



SLOVENSKI STANDARD
SIST EN ISO 10684:2004
01-november-2004

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Fasteners - Hot dip galvanized coatings (ISO 10684:2004)

Verbindungselemente - Feuerverzinkung (ISO 10684:2004)

Éléments de fixation - Revêtements de galvanisation à chaud (ISO 10684:2004)

Ta slovenski standard je istoveten z: EN ISO 10684:2004

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ICS:

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

SIST EN ISO 10684:2004

en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 10684

July 2004

ICS 25.220.40; 21.060.01

English version

Fasteners - Hot dip galvanized coatings (ISO 10684:2004)

Éléments de fixation - Revêtements de galvanisation à chaud (ISO 10684:2004)

Verbindungselemente - Feuerverzinkung (ISO 10684:2004)

This European Standard was approved by CEN on 17 June 2004.

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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.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 10684:2004 (E)**Foreword**

This document (EN ISO 10684:2004) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Threaded and non-threaded mechanical fasteners and accessories", 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of an identical text or by endorsement, at the latest by January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

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

Endorsement notice

The text of ISO 10684:2004 has been approved by CEN as EN ISO 10684:2004 without any modifications.

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INTERNATIONAL STANDARD

ISO
10684

First edition
2004-07-15

Fasteners — Hot dip galvanized coatings

Éléments de fixation — Revêtements de galvanisation à chaud

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 10684 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 1, *Mechanical properties of fasteners*.

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Fasteners — Hot dip galvanized coatings

1 Scope

This International Standard specifies material, process, dimensional and some performance requirements for hot dip spun galvanized coatings applied to coarse threaded steel fasteners from M8 up to and including M64 and for property classes up to and including 10.9 for bolts, screws and studs and 12 for nuts. It is not recommended to hot dip galvanize threaded fasteners in diameters smaller than M8 and/or with pitches below 1,25 mm.

NOTE Attention is drawn to the fact that the proof loads and stresses under proof load of oversize tapped nuts with threads M8 and M10 and the ultimate tensile loads and proof loads of undersize threaded bolts and screws with threads M8 and M10 are reduced as compared to the values specified in ISO 898-2 and ISO 898-1 respectively and are specified in Annex A.

It primarily concerns the spun hot dip galvanizing of threaded steel fasteners, but it may also be applied to other threaded steel parts.

The specifications given in this International Standard may also be applied to non-threaded steel parts such as washers.

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2 Normative references

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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.

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs*

ISO 898-2, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread*

ISO 965-1, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

ISO 965-3, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*

ISO 965-4, *ISO general purpose metric screw threads — Tolerances — Part 4: Limits of sizes for hot-dip galvanized external screw threads to mate with internal screw threads tapped with tolerance position H or G after galvanizing*

ISO 965-5, *ISO general purpose metric screw threads — Tolerances — Part 5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing*

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ISO 1460, *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*

ISO 2064, *Metallic and other inorganic coatings — Definitions and conventions concerning the measurement of thickness*

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

ISO 8991, *Designation system for fasteners*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2064 (in particular, the definitions of significant surface, measuring area, local thickness, minimum local thickness and average thickness) and the following apply.

3.1**batch**

quantity of identical parts cleaned, pickled, fluxed and galvanized together at one time in a galvanizing basket

3.2**production lot**

batches of parts originating from the same manufacturing lot, processed continuously through cleaning, pickling, fluxing, dipping in molten zinc and spun in a centrifuge without any change in temperature and concentration of the constituents of the process

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3.3**batch average thickness**

calculated average thickness of a coating as if it was uniformly distributed over the surface of the parts of the batch

3.4**baking**

process of heating parts for a definite time at a given temperature in order to minimize the risk of hydrogen embrittlement

3.5**stress relief**

process of heating parts for a definite time at a given temperature in order to relieve stress induced by work hardening

3.6**hot dip galvanizing of fasteners**

process whereby steel fasteners are zinc coated by immersion in a bath of molten zinc, resulting in the formation of a zinc-iron alloy coating or a zinc-iron alloy coating plus a zinc coating at the surface of the fastener

NOTE This process involves the removal of excess zinc by spinning the parts in a centrifuge or by an equivalent method.

4 Materials

4.1 Raw material of parts

4.1.1 Chemical composition

Materials as included in ISO 898-1 and ISO 898-2 are suitable for hot dip galvanizing except if the total content of phosphorus and silicon is between 0,03 % and 0,13 %, in which case high temperature galvanizing (530 °C to 560 °C) is recommended.

4.1.2 Surface condition

The surface of the fastener, before immersion in the molten zinc, shall be clean and free from all contaminants that would adversely effect the galvanizing.

4.2 Zinc

The zinc used for this process shall be in accordance with ISO 1461.

5 Hot dip galvanizing procedures and precautions

5.1 Stress relief

Fasteners subjected to severe work hardening may require stress relief before acid cleaning and hot dip galvanizing.

5.2 Cleaning and pickling

Parts shall be cleaned. During the cleaning process, hydrogen could be absorbed into the steel. The hydrogen may not effuse completely in the galvanizing bath and consequently, may lead to brittle failure. Unless otherwise agreed, parts heat treated or work hardened to a hardness of ≥ 320 HV shall be cleaned using an inhibited acid, alkaline or mechanical process. Immersion time in the inhibited acid depends on the as-received surface condition and should be of minimum duration.

NOTE An inhibited acid is an acid to which a suitable inhibitor has been added to reduce corrosive attack on the steel and absorption of hydrogen.

5.3 Baking

If baking is carried out, it shall be carried out prior to surface activation.

5.4 Fluxing

Parts shall be surface activated, and dried if necessary.

5.5 Hot dip galvanizing

Normal temperature galvanizing is carried out at a bath temperature of 455 °C to 480 °C. High temperature galvanizing is used to produce a smoother and thinner coating and is carried out at a bath temperature of 530 °C to 560 °C. The finish obtained using the high temperature process is dull. In order to avoid micro-cracks, bolts, screws and studs of property class 10.9 in sizes M27 and above, shall not be high temperature galvanized.

Galvanizing shall not be carried out at bath temperatures between 480 °C and 530 °C.