

TOLERANCES
Aluminum Alloy Drawn Tubing

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.

2. **DIAMETER, WIDTH, OR DEPTH:**

2.1 **Round:**

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TABLE I

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)	Diameter at Any Point (Ovality) (See Note 3)	
		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 0.018
Over 0.500 to 1.000, incl	0.004	0.004	0.008 0.024
Over 1.000 to 2.000, incl	0.005	0.005	0.010 0.030
Over 2.000 to 3.000, incl	0.006	0.006	0.012 0.036
Over 3.000 to 5.000, incl	0.008	0.008	0.016 0.048
Over 5.000 to 6.000, incl	0.010	0.010	0.020 0.060
Over 6.000 to 8.000, incl	0.015	0.015	0.030 0.090
Over 8.000 to 10.000, incl	0.020	0.020	0.040 0.120
Over 10.000 to 12.000, incl	0.025	0.025	0.050 0.150

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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)	<u>Tolerance, Inch, Plus and Minus (See Note 2)</u>		
	Mean Wall Thickness from Specified Wall Thickness (See Note 7)	<u>Wall Thickness at any Point from Specified Wall Thickness (Eccentricity)</u>	
		Round, Non-Heat Treatable (See Note 8)	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	10% of specified
Over 0.083 to 0.120, incl	0.005	0.006	wall thickness;
Over 0.120 to 0.203, incl	0.006	0.008	0.003 in., min
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	<u>Tolerance, Inch, Plus Only</u>			
	<u>Length Ranges, Feet</u>			
	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	<u>Tolerance, %, Plus and Minus Except as Indicated</u>			
	<u>Length Ranges, Feet</u>			
	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

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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 L in ft	
0.375 to 6.000, excl	0.010 x L in ft	
0.600 and over	0.020 x L in ft	

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	0.003
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 ft; 7 max	
1.500 to 3.000, excl	1/2 per ft; 5 max	
3.000 and over	1/4 per ft; 3 max	