SAE The Engineering Resource For Advancing Mobility®
400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5504H
Superseding AMS 5504G

Issued 7-1-48
Revised 7-1-85

STEEL SHEET, STRIP, AND PLATE, CORROSION AND MODERATE HEAT RESISTANT 12.5Cr (SAE 51410) Annealed

UNS S41000

1. SCOPE:

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

1.2 Application: Primarily for parts requiring oxidation resistance up to 1000°F (540°C) but useful at the higher temperatures only when stresses are low.

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

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2242 - Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
MAM 2242 - Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

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 E112 - Determining Average Grain Size
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

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

2.3.1 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 or by spectrographic or other analytical methods approved by purchaser:

ø

	min	max
Carbon	--	0.15
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	11.50	13.50
Nickel	--	0.75
Molybdenum	--	0.50
Aluminum	--	0.05
Copper	--	0.50
Tin	--	0.05
Nitrogen	--	0.08

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 and Strip: Cold rolled, annealed, and descaled having a surface appearance comparable to 3.2.1.1 or 3.2.1.2 as applicable.

3.2.1.1 Sheet: No. 2D finish.

3.2.1.2 Strip: No. 1 Strip finish.

3.2.2 Plate: Hot rolled, annealed, and descaled.

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

3.3.1 Tensile Properties: Shall be as follows:

Tensile Strength, max	95,000 psi (655 MPa)
Elongation in 2 in. (50 mm) or 4D, min	

Nominal Thickness		
Inch	Millimetres	
Up to 0.030, excl	Up to 0.75, excl	12%
0.030 and over	0.75 and over	15%

3.3.2 Bending: Product 0.500 in. (12.50 mm) and under in nominal thickness shall withstand, without cracking, bending through the angle indicated below around a diameter equal to the bend factor times 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.

Nominal Thickness		Type of Bend	Angle deg, min	Bend Factor
Inch	Millimetres			
Up to 0.375, incl	Up to 9.50, incl	Free Bend	180	1
		V-Block	135	2
Over 0.375 to 0.500, incl	Over 9.50 to 12.50, incl	Free Bend	180	2
		V-Block	135	4

3.3.2.1 Bending requirements for plate over 0.500 in. (12.50 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.3 Grain Size: Sheet and strip shall have grain size predominantly 5 or finer with occasional grains as large as 3 permissible, determined by comparison of a polished and etched specimen with the chart in ASTM E112. Grain size requirements for plate shall be as agreed upon by purchaser and vendor.

3.3.4 Response to Heat Treatment: Product 0.500 in. (12.50 mm) and under in nominal thickness and specimens 0.500 in. ± 0.010 (12.50 mm ± 0.25) thick cut from heavier product shall have hardness of 35 - 45 HRC, or equivalent, after being heat treated by heating to 1750°F ± 10 (955°C ± 5), holding at heat for 15 - 30 min., and cooling in still air.

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 AMS 2242 or MAM 2242.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the product 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 and shall be performed on each lot.

4.3 Sampling: Shall be in accordance with AMS 2371.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile and bending properties, grain size, and response to heat treatment of each lot. This report shall include the purchase order number, heat number, AMS 5504H, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5504H, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification and shall include in the report either a statement that the material conforms or 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 sheet, strip, and plate shall be marked on one face, in the respective location indicated below, with AMS 5504H, heat number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be 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 product or its performance and shall be sufficiently stable to withstand normal handling.

5.1.1 Flat Strip 6 In. (150 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm).