Irish Standard
I.S. EN 50050-2:2013

Electrostatic hand-held spraying equipment - Safety requirements -- Part 2: Hand-held spraying equipment for ignitable coating powder

I.S. EN 50050-2:2013

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Elektrostatische Handsprüheinrichtungen - Sicherheitsanforderungen - Teil 2: Handsprüheinrichtungen für entzündbares Beschichtungspulver

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

This document (EN 50050-2:2013) 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
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In combination with EN 50050-1:2013 and EN 50050-3:2013, 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.

0 Introduction

0.1 Process

During the electrostatic coating process the coating powder is transported in an air stream, or by air, from a powder hopper or other container, up to an applicator. As the powder particles are passing the applicator they are electrostatically charged by means of a high voltage in the range of some tens of kilovolts or triboelectrically and ejected in the form of a cloud which is directed towards the workpiece. The charged powder particles of the cloud are attracted by and applied to the earthed workpiece.

Powder, that is not applied to the workpiece (overspray) is removed by a exhaust ventilation system or other means and transported into the powder recovery unit.

After the coating process the workpieces are introduced into an oven where the powder is melted and cured into a coherent coating.

0.2 Explosion hazards

0.2.1 An explosion can occur, if

— the concentration of coating powder in air is above the lower explosion limit,

— an ignition source of appropriate energy for this coating powder cloud 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 coating powder in air.

0.2.2 Deflagration of explosive atmospheres is only possible within a given range of concentration above the lower explosion limit.

NOTE 1 If an explosive cloud of coating powder and air is trapped into a closed room, an explosion can lead to a fatal increase of pressure.

NOTE 2 The particle size distribution of coating powder is usually in the range of 5 μm to 120 μm.

NOTE 3 Coating powder in air is not evenly distributed inside a given volume, therefore it is possible that a part of the mixture is within the ignitable concentration range. An upper limit is safety-related not applicable.

0.2.3 It is important that deposits of powder 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 coating powder in hoppers where filters and hoppers are integrated in the spraying area and are designed to collect the coating powder. See 4.6 of EN 12981:2005.

0.2.4 Particular attention should be paid to the prevention of electrostatic charges on different surfaces located in the vicinity of the powder cloud. This could apply to e.g. workpieces during the coating process. Grounding is very critical to the prevention of electrostatic charge to any conductive objects in the spray area.

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 coating powder).

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.

1 Scope

1.1 This European Standard specifies the requirements for hand-held or hand-operated electrostatic spraying equipment for ignitable coating powders 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 coating powders, 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-P according to Table 1 of EN 50177:2009.

1.2 With regard to explosion protection and prevention measures, this standard also applies to ionisators with corona charging. Ionisators used together with or under similar conditions as electrostatic spraying equipment for ignitable coating powders are considered to be equipment of group II, category 2D for use in potentially explosive areas of zone 21 or 22. All other parts of ionisators are considered to be equipment of category 3D if they are installed or used in potentially explosive areas of zone 22, see Annex D.

1.3 Electrostatic applicators are considered to be equipment of group II, category 2D for use in potentially explosive areas of zone 21 or 22, which have been generated by the equipment itself. 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.

1.4 All other significant hazards relevant for applicators (e.g. ejection of powder, mechanical strength, electrical hazards (apart from the electrostatic hazards)), noise, explosion, contract with or inhalation of dangerous substances, ergonomics) are covered by EN 1953.

1.5 This European Standard also gives details regarding quality assurance systems for electrostatic spraying equipment, see Annex C.

1.6 Additional requirements may be applicable to equipment designed for use in food and pharmaceutical industry.

1.7 This European Standard does not apply to

— zone classification of the areas in and around spray booths [see EN 12981],

— 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 12981],

— 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 12981],

— dust hazards [see EN 12981].