



**SLOVENSKI STANDARD**  
**oSIST prEN 50059:2021**

**01-december-2021**

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**Oprema za ročno elektrostatično brizganje - Varnostne zahteve - Ročna oprema za brizganje nevnetljivih premazov**

Electrostatic hand-held spraying equipment - Safety requirements - Hand-held spraying equipment for non-ignitable coating materials

Elektrostatische Handsprüheinrichtungen - Sicherheitsanforderungen - Handsprüheinrichtungen für nichtentzündbare Beschichtungsstoffe

Équipement manuel de projection électrostatique - Exigences de sécurité - Équipement manuel de projection de revêtement inflammable

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**Ta slovenski standard je istoveten z: prEN 50059**

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**ICS:**

87.100	Oprema za nanašanje premazov	Paint coating equipment
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Will supersede EN 50059:2018 and all of its  
amendments and corrigenda (if any)

English Version

## Electrostatic hand-held spraying equipment - Safety requirements - Hand-held spraying equipment for non-ignitable liquid coating materials

Équipement manuel de projection électrostatique -  
Exigences de sécurité - Équipement manuel de projection  
de produits liquides de revêtement ininflammables

Elektrostatische Handsprüheinrichtungen -  
Sicherheitsanforderungen - Handsprüheinrichtungen für  
nichtentzündbare Beschichtungsstoffe

This draft European Standard is submitted to CENELEC members for enquiry.  
Deadline for CENELEC: 2021-12-31.

It has been drawn up by CLC/TC 204.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).  
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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## prEN 50059:2021 (E)

## European foreword

This document (prEN 50059:2021) has been prepared by Technical Committee CLC/TC 204 “Safety of electrostatic painting and finishing equipment”, the secretariat of which is held by DKE.

This document is currently submitted to the 2nd Enquiry.

The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

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

prEN 50059:2021 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).

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This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZZ, which is an integral part of this document.

## 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.

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**prEN 50059:2021 (E)****1 Scope**

**1.1** This document specifies the requirements for hand-held or hand-operated electrostatic spraying 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  $\mu\text{S}/\text{cm}$ ,
- 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 the environment where spraying equipment is used,
- requirements for an interface to machinery according to EN 16985:2018,
- additional requirements for machinery according to prEN 12621:2021 and prEN 1953:2021.

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

**1.4** For electrostatic spraying equipment used in food and pharmaceutical industry, additional requirements could apply.

**1.5** This document is not applicable 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, Annex ZB 11).

**1.6** This document is not applicable to equipment manufactured before the date of its publication as European Standard.

**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*

prEN 1953:2021, Application equipment for coating materials — *Safety requirements*

prEN 12621:2021, Machinery for supply and circulation of liquid coating materials — *Safety requirements*

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

EN 50050-1:2013, *Electrostatic hand-held spraying equipment - Safety requirements - Part 1: Hand-held spraying equipment for ignitable liquid coating materials*



EN 50050-2:2013, *Electrostatic hand-held spraying equipment - Safety requirements - Part 2: Hand-held spraying equipment for ignitable coating powder*

EN 50050-3:2013, *Electrostatic hand-held spraying equipment - Safety requirements - Part 3: Hand-held spraying equipment for ignitable flock*

prEN 50176:2021, *Automatic electrostatic application systems for ignitable coating materials - Safety requirements*

EN 50177:2009<sup>1</sup>, *Stationary electrostatic application equipment for ignitable coating powders - Safety requirements*

EN 50223:2015, *Stationary electrostatic application equipment for non-ignitable liquid coating material - Safety requirements*

EN 50348:2010, *Stationary electrostatic application equipment for non-ignitable liquid coating material - Safety requirements*

EN 60079-7:2015, *Explosive atmospheres - Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2015)*

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

EN 60529:1991<sup>2</sup>, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61340-4-1:2004<sup>3</sup>, *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 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 20344:2011, *Personal protective equipment - Test methods for footwear (ISO 20344:2011)*

IEC/TS 60479-1:2005<sup>4</sup>, *Effects of current on human beings and livestock — Part 1: General aspects*

### 3 Terms, definitions and abbreviations

#### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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<sup>1</sup> As impacted by EN 50177:2009/A1:2012.

<sup>2</sup> As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

<sup>3</sup> As impacted by EN 61340-4-1:2004/A1:2015.

<sup>4</sup> As impacted by IEC/TS 60479-1:2005/Corrigendum October 2006.

**prEN 50059:2021 (E)**

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

**3.1.1****spraying equipment**

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

- applicator,
- high voltage supply system,
- control system,
- connecting cables, 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,
- exchangeable attachment parts and
- battery unit (integrated fixedly, or attached), if applicable

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**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 shaping air

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

**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 spraying 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, regulation, limitation and monitoring of, for instance, the 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,
- dosing and mixing devices for coating materials,
- supply lines for coating materials, and
- charging device for liquid coating material

**3.1.9****earthing system**

system for earthing the spraying equipment permanently

**3.1.10****spraying area**

area, closed or not, in which the coating material is applied to the workpiece by the spraying equipment

**3.1.11****hazardous discharge**

discharge which generates the hazard of electric shock

**3.1.12****workpiece**

article to which the coating material is applied

**3.1.13****non-ignitable liquid coating material**

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.

**prEN 50059:2021 (E)****3.1.14****protective 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 20344:2011.

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 have 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, extensions, angular pieces, electron and ion absorber

**3.1.18****periodic inspection**

inspection of the spraying equipment to be carried out at regular intervals

**3.2 List of abbreviations**

$U_{max}$	maximum outlet high voltage
$I_{max}$	maximum short-circuit current
$I_{B rms}$	body current (RMS) flowing from the hand to both feet
$I_{C(p)}$	peak current value of a discharge caused by the spraying equipment
$U_{C(p)}$	peak voltage value of a discharge measured from the oscilloscope
$t_i$	pulse duration in which the peak current value $I_{C(p)}$ is dropped to 5 % of its value
$R_{Shunt}$	resistance of the shunt, e.g. 0,100 $\Omega$ to 0,500 $\Omega$
$F_{CT}$	factor of the current transformer in V/A
$F_{AT}$	factor of the attenuator, e.g. 10:1

**4 Electric hazards**

Electric shock (by direct or indirect contact) may be generated, for instance, by contact with:

- live parts which are not insulated for operational reasons,
- conductive parts which are not under hazardous voltage during normal operation, but in case of failure,
- insulated live parts whose insulation is insufficient or has been damaged due to internal or external influences.