SLOVENSKI STANDARD
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Automatic electrostatic spraying equipment for non–flammable liquid spraying material

Automatic electrostatic spraying equipment for non-flammable liquid spraying material

Ortsfeste elektrostatische Sprüheinrichtungen für nichtbrennbare flüssige Beschichtungsstoffe

Matériel de pulvérisation électrostatique automatique pour matériau de pulvérisation liquide non inflammable

Ta slovenski standard je istoveten z: **EN 50348:2001**

ICS:

87.100	Oprema za nanašanje premazov	Paint coating equipment

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English version

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

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 204, Safety of electrostatic painting and finishing equipment.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50348 on 2000-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2002-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2003-10-01

Annexes designated "informative" are given for information only.
In this standard, annex A is informative.

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Introduction

Process

In the process of electrostatic paint spraying, liquid is converted into a mist of of droplets which are directed onto a surface in order to obtain a uniform layer of the thickness and type required. The droplets are charged by means of a high voltage of the order of some tens of kilovolts so that they are attracted to and deposited on the earthed workpiece.

1 Scope

1.1 This European Standard specifies requirements for automatic electrostatic spraying equipment which is used for spraying non-flammable liquids which do not form explosive atmospheres in the spraying area. This applies also for paints that are classed as non-ignitable while spraying, e.g. water based paints (see annex A).

In this connection a distinction is made between spraying devices which due to their type of construction comply with requirements of personnel protection, and those for which other discharge energies and/or current limits are stipulated.

It also specifies the constructional requirements for the safe operational conditions of the electrical equipment installations including ventilation requirements. Additional requirements as to the construction of the spraying areas such as cabins and booths, etc. are dealt with in other standards, currently in preparation in CEN/TC 271.

NOTE If flammable liquid spraying materials are also used in the equipment, the requirements laid down in EN 50176 for automatic electrostatic spraying equipment for flammable liquid spraying material apply; that means that the spraying areas have to be equipped accordingly.

1.2 This European Standard considers the following types of electrostatic spraying systems:

Type B Systems with a discharge energy limit in excess of 5 mJ but less than 350 mJ and a current limit of less than 0,7 mA

In these systems there is no danger of electric shock.

Type C Systems with a discharge energy in excess of 350 mJ and/or a current in excess of 0,7 mA (see 5.1.2)

In these systems there are dangers of electric shock.

NOTE Type A systems complying with EN 50050:1986 are not relevant for this European Standard.

1.3 This European Standard considers only the hazards specific to the electrostatic characteristics of the electrostatic spraying process.

1.4 For other aspects, such as:

- selection, installation and use of electrical equipment in hazardous areas;
- health hazards, for example toxic and skin effects;
- cleaning of spraying areas;
- fire hazard from external sources;
- fire protection;

where there are no harmonized European Standards then national regulations apply.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred applies (including amendments).

EN 292-2	1991	Safety of machinery - Basic concepts, general principles for design Part 2: Technical principles and specifications
EN 344	1992	Requirements and test methods for safety - Protective and occupational footwear for professional use
EN 954-1	1996	Safety of machinery - Safety related parts of control systems Part 1: General principles for design
EN 50053-3	1990	Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials Part 3: Electrostatic hand-held flock application guns with an energy limit of 0,24 mJ or 5 mJ and their associated apparatus
EN 50059	1990	Specification for electrostatic hand-held spraying equipment for non-flammable material for painting and finishing
EN 50176	1996	Automatic electrostatic spraying installations for flammable liquid spraying material
EN 50177	1996	Automatic electrostatic spraying installations for flammable coating powder
EN 60529	1991	Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)
IEC 61340-4-1	1995	Electrostatics -- Part 4: Standard test methods for specific applications -- Section 1: Electrostatic behaviour of floor coverings and installed floors

3 Definitions

For the purpose of this European Standard, the following definitions apply:

3.1
electrostatic spraying device for liquid spraying material
a device for producing, charging and depositing suspended droplets with the assistance of electric fields

3.2
electrostatic spraying system
a system in general comprising electrostatic spraying devices, high voltage supply system and connecting cables

3.3
automatic electrostatic spraying equipment
an equipment in which the spraying device is either permanently fixed or led by means of moving automatic devices (e.g. robots)

The spraying equipment comprises in general the following items:

- spraying area;
- high voltage supply system;
- electrostatic spraying devices;
- supply of spraying material;
- fixtures of the spraying devices;
- jigs/resp. fixtures of the workpieces;
- conveyors;
- earthing system;
- exhaust ventilation system.

3.4
high voltage supply system
voltage conversion unit comprising in general:

- low voltage section with devices for switching on and off the unit and for adjustment, control, regulation, limitation and monitoring of voltage and current;
- high voltage section for voltage conversion;
- high voltage switching device;
- high voltage cables.

NOTE The high voltage supply generator can be, in certain cases, incorporated in the spray gun.

3.5
spraying area
an area, closed or not, in which the spraying material is deposited onto the workpieces by the electrostatic spraying system

3.5.1
enclosed spraying cabin
an area closed on all sides while spraying excluding openings for ingress and egress of the workpieces and ducts for ventilation

3.5.2
partly enclosed spraying cabin
an area closed on all sides while spraying excluding openings for ingress and egress of the workpieces, the automatic electrostatic spraying devices and ducts for ventilation

3.5.3
spray booth
an area closed on all sides while spraying except on the side of the automatic electrostatic spraying devices and excluding openings for ingress and egress of the workpieces and ducts for ventilation

3.6
workpiece
the article on which the spraying material is to be deposited

3.7
discharge energy
the energy discharged from a conductive part of the installation in the form of a spark which could cause an electric shock to a person

3.8
non-flammable liquid spraying material applying to this European Standard
coating material which cannot be ignited while spraying in automatic electrostatic spraying equipment even by strong ignition sources like open flames

NOTE A formula for the estimation of the flammability in accordance to the recipe of the coating material is given in the literature in annex A.

3.9
antistatic footwear
footwear that has a resistance to earth, via the sole, which is low enough to prevent the build-up of electrostatic charges capable of causing dangers to personnel

See EN 344.

3.10
antistatic gloves
gloves that have a resistance low enough to prevent the build-up of electrostatic charges capable of causing dangers to personnel

See EN 50053-3.

3.11
antistatic floor
a floor which has a resistance to earth which is low enough to prevent the build-up of electrostatic charges capable of causing dangers to personnel

See IEC 61340-4-1.

3.12
minimum volumetric air flow
the air flow of the exhaust ventilation system which is to be ensured in accordance with 5.2.1

4 General requirements

4.1 Spraying of non-flammable liquid spraying material shall be performed only in spraying areas which are equipped in accordance with clause 5.

4.2 All associated apparatus, e.g. the high voltage supply system, shall, wherever possible, be located outside spraying areas.

Associated apparatus should comply with the requirements of the degree of protection of at least IP 54 as defined in EN 60529.

4.3 Footwear and gloves

Footwear intended for use by operators shall be antistatic and shall comply with EN 344. If gloves are required, only antistatic gloves passing the following test shall be used:

From each of three gloves of the same type which have been stored for seven days at a temperature of (23 ± 2) °C and (50 ± 5) % relative humidity, take a specimen of 80 mm diameter out of the palm.

For multi-layered gloves, all layers are testing in one testing process, even if, by taking the specimens, the connections between the layers no longer exist.

Apply a circular electrode of 50 mm diameter with a force of 10 N to the top of a specimen lying on a circular metal plate with a diameter greater than 80 mm. Measure the resistance between the electrode and the metal plate under the ambient conditions given above using an applied d.c. voltage of not less than 100 V and not more than 1 kV from a source which will not constitute an electric shock risk to personnel.

Each of the three readings shall be not greater than 100 MΩ.