SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7717 | REV. D

Issued 1961-01
Revised 2001-10
Reaffirmed 2011-11

Superseding AMS 7717C

Nickel-Iron Alloy, Magnetic, Sheet and Strip
50Ni - 50Fe
Annealed, Forming Grade

(Composition similar to UNS K95000)

RATIONALE

This document has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

1.1 Form:

This specification covers a magnetically soft nickel-iron alloy in the form of sheet and strip.

1.2 Application:

These products have been used typically for parts in magnetic circuits requiring high magnetic permeability and high saturation induction with the fabricated parts to be annealed in dry hydrogen, 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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2242	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
MAM 2242	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

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

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS7717D

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM A 596/A 596M	Direct-Current Magnetic Properties of Materials Using the Ballistic Method and Ring Specimens
ASTM A 773/A 773M	D-C Magnetic Properties of Materials Using Ring and Permeameter Procedures with dc Electronic Hysteresigraphs.
ASTM E 18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall be an alloy containing approximately 50% nickel and 50% iron with other alloying elements in such proportions as required to provide a product meeting the requirements of 3.3.

3.2 Condition:

Hot rolled with subsequent cold reduction, annealed, and descaled having a surface appearance comparable to the following commercial corrosion-resistant steel finishes as applicable (See 8.2).

3.2.1 Sheet: No. 2D finish.

3.2.2 Strip: No. 1 strip finish.

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Hardness: Shall be not higher than shown in Table 1, or equivalent (See 8.3), determined in accordance with ASTM E 18.

TABLE 1 - Maximum Hardness

Nominal Thickness Inch	Nominal Thickness Millimeters	Hardness HRB
0.006 to 0.059, incl	0.15 to 1.50, incl	75
Over 0.059	Over 1.50	85

3.3.2 Magnetic Properties: Shall be as shown in Table 2, determined in accordance with ASTM A 596/A 596M or ASTM A 773/A 773M on specimens as in 4.3.1 annealed by heating to 2150°F ± 25 (1177 °C ± 14) in a dry hydrogen atmosphere having a dew point of -60°F (-51°C) or lower, holding at heat for 4 hours± 0.25, and cooling in a non-contaminating atmosphere at a rate not greater than 100 F (56 C) degrees per hour to 1100 °F (593 °C) or lower unless another cooling rate recommended by the alloy producer (See 8.4).

TABLE 2 - Annealed Minimum Magnetic Properties

Nominal Thickness Inch	Nominal Thickness Millimeters	Maximum DC Permeability	Permeability at B = 100 Gauss (0.01T)	Induction at H = 100 Oersteds (7958 A/m)
Up to 0.020, excl	Up to 0.51, excl	60,000	8,000	15,000 gauss (1.5T)
0.020 and over	0.51 and over	40,000	6,000	15,000 gauss (1.5T)

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:

Shall conform to all applicable requirements of AMS 2242 or MAM 2242.

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 the performance of all required tests. 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 and Testing:

Shall be in accordance with AMS 2371 and the following:

4.3.1 For magnetic property tests, one or more samples shall be selected at random from each lot.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests for hardness and magnetic properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 7717D, cooling rate if other than 100 F (56 C) degrees per hour, method of testing and specimen thickness used for magnetic properties, size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with AMS 2807.

5.2 Protective Treatment:

Product shall be protected from corrosion prior to shipment.

5.3 Packaging:

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.

6. ACKNOWLEDGMENT:

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

7. REJECTIONS:

Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.