

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS 5501B
Superseding AMS 5501A

Issued 11-1-67
Revised 7-1-84

STEEL FOIL, CORROSION RESISTANT
19Cr - 9.5Ni (SAE 30304)
Cold Rolled, 125,000 psi (860 MPa) UTS UNS S30400

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-27-83. It is recommended, therefore, that this specification not be referenced for new designs.

This cover sheet should be attached to the "B" revision of the subject specification.

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AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AMS 5501B

Superseding AMS 5501A

Issued 11-1-67

Revised 1-15-78

UNS S30400

STEEL FOIL, CORROSION RESISTANT
19Cr - 9.5Ni (SAE 30304)
Cold Rolled, 125,000 psi (862 MPa) Tensile Strength

1. SCOPE:

1.1 Form: This specification covers a corrosion-resistant steel in the form of foil.

1.2 Application: Primarily for liners of filament-wound pressure vessels.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2242 - Tolerances, Corrosion and Heat Resistant Steel and Iron Base Alloy
Sheet, Strip, and Plate and Titanium and Titanium Alloy Sheet,
Strip, and Plate

AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion
Resistant Steels and Alloys

AMS 2350 - Standards and Test Methods

AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys,
Wrought Products Except Forgings

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A370 - Mechanical Testing of Steel Products

ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and
Other Similar Chromium-Nickel-Iron Alloys

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

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- 3.1 **Composition:** Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods.

	min	max
Carbon	--	0.08
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	18.00 - 20.00	
Nickel	8.00 - 11.00	
Molybdenum	--	0.75
Copper	--	0.75

- 3.1.1 **Check Analysis:** Composition variations shall meet the requirements of AMS 2248.

- 3.2 **Condition:** Cold rolled, solution heat treated, descaled, and rerolled (No. 2 Strip Finish).

- 3.3 **Properties:** Foil 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 follows:

Tensile Strength, min	125,000 psi (862 MPa)
Yield Strength at 0.2% Offset, min	75,000 psi (517 MPa)
Elongation in 2 in. (50 mm), min	15%

- 3.3.2 **Bending:** Foil 0.010 in. (0.25 mm) and under in nominal thickness, tested with specimens nominally 0.750 in (19.05 mm) in width, shall withstand without cracking, bending through the angle indicated below around a diameter equal to the bend factor times the nominal thickness of the foil with axis of bend parallel to the direction of rolling. Only one type of test will be required in routine inspection; in case of dispute results of tests using the V-block procedure shall govern.

Type of Bend	Angle deg, min	Bend Factor
Free Bend	180	1
V-Block	135	2

- 3.4 **Quality:** Foil shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the foil.

- 3.5 **Tolerances:** Unless otherwise specified, tolerances for foil 0.005 in. (0.13 mm) and over in nominal thickness shall conform to all applicable requirements of AMS 2242; for nominal thicknesses under 0.005 in. (0.13 mm), tolerances shall be as agreed upon by purchaser and vendor.

4. **QUALITY ASSURANCE PROVISIONS:**

- 4.1 **Responsibility for Inspection:** The vendor of foil shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the foil conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests.

4.3 Sampling: Shall be in accordance with AMS 2371 and the following:

4.3.1 Specimens for tensile tests of widths 9 in. (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths less than 9 in. (229 mm), specimens shall be taken with the axis parallel to the direction of rolling.

4.4 Reports:

4.4.1 The vendor of foil shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat and for tensile and bending properties of each size from each heat. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of foil, part number, and quantity. When foil for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of foil to determine conformance to the requirements of this specification, and shall include in the report a statement that the foil conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each piece of foil shall be marked on one face, in the respective location indicated below, with AMS 5501B, heat number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be removable in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the foil or its performance and shall be sufficiently stable to withstand normal handling.

5.1.1 Flat Foil 6 In. (152 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm).

5.1.2 Flat Foil Over 6 In. (152 mm) in Width: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm), the rows being spaced not more than 6 in. (152 mm) apart and alternately staggered.

5.1.3 Coiled Foil: Shall be marked near both the outside and inside ends of the coil; the markings shall be applied as in 5.1 or shall appear on a durable tag or label attached to the coil and marked with the information of 5.1. When the inside end of the coil is inaccessible, as when the product is wound on cores, the tag or label may be attached to the core.

5.2 Packaging:

5.2.1 Foil 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 foil to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.