

Product Specifications - Tolerances

The dimensions and mass of the following hot-rolled structural steel sections currently produced by British Steel – universal beams, universal columns, universal bearing piles, joists, parallel flange channels, structural tees cut from universal beams, structural tees cut from universal columns, as well as length, depth and mass tolerances for taper flange joists are specified in BS4: Part 1:1993.

Rolling tolerances – BS EN 10034: 1993

This European Standard specifies tolerances on shape dimensions and mass of structural steel universal beams and columns. These requirements do not apply to taper flange sections.

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(a).

Table 1 (a) Tolerance on height and cross-section

Section height (h) mm	Tolerance mm
Up to and including 180	+3.0 -2.0
Greater than 180 up to and including 400	+4.0 -2.0
Greater than 400 up to and including 700	+5.0 -3.0
Greater than 700	± 5.0

Flange width (b)

The deviation from nominal on flange width shall be within the tolerance given in Table 1(b).

Table 1 (b) Tolerance on flange width

Flange width (b) mm	Tolerance mm
Up to and including 110	+4.0 -1.0
Greater than 110 up to and including 210	+4.0 -2.0
Greater than 210 up to and including 325	± 4.0
Greater than 325	+6.0 -5.0

Product Specifications - Tolerances (continued)

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(c)

Table 1 (c) Tolerances on web thickness

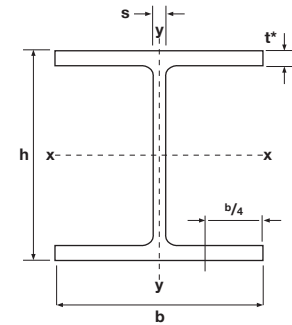
Web thickness (s) mm	Tolerance mm
Less than 7	± 0.7
7 up to but excluding 10	± 1.0
10 up to but excluding 20	± 1.5
20 up to but excluding 40	± 2.0
40 up to but excluding 60	± 2.5
60 and over	± 3.0

Flange thickness (t)

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

Table 1 (d) Tolerances on flange thickness

Flange thickness (s) mm	Tolerance mm
Less than 6.5	+1.5 / -0.5
6.5 up to but excluding 10	+2.0 / -1.0
10 up to but excluding 20	+2.5 / -1.5
20 up to but excluding 30	+2.5 / -2.0
30 up to but excluding 40	± 2.5
40 up to but excluding 60	± 3.0
60 and over	± 4.0



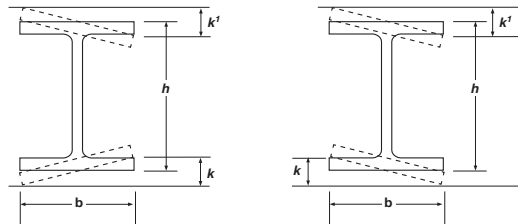
t* is measured at b/4

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

The out-of-squareness of the section shall not exceed the maximum given in Table 2 (a)

Table 2 (a) Tolerance on out-of-squareness of universal beams and columns Section height (h)

Flange width (b) mm	Tolerance mm
Up to and including 110	1.5
Greater than 110	2% of b (maximum 6.5mm)



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(b).

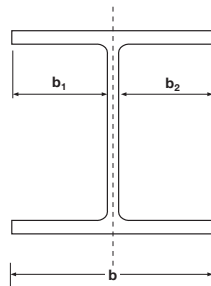


Table 2 (b) Tolerance on web off-centre of universal beams and columns

Flange thickness (t) mm	Flange width (b) mm	Web off-centre where $e = \frac{b_1 - b_2}{2}$ mm
$t < 40$	Up to and including 110	2.5
	Greater than 110 up to and including 325	3.5
	Greater than 325	5.0
$t \geq 40$	Greater than 110 up to and including 325	5.0
	Greater than 325	8.0

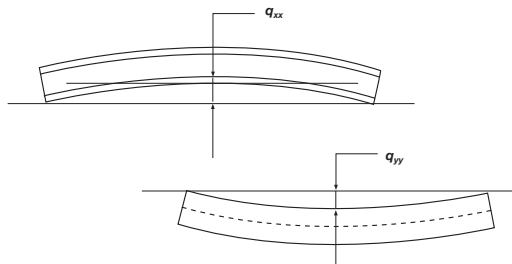
Product Specifications - Tolerances (continued)

Straightness (q_{xx} or q_{yy})

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

Table 3 Tolerance on straightness of universal beams and columns

Section height (h) mm	Tolerance q_{xx} and q_{yy} on length (L) %
Greater than 80 up to and including 180	0.30 L
Greater than 180 up to and including 360	0.15 L
Greater than 360	0.1 L



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 7850kg/m^3 .

Tolerance on length

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

- a) $\pm 50\text{mm}$ or
- b) $-0, +100\text{mm}$ where minimum lengths are required.

L represents the longest useable length of the section assuming that the ends of the section have been cut square.

