SLOVENSKI STANDARD
oSIST prEN 10348:2006

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Jekla za armiranje betona - Pocinkana jekla za armiranje

Steel for the reinforcement of concrete - Galvanized reinforcing steel

Stahl für die Bewehrung von Beton - Verzinkter Betonstahl

Acier pour l'armature du béton - Aciers pour béton armé galvanisés

Ta slovenski standard je istoveten z: prEN 10348

ICS:

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

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Foreword

This document (prEN 10348:2006) has been prepared by Technical Committee ECISS/TC 19 “Concrete reinforcing and prestressing steels - Properties, dimensions, tolerances and specific tests”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under Mandate M/115 given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of the EU Construction Products Directive (89/106/EEC).

For relationship with the EU Construction Products Directive, see informative Annex ZA, which is an integral part of this document.

This document does not apply to galvanized (hot-dip zinc coated) reinforcement for prestressing or components of these reinforcements.

1 Scope

This European Standard specifies requirements for galvanized (hot-dip zinc coated) reinforcing steel in the form of bars, coils (rod, wire), welded fabric and lattice girder for the reinforcement of concrete.

It specifies seven classes of coating, class A to class G, corresponding to different coating masses (see 9.5.4).

This specification may also be understood to cover other classes of coating whose details are not stated in this edition of the standard but whose specified values of properties are defined consistenly with Clause 9 and the conformity of which is carried out according to Clause 10.

This European Standard does not apply to galvanized (hot-dip zinc coated) reinforcement for prestressing or components of these reinforcements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10080, *Steel for the reinforcement of concrete – Weldable reinforcing steel – General*

EN 10204, *Metallic products – Types of inspection documents*

EN ISO 1461, *Hot dip galvanized coating on fabricated iron and steel articles – Specifications and test methods (ISO 1461:1999)*

EN ISO 2178, *Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic methods (ISO 2178:1982)*

EN ISO 15630-1:2002, *Steel for the reinforcement and prestressing of concrete – Test methods – Part 1: Reinforcing bars, wire rod and wires (ISO 15630-1:2002)*

EN ISO 15630-2, *Steel for the reinforcement and prestressing of concrete – Test methods – Part 2: Welded fabric (ISO 15630-2:2002)*

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply:

3.1
hot-dip galvanizing
any process in which the product is immersed in a bath of molten zinc

3.2
bundle
two or more bars properly bound together

3.3
coated bar
reinforcing steel bar (plain or ribbed) which has been coated with zinc and/or zinc-iron alloys

3.4
coated coil (rod or wire)
steel coil (plain or ribbed) which has been coated with zinc and/or zinc-iron alloys

3.5
coated welded fabric
sheet of steel welded fabric which has been coated with zinc and/or zinc-iron alloys

3.6
coated lattice girder
lattice girder which has been coated with zinc and/or zinc-iron alloys

3.7
fabricator
any organization which cuts and/or bends coated reinforcing steel bar, coil (rod, wire), welded fabric and/or lattice girder

3.8
longitudinal rib
uniform continuous rib parallel to the axis of the reinforcing steel bar

3.9
test unit
the quantity of coated reinforcing steel that is represented by the sample which has been tested

3.10
manufacturer
any organization which produces coated reinforcing steel bar, coil (rod, wire), welded fabric and/or lattice girder

3.11
transverse rib
any rib on the surface of the reinforcing steel bar or coil (rod, wire) other than a longitudinal rib

3.12
steel reinforcing products
reinforcing steel bar, coil (rod, wire), welded fabric and lattice girder

4 Symbols

Symbols used in this European Standard are listed in Table 1.

Table 1 — List of symbols

Symbol	Description	Unit
d_n	Nominal diameter of the coated product	mm
e	Average thickness of the zinc coating	µm
f_R	Relative rib area	-
f_P	Relative indentation area	-
L_o	Length of the test piece (see Table A.1)	mm
m	Mass of zinc per unit area	g/m^2
M	Mass of the uncoated test piece	g
M_z	Mass of the zinc coated test piece	g
$_{\Delta}M$	Mass of the zinc	g
S	Total coated area of the test piece	mm^2

5 Materials

5.1 Hot dip galvanizing bath

The chemical composition of the contents of the hot dip galvanizing bath shall comply with (the relevant clauses in) EN ISO 1461.

5.2 Repair material

Material for repairing damaged coating and renovating uncoated areas shall be an appropriate zinc-rich formulation (paint).

6 Designation

The designation of the products shall be in accordance with EN 10080, except the reference to EN 10080.

In addition, the designation shall include the following:

a) A reference to this European Standard.

b) The additional symbol +Z (hot-dip zinc coating) added to the technical class(es) of steel(s) and the coating class (see Table 2).

7 Information to be supplied at the time of enquiry and order

The following information shall be supplied at the time of enquiry and order:

— quantity ordered;

— the designation of the product in accordance with Clause 6;

— the packaging and protection requirements;

— surface treatment if required (see Clause 8);

— the requirements for documentary information to accompany the delivery (e.g. delivery note, type and content of inspection document according to EN 10204);

— special requirements for labelling.

8 Manufacture (galvanizing)

It is at the discretion of the manufacturer to choose the galvanization method, unless otherwise agreed.

Zinc coating processes can be subdivided in two main categories:

1. zinc coating applied before further working operations (e.g. cutting, welding, bending, etc);

2. zinc coating applied to the final reinforcing steel products not subject to bending.

Any further surface treatment of the galvanized coating and its method of application may be specified (e.g. passivation, etc.).

NOTE The manufacturer should exercise due care:

— to avoid distortion or cracking of the steel reinforcement occurring during galvanizing; and

— of steel reinforcement that is susceptible to embrittlement in processing.

9 Performance characteristics

9.1 Chemical composition

For the chemical composition EN 10080 shall apply.

9.2 Mechanical properties

The mechanical properties of galvanized reinforcing steels shall be those of the technical class agreed at the time of enquiry and order (see EN 10080 and the non conflicting product specification defining the technical class).

No retesting of mechanical properties is required for products on which the zinc coating is applied at a temperature below or equal to 465 °C. Retesting of mechanical properties is necessary for products on which the zinc coating is applied at a temperature above 465 °C, to prove that the mechanical properties of the technical class are maintained.

9.3 Dimensions, mass per metre and tolerances

The nominal diameter (without zinc coating) and cross-sectional area of galvanized reinforcing steel which include the zinc coating, shall meet the requirements in EN 10080. The requirements on dimensions, mass per metre and tolerances in EN 10080 shall apply.

9.4 Bond strength and surface geometry

The requirements in the relevant product specification for the technical class shall apply.

9.5 Coating characteristics

9.5.1 General

The characteristics of the zinc coating are

— finish and appearance;

— adherence;

— mass of zinc deposited per unit area;

— coating continuity.

9.5.2 Finish and appearance

9.5.2.1 General

The surface finish of the zinc coating shall be in accordance with EN ISO 1461:1999, 6.1.

9.5.2.2 Permissible amount of damaged coating and repair of damaged coating

Damaged coating discernible to a person with normal or corrected vision shall be repaired with an appropriate zinc-rich formulation (paint).

The total damaged surface area, prior to repair with a zinc-rich formulation (paint), shall not exceed 0,5 % of the surface area in any one metre length of the reinforcing steel. This limit on repaired damage does not include sheared or cut ends.

NOTE 1 When coated steel reinforcing products bars, coils and welded fabric, are sheared, saw-cut, or cut by other means during the manufacturing process, the cut ends should be repaired with the same zinc-rich formulation (paint) that is used for the repair of damaged coating.

The coating at repaired areas shall have a minimum thickness as specified for the relevant class (see 9.5.4).

NOTE 2 If the total damaged surface area in any one metre length of the bar or coil exceeds 0,5 % of the surface area, that section should be removed from the coated bar or wire and discarded.

9.5.3 Adherence

The adherence of the zinc coating shall be evaluated by a bend test on the coated product (see 10.2.3.2.1). The mandrel diameter shall be 3 d_n for nominal diameters ≤ 16 mm and 6 d_n for nominal diameters > 16 mm.

This does not apply to Category 2 (see Clause 8).

9.5.4 Mass of zinc deposited per unit area

The mass of zinc deposited per nominal unit area (m) shall not be less than the values specified in Table 2 (see 10.2.3.2.2).

Table 2 — Specified values of the mass of zinc per unit area

Class	*m* g/m^2
A	1600
B	1350
C	1100
D	850
E	600
F	350
G	150

If the coating thickness in micrometres is requested, it shall be calculated by using the formula

$$e = m/7{,}14 \qquad (1)$$

where

— *e* is the value of the thickness, expressed in micrometres (µm);

— *m* is the value of the mass of zinc per unit area, expressed in grams per square metre (g/m²), see (3).

The mass of zinc per unit area shall be determined using the provisions given in Annex A.

9.5.5 Coating continuity

The coating continuity shall be such that the average value of the coating thickness determined in accordance with the method described in A.1.2 shall not be less than the minimum thickness values stated in 9.5.4.

Local value may be lower but not less than 60% of the minimum values given in Table 2.

10 Evaluation of conformity

10.1 General

The compliance of galvanized steel with the requirements of this European Standard and with the stated values (including classes) shall be demonstrated by:

— initial type testing (see also 9.2);

— factory production control (see also 9.2), including product assessment;

— continuous surveillance and audit testing.

The general provisions of EN 10080:2005, Clause 8, shall apply.