



# AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

## AMS 5870A

Superseding AMS 5870

Issued 5-15-72

Revised 7-16-79

UNS N06601

ALLOY SHEET, STRIP, AND PLATE, CORROSION AND HEAT RESISTANT  
60.5Ni - 23Cr - 14Fe - 1.4Al

### 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: Primarily for parts and assemblies requiring corrosion and oxidation resistance up to 2200°F (1205°C), particularly where such parts may require welding during fabrication.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2262 - Tolerances, Nickel, Nickel-Base, and Cobalt-Base Alloy Sheet, Strip, and Plate  
AMS 2269 - Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt Alloys  
AMS 2350 - Standards and Test Methods  
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials  
ASTM E290 - Semi-Guided Bend Test for Ductility of Metallic Materials  
ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

- 2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

- Ø MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

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### 3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	--	0.10
Manganese	--	1.00
Silicon	--	0.50
Sulfur	--	0.015
Chromium	21.00 - 25.00	
Nickel	58.00 - 63.00	
Aluminum	1.00 - 1.70	
Titanium	--	0.60
Boron	--	0.006
Copper	--	1.00
Iron	remainder	

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2269.

3.2 Condition: The product shall be applied in the following condition:

3.2.1 Sheet and Strip: Cold rolled, annealed, and descaled unless annealing is performed in an atmosphere yielding a bright finish, having a surface appearance comparable to a commercial corrosion-resistant steel No. 2D finish; standards for acceptance shall be as agreed upon by purchaser and vendor.

3.2.2 Plate: Hot rolled and annealed.

3.2.2.1 Surface finish shall be as hot rolled unless plate is ordered descaled.

3.3 Properties: The product shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM E8:

Tensile Strength, min	80,000 psi (552 MPa)
Yield Strength at 0.2% Offset, min	30,000 psi (207 MPa)
Elongation in 2 in. (50 mm) or 4D, min	35%

3.3.2 Bending: Product 0.250 in. (6.35 mm) and under in nominal thickness shall withstand, without cracking, bending in accordance with ASTM E290 at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

<u>Nominal Thickness</u>		<u>Bend Factor</u>
<u>Inch</u>	<u>(Millimetres)</u>	
Up to 0.050, incl	(Up to 1.27, incl)	1
Over 0.050 to 0.250, incl	(Over 1.27 to 6.35, incl)	2

- 3.3.2.1 Bending requirements for product over 0.250 in. (6.35 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.
- 3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.
- 3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2262.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.
- 4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.
- 4.3 Sampling: Shall be in accordance with AMS 2371 and the following:
- 4.3.1 Specimens for tensile tests of widths 9 in. (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths less than 9 in. (229 mm), specimens shall be taken with the axis parallel to the direction of rolling.
- 4.4 Reports:
- 4.4.1 The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests for chemical composition of each heat and for tensile and bending properties on each thickness from each heat. This report shall include the purchase order number, heat number, material specification number and its revision letter, annealing temperature used, size, and quantity from each heat.
- 4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.
- 4.5 Resampling and Retesting: Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

- 5.1 Identification: Each sheet, strip, and plate shall be marked on one face, in the respective location indicated below, with AMS 5870A, heat number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be removable in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the product or its performance and shall be sufficiently stable to withstand normal handling.
- 5.1.1 Flat Strip 6 In. (152 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm).