

# AEROSPACE MATERIAL SPECIFICATION



AMS 5523E

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Reaffirmed SEP 2000

Superseding AMS 5523D

## Steel, Corrosion and Heat Resistant, Sheet, Strip, and Plate 23Cr - 13.5Ni (SAE 30309S) Solution Heat Treated

### 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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

#### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2242	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
MAM 2242	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2248	Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2807	Identification, Carbon and Low Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate and Aircraft Tubing

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## 2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM A 370 Mechanical Testing of Steel Products  
 ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

## 2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

## 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 requirements of AMS 2248.

## 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 appearance comparable to 3.2.1.1 and 3.2.1.2 as applicable (see 8.2).

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 bend testing shall be performed in accordance with ASTM A370:

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	Valve	
		Yield Strength at 0.2% Offset psi, 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	Valve	
		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 8.3).

3.3.3 Bending: Product 0.749 inch (19.02 mm) and under in nominal thickness shall withstand, without cracking, bending through the angle indicated below around a diameter equal to the bend factor times the nominal thickness of the product with axis of bend parallel to the direction of rolling. Only one type of test will be required in routine inspection; in case of dispute, results of tests using the V-block procedure shall govern.

TABLE 3 - Bending Requirements

Nominal Thickness Inch	Nominal Thickness mm	Type of Bend	Angle deg, min	Bend Factor
Up to 0.249, incl	Up to 6.32, incl	Free Bend	180	1
Up to 0.249, incl	Up to 6.32, incl	V-Block	135	1
Over 0.249 to 0.749, incl	Over 6.32 to 19.02, incl	Free Bend	90	1
Over 0.249 to 0.749, incl	Over 6.32 to 19.02, incl	V-Block	135	2

## 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 AMS 2242 or MAM 2242.

## 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 performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

## 4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1), tensile properties (3.3.1), hardness (3.3.2), bending (3.3.3 - only for product 0.1874 inch (4.72 mm) and under in nominal thickness) and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Test for bending (3.3.3 - for product over 0.1874 inch (4.72 mm) in nominal thickness) 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 AMS 2371.