

**Kohtkindlad elektrostaatilised seadmed mittesüttivate vedelate pinnakattematerjalide jaoks. Ohutusnõuded**

Stationary electrostatic application equipment for non-ignitable liquid coating material - Safety requirements

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 50348:2010 sisaldab Euroopa standardi EN 50348:2010 ingliskeelset teksti.

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EUROPEAN STANDARD

**EN 50348**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 87.100

Supersedes EN 50348:2001

English version

**Stationary electrostatic application equipment  
for non-ignitable liquid coating material -  
Safety requirements**

Matériel fixe de projection électrostatique  
de produit à projeter liquide inflammable -  
Exigences de sécurité

Stationäre Ausrüstung  
zum elektrostatischen Beschichten  
mit nichtentzündbaren flüssigen  
Beschichtungsstoffen -  
Sicherheitsanforderungen

This European Standard was approved by CENELEC on 2009-12-01. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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**CENELEC**

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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

## 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 formal vote and was approved by CENELEC as EN 50348 on 2009-12-01.

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

This European Standard supersedes EN 50348:2001.

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) 2010-12-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2012-12-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2006/42/EC. See Annex ZZ.

The State of the Art is included in Annex ZY "Significant changes between this European Standard and EN 50348:2001".

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## 0 Introduction

### 0.1 Process

During the electrostatic coating process the liquid coating material is transported to an electrostatic spraying device where it is converted to droplets by mechanical forces and by the influence of an electric field. During this atomising process the droplets are charged by high voltage of some 10 kV and a spray cloud is generated. The charged droplets are attracted by and applied to the grounded workpiece.

Droplets which are not applied to the workpiece (overspray) are removed by an extraction device or by another device.

The coated workpieces are transported to dryer, where the solvent is evaporated and a dry film of coating material is generated.

### 0.2 Fire hazards

**0.2.1** Fire hazards can be caused by paint and varnish deposits inside the spray booth, exhaust air ducts and filters. During operation, malfunctions or electrical faults may cause ignition of these residues. This is especially true for spray booths where electrostatic coating takes place. The fast propagation of the fire leads to hazards also in adjacent areas.

**0.2.2** Particular attention shall be paid to the prevention of electrostatic charges on different surfaces, which are in the vicinity of the spray cloud. This could apply to workpieces during the coating process or the reciprocating devices and the mounting parts of the spraying system, etc.

**0.2.3** When spraying non-ignitable coating material, the formation of an explosive atmosphere is not likely to occur. Electrostatic application equipment for ignitable liquid coating materials and hard to ignite coating materials are covered by EN 50176.

### 0.3 Electric hazards

**0.3.1** Electric shock (by direct or indirect contact) can be generated, for instance, by contact with

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

**0.3.2** Inadequate grounding may occur, for instance, due to

- faulty connections to the protective grounding system,
- a too high resistance to ground (requirement as in 5.6).

**0.3.3** Hazards could occur, for instance, if hazardous malfunctions (e.g. short-circuit of electronic safety circuits, of access guards to dangerous areas or of warning devices) occur due to interferences of the high voltage equipment and the components of the control and safety systems.

**0.3.4** Hazardous electrostatic discharges could be generated, for instance, by non-grounded conductive components or by large insulating surfaces, especially if they are backed with conductive material.

## 1 Scope

**1.1** This European Standard specifies the requirements for stationary electrostatic application equipment for non-ignitable liquid coating materials which do not generate an explosive atmosphere inside the spraying area. A distinction is made between spraying systems corresponding to EN 50050 and spraying systems designed for higher discharge energies and/or currents.

This European Standard also specifies the design-related requirements for a safe operation of the stationary equipment, including its electrical installations.

**1.2** This European Standard considers two types of electrostatic spraying systems, see 5.1 for more details.

**1.3** Noise has not been dealt with in this standard as it is not considered to be a significant hazard of stationary electrostatic application equipment for non-ignitable liquid coating material. For any other health protection, see EN 12215:2004, 5.5. For fire prevention and protection (e. g. fire hazards due to other sources), see also EN 12215:2004, 5.7.1.

This European Standard deals with all significant hazards, hazardous situations and events, which are relevant for stationary electrostatic application equipment for non-ignitable liquid coating and cleaning materials which do not generate an explosive atmosphere inside the spraying area, provided they are used as intended by the manufacturer.

## 2 Normative references

The following referenced documents are indispensable for the application 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 1081:1998, *Resilient floor coverings - Determination of the electrical resistance*

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

EN 12215:2004, *Coating plants - Spray booths for application of organic liquid coating materials - Safety requirements*

EN 14462, *Surface treatment equipment - Noise test code for surface treatment equipment including its ancillary handling equipment - Accuracy grades 2 and 3*

EN 50059:1990, *Specification for electrostatic hand-held spraying equipment for non-flammable material for painting and finishing*

EN 50176, *Automatic electrostatic spraying installations for flammable liquid spraying material*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* (IEC 60204-1:2005, mod.)

EN 60529, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529)

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

EN 61508-3, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements* (IEC 61508-3)

EN 62061:2005, *Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems* (IEC 62061:2005)

EN ISO 11688-1:1998, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning* (ISO/TR 11688-1:1995)

EN ISO 12100-1:2003, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology* (ISO 12100-1:2003)

EN ISO 12100-2:2003, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles* (ISO 12100-2:2003)

EN ISO 13849-1:2008, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design* (ISO 13849-1:2006)

EN ISO 20344:2004, *Personal protective equipment - Test methods for footwear* (ISO 20344:2004)

### 3 Definitions

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

#### 3.1

##### **stationary electrostatic application equipment for non-ignitable liquid coating material**

equipment in which the electrostatic spraying system is either fixed stationary (e. g. on supports) and is operated automatically or is guided by reciprocators (e. g. robots).

In general, the equipment comprises the following:

- spray booth;
- spraying area;
- spraying system;
- fixtures for workpieces;
- conveyors;
- grounding system;
- forced ventilation

#### 3.2

##### **spraying system**

devices for application of liquid coating material by means of electrostatic charge.

In general, the spraying system consists of the following components:

- device for the supply of coating material;
- high voltage electrode;
- high voltage supply system;
- spraying device

#### 3.3

##### **high voltage supply system**

system consisting generally of the following components:

- low voltage section with devices for switching on and off the unit 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