



AEROSPACE MATERIAL SPECIFICATION

AMS5598™**REV. G**

Issued 1965-09
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Revised 2024-07

Superseding AMS5598F

(R) Nickel Alloy, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
72Ni - 15.5Cr - 0.95 (Cb [Nb] + Ta) - 2.5Ti - 0.70Al - 7.0Fe (X750)
Consumable Electrode, Remelted or Vacuum Induction Melted,
Solution Heat Treated, Precipitation-Hardenable
(Composition similar to UNS N07750)

RATIONALE

AMS5598G is the result of a Five-Year Review and update of the specification. The revision updates the composition testing specification and reporting requirements (see 3.1 and 3.1.1), revises the finish requirements (see 3.3.1), adds strain rate controls (see 3.5.1.1.3 and 3.5.2.2), updates bending requirements (see 3.5.1.2), adds pyrometry controls and clarifies heat-treatment time (see 3.5.2), updates tensile and hardness requirements (see 3.5.1.1, 3.5.2.1, and 8.2) and updates the exception requirements (see 8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of sheet and strip up to 0.187 inch (4.75 mm) thick, inclusive, and plate up to 4.000 inches (101.6 mm) thick, inclusive.

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 1800 °F (982 °C) and for bellows and flat springs requiring optimum resistance to relaxation up to 1000 °F (538 °C) with moderate or relatively low stresses, particularly where welding is involved, but usage is not limited to such applications. Parts may be formed, welded if required, and then heat treated to improve strength at elevated temperatures.

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.

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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
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 E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
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

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

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	--	0.08
Manganese	--	0.35
Silicon	--	0.35
Phosphorus	--	0.015
Sulfur	--	0.010
Chromium	14.00	17.00
Nickel	70.00	--
Columbium (Niobium)	0.70	1.20
Tantalum	--	0.05
Titanium	2.25	2.75
Aluminum	0.40	1.00
Iron	5.00	9.00
Copper	--	0.50

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 consumable electrode practice in the remelt cycle or shall be induction melted under vacuum. If consumable electrode remelting is not performed in vacuum, electrodes that 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

Sheet and strip shall be hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a uniform finish.

3.3.2 Plate

Plate shall be hot rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled.

3.4 Solution Heat Treatment

No specific heat-treating instructions are specified, but it is recommended that the product be solution heat treated by heating in a suitable protective atmosphere to 1800 °F ± 25 °F (982 °C ± 15 °C), holding at heat for a time commensurate with product thickness, and cooling at a rate equivalent to an air cool or faster. Pyrometry shall be in accordance with AMS2750.

3.4.1 When continuous heat treating is used, 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 the product to the requirements of 3.5.