UDC 669.14.018.29-423.1:621.713.1

March 1994

Structural steel I and H sections

Tolerances on shape and dimensions
English version of DIN EN 10034

DIN
EN 10034

I- und H-Profile aus Baustahl; Grenzabmaße und Formtoleranzen

This standard, together with the March 1994 editions of DIN 1025 Parts 2 to 5, supersedes the October 1963 editions of DIN 1025 Parts 2, 3 and 4 and the March 1965 edition of DIN 1025 Part 5.

European Standard EN 10034:1993 has the status of a DIN Standard.

A comma is used as the decimal marker.

National foreword

This standard has been prepared by ECISS/TC 11.

The responsible German body involved in its preparation was the *Normenausschuß Eisen und Stahl* (Steel and Iron Standards Committee), Technical Committee *Warmgewalzte Profilerzeugnisse*.

The present standard specifies dimensional and geometrical tolerances for I and H sections and bearing piles, which had been given previously in DIN 1025 Parts 2 to 5.

The values no longer apply for specific section shapes. The scope of the present standard covers many more sizes than the DIN Standards did, and includes, for example, a flange width of 420 mm and a flange thickness of 75 mm. Negotiations are continuing within ECISS/TC 11 for harmonizing the sizes of I and H sections.

In specifying tolerances on the cross-sectional dimensions, ECISS/TC 11 endeavoured to specify values which, where lower limit deviations are chosen, do not lead to an automatic reduction of static parameters, which would necessitate the use of higher factors of safety when designing the particular steel structure. These efforts resulted in an asymmetrical distribution of limit deviations, and in a reduction of the tolerance on nominal mass for single sections to ± 4 %.

The DIN Standards corresponding to the European Standard and EURONORMs referred to in clause 2 of the EN are as follows:

EN Standard	DIN Standard
EN 10079	DIN EN 10079
EURONORM 19	DIN 1025 Part 5
EURONORM 53	DIN 1025 Parts 2 to 4

Standards referred to

(and not included in **Normative references**)

DIN EN 10079	Definition of steel products
DIN 1025 Part 2	Hot rolled I and H sections (IPB and IB series); dimensions, mass and static parameters
DIN 1025 Part 3	Hot rolled I and H sections (IPBl series); dimensions, mass and static parameters
DIN 1025 Part 4	Hot rolled I and H sections (IPBv series); dimensions, mass and static parameters
DIN 1025 Part 5	Hot rolled I and H sections (IPE series); dimensions, mass and static parameters

Continued overleaf.

EN comprises 5 pages.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10034

September 1993

UDC 669.14.018.29-423.1:621.713.1

Descriptors: Iron and steel products, I beams, structural steels, dimensional tolerances, form tolerances.

English version

Structural steel I and H sections
Tolerances on shape and dimensions

Poutrelles I et H en acier de construction; tolérances de formes et de dimensions

I- und H-Profile aus Stahl; Grenzabmaße und Formtoleranzen

This European Standard was approved by CEN on 1993-08-30.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 10034:1993 E

Previous editions

DIN 1612: 09.24, 01.32, 03.43x; DIN 1025 Part 2: 04.26, 10.28, 12.29, 04.32, 09.39, 07.40x, 07.59, 10.63; DIN 1025 Part 3: 10.63; DIN 1025 Part 4: 10.63; DIN 1025 Part 5: 03.65.

Amendments

In comparison with the October 1983 editions of DIN 1025 Parts 2 to 4 and the March 1965 edition of DIN 1025 Part 5, the following amendments have been made.

a) The specifications have been restricted to dimensional and geometrical tolerances.

b) Some of the limit deviations for section height, flange width and thickness and web thickness have been changed (cf. table 1).

c) Some of the tolerances on parallelism of flange, section symmetry and straightness of web have been changed (cf. tables 2 and 3).

d) The tolerance on nominal mass has been reduced to ± 4 %.

Contents list

Foreword

This European Standard has been prepared by ECISS/TC 11 'Sections: Tolerances and dimensions', the Secretariat of which is held by BSI.

The discussions within ECISS/TC 11 were based on

EURONORM 34-62 Broad flanged beams with parallel sides; rolling tolerances

and

EURONORM 44-63 Hot rolled IPE joists; rolling tolerances

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by March 1994 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies tolerances on the shape, dimensions and mass of structural steel I and H sections. These requirements do not apply to I and H sections rolled from stainless steel, nor to taper flange sections.

NOTE: Until a European Standard covering the dimensions of I and H beams is published, EURONORM 19 and EURONORM 53, or corresponding national standards, may be used.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 10079	Definition of steel products
EURONORM 19-57	IPE beams, parallel flanged beams
EURONORM 53-62	Wide flanged beams with parallel flanges

3 Definitions

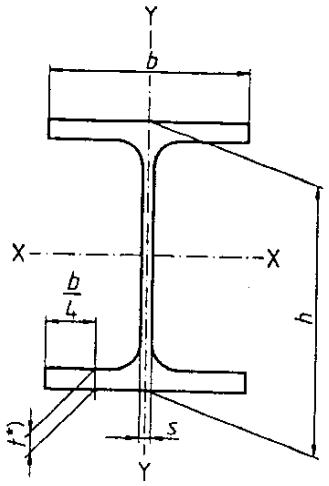
For the purposes of this European Standard, the definitions given in EN 10079 apply.

4 Rolling tolerances for structural steel I and H sections

4.1 Section height (h)

The deviation from the nominal section height, measured at the centreline of the web thickness, shall be within the tolerance given in table 1.

Table 1: Dimensional tolerances for structural steel I and H sections



*) t shall be measured at $\frac{b}{4}$ (see subclause 4.4).

Section height, h		Flange width, b		Web thickness, s		Flange thickness, t	
Nominal size mm	Limit deviation mm	Nominal size mm	Limit deviation mm	Nominal size mm	Limit deviation mm	Nominal size mm	Limit deviation mm
$h \leq 180$	$^{+3,0}_{-2,0}$	$b \leq 110$	$^{+4,0}_{-1,0}$	$s < 7$	$\pm 0,7$	$t < 6,5$	$^{+1,5}_{-0,5}$
$180 < h \leq 400$	$^{+4,0}_{-2,0}$	$110 < b \leq 210$	$^{+4,0}_{-2,0}$	$7 \leq s < 10$	$\pm 1,0$	$6,5 \leq t < 10$	$^{+2,0}_{-1,0}$
$400 < h \leq 700$	$^{+5,0}_{-3,0}$	$210 < b \leq 325$	$\pm 4,0$	$10 \leq s < 20$	$\pm 1,5$	$10 \leq t < 20$	$^{+2,5}_{-1,5}$
$h > 700$	$\pm 5,0$	$b > 325$	$^{+6,0}_{-5,0}$	$20 \leq s < 40$	$\pm 2,0$	$20 \leq t < 30$	$^{+2,5}_{-2,0}$
				$40 \leq s < 60$	$\pm 2,5$	$30 \leq t < 40$	$\pm 2,5$
				$s \geq 60$	$\pm 3,0$	$40 \leq t < 60$	$\pm 3,0$
						$t \geq 60$	$\pm 4,0$

4.2 Flange width (b)

The deviation from the nominal flange width shall be within the tolerance given in table 1.

4.3 Web thickness (s)

The deviation from the nominal web thickness, measured at the mid-point of dimension h, shall be within the tolerance given in table 1.

4.4 Flange thickness (t)

The deviation from the nominal flange thickness, measured at a point corresponding to one-fourth of the flange width, shall be within the tolerance given in table 1.

4.5 Out-of-squareness ($k + k'$)

The out-of-squareness of the section shall not exceed the maximum values given in table 2.

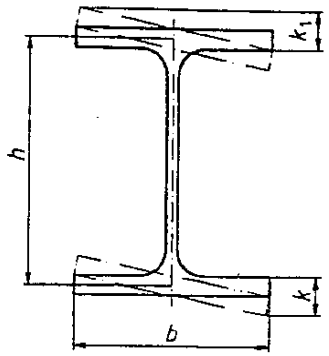
4.6 Web off-centre (e)

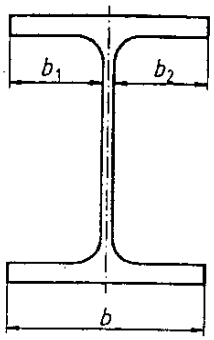
The mid-thickness of the web shall not deviate from the mid-width position on the flange by more than the distance e, given in table 2.

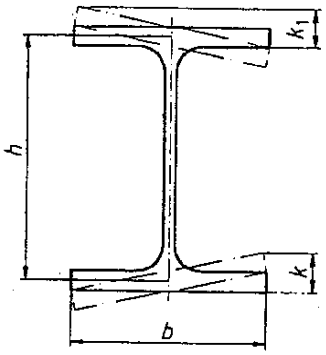
4.7 Deviation from straightness (q_{xx} or q_{yy})

The straightness shall comply with the requirements given in table 3.

Table 2: Tolerance on out-of-squareness and web off-centre of structural steel I and H sections

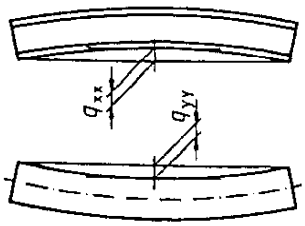






Out-of-squareness $k + k'$		Web off-centre, e $\left(e = \frac{b_1 - b_2}{2}\right)$	
Flange width, b mm	Tolerance mm	Flange width, b mm	Tolerance mm
$b \leq 110$	1,5	Where $t < 40$ mm	
		$b \leq 110$	2,5
		$110 < b \leq 325$	3,5
		$b > 325$	5,0
$b > 110$	2 % of b (max. 6,5 mm)	Where $t \geq 40$ mm	
		$110 < b \leq 325$	5,0
		$b > 325$	8,0

Table 3: Tolerances on straightness of structural steel I and H sections



Section height, h mm	Tolerance on straightness, q_{xx} and q_{yy}
$80 < h \leq 180$	0,30 % of L
$180 < h \leq 360$	0,15 % of L
$h > 360$	0,1 % of L

5 Tolerance on mass

The deviation from the nominal mass of a batch or an item shall not exceed ± 4,0 %.

The mass deviation is the difference between the actual mass of the batch or item and the calculated mass.

The calculated mass shall be determined using a density of 7,85 kg/dm³.

6 Tolerance on length

The sections shall be cut to ordered lengths, within tolerances of:

a) ± 50 mm, or

b) ± 100 mm, where minimum lengths are ordered.

L represents the longest useable length of the section, assuming that the ends of the section have been cut square (see figure 1).

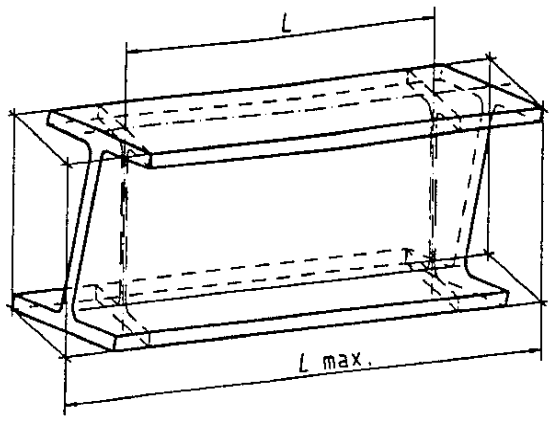


Figure 1: Measurement of length L of I and H sections

Annex A (informative)

Straightness measurement

Straightness measurement requires the use of a straight edge from which deviations in section straightness are measured. A taut string line is an acceptable straight edge, provided that deviations in the horizontal plane only are measured.

Measurement for q_{xx} shall be carried out as follows: The section is laid in the 'H' position on a flat surface, and the string is taken from the outside of the centre of the flange width between the two ends of the unconstrained section.

Measurement for q_{yy} shall be carried out as follows: The section is laid in the 'I' position on a flat surface, and the string is taken along the flange tip between the two ends of the unconstrained section.