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Paints and varnishes — Electro-deposition coatings —

Part 1: Vocabulary

Peintures et vernis — Peintures d'électrodéposition —

Partie 1: Vocabulaire

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Foreword

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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.

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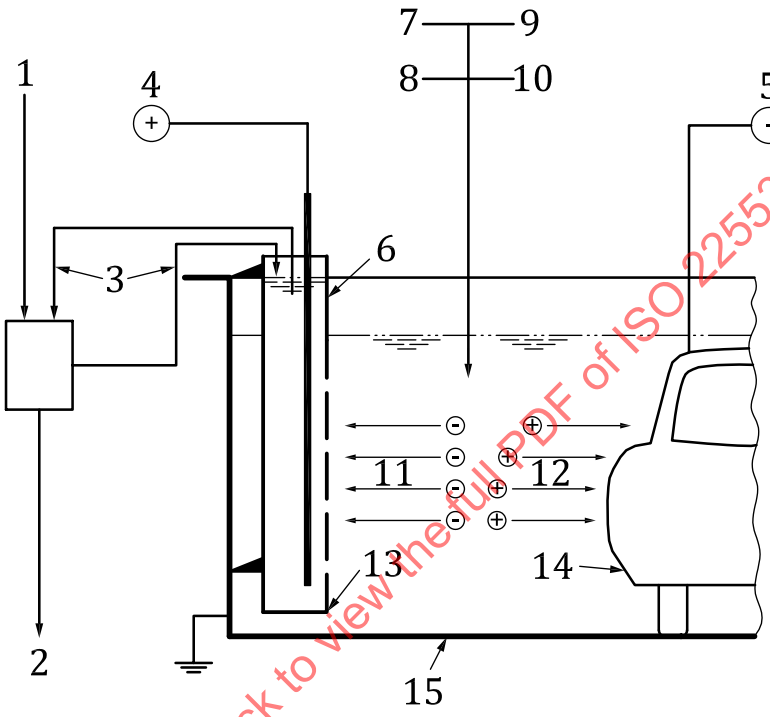
Introduction

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

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

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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/m^3).

Note 2 to entry: $1\ C/m^3 = 1\ A{\cdot}s/m^3$.

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

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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.

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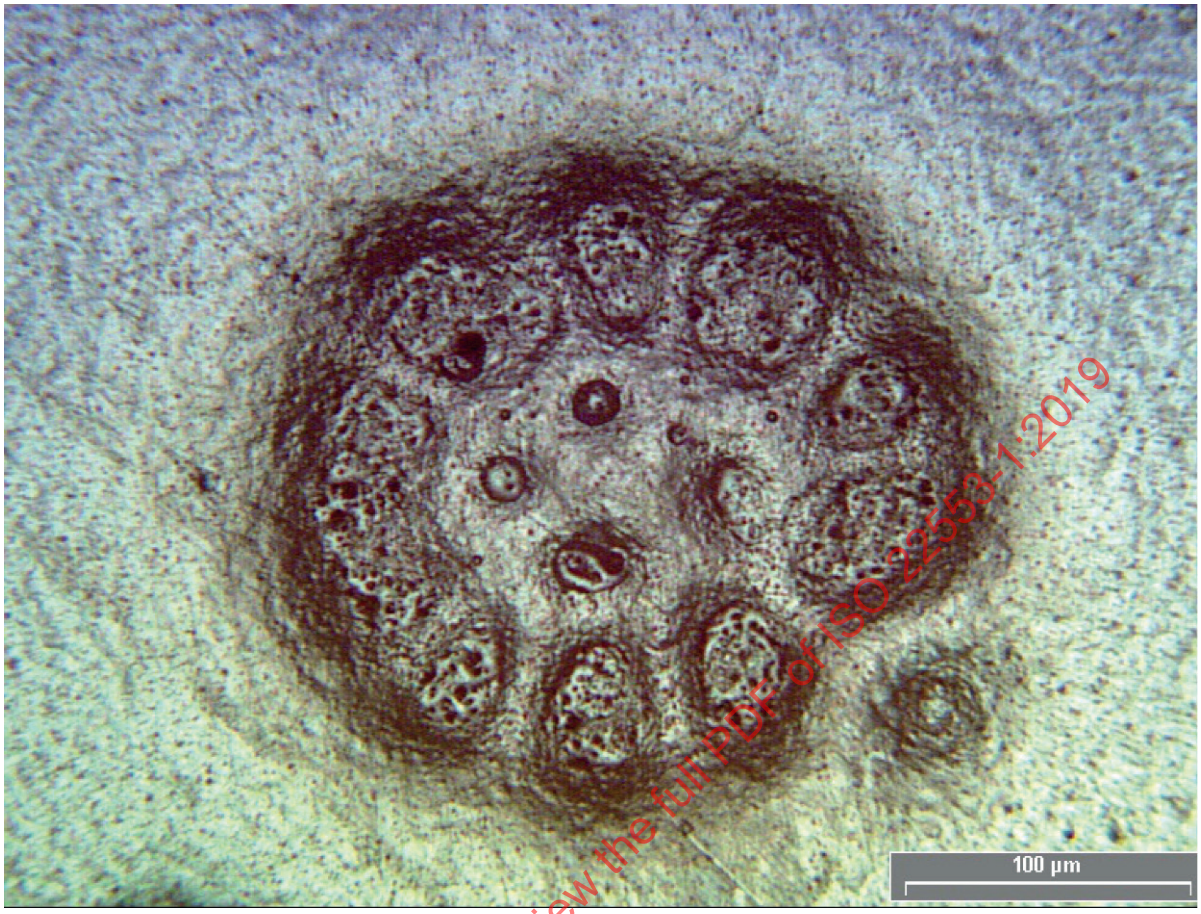

Figure 2 — Example for flores

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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.

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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.

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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.

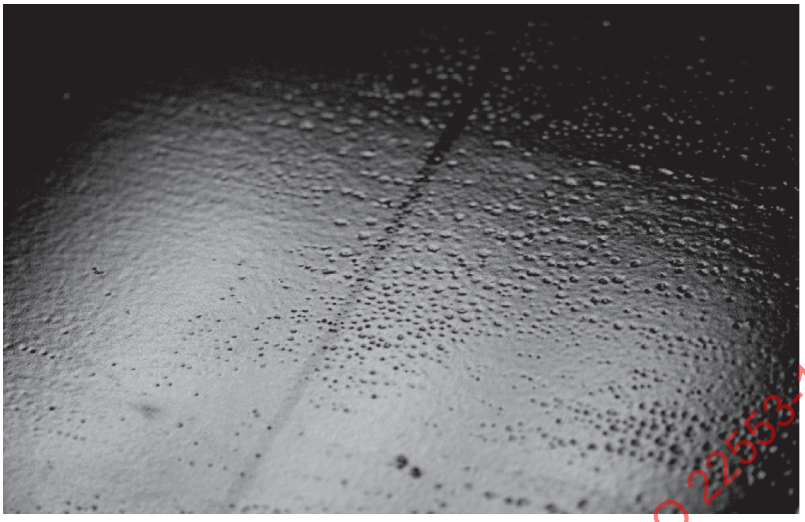

Figure 5 — Example for hashmarks

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)

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