The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5580H

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Submitted for recognition as an American National Standard

Superseding AMS 5580G

NICKEL ALLOY, CORROSION AND HEAT RESISTANT, SEAMLESS TUBING
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 seamless tubing.

1.2 Application:

This tubing has been used typically for parts requiring corrosion and oxidation resistance, up to 2000 °F (1093 °C), particularly where such parts may require welding during fabrication, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2243 Tolerances, Corrosion and Heat Resistant Steel Tubing
MAM 2243 Tolerances, Metric, Corrosion and Heat Resistant Steel Tubing
AMS 2263 Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Tubing
MAM 2263 Tolerances, Metric, Nickel, Nickel Alloy, and Cobalt Alloy Tubing
AMS 2269 Chemical Check Analysis Limits, Wrought Nickel Alloys and Cobalt Alloys

2.1 (Continued)

AMS 2371 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS 2807 Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM E 8 Tension Testing of Metallic Materials
ASTM E 8M Tension Testing of Metallic Materials (Metric)
ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

(R)

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	--	0.15
Manganese	--	1.00
Silicon	--	0.50
Sulfur	--	0.015
Chromium	14.00	17.00
Nickel	72.00	--
Iron	6.00	10.00
Cobalt	--	1.00
Columbium	--	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:

Tubing shall be supplied in the following condition:

3.2.1 Tubing 6.625 inches (168.28 mm) and under in nominal OD with nominal wall thickness 0.382 inch (9.70 mm) and under shall be cold drawn, annealed, and pickled if necessary.

3.2.2 Tubing over 6.625 inches (168.28 mm) in nominal OD or over 0.382 inch (9.70 mm) in nominal wall thickness shall be hot finished and annealed.

3.3 Fabrication:

(R)

Tubing shall be produced by a seamless process.

3.4 Properties:

Tubing shall conform to the following requirements:

3.4.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM E 8 or ASTM E 8M.

3.4.1.1 Cold Drawn: Shall be as shown in Table 2.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal OD Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Up to 5.000, incl	80.0	35.0	30
Over 5.000 to 6.625, incl	80.0	30.0	35

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal OD Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 127.00, incl	552	241	30
Over 127.00 to 168.28, incl	552	207	35

3.4.1.2 Hot Finished: Shall be as shown in Table 3.

TABLE 3A - Minimum Tensile Properties, Inch/Pound Units

Nominal OD Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
2.500 to 5.000, incl	80.0	30.0	35
Over 5.000 to 9.250, incl	75.0	25.0	35

TABLE 3B - Minimum Tensile Properties, SI Units

Nominal OD Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
63.50 to 127.00, incl	552	207	35
Over 127.00 to 234.95, incl	517	172	35

3.4.2 (R) Flarability: Specimens as in 4.3.1 from cold drawn tubing with nominal OD of 0.188 to 2.000 inches (4.78 to 50.80 mm), inclusive, having nominal wall thickness of 0.125 inch (3.18 mm) and under shall withstand, without formation of cracks or other visible defects, flaring at room temperature by being forced axially with steady pressure over a hardened and polished tapered steel pin having a 74-degree included angle to produce a flare having a permanent expanded OD not less than 1.2 times the original nominal OD.

3.5 Quality:

3.5.1 Cold drawn tubing, as received by purchaser, shall be uniform in quality and condition and shall have a finish conforming to the best practice for high quality aircraft tubing. It shall be smooth and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other imperfections detrimental to usage of the tubing. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered injurious if the imperfections are removable within the tolerances specified for wall thickness but removal of such imperfections is not required.

3.5.2 Hot finished tubing, 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 tubing.

3.6 Tolerances:

Shall be as follows:

3.6.1 Cold Drawn Tubing: Shall conform to all applicable requirements of AMS 2263 or MAM 2263.

3.6.2 Hot Finished Tubing:

3.6.2.1 (R) Length and Straightness: Shall conform to all applicable requirements of AMS 2243 or MAM 2243.

3.6.2.2 Diameter and Wall Thickness: Shall be as shown in Table 4.

TABLE 4A - Tolerances, Inch/Pound Units

Nominal OD Inches	OD Tolerance Inch Plus and Minus	Wall Thickness Tolerance % of Nominal Wall Thickness Plus and Minus
2.500 to 5.000, excl	0.031	12.5
5.000 to 9.250, incl	0.047	12.5

TABLE 4B - Tolerances, SI Units

Nominal OD Millimeters	OD Tolerance Millimeters Plus and Minus	Wall Thickness Tolerance % of Nominal Wall Thickness Plus and Minus
63.50 to 127.00, excl	0.79	12.5
127.00 to 234.95, incl	1.19	12.5

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of tubing shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1), tensile properties (3.4.1), and tolerances (3.6) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests for flarability (3.4.2) are periodic tests and shall be performed at a frequency selected by the manufacturer unless frequency of testing is specified by purchaser.