

# AEROSPACE MATERIAL SPECIFICATION

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Superseding AMS 2243F

## 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).

1.1 MAM 2243, specified in SI (metric) units, is the equivalent of this AMS.

### 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.

2.2 Pressure Tubing (See 6.1.5); Cold Drawn or Cold Reduced (Seamless or Welded):

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TABLE II

Specified OD or ID Inches	OD or ID Tolerance, Inch Including Ovality (See 2.3) Plus and Minus
Up to 0.5, incl	0.003
Over 0.5 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

2.2.1 Half Tolerances: When half tolerances are specified, the tolerances of Table II shall be plus only; the minus side of the tolerance range shall not be applicable.

### 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  $\pm 0.5\%$  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 or Minus	
	For Wall Thickness, 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 (See 6.1.5); Seamless or Welded:

Shall be  $\pm 10\%$  for all specified diameters.

3.2.1 Half Tolerances: When half tolerances are specified, tolerance shall be  $\pm 10\%$ , -0%.

## 4. LENGTH:

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

TABLE IV

Specified OD or ID Inches	Tolerance, Inch Plus Only
Up to 1.5, incl	1/8
Over 1.5	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 feet 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 taken at right angles to each other in the same cross-section of tubing.