



AEROSPACE MATERIAL SPECIFICATION

AMS5951™**REV. B**Issued 2010-12
Revised 2023-06

Superseding AMS5951A

(R) Nickel Alloy, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
57Ni - 20Cr - 10Co - 8.5Mo - 2.1Ti - 1.5Al - 0.005B
Vacuum Induction and Consumable Electrode Melted, Solution Heat Treated
Precipitation Heat Treatable
(Composition similar to UNS N07208)

RATIONALE

AMS5951B is the result of a Five-Year Review and update of the specification. The revision increases the allowable thickness (see 1.1 and throughout), revises composition specification and reporting (see 3.1 and 3.1.1), updates the solution heat treatment (see 3.4.1 and 3.4.2), adds option for continuous heat treatment (see 3.4.3), limits Table 2 testing requirements, updates Table 4 grain size based on thickness, adds mechanical properties for thicker sections (see Table 5 and Table 6), adds strain rate controls for tensile tests (see 3.5.1.1.1 and 3.5.2.1.1), prohibits unauthorized exceptions (see 3.5.3, 3.8, 4.4.4, 5.1.1, and 8.5), and allows prior revisions (see 8.4).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel-based alloy in the form of sheet, strip, and plate 0.020 to 2.25 inches (0.50 to 57.2 mm) in thickness.

1.2 Application

These products have been used typically for parts requiring high strength up to 1600 °F (871 °C) and oxidation resistance up to 1800 °F (982 °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

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Full document details: SAE AMS5951B

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Documents
Document Sharing Hub

AMS2283	Composition Testing Methods for Nickel- and Cobalt-Based Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2750	Pyrometry
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 B906	Flat-Rolled Nickel and Nickel Alloys 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 Testing of Material for Ductility
ASTM E384	Knoop and Vickers Hardness of Materials

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 in accordance with AMS2283 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.04	0.08
Manganese	--	0.3
Silicon	--	0.15
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	18.5	20.5
Cobalt	9.0	11.0
Molybdenum	8.0	9.0
Tungsten	--	0.5
Columbium (Niobium)	--	0.2
Titanium	1.90	2.30
Tantalum	--	0.1
Aluminum	1.38	1.65
Boron	0.003	0.010
Iron	--	1.5
Copper	--	0.1
Zirconium	--	0.020
Nickel	remainder	

3.1.1 The 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 applicable requirements of AMS2269.

3.2 Melting Practice

Alloy shall be multiple melted using vacuum induction followed by consumable electrode practice in the remelt cycle.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Sheet and Strip

Hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM B906 and AS4194 comparable to 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 or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled.