



AEROSPACE MATERIAL SPECIFICATION

AMS5889™**REV. C**

Issued 1990-01
Revised 2010-08
Reaffirmed 2015-12

Superseding AMS5889B

Nickel Alloy, Corrosion and Heat Resistant, Sheet and Strip
54Ni - 22Cr - 12.5Co - 9.0Mo - 1.2Al
Consumable Electrode or Vacuum Induction Melted
Annealed

(Composition similar to UNS N06617)

RATIONALE

AMS5889C 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 sheet and strip.

1.2 Application

These products have been used typically for parts requiring a combination of high strength and resistance to oxidation, corrosion, and fatigue 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

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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

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 A 480/A 480M General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip

ASTM E 8/E 8M Tension Testing of Metallic Materials

ASTM E 112 Determining Average Grain Size

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
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	20.0	24.0
Cobalt	10.0	15.0
Molybdenum	8.0	10.0
Aluminum	0.8	1.5
Titanium	--	0.6
Boron	--	0.006
Iron	--	3.0
Copper	--	0.5
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

The product shall be supplied in the following condition:

3.3.1 Sheet and Strip

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 A 480/A 480M or AS4194 and the following:

3.3.1.1 Sheet

No. 2D finish.

3.3.1.2 Strip

No. 1 strip finish.

3.4 Heat Treatment

Sheet and strip shall be annealed by heating in the range 2075 to 2175 °F (1135 to 1191 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for a time commensurate with section thickness, and cooling at a rate equivalent to an air cool or faster.

3.5 Properties

The product shall conform to the following requirements:

3.5.1 Tensile Properties

Shall be as shown in Table 2, determined at room temperature in accordance with ASTM E 8/E 8M.

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)	40%

3.5.2 Bending

Product 0.1874 inch (4.760 mm) and under shall be tested in accordance with ASTM E 290 using a sample prepared nominally 0.75 inch (19.0 mm) in width with its axis of bending parallel to the direction of rolling and shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor shown in Table 3 times the nominal thickness of the product. In case of dispute, the results of tests using the guided bend test of ASTM E 290 shall govern.

TABLE 3 - BENDING PARAMETERS

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
Up to 0.050, incl	Up to 1.27, incl	1
Over 0.050 to 0.1874, incl	Over 1.27 to 4.760, incl	2

3.5.3 Average Grain Size

Shall be not coarser than as shown in Table 4, determined in accordance with ASTM E 112.

TABLE 4 - MAXIMUM AVERAGE GRAIN SIZE

Nominal Thickness Inch	Nominal Thickness Millimeters	ASTM Grain Size No.
Up to 0.020, incl	Up to 0.51, incl	4
Over 0.020 to 0.1874, incl	Over 0.51 to 4.760, incl	2

3.6 Quality

The product, 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 product.

3.7 Tolerances

Shall conform to all applicable requirements of AMS2262.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of the product 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 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

Shall be in accordance with AMS2371.

4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests for composition of each heat and for tensile properties, bending, and average grain size 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, AMS5889C, 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.