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English version

Electrolytically zinc coated cold rolled steel flat products for cold forming - Technical delivery conditions

Produits plats en acier, laminés à froid, revêtus de zinc par voie électrolytique pour formage à froid - Conditions techniques de livraison

Elektrolytisch verzinkte kaltgewalzte Flacherzeugnisse aus Stahl zum Kaltumformen - Technische Lieferbedingungen

This European Standard was approved by CEN on 21 February 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document EN 10152:2003 has been prepared by Technical Committee ECISS/TC 27 "Surface coated flat products - Qualities, dimensions, tolerances and specific tests", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document supersedes EN 10152:1993.

Annex A is normative.

This document includes a Bibliography.

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

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1 Scope

1.1 This European Standard specifies requirements for continuously electrolytic zinc coated cold rolled flat products of low carbon steels suitable for cold forming according to Table 1 in rolled widths ≥ 600 mm and thicknesses from 0,35 mm up to and including 3 mm, delivered as strip (in coil form), sheet, slit strip or cut lengths obtained from slit strip or sheet.

1.2 This European Standard can also be applied to continuously electrolytic zinc coated cold rolled flat products of

- a) steels according to EN 10139 (cold rolled strip in rolled widths < 600 mm),
- b) other types of low carbon steel for cold forming,
- c) steels normally characterized by minimum yield strength values in addition to formability parameters, e. g.
 - steels with high yield strength and improved formability according to EN 10268, or other microalloyed steels,
 - high strength IF(without interstitial atoms) steels,
 - phosphorous alloyed steels and bake-hardening steels,
 - dual phase steels,
 - general purpose structural steels.

1.3 By special agreement at the time of enquiry and order this European Standard can be applied to continuously electrolytic zinc coated hot-rolled steel flat products (e.g. according to EN 10025, EN 10111, EN 10149-1 to EN 10149-3, etc.).

1.4 The coating masses, surface qualities and surface finishes are given in 6.9, 6.11 and Table 2. As the mass of the zinc coating applied is relatively small, the material is not intended to withstand outside exposure without further chemical treatment and painting.

1.5 This European Standard is not applicable to

- hot-dip zinc coated steel strip and sheet (see EN 10142 and EN 10147);
- continuously organic coated steel flat products (see EN 10169-1, ENV 10169-2 and prEN 10169-3).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 10002-1, *Metallic materials - Tensile testing - Part 1: Method of test at ambient temperature.*

EN 10020:2000, *Definition and classification of grades of steel.*

EN 10021:1993, *General technical delivery requirements for steel and iron products.*

EN 10027-1, *Designation systems for steels - Part 1: Steel names; principal symbols.*

EN 10027-2, *Designation systems for steels - Part 2: Numerical system.*

EN 10079:1992, *Definition of steel products.*

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EN 10131, *Cold rolled uncoated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimensions and shape.*

EN 10204:1991, *Metallic materials - Types of inspection documents.*

CR 10260, *Designation systems for steel - Additional symbols.*

EN ISO 7438, *Metallic materials - Bend test (ISO 7438:1985).*

ISO 10113, *Metallic materials - Sheet and strip - Determination of plastic strain ratio.*

ISO 10275, *Metallic materials - Sheet and strip - Determination of tensile strain hardening exponent.*

3 Terms and definitions

For the purposes of this European Standard the terms and definitions given in EN 10020:2000, EN 10021:1993, EN 10079:1992 and EN 10204:1991 and the following apply.

3.1

electrolytic zinc coating (ZE)

application of a zinc coating by electrolysis on a suitably prepared steel surface from an aqueous zinc salt solution by the use of an electric current

NOTE Flat products can have a zinc coating on one or both surfaces. If both surfaces are zinc coated, a different coating thickness can be applied on each side (this process being referred to as differential zinc coating).

4 Classification and designation

4.1 Classification

The steel grades specified in this standard are classified in accordance with EN 10020 as non-alloy quality steels (DC01, DC03, DC04, DC05) and alloy quality steel (DC06) and by their increasing suitability for cold forming as follows:

DC01: drawing quality;

DC03: deep drawing quality;

DC04, DC05: special deep drawing quality;

DC06: extra deep drawing quality.

4.2 Designation

4.2.1 The steel names are allocated in accordance with EN 10027-1 and CR 10260; the steel numbers are allocated in accordance with EN 10027-2.

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

- a) Type of product (e. g. strip, sheet, cut length),
- b) Number of this standard (EN 10152),
- c) Steel name or steel number and symbol for the type of electrolytical coating (see Table 1),
- d) Numbers denoting the nominal coating thickness on each surface (e. g. 50/50 = nominal coating thickness of 5,0 µm on each side, see Table 2 and 6.9.2).
- e) Letters A or B indicating the surface quality (see 6.11.2).
- f) Letters denoting the surface treatment (see 6.12 and Table 3).

EXAMPLE 1 Designation of strip made of steel DC03+ZE (1.0347+ZE), electrolytically zinc coated with a nominal thickness of 5,0 µm on each surface (50/50), surface quality A, surface treatment phosphated (P):

Strip EN 10152-DC03+ZE50/50-A-P

or

Strip EN 10152-1.0347+ZE50/50-A-P

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EXAMPLE 2 Designation of sheet made of steel DC05+ZE (1.0312+ZE), electrolytically zinc coated with a nominal thickness of 7,5 µm on one surface and of 2,5 µm on the other surface (75/25), surface quality B, surface treatment phosphated and oiled (PO):

Sheet EN 10152-DC05+ZE75/25-B-PO

or

Sheet EN 10152-1.0312+ZE75/25-B-PO

4.2.3 Where appropriate, additional information to the designation as specified in 4.2.2 shall be given to describe clearly the delivery requirements (see clause 5).

5 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:

- a) complete designation (see 4.2.2);
- b) nominal dimensions (thickness, width and, in the case of sheet and cut lengths, length);
- c) quantity;
- d) limiting mass and sizes of the coils and individual bundles of sheets;
- e) properties of steels other than those covered by Table 1 (see 6.1, 6.14.2 and 7.5.3);
- f) any requirement concerning a special steelmaking or manufacturing process (see 6.2);
- g) any products suitable for making a particular part (see 6.6);
- h) any requirement relating to coating on one surface only (see 6.9.5);
- i) any requirement for a maximum value of the coating mass (see 6.9.6);
- j) any requirement concerning surface quality and surface finish (see 6.11);
- k) any requirement on surface roughness (see 6.11.3),
- l) any requirement concerning surface treatment (see 6.12 and Table 3);
- m) any requirement concerning application of a dimensional standard different from EN 10131 (see 6.14.2);
- n) if required type of testing and inspection document (see 7.1.1 and 7.7);
- o) any marking desired by branding of the product (see 8.2);
- p) any requirement for packing (see clause 9).

6 Requirements

6.1 General

The requirements according to 6.2 to 6.5 and 6.13 apply to products made of the steel grades given in Table 1.

For other steels used as substrate for electrolytically deposited coatings of zinc (see 1.2 and 1.3) the requirements shall be based on the appropriate quality standard for the non-coated steel product.

6.2 Steelmaking and manufacturing processes

Unless otherwise agreed at the time of enquiry and order, the steelmaking and manufacturing processes are left to the discretion of the manufacturer. The purchaser shall be informed of these processes, if he requires it.

6.3 Deoxidation

The method of deoxidation shall be in accordance with that specified in Table 1.

6.4 Chemical composition

The chemical composition based on ladle analysis shall be as given in Table 1.

6.5 Delivery condition

The steel substrates are normally supplied in the skin-passed condition. By agreement at the time of enquiry and order non skin-passed products may be supplied.

6.6 Choice of properties

The products covered by this standard shall comply with the requirements of Table 1. By agreement at the time of enquiry and order they may be delivered as suitable for making a particular part; in this case a maximum percentage of scrap may be agreed and acceptance on the basis of mechanical properties is not applicable.

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6.7 Mechanical properties

6.7.1 The mechanical properties are given in Table 1; they apply only to skin-passed products.

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NOTE The properties in Table 1 are those specified for cold rolled non-coated low carbon steel flat products according to EN 10130 with the exception of the R_e , A_{80} and n_{90} values for the grades DC04+ZE, DC05+ZE and DC06+ZE which have been altered with respect to the influence of the electrolytical treatment on those properties.

The mechanical properties are valid for the period specified in Table 1 from the date on which the products are made available. The date of availability shall be notified to the purchaser with reasonable prior notice compatible with the validity of the mechanical properties. Prolonged storage of products of grade DC01+ZE could result in some change in the mechanical properties leading to a reduction in formability.

6.7.2 The tensile test values apply to transverse samples and relate to the test piece cross-section without zinc coating.