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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5601B
Superseding AMS 5601A

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

STEEL SHEET AND STRIP, CORROSION AND MODERATE HEAT RESISTANT
14.5Cr - 8.2Ni - 2.5Mo - 1.1Al
Solution Heat Treated

UNS S14800

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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This specification is under the jurisdiction of AMS Committee "F".

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

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1. SCOPE:

1.1 Form: This specification covers a precipitation-hardenable, corrosion and moderate heat resistant steel in the form of sheet and strip.

1.2 Application: Primarily for parts requiring corrosion resistance, high strength, high fracture toughness, stress-corrosion resistance, and oxidation resistance up to 800°F (425°C). Such parts may require welding or brazing during fabrication. Certain processing procedures and service conditions may cause this material to be subject to stress-corrosion cracking; ARP 1110 recommends practices to minimize such conditions.

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) and Aerospace Recommended Practices (ARP) 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

2.1.2 Aerospace Recommended Practices:

ARP 1110 - Minimizing Stress Corrosion Cracking in Heat Treatable Wrought Low Alloy and Martensitic Corrosion Resistant Steels

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:

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	--	0.05
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.015
Sulfur	--	0.010
Chromium	13.75	15.00
Nickel	7.75	8.75
Molybdenum	2.00	3.00
Aluminum	0.75	1.50

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

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Sheet: Cold rolled, solution heat treated, and descaled (No. 2D Finish).

3.2.2 Strip: Cold rolled, solution heat treated, and descaled (No. 1 Strip Finish).

3.3 Solution Heat Treatment: The product shall be solution heat treated by heating to 1825° F ± 25 (995° C ± 15), holding at heat for not less than 3 min. per 0.10 in. (2.5 mm) of nominal thickness, and cooling in air to room temperature.

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

3.4.1 As Solution Heat Treated:

3.4.1.1 Tensile Properties:

3.4.1.1.1 Product 0.005 In. (0.13 mm) and Over in Nominal Thickness:

Tensile Strength, max	150,000 psi (1034 MPa)
Yield Strength at 0.2% Offset, max	65,000 psi (448 MPa)
Elongation in 2 in. (50 mm), min	20%

3.4.1.1.2 Product Less than 0.005 In. (0.13 mm) in Nominal Thickness: As agreed upon by purchaser and vendor.

3.4.1.2 Hardness:

3.4.1.2.1 Product Over 0.010 In. (0.25 mm) in Nominal Thickness: Not higher than 100 HRB or equivalent.

3.4.1.2.2 Product 0.010 In. (0.25 mm) and Under in Nominal Thickness: As agreed upon by purchaser and vendor.

3.4.1.3 Bending: Product shall withstand, without cracking, bending through the angle indicated below around a diameter equal to the nominal thickness of the product 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.

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

3.4.2 After Austenite Conditioning, Sub-Zero Transformation, and Precipitation Hardening: Product shall conform to the following requirements after heating to 1700° F ± 15 (925° C ± 8), holding at heat for not less than 1 hr, rapidly cooling to 75° F (25° C) or lower, cooling to -100° F ± 10 (-75° C ± 5) within 1 hr, holding at this temperature for not less than 8 hr, warming in air to room temperature, heating to 950° F ± 10 (510° C ± 5), holding at heat for not less than 1 hr, and cooling in air.

3.4.2.1 Tensile Properties: Shall be as shown in Table I and 3.4.2.1.1.

TABLE I

Nominal Thickness Inch	Tensile Strength psi, min	Yield Strength at 2% Offset psi, min	Elongation in 2 in. %, min
0.005 to 0.010, excl	220,000	190,000	2
0.010 to 0.020, excl	220,000	190,000	3
0.020 to 0.1875, excl	220,000	190,000	4

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 2% Offset MPa, min	Elongation in 50 mm %, min
0.13 to 0.25, excl	1517	1310	2
0.25 to 0.51, excl	1517	1310	3
0.51 to 4.762, excl	1517	1310	4

3.4.2.1.1 Product Less Than 0.005 In. (0.13 mm) in Nominal Thickness: As agreed upon by purchaser and vendor.

3.4.2.2 Hardness:

3.4.2.2.1 Product Over 0.010 In. (0.25 mm) in Nominal Thickness: Should be not lower than 45 HRC or equivalent but the product shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.4.2.2.2 Product 0.010 In. (0.25 mm) and Under in Nominal Thickness: As agreed upon by purchaser and vendor.

3.5 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.

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3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2242.