

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5528

REV. H

Issued 1953-12
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Reaffirmed 2012-10

Superseding AMS5528G

Steel, Corrosion-Resistant, Sheet, Strip, and Plate
17Cr - 7.1Ni - 1.1Al
Solution Heat Treated, Precipitation Hardenable
(Composition similar to UNS S17700)

RATIONALE

AMS5528H has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts requiring corrosion resistance and high strength up to 600 °F (316 °C), and where such parts may require welding during fabrication, 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 724-776-4970 (outside USA), www.sae.org.

AMS 2242	Tolerances, 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
AS4194	Sheet and Strip Surface Finish Nomenclature

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<http://www.sae.org/technical/standards/AMS5528H>**

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 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	Semi-Guided Bend Test for Ductility 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	--	0.09
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	6.50	7.75
Aluminum	0.75	1.50

3.1.1 Check Analysis

Composition variations shall meet the applicable 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, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A 480/A 480M and AS4194 comparable to 3.2.1.1 and 3.2.1.2 as applicable.

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 Solution Heat Treatment

The product shall be solution heat treated at a temperature not to exceed 1975 °F (1079 °C), holding at heat for a time commensurate with thickness and the heating equipment and procedure used, and cooling at a rate equivalent to an air cool or faster.

3.4 Properties

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

3.4.1 As Solution Heat Treated

3.4.1.1 Tensile Properties

Shall be as shown in Table 2:

TABLE 2A - TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Thickness Inch	Tensile Strength ksi, Max	Yield Strength at 0.2% Offset ksi, Max	Elongation in 2 Inches or 4D %, Min
0.005 to 0.010, incl	150	65.0	20
Over 0.010	150	55.0	20

TABLE 2B - TENSILE PROPERTIES, SI UNITS

Nominal Thickness mm	Tensile Strength MPa, Max	Yield Strength at 0.2% Offset MPa, Max	Elongation in 50.8 mm or 4D %, Min
0.13 to 0.25, incl	1034	448	20
Over 0.25	1034	379	20

3.4.1.2 Hardness

Shall be not higher than 92 HRB, or equivalent (see 8.2).

3.4.1.3 Bending

Product 0.275 inch (6.98 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 and bend diameter shown in Table 3. 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	Type of Bend	Angle deg min	Bend Factor
Up to 0.1874, incl	Up to 4.760, incl	Free Bend	180	1
Over 0.1874 to 0.275, incl	Over 4.760 to 6.98, incl	Free Bend	180	3

3.4.2 Response to Heat Treatment

Specimens cut from product 0.005 to 1.000 inch (0.13 to 25.40 mm), inclusive, in nominal thickness shall have the following properties after being austenite-conditioned by heating to 1400 °F ± 25 (760 °C ± 14), holding at heat for 90 minutes ± 5, cooling to 55 °F ± 5 (13 °C ± 3) within 1 hour, holding at that temperature for not less than 30 minutes, and precipitation heat treated by heating to 1050 °F ± 10 (566 °C ± 6), holding at heat for 90 minutes ± 5, and cooling to room temperature:

3.4.2.1 Tensile Properties

Shall be as shown in Table 4:

TABLE 4A - TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi, Min	Elongation in 2 Inches %, Min
0.005 to 0.010, incl	180 to 210	150	4
Over 0.010 to 0.019, incl	180 to 210	150	5
Over 0.019 to 1.000, incl	180 to 210	150	6

TABLE 4B - TENSILE PROPERTIES, SI UNITS

Nominal Thickness mm	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, Min	Elongation in 50.8 mm %, Min
0.13 to 0.25, incl	1241 to 1448	1035	4
Over 0.25 to 0.48, incl	1241 to 1448	1035	5
Over 0.48 to 25.40, incl	1241 to 1448	1035	6

3.4.2.2 Hardness

Should be 38 to 46 HRC, or equivalent (see 8.2), but the product shall not be rejected on the basis of hardness if the tensile property requirements of 3.4.2.1 are met.

3.5 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.

3.6 Tolerances

Shall conform to all applicable requirements of AMS 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 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 (3.4.1.1), hardness (3.4.1.2), bending for product 0.1874 inch (4.762 mm) and under in nominal thickness (3.4.1.3), response to heat treatment (3.4.2), and tolerances (3.6) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests

Bending for product over 0.1874 to 0.275 inch (4.762 to 6.98 mm), inclusive, in nominal thickness (3.4.1.3) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS 2371.