British Standard

BRITISH STANDARD

BS 1449 : Section 1.13 : 1991

Steel plate, sheet and strip

Part 1. Carbon and carbon-manganese plate, sheet and strip

Section 1.13 Specification for tolerances on dimensions and shape for cold rolled narrow strip

Tôles, bandes et feuillards en acier
Partie 1. Tôles, bandes et feuillards en acier au carbone et au carbone-manganèse
Section 1.13 Tolérances de dimensions et de forme des feuillards laminés à froid — Spécifications

Bleche und Bänder
Teil 1. Bleche und Bänder aus unlegiertem Stahl und Manganstahl
Abschnitt 1.13 Maß- und Formtoleranzen für kaltgewalztes Schmalband

BSI STANDARDS

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Iron and Steel Standards Policy Committee (ISM/-) to Technical Committee ISM/10, upon which the following bodies were represented:

British Railways Board
British Steel Industry
Cold Rolled Sections Association
Society of Motor Manufacturers and Traders Limited

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

British Welded Steel Tube Association
Institution of Mechanical Engineers
National Association of Steel Stockholders

This British Standard, having been prepared under the direction of the Iron and Steel Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 31 October 1991

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
Committee reference ISM/10
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Foreword

This Section of BS 1449 has been prepared under the direction of the Iron and Steel Standards Policy Committee. It is a new edition of the element of BS 1449 : Part 1 : 1983 covering tolerances on dimensions and shape for cold rolled narrow strip. This Section of BS 1449, together with BS 1449 : Sections 1.1 to 1.12, Sections 1.14 and 1.15 and BS EN 10130, supersedes BS 1449 : Part 1 : 1983 which is withdrawn.

The requirements specified are technically identical to those applicable to cold rolled narrow strip in section five of BS 1449 : Part 1 : 1983. This Section of BS 1449 will be withdrawn when EU 140 'Cold rolled uncoated steel narrow strip. Dimensions, tolerances on dimensions and shape' becomes a European Standard and is published as a British Standard.

For further explanation of this change in presentation see the foreword to BS 1449 : Section 1.1 : 1991.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Specification

1 Scope

This Section of BS 1449 specifies tolerances on dimensions and shape for cold rolled narrow strip.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Section of BS 1449, the definitions given in BS 1449 : Section 1.1 apply.

3 Tolerance on thickness

3.1 The thickness of material shall be measured at a position that complies with the appropriate requirements of table 1.

Table 1. Details of position for measurement of thickness

Nominal width of ordered material	Details of position for measurement
mm	
Up to and including 75	Not less than 10 % of the ordered width from the edge
Over 75 up to and including 600	Not less than 10 mm from the edge

3.2 The variation in thickness shall be in accordance with the tolerances given in table 2. The variation in thickness across the width shall not exceed half the total tolerance given in table 2. This thickness variation or 'crown' shall be within the overall thickness tolerances as given in table 2.

4 Tolerance on width

The variation in the width of strip shall be in accordance with the tolerances given in tables 3 and 4.

5 Tolerance on length

The variation in length of flat cut lengths shall not exceed the tolerances given in table 5.

6 Maximum edge camber

The edge camber (i.e. lateral departure of the edge of the material from a straight line forming a chord) (see figure 1) shall not exceed the values given in table 6.

7 Maximum out-of-squareness

The out-of-squareness (i.e. the greatest deviation of an end edge from a straight line at right angles to a side and touching one corner) of material shall not exceed the tolerances given in table 7.

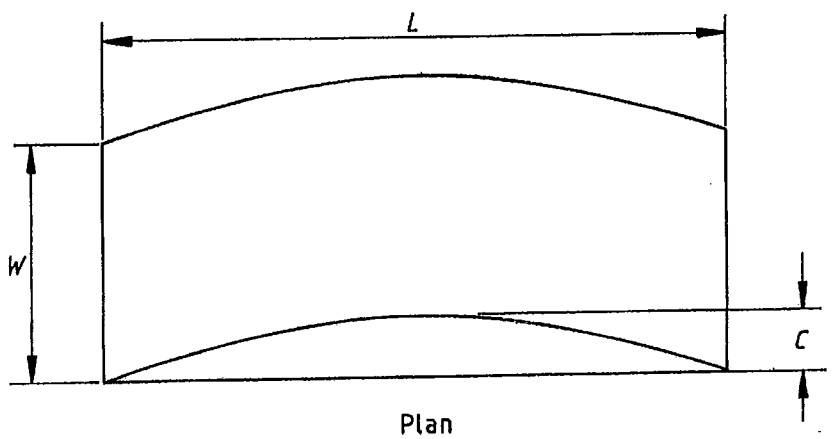
8 Maximum deviation from flatness

8.1 General

If cold rolled narrow strip is required to be specially flat across the width, the maximum deviation from flatness and the method of measurement shall be agreed between manufacturer and purchaser at the time of ordering.

NOTE 1. Material that has been rotary sheared as a final operation tends to have a slight bow across the width.

NOTE 2. If strip is required specially flat across the width, this condition may be produced by further cold rolling after shearing.



Key
W is the width
L is the length
C is the edge camber

Figure 1. Edge camber

8.2 Products, flattened and cut to length

For products of nominal length 2000 mm, the deviation from flatness shall not exceed 10 mm plus the thickness of the strip.

NOTE. These maximum deviations from flatness do not apply to material supplied in coil form.

For products of nominal lengths other than 2000 mm, the permitted maximum deviations shall be agreed between manufacturer and purchaser at the time of ordering.

Table 2. Tolerance on nominal thickness

Nominal thickness		Tolerances on nominal thickness			
Over	Up to and including	Nominal width			
		≤ 250 mm		> 250 ≤ 600 mm	
		Normal	Fine	Normal	Fine
mm	mm	mm	mm	mm	mm
—	0.16	±0.015	±0.011	±0.020	±0.015
0.16	0.40	±0.025	±0.019	±0.030	±0.023
0.40	0.60	±0.030	±0.023	±0.035	±0.026
0.60	0.80	±0.035	±0.026	±0.040	±0.030
0.80	1.00	±0.035	±0.026	±0.045	±0.034
1.00	1.20	±0.040	±0.030	±0.050	±0.038
1.20	1.60	±0.045	±0.034	±0.055	±0.040
1.60	2.00	±0.045	±0.034	±0.055	±0.040
2.00	2.50	±0.050	±0.038	±0.060	±0.045
2.50	3.00	±0.050	—	±0.060	—
3.00	6.00	±0.075	—	±0.090	—
6.00	13.00	±0.125	—	±0.170	—

NOTE 1. If thickness is specified as a minimum with tolerances all +, the permitted variation is equal to the total tolerance. For example, a specified minimum thickness of 2.30 mm permits a normal tolerance of −0, +0.10 mm (for material ≤ 250 mm wide) and the nominal thickness would be 2.35 mm. However where, as a result, the nominal thickness then falls within the next higher range for nominal thicknesses, the tolerances for the higher range apply; i.e. if a minimum thickness of 5.95 mm is ordered, the normal, tolerance range would be −0, +0.25 mm (products ≤ 250 mm wide) and the nominal thickness would be 6.075 mm.

NOTE 2. Where no values are given, the material is not normally available. However, when material is obtainable, the tolerance are by special arrangement between the manufacturer and the purchaser.

NOTE 3. Steels containing carbon above 0.35 % are normally available only in thicknesses up to 2.50 mm inclusive. Above this thickness, tolerances are by arrangement between supplier and purchaser.

Table 3. Tolerance on nominal width

Type of edge	Nominal width		Nominal thickness		Tolerance on nominal width
	Over	Up to and including	Over	Up to and including	
	mm	mm	mm	mm	mm
Mill edge	—	50	All thicknesses		±1.4
	50	150			±1.8
	150	250			±2.4
	250	600			±3.6
Sheared edge	—	250	—	1.6	±0.13
	—	250	1.6	3.0	±0.19
	—	250	3.0	—	±0.25
	250	600	—	1.6	±0.20
	250	600	1.6	5.0	±0.25

Table 4. Tolerance on nominal width for hardened and tempered material with sheared edges

Nominal length		Nominal thickness		Tolerance on normal width
Over	Up to and including	Over	Up to and including	
mm	mm	mm	mm	mm
—	80	—	1.25	±0.19
80	250	—	1.25	±0.19
—	80	1.25	2.65	±0.19
80	450	1.25	2.65	±0.28

[1]See BS 1449 : Section 1.15.

Table 5. Tolerance on nominal length for cut lengths in all widths

Nominal length		Tolerance on nominal length	
Over	Up to and including	Normal	Fine
mm	mm	mm	mm
—	1000	−0 +25	−0 +6.0
1000	3000	−0 +25	−0 +12
3000	—	−0 +25	−0 +12

Table 6. Maximum edge camber for mill edge and sheared edge material[1]

Nominal width		Nominal thickness		Maximum edge camber in any 2000 mm length
Over	Up to and including	Over	Up to and including	
mm	mm	mm	mm	mm
—	25	—	2	13
25	50	—	2	10
—	50	2	—	13
50	250	—	2	6.5
50	250	2	—	13
250	600	—	2	6.5
250	600	2	—	13

[1]See figure 1.

NOTE 1. Where it is not practicable to measure over 2000 mm, equivalent tolerances can be calculated from the following equation and rounded to the next higher millimetre.

$$\text{New tolerance} = \frac{(\text{non standard length})^2}{(\text{standard length})^2} \times \text{tolerance in table 6}$$

NOTE 2. Special requirements on edge camber may be available by arrangement between the manufacturer and the supplier.

Table 7. Maximum out-of-squareness of width in flat cut lengths

Nominal length	Nominal width	Nominal thickness	Maximum out-of-squareness per 150 mm of nominal width or fraction thereof
			mm
All lengths	All widths	All thicknesses	1.5 max. (1.0 %)

Publication(s) referred to

BS 1449	Steel plate, sheet and strip Section 1.1 General specification Section 1.15 Specification for cold rolled narrow strip supplied in a range of conditions for heat treatment and general engineering purposes
EU 140[1)]	Cold rolled uncoated steel narrow strip. Dimensions, tolerances on dimensions and shape

[1)]Referred to in the foreword only.

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