BS EN 50050-3:2013

BSI Standards Publication

Electrostatic hand-held spraying equipment — Safety requirements -

Part 3: Hand-held spraying equipment for ignitable flock

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National foreword

This British Standard is the UK implementation of EN 50050-3:2013. Together with BS EN 50050-1:2013 and BS EN 50050-2:2013 it supersedes BS EN 50050:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EXL/31/-/1, Electrostatic spray guns.

A list of organizations represented on this committee can be obtained on request to its secretary.

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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 document (EN 50050-3:2013) has been prepared by SC 31-8, "Electrostatic painting and finishing equipment", of CLC/TC 31, "Electrical apparatus for potentially explosive atmospheres".

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) 2014-10-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-10-14

In combination with EN 50050-1:2013 and EN 50050-2:2013, this document supersedes EN 50050:2006.

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

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0 Introduction

0.1 Process

In the process of electrostatic flock application, flock particles are transported from a reservoir to an applicator either by gravitational forces or within an air stream. As the flock particles are passing the applicator, they are electrostatically charged and developed by means of a high voltage of some tens of kilovolts and ejected in the form of a cloud which is directed towards the workpiece. The flock particles of the cloud are attracted by the earthed workpiece and enclosed from a before served adhesive layer. They stick in this adhesive layer until the adhesive is set at room temperature or by heating.

Flock particles not deposited on the workpiece (overspray) are removed by the exhaust ventilation system, by brushes or other devices into the flock recovery system.

0.2 Explosion hazards

0.2.1 An explosion can occur, if

— the concentration of flock particles in air is within the explosion limits,

— contamination by adhesives (in a cured condition most of the adhesives are insulating), and

— an ignition source of appropriate energy for this explosive atmosphere

is present.

Ignition sources could be, for instance, a hot surface, a naked flame, an electric arc or a spark.

An explosion could be prevented, if at least one condition is avoided. Because it is very difficult to exclude the possibility of ignitable discharges completely, the main focus should be the prevention of ignitable concentrations of flock in air.

0.2.2 Deflagration of explosive atmospheres is only possible within a given range of concentration, but not, if the concentration is above or below this range.

NOTE If an explosive cloud of flock and air is trapped into a closed room, an explosion can lead to a fatal increase of pressure.

0.2.3 It is important that deposits of flock are not allowed to accumulate within the spraying areas for they may be whirled up and give rise to an explosive atmosphere. This does not apply to deposits on filter devices and accumulations of flock in reservoirs where filters and reservoirs are integrated in the spraying area and are designed to collect the flock.

0.2.4 Particular attention should be paid to the prevention of electrostatic charges on different surfaces located in the vicinity of the flock cloud. This could apply to e.g. workpieces during the coating process.

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 connected to dangerous voltage during normal operation, but only in case of failure,
- insulated live parts with insufficient or damaged insulation due to external impact.

0.3.2 Inadequate earthing may occur, for instance, due to

- faulty connections to the protective earthing system,
- a too high resistance to earth (e. g. contamination by flock).

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0.3.3 Hazards could occur, for instance, if hazardous malfunctions (e.g. shortcut of electronic safety circuits) 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-earthed conductive components or by large insulating surfaces, especially if they are backed with conductive material.

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1 Scope

1.1 This European Standard specifies the requirements for hand-held or hand-operated electrostatic spraying equipment for ignitable flock within a temperature range from 5 °C to 40 °C to be used in explosive atmospheres generated by their own spray cloud.

This European Standard deals with all electrical hazards significant for the electrostatic spraying of flock, which could also contain small quantities of added metal particles, if the work is carried out under conditions recommended by the manufacturer. In particular, this includes ignition hazards resulting from the generated explosive atmosphere. This European Standard specifies the design-related and test requirements for electrostatic spraying equipment of type A-F and type B-F according to Table 1 of EN 50223:2010.

1.2 Electrostatic applicators are considered to be equipment of group II, category 3D for use in potentially explosive areas of zone 22. All other parts of hand-held electrostatic spraying equipment are considered to be equipment of category 3D if they are installed or used in potentially explosive areas of zone 22.

NOTE 1 Solvent vapours which could be evaporated by workpieces coated with adhesives do not lead to a zone 2 in the flocking area.

1.3 In addition to the requirements above, the requirements of EN 1953 applies with regard to all other significant hazards relevant for applicators (e.g. health hazards, inadequate ergonomics).

1.4 This European Standard does not apply to

— zone classification of the areas in and around spray booths [see EN 50223],

— zone classification of other areas with potentially explosive atmosphere [see EN 60079-10-2],

— selection, erection and application of other electrical and non-electrical equipment in areas with explosion hazard [see EN 60079-14 and EN 50223],

— cleaning of spraying areas, see instruction manual of the spray booth,

— fire prevention and protection, for instance fire hazards due to other sources [see EN 50223],

— explosion protection systems [see EN 50223],

— dust hazards [see EN 12981].

NOTE 2 Noise is not considered to be a significant hazard for hand-held spraying equipment for ignitable flock.

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1953	*Atomising and spraying equipment for coating materials – Safety requirements*
EN 1149-5	*Protective clothing – Electrostatic properties – Part 5: Performance requirements*
EN 12981	*Coating plants – Spray booths for application of organic powder coating material – Safety requirements*
EN 50223:2010	*Stationary electrostatic application equipment for ignitable flock material – Safety requirements*
EN 60079-7:2007	*Explosive atmospheres – Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2006)*
EN 60204-1	*Safety of machinery – Electrical equipment of machines – Part 1: General requirements (IEC 60204-1)*
EN 60529	*Degrees of protection provided by enclosures (IP code) (IEC 60529)*
EN 61340-4-1	*Electrostatics – Part 4-1: Standard test methods for specific applications – Electrical resistance of floor coverings and installed floors (IEC 61340-4-1)*
EN 62061	*Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061)*
EN ISO 12100	*Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100)*
EN ISO 13849-1	*Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1)*
EN ISO 20344	*Personal protective equipment – Test methods for footwear (ISO 20344)*

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