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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 2243F

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Superseding AMS 2243E

TOLERANCES Corrosion and Heat Resistant Steel Tubing

1. **SCOPE:** This specification covers manufacturing tolerances applicable to seamless and welded tubing of corrosion and heat resistant steel ordered to inch dimensions. These tolerances apply to all conditions and are based on individual measurements, unless otherwise noted. Tubing may be specified by two dimensions only (OD and wall thickness, ID and wall thickness, or OD and ID).
2. **DIAMETER:**
 - 2.1 Tubing Other than Pressure Tubing; Welded (See 2.1.1) or Seamless (See 2.1.2):

TABLE I

Specified OD or ID Inches	Tolerance, Inch Including Ovality (See 2.3) Plus and Minus
Up to 0.5, excl	0.005
0.5 to 1.5, excl	0.005
1.5 to 3.5, excl	0.010
3.5 to 5.5, excl	0.015
5.5 and over	0.031

- 2.1.1 Welded Tubing: Shall be bead-reduced or shall be cold finished by tube-reducing, cold-drawing, machining, or grinding.
- 2.1.2 Seamless Tubing: Shall be cold-finished by tube-reducing, cold-drawing, machining, or grinding.

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2.2 Pressure Tubing; Cold Drawn or Cold Reduced (Seamless or Welded):TABLE II

Specified OD Inches	OD or ID Tolerance, Inch Including Ovality (See 2.3) Plus and Minus
Up to 0.500, incl	0.003
Over 0.500 to 1.0, excl	0.004
1.0 to 1.5, excl	0.005
1.5 to 2.0, excl	0.006
2.0 to 2.5, excl	0.007
2.5 to 3.5, excl	0.010
3.5 to 5.5, excl	0.015
5.5 to 8.0, excl	0.030
8.0 to 8.625, incl	0.045

- 2.3 Ovality, All Tubing: All of the tolerances shown in Tables I and II include ovality except on light-walled tubing where the specified wall thickness is 3% or less of the specified OD. On such light-walled tubing, there is an additional ovality tolerance (in addition to the tabular tolerances) equal to +0.5% of the specified OD (or ID); however, the average diameter shall be within the tabular tolerances.

3. WALL THICKNESS:3.1 Tubing Other than Pressure Tubing; Welded or Seamless:TABLE III

Specified OD or ID Inches	Wall Thickness Tolerance, % Plus and Minus For Wall Thicknesses, Inch, Shown	
	Under 0.250	0.250 and Over
Up to 0.5, excl	15	15
0.5 to 1.5, excl	12.5	10
1.5 to 3.5, excl	12.5	10
3.5 to 5.5, excl	12.5	10
5.5 and over	12.5	10

- 3.2 Pressure Tubing; Seamless or Welded: Shall be +10% for all specified diameters.

4. LENGTH: When cut lengths are specified, the following tolerances apply to $\emptyset$ straight tubing in lengths up to 24 ft, inclusive. For each 10 ft or fraction thereof beyond 24 ft, an additional +1/8 in. tolerance is permitted up to a maximum of 1/2 inch.

TABLE IV

Specified OD Inches	Tolerance, Inch Plus Only
Up to 1.5, incl	1/8
1.5, excl	3/16

5. STRAIGHTNESS: The maximum allowable deviation from a straight edge shall be as shown in Table V. These tolerances apply to all types of tubing to which this specification applies.

TABLE V

Specified OD or ID Inches	Maximum Curvature in any 3 ft Inch	Maximum Curvature in Total Length Inch
Up to 5.0, incl	0.030	0.010 x length in feet
Over 5.0 to 8.0, incl	0.045	0.015 x length in feet
Over 8.0	0.060	0.020 x length in feet

6. NOTES:

6.1 Definitions:

- 6.1.1 The term "excl" (exclusive) applies only to the upper limit of a specified range.
- 6.1.2 The term "incl" (inclusive) applies to both upper and lower limits of a specified range.
- 6.1.3 The mean diameter is the average of two diameter measurements, either OD or ID, taken at right angles to each other in the same cross-section of tubing.
- 6.1.4 Ovality is the difference between the maximum and minimum diameters (either OD or ID) of any plane at 90 deg to the axis of a tube.
- 6.1.5 Pressure tubing is tubing intended primarily for the transmission of liquids or gasses. Such tubing is usually used without machining.

- 6.2 Marginal Indicia: The phi ($\emptyset$) symbol is used to indicate technical changes from the previous issue of this specification.