SLOVENSKI STANDARD
SIST EN 50059:2025

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Ročna elektrostatična oprema za brizganje nevnetljivih tekočih premazov - Varnostne zahteve

Hand-held electrostatic application equipment for non-ignitable liquid coating materials - Safety requirements

Elektrostatische Handsprüheinrichtungen - Sicherheitsanforderungen - Handsprüheinrichtungen für nichtentzündbare Beschichtungsstoffe

Équipement manuel d'application électrostatique de produits de revêtement liquides non-inflammables - Exigences de sécurité

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European Committee for Electrotechnical Standardization
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 50059:2025) has been prepared by CLC/TC 204 “Safety of electrostatic painting and finishing equipment”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2026-02-28
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2028-02-29

This document supersedes EN 50059:2018 and all of its amendments and corrigenda (if any).

EN 50059:2024 includes the following significant technical changes with respect to EN 50059:2018:

— new structure of the entire document,

— update of Clause 2,

— complete revision of Clauses 1, 3 to 7,

— revision of Annex A (normative),

— revision of Annex C (informative).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Introduction

During the electrostatic coating process, the non-ignitable liquid coating material is transported to a spraying device where it is atomized by mechanical forces and/or by the influence of an electric field. The generated spray cloud is charged by high voltage of some 10 kV, is attracted by, and is applied to the earthed workpiece.

Spray clouds which are not applied to the workpiece (overspray) are removed by a suction device or by other means.

The coating material is cured at room temperature or by heating.

1 Scope

1.1 This document specifies the electrical requirements for hand-held or hand-operated electrostatic application equipment for non-ignitable liquid coating materials which

— do not generate an explosive atmosphere inside the spraying area,

— are used to process coating materials with a conductivity of the complete system up to 2 000 µS/cm,

— operate with direct current having a d.c. sinusoidal ripple of not more than 10 % of the r.m.s. value, and

— are used within a temperature range from 5 °C to 40 °C.

1.2 This document specifies

— requirements for an interface to machinery according to EN 16985:2018,

— additional requirements for machinery according to EN 1953:2025 and EN 12621:2025.

1.3 This document also specifies requirements for a safe operation of electrostatic application equipment, including the electrical installation. The requirements consider both the processing of coating materials and the cleaning and purge processes.

1.4 For electrostatic application equipment used in food and pharmaceutical industry, additional requirements can apply.

1.5 This document does not apply to

— electrostatic hand-held spraying equipment for ignitable materials, see EN 50050:2013, Parts 1 to 3,

— cleaning systems for spraying devices,

— quality assurance systems for electrostatic spraying equipment (see EN ISO/IEC 80079-34:2020, Clause ZB.11).

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.

EN 1149-5:2018, *Protective clothing - Electrostatic properties - Part 5: Material performance and design requirements*

EN 1953:2025, *Application equipment for coating materials — Safety requirements*

EN 12621:2025, *Machinery for supply and circulation of liquid coating materials — Safety requirements*

EN 16985:2018, *Spray booths for organic coating material - Safety requirements*

EN 50176:2025, *Automatic electrostatic application systems for ignitable liquid coating materials - Safety requirements*

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2016, modified*)

EN 60529:1991,[1] *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61340-4-1:2004,[2] *Electrostatics - Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors (IEC 61340-4-1:2003)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2023, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2023)*

EN ISO 20344:2021, *Personal protective equipment - Test methods for footwear (ISO 20344:2021)*

IEC 60479-1:2018, *Effects of current on human beings and livestock — Part 1: General aspects*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1.1
application equipment
hand-held or hand-operated equipment for electrostatic coating which in general comprises the following:

— applicator,

— high voltage supply system,

— control system, and

— coating material supply system

3.1.2
applicator
device for application of coating material by means of electrostatic charge which in general comprises the following:

— spraying device,

— high voltage electrode, if applicable,

— high voltage supply system (if integrated into the applicator),

— housing,

[1] As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

[2] As impacted by EN 61340-4-1:2004/A1:2015.

— exchangeable attachment parts, and

— battery unit (integrated fixedly, or attached), if applicable

3.1.3
spraying device
device with outlet opening of coating material for atomising, high-voltage electrode for charging the coating material and, if applicable, supplying atomising air and horn/shaping air

Note 1 to entry: Typical designs are nozzles or rotating discs, or bell-shaped devices.

Note 2 to entry: The high-voltage electrode can be a needle or a solid part which is on high-voltage potential.

3.1.4
high voltage supply system
system which in general comprises the following:

— low-voltage section with devices for switching on and off the application equipment and for adjustment, control, regulation, limitation and monitoring of current and voltage, as well as the required connecting cables,

— high-voltage generator,

— high-voltage switching device,

— high-voltage cable,

— high-voltage plug-and-socket connector

3.1.5
control system
device generally having the following functions for adjustment, control, regulating, limitation and monitoring of, for instance, the applicator, high voltage supply system, coating material supply and the control air

Note 1 to entry: A combination of the control system and the high voltage supply system according to 3.1.4 is possible.

3.1.6
connecting cable
electric cable connected to the applicator or charging device for coating material

3.1.7
high voltage electrode
conductive part in the form of a needle or a solid part, which is under high voltage and serves for direct or indirect charging of the coating material

3.1.8
coating material supply system
system for supplying the applicator with coating material which in general comprises the following:

— pressurized or depressurised containers,

— pumps,

— controllers and valves,

— dosing and mixing devices for coating materials,

— ducts and hoses, and

— charging device for liquid coating material

3.1.9
earthing system
system for earthing the application equipment permanently

3.1.10
hazardous discharge
discharge which generates the hazard of electric shock

3.1.11
workpiece
article to which the coating material is applied

3.1.12
non-ignitable liquid coating materials
substances, especially liquids and varnishes, which cannot be ignited in sprayed state

Note 1 to entry: A formula for the estimation of ignitability on the basis of the composition of the liquid coating material is given in Annex C.

3.1.13
ignitable liquid coating materials
sprayed materials, especially varnishes which can be ignited in sprayed state and react in the form of an explosion

Note 1 to entry: A formula for the estimation of ignitability on the basis of the composition of the coating material is given in Annex C.

3.1.14
dissipative footwear
footwear that has a resistance to earth via its sole which is low enough to prevent the build-up of electrostatic charges capable to produce a hazardous discharge

Note 1 to entry: See EN ISO 20344:2021.

Note 2 to entry: A required electric insulating resistance to prevent electric shocks is not contradictory to this definition.

3.1.15
protective clothing
clothing that has a resistance to earth which is low enough to prevent the build-up of electrostatic charges capable to produce a hazardous discharge

Note 1 to entry: See EN 1149-5:2018.

Note 2 to entry: A required electric insulating resistance to prevent electric shocks is not contradictory to this definition.

3.1.16
dissipative floor
floor that has a resistance to earth which is low enough to prevent the build-up of electrostatic charges capable to produce a hazardous discharge

3.1.17
exchangeable attachment parts
nozzles, bells/discs, extensions, angular pieces, electron and ion absorber and discharge electrodes if applicable