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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5540K

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Superseding AMS 5540J

ALLOY SHEET, STRIP, AND PLATE, CORROSION AND HEAT RESISTANT
74Ni - 15.5Cr - 8.0Fe
Annealed

UNS N06600

1. SCOPE:

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

1.2 Application: Primarily for parts requiring oxidation resistance up to 2000°F (1093°C), but useful at the higher temperatures only when stresses are low, where such parts may require welding during fabrication. Strength at elevated temperatures is similar to that of 18-8 type steel.

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 E8M - Tension Testing of Metallic Materials (Metric)
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, 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 E354, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Carbon	--	0.15
Manganese	--	1.00
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.015
Chromium	14.00	17.00
Nickel + Cobalt	72.00	--
Iron	6.00	10.00
Cobalt	--	1.00
Columbium + Tantalum	--	1.00
Titanium	--	0.50
Aluminum	--	0.35
Copper	--	0.50

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

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

3.2.1 Sheet and Strip: Hot-rolled or cold-rolled, annealed, and, unless Ø 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 (See 8.2):

3.2.1.1 Sheet: No. 2D finish.
Ø

3.2.1.2 Strip: No. 1 strip finish.
Ø

3.2.2 Plate: Hot rolled, annealed, and descaled.

3.3 Properties: The product shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM E8 or ASTM E8M on product 2.000 inches (50.80 mm) and under in nominal thickness:

Tensile Strength, minimum	80,000 psi (552 MPa)
Yield Strength at 0.2% Offset, minimum	35,000 psi (241 MPa)
Elongation in 2 inches (50.8 mm) or 4D, minimum	30%

3.3.1.1 Yield strength requirement does not apply to product under 0.020 inch (0.51 mm) in nominal thickness.

3.3.1.2 Elongation requirement does not apply to product under 0.010 inch (0.25 mm) in nominal thickness.

3.3.1.3 Tensile property requirements for product over 2.000 inches (50.80 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Bending: Product 0.010 - 0.250 inch (0.25 - 6.35 mm), incl, in nominal thickness shall withstand without cracking, bending in accordance with ASTM E290 through an angle of 180 degrees 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		
Inches	Millimetres	Bend Factor
0.010 to 0.050, incl	0.25 to 1.27, incl	1
Over 0.050 to 0.250, incl	Over 1.27 to 6.35, incl	2

3.3.2.1 Bending requirements for product under 0.010 inch (0.25 mm) or over 0.250 inch (6.35 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.3 Grain Size: Shall be not larger than the following, determined in accordance with ASTM E112:

Form	Nominal Thickness		ASTM Grain Size No.
	Inches	Millimetres	
Sheet	Up to 0.050, incl	Up to 1.27, incl	4.5
	Over 0.050 to 0.250, incl	Over 1.27 to 6.35, incl	3.5
Strip	Up to 0.125, incl	Up to 3.18, incl	4.5

3.3.3.1 Grain size requirements for strip over 0.125 inch (3.18 mm) in nominal thickness and for plate shall be as agreed upon by purchaser and vendor.

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 5540K, 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 5540K, contractor or other direct supplier of product, part number, and quantity. When product for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of product to determine conformance to the requirements of this specification and shall include in the report either a statement that the product 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 5540K, 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 Inches (152 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 feet (914 mm).