

TSINKPINNAKATTED. JUHISED JA SOOVITUSED
RAUAPÕHISTEST SULAMITEST JA TERASEST
KONSTRUKTSIOONIDE KAITSMISEKS KORROSIONI
EEST. OSA 1: PROJEKTEERIMISE ÜLDPÕHIMÕTTED JA
KORROSIONIKINDLUS

Zinc coatings - Guidelines and recommendations for the
protection against corrosion of iron and steel in
structures - Part 1: General principles of design and
corrosion resistance (ISO 14713-1:2017)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 14713-1:2017 sisaldab Euroopa standardi EN ISO 14713-1:2017 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 14713-1:2017 consists of the English text of the European standard EN ISO 14713-1:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.05.2017.	Date of Availability of the European standard is 10.05.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 25.220.40

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 14713-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 25.220.40

Supersedes EN ISO 14713-1:2009

English Version

Zinc coatings - Guidelines and recommendations for the
protection against corrosion of iron and steel in structures
- Part 1: General principles of design and corrosion
resistance (ISO 14713-1:2017)

Revêtements de zinc - Lignes directrices et
recommandations pour la protection contre la
corrosion du fer et de l'acier dans les constructions -
Partie 1: Principes généraux de conception et
résistance à la corrosion (ISO 14713-1:2017)

Zinküberzüge - Leitfäden und Empfehlungen zum
Schutz von Eisen- und Stahlkonstruktionen vor
Korrosion - Teil 1: Allgemeine
Konstruktionsgrundsätze und Korrosionsbeständigkeit
(ISO 14713-1:2017)

This European Standard was approved by CEN on 3 May 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 14713-1:2017) has been prepared by Technical Committee ISO/TC 107 “Metallic and other inorganic coatings” in collaboration with Technical Committee CEN/TC 262 “Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys” 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 November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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

This document supersedes EN ISO 14713-1:2009.

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

Endorsement notice

The text of ISO 14713-1:2017 has been approved by CEN as EN ISO 14713-1:2017 without any modification.

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Materials	2
4.1 Iron and steel substrates.....	2
4.2 Zinc coatings.....	3
5 Selection of zinc coating	3
6 Design requirements	3
6.1 General principles of design to avoid corrosion.....	3
6.2 Design for application of different zinc coating processes.....	4
6.3 Tubes and hollow sections.....	4
6.3.1 General.....	4
6.3.2 Corrosion protection of internal and external surfaces.....	4
6.4 Connections.....	5
6.4.1 Fastenings to be used with hot dip galvanized, sherardized or thermally sprayed coatings.....	5
6.4.2 Welding considerations related to coatings.....	5
6.4.3 Brazing or soldering.....	6
6.5 Duplex systems.....	6
6.6 Maintenance.....	6
7 Corrosion in different environments	6
7.1 Atmospheric exposure.....	6
7.2 Exposure to soils.....	9
7.3 Exposure to water.....	12
7.4 Abrasion.....	12
7.5 Exposure to chemicals.....	12
7.6 Elevated temperatures.....	13
7.7 Contact with concrete.....	13
7.8 Contact with wood.....	14
7.9 Bimetallic contact.....	14
8 Accelerated test methods applied to zinc coatings	16
Bibliography	17

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 107, *Metallic and other inorganic coatings*, Subcommittee SC 4, *Hot dip coatings (galvanized, etc.)*.

This second edition cancels and replaces the first edition (ISO 14713-1:2009), of which it constitutes a minor revision following the publication of ISO 17668:2016 and ISO 9223:2012, with the following changes:

- ISO 17668 has replaced EN 13811;
- revisions to [Table 1](#) to align with corresponding descriptions of typical environments in ISO 9223:2012, Table C.1 and to make clearer that the corrosion rates presented are for the first year of exposure.

A list of all parts in the ISO 14713 series can be found on the ISO website.

Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures —

Part 1: General principles of design and corrosion resistance

1 Scope

This document provides guidelines and recommendations regarding the general principles of design which are appropriate for articles to be zinc coated for corrosion protection and the level of corrosion resistance provided by zinc coatings applied to iron or steel articles, exposed to a variety of environments. Initial protection is covered in relation to

- available standard processes,
- design considerations, and
- environments for use.

This document applies to zinc coatings applied by the following processes:

- a) hot dip galvanized coatings (applied after fabrication);
- b) hot dip galvanized coatings (applied onto continuous sheet);
- c) sherardized coatings;
- d) thermal sprayed coatings;
- e) mechanically plated coatings;
- f) electrodeposited coatings.

These guidelines and recommendations do not deal with the maintenance of corrosion protection in service for steel with zinc coatings. Guidance on this subject can be found in ISO 12944-5 and ISO 12944-8.

NOTE There are a variety of product-related standards (e.g. for nails, fasteners, ductile iron pipes, etc.) which provide specific requirements for the applied zinc coating systems which go beyond any general guidance presented in this document. These specific product-related requirements will take precedence over these general recommendations.

2 Normative references

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

ISO 2063, *Thermal spraying — Metallic and other inorganic coatings — Zinc, aluminium and their alloys*

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

ISO 8044:2015, *Corrosion of metals and alloys — Basic terms and definitions*

ISO 12683, *Mechanically deposited coatings of zinc — Specification and test methods*

ISO 17668, *Zinc diffusion coatings on ferrous products — Sherardizing — Specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1461, ISO 2063, ISO 2064, ISO 8044, ISO 12683 and ISO 17668 and the following 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 atmospheric corrosion

corrosion with the earth's atmosphere at ambient temperature as the corrosive environment

[SOURCE: ISO 8044:2015, 3.4]

3.2 elevated temperatures

temperatures between +60 °C and +200 °C

3.3 exceptional exposure

special cases such as exposure that substantially intensifies the corrosive exposure and/or places increased demands on the corrosion protection system

3.4 life to first maintenance

time interval that can elapse after initial coating before coating deterioration reaches the point when maintenance is necessary to restore protection of the basis metal

4 Materials

4.1 Iron and steel substrates

In hot dip galvanizing, the reactivity of the steel is modified by its chemical composition, particularly by the silicon plus phosphorus contents (see ISO 14713-2). The metallurgical and chemical nature of the steel is irrelevant to protection by thermally sprayed or sherardized coatings.

The broad range of steels likely to be subject to zinc coating will commonly fall into the following categories:

- carbon steel, composed simply of iron and carbon, accounts for 90 % of steel production [e.g. EN 10025-2 and EN 10080 (steel reinforcement)];
- high-strength, low-alloy (HSLA) steels have small additions (usually <2 % by weight) of other elements, typically 1,5 % manganese, to provide additional strength for a modest price increase (e.g. EN 10025-6);
- low-alloy steel is alloyed with other elements, usually molybdenum, manganese, chromium, or nickel, in amounts of up to 10 % by weight to improve the hardenability of thick sections (e.g. EN 10083-1).

Steel can be hot rolled or cold formed. Hot rolling is used to produce angle, "I", "H" and other structural sections. Some structural sections, e.g. safety barriers, cladding rails and cladding panels, are cold formed.

Cast and wrought irons are of various metallurgical and chemical compositions. This is irrelevant to protection by thermally sprayed or sherardized coatings but special consideration is needed regarding the cast irons most suitable for hot dip galvanizing (see ISO 14713-2).