max   |
|----------------------|-------|-------|
| Carbon               | --    | 0.05  |
| Manganese            | --    | 0.50  |
| Silicon              | --    | 0.50  |
| Phosphorus           | --    | 0.025 |
| Sulfur               | --    | 0.025 |
| Chromium             | 11.00 | 12.50 |
| Nickel               | 7.50  | 9.50  |
| Columbium + Tantalum | 0.10  | 0.50  |
| Titanium             | 0.80  | 1.40  |
| Copper               | 1.50  | 2.50  |
| Molybdenum           | --    | 0.50  |
| Nitrogen             | --    | 0.015 |

## 3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

## 3.2 Condition:

Spring temper, cold drawn to required size.

3.2.1 Wire ordered for coiling on automatic spring-winding machines shall be coated with a suitable lubricant.

## 3.3 Properties:

Wire shall conform to the following requirements; tensile and wrapping tests shall be performed in accordance with ASTM A370:

3.3.1 Tensile Properties: Wire, as cold-drawn, shall have the tensile strength specified in Table I, Column A. Wire shall have the tensile strength specified in Table I, Column B, after being precipitation heat treated by heat to 850 °F ± 10 (455 °C ± 5), holding at heat for 30 min. ± 3, and cooling in air.

TABLE I

| Nominal Diameter<br>Inch  | Column A                     | Column B                     | Column B                     |
|---------------------------|------------------------------|------------------------------|------------------------------|
|                           | As Cold-Drawn                | Precipitation-Hardened       | Precipitation-Hardened       |
|                           | Tensile Strength<br>psi, min | Tensile Strength, psi<br>min | Tensile Strength, psi<br>max |
| 0.010 to 0.040, incl      | 245,000                      | 310,000                      | 340,000                      |
| Over 0.040 to 0.050, incl | 235,000                      | 305,000                      | 335,000                      |
| Over 0.050 to 0.060, incl | 225,000                      | 300,000                      | 330,000                      |
| Over 0.060 to 0.075, incl | 220,000                      | 295,000                      | 325,000                      |
| Over 0.075 to 0.085, incl | 215,000                      | 290,000                      | 320,000                      |
| Over 0.085 to 0.095, incl | 210,000                      | 285,000                      | 315,000                      |
| Over 0.095 to 0.110, incl | 200,000                      | 278,000                      | 308,000                      |
| Over 0.110 to 0.125, incl | 195,000                      | 272,000                      | 302,000                      |
| Over 0.125 to 0.150, incl | 190,000                      | 265,000                      | 295,000                      |
| Over 0.150 to 0.500, incl | 180,000                      | 260,000                      | 290,000                      |

TABLE I (SI)

| Nominal Diameter<br>Millimetres | Column A                     | Column B                     | Column B                     |
|---------------------------------|------------------------------|------------------------------|------------------------------|
|                                 | As Cold-Drawn                | Precipitation-Hardened       | Precipitation-Hardened       |
|                                 | Tensile Strength<br>MPa, min | Tensile Strength, MPa<br>min | Tensile Strength, MPa<br>max |
| 0.25 to 1.00, incl              | 1690                         | 2135                         | 2345                         |
| Over 1.00 to 1.25, incl         | 1620                         | 2105                         | 2310                         |
| Over 1.25 to 1.50, incl         | 1550                         | 2070                         | 2275                         |
| Over 1.50 to 1.88, incl         | 1515                         | 2035                         | 2240                         |
| Over 1.88 to 2.12, incl         | 1480                         | 2000                         | 2205                         |
| Over 2.12 to 2.38, incl         | 1450                         | 1965                         | 2170                         |
| Over 2.38 to 2.75, incl         | 1380                         | 1915                         | 2125                         |
| Over 2.75 to 3.00, incl         | 1345                         | 1875                         | 2080                         |
| Over 3.00 to 3.75, incl         | 1310                         | 1825                         | 2035                         |
| Over 3.75 to 12.50, incl        | 1240                         | 1795                         | 2000                         |

3.3.2 Wrapping: Wire, as cold-drawn, 0.162 in. (4.00 mm) and under in nominal diameter shall withstand, without cracking, wrapping at  $77\text{ }^{\circ}\text{F} \pm 9$  ( $25\text{ }^{\circ}\text{C} \pm 5$ ) one full turn around a diameter equal to the nominal diameter of the wire. Wire, as cold-drawn, over 0.162 in. (4.00 mm) in nominal diameter shall withstand, without cracking, wrapping at  $77\text{ }^{\circ}\text{F} \pm 9$  ( $25\text{ }^{\circ}\text{C} \pm 5$ ) one full turn around a diameter equal to twice the nominal diameter of the wire.

#### 3.4 Quality:

3.4.1 Wire, as received by purchaser, shall be uniform in quality and condition, cylindrical, and free from kinks, twists, scrapes, splits, and other imperfections detrimental to usage of the wire.

3.4.2 The surface of the wire shall have a smooth, cold-drawn finish free from pits, abrasions, and other surface imperfections.

#### 3.5 Tolerances:

Shall be in accordance with Table II and 3.5.2.

##### 3.5.1 Diameter:

TABLE II

| Nominal Diameter<br>Inch  | Tolerance, Inch<br>Plus and Minus |
|---------------------------|-----------------------------------|
| 0.010 to 0.015, incl      | 0.0003                            |
| Over 0.015 to 0.041, incl | 0.0005                            |
| Over 0.041 to 0.312, incl | 0.001                             |
| Over 0.312 to 0.500, incl | 0.002                             |

TABLE II (SI)

| Nominal Diameter<br>Millimetres | Tolerance, Millimetre<br>Plus and Minus |
|---------------------------------|---|
| 0.25 to 0.38, incl              | 0.008                                   |
| Over 0.38 to 1.00, incl         | 0.012                                   |
| Over 1.00 to 7.80, incl         | 0.02                                    |
| Over 7.80 to 12.50, incl        | 0.05                                    |

3.5.2 Out-of-Roundness: Wire shall not be out-of-round by more than one-half the total permissible tolerance specified for diameter in Table II.

#### 4. QUALITY ASSURANCE PROVISIONS:

##### 4.1 Responsibility for Inspection:

The vendor of wire shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to the requirements of this specification.

##### 4.2 Classification of Tests:

Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

##### 4.3 Sampling:

Shall be in accordance with AMS 2371.