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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 2245A

Issued DEC 1973
Revised JAN 1983
Reaffirmed APR 1992

Superseding AMS 2245

Tolerances
Titanium and Titanium Alloy Extruded Bars, Rods, and Shapes

1. SCOPE:

This specification covers established inch/pound manufacturing tolerances applicable to titanium and titanium alloy extruded bars, rods, and shapes 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 OR THICKNESS:

TABLE I

Specified Diameter or Distance Between Parallel Sides Inches	Tolerance, Inch, Plus and Minus (See 11.2)
Up to 0.500, excl	0.020
0.500 to 1.000, excl	0.030
1.000 to 2.000, excl	0.040
2.000 to 3.000, excl	0.050
3.000 to 5.000, excl	0.060
5.000 and over	0.125

3. CORNER AND FILLET RADII:

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3.1 Bars and Shapes (See Fig. 1):

TABLE II

Specified Radius Inches	Tolerance, Inch, Plus and Minus	
	Difference Between Specified Radius and Corner Radius (A)	Difference Between Specified Radius and Fillet Radius (B)
All	0.031	0.062

4. ANGULARITY (SEE 11.3):

4.1 Shapes (See Fig. 2):

TABLE III

Minimum Specified Leg or Metal Thickness Inches	Tolerance (Allowable Deviation from Specified Angle) Degrees, Plus and Minus
	(Ratio: Leg or surface length shall not exceed 14 times the leg or metal thickness.)
All	2

5. TRANSVERSE FLATNESS:

5.1 Bars and Shapes (See Fig. 3):

TABLE IV

Surface Width (W) Inches	Tolerance (Allowable Deviation from Flat) Inch
Up to 1.000, excl	0.010
1.000 and over	0.010 x W
In any 1 inch of width	0.010

6. STRAIGHTNESS (SEE FIG. 4):

TABLE V

Specified Diameter (Rod) Specified Width (Bar) Circumscribing Circle Diameter (See 11.5) Inches	Tolerance, Inch (See 11.4)	
	In any Foot or Less of Length	In Total Length Of Piece
All	0.025	0.025 x length, ft

7. TWIST (SEE 11.6):

7.1 Bars and Shapes (See Fig. 5):

TABLE VI

Specified Width (Bars)		Tolerance, Degrees	
Circumscribing Circle Diameter (See 11.5) Inches	Minimum Thickness Inches	In any Foot or Less of Length	In Total Length of Piece
All	All	1	1 x length ft; 3 max

8. LENGTH:

TABLE VII

Circumscribing Circle Diameter (Shapes); Specified Diameter (Rod); Specified Width (Bar) Inches (See 11.5)	Tolerance, Inch, Plus Only Length Ranges, Feet		
	Up to 10, Incl	Over 10 to 20, Incl	Over 20
Up to 3.000, excl	1/4	5/16	3/8
3.000 to 5.000, excl	5/16	7/16	1/2
5.000 to 9.000, excl	3/8	1/2	5/8

9. SQUARENESS OF CUT ENDS:

Ends shall not deviate from square by more than 3 degrees.

10. SURFACE ROUGHNESS:

TABLE VIII

Specified Section Thickness Inches	Depth of Imperfection Inch, Maximum (See 11.7, 11.8)
Up to 0.250, incl	0.008
Over 0.250 to 0.500, incl	0.010
Over 0.500	0.015

11. NOTES:

11.1 Marginal Indicia:

No phi (¢) symbol is used to indicate technical changes from the previous issue of this specification because the only changes were to remove metric (SI) values, as shown in MAM 2245, from this specification.

11.2 Allowable deviation from specified dimension when diameter of circumscribing circle is less than 7 inches.

11.3 Angles are measured with protractors or with gauges. As illustrated, a four point contact system is used, two contact points being as close to the angle vertex as practical, and the others near the ends of the respective surfaces forming the angle. Between these points of measurement, surface flatness is the controlling tolerance.

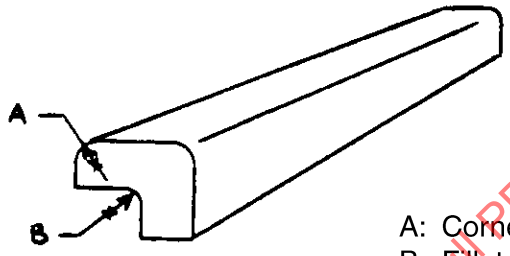
11.4 When weight of piece on flat surface minimizes deviation.

11.5 The circumscribing circle diameter is the smallest circle that will completely enclose the cross-section of the extruded product.

11.6 Twist is normally measured by placing the extruded section on a flat surface and measuring the maximum distance at any point along its length between the bottom surface of the section and the flat surface. From this measurement, the deviation from true straightness of the section is subtracted. The remainder is the twist. To convert the standard twist tolerance to an equivalent linear value, the tangent of the standard tolerance is multiplied by the width of the surface of the section that is on the flat surface.

11.7 The depth of local defects, such as gouges, dents, die lines, laps, and handling marks shall be included within the minimum dimensions permitted by the tolerances of Table I.

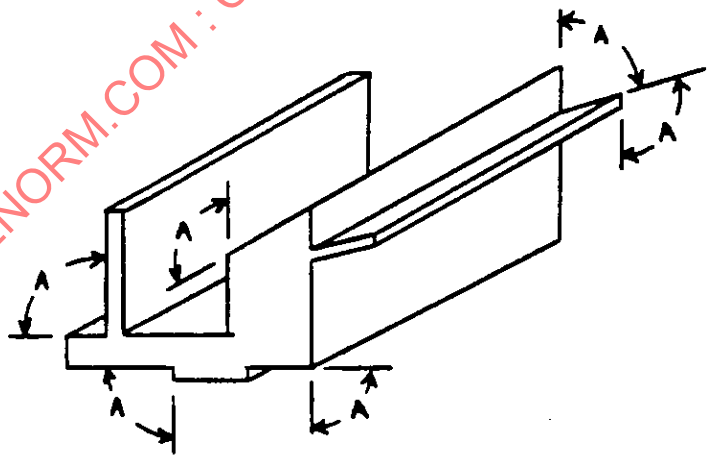
11.8 A maximum roughness equivalent approximately to 250 microinches will be permitted. This value should be used as a guide only because surface texture standards are established primarily for machined surfaces. The surface texture standard may not be directly applicable in all respects to extruded surfaces.



A: Corner Radius
B: Fillet Radius

CORNER AND FILLET RADII DIMENSIONS

FIGURE 1



ANGULARITY OF SHAPED SECTION

FIGURE 2