

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

BS EN 50050-1:2013



BSI Standards Publication

Electrostatic hand-held spraying equipment — Safety requirements -

Part 1: Hand-held spraying equipment for
ignitable liquid coating materials

bsi.

...making excellence a habit.™

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

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 Together with BS EN 50050-2:2013 and BS EN 50050-3:2013 it supersedes BS EN 50050:2006 which is withdrawn.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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2014.
Published by BSI Standards Limited 2014

ISBN 978 0 580 75855 3
ICS 29.260.20; 87.100

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2014.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

EUROPÄISCHE NORM

November 2013

ICS 87.100

Supersedes EN 50050:2006 (partially)

English version

**Electrostatic hand-held spraying equipment -
Safety requirements -
Part 1: Hand-held spraying equipment for ignitable liquid coating
materials**

Équipement manuel de projection
électrostatique - Exigences de sécurité -
Partie 1 : Équipement manuel de
projection de liquides de revêtement
inflammable

Elektrostatische Handsprüheinrichtungen -
Sicherheitsanforderungen -
Teil 1: Handsprüheinrichtungen für
entzündbare flüssige Beschichtungsstoffe

This European Standard was approved by CENELEC on 2013-10-14. 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 CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	3
0 Introduction.....	5
0.1 Process.....	5
0.2 Explosion hazards.....	5
0.3 Electric hazards.....	5
1 Scope.....	6
2 Normative references.....	7
3 Terms and definitions.....	8
4 Requirements for hand-held spraying equipment for ignitable liquid coating materials.....	10
4.1 General requirements.....	10
4.2 Requirements for the accessories.....	11
5 Tests.....	12
5.1 General.....	12
5.2 General tests.....	12
5.3 Conditioning test.....	13
5.4 Tests for electrical safety.....	13
5.5 Ignition test.....	14
5.6 Tests of the accessories.....	14
6 Information for use.....	15
6.1 General.....	15
6.2 Instruction manual.....	15
6.3 Marking of electrostatic hand-held spraying equipment and associated control devices.....	17
Annex A (normative) Test for ignition protection using a shunt and an oscilloscope.....	20
Annex B (normative) Ignition test within the gas mixture.....	21
B.1 General.....	21
B.2 Preparations.....	21
B.3 Preliminary test.....	21
B.4 Test.....	22
B.5 Result.....	22
Annex C (informative) Quality assurance systems for electrostatic spraying equipment.....	23
C.1 General.....	23
C.2 Electrical assembly.....	23
C.3 Mechanical assembly.....	24
C.4 Tests.....	24
Annex D (normative) Requirements for explosion protection and prevention for ionisators.....	25
Annex E (informative) Ignitability of water-based paints.....	26
E.1 General.....	26
E.2 Non-ignitable.....	26
E.3 Hard to ignite.....	26
E.4 Ignitable.....	26
Annex ZY (informative) Significant changes between this European Standard and EN 50050:2006.....	27
Annex ZZ (informative) Coverage of Essential Requirements of EU Directives.....	29
Bibliography.....	30
Figure	
Figure B.1 — Example of a test arrangement.....	21
Tables	

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

This document (EN 50050-1:2013) 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 50050-2:2013 and EN 50050-3:2013, this document supersedes EN 50050:2006.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

0.1 Process

During the electrostatic coating process the liquid coating material is transported to an applicator where it is atomised and 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 earthed workpiece.

Droplets, which are not applied to the workpiece (overspray) are removed by a suction device or by other means.

After the coating process the coated workpieces are introduced into a dryer where the solvent is evaporated and a dry film of coating material is generated.

0.2 Explosion hazards

0.2.1 An explosion could occur, if

- the concentration of sprayed ignitable liquid coating material in air is within the explosion limits,
- 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 an explosive atmosphere.

0.2.2 An explosive atmosphere can only explode within a given range of concentration, but not, if the concentration is above or below this range.

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

0.2.3 Particular attention should be paid to the prevention of electrostatic charges on different surfaces located in the vicinity of the spraying cloud. This could apply to e.g. workpieces during the coating process. Grounding is 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 materials).

0.3.3 Hazards could occur, for instance, if hazardous malfunctions (e.g. shortcut of electronic safety circuits) occur due to interferences of the electrostatic 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.

This is a preview of "BS EN 50050-1:2013". [Click here to purchase the full version from the ANSI store.](#)

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

This European Standard deals with all hazards significant for the electrostatic spraying of liquid coating materials, 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-L according to Table 1 of EN 50176:2009.

1.2 With regard to explosion protection and prevention measures, this European Standard also applies to ionisators with high voltage corona charging. Ionisators in conformity with EN 50050-1 provide equipment category 2G. Parts of ionisators, which are intended to be used or installed in Zone 2, provide equipment category 3G in conformity with EN 50050-1:2013, see Annex D.

1.3 Electrostatic applicators are considered to be equipment of group II, category 2G for use in potentially explosive areas of zone 1 or 2, which have been generated by the equipment itself. All other parts of hand-held electrostatic spraying equipment are considered to be equipment of category 3G if they are installed or used in potentially explosive areas of zone 2.

1.4 All other significant hazards relevant for applicators (e.g. ejection of fluids, mechanical strength, electrical hazards (apart from the electrostatic hazards), noise, explosion, contact 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 12215],
- zone classification of other areas with potentially explosive atmosphere [see EN 60079-10-1],
- selection, erection and application of other electrical and non-electrical equipment in areas with explosion hazard [see EN 60079-14 and EN 12215],
- 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 12215],
- requirements for machinery for the supply and recirculation of coating material under pressure [see EN 12621].

1.8 When processing coating materials having specific electrical properties (conductivity, resistivity) the function of the hand-held spraying equipment to charge coating materials electrostatically may be affected as a result of a voltage drop at the charging electrode.