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Structural steel I and H sections - Tolerances on shape and dimensions

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English version

Structural steel I and H sections - Tolerances on shape and dimensions

Poutrelles I et H en acier de construction -
Tolerances de formes et de dimensions

I- und H-Profil aus Baustahl - Grenzabmaße und
Formtoleranzen

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CEN

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

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Foreword

This European Standard has been prepared by ECISS/TC11 Sections: Tolerances and Dimensions; the Secretariat of which is held by BSI.

The discussions within ECISS/TC11 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publication of an identical text or by endorsement, at least by march 1994, and conflicting national standards shall be withdrawn at the latest by march 1994.

According to 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, United Kingdom.

1 Scope

This European Standard specifies tolerances on 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. These requirements do not apply to taper flange sections.

NOTE: Until a European Standard for 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 into 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: 1957 IPE beams, parallel flanged beams

Euronorm 53: 1962 Wide flange beams with parallel flanges

3 Definitions

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

4 Rolling tolerances for structural steel I and H sections

4.1 Section height (h)

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

4.2 Flange width (b)

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

4.3 Web thickness (s)

The deviation from nominal on 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 nominal on flange thickness measured at the quarter flange width point 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 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 Straightness (q_x or q_y)

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

5 Tolerance on mass

The deviation from the nominal mass of a batch or a piece shall not exceed $\pm 4.0 \%$.

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

The calculated mass shall be determined using a density of $7,85 \text{ kg/dm}^3$.

6 Tolerance on length

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

a) $\pm 50 \text{ mm}$

or b) $+ 100 \text{ mm}$ where minimum lengths are requested

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

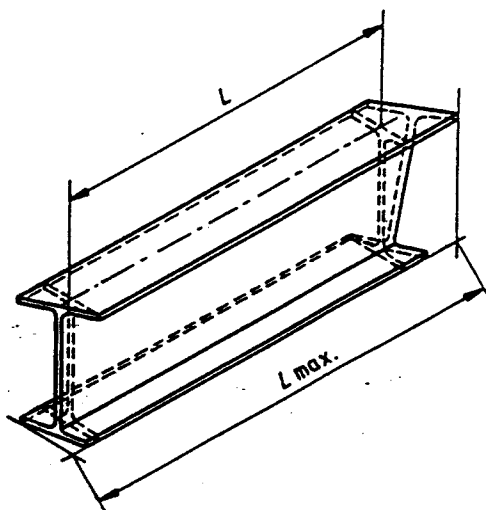
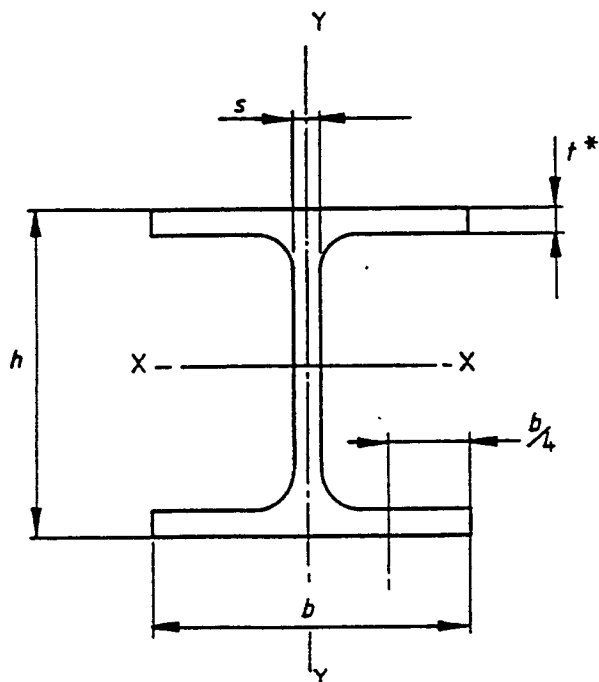


Figure 1: Measurement of length L on I and H steel sections

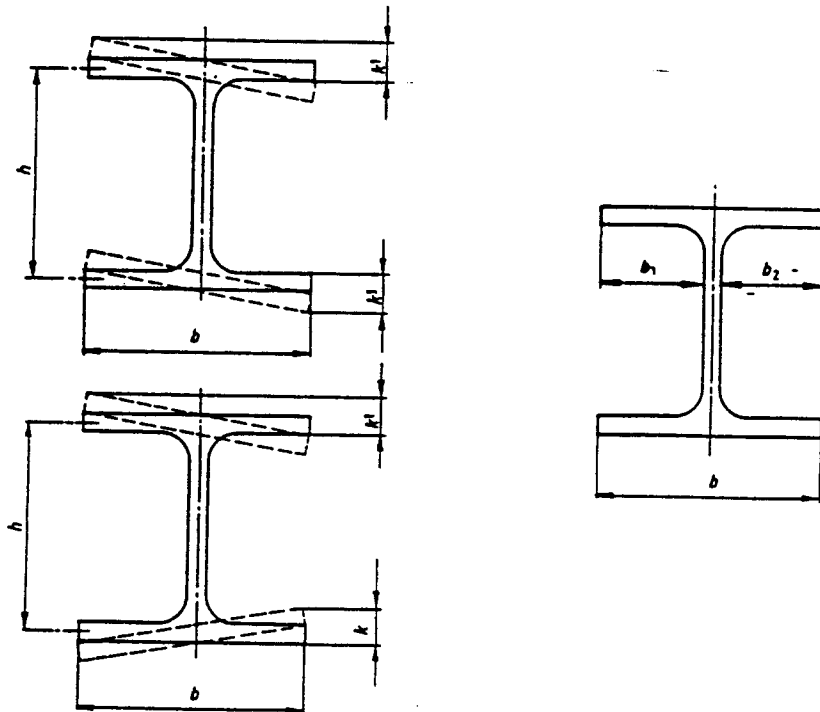
Table 1 Dimensional tolerances for structural steel I and H sections



* t is measured at $b/4$
(see clause 4.4.)

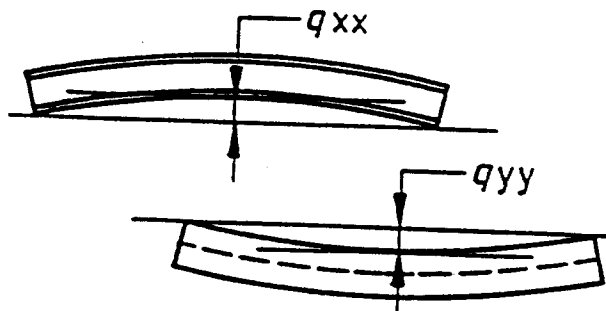
Section height h		Flange width b		Web thickness s		Flange thickness t	
height mm	tol mm	width mm	tol mm	thickness mm	tol mm	thickness mm	tol mm
$h \leq 180$	+3.0 -2.0	$b \leq 110$	+4.0 -1.0	$s < 7$	± 0.7	$t < 6.5$	+1.5 -0.5
$180 < h \leq 400$	+4.0 -2.0	$110 < b \leq 210$	+4.0 -2.0	$7 \leq s < 10$	± 1.0	$6.5 \leq t < 10$	+2.0 -1.0
$400 < h \leq 700$	+5.0 -3.0	$210 < b \leq 325$	+4.0 -4.0	$10 \leq s < 20$	± 1.5	$10 \leq t < 20$	+2.5 -1.5
$h > 700$	+5.0 -5.0	$b > 325$	+6.0 -5.0	$20 \leq s < 40$	± 2.0	$20 \leq t < 30$	+2.5 -2.0
				$40 \leq s < 60$	± 2.5	$30 \leq t < 40$	+2.5 -2.5
				$s \geq 60$	± 3.0	$40 \leq t < 60$	+3.0 -3.0
						$t \geq 60$	+4.0 -4.0

Table 2 Tolerances on out-of-square and web off-centre of structural steel I and H sections



Out-of-square $k + k'$		Web off-centre e where $e = \frac{b_1 - b_2}{2}$	
flange width b mm	tol mm	flange width b mm	tol mm
$b \leq 110$	1.5	Where $t < 40$	40
$b > 110$	2 % of b (max 6.5 mm)	$b \leq 110$	2.5
		$110 < b \leq 325$	3.5
		$b > 325$	5.0
		Where $t \geq 40$	40
		$110 < b \leq 325$	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} , on length L %
$80 < h < 180$	0.30 L
$180 < h \leq 360$	0.15 L
$h > 360$	0.1 L

Annex A

(informative)

Straightness measurement

Straightness measurement requires a reference 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 is carried out as follows:

for q_{xx} :

The beam is laid in the H position on a flat surface and the string is taken along the outside of the centre of the flange width between the two ends of the unconstrained section.

for q_{yy} :

The beam 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.