

**Metallic and other inorganic coatings -  
Electroplated coatings of zinc with supplementary  
treatments on iron or steel**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 2081:2009 sisaldab Euroopa standardi EN ISO 2081:2008 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 29.01.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.12.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 2081:2009 consists of the English text of the European standard EN ISO 2081:2008.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 29.01.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 15.12.2008.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

ICS 25.220.40

Võtmesõnad:

### Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

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

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:  
Aru 10 Tallinn 10317 Eesti; [www.evs.ee](http://www.evs.ee); Telefon: 605 5050; E-post: [info@evs.ee](mailto:info@evs.ee)

English Version

**Metallic and other inorganic coatings - Electroplated coatings of  
zinc with supplementary treatments on iron or steel (ISO  
2081:2008)**

Revêtements métalliques et autres revêtements  
inorganiques - Dépôts électrolytiques de zinc avec  
traitements supplémentaires sur fer ou acier (ISO  
2081:2008)

Metallische Überzüge - Galvanische Zinküberzüge auf  
Eisenwerkstoffen mit zusätzlicher Behandlung (ISO  
2081:2008)

This European Standard was approved by CEN on 19 November 2008.

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 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 Management Centre has the same status as the official versions.

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



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

This document (EN ISO 2081:2008) 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", 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 June 2009, and conflicting national standards shall be withdrawn at the latest by June 2009.

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 12329:2000.

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

### Endorsement notice

The text of ISO 2081:2008 has been approved by CEN as a EN ISO 2081:2008 without any modification.

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions, abbreviated terms and symbols</b> .....	<b>2</b>
3.1 Terms and definitions.....	2
3.2 Abbreviated terms.....	2
3.3 Symbols.....	3
<b>4 Information to be supplied by the purchaser to the electroplater</b> .....	<b>3</b>
4.1 Essential information.....	3
4.2 Additional information.....	3
<b>5 Designation</b> .....	<b>4</b>
5.1 General.....	4
5.2 Designation specification.....	4
5.3 Designation of the basis material.....	5
5.4 Designation of heat treatment requirements.....	5
5.5 Examples.....	5
<b>6 Requirements</b> .....	<b>6</b>
6.1 Appearance.....	6
6.2 Thickness.....	6
6.3 Conversion coatings and other supplementary treatments.....	6
6.4 Adhesion of zinc and chromate coatings.....	7
6.5 Accelerated corrosion testing.....	7
6.6 Stress relief heat treatments before cleaning and metal deposition.....	9
6.7 Hydrogen-embrittlement-relief heat treatments after electroplating.....	9
<b>7 Sampling</b> .....	<b>9</b>
<b>Annex A (normative) Designation of chromate conversion coatings and other supplementary treatments</b> .....	<b>10</b>
<b>Annex B (normative) Measurement of average thickness of coating on small articles</b> .....	<b>12</b>
<b>Annex C (informative) Additional information on corrosion resistance, rinsing and drying, processing parts in bulk and dyeing of chromate conversion coatings</b> .....	<b>13</b>
<b>Bibliography</b> .....	<b>15</b>

## Introduction

Zinc coatings are applied to iron or steel articles for protective and decorative purposes by electrodeposition from acid zinc chloride, alkaline non-cyanide zinc, and alkaline zinc cyanide solutions. Electroplated, bright zinc coatings are popular and the processes for preparing bright zinc coatings are widely used.

The ability of a zinc coating to prevent corrosion is a function of its thickness and the type of service conditions to which it is exposed. For example, the rate of corrosion of zinc will generally be greater in industrial exposures than in rural ones. The type of service condition should, therefore, be taken into consideration when specifying the minimum coating thickness. Chromate conversion coatings and other supplementary treatments enhance the corrosion resistance of electrodeposited zinc coatings and are commonly applied after electroplating.

Because the appearance and serviceability of zinc coatings depends on the surface condition of the basis metal, agreement should be reached between the interested parties that the surface finish of the basis metal is satisfactory for electroplating.

Chromate conversion coatings are omitted, or replaced by other conversion coatings, at the specific request of the purchaser. This International Standard provides the codes for all types of chromate conversion and other supplementary coatings.

Chemical conversion coatings that do not contain hexavalent chromium or are chromium-free, conforming to this International Standard, are commercially available. The appearance of these substitutes may be different from those produced with hexavalent chromium. All forms of chromate conversion coatings, alternative conversion coatings or substitutes, with the exception of phosphate coatings, can be used and are required to satisfy the corrosion requirements given in this International Standard.

Standard designations for metals and alloys can be found in References [6] to [10] in the Bibliography.

# Metallic and other inorganic coatings — Electroplated coatings of zinc with supplementary treatments on iron or steel

**WARNING** — This International Standard may not be compliant with some countries' health, safety and environmental legislations and calls for the use of substances and/or procedures that may be injurious to health if adequate safety measures are not taken. This International Standard does not address any health hazards, safety or environmental matters and legislations associated with its use. It is the responsibility of the producers, purchasers and/or user of this International Standard to establish appropriate health, safety and environmentally acceptable practices and take appropriate actions to comply with any national, regional and/or international rules and regulations. Compliance with this International Standard does not, of itself, confer immunity from legal obligations.

## 1 Scope

This International Standard specifies requirements for electroplated coatings of zinc with supplementary treatments on iron or steel. It includes information to be supplied by the purchaser to the electroplater, and the requirements for heat treatment before and after electroplating.

It is not applicable to zinc coatings applied

- to sheet, strip or wire in the non-fabricated form,
- to close-coiled springs, or
- for purposes other than protective or decorative.

This International Standard does not specify requirements for the surface condition of the basis metal prior to electroplating with zinc. However, defects in the surface of the basis metal can adversely affect the appearance and performance of the coating.

The coating thickness that can be applied to threaded components can be limited by dimensional requirements, including class or fit.

## 2 Normative references

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

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

ISO 2080, *Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary*

ISO 2177, *Metallic coatings — Measurement of coating thickness — Coulometric method by anodic dissolution*

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

ISO 2819, *Metallic coatings on metallic substrates — Electrodeposited and chemically deposited coatings — Review of methods available for testing adhesion*

ISO 3497, *Metallic coatings — Measurement of coating thickness — X-ray spectrometric methods*

ISO 3543, *Metallic and non-metallic coatings — Measurement of thickness — Beta backscatter method*

ISO 3613, *Chromate conversion coatings on zinc, cadmium, aluminium-zinc alloys and zinc-aluminium alloys — Test methods*

ISO 3892, *Conversion coatings on metallic materials — Determination of coating mass per unit area — Gravimetric methods*

ISO 4518, *Metallic coatings — Measurement of coating thickness — Profilometric method*

ISO 4519, *Electrodeposited metallic coatings and related finishes — Sampling procedures for inspection by attributes*

ISO 9587, *Metallic and other inorganic coatings — Pretreatment of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 9588, *Metallic and other inorganic coatings — Post-coating treatments of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 10289, *Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates — Rating of test specimens and manufactured articles subjected to corrosion tests*

ISO 10587, *Metallic and other inorganic coatings — Test for residual embrittlement in both metallic-coated and uncoated externally-threaded articles and rods — Inclined wedge method*

ISO 15724, *Metallic and other inorganic coatings — Electrochemical measurement of diffusible hydrogen in steels — Barnacle electrode method*

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*

### **3 Terms, definitions, abbreviated terms and symbols**

#### **3.1 Terms and definitions**

For the purposes of this document, the terms and definitions given in ISO 2064 and ISO 2080 apply.

#### **3.2 Abbreviated terms**

C	iridescent conversion coating
D	opaque chromate conversion coating
ER	hydrogen embrittlement relief heat treatment
NM	non-metallic materials
PL	plateable plastics materials
SR	stress relief heat treatment
T2	organic sealant