

**MADALPINGELISED ELEKTRIPAIGALDISED.
OSA 5-54: ELEKTRISEADMETE VALIK JA PAIGALDAMINE.
MAANDAMINE JA KAITSEJUHID**

**Low-voltage electrical installations - Part 5-54: Selection
and erection of electrical equipment - Earthing
arrangements and protective conductors
(IEC 60364-5-54:2011 + IEC 60364-5-54:2011/A1:2021)**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-HD 60364-5-54:2011+A11+A1:2022 sisaldab Euroopa standardi HD 60364-5-54:2011 ja selle muudatuste A11:2017 ja A1:2022, ingliskeelset teksti.	This Estonian standard EVS-HD 60364-5-54:2011+A11+A1:2022 consists of the English text of the European standard HD 60364-5-54:2011 and its amendments A11:2017 and A1:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 22.07.2011, muudatused A11 11.08.2017 ja A1 25.11.2022.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 22.07.2011, for A11 11.08.2017 and A1 25.11.2022.
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ICS 29.020; 91.140.50

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English Version
**Low-voltage electrical installations - Part 5-54: Selection and
erection of electrical equipment - Earthing arrangements and
protective conductors
(IEC 60364-5-54:2011 + IEC 60364-5-54:2011/A1:2021)**

Installations électriques à basse tension - Partie 5-54: Choix
et mise en oeuvre des matériels électriques - Installations
de mise à la terre et conducteurs de protection
(CEI 60364-5-54:2011 + IEC 60364-5-54:2011/A1:2021)

Errichten von Niederspannungsanlagen - Teil 5-54:
Auswahl und Errichtung elektrischer Betriebsmittel -
Erdungsanlagen, Schutzleiter und
Schutzpotentialausgleichsleiter
(IEC 60364-5-54:2011 + IEC 60364-5-54:2011/A1:2021)

This Harmonization Document was approved by CENELEC on 2011-04-27. Amendment A1 was approved by CENELEC on 2021-05-18. Amendment A11 was approved by CENELEC on 2017-05-31. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document and its amendments at national level.

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This Harmonization Document and its Amendments A11 and A1 exist in three official versions (English, French, German).

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Foreword

The text of document 64/1755/FDIS, future edition 3 of IEC 60364-5-54, prepared by IEC TC 64, Electrical installations and protection against electric shock, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 64, Electrical installations and protection against electric shock, was submitted to the formal vote.

The combined texts were approved by CENELEC as HD 60364-5-54 on 2011-04-27.

This European Standard supersedes HD 60364-5-54:2007.

The main changes with respect to HD 60364-5-54:2007 are listed below:

- clarification of the definition of protective conductor;
- improved specification of mechanical characteristics of the earth electrode;
- introduction of earth electrode for protection against electric shock and lighting protection;
- annexes describing concrete-embedded foundation earth electrodes and soil-embedded earth electrode.

The following dates were fixed:

- | | | |
|---|-------|------------|
| – latest date by which the existence of the HD has to be announced at national level | (doa) | 2011-10-27 |
| – latest date by which the HD has to be implemented at national level by publication of an harmonized national standard or by endorsement | (dop) | 2012-04-27 |
| – latest date by which the national standards conflicting with the HD have to be withdrawn | (dow) | 2014-04-27 |

Annexes ZA, ZB and ZC have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60364-5-54:2011 was approved by CENELEC as a Harmonization Document without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60079-0	NOTE Harmonized as EN 60079-0.
IEC 60079-14	NOTE Harmonized as EN 60079-14.
IEC 60364-4-43	NOTE Harmonized as HD 60364-4-43.
IEC 60364-5-52	NOTE Harmonized as HD 60364-5-52.
IEC 60364-6	NOTE Harmonized as HD 60364-6.

IEC 60364-7-701:2006 NOTE Harmonized as HD 60364-7-701:2007 (modified).

IEC 60702-1 NOTE Harmonized as EN 60702-1.

IEC 61643-12 NOTE Harmonized as CLC/TS 61643-12.

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A11 Amendment A11 European foreword

This document (HD 60364-5-54:2011/A11:2017) has been prepared by CLC/TC 64, "Electrical installations and protection against electric shock".

The following dates are fixed:

- latest date by which this document has (dop) 2018-05-31
to be implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-05-31
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A1 Amendment A1 European foreword

The text of document 64/2479/FDIS, future IEC 60364-5-54/A1, prepared by IEC/TC 64 "Electrical installations and protection against electric shock" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as HD 60364-5-54:2011/A1:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-05-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-11-25

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In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60364-4-42 NOTE Harmonized as HD 60364-4-42



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Low-voltage electrical installations –
Part 5-54: Selection and erection of electrical equipment – Earthing
arrangements and protective conductors**

**Installations électriques à basse tension –
Partie 5-54: Choix et mise en œuvre des matériels électriques – Installations
de mise à la terre et conducteurs de protection**



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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Low-voltage electrical installations –
Part 5-54: Selection and erection of electrical equipment – Earthing
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**Installations électriques à basse tension –
Partie 5-54: Choix et mise en œuvre des matériels électriques – Installations
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CONTENTS

FOREWORD.....	4
■ ^{A1} AMENDMENT A1 FOREWORD ■ ^{A1}	6
INTRODUCTION.....	7
■ ^{A1} INTRODUCTION to Amendment 1 ■ ^{A1}	8
541 General	9
541.1 Scope.....	9
541.2 Normative references	9
541.3 Terms and definitions	10
542 Earthing arrangements	12
542.1 General requirements	12
542.2 Earth electrodes	13
542.3 Earthing conductors	16
542.4 Main earthing terminal.....	16
543 Protective conductors	16
543.1 Minimum cross-sectional areas	17
543.2 Types of protective conductors	18
543.3 Electrical continuity of protective conductors	19
543.4 PEN, PEL or PEM conductors	19
543.5 Combined protective and functional earthing conductors	22
543.6 Currents in protective earthing conductors	22
543.7 Reinforced protective earthing conductors for protective earthing conductor currents exceeding 10 mA.....	22
543.8 Arrangement of protective conductors	22
544 Protective bonding conductors	22
544.1 Protective bonding conductors for connection to the main earthing terminal	22
544.2 Protective bonding conductors for supplementary bonding	23
■ ^{A1} 545 Functional earthing and functional-equipotential-bonding for Information and communication technology equipment and systems (ICT)	23
545.1 Functional-equipotential-bonding for ICT	23
545.2 Main functional earthing terminal (MFET)	24
545.3 Equipotential bonding ring conductors ■ ^{A1}	24
Annex A (normative) Method for deriving the factor k in 543.1.2 (see also IEC 60724 and IEC 60949)	26
Annex B (informative) Example of earthing arrangements and protective conductors	30
Annex C (informative) Erection of concrete-embedded foundation earth electrodes	32
Annex D (informative) Erection of soil-embedded earth electrodes.....	35
Annex E (informative) List of notes concerning certain countries.....	39
Annex ZA (normative) Normative references to international publications with their corresponding European publications	45
Annex ZB (normative) Special national conditions.....	47
Annex ZC (informative) A-deviations	51
Bibliography.....	52

Figure 54.1 – Examples of a PEN conductor connection	21
Figure B.54.1 – Examples of earthing arrangements for foundation earth electrode, protective conductors and protective bonding conductors	31
Table 54.1 – Minimum size of commonly used earth electrodes, embedded in soil or concrete used to prevent corrosion and provide mechanical strength.....	14
Table 54.2 – Minimum cross-sectional area of protective conductors (where not calculated in accordance with 543.1.2)	17
Table A.54.1 – Value of parameters for different materials.....	26
Table A.54.2 – Values of k for insulated protective conductors not incorporated in cables and not bunched with other cables.....	27
Table A.54.3 – Values of k for bare protective conductors in contact with cable covering but not bunched with other cables	27
Table A.54.4 – Values of k for protective conductors as a core incorporated in a cable or bunched with other cables or insulated conductors	28
Table A.54.5 – Values of k for protective conductors as a metallic layer of a cable, e.g. armour, metallic sheath, concentric conductor, etc.....	29
Table A.54.6 – Values of k for bare conductors where there is no risk of damage to any neighbouring material by the temperature indicated	29
Table D.54.1 – Resistivity for types of soil	36
Table D.54.2 – Variation of the resistivity for different types of soil	36
Table ZB.54.1 – Minimum size of steel earth electrodes in soil with resistivity higher than 50 Ω	50

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors

FOREWORD

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International Standard IEC 60364-5-54 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This third edition cancels and replaces the second edition, published in 2002, and constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- clarification of the definition of protective conductor;
- improved specification of mechanical characteristics of the earth electrode;
- introduction of earth electrode for protection against electric shock and lighting protection;
- annexes describing concrete-embedded foundation earth electrodes and soil-embedded earth electrode.

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

FDIS	Report on voting
64/1755/FDIS	64/1766/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.

It has the status of a basic safety publication in accordance with IEC Guide 104.

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

The reader's attention is drawn to the fact that Annex E lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this standard.

A list of all parts in the IEC 60364 series, under the general title: *Low-voltage electrical installations*, can be found on the IEC website.

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A1 AMENDMENT A1 FOREWORD

Amendment 1 to IEC 60364-5-54:2011 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

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

Draft	Report on voting
64/2479/FDIS	64/2481/RVD

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

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INTRODUCTION

Clause numbering is sequential, preceded by the number of this Part. Numbering of figures and tables takes the number of this part followed by a sequential number, i.e. Table 54.1, 54.2, etc. Numbering of figures and tables in annexes takes the letter of the annex, followed by the number of the part, followed by a sequential number, e.g. A.54.1, A.54.2, etc.

A1 To define a clear borderline between functional earthing and protective earthing the following explanations are given:

Functional earthing

- Functional earthing

If any connection of the functional earthing is interrupted, it does not impair any kind of protection or any kind of protective measure or protective provision provided for electrical safety. Therefore, its application mainly relates to:

- communication,
- measurement, and
- EMC as regards radiated disturbances and conducted high frequency disturbances.

- Protective earthing

If any connection of the protective earthing is interrupted, it impairs the protection or the function of a protective measure or protective provision provided for electrical safety.

Requirement for protective earthing are given in:

- IEC 60364-4-41 for protection against electric shock;
- IEC 60364-4-42 for protection against thermal effects;
- IEC 60364-4-44 for protection against conducted disturbances. **A1**

A1 INTRODUCTION to Amendment 1

The main changes provided in this Amendment 1 are:

- clarification and necessary modifications to define a clear borderline between functional earthing and protective earthing (see INTRODUCTION);
- introduction of additional requirements for functional earthing and functional-equipotential-bonding for information technology systems and communication equipment (ICT). **A1**

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors

541 General

541.1 Scope

This part of IEC 60364 addresses the earthing arrangements and protective conductors including protective bonding conductors in order to satisfy the safety of the electrical installation.

A1 This document also includes requirements regarding earthing and equipotential bonding for information and communication technology (ICT) with the aim of:

- reducing the risk of electrical hazards for correct operation of these devices and the information and communication technology wiring;
- providing the telecommunication systems with a reliable signal reference plane that can improve resistance to electromagnetic interference (EMI) by reference to ISO/IEC 30129.

NOTE Examples of information and communication technology (ICT) include:

- DC supply networks (and systems) for supplying power to ICT equipment within a building;
- star-shaped private automatic branch exchanges (PABX) or their equipment;
- local area (communication) networks (LANs);
- fire and intruder alarms communication systems;
- building automation systems, e.g. direct digital control systems;
- systems for computer-aided manufacturing (CAM) and other computer-aided services;
- broadcast and communication technology. **A1**

541.2 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.

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-5-51:2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60439-2, *Low-voltage switchgear and controlgear assemblies – Part 2: Particular requirements for busbar trunking systems (busways)*

IEC 61439-1, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 61439-2, *Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies*

IEC 60724, *Short-circuit temperature limits of electric cables with rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV)*

IEC 60909-0, *Short-circuit currents in three-phase a.c. systems – Part 0: Calculation of currents*

IEC 60949, *Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects*

IEC 61140:2001, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61534-1, *Powertrack systems – Part 1: General requirements*

IEC 62305 (all parts) *Protection against lightning*

☐_{A1} IEC 62305-3:2010, *Protection against lightning – Part 3: Physical damage to structures and life hazard* ☐_{A1}

☐_{A1} IEC 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>) ☐_{A1}

541.3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61140, together with the following definitions, apply.

Definitions used for earthing arrangements, protective conductors and protective bonding conductors are illustrated in Annex B and listed below:

541.3.1

exposed-conductive-part

conductive part of equipment which can be touched and which is not normally live, but which can become live when basic insulation fails

[IEC 60050-826:2004, 826-12-10]

541.3.2

extraneous-conductive-part

conductive part not forming part of the electrical installation and liable to introduce an electric potential, generally the electric potential of a local earth

[IEC 60050-825:2004, IEC 826-12-11]

541.3.3

earth electrode

conductive part, which may be embedded in the soil or in a specific conductive medium, e.g. concrete, in electrical contact with Earth

[IEC 60050-826:2004, 826-13-05, modified]

541.3.4

concrete-embedded foundation earth electrode

earth electrode embedded in concrete of a building foundation, generally in the form of a closed loop