SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5870 REV. E

Issued 1972-05
Reaffirmed 2000-08
Revised 2012-06

Superseding AMS5870D

Nickel Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Plate
60.5Ni - 23Cr - 14Fe - 0.35Ti - 1.4Al
Solution Heat Treated

(Composition similar to UNS N06601)

RATIONALE

AMS5870E revises bending (3.3.2) 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 plate.

1.2 Application

These products have been used typically for parts requiring corrosion and oxidation resistance up to 2200 °F (1204 °C), particularly 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

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**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS5870E

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 Flat-Rolled Stainless and Heat Resisting Steel Plate, Sheet, and Strip

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

ASTM E 290 Semi-Guided Bend Test for Ductility of Metallic Materials

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

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet and Strip

Cold rolled, solution heat treated, and, unless solution heat treatment 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 and AS4194 and 3.2.1.1 or 3.2.1.2 as applicable.

3.2.1.1 Sheet

No. 2D finish.

3.2.1.2 Strip

No. 1 strip finish.

3.2.2 Plate

Hot rolled and solution heat treated.

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 shown in Table 2 for product 0.010 to 2.000 inches (0.25 to 50.80 mm), inclusive, in nominal thickness, determined in accordance with ASTM E 8/E 8M .

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	80 ksi (552 MPa)
Yield Strength at 0.2% Offset	30.0 ksi (207 MPa)
Elongation in 2 inches (50.8 mm) or 4D	35%

3.3.2 Bending

Product, 0.250-inch (6.35-mm) and under in nominal thickness, 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, when bending at room temperature through the angle and bend diameter shown in Table 3. 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 Angle Degrees	Bend Diameter t=nominal thickness
Up to 0.050, incl	Up to 1.27, incl	180	1t
Over 0.050 to 0.250, incl	Over 1.27 to 6.35, incl	180	2t

3.4 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.

3.5 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 and bending properties of each lot, and stating that this product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS5870E, 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

The product 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 product to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES

8.1 A change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 Terms used in AMS are clarified in ARP1917.