

# AEROSPACE MATERIAL SPECIFICATION

**SAE** AMS5523

REV. G

Issued 1952-11  
Reaffirmed 2000-09  
Revised 2012-01  
Superseding AMS5523F

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

(Composition similar to UNS S30908)

## RATIONALE

AMS5523G revises Properties (3.3), and Bending (3.3.3) and is a Five Year Review and update of this specification.

### 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 |

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on this Technical Report, please visit  
<http://www.sae.org/technical/standards/AMS5523G>**

- 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 Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi, min	Elongation in 2 inches or 4D %, 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 mm	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, min	Elongation in 50.8 mm or 4D %, 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 Inch	Nominal Thickness mm	Angle deg, min	Bend 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

### 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

#### 4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), hardness (3.3.2), bending of product 0.1874 inch (4.72 mm) and under in nominal thickness (3.3.3), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

#### 4.2.2 Periodic Tests

Bending of product over 0.1874 to 0.749, inch, incl (4.72 to 19.02 mm) in nominal thickness (3.3.3) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by the purchaser.

### 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, hardness, and applicable bending properties of each lot as applicable. This report shall include the purchase order number, heat and lot numbers, AMS5523G, 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

5.2.1 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.