INTERNATIONAL STANDARD

ISO 7452

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Hot-rolled structural steel plates — Tolerances on dimensions and shape

Tôles en acier de construction laminées à chaud — Tolérances sur les dimensions et la forme

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7452 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 3, *Steels for structural purposes*.

This second edition cancels and replaces the first edition (ISO 7452:1984), the tables of which have been technically revised.

Hot-rolled structural steel plates — Tolerances on dimensions and shape

1 Scope

This International Standard specifies requirements for tolerances for hot-rolled steel plates made on a reversing mill (excluding stainless steels) with the following characteristics:

a) nominal thickness $\geqslant$ 4 mm but $\leqslant$ 400 mm;

b) nominal width $\geqslant$ 600 mm;

c) specified minimum yield strength $\leqslant$ 700 N/mm^2.

Tolerances for products of width < 600 mm, cut or slit from plate, should be agreed between manufacturer and purchaser at the time of inquiry and order.

Tolerances on dimensions and shape of steel plates having a specified minimum yield stress greater than 700 N/mm^2 should be the subject of agreement at the time of inquiry and order.

This International Standard does not include continuous mill products, custom-made plate, checker plate or bulb plate for flooring or wide flats.

It does not apply to continuous hot-rolled steel plates as defined in specific International Standards (see ISO 4995, ISO 4996, ISO 5951, ISO 5952).

2 Information to be supplied by the purchaser

2.1 General

The following information shall be supplied by the purchaser at the time of inquiry and order.

a) description of this product (plate);

b) number of this International Standard, i.e. ISO 7452;

c) nominal thickness, in millimetres;

d) the thickness tolerance table and class required (Table 1 class N; Table 2 class A, B, or C) (see 3.2 and 4.1.1);

e) nominal width, in millimetres (see 4.2.1);

f) the letters NK if plate with mill edges is required (see 4.2.2);

(Option 1, see clause 9.)

g) the flatness tolerance required (Table 5, 6, 7 or 8);

h) nominal length, in millimetres (see 4.3);

i) the letter G if plate with limited edge camber and out-of-squareness is required (see 5.1);

(Option 2, see clause 9.)

2.2 Options

A number of options are specified in clause 9. In the event that the purchaser does not indicate his wish to implement any of these options, the supplier shall supply the goods in accordance with the basic specification (see 3.2).

3 Form of supply

3.1 Plate shall be supplied:

— with thickness tolerances of Table 1 (class N) or Table 2 (class A, B or C) (see 4.1.1);

— with trimmed edges or with mill edges (NK) (see 4.2.2).

3.2 In the absence of information in the order or of code letters for the supply, plate shall be supplied as follows:

— sheared or flame cut edges;

— normal thickness tolerances, class N (see Table 1);

— edge camber and out-of-squareness in accordance with 5.1;

— normal flatness tolerances (see Table 5).

4 Tolerances on dimensions

4.1 Thickness

4.1.1 Tolerances on thickness are given in Table 1.

When the purchaser requires another distribution of tolerances (Table 2), the purchaser shall indicate if class A, B or C is required (see 2.1).

— class A: for minus thickness tolerances depending on the nominal thickness;

— class B: for a fixed minus tolerance of 0,3 mm;

— class C: for all plus tolerances depending on the nominal thickness.

4.1.2 The special provision applicable to ground parts of the surface of the plates are given in the International Standards for the corresponding products.

Table 1 — Range of tolerances on thickness (class N)

Dimensions in millimetres

Nominal thickness t	Nominal width, w					
	$w < 2\,000$		$2\,000 \leqslant w < 4\,000$		$4\,000 \leqslant w$	
	lower	upper	lower	upper	lower	upper
$4{,}00 \leqslant t < 5{,}00$	− 0,60	+ 0,60	− 0,65	+ 0,65	—	—
$5{,}00 \leqslant t < 8{,}00$	− 0,60	+ 0,60	− 0,75	+ 0,75	—	—
$8{,}00 \leqslant t < 15{,}0$	− 0,65	+ 0,65	− 0,80	+ 0,80	− 0,90	+ 0,90
$15{,}0 \leqslant t < 25{,}0$	− 0,75	+ 0,75	− 0,95	+ 0,95	− 1,10	+ 1,10
$25{,}0 \leqslant t < 40{,}0$	− 0,80	+ 0,80	− 1,00	+ 1,00	− 1,20	+ 1,20
$40{,}0 \leqslant t < 80{,}0$	− 1,00	+ 1,00	− 1,20	+ 1,20	− 1,40	+ 1,40
$80{,}0 \leqslant t < 150$	− 1,40	+ 1,40	− 1,60	+ 1,60	− 1,80	+ 1,80
$150 \leqslant t < 250$	− 1,80	+ 1,80	− 1,95	+ 1,95	− 2,10	+ 2,10
$250 \leqslant t \leqslant 400$	− 2,00	+ 2,00	− 2,20	+ 2,20	− 2,40	+ 2,40

NOTE 1 For heavier plate thicknesses ($\geqslant$ 40 mm) for special applications, an increased plus (+) tolerance may be permitted by agreement between the purchaser and the manufacturer.

NOTE 2 By agreement at the time of enquiry and order, and additionally to the N tolerances, a maximum thickness difference within any plate may be applied, see annex A.

Table 2 — Classes of distribution of tolerances on thickness

Dimensions in millimetres

Nominal thickness t	Nominal width, w																	
	$w < 2\ 000$						$2\ 000 \leqslant w < 4\ 000$						$4\ 000 \leqslant w$					
	Class A		Class B		Class C		Class A		Class B		Class C		Class A		Class B		Class C	
	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper
$4{,}00 \leqslant t < 5{,}00$	− 0,40	+ 0,80	− 0,30	+ 0,90	0	+ 1,20	− 0,45	+ 0,85	− 0,30	+ 1,00	0	+ 1,30	—	—	—	—	—	—
$5{,}00 \leqslant t < 8{,}00$	− 0,40	+ 0,80	− 0,30	+ 0,90	0	+ 1,20	− 0,50	+ 1,00	− 0,30	+ 1,20	0	+ 1,50	—	—	—	—	—	—
$8{,}00 \leqslant t < 15{,}0$	− 0,45	+ 0,85	− 0,30	+ 1,00	0	+ 1,30	− 0,50	+ 1,10	− 0,30	+ 1,30	0	+ 1,60	− 0,60	+ 1,20	− 0,3	+ 1,50	0	+ 1,80
$15{,}0 \leqslant t < 25{,}0$	− 0,50	+ 1,00	− 0,30	+ 1,20	0	+ 1,50	− 0,65	+ 1,25	− 0,30	+ 1,60	0	+ 1,90	− 0,70	+ 1,50	− 0,3	+ 1,90	0	+ 2,20
$25{,}0 \leqslant t < 40{,}0$	− 0,55	+ 1,05	− 0,30	+ 1,30	0	+ 1,60	− 0,65	+ 1,35	− 0,30	+ 1,70	0	+ 2,00	− 0,80	+ 1,60	− 0,3	+ 2,10	0	+ 2,40
$40{,}0 \leqslant t < 80{,}0$	− 0,65	+ 1,35	− 0,30	+ 1,70	0	+ 2,00	− 0,80	+ 1,60	− 0,30	+ 2,10	0	+ 2,40	− 0,90	+ 1,90	− 0,3	+ 2,50	0	+ 2,80
$80{,}0 \leqslant t < 150$	− 0,90	+ 1,90	− 0,30	+ 2,50	0	+ 2,80	− 1,05	+ 2,15	− 0,30	+ 2,90	0	+ 3,20	− 1,20	+ 2,40	− 0,3	+ 3,30	0	+ 3,60
$150 \leqslant t < 250$	− 1,20	+ 2,40	− 0,30	+ 3,30	0	+ 3,60	− 1,30	+ 2,60	− 0,30	+ 3,60	0	+ 3,90	− 1,40	+ 2,80	− 0,3	+ 3,90	0	+ 4,20
$250 \leqslant t \leqslant 400$	− 1,30	+ 2,70	− 0,30	+ 3,70	0	+ 4,00	− 1,45	+ 2,95	− 0,30	+ 4,10	0	+ 4,40	− 1,60	+ 3,20	− 0,3	+ 4,50	0	+ 4,80

Either plus side (+) or minus side (–) of the thickness tolerances given in this table may be limited on request. Also a minus side of thickness of 0,3 mm is permitted. In all cases the total tolerances shall be equal to those given in Table 1.

NOTE By agreement at the time of enquiry and order, and in addition to the A, B and C tolerances, a maximum thickness difference within any plate may be applied, see annex A.

4.2 Width

4.2.1 Tolerances on width are given in Table 3

Table 3 — Tolerances on width

Dimensions in millimetres

Nominal width	Tolerances	
w	lower	upper
$600 \leqslant w < 2\,000$	0	+ 15
$2\,000 \leqslant w < 3\,000$	0	+ 20
$w \geqslant 3\,000$	0	+ 25

4.2.2 Tolerances on width for plates with untrimmed edges (NK) shall be the subject of agreement between the manufacturer and purchaser at the time of enquiry and order.

(Option 1, see clause 9.)

4.3 Length

Tolerances on length are given in Table 4.

Table 4 — Tolerances on length

Dimensions in millimetres

Nominal length	Tolerances	
l	lower	upper
$600 \leqslant l < 4\,000$	0	+ 20
$4\,000 \leqslant l < 6\,000$	0	+ 30
$6\,000 \leqslant l < 8\,000$	0	+ 40
$8\,000 \leqslant l < 10\,000$	0	+ 50
$10\,000 \leqslant l < 15\,000$	0	+ 75
$15\,000 \leqslant l \leqslant 20\,000$ [a]	0	+ 100

[a] Tolerances on plates with a nominal length > 20 000 mm shall be agreed at the time of the enquiry and order.

(Option 3, see clause 9.)

5 Tolerances on shape

5.1 Edge camber and out-of-squareness

The edge camber and the 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 size of the delivered goods.

Additionally, if agreed at the time of the enquiry and order, edge camber can 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 (G).

(Option 2, see clause 9.)

5.2 Flatness

5.2.1 The steel types in accordance with Tables 5, 6 and 8 are defined as follows:

— steel type L: products with a specified minimum yield strength $\leqslant$ 460 N/mm^2, neither quenched nor quenched and tempered;

— steel type H: products with a specified minimum yield strength $>$ 460 N/mm^2 but $<$ 700 N/mm^2 and/or all grades of quenched and quenched and tempered products.

5.2.2 For Table 7, the steel types are defined as follows:

— steel type L: products with a specified minimum tensile strength $\leqslant$ 430 N/mm^2;

— steel type H: products with a specified minimum tensile strength $>$ 430 N/mm^2.

5.2.3 Tolerances on flatness are given in Tables 5 to 8.

The applicable table shall be subject to agreement at the time of enquiry and order.

Table 5 — Normal tolerances for flatness, class N, measurement on 1 000 mm or 2 000 mm length

Dimensions in millimetres

Nominal thickness t	Steel type L [a]		Steel type H [a]	
	Measuring length			
	1 000	2 000	1 000	2 000
$4 \leqslant t < 5$	9	14	12	17
$5 \leqslant t < 8$	8	12	11	15
$8 \leqslant t < 15$	7	10	10	14
$15 \leqslant t < 25$	7	10	10	13
$25 \leqslant t < 40$	6	9	9	12
$40 \leqslant t \leqslant 400$	5	8	8	11

[a] See 5.2.1.

Table 6 — Tolerances for flatness, class R, measurement over a 2 000 mm or a 4 000 mm length

Dimensions in millimetres

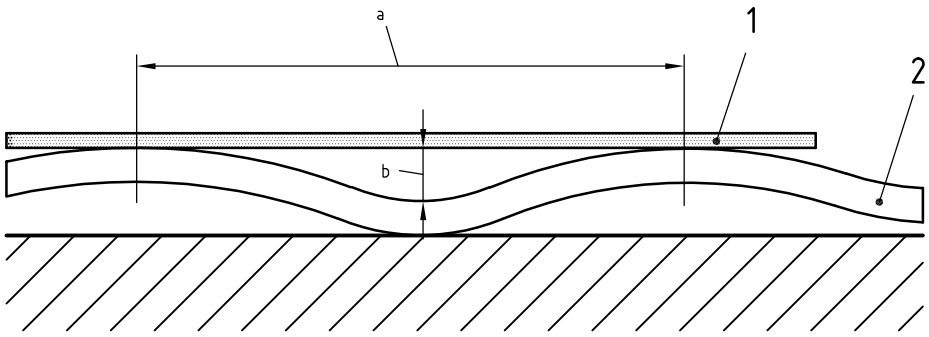
Nominal thickness t	Straightedge				
	2 000		4 000		
	Nominal plate width, w				
	$w < 2\,000$	$w \geqslant 2\,000$	$w < 2\,000$	$2\,000 \leqslant w < 3\,000$	$w \geqslant 3\,000$
$4 \leqslant t < 5$	14	24	26	a	a
$5 \leqslant t < 8$	13	21	22	28	a
$8 \leqslant t < 15$	12	16	12	16	24
$15 \leqslant t < 25$	12	16	12	16	22
$25 \leqslant t < 40$	9	13	9	13	19
$40 \leqslant t < 80$	8	11	8	11	16
$80 \leqslant t < 150$	8	10	8	10	15
$150 \leqslant t < 250$	10	15	10	15	20
$250 \leqslant t \leqslant 400$	20	20	20	20	20

Deviation from flatness shall be determined by measuring the deviation in distance between the plates and straightedge of 2 000 mm long which may be placed in any direction. For steel plates less than 2 000 mm in wave pitch (see Figure 1), the values given in the above table for a 2 000 mm straightedge shall be applied. For steel plates over 4 000 mm in wave pitch, the values given in the above table for a 4 000 mm straightedge shall be applied to any 4 000 mm length.

NOTE 1 Values given above are for type L (see 5.2.1).

NOTE 2 Values for type H = 1,5 × values for type L (see 5.2.1).

a Subject to be agreement between purchaser and manufacturer.



Key

1 Straightedge
2 Plate

a Wave pitch
b Flatness

Figure 1 — Measuring of flatness on wave pitch