# AEROSPACE MATERIAL SPECIFICATION

| AMS7717™ | REV. F |
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| Issued | 1961-01 |
| Revised | 2015-08 |
| Reaffirmed | 2019-05 |
| Stabilized | 2025-01 |

Superseding AMS7717E

Nickel-Iron Alloy, Magnetic, Sheet and Strip
50Ni - 50Fe
Annealed, Forming Grade
(Composition similar to UNS K95000)

RATIONALE

AMS7717F has been declared “STABILIZED” by SAE AMS Committee E. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because this document is no longer state of the art and other documents contain similar but not necessarily equivalent requirements.

NOTE: Previously this document was “REAFFIRMED.” The last technical update of this document occurred in November 2011. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification. In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

STABILIZED NOTICE

AMS7717F has been declared “STABILIZED” by SAE AMS Committee E Carbon and Low Alloy Steels and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

AMS Committee E recommends that the following similar but not identical specification may be considered for future procurement. This listing does not constitute authority to substitute this specification for the “STABILIZED” specification.

ASTM A753, Alloy Type 2, Annealed Sheet or Strip





**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/AMS7717F/

## 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 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.

AMS2242 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

AMS2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

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

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 A596/A596M Direct-Current Magnetic Properties of Materials Using the Ballistic Method and Ring Specimens

ASTM A773/A773M D-C Magnetic Properties of Materials Using Ring and Permeameter Procedures with dc Electronic Hysteresigraphs.

ASTM E18 Rockwell 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 E18.

***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 A596/A596M or ASTM A773/A773M 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 (- 1 °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 is 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 | 8000 | 15 000 gauss (1.5T) |
| 0.020 and over | 0.51 and over | 40 000 | 6000 | 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 AMS2242.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer'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 AMS2371 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 producer of the product shall furnish with each shipment a report showing the producer identity, 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, AMS7717F, 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 AMS2371.