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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 7713

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Revised

IRON BAR AND STRIP, ELECTRICAL
Cold Finished, Annealed

1. SCOPE:

1.1 Form: This specification covers electrical iron in the form of bar and strip.

1.2 Application: Primarily for use in direct current devices requiring high electrical conductivity, high magnetic saturation and permeability, and low magnetic retentivity, and where deep drawing or formability is 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 2251 - Tolerances, Low-Alloy Steel Bars
MAM 2251 - Tolerances, Metric, Low-Alloy Steel Bars
AMS 2252 - Tolerances, Low-Alloy Steel Sheet, Strip, and Plate
MAM 2252 - Tolerances, Metric, Low-Alloy Steel Sheet, Strip, and Plate
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
AMS 2806 - Identification, Bars, Wire, Mechanical Tubing and Extrusions, Carbon and Alloy Steels and Heat and Corrosion Resistant Steels and Alloys

REAFFIRMED

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

ASTM A341 - Direct-Current Magnetic Properties of Materials Using D-C Permeameters and the Ballistic Test Methods
ASTM A596 - Direct-Current Magnetic Properties of Materials Using Ring Test Procedures and the Ballistic Methods
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 U.S. 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: 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	--	0.020
Manganese	--	0.15
Silicon	--	0.15
Phosphorus	--	0.020
Sulfur	--	0.015
Chromium	--	0.30
Nickel	--	0.20
Vanadium	0.04	0.08
Iron	remainder	

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

3.2 Condition: Cold finished and annealed.

3.3 Properties: The product shall conform to the following requirements:

3.3.1 Hardness: Shall be as follows, determined in accordance with ASTM E18:

3.3.1.1 Bars: Not higher than 65 HRB or equivalent.

3.3.1.2 Strip: Not higher than 55 HRB or equivalent.

3.3.2 Coercive Force: Shall not exceed 103 ampere/metre at 1.5 tesla after annealing by heating to 995°C ± 10 (1825°F ± 20) in a wet hydrogen atmosphere, holding at heat for 4 hr ± 0.25, and cooling at a rate of 55 - 80°C (108° - 145°F) per hour to below 540°C (1005°F), and at any rate thereafter. Test specimens shall be machined to size prior to annealing.

3.3.2.1 Strip and Bars With Nominal Diameter Over 0.250 In. (6.25 mm): Coercive force shall be determined in accordance with ASTM A596. The rings shall have an effective ratio of mean diameter to radial width of not less than 5 to 1 and the cross section of the test specimen shall be not less than 0.250 in. (6.25 mm).

3.3.2.2 Bars With Nominal Diameter 0.250 In. (6.25 mm) and Under: Shall be tested using a permeameter in accordance with ASTM A341.

3.4 Quality: The product, 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 product.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of the following:

3.5.1 Bars: AMS 2251 or MAM 2251.

3.5.2 Strip: AMS 2252 or MAM 2252.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product 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 product 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 heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2370 and the following; a lot shall be all product of the same nominal thickness from the same heat processed and tested at one time:

4.3.1 Coercive Force: At least one piece from each lot.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 7713, condition, size, and quantity from each test lot.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 7713, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each test lot of material to determine conformance to the requirements of this specification, and shall include in the report either a statement that the material 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 Identification: The product shall be identified as follows:

5.1.1 Bars: In accordance with AMS 2806.

5.1.2 Strip: Shall be marked near one end, coils being marked near the outside end, with the purchase order number, AMS 7713, and nominal thickness, using any suitable marking fluid. As an alternative method, individual pieces or bundles shall have attached a durable tag marked with the above information, or shall be boxed and the box marked with the same information.

5.2 Protective Treatment: The product shall be oiled prior to shipment.

5.3 Packaging:

5.3.1 The product 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 product to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.3.2 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 5.3.1 will be acceptable if it meets the requirements of Level C.

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