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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7702D

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Superseding AMS 7702C

Nickel-Iron Alloy, Magnetic, Sheet and Strip
Cold Rolled, Half-Hard Temper

1. SCOPE:

1.1 Form:

This specification covers two types of magnetic nickel-iron alloy in the form of sheet and strip.

1.2 Application:

These products have been used typically for magnetic circuit parts that require high magnetic permeability at low flux densities with the fabricated parts to be annealed in dry hydrogen, but usage is not limited to such applications.

1.3 Classification:

The magnetic alloys covered by this specification are classified as follows:

Type 1 - Nickel plus iron and other alloying elements, usually copper and chromium. Type 1 may be required for applications involving severe forming.

Type 2 - Nickel plus iron and other alloying elements, usually copper and/or molybdenum.

1.3.1 Unless a specific type is specified, either type may be supplied.

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.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

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

AMS 2262	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate
MAM 2262	Tolerances, Metric, Nickel, Nickel Alloy, and Cobalt 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

2.2 ASTM Publications:

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

ASTM A 596	Direct-Current Magnetic Properties of Materials Using Ring Test Procedures and the Ballistic Methods
ASTM A 773	D-C Magnetic Properties of Materials Using Ring and Permeameter Procedures with D-C 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 80% nickel plus iron and other alloying elements (See 1.3) in such proportions as required to provide a product meeting the requirements of 3.3.

3.2 Condition:

Cold rolled to half-hard temper 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 lower than 90 HRB, or equivalent (See 8.3), determined in accordance with ASTM E 18.

3.3.2 Magnetic Properties: Shall be as shown in Table 1, determined in accordance with ASTM A 596 or ASTM A 773 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 (55 °C) per hour to 800 °F (427 °C) or lower or at a cooling rate recommended bythe alloy producer (See 8.4).

TABLE 1 - Minimum Magnetic Properties

Property	Value
Maximum permeability	250,000
Permeability at 100 gauss (0.01T)	70,000
Induction at 100 Oersteds (7958 A/m), gauss	7,500 (0.75T)

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 2262 or MAM 2262.

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 of each lot and for the three Table 1 magnetic properties of each heat or lot, as applicable, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 7702D, cooling rate if other than 100 °F (55 °C) per hour, size, and quantity.

4.5 Sampling 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 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.

8. NOTES:

8.1 A change bar (**l**) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this specification. An (R) symbol to the left of the document title indicates a complete revision of the specification, including technical revisions. Change bars and (R) are not used in original publications, nor in specifications that contain editorial changes only.

8.2 Commercial corrosion-resistant steel finishes are defined in ASTM A 480/A 480M and AS4194.

8.3 Hardness conversion tables for metals are presented in ASTM E 140.