SLOVENSKI STANDARD
SIST EN 50164-2:2008

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Nadomeġļa:
SIST EN 50164-2:2002
SIST EN 50164-2:2002/A1:2006

Elementi za zaġļito pred strelo (LPC) - 2. del: Zahteve za vodnike in ozemljila

Lightning Protection Components (LPC) - Part 2: Requirements for conductors and earth electrodes

Blitzschutzbauteile - Teil 2: Anforderungen an Leitungen und Erder

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Composants de protection contre la foudre (CPF) - Partie 2: Caractéristiques des conducteurs et des électrodes de terre

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Ta slovenski standard je istoveten z: **EN 50164-2:2008**

ICS:

91.120.40	Zaġļita pred strelo	Lightning protection

SIST EN 50164-2:2008 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50164-2

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English version

Lightning Protection Components (LPC) - Part 2: Requirements for conductors and earth electrodes

Composants de protection contre la foudre (CPF) - Partie 2: Caractéristiques des conducteurs et des électrodes de terre

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

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

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 81X, Lightning protection.

It includes the texts of EN 50164-2:2002 + A1:2006 and a draft amendment (prA2) which was submitted to the Unique Acceptance Procedure. The combined texts were approved by CENELEC as EN 50164-2 on 2008-04-01.

This European Standard supersedes EN 50164-2:2002 + A1:2006.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2009-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-04-01

EN 50164 is a family standard and consists of the following parts under the generic title *"Lightning Protection Components (LPC)":*

Part 1	Requirements for connection components
Part 2	Requirements for conductors and earth electrodes
Part 3	Requirements for isolating spark gaps
Part 4	Requirements for conductor fasteners
Part 5 [1)]	Requirements for earth electrode inspection housings and earth electrode seals
Part 6 [1)]	Requirements for lightning strike counters
Part 7	Requirements for earthing enhancing compounds

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1 Scope

This European Standard 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.

Lightning protection components (LPC) may also be suitable for use in hazardous atmospheres. Regard should then be taken of the extra requirements necessary for the components to be installed in such conditions.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 50164-1	1999	Lightning protection components (LPC) – Part 1: Requirements for connection components
EN 60068-2-52	1996	Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1996)
EN 62305-1		Protection against lightning – Part 1: General principles (IEC 62305-1)
EN 62305-3		Protection against lightning – Part 3: Physical damage to structures and life hazards (IEC 62305-3, mod.)
EN 62305-4		Protection against lightning – Part 4: Electrical and electronic systems within structures (IEC 62305-4)
EN 10002-1		Metallic materials – Tensile testing – Part 1: Method of test at ambient temperature
EN ISO 1460	1994	Metallic coatings – Hot dip galvanized coatings on ferrous materials – Gravimetric determination on the mass per unit area (ISO 1460:1992)
EN ISO 1461	1999	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods (ISO 1461:1999)
EN ISO 2178	1995	Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method (ISO 2178:1982)
EN ISO 6988	1994	Metallic and other non-organic coatings - Sulphur dioxide test with general condensation of moisture (ISO 6988:1985)
IEC 60648	1979	Method of measurement of resistivity of metallic materials

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3 Definitions

For the purpose of this standard, the following definitions apply.

3.1
air termination system
part of an external lightning protection system which is intended to intercept and conduct 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

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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

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NOTE Typical examples are earth rod, earth conductor and earth plate.

3.6
earth rod
earth electrode consisting of a metal rod driven into the ground

[IEC 60050 (604-04-06)]

3.7
earth conductor
earth electrode consisting of a conductor buried in the ground

3.8
earth plate
earth electrode consisting of a metal plate buried in the ground

[IEC 60050 (604-04-06)]

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

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3.11
earth lead-in rod
rod which is installed between the down conductor/test joint and the earth electrode

NOTE Earth lead-in rods are used to improve mechanical stability.

4 Requirements

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

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

4.1 Documentation

The manufacturer or supplier of the conductors and earth electrodes shall provide adequate information in his 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 EN 62305-3.

Compliance is checked by inspection.

4.2 Air termination conductors, air termination rods and down conductors

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

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

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

The materials given in Table 1 may be covered with a coating of either plastic material such as ultra violet stabilized polyvinyl chloride (pvc), or equivalent material, depending on its application.

NOTE 1 Requirements and tests for ultra violet stabilized materials are under consideration.

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

Compliance is checked by the test of 5.2.

NOTE 2 A summary of requirements for minimum cross sectional area, mechanical and electrical characteristics as well as tests is given in Annex B.

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

Material	Configuration	Minimum cross sectional area[a]	Comments
Copper	Solid tape	50 mm²	2 mm min. thickness
	Solid round [e]	50 mm²	8 mm diameter
	Stranded	50 mm²	1,7 mm min. diameter of each strand
	Solid round [f,g]	200 mm²	16 mm diameter
Tin plated copper [b]	Solid tape	50 mm²	2 mm min. thickness
	Solid round[e]	50 mm²	8 mm diameter
	Stranded	50 mm²	1,7 mm min. diameter of each strand
	Solid round[f,g]	200 mm²	16 mm diameter
Aluminium	Solid tape	70 mm²	3 mm min. thickness
	Solid round	50 mm²	8 mm diameter
	Stranded	50 mm²	1,7 mm min. diameter of each strand
Aluminium alloy	Solid tape	50 mm ²	2,5 mm min. thickness
	Solid round	50 mm²	8 mm diameter
	Stranded	50 mm²	1,7 mm min. diameter of each strand
	Solid round [f]	200 mm²	16 mm diameter
Galvanized steel [c]	Solid tape	50 mm²	2,5 mm min. thickness
	Solid round	50 mm²	8 mm diameter
	Stranded	50 mm²	1,7 mm min. diameter of each strand
	Solid round [f,g]	200 mm²	16 mm diameter
Stainless steel [d]	Solid tape [h]	50 mm²	2 mm min. thickness
	Solid round [h]	50 mm²	8 mm diameter
	Stranded	70 mm²	1,7 mm min. diameter of each strand
	Solid round [f,g]	200 mm²	16 mm diameter

[a] Allowable tolerance: - 3 %.

[b] Hot dipped or electroplated; minimum thickness coating of 1 micron.

[c] The coating should be smooth continuous and free from flux stains with a minimum weight of 350 g/m^2 for solid round material and 500 g/m² for solid tape material. The coating can be measured in accordance with EN ISO 1460 with a sample length of approximately 200 mm. The coating can be measured also in accordance with EN ISO 1461:1999 with a sample length of approximately 200 mm.

[d] Chromium ≥ 16 %; Nickel ≥ 8 %; Carbon ≤ 0,07 %.

[e] 50 mm² (8 mm diameter) may be reduced to 28 mm² (6 mm diameter) in certain applications where mechanical strength is not an essential requirement. Consideration should in this case, be given to reducing the spacing of the fasteners.

[f] Applicable for air termination rods only. For applications where mechanical stress such as wind loading is not critical, a 10 mm diameter, 1 m long maximum air termination rod may be used.

[g] Applicable for earth lead-in rods only.

[h] If thermal and mechanical considerations are important then these values should be increased to 78 mm² (10 mm diameter) for solid round and 75 mm² (3 mm minimum thickness) for solid tape.

[i] It is not necessary to detail any specific measuring techniques, as the dimensions of all conductors, plates, rods etc shown in the table are not critical.

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Table 2 - Mechanical and electrical characteristics of air termination conductors, air termination rods, earth lead-in rods and down conductors

Material	Configuration	Maximum electrical resistivity µΩm	Tensile strength N/mm^2	Minimum elongation %
Copper and tin plated copper	Solid	0,019	200 - 450	7
	stranded		N/A	N/A
Aluminium	solid	0,028	≤ 150	15
	stranded		N/A	N/A
Aluminium alloy	solid	0,036	120 -280	10
	stranded		N/A	N/A
Hot dip galvanized steel	solid	0,15	290 -510	7
	stranded		N/A	N/A
Stainless steel	solid	0,80	400 -730	35
	stranded		N/A	N/A
N/A=not applicable				

4.3 Earth electrodes

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The minimum cross sectional area of earth electrodes, its material and its configuration shall be in accordance with Table 3. Its mechanical and electrical characteristics shall be in accordance with Table 4.

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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.

NOTE 1 Aluminium/aluminium alloy should not be buried in the ground.

NOTE 2 A summary of requirements for minimum dimensions, mechanical and electrical characteristics as well as tests is given in Annex C.

4.3.1 Earth rods

Earth rods shall be mechanically robust to ensure correct installation. The choice of material shall be sufficiently malleable to ensure no cracking of the rod takes place during installation.

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.

NOTE For electroplated rods such as copper coated 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 test according to 5.3.

4.3.2 Joints for earth rods

Earth rods can be extended to drive 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.