



AEROSPACE MATERIAL SPECIFICATION

AMS5810™**REV. B**

Issued 1994-08
Revised 2008-11
Reaffirmed 2021-05

Superseding AMS5810A

Steel, Corrosion and Heat Resistant, Flat Wire
15Cr - 25.5Ni - 1.2Mo - 2.1Ti - 0.006B - 0.30V
1800 °F (982 °C) Solution Treated, Cold Drawn or Cold Rolled and Aged,
Consumable Electrode Remelted
(Composition similar to UNS S66286)

RATIONALE

AMS5810B has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat resistant steel in the form of flat wire.

1.2 Application

This wire has been used typically for retaining rings requiring corrosion and heat resistance up to 900 °F (482 °C) and which may require moderate to severe forming and bending, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2248	Chemical Check Analysis Limits, Corrosion and Heat-Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2750	Pyrometry

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<https://www.sae.org/standards/content/AMS5810B>

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A 370 Mechanical Testing of Steel Products
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight as shown in Table 1, determined by wet chemical methods in accordance with ASTM E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	13.50	16.00
Nickel	24.00	27.00
Molybdenum	1.00	1.50
Titanium	1.90	2.30
Boron	0.003	0.010
Vanadium	0.10	0.50
Cobalt	--	1.00
Aluminum	--	0.35
Copper	--	0.50

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2488.

3.2 Melting Practice

Steel shall be produced by multiple melting using consumable electrode practice in the remelt cycle.

3.3 Condition

Wire shall be solution heat treated, descaled if necessary, cold drawn or cold rolled to required size, and aged.

3.4 Heat Treatment

3.4.1 Heating Equipment

Furnaces may be of any type. The heating medium or atmosphere shall be dry nitrogen or other atmospheres that will not alter the surface composition.

3.4.2 Solution Heat Treatment

Except as specified in 3.4.2.1, wire shall be solution heat treated by heating to $1800^{\circ}\text{F} \pm 25$ ($982^{\circ}\text{C} \pm 14$), holding at heat for not less than one hour, and quenching in oil. Pyrometry shall conform to AMS2750.

3.4.2.1 Continuous Heat Treating: Process parameters (e.g., furnace temperature set points, heat input, travel rate, etc.) for continuous heat treating lines shall be established by the material producer and validated by testing of product to the other requirements of this specification.

3.4.3 Aging Heat Treatment

Wire, cold drawn or cold rolled to required size, shall be aged by heating to a temperature within the range 1150 to 1325 °F (621 to 718 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for 4 to 6 hours, and cooling at a rate equivalent to cooling in air. Pyrometry shall conform to AMS2750.

3.5 Properties After Aging Heat Treatment

The product shall conform to the following requirements, determined in accordance with ASTM A 370:

3.5.1 Tensile Strength

Shall be within the range 185 to 240 ksi (1276 to 1655 MPa).

3.5.1.1 The rectangular cross-section area of the wire specimen for the tensile test shall be determined from measurements of thickness and width taken prior to the tensile test. The area on which stress is based shall be determined as shown in Equation 1.

$$A = TW - 0.12 (T)^2 \quad (\text{Eq. 1})$$

where:

A = area (for this test) of wire cross-section, inch^2 (mm^2)

T = thickness of wire specimen, inch (mm)

W = width of wire specimen, inch (mm)

3.5.2 Hardness

Shall be as shown in Table 2, or equivalent (See 8.2), but the product shall not be rejected on the basis of hardness if the tensile properties of 3.5.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

TABLE 2 - HARDNESS

Thickness Inch	Thickness Millimeters	Hardness
0.0067 to 0.0142, excl	0.170 to 0.361, excl	81.0 to 85.0 HR15N
0.0142 to 0.0213, excl	0.361 to 0.541, excl	60.5 to 67.5 HR30N
0.0213 to 0.0433, excl	0.541 to 1.100, excl	71.0 to 75.5 HRA
0.0433 and over	1.100 and over	41.0 to 49.0 HRC

3.6 Quality

3.6.1 Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free of pipes, seams, blisters, laminations, inclusions, and surface imperfections detrimental to usage of the wire.

3.6.2 Wire shall have a smooth, cold drawn or cold rolled surface free from pits, abrasions, and other surface imperfections. Wire for coiling on automatic spring winding machines shall be furnished with a lubricating coating suitable for such purpose, unless otherwise specified.

3.6.3 All welds shall be marked and the method of marking shall be specified on the spool, label, or tag.

3.7 Dimensions and Tolerances

3.7.1 Edges

Wire shall have commercial round edges as shown in Figure 1 and maximum camber shall be 0.5 inch in 8 feet (12.7 mm in 2.4 m).

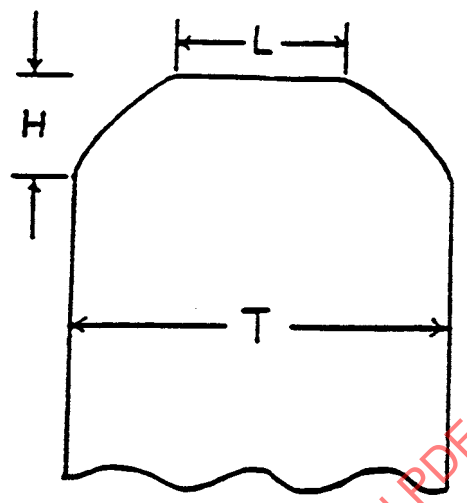


FIGURE 1 - WIRE ROUNDED EDGES

3.7.1.1 For wire thickness "T" 0.021 inch (0.53 mm) and under, the crown dimension "H" shall be 0.005 inch (0.13 mm) minimum and the maximum dimension "L" shall be 0.010 inch (0.25 mm) less than the thickness "T".

3.7.1.2 For wire thickness "T" over 0.021 inch (0.53 mm), the crown dimension "H" shall be 0.0075 inch (0.190 mm) minimum and the maximum dimension of "L" shall be 0.020 inch (0.51 mm) less than the thickness "T".

3.7.2 Thickness Tolerances

Shall be as specified in Table 3.

TABLE 3A - THICKNESS TOLERANCE, INCH/POUND UNITS

Thickness Inch	Tolerance Inch Plus and Minus
Up to 0.010, incl	0.00035
Over 0.010 to 0.021, incl	0.0005
Over 0.021 to 0.045, incl	0.00075
Over 0.045 to 0.060, incl	0.0010
Over 0.060 to 0.095, incl	0.0015

TABLE 3B - THICKNESS TOLERANCE, SI UNITS

Thickness Millimeters	Tolerance Millimeter Plus and Minus
Up to 0.25, incl	0.0089
Over 0.25 to 0.53, incl	0.013
Over 0.53 to 1.14, incl	0.0190
Over 1.14 to 1.52, incl	0.025
Over 1.52 to 2.41, incl	0.038