
Izenačevanje potencialov in ozemljevanje v zgradbah z opremo informacijske tehnologije

Application of equipotential bonding and earthing in buildings with information technology equipment

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English version

**Application of equipotential bonding and earthing
in buildings with information technology equipment**

Application de liaison équipotentielle
et de la mise à la terre dans les locaux
avec équipement de technologie de
l'information

Anwendung von Maßnahmen
für Erdung und Potentialausgleich
in Gebäuden mit Einrichtungen
der Informationstechnik

iTeh STANDARD PREVIEW

This European Standard was approved by CENELEC on 2005-09-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The first edition of this European Standard has been prepared by CENELEC/TC 215/WG 4, which was composed of experts of both CENELEC/TC 215 and ETSI/TC EE/WG EE 2 (former ETSI/STC EE 2). The second edition of this European Standard has been prepared by CENELEC/TC 215/WG 2.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50310 on 2005-09-01.

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) 2006-10-01
- latest date by which the national standards
conflicting with the EN have to be withdrawn (dow) 2008-09-01

This standard has been produced within the framework of the following considerations:

- a) With the ongoing growth of the liberalised telecommunication market, the increasing advent of private telecommunication network operators, and the flourishing use of networking computers, the amount of Information Technology equipment installed in buildings and the complexity of these Information Technology installations are permanently growing.
- b) Information Technology equipment is generally installed either as stand alone equipment (e. g. personal or network computers, small PBXs), or held in racks, cabinets or other mechanical structures (e. g. switching systems, transmission systems, mobile base stations).
- c) CENELEC/SC 64B „*Electrical installations of buildings: Protection against thermal effects*“ had decided during their meeting in November 1997 not to harmonize IEC 60364-5-548:1996 „*Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Section 548: Earthing arrangements and equipotential bonding for information technology installations*“.
- d) This European Standard shall give guidance to Network operators, equipment providers and building owners to agree on a standardised bonding configuration that facilitates:
 - compliance of the Information Technology Equipment installation with functional requirements including Electromagnetic Compatibility (EMC) aspects of emission and immunity;
 - compatible building installation and equipment provisions;
 - installation of new equipment in buildings as well as expansion or replacement of installations in existing buildings with equipment coming from different suppliers;
 - a structured installation practice;
 - simple maintenance rules;
 - contracting on a common basis;
 - harmonisation in development, manufacturing, installation and operation.

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Introduction

This standard addresses earthing and bonding of information technology equipment in buildings in relation to safety, functional and electromagnetic performance, taking into account that the draft does not specify another earthing and bonding system but selects out of the existing ones (specified in HD 384/HD 60364 series together with IEC 60364-5-548) the best suitable system to information technology needs (CBN, MESH-BN, TN-S system).

Information regarding the general principles on earthing for (small) telecommunication installations in buildings has been published in Recommendation ITU-T K.31.

Depending on the degree of complexity and the size of the information technology installation, different levels of earthing and bonding are required. Starting from basic requirements on earthing and bonding this standard defines the refinements necessary to operate information technology equipment. The underlined concepts of this standard are in harmony with EN 300253. Therefore large information technology installations in buildings, which may require special care to avoid damage or upset from electromagnetic sources can make use of the bonding configurations and earthing techniques of EN 300253.

The specifications of EN 50310 are intended to provide optimum earthing and bonding conditions for buildings, where information technology installations are to be operated. EN 50310 should be applied at least in the case of newly constructed buildings and whenever possible in existing buildings (e. g. on the occasion of refurbishment). EN 50174-2 details the considerations for satisfactory installation and operation of information technology cabling within the environment of a building operating a low-voltage electricity distribution system (up to AC 1000 V rms). EN 50174-2 therefore refers, among others, to the requirements of EN 50310.

Figure 1 and Figure 2 show the schematic and contextual relationships between the standards produced by TC 215 for information technology cabling, namely this standard on equipotential bonding and earthing requirements, the generic cabling design standards (EN 50173 series), other application dependent cabling design standards (e.g. EN 50098 series), cabling installation standards (EN 50174 series) and testing of installed cabling (EN 50346).

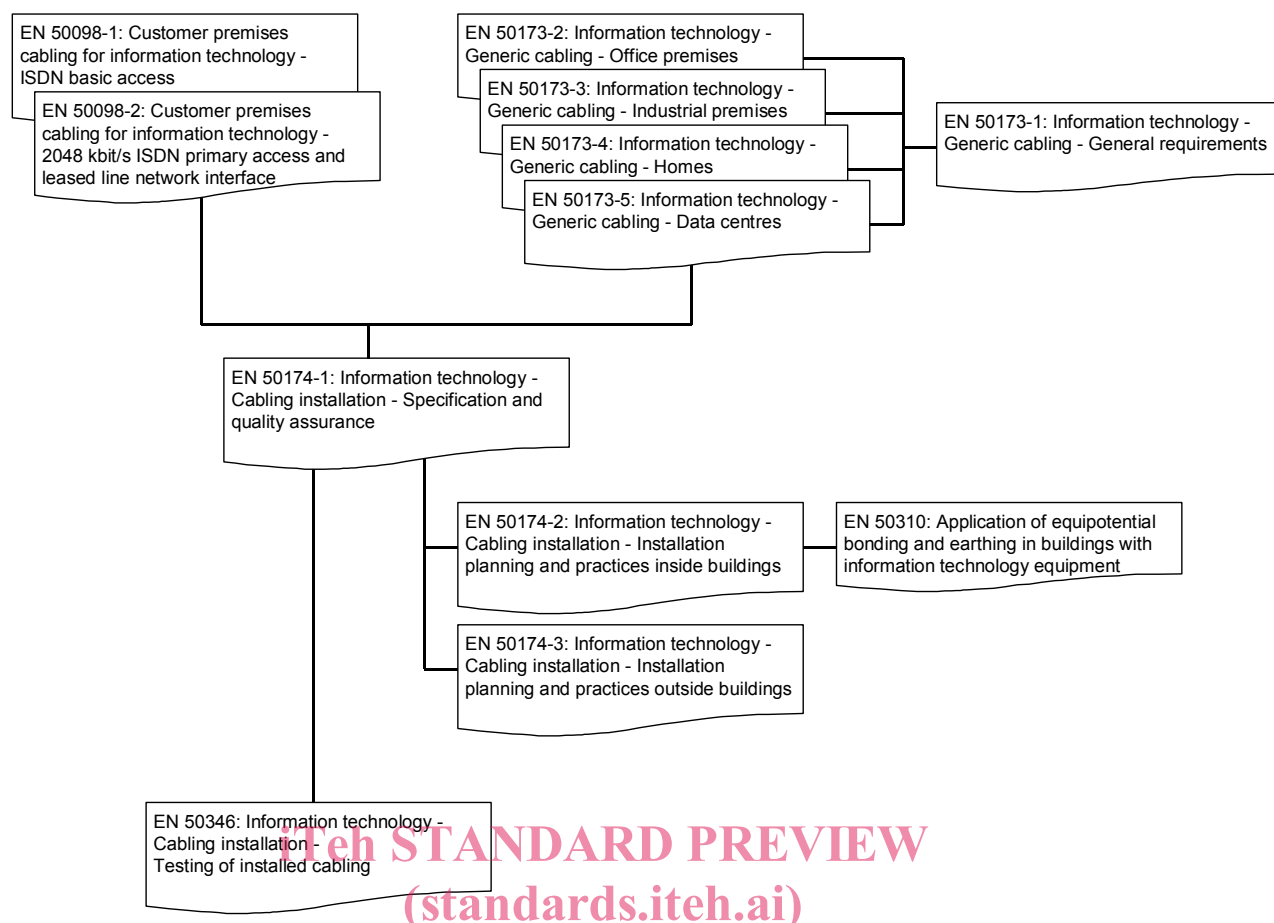


Figure 1 – Schematic relationship between EN 50310 and other standards relevant for information technology cabling systems

Building design phase	Cabling design phase	Planning phase	Implementation phase	Operation phase
EN 50310 5.2: Common bonding network (CBN) within a building 6.3: AC distribution system and bonding of the protective conductor (TN-S)	EN 50173 series except EN 50173-4 4: Structure 5: Channel performance 7: Cable requirements 8: Connecting hardware requirements 9: Requirements for cords and jumpers A: Link performance limits and EN 50173-4 4 and 5: Structure 6: Channel performance 8: Cable requirements 9: Connecting hardware requirements 10: Requirements for cords and jumpers A: Link performance limits or (and) EN 50098-1 or (and) EN 50098-2 or (and) other application standards	EN 50174-1 4: Specification considerations 5: Quality assurance 7: Cabling administration and EN 50174-2 4: Safety requirements 5: General installation practices for metallic and optical fibre cabling 6: Additional installation practice for metallic cabling 7: Additional installation practice for optical fibre cabling and EN 50174-3 See EN 50174-2 and 8: Additional installation practices for specific sites and services and (for equipotential bonding) EN 50310 5.2: Common bonding network (CBN) within a building 6.3: AC distribution system and bonding of the protective conductor (TN-S)	EN 50174-1 6: Documentation 7: Cabling administration and EN 50174-2 4: Safety requirements 5: General installation practices for metallic and optical fibre cabling 6: Additional installation practice for metallic cabling 7: Additional installation practice for optical fibre cabling See EN 50174-2 and 8: Additional installation practices for specific sites and services and (for equipotential bonding) EN 50310 5.2: Common bonding network (CBN) within a building 6.3: AC distribution system and bonding of the protective conductor (TN-S) and EN 50346 4: General requirements 5: Test parameters for balanced cabling 6: Test parameters for optical fibre cabling	EN 50174-1 5: Quality assurance 7: Cabling administration 8: Repair and maintenance

Figure 2 – Contextual relationship between EN 50310 and other standards relevant for information technology cabling systems

1 Scope

1.1 This European Standard applies to the equipotential bonding inside buildings in which information technology equipment is going to be installed. It contributes to the standardisation of information technology equipment and co-ordinates with the pre-requirements of the generic installation conditions as outlined in IEC 60364-5-548 to achieve the following targets:

- a) safety from electrical hazards;
- b) reliable signal reference within the entire information technology installation;
- c) satisfactory electromagnetic performance of the entire information technology installation.

1.2 A defined bonding configuration down to the equipment level – independent of the equipment supplier – is intended to facilitate

- the installation, operation and maintenance of information technology installations in buildings;
- the interworking between different information technology equipment (interconnected by metallic links).

The specification of information technology equipment and of the pre-requirements of installation are subject to agreement of the parties (e. g. the equipment supplier and the purchaser or building owner).

1.3 This standard applies to buildings with information technology equipment or in which the installation of information technology equipment is intended. It provides additional information for architects of buildings and for designers and installers of electrical installations of buildings on some installation concepts that limit electromagnetic influences. Basic considerations are given here to mitigate such influences that may result in disturbance. This standard does not apply to buildings which may be subject to a harsh electromagnetic environment or rooms containing the generation, transmission or termination of voltages over AC 1000 V. This standard does not address the specific requirements for telecommunication centres; these are specified in EN 300253.

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 41003, *Particular safety requirements for equipment to be connected to telecommunication networks*

EN 50083 (series), *Cable networks for television signals, sound signals and interactive services* ^{1), 2)}

EN 50174-2, *Information technology – Cabling installation – Part 2: Installation planning and practices inside buildings*

EN 50174-3, *Information technology – Cabling installation – Part 3: Installation planning and practices outside buildings*

EN 60079-14, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in hazardous areas (other than mines)* IEC 60079-14:2002)

EN 60446, *Basic and safety principles for man-machine interface, marking and identification - Identification of conductors by colours or numerals* (IEC 60446:1999)

¹⁾ Antenna systems are included in the scope of the EN 50083 series.

²⁾ EN 50083 series will be gradually transformed into EN 60728 series.

EN 60950-1, *Information technology equipment – Safety – Part 1: General requirements* (IEC 60950-1:2001, modified)

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

EN 300253, *Environmental Engineering (EE) – Earthing and bonding configuration inside telecommunication centres*

HD 384.3 S2, *Electrical installations of buildings – Part 3: Assessment of general characteristics of installations* (IEC 60364-3:1993, modified)

HD 384.4.41 S2, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 41: Protection against electric shock* (IEC 60364-4-41:1992, modified)

HD 384.5.54 S1 ³⁾, *Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Chapter 54: Earthing arrangements and protective conductors* (IEC 60364-5-54:1980, modified)

IEC 61024 (series), *Protection of structures against lightning*

IEC 61312 (series), *Protection against lightning electromagnetic impulse*

3 Definitions, abbreviations and symbols

3.1 Definitions

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

NOTE 1 The definitions with respect to earthing and bonding are taken from series IEC 60050. Furthermore, definitions specific to information technology installations given in EN 300253:2002 are used. Reference to these standards is indicated, where appropriate, in square brackets. These definitions are reproduced here to assist the reader of this standard.

NOTE 2 The concept of the various electricity distribution systems (TN-S, TN-C, TT and IT) is introduced in detail in HD 384.3 S2.

3.1.1

bonding mat

essential means to provide a SRPP by a discernible, nearly regular mesh structure

NOTE The bonding mat may be located either below or above a collection of equipment constituting a system block.

[EN 300253:2002, 3.1.2]

3.1.2

bonding network

BN (abbreviation)

set of interconnected conductive structures that provides an „electromagnetic shield“ for electronic systems and personnel at frequencies from direct current (DC) to low radio frequency (RF)

NOTE The term „electromagnetic shield“ denotes any structure used to divert, block or impede the passage of electromagnetic energy. In general, a BN need not be connected to earth but all BNs considered in the present document will have an earth connection.

[EN 300253:2002, 3.1.2]

3.1.3

bonding ring conductor

BRC (abbreviation)

an earthing bus conductor which forms a closed connected ring. Normally a BRC has multiple connections to the CBN and therefore improves its quality

³⁾ Intended to be superseded by HD 60364-5-54 (at draft stage).