AEROSPACE MATERIAL SPECIFICATION

AMS5592™	REV. H

Issued 1963-07
Reaffirmed 2006-10
Revised 2024-12

Superseding AMS5592G

Iron-Nickel Alloy, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
44Fe - 18.5Cr - 35Ni - 1.15Si (Alloy 330)
Solution Heat Treated

(Composition similar to UNS N08330)

RATIONALE

AMS5592H is the result of a Five-Year Review and update of the specification. The revision updates composition reporting (see 3.1.1), and finish (see 3.2.1), adds strain rate control (see 3.3.1.2), revises hardness testing requirements (see 3.3.2 and 8.2), and updates the prohibition of exceptions (see 8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant iron-nickel alloy in the form of sheet, strip, and plate.

1.2 Application

These products have been used typically for parts requiring heat and oxidation resistance up to 2150 °F (1177 °C), 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.

AMS2242 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium and Titanium Alloy Sheet, Strip, and Plate

AMS2248 Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys

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/AMS5592H/

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

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

AS7766 Terms Used in Aerospace Metals Specifications

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 A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

ASTM E3 Preparation of Metallographic Specimens

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E18 Rockwell Hardness of Metallic Materials

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	--	2.00
Silicon	0.75	1.50
Phosphorus	--	0.030
Sulfur	--	0.030
Chromium	17.00	20.00
Nickel	34.00	37.00
Copper	--	0.75
Tin	--	0.025
Lead	--	0.005
Iron	remainder	

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet and Strip

Sheet and strip shall be hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in a protective atmosphere yielding a bright finish, descaled producing a uniform finish.

3.2.2 Plate

Plate shall be hot rolled, solution heat treated, and descaled.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 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	70 ksi (483 MPa)
Yield Strength at 0.2% Offset	30.0 ksi (207 MPa)
Elongation in 2 Inches (50 mm) or 4D	30%

3.3.1.1 Elongation requirement does not apply to sheet or strip under 0.020 inch (0.51 mm) in nominal thickness.

3.3.1.2 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. After the yield strain, the speed of the testing machine shall be set between 0.05 and 0.5 in/in (0.05 and 0.5 mm/mm) of the length of the reduced parallel section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 and 0.5 in/in/min (0.05 and 0.5 mm/mm/min). The requirement for compliance becomes effective for material produced 1 year after the publication date of this specification.

3.3.2 Hardness

Hardness for product 0.005 and over shall be not higher than 95 HRB, or equivalent (see 8.2), determined in accordance with ASTM E18. Product shall not be rejected on the basis of hardness if the tensile properties of 3.3.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness

3.3.3 Microstructure

Shall be free from continuous carbide network, determined by metallographic examination of specimens prepared in accordance with ASTM E3.

3.4 Quality

The product, as received by the 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

Tolerances shall conform to all applicable requirements of AMS2242.

3.6 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 the producer's tests and shall be responsible for the performance of all required tests. The 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 producer of the product shall furnish with each shipment a report showing the producer's name, country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations), and the following results of tests and relevant information:

4.4.1 For Each Heat

Composition.

4.4.2 For Each Lot

Tensile properties
Hardness
Microstructure

4.4.3 A statement that the product conforms to the other technical requirements.