BRITISH STANDARD

BS 2989 : 1992

Specification for

Continuously hot-dip zinc coated and iron-zinc alloy coated steel flat products: tolerances on dimensions and shape

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
Institution of Production Engineers
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
Coated Metals Limited
Department of the Environment (Property Services Agency)
International Tin Research Institute
Metal Roof Deck Association
National Association of Steel Stockholders
Paintmakers Association of Great Britain Ltd.
Zinc Development Association

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 28 February 1992

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Contents

Foreword

This British Standard has been prepared under the direction of the Iron and Steel Standards Policy Committee and is technically identical to BS 2989 : 1991 except for the deletion of the structural qualities together with any reference to them in the text.

This standard, together with BS EN 10147, supersedes BS 2989 : 1991 which is withdrawn.

The structural qualities are specified in BS EN 10147 which is published simultaneously with this standard.

Work is going on in Europe to prepare a standard covering the dimensional tolerances for coated products and when the project achieves European Standard status it will be published as BS EN 10143 and this standard will be withdrawn.

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

Specification

1 Scope

This British Standard specifies tolerances on dimensions and shape for hot-dip zinc coated and iron-zinc alloy coated steel flat rolled products as specified in BS EN 10142 and BS EN 10147.

This standard applies to products supplied in the form of wide strip, sheet or plate cut from wide strip and slit wide strip.

NOTE 1. Various surface finishes of coating are available depending on the application. See BS EN 10142 and BS EN 10147.

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this standard the definitions given in BS EN 10079 apply, together with the following.

2.1 product thickness

The thickness of the finished product after coating.

3 Information to be supplied by the purchaser

To assist the manufacturer in supplying the correct dimensions and shape of materials, the following information should be given in the enquiry and order:

(a) the complete product designation in accordance with BS EN 10142 and BS EN 10147, as appropriate;

(b) the dimensions (see clause **4**) of the material and any special requirements for resheared material (see tables 2, 3 and 4) or flattened material (see **4.4**) and for thickness tolerances (see **4.1** and notes of table 6) or flatness tolerances (see **4.4** and notes 1 to 3 of table 4);

(c) whether the material is to be inspected by the purchaser at the works of the manufacturer (see clause **5**).

4 Dimensional tolerances and geometrical deviations

4.1 Thickness

The thickness, including coating, shall be measured at any point located more than 40 mm from the edges and the tolerance on the thickness shall be as given in table 1.

For strip or slit strip, the tolerance values given in table 1 shall apply to the whole length, except in the region of strip welds where the values shall be doubled over a length to be agreed between the manufacturer and purchaser.

In the case of slit strip and cut lengths having a width of 80 mm or less, the position of measurement shall be agreed at the time of ordering.

4.2 Length

The length shall be measured along one of the longer sides of the sheet or cut length and the tolerance on the length shall be as given in table 2.

4.3 Width

The width shall be measured at right angles to the longitudinal axis of the product and the tolerance on the width shall be as given in table 3.

4.4 Flatness

The deviation from flatness shall be measured as the maximum distance between the product (sheet or plate) and the flat horizontal surface on which it is placed (see figure 1). Except for coating types Z450 and Z600, the maximum deviation from flatness shall be as given in table 4.

NOTE. For coating types Z450 and Z600, the maximum deviation from flatness should be agreed between manufacturer and purchaser.

4.5 Out-of-squareness

The out-of-squareness value, u, shall be measured as the orthogonal projection of a transverse edge on a longitudinal edge (see figure 2). Unless replaced by the requirement of **4.7**, the out-of-squareness shall not exceed:

(a) 1 % of the actual width of the sheet, for non-resheared material;

(b) the values given in table 5, for resheared material.

4.6 Edge camber

The edge camber shall be measured as the lateral departure of the edge of the material from a straight line, forming a chord. The edge camber shall be measured on the concave edge (see figure 3).

The measuring base shall be a distance of 2 m, taken anywhere along the edge but if the sheet or cut length is less than 2 m long, the measuring base shall be its length.

Unless replaced by the requirement of **4.7**, the edge camber shall:

(a) not exceed 6 mm, for lengths of 2 m and greater;

(b) be less than 0.3 % of the actual length, for lengths less than 2 m.

4.7 Superimposement of dimensions

By agreement at the time of ordering, the limits on out-of-squareness (see **4.5**) and edge camber (see **4.6**) shall be replaced by a requirement that a perfect rectangle formed by the ordered width and length dimensions can be sheared from the sheets delivered.

Table 1. Thickness tolerance (including coating on both sides)

Nominal thickness	Coating types other than Z450 and Z600		Coating types Z450 and Z600	
	Normal tolerance for coating type and a nominal width of:			
	⩽ 1200 mm	> 1200 mm to ⩽ 1500 mm	⩽ 1200 mm	> 1200 mm to ⩽ 1500 mm
mm	mm	mm	mm	mm
> 0.35 to ⩽ 0.40	± 0.05	± 0.06	± 0.07	± 0.08
> 0.40 to ⩽ 0.60	± 0.06	± 0.07	± 0.08	± 0.09
> 0.60 to ⩽ 0.80	± 0.07	± 0.08	± 0.09	± 0.10
> 0.80 to ⩽ 1.00	± 0.08	± 0.09	± 0.10	± 0.11
> 1.00 to ⩽ 1.20	± 0.10	± 0.11	± 0.12	± 0.13
> 1.20 to ⩽ 1.60	± 0.12	± 0.13	± 0.14	± 0.15
> 1.60 to ⩽ 2.00	± 0.14	± 0.15	± 0.16	± 0.17
> 2.00 to ⩽ 2.50	± 0.16	± 0.17	± 0.18	± 0.19
> 2.50 to ⩽ 3.00	± 0.19	± 0.20	± 0.21	± 0.22
> 3.00 to ⩽ 4.00	± 0.23	± 0.25	± 0.25	± 0.27
> 4.00 to ⩽ 5.00	± 0.24	± 0.26	± 0.26	± 0.28

NOTE 1. Products with closer tolerances may be supplied by agreement between manufacturer and purchaser.

NOTE 2. If thickness is specified as a minimum with tolerances all +, the permissible variation is equal to the total tolerance. For example, a specified minimum thickness of 2.60 mm permits −0, +0.38 mm (for material ⩽ 1200 mm wide) and the nominal thickness would be 2.79 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, e.g. if a minimum thickness of 2.90 mm is ordered, the tolerance range would be −0, +0.46 mm (for material ⩽ 1200 mm wide) and the nominal thickness would be 3.13 mm.

Table 2. Tolerance on length

Nominal length	Normal tolerance	Resheared tolerance
mm		
< 1500	0, +6 mm	0, +3 mm
⩾ 1500 to ⩽ 3000	0, +8 mm	0, +4 mm
> 3000	0, +0.3 % of actual length	0, +0.15 % of actual length

Table 3. Tolerance on width

Nominal width	Normal tolerance	Resheared tolerance for a length of:	
		⩽ 3 m	> 3 m
mm	mm	mm	mm
⩽ 1200	0, +6	0, +2	0, +3
> 1200 to ⩽ 1500	0, +7	0, +3	

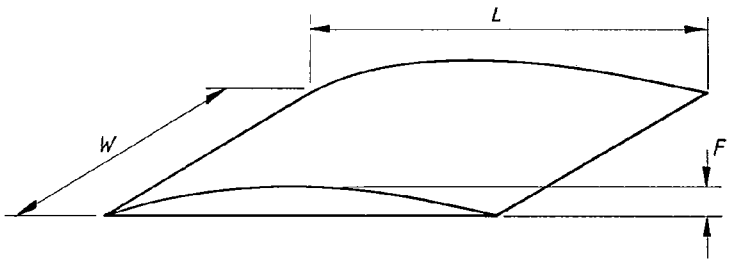
Table 4. Maximum permissible deviation from flatness for plate and sheet in lengths up to and including 5 m

Nominal width	Maximum permissible deviation									
	Not specially flattened plate and sheet, all grades except Fe E 550 G[1] for a nominal thickness (in mm) of:					Specially flattened plate and sheet, all grades except Fe E 350 G[2] and Fe E 550 G[1], for a nominal thickness (in mm) of:				
	≤ 0.70	> 0.70 to ≤ 1.20	> 1.20 to ≤ 2.00	> 2.00 to ≤ 3.00	> 3.00	≤ 0.70	> 0.70 to ≤ 1.20	> 1.20 to ≤ 2.00	> 2.00 to ≤ 3.00	> 3.00
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
≤ 1200	12	10	8	10	18	5	4	3	5	8
< 1200 to ≤ 1500	15	12	10	12	19	6	5	4	6	9

[1] Maximum deviations for grade Fe E 550 G should be agreed between the manufacturer and the purchaser.

[2] Special maxima for grade Fe E 350 G may be available, subject to agreement between manufacturer and purchaser.

NOTE. If plate or sheet cut from strip by a purchaser is required to have special maximum deviations, or if strip is used directly for a special purpose, an agreement on maximum deviations should be reached between manufacturer and purchaser. The agreed maximum deviations will only be obtained if the purchaser carries out adequate flattening while shearing.



W is the width of sheet/plate
L is the length of sheet/plate
F is the deviation from flatness

Figure 1. Flatness of sheet/plate

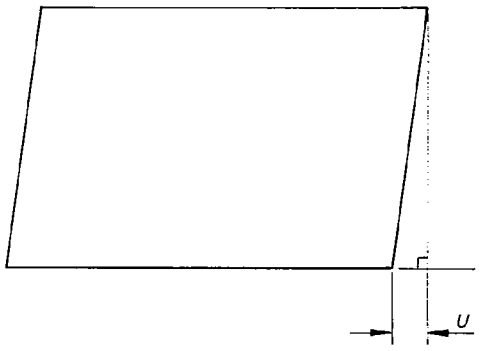
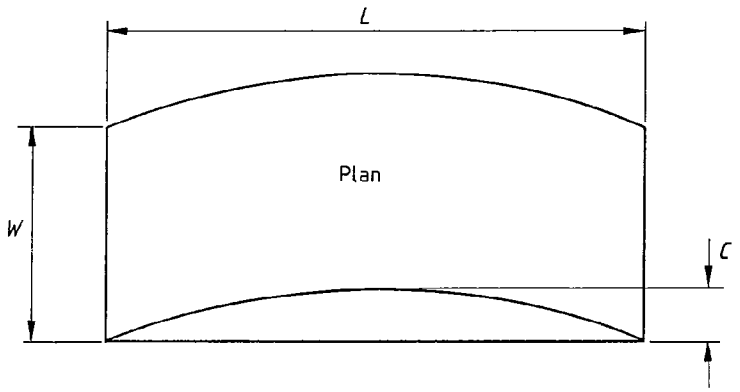


Figure 2. Out-of-squareness

Table 5. Out-of-squareness for resheared material

Nominal length	Nominal width	Maximum out-of-squareness, u
mm $\leqslant$ 3000	mm $\leqslant$ 1200	mm 2
$\leqslant$ 3000	$>$ 1200 $\leqslant$ 1500	3
$>$ 3000	$\leqslant$ 1500	3



W is the width of sheet
L is the length of sheet
C is the edge camber

Figure 3. Edge camber of sheet

5 Inspection and acceptance

The purchaser or his representative shall have reasonable access to the works of the manufacturer for the purpose of inspection. If such inspection is to be carried out this shall be stated when placing the order (see **2.2** (c)). The inspector shall have all reasonable facilities to determine that the product is being supplied in accordance with this standard.

NOTE. In continuous hot-dip coating practice all orders are subject to a detailed system of inspection and testing. It is desirable that the external inspector uses the available manufacturer's records wherever possible.

If the purchaser elects to test and inspect the product after delivery, any specimen that does not appear to comply with the requirements of this standard shall be set aside, properly and correctly identified and adequately protected. The manufacturer shall be informed so that he may investigate.

Publication(s) referred to

BS EN 10079	Definition of steel products
BS EN 10142	Specification for continuously hot-dip zinc coated low carbon steel sheet and strip for cold forming : technical delivery conditions
BS EN 10147	Specification for continuously hot-dip zinc coated structural steel sheet and strip — Technical delivery conditions

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