

Steel Wire, Copper Clad, Round  
99Fe - 0.45Mn (0.13C max)  
Annealed

#### RATIONALE

AMS7733D is designated as stabilized by AMS Committee E because it is deemed to represent technology that is not expected change in the future.

#### STABILIZED NOTICE

This document has been declared "Stabilized" by the AMS Committee E, Carbon and Low Alloy Steels, and will not be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

#### 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

This wire has been used typically for electronic components requiring essentially soft magnetic properties 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

##### 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AMS2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels

AMS2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock

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## 2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B 379 Phosphorized Coppers, Refinery Shapes

ASTM E 350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

ASTM F 219 Testing Fine Round and Flat Wire for Electron Devices and Lamps

## 3. TECHNICAL REQUIREMENTS

### 3.1 Composition

#### 3.1.1 Basis Wire (Core)

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 350 or by spectrochemical or other analytical methods acceptable to purchaser:

TABLE 1 - COMPOSITION

Element	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 AMS2259.

#### 3.1.2 Cladding (Sheath)

Shall be phosphorus deoxidized copper (not less than 99.90% by weight copper) conforming to ASTM B 379, Type DLP.

### 3.2 Condition

Annealed.

### 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 F 219, using a tester with constant rate of extension and a precision of  $\pm 1\%$ .

TABLE 2 - TENSILE PROPERTIES

Property		Value
Yield Strength		
Center Stress, +15%		36.0 ksi
Working Range		10.5 ksi
Elongation, min		
Nominal Diameter Inch	Nominal Diameter Millimeter	
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 to 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 3.

TABLE 3A - DIAMETER TOLERANCES, INCH/POUND UNITS

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 3B - DIAMETER TOLERANCES, SI UNITS

Nominal Diameter Millimeter	Tolerance, Millimeter 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 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 lot.

##### 4.3 Sampling

Shall be in accordance with AMS2370.

##### 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 cladding thickness of each lot and stating that the wire conforms to the other technical requirements. This report shall include the purchase order number, manufacturer's identification, heat and lot numbers, AMS7733D, size, and quantity.

##### 4.5 Resampling and Retesting

Shall be in accordance with AMS2370.

#### 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 feet (30 m). Spools shall be packaged in such a manner as to minimize, during shipment and storage, damage from normal hazards.