

# INTERNATIONAL STANDARD

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

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## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Requirements .....	9
4.1 General.....	9
4.2 Documentation .....	9
4.3 Air termination conductors, air termination rods, earth lead-in rods and down conductors .....	9
4.4 Earth electrodes .....	11
4.4.1 General .....	11
4.4.2 Earth rods .....	11
4.4.3 Joints for earth rods.....	11
4.4.4 Earth conductors and plates .....	12
4.5 Marking.....	12
5 Tests.....	15
5.1 General conditions for tests.....	15
5.2 Conductors, air termination rods and earth lead-in rods.....	15
5.2.1 General .....	15
5.2.2 Tests for thickness coating on conductors .....	15
5.2.3 Bend and adhesion test for coated conductors .....	15
5.2.4 Environmental test.....	16
5.2.5 Tensile tests.....	16
5.2.6 Electrical resistivity test.....	16
5.3 Earth rods .....	17
5.3.1 General.....	17
5.3.2 Tests for thickness coating on earth rods.....	17
5.3.3 Adhesion test .....	18
5.3.4 Bend test.....	18
5.3.5 Environmental test.....	19
5.3.6 Tensile strength tests .....	19
5.3.7 Test for yield/tensile ratio .....	19
5.3.8 Electrical resistivity test.....	20
5.4 Joints for earth rods .....	21
5.4.1 General .....	21
5.4.2 Compression tests by mechanical means .....	21
5.4.3 Environmental – Electrical tests.....	22
5.5 Marking test .....	23
5.5.1 General conditions for tests.....	23
5.5.2 Acceptance criteria.....	23
6 Electromagnetic compatibility (EMC) .....	23
7 Structure and content of the test report .....	23
7.1 General.....	23
7.2 Report identification .....	24
7.3 Specimen description .....	24

7.4	Conductor .....	24
7.5	Standards and references .....	24
7.6	Test procedure .....	24
7.7	Testing equipment, description .....	24
7.8	Measuring instruments description .....	24
7.9	Results and parameters recorded .....	25
7.10	Statement of pass/fail .....	25
Annex A	(normative) Environmental test for conductors, air termination rods and earth lead-in rods .....	26
Annex B	(normative) Requirements for the cross sectional area, mechanical and electrical characteristics, tests to be applied .....	27
Annex C	(normative) Requirements for dimensions, mechanical and electrical characteristics, tests to be applied .....	28
Annex D	(informative) Typical example calculation of conductor resistivity .....	29
Annex E	(informative) Typical example of calculation of the tensile strength of a coated material .....	30
Annex F	(normative) Flow chart of tests for air termination conductors, air termination rods, earth lead-in rods and down conductors .....	31
Annex G	(normative) Flow chart of tests for earth rods .....	32
Annex H	(normative) Flow chart of tests of joints for earth rods .....	33
	Bibliography .....	34
Figure 1	– Coating measurements around the circumference of the rod .....	17
Figure 2	– Typical test arrangement for adhesion test .....	18
Figure 3	– Definitions of upper yield strength $R_{eH}$ (Mpa) and tensile strength $R_m$ (Mpa) .....	20
Figure 4	– Typical test arrangement for the compression test by mechanical means .....	22
Table 1	– Material, configuration and cross sectional area of air termination conductors, air termination rods, earth lead-in rods and down conductors .....	10
Table 2	– Mechanical and electrical characteristics of air termination conductors, air termination rods, earth lead-in rods and down conductors .....	11
Table 3	– Material, configuration and cross sectional area of earth electrodes .....	13
Table 4	– Mechanical and electrical characteristics of earth electrodes .....	14
Table B.1	– Summary of requirements for various elements tested according to Table 1 and Table 2 .....	27
Table C.1	– Summary of requirements for various elements tested according to Table 3 and Table 4 .....	28

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –**

**Part 2: Requirements for conductors and earth electrodes**

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

The text of this standard is based on the following documents:

FDIS	Report on voting
81/417/FDIS	81/423/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

The content of this document is taken from the European Standard EN 50164-2.

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

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

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## INTRODUCTION

This part of IEC 62561 deals with the requirements and tests for lightning protection system components (LPSC) used for the installation of a lightning protection system (LPS) designed and implemented according to the IEC 62305 series of standards.

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## LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

### Part 2: Requirements for conductors and earth electrodes

#### 1 Scope

This part of IEC 62561 specifies the requirements and tests for:

- metallic conductors (other than “natural” conductors) that form part of the air termination system and down conductors;
- metallic earth electrodes that form part of the earth termination system.

#### 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.

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

IEC 60228, *Conductors of insulated cables*

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 1460, *Metallic coatings – Hot dip galvanized coatings on ferrous materials – Gravimetric determination of the mass per unit area*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

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

ISO 6892-1:2009, *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 purpose of this document, the following terms and definitions apply.

#### 3.1

##### **air termination system**

part of an external LPS using metallic elements such as rods, mesh conductors or catenary wires intended to intercept lightning flashes

#### 3.2

##### **air termination rod**

air termination conductor

part of the air termination system for intercepting and conducting direct lightning flashes to the structure

#### 3.3

##### **down conductor**

part of an external lightning protection system which is intended to conduct lightning current from the air termination system to the earth termination system

#### 3.4

##### **earth termination system**

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

#### 3.5

##### **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

Note 1 to entry Typical examples are earth rod, earth conductor and earth plate.

#### 3.6

##### **earth rod**

an earth electrode consisting of a metal rod driven into the ground

[IEC 60050-604:1987, 604-04-09]

#### 3.7

##### **earth conductor**

earth electrode consisting of a conductor buried in the ground

#### 3.8

##### **earth plate**

an earth electrode consisting of a metal plate buried in the ground

[IEC 60050-604:1987, 604-04-10]

#### 3.9

##### **joint for earth rod**

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

#### 3.10

##### **driving head**

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

### 3.11

#### **earth lead-in rod**

rod installed between the down conductor/test joint and the earth electrode

Note 1 to entry Earth lead-in rods are used to improve mechanical stability.

## 4 Requirements

### 4.1 General

Conductors and earth electrodes shall be so designed and constructed that in normal use their performance is reliable and without danger to persons and surrounding equipment.

The choice of a material depends on its ability to match the particular application requirements.

A summary of the requirements and their corresponding tests are given in Annex F, Annex G and Annex H.

### 4.2 Documentation

The manufacturer or supplier 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 the materials in a suitable and safe manner, in accordance with IEC 62305-3 and IEC 62305-4.

Compliance is checked by inspection.

### 4.3 Air termination conductors, air termination rods, earth lead-in rods and down conductors

The material, configuration and cross sectional area of the conductors and rods shall be in accordance with Table 1. Their mechanical and electrical characteristics shall be in accordance with Table 2.

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

Compliance is checked by the tests described in 5.2.2, 5.2.3 and 5.2.4.

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

**Table 1 – Material, configuration and cross sectional area of air termination conductors, air termination rods, earth lead-in rods and down conductors**

Material	Configuration	Cross sectional area <sup>a</sup> mm <sup>2</sup>	Recommended dimensions
Copper, Tin plated copper <sup>b</sup>	Solid tape	≥ 50	2 mm thickness
	Solid round <sup>d</sup>	≥ 50	8 mm diameter
	Stranded <sup>d, g</sup>	≥ 50	1,7 mm diameter of each strand <sup>f</sup>
	Solid round	≥ 176	15 mm diameter
Aluminium	Solid tape	≥ 70	3 mm thickness
	Solid round	≥ 50	8 mm diameter
	Stranded <sup>g</sup>	≥ 50	1,63 mm diameter of each strand
Copper coated aluminium alloy <sup>e</sup>	Solid round	≥ 50	8 mm diameter
Aluminium alloy	Solid tape	≥ 50	2,5 mm thickness
	Solid round	≥ 50	8 mm diameter
	Stranded <sup>g</sup>	≥ 50	1,7 mm diameter of each strand
	Solid round	≥ 176	15 mm diameter
Hot dipped galvanized steel	Solid tape	≥ 50	2,5 mm thickness
	Solid round	≥ 50	8 mm diameter
	Stranded <sup>g</sup>	≥ 50	1,7 mm diameter of each strand
	Solid round	≥ 176	15 mm diameter
Copper coated steel <sup>e</sup>	Solid round	≥ 50	8 mm diameter
	Solid tape	≥ 50	2,5 mm thickness
Stainless steel <sup>c</sup>	Solid tape	≥ 50	2 mm thickness
	Solid round	≥ 50	8 mm diameter
	Stranded <sup>g</sup>	≥ 70	1,7 mm diameter of each strand
	Solid round	≥ 176	15 mm diameter

NOTE For the application of the conductors, see IEC 62305-3.

<sup>a</sup> Manufacturing tolerance: –3 %.

<sup>b</sup> Hot dipped or electroplated; minimum thickness coating of 1 µm. Tin plating is for aesthetic reasons only.

<sup>c</sup> Chromium ≥ 16 %; nickel ≥ 8 %; carbon ≤ 0,08 %.

<sup>d</sup> 50 mm<sup>2</sup> (8 mm diameter) may be reduced to 25 mm<sup>2</sup> (6 mm diameter) in certain applications where mechanical strength is not an essential requirement.

<sup>e</sup> Minimum 70 µm radial copper coating of 99,9 % copper content.

<sup>f</sup> In some countries 1,14 mm diameter of each strand may be used.

<sup>g</sup> The cross sectional area of stranded conductors is determined by the resistance of the conductor according to IEC 60228.