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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5528E

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Superseding AMS 5528D

STEEL SHEET, STRIP, AND PLATE, CORROSION RESISTANT
17Cr - 7.1Ni - 1.1Al
Solution Heat Treated

UNS S17700

1. SCOPE:

1.1 Form: This specification covers a corrosion-resistant, precipitation hardenable 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 (316°C), and where such parts may require welding during fabrication.

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
AMS 2750 - Pyrometry

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 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, Ø determined by wet chemical methods in accordance with ASTM E353, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Carbon	--	0.09
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	6.50	7.75
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 and Strip: 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 (See 8.2):

3.2.1.1 Sheet: No. 2D finish.

3.2.1.2 Strip: No. 1 strip finish.

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

3.3 Solution Heat Treatment: The product shall be solution heat treated by Ø heating to 1950°F ± 25 (1066°C ± 14), holding at heat for a time commensurate with thickness and the heating equipment and procedure used, and cooling at a rate equivalent to an air cool or faster. Pyrometry shall be in accordance with AMS 2750.

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: Shall be as follows:

TABLE I

Nominal Thickness Inch	Tensile Strength psi, maximum	Yield Strength at 0.2% Offset psi, maximum	Elongation in 2 Inches or 4D %, minimum
0.005 to 0.010, incl	150,000	65,000	20
Over 0.010	150,000	55,000	20

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, maximum	Yield Strength at 0.2% Offset MPa, maximum	Elongation in 50.8 mm or 4D %, minimum
0.13 to 0.25, incl	1034	448	20
Over 0.25	1034	379	20

3.4.1.2 Hardness: Shall be not higher than 92 HRB, or equivalent.

3.4.1.3 Bending: Product 0.275 inch (6.98 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 Inch	Nominal Thickness Millimetres	Type of Bend	Angle deg, min	Bend Factor
Up to 0.187, incl	Up to 4.75, incl	Free Bend	180	1
Up to 0.187, incl	Up to 4.75, incl	V-Block	135	1
Over 0.187 to 0.275, incl	Over 4.75 to 6.98, incl	Free Bend	180	3
Over 0.187 to 0.275, incl	Over 4.75 to 6.98, incl	V-Block	135	3

3.4.1.3.1 Bending requirements for plate over 0.275 inch (6.98 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.4.2 Response to Heat Treatment: Specimens cut from product shall have the Ø following properties after being austenite-conditioned by heating to 1400°F ± 25 (760°C ± 14), holding at heat for 90 minutes ± 5, cooling to 55°F ± 5 (13°C ± 3) within 1 hour, holding at that temperature for not less than 30 minutes, and precipitation heat treated by heating to 1050°F ± 10 (566°C ± 6), holding at heat for 90 minutes ± 5, and cooling to room temperature:

3.4.2.1 Product 0.005 to 1.000 Inch (0.13 to 25.40 mm), Incl, in Thickness:

3.4.2.1.1 Tensile Properties: Shall be as follows:

Tensile Strength	180,000 - 210,000 psi (1241 - 1448 MPa)
Yield Strength at 0.2% Offset, minimum	150,000 psi (1034 MPa)
Elongation in 2 inches (50.8 mm), minimum	

Nominal Thickness		
Inch	Millimetres	
0.005 to 0.010, incl	0.13 to 0.25, incl	4%
0.010 to 0.019, incl	Over 0.25 to 0.48, incl	5%
Over 0.019 to 1.000, incl	Over 0.48 to 25.40, incl	6%

3.4.2.1.2 Hardness: Should be 38 - 46 HRC, or equivalent, but the product shall Ø not be rejected on the basis of hardness if the tensile property requirements of 3.4.2.1.1 are met.

3.4.2.2 Product Over 1.000 Inch (25.40 mm) in Thickness: Shall be 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 imperfections detrimental to usage of the product.

3.6 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 Ø 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 Ø requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2371.