

**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<br>Millimetres or Percent of<br>Specified Dimension |
|---------------------|--|---|
| Thickness           | Angles, Channels,<br>Tees, Zees,<br>I-Beams, and H-Beams | $\pm 2.5\%$ or $\pm 0.25$ mm,<br>whichever is greater         |
| Flange Width        | Angles and Zees  | $\pm 2.5\%$ or $\pm 1.5$ mm,<br>whichever is greater          |
| Flange Width        | Channels, Tees,<br>I-Beams, and H-Beams                  | $\pm 4\%$   |
| Depth               | Zees and H-Beams   | $\pm 2.5\%$ or $\pm 1.5$ mm,<br>whichever is greater          |
| Depth               | Channels and I-Beams                                     | $\pm 2.5$ mm, $-1.5$ mm                                       |
| Stem Height         | Tees   | $\pm 2.5\%$ or $\pm 1.5$ mm,<br>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<br>Millimetres or Percent of<br>Specified Dimension |
|---------------------|-----------------------------------|---|
| Thickness           | I-Beams, H-Beams,<br>and Channels | +3% or +0.40 mm,<br>whichever is greater                      |
| Thickness           | Angles, Tees,<br>and Zees         | +2.5% or +0.40 mm,<br>whichever is greater                    |
| Flange Width        | I-Beams, Channels,<br>and Tees    | +4%   |
| Flange Width        | H-Beams                           | +4% or +6 mm,<br>whichever is greater                         |
| Flange Width        | Angles                            | +2.5% or +5 mm,<br>whichever is greater                       |
| Flange Width        | Zees                              | +2.5% or +2.5 mm,<br>whichever is greater                     |
| Depth               | I-Beams, Channels,<br>and Zees    | +2.5% or +6 mm,<br>whichever is greater                       |
| Depth               | H-Beams                           | +3% or +6 mm,<br>whichever is greater                         |
| Stem Height         | Tees                              | +2.5% or +6 mm,<br>whichever is greater                       |

3. LENGTH:

TABLE III

| Specified Depth, Flange<br>Width, or Stem Height<br>(Whichever is Greater)<br>Millimetres | Tolerance, Millimetres, Plus Only<br>Specified Length, Millimetres |                              |                                |                |
|---|--|------------------------------|--------------------------------|----------------|
|   | Up to<br>5000, incl  | Over 5000 to<br>10,000, incl | Over 10,000 to<br>15,000, incl | Over<br>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<br>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<br>Width, or Stem Height<br>(Whichever is Greater)<br>Millimetres | <u>Allowable Deviation from Straight</u><br>In total length or in any 300 mm<br>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,<br>or Flange Thickness<br>(Whichever is Smaller)<br>Millimetres | Allowable Deviation<br>From Specified Angle<br>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<br>Millimetres | Maximum Allowable Deviation from Flat<br>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  |