BS EN 10131 : 1991

Cold rolled uncoated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimensions and shape

Tolerances on thickness

The tolerances on thickness are given in a for low carbon steel flat products and in b for high yield strength steel flat products.

Low carbon steel flat products

The tolerances on thickness shall be given in table 1 and apply over the whole length.

Tolerances more severe than special tolerances may be agreed at the time of the order.

High yield strength steel flat products

The thickness tolerance shall be as given in table 1 subject to the increases given in table 2 depending on the yield strength.

Table 1. Percentage increases in thickness tolerances for high yield strength steel flat products

Specified minimum yield strength (*Re*) N/mm2	Percentage increase in thickness tolerances over those specified for low carbon steels %
<280	0
≥280 < 360	20
≥360	40

Table 2. Tolerances on thickness - dimensions in mm

Nominal thickness	Normal tolerances for (1) a nominal width of:			Special tolerances (S) for (1) a nominal width of:		
	≤1200	>1200 to ≤1500	>1500	≤1200	>1200 to ≤1500	>1500
≥0.35 to ≤0.40	±0.04	±0.05	_	±0.025	±0.035	_
>0.4 to ≤0.60	±0.05	±0.06	±0.07	±0.035	±0.045	±0.05
>0.6 to ≤0.80	±0.06	±0.07	±0.08	±0.04	±0.05	±0.05
>0.8 to ≤1.00	±0.07	±0.08	±0.09	±0.045	±0.06	±0.06
>1.00 to ≤1.20	±0.08	±0.09	±0.10	±0.055	±0.07	±0.07
>1.20 to ≤1.60	±0.10	±0.11	±0.11	±0.07	±0.08	±0.08
>1.60 to ≤2.00	±0.12	±0.13	±0.13	±0.08	±0.09	±0.09
>2.00 to ≤2.50	±0.14	±0.15	±0.15	±0.10	±0.11	±0.11
>2.50 to ≤3.00	±0.16	±0.17	±0.17	±0.11	±0.12	±0.12

(1) For wide strip and slit wide strip the thickness tolerances in the region of cold-rolled welds may be increased by a maximum of 60% over a length of 15 metres. This increase is applicable to all thicknesses and unless otherwise agreed at the time of order, to normal and special tolerances over or under.

Tolerances on width

The tolerances on width of flat products in low carbon and high yield strength steels are given in a for sheet and wide strip and in for slit wide strip of width less than 600mm.

Tolerances on width of sheet and wide strip

The tolerances on width of sheet and wide strip shall be as given in table 3.

Slit wide strip of width less than 600mm

The tolerances on width of sheet and wide strip shall be as given in table 4.

Tolerance on out-of-squareness

The out-of-squareness shall not exceed 1% of the actual width of the sheet.

Table 3. Tolerances on width of sheet and wide strip - dimensions in mm

Nominal width	Normal tolerances		Special tolerances (S)	
	Under	Over	Under	Over
≤1 200	0	+4	0	+2
>1 200 to ≤ 1 500	0	+5	0	+2
> 1 500	0	+6	0	+3

Tolerances on edge camber

The edge camber shall not exceed 6mm over a length of 2m. For lengths less than 2 metres, the edge camber shall not exceed 0.3% of the actual length.

For slit wide strip of width less than 600mm a special edge camber tolerance (CS) of 2mm maximum on a 2 metre length may be specified. This special edge camber tolerance is not applicable to slit wide strip of high yield strength steels.

Table 4. Tolerances on slit wide strip of width less than 600mm - dimensions in mm

Tolerance class	Nominal thickness	Nominal width							
		<125		≥125 to < 250		≥250 to < 400		≥400 to < 600	
		Under	Over	Under	Over	Under	Over	Under	Over
Normal	<0.6	0	+0.4	0	+0.5	0	+0.7	0	+1.0
	≥0.6 to < 1.0	0	+0.5	0	+0.6	0	+0.9	0	+1.2
	≥1.0 to < 2.0	0	+0.6	0	+0.8	0	+1.1	0	+1.4
	≥2.0 to ≤ 3.0	0	+0.7	0	+1.0	0	+1.3	0	+1.6
Special (S)	≥0.6	0	+0.2	0	+0.2	0	+0.3	0	+0.5
	≥0.6 to < 1.0	0	+0.2	0	+0.3	0	+0.4	0	+0.6
	≥1.0 to < 2.0	0	+0.3	0	+0.4	0	+0.5	0	+0.7
	≥2.0 to ≤ 3.0	0	+0.4	0	+0.5	0	+0.6	0	+0.8

Table 5. Tolerances on length
dimensions in mm

Nominal length	Tolerances			
	Normal		Special (S)	
	Under	Over	Under	Over
<2000	0	6	0	3
≥2000	0	0.3% of the length	0	0.15% of the length

Table 6. Flatness tolerances for low carbon steel sheet - dimensions in mm

Tolerance class	Nominal width	Nominal thickness		
		<0.7	≥0.7<1.2	≥1.2
Normal	≥600 < 1200	12	10	8
	≥1200 < 1500	15	12	10
	≥1500	19	17	15
Special (FS)	≥600 < 1200	5	4	3
	≥1200 < 1500	6	5	4
	≥1500	8	7	6

Tolerances on length

The tolerances on length shall be as given in table 5 and apply to all products covered by this standard including low carbon and high yield strength steels.

Flatness tolerances

The flatness tolerances apply only to sheet. If sheet is ordered non-skin passed only the normal tolerances are applicable.

Flatness tolerances closer than special tolerances may be agreed at the time of the order.

Low carbon steel sheets and with *RE*<280N/mm²

Flatness tolerances for low carbon steel sheet with *RE*<280N/mm² shall be as given in table 6.

When low carbon steel sheet is ordered with the special tolerances in table 6 it is necessary, but only in cases of dispute, to verify that the wave height of any edge wave of length over 200mm is always less than:

- 1% of its length for a nominal sheet width < 1500mm,
- 1.5% of its length for a nominal sheet width ≥ 1500mm

If the length of an edge wave is less than 200 mm it is necessary to verity that its maximum height does not exceed 2mm.

High Yield strength steel sheet

Flatness tolerances for high yield strength steel sheet shall be as given in table 7 and apply to specified minimum yield strengths equal to over 280N/mm² and less than 360 N/mm².

For specified minimum yield strengths equal to or over 360 N/mm² the values for flatness tolerances should be specified at the time of the order.

Table 7. Flatness tolerances for high yield strength steel sheet (280≤ *Re* < 360 N/mm²)
dimensions in mm

Tolerance class	Nominal width	Nominal thickness		
		<0.7	≥0.7<1.2	≥1.2
Normal	≥600<1200	15	13	10
	≥1200<1500	18	15	13
	≥1500	22	20	19
Special (FS)	≥600<1200	8	6	5
	≥1200<1500	9	8	6
	≥1500	12	10	9