

BRITISH STANDARD

**BS EN
10215 : 1995**

**Continuously hot-dip
aluminium-zinc (AZ) coated
steel strip and sheet —
Technical delivery conditions**

The European Standard EN 10215 : 1995 has the status of a
British Standard

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ISE/10, Flat rolled steel products, 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
Coated Metals Limited
Department of the Environment (Property Services Agency)
International Tin Research Institute
Metal Roof Deck Association
National Association of Steel Stockholders
National Centre of Tribology
Paintmakers Association of Great Britain Ltd.
Zinc Development Association

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 10215	3

National foreword

This British Standard has been prepared by Technical Committee ISE/10 and is the English language version of EN 10215 : 1995 *Continuously hot-dip aluminium-zinc (AZ) coated steel strip and sheet — Technical delivery conditions*, published by the European Committee for Standardization (CEN). It supersedes BS 6830 : 1987 which is withdrawn.

Cross-references

Publication referred to	Corresponding British Standard
EN 10002-1	BS EN 10002 <i>Tensile testing of metallic materials</i> Part 1 : 1990 <i>Method of test at ambient temperature</i>
EN 10020	BS EN 10020 : 1991 <i>Definition and classification of grades of steel</i>
EN 10021	BS EN 10021 : 1993 <i>General technical delivery requirements for steel and iron products</i>
EN 10027-1	BS EN 10027 <i>Designation systems for steel</i> Part 1 : 1992 <i>Steel names, principal symbols</i>
EN 10027-2	Part 2 : 1992 <i>Steel numbers</i>
EN 10079	BS EN 10079 : 1993 <i>Definition of steel products</i>
EN 10143	BS EN 10143 : 1993 <i>Continuously hot-dip metal coated steel sheet and strip. Tolerances on dimensions and shape</i>
EN 10204	BS EN 10204 : 1991 <i>Metallic products. Types of inspection documents</i>

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EUROPEAN STANDARD

EN 10215

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English version

Continuously hot-dip aluminium-zinc (AZ) coated steel strip and sheet — Technical delivery conditions

Bandes et tôles en acier revêtues d'alliage aluminium-zinc (AZ) à chaud en continu — Conditions techniques de livraison

Kontinuierlich schmelztauchveredeltes Band und Blech aus Stahl mit Aluminium-Zink-Überzügen (AZ) — Technische Lieferbedingungen

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard was prepared by Technical Committee ECISS/TC 27, Surface coated steel flat products — Qualities, dimensions, tolerances and specific tests, the Secretariat of which is held by DIN.

It is the first edition of European technical delivery conditions for continuously hot-dip aluminium-zinc (AZ)-coated steel sheet and strip.

The draft prEN 10215 was published for CEN enquiry in August 1992. At a meeting of ECISS/TC 27 on 16 March 1993 in Düsseldorf the text was agreed for the final edition of the European Standard. The following countries were represented at this meeting: Austria, Belgium, France, Germany, Netherlands, Sweden and United Kingdom.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 1995, and conflicting national standards shall be withdrawn at the latest by August 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Definitions	3
4 Designation	4
5 Classification of grades and types of delivery	4
5.1 Steel grades	5
5.2 Coatings	6
5.3 Coating finish	6
5.4 Surface quality	6
5.5 Surface treatment (temporary surface protection)	6
6 Requirements	7
6.1 Manufacturing process	7
6.2 Selection of properties	7
6.3 Mechanical properties	7
6.4 Freedom from coil breaks	7
6.5 Stretcher strains (low carbon steels for cold forming)	7
6.6 Coating mass	7
6.7 Adhesion of coating	7
6.8 Surface condition	7
6.9 Dimensions, tolerances on dimensions and shape	8
6.10 Suitability for further processing	8
7 Testing	8
7.1 General	8
7.2 Test units	8
7.3 Number of tests	8
7.4 Sampling	8
7.5 Test methods	9
7.6 Retests	9
7.7 Inspection documents	9
8 Marking	9
9 Packing	9
10 Storage and transportation	9
11 Disputes	9
12 Information to be supplied by the purchaser	10
Annex A (normative) Reference method for determination of the coating mass	11

1 Scope

1.1 This European Standard specifies requirements for continuously hot-dip aluminium-zinc alloy coated flat products made of low carbon steels for cold forming (see table 1) or of structural steels (see table 2) in thicknesses $\leq 3,0$ mm. The thickness is the final thickness of the delivered product after coating.

This European Standard applies to strip of all widths and to sheets cut from it (≥ 600 mm width) and cut lengths (< 600 mm width).

The aluminium-zinc alloy composition by mass is nominally 55 % Al, 1,6 % Si, and the balance zinc.

The available coating masses, coating finishes and surface qualities are given in 5.2 to 5.4 and table 3.

1.2 The products covered by this European Standard are mainly intended for applications where the protection of the steel base against corrosion is of prime importance.

1.3 This European Standard is not applicable to:

- continuously hot-dip zinc-aluminium alloy (ZA) coated steel flat products (see EN 10214);
- continuously hot-dip zinc coated low carbon steel sheet and strip for cold forming (see EN 10142);
- continuously hot-dip zinc coated structural steel sheet and strip (see EN 10147);
- electrolytically zinc coated steel flat products (see EN 10152);
- continuously organic coated flat steel products (see EN 10169, in preparation).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate points in the text and the publications are listed hereafter. Subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. In the case of undated references, the most recent edition of the publications referred to applies.

EN 10002-1	<i>Metallic materials. Tensile testing — Part 1: Method of testing (at ambient temperature)</i>
EN 10020	<i>Definition and classification of grades of steel</i>
EN 10021	<i>General technical delivery requirements for steel and steel products</i>
EN 10027-1	<i>Designation systems for steels — Part 1: Steel names; principal symbols</i>
EN 10027-2	<i>Designation systems for steels — Part 2: Numerical system</i>
EN 10079	<i>Definition of steel products</i>
EN 10143	<i>Continuously hot-dip metal coated steel sheet and strip — tolerances on dimensions and shape</i>
EN 10204	<i>Metallic products — types of inspection documents</i>
ECISS IC 10:	<i>Designation systems for steel — additional symbols for steel names</i>
EURONORM 12 ¹⁾	<i>Bend test for steel sheet and strip less than 3 mm thick</i>

3 Definitions

For the purposes of this European Standard the following definitions apply in addition to the definitions in EN 10020, EN 10021, EN 10079 and EN 10204 (see clause 2).

3.1 hot-dip aluminium-zinc alloy coating (AZ)

Application of an aluminium-zinc coating by immersing the prepared products in the molten metal alloy.

In the present case, wide strip is continuously hot-dip coated in a bath the composition of which is given in 1.1.

3.2 coating mass

Total mass of coating on both surfaces of the product (expressed in grams per square metre).

¹⁾ Until it is transformed into a European Standard, either EURONORM 12 or the corresponding national standard may be applied.

4 Designation

4.1 The steel names are allocated in accordance with EN 10027-1 and ECISS Information Circular IC 10; the steel numbers are allocated in accordance with EN 10027-2.

4.2 The products covered by this European Standard shall be designated as follows in the order given:

- a) Type of product (e.g. strip, sheet or cut length);
- b) Number of this standard (EN 10215);
- c) Steel name or steel number and symbol for the type of hot-dip coating as given in table 1 or table 2;
- d) Number denoting the nominal mass of coating (e.g. 150 = 150 g/m² including both surfaces, see table 3);
- e) Letter denoting the surface quality (A, B or C, see 5.4);
- f) Letter denoting the surface treatment (C, O, CO or U, see 5.5).

Example 1

Designation of strip made of steel DX53D+AZ, coating mass 150 g/m² (150), surface quality B; surface treatment chemical passivation (C):

Strip EN 10215 — DX53D+AZ150-B-C

or: Strip EN 10215 — 1.0355+AZ150-B-C

Example 2

Designation of sheet made of steel S250GD+AZ, coating mass 185 g/m² (185), surface quality C, surface treatment chemical passivation and oiling (CO):

Sheet EN 10215 — S250GD+AZ185-C-CO.

or: Sheet EN 10215 — 1.0242+AZ185-C-CO.

4.3 Where appropriate, additional information to the designation as specified in 4.2 shall be given to describe clearly the delivery requirements (see clause 12).

5 Classification of grades and types of delivery

5.1 Steel grades

The steel grades available are given in table 1 and table 2.

Table 1 contains low carbon steels listed in the following order of increasing suitability for cold forming:

DX51D+AZ	:	bending and profiling quality;
DX52D+AZ	:	drawing quality;
DX53D+AZ	:	deep drawing quality;
DX54D+AZ	:	special deep drawing quality.

Table 2 contains structural steels listed in order of increasing specified minimum yield strength values.

Designation			Yield strength	Tensile strength	Elongation
Steel grade		Symbol for the type of hot-dip coating			
Steel name	Steel number			R_e N/mm ² max. ¹⁾²⁾³⁾	R_e N/mm ² max. ¹⁾³⁾
DX51D	1.0226	+ AZ	—	500	22
DX52D	1.0350	+ AZ	300 ⁵⁾	420	26
DX53D	1.0355	+ AZ	260	380	30
DX54D	1.0306	+ AZ	220	350	36

¹⁾ The values apply to transverse test pieces.
²⁾ The yield strength values apply to the 0,2 % proof stress if the yield point is not pronounced, otherwise to the lower yield strength (R_{eL}).
³⁾ For all steel grades a minimum value of 140 N/mm² for the yield strength (R_e) and of 270 N/mm² for the tensile strength (R_m) may be expected.
⁴⁾ For product thickness $\leq 0,7$ mm the minimum elongation values (A_{80}) shall be reduced by 2 units.
⁵⁾ This value applies to skin passed products only (surface qualities B and C).

Designation			Yield strength	Tensile strength	Elongation
Steel grade		Symbol for the type of hot-dip coating			
Steel name	Steel number			R_{eH} N/mm ² min. ¹⁾²⁾	R_m N/mm ² min. ¹⁾
S250GD	1.0242	+ AZ	250	330	19
S280GD	1.0244	+ AZ	280	360	18
S320GD	1.0250	+ AZ	320	390	17
S350GD	1.0529	+ AZ	350	420	16
S550GD	1.0531	+ AZ	550	560	—

¹⁾ The values apply to longitudinal test pieces.
²⁾ The yield strength values apply to the 0,2 % proof stress if the yield point is not pronounced, otherwise to the upper yield strength (R_{eH}).
³⁾ For product thickness $\leq 0,7$ mm the minimum elongation values (A_{80}) shall be reduced by 2 units.

5.2 Coatings

5.2.1 The coating masses are given in table 3.

For special applications coating masses which are different from those of table 3 can be supplied. The masses and the relevant surface condition shall be as agreed upon between the producer and the user.

Thicker coatings limit the formability and weldability of the products. Therefore, the forming and weldability requirements should be taken into account when ordering the coating mass.

Coating designation ¹⁾	Minimum coating mass, total both surfaces ²⁾ g/m ²	
	Triple spot test ³⁾	Single spot test ³⁾
100	100	85
150	150	130
185	185	160

¹⁾ See also 5.2.
²⁾ A coating mass of 100 g/m² corresponds to a coating thickness of approximately 13,3 µm on each surface.
³⁾ See 7.4.4 and 7.5.3.

5.2.2 If agreed at the time of ordering, different coating masses on each surface may be supplied. The two surfaces may have a different appearance as a result of the manufacturing process.

5.3 Coating finish

The products are supplied with a normal spangle. Normal spangle is a coating finish, having a metallic lustre, that is the result of unrestricted growth of the aluminium-zinc crystals during normal solidification.

5.4 Surface quality

5.4.1 General

The products may be supplied with one of the surface qualities described in 5.4.2 to 5.4.4 (see also 4.2e and 6.8).

5.4.2 As coated surface (A)

Imperfections such as small pits, variations in spangle size, dark spots, stripe marks and light passivation stains are permissible. Leveller breaks or run-off marks may appear.

5.4.3 Improved surface (B)

Surface quality B is obtained by skin passing.

With this surface quality, small imperfections such as stretch levelling breaks, skin pass marks, scratches, indentations, spangle structure, run-off marks and light passivation marks are permissible. The surface has no pits.

5.4.4 Best quality surface (C)

Surface quality C is obtained by skin passing.

The better surface shall not impair the uniform appearance of a high-class paint finish. The other surface shall have at least the characteristics of surface quality B (see 5.4.3).

5.5 Surface treatment (temporary surface protection)

5.5.1 General

Hot-dip aluminium-zinc coated flat products generally receive a surface protection at the producer's plant as specified in 5.5.2 to 5.5.5 (see also 4.2f). The period of protection afforded depends on the atmospheric conditions.

5.5.2 Chemical passivation (C)

Chemical passivation may be carried out after coating to protect the surface against humidity and to reduce the risk of formation of wet storage stain (known as black rust).

Chemical passivation may cause slight discoloration of the surface but is not detrimental to the general performance of the product.

5.5.3 Oiling (O)

This treatment also reduces the risk of formation of black rust.

It shall be possible to remove the oil layer with a suitable degreasing solvent which does not adversely affect the coating.

Products supplied oiled may require additional lubrication prior to rolling or drawing.

5.5.4 Chemical passivation and oiling (CO)

Agreement may be reached on this combination of surface treatment if increased protection against the formation of black rust is required.

5.5.5 Untreated (U)

Hot-dip aluminium-zinc coated flat products are only supplied without surface treatment if expressly desired by the purchaser on his own responsibility. In this case, there is increased risk of early corrosion during transportation and storage.

6 Requirements

6.1 Manufacturing process

The processes used in steelmaking and manufacture of the products are left to the discretion of the manufacturer.

6.2 Selection of properties

6.2.1 The products are generally supplied on the basis of the mechanical property requirements in table 1 and table 2.

6.2.2 If specially agreed at the time of ordering products made of steel DX52D+AZ, DX53D+AZ and DX54D+AZ grades with suitability for manufacturing a specific part may be supplied. In this case the values in table 1 do not apply. The reject tolerances arising when the material is processed shall not exceed a specific proportion to be agreed upon at the time of ordering.

6.3 Mechanical properties

6.3.1 If ordered in accordance with **6.2.1** the mechanical property values in table 1 for the low carbon steels apply for the following periods commencing from the date on which the products are made available by the works:

- 8 days for steel grades DX51D+AZ and DX52D+AZ;
- 6 months for steel grades DX53D+AZ and DX54D+AZ.

6.3.2 For the structural steel flat products the mechanical properties in table 2 apply. A reduction in the formability may occur with time. It is therefore in the interest of the purchaser to use the products as soon as possible.

6.3.3 The tensile test values apply to:

- transverse test pieces for the low carbon steel grades according to table 1;
- longitudinal test pieces for the structural steel grades according to table 2.

The values shall be related to the test piece cross section without coating.

6.4 Freedom from coil breaks

6.4.1 *Low carbon steels for cold forming*

If particular requirements are made for freedom from coil breaks (fluting), it may be necessary to skin pass or stretch level the products. This treatment may limit the formability. Similar conditions exist for the appearance of coil breaks as for the appearance of stretcher strains (see **6.5**).

6.4.2 *Structural steels*

If the products are to be delivered with freedom from coil breaks (fluting), this shall be indicated at the time of order.

6.5 Stretcher strains (low carbon steels for cold forming)

6.5.1 In order to avoid the formation of stretcher strains when cold forming, it may be necessary for the products to be skin passed at the manufacturer's works. As there is a tendency for stretcher strains to form again after some time, it is in the interest of the purchaser to use the products as soon as possible.

6.5.2 Products with the surface condition B or C are free from stretcher strains for the following periods commencing from the agreed date on which they are made available by the works:

- 1 month for steel grades DX51D+AZ and DX52D+AZ;
- 6 months for steel grades DX53D+AZ and DX54D+AZ.

6.6 Coating mass

6.6.1 The coating mass shall correspond to the data in table 3. The values apply for the total mass of the coating on both surfaces for the triple spot test and the single spot test (see **7.4.4** and **7.5.3**).

The coating mass is not always equally distributed on both the product surfaces. However, it may be assumed that a coating mass of at least 40 % of the value given in table 3 for the single spot test exists on each surface of the product.

6.6.2 A maximum or minimum value for the coating mass may be agreed upon per surface of the product (single spot test) for each coating given in table 3.

6.7 Adhesion of coating

The adhesion of the coating shall be evaluated by a bend test as described in **7.5.2**. After bending, the coating shall show no signs of flaking, but an area of 6 mm from each edge of the specimen shall be disregarded in order to exclude the effect of the cutting. Cracking and roughening are permissible.

6.8 Surface condition

6.8.1 The surface shall comply with the requirements in **5.3** to **5.5**. Unless otherwise agreed at the time of ordering, only one surface shall be inspected at the manufacturer's works. If requested the supplier shall inform the purchaser whether the inspected surface is the top surface or bottom surface.

Small edge cracks which may occur in the case of uncut edges are not a justification for rejection.

6.8.2 When supplying strip in coils, there is greater risk of surface defects than if sheet and cut lengths are supplied. This shall be taken into account by the purchaser when evaluating the products.

6.9 Dimensions, tolerances on dimensions and shape

The requirements of EN 10143 shall apply.

6.10 Suitability for further processing

6.10.1 Welding

The products according to this standard — with the exception of steel grade S550GD+AZ — are suitable for welding using the normal welding methods. With larger coating masses, special measures shall be taken for welding, as appropriate.

6.10.2 Bonding

The products according to this standard are suitable for bonding together.

6.10.3 Organic coating

All steel grades and surface conditions are suitable for organic coating. The appearance after this treatment depends on the surface quality ordered (see 5.4).

NOTE. Application of organic coatings requires a corresponding pre-treatment of the surface at the processor's works.

7 Testing

7.1 General

7.1.1 The products may be supplied with or without testing for compliance with the requirements of this European Standard.

7.1.2 If testing is required, the purchaser shall give the following information at the time of ordering:

- type of test (specific or non-specific test, see EN 10021);
- type of inspection document (see 7.7).

7.1.3 Specific tests shall be carried out in accordance with the requirements in 7.2 to 7.6.

7.2 Test units

The test unit consists of 20 t or a fraction of 20 t of hot-dip aluminium-zinc coated flat products of the same grade and nominal thickness, coating mass and surface condition. In the case of strip, a coil weighing more than 20 t is regarded as one test unit.

7.3 Number of tests

One series of tests shall be carried out per test unit as specified in 7.2 to determine:

- the mechanical properties (see 7.5.1);
- the adhesion of the coating (see 7.5.2);
- and the coating mass (see 7.5.3).

7.4 Sampling

7.4.1 In the case of strip, the samples shall be taken from the beginning or the end of the coil. In the case of sheet and cut lengths, the selection of the sample shall be left to the discretion of the inspector carrying out the tests.

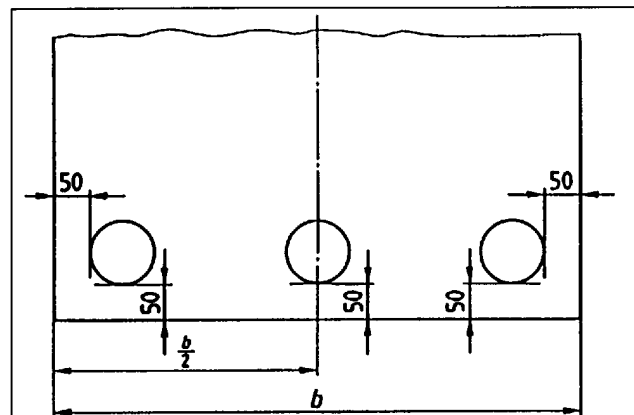
7.4.2 The sample for the tensile test (see 7.5.1) shall be taken:

- in the transverse direction for steels according to table 1;
- in the longitudinal direction for steels according to table 2;

at a distance of at least 50 mm from the edge of the product.

7.4.3 The sample for the bend test to determine the adhesion of the coating (see 7.5.2) may be taken in any direction. The distance from the product edge shall be at least 50 mm. The size of the sample shall be such that the length of the folded edge is at least 100 mm.

7.4.4 The three samples for testing the coating mass (see 7.5.3) shall be taken as shown in figure 1 if the product permits. The samples may be round or square and the individual sample shall be at least 5000 mm² in area.



b = Strip or sheet width

Figure 1. Position of the samples for determining the coating mass of aluminium-zinc coating (dimensions in mm)

If sampling as shown in figure 1 is not possible because the product width is too small, only one sample shall be taken with an area of at least 5000 mm². The coating mass determined from it shall comply with the requirements for the single spot test as specified in table 3.

7.4.5 All the samples shall be taken and machined, if necessary, in such a way that the results of the tests are not affected.

7.5 Test methods

7.5.1 The tensile test shall be carried out as described in EN 10002-1 using type 2 test pieces (initial gauge length $L_0 = 80$ mm, width $b = 20$ mm) (see also 6.3.3).

7.5.2 The bend test to determine the adhesion of the coating (see also 6.7 and 7.4.3) shall be carried out as described in EURONORM 12.

The diameters D of the mandrel or bending roll given in table 4 shall be used. The angle of bend shall be 180° in all cases.

When pressing together with the two legs of the test piece, care shall be taken that the coating is not damaged.

Table 4. Bend test to determine the adhesion of the coating (see 7.5.2)

Steel grade	Mandrel diameter $D^{1)}$ for coating designation		
	100	150	185
DX51D+AZ	0	0	1a
DX52D+AZ	0	0	0
DX53D+AZ	0	0	0
DX54D+AZ	0	0	0
S250GD+AZ	1a	1a	1a
S280GD+AZ	2a	2a	2a
S320GD+AZ	3a	3a	3a
S350GD+AZ	3a	3a	3a
S550GD+AZ ²⁾	— 2)	— 2)	— 2)

¹⁾ a: Product thickness.

²⁾ This steel grade shall not be subjected to the bend test.

7.5.3 The coating mass shall be determined from the difference in mass of the samples before and after the coating has been removed chemically. In the test with specimens according to figure 1, the triple spot test value is the arithmetic mean of the three test results. Each individual result shall meet the requirements of the single spot test as given in table 3.

Other methods — e.g. non-destructive tests — may be used for continuous checks at the manufacturer's works.

In cases of dispute, the method described in annex A of this standard shall be used.

7.6 Retests

The requirements of EN 10021 shall apply. In the case of coils, the retest specimens shall be taken from a distance of at least one lap away, but with a maximum of 20 m from the end of the coil.

7.7 Inspection documents

If agreed at the time of ordering, one of the inspection documents specified in EN 10204 shall be supplied.

8 Marking

A label shall be attached to each coil or bundle containing at least the following information:

- name or mark of the manufacturer's works;
- full designation (see 4.2);
- nominal dimensions of the product;
- identification number;
- order number;
- mass of the coil or bundle.

9 Packing

If not otherwise agreed at the time of ordering the packing requirements for the product shall be left at the discretion of the supplier.

10 Storage and transportation

10.1 Moisture, in particular condensation between the sheets, laps of the coil or other adjacent parts made of hot-dip aluminium-zinc coated flat products can lead to the formation of corrosion products. The possible types of surface protection are given in 5.5. However if there is lengthy contact with moisture the protection may be reduced locally. As a precaution, the products should be transported and stored dry and protected from moisture.

10.2 During transportation, dark spots may appear in the coated surfaces as a result of friction. Generally, they only impair the appearance. Friction is reduced by oiling the products. However, the following precautionary measures should be taken: secure packing, laid flat, no local pressure spots.

11 Disputes

EN 10021 is applicable to disputes after delivery and their settlement.

12 Information to be supplied by the purchaser

The following information is required from the purchaser so that the manufacturer may supply the products to conform with the requirements of this standard:

- a) product type (strip, sheet, cut length);
- b) nominal dimensions (thickness, width and, in the case of sheet and cut lengths, length);
- c) quantity;
- d) complete designation (see 4.2),
- e) limiting mass and sizes of the coils and individual bundles of sheets;
- f) any products desired with different coating masses on each surface (see 5.2.2);
- g) any low carbon steel products suitable for the manufacture of a specific part (see 6.2.2);
- h) any products supplied free from coil breaks (see 6.4);
- i) any maximum or minimum value for the coating mass per product surface (see 6.6.2);
- j) notification of which surface has been inspected (see 6.8.1);
- k) any testing at the manufacturer's works (see 7.1.1 and 7.1.2);
- l) any supply of an inspection document and type of document (see 7.7);
- m) any requirements for packing (see clause 9).

Annex A (normative)

Reference method for determination of the coating mass

A.1 Principle

The sample shall be at least 5000 mm² in area. Using a sample with a surface area of 5000 mm², the loss of mass in grams when the coating is dissolved, multiplied by 200, will represent the coating mass in grams per square metre of the product, including both sides.

A.2 Reagent and preparation of the solution

Reagent:

- Hydrochloric acid (HCl $\rho_{20} = 1,19 \text{ g/cm}^3$)
- Hexamethylenetetramine

Preparation of the solution:

The hydrochloric acid is diluted with deionized or distilled water in the ratio one part pure HCl to one part water (50 % dilution).

Hexamethylenetetramine is then added, stirring, in the ratio of 3,5 g per litre of dilute hydrochloric acid solution.

This prepared solution permits the execution of numerous successive dissolutions under satisfactory conditions of attack of the coating, both from the point of view of speed and accuracy.

A.3 Apparatus

Balance capable of weighing samples to an accuracy of 0,01 g. For the test, use a take-off device.

A.4 Procedure

The following operations are applied to each sample:

- a) if necessary, degrease the sample with an organic solvent which will not attack the coating, then dry the sample;
- b) weigh the sample to an accuracy of 0,01 g;
- c) place the sample in the hydrochloric acid solution with hexamethylenetetramine inhibitor at ambient temperature (20 °C to 25 °C). Leave the sample immersed in the solution until the release of hydrogen ceases or only a few bubbles are released;
- d) after the attack, the sample is washed and brushed under running water, dried with a cloth and then by heating to around 100 °C and cooled or dried by blowing with warm air;
- e) weigh the sample again to an accuracy of 0,01 g;
- f) determine the difference between the mass of the coated sample and that of the sample without its coating. This difference, calculated in grams, represents the mass *m* of the coating.

List of references

See national foreword.

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BSI
389 Chiswick High Road
London
W4 4AL