GB

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PEOPLE'S REPUBLIC OF CHINA

GB/T 709-2006

Replacing GB/T 709-1988

Dimension, Shape, Weight and Tolerances for Hot Rolled Plates and Sheets

(ISO 7452:2002(E) Hot-rolled Structural Steel Plates - Tolerance on Dimensions and Shape; ISO 16160:2000(E) Continuously Hot-rolled Steel Products - Dimensional and Shape Tolerances, NEQ)

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Foreword

This standard is not equivalent to ISO 7452:2002 (E) Hot-rolled Structural Steel Plates - Tolerance on Dimensions and Shape; ISO 16160:2000 (E) Continuously Hot-rolled Steel Products - Dimensional and Shape Tolerances.

This standard replaces GB/T 709 -1988 Dimension, Shape, Weight and Tolerances for Hot Rolled Sheets and Plates.

Compared with the previous standard, this standard is mainly revised in the following parts:

- Delete the nominal dimension table of steel plates and strips but specify the dimension range and recommended nominal dimension;
- The steel plate thickness increases to 400mm, and the width increases to 5000mm; The steel strip width increases to 2,200mm;
- Tighten the thickness tolerance for the thicker and wider steel plates as well as the width tolerance of steel strips;
- The plus and minus tolerances of the longitudinal-cutting steel strip is replaced with plus tolerance;
- Adjust the length tolerance;
- The unevenness of the single rolled steel plate, the measured length shall be 1m or 2m;
- The unevenness of the continuously rolled steel plate shall be stipulated singly and the measured length shall be physical length;
- The measured length of the sickle curvature is changed into any 5,000mm or physical length; specify the sickle curvature of the longitudinal-cutting steel strip;
- Tighten the height of the coiling steel strip tower;
- specify all kinds of dimensional metrologies and attach measurement graphic illustrations;
- Specify the thickness for weighing the limited tolerance or plus-tolerance steel plate theory.

Dimension, Shape, Weight and Tolerances for Hot Rolled Plates and Sheets

1 Scope

This standard specifies the dimension, shape, weight and tolerances for hot-rolled sheets and plates.

This standard is applicable to the single-sheet rolled steel plate (hereinafter referred to as "single rolled steel plate"), steel strip and its shear steel plates (hereinafter referred to as "continuously rolled steel plate") and longitudinal-cutting steel strip, of which the rolling width is not less than 600mm.

2 Normative References

The following standards contain the provisions which, through reference in this text, constitute the provisions of this standard. For dated reference, subsequent amendments (excluding corrigendum) or revisions of these publications do not apply. However, the parties who enter into agreement according to these specifications are encouraged to study whether the latest editions of these references are applicable. For undated references, the latest edition of the normative document is applicable to this standard.

GB/T 8170 Rules for Rounding-off of Numerical Values

3 Terms and Definitions

For the purposes of this standard, the following terms and definitions are applicable.

3.1 Steel plate or sheet

The steel plate or sheet is referred to the hot-rolled flat steel products with instable edges, including directly-rolled single rolled steel plate and the continuously rolled steel plate cutting from the wide steel strip.

3.2 Steel strip

The steel strip is referred to as the wide steel strip whose rolling width is not

less than 600mm and that is delivered in coils.

4 Classification and Code Name

4.1 Classification according to the edge conditions

Cut edge	EC;
Mill edge	EM.

4.2 Classified according to the thickness tolerance

N-type tolerance: the plus tolerance is equal to the minus tolerance;

A-type tolerance: the minus tolerance specified according to the normal thickness;

B-type tolerance: the fixed minus tolerance is 0.3mm;

C-type tolerance: the fixed minus tolerance is zero, the plus tolerance specified according to the normal thickness.

4.3 Classified according to the thickness precision

Common thickness precision: PT.A;

Higher thickness precision: PT.B.

5 Dimension

5.1 Dimension range of steel plates (sheets) and steel strips

Normal thickness of single rolled steel plate: 3mm-400mm;

Nominal width of single rolled steel plate: 600mm-4,800mm

Nominal length of steel plate: 2,000-20,000mm;

Normal thickness of steel strip (including continuously rolled steel plate): 0.8mm-25.4mm

Nominal width of steel strip (including continuously rolled steel plates): 600mm-2200mm;

Nominal width of longitudinal-cutting steel strip: 120mm-900mm.

5.2 Recommended nominal dimension of steel plates (sheets) and steel

strips

5.2.1 The normal thickness of the single rolled steel plate shall be within the specified range stated in Article 5.1, the steel plate whose thickness is less than 30mm shall subject to any dimension according to 0.5mm multiple; the steel plate whose thickness is not less than 30mm shall subject to any dimension according to 1mm multiple.

5.2.2 The nominal width of single rolled steel plate within the specified range stated in Article 5.1 shall subject to any dimension according to 10mm or 50mm multiples.

5.2.3 The normal thickness of steel strip (including continuously rolled steel plate) within the range stated in Article 5.1 shall subject to any dimension according to 0.1mm multiple.

5.2.4 The nominal width of steel strips (including continuously rolled steel plates) within the range stated in Article 5.1 shall subject to any dimension according to 10mm multiple.

5.2.5 The length of steel plate within the specified range stated in Article 5.1 shall subject to any dimension according to 50mm or 100mm multiples.

5.2.6 According to the purchaser's requirements, the steel plates (sheets) and steel strips out of the recommended nominal dimensions can be supplied upon being agreed by both the supplier and the purchaser.

6 Dimension Tolerance

When examining the thickness and width of the mill-edge steel strips, the total unexamined length of both ends, L shall be:

$$L(m) = 90/\text{Normal thickness}(mm)$$

However, the maximum total length of both ends shall not be greater than 20m.

6.1 Thickness tolerance

6.1.1 The thickness tolerance of the single rolled steel plate shall be compliant to the provisions of Table 1 (N-type).

6.1.2 According to the purchaser's requirements and indicating the tolerance type in the contract, the single rolled steel plate of other tolerance type whose tolerance value is equal to that stated in Table 1 can be supplied, such as A-type, B-type and C-type tolerance stated in Table 2 - Table 4; the single

	600-1200	>1200-1500	>1500-1800	>1800	600-1200	>1200-1500	>1500-1800	>1800
0.8-1.5	±0.15	±0.17	-	-	±0.10	±0.12	-	-
>1.5-2.0	±0.17	±0.19	±0.21	-	±0.13	±0.14	±0.14	-
>2.0-2.5	±0.18	±0.21	±0.23	±0.25	±0.14	±0.15	±0.17	±0.20
>2.5-3.0	±0.20	±0.22	±0.24	±0.26	±0.15	±0.17	±0.19	±0.21
>3.0-4.0	±0.22	±0.24	±0.26	±0.27	±0+17	±0.18	±0.21	±0.22
>4.0-5.0	±0.24	±0.26	±0.28	±0.29	±0.19	±0.21	±0.22	±0.23
>5.0-6.0	±0.26	±0.28	±0.29	±0.31	±0.21	±0.22	±0.23	±0.25
>6.0-8.0	±0.29	±0.30	±0.31	±0.35	±0.23	±0.24	±0.25	±0.28
>8.0-10.0	±0.32	±0.33	±0.34	±0.40	±0.26	±0.26	±0.27	±0+32
>10.0-12.5	±0.35	±0.36	±0.37	±0.43	±0.28	±0.29	±0.30	±0.36
>12.5-15.0	±0.37	±0.38	±0.40	±0.46	±0.30	±0.31	±0+33	±0.39
>15.0-25.4	±0.40	±0.42	±0.45	±0.50	±0.32	±0.34	±0+37	±0.42
a For the steel strip of specified minimum yield strength R≥345 MPa, the thickness tolerance shall increase by 10%.								

6.2 Width tolerance

6.2.1 The width tolerance of the cut-edge single rolled steel plate shall comply with the provisions of Table 6.

Table 6 Width tolerance of cut-edge single rolled steel plate In: mm

Normal thickness	Nominal width	Allowable deviation
3-16	≤1500	+10 0
	>1500	+15 0
>16	≤2 000	+20 0
	>2000-3000	+25 0
	>3 000	+30 0

6.2.2 The width tolerance of the mill-edge single rolled steel plate shall be agreed by both the purchaser and the supplier.

6.2.3 The thickness tolerance of the mill-edge steel strip (including continuously rolled steel plate) shall comply with the provisions stated Table 7.

Table 7 Thickness tolerance of mill-edge steel strip (including continuously rolled steel plate) In: mm

Nominal width	Allowable deviation
≤1500	+20 0
>1500	+25 0

	0
>20 000	Agreed by both the purchaser and the supplier

6.3.2 The length tolerance of continuously rolled steel plate shall comply with the provisions of Table 11.

Table 11 Length tolerance of continuously rolled steel plate In: mm

Nominal length	Tolerance
2000-4000	+0.5%×Nominal length
>8000	+40 0

7 Shape

7.1 Unevenness

7.1.1 The single rolled steel plate shall respectively specify the unevenness of steel plate according to the following two types.

Steel type L: the specified minimum yield strength value ≤460 MPa, non-quenching or quenching+ tempering steel plate.

Steel type H: the specified minimum yield strength value >460 MPa-700MPa, and all quenching or quenching + tempering steel plate.

7.1.1.1 Unevenness of single rolled steel plate shall comply with the provisions of Table 12.

Table 12 Unevenness of single rolled steel plate In: mm

Normal thickness	Steel type L				Steel type H			
	The unevenness of the steel plates of the following nominal width shall not be greater than							
	≤3000		>3000		≤3000		>3000	
	Measured length							
1	1000	2000	1000	2000	1000	2000	1000	2 000
3-5	9	14	15	24	12	17	19	29
>5-8	8	12	14	21	11	15	18	26
>8-15	7	11	11	17	10	14	16	22
>15-25	7	10	10	15	10	13	14	19
>25-40	6	9	9	13	9	12	13	17
>40-400	5	8	8	11	8	11	11	15

7.1.1.2 If the distance between the ruler (straight line) and the contact point of the steel plate is less than 1000mm when measuring, then the maximum

unevenness tolerance shall comply with the following requirements: for steel type L, 1% of the distance of the contact point (300mm-1000mm); for steel type H, 1.5% of distance of the contact point (300mm-1,000mm). However, both of them shall not exceed the provisions of Table 12.

7.1.2 Unevenness of continuously rolled steel plate shall comply with the provisions of Table 13.

Table 13 Unevenness of continuously rolled steel plate In: mm

Normal thickness	Nominal width	Unevenness, no greater than		
		Specified yield strength, R		
		<220 MPa	220 MPa-320 MPa	>320 MPa
≤2	≤1200	21	26	32
	>1200-1 500	25	31	36
	>1500	30	38	45
>2	≤1200	18	22	27
	>1200-1500	23	29	34
	>1500	28	35	42

7.1.3 If the purchaser has requirements on the unevenness of steel strip, then both the supplier and the purchaser can negotiate about them and indicate them on the contract provided that the purchaser's pay-off equipment can ensure the quality.

7.2 Sickle curvature and shear drag (off-square)

The sickle curvature and shear drag of the steel plate shall be restricted to ensure the dimensional rectangular of the steel plate.

7.2.1 Sickle curvature

7.2.1.1 The sickle curvature of single rolled steel plate shall not be greater than 0.2% of the physical length.

7.2.1.2 The sickle curvature of the steel strip (including longitudinal-cutting steel strip) and continuously rolled steel plate shall subject to the provisions of Table 14. When examining the sickle curvature for the mill-edge steel strip, the total length of the non-examined ends shall subject to the provisions of Chapter 6.

Table 14 Sickle curvature of the steel strip (including longitudinal-cutting steel strip) and continuously rolled steel plate In: mm

Product type	Nominal length	Nominal width	Sickle curvature, no greater than		Measured length
			Cut-edge	Mill edge	
Continuously rolled steel	<5000	≥600	Physical length×0.3%	Physical length×0.4%	Physical length

plate	≥5000	≥600	15	20	Any 5000 mm length
Steel strip	-	≥600	15	20	Any 5000 mm length
	-	<600	15	-	-

7.2.2 Shear drag

The shear drag of steel plate shall not be greater than 1% of the physical width.

7.3 Tower

7.3.1 The steel strips shall be coiled firmly. At a side of the steel strip coil, the tower height shall not exceed the provisions of Table 15.

Table 15 Tower height

In: mm

Nominal width	Cut-edge	Mill edge
≤1000	20	50
>1000	30	60

8 Dimensional metrology

8.1 Thickness

The cut-edge steel strip (including continuously rolled steel plate) shall be measured at a distance not less than 25mm from the longitudinal edge; the mill-edge steel strip (including the continuously rolled steel plate) shall be measured at a distance not less than 40mm from the longitudinal edge. The cut-edge single rolled steel plate shall be measured at a distance not less than 25mm away from the edge (longitudinal edge and horizontal edge); but the measuring point of the mill-edge single rolled steel plate shall be agreed by both the supplier and the purchaser.

8.2 Width

The width shall be measured at the direction that is perpendicular to the steel plate or steel strip center line.

8.3 Length

The length of the maximal rectangle within the steel plate

8.4 Unevenness

The steel plate is freely placed on a plane, without any pressure in addition to its own weight.

Table 16 Calculation method of the steel plate theoretical weight

Calculation sequence	Calculation method	Rounding-off method of results
Basic weight/[kg/(mm·m^2)]	7.85 (weight of 1mm thickness and 1 m^2 area)	-
Unit weight/(kg/m^2)	Basic weight [kg/(mm·m^2)] × Thickness (mm)	Rounding-off is to 4 bits of significant figure
Area of steel plate/m^2	Width (m) × length (m)	Rounding-off is to 4 bits of significant figure
Weight of a sheet of steel plate/kg	Unit weight (kg/m^2) × area (m^2)	Rounding-off is to 3 bits of significant figure
Total weight/kg	Sum of the weight of all the steel plates	Integer value of kg

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