SAE Aerospace
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# AEROSPACE MATERIAL SPECIFICATION

SAE AMS5687 | REV. M

Issued 1948-07
Revised 2002-01
Reaffirmed 2012-04

Superseding AMS5687L

## Nickel Alloy, Corrosion and Heat-Resistant, Wire
## 74Ni - 15.5Cr - 8.0Fe
## Annealed

(Composition similar to UNS N06600)

RATIONALE

AMS5687M 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 lock wire and wire cloth requiring oxidation 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/AMS5687M**

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-drawn from hot finished wire or rod, annealed, and descaled if necessary.

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.

TABLE 2A - Tensile Strength, Inch/Pound Units

| Nominal Diameter Inch | Tensile Strength ksi Coiled or Spooled | Tensile Strength ksi Straight Lengths |
|---|---|---|
| 0.002 to 0.015, incl | 80 to 130 | -- |
| Over 0.015 to 0.040, incl | 80 to 115 | -- |
| Over 0.040 | 80 to 110 | 80 to 125 |

TABLE 2B - Tensile Strength, SI Units

| Nominal Diameter Millimeters | Tensile Strength MPa Coiled or Spooled | Tensile Strength MPa Straight Lengths |
|---|---|---|
| 0.05 to 0.38, incl | 552 to 896 | -- |
| Over 0.38 to 1.02, incl | 552 to 793 | -- |
| Over 1.02 | 552 to 758 | 552 to 862 |

3.3.2 Wrapping: Wire shall withstand, without cracking, wrapping at room temperature eight full, closely-spaced turns, pitch approximately equal to diameter of the wire, around a diameter equal to the nominal diameter of the wire.

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:

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 | 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 | 0.051 |

## 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 5687M, nominal size, and quantity.

### 4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.