BS EN 10034 : 1993
Structural steel I and H sections
Tolerances on shape and dimensions

Rolling tolerances for structural steel I and H sections

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

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

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.

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.

Out-of-squareness ($k + k'$)
The out-of-squareness of the section shall not exceed the maximum given in table 2.

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.

Straightness (q_{xx} or q_{yy})
The straightness shall comply with the requirements given in table 3.

Tolerances 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.

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

Section height h		Flange width b		Web thickness s		Flange thickness t	
height mm	tolerance mm	width mm	tolerance mm	thickness mm	tolerance mm	thickness mm	tolerance 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

Fig 1. Dimensional tolerances for structural steel I and H sections

*t is measured at b/4
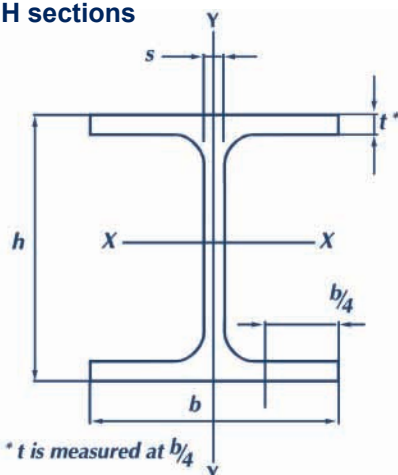
The calculated mass shall be determined using a density of 7.85 kg/dm³.

Tolerances on length
The sections shall be cut to ordered lengths to tolerances of:
   a) $\pm$ 50 mm; or
   b)   + 100 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
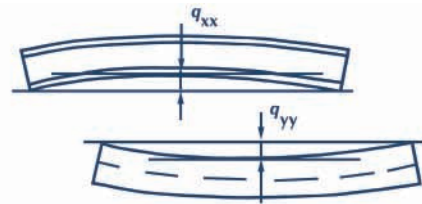
Table 2. Tolerances on out-of-square and web off-centre of structural steel I and H sections

Out-of-square $k + k'$		Web off-centre e where $e = \dfrac{b1 - b2}{2}$	
flange width b mm	tolerance mm	flange width b mm	tolerance mm
$b \leq 110$	1.5	Where $t < 40$	
$b > 110$	2% of b (max 6.5)	$b \leq 110$	2.5
		$110 < b \leq 325$	3.5
		$b > 325$	5.0
		Where $t \geq 40$	
		$110 < b \leq 325$	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
$h > 360$	0.10 L

Fig 3. Tolerances on straightness of structural steel I and H sections

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