



AEROSPACE MATERIAL SPECIFICATION

AMS5544™**REV. L**

Issued 1964-01
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Superseding AMS5544K

Nickel Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Plate
57Ni - 19.5Cr - 13.5Co - 4.2Mo - 3.0Ti - 1.4Al - 0.05Zr - 0.006B
Consumable Electrode or Vacuum Induction Melted, Annealed
(Composition similar to UNS N07001)

RATIONALE

AMS5544L prohibits unauthorized exceptions (3.8), revises reports (4.4), and identification (5.1.1), and results from a Five-Year Review and update of this specification.

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts requiring high strength up to 1500 °F (816 °C) and oxidation resistance up to 1750 °F (954 °C), 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

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Documents

Document Sharing Hub

- AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing
- ARP1917 Clarification of Terms Used in Aerospace Metals Specifications
- AS4194 Sheet and Strip Surface Finish Nomenclature

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 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 E21 Elevated Temperature Tension Tests of Metallic Materials
- ASTM E112 Determining Average Grain Size
- ASTM E139 Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
- ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
- ASTM E290 Bend Test of Material for Ductility
- ASTM E354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys
- ASTM E384 Microhardness Hardness of Materials

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 E354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.02	0.10
Manganese	--	0.10
Silicon	--	0.15
Phosphorous	--	0.015
Sulfur	--	0.015
Chromium	18.00	21.00
Cobalt	12.00	15.00
Molybdenum	3.50	5.00
Titanium	2.75	3.25
Aluminum	1.20	1.60
Zirconium	0.02	0.08
Boron (3.1.1)	0.003	0.010
Iron	--	2.00
Copper	--	0.10
Nickel	remainder	

3.1.1 Boron measured on stock prior to rolling into sheet or strip shall meet the specified requirements of Table 1. When measured on sheet and strip under 0.050 inch (1.27 mm) in nominal thickness, boron may be less than 0.003.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Melting Practice

Alloy shall be produced by multiple melting using consumable electrode practice in the remelt cycle or shall be induction melted under vacuum. If consumable electrode remelting is not performed in vacuum, electrodes which have been produced by vacuum induction melting shall be used for remelting.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Sheet and Strip

Hot-rolled or cold-rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance comparable to the following commercial corrosion resistant steel finishes as described in ASTM A480/A480M and AS4194 and 3.3.1.1 or 3.3.1.2 as applicable.

3.3.1.1 Sheet

No. 2D finish.

3.3.1.2 Strip

No. 1 strip finish.

3.3.2 Plate

Hot rolled, annealed, and descaled.

3.4 Annealing

Except as specified in 3.4.1, the product shall be annealed by heating in a suitable atmosphere to 1975 °F ± 25 °F (1079 °C ± 14 °C), holding at heat for not more than 30 minutes, and cooling at a rate equivalent to an air cool or faster.

3.4.1 Continuous Heat Treating

Process parameters (e.g., furnace temperature set points, heat input, travel rate, etc.) for continuous heat treating lines shall be established by the material producer and validated by testing of product to the other requirements of this specification.

3.5 Properties

The product shall conform to the following requirements:

3.5.1 As Annealed

3.5.1.1 Tensile Properties

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