AERONAUTICAL MATERIAL SPECIFICATION

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ALUMINUM ALLOY TUBING
Magnesium-Silicon-Chromium (53S-W)

1. ACKNOWLEDGMENT: A vendor must mention this specification number 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	0.03 max
Other Impurities, each	0.03 max
Other Impurities, total	0.10 max
Aluminum	remainder

3. CONDITION: (a) The material shall be supplied in the quenched (W) condition conforming to the following minimum physical properties: The yield strength may be taken at 0.2% set or at the extension under load as tabulated below.

Diameter (Inch)	Wall Thickness (Inch)	Tensile Strength Lbs.per Sq.In.	Yield Strength At 0.2% Set Lbs.per Sq.In.	Extension Under Load In.perIn.	Elongation (Per cent in 2 inch
1/4 to 2	0.025 to 0.049	28,000	14,000	0.0034	16
	0.050 to 0.259	28,000	14,000	0.0034	18
	0.260 to 0.500	28,000	14,000	0.0034	20
Greater than 2 to 8	0.025 to 0.049	28,000	14,000	0.0034	14
	0.050 to 0.259	28,000	14,000	0.0034	16
	0.260 to 0.500	28,000	14,000	0.0034	18

(b) Flattening Test: The tubing shall withstand being flattened sidewise without cracking, in an oval shape until the minimum inside dimension is not less than four times the wall thickness of the tubing.

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

(d) Pressure Test: Air pressure of 250 pounds per square inch shall be applied to the inside of each tube 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, shall be rejected.

(e) Unless otherwise specified by the purchaser, tubing supplied to this specification shall be capable of attaining the following physical properties when given an aging treatment in accordance with the manufacturer's recommendations.

Diameter (Inch)	Wall Thickness (Inch)	Tensile Strength Lbs.per Sq.In.	Extension Under Load In. per In.	Yield Strength Lbs.per Sq.In.	Elongation (Per Cent in 2 inch)
1/4 to 2	0.025 to 0.049	35,000	.0048	28,000	12
	0.050 to 0.259	35,000	.0048	28,000	14
	0.260 to 0.500	35,000	.0048	28,000	16
Greater than 2 to 8	0.025 to 0.049	35,000	.0048	28,000	8
	0.050 to 0.259	35,000	.0048	28,000	10
	0.260 to 0.500	35,000	.0048	28,000	12

4. QUALITY: The material shall be seamless, uniform in quality and temper, clean and smooth, and free from seams, laminations, blisters and other defects. Material revealing defects during fabrication is subject to rejection.

5. TOLERANCE: (a) Diameter: The diameter of the tubing at any section shall not vary from the nominal diameter by more than the following tolerances; all dimensions being in inches:

Nominal Diameter	Tolerance, Plus or Minus	
	Mean Diameter Measurement	Individual Diameter Measurement
1/4 to 1/2, incl.	0.003	0.006
Over 1/2 to 1 "	0.004	0.008
Over 1 to 2 "	0.005	0.010
Over 2 to 3 "	0.006	0.012
Over 3 to 5 "	0.008	0.016
Over 5 to 6 "	0.010	0.020
Over 6 to 8 "	0.015	0.030
Over 8 to 10 "	0.020	0.040

NOTE: The tolerance of individual measurements shall not apply to tubes in which the wall thickness is less than 2.5 per cent of the diameter or less than 0.020 in. Such thin wall tubes shall be commercially round.

(b) See page 3.