AEROSPACE MATERIAL SPECIFICATION

AMS5901™	REV. D

Issued 1992-01
Reaffirmed 2015-05
Revised 2022-03

Superseding AMS5901C

Steel, Corrosion-Resistant, Sheet, Strip, and Plate 18Cr - 8Ni (SAE 30301) Solution Heat Treated

(Composition similar to UNS S30100)

RATIONALE

AMS5901D is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (3.4, 4.4.1, 5.1.1, 8.6), updates the chemistry specification (3.1), updates the allowable conditions (3.2), controls strain rate during testing (3.3.1.1), requires country of origin reporting (4.4), updates definitions (8.3), and allows prior revisions (8.5).

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

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/AMS5901D/

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

ASTM E384 Microindentation Hardness of Materials

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	--	0.15
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	6.00	8.00
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 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

Shall be No. 2B finish, unless otherwise specified.

3.2.1.2 Strip

Shall be No. 1 strip finish.

3.2.2 Plate

Hot rolled, solution heat treated, and descaled.

3.3 Properties

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

3.3.1 Tensile Properties

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

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	75 ksi (517 MPa)
Yield Strength at 0.2% Offset	30.0 ksi (207 MPa)
Elongation in 2 Inches (50 mm) or 4D	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 document.

3.3.2 Hardness

Shall be not higher than 92 HRB (202 HB), or equivalent (see 8.2). Product shall not be rejected on the basis of hardness if the tensile properties of 3.3.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.3.2.1 Microhardness testing in accordance with ASTM E384 may be used for thin gages where superficial hardness testing is impractical.

3.3.3 Bending

Product 0.75 inch (19.0 mm) and under in thickness shall be tested in accordance with ASTM E290 using specimens prepared nominally 0.75 inch (19.0 mm) in width with its axis parallel to the direction of rolling, and shall withstand, without cracking, when bending at room temperature 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 govern.

Table 3 - Bending

Nominal Thickness Inches	Nominal Thickness Millimeters	Angle Deg, Min	Bend Factor
Up to 0.187, incl	Up to 4.75, incl	180	1
Over 0.187	Over 4.75	90	1

3.4 Exceptions

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

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 AMS2242.

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

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with AMS2371.

4.4 Reports

The producer of the product shall furnish with each shipment a report showing the producer’s name and country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations) and the results of tests for composition of each heat and for tensile, hardness, and bending properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS5901D, product form, size, and quantity.

4.4.1 When material produced to this specification has exceptions taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS5901D(EXC) because of the following exceptions:" and the specific exceptions shall be listed (also see 5.1.1).

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with AMS2807.

5.1.1 When technical exceptions are taken (see 4.4.1), the material shall be identified with AMS5901D(EXC).

5.2 Packaging

The product shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.