

AERONAUTICAL MATERIAL SPECIFICATION

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TOLERANCES Aluminum and Aluminum Alloy Bars, Rods and Shapes Extruded

1. **PURPOSE:** To publish established manufacturing tolerances.
2. **APPLICATION:** Tolerances shown herein apply, unless otherwise agreed between purchaser and vendor. These tolerances apply to all conditions, unless otherwise noted.
3. **DIAMETER OR THICKNESS:**

TABLE I

Specified Dimension
Inches

Tolerance (1), Inch, Plus and Minus

For Dimensions Taken at a Point Where 75% or More is Metal	For Dimensions Taken At a Point Where Over 25% is Space
Rods and Bars Only	Shapes (2) Where the Space is Completely Enclosed
	Where the Space is Not Completely Enclosed
	Where Metal on Both Sides is 1/8 in. Thick or more and Projects Less Than 2 in.
	Where Metal on Either Side is Less than 1/8 in. Thick or Project 2 in. or More

0.063 and under	0.006	0.006	0.010	0.010	0.020
Over 0.063 to 0.125, incl.	0.007	0.007	0.010	0.010	0.020
Over 0.125 to 0.250, incl.	0.007	0.008	0.015	0.015	0.030
Over 0.250 to 0.375, incl.	0.007	0.009	0.015	0.015	0.030
Over 0.375 to 0.500, incl.	0.007	0.010	0.015	0.015	0.030
Over 0.500 to 0.750, incl.	0.010	0.012	0.020	0.020	0.040
Over 0.750 to 1.000, incl.	0.010	0.014	0.020	0.020	0.040
Over 1.000 to 1.500, incl.	0.012	0.017	0.025	0.025	0.050
Over 1.500 to 2.000, incl.	0.012	0.020	0.025	0.025	0.050
Over 2.000 to 4.000, incl.	0.015	0.025	0.035	0.035	0.070
Over 4.000 to 6.000, incl.	0.035	0.035	0.045	0.045	0.090
Over 6.000 to 8.000, incl.	0.045	0.045	0.055	0.055	0.110
Over 8.000 to 10.000, incl.	0.055	0.055	0.065	0.065	0.130
Over 10.000 to 12.000, incl.	0.065	0.065	0.080	0.080	0.160

- (1) The sum of the tolerances of component dimensions shall not be used as a tolerance for an overall dimension.



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- (2) For hollow shapes, the standard tolerances on the thickness of the walls surrounding the opening are plus and minus 20% of the specified thickness when the area of the opening is less than 0.1105 square inch (less than 3/8 inch diameter or equivalent) and plus and minus 10% when the area is 0.1105 square inch or greater. The minimum tolerance is 0.010 inch and the maximum 0.060 inch.

4. WIDTH: See Section 3.

5. LENGTH:

TABLE II	
Specified Length	Tolerance, Inch
Feet	Plus Only
Under 10.0	1/8
10.0 to 30.0 excl.	1/4
30.0 and over	1/2

6. STRAIGHTNESS:

TABLE III		
Circumscribed Circle Diameter (1) Inches	Minimum Thickness Inches	Tolerance (2), Inch In Each Foot of Length
Under 1.5	0.094 and under	0.050 (3)
Under 1.5	Over 0.094	0.0125
1.5 and over	--	0.0125

- (1) The circumscribed circle diameter is the diameter of the smallest circle that will completely enclose the shape.
- (2) Allowable deviation from a straight line. These tolerances are not applicable to extruded shapes in the annealed temper.
- (3) When weight of shape on flat surface minimizes deviation.

7. FLATNESS: The deviation from flatness shall not exceed 0.004 inch for widths 1 inch and under and 0.004 inch per inch of width for widths over 1 inch.

8. ANGULARITY:

TABLE IV	
Thickness of Thinnest Leg Inch	Angular Tolerance, Degrees Plus and Minus
Under 0.188	2.0
0.188 and over	1.5

9. TWIST:

TABLE V		
Circumscribed Circle Diameter (1) Inches	Tolerance (2), Degrees	
	In Each Foot of Length	In Total Length of Piece
Under 1.5	1°	1° x length in feet
1.5 to 3.0, excl.	1/2°	1/2° x length in feet, not over 5°
3.0 and over	1/4°	1/4° x length in feet, not over 3°