# AEROSPACE MATERIAL SPECIFICATION

| AMS5592 | REV. F |
|---|---|

Issued 1963-07
Reaffirmed 2006-10
Revised 2013-08

Superseding AMS5592E

Iron-Nickel Alloy, Corrosion and Heat-Resistant, Sheet, Strip, and Plate
44Fe - 18.5Cr - 35Ni - 1.15Si
Solution Heat Treated
(Composition similar to UNS N08330)



RATIONALE

AMS5592F revises Reports (4.4.5), and is a Five Year Review and update of this specification.

## 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.



**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/AMS5592F**

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.

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

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

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 3 Preparation of Metallographic Specimens

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

ASTM E 18 Rockwell Hardness of Metallic Materials

ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron 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 353, by spectrochemical methods, or by other analytical methods acceptable to 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 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

Hot or 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 the following:

3.2.1.1 Sheet

No. 2D finish.

3.2.1.2 Strip

No. 1 strip finish.

3.2.2 Plate

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 E 8/E 8M.

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 (50.8mm) 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.

3.3.2 Hardness

Shall be not higher than 95 HRB, or equivalent (See 8.2), determined in accordance with ASTM E 18.

3.3.3 Microstructure

Shall be free from continuous carbide network, determined by metallographic examination of specimens prepared in accordance with ASTM E 3.

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 AMS2242.

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 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.

4.4.4 Purchase order number

Heat and lot numbers
AMS5592F
Size
Quantity.

4.4.5 The vendor shall provide a copy of the original material manufacturer's (producer's) report (material certification), including: producer name and country where the metal was melted (e.g., the final melt in the case of metal processed by multiple melting operations.

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with AMS2807.