



AEROSPACE MATERIAL SPECIFICATION

AMS5510™

REV. T

Issued 1939-12
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Revised 2022-07

Superseding AMS5510S

Steel, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
18Cr - 10.5Ni - 0.40Ti (SAE 30321)
Solution Heat Treated
(Composition similar to UNS S32100)

RATIONALE

AMS5510T is the result of a Five-Year Review and update of the specification. The revision updates composition testing and reporting (3.1), adds hot finish provision (3.2.1), revises sheet finish (3.2.1.1), adds strain rate control while tensile testing (3.3.1.1), prohibits unauthorized exceptions (3.6, 4.4.1, 5.1.1, 8.3), clarifies bend testing (3.3.2), adds country of origin (4.4), and allows prior revisions (8.4).

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, 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 supplied 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

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<https://www.sae.org/standards/content/AMS5510T/>

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
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 Austenitic Stainless Steels
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 E290	Bend Testing of Material for Ductility

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 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 purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	--	2.00
Silicon	0.25	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	9.00	12.00
Titanium	5x(C+N)	0.70
Molybdenum	--	0.75
Copper	--	0.75
Nitrogen	--	0.10

3.1.1 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

Hot or cold rolled, solution heat treated, and, unless solution heat treatment is performed in an atmosphere yielding a bright finish, descaled having a surface appearance comparable to the following commercial corrosion-resistant steel finishes as described in ASTM A480/A480M and AS4194, and 3.2.1.1 or 3.2.1.2, as applicable.

3.2.1.1 Sheet

No. 2B finish unless otherwise specified.

3.2.1.2 Strip

No. 1 strip finish.

3.2.2 Plate

Hot or cold rolled, solution heat treated, and descaled.

3.3 Properties

The product shall conform to the following requirements; tensile 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 to 110	25.0 ksi	20
Over 0.003 to 0.004, incl	70 to 105	25.0 ksi	30
Over 0.004	70 to 100	25.0 ksi	40

Table 2B - Tensile properties, SI units

Nominal Thickness Millimeter	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, Min	Elongation in 50 mm or 4D %, Min
Over 0.05 to 0.08, incl	483 to 758	172	20
Over 0.08 to 0.10, incl	483 to 724	172	30
Over 0.10	483 to 689	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. The strain rate after yield may be increased to any value up to 0.5 in/in/min (or 0.5 mm/mm/min) or equivalent crosshead speed as a function of gage length. The requirement for compliance becomes effective for material produced 1 year after the publication date of this specification.

3.3.2 Bending

Product 0.749 inch (19.02 mm) and under in nominal thickness shall be tested in accordance with ASTM E290. Specimens shall be:

- Prepared with a nominal width of 0.75 inch (19.0 mm).
- Tested with the axis of bending parallel to the direction of rolling.
- Tested at room temperature.
- Visually inspect.

The product shall not crack when bending 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 E290 shall apply.

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

3.3.3 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 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.

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 producer'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), bending of product 0.1874 inch (4.762 mm) and under in nominal thickness (3.3.2), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.