AEROSPACE MATERIAL SPECIFICATION

AMS4544™	REV. J

Issued 1948-05
Reaffirmed 2007-01
Revised 2022-08

Superseding AMS4544H

Nickel-Copper Alloy, Corrosion-Resistant, Sheet, Strip, and Plate
67Ni - 30Cu
Annealed
(Composition similar to UNS N04400)

RATIONALE

AMS4544J is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (3.6, 4.4.1, 5.1.1, 8.4), updates reporting of composition (3.1.1), revises condition (3.2.1), adds strain rate control (3.3.1.1), and allows prior revisions (8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant nickel-copper alloy in the form of sheet, strip, and plate.

1.2 Application

These products have been used typically for formed or moderately drawn parts requiring corrosion resistance, 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.

AMS2262	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steels and Alloys, 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/AMS4544J/

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

AS4194 Sheet and Strip Surface Finish Nomenclature

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 A480/A480M General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E18 Rockwell Hardness of Metallic Materials

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

ASTM E290 Bend Test of Materials for Ductility

ASTM E384 Microindentation Hardness of Materials

ASTM E1473 Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E1473, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Nickel	63.0	70.0
Iron	--	2.5
Manganese	--	2.0
Cobalt	--	1.0
Silicon	--	0.50
Carbon	--	0.30
Sulfur	--	0.024
Copper	remainder	

3.1.1 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 requirements of AMS2269.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet and Strip

Hot or cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A480/A480M and AS4194, and the following as applicable:

3.2.1.1 Sheet

No. 2D finish.

3.2.1.2 Strip

No. 1 finish.

3.2.2 Plate

Hot rolled, or when authorized by purchaser, cold rolled, and annealed; when so ordered, plate shall be descaled.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as shown in Table 2, determined in accordance with ASTM E8/E8M.

Table 2 - Tensile properties

Property	Value
Tensile Strength	70 to 85 ksi (483 to 586 MPa)
Elongation in 2 Inches (50 mm) or 4D, Minimum	35%

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. The strain rate after yield may be increased to any value up to 0.5 in/in/min (or 0.5 mm/mm/min) or equivalent crosshead speed as a function of gage length.

3.3.2 Bending

Product 0.250 inch (6.35 mm) and under in nominal thickness shall be tested in accordance with ASTM E290 using a sample prepared nominally 0.75 inch (19.0 mm) in width with its axis of bending parallel to the rolling direction, and shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the nominal thickness of the product. In case of dispute, the results of tests using the guided bend test of ASTM E290 shall govern.

3.3.3 Hardness

Shall be as shown in Table 3, or equivalent (see 8.2), determined in accordance with ASTM E18; for thin gages where superficial hardness testing is impractical, microhardness testing in accordance with ASTM E384 may be used. Product shall not be rejected on the basis of hardness if the tensile properties of Table 2, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness, are acceptable.

Table 3 - Hardness

Nominal Thickness Inches	Nominal Thickness Millimeters	Hardness
Up to 0.250, incl	Up to 6.35, incl	73 HRB, maximum
Over 0.250	Over 6.35	69 to 80 HRB

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 AMS2262.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

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.

4.4 Reports

The producer of the product shall furnish with each shipment a report showing the producer's name and country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations) and the results of tests for chemical composition of each heat and for tensile properties, bending, and hardness 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, AMS4544J, size, and quantity.

4.4.1 When material produced to this specification has exceptions taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS4544J(EXC) because of the following exceptions:" and the specific exceptions shall be listed (also see 5.1.1).

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with AMS2807.