

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 2204F

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Superseding AMS 2204E

TOLERANCES Aluminum Alloy Standard Structural Shapes

1. **SCOPE:** This specification covers established manufacturing tolerances applicable to aluminum alloy standard structural shapes ordered to inch/pound dimensions. Standard structural shapes are shapes in certain standard alloys, tempers, sizes, and sections such as angles, channels, Tees, Zees, I-Beams, and H-Beams commonly used for structural purposes. These tolerances apply to all conditions, unless otherwise noted. The term "excl" applies only to the higher figure of the specified range.
2. **CROSS-SECTIONAL DIMENSIONS:** Applicable tolerances are those found in
Ø AMS 2205 when shape is produced by the extension process. When shape is produced by rolling, the tolerances of Tables I and II apply.

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- 2.1 Structural Shapes Where Depth, Flange Width, or Stem Height is Less Than 8.000 Inches: Depth tolerance applies only at web. Depth across other points is controlled by angularity tolerance.

TABLE I

Specified Dimension	Shape	Tolerance, Percent of Specified Dimension or Inch
Thickness	Angles, Channels, Tees, Zees, I-Beams, and H-Beams	$\pm 2.5\%$ or ± 0.010 inch, whichever is greater
Flange Width	Angles and Zees	$\pm 2.5\%$ or $\pm 1/16$ inch, whichever is greater
Flange Width	Channels, Tees, I-Beams, and H-Beams	$\pm 4\%$
Depth	Zees and H-Beams	$\pm 2.5\%$ or $\pm 1/16$ inch, whichever is greater
Depth	Channels and I-Beams	$+3/32$, $-1/16$ inch
Stem Height	Tees	$\pm 2.5\%$ or $\pm 1/16$ inch, whichever is greater

- 2.2 Structural Shapes Where Depth, Flange Width, or Stem Height is 8.000 to 15.000 Inches, Incl: Depth tolerance applies only at web. Depth across other points is controlled by angularity tolerance.

TABLE II

Specified Dimension	Shape	Tolerance, Percent of Specified Dimension or Inch
Thickness	I-Beams, H-Beams, and Channels	$\pm 3\%$ or ± 0.015 inch, whichever is greater
Thickness	Angles, Tees, and Zees	$\pm 2.5\%$ or ± 0.015 inch, whichever is greater
Flange Width	I-Beams, Channels, and Tees	$\pm 4\%$
Flange Width	H-Beams	$\pm 4\%$ or $\pm 1/4$ inch, whichever is greater
Flange Width	Angles	$\pm 2.5\%$ or $\pm 3/16$ inch, whichever is greater
Flange Width	Zees	$\pm 2.5\%$ or $\pm 3/32$ inch, whichever is greater
Depth	I-Beams, Channels, and Zees	$\pm 2.5\%$ or $\pm 1/4$ inch, whichever is greater
Depth	H-Beams	$\pm 3\%$ or $\pm 1/4$ inch, whichever is greater
Stem Height	Tees	$\pm 2.5\%$ or $\pm 1/4$ inch, whichever is greater

3. LENGTH:

TABLE III

Specified Depth, Flange Width, or Stem Height (Whichever is Greater) 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 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. STRAIGHTNESS (Allowable deviation from straight): When weight of shape on flat surface minimizes deviation.

TABLE IV

In total length or in any measured segment of one foot or more of total length	0.025 inch x length in feet
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5. TWIST: When weight of shape on flat surface minimizes deviation.

TABLE V

Specified Depth, Flange Width, or Stem Height (Whichever is Greater) Inches	Allowable Deviation from Straight Degrees
	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	0.5 per foot; 5 maximum
3.000 and over	0.25 per foot; 3 maximum

6. ANGULARITY:

TABLE VI

Nominal Leg, Web or Flange Thickness (Whichever is Smaller) Inches	Allowable Deviation from Specified Angle Degrees, Plus and Minus
Up to 0.188, excl	2
0.188 to 0.750, excl	1.5
0.750 and over	1

7. FLATNESS:

TABLE VII

Surface Width Inches	Maximum Allowable Deviation from Flat Inches
Up to 1.000, incl	0.004
Over 1.000 to 6.000, excl	0.004 x width (inches)
In any 1 inch of width	0.004