*भारतीय मानक*

**IS 3908 : 2024**

(Amalgamating IS 3909, IS 3921 and IS 5384)

***Indian Standard***

**एल्यूमिनियम बीम, चैनल और कोण अनुभाग**

**आयाम और गुण**

**Aluminium Beam, Channel and Angle Sections**

**Dimensions and Properties**

(ICS No. 77.150.10)

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**Price Group XX**

Structural Engineering and Structural Sections Sectional Committee, CED 07

**FOREWORD**

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Structural Engineering and Structural Sections Sectional Committee had been approved by the Civil Engineering Division Council.

Aluminium, because of its lightness, strength and better resistance to atmospheric corrosion, has gained popularity in structures especially for use in hilly area and in defence establishments.

A large number of variety of Aluminium sections are being produced in the country. In order to standardize these sections for their economic production, the Committee had formulated Indian Standard series covering angles, channels, beams and tee sections for structural use and other applications.

BIS had published standards for material, dimensions and sectional properties of equal leg angle, unequal leg angle, channels and ‘I’ beam sections as follows:

IS 3908:1986 Specification for aluminium equal leg angles (first revision)

IS 3909:1986 Specification for aluminium unequal leg angles (first revision)

IS 3921:1985 Specification for aluminium channels (first revision)

IS 5384:1985 Specification for aluminium I-beam (first revision)

In this revision, in view of the recent developments that have taken place, the Committee viewed that these standards be revised and merged into one standard. The merger will facilitate better access of the sectional details under one resource document. The following additional modifications have been effected in this revision:

1. Cross reference have been updated.
2. Tables for aluminium sections have been updated.

A code of practice for use of Aluminium alloys in structure namely IS 8147 : 1976 ‘Code of practice for use of aluminium alloys in structures’ was published which covers provisions for the design of structures (except bridges and pressure vessels) using Aluminium alloys.

In the formulation of this standard, assistance has been derived from BS 1161 : 2017 Aluminium alloy sections for structural purposes

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

**Aluminium Beam, Channel and Angle Sections — Dimensions and Properties**

**1 SCOPE**

**1.1** This standard covers the material, dimensions and sectional properties of aluminium equal leg angles, unequal leg angle, channels and ‘I’ beam sections for structural use and other applications.

**2 REFERENCES**

The standards listed below contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

|  |  |
| --- | --- |
| *IS No.* | *Title* |
| IS 733 : 1983 | Specification for wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purposes) (*third revision*) |
| IS 3965 : 1981 | Dimensions for wrought aluminium and aluminium alloys, bar, rod and section (*first revision*) |

**3 TERMINOLOGY**

For the purpose of this standard the following definitions shall apply.

**3.1 Moment of Inertia** — The quantity expressed by the section resisting angular acceleration which is the sum of the product of the mass of every particle with its square of a distance from the axis of rotation.

**3.2 Radii of Gyration** — As a measure of the way in which the mass of a rotating rigid body is distributed about the axis of rotation.

**3.3 X-X Axis** — A line along the member passing through the centre of gravity of the sections profile.

**3.4 Y-Y Axis** — A line perpendicular to the flanges (in case of beams and channels) or perpendicular to the smaller leg (in case of an angle section) and passing through the centre of gravity of the sections profile.

**3.5 Z-Z Axis –** A line parallel to the flanges (in case of beams and channels) or parallel to the smaller leg (in case of an angle section) and passing through the centre of gravity of the sections profile.

**3.6 U-U and V-V Axes –** Lines passing through the centre of gravity of the profile of the section, representing the principal axes of angle sections, where U-U is a major axis (when it does not coincide with z-z axis) and V-V axis is a minor axis (when it does not coincide with y-y axis).

**4 SYMBOLS**

**4.1** Letter symbols used in this standard have been indicated in the Fig. 1 to 4. The letter symbols used in Table 1 to 4 shall have the meaning indicated against each as given below:

Sectional area;

Mass of the section per unit length;

Moment of inertia about the Z-Z axis;

Moment of inertia about the Y-Y axis;

Movement of inertia (Max) about the U-U axis;

Movement of inertia (Min) about the V-V axis;

Distance of extreme fibre from the Z-Z axis, );

Distance of extreme fibre from the Y-Y axis, );

Modulus of section about the Z-Z axis:

Modulus of section about the Y-Y axis;

Radius of gyration about the Z-Z axis;

Radius of gyration about the Y-Y axis;

Radius of gyration about the U-U axis; and

Radius of gyration about the V-V axis.

Torsional constant.

|  |  |
| --- | --- |
|  | A drawing of a metal beam  Description automatically generated |
| Fig. 1 Symbols in Equal Leg Angles | Fig.2 Aluminium Unequal Leg Angle |
| A drawing of a curved object  Description automatically generated | A drawing of a letter  Description automatically generated |
| Fig. 3 Aluminium Channel Section | Fig. 4 Aluminium I-Beam |

| **Table 1 Indian Standard Aluminium Equal Leg Angles**  (*Clauses* **4.1**, **6.1** and **6.1.1**) | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Designation and Size**  **(A × B × in mm)** | **Mass\* Per Metre** | **Sectional Area** | **Radius at Root** | **Centre of Gravity** | **Moment of Inertia** | | | **Radius of Gyration** | | | **Modulus of Section** |
|  | (M) | () | () |  |  | (*Min*) | *(Min*) |  | (*Min*) | *(Min*) |  |
|  | kg/m | cm2 | mm | cm | cm4 | cm4 | cm4 | cm | cm | cm | cm3 |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| ALE10×10×1.5 | 0.08 | 0.30 | 3.0 | 0.30 | 0.03 | 0.04 | 0.01 | 0.29 | 0.37 | 0.19 | 0.04 |
| ALE10×10×2.0 | 0.10 | 0.38 | 3.0 | 0.32 | 0.03 | 0.05 | 0.01 | 0.29 | 0.36 | 0.19 | 0.05 |
| ALE15×15×1.5 | 0.12 | 0.45 | 3.0 | 0.42 | 0.09 | 0.15 | 0.04 | 0.45 | 0.57 | 0.29 | 0.09 |
| ALE15×15×2.0 | 0.16 | 0.58 | 3.0 | 0.44 | 0.12 | 0.18 | 0.05 | 0.45 | 0.56 | 0.29 | 0.11 |
| ALE15×15×3.0 | 0.22 | 0.83 | 3.0 | 0.48 | 0.16 | 0.25 | 0.07 | 0.44 | 0.55 | 0.29 | 0.16 |
| ALE20×20×2.0 | 0.21 | 0.79 | 4.0 | 0.56 | 0.29 | 0.46 | 0.12 | 0.61 | 0.76 | 0.39 | 0.20 |
| ALE20×20×3.0 | 0.31 | 1.14 | 4.0 | 0.60 | 0.40 | 0.64 | 0.17 | 0.59 | 0.75 | 0.39 | 0.29 |
| ALE25×25×2.0 | 0.27 | 0.99 | 4.0 | 0.68 | 0.58 | 0.92 | 0.24 | 0.77 | 0.96 | 0.50 | 0.32 |
| ALE25×25×3.0 | 0.39 | 1.44 | 4.0 | 0.73 | 0.82 | 1.31 | 0.34 | 0.76 | 0.95 | 0.49 | 0.47 |
| ALE25×25×4.0 | 0.51 | 1.87 | 4.0 | 0.77 | 1.04 | 1.64 | 0.44 | 0.74 | 0.93 | 0.48 | 0.60 |
| ALE30×30×2.5 | 0.40 | 1.49 | 5.0 | 0.82 | 1.26 | 1.98 | 0.53 | 0.92 | 1.15 | 0.6 | 0.578 |
| ALE30×30×3.0 | 0.48 | 1.76 | 5.0 | 0.85 | 1.47 | 2.33 | 0.61 | 0.91 | 1.15 | 0.59 | 0.68 |
| ALE30×30×3.0 | 0.62 | 2.29 | 5.0 | 0.89 | 1.86 | 2.95 | 0.78 | 0.90 | 1.13 | 0.58 | 0.88 |
| ALE30×30×5.0 | 0.76 | 2.80 | 5.0 | 0.93 | 2.22 | 3.50 | 0.94 | 0.89 | 1.12 | 0.58 | 1.07 |
| ALE35×35×3.0 | 0.56 | 2.06 | 5.0 | 0.97 | 2.38 | 3.77 | 0.99 | 1.07 | 1.35 | 0.69 | 0.94 |
| ALE35×35×4.0 | 0.73 | 2.69 | 5.0 | 1.01 | 3.04 | 4.81 | 1.26 | 1.06 | 1.34 | 0.69 | 1.22 |
| ALE35×35×5.0 | 0.89 | 3.30 | 5.0 | 1.05 | 3.66 | 5.76 | 1.53 | 1.05 | 1.32 | 0.68 | 1.49 |
| ALE40×40×3.0 | 0.64 | 2.36 | 5.0 | 1.10 | 3.61 | 5.72 | 1.50 | 1.24 | 1.56 | 0.80 | 1.24 |
| ALE40×40×4.0 | 0.84 | 3.09 | 5.0 | 1.14 | 4.63 | 7.34 | 1.92 | 1.22 | 1.54 | 0.79 | 1.62 |
| ALE40×40×5.0 | 1.03 | 3.80 | 5.0 | 1.18 | 5.58 | 8.84 | 2.32 | 1.21 | 1.52 | 0.78 | 1.98 |
| ALE45×45×3.0 | 0.73 | 2.69 | 6.0 | 1.21 | 5.21 | 8.22 | 2.20 | 1.39 | 1.75 | 0.90 | 1.58 |
| ALE45×45×4.0 | 0.95 | 3.52 | 6.0 | 1.26 | 6.66 | 10.61 | 2.71 | 1.38 | 1.74 | 0.88 | 2.06 |
| ALE45×45×5.0 | 1.17 | 4.33 | 6.0 | 1.30 | 8.06 | 12.83 | 3.29 | 1.36 | 1.72 | 0.87 | 2.52 |
| ALE50×50×3.0 | 0.81 | 2.99 | 6.0 | 1.34 | 7.22 | 11.43 | 3.00 | 1.55 | 1.96 | 1.00 | 1.97 |
| ALE50×50×4.0 | 0.06 | 3.92 | 6.0 | 1.38 | 9.32 | 14.78 | 3.86 | 1.54 | 1.94 | 0.99 | 2.57 |
| ALE50×50×5.0 | 1.30 | 4.83 | 6.0 | 1.42 | 11.30 | 17.92 | 4.68 | 1.53 | 1.93 | 0.98 | 3.16 |
| ALE50×50×6.0 | 1.54 | 5.72 | 6.0 | 1.46 | 13.17 | 20.86 | 5.47 | 1.52 | 1.91 | 0.98 | 3.72 |
| ALE60×60×3.5 | 1.17 | 4.31 | 7.0 | 1.57 | 14.7 | 23.1 | 6.31 | 1.85 | 2.31 | 1.21 | 3.32 |
| ALE60×60×4.0 | 1.28 | 4.75 | 7.0 | 1.62 | 16.44 | 26.06 | 6.81 | 1.86 | 2.34 | 1.20 | 3.76 |
| ALE60×60×5.0 | 1.58 | 5.86 | 7.0 | 1.67 | 20.02 | 31.76 | 8.27 | 1.85 | 2.33 | 1.19 | 4.62 |
| ALE60×60×6.0 | 1.88 | 6.95 | 7.0 | 1.71 | 23.43 | 37.16 | 9.69 | 1.84 | 2.31 | 1.18 | 5.46 |
| ALE70×70×5.0 | 1.86 | 6.89 | 8.0 | 1.91 | 32.35 | 51.31 | 13.39 | 2.17 | 2.73 | 1.39 | 6.36 |
| ALE70×70×6.0 | 2.21 | 8.18 | 8.0 | 1.95 | 38.03 | 60.26 | 15.80 | 2.16 | 2.71 | 1.39 | 7.53 |
| ALE70×70×7.0 | 2.55 | 9.45 | 8.0 | 1.99 | 43.43 | 68.80 | 18.06 | 2.14 | 2.70 | 1.38 | 8.67 |
| ALE80×80×5.0 | 2.23 | 8.23 | 8.0 | 2.11 | 49.5 | 77.7 | 21.3 | 2.45 | 3.07 | 1.61 | 8.40 |
| ALE80×80×6.0 | 2.53 | 9.38 | 8.0 | 2.20 | 57.59 | 91.48 | 23.71 | 2.48 | 3.12 | 1.59 | 9.93 |
| ALE80×80×8.0 | 3.32 | 12.30 | 8.0 | 2.28 | 73.97 | 117.43 | 30.50 | 2.45 | 3.09 | 1.57 | 12.93 |
| ALE80×80×10.0 | 4.09 | 15.14 | 8.0 | 2.36 | 89.18 | 141.32 | 37.04 | 2.43 | 3.06 | 1.56 | 15.80 |
| ALE100×100×6.0 | 3.17 | 11.81 | 9.0 | 2.72 | 115.15 | 182.92 | 47.42 | 3.10 | 3.92 | 1.99 | 15.78 |
| ALE100×100×8.0 | 4.19 | 15.53 | 9.0 | 2.78 | 148.73 | 236.41 | 61.06 | 3.09 | 3.92 | 1.98 | 20.59 |
| ALE100×100×10.0 | 5.18 | 19.17 | 9.0 | 2.85 | 180.49 | 286.67 | 74.30 | 3.07 | 3.87 | 1.97 | 25.23 |
| ALE120×120×12.0 | 6.14 | 22.73 | 9.0 | 2.93 | 210.43 | 333.70 | 87.15 | 3.04 | 3.83 | 1.96 | 29.76 |
| ALE120×120×7.0 | 4.68 | 17.3 | 10.0 | 3.14 | 235 | 370 | 110 | 3.69 | 4.63 | 2.42 | 26.6 |
| ALE120×120×10.0 | 6.27 | 23.21 | 10.0 | 3.35 | 319.51 | 508.04 | 130.99 | 3.71 | 4.68 | 2.38 | 36.94 |
| ALE120×120×12.0 | 7.45 | 27.57 | 10.0 | 3.43 | 374.13 | 594.41 | 153.85 | 3.68 | 4.64 | 2.36 | 43.64 |
| ALE120×120×16.0 | 9.73 | 36.05 | 10.0 | 3.58 | 475.66 | 753.35 | 191.97 | 3.63 | 4.57 | 2.34 | 56.43 |
| ALE150×150×10.0 | 7.91 | 29.31 | 12.0 | 4.09 | 639.75 | 1017.61 | 261.88 | 4.67 | 5.89 | 2.99 | 58.64 |
| ALE150×150×12.0 | 9.41 | 34.87 | 12.0 | 4.17 | 752.41 | 1196.72 | 308.11 | 4.65 | 5.86 | 2.97 | 69.47 |
| ALE150×150×16.0 | 12.35 | 45.75 | 12.0 | 4.32 | 964.79 | 1532.30 | 397.29 | 4.59 | 5.79 | 2.95 | 90.35 |
| ALE200×200×12.0 | 12.72 | 47.11 | 16.0 | 5.40 | 1838.49 | 2923.90 | 753.08 | 6.25 | 7.88 | 4.00 | 125.92 |
| ALE200×200×16.0 | 16.74 | 61.99 | 16.0 | 5.56 | 2782.00 | 3782.21 | 973.79 | 6.19 | 7.81 | 3.96 | 164.68 |
| ALE200×200×20.0 | 20.67 | 76.55 | 16.0 | 5.71 | 2886.35 | 4586.40 | 1186.30 | 6.14 | 7.74 | 3.94 | 202.02 |
| \*Based on density of 2.7 gm/cm2. | | | | | | | | | | | |

| **Table 2 Indian Standard Aluminium Unequal Leg Angles**  (*Clauses* **4.1**, **6.1** and **6.1.1**) | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Designation and Size** | **Mass per Metre** | **Sectional Area** | **Radius at Root** | **Centre of Gravity** | | **Moment of Inertia** | | | | **Radius of Gyration** | | | | **Modulus of Section** | | **Tan** |
|  | (M) | () |  |  |  |  |  | *Max* | *Min* |  |  | *Max* | *Min* |  |  |  |
| (A × B × in mm) | kg/m | cm2 | mm | cm | cm | cm4 | cm4 | cm4 | cm4 | cm | cm | cm | cm | cm3 | cm3 |  |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
| ALU20×10×1.5 | 0.12 | 0.46 | 4.0 | 0.69 | 0.23 | 0.18 | 0.03 | 0.20 | 0.02 | 0.63 | 0.26 | 0.65 | 0.21 | 0.14 | 0.04 | 0.26 |
| ALU20×10×2.0 | 0.16 | 0.59 | 4.0 | 0.72 | 0.25 | 0.23 | 0.04 | 0.25 | 0.03 | 0.63 | 0.26 | 0.64 | 0.21 | 0.18 | 0.18 | 0.26 |
| ALU20×15×1.5 | 0.14 | 0.54 | 4.0 | 0.60 | 0.37 | 0.21 | 0.10 | 0.25 | 0.06 | 0.62 | 0.43 | 0.69 | 0.32 | 0.15 | 0.15 | 0.54 |
| ALU20×15×2.0 | 0.19 | 0.69 | 4.0 | 0.63 | 0.39 | 0.27 | 0.13 | 0.32 | 0.07 | 0.62 | 0.43 | 0.68 | 0.32 | 0.19 | 0.19 | 0.54 |
| ALU20×15×3.0 | 0.27 | 0.99 | 4.0 | 0.67 | 0.43 | 0.37 | 0.17 | 0.45 | 0.10 | 0.61 | 0.42 | 0.67 | 0.31 | 0.28 | 0.28 | 0.54 |
| ALU30×15×2.0 | 0.25 | 0.91 | 5.0 | 1.03 | 0.33 | 0.84 | 0.14 | 0.89 | 0.09 | 0.96 | 0.39 | 0.98 | 0.32 | 0.42 | 0.12 | 0.26 |
| ALU30×15×3.0 | 0.35 | 1.31 | 5.0 | 1.09 | 0.37 | 1.17 | 0.20 | 1.24 | 0.13 | 0.94 | 0.39 | 0.97 | 0.31 | 0.61 | 0.17 | 0.25 |
| ALU30×20×2.0 | 0.27 | 1.01 | 5.0 | 0.94 | 0.47 | 0.92 | 0.33 | 1.05 | 0.19 | 0.95 | 0.57 | 1.02 | 0.43 | 0.44 | 0.21 | 0.43 |
| ALU30×20×3.0 | 0.40 | 1.46 | 5.0 | 0.99 | 0.51 | 1.29 | 0.46 | 1.48 | 0.27 | 0.94 | 0.56 | 1.01 | 0.43 | 0.64 | 0.31 | 0.43 |
| ALU30×20×4.0 | 0.51 | 1.89 | 5.0 | 1.03 | 0.55 | 1.63 | 0.57 | 1.86 | 0.34 | 0.93 | 0.55 | 0.99 | 0.42 | 0.85 | 0.39 | 0.42 |
| ALU40×20×2.0 | 0.32 | 1.21 | 5.0 | 1.36 | 0.41 | 2.03 | 0.35 | 2.15 | 0.23 | 1.29 | 0.54 | 1.33 | 0.43 | 0.77 | 0.22 | 0.26 |
| ALU40×20×3.0 | 0.48 | 1.76 | 5.0 | 1.42 | 0.45 | 2.89 | 0.49 | 3.06 | 0.32 | 1.28 | 0.53 | 1.32 | 0.43 | 1.12 | 0.32 | 0.26 |
| ALU40×20×4.0 | 0.62 | 2.29 | 5.0 | 1.46 | 0.49 | 3.67 | 0.62 | 3.89 | 0.41 | 1.27 | 0.52 | 1.30 | 0.42 | 1.45 | 0.41 | 0.25 |
| ALU40×25×2.0 | 0.36 | 1.34 | 6.0 | 1.25 | 0.54 | 2.19 | 0.67 | 2.45 | 0.41 | 1.28 | 0.71 | 1.35 | 0.55 | 0.80 | 0.34 | 0.38 |
| ALU40×25×3.0 | 0.52 | 1.94 | 6.0 | 1.31 | 0.59 | 3.13 | 0.94 | 3.50 | 0.57 | 1.27 | 0.70 | 1.34 | 0.54 | 1.16 | 0.49 | 0.38 |
| ALU40×25×4.0 | 0.68 | 2.52 | 6.0 | 1.35 | 0.63 | 3.98 | 1.19 | 4.46 | 0.72 | 1.26 | 0.69 | 1.33 | 0.53 | 1.51 | 0.64 | 0.38 |
| ALU45×30×3.0 | 0.60 | 2.24 | 6.0 | 1.43 | 0.70 | 4.56 | 1.65 | 5.25 | 0.96 | 1.43 | 0.86 | 1.53 | 0.66 | 1.49 | 0.72 | 0.44 |
| ALU45×30×4.0 | 0.79 | 2.92 | 6.0 | 1.47 | 0.74 | 5.91 | 2.10 | 6.76 | 1.52 | 1.42 | 0.85 | 1.25 | 0.65 | 1.95 | 0.93 | 0.43 |
| ALU45×30×5.0 | 0.97 | 3.58 | 6.0 | 1.52 | 0.78 | 7.04 | 2.51 | 8.08 | 1.50 | 1.40 | 0.84 | 1.47 | 0.64 | 2.36 | 1.13 | 0.40 |
| ALU50×25×3.0 | 0.60 | 2.24 | 6.0 | 1.74 | 0.53 | 5.80 | 1.00 | 6.15 | 0.65 | 1.61 | 0.67 | 1.66 | 0.54 | 1.78 | 0.50 | 0.26 |
| ALU50×25×4.0 | 0.79 | 2.92 | 6.0 | 1.79 | 0.57 | 7.43 | 1.26 | 7.87 | 0.82 | 1.60 | 0.66 | 1.64 | 0.53 | 2.31 | 0.65 | 0.26 |
| ALU50×25×5.0 | 0.97 | 3.58 | 6.0 | 1.83 | 0.61 | 8.96 | 1.50 | 9.47 | 0.99 | 1.58 | 0.65 | 1.63 | 0.53 | 2.83 | 0.79 | 0.25 |
| ALU50×30×3.0 | 0.64 | 2.39 | 6.0 | 1.64 | 0.67 | 6.15 | 1.69 | 6.81 | 1.03 | 1.61 | 0.84 | 1.69 | 0.66 | 1.83 | 0.74 | 0.36 |
| ALU50×30×4.0 | 0.84 | 3.12 | 6.0 | 1.68 | 0.71 | 7.91 | 2.16 | 8.75 | 1.32 | 1.59 | 0.83 | 1.68 | 0.65 | 2.38 | 0.94 | 0.36 |
| ALU50×30×5.0 | 1.03 | 3.83 | 6.0 | 1.73 | 0.75 | 9.55 | 2.58 | 10.54 | 1.59 | 1.58 | 0.82 | 1.66 | 0.64 | 2.92 | 1.15 | 0.35 |
| ALU50×38×3.0 | 0.74 | 2.72 | 7.0 | 1.47 | 0.90 | 6.72 | 3.35 | 8.21 | 1.86 | 1.57 | 1.11 | 1.74 | 0.82 | 1.90 | 1.16 | 0.55 |
| ALU50×38×4.0 | 0.95 | 3.50 | 7.0 | 1.53 | 0.95 | 8.60 | 4.28 | 10.5 | 2.34 | 1.57 | 1.11 | 1.74 | 8.1 | 2.48 | 1.50 | 0.56 |
| ALU60×30×3.0 | 0.73 | 2.72 | 7.0 | 2.05 | 0.61 | 10.22 | 1.77 | 10.84 | 1.15 | 1.94 | 0.81 | 2.00 | 0.65 | 2.59 | 0.74 | 0.26 |
| ALU60×30×4.0 | 0.96 | 3.55 | 7.0 | 2.11 | 0.65 | 13.16 | 2.25 | 13.96 | 1.46 | 1.93 | 0.80 | 1.98 | 0.64 | 3.38 | 0.96 | 0.26 |
| ALU60×30×5.0 | 1.18 | 4.36 | 7.0 | 2.15 | 0.69 | 15.94 | 2.70 | 16.88 | 1.76 | 1.91 | 0.79 | 1.97 | 0.64 | 4.15 | 1.17 | 0.26 |
| ALU60×40×4.0 | 1.07 | 3.95 | 7.0 | 1.93 | 0.94 | 14.48 | 5.20 | 16.66 | 3.02 | 1.92 | 1.15 | 2.05 | 0.88 | 3.54 | 1.70 | 0.44 |
| ALU60×40×5.0 | 1.31 | 4.86 | 7.0 | 1.96 | 0.98 | 17.58 | 6.28 | 20.21 | 3.65 | 1.90 | 1.14 | 1.98 | 0.87 | 4.25 | 2.08 | 0.43 |
| ALU60×40×6.0 | 1.55 | 5.75 | 7.0 | 2.00 | 0.61 | 20.52 | 7.29 | 23.55 | 4.26 | 1.89 | 1.13 | 1.97 | 0.86 | 5.13 | 2.45 | 0.43 |
| ALU60×45×3.5 | 1.03 | 3.79 | 7.0 | 1.77 | 1.06 | 13.5 | 6.52 | 16.4 | 3.65 | 1.89 | 1.31 | 2.08 | 0.98 | 3.20 | 1.90 | 0.54 |
| ALU65×45×4.0 | 1.17 | 4.35 | 7.0 | 2.03 | 1.06 | 18.8 | 7.41 | 22.0 | 4.21 | 2.08 | 1.31 | 2.25 | 0.98 | 4.21 | 2.15 | 0.47 |
| ALU65×45×5.0 | 1.45 | 5.36 | 7.0 | 2.08 | 1.10 | 22.78 | 8.99 | 26.7 | 5.07 | 0.06 | 1.30 | 2.23 | 0.97 | 5.15 | 2.64 | 0.47 |
| ALU75×50×5.0 | 1.66 | 6.14 | 8.0 | 2.39 | 1.17 | 35.47 | 12.77 | 40.67 | 5.57 | 2.40 | 1.44 | 2.57 | 1.11 | 6.94 | 3.33 | 0.43 |
| ALU75×50×6.0 | 1.97 | 7.28 | 8.0 | 2.44 | 1.21 | 41.42 | 14.91 | 47.54 | 8.79 | 2.39 | 1.43 | 2.56 | 1.10 | 18.19 | 3.93 | 0.43 |
| ALU80×40×4.0 | 1.29 | 4.78 | 8.0 | 2.76 | 0.81 | 32.10 | 5.58 | 34.07 | 3.61 | 2.59 | 1.08 | 2.67 | 0.87 | 6.12 | 1.75 | 0.26 |
| ALU80×40×6.0 | 1.88 | 6.98 | 8.0 | 2.85 | 0.89 | 45.87 | 7.84 | 48.62 | 5.09 | 2.56 | 1.06 | 2.64 | 0.85 | 8.91 | 2.52 | 0.26 |
| ALU80×40×8.0 | 2.46 | 9.10 | 8.0 | 2.94 | 0.97 | 58.51 | 9.84 | 61.86 | 6.49 | 2.54 | 1.04 | 2.61 | 0.84 | 11.57 | 3.25 | 0.25 |
| ALU80×60×4.0 | 1.51 | 5.58 | 8.0 | 2.39 | 1.41 | 36.59 | 17.86 | 44.76 | 9.68 | 2.56 | 1.79 | 2.83 | 1.32 | 6.52 | 3.89 | 0.55 |
| ALU80×60×5.0 | 1.96 | 7.23 | 8.0 | 2.36 | 1.43 | 45.6 | 21.9 | 55.2 | 12.3 | 2.51 | 1.74 | 2.76 | 1.30 | 8.08 | 4.79 | 0.54 |
| ALU80×60×6.0 | 2.21 | 8.18 | 8.0 | 2.43 | 1.50 | 52.59 | 25.50 | 64.31 | 13.78 | 2.54 | 1.77 | 2.80 | 1.30 | 9.53 | 5.66 | 0.55 |
| ALU80×60×8.0 | 2.89 | 10.70 | 8.0 | 2.56 | 1.57 | 67.38 | 32.46 | 82.20 | 17.64 | 2.51 | 1.74 | 2.77 | 1.28 | 12.37 | 7.33 | 0.55 |
| ALU90×60×60 | 2.37 | 8.78 | 8.0 | 2.89 | 1.41 | 72.93 | 26.42 | 83.96 | 15.39 | 2.88 | 1.73 | 3.09 | 1.32 | 11.94 | 5.76 | 0.44 |
| ALU100×50×6.0 | 2.38 | 8.81 | 9.0 | 3.51 | 1.06 | 91.88 | 15.91 | 97.53 | 10.27 | 3.23 | 1.34 | 3.33 | 1.08 | 14.16 | 4.04 | 0.26 |
| ALU100×50×8.0 | 3.11 | 11.53 | 9.0 | 3.60 | 1.14 | 118.11 | 20.16 | 125.16 | 13.11 | 3.20 | 1.32 | 3.29 | 1.07 | 18.45 | 5.22 | 0.26 |
| ALU100×50×10.0 | 3.83 | 14.17 | 9.0 | 3.68 | 1.21 | 142.61 | 24.03 | 150.80 | 15.83 | 3.17 | 1.30 | 3.26 | 1.06 | 22.58 | 6.35 | 0.25 |
| ALU100×75×6.0 | 2.94 | 10.8 | 9.0 | 2.95 | 1.78 | 107 | 51.6 | 130 | 28.9 | 3.14 | 2.18 | 3.46 | 1.63 | 15.2 | 9.01 | 0.54 |
| ALU100×75×8.0 | 3.77 | 13.9 | 9.0 | 3.08 | 1.88 | 137 | 66.0 | 167 | 36.3 | 31.4 | 2.18 | 3.46 | 1.62 | 19.8 | 11.7 | 0.54 |
| ALU100×80×6.0 | 2.87 | 10.61 | 9.0 | 2.97 | 1.98 | 107.33 | 61.52 | 137.22 | 31.63 | 3.18 | 2.41 | 3.60 | 1.73 | 15.26 | 10.22 | 0.63 |
| ALU100×80×8.0 | 3.76 | 13.93 | 9.0 | 3.05 | 2.06 | 138.58 | 79.09 | 176.97 | 40.70 | 3.15 | 2.38 | 3.56 | 1.71 | 19.94 | 13.32 | 0.63 |
| ALU100×80×10.0 | 4.64 | 17.17 | 9.0 | 3.13 | 2.14 | 167.96 | 96.46 | 214.01 | 49.41 | 3.13 | 2.36 | 3.53 | 1.70 | 24.44 | 16.28 | 0.62 |
| ALU120×80×8.0 | 4.21 | 15.57 | 10.0 | 3.86 | 1.89 | 230.16 | 83.17 | 265.44 | 47.89 | 3.84 | 2.31 | 4.13 | 1.75 | 28.28 | 13.61 | 0.44 |
| ALU120×80×10.0 | 5.19 | 19.21 | 10.0 | 3.94 | 1.97 | 279.93 | 100.45 | 322.29 | 58.09 | 3.82 | 2.29 | 4.10 | 1.74 | 34.74 | 16.64 | 0.44 |
| ALU120×80×12.0 | 6.15 | 22.77 | 10.0 | 4.02 | 2.04 | 327.13 | 116.60 | 375.79 | 67.94 | 3.79 | 2.26 | 4.06 | 1.73 | 41.00 | 19.57 | 0.43 |
| ALU120×90×7 | 4.11 | 15.2 | 10.0 | 3.52 | 2.13 | 216 | 104 | 262 | 58.5 | 3.78 | 2.62 | 4.16 | 1.96 | 25.6 | 15.2 | 0.54 |
| ALU120×90×10 | 5.65 | 20.9 | 10.0 | 3.70 | 2.26 | 295 | 142 | 358 | 78.1 | 3.76 | 2.60 | 4.14 | 1.94 | 35.5 | 21.0 | 0.54 |
| ALU125×80×8.0 | 4.31 | 15.97 | 10.0 | 4.07 | 1.85 | 257.62 | 84.05 | 292.35 | 49.32 | 4.02 | 2.29 | 4.28 | 1.76 | 30.56 | 13.67 | 0.41 |
| ALU125×80×10.0 | 5.32 | 19.71 | 10.0 | 4.15 | 1.93 | 313.57 | 101.54 | 355.28 | 59.83 | 3.99 | 2.27 | 4.25 | 1.74 | 37.57 | 16.72 | 0.41 |
| ALU125×80×12.0 | 6.31 | 23.37 | 10.0 | 4.23 | 2.00 | 365.72 | 117.88 | 414.63 | 69.98 | 3.96 | 2.25 | 4.22 | 1.73 | 44.36 | 19.66 | 0.40 |
| ALU140×105×8.5 | 5.83 | 21.5 | 12.0 | 4.13 | 2.49 | 416 | 200 | 504 | 112 | 4.40 | 3.05 | 4.84 | 2.28 | 42.2 | 25.0 | 0.54 |
| ALU140×105×11 | 7.26 | 26.8 | 12.0 | 4.30 | 2.62 | 518 | 250 | 630 | 137 | 4.40 | 3.05 | 4.85 | 2.26 | 53.4 | 31.7 | 0.54 |
| ALU150×80×8.0 | 4.88 | 18.07 | 12.0 | 5.13 | 1.69 | 426.69 | 87.93 | 459.21 | 55.41 | 4.86 | 2.21 | 5.04 | 1.75 | 43.22 | 13.93 | 0.30 |
| ALU150×80×10.0 | 6.02 | 22.31 | 12.0 | 5.22 | 1.77 | 520.60 | 106.29 | 559.73 | 67.16 | 4.83 | 2.18 | 5.09 | 1.74 | 53.22 | 17.05 | 0.29 |
| ALU150×80×12.0 | 7.15 | 26.47 | 12.0 | 5.30 | 1.84 | 610.41 | 123.50 | 655.43 | 78.48 | 4.80 | 2.16 | 4.98 | 1.72 | 62.94 | 20.06 | 0.29 |
| ALU200×100×10.0 | 7.98 | 29.55 | 16.0 | 6.95 | 2.04 | 1245.12 | 217.90 | 1322.87 | 140.15 | 6.49 | 2.72 | 6.69 | 2.18 | 95.38 | 27.37 | 0.27 |
| ALU200×100×12.0 | 9.48 | 35.11 | 16.0 | 7.04 | 2.12 | 1466.07 | 254.59 | 1556.66 | 163.99 | 6.46 | 2.69 | 6.66 | 2.16 | 113.13 | 32.30 | 0.26 |
| ALU200×100×16.0 | 12.42 | 45.99 | 16.0 | 7.22 | 2.28 | 1886.05 | 322.58 | 1999.02 | 209.61 | 6.40 | 2.65 | 6.59 | 2.13 | 147.52 | 41.76 | 0.26 |
| ALU200×150×12.0 | 11.10 | 41.11 | 16.0 | 6.10 | 3.63 | 1679.35 | 819.32 | 2059.03 | 439.65 | 6.39 | 4.46 | 7.08 | 3.27 | 120.82 | 72.09 | 0.55 |
| ALU200×150×16.0 | 14.58 | 51.99 | 16.0 | 6.26 | 3.79 | 2168.22 | 1051.71 | 2653.96 | 565.97 | 6.34 | 4.41 | 7.01 | 3.24 | 157.86 | 93.82 | 0.55 |
| ALU200×150×20.0 | 18.05 | 66.86 | 20.0 | 6.40 | 3.94 | 2632.10 | 1267.91 | 3210.76 | 689.24 | 6.27 | 4.35 | 6.93 | 3.21 | 193.58 | 114.59 | 0.55 |
| \*Based on density of 2.7 gm/cm3 | | | | | | | | | | | | | | | | |

| **Table 3 Indian Standard Aluminium Channels**  (*Clauses* **4.1**, **6.1** and **6.1.1**) | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Designation** | **Mass\* per metre** | **Sectional Area** | **Depth of Section** | **Width of Flange** | **Thickness of Web** | **Thickness of Flange** | **Radius at Root** | **Centre of Gravity** | **Moment of Inertia** | | **Radius of Gyration** | | **Modulus of Section** | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Kg/m | cm2 | mm | mm | mm | mm | mm | cm4 | cm4 | cm | cm | cm3 | cm3 | cm4 |
| **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** | **(11)** | **(12)** | **(13)** | **(14)** | **(15)** |
| ALC 40 × 20-0.44 | 0.44 | 1.63 | 40 | 20 | 2.0 | 2.0 | 5.0 | 0.56 | 3.98 | 0.58 | 1.56 | 0.60 | 1.99 | 0.40 |
| ALC 40 × 20-0.63 | 0.63 | 2.33 | 40 | 20 | 3.0 | 3.0 | 5.0 | 0.60 | 5.37 | 0.81 | 1.52 | 0.59 | 2.69 | 0.58 |
| ALC 50 × 30-0.88 | 0.88 | 3.27 | 50 | 30 | 3.0 | 3.0 | 6.0 | 0.91 | 12.75 | 2.79 | 1.97 | 0.92 | 5.10 | 1.33 |
| ALC 50 × 30-1.14 | 1.14 | 4.23 | 50 | 30 | 4.0 | 4.0 | 6.0 | 0.95 | 15.80 | 3.52 | 1.93 | 0.91 | 6.32 | 1.72 |
| ALC 60 × 30-1.33 | 1.13 | 4.17 | 60 | 30 | 3.0 | 4.0 | 7.0 | 0.94 | 23.62 | 3.59 | 2.38 | 0.93 | 7.87 | 1.75 |
| ALC 60 × 30-1.55 | 1.55 | 5.73 | 60 | 30 | 4.0 | 6.0 | 7.0 | 1.03 | 31.10 | 4.89 | 2.33 | 0.92 | 10.37 | 2.48 |
| ALC 60 × 30-1.69 | 1.69 | 6.24 | 60 | 30 | 5.0 | 6.0 | 7.0 | 0.98 | 32.2 | 5.03 | 2.27 | 0.89 | 10.7 | 2.50 |
| ALC 60 × 30-1.95 | 1.95 | 7.21 | 60 | 30 | 5.0 | 8.0 | 7.0 | 1.09 | 37.14 | 6.05 | 2.27 | 0.92 | 12.39 | 3.17 |
| ALC 60 × 40-1.87 | 1.87 | 6.93 | 60 | 40 | 4.0 | 6.0 | 7.0 | 1.46 | 39.88 | 11.05 | 2.90 | 1.26 | 13.29 | 4.35 |
| ALC 60 × 40-2.38 | 2.98 | 8.81 | 60 | 40 | 5.0 | 8.0 | 7.0 | 1.53 | 48.04 | 13.76 | 2.84 | 1.25 | 16.01 | 5.57 |
| ALC 80 × 35-2.29 | 2.29 | 8.44 | 80 | 35 |  | 5.0 | 7.0 | 1.13 | 79.8 | 9.57 | 3.08 | 1.06 | 20.0 | 4.04 |
| ALC 80 × 40-2.10 | 2.10 | 7.79 | 80 | 40 | 4.0 | 6.0 | 8.0 | 1.32 | 79.19 | 12.22 | 3.19 | 1.25 | 19.80 | 4.56 |
| ALC 80 × 40-2.67 | 2.67 | 9.87 | 80 | 40 | 5.0 | 8.0 | 8.0 | 1.40 | 96.72 | 15.28 | 3.13 | 1.24 | 24.18 | 5.87 |
| ALC 80 × 40-3.21 | 3.21 | 11.87 | 80 | 40 | 6.0 | 10.0 | 8.0 | 1.46 | 111.67 | 18.09 | 3.07 | 1.23 | 27.91 | 7.11 |
| ALC 100 × 40-2.95 | 2.95 | 10.95 | 100 | 40 | 5.0 | 8.0 | 9.0 | 1.29 | 166.03 | 16.52 | 3.89 | 1.23 | 33.21 | 6.09 |
| ALC 100 × 40-3.20 | 3.20 | 11.8 | 100 | 40 | 6.0 | 8.0 | 9.0 | 1.24 | 171 | 16.9 | 3.81 | 1.19 | 34.2 | 6.12 |
| ALC 100 × 40-3.55 | 3.55 | 13.15 | 100 | 40 | 6.0 | 10.0 | 9.0 | 1.35 | 193.29 | 19.60 | 3.83 | 1.22 | 38.66 | 7.39 |
| ALC 100 × 50-3.39 | 3.39 | 12.55 | 100 | 50 | 5.0 | 8.0 | 9.0 | 1.70 | 199.97 | 31.06 | 3.99 | 1.57 | 39.99 | 9.40 |
| ALC 100 × 50-4.09 | 4.09 | 15.15 | 100 | 50 | 6.0 | 10.0 | 9.0 | 1.76 | 233.96 | 37.01 | 3.93 | 1.56 | 46.79 | 11.44 |
| ALC 100 × 50-4.98 | 4.98 | 18.43 | 100 | 50 | 8.0 | 12.0 | 9.0 | 1.78 | 267.54 | 43.34 | 3.18 | 1.53 | 53.51 | 13.46 |
| ALC 120 × 50-3.68 | 3.68 | 13.63 | 120 | 50 | 5.0 | 8.0 | 10.0 | 1.59 | 308.82 | 33.07 | 4.76 | 1.56 | 51.47 | 9.69 |
| ALC 120 × 50-4.19 | 4.19 | 15.5 | 120 | 50 | 6.0 | 9.0 |  | 1.59 | 339 | 36.8 | 4.68 | 1.54 | 56.5 | 10.8 |
| ALC 120 × 50-4.43 | 4.43 | 16.43 | 120 | 50 | 6.0 | 10.0 | 10.0 | 1.65 | 363.14 | 39.48 | 4.70 | 1.55 | 60.52 | 11.80 |
| ALC 120 × 60-4.98 | 4.98 | 18.43 | 120 | 60 | 6.0 | 10.0 | 10.0 | 2.07 | 423.81 | 66.04 | 4.80 | 1.89 | 70.63 | 16.80 |
| ALC 120 × 60-6.08 | 6.08 | 22.51 | 120 | 60 | 8.0 | 12.0 | 10.0 | 2.08 | 489.62 | 77.97 | 4.66 | 1.86 | 81.60 | 19.87 |
| ALC 140 × 60-5.66 | 5.66 | 20.9 | 140 | 60 | 7.0 | 10.0 | 12.0 | 1.89 | 625 | 71.5 | 5.47 | 1.85 | 89.2 | 17.4 |
| ALC 150 × 60-5.51 | 5.51 | 20.42 | 150 | 60 | 6.0 | 10.0 | 12.0 | 1.90 | 722.88 | 71.41 | 5.95 | 1.87 | 96.38 | 17.43 |
| ALC 150 × 60-6.77 | 6.77 | 25.10 | 150 | 60 | 8.0 | 12.0 | 12.0 | 1.91 | 843.19 | 84.30 | 5.80 | 1.83 | 112.42 | 20.60 |
| ALC 150 × 80-6.59 | 6.59 | 24.42 | 150 | 80 | 6.0 | 10.0 | 12.0 | 2.74 | 919.22 | 159.60 | 6.14 | 2.56 | 122.56 | 30.34 |
| ALC 150 × 80-8.07 | 8.07 | 29.90 | 150 | 80 | 8.0 | 12.0 | 12.0 | 2.73 | 072.29 | 190.37 | 5.99 | 2.52 | 142.97 | 36.09 |
| ALC 150 × 80-10.26 | 10.26 | 38.02 | 150 | 80 | 10.0 | 16.0 | 12.0 | 2.87 | 311.20 | 233.10 | 5.87 | 2.50 | 174.83 | 46.41 |
| ALC 160 × 70-6.58 | 6.58 | 24.3 | 160 | 70 | 7.0 | 10.0 | 16.0 | 2.18 | 970 | 116 | 6.32 | 2.18 | 121 | 24.0 |
| ALC 180 × 75-8.06 | 8.06 | 29.8 | 180 | 75 | 8.0 | 11.0 | 16.0 | 2.27 | 1480 | 159 | 7.05 | 2.31 | 164 | 30.5 |
| ALC 200 × 80-9.19 | 9.19 | 33.9 | 200 | 80 | 8.0 | 12.0 | 16.0 | 2.45 | 2110 | 210 | 7.88 | 2.49 | 211 | 37.8 |
| ALC 200 × 80-9.28 | 9.28 | 34.38 | 200 | 80 | 8.0 | 12.0 | 16.0 | 2.43 | 140.69 | 210.38 | 7.89 | 2.47 | 214.07 | 37.80 |
| ALC 200 × 80-11.74 | 11.74 | 43.50 | 200 | 80 | 10.0 | 16.0 | 16.0 | 2.58 | 638.55 | 268.98 | 7.79 | 2.46 | 263.86 | 48.72 |
| ALC 200 × 100-13.47 | 13.47 | 49.90 | 200 | 100 | 10.0 | 16.0 | 16.0 | 3.40 | 181.61 | 495.96 | 7.99 | 3.15 | 318.16 | 75.20 |
| ALC 200 × 100-15.33 | 15.33 | 56.78 | 200 | 100 | 12.0 | 18.0 | 18.0 | 3.41 | 499.65 | 552.64 | 7.85 | 3.12 | 349.97 | 83.84 |
| ALC 240 × 100-12.5 | 12.5 | 46.0 | 240 | 100 | 9.0 | 13.0 | 18.0 | 3.03 | 4170 | 450 | 9.52 | 3.12 | 345 | 64.65 |
| \*Based on density of 2.7 g/cm3. | | | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4 Indian Standard Aluminium I-Beams**  (*Clauses* **4.1**, **6.1** and **6.1.1**) | | | | | | | | | | | | | | |
| **Designation** | **Mass\* per metre** | **Sectional area** | **Depth of beam** | **Width of flange** | **Thickness of web** | **Thickness of flange** | **Radius at root** | **Moment of inertia** | | **Radius of gyration** | | **Modulus of section** | | **Torsion constant** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** | **(11)** | **(12)** | **(13)** | **(14)** | **(15)** |
|  | Kg/m | cm2 | mm | mm | mm | mm | mm | cm4 | cm4 | cm | cm | cm3 | cm3 | cm4 |
| ALC 40 × 20-0.4 | 0.4 | 1.66 | 40 | 20 | 2.0 | 2.0 | 4.0 | 0.3 | 1.57 | 0.41 | 2.0 | 0.3 | 0.039 | 0.039 |
| ALC 40 × 20-0.6 | 0.6 | 2.36 | 40 | 20 | 3.0 | 3.0 | 4.0 | 0.4 | 1.52 | 0.42 | 2.7 | 0.4 | 0.104 | 0.104 |
| ALC 50 × 30-0.9 | 0.88 | 3.33 | 50 | 30 | 3.0 | 3.0 | 5.0 | 1.4 | 1.98 | 0.064 | 5.2 | 0.9 | 0.154 | 0.154 |
| ALC 50 × 30-1.2 | 1.14 | 4.29 | 50 | 30 | 4.0 | 4.0 | 5.0 | 1.8 | 1.93 | 0.66 | 6.4 | 1.2 | 0.322 | 0.322 |
| ALC 60 × 30-1.1 | 1.2 | 4.17 | 60 | 30 | 3.0 | 4.0 | 5.0 | 1.8 | 2.38 | 0.66 | 7.9 | 1.2 | 0.252 | 0.252 |
| ALC 60 × 30-1.5 | 1.5 | 5.73 | 60 | 30 | 4.0 | 6.0 | 5.0 | 2.7 | 2.33 | 0.69 | 10.4 | 1.8 | 0.824 | 0.824 |
| ALC 60 × 30-1.9 | 1.9 | 7.21 | 60 | 30 | 5.0 | 8.0 | 5.0 | 3.7 | 2.27 | 0.71 | 12.4 | 2.5 | 1.700 | 1.700 |
| ALC 60 × 40-1.9 | 1.9 | 7.03 | 60 | 40 | 4.0 | 6.0 | 6.0 | 6.5 | 2.40 | 0.96 | 13.5 | 3.2 | 0.897 | 0.897 |
| ALC 60 × 40-2.4 | 2.4 | 8.91 | 60 | 40 | 5.0 | 8.0 | 6.0 | 8.6 | 2.33 | 0.98 | 16.2 | 4.3 | 1.97 | 1.97 |
| ALC 80 × 40-2.1 | 2.1 | 7.83 | 80 | 40 | 4.0 | 6.0 | 6.0 | 6.5 | 3.19 | 0.91 | 19.9 | 3.2 | 0.940 | 0.940 |
| ALC 80 × 40-2.5 | 2.5 | 9.38 | 80 | 40 | 5.0 | 7.0 |  | 91.6 | 7.63 | 3.12 | 0.90 | 22.9 | 3.82 | 1.69 |
| ALC 80 × 40-2.7 | 2.7 | 9.91 | 80 | 40 | 5.0 | 8.0 | 6.0 | 8.6 | 3.13 | 0.93 | 24.3 | 4.3 | 1.97 | 1.99 |
| ALC 80 × 40-3.2 | 3.2 | 11.91 | 80 | 40 | 6.0 | 6.0 | 6.0 | 10.8 | 3.07 | 0.95 | 28.0 | 5.4 | 3.63 | 3.63 |
| ALC 100 × 50-3.4 | 3.4 | 12.62 | 100 | 50 | 5.0 | 8.0 | 7.0 | 16.8 | 3.99 | 1.15 | 40.3 | 6.7 | 2.55 | 2.55 |
| ALC 100 × 50-3.7 | 3.7 | 13.7 | 100 | 50 | 6.0 | 8.0 |  | 210 | 17.0 | 3.92 | 1.11 | 42.1 | 6.80 | 3.30 |
| ALC 100 × 50-3.9 | 3.9 | 14.42 | 100 | 50 | 5.0 | 10.0 | 7 .0 | 21.0 | 4.00 | 1.21 | 46.2 | 8.4 | 4.27 | 4.27 |
| ALC 100 × 60-3.9 | 3.9 | 14.35 | 100 | 60 | 5.0 | 8.0 | 8.0 | 29.0 | 4.07 | 1.42 | 47.4 | 9.7 | 3.05 | 3.05 |
| ALC 100 × 60-4.1 | 4.1 | 15.19 | 100 | 60 | 6.0 | 10.0 | 8.0 | 29.1 | 3.99 | 1.38 | 48.4 | 9.7 | 3.43 | 3.43 |
| ALC 100 × 60-4.7 | 4.7 | 17.35 | 100 | 60 | 6.0 | 8.0 | 8.0 | 36.3 | 4.00 | 1.45 | 55.5 | 12.1 | 3.54 | 3.54 |
| ALC 120 × 60-4.7 | 4.7 | 17.55 | 120 | 60 | 5.0 | 8.0 | 8.0 | 36.2 | 4.88 | 1.44 | 69.7 | 12.1 | 5.47 | 5.47 |
| ALC 120 × 60-5.0 | 5.0 | 18.70 | 120 | 60 | 6.0 | 10.0 | 9.0 | 36.4 | 4.80 | 1.39 | 71.7 | 12.1 | 5.95 | 5.95 |
| ALC 120 × 70-5.6 | 5.6 | 20.70 | 120 | 70 | 6.0 | 10.0 | 9.0 | 57.5 | 4.87 | 1.67 | 81.8 | 16.4 | 6.62 | 6.62 |
| ALC 120 × 80-6.1 | 6.1 | 22.70 | 120 | 80 | 6.0 | 10.0 | 9.0 | 85.7 | 4.96 | 1.94 | 91.9 | 21.4 | 7.28 | 7.28 |
| ALC 120 × 80-7.4 | 7.4 | 27.58 | 120 | 80 | 8.0 | 12.0 | 9.0 | 103.1 | 4.30 | 1.93 | 106.0 | 25.8 | 12.8 | 12.8 |
| ALC 140 × 70-6.3 | 6.3 | 23.4 | 140 | 70 | 7.0 | 10.0 |  | 725 | 57.9 | 5.57 | 1.57 | 104 | 16.5 | 8.00 |
| ALC 150 × 80-6.6 | 6.6 | 24.50 | 150 | 80 | 6.0 | 10.0 | 9.0 | 85.8 | 6.14 | 1.87 | 123.0 | 21.4 | 7.50 | 7.50 |
| ALC 150 × 80-8.1 | 8.1 | 29.98 | 150 | 80 | 8.0 | 12.0 | 9.0 | 103.2 | 5.99 | 1.86 | 143.4 | 25.8 | 13.3 | 13.3 |
| ALC 150 × 100-7.7 | 7.7 | 28.66 | 150 | 100 | 6.0 | 10.0 | 10.0 | 167.2 | 6.27 | 2.42 | 150.0 | 33.4 | 9.14 | 9.14 |
| ALC 150 × 100-9.4 | 9.4 | 34.94 | 150 | 100 | 8.0 | 12.0 | 10.0 | 200.9 | 6.12 | 2.40 | 174.7 | 40.2 | 16.1 | 16.1 |
| ALC 150 × 100-12.1 | 12.1 | 44.66 | 150 | 100 | 10.0 | 16.0 | 10.0 | 268.1 | 6.00 | 2.45 | 214.4 | 53.6 | 35.3 | 35.3 |
| ALC 160 × 80-7.6 | 7.6 | 28.2 | 160 | 80 | 7.0 | 11.0 |  | 1170 | 94.6 | 6.45 | 1.83 | 147 | 23.7 | 10.8 |
| ALC 200 × 100-10.5 | 10.5 | 38.94 | 200 | 100 | 8.0 | 12.0 | 10.0 | 201.1 | 8.09 | 2.27 | 255.0 | 40.2 | 16.9 | 16.9 |
| ALC 200 × 100-13.4 | 13.4 | 49.66 | 200 | 100 | 10.0 | 16.0 | 10.0 | 268.5 | 7.99 | 2.33 | 316.8 | 53.7 | 36.9 | 36.9 |
| ALC 200 × 120-12.9 | 12.9 | 47.64 | 200 | 120 | 10.0 | 12.0 | 12.0 | 347.9 | 8.06 | 2.70 | 309.3 | 58.0 | 24.1 | 24.1 |
| ALC 200 × 120-16.1 | 16.1 | 59.80 | 200 | 120 | 12.0 | 16.0 | 12.0 | 464.2 | 7.99 | 2.79 | 381.4 | 77.4 | 49.6 | 49.6 |
| \*Based on density of 2.7 g/cm3. | | | | | | | | | | | | | |  |

**5 DESIGNATION**

**5.1** Aluminium equal leg angles sections shall be designated as ALE followed by lengths of legs and thickness of the section in mm.

*For example:* ALE 80×80×6

**5.2** Aluminium unequal leg angle sections shall be designated as ALU followed by lengths of the longer and shorter legs and thickness of the section in mm.

*For example:* ALU 80 × 60 × 6.

**5.3** Aluminium channels shall be designated as ALC followed by the depth of channel in mm, flange width in mm and mass of the section in kg/m,

*For Example*: ALC 80 × 40 – 3.21

**5.4** Aluminium I-beam sections shall be designated as ALB followed by the depth of the section, width of flange in millimetres and mass in kilograms per metre of the section.

*For Example*: ALB 120 × 60 – 4.7

**6 DIMENSIONS AND SECTIONAL PROPERTIES**

**6.1** Dimensions and mass of Indian Standard aluminium sections shall be as given in Tables 1 to 4. For convenience of reference sectional properties are also given in the Tables.

**6.1.1** Sections of dimensions other than those included in the Tables 1 to 4 may also be manufactured subject to the agreement between the purchaser and the manufacturer.

**6.1.2** Sections without root radius (square fillet) may also be manufactured subject to the agreement between the purchaser and the manufacturer.

**6.2** Dimensional tolerances for the sections shall be as specified in IS 3965.

**7 MATERIALS**

**7.1** Aluminium sections covered in this standard shall be manufactured from the following alloys in appropriate temper:

For Equal leg section: 19000, 24345, 24534, 52000, 53000, 544300, 63400, 64423, 64430, 65032 and 74530.

For Unequal leg section: 19000, 24345, 24534, 52000, 53000, 543000, 63400, 64423, 64430, 65032, and 74530

For Channel section: 19000, 24345, 24534, 52000, 53000, 63400, 64423, 64430, 65032 and 74530

For I-beam: 19000, 24345, 24534, 52000, 53000, 544300, 63400, 64423, 64430, 65032 and 74530

**7.1.1** Aluminium alloys and temper selected shall conform to the provisions of IS 733.

**7.2** Other alloys and temper as per IS 733, as mutually agreed between purchaser and manufacturer, may also be used.

**8 PACKING**

**8.1** Aluminium sections that are covered under this standard shall be securely bundled and wrapped in bituminised hessian cloth or in wooden boxes or as mutually agreed. Weight of each bundle may be as agreed to between the purchaser and the manufacturer.

**9 MARKING**

**9.1** Each lot/bundle of aluminium section shall be clearly marked with designation, alloy and temper, manufacturer’s name and lot number/year of manufacture.

**9.2** **BIS Certification Marking**

**9.2.1** The manufacturer may also use the Standard Mark.

**9.2.2** The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations made thereunder. The derails of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**ANNEX A**

( *Foreword* )

**COMMITTEE COMPOSITION**

Structural Engineering Sectional Committee, CED 07

|  |  |
| --- | --- |
| *Organization* | *Representative(s)* |
| In Personal Capacity, Chennai | Dr V. Kalyanaraman (*Chairperson*) |
| Ashwathnarayana & Eswara, Chennai | Shri H. E. Sriprakash Shastry |
| Bhilai Institute of Technology, Durg | Dr Mohan Kumar Gupta |
| C.R. Narayana Rao, Architects & Engineers, Chennai | Dr C. N. Srinivasan  Shri C. R. Arvind (Alternate) |
| Central Electricity Authority, New Delhi | Shri A. K. Jain  Director (Transmission) (Alternate) |
| Central Public Works Department, New Delhi | Shri D. K. Garg  Shri N. K. Bansal (Alternate) |
| Construma Consultancy Pvt Limited, Mumbai | Dr Harshavardhan Subbarao |
| CSIR-Structural Engineering Research Centre, Chennai | Dr G. S. Palani |
| Dr Napa Prasad Rao (Alternate I)  Dr. R. Balagopal (Alternate II) |
| Engineers India Limited, New Delhi | Shri Anurag Sinha  Dr Sudip Paul (Alternate)  Shri Saptdip Sarkar (YP) |
| GAIL India Ltd, New Delhi | Shri S. Ashish Vaidya |
| Indian Institute of Engineering Science and Technology, Shibpur | Dr Subrata Chackraborty  Ms Chaitali Ray (Alternate) |
| Indian Institute of Technology Delhi, New Delhi | Dr Dipti Ranjan Sahoo  Dr Alok Madan (Alternate) |
| Institute for Steel Development & Growth, Kolkata | Shri Arijit Guha  Shri Lakhamana Rao Pydi (Alternate) |
| In Personal Capacity, | Shri Gayana Ranjan Mohainty |
| In Personal Capacity, Chennai | Shri V.N. Heggade |
| Jindal Steel & Power Ltd, Gurugram | Shri Sanjay Nandanwar |
| Larsen & Toubro Limited, Chennai | Shri T. Venkatesh Rao |
| M. N. Dastur & Company Pvt Limited, Kolkata | Shri Shuvendu Chattopadhyay  Shri Gargi Aditya Basu (Alternate-I)  Smt Mohua Chatterjee (Alternate-II) |
| MECON Limited, Ranchi | Shri B. K. Pandey  Shri J. K. Sarkar (Alternate) |
| NTPC Ltd, Noida | Shri Himanshu Kundu  Shri Chander Shekhar (Alternate) |
| Powergrid Corporation of India Limited, New Delhi | Shri Abhishek  Ms Sumana Mukherjee (Alternate) |
| Ramboll India, Hyderabad | Shri D Sankar Ganesh |
| Salasar Techno Engg Limited, Noida | Shri Dayanand K |
| Steel Authority of India Limited, Ranchi | Shri Gautam Kumar Mitra  Shri Deepak Rangarao (Alternate) |
| STUP Consultants Pvt Ltd, Kolkata | Shri Anirban Sengupta  Shri Sumantra Sengupta (Alternate-I)  Shri Mandar Sardesai (Alternate-II) |
| Tata Consulting Engineers Ltd, Mumbai | Shri Pratip Bhattacharya  Shri T. Shriprasad (Alternate) |
| Takalkar Power Engineering and Consultants Private Limited, Vadodara | Shri S.M. Takalkar  Shri Shreedhar V. Rana (Alternate) |
| The Institution of Engineers (India), Kolkata | Shri S. H. Jain |
| BIS Directorate General | Shri Dwaipayan Bhadra, Scientist ‘E’ And Head (Civil Engineering) [Representing Director General (*Ex-officio*)] |
| *Member Secretary*  Shri Abhishek Pal  Scientist ‘D’/Joint Director  (Civil Engineering), BIS  Shri Dheeraj Damachya  Scientist ‘B’/Assistant Director  (Civil Engineering), BIS | |