



AEROSPACE MATERIAL SPECIFICATION

AMS4575™**REV. F**

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Superseding AMS4575E

Nickel-Copper Alloy Tubing, Brazed, Corrosion Resistant
67 Ni - 31Cu
Annealed

UNS NO4400

RATIONALE

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1. SCOPE:

1.1 Form: This specification covers a corrosion-resistant nickel-copper alloy in the form of copper-furnace-brazed tubing.

1.2 Application: Primarily for fluid lines, such as primer and fuel lines, requiring corrosion resistance with relatively-high strength.

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 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
- 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

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- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASM E8 - Tension Testing of Metallic Materials
ASTM E76 - Chemical Analysis of Nickel-Copper 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, determined by wet chemical methods in accordance with ASTM E76 or by spectrographic or other analytical methods approved by purchaser:

	min	max
Nickel + Cobalt	63.0	--
Copper	28.0	34.0
Iron	--	2.5
Manganese	--	2.0
Cobalt (3.1.1)	--	1.0
Silicon	--	0.5
Carbon	--	0.3
Sulfur	--	0.024

- 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 drawn after brazing and annealed.

- 3.3 Properties: Tubing shall conform to the following requirements:

- 3.3.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM E8:

Tensile Strength, max	85,000 psi (585 MPa)
Elongation in 2 in. (50 mm) or 4D, min	32%

- 3.3.2 Flareability: Tubing shall withstand flaring, without formation of cracks or other visible defects, by being forced, at room temperature, axially with steady pressure over a hardened and polished tapered steel pin having a 74 deg included angle to produce a flare having a permanent expanded OD not less than 1.25 times the original nominal OD.

- 3.3.3 Pressure Test: Tubing shall show no bulges, leaks, pinholes, cracks, or other defects when subjected to an internal hydrostatic pressure (P), calculated from the following equation:

$$P = \frac{2St}{D}$$

where, P = Test pressure
S = 17,500 psi (120 MPa)
t = Minimum wall thickness
D = Nominal OD

- 3.4 Quality: Tubing, as received by purchaser, shall be uniform in quality and condition, sound, smooth, and free from foreign materials and from imperfections detrimental to usage of the tubing.

- 3.5 Tolerances: Shall conform to all applicable requirements of AMS 2263 or MAM 2263.

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. 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 tubing conforms to the requirements of this specification.

4.2 Classification of Tests:

- 4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are classified as acceptance tests and shall be performed on each heat or lot as applicable.
- 4.2.2 Periodic Tests: Tests to determine conformance to requirements for flarability (3.3.2) and pressure test (3.3.3) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.
- 4.3 Sampling : Shall be in accordance with AMS 2371 and the following:
- 4.3.1 Specimens for flarability test shall be full tubes or sections cut from tubes. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but not rounded.