



AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N. Y. 10017

AMS 4087D

Superseding AMS 4087C

Issued 11-1-45

Revised 11-1-67

ALUMINUM ALLOY TUBING, SEAMLESS, DRAWN 4.4Cu - 1.5Mg - 0.60Mn (2024-0)

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for parts and assemblies such as brackets where high strength non-weldable material is required. Parts are usually heat treated to the T42 temper before use.
3. **COMPOSITION:**

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

4. **CONDITION:** Annealed.
5. **TECHNICAL REQUIREMENTS:** The product shall conform to the following requirements; tensile properties shall be determined in accordance with the latest issue of AMS 2355.
 - 5.1 **Tensile Properties:** The following requirements apply to tubing having a nominal wall thickness of \emptyset 0.018 to 0.500 in., inclusive:

Tensile Strength, psi	32,000 max
Yield Strength at 0.2% Offset or at 0.0069 in. in 2 in. Extension Under Load ($E = 10,500,000$), psi	15,000 max
 - 5.1.1 When a dispute occurs between purchaser and vendor over the yield strength values, yield strength \emptyset determined by the offset method shall apply.
 - 5.1.2 Tensile properties shall be as agreed upon by purchaser and vendor for tubing having nominal wall \emptyset thickness under 0.018 inch.
 - 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.

\emptyset	Nominal Wall Thickness	Flattening Factor
	Inch	
	Up to 0.049, incl	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
Up to 0.049, incl	1
Over 0.049	2

- 5.3 Flarability: Tubing with nominal OD of 0.375 in. and under 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 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 74 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	0.200	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	2.500	2.856
		3.000	3.356

- 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 3.000 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 aging for not less than 4 days at room temperature shall conform to the following requirements:

5.4.1 Tensile Properties:

Nominal Wall Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000)		Elongation % in 2 in.	
		Extension Under Load		Full	
		psi, min	in. in 2 in.	Strip	Section
0.018 to 0.024, incl	64,000	40,000	0.0116	--	10
Over 0.024 to 0.049, incl	64,000	40,000	0.0116	10	12
Over 0.049 to 0.259, incl	64,000	40,000	0.0116	10	14
Over 0.259 to 0.500, incl	64,000	40,000	0.0116	12	16