

TOLERANCES, METRIC
Aluminum Alloy Standard Structural Shapes

1. **SCOPE:** This specification covers established metric manufacturing tolerances applicable to aluminum alloy standard structural shapes ordered to metric 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.
2. **CROSS-SECTIONAL DIMENSIONS:**
 - 2.1 Structural Shapes Where Depth, Flange Width, or Stem Height is 200 mm or Less: Depth tolerance applies only at web. Depth across other points is controlled by angularity tolerance.

TABLE I

Specified Dimension	Shape	Tolerance Millimetres or Percent of Specified Dimension
Thickness	Angles, Channels, Tees, Zees, I-Beams, and H-Beams	$\pm 2.5\%$ or ± 0.25 mm, whichever is greater
Flange Width	Angles and Zees	$\pm 2.5\%$ or ± 1.5 mm, whichever is greater
Flange Width	Channels, Tees, I-Beams, and H-Beams	$\pm 4\%$
Depth	Zees and H-Beams	$\pm 2.5\%$ or ± 1.5 mm, whichever is greater
Depth	Channels and I-Beams	± 2.5 mm, -1.5 mm
Stem Height	Tees	$\pm 2.5\%$ or ± 1.5 mm, whichever is greater

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 2.2 Structural Shapes Where Depth, Flange Width, or Stem Height is Over 200 to 400 mm, Inclusive: Depth tolerance applies only at web. Depth across other points is controlled by angularity tolerance.

TABLE II

Specified Dimension	Shape	Tolerance Millimetres or Percent of Specified Dimension
Thickness	I-Beams, H-Beams, and Channels	$\pm 3\%$ or ± 0.40 mm, whichever is greater
Thickness	Angles, Tees, and Zees	$\pm 2.5\%$ or ± 0.40 mm, whichever is greater
Flange Width	I-Beams, Channels, and Tees	$\pm 4\%$
Flange Width	H-Beams	$\pm 4\%$ or ± 6 mm, whichever is greater
Flange Width	Angles	$\pm 2.5\%$ or ± 5 mm, whichever is greater
Flange Width	Zees	$\pm 2.5\%$ or ± 2.5 mm, whichever is greater
Depth	I-Beams, Channels, and Zees	$\pm 2.5\%$ or ± 6 mm, whichever is greater
Depth	H-Beams	$\pm 3\%$ or ± 6 mm, whichever is greater
Stem Height	Tees	$\pm 2.5\%$ or ± 6 mm, whichever is greater

3. LENGTH:

TABLE III

Specified Depth, Flange Width, or Stem Height (Whichever is Greater) Millimetres	Tolerance, Millimetres, Plus Only Specified Length, Millimetres			
	Up to 5000, incl	Over 5000 to 10,000, incl	Over 10,000 to 15,000, incl	Over 15,000
Up to 70.00, incl	4	7	10	25
Over 70.00 to 200.00, incl	6	9	11	25
Over 200.00	7	10	13	25

4. STRAIGHTNESS (Allowable Deviation From Straight): When weight of shape on flat surface minimizes deviation.

TABLE IV

In total length or in any 300 mm
or longer chord segment of total length 2 mm/m

5. TWIST: When weight of shape on flat surface minimizes deviation.

TABLE V

Specified Depth, Flange Width, or Stem Height (Whichever is Greater) Millimetres	Allowable Deviation from Straight In total length or in any 300 mm or longer chord segment of total length
Up to 40.00, incl	3°/m; 7° max
Over 40.00 to 80.00, incl	1.5°/m; 5° max
Over 80.00	1°/m; 3° max

6. ANGULARITY:

TABLE VI

Specified Leg, Web, or Flange Thickness (Whichever is Smaller) Millimetres	Allowable Deviation From Specified Angle Degrees, Plus and Minus
Up to 5.00, incl	2
Over 5.00 to 20.00, incl	1.5
Over 20.00	1

7. FLATNESS:

TABLE VII

Surface Width Millimetres	Maximum Allowable Deviation from Flat Millimetre
Up to 25, incl	0.10
Over 25 to 150, incl	0.004 x width (mm)
In any 25 mm of width	0.10