



AEROSPACE MATERIAL SPECIFICATION	AMS5879	REV. D
	Issued 1991-01 Reaffirmed 2007-08 Revised 2015-07 Superseding AMS5879C	
Nickel Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Foil 62Ni - 21.5Cr - 9.0Mo - 3.7Cb (Nb) Cold Rolled and Annealed (Composition similar to UNS N06625/N06626)		

RATIONALE

AMS5879D revises Condition (3.3.1), Heat Treatment (3.4), Bending (3.5.2, Table 3), and Reports (4.4), and is a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant nickel alloy in the form of sheet, strip, and foil 0.100 inch (2.54 mm) and under in nominal thickness (See 8.4).

1.2 Application

These products have been used typically for the fabrication of high-quality bellows and other applications requiring low-cycle fatigue life, high strength, resistance to corrosion, and excellent formability and weldability, 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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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

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 A480/A480M	Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E290	Bend Test of Material for Ductility
ASTM E354	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 E354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 – Composition

Element	min	max
Carbon	--	0.03
Manganese	--	0.50
Silicon	--	0.15
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	20.00	23.00
Molybdenum	8.00	10.00
Columbium (Niobium)	3.15	4.15
Cobalt	--	1.00
Titanium	--	0.40
Aluminum	--	0.40
Iron	--	5.00
Nitrogen	--	0.02
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. 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

Cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled, having a surface appearance comparable to the following corrosion resistant steel finishes as described in ASTM A480/A480M and AS4194 and 3.3.1, 3.3.2 or 3.3.3 as applicable. Overall grinding of the final product is not permitted.

3.3.1 Sheet

No. 2B finish or bright annealed finish.

3.3.2 Strip

No. 1 strip finish or bright annealed finish.

3.3.3 Foil

As ordered.

3.4 Heat Treatment

The product shall be annealed by heating to a temperature not lower than 1600 °F (871 °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, except as specified in 3.4.1. Pyrometry shall be in accordance with AMS2750. The use of dissociated ammonia atmosphere is prohibited.

3.4.1 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.

3.5 Properties

Product, 0.100 inch (2.54 mm) and under in nominal thickness, shall conform to the following requirements:

3.5.1 Tensile Properties

Except as specified in 3.5.1.1 and 3.5.1.2, tensile properties shall be as shown in Table 2, determined in accordance with ASTM E8/E8M.

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	120 ksi (827 MPa)
Yield Strength at 0.2% Offset	60 ksi (414 MPa)
Elongation in 2 Inches (50.8 mm)	40%

3.5.1.1 Yield strength requirements of Table 2 do not apply to product under 0.010 inch (0.25 mm) in nominal thickness.

3.5.1.2 Elongation requirements of Table 2 do not apply to product under 0.005 inch (0.13 mm) in nominal thickness.

3.5.2 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between purchaser and producer, except as in 3.5.1.1 and 3.5.1.2.

3.5.3 Bending

Product 0.010 to 0.100 inch (0.25 to 2.54 mm) in nominal thickness shall be tested in accordance with ASTM E290 using a sample nominally 0.75 inch (19.0 mm in width, with the 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 the case of dispute, the guided bend test of ASTM E290 shall prevail.

Table 3 - Bending parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.010 to 0.050, incl	0.25 to 1.27, incl	1
Over 0.050 to 0.100, incl	Over 1.27 to 2.54, incl	2

3.5.4 Average Grain Size

Shall be not coarser than shown in Table 4, determined in accordance with ASTM E112.

Table 4 - Maximum average grain size

Nominal Thickness Inch	Nominal Thickness Millimeters	ASTM Grain Size No.
Up to 0.010, incl	Up to 0.25, incl	8
Over 0.010 to 0.050, incl	Over 0.25 to 1.27, incl	6
Over 0.050 to 0.100, incl	Over 1.27 to 2.54, incl	5

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.