AEROSPACE MATERIAL SPECIFICATION

AMS5506™	REV. H

Issued 1952-11
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Revised 2024-01

Superseding AMS5506G

Steel, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
13Cr (0.30 - 0.40C) (420)
Annealed

(Composition similar to UNS S42000)

RATIONALE

AMS5506H is the result of a Five-Year Review and update of the standard. The revision updates composition reporting (see 3.1.2), adds continuous heat treatment options (see 3.2.4), updates tensile testing requirements due to testing limits (see 3.3.1), updates hardness testing, due to testing limits (see 3.3.3), adds pyrometry requirements (see 3.3.3), clarifies hardness conversions (see 8.2), and prohibits unauthorized exceptions (see 3.6, 4.4.1, and 8.5).

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts, such as snap rings and flat springs, requiring corrosion and oxidation resistance up to 800 °F (427 °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.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (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

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS5506H

AMS2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

AMS2750 Pyrometry

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

AS7766 Terms Used in Aerospace Metals Specifications

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 A370 Mechanical Testing of Steel Products

ASTM A480/A480M Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM A751 Chemical Analysis of Steel Products

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

ASTM E290 Bend Testing of Material for Ductility

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, in accordance with ASTM A751, or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.30	0.40
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	12.00	14.00
Nickel	--	0.50
Molybdenum	--	0.50
Aluminum	--	0.15
Copper	--	0.50
Tin	--	0.05

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.1.2 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection, unless limits of acceptability are specified by the purchaser.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet

Sheet shall be hot or cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A480/A480M, AS4194 and 3.2.1.1 or 3.2.1.2 as applicable.

3.2.1.1 Hot rolled sheet shall have a No. 1 finish.

3.2.1.2 Cold rolled sheet shall have a No. 2D finish.

3.2.2 Strip

Strip shall be cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A480/A480M and AS4194 comparable to a No. 1 strip finish.

3.2.3 Plate

Plate shall be hot or cold rolled, annealed, and descaled.

3.2.4 Continuous Heat Treatment:

When continuous heat treating is used process parameters (e.g., furnace temperature set points, heat input, travel rate, etc.) for continuous heat-treating lines shall be established by the material producer and validated by testing of product to the requirements of 3.3.

3.3 Properties

The product shall conform to the following requirements; tensile and hardness testing shall be performed in accordance with ASTM A370:

3.3.1 Tensile Properties

Tensile properties shall be as shown in Table 2 for product over 0.005 inch (0.13 mm) in nominal thickness.

Table 2 - Tensile properties

Nominal Thickness		Tensile Strength, Max		Elongation in 2 Inches (50 mm) or 4D
Inches	mm	ksi	MPa	% Min
Up to 0.030, excl	0.76	100	689	12
0.030 and over	0.76	100	689	15

3.3.2 Bending

Product 0.500 inch (12.70 mm) and under in nominal thickness shall be tested in accordance with ASTM E290 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, bending through the angle shown 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 E290 shall govern.

Table 3 - Bending parameters

Nominal Thickness Inches	Nominal Thickness Millimeters	Type of Bend	Angle Degrees, min	Bend Factor
Up to 0.375, incl	Up to 9.52, incl	Free Bend	180	2
Over 0.375 to 0.500, incl	Over 9.52 to 12.70, incl	Free Bend	180	3

3.3.3 Response to Heat Treatment

Product 0.005 inch (0.13 mm) to 0.500 inch (12.70 mm) in nominal thickness and specimens 0.500 inch ± 0.010 inch (12.70 mm ± 0.25 mm) thick cut from heavier product shall have hardness not lower than 50 HRC, or equivalent (see 8.2), after being heated to 1825 °F ± 10 °F (996 °C ± 6 °C), held at heat for 25 minutes ± 2 minutes, and cooled at a rate equivalent to cooling in air. Pyrometry shall be in accordance with AMS2750.

3.4 Quality

The product, as received by the 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

Tolerances shall conform to all applicable requirements of AMS2242.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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 (see 3.1), tensile properties (see 3.3.1), response to heat treatment (see 3.3.3), and tolerances (see 3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests

Bending (see 3.3.2) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

4.3 Sampling and Testing

Sampling and testing shall be in accordance with AMS2371.