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**AEROSPACE
MATERIAL
SPECIFICATION**

Submitted for recognition as an American National Standard

AMS 2203J

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Superseding AMS 2203H

TOLERANCES
Aluminum Alloy Drawn Tubing

THIS REVISION CONTAINS ONLY EDITORIAL CHANGES

1. **SCOPE:** This specification covers established manufacturing tolerances applicable to aluminum alloy drawn tubing ordered to inch/pound dimensions. These tolerances apply to all conditions, unless otherwise noted. The term "excl" applies only to the higher figure of the specified range.
- 1.1 MAM 2203, specified in SI (metric) units, is the equivalent of this AMS.
2. **DIAMETER, WIDTH, OR DEPTH:**
 - 2.1 **Round:**

TABLE 1

Tolerance, Inch, Plus and Minus (See Note 2)
Diameter at Any Point (Ovality)
(See Note 3)

Specified OD or ID Inches (See Note 1)	Mean Diameter (See Note 4)	Tolerance, Inch, Plus and Minus (See Note 2)	
		Non-Annealed and Non-Heat Treated Tube	Heat Treated Tube Annealed (See Note 5) Tube
Up to 0.500, incl	0.003	0.003	0.006
Over 0.500 to 1.000, incl	0.004	0.004	0.008
Over 1.000 to 2.000, incl	0.005	0.005	0.010
Over 2.000 to 3.000, incl	0.006	0.006	0.012
Over 3.000 to 5.000, incl	0.008	0.008	0.016
Over 5.000 to 6.000, incl	0.010	0.010	0.020
Over 6.000 to 8.000, incl	0.015	0.015	0.030
Over 8.000 to 10.000, incl	0.020	0.020	0.040
Over 10.000 to 12.000, incl	0.025	0.025	0.050

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2.2 Square, Rectangular, Hexagonal, and Octagonal:

TABLE II

Specified Width or Depth Inches (See Note 1)	Tolerance, Inch, Plus and Minus (See Note 2)		
	At Corners	Not at Corners (See Note 3 and 9)	
	Square and Rectangular	Square, Hexagonal, and Octagonal	Rectangular
Up to 0.500, incl	0.003	0.006	The tolerance for the width is the value in the preceding column for a dimension equal to the depth, and conversely, but in no case less than that for its own dimension at the corners (See Note 6).
Over 0.500 to 1.000, incl	0.004	0.008	
Over 1.000 to 2.000, incl	0.005	0.010	
Over 2.000 to 3.000, incl	0.006	0.012	
Over 3.000 to 5.000, incl	0.008	0.016	
Over 5.000 to 6.000, incl	0.010	0.020	
Over 6.000 to 8.000, incl	0.015	0.030	
Over 8.000 to 10.000, incl	0.020	0.040	
Over 10.000 to 12.000, incl	0.025	0.050	

2.3 Streamline, Oval, and Elliptical: The equivalent round diameter is the diameter of a circle having a circumference equal to the perimeter of the tube.

TABLE III

Equivalent Round Diameter Inches (See Note 1)	Tolerance, Inch			
	Major Axis		Minor Axis	
	Plus	Minus	Plus	Minus
Up to 2.500, incl	0.040	0.025	0.025	0.015
Over 2.500 to 4.250, incl	0.050	0.035	0.035	0.025
Over 4.250 to 6.000, incl	0.070	0.050	0.055	0.040
Over 6.000 to 8.000, incl	0.100	0.085	0.080	0.060
Over 8.000 to 10.000, incl	0.160	0.140	0.115	0.085

3. **WALL THICKNESS:** When the dimensions specified are outside and inside, rather than wall thickness itself, the allowable deviation at any point is $\pm 10\%$ of the mean wall thickness but not less than ± 0.003 inch.

TABLE IV

Specified Wall Thickness Inch (See Note 1)	Mean Wall Thickness from Specified Wall Thickness (See Note 7)	Tolerance, Inch, Plus and Minus (See Note 2)	
		Round, Non-Heat Treatable (See Note 8)	Wall Thickness at any Point from Specified Wall Thickness (Eccentricity) Round, Heat Treatable; All Tubing Other Than Round; and All Coiled Tubing
0.010 to 0.035, incl	0.002	0.002	
Over 0.035 to 0.049, incl	0.003	0.003	
Over 0.049 to 0.083, incl	0.004	0.004	
Over 0.083 to 0.120, incl	0.005	0.006	10% of specified wall thickness;
Over 0.120 to 0.203, incl	0.006	0.008	0.003 inch, minimum
Over 0.203 to 0.300, incl	0.008	0.012	
Over 0.300 to 0.375, incl	0.015	0.020	
Over 0.375 to 0.500, incl	0.020	0.030	

4. **LENGTH:**4.1 **Straight Tubing:**

TABLE V

Specified OD, Width, or Major Axis Inches	Tolerance, Inch, Plus Only			
	Length Ranges, Feet			
	Up to 12, incl	Over 12 to 30, incl	Over 30 to 50, incl	Over 50
Up to 0.250, excl	1/4	3/8	1/2	-
0.250 to 3.000, excl	1/8	1/4	3/8	1
3.000 to 8.000, excl	3/16	5/16	7/16	1
8.000 and over	1/4	3/8	1/2	1

4.2 **Coiled Tubing:**

TABLE VI

Specified OD or Width Inches	Tolerance, %, Plus and Minus Except as Indicated			
	Length Ranges, Feet			
	Up to 100, incl	Over 100 to 250, excl	250 to 500, excl	500 and over
Up to 1.250, excl	-0, +5	10	15	20

5. STRAIGHTNESS:5.1 Straight Tubing:TABLE VII

Specified OD or Width Inches	<u>Tolerance, Inches (See Notes 9 and 10)</u>
	In total length or in any measured segment of one foot or more of total length
Up to 0.375, excl	0.500 x Length in feet
0.375 to 6.000, excl	0.010 x Length in feet
6.000 and over	0.020 x Length in feet

6. FLATNESS:6.1 Square, Rectangular, Hexagonal, and Octagonal:TABLE VIII

Specified Width, Depth or Distance Between Parallel Sides Inches	<u>Tolerance, Inch</u> (See Note 12)
	Up to 0.500, incl
Over 0.500 to 1.000, incl	0.004
Over 1.000 to 2.000, incl	0.005
Over 2.000 to 3.000, incl	0.006
Over 3.000 to 5.000, incl	0.008
Over 5.000 to 6.000, incl	0.010
Over 6.000 to 8.000, incl	0.015
Over 8.000 to 10.000, incl	0.020
Over 10.000 to 12.000, incl	0.025

7. TWIST:7.1 Square, Rectangular, Hexagonal, and Octagonal:TABLE IX

Specified Width Inches	<u>Tolerance, Degrees (See Notes 9 and 10)</u>
	In total length or in any measured segment of one foot or more of total length
Up to 1.500, excl	1 per foot; 7 maximum
1.500 to 3.000, excl	1/2 per foot; 5 maximum
3.000 and over	1/4 per foot; 3 maximum