

**SLS 1023 : 1994**

**Sri Lanka Standard  
SPECIFICATION FOR TOLERANCES ON DIMENSIONS  
AND SHAPE OF HOT ROLLED STEEL PLATES FOR  
STRUCTURAL AND GENERAL ENGINEERING  
PURPOSES**

**SRI LANKA STANDARDS INSTITUTION**



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FOREWORD

This standard was approved by the Sectoral Committee on Metal and Metal Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on *1994/11/24*

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or an analysis shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

The Sri Lanka Standards Institution gratefully acknowledges the use of the following publications of International Organization for Standardization and the British Standards Institution in the preparation of this standard.

ISO 7452 : 1984 (E) Hot rolled structural steel plates  
Tolerances on dimensions and shape

BS 1449 : Part 1 : 1983 Specification for carbon steel plates  
sheets and strip

1 SCOPE

This standard specifies the tolerances on the dimensions, shape and mass of hot rolled, non alloyed, alloyed and stainless steel plates either in the as rolled state or which have been subjected to heat treatment.

NOTE

*It applies to plates of nominal thickness up to 150 mm and of width up to 4000 mm whose specified minimum yield stress is equal to or less than 700 N/mm<sup>2</sup>.*

*Tolerances on dimensions and shape of steel plates having a specified minimum yield stress greater than 700 N/mm<sup>2</sup> should be the subject of agreement at the time of ordering.*

## 2 REFERENCE

- CS 102 Presentation of numerical values  
 SLS 874 Steel Products  
 Part 1 Classification and definitions

## 3 DEFINITIONS

For the purposes of this standard the following definitions as given in SLS 874 : Part 1 shall apply:

**3.1 flat products** : Finished products of nominally rectangular cross-section with a width much greater than thickness, generally manufactured by rolling.

**3.1.1 hot rolled flat product** : Flat product produced by hot rolling

### NOTE

*The very light cold rolling pass, generally less than 5 per cent called a 'skin-pass' or 'dressing-pass' which is given to certain hot rolled flat products does not alter their classification as hot rolled flat products.*

**3.1.2 cold rolled flat product** : Flat product that has undergone during finishing a reduction in cross section generally at least 25 per cent by cold rolling without prior reheating.

### NOTE

*In the case of flat products of width less than 600 mm and for certain qualities of special steel, levels of reduction of cross section less than 25 per cent may be included.*

**3.1.3 wide flat (hot rolled)** : Finished flat product of width greater than 150 mm but not exceeding 1250 mm and thickness not less than 4 mm always supplied in lengths, with sharp edges

### NOTE

*Wide flats are hot rolled on the four sides (or in box passes) or produced by shearing or flame cutting wider flat products. Wide flats, rolled on all four sides are sometimes termed "Universal Plates".*

**3.1.4 sheet/plate (hot/cold rolled)** : Finished flat product, the edges being allowed to deform freely during rolling supplied flat and generally square or rectangular but also in any other shape, for example: circular or according to the design sketch. The product may also be delivered pre-curved.

**NOTE**

*The edges are as rolled or sheared or flame cut or chamfered.*

**3.1.4.1 sheet (hot/cold rolled)** : If the thickness is less than 3 mm.

**NOTE**

*Sheet is generally cut from hot or cold rolled strip rolled on a continuous mill.*

**3.1.4.2 plate (hot/cold rolled)** : If the thickness is equal to or greater than 3 mm.

**NOTE**

*Plate may be produced :*

*a) directly on a reversing mill or by cutting from a parent plate rolled on a reversing mill (generally known as 'quarto plate');*

*b) by cutting from hot or cold rolled strip rolled on a continuous mill.*

## 4 SYMBOLS

The following symbols are used in the standard:

- t - thickness
- b - nominal width
- l - nominal length

## 5 CLASSES AND TYPES

**5.1** For the purpose of specifying thickness tolerance, steels shall be classified as follows:

**Class A** - With a variable minus tolerances, the value of which depends on the nominal thickness.

**Class B** - With a constant minus tolerance of 0.3 mm (see 7.3.1)

5.2 For the purpose of specifying flatness tolerance, steel types shall be defined as follows:

**Steel L** - Plates with a specified minimum yield strength less than or equal to 460 N/mm<sup>2</sup> not quenched and tempered.

**Steel H** - Plates with a specified minimum yield strength greater than 460 N/mm<sup>2</sup> and equal to or less than 700 N/mm<sup>2</sup> and quenched and tempered. (see 7.3.5)

## 6 DESIGNATION

Steel plates shall be designated by the grade of steel, size of the plate and nominal thickness in mm.

## 7 REQUIREMENTS

### 7.1 Dimensions

Dimensions shall be as given in Tables 1, 2, and 3

### 7.2 Mass

The excess mass for tolerance Class A and B shall be as given in Table 4.

### 7.3 Tolerances on dimensions, mass and shape

#### 7.3.1 *Tolerance on thickness*

7.3.1.1 The tolerance on thickness shall conform to the values given in Table 1.

7.3.1.2 The maximum difference on thickness on the same plate is identical, whatever Class A or B tolerances apply. This requirement applies only by special agreement at the time of ordering.

#### **NOTE**

*By agreement at the time of ordering, plates may also be supplied with other types of tolerances with respect to the nominal thicknesses (symmetrical, wholly over or wholly under, etc.), provided that the permissible deviation range given in Table 1 and maximum difference in thickness on the same plate are respected.*

TABLE 1 - Tolerances on thickness

Dimensions in millimetres

Nominal thickness (t)	Permissible deviation on nominal thickness (see 7.4.1)		Maximum deviation in thickness in the same plate 1)					
	Class A	Class B	Width of the plate 2)					
			< 2 000	≥ 2 000 < 2 500	≥ 2 500 < 3 000	≥ 3 000 < 3 500	≥ 3 500 < 4 000	≥ 4 000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
3 ≤ t < 5	+ 0.8 - 0.4	+ 0.9 - 0.3	0.8	0.9	0.9	-	-	
5 ≤ t < 8	+ 1.1 - 0.4	+ 1.2 - 0.3	0.9	0.9	1.0	1.0	-	
8 ≤ t < 15	+ 1.2 - 0.5	+ 1.4 - 0.3	0.9	1.0	1.0	1.1	1.1	
15 ≤ t < 25	+ 1.3 - 0.6	+ 1.6 - 0.3	1.0	1.1	1.2	1.2	1.3	
25 ≤ t < 40	+ 1.4 - 0.8	+ 1.9 - 0.3	1.1	1.2	1.2	1.3	1.3	
40 ≤ t < 80	+ 1.8 - 1.0	+ 2.5 - 0.3	1.2	1.3	1.4	1.4	1.5	
80 ≤ t ≤ 150 <sup>3)</sup>	+ 2.2 - 1.0	+ 2.9 - 0.3	1.3	1.4	1.5	1.5	1.6	

NOTES

1. The values are only guaranteed by special agreement at the time of ordering. (see 7.3.1.2)
2. For nominal widths over 4 000 mm, the permissible deviations should be the subject of agreement between the manufacturer and purchaser.
3. For nominal thicknesses over 150 mm, the permissible deviations should be the subject of agreement between the manufacturer and purchaser.

### 7.3.2 Tolerance on width

7.3.2.1 Permissible deviations on nominal width shall be as given in Table 2.

TABLE 2 - Tolerances on width  
Dimensions in millimetres

Nominal width (b)	Permissible deviation
(1)	(2)
$b < 2\ 000$	+ 20 0
$2\ 000 \leq b < 3\ 000$	+ 25 0
$3\ 000 \leq b \leq 4\ 000$ <sup>1)</sup>	+ 30 0

#### NOTES

1. For nominal widths above 4000 mm, the tolerances on width should be the subject of agreement between the manufacturer and purchaser.

2. Subject to agreement at time of order, a minus permissible deviation of 6 mm may be tolerated.

7.3.2.2 Permissible deviations on nominal widths of plates with mill edges should be the subject of agreement between the manufacturer and purchaser.

#### NOTE

When there is no agreement between the purchaser and supplier, the supplier shall declare the deviation to the purchaser or to the testing authority.

### 7.3.3 Tolerance on length

7.3.3.1 The permissible deviation on nominal length shall be as given in Table 3.



TABLE 3 - Tolerance on length  
Dimensions in millimetres

Nominal length (1)	Permissible deviation
(1)	(2)
1 < 4 000	+ 20 0
4 000 ≤ 1 < 6 000	+ 30 0
6 000 ≤ 1 < 8 000	+ 40 0
8 000 ≤ 1 < 10 000	+ 50 0
10 000 ≤ 1 < 15 000	+ 75 0
15 000 ≤ 1 ≤ 20 000 <sup>1)</sup>	+100 0

**NOTES**

1. For nominal lengths above 20 000 mm, the permissible deviation should be the subject of agreement between the manufacturer and purchaser.

2. Subject to agreement at time of order, a minus permissible deviation of 6 mm may be tolerated.

*7.3.4 Tolerance on mass (Applicable only to deliveries at actual weight)*

7.3.4.1 The excess mass is the variation in mass expressed as a percentage of the theoretical mass of the product.

*NOTE*

*The theoretical mass is determined by taking the density of the steel to be 7.85 kg/dm<sup>3</sup>.*

7.3.4.2 The excess masses corresponding to the thickness tolerance Class A or B (7.3.1) are given in Table 4.

7.3.4.3 Table 4 applies to deliveries with the same nominal dimensions and of the same quality, whose mass is between 25 t and 75 t.

The excess masses for deliveries of different masses are given in Note 1 of Table 4.

7.3.4.4 Excess masses that exceed the limits of Table 4 will not cause rejection of the product, unless otherwise agreed at the time of ordering.

7.3.4.5 For thickness tolerances other than those two classes A and B, the excess masses quoted in Table 4 shall be modified accordingly.

TABLE 4 - Excess masses for class A and B (see 7.3.1) as a percentage of the theoretical mass

Nominal thickness t mm	Class	Permissible deviation on nominal thickness mm	Excess mass as a percentage of theoretical mass 1) 2)				
			Width of plate mm				
			< 2 000	≥ 2 000 < 2 500	≥ 2 500 < 3 000	≥ 3 000 < 3 500	≥ 3 500 ≤ 4 000
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
3 ≤ t < 5	A	+ 0.8 - 0.4	8.5	9.5	10.5		
	B	+ 0.9 - 0.3	11	12	13.5		
5 ≤ t < 8	A	+ 1.1 - 0.4	7	7.5	8.5	9	
	B	+ 1.2 - 0.3	9	9.5	10	11	
8 ≤ t < 15	A	+ 1.2 - 0.5	6	6	6.5	7	7.5
	B	+ 1.4 - 0.3	7.5	8	8.5	9	9.5
15 ≤ t < 25	A	+ 1.3 - 0.6	4.5	4.5	5	5	5.5
	B	+ 1.6 - 0.3	6	6	6.5	6.5	7
25 ≤ t < 40	A	+ 1.4 - 0.8	3.5	3.5	4	4	4
	B	+ 1.9 - 0.3	5	5	5.5	5.5	5.5
40 ≤ t < 80	A	+ 1.8 - 1.0	3.5	3.5	4	4	4
	B	+ 2.5 - 0.3	5	5	5.5	5.5	5.5
80 ≤ t ≤ 150	A	+ 2.2 - 1.0	3.5	4	4	4	4
	B	+ 2.9 - 0.3	4.5	4.5	4.5	4.5	4.5

**NOTES**

1. mass supplied $\geq$ 150 000 kg	:	80 per cent of the value indicated
75000 kg $\leq$ mass supplied < 150000 kg	:	90 per cent of the value indicated
25000 kg $\leq$ mass supplied < 75 000 kg	:	value indicated
10 000 kg $\leq$ mass supplied < 25 000 kg	:	120 per cent of the value indicated
mass supplied < 10 000 kg	:	excess mass greater than 140 per cent of the value indicated

2. Deviation of average theoretical mass due to overlenght and overwidth included.

**7.3.5 Tolerance on flatness**

7.3.5.1 Tolerance on flatness shall be as given in Table 5 for steel type L and steel type H (see 5.2).

**NOTES**

1) In the case of stainless steels, the flatness tolerances should be the subject of agreement at the time of ordering.

2) Attention is drawn to the fact that the handling of the plate or storage under unfavourable conditions may produce deviations greater than those measured on leaving the factory.

TABLE 5 - Tolerances on flatness  
Dimensions in millimetres

Rule		Flatness tolerances			
		Steel L (7.3.5.1)		Steel H (7.3.5.1)	
		1 000	2 000	1 000	2 000
Nominal thickness (t) (1)	(2)	(3)	(4)	(5)	
$3 \leq t < 5$	9	15	12	18	
$5 \leq t < 8$	8	13	11	16	
$8 \leq t < 15$	7	11	10	14	
$15 \leq t < 25$	7	10	10	13	
$25 \leq t < 40$	6	9	9	12	
$40 \leq t \leq 150$	5	8	8	11	

**NOTE**

1. Only one value is measured and, unless otherwise specified, the 2000 mm rule is used.

7.3.5.2 If the distance between the points of contact of the rule with the plate is less than 1000 mm, the flatness tolerances shall be 1 per cent of the distance between the points of contact, but with a minimum value of 50 per cent and a maximum value of 100 per cent of the values specified in Table 5 for the 1000 mm rule.

7.3.5.3 Special flatness tolerances may be agreed on order.

7.3.5.4 If measuring lengths or measuring conditions different from those specified in this standard are used, flatness tolerances should be the subject of agreement at the time of ordering.

**7.3.6 Tolerance on squareness**

The out of squareness shall be 1 per cent of the actual width of the plate (see Figure 1)

**7.3.7 Camber**

The camber shall be 0.2 per cent of the actual length of the plate (see Figure 1)

## 7.4 Measurements

Measurements shall be made at ambient temperature

### 7.4.1 Thickness

The thickness shall be measured at any point more than 15 mm from the edges of the plate.

However, by agreement at the time of ordering conformity with the values of Table 1 may be determined by measuring the thickness at a distance 15 to 30 mm from a longitudinal edge.

#### *NOTE*

*In the case of plates with untrimmed edges, the location where the thickness is measured should be the subject of agreement at the time of ordering.*

### 7.4.2 Width

The width shall be measured perpendicular to the main axis of the plate.

### 7.4.3 Length

The length is deemed to be the length of the largest rectangle contained in the plate delivered.

### 7.4.4 Flatness

To measure the flatness, the plates shall be laid on a surface considered flat.

Deviation with respect to flatness shall be determined by measuring the distance between the plate and a rule either of 1000 mm or of 2000 mm in length which may be placed in any direction. The permissible deviations between the plate and these two types of rule are given in Table 4. Only one length of the rule is used for measuring and, unless otherwise specified, the 2000 mm rule is used.

Only the portion between two points of contact of the rule and the plate is taken into consideration.

Measurement is made at least 20 mm from the longitudinal edges and at least 200 mm or 100 mm from the plate ends, depending on whether the tolerances are standard or special (see Figure 1).

#### **NOTE**

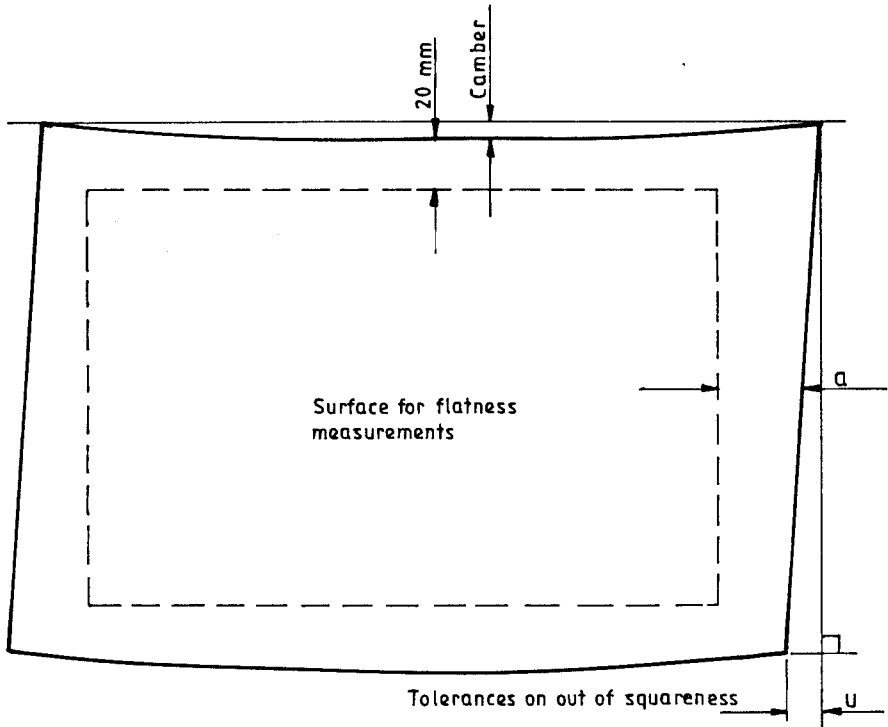
*Attention is drawn to the fact that the handling of the plate or storage under unfavourable conditions may produce deviations greater than those measured on leaving the factory.*

#### **7.4.5 Squareness**

The out-of-squareness, (u) is the orthogonal projection of one transverse edge on a longitudinal edge (see Figure 1) and quoted as a percentage of the plate width.

#### **7.4.6 Camber**

Camber is the maximum deviation between a longitudinal edge and the straight line joining the two ends of this edge. It shall be measured on the concave edges of the plate (see Figure 1) and quoted as a percentage of the plate length.



$a = 200$  mm for standard flatness tolerances  
 $a = 100$  mm for special flatness tolerances

FIGURE 1 - Location of measurements



**APPENDIX A**  
**INFORMATION TO BE STATED IN THE ORDER**

The following information shall be given in the order :

- A.1 Class of tolerance on thickness, A or B (see 7.3.1) or other type of tolerance on thickness (see 7.3.1.2)
- A.2 Where necessary the deviation between maximum thickness and minimum thickness of the same plate (see 7.3.1).
- A.3 In the case of plates with untrimmed edges, the point chosen for measuring the thickness (see 7.4.1).
- A.4 In the case of plates with mill edges, the permissible deviation on width (see 7.3.2.2)
- A.5 Where necessary, the minus deviation on width and length (see 7.3.2.1 and 7.3.3).
- A.6 Tolerance on camber (see 7.3.7).
- A.7 Tolerance on out-of squareness (see 7.3.6)
- A.8 Where necessary, use of the 1 000 mm rule for measuring the flatness tolerance (see Table 5).
- A.9 Where necessary, special flatness tolerances (see 7.3.5.3)
- A.10 Where necessary, in the case of deliveries at actual weight, an indication that excess mass stipulations have been observed (see 7.3.4.4).

