SLOVENSKI STANDARD
SIST EN ISO 10683:2018

01-december-2018

Nadomešča:
SIST EN ISO 10683:2014

Vezni elementi - Cinkova lamelna prevleka, ki ni izdelana z elektrolizo (ISO 10683:2018)

Fasteners - Non-electrolytically applied zinc flake coating systems (ISO 10683:2018)

Verbindungselemente - Nichtelektrolytisch aufgebrachte Zinklamellenüberzugsysteme (ISO 10683:2018)

Fixations - Systèmes de revêtements non électrolytiques de zinc lamellaire (ISO 10683:2018)

Ta slovenski standard je istoveten z: **EN ISO 10683:2018**

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21.060.01	Vezni elementi na splošno	Fasteners in general
25.220.40	Kovinske prevleke	Metallic coatings

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September 2018

ICS 21.060.01; 25.220.40

Supersedes EN ISO 10683:2014

English Version

Fasteners - Non-electrolytically applied zinc flake coatings (ISO 10683:2018)

Fixations - Systèmes de revêtements non électrolytiques de zinc lamellaire (ISO 10683:2018)

Verbindungselemente - Nichtelektrolytisch aufgebrachte Zinklamellenüberzüge (ISO 10683:2018)

This European Standard was approved by CEN on 10 August 2018.

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

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European foreword

This document (EN ISO 10683:2018) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 “Fasteners” the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.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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Endorsement notice

The text of ISO 10683:2018 has been approved by CEN as EN ISO 10683:2018 without any modification.

INTERNATIONAL STANDARD

ISO 10683

Third edition
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Fasteners — Non-electrolytically applied zinc flake coating systems

Fixations — Systèmes de revêtements non électrolytiques de zinc lamellaire

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, SC 14, *Surface coatings*.

This third edition cancels and replaces the second edition (ISO 10683:2014), which has been technically revised. The main changes compared to the previous edition are as follows:

- the normative references have been updated;
- the restriction of gauging to external threads in the 2nd paragraph of 6.2.2 has been removed;
- the last column in Table B.2 with maximum clearance for tolerance position e has been removed;
- Annex C has been revised completely.

Fasteners — Non-electrolytically applied zinc flake coating systems

1 Scope

This document specifies requirements for non-electrolytically applied zinc flake coating systems for steel fasteners. It is applicable to coatings:

— with or without hexavalent chromium;

— with or without top coat;

— with or without lubricant (integral lubricant and/or subsequently added lubricant).

It is applicable to bolts, screws, studs and nuts with ISO metric thread, to fasteners with non-ISO metric thread, and to non-threaded fasteners such as washers, pins, clips, etc.

This document does not specify requirements for such fastener properties as weldability or paintability. It is not applicable to mechanically applied zinc coatings.

NOTE Coatings in accordance with this document are especially used for high strength fasteners (≥ 1 000 MPa) to avoid risk of internal hydrogen embrittlement (IHE — see 4.4).

Information for design and assembly of coated fasteners is given in Annex A.

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.

ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method*

ISO 1502, *ISO general-purpose metric screw threads — Gauges and gauging*

ISO 1891-2, *Fasteners — Terminology — Part 2: Vocabulary and definitions for coatings*

ISO 3613:2010, *Metallic and other inorganic coatings — Chromate conversion coatings on zinc, cadmium, aluminium-zinc alloys and zinc-aluminium alloys — Test methods*

ISO 6988, *Metallic and other non organic coatings — Sulfur dioxide test with general condensation of moisture*

ISO 8991, *Designation system for fasteners*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 16047, *Fasteners — Torque/clamp force testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1891-2 apply.

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

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

— IEC Electropedia: available at www.electropedia.org

4 General characteristics of the coating

4.1 Zinc flake coating systems

Zinc flake coating systems are produced by applying a zinc flake dispersion to the surface of a steel fastener, usually with the addition of aluminium flakes, in a suitable medium. Under the influence of heat (curing), a bonding amongst flakes and also between flakes and substrate is generated, thus forming an inorganic surface coating sufficiently electrically conducting to ensure cathodic protection. The coating system can contain hexavalent chromium, Cr(VI).

Special techniques can be necessary to avoid excessive or insufficient coating thickness.

Special techniques can be necessary to prevent lightweight and/or flat fasteners from sticking together (e.g. washers, clips, fasteners with captive washer, flanged nuts).

An additional top coat can be applied to increase corrosion resistance and/or to achieve specific properties (e.g. torque/clamp force properties, chemical resistance, aspect, colour, electrical insulation/conductivity — see A.2).

4.2 Composition of the systems

There are four basic zinc flake coating systems, as shown in Figure 1.

Key

1 only base coat
2 base coat + lubricant
3 base coat + top coat
4 base coat + top coat + lubricant

Figure 1 — Basic zinc flake coating systems

Base coat and top coat can be with integral lubricant; see detailed possible combinations in A.1.2.

4.3 Mechanical and physical properties and curing

The coating process shall not adversely influence the mechanical and physical properties of the fasteners.

NOTE Distributors who coat non-coated fasteners are considered as alteration distributors in accordance with ISO 1891-4.

Depending on the zinc flake coating system, the curing temperatures can be up to 320 °C. The curing temperature shall not be above the tempering temperature of quenched and tempered fasteners.

WARNING — The curing process (especially with higher temperature and/or longer duration) can affect the fatigue limit of fasteners with thread rolled after heat treatment. See also A.1.3 for other possible effects of curing.

4.4 Avoidance of internal hydrogen embrittlement

A characteristic of zinc flake coating systems is that hydrogen is not generated during the deposition process.

Pre-treatment processes using alkaline/solvent cleaner followed by mechanical cleaning do not generate hydrogen, thus eliminating all risk of internal hydrogen embrittlement (IHE).

When mechanical cleaning is not suitable for functional reasons (e.g. for fasteners with captive washers, fasteners with internal threads, fasteners to be rack coated), chemical cleaning (pickling) may be applied, provided that acid with suitable inhibitor and minimum cleaning cycle time are used to minimize the risk of internal hydrogen embrittlement. Fasteners with hardness greater than 390 HV or property class 12.9 and above shall not be subjected to acid cleaning. The duration between cleaning and coating shall be as short as possible.

A phosphating process is permitted as an alternative to mechanical cleaning (hydrogen may be generated during this pre-treatment process, however the curing process allows outward diffusion). The duration between phosphating and coating shall be as short as possible.

Cathodic cleaning processes are not permitted.

NOTE Zinc flake coatings have a high permeability for hydrogen which, during the curing process, allows outward diffusion of hydrogen that could have been absorbed during the pre-treatment process.

4.5 Coating systems and coating processes

The type and geometry of the fasteners shall be considered when selecting a coating system and the related coating process; see A.2.

5 Corrosion protection and testing

5.1 General

Corrosion resistance in accelerated corrosion tests cannot be directly related to corrosion protection behaviour in particular service environments. However, accelerated tests are used to evaluate the corrosion resistance of the coating.

5.2 Neutral salt spray test

The neutral salt spray test (NSS) in accordance with ISO 9227 shall be used to evaluate the corrosion resistance of the coating systems.

When evaluation of the cabinet corrosivity is requested, it should be performed in accordance with Annex C.

The neutral salt spray test shall be carried out on fasteners alone, no sooner than 24 h after coating in the "as-coated" condition, i.e. before sorting, packaging and/or assembling.

After the neutral salt spray test using a test duration of Table 1, there shall be no visible basis metal corrosion (red rust).

The contact points of fasteners with a holding fixture shall not be considered in the evaluation of corrosion protection.

NOTE Guidance for the selection of coating thickness in relation to corrosion protection is given in Annex B.