SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS5961 REV. A

Issued 1996-10
Revised 2002-01
Reaffirmed 2012-04

Superseding AMS5961

Nickel Alloy, Corrosion and Heat-Resistant, Wire
74Ni - 15.5Cr - 8.0Fe
Cold Reduced, Spring Temper
(Composition similar to UNS N06600)

RATIONALE

AMS5961A 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 nickel alloy in the form of wire.

1.2 Application:

This wire has been used typically for springs and wire cloth requiring retention of spring properties up to 700 °F (371 °C) and corrosion resistance superior to that of the 18-8 type corrosion-resistant steels, 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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS5961A

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM E 8	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
ASTM E 354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	–	0.15
Manganese	–	1.00
Silicon	–	0.50
Phosphorus	–	0.040
Sulfur	–	0.015
Chromium	14.00	17.00
Nickel	72.00	--
Iron	6.00	10.00
Cobalt	–	1.00
Columbium	–	1.00
Titanium	–	0.50
Tantalum	–	0.05
Aluminum	–	0.35
Copper	–	0.50

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2269.

3.2 Condition:

Cold reduced from hot-finished wire or rod. Wire shall have a thin coating of lubricant, unless bare wire having a dull, matte finish is specified.

3.3 Properties:

Wire shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M (See 8.2).

TABLE 2A - Minimum Tensile Strength, Inch/Pound Units

Nominal Diameter Inch	Tensile Strength ksi
Up to 0.057, incl	185
Over 0.057 to 0.114, incl	175
Over 0.114 to 0.229, incl	170
Over 0.229 to 0.329, incl	165
Over 0.329 to 0.375, incl	160
Over 0.375 to 0.500, incl	155
Over 0.500 to 0.563, incl	140

TABLE 2B - Minimum Tensile Strength, SI Units

Nominal Diameter Millimeters	Tensile Strength MPa
Up to 1.45, incl	1276
Over 1.45 to 2.90, incl	1207
Over 2.90 to 5.82, incl	1172
Over 5.82 to 8.36, incl	1138
Over 8.36 to 9.52, incl	1103
Over 9.52 to 12.70, incl	1069
Over 12.70 to 14.30, incl	965

3.3.2 Wrapping: Wire 0.299 inch (7.59 mm) and under in nominal diameter shall withstand, without cracking or developing a pebbled or orange peel surface, wrapping at room temperature eight full, closely-spaced turns around a diameter equal to the nominal diameter of the wire. Wire over 0.299 inch (7.59 mm) in nominal diameter shall withstand, without cracking or developing a pebbled or orange peel surface, wrapping at room temperature eight full, closely-spaced turns around a diameter equal to twice the nominal wire diameter.

3.4 Quality:

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the wire.

3.5 Tolerances:

Shall be as follows:

3.5.1 Diameter: Shall be as shown in Table 3.

TABLE 3A - Diameter Tolerances, Inch/Pound Units

Nominal Diameter Inches	Tolerance, Inch Plus and Minus
0.0020 to 0.0044, incl	0.0002
Over 0.0044 to 0.0079, incl	0.00025
Over 0.0079 to 0.0149, incl	0.0003
Over 0.0149 to 0.0199, incl	0.0004
Over 0.0199 to 0.031, incl	0.0005
Over 0.031 to 0.045, incl	0.0006
Over 0.045 to 0.079, incl	0.0007
Over 0.079 to 0.1875, incl	0.0010
Over 0.1875 to 0.406, incl	0.0015
Over 0.406 to 0.563, incl	0.0020

TABLE 3B - Diameter Tolerances, SI Units

Nominal Diameter Millimeters	Tolerance, Millimeter Plus and Minus
0.051 to 0.112, incl	0.005
Over 0.112 to 0.201, incl	0.0064
Over 0.201 to 0.378, incl	0.008
Over 0.378 to 0.505, incl	0.010
Over 0.505 to 0.79, incl	0.013
Over 0.79 to 1.14, incl	0.015
Over 1.14 to 2.01, incl	0.018
Over 2.01 to 4.762, incl	0.025
Over 4.762 to 10.31, incl	0.038
Over 10.31 to 14.30, incl	0.051

3.5.2 Roundness: Wire shall not be out of round by more than one-half of the Table 3 permissible variation in diameter.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2371. Sampling for wrapping test shall be as specified in AMS 2371 for bend testing.

4.4 Reports:

The vendor of wire shall furnish with each shipment a report showing the results of tests for composition of each heat and for tensile properties and wrapping of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5961A, nominal size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Wire shall be supplied on spools or in coils except when straight lengths are ordered.

5.2 Identification:

5.2.1 Spools and Coils: Shall each be legibly marked, on a durable tag or label, with not less than the manufacturer's identification, purchase order number, AMS 5961A, nominal size, and quantity; boxes or drums shall be marked with the same information.

5.2.2 Straight Lengths: Shall have attached to each bundle or enclosed in each box a durable tag legibly marked with the information of 5.2.1; when boxed, the box shall be marked with the same information.