

Tolerances to EN 10029 for hot rolled plate 3mm and above

General

This standard covers a wider group of steels than just stainless:

Non-alloy and alloy steels including stainless steels with:

1. Nominal thickness $\geq 3\text{mm} \leq 250\text{mm}$
2. Nominal width $\geq 600\text{mm}$
3. Specified minimum yield strength $< 700 \text{ N/mm}^2$

Tolerances on plate less than 600 mm wide shall be agreed at time of enquiry/order

Thickness tolerance

At the enquiry/order stage it is necessary to define which of 4 classes A-D is required.

Nominal thickness	Tolerances on nominal thickness ¹⁾							
	Class A		Class B		Class C		Class D	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
$\geq 3 < 5$	-0.4	+0.8	-0.3	+0.9	-0	+1.2	-0.6	+0.6
$\geq 5 < 8$	-0.4	+1.1	-0.3	+1.2	-0	+1.5	-0.75	+0.75
$\geq 8 < 15$	-0.5	+1.2	-0.3	+1.4	-0	+1.7	-0.85	+0.85
$\geq 15 < 25$	-0.6	+1.3	-0.3	+1.6	-0	+1.9	-0.95	+0.95
$\geq 25 < 40$	-0.8	+1.4	-0.3	+1.9	-0	+2.2	-1.1	+1.1
$\geq 40 < 80$	-1.0	+1.8	-0.3	+2.5	-0	+2.8	-1.4	+1.4
$\geq 80 < 150$	-1.0	+2.2	-0.3	+2.9	-0	+3.2	-1.6	+1.6
$\geq 150 < 250$	-1.2	+2.4	-0.3	+3.3	-0	+3.6	-1.8	+1.8

1. These thickness tolerances apply outside ground areas

Nominal thickness	Maximum thickness difference within a plate					
	Nominal width					
	$\geq 600 < 2000$	$\geq 2000 < 2500$	$\geq 2500 < 3000$	$\geq 3000 < 3500$	$\geq 3500 < 4000$	≥ 4000
$\geq 3 < 5$	0.8	0.9	0.9	---	---	---
$\geq 5 < 8$	0.9	0.9	1.0	1.0	---	---
$\geq 8 < 15$	0.9	1.0	1.0	1.1	1.1	1.2
$\geq 15 < 25$	1.0	1.1	1.2	1.2	1.3	1.4
$\geq 25 < 40$	1.1	1.2	1.2	1.3	1.3	1.4
$\geq 40 < 80$	1.2	1.3	1.4	1.4	1.5	1.6
$\geq 80 < 150$	1.3	1.4	1.5	1.5	1.6	1.7
$\geq 150 < 250$	1.4	1.5	1.6	1.6	1.7	---

Thickness shall be measured at any point situated more than 25mm from the transverse or longitudinal edges of the plate, other than locally ground areas.

For plates with untrimmed edges the measuring points shall be agreed at the time of order.

Ground areas

The standard governing surface defects and permissible ground areas of hot rolled plates is EN 10163. It is intended to publish an article on this standard on the website in the near future. For the time being please refer to the [Stainless Steel Advisory Service](#).

Width tolerance

Nominal width	Tolerances	
	Lower	Upper
> 600 < 2000	0	+20
> 2000 < 3000	0	+25
> 3000	0	+30

Width shall be measured perpendicular to the major axis of the plate.

Plates may be supplied with untrimmed edges, condition NK. In this case, width tolerances shall be agreed at the time of the enquiry and order.

Length tolerance

Nominal length	Tolerances	
	Lower	Upper
< 4000	0	+ 20
>4000 < 6000	0	+ 30
>6000 < 8000	0	+ 40
>8000 < 10000	0	+ 50
>10000 < 15000	0	+ 75
>15000 < 20000 ¹⁾	0	+100

1. Tolerances on plates with a nominal length > 20000mm shall be agreed at the time of the enquiry/order. The length of the plate is the length of the largest rectangle contained within a plate.

Edge camber and out of squareness

Edge camber is the maximum deviation between one longitudinal edge and the straight line joining the two ends of this edge.

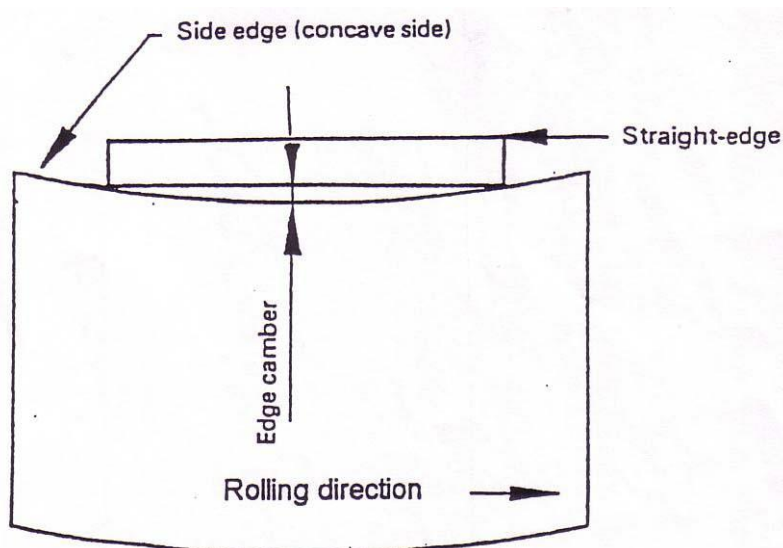


Figure 3. Measurement of edge camber

The out of squareness is the orthogonal projection of one transverse edge on one longitudinal edge.

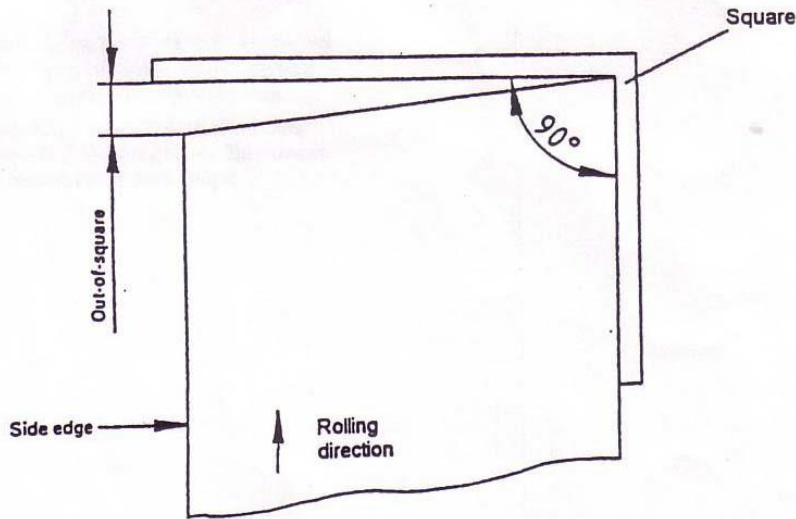


Figure 2. Measurement of out-of-squareness

The edge camber and out of squareness of a plate shall be limited so that it shall be possible to inscribe a rectangle with the dimensions of the ordered plate within the delivered size.

Additionally, if agreed at the time of the enquiry and order, edge camber shall be limited to 0.2% of the actual length of the plate and out of squareness to 1% of the actual width of the plate. This extra requirement is designated G.

Flatness tolerance

Flatness shall be measured as follows:

Place plate on a flat surface. Deviation from flatness shall be determined by measuring the deviation in distance between the plates and a straight edge of 1000mm or 2000mm long which may be placed in any direction.

Only the part between two points of contact between the straight edge and the plate shall be taken into consideration. Deviations shall be measured at a point at least 25mm from the longitudinal edges and at a distance of 200mm from the end for Normal tolerances or 100mm for Special tolerances

Flatness tolerances are either Normal, Class N, or Special, Class S. The tolerance also depends on the minimum yield strength of the steel. These are steel types L and H:

L - Products with a specified minimum yield strength ≤ 460 N/mm², neither quenched nor quenched and tempered.

H - Products with specified minimum yield strength > 460 N/mm² and < 760 N/mm² and all grades of quenched and quenched and tempered products

Note. Not in standard itself. For stainless steels the yield strength should be taken as the 0.2% PS from the material standard EN 10088-2 or EN 10028-7. The quenching which is often part of the heat treatment after solution annealing of austenitic stainless steels is NOT intended in these definitions. Most austenitic stainless steels will therefore fall into class L.

Normal flatness tolerances Class N

Nominal thickness	Steel type L		Steel type H	
	Measuring length			
	1000	2000	1000	2000
> 3 < 5	9	14	12	17
> 5 < 8	8	12	11	15
> 8 < 15	7	11	10	14
> 15 < 25	7	10	10	13
> 25 < 40	6	9	9	12
≥ 40 ≤ 250	5	8	8	11

If the distance between the points of contact of the straight edge and the plate < 1000mm the permissible deviation from flatness shall comply with the following requirements:

For steel type L a maximum of 1% and for steel type H a maximum of 1.5% of the distance between points of contact on the plate between 300 and 1000mm but not exceeding the values in the above table.

Special flatness tolerances, Class S

Nominal thickness	Steel type L		Steel type H			
	Plate width		Measuring length			
	< 2750	≥ 2750				
	1000	2000	1000	2000	1000	2000
> 3 < 8	4	8	5	10	Shall be agreed at time of enquiry and order	
≥ 8 < 250	3	6	3	6	Shall be agreed at time of enquiry and order	

Tighter tolerances for steel type L can be agreed at the time of enquiry and order.

If the distance between the points of contact of the straight edge and the plate < 1000mm the permissible deviation from flatness shall comply with the following requirements:

A maximum of 0.5% of the distance between points of contact but not exceeding the values in the above table and not < 2mm.

Excess mass

There is a rather complex table for excess mass and it is not intended to reproduce it in this article. Unless otherwise agreed at the time of the enquiry and order, excess mass shall not be a cause for rejection. For information on this particular issue, please refer to the [Stainless Steel Advisory Service](#).