AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 4087 B

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ALUMINUM ALLOY TUBING, SEAMLESS
4.5Cu - 1.5Mg - 0.6Mn (2024-O)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. APPLICATION: Parts and assemblies such as brackets where high strength, non-
Ø weldable material is required. Parts are usually heat treated to the T4 temper before use.

3. COMPOSITION:

	Copper	3.8 - 4.9
	Magnesium	1.2 - 1.8
	Manganese	0.30 - 0.9
	Iron	0.50 max
Ø	Silicon	0.50 max
	Zinc	0.25 max
	Chromium	0.10 max
	Other Impurities, each	0.05 max
	Other Impurities, total	0.15 max
	Aluminum	remainder

4. CONDITION: Annealed.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

Tensile Strength, psi	35,000 max

5.2 Flattening: Tubing having nominal wall thickness less than 10% of the nominal OD shall be capable of withstanding, without cracking, flattening sideways under a load applied gradually at room temperature until the outside dimension under load is equal to the flattening factor times the nominal wall thickness.

Nominal Wall Thickness Inch	Flattening Factor
0.049 and under	3
Over 0.049	4

5.2.1 If tubing does not pass the flattening test of 5.2, a section of the tube not less than 1/2 in. in length and embracing 1/3 to 1/2 the circumference of the tube shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal wall thickness of the tubing with axis of bend parallel to axis of tube and with inside of tube on inside of bend.

Nominal Wall Thickness Inch	Bend Factor
0.049 and under	1
Over 0.049	2

5.3 Flarability: Tubing with nominal OD of 0.375 in. and under shall be capable of being double-flared and tubing with nominal OD over 0.375 in. shall be capable of being single-flared without formation of cracks or other visible defects. Specimens for flaring may be cut from any portion of the tube, or an entire tube ø may be used as a specimen. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but not rounded except for sizes 0.375 in. and under. The specimen shall, at room temperature, be forced axially with steady pressure over a hardened and polished tapered steel pin having a 75 deg included angle, to produce a flare having the permanent expanded OD specified in the following table:

Nominal OD Inches	Expanded OD Inches, min	Nominal OD Inches	Expanded OD Inches, min
0.125	0.224	0.750	0.937
0.188	0.302	1.000	1.187
0.250	0.359	1.250	1.500
0.312	0.421	1.500	1.721
0.375	0.484	1.750	2.106
0.500	0.656	2.000	2.356
0.625	0.781		

5.3.1 Tubing with intermediate nominal OD shall take the same percentage flare as that for the next larger OD.

5.3.2 Tubing with nominal OD greater than 2.00 in. or less than 0.125 in. shall have flarability as agreed upon by purchaser and vendor.

5.4 Properties After Heat Treatment: Tubing after proper solution heat treatment and ø aging for not less than 4 days at room temperature shall conform to the following requirements:

5.4.1 Tensile Properties:

Nominal OD Inches	Nominal Wall Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000) psi, min	Extension Under Load in. in 2 in.	Elongation % in 2 in. min
0.250 to 2, incl	0.024 and under	62,000	40,000	0.0116	10
	Over 0.024 to 0.049, incl	62,000	40,000	0.0116	12
	Over 0.049 to 0.259, incl	62,000	40,000	0.0116	14
	Over 0.259 to 0.500, incl	62,000	40,000	0.0116	16
Over 2 to 8, incl	0.259 and under	62,000	40,000	0.0116	10
	Over 0.259 to 0.500, incl	62,000	40,000	0.0116	12

6. QUALITY: Tubing shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2203 as applicable and as specified below:

7.1 Diameter: Table 1, column headed "Mean Diameter".

8. REPORTS:

8.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, size, and quantity.

8.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, 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.

9. IDENTIFICATION:

9.1 Unless otherwise specified, each tube 0.25 in. and over in OD shall be marked with the manufacturer's identification, and, in addition, the alloy name or number and temper, or AMS 4087. The characters shall be of such size as to be clearly legible, shall be applied recurring at intervals not exceeding 2 ft using a suitable marking fluid, and shall not be obliterated by normal handling or heat treatment.