AEROSPACE MATERIAL SPECIFICATION

AMS5607™	REV. H

Issued 1971-05
Reaffirmed 2012-07
Revised 2024-09

Superseding AMS5607G

Nickel Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Plate
73Ni - 7.0Cr - 16.5Mo
Solution Heat Treated
(Composition similar to UNS N10003)

RATIONALE

AMS5607H is the result of a Five-Year Review and update of the specification. The revision updates testing and reporting of composition (see 3.1 and 3.1.1), provides options for finish (see 3.2.1), adds pyrometry controls (see 3.3), updates strain rate control during tensile testing, revises bend test requirements (see 3.4.2), sets size requirement for tensile testing (see 3.4.1 and 3.4.3), and updates the exceptions requirements (see 8.4).

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 moderate strength up to 1400 °F (760 °C) and oxidation resistance up to 1600 °F (871 °C), particularly where a low coefficient of expansion is desirable, 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

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/AMS5607H/

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

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 E139 Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials

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	0.04	0.08
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.015
Sulfur	--	0.020
Chromium	6.00	8.00
Molybdenum	15.75	17.25
Cobalt	--	0.20
Tungsten	--	0.50
Aluminum + Titanium	--	0.50
Boron	--	0.01
Iron	--	5.00
Copper	--	0.35
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 Condition

The product shall be supplied in the following condition:

3.2.1 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 producing a uniform finish.

3.2.2 Plate

Plate shall be hot rolled, solution heat treated, and descaled.

3.3 Heat Treatment

Except as specified in 3.3.1, the product shall be solution heat treated by heating to 2150 °F ± 25 °F (1177 °C ± 14 °C), holding at heat for a time commensurate with section thickness but not more than 30 minutes, and cooling at a rate equivalent to an air cool or faster. Pyrometry shall be in accordance with AMS2750.

3.3.1 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.

3.4 Properties

The product shall conform to the following requirements:

3.4.1 Tensile Properties

Tensile properties shall be as shown in Table 2, determined in accordance with ASTM E8/E8M for product 0.010 inch (0.25 mm) and over. 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. After the yield strain, the speed of the testing machine shall be set between 0.05 in/in and 0.5 in/in (0.05 mm/mm and 0.5 mm/mm) of the length of the reduced parallel section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 in/in/min and 0.5 in/in/min (0.05 mm/mm/min and 0.5 mm/mm/min).

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	100 ksi (689 MPa)
Yield Strength at 0.2% Offset	40 ksi (276 MPa)
Elongation in 2 Inches (50 mm) or 4D	40%

3.4.2 Bending

Product 0.1874 inch (4.760 mm) and under in nominal thickness shall be tested in accordance with ASTM E290. Transverse testing shall be performed at room temperature. Bend requirements shall be in accordance with Table 3. When visually examined, the specimen shall exhibit no cracking. In case of dispute, the results of tests using the guided bend test of ASTM E290 shall govern.

Table 3 - Bending parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Angle Degrees	Bend Radius[1, 2]
Up to 0.050, incl	Up to 1.27, incl	180	0.75t
Over 0.050 to 0.1874, incl	Over 1.27 to 4.760, incl	180	1t

(1) Bend radius is defined as a bend factor multiplied by the nominal thickness (t).
(2) Prior versions of this specification may have specified a bend factor and a bend diameter in lieu of bend radius.

3.4.3 Stress-Rupture Properties at 1500 °F (816 °C)

For product over 0.010 inches in thickness, a tensile specimen, maintained at 1500 °F ± 3 °F (816 °C ± 2 °C) while a load sufficient to produce an initial axial stress of 13.0 ksi (90 MPa) or higher is applied continuously, shall not rupture in less than 23 hours. The test shall be continued to rupture without change of load. Elongation after rupture, measured at room temperature, shall be not less than 8% in 2 inches (50 mm) or 4D. Tests shall be conducted in accordance with ASTM E139.

3.4.3.1 The test of 3.4.3 may be conducted using incremental loading. In such case, the load required to produce an initial axial stress of 13.0 ksi (90 MPa) or higher shall be used for 23 hours or to rupture, whichever occurs first. After the 23 hours and at intervals of 8 hours, minimum, thereafter, the stress shall be increased in increments of 2.0 ksi (14 MPa). Time to rupture and elongation requirements shall be as specified in 3.4.3.

3.5 Quality

The product, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.6 Tolerances

Tolerances shall conform to all applicable requirements of AMS2262.

3.7 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 the producer's tests and shall be responsible for the performance of all required tests. The 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

Sampling and testing shall be in accordance with AMS2371.