AEROSPACE MATERIAL SPECIFICATION

AMS7707™	REV. F

Issued 1957-09
Reaffirmed 2007-09
Revised 2024-03

Superseding AMS7707E

Iron, Commercially Pure, Bar, Sheet, Strip, and Plate
Hot Rolled, Unannealed
(Composition similar to UNS K00095)

RATIONALE

AMS7707F is the result of a Five-Year Review and update of the specification. The revision updates composition test methods and reporting (see 3.1 and 3.1.1), prohibits bar cut from plate (see 3.2.1 and 4.4.2), prohibits unauthorized exceptios (see 3.6, 4.4.3, and 8.4), updates bar quality requirements (see 3.4.1 and 8.3), and updates ordering information in line with requirements (see 8.6).

1. SCOPE

1.1 Form

This specification covers electrical iron in the form of bar, sheet, strip, and plate.

1.2 Application

These products have been used typically for direct current devices, such as controls, relay and regulator parts, magnetic cores, and motor and generator parts requiring a combination of high electrical conductivity, high magnetic saturation and permeability, and low magnetic retentivity, and where fair formability is required, 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 +1 724-776-4970 (outside USA), www.sae.org.

AMS2231 Tolerances, Carbon Steel Bars

AMS2232 Tolerances, Carbon Steel, Sheet, Strip, and Plate

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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS7707F/

AMS2806 Identification Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels, and Corrosion and Heat-Resistant Steels and Alloys

AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys Sheet, Strip, Plate, and Aircraft Tubing

AS1182 Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel, Bars and Mechanical Tubing

AS7766 Terms Used in Aerospace Metals Specifications

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 A370 Mechanical Testing of Steel Products

ASTM A751 Chemical Analysis of Steel Products

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Percent
Carbon + Manganese + Silicon + Phosphorus + Sulfur	0.10 max
Phosphorus	0.010 max
Sulfur	0.030 max
Copper	0.15 max
Iron	remainder

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Condition

Product shall be in the hot rolled condition.

3.2.1 Bar shall not be cut from plate (see 4.4.2).

3.3 Properties

The product shall conform to the following requirements; hardness and tensile testing shall be determined in accordance with ASTM A370:

3.3.1 Tensile Properties

Tensile properties shall be as shown in Table 2.

Table 2 - Tensile properties

Property	Value
Tensile Strength, Max	65 ksi (450 MPa)
Yield Strength at 0.2% Offset, Max	55 ksi (380 MPa)
Elongation in 2 inches (50 mm) or 4D, Min	25%

3.3.1.1 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (±0.002 mm/mm/min) through 0.2% offset yield strain. After the yield strain, the speed of the testing machine shall be set between 0.05 in/in and 0.5 in/in (0.05 mm/mm and 0.5 mm/mm) of the length of the reduced section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 in/in/min and 0.5 in/in/min (0.05 mm/mm/min and 0.5 mm/mm/min).

3.3.2 Hardness

Hardness shall be not higher than shown in 3.3.2.1 or Table 3, or equivalent (see 8.2). Product shall not be rejected on the basis of hardness if the tensile property requirements are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from a sample with similar nonconforming hardness.

3.3.2.1 Bars

Bar hardness shall be 80 HRB maximum.

3.3.2.2 Sheet

Sheet hardness shall be as specified in Table 3.

Table 3 - Hardness Requirements for Sheet

Nominal Thickness Inches	Nominal Thickness Millimeters	Hardness HRB, Max
Up to 0.0625, excl	Up to 1.55, excl	80
0.0625 and over	1.55 and over	75

3.3.2.3 Strip and Plate

Strip and plate hardness shall be as agreed upon by the purchaser and producer.

3.3.3 Magnetic Properties

If required, magnetic properties shall be as agreed upon by the purchaser and producer, determined on product suitably annealed and using a test method agreed upon between the producer and purchaser (see 8.6).

3.3.4 Bending and Forming Properties

If required, bending and forming properties shall be as agreed upon by the purchaser and producer (see 8.6).

3.4 Quality

3.4.1 The product, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.4.2 Bars shall be free from seams, laps, tears, and cracks after removal of the standard stock removal allowance in accordance with AS1182.

3.5 Tolerances

Tolerances shall be as follows:

3.5.1 Bars

Bar tolerances shall be in accordance with AMS2231.

3.5.2 Sheet, Strip, and Plate

Sheet, strip, and plate tolerances shall be in accordance with AMS2232.

3.6 Any exceptions shall be authorized by the purchaser and reported as in 4.4.3.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling

Sampling shall be in accordance with AMS2370.