AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5053

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STEEL TUBING (WELDED)
Low Carbon

1. ACKNOWLEDGMENT: A vendor must mention this specification number in all quotations and when acknowledging purchase orders.

2. TYPE: The tubing shall be made from flat rolled steel by an approved continuous welding process without any extraneous additions of weld metal.

3. COMPOSITION:

Carbon	0.15 max
Manganese	0.60 max
Phosphorus	0.048 max
Sulphur	0.058 max

4. GRAIN SIZE: Shall be fine and uniform in all parts of the tubing.

5. CONDITION: Normalized or annealed to conform to a minimum elongation of 35% in 2 inches with a full section test piece, or 25% in 2 inches with a strip test piece.

6. QUALITY: (a) This tubing must be aircraft quality, uniform in temper and must not reveal defects during the fabrication processes.

(b) The tubing shall have a good workmanlike finish conforming to the best practice for high cuality aircraft material. It shall be smooth, clean, and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other injurious defects. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered as injurious defects, provided the imperfections are removable within the tolerances specified herein for diameter and wall thickness. The removal of surface imperfections is not required.

(c) If beads are present at the welds on the inner surfaces of the tubing, such beads shall not be thicker than .007 unless otherwise specified. The outer surfaces of the tubing shall be free from beading.

7. TOLERANCES: (a) The following variations in nominal outside diameter for the available standard sizes listed are permissible; all dimensions are in inches:

Nominal Outside Diameter	Wall Thickness	Tolerance, plus or minus
Up to 3/8, incl.	0.028 to 0.083, incl.	0.003
1/2	0.028 to 0.095, incl.	0.004
5/8	0.028 to 0.065, incl.	0.005
3/4 to 1, incl.	0.028 to 0.049, incl.	0.005
3/4 to 1, incl.	0.065 to 0.109, incl.	0.004
1-1/8 to 2, incl.	0.065 to 0.109, incl.	0.005
1-1/8 to 2, incl.	0.035 to 0.049, incl.	0.006
2-1/8 to 2-1/2, incl.	0.035 to 0.109, incl.	0.007
2-5/8 to 3, incl.	0.049 to 0.109, incl.	0.010

(b) The following variations in nominal wall thickness for the outside diameter ranges indicated are permissible; all dimensions are in inches:

Nominal Wall Thickness	Outside Diameter	Tolerance, plus or minus
0.028 to 0.049, incl.	3/8 to 7/8, incl.	0.003
0.058 to 0.083, incl.	3/8 to 7/8, incl.	0.004
0.028 to 0.035, incl.	1 to 2, incl.	0.003
0.049 to 0.083, incl.	1 to 2, incl.	0.004
0.095 to 0.109, incl.	1 to 2, incl.	0.005
0.095 to 0.109, incl.	2 to 3, incl.	0.006
0.035 to 0.083, incl.	2 to 3, incl.	0.004

(c) In no portion of any piece of tubing shall the departure from straightness exceed one part in 800 parts of length.

8. TESTS: (a) Each length of tubing shall be subjected to a non-destructive test by the tube manufacturer for the detection of injurious imperfections. The method of testing shall be capable of detecting all imperfections, interior and exterior, with a length greater than 1/16 inch and a total depth equivalent to half the wall thickness of the tube.

(b) At least one crushing test sample shall be selected from each 1000 feet or less of each lot of tubing in the shipment. Test specimens shall have a length equal to 1-1/2 times the outside diameter and shall withstand crushing under a gradually applied load until the cross sectional dimension is increased in one zone by 20 per cent, or until one complete fold is formed, or until the specimen is reduced in length to 2/3 of the original length, without failure of the weld occurring.

(c) The tubing shall be capable of being expanded on a hardened and polished, tapered steel pin having a 60° included angle, to a diameter 50% greater than the original, without cracking.

(d) At least one flattening test sample shall be selected from each 1000 ft or less of each lot of tubing in the shipment. Test specimens shall have a length of at least six inches and shall be flattened, so that the weld becomes one edge of the flattened specimen, without failure of the weld occurring. The specimen shall be flattened until the distance between the faces of the mashing fixtures is three times the wall thickness.

9. REPORTS: The manufacturer shall furnish three copies of a notarized report of the chemical composition and the results of the non-destructive test required by section 8 of each size and heat in each shipment. This report shall include the purchase order number, material specification number, heat number, size and quantity. If parts are supplied, the part numbers shall also be included.