SLOVENSKI STANDARD
SIST EN 10244-2:2023

01-september-2023

Jeklena žica in žični izdelki - Neželezne kovinske prevleke na jekleni žici - 2. del: Prevleke iz cinka in cinkovih zlitin

Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings

Stahldraht und Drahterzeugnisse - Überzüge aus Nichteisenmetall auf Stahldraht - Teil 2: Überzüge aus Zink oder Zinklegierungen

Fils et produits tréfilés en acier - Revêtements métalliques non ferreux sur fils d'acier - Partie 2 : Revêtement de zinc ou d'alliage de zinc

Ta slovenski standard je istoveten z: **EN 10244-2:2023**

ICS:

25.220.40	Kovinske prevleke	Metallic coatings
77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains

SIST EN 10244-2:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10244-2

June 2023

ICS 25.220.40; 77.140.65

Supersedes EN 10244-2:2009

English Version

Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings

Fils et produits tréfilés en acier - Revêtements métalliques non ferreux sur fils d'acier - Partie 2 : Revêtement de zinc ou d'alliage de zinc

Stahldraht und Drahterzeugnisse - Überzüge aus Nichteisenmetall auf Stahldraht - Teil 2: Überzüge aus Zink oder Zinklegierungen

This European Standard was approved by CEN on 26 May 2023.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

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

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

Contents

Page

European foreword

This document (EN 10244-2:2023) has been prepared by Technical Committee CEN/TC 459 “ECISS – European Committee for Iron and Steel Standardization”[1], the secretariat of which is held by AFNOR.

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 December 2023, and conflicting national standards shall be withdrawn at the latest by December 2023.

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.

This document supersedes EN 10244-2:2009.

In comparison with the previous edition, the following technical modifications have been made:

— the reference towards ASTM B750 for Zn-Alu alloys has been changed to ASTM B997;

— dipping test better specified for Zinc-Alu alloy coatings (see Table 3).

This European Standard series for non-ferrous metallic coating on steel wire is made up of the following parts:

— *Part 1: General principles*

— *Part 2: Zinc or zinc alloy coatings*

— *Part 3: Aluminium coatings*

— *Part 4: Tin coatings*

— *Part 5: Nickel coatings*

— *Part 6: Copper, bronze or brass coatings*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

[1] Through its sub-committee SC 6 “Wire rod and wires” (secretariat: AFNOR).

1 Scope

This document specifies the requirement for coating mass, other properties and testing of zinc and zinc alloy coatings on steel wire and steel wire products of circular or other section.

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 1179, *Zinc and zinc alloys — Primary zinc*

EN 10218-1, *Steel wire and wire products — General — Part 1: Test methods*

EN 10244-1, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 1: General principles*

3 Terms and definitions

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

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

3.1
wire with zinc or zinc alloy coating
wire to which zinc or zinc alloy coating has first been applied to protect it against corrosion

Note 1 to entry: The coating method may be hot dipping in a bath of molten zinc or by means of an aqueous solution of suitable electrolyte. In the hot dipping process wiping media may be used to modify the mass of coating.

3.2
zinc or zinc alloy coating
zinc to which other elements are deliberately added in order to obtain particular characteristics

Note 1 to entry: In all cases, the quantity of zinc in the alloy shall be minimum 50 %. The most common alloy elements are aluminium, tin and nickel, but other elements may also be considered.

3.3
mass of coating
mass of zinc per unit of surface area expressed in grams per square metre of surface of bare wire

4 Coating requirements

4.1 Requirements for the coatings material

The zinc or zinc alloy used for the coating shall comply with the standard EN 1179. For zinc-alloy grades not mentioned in the EN, the alloy shall be specified at the time of enquiry and order. For Zn-Al alloys, reference is made to ASTM B997.

The ingot of the material used for the zinc coating shall be of minimum 99,95 % purity (according to Z3 of EN 1179) unless otherwise stated in the relevant product standard or other specification in the order. Coatings applied by electrolysis shall contain a minimum of 99 % zinc.

4.2 Requirements relating to coating on the wire

4.2.1 Coating mass

The minimum mass of zinc per unit of surface area of the wire shall comply with the requirements of Table 1.

Table 1 — Mass requirements for a coating of Zn

Diameter *d* mm	Classes [a]					
	A g/m²	AB g/m²	B g/m²	C g/m²	D g/m²	A x 3 [b] g/m²
0,15 ≤ *d* < 0,20	—	—	15	—	10	—
0,20 ≤ *d* < 0,25	30	20	20	20	15	—
0,25 ≤ *d* < 0,32	45	30	30	25	15	—
0,32 ≤ *d* < 0,40	60	30	30	25	15	—
0,40 ≤ *d* < 0,50	85	55	40	30	15	—
0,50 ≤ *d* < 0,60	100	70	50	35	20	—
0,60 ≤ *d* < 0,70	115	80	60	40	20	—
0,70 ≤ *d* < 0,80	130	90	60	45	20	—
0,80 ≤ *d* < 0,90	145	100	70	50	20	—
0,90 ≤ *d* < 1,00	155	110	70	55	25	—
1,00 ≤ *d* < 1,20	165	115	80	60	25	—
1,20 ≤ *d* <1,40	180	125	90	65	25	540
1,40 ≤ *d* < 1,65	195	135	100	70	30	585
1,65 ≤ *d* < 1,85	205	145	100	75	30	615
1,85 ≤ *d* < 2,15	215	155	115	80	40	645
2,15 ≤ *d* < 2,50	230	170	125	85	45	690
2,50 ≤ *d* < 2,80	245	185	125	95	45	735
2,80 ≤ *d* < 3,20	255	195	135	100	50	765
3,20 ≤ *d* < 3,80	265	210	135	105	60	795
3,80 ≤ *d* < 4,40	275	220	135	110	60	825
4,40 ≤ *d* < 5,20	280	220	150	110	70	840
5,20 ≤ *d* < 8,20	290	—	—	110	80	870
8,20 ≤ *d* ≤ 10,00	300	—	—	110	80	900

[a] The coating class with a designation starting with A relates to thick coatings (generally final coating). Designations ending in B relate to classes usually but not always obtained by (zinc coating) and subsequent drawing. Classes C and D are standard classes for low mass coating which are usually produced, but not exclusively produced, by hot zinc dipping and then wiping.

[b] A x 3 relates to very high mass requirement three times higher than class A. Other multiples of Class A are possible and these classes will be identified in the same way, e.g. A x 4.

If no class of zinc coating or no coating mass is specified in the coating it shall be called “regular coating”. Such a coating shall be not less than 1 g zinc mass per Kg of zinc coated wire (equivalent to the coating mass in g/m^2 not less than two times the wire diameter expressed in mm).

The requirements for zinc-aluminium coatings are given in Table 2.

Table 2 — Mass requirements for a coating of ZnAl alloy

Diameter mm	**Mass of coating** [a] g/m^2			
	A	AB	B	E [b]
0,20 ≤ *d* < 0,25	—	20	20	40
0,25 ≤ *d* < 0,40	—	30	30	
0,40 ≤ *d* < 0,50	85	55	40	
0,50 ≤ *d* < 0,60	100	70	50	
0,60 ≤ *d* < 0,70	115	80	60	
0,70 ≤ *d* < 0,80	130	90	60	
0,80 ≤ *d* < 0,90	145	100	70	
0,90 ≤ *d* < 1,00	155	110	70	
1,00 ≤ *d* < 1,20	165	115	80	
1,20 ≤ *d* < 1,40	180	125	90	60
1,40 ≤ *d* < 1,65	195	135	100	
1,65 < *d* < 1,85	205	145	100	
1,85 ≤ *d* < 2,15	215	155	115	
2,15 ≤ *d* < 2,50	230	170	125	
2,50 ≤ *d* < 2,80	245	185	125	
2,80 ≤ *d* < 3,20	255	195	135	
3,20 ≤ *d* < 3,80	265	210	135	
3,80 ≤ *d* < 4,40	275	220	135	
4,40 ≤ *d* < 5,20	280	220	150	
5,20 ≤ *d* < 8,20	290	—	—	
8,20 ≤ *d* < 10,00	300	—	—	

[a] The coating class with a designation starting with A relates to thick coatings (generally final coating). Designations ending in B relate to classes usually but not always obtained by (zinc coating) and subsequent drawing.

[b] The corrosion resistance of this class E shall be at least equivalent of these from a zinc coating according to Table 1 class B.

For other zinc alloy coatings, the manufacturer and supplier shall agree on the required coating mass.

4.2.2 Appearance of coating

The coating applied to the wire shall be reasonably smooth and as evenly distributed as industrial technology allows and not show discontinuities such as bare patches, dross contamination, etc.

NOTE The zinc-aluminium alloy might show difference in colour and become darker with time. This does not affect the corrosion protection performance.

4.2.3 Dipping test

When specified, the dipping (immersion) test shall be carried out according to the procedure detailed in 5.3. However, it should be pointed out that there is no correlation between the number of dips and the mass of the coating and the result is influenced as much by the conditions of manufacture of the coating as by the uniformity of the coating.

Table 3 gives the minimum number of immersions for coatings of classes A and AB.

The dipping test does not apply to class B, C and D and E.

Table 3 — Minimum number of dips

Nominal diameter mm	Class A of coating		Class AB of coating	
	Number of dips		Number of dips	
	of 1 min[a]	of 1/2 min[b]	of 1 min[a]	of 1/2 min[b]
$0{,}40 \le d < 0{,}60$	—	1	—	—
$0{,}60 \le d < 0{,}90$	1	—	—	1
$0{,}90 \le d < 1{,}00$	1	1	—	1
$1{,}00 \le d < 1{,}40$	1	1	1	—
$1{,}40 \le d < 1{,}65$	2	—	1	—
$1{,}65 \le d < 1{,}85$	2	—	1	—
$1{,}85 \le d < 2{,}15$	2	—	1	1
$2{,}15 \le d < 2{,}80$	2	1	1	1
$2{,}80 \le d < 4{,}40$	3	—	2	—
$4{,}40 \le d < 5{,}20$	3	1	2	—
$5{,}20 \le d < 8{,}20$	3	1	—	—
$8{,}20 \le d < 10{,}00$	4	—	—	—

[a] For Zinc-Alu alloy coatings, one dip equals 45 s instead of 1 min.

[b] For Zinc-Alu alloy coatings, one dip equals 22 s instead of 1/2 min.

4.2.4 Special finishes

If drawing after galvanizing is required, it shall be stipulated at the time of enquiry and order or in the appropriate product standard. The same also applies for other special finishes, such as wax coating, a polished surface or an exceptionally smooth surface.

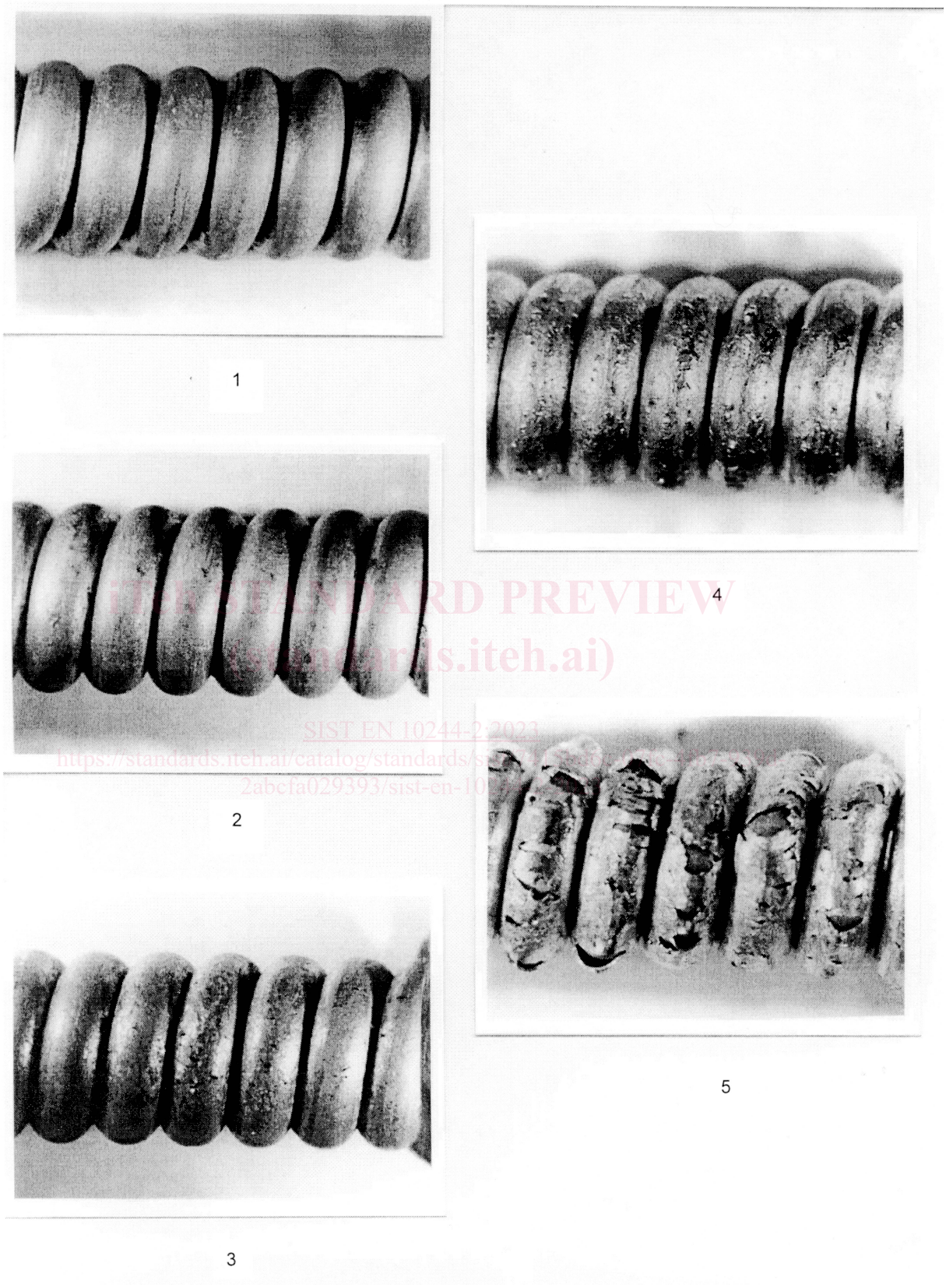
4.2.5 Adherence of coating

4.2.5.1 During the test carried out in accordance with EN 10218-1, the coating shall adhere to the steel when subjected to the conditions of wrapping test for adherence. It shall not crack or split to such an extent that slivers of coating can be removed by simply rubbing with the bare fingers. The loosening or detachment during testing of small particles of zinc resulting from mechanical polishing of the surface of the zinc or zinc alloy coating shall not be considered to be a cause for rejection.

The wrapping test is defined in ISO 7802 and specific requirements for wires are defined in EN 10244-1: Adherence test.

4.2.5.2 To assess the adherence of the coating as may be specified in the relevant product standard or for evaluating different conditions of manufacturing, the following procedure may be applied.

Coil the wire around its own diameter and compare to the reference chart (see Figure 1). Allocate a value of 1 to 5 to the quality of adherence of the coating in accordance with the reference chart in Figure 1.



Key

Descending scale based on quality of adherence from 1 (highest quality) to 5 (lowest quality) (see 4.2.5.2)

Figure 1 — Assessment of the adherence of the coating