



# SLOVENSKI STANDARD SIST EN 10142:2001

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Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming -  
Technical delivery conditions

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**iTeh STANDARD PREVIEW**

Kontinuierlich feuerverzinktes Band und Blech aus weichen Stählen zum Kaltumformen -  
Technische Lieferbedingungen

[SIST EN 10142:2001](https://standards.itih.ai/catalog/standards/sist/7bcca3de-deea-41b0-b1ba-2c808eb11374/sist-en-10142-2001)

Bandes et tôles en acier doux galvanisées a chaud et en continu pour formage a froid -  
Conditions techniques de livraison

**Ta slovenski standard je istoveten z: EN 10142:2000**

**ICS:**

77.140.50 Ú[[ z aãá \ |^} áá á^ \ áá Flat steel products and semi-products  
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 10142

April 2000

ICS 77.140.50

Supersedes EN 10142:1990

English version

## Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming - Technical delivery conditions

Bandes et tôles en aciers doux galvanisées à chaud et en continu pour formage à froid - Conditions techniques de livraison

Kontinuierlich feuerverzinktes Band und Blech aus weichen Stählen zum Kaltumformen - Technische Lieferbedingungen

This European Standard was approved by CEN on 1 April 2000.

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 Central Secretariat 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 Central Secretariat 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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 European Standard 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 supersedes EN 10142:1990.

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 2000, and conflicting national standards shall be withdrawn at the latest by October 2000.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## 1 Scope

**1.1** This European Standard specifies requirements for continuously hot-dip zinc coated flat products in thicknesses up to and including 3,0 mm - unless otherwise agreed at the time of ordering - made of the steel given in 4.1 and Table 1. The thickness is the final thickness of the delivered product after zinc coating.

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

The types of coating, coating masses and coating finishes available, and surface qualities are given in Tables 2 to 4 (see also 7.2 to 7.4).

**1.2** The products covered by this European Standard are suitable for applications where suitability for forming and resistance to corrosion are of prime importance. Corrosion protection afforded by the coating is directly proportional to the mass of coating (see also 7.2.2).

**1.3** This European Standard is not applicable to

- continuously hot-dip zinc coated structural steel strip and sheet (see EN 10147),
- electrolytically zinc coated cold rolled steel flat products (see EN 10152),
- continuously organic coated (coil coated) steel flat products (see EN 10169-1 and ENV 10169-2),
- continuously hot-dip coated strip and sheet of steels with higher yield strength for cold forming (see EN 10292).

## 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 (including amendments).

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

EN 10020, *Definition and classification of grades of steel*

EN 10021, *General technical delivery requirements for steel and steel products*

EN 10027-1, *Designation systems for steel - Part 1: Steel names, principal symbols*

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

EN 10079, *Definition of steel products*

EN 10143, *Continuously hot-dip metal coated steel sheet and strip - Tolerances on dimensions and shape*

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

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

EURONORM 12<sup>1)</sup>, *Bend test for steel sheet and strip less than 3 mm thick*

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 Standard the following terms and definitions apply in addition to the terms and definitions in EN 10020, EN 10021, EN 10079 and EN 10204 (see clause 2):

#### 3.1

##### hot-dip zinc coating

application of zinc coating by immersing the prepared products in a molten bath containing a zinc content of at least 99 %.

In this case, the wide strip steel is continuously hot-dip coated.

#### 3.2

##### coating mass

total mass including both surfaces (expressed in grams per square metre).

### 4 Classification and designation

#### 4.1 Classification

The steel grades according to this European Standard are classified according to their increasing suitability for cold forming as follows:

DX51D+Z, DX51D+ZF:	bending and profiling quality,
DX52D+Z, DX52D+ZF:	drawing quality,
DX53D+Z, DX53D+ZF:	deep drawing quality,
DX54D+Z, DX54D+ZF:	special deep drawing quality,
DX56D+Z, DX56D+ZF:	extra deep drawing quality.

<sup>1)</sup> Until it is transformed into an European Standard, either EURONORM 12 or the corresponding national standard may be applied.

## 4.2 Designation

### 4.2.1 Steel names

For the steel grades covered by this European Standard, the steel names as given in Table 1 are allocated in accordance with EN 10027-1 and CR 10260.

### 4.2.2 Steel numbers

For the steel grades covered by this European Standard, the steel numbers as given in Table 1 are allocated in accordance with EN 10027-2 and CR 10260.

## 5 Information to be supplied by the purchaser

### 5.1 Mandatory information

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

- a) the quantity to be delivered,
- b) the type of product (strip, sheet, cut length),
- c) the number of the dimensional standard (EN 10143),
- d) the nominal dimensions and the tolerances on dimensions and shape and, if applicable, letters denoting relevant special tolerances,
- e) the term "steel",
- f) number of this standard (EN 10142),
- g) steel name or steel number and symbol for the type of hot-dip coating as given in Table 1,
- h) number designating the nominal mass of coating (e.g. 275 = 275 g/m<sup>2</sup> including both surfaces, see Tables 2; 3 and 4),
- i) letter denoting the coating finish (N, M or R, see Tables 2 and 3 and 7.3),
- j) letter denoting the surface quality (A, B or C, see 7.4),
- k) letter denoting the surface treatment (C, O, CO, S, P or U, see 7.5).

**EXAMPLE** 1 sheet, delivered with dimensional tolerances according to EN 10143 with nominal thickness of 0,80 mm, ordered with special thickness tolerances (S), nominal width 1200 mm, ordered with special width tolerances (S), nominal length 2500 mm, ordered with special flatness tolerances (FS) made of steel DX53D+ZF (1.0355+ZF) according to EN 10142, coating mass 100 g/m<sup>2</sup> (100), coating finish regular (R), surface quality B, surface treatment oiled (O):

1 sheet EN 10143-0,80Sx1200Sx2500FS  
steel EN 10142-DX53D+ZF100-R-B-O

or

1 sheet EN 10143-0,80Sx1200Sx2500FS  
steel EN 10142-1.0355+ZF100-R-B-O

### 5.2 Options

A number of options are specified in this European Standard and listed below. If the purchaser does not indicate his wish to implement one of these options, the supplier shall supply in accordance with the basis specification of this European Standard (see 5.1)



- a) Any steel products suitable for the manufacture of a specific part (see 7.1.2),
- b) Any coating masses different from those of Tables 2 and 3 (see 7.2.2),
- c) Any special requirements for different coating masses on each surface (see 7.2.3),
- d) Any products with pronounced spangle (see 7.3.1),
- e) Any products supplied free from coil breaks (see 7.6),
- f) Any maximum or minimum value for the coating mass per product surface (see 7.8.2),
- g) Notification of which surface has been inspected (see 7.10.1),
- h) Any testing for compliance with the requirements of this standard (see 8.1.1 and 8.1.2),
- i) Any supply of an inspection document and type of document (see 8.7),
- j) Any marking desired by branding of the products (see 9.2),
- k) Any requirements for packing (see clause 10).

## 6 Manufacturing process

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

## 7 Requirements

### 7.1 Mechanical properties

**7.1.1** The products shall be supplied on the basis of the mechanical property requirements in Table 1.

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**7.1.2** If specially agreed at the time of ordering, products made of steel grades DX52D+Z, DX52D+ZF, DX53D+Z, DX53D+ZF, DX54D+Z, DX54D+ZF, DX56D+Z and DX56D+ZF 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.

**7.1.3** If ordered in accordance with 7.1.1 the mechanical property values in Table 1 apply for the following periods agreed upon at the time of placing the order commencing from the date on which they are made available by the works.

- 8 days for steel grades DX51D+Z, DX51D+ZF, DX52D+Z and DX52D+ZF.

- 6 months for steel grades DX53D+Z, DX53D+ZF, DX54D+Z, DX54D+ZF, DX56D+Z and DX56D+ZF.

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

**Table 1 - Steel grades and mechanical properties**

Designation		Symbol for the type of hot-dip coating	0,2%-proof strength <sup>a</sup>	Tensile strength	Elongation	Plastic strain ratio $r_{90}$	Strain hardening exponent $n_{90}$
Steel grade	Steel number						
Steel name	Steel number		$R_{p0,2}$ N/mm <sup>2</sup>	$R_m$ N/mm <sup>2</sup>	$A_{80}^b$ % min.	min.	min.
DX51D DX51D	1.0226 1.0226	+Z +ZF	-	270 to 500	22	-	-
DX52D DX52D	1.0350 1.0350	+Z +ZF	140 to 300 <sup>c</sup>	270 to 420	26	-	-
DX53D DX53D	1.0355 1.0355	+Z +ZF	140 to 260	270 to 380	30	-	-
DX54D DX54D	1.0306 1.0306	+Z +ZF	140 to 220 140 to 220	270 to 350 270 to 350	36 34	1,6 1,4	0,18 0,18
DX56D DX56D	1.0322 1.0322	+Z +ZF	120 to 180 120 to 180	270 to 350 270 to 350	39 37	1,9 <sup>d</sup> 1,7 <sup>d,e</sup>	0,21 0,20 <sup>e</sup>

<sup>a</sup> If the yield point is pronounced, the values apply to the lower yield point ( $R_{eL}$ ).

<sup>b</sup> For product thicknesses  $\leq 0,7$  mm (including zinc coating) the minimum elongation values ( $A_{80}$ ) shall be reduced by 2 units.

<sup>c</sup> This value applies to skin passed products only (surface qualities B and C).

<sup>d</sup> For thicknesses  $> 1,5$  mm, the  $r_{90}$ -value shall be reduced by 0,2.

<sup>e</sup> For thicknesses  $\leq 0,7$  mm, the  $r_{90}$ -value shall be reduced by 0,2 and the  $n_{90}$ -value shall be reduced by 0,01.

## 7.2 Coatings

**7.2.1** Zinc (Z) or zinc-iron alloy (ZF) coating as given in Tables 2 and 3 are applicable for the products.

**7.2.2** The available coating masses are given in Tables 2 and 3. Other coating masses shall be agreed separately at the time of ordering.

Thicker zinc 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.

**7.2.3** If agreed at the time of ordering, different coating masses on each surface may be supplied for the hot-dip zinc coated flat products. The two surfaces may have a different appearance as a result of the manufacturing process.

### 7.3 Coating finish (see Tables 2 and 3)

#### 7.3.1 Normal spangle (N)

This finish is obtained when the zinc coating is left to solidify normally. Either no spangle or zinc crystals of different sizes and brightness appear depending on the galvanizing conditions. The quality of the coating is not affected by this.

If a pronounced spangle is desired, this shall be indicated specially at the time of ordering.

#### 7.3.2 Minimized spangle (M)

This finish is obtained by influencing the solidification process in a specific way. The surface will have reduced spangles, in some cases, not visible to the unaided eye. The finish may be specified if the normal spangle applicable (see 7.3.1) does not satisfy the surface appearance requirements.

#### 7.3.3 Regular zinc-iron alloy coating (R)

This coating results from heat treatment in which iron diffuses through the zinc. The surface has a uniform matt grey appearance.

### 7.4 Surface quality (see Tables 2 and 3 and 7.10)

#### 7.4.1 As coated surface (A)

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

#### 7.4.2 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 and zinc run-off marks and light passivation marks are permissible.

#### 7.4.3 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 7.4.2).