



International
Standard

ISO 657-1

**Hot-rolled steel sections —
Dimensions, sectional properties
and tolerances —**

**Part 1:
Angles, sloping flange channels and
sloping flange beams**

*Profilés en acier laminés à chaud — Dimensions et
caractéristiques rapportées aux axes —*

*Partie 1: Cornières, profilés en U à ailes inclinées et poutrelles à
ailes inclinées*

**Second edition
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 3, *Steels for structural purposes*.

This first edition of ISO 657-1 cancels and replaces ISO 657-1:1989, ISO 657-2:1989, ISO 657-5:1976, ISO 657-11:1980, ISO 657-15:1980, which have been technically revised.

The main are as follows:

- revised designation of section steels;
- revised tolerance of section steels;
- revised sectional properties of section steels;
- added requirements of surface conditions.

A list of all parts in the ISO 657 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Hot-rolled steel sections — Dimensions, sectional properties and tolerances —

Part 1: Angles, sloping flange channels and sloping flange beams

1 Scope

This document specifies requirements for dimensions, sectional properties and tolerances for hot-rolled sections as follows:

- a) equal angle LE (L section);
- b) unequal angle LU (L section);
- c) sloping flange channel US (U section);
- d) sloping flange I beam IS(I section).

This document is used together with technical delivery conditions especially, but is not limited, ISO 630-1, ISO 630-2, ISO 630-3, ISO 630-5 and ISO 630-6.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6929, *Steel products — Vocabulary*

ISO 20723, *Structural steels — Surface condition of hot-rolled sections — Delivery requirements*

3 Terms and definitions

For the purpose of this documents, the terms and definitions given in ISO 6929 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Dimensions, shape, mass and tolerances

4.1 Dimensions and designation

4.1.1 Profiles of section steel are shown in [Figure 1](#) to [Figure 4](#).

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4.1.2 The sectional area and the unit mass of steel sections obtained in terms of the standard sectional dimension are given in [Table A.1](#) to [Table A.4](#) of [Annex A](#). If agreed between the purchaser and manufacturer, other dimensional tables may be used, e.g. GB/T 706, JIS G 3192, EN 10056-1 and EN 10365.

Besides the sectional area and the unit mass, [Table A.1](#) to [Table A.4](#) of [Annex A](#) show the moment of inertia, radius of inertia, modulus of section and centre of gravity distance calculated by electronic devices or software for reference.

4.1.3 The designation of the hot-rolled equal and unequal leg angles, taper flange I-sections and taper flange U sections shall comprise:

- a) the number of this document;
- b) the letter for equal angle LE (L section) or unequal angle LU (L section) or sloping flange channel US (U section) or sloping flange beam IS(I-section);
- c) height and width (in mm);
- d) the leg width B_L or B_S (in mm) and if necessary, the leg thickness t (in mm), web thickness t_w (in mm) and/or flange middle thickness t_f (in mm);
- e) a reference to the material standard (e.g. ISO 630-2);
- f) the steel name (e.g. S355D).

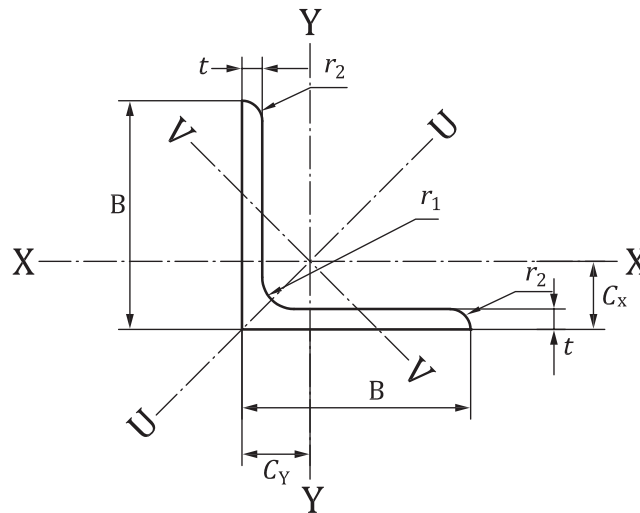
Example of designation for an unequal angle with long leg width $B_L=25$ mm and short leg width $B_S=16$ mm and leg thickness of 3 mm made from steel grade S355D as specified in ISO 630-2:

ISO 657-1- LU 25 × 16 × 3 - ISO 630-2 - S355D

4.2 Tolerances on dimension and shape

4.2.1 The tolerances on section steel shall be in accordance with the requirements in [Table 1](#) and [Table 2](#). If agreed between the purchaser and the manufacturer, other tolerances on dimension and shape may be used, e.g. GB/T 706, JIS G 3192, EN 10024, EN 10056-2 and EN 10279.

4.2.2 The out-of-square and web flatness for the sloping flange I beams and the sloping flange channels, and the top corner for the angles shall be checked at a distance to the end not less than 750 mm.



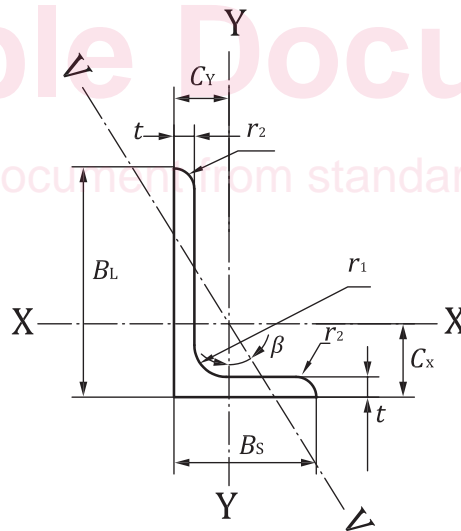
Key

- B leg width
- t leg thickness
- r_1 root radius
- r_2 toe root radius
- C_x distance of centre of gravity

Figure 1 — Profile of equal leg angles

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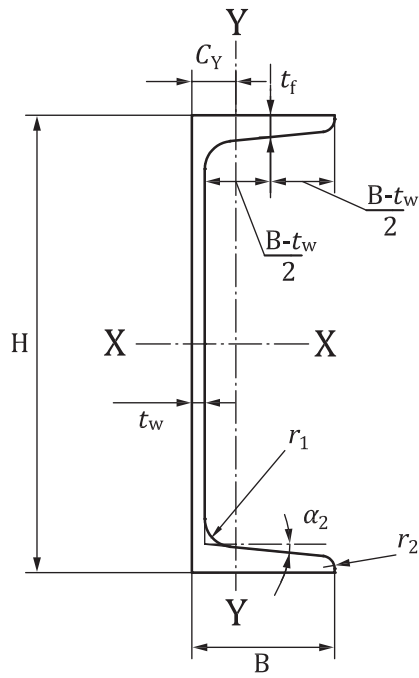
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Key

- B_L long leg width
- B_S short leg width
- t leg thickness
- r_1 root radius
- r_2 toe root radius
- C_y distance of centre of gravity
- C_x distance of centre of gravity

Figure 2 — Profile of unequal-leg angles

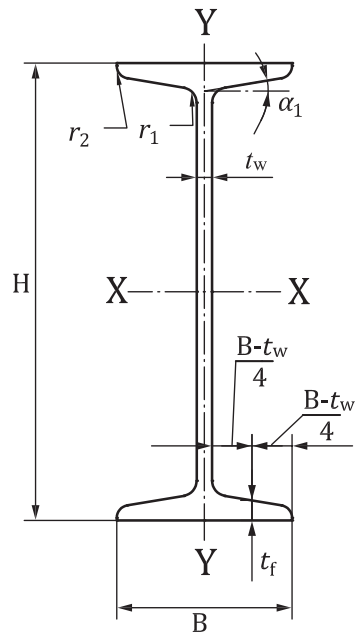


Key

- H height
- B width
- t_w web thickness
- t_f flange middle thickness
- r_1 root radius
- r_2 toe root radius
- C_y distance of centre of gravity
- α_2 flange taper, $\tan\alpha_2=1/10$.

NOTE The different degrees of slope will result in different sectional area.

Figure 3 — Profile of sloping flange channels



Key

- H height
- B width
- t_w web thickness
- t_f flange middle thickness
- r_1 root radius
- r_2 toe root radius
- α_1 flange taper, $\tan \alpha_1 = 1/6$.

NOTE The different degrees of slope will result in different sectional area.

Figure 4 — Profile of sloping flange I beams