



AEROSPACE MATERIAL SPECIFICATION

AMS5866™**REV. F**

Issued 1989-07
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Revised 2022-07

Superseding AMS5866E

Steel, Corrosion-Resistant, Flat Wire
18Cr - 9.0Ni (302)
Spring Temper
(Composition similar to UNS S30200)

RATIONALE

AMS5866F is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (3.4, 3.7, 4.4.1, 5.1.1, 8.5), updates composition and reporting (3.1, 3.1.1), adds strain rate control (3.3.1.2), and allows prior revisions (8.4).

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant steel in the form of flat wire 0.005 to 0.095 inch (0.13 to 2.41 mm) thick, inclusive.

1.2 Application

This wire has been used typically for retaining rings requiring corrosion- and heat-resistance up to 400 °F (204 °C) and which require moderate to severe forming and bending, but usage is not limited to such applications.

1.3 Classification

Wire covered by this specification is classified by edge configuration as follows:

Type 1 - Round edged wire

Type 2 - Square edged wire

1.3.1 Type 1 shall be supplied unless Type 2 is specified by purchaser (see 8.6).

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Documents
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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 +1 724-776-4970 (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

AS7766 Terms Used in Aerospace Metals Specifications

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 A370 Mechanical Testing of Steel Products

ASTM A751 Chemical Analysis of Steel Products

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.15
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	8.00	10.00
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 Producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection, unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

Spring temper; cold drawn or rolled, descaled, and rerolled to required size.

3.3 Properties

Wire shall conform to the following requirements, determined in accordance with ASTM A370:

3.3.1 Tensile Properties

Square wire, and rectangular wire having nominal width not greater than ten times the nominal thickness, shall have tensile properties as shown in Table 2.

Table 2A - Tensile properties, inch/pound units (see Note)

Nominal Thickness Inches	Tensile Strength ksi	Elongation in 2 Inches %, min
0.005 to 0.022, incl	210 to 250	--
Over 0.022 to 0.047, incl	200 to 240	3
Over 0.047 to 0.062, incl	185 to 235	3
Over 0.062 to 0.074, incl	175 to 225	3
Over 0.074 to 0.089, incl	165 to 215	3
Over 0.089 to 0.095, incl	155 to 205	3

Table 2B - Tensile properties, SI units (see Note)

Nominal Thickness Millimeters	Tensile Strength MPa	Elongation in 50.8 mm %, min
0.13 to 0.56, incl	1448 to 1724	--
Over 0.56 to 1.19, incl	1379 to 1655	3
Over 1.19 to 1.57, incl	1276 to 1620	3
Over 1.57 to 1.88, incl	1207 to 1551	3
Over 1.88 to 2.26, incl	1138 to 1482	3
Over 2.26 to 2.41, incl	1069 to 1413	3

NOTE: Tensile properties for wire less than 0.008 inch (0.20 mm) have not been statistically substantiated in accordance with the SAE Aerospace Materials Systems Group policy.

3.3.1.1 The cross-sectional area of round edged wire (Type 1) shall be determined from measurements of thickness and width taken prior to the tensile test. The area on which stress is based, adjusted for rounded edges, shall be determined as shown in Equation 1.

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