SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS5550	REV. E

Issued	1960-06
Revised	1988-01
Noncurrent	1993-08
Reaf Nonc	2012-04

Superseding AMS5550D

Alloy Sheet, Strip, and Plate, Corrosion and Heat Resistant
80Ni - 15.5Cr - 0.62Ti - 3.25Al
Annealed

RATIONALE

AMS5550E has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of August 26, 1993. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE.

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http://www.sae.org/technical/standards/AMS5550E

1. SCOPE:

1.1 Form:

This specification covers a corrosion and heat resistant nickel alloy in the form of sheet and strip.

1.2 Application:

Primarily for parts requiring oxidation resistance up to 2000°F (1095°C) and where 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 2262	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate
MAM 2262	Tolerances, Metric, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate
AMS 2269	Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt 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 E8	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E290	Semi-Guided Bend Test for Ductility of Metallic Materials
ASTM E354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5901 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-163 Steel Mills 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 E354 or by spectrochemical or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.10
Manganese	--	1.00
Silicon	--	0.70
Sulfur	--	0.01
Chromium	14.00	17.00
Titanium	0.25	1.00
Aluminum	2.75	3.75
Iron	--	2.00
Cobalt (3.1.1)	--	1.00
Copper	--	0.50
Nickel + Cobalt	remainder	

3.1.1 Determination not required for routine acceptance.

3.1.2 Check Analysis: Composition variations shall meet the requirements of AMS 2269.

3.2 Condition:

Cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance comparable to the following commercial corrosion-resistant steel finishes as applicable:

3.2.1 Sheet: No. 2D finish.

3.2.2 Strip: No. 1 Strip finish.

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 As Annealed:

3.3.1.1 Hardness: Shall be as follows, determined in accordance with ASTM E18:

3.3.1.1.1 Sheet 0.005 - 0.250 in. (0.12 - 6.25 mm), incl, and strip 0.005 - 0.025 in. (0.12 - 0.64 mm), excl, in nominal thickness shall have hardness not higher than 96 HRB, or equivalent.

3.3.1.1.2 Strip 0.025 in. (0.62 mm) and over in nominal thickness shall have hardness as agreed upon by purchaser and vendor.

3.3.1.2 Bending: The product shall withstand, without cracking, bending in accordance with ASTM E290 through an angle of 180 deg 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.

Nominal Thickness		Bend Factor
Inch	Millimetres	
Up to 0.050, incl	Up to 1.25, incl	1
Over 0.050 to 0.250, incl	Over 1.25 to 6.25, incl	2

3.3.1.3 Grain Size: Product 0.010 in. (0.25 mm) and over in nominal thickness shall have average grain size not over 0.0060 in. (0.15 mm) in diameter (ASTM Grain Size No. 2.5), determined in accordance with ASTM E112. Grain size requirements for product under 0.010 in. (0.25 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 After Precipitation Heat Treatment: The product shall have the following properties after being precipitation heat treated by heating to 1400°F ± 25 (760°C ± 15), holding at heat for not less than 5 hr, and cooling in air:

3.3.2.1 Tensile Properties: Shall be as shown in Table I, determined in accordance with ASTM E8:

TABLE I

Product	Nominal Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
Strip	Up to 0.010, excl	125,000	- -	- -
	0.010 to 0.125, incl	125,000	- -	15
Sheet	0.010 to 0.025, excl	125,000	60,000	17
	0.025 to 0.250, incl	125,000	60,000	25

TABLE I (SI)

Product	Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
Strip	Up to 0.25, excl	860	- -	- -
	0.25 to 3.12, incl	860	- -	15
Sheet	0.25 to 0.64, excl	860	415	17
	0.64 to 6.25, incl	860	415	25

3.3.2.2 Hardness: Should be not lower than 21 HRC, or equivalent, determined in accordance with ASTM E18, but the product shall not be rejected on the basis of hardness if the tensile property requirements are met.

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 2262 or MAM 2262.

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 heat or lot as applicable.

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 the results of tests on each lot to determine conformance to the other technical requirements of this specification. This report shall include the purchase order number, heat number, AMS 5550E, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5550E, 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 and strip shall be marked on one face, in the respective location indicated below, with AMS 5550E, 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.