

SVENSK STANDARD

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Oorganiska ytbeläggningar – Elektrolytisk beläggning av kadmium med kompletterande behandling på järn och stål (ISO 2082:2017)

Metallic and other inorganic coatings – Electroplated coatings of cadmium with supplementary treatments on iron or steel (ISO 2082:2017)



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Denna standard ersätter SS-EN ISO 2082:2008, utgåva 1.

The European Standard EN ISO 2082:2017 has the status of a Swedish Standard. This document contains the official version of EN ISO 2082:2017.

This standard supersedes the Swedish Standard SS-EN ISO 2082:2008, edition 1.

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EUROPEAN STANDARD

EN ISO 2082

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2017

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Supersedes EN ISO 2082:2008

English Version

Metallic and other inorganic coatings - Electroplated coatings of cadmium with supplementary treatments on iron or steel (ISO 2082:2017)

Revêtements métalliques et autres revêtements inorganiques - Dépôts électrolytiques de cadmium avec traitements supplémentaires sur fer ou acier (ISO 2082:2017)

Metallische und andere anorganische Überzüge - Galvanische Cadmiumüberzüge auf Eisenwerkstoffen mit zusätzlicher Behandlung (ISO 2082:2017)

This European Standard was approved by CEN on 24 June 2017.

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

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

SS-EN ISO 2082:2017 (E)

Contents		Page
European 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	5
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	6
6.4	Adhesion of cadmium and chromate 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 treatment before cleaning and metal deposition	7
6.7	Hydrogen-embrittlement-relief heat treatment after electroplating	7
6.8	Sampling	8
Annex A (normative) Designation of supplementary treatments		9
Annex B (normative) Measurement of average thickness of coating on small articles		11
Annex C (informative) Additional information on corrosion resistance, rinsing and drying, processing parts in bulk and dyeing of chromate conversion coatings		12
Bibliography		13

European foreword

This document (EN ISO 2082:2017) 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 February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 2082:2017 has been approved by CEN as EN ISO 2082:2017 without any modification.

SS-EN ISO 2082:2017 (E)**Introduction**

Electrodeposits of cadmium are used to protect iron and steel from corrosion. Cadmium is anodic and corrodes sacrificially, thus protecting ferrous basis metals even when exposed through pores or pits in the cadmium. Electrodeposited cadmium coatings have traditionally been applied to iron or steel from alkaline cyanide solutions, but in recent years, environmental concerns and regulations have led to increased use of acid sulfate, neutral chloride and acid fluoborate cadmium solutions.

Because the appearance and serviceability of electroplated cadmium coatings are influenced by the surface condition of the basis metal, agreement should be reached between the interested parties that the surface of the basis metal is satisfactory for electroplating.

Although concerns have been raised about the use of cadmium due to safety and environmental effects, there are critical applications, often aerospace-related, where the unique properties of electrodeposited cadmium coatings, for example, their corrosion resistance, intrinsic lubricity, ductility, electrical conductivity and low contact resistance, make continued use of cadmium coatings necessary.

The corrosion resistance of electroplated cadmium coatings and their tendency to tarnish when handled can be improved by applying chromate conversion and other supplementary coatings.

Chemical conversion coatings that do not contain hexavalent chromium are commercially available and their use is becoming more and more popular. The appearance of these substitutes may be different from those produced with hexavalent chromium. Due to the REACH Regulations, however, the use of hexavalent chromium compounds will be banned in Europe from September 2017 except where specifically authorized. Other conversion coatings that are chromium-free are also available. Substitutes are required to satisfy the corrosion requirements given in this document.

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

DANGER — Cadmium vapour is highly toxic by inhalation. During heat treatment, all precautions should be taken to ensure that no person is exposed to it. Attention is also drawn to the danger arising from welding, soldering or heating and other operations, in which the possibility that cadmium will be vaporised exists. Because of its toxicity, cadmium should not be employed as a coating for any article that will come in contact with food or beverages or containers in contact with these items or any household goods.

1 Scope

This document specifies the requirements of electroplated coatings of cadmium with supplementary treatments on iron and steel. It includes information that is to be supplied by the purchaser to the electroplater, and describes coating requirements, including those for heat treatment before and after electroplating.

It is not applicable to coatings applied

- to sheet, strip or wire in the non-fabricated form,
- to close-coiled springs, or
- for purposes other than protective, intrinsic lubricity, ductility, electrical conductivity and low contact resistance use.

This document does not specify requirements for the surface condition of the basis metal prior to electrodeposition with cadmium.

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

Additional information on corrosion resistance, rinsing and drying, processing parts in bulk and dyeing of chromate conversion coatings is given in [Annex C](#).

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 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*

SS-EN ISO 2082:2017 (E)

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

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

ISO 4519:1980, *Electrodeposited metallic coatings and related finishes — Sampling procedures for inspection by attributes*

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

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*

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 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>

3.2 Abbreviated terms

ER hydrogen-embrittlement-relief heat treatment

SR stress relief heat treatment

T2 organic sealant

3.3 Symbols

Cd chemical symbol for cadmium

Fe chemical symbol for iron

4 Information to be supplied by the purchaser to the electroplater

4.1 Essential information

The following information shall be supplied to the electroplater in writing, for example, in the contract or purchase order or on engineering drawings:

- a) a reference to this document, i.e. ISO 2082, and the designation (see [Clause 5](#));
- b) the significant surface indicated, for example, by drawings or by the provision of suitably marked samples;
- c) the nature, condition and finish of the basis metal if they are likely to affect the serviceability and/or the appearance of the coating (see [Clause 1](#));
- d) the position on the surface for unavoidable defects, such as rack marks (see [6.1](#));
- e) the finish required, for example, bright, dull or other finish, preferably accompanied by approved samples of the finish (see [6.1](#));
- f) the type of conversion coating or supplementary treatment (see [6.3](#) and according to [Annex A](#)); conversion coatings shall only be omitted, and alternative conversion coatings and/or other supplementary treatments (see [Table A.1](#)) or conformal coatings, such as lacquers, applied over the conversion coating, at the specific request of the purchaser;
- g) the requirements for thickness, adhesion and accelerated corrosion test requirements (see [6.2](#), [6.4](#), [6.5](#) and [Annex B](#));
- h) the tensile strength of parts and the requirements for heat treatment before and/or after electrodeposition (see [6.6](#) and [6.7](#));
- i) sampling methods, acceptance levels or any other inspection requirements if inspection is different from that given in ISO 4519:1980, Clause 7.

4.2 Additional information

The following additional information shall also be supplied to the electroplater:

- a) any special requirements for, or restrictions on, preparation of the article to be coated (see [Bibliography](#));
- b) any other requirements, such as for articles of complex shape, an area for testing and rating.

5 Designation

5.1 General

The designation shall appear on engineering drawings, in the purchase order, in the contract or in the detailed product specification. The designation specifies, in the following order:

- a) the basis metal,
- b) stress relief requirements,
- c) the type and thickness of undercoats, if present,
- d) the thickness of the cadmium coating,
- e) heat treatment requirements after electroplating, and
- f) the type of conversion coating and/or supplementary treatment (see [Bibliography](#)).