
Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - Part 2: Hand held electrostatic powder spray guns with an energy limit of 5 mJ and their associated apparatus

Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials -- Part 2: Hand-held electrostatic powder spray guns with an energy limit of 5 mJ and their associated apparatus

Bestimmungen für die Auswahl, Errichtung und Anwendung elektrostatischer Sprühanlagen für brennbare Sprühstoffe -- Teil 2: Elektrostatische Handsprüheinrichtungen für Pulver mit einer Energiegrenze von 5 mJ sowie Zubehör

[SIST EN 50053-2:1996](https://standards.iteh.ai/catalog/standards/sist/aae97131-f91-4b61-a60c-1e30b01a1a01/sist-en-50053-2-1996)

Règles de sélection, d'installation et d'utilisation d'un équipement de projection électrostatique pour produits inflammables -- Partie 2: Pistolets manuels de projection électrostatique de poudre avec une énergie limite de 5 mJ et leur matériel associé

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ENGLISH VERSION

REQUIREMENTS FOR THE SELECTION, INSTALLATION AND USE OF ELECTROSTATIC SPRAYING EQUIPMENT FOR FLAMMABLE MATERIALS
PART 2: HAND-HELD ELECTROSTATIC POWDER SPRAY GUNS WITH AN ENERGY LIMIT OF 5 mJ AND THEIR ASSOCIATED APPARATUS

Règles de sélection, d'installation et d'utilisation d'un équipement de projection électrostatique pour produits inflammables
Deuxième partie: Pistolets manuels de projection électrostatique de poudre avec une énergie limite de 5 mJ et leur matériel associé

Bestimmungen für die Auswahl, Errichtung und Anwendung elektrostatischer Sprühanlagen für brennbare Sprühstoffe
Teil 2: Elektrostatische Handsprüheinrichtungen für Pulver mit einer Energiegrenze von 5 mJ sowie Zubehör

This European Standard was ratified by CENELEC on 7 March 1989. CENELEC members are bound to comply with the requirements of the CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue Bréderode 2, B-1000 Brussels

EN 50 053-2

Foreword

The European Standard EN 50 053 is published in three parts:

Part 1 : Hand-held electrostatic paint spray guns with an energy limit of 0,24 mJ and their associated apparatus.

Part 2 : Hand-held electrostatic powder spray guns with an energy limit of 5 mJ and their associated apparatus.

Part 3 : Hand-held electrostatic flock guns with an energy limit of 0,24 mJ or 5 mJ and their associated apparatus.

The reason for the publication in three parts is to draw to the attention of the user the particular requirements relevant to the chosen spraying material.

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TECHNICAL TEXT

The text of the European Standard 50 053-2 was approved by all CENELEC members on 7 March 1989.

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CENELEC Harmonization Document referred to in European Standard EN 50 053 part 2 :

CENELEC HD 365 S3 Classification of degrees of protection provided by enclosures (IEC 529 (1976) and amendments 1 and 2).

ISO Publication referred to in European Standard EN 50 053 part 2 :

ISO 2251 (1975) Lined antistatic rubber footwear.

European Standards referred to in European Standard EN 50 053 part 2 :

EN 50 014 (1977) (1st edition) Electrical apparatus for potentially explosive atmospheres - General requirements (including amendment 1 (July 1979), amendment 2 (June 1982), amendment 3 (December 1982), amendment 4 (December 1982) and amendment 5 (February 1986)).

EN 50 050 (1986) (1st edition) Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment.

<https://standards.iteh.ai/catalog/standards/sist/aae97131-f91-4b61-a60c-4c4c056d1cd3/sist-en-50053-2-1996>

This European Standard has been prepared by CENELEC Sub-Committee 31-8.

1. Introduction

1.1 Process

In the process of electrostatic powder coating the powder is transported in an air stream from a powder hopper up to an electrostatic spraying device. As the powder particles flow through the spraying device they are electrostatically charged by means of a high voltage of the order of tens of kilovolts provided by a high voltage generator. They are attracted to and deposited on the earthed workpiece. The powder will continue to be deposited on the earthed workpiece until, at a certain thickness, it acts as an insulator and prevents further deposition of powder. Powder that is not deposited on the workpiece (overspray) is extracted by the ventilation system or other means into the powder recovery equipment. The workpieces coated with powder are then passed into an oven where the powder is melted and cured into a coherent coating.

1.2 Special hazard

A flammable coating powder¹⁾ explosion may occur where both :

- the concentration of coating powder in air is between the upper and lower limits of an explosive atmosphere, and
- a source of ignition of sufficient energy for that coating powder cloud is present. This ignition source can be for example a hot surface, a naked flame, an electrical arc or spark.

It follows that an explosion can be prevented if one or preferably both of these conditions are avoided. Due to the difficulty in totally eliminating sources of ignition most reliance should be placed on avoiding explosive atmospheres of powder.

1.2.1 Although an intimate mixture of flammable coating powder and air may burn with explosive violence not all mixtures will do so. There is a range of concentrations of coating powder in air in which the mixture can explode but mixtures above or below this range cannot.

1) Flammable coating powders will behave as combustible/flammable dusts.

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1.2.2 Typically the particle size distribution of coating powders is from 5 μm to 80 μm . Where there is doubt about or no knowledge of the Lower Explosive Limit, an average concentration of the coating powder suspended in the air of 10 g/m³ shall not be exceeded.

It is important that deposits of powder are not allowed to accumulate within the booth for they may become disturbed and give rise to an explosive atmosphere. This does not apply to deposits on filters and powder contained in the hoppers where filters and hoppers are integrated in the spray booth and are designed to collect the powder.

1.2.3 Careful attention should be given to prevent the build-up of an electrostatic charge on various surfaces close to the powder application zone. These can be the workpieces being coated, the operator himself, etc. Care shall be taken to see that these are all adequately earthed. Of special importance is the attention needed to maintain proper earthing through the jigs supporting the workpieces. These should be carefully designed to minimize deposition of powder on them.

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2. Scope

This European Standard gives requirements for the selection, installation and safe use of hand-held electrostatic spray guns with an energy limit of 5 mJ and their associated apparatus complying with EN 50 050, which may cause an explosive atmosphere when spraying flammable coating powders.

This European Standard considers only the hazards that are specific to the electrostatic characteristics of the electrostatic spraying process when the operator stands outside the booth when spraying.

For other aspects, such as

- classification of hazardous areas (for example classification into zones),
- selection, installation and use of electrical equipment in hazardous areas,
- health hazards (for example toxic and skin effects, electric shock),
- cleaning of powder spraying areas,
- fire hazard from external sources,
- storage and handling of flammable materials,
- explosion protection systems (see note in 5.3.3)

national regulations apply.

3. Definitions

For this European Standard the following definitions apply :

3.1 Antistatic footwear

Footwear that has a resistance to earth, via the sole, which is low enough to prevent the build-up of electrostatic charges.

3.2 Antistatic gloves

Gloves that have a resistance low enough to prevent the build-up of electrostatic charges.

3.3 Antistatic floor

A floor that has a resistance to earth which is low enough to prevent the build-up of electrostatic charges.

3.4 Explosive atmosphere [SIST EN 50053-2:1996](https://standards.iteh.ai/catalog/standards/sist/aae97131-f91-4b61-a60c-4e4056d1-43/sist-en-50053-2-1996)

A mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapour, mist, powder or flock, in such proportions that it can be exploded by excessive temperature, arcs or sparks (the danger is a real one).

3.5 Average concentration of powder in air

The quantity of powder emitted by the spray guns divided by the volume of air extracted by the ventilation system in the same period of time.

3.6 Lower explosive limit (LEL)

The concentration of flammable coating powder in air below which an explosive atmosphere will not be formed.

3.7 Hazardous area

An area in which an explosive atmosphere is or may be expected to be present in quantities such as to require special precautions for the construction, installation and use of electrical apparatus.