AEROSPACE MATERIAL SPECIFICATION

AMS5888	REV. C

Issued 1990-01
Revised 2009-05
Reaffirmed 2015-04

Superseding AMS5888B

Nickel Alloy, Corrosion and Heat-Resistant, Plate
54Ni - 22Cr - 12.5Co - 9.0Mo - 1.2Al
Annealed
(Composition similar to UNS N06617)

RATIONALE

AMS5888C has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

This plate has been used typically for parts requiring a combination of high strength and resistance to oxidation and corrosion up to 2200 °F (1204 °C) and where such parts may require welding during fabrication, 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 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
AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

2.2 ASTM Publications

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**

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 E 8/E 8M Tension Testing of Metallic Materials
ASTM E 21 Elevated Temperature Tension Tests of Metallic Materials
ASTM E 139 Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
ASTM E 290 Bend Testing of Material for Ductility
ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

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 E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	0.05	0.15
Manganese	--	0.50
Silicon	--	0.50
Phosphorous	--	0.015
Sulfur	--	0.015
Chromium	20.00	24.00
Cobalt	10.00	15.00
Molybdenum	8.00	10.00
Aluminum	0.80	1.50
Titanium	--	0.60
Boron	--	0.006
Iron	--	3.00
Copper	--	0.50
Nickel	remainder	

3.1.1 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 which have been produced by vacuum induction melting shall be used for remelting.

3.3 Condition

Hot rolled, annealed, and descaled.

3.4 Heat Treatment

Plate shall be annealed by heating in the range 2075 to 2200 °F (1135 to 1204 °C), holding at the selected temperature within ±25 °F (±14 °C) for a time commensurate with cross-sectional thickness, and cooling at a rate equivalent to an air cool or faster.

3.5 Properties

Plate 2.00 inches (50.8 mm) and under in nominal thickness shall conform to the following requirements:

3.5.1 Tensile Properties

3.5.1.1 At Room Temperature

Shall be as follows, determined in accordance with ASTM E 8/E 8M:

3.5.1.1.1 Plate 1.00 Inch (25.4 mm) and Under in Nominal Thickness

Shall be as shown in Table 2.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	100 ksi (689 MPa)
Yield Strength at 0.2% Offset	40.0 ksi (276 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	40%

3.5.1.1.2 Plate Over 1.00 to 2.00 Inches (25.4 to 50.8 mm), Inclusive, in Nominal Thickness

Shall be as shown in Table 3.

TABLE 3 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	95 ksi (655 MPa)
Yield Strength at 0.2% Offset	35.0 ksi (241 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	35%

3.5.1.2 At 1000 °F (538 °C)

Shall be as shown in Table 4, determined in accordance with ASTM E 21 on specimens heated to 1000 °F ± 5 (538 °C ± 3), held at heat for not less than 20 minutes before testing, and tested at 1000 °F ± 5 (538 °C ± 3).

TABLE 4 - MINIMUM ELEVATED TEMPERATURE TENSILE PROPERTIES

Property	Value
Tensile Strength	66 ksi (455 MPa)
Yield Strength at 0.2% Offset	23.0 ksi (159 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	45%

3.5.2 Stress-Rupture Properties at 1600 °F (871 °C)

A tensile specimen, maintained at 1600 °F ± 3 (871 °C ± 2) 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 10% in 4D. Test shall be conducted in accordance with ASTM E 139.

3.5.2.1 The test of 3.5.2 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 to rupture or for 23 hours, 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 (13.8 MPa). Time to rupture and elongation requirements shall be as specified in 3.5.2.

3.5.3 Bending

Plate, 0.250 inch (6.35 mm) and under in nominal thickness, shall be tested in accordance with ASTM E 290 using a specimen prepared nominally 0.75 inch (19.0 mm) in width, with the axis of bend parallel to the direction of rolling, and shall withstand, without cracking, when bending at room temperature through an angle of 180 degrees around a diameter equal to two times the nominal thickness of the plate. In case of dispute, the results of tests using the guided bend test of ASTM E 290 shall govern.

3.6 Quality

Plate, 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 plate.

3.7 Tolerances

Shall conform to all applicable requirements of AMS2262.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of plate shall supply all samples for vendor'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 plate 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 vendor of plate shall furnish with each shipment a report showing the results of tests for composition of each heat and for tensile, stress-rupture, and bending properties 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, AMS5888C, size, and quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with AMS2807.

5.2 Packaging

Plate shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the plate to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT