



**International
Standard**

ISO 2081

**Metallic and other inorganic
coatings — Electroplated coatings on
iron and steel using zinc treated with
solutions containing chromium (VI)**

*Revêtements métalliques et autres revêtements inorganiques —
Dépôts électrolytiques de zinc traité par des solutions contenant
du chrome (VI) sur fer ou acier*

**Fifth edition
2025-11**

This document is a preview generated by EMS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, definitions, abbreviated terms and symbols	2
3.1 Terms and definitions.....	2
3.2 Abbreviated terms.....	2
3.3 Symbols.....	2
4 Information to be supplied by the purchaser to the electroplater	3
4.1 Essential information.....	3
4.2 Additional information.....	3
5 Designation	3
5.1 General.....	3
5.2 Designation specification.....	4
5.3 Designation of the basis material.....	4
5.4 Designation of heat treatment requirements.....	5
6 Requirements	5
6.1 Appearance.....	5
6.2 Thickness.....	5
6.3 Conversion coatings and other supplementary treatments.....	5
6.4 Adhesion of zinc and conversion coatings.....	6
6.5 Accelerated corrosion testing.....	6
6.5.1 Neutral salt spray test.....	6
6.5.2 Corrosion rating.....	7
6.6 Stress relief heat treatments before cleaning and electroplating.....	7
6.7 Hydrogen-embrittlement-relief heat treatments after electroplating.....	7
7 Sampling	7
Annex A (normative) Designation of supplementary treatments	9
Annex B (normative) Measurement of average thickness of coating on small articles	11
Bibliography	12

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of 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 www.iso.org/iso/foreword.html.

This document was prepared by ISO Technical Committee TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 3, *Electrodeposited coatings and related finishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 262, *Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 2081:2018), which has been technically revised.

The main changes are as follows:

- [Table 2](#) has been added.
- References to trivalent chromium [Cr (III)] passivate have been removed, as these systems are addressed in ISO 19598.
- References to sampling have been updated to reflect actual industry practice.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 is generally greater in industrial atmospheres 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.

Chromium (VI) conversion coatings are omitted or replaced by other conversion coatings at the specific request of the purchaser. This document provides the codes for all types of chromium (VI) conversion and other supplementary coatings.

With reference to chromium (VI)-free conversion coatings, attention is drawn to ISO 19598. ISO 19598 is applicable to zinc, zinc-iron and zinc-nickel plating, where only trivalent systems are required.

Due to the REACH Regulations, the use of hexavalent chromium compounds was banned in Europe except where specifically authorized in September 2017. Alternative conversion coatings or substitutes can be used where required to satisfy the corrosion requirements given in this document.

Metallic and other inorganic coatings — Electroplated coatings on iron and steel using zinc treated with solutions containing chromium (VI)

WARNING — This document calls for the use of substances or procedures, or both, that can be injurious to health if adequate safety measures are not taken. This document does not address any health hazards, safety or environmental matters associated with its use. It is the responsibility of the producers, purchasers and users of this document to establish appropriate health, safety and environmentally acceptable practices.

1 Scope

This document specifies requirements for electroplated coatings of zinc with supplementary treatments using hexavalent chromium compounds 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.

This document is not applicable to zinc coatings applied:

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

This document 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 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 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 coating — Vocabulary*

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

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

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

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

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

ISO 24251-1, *Prevention of hydrogen assisted brittle fracture of high-strength steel components — Part 1: Fundamentals and measures*

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 15330, *Fasteners — Preloading test for the detection of hydrogen embrittlement — Parallel bearing surface method*

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

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.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.2 Abbreviated terms

The following abbreviations have been used within this document.

ER hydrogen embrittlement relief heat treatment

SR stress relief heat treatment

T2 organic sealant

3.3 Symbols

The following chemical symbols have been used within this document.

Cr chemical symbol for chromium

Fe chemical symbol for iron

Zn chemical symbol for zinc