

# AEROSPACE MATERIAL SPECIFICATION

AMS 7733B

Issued 11-1-70  
Revised 4-1-87

Superseding AMS 7733A

Submitted for recognition as an American National Standard

STEEL WIRE, COPPER CLAD, ROUND  
99Fe - 0.45Mn (0.13C max)  
Annealed

## 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 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 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, T97-Tace 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

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

2.3.1 Military Standards:

MIL-STD-163 - Steel Mill 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 E350 or by spectrographic or 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  $\pm 1\%$ .

Yield Strength	
Center Stress, $\pm 15\%$	36,000 psi (250 MPa)
Working Range, min	10,500 psi ( 70 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	0.62 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 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	0.0002
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 Millimetre	Tolerance, Millimetre plus and minus
0.30	0.005
0.35	0.005
0.40	0.005
0.50	0.008
0.62	0.008
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: 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 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, AMS 7733B, 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 7733B, 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 conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2370.

#### 5. PREPARATION FOR DELIVERY:

##### 5.1 Packaging and Identification:

- 5.1.1 Wire shall be wound on spools, without splicing, in lengths of not less than 100 ft (30 m). Spools shall be packaged in such a manner as to minimize, during shipment and storage, damage from normal hazards.
- 5.1.2 Each spool and the exterior of each container shall be permanently and legibly marked with not less than the following information:

STEEL WIRE, COPPER CLAD, ROUND

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SIZE \_\_\_\_\_

QUANTITY \_\_\_\_\_

PURCHASE ORDER NUMBER \_\_\_\_\_

MANUFACTURER'S IDENTIFICATION \_\_\_\_\_

- 5.1.3 Containers of wire shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the wire to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.
- 5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-163, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.