Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 7733A
Superseding AMS 7733
Issued 11-1-70
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STEEL WIRE, COPPER CLAD
99Fe - 0.45Mn

1. SCOPE:

1.1 Form: This specification covers a low-carbon steel in the form of round wire clad with phosphorus-deoxidized copper.

1.2 Application: Primarily for electronic components requiring essentially soft magnetic properties.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerosospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2259 - Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2350 - Standards and Test Methods
AMS 2370 - Quality Assurance Sampling of Carbon and Low-Alloy Steels, 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 B379 - Phosphorized Coppers, Refinery Shapes
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron
ASTM F219 - Testing Fine Round and Flat Wire for Electron Devices and Lamps

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Printed in U.S.A.

3.1.1 Basis Wire (Core): Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.13
Manganese	0.30 -	0.60
Phosphorus	--	0.04
Sulfur	--	0.05

3.1.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.1.2 Cladding (Sheath): Shall be phosphorus deoxidized copper (not less than 99.90% by weight copper) conforming to ASTM B379, Type DLP.

3.2 Condition: Annealed.

3.3 Properties: Wire shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM F219, using a tester with constant rate of extension and a precision of ± 1%.

Yield Strength

Center Stress, ±15%	36,000 psi (248 MPa)
Working Range, min	10,500 psi (72 MPa)

Elongation, min

Nominal Diameter		
Inch	Millimetre	
0.012 to 0.020, incl	(0.30 to 0.50, incl)	15%
0.025 to 0.040, incl	(0.65 to 1.00, incl)	20%

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 internal and external 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: Unless otherwise specified, 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	0.0002
0.014	0.0002
0.016	0.0002
0.020	0.0003
0.025	0.0003
0.032	0.0005
0.040	0.0005

TABLE I (SI)

Nominal Diameter Millimetres	Tolerance, Millimetre plus and minus
0.30	0.005
0.35	0.005
0.40	0.005
0.50	0.008
0.65	0.008
0.80	0.013
1.00	0.013

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of wire shall supply all samples 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 perform such confirmatory testing as he deems necessary to ensure that the wire conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.3 Sampling: Shall be in accordance with AMS 2370; a lot shall be all wire of the same nominal diameter from the same heat of steel 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 three copies of a report showing the results of tests for chemical composition of each heat and for tensile properties 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, material specification number and its revision letter, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, 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 a statement that the wire conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.