*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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भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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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.

Bureau of Indian Standard 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-beams (*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; and
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 ‘Specification 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**

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 given 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 edition of these standards:

|  |  |
| --- | --- |
| *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 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).

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

**3.5 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.

**3.6 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.

**4 SYMBOLS**

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

|  |  |  |
| --- | --- | --- |
|  | = | Sectional area |
|  | = | Distance of extreme fibre from the Y-Y axis, ) |
|  | = | Distance of extreme fibre from the Z-Z axis, ) |
|  | = | Movement of inertia (*Max*) about the U-U axis |
|  | = | Movement of inertia (*Min*) about the V-V axis |
|  | = | Moment of inertia about the Y-Y axis |
|  | = | Moment of inertia about the Z-Z axis |
|  | = | Torsional constant |
|  | = | Mass of the section per unit length |
|  | = | Radius of gyration about the U-U axis |
|  | = | Radius of gyration about the V-V axis |
|  | = | Radius of gyration about the Y-Y axis |
|  | = | Radius of gyration about the Z-Z axis |
|  | = | Modulus of section about the Y-Y axis |
|  | = | Modulus of section about the Z-Z axis  |

|  |  |
| --- | --- |
|  | 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) |
| --- |
| **Sl No.** | **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) | (13) |
|  | 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 | 1 196.72 | 308.11 | 4.65 | 5.86 | 2.97 | 69.47 |
|  | ALE150 × 150 × 16.0 | 12.35 | 45.75 | 12.0 | 4.32 | 964.79 | 1 532.30 | 397.29 | 4.59 | 5.79 | 2.95 | 90.35 |
|  | ALE200 × 200 × 12.0 | 12.72 | 47.11 | 16.0 | 5.40 | 1 838.49 | 2 923.90 | 753.08 | 6.25 | 7.88 | 4.00 | 125.92 |
|  | ALE200 × 200 × 16.0 | 16.74 | 61.99 | 16.0 | 5.56 | 2 782.00 | 3 782.21 | 973.79 | 6.19 | 7.81 | 3.96 | 164.68 |
|  | ALE200 × 200 × 20.0 | 20.67 | 76.55 | 16.0 | 5.71 | 2 886.35 | 4 586.40 | 1 186.30 | 6.14 | 7.74 | 3.94 | 202.02 |
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|  |

\*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) |
| --- | --- |
| **Sl No.** | **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) | (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 | 1 245.12 | 217.90 | 1 322.87 | 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 | 1 466.07 | 254.59 | 1 556.66 | 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 | 1 886.05 | 322.58 | 1 999.02 | 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 | 1 679.35 | 819.32 | 2 059.03 | 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 | 2 168.22 | 1 051.71 | 2 653.96 | 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 | 2 632.10 | 1 267.91 | 3 210.76 | 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) |
| --- | --- |
| **Sl No.** | **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) | (16) |
|  | 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) |
| **Sl No.** | **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** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 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) | (16) |
|  | 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 Table 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 Table 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: 19 000, 24 345, 24 534, 52 000, 53 000, 54 4300, 63 400, 64 423, 64 430, 65 032 and 74 530

For unequal leg section: 19 000, 24 345, 24 534, 52 000, 53 000, 543 000, 63 400, 64 423, 64 430, 65 032, and 74 530

For channel section: 19 000, 24 345, 24 534, 52 000, 53 000, 63 400, 64 423, 64 430, 65 032 and 74 530

For I-beam: 19 000, 24 345, 24 534, 52 000, 53 000, 544 300, 63 400, 64 423, 64 430, 65 032 and 74 530

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**

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**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

**ANNEX A**

(*Foreword*)

**COMMITTEE COMPOSITION**

Structural Engineering Sectional Committee, CED 07

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| *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  |
| 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 |
|  C.R. Narayana Rao, Architects & Engineers, Chennai |  | Dr C. N. Srinivasan Shri C. R. Arvind (*Alternate*)  |
| CSIR - Structural Engineering Research Centre, Chennai |  | Dr G. S. PalaniDr Napa Prasad Rao (*Alternate* I)  Dr R. Balagopal (*Alternate* II)  |
|  |
| Engineers India Limited, New Delhi |  | Shri Anurag SinhaDr Sudip Paul (*Alternate*)  |
| GAIL India Ltd, New Delhi |  | Shri S. Ashish Vaidya  |
| Indian Institute of Engineering Science and Technology, Shibpur |  | Dr Subrata ChackrabortyMs Chaitali Ray (*Alternate*)  |
| Indian Institute of Technology Delhi, New Delhi |  | Dr Dipti Ranjan SahooDr Alok Madan (*Alternate*)  |
| Institute for Steel Development & Growth, Kolkata |  | Shri Arijit GuhaShri Lakhamana Rao Pydi (*Alternate*)  |
| Jindal Steel & Power Ltd, Gurugram |  | Shri Sanjay Nandanwar |
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| MECON Limited, Ranchi |  | Shri B. K. Pandey Shri J. K. Sarkar (*Alternate*)  |
| M. N. Dastur & Company Pvt Limited, Kolkata |  | Shri Shuvendu ChattopadhyayShri Gargi Aditya Basu (*Alternate* I) Shrimati Mohua Chatterjee (*Alternate* II)  |
| NTPC Ltd, Noida |  | Shri Himanshu KunduShri Chander Shekhar (*Alternate*)  |
| Powergrid Corporation of India Limited, New Delhi |  | Shri AbhishekMs 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 MitraShri Deepak Rangarao (*Alternate*)  |
| STUP Consultants Pvt Ltd, Kolkata |  | Shri Anirban SenguptaShri Sumantra Sengupta (*Alternate* I) Shri Mandar Sardesai (*Alternate* II)  |
| Takalkar Power Engineering and Consultants Private Limited, Vadodara |  | Shri S. M. TakalkarShri Shreedhar V. Rana (*Alternate*)  |
| Tata Consulting Engineers Ltd, Mumbai |  | Shri Pratip BhattacharyaShri T. Shriprasad (*Alternate*)  |
| The Institution of Engineers (India), Kolkata |  | Shri S. H. Jain  |
| In Personal Capacity, Chennai |  | Shri V. N. Heggade |
| In Personal Capacity, |  | Shri Gayana Ranjan Mohainty |
| BIS Directorate General |  | Shri Dwaipayan Bhadra, Scientist ‘E’/Director and Head (Civil Engineering) [Representing Director General (*Ex-officio*)] |

*Member Secretary*

Shri Abhishek Pal

Scientist ‘D’/Joint Director

(Civil Engineering), BIS

and

*Member Secretary*

Shri Dheeraj Damachya

Scientist ‘B’/Assistant Director

(Civil Engineering), BIS