



# SLOVENSKI STANDARD

## SIST EN 10348-2:2019

01-februar-2019

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### Jekla za armiranje betona - Pocinkana jekla za armiranje - 2. del: Pocinkana jekla za armiranje izdelkov

Steel for the reinforcement of concrete - Galvanized reinforcing steel - Part 2: Galvanized reinforcing steel products

Stahl für die Bewehrung von Beton - Verzinkter Betonstahl - Teil 2: Verzinkte Bewehrungsstahlerzeugnisse

Aciers pour béton armé - Aciers pour béton armé galvanisés - Partie 2 : Produits en acier galvanisés pour l'armature du béton

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77.140.15      Jekla za armiranje betona      Steels for reinforcement of concrete

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EUROPEAN STANDARD

EN 10348-2

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## Steel for the reinforcement of concrete - Galvanized reinforcing steel - Part 2: Galvanized reinforcing steel products

Aciers pour béton armé - Aciers pour béton armé galvanisés - Partie 2 : Produits en acier galvanisés pour l'armature du béton

Stahl für die Bewehrung von Beton - Verzinkter Betonstahl - Teil 2: Verzinkte Bewehrungsstahlerzeugnisse

This European Standard was approved by CEN on 9 November 2018.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 10348-2:2018) has been prepared by Technical Committee ECISS/TC 104 “Concrete reinforcing and prestressing steels”, 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of an identical text or by endorsement, at the latest by June 2019 and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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**EN 10348-2:2018 (E)****1 Scope**

This document specifies requirements for hot-dip galvanized reinforcing steel in the form of products according to EN 10080 and subjected to further processing, e.g. bent bars, stirrups, products straightened from coils, products cut from bars, welded structures (other than welded fabric or lattice girders according to EN 10348, Part 1) and any other components fabricated for use in the reinforcement of concrete.

This document does not apply to hot dip galvanized reinforcement for pre-stressing or components of these reinforcements.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 1460, *Metallic coatings - Hot dip galvanized coatings on ferrous materials - Gravimetric determination of the mass per unit area (ISO 1460)*

EN ISO 1461:2009, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods (ISO 1461:2009)*

EN ISO 2178, *Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method (ISO 2178)*

EN ISO 14713-2, *Zinc coatings - Guidelines and recommendations for the protection against corrosion of iron and steel in structures - Part 2: Hot dip galvanizing (ISO 14713-2)*

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

**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

**3.1****hot-dip galvanizing**

formation of a coating of zinc and/or zinc iron alloys on iron and steel products by dipping prepared steel in a zinc melt

**3.2****galvanized reinforcing steel products**

reinforcing steel products which has been hot-dip galvanized before or after working operations e.g. cutting, welding, bending, etc

**3.3****reinforcing steel products**

reinforcing steel in the form of bent bars, stirrups, welded structures, products from straightened coils and any other components fabricated for use in the reinforcement of concrete

**3.4****reinforcing steel**

reinforcing steel in the form of bars, coils from rod or wire, welded fabrics and lattice girders before any further working operations (e.g. cutting, welding, bending, etc)

**3.5****manufacturer**

organization which produces galvanized reinforcing steel according to the scope of this standard

Note 1 to entry: The manufacturer can apply the galvanized coating or sub-contract the galvanizing to a third party organization (the galvanizer). The manufacturer can apply the operations of cutting/bending/welding or sub-contract this operation to a third party organization (the fabricator).

**3.6****test unit**

quantity of coated reinforcing steel products that is represented by the samples which has been tested

**3.7****rib height*****h***

distance from the highest point of the rib (transverse or longitudinal) to the surface of the core, to be measured normal to the axis of the sample

**3.8****indentation depth*****t***

distance between the surface of the wire and the deepest point of the indentation

**4 Symbols**

Symbols used in this document are listed in Table 1.

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Table 1 — List of symbols

Symbol	Unit	Description
$d$	$mm$	Nominal diameter of the reinforcing steel
$d_n$	$mm$	Nominal diameter of the coated product
$e$	$\mu m$	Average thickness of the zinc coating
$f_P$	-	Relative indentation area
$f_R$	-	Relative rib area
$h$	$mm$	Rib height
$t$	$mm$	Depth of indentation
$L_o$	$mm$	Length of the test piece
$m$	$g/m^2$	Mass of zinc per unit area
$M$	$g$	Mass of the uncoated test piece
$M_z$	$g$	Mass of the zinc coated test piece
$\Delta M$	$g$	Mass of the zinc
$S$	$mm^2$	Total coated area of the test piece

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## 5 Materials

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### 5.1 Reinforcing steel

Reinforcing steel products to be galvanized shall be made from steel within the scope of EN 10080.

NOTE For information on the effect of the chemical composition of the reinforcing steel on the coating see EN ISO 14713-2:2009 (Table 1).

Reinforcing steel that is bent cold prior to hot dip galvanizing may be susceptible to embrittlement. To minimize this risk for steel reinforcement products that are bent cold prior to galvanizing the mandrel diameter shall be equal to, or greater than specified in Table 2.

Table 2 — Minimum bend diameter for bars bent prior to galvanizing

Nominal diameter of the reinforcing steel bar $d$ (mm)	Minimum bend diameter
$d \leq 16$	$6d$
$16 < d < 36$	$8d$
$d \geq 36$	$10d$



## 5.2 Zinc melt

The chemical composition of the contents of the hot dip galvanizing bath shall satisfy the requirements of EN ISO 1461.

## 5.3 Repair material

Material for repairing damaged coating and renovating uncoated areas shall satisfy the requirements of EN ISO 1461.

## 6 Designation

In addition to the designation of the reinforcing steel product before galvanizing, the designation shall include the following:

- reference to this European Standard;
- additional symbol +Z (hot-dip galvanized coating).

## 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;
- designation of the product in accordance with Clause 6;
- packaging and protection requirements;
- surface treatment if required (e.g. passivation, etc);
- requirements for documentary information to accompany the delivery (e.g. delivery note, type).

## 8 Galvanizing

### 8.1 Coating application

The galvanizing shall be, with the exception of the requirements of 9.4 and 10.2, in accordance with EN ISO 1461.

Galvanizing may be applied:

- before further working operations (e.g. cutting, welding, bending, etc);
- to the final reinforcing steel products after further working operations.

The temperature of the application of the hot-dip galvanized coating shall be no higher than 465°C.

### 8.2 Renovation

The total uncoated surface area shall not exceed 0,5 % of the surface area in any one metre length of the reinforcing steel. The repair of uncoated areas shall be according to EN ISO 1461:2009, 6.3.

Repair of damaged coating due to transport, storage and further fabrication should apply in accordance with this section. When galvanized steel reinforcing products, are sheared, saw-cut, or cut by other means after the galvanizing process, the cut ends should be repaired. When bending galvanized rebar after the hot-dip galvanizing process, some cracking or flaking of the galvanized coating at the bend may occur. Some cracking and flaking of the galvanized coating in the bend area is not cause for rejection. Any flaking or cracking can be repaired by an acceptable repair method as defined in EN ISO 1461.