SAE Aerospace
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# AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7734D

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|---|---|
| Issued | NOV 1970 |
| Revised | APR 1987 |
| Noncurrent | DEC 1991 |
| Reaf. Noncur. | NOV 2000 |
| Cancelled | MAY 2006 |
| Superseding | AMS 7734C |

## Nickel-Iron Alloy Wire, Copper Clad, Round
## 42Ni - 56.5Fe
## Annealed Dumet

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of May, 2006. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications indicating that it has been “CANCELLED”.

Cancelled specifications are available from SAE.





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1. SCOPE:

1.1 Form:

This specification covers a nickel-iron alloy in the form of round wire clad with electrolytic copper.

1.2 Application:

Primarily for weldable leads, terminals, and inter-connections for electronic components where magnetic properties are essential and where glass-to-metal seals are required.

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.

2.1.1 Aerospace Material Specifications:

| | |
|---|---|
| AMS 2269 | Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt 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 |

2.2 ASTM Publications:

Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

| | |
|---|---|
| ASTM B5 | Electrolytic Tough-Pitch Copper Refinery Shapes |
| ASTM E8 | Tension Testing of Metallic Materials |
| ASTM E290 | Semi-Guided Bend Test for Ductility of Metallic Materials |
| ASTM E 354 | Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys |

2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5901 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

3.1.1 Basis Wire (Core): Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E 354 or by spectrographic or other analytical methods approved by purchaser:

| | min | max |
|---|---|---|
| Carbon | -- | 0.15 |
| Manganese | 0.75 | 1.25 |
| Silicon | -- | 0.30 |
| Phosphorus | -- | 0.02 |
| Sulfur | -- | 0.02 |
| Nickel | 41.00 | 43.00 |
| Iron | 55.00 | 58.00 |

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

3.1.2 Cladding (Sheath): Shall be electrolytic copper (not less than 99.90% by weight copper) conforming to ASTM B5.

3.2 Condition:

Annealed.

3.3 Properties:

Wire shall conform to the following requirements:

3.3.1 Tensile Strength: Shall be not greater than 85,000 psi (585 MPa), determined in accordance with ASTM E8.

3.3.2 Bending: Wire shall withstand, without evidence of cracking or of separation of the cladding (sheath) from the basis wire when examined under 10X magnification, bending in accordance with ASTM E290 at room temperature through an angle of 180 deg around a diameter equal to the nominal diameter of the wire.

3.4 Quality:

Wire, as received by purchaser, shall be uniform in quality, condition, temper, and cross-section. Surfaces, evaluated at up to 30X magnification, shall be free from scale, corrosion, cracks, seams, scratches, slivers, dirt, grease, oil, streaks, stains, pit marks, burns, dents, blisters, laps, grooves, inclusions, and other imperfections detrimental to usage of the wire.

3.5 Tolerances:

3.5.1 Cladding (Sheath) Thickness: The completed core-and-sheath cross-section shall be 18 - 26% by weight copper. At any cross-section, the maximum thickness of the sheath shall not exceed twice the minimum thickness of the sheath.

3.5.2 Diameter: Wire shall be supplied in the sizes and to the tolerances shown in Table I.

TABLE I

| Nominal Diameter Inch | Tolerance, Inch plus and minus |
|---|---|
| 0.012 | 0.0003 |
| 0.014 | 0.0004 |
| 0.016 | 0.0004 |
| 0.020 | 0.0005 |
| 0.025 | 0.0005 |
| 0.032 | 0.0005 |
| 0.040 | 0.0005 |

TABLE I (SI)

| Nominal Diameter Millemetre | Tolerance, Millimetre plus and minus |
|---|---|
| 0.30 | 0.008 |
| 0.35 | 0.010 |
| 0.40 | 0.010 |
| 0.50 | 0.012 |
| 0.62 | 0.012 |
| 0.80 | 0.012 |
| 1.00 | 0.012 |

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:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1.1 and 3.1.2), tensile strength (3.3.1), quality (3.4), and tolerances (3.5) are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for bending (3.3.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling:

Shall be in accordance with AMS 2371; a lot shall be all wire of the same nominal diameter from the same heat of alloy processed at the same time and presented for vendor's inspection at one time.

4.4 Reports:

4.4.1 The vendor of wire shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile strength of each lot and stating that the wire conforms to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 7734D, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 7734C, contractor or other direct supplier of wire, part number, and quantity. When wire for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of wire to determine conformance to the requirements of this specification and shall include in the report either a statement that the wire conform or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.