



# AEROSPACE MATERIAL SPECIFICATION

**AMS5523™****REV. H**

|            |         |
|------------|---------|
| Issued     | 195211  |
| Reaffirmed | 2000-09 |
| Revised    | 2012-01 |
| Stabilized | 2019-03 |

Superseding AMS5523G

Steel, Corrosion and Heat-Resistant, Sheet, Strip, and Plate  
23Cr - 13.5Ni (309S)  
Solution Heat Treated  
(Composition similar to UNS S30908)

## RATIONALE

AMS5523H stabilizes this document because it contains mature technology that is not expected to change and thus no further revisions are anticipated.

## STABILIZED NOTICE

AMS5523H has been declared "STABILIZED" by SAE AMS Committee "F" Corrosion Heat Resistant Alloys and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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## 1. SCOPE

### 1.1 Form

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

### 1.2 Application

These products have been used typically for parts requiring both corrosion and heat resistance and oxidation resistance up to 2000 °F (1093 °C), but usage is not limited to such applications. Strength at elevated temperatures is similar to the room temperature strength of 18-8 type steels.

## 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](http://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](http://www.astm.org).

|                   |                                                                                                         |
|-------------------|---------------------------------------------------------------------------------------------------------|
| ASTM A 370        | Mechanical Testing of Steel Products                                                                    |
| ASTM A 480/A 480M | Flat Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip                                  |
| ASTM E 290        | Bend Testing of Material for Ductility                                                                  |
| 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     | --    | 1.00  |
| Phosphorous | --    | 0.040 |
| Sulfur      | --    | 0.030 |
| Chromium    | 22.00 | 24.00 |
| Nickel      | 12.00 | 15.00 |
| Molybdenum  | --    | 0.75  |
| Copper      | --    | 0.75  |

#### 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

Cold rolled, solution heat treated free from continuous carbide network, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface finish 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 free from continuous carbide network, and descaled.

## 3.3 Properties

The product shall conform to the following requirements: tensile and hardness testing shall be performed in accordance with ASTM A 370:

## 3.3.1 Tensile Properties

Shall be as shown in Table 2.

TABLE 2A - TENSILE PROPERTIES, INCH/POUND UNITS

| Nominal Thickness<br>Inches | Tensile<br>Strength<br>ksi | Yield Strength<br>at 0.2% Offset<br>ksi, min | Elongation in<br>2 inches or 4D<br>%, min |
|-----------------------------|----------------------------|----------------------------------------------|-------------------------------------------|
| Over 0.002 to 0.003, incl   | 110 max                    | --                                           | 20                                        |
| Over 0.003 to 0.004, incl   | 105 max                    | --                                           | 30                                        |
| Over 0.004                  | 75 - 100                   | 30.0                                         | 40                                        |

TABLE 2B - TENSILE PROPERTIES, SI UNITS

| Nominal Thickness<br>mm   | Tensile<br>Strength<br>MPa | Yield Strength<br>at 0.2% Offset<br>MPa, min | Elongation in<br>50.8 mm or 4D<br>%, min |
|---------------------------|----------------------------|----------------------------------------------|------------------------------------------|
| Over 0.051 to 0.076, incl | 758 max                    | --                                           | 20                                       |
| Over 0.076 to 0.102, incl | 724 max                    | --                                           | 30                                       |
| Over 0.102                | 517 - 689                  | 207                                          | 40                                       |

## 3.3.2 Hardness

Shall not be higher than 95 HRB, or equivalent (See 8.2).

## 3.3.3 Bending

Product 0.749 inch (19.02 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 indicated in Table 3 around a diameter equal to the bend factor times the nominal thickness of the product. In case of dispute, the results of tests using the guided bend test of ASTM E 290 shall govern.

TABLE 3 - BENDING REQUIREMENTS

| Nominal Thickness<br>Inch | Nominal Thickness<br>mm  | Angle<br>deg, min | Bend<br>Factor |
|---------------------------|--------------------------|-------------------|----------------|
| Up to 0.249, incl         | Up to 6.32, incl         | 180               | 1              |
| Over 0.249 to 0.749, incl | Over 6.32 to 19.02, incl | 90                | 1              |