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

AEROSPACE MATERIAL SPECIFICATION

AMS 5540J
Superseding AMS 5540H

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UNS N06600

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

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 (1095°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 of 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 (AMS) 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 2262 - Tolerances, Nickel, Nickel-Base, and Cobalt-Base 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 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 E112 - Estimating the Average Grain Size of Metals
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 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 E354, 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	--	0.15
Manganese	--	1.00
Silicon	--	0.50
Sulfur	--	0.015
Chromium	14.00	17.00
Nickel + Cobalt	72.00	--
Iron	6.00	10.00
Cobalt (3.1.1)	--	1.00
Columbium + Tantalum (3.1.1)	--	1.00
Titanium (3.1.1)	--	0.50
Aluminum (3.1.1)	--	0.35
Copper (3.1.1)	--	0.50

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: The product shall be supplied in the following condition; standards for acceptance shall be as agreed upon by purchaser and vendor:

3.2.1 Sheet and Strip: Cold rolled, annealed, and descaled; or cold rolled and bright annealed.

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 on product 2.000 in. (50.80 mm) and under in nominal thickness:

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Tensile Strength, min	80,000 psi (552 MPa)
Yield Strength at 0.2% Offset, min	35,000 psi (241 MPa)
Elongation in 2 in. (50 mm) or 4D, min	30%

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

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

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

3.3.2 Bending: Product 0.010 - 0.250 in. (0.25 - 6.35 mm), incl, in nominal thickness 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		
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 in. (0.25 mm) or over 0.250 in. (6.35 mm) in Ø 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.
Ø	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 in. (3.18 mm) or plate over 0.250 in. (6.35 mm) Ø in nominal thickness 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 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 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 Ø reported 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.

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. Ø

4.3 Sampling: Shall be in accordance with AMS 2371 and the following:

4.3.1 Specimens for tensile tests of widths 9 in. (225 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths less than 9 in. (225 mm), specimens shall be taken with the axis parallel to the direction of rolling.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of 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 5540J, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 5540J, 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 a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2371.