AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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ALUMINUM ALLOY TUBING (SEAMLESS)
Magnesium Silicon Chromium (53S-W)

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

2. COMPOSITION:

Silicon	45 to 65% of magnesium content
Magnesium	1.10 - 1.40
Chromium	0.15 - 0.35
Iron	0.35 max
Copper	0.10 max
Titanium	0.10 max
Manganese	0.10 max
Zinc	0.10 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

3. CONDITION: (a) Solution heat treated conforming to the following minimum physical properties:

Diameter	Wall Thickness	Tensile Strength	Yield Strength (0.2% Offset) or at Extension Indicated		
				Extension Under Load	
Inches	Inch	psi	psi	inch in 2 in.	Elongation % in 2 in.
1/4 to 2, incl.	0.025 - 0.049	28,000	14,000	0.0068	16
	0.050 - 0.259	28,000	14,000	0.0068	18
	0.260 - 0.500	28,000	14,000	0.0068	20
Over 2 to 8, incl.	0.025 - 0.049	28,000	14,000	0.0068	14
	0.050 - 0.259	28,000	14,000	0.0068	16
	0.260 - 0.500	28,000	14,000	0.0068	18

(b) The tubing shall be capable of being flattened sidewise under a gradually applied load, without cracking, to an outside dimension six times the wall thickness.

(c) When specified, the tubing shall be capable of being flared sufficiently for use in standard compression type fittings, using shop equipment and practices.

(d) Unless otherwise specified, the manufacturer shall apply an air pressure of 250 psi to the inside of each tube 1-1/2 inches or less in diameter, for a period of not less than 5 seconds, while the tube is immersed in water or other suitable liquid. The pressure test may be applied to the tube after reduction to size but before the final heat treatment. Any tube which leaks, as indicated by the formation of air bubbles in the liquid, shall be rejected.

4. PHYSICAL PROPERTIES: Unless otherwise specified, the tubing after precipitation treatment shall conform to the following minimum physical properties:

Diameter	Wall Thickness	Tensile Strength	Yield Strength (0.2% Offset) or at Extension Indicated		
				Extension Under Load	
Inches	Inch	psi	psi	inch in 2 in.	Elongation % in 2 in.
1/4 to 2, incl.	0.025 - 0.049	35,000	28,000	0.0096	12
	0.050 - 0.259	35,000	28,000	0.0096	14
	0.260 - 0.500	35,000	28,000	0.0096	16
Over 2 to 8, incl	0.025 - 0.049	35,000	28,000	0.0096	8
	0.050 - 0.259	35,000	28,000	0.0096	10
	0.260 - 0.500	35,000	28,000	0.0096	12

5. QUALITY: (a) Tubing shall be uniform in quality and condition, sound and free from foreign material and from internal and external defects detrimental to fabrication or to the performance of parts in service. Tubing revealing defects during fabrication shall be subject to rejection.

(b) Tubing and parts made therefrom shall be subject to inspection by any method which will reveal defects.

6. TOLERANCES: Unless otherwise specified, tolerances shall conform to AMS 2203 as applicable for heat-treatable alloys and/or as specified below:

(a) Diameter--Table I, columns headed "Mean Diameter" and "Individual Diameter".

(b) Wall Thickness--Table II, columns headed "Mean Wall Thickness" and "Individual Wall Thickness".

7. REPORTS: (a) Unless otherwise specified, the vendor of tubing shall furnish three copies of a notarized report stating that the physical properties and chemical composition of the tubing are within the requirements specified. This report shall include the purchase order number, material specification number, size and quantity.

(b) Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment, three copies of a notarized report showing the purchase order number, material specification number, contractor or other direct supplier of tubing part number, and quantity. When tubing for making parts is produced or purchased by the parts vendor, the vendor shall inspect each lot of tubing to determine conformance to the requirements of this specification, and shall include in the above report, a certification that the tubing conforms, or shall include copies of the laboratory report showing the results of tests to determine conformance.

8. IDENTIFICATION: (a) Unless otherwise specified, each tube 5/8 inch in diameter and over shall be marked with the manufacturer's identification, and, in addition, the alloy name or number or AMS 4076, and the temper. The characters shall not be less than 1/8 inch in height and shall be applied continuously at intervals not exceeding 2 feet. The characters shall be clearly legible and applied to the tubing by suitable means and suitable marking fluid, and shall not be obliterated by normal handling or heat treatment.