AEROSPACE MATERIAL SPECIFICATION

AMS5512™	REV. N

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Superseding AMS5512M

Steel, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
18Cr - 10.5Ni - 0.80Cb (347)
Solution Heat Treated
(Composition Similar to UNS S34700)

RATIONALE

AMS5512N is the result of a Five-Year Review and update of the specification. The revision updates composition testing and reporting (see 3.1 and 3.1.1), updates sheet condition (see 3.2.1), adds strain rate control for tensile tests (see 3.3.1.1), updates bend test requirements (see 3.3.2), and prohibits unauthorized exceptions (see 1.1, 3.3.1.2, 5.1.1, and 8.4)

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant steel in the form of sheet, strip, and plate over 0.002 inch (0.051 mm) in thickness.

1.2 Application

These products have been used typically for parts requiring both corrosion and heat resistance and especially when such parts require welding during fabrication and for parts requiring oxidation resistance up to 1500 °F (816 °C) but useful at that temperature only when stresses are low, 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/AMS5512N/

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

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 A262 Detecting Susceptibility to Intergranular Attack in Stainless Steels

ASTM A370 Mechanical Testing of Steel Products

ASTM A751 Chemical Analysis of Steel Products

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, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	9.00	12.00
Columbium (Niobium)	10xC	1.10
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 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.

3.1.2 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

Sheet and strip shall be hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled producing a uniform finish.

3.2.2 Plate

Plate shall be hot or cold rolled, solution heat treated, and unless solution heat treatment is performed in an atmosphere yielding a bright finish, 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	Yield Strength at 0.2% Offset ksi, Min	Elongation in 2 Inches or 4D %, Min
Over 0.002 to 0.003, incl	70-115	25.0	20
Over 0.003 to 0.004, incl	70-110	25.0	30
Over 0.004	70-105	25.0	40

Table 2B - Tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, Min	Elongation in 50 mm or 4D %, Min
Over 0.051 to 0.076, incl	483-793	172	20
Over 0.076 to 0.102, incl	483-758	172	30
Over 0.102	483-724	172	40

3.3.1.1 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (±0.002 mm/mm/min) through 0.2% offset yield strain. After the yield strain, the speed of the testing machine shall be set between 0.05 in/in and 0.5 in/in (0.05 mm/mm and 0.5 mm/mm) of the length of the reduced parallel section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 in/in/min and 0.5 in/in/min (0.05 mm/mm/min and 0.5 mm/mm/min). The requirement for compliance becomes effective for material produced 1 year after the publication date of this specification.

3.3.1.2 Mechanical properties for product outside the size range shown in 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1.

3.3.2 Bending

Product 0.749 inch (19.02 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 the axis of bending parallel to the direction of rolling. Bending shall be performed at room temperature in accordance with Table 3. Testing shall be around a diameter equal to the bend factor times the nominal thickness of the product. The specimen shall exhibit no cracks when visually examined. 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	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

3.3.2.1 Bending requirements do not apply for plate over 0.749 inch (19.02 mm) in nominal thickness.

3.3.3 Susceptibility to Intergranular Attack

The product, after sensitizing treatment, shall pass the intergranular corrosion test performed in accordance with ASTM A262, Practice E.

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), bending (see 3.3.2) of product 0.1874 inch (4.76 mm) and under in nominal thickness, 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) of product over 0.1874 inch (4.76 mm) in nominal thickness and susceptibility to intergranular attack (see 3.3.3) are periodic tests 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 shall be in accordance with AMS2371.