
**Paints and varnishes —
Electro-deposition coatings —**

**Part 1:
Vocabulary**

*Peintures et vernis — Peintures d'électrodéposition —
Partie 1: Vocabulaire*

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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.

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).

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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.

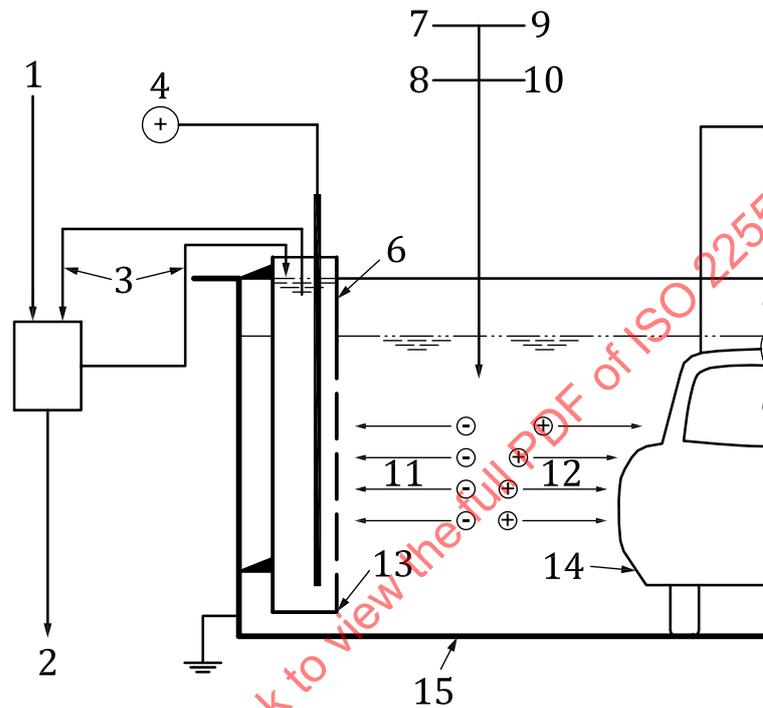
This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

A list of all parts in the ISO 22553 series can be found on the ISO website.

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

During the electro-deposition coating process, the non-volatile matter content from water-thinnable electro-deposition coating materials is deposited on the workpiece caused by an electrophoretic process. During that process, the areas on the inside as well as on the outside of the workpiece, including all cavities, are reached. Depending on whether the workpiece is used as cathode or anode, it is distinguished between cathodic or anodic deposition. The cathodic electro-deposition coating process is commonly used (see [Figure 1](#)).



Key

1	demineralized water	9	solvent
2	wastewater treatment	10	demineralized water
3	anolyte circulation	11	acid
4	anode	12	electro-deposition coating material
5	cathode	13	ion-selective membrane
6	anode box	14	vehicle body
7	binder	15	cathodic e-coat tank
8	pigment		

Figure 1 — Example of a deposition processes during cathodic electro-deposition coating

With the combination of binder, pigment and deposition process, a very resistant coating is generated on the workpiece after hardening, which significantly contributes to the corrosion protection in interior and exterior areas.

The electric properties of the material are also significant for the electric power consumption of the process (density of volume charge).

Since the e-coat is jointly responsible for the total appearance of the coating system, a good run of the coating without visible defects is generally emphasized.

Consequently, for extensive corrosion protection and for sealing the workpiece, an additional application of seam-sealing materials, adhesives or foams is recommended.

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Inside the e-coat tanks, there is a possibility of bacterial contamination due to the dragged-in material and the physical conditions (heat, aqueous media, sources of carbon, etc.).

This document specifies terms and definitions for electro-deposition coatings. The subsequent parts of the ISO 22553 series specify methods for the characterization of electro-deposition coatings and test methods. An overview on the test methods is given in [Annex A](#).

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Paints and varnishes — Electro-deposition coatings —

Part 1: Vocabulary

1 Scope

This document defines terms for electro-deposition coatings.

It is applicable to electro-deposition coatings for automotive industries and other general industrial applications, e.g. chiller units, consumer products, radiators, aerospace, agriculture.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

3.1

density of volume charge

ρ_A

quotient from an electrical charge, Q , and a volume, V , as shown by the formula:

$$\rho_A = \frac{Q}{V}$$

Note 1 to entry: The density of volume charge is expressed in coulombs per cubic metre (C/m³).

Note 2 to entry: 1 C/m³ = 1 A·s/m³.

3.2

deposition voltage tank voltage

U

voltage adjusted on the respective device, in order to deposit an *electro-deposition coating material* (3.9), by an anodic or cathodic method, with a film thickness specified for that coating material

Note 1 to entry: The deposition voltage is given in volts (V).

3.3

deposition time

time necessary to obtain the required film thickness

3.4

anodic electro-deposition coating process anodic e-coating process

variant of the electro-deposition coating where the coated component is connected as the anode and the counter electrode is connected as the cathode

3.5

pigment content, determined by ashing

mass fraction of the product under test that is left as a residue after ashing under the specified conditions

Note 1 to entry: It includes inorganic pigments, extenders and other solid constituents of the product that are not volatile under the test conditions but their state can have altered.

3.6

stoving process

process of final drying and chemical cross-linking of the applied paint film, initiated by the application of heat

3.7

stoving loss

amount of released volatile matter under standard stoving conditions

Note 1 to entry: The stoving loss includes the reaction loss.

3.8

entry marks

visible defects that have occurred during the immersion of the panel under voltage, often in the form of streaks produced parallel to the bath surface on the object to be coated

EXAMPLE Hashmarks (see [Figure 5](#)), pinholes (see [Figure 4](#)), mapping (see [Figure 3](#)).

3.9

electro-deposition coating material

e-coat

aqueous coating material suitable for electro-deposition coating

3.10

deposition time

time in the course of which the voltage is applied between the anode and cathode during the coating process

3.11

flores

crater in the shape of a flower, resulting from the assembly of single craters

Note 1 to entry: See [Figure 2](#) for an example.

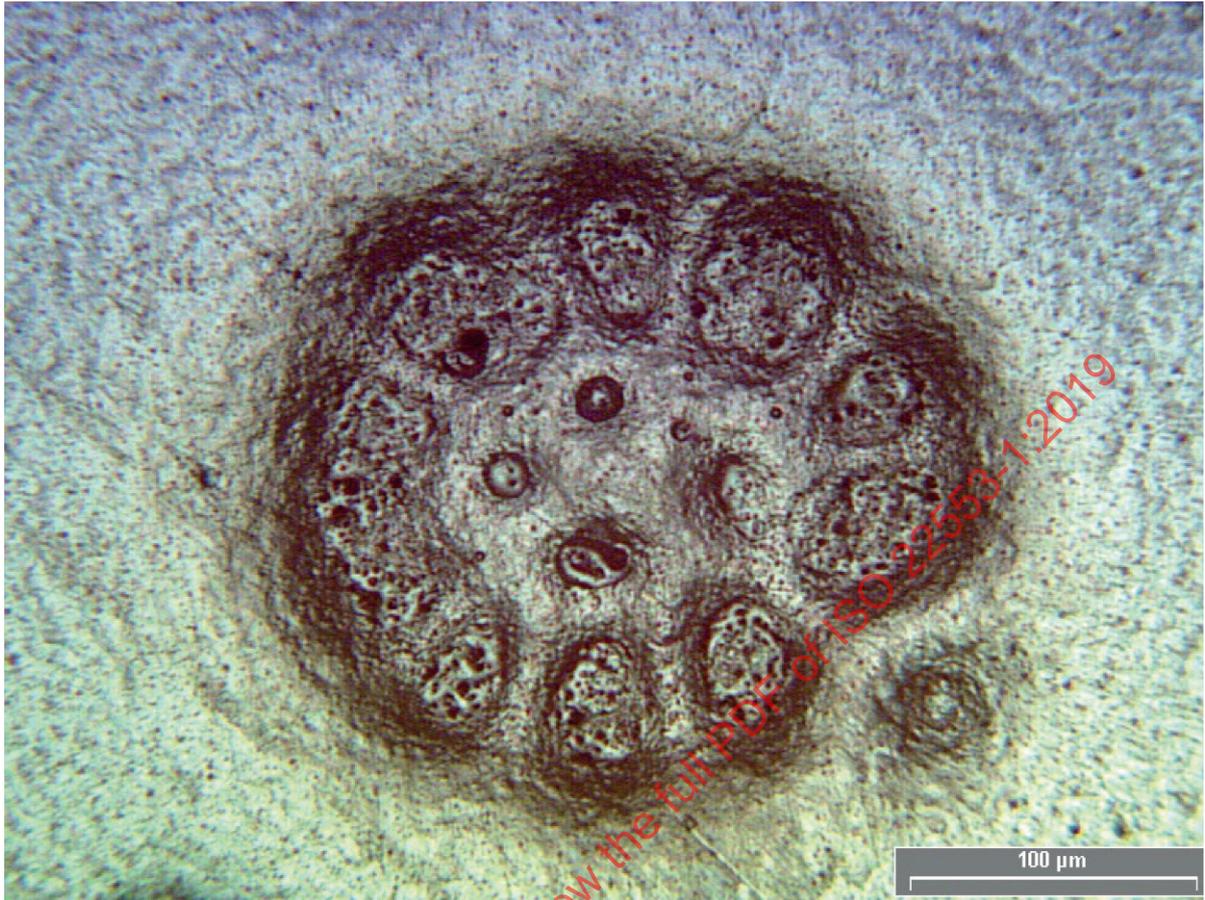


Figure 2 — Example for flores

**3.12
edge protection**

ability to protect edges from corrosion

Note 1 to entry: Edges can result from drilling, punching and cutting.

**3.13
edge corrosion**

corrosion caused by insufficient *edge protection* (3.12)

Note 1 to entry: Edges can result from drilling, punching and cutting.

**3.14
cathodic electro-deposition coating process
cathodic e-coating**

variant of the electro-deposition coating where the coated component is connected as the cathode and the counter electrode is connected as the anode

**3.15
bacterial count
colony count**

number of colony forming units (CFU) forming macroscopically countable colonies

**3.16
mapping**

local differences in the film thickness in an electro-deposition film

Note 1 to entry: See [Figure 3](#) for an example.



Figure 3 — Example for mapping

3.17

pinholes

small holes in the coating down to the substrate

Note 1 to entry: Pinholes are often mixed up with craters.

Note 2 to entry: See [Figure 4](#) for an example.



Figure 4 — Example for pinholes

3.18

hashmarks

characteristic depressions in electro-deposition coatings caused by adhering hydrogen from the process

Note 1 to entry: A characteristic for hashmarks is the orientation in horizontal lines. Hashmarks occur especially when jerkily dipping the specimen.

Note 2 to entry: See [Figure 5](#) for an example. Significant hashmarks are detectable on the right side, which has been wetted with demineralized water. On the left side of the division, there are decidedly less hashmarks.



Figure 5 — Example for hashmarks

3.19 stability

electro-deposition coatings that are constantly exposed to the ageing processes, especially during extended down times (vacations, shutdown, etc.), such as:

- evaporation of water, solvents and neutralizing agents;
- chemical alteration of the binder caused by air;
- dragged-in germs;
- other reactions of the binder

3.20 throwing power

ability of an electro-deposition coating to penetrate box sections

3.21 workpiece

object on which the coating material is applied

EXAMPLE Pipes, radiators, vehicles, steel test panels, magnesium and aluminium alloys, pretreated plastics.

3.22 rupture voltage

electric potential from which the deposition of the electro-deposition coating is no longer controllable, e.g. significant variations of the film thickness, gas formation or heat development occur

Note 1 to entry: The rupture voltage can only be experimentally determined by a voltage series.

4 Abbreviated terms

Abbreviation	Description
e-coat	electro-deposition coating/coating material
anodic e-coat	anodic electro-deposition coating (process)
cathodic e-coat	cathodic electro-deposition coating (process)