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Interested committees:

Title: Draft BS EN IEC 62561-2 Lightning protection system components (LPSC). Part 2: Requirements for conductors and earth electrodes.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



81/649/CD

COMMITTEE DRAFT (CD)

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SECRETARIAT:

Italy

SECRETARY:

Mrs Marina Bernardi

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 64, TC 88

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

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TITLE:

Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –**Part 2: Requirements for conductors and earth electrodes****FOREWORD**

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International Standard IEC 62561-2 has been prepared by subcommittee 81: Lightning protection.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition:

- a)
- b)

The text of this International Standard is based on the following documents:

FDIS	Report on voting

199
200 Full information on the voting for the approval of this International Standard can be found in
201 the report on voting indicated in the above table.

202 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

203 A list of all parts in the IEC 62561 series, published under the general title *Lightning*
204 *protection system components (LPSC)*, can be found on the IEC website

205 The committee has decided that the contents of this document will remain unchanged until the
206 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
207 the specific document. At this date, the document will be

- 208 • reconfirmed,
209 • withdrawn,
210 • replaced by a revised edition, or
211 • amended.

212 The contents of the corrigendum of August 2019 have been included in this copy.

213

214

INTRODUCTION

215 This part of IEC 62561 deals with the requirements and tests for lightning protection system
216 components (LPSC), specifically conductors and earth electrodes, used for the installation of
217 a lightning protection system (LPS) designed and implemented according to IEC 62305 (all
218 parts).

219

220

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 2: Requirements for conductors and earth electrodes

1 Scope

Part 2 of IEC 62561 specifies the requirements and tests for:

- metallic conductors (other than "natural" conductors) that form part of the air-termination and down-conductor systems,
- metallic earth electrodes that form part of the earth-termination system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60068-2-52:1996, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 62305-3, *Protection against lightning – Part 3: Physical damage to structures and life hazard*

IEC 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within structures*

IEC 62561-1, *Lightning protection system components (LPSC) – Part 1, Requirements for connection components*

ISO 2178, *Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method*

ISO 6892-1, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature*

ISO 6957:1988, *Copper alloys – Ammonia test for stress corrosion resistance*

ISO 6988:1985, *Metallic and other non-organic coatings – Sulphur dioxide test with general condensation of moisture*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1**air-termination system**

part of an external lightning protection system (LPS) intended to intercept lightning flashes

EXAMPLES: Air-termination rods, air-termination conductors and catenary wires

3.2**air-termination rod**

part of the air-termination system consisting of a metal rod for intercepting and conducting flashes to the down-conductor and earthing system of the lightning protection system (LPS)

3.3**air-termination conductor**

part of the air-termination system consisting of a conductor for intercepting and conducting flashes to the down-conductor and earthing system of the lightning protection system (LPS)

3.4**catenary wire**

part of the air-termination system consisting of an overhead wire for intercepting and conducting flashes to the down-conductor and earthing system of the lightning protection system (LPS)

3.5**down-conductor system**

part of an external LPS intended to conduct lightning current between the air-termination system and the earth-termination system

3.6**down-conductor**

part of the down-conductor system intended to conduct lightning current from the air-termination system to the earth-termination system of the LPS

3.7**earth lead-in rod**

rod installed between the down-conductor / test joint and the earth electrode intended to provide mechanical protection against accidental stresses to the down conductor system

3.8**earth-termination system**

part of an external lightning protection system, which is intended to conduct and disperse lightning current to the earth

3.9**earth electrode**

part or group of parts of the earth-termination system, which provides direct electrical contact with and disperses the lightning current to the earth

EXAMPLES: Earth conductor, earth plate and earth rod

3.10**earth conductor**

earth electrode consisting of a conductor buried in the ground

3.11**earth plate**

earth electrode consisting of a metal plate buried in the ground

3.12**earth rod**

earth electrode consisting of a metal rod driven into the ground

3.13**earth rod coupler**

part of the earth-termination system that facilitates the coupling of one section of an earth rod to another for the purpose of deep driving

3.14**earth rod driving head**

tool used in those applications where it is necessary to drive the earth rod

3.15**type test**

test required to be made before supplying a type of material covered by IEC 62561-1 on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made to the accessory materials, design or type of manufacturing process which might change the performance characteristics.

4 Requirements**4.1 General**

Conductors and earth electrodes shall be designed in such a manner that, when they are installed in accordance with the manufacturer's instructions, their performance shall be reliable, stable and safe to persons and surrounding equipment.

The choice of a material depends on its ability to match the particular application requirements such as life cycle of the material, effects from galvanic corrosion and compatibility with other interconnected materials or services.

The summaries of the requirements are given in Annex M and Annex N and their corresponding tests are given in Annex M, Annex N and the sequence of tests in Annex Q, Annex R, Annex S and Annex T.

4.2 Documentation – installation instructions

The manufacturer of the conductors and earth electrodes shall provide adequate information in their literature to ensure that the installer of the conductors and earth electrodes can select and install them in a suitable and safe manner.

Compliance is checked by review as per 5.2.2.

4.3 Marking

All products complying with this document shall be marked at least with the following:

- a) manufacturer's or responsible vendor's name or trade mark;
- b) identifying symbol (picture, product number, etc.);

c) marking shall be durable and legible.

Compliance is checked by review and test in accordance to 5.2.3.

Where this proves to be impractical the marking in accordance with a) and b) may be given on the smallest packing unit label or on the accompanying documentation.

4.4 Air-termination conductors, air-termination rods, catenary wires and down conductors

The material, configuration and cross-sectional area of the conductors and rods, shall be in accordance with Annex A. Their mechanical and electrical characteristics shall be in accordance with Annex B.

Other materials may be used if they possess equivalent mechanical and electrical characteristics and corrosion resistance properties for the intended application.

Other configurations may be used if the relevant dimensions are met.

Coated rods and conductors shall be corrosion resistant and the coating shall exhibit good adherence to the base material.

Compliance is checked by inspection and by the tests as follows:

a) For coated specimens according to 5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.2.7, 5.2.8 and 5.2.9.

b) For uncoated specimens according to 5.2.2, 5.2.3, 5.2.4, 5.2.8 and 5.2.9.

NOTE A summary of requirements for the cross-sectional area, mechanical and electrical characteristics as well as tests is given in Annex M.

4.5 Earth electrodes (earth conductors, earth plates, earth rods) and earth lead-in rods

The cross-sectional area of earth electrodes (earth conductors, earth plates, earth rods) and earth lead-in rods their material and their configuration shall be in accordance with Annex C. Moreover, their mechanical and electrical characteristics shall be in accordance with Annex B.

Earth electrodes shall be mechanically robust to ensure correct installation. The material of choice shall be sufficiently malleable to ensure that no cracking of the rod takes place during installation or after their covering in the ground.

The threads on the rods, if any, shall be smooth and fully formed. For coated rods, the coating shall extend over the threads. A lead-in chamfer or point is recommended to facilitate driving.

For electroplated steel earth electrodes such as copper coated steel conductors and rods, it is desirable to thread roll the thread profile to ensure no copper is removed from the steel.

Compliance is checked by inspection and by the tests as follows:

c) For steel copper coated specimens according to 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.3.7, 5.3.8, 5.3.9, 5.3.10 and 5.3.11 determined only for earth rods.

d) For coated specimens according to 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.7, 5.3.8, 5.3.9, 5.3.10 and 5.3.11 determined only for earth rods.

e) For uncoated specimens according to 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.9, 5.3.10, and 5.3.11 determined only for earth rods.

NOTE A summary of the requirements for dimensions, mechanical and electrical characteristics as well as tests is given in Annex N.

4.6 Couplers for earth rods

Earth rods can be extended allowing them to be driven deeper into the ground. This can be achieved by means of a joint/coupling device.

The choice of material shall be compatible with that of the earth rod being joined.

It shall be sufficiently mechanically robust to withstand the driving forces generated during installation.

It shall also exhibit good corrosion resistance.

Threaded externally couplers shall be of a sufficient length to ensure no threads on the earth rod are exposed when installed.

Threaded internally couplers shall ensure that the mating faces of the earth rods come in contact after assembly.

It shall have sufficient lightning current carrying capability. According to the ability to withstand lightning current couplers for earth rods are classified:

a) class H for heavy duty;

b) class N for normal duty.

The selection of class H and N should be performed by the manufacturer in accordance with the test parameter identified in Table 1 of Annex J.

Compliance is checked by the tests of 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.7 and 5.4.8.

NOTE A summary of the requirements for dimensions, mechanical and electrical characteristics as well as tests is given in Annex N.

5 Tests

5.1 General conditions for tests

a) Tests according to this document are type tests (see 3.15).

b) Unless otherwise specified, all tests are carried out on new specimens.

c) Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met.

d) Unless otherwise specified, tests are carried out with the specimens assembled and installed as in normal use according to the manufacturer's or supplier's installation instructions.

e) All tests are carried out on new specimens or otherwise specified.

f) Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met.

g) If only one of the specimens does not satisfy a test, due to an assembly or a manufacturing fault, that test and any preceding one which may have influenced the results of the test shall be repeated and also the tests that follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.

NOTE The applicant, when submitting the set of specimens, may also submit an additional set of specimens, which may be necessary should one specimen fail. The testing laboratory will then, without further request, test the additional set of specimens and will reject it only if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.

5.2 Air termination conductors, air-termination rods, catenary wires and down conductors

5.2.1 General

Air-termination conductors, air-termination rods and catenary wires, shall be subjected to the following tests to confirm their suitability for the intended application.

Air-termination conductors, air-termination rods, catenary wires and down conductors shall be subjected to the tests according to Annex Q.

5.2.2 Documentation / installation instructions

5.2.2.1 General conditions for tests

The content of documentation / installation instructions are checked as per their completeness by review as per Annex L.

5.2.2.2 Acceptance criteria

Documentation / installation instructions are deemed to have passed the test if they contain guidance's for the safe use and selection of the components and their proper installation in accordance with IEC 62305-3 and Annex L.3.

5.2.3 Marking

5.2.3.1 General conditions for tests

Three specimens shall be subjected to inspection for the content and test for the durability / legibility of the marking as per Annex K.

5.2.3.2 Acceptance criteria

Marking is deemed to have passed the test if it is comply with Annex K.3.

5.2.4 Material, configuration and cross-sectional area test

5.2.4.1 General conditions for tests

Three specimens shall be subjected to the following inspections and calculation:

- a) The manufacturer or the supplier shall provide proof of the specimens' material;
- b) configuration and dimensions of the specimens shall be defined by review or / and drawing submitted by the manufacturer or supplier;
- c) cross sectional area of the specimen shall be calculated by the test laboratory.

5.2.4.2 Acceptance criteria

The specimens are deemed to have passed the tests if the manufacturer or the supplier:

- a) Has provided proof of the specimens' material;
- b) the submitted specimens' configuration comply with the configurations and dimensions of Annex A;
- c) calculated by the test laboratory cross sectional area comply with the requirements of Annex A.