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

AEROSPACE MATERIAL SPECIFICATION

AMS 5604B
Superseding AMS 5604A
Issued 5-1-68
Revised 10-15-80

UNS S17400

STEEL, SHEET, STRIP, AND PLATE, CORROSION RESISTANT
16.5Cr - 4.0Ni - 4.0Cu - 0.30(Cb + Ta)
Solution Heat Treated

1. SCOPE:

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

1.2 Application: Primarily for parts requiring corrosion resistance and high strength up to 600°F (315°C) and where such parts may require welding during fabrication. Certain processing procedures and service conditions may cause these products to become 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, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys
AMS 2315 - Determination of Free Ferrite Content
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings and Forging Stock

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 U.S. 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 analytical methods approved by purchaser:

	min	max
Carbon	--	0.07
Manganese	--	1.00
Ø Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	15.00	17.50
Nickel	3.00	5.00
Columbium + Tantalum	5xC	0.45
Copper	3.00	5.00
Molybdenum	--	0.50

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 unless solution heat treatment is performed in an atmosphere yielding a bright finish (No. 1 Strip Finish).

3.2.3 Plate: Hot rolled, solution heat treated, and descaled.

3.3 Solution Heat Treatment: The product shall be solution heat treated by heating to 1950°F ± 25 Ø (1040°C ± 15), holding at heat for a time commensurate with the thickness and the heating equipment and procedure used, and cooling in air.

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

3.4.1 As Solution Heat Treated:

3.4.1.1 Tensile Properties: Shall be as follows:

3.4.1.1.1 Nominal Thickness 0.015 to 0.1875 in. (0.38 to 4.762 mm), Excl:

Tensile Strength, max	185,000 psi (1276 MPa)
Yield Strength at 0.2% Offset, max	160,000 psi (1103 MPa)
Elongation in 2 in. (50 mm), min	3%

3.4.1.1.2 Nominal Thickness Less than 0.015 in. (0.38 mm) or 0.1875 in. (4.762 mm) and Over: As agreed upon by purchaser and vendor.

3.4.1.2 Hardness: Shall be not higher than 38 HRC or equivalent.

3.4.1.3 Microstructure: The product shall contain not more than 5% ferrite, determined in accordance Ø with AMS 2315.

3.4.1.4 Bending: Product 0.109 in. (2.75 mm) and under in nominal thickness shall withstand without cracking, bending through an angle of 180 deg around a diameter equal to 18 times the nominal thickness of the product with axis of bend parallel to the direction of rolling. Bending requirements for product over 0.109 in. (2.75 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.4.2 After Precipitation Heat Treatment: The solution heat treated product up to 4.0 in. (102 mm), incl, in nominal thickness, precipitation heat treated to a particular condition in accordance with the corresponding temperatures and times shown in Table I and cooled in air, shall have the tensile properties shown in Table II for that particular condition. Tensile and hardness tests shall be made in only one precipitation heat treated condition; unless otherwise specified, that precipitation heat treated condition shall be H900:

TABLE I

Condition	Temperature	Time
H900	900°F ± 10(482°C ± 5)	60 min. ± 5
H925	925°F ± 10(496°C ± 5)	4 hr ± 0.25
H1025	1025°F ± 10(552°C ± 5)	4 hr ± 0.25
H1075	1075°F ± 10(579°C ± 5)	4 hr ± 0.25
H1100	1100°F ± 10(593°C ± 5)	4 hr ± 0.25
H1150	1150°F ± 10(621°C ± 5)	4 hr ± 0.25

3.4.2.1 Tensile Properties:

TABLE II

Condition	Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min	Reduction of Area %, min
H900	Up to 0.1875, excl	190,000	170,000	5	--
	0.1875 to 0.625, incl	190,000	170,000	8	30
	Over 0.625 to 4.000, incl	190,000	170,000	10	35
H925	Up to 0.1875, excl	170,000	155,000	5	--
	0.1875 to 0.625, incl	170,000	155,000	8	30
	Over 0.625 to 4.000, incl	170,000	155,000	10	35
H1025	Up to 0.1875, excl	155,000	145,000	5	--
	0.1875 to 0.625, incl	155,000	145,000	8	35
	Over 0.625 to 4.000, incl	155,000	145,000	12	40
H1075	Up to 0.1875, excl	145,000	125,000	5	--
	0.1875 to 0.625, incl	145,000	125,000	9	35
	Over 0.625 to 4.000, incl	145,000	125,000	13	45
H1100	Up to 0.1875, excl	140,000	115,000	5	--
	0.1875 to 0.625, incl	140,000	115,000	10	35
	Over 0.625, to 4.000, incl	140,000	115,000	14	45
H1150	Up to 0.1875, excl	135,000	105,000	8	--
	0.1875 to 0.625, incl	135,000	105,000	10	40
	Over 0.625 to 4.000, incl	135,000	105,000	16	50

TABLE II (SI)

Condition	Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min	Reduction of Area %, min
H900	Up to 4.762, excl	1310	1170	5	--
	4.762 to 15.88, incl	1310	1170	8	30
	Over 15.88 to 102, incl	1310	1170	10	35
H925	Up to 4.762, excl	1170	1070	5	--
	4.762 to 15.88, incl	1170	1070	8	30
	Over 15.88 to 102, incl	1170	1070	10	35
H1025	Up to 4.762, excl	1070	1000	5	--
	4.762 to 15.88, incl	1070	1000	8	35
	Over 15.88 to 102, incl	1070	1000	12	40
H1075	Up to 4.762, excl	1000	860	5	--
	4.762 to 15.88, incl	1000	860	9	35
	Over 15.88 to 102, incl	1000	860	13	45
H1100	Up to 4.762, excl	965	790	5	--
	4.762 to 15.88, incl	965	790	10	35
	Over 15.88 to 102, incl	965	790	14	45
H1150	Up to 4.762, excl	930	725	8	--
	4.762 to 15.88, incl	930	725	10	40
	Over 15.88 to 102, incl	930	725	16	50

3.4.2.2 Hardness: Shall be within the range shown in Table III for the corresponding precipitation heat treatment condition.

TABLE III

Condition	Hardness HB	Hardness HRC
H900	388 - 448	40 - 48
H925	375 - 438	38 - 47
H1025	331 - 401	33 - 42
H1075	302 - 375	29 - 38
H1100	311 - 364	29 - 38
H1150	277 - 352	26 - 36

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

3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2242; flatness tolerance for sheet shall be as specified for cold worked austenitic sheet in 1/2-hard temper.

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 Ø to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.