AEROSPACE MATERIAL SPECIFICATION

AMS5879™	REV. E

Issued 1991-01
Reaffirmed 2007-08
Revised 2021-08

Superseding AMS5879D

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

AMS5879 incorporates updated unauthorized exceptions clauses (3,8, 4.4.5, 5.1.1, 8.5, 8.6), updates composition (3.1), standardizes condition (3.3), adds strain rate control (3.5.1.1), allows prior revisions (8.4), and is the result of a Five-Year Review and update of the 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.

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
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

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/AMS5879E

AMS2750 Pyrometry

AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

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 in accordance with ASTM E354 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 in accordance with ASTM A480/A480M, 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

When continuous heat treating is used, processing 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 through 3.5.1.4, tensile properties shall be as shown in Table 2, determined in accordance with ASTM E8/E8M.

3.5.1.1 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. The strain rate after yield may be increased to any value up to 0.5 in/in/min (or mm/mm/min) or equivalent crosshead speed as a function of gage length.

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 mm)	40%

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

3.5.1.3 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 and reported per 4.4.5.

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 Inches	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 Inches	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.

3.8 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.5.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer'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.