



BSI Standards Publication

Information technology – Cabling installation

Part 3: Installation planning and practices outside buildings

National foreword

This British Standard is the UK implementation of EN 50174-3:2013, including amendment A1:2017. It supersedes BS EN 50174-3:2013, which is withdrawn.

The text of CENELEC amendment A1:2017 has been provided in its entirety at the beginning of this document. BSI's policy of providing consolidated content remains unchanged; however, in the interest of expediency, in this instance BSI have chosen to collate the relevant content at the beginning of this document.

The UK participation in its preparation was entrusted to Technical Committee TCT/7, Telecommunications - Installation requirements.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Amendments/corrigenda issued since publication

Date	Text affected
31 March 2018	Implementation of CENELEC amendment A1:2017

English Version

Information technology - Cabling installation - Part 3: Installation planning and practices outside buildings

Technologies de l'information - Installation de câblage -
Partie 3: Planification et pratiques d'installation à l'extérieur
des bâtiments

Informationstechnik - Installation von
Kommunikationsverkabelung - Teil 3: Installationsplanung
und Installationspraktiken im Freien

This amendment A1 modifies the European Standard EN 50174-3:2013; it was approved by CENELEC on 2017-04-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 CEN-CENELEC Management Centre or to any CENELEC member.

This amendment 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN 50174-3:2013/A1:2017) has been prepared by CLC/TC 215 "Electrotechnical aspects of telecommunication equipment".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-04-17
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-04-17

This document comes with:

- a new sub-clause 4.10 on planning of repair;
- modifications to the definitions used;
- technical and editorial corrections to Clauses 4, 5, 6, 7, Annex A and Annex B.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

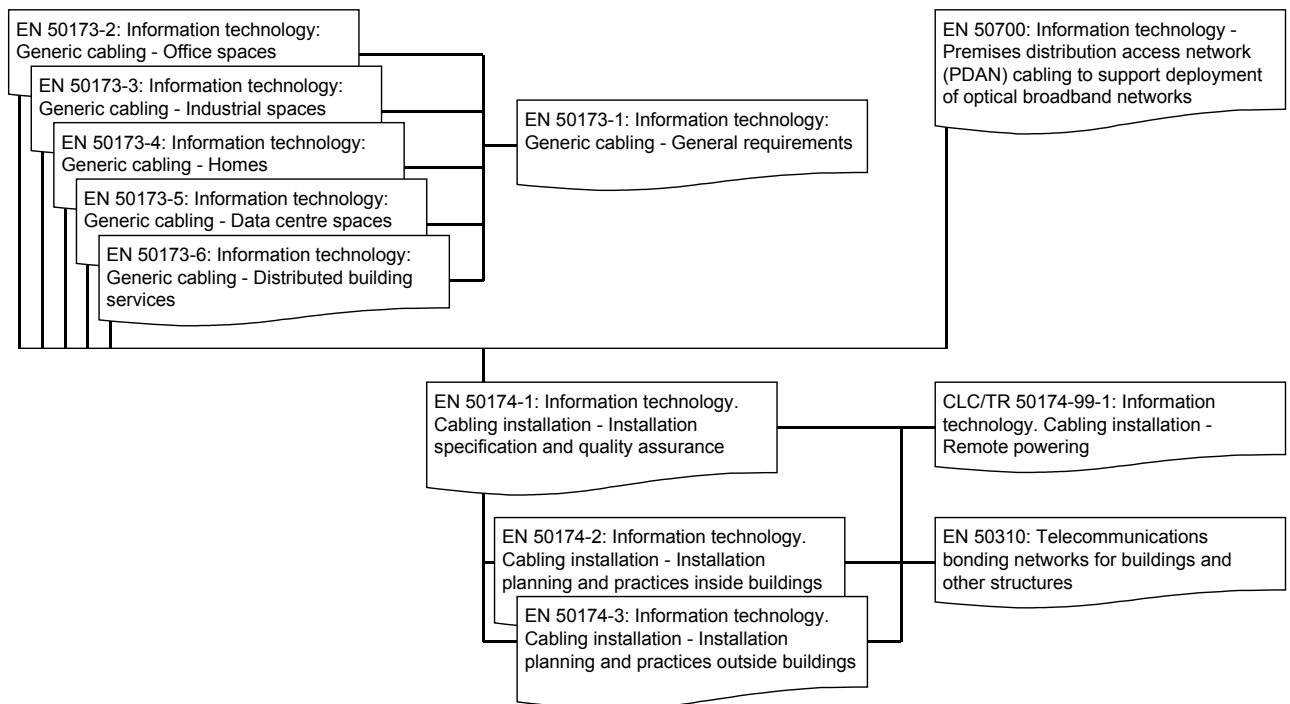
Introduction

Replace bullet 3 with “3) application dependent cabling design (e.g. EN 50700);

Delete bullet 4)

Replace bullet 5) with “4) bonding requirements (EN 50310) - the principles of which can be employed in installations outside buildings.

Replace Figure 1 by the following figure:



Replace Table 1 by the following Table

Building design phase	Generic cabling design phase	Specification phase	Installation phase	Operation phase
EN 50310	EN 50173-2	EN 50174-1	EN 50174-2 EN 50174-3 EN 50310	EN 50174-1
	EN 50173-3	Planning phase		
	EN 50173-4	EN 50174-2 EN 50174-3 EN 50310		
	EN 50173-5			
	EN 50173-6			
	(these ENs reference general requirements of EN 50173-1)			

2 Normative references

Update title of EN 50310: “*Telecommunications bonding networks for buildings and other structures*”

Delete EN 50346

Delete EN 60950 (all parts)

Delete EN 60950-1

Add EN 13501-6, *Fire classification of construction products and building elements. Classification using data from reaction to fire tests on electric cables*

Add EN 61300-3-35, *Fibre optic connecting devices and passive components. Basic test and measurements procedures. Examinations and measurements. Fibre optic connector endface visual and automated inspection*

Add EN 62368-1, *Audio/video, information and communication technology equipment – Part 1: Safety requirements (IEC 62368-1:2014, modified)*

Add EN 62368-3, *Audio/video, information and communication technology equipment – Safety – Part 3: DC power transfer through information technology communication cabling (IEC 62368-3)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

Insert new definition 3.1.8 and **renumber** the following ones accordingly:

3.1.8

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

[SOURCE: IEC 60050-826:2004, 826-12-11, IEC 60050-195:1998, 195-06-11]

Amend existing definition **3.1.11** to read

“vault/chamber as part of an underground conduit system and used to facilitate placing, connectorisation, and maintenance of cables as well as the placing of associated equipment, in which it is expected that a person will enter to perform work”

Delete existing definition 3.1.12 “rural area”

Amend definition **3.1.14** to read

“use of electrically conductive barriers or physical separation to prevent electromagnetic interference between external noise sources, including power supply cabling, and information technology cabling

[SOURCE: EN 50174-2:2009/A2:2014, 3.1.28 modified – deleted the word “earthed”]

Insert new definition 3.1.17 and **renumber** the following one accordingly:

3.1.17

subscriber

identifiable entity, and the space allocated to that entity, within the premises that may require a future direct connection to the access network

[SOURCE: EN 50700:2014, 3.1.22 – modified: added “and the space allocated to that entity”]

Delete existing definition 3.1.18 “urban area”

4 Requirements for planning installations of information technology cabling

4.1.2 Power supply cabling

Amend title to read “Low voltage power supply cabling”.

4.1.4 Transmission and terminal equipment

Replace 1st paragraph with:

“Information technology cabling shall be connected to equipment that incorporates safe signal circuitry complying with the SELV circuit and the TNV requirements as defined in the EN 60950 series and EN 62368-1. Where equipment provides direct current (DC) power transfer over the information technology cabling it shall comply with EN 62368-3.”

4.1.5 Cells and batteries

Delete this subclause and **renumber** the following ones accordingly.

4.1.7 Closures

Replace sub-clause with:

“Where both information technology cabling and power supply cabling are contained within a closure any conductive material of the closure or internal barriers shall be treated in accordance with HD 384/HD 60364 series and/or local regulations as appropriate.

In addition:

a) a barrier (either conducting or non-conducting) shall be present between the two cable types which shall meet a minimum of IP20 as specified in EN 60529;

b) covers on the closure shall allow separate access to the information technology cabling and the power supply cabling and shall be retained such that the use of a tool is necessary to gain access thereby preventing inadvertent connection between the power supply and the information technology cabling;

c) the entry for the information technology cables shall be separately removable.”

4.3 Pathways

4.3.1.1 Requirements

Insert after paragraph 1:

The external surfaces of existing piping systems shall not be used for the installation of pathways systems or the direct attachment of cables.

4.3.7.2 Pathways shared with overhead power supply infrastructures

4.3.7.2.2 Requirements

Amend bullet c) to read:

c) the requirements for earthing systems, aerial to underground junctions and aerial connections.

Amend last paragraph to read:

“Where an earthing system exists on a supporting structure then, unless technical and contractual agreement for joint use has been obtained, it shall be dedicated to only one of the following applications:”

4.3.7.3 The provision of a parallel earthing conductor (PEC)

4.3.7.3.2 Requirements

Replace sub-clause to read:

“A PEC shall be connected to an earthing system at least at one point. The planning of any additional connections shall be in accordance with the HD 384/HD 60364 series and/or local regulations as appropriate.

An information technology cable screen shall not be used where a PEC is required to withstand large currents (e.g. for lightning protection or as power fault current return).”

4.3.7.3.3 Recommendations

Replace “parallel earthing conductor” with “PEC”

4.4 Pathway systems

4.4.1.2 Requirements

Replace 5th paragraph (including the 3 bullets) with the following:

“Pathways, entry points to the pathways and the pathway systems selected shall ensure cables are able to be installed and, where appropriate, fixed in accordance with the applicable minimum bend radius (during installation, during operation – static and during operation – dynamic) without introducing deformation of the cable sheath or applying compressive loads exceeding that specified for the cable. These requirements apply in three dimensions. This can be achieved by the use of pre-fabricated curved corners, drop-outs, radius limiters or other means as shown in Figure 4.

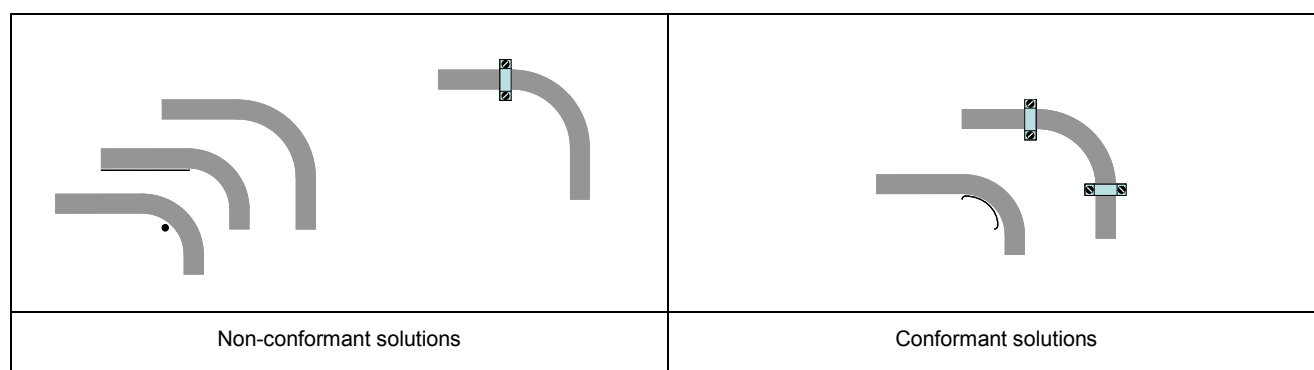


Figure 4 – Examples of non-conformant and conformant bend limiting techniques”

Renumber the following Figures accordingly (both in text and figure captions).

Replace 7th and 8th paragraph with the following:

NOTE 1 Pathway systems that do not allow such an approach can restrict the type and use of cables installed in the pathways and cable management systems selected.

NOTE 2 For cables with additional protection, minimum bend radius can be greater than specified above."

4.5 Pathway systems other than for core and access networks

4.5.1.2 Requirements

Insert text after 1st paragraph:

"Conductive pathway systems in close proximity to HV power supply cabling shall be protected from electrical hazards by means of protective earthing and/or sectioning."

4.5.4.2 Pathway systems on overhead power supply infrastructures

4.5.4.2.1 General

Amend 2nd paragraph to read:

"Components of the pathway systems can include:"

Amend bullet g) to read:

g) fittings to allow electrostatic discharge of the information technology cable sheath at each end of the pathway.

4.5.4.2.2 Requirements for metallic information technology cables

Replace bullet b) and last paragraph to read:

"b) connected to the earthing system of power supply system; this connection also includes that of extraneous-conductive-parts of the cables.

The earthing at the ends of the shared routes of extraneous-conductive-parts (e.g. armouring, strain relief members of optical fibre cables) that are part of the information technology cable construction shall be in accordance with local regulations. Where no local regulation exists the default procedure is to earth the conductive parts at one end and insulate them at the other. In all cases the procedures used shall be documented."

4.9 Spaces and structures other than for core and access networks

4.9.3 Telecommunication cabinets

4.9.3.1 Requirements

Amend to read:

"The design of the telecommunications cabinets shall consider any requirements for the accommodation of climate control equipment, electrical connections (including uninterruptible power supplies) and alarms systems to advise of unauthorised access."

4.9.4 Building entrance facilities

4.9.4.1 General

4.9.4.1.1 Requirements

Replace 2nd paragraph with:

Information technology cables of EuroClass F_{ca} in accordance with EN 13501-6 or others that do not comply with the minimum recommended performance requirements of EN 60332-1-2 shall either be:

- a) terminated in an entrance facility which is outside the external fire barrier of the building
- or
- b) terminated inside the building, within 2 m (unless an alternative distance is specified by local regulations) of the point of internal penetration of the external fire barrier (e.g. floor/ceiling/wall) or any length exceeding 2 m (unless an alternative distance is specified by local regulations) is installed within trunking or conduit that is considered as a fire barrier in accordance with local fire regulations.

NOTE This also applies where the cable has to pass through a space between two external fire barriers within a building.

4.9.4.1.2 Recommendations

Replace 2nd paragraph to read:

"Cables should enter buildings as close as possible to any conducting pipes (e.g. gas, water, heating) in order to minimise:

- a) induction loops,
- b) the length and impedance of bonding conductors.

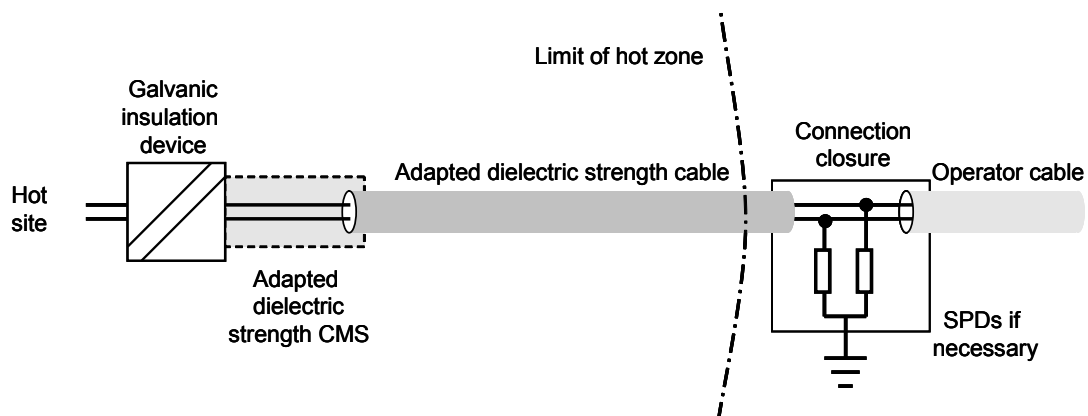
Replace 4th paragraph to read:

The earthing of extraneous-conductive-parts (e.g. armouring, strain relief members of optical fibre cables) that are part of the information technology cable construction shall be in accordance with local regulations. Where no local regulation exists the default procedure is to earth the conductive parts at one end and insulate it at the other. In all cases the procedures used shall be documented.

4.9.4.2 Hot zone entrance facilities

4.9.4.2.1 Requirements

Replace Figure 7 (new Figure 8) with the following



4.9.8 *Lightning*

4.9.8.2 *Requirements*

Delete sub-clause and **renumber** next subclause.

4.9.8.3 *Recommendations*

Amend 2nd paragraph to read:

Additional connections to earth of any structural metallic elements of cables (e.g. armouring or strength members) should be applied following consideration of EN 62305 series and:

- EN 61663-2 for metallic cables;
- EN 61663-1 for optical fibre cables.

Insert new sub-clause

4.10 *Planning for repair*

The planning of the installation should take into account the procedures to be applied following damage to the installed cabling - which is assumed to occur during the lifetime of an installation.

Planning options which address the practicality of repairs include:

- a) the provision of resilience by means of cabling redundancy which affects the timescale within which a repair may need to be effected;
- b) the selection of pathway and pathway systems and/or the installation of service loops to simplify the repair process;
- c) the sub-division of the fixed cabling to introduce cable sections to simplify replacement of such sections;
- d) the allocation of performance margin to allow for the chosen repair procedures;
- e) the maintenance of service provision by means of temporary repairs which precede the final corrective action.

Where damage occurs, corrective actions include one or more of the following procedures:

- repair of damaged components;
- replacement of damaged components;
- installation of additional components to provide the required function.

The selection of the appropriate procedure shall take into account:

- 1) the available margin between the initial (i.e. pre-damaged) performance of the cabling and the requirements of the service provided over the cabling;
- 2) the objectives of the user for the transmission performance of the cabling i.e. to maintain the initial performance (perhaps to support network evolution) or to allow for gradual degradation during repair(s) subject to the available margin;
- 3) financial constraints taking into account the available margin and the objectives of the user;
- 4) the media and type of cables to be repaired;
- 5) practicality constraints;
- 6) time constraints which may be affected by a range of factors including the practicality constraints;

The user should ensure that documentation exists which defines contingency planning, procedures for fault analysis and for initiating, monitoring and recording all repairs undertaken.

Replace existing 4.10 with the following:

4.11 Administration

The administration (installation) requirements shall be Level 3 of EN 50174-1:2009+A1:2011+A2:2014. The administration (operation) requirements shall be Level 3 of EN 50174-1:2009+A1:2011+A2:2014.

5 Requirements for the installation of information technology cabling

5.1 Safety

5.1.1 General

Insert new 5.1.1.1 to read (and renumber following subclauses accordingly):

5.1.1.1 Personnel

Installation personnel shall be aware of additional safety practices necessary when:

- installing or maintaining information technology cabling in or on shared infrastructures (e.g. LV, HV, gas, water);
- installing or maintaining connections to hybrid cables containing hazardous voltages.

Existing 5.1.1.1 Power supply cabling

Amend title to read "Low voltage power supply cabling".

5.1.3 Closures

Replace sub-clause to read:

"The installation of closures containing power supply cabling shall be in accordance with 4.1.3 and 5.1.1.4."

5.1.4 Cables

Replace 2nd paragraph with

Information technology cables of EuroClass F_{ca} in accordance with EN 13501-6 or others that do not comply with the minimum recommended performance requirements of EN 60332-1-2 shall be installed according to the instructions of the planner (see 4.9.4.1).

5.3 Installation practices

5.3.4 Pathway systems

5.3.4.2.2 Electromagnetic screening using cable management systems

Insert NOTE within Figure 8 (new: Figure 9) as follows:

"NOTE The bend radius control techniques required by 4.4.1 are not shown above for the purposes of clarity."

5.3.4.3 Recommendations

5.3.4.3.2 Electromagnetic screening using cable management systems

Delete "very" in sub-bullet b) 1)

Amend sub-bullet b) 3) by **replacing** 2,5 mm² with 4 mm²

Replace NOTE 1 to read “Local regulations concerning electrical safety can require a greater CSA.”

Amend sub-bullet c) 2) by **replacing** 2,5 mm² with 4 mm²

Replace NOTE 2 to read “Local regulations concerning electrical safety can require a greater CSA.”

Replace NOTE 3 to read “The long term stability of bonding connections to earthing systems and between sections or parts of cable management systems depends on the galvanic coupling of the materials used (see EN 50310).”

5.3.4.6 Aerial pathway systems

5.3.4.6.1 Requirements

Replace 1st paragraph to read

“Metallic elements of the pathway system shall be bonded in accordance with the planning information. The connections shall be safeguarded against corrosion (see EN 50310) and a good electrical contact between all parts ensured (maintenance periods may be dependent upon the environment, see EN 50174-1).”

5.3.7 Cable installation

5.3.7.3 Installation into pathways

5.3.7.3.1 Requirements

Amend 9th paragraph to read:

“Extraneous-conductive-parts of information technology cables shall be bonded in accordance with the planning information. The connections shall be safeguarded against corrosion (see EN 50310) and a good electrical contact between all parts ensured (maintenance periods can be dependent upon the environment, see EN 50174-1).”

5.3.8 Jointing and termination of cables

5.3.8.4 Optical fibre cabling

5.3.8.4.1 Requirements

Replace 4th paragraph with:

The end-faces of terminated optical fibres shall be subjected to visual inspection as defined in EN 61300-3-35.

5.3.11 Spaces and structures other than for core and access networks

5.3.11.5 Hot zone entrance facilities

5.3.11.5.1 Requirements

Amend bullet c) to read:

“surge protective devices shall be installed in accordance with 5.3.14.”

5.3.14 Surge protection devices

5.3.14.1 Requirements

Replace sub-clause to read:

“Overvoltage protectors shall be connected between the conductors and the earthing system via the lowest possible impedance. Additional protection can be provided by installation of overvoltage protection between the conductors.

The earthing arrangements of surge protection devices forming part of a protection system shall be installed to prevent any possibility of a bypass of the protection arrangements.

When surge protective devices are installed, equipotential bonding of the earth connections of surge protective devices, the protected equipment and the earthing system shall be in accordance with HD 60364-5-534 and the EN 61643 series.”

6 Segregation

6.2 Segregation of underground information technology cabling

6.2.1 General

6.2.1.2 Power supply cabling > AC 1000 V r.m.s or DC 1 500 V

6.2.1.2.1 Requirements (safety)

Replace 1st paragraph with:

Unless either the information technology cables or the power supply cables are installed in non-conducting conduit or duct or separated by a non-conducting barrier, the minimum separation between information technology cables and power supply cables shall be 0,3 m (see Figure 11).

6.2.1.3.3 Recommendations (safety)

Amend the 2nd paragraph to read:

“...than the distances given in Table 8, cables containing ...”

6.3 Segregation of aerial information technology cabling

6.3.1 General

6.3.1.3 Sharing of infrastructures carrying $\leq$ AC 1000 V r.m.s or DC 1 500 V

6.3.1.3.1 Requirements (safety)

Amend last paragraph to read:

Unless technical and contractual agreement for joint use has been obtained, earthing systems for information technology cabling shall not be installed on poles containing, or intended to contain, the earthing systems of the power supply cabling.

6.3.1.3.3 Requirements (EMI)

Insert text:

“See ITU-T K.109 for further information.”

6.3.1.4 Sharing of infrastructures carrying > AC 1000 V r.m.s or DC 1 500 V

6.3.1.4.1 Requirements (safety) of infrastructures carrying < AC 25 kV

Amend last paragraph to read:

Unless technical and contractual agreement for joint use has been obtained, earthing systems for information technology cabling shall not be installed on poles containing, or intended to contain, the earthing systems of the power supply cabling.

6.3.1.4.3 Requirements (EMI)

Insert text

“See ITU-T K.108 for further information.”

6.4 Segregation with respect to specific sources of EMI

6.4.1 Power distribution (equipment of power stations) and electrified traction infrastructures

6.4.1.1 Requirements

Amend paragraph 5 to read:

A general protective method for metallic screened cable is to bond the screen of the information technology cabling to earth at both ends of the cable and if necessary at some specific points along the cable.

Amend last paragraph to read:

In the case of underground cables and when the methods described above are not enough to mitigate the induced voltage, it is possible to lay cables inside a completely closed metallic conduit which is bonded to earth at both ends.

7 Additional installation practices for specific sites and services

7.4 Chemical manufacturing areas

Delete paragraph 1.

Replace 2nd paragraph with

“In chemical environments, the main stress for equipment and accessories is corrosion. All metallic parts such as bonding connections, EMC gaskets and seals, connectors and connection points, closures and cabinets, cable management systems are very sensitive to corrosion. EN 50310 provides further information.”

7.5 Railways (overground and underground)

7.5.4 Segregation of information technology cabling and electrified railway infrastructures

7.5.4.2 Requirements for electrified railways

Replace “protection” with “protective” in 7th (last) paragraph.

Annex A
(informative)
EMC and protection

A.1 Coupling mechanisms and countermeasures

A.1.3 Countermeasures against capacitive coupling

Amend bullet b) 4) to read

“bonded as detailed in this European Standard.”

Amend paragraph 2 to read

“At high frequencies the method of bonding of the screen at the cable ends is very important. Even a few centimetres of unscreened lead (pigtail) can compromise the screen effectiveness. EN 50310 provides further information.”

A.1.4 Countermeasures against inductive coupling

Amend text in bullet a) to read:

“Single conductors are twisted together; the surfaces of possible induction loops are very small. Only few magnetic field lines penetrate these loops. Adjacent twists create induced voltages in phase opposition which as a consequence cancel each other. The induced difference between the two conductors approaches close to zero. On the other hand a common mode disturbance is induced in the loop formed with the (twisted) conductors and a reference potential plane. The influence on the equipment is reduced by the common mode rejection of the connected port.”

Amend text in bullet b) to read:

Screened cabling provides – depending on the frequency and the materials used – protection against magnetic fields if the screen is bonded to the reference potential at both cable ends. In general, no adequate protection against magnetic fields is given, if the screen of the cable is not connected to a reference potential plane. Exceptions to this rule exist e.g. when the unconnected cable screen is placed on the surface of or near to an equipotential bonding system.

Replace in bullet c) “Parallel Earth Conductor” with “PEC.”

A.1.5 Countermeasures against radiative coupling

Replace in bullet a) “parallel earthing conductor” with “PEC”.

Amend text in bullet c) to read:

A screened cable connected at both ends with the screening of the equipment is a possible solution; the equipment need not be bonded to the reference potential in the case of high frequencies. When connecting both equipment to the reference potential, current loops should be avoided or at least minimised. Radiated coupling decreases with distance and through the application of symmetrical transmission on balanced cabling.

Replace Figures A.2 and A.3 by the following new figures:

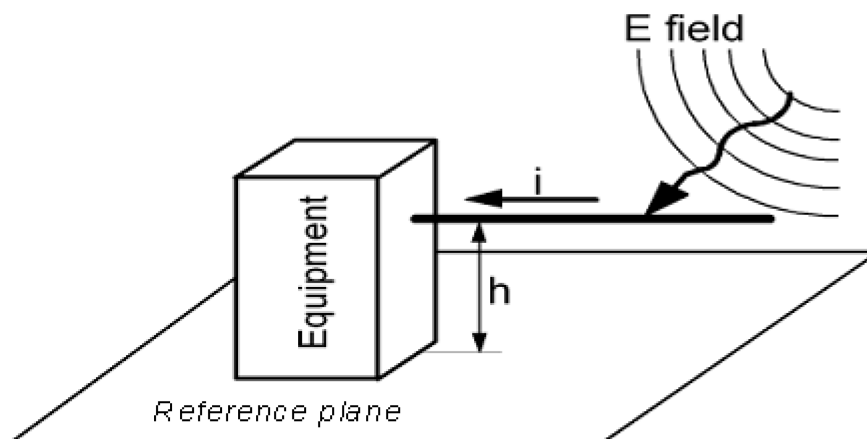


Figure A.2 - Electrical field to cable, capacitive coupling example

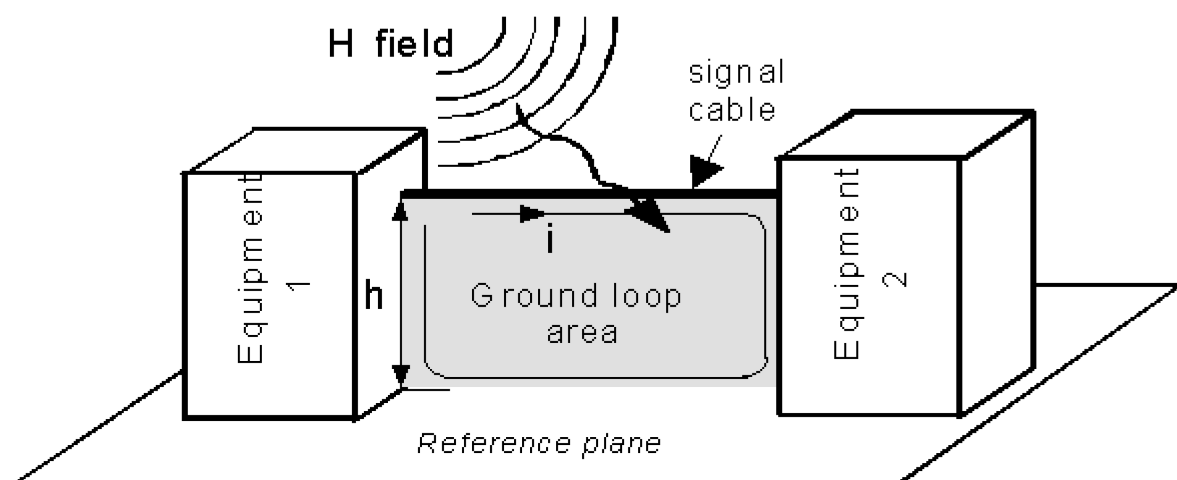


Figure A.3 - Magnetic field to loop, inductive coupling example

A.1.6 Countermeasures against very low frequency fields

A.1.6.2 Design

In Example 1: Replace “Power cabling” with “power supply cabling”

A.3 Filtering and electrical isolation components and surge protective devices

A.3.1 Filtering

A.3.1.3 Installation

A.3.1.3.1 General

Amend paragraph 2 to read

“If screened conductors are to be connected to the filter case, EMI gland type connections should be used. The mounting of a filter is often more important than type of filter. Poor mounting of an otherwise good filter will produce poor filtering. The impedance of the filter earth connection should be as low as possible to avoid the generation of disturbances that would otherwise be applied in common mode to the apparatus to be protected. See Figure A.6 for an example.”

A.3.2 Electrical isolation components

A.3.2.2 Design

Amend list item 6 to read:

“an equipment will have to be changed from safety protection class I into class II (see EN 62368-1) if applicable; ”

Annex B (informative) **Earth potential rise (EPR)**

B.1 General

Amend paragraph 1 to read:

The EPR for a single phase fault (phase/neutral) is the product of the part of the fault current flowing into the earthing system including treatment of earth conductors,...

Insert new sub-clause:

B.3 Further information

See ITU-T K.104.

Bibliography

Add

EN 50700, *Information technology - Premises distribution access network (PDAN) cabling to support deployment of optical broadband networks*

IEC 60050-826:2004, *International Electrotechnical Vocabulary – Chapter 826: Electrical installations*

ITU-T K.104, *Method for identifying the transfer potential of the earth potential rise from high or medium voltage networks to the earthing system or neutral of low voltage networks*

ITU-T K.108, *Joint use of poles by telecommunication and solidly earthed power lines*

ITU-T K.109, *Installation of telecommunication equipment on utility poles*

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**Information technology -
Cabling installation -
Part 3: Installation planning and practices outside buildings**

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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 document (EN 50174-3:2013) has been prepared by CLC/TC 215 "Electrotechnical aspects of telecommunication equipment".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-09-02
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-09-02

This document supersedes EN 50174-3:2003.

EN 50174 comprises three parts:

- EN 50174-1, *Information technology — Cabling installation — Part 1: Installation specification and quality assurance*;
- 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* (the present document).

All three parts support the specification, implementation and operation of information technology cabling. There are specific requirements for cabling systems that are in accordance with the design requirements of EN 50173 series. However, the three parts also apply to cabling systems of any design including those in accordance with standards such as EN 50098-1 or EN 50098-2.

This part, EN 50174-3, is concerned with the planning and installation of information technology cabling using metallic cabling and optical fibre cabling outside buildings; it is not confined to the border of a particular premises and includes wide area information technology cabling of any kind. It provides guidance as to the responsibilities of those involved and is intended to be referenced in relevant contracts.

EN 50174-3:2003 (the 1st edition) has been completely revised in the light of the technical evolution and the feedback received from the users of the 1st edition. Major changes include:

- a) restructuring of the contents to align with the structure of EN 50174-1:2009 and EN 50174-2:2009 (including their associated amendments); in particular, the pertinent requirements and recommendations have been clearly distinguished and are presented in separate subclauses;
- b) where appropriate, text has been aligned with that of EN 50174-1 and EN 50174-2;
- c) requirements and recommendations for wide area information technology cabling have been elaborated in greater detail;
- d) a new Annex A on EMC and protection (the existing Annex A is renumbered as Annex B) and a new Annex C on the application of responsibilities have been added.

Introduction

The importance of services delivered by information technology cabling infrastructure is similar to that of utilities such as heating, lighting and electricity supplies. As with those utilities, interruptions to service can have a serious impact. Poor quality of service due to lack of planning, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organisation's effectiveness.

There are four phases in the successful implementation of information technology cabling. These are:

- a) design;
- b) specification – the detailed requirement for the cabling, including the planning of its accommodation and associated building services addressing specific environments (e.g. electromagnetic) together with the quality assurance requirements to be applied;
- c) installation – in accordance with the requirements of the specification;
- d) operation – the management of connectivity and the maintenance of transmission performance during the life of the cabling.

This European Standard is in three parts and addresses the specification, installation and operational aspects. EN 50173 series and other application standards cover design issues.

EN 50174-1 is used during the specification phase. It addresses the:

- installation specification, quality assurance documentation and procedures;
- documentation and administration;
- operation and maintenance.

This part, EN 50174-3, and EN 50174-2 are intended to be used by the personnel directly involved in the planning aspects (of the specification phase) and installation phase. EN 50174-2 is applicable inside buildings and EN 50174-3 is applicable outside buildings.

This European Standard is applicable to all types of information technology cabling outside buildings, including generic cabling systems designed in accordance with EN 50173 series. The requirements and recommendations of this European Standard may be applied to cabling that is defined as part of the building.

The planning of the pathway systems, spaces and structures within the core and access network cabling as described in Figure 2 that are owned by access providers is excluded except for requirements and recommendations that provide basic safety, function and environmental objectives for mechanical, ingress and climatic characteristics (i.e. excluding pathway dimensions, distribution of spaces and similar constraints based on specific transmission methods).

This European Standard is also relevant to:

- architects, building designers and builders;
- main contractors;
- designers, suppliers, installers, inspectors (auditors), maintainers and owners of information technology cabling;
- public network providers and local service providers;
- end users.

This part, EN 50174-3, contains requirements and recommendations relating to the installation planning and practices by defining:

- i) planning strategy (road map) and guidance depending on the application, electromagnetic environment, building infrastructure and facilities, etc.;
- ii) planning and installation requirements for metallic and optical fibre information technology cabling depending on the application, electromagnetic environment, building infrastructure and facilities, etc.;
- iii) the practices and procedures to be adopted to ensure that the cabling is installed in accordance with the specification.

Figure 1 and Table 1 show the schematic and contextual relationships between the standards produced by CLC/TC 215 for information technology cabling, namely:

- 1) this part and other parts of EN 50174 series;
- 2) generic cabling design (EN 50173 series);
- 3) application dependent cabling design (e.g. EN 50098 series);
- 4) testing of installed cabling (EN 50346);
- 5) equipotential bonding requirements (EN 50310).

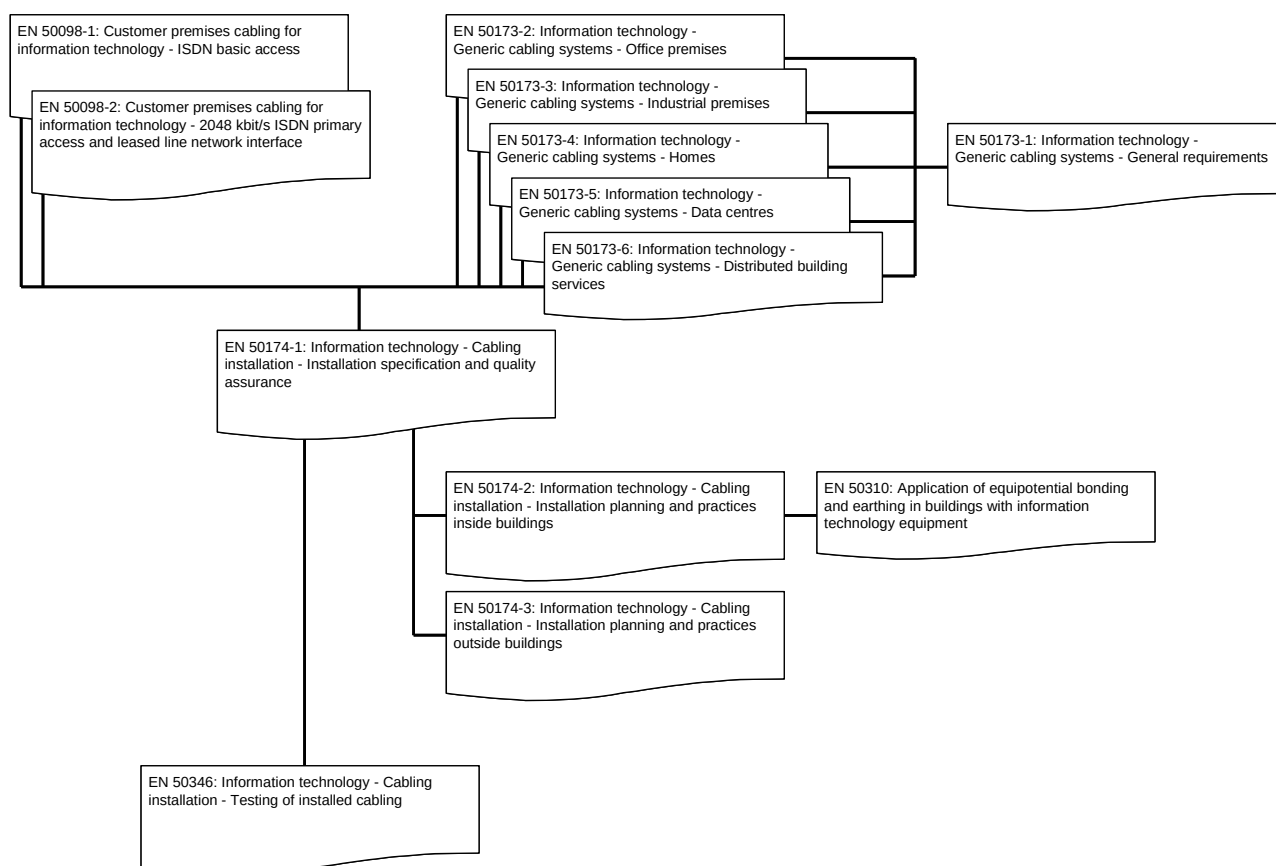


Figure 1 — Schematic relationship between EN 50174 series and other relevant standards

Table 1 — Contextual relationship between EN 50174 series and other standards relevant for information technology cabling systems

Building design phase	Generic cabling design phase	Specification phase	Installation phase	Operation phase
EN 50310	EN 50173 series except EN 50173-4	EN 50174-1		EN 50174-1
6. Earthing networks	4: Structure 5: Channel performance 7: Cable requirements 8: Connecting hardware requirements 9: Requirements for cords and jumpers A: Link performance limits	4: Requirements for specifying installations of information technology cabling 5: Requirements for installers of information technology cabling		4: Requirements for specifying installations of information technology cabling
		Planning phase		
	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	EN 50174-2 4: Requirements for planning installations of information technology cabling 6: Segregation of metallic information technology cabling and power supply cabling 7: Electricity distribution systems and lightning protection	EN 50174-2 5: Requirements for the installation of information technology cabling 6: Segregation of metallic information technology cabling and power supply cabling	
		and EN 50174-3 and (for equipotential bonding) EN 50310	and EN 50174-3 and (for equipotential bonding) EN 50310 and EN 50346 4: General requirements 5: Test parameters for balanced cabling 6: Test parameters for optical fibre cabling	

1 Scope and conformance

1.1 Scope

This European Standard specifies requirements and provides recommendations for the following aspects of information technology cabling:

- a) planning;
- b) installation practice.

This European Standard is applicable to all types of information technology cabling outside buildings including generic cabling systems designed in accordance with EN 50173 series. The requirements and recommendations of this European Standard may be applied to cabling that is defined as part of the building.

The requirements and recommendations of Clauses 4, 5 and 6 of this European Standard are subject to any site-specific requirements and recommendations of Clause 7.

The planning of the pathway systems, spaces and structures within the core and access network cabling as described in Figure 2 that are owned by access providers is excluded except for requirements and recommendations that provide basic safety, function and environmental objectives for mechanical, ingress and climatic characteristics (i.e. excluding pathway dimensions, distribution of spaces and similar constraints based on specific transmission methods).

The installation practices applicable to all cabling installation methods are included by the provision of the necessary planning requirements and recommendations associated with each one with the exception of information technology cabling installed:

- around or within aerial power supply or associated earth conductors;
- on infrastructures carrying power supplies in excess of AC/DC 25 kV.

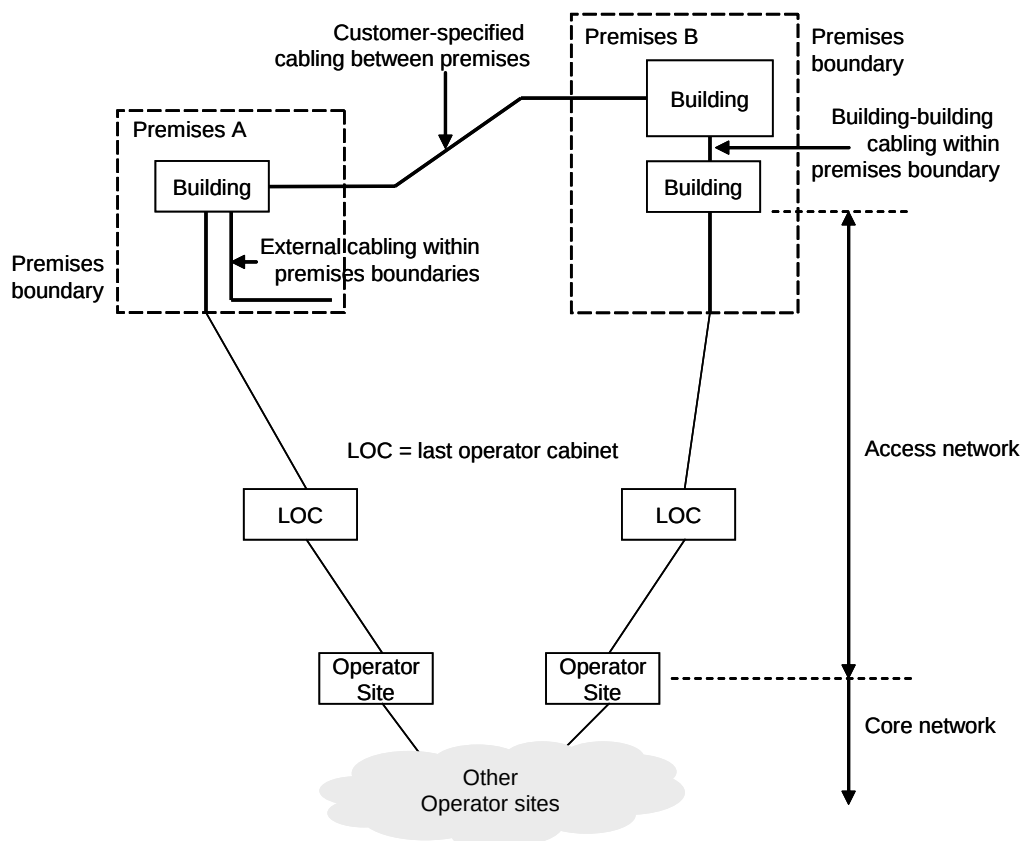
This European Standard:

- 1) details the considerations for satisfactory installation and operation of information technology cabling;
- 2) excludes specific requirements applicable to other cabling systems (e.g. power supply cabling); however, it takes account of the effects other cabling systems may have on the installation of information technology cabling (and vice versa) and gives general advice;
- 3) excludes those aspects of installation associated with the transmission of signals in free space between transmitters, receivers or their associated antenna systems (e.g. wireless, radio, microwave or satellite).

This European Standard is applicable to certain hazardous environments. It does not exclude additional requirements which are applicable in particular circumstances, defined by e.g. electricity supply and electrified railways.

The requirements within this European Standard do not cover any additional requirements for the information technology cables installed in hazardous or stressful environments e.g. electricity supply and electric railway locations (see Clause 7).

Examples of areas covered by this European Standard are shown in Figure 2.



NOTE Pathways and spaces between premises A and B are assumed to be designed to meet specific networking objectives, whereas the pathways and spaces between the premises boundary and the buildings in the premises, if provided by the premises owner, are aimed to be more generic to meet the needs of multiple access providers and transmission systems within their access networks.

Figure 2 — Examples of areas covered by this document

1.2 Conformance

For a cabling installation to conform to this European Standard:

- the planning of the installation shall meet the requirements of Clause 4;
- the installation practices shall meet the requirements of Clause 5;
- local regulations, including safety, shall be met.

The responsibilities for specific elements of conformance may be made by national-specific amendment of Annex C.

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.

EN 124:1994 ¹⁾, *Gully tops and manhole tops for vehicular and pedestrian areas - Design requirements, type testing, marking, quality control*

EN 12613, *Plastics warning devices for underground cables and pipelines with visual characteristics*

1) To be replaced by series EN 124, which is at draft stage.

- EN 50085-1, *Cable trunking systems and cable ducting systems for electrical installations — Part 1: General requirements*
- EN 50085-2 (all parts), *Cable trunking systems and cable ducting systems for electrical installations*
- EN 50173-1:2011, *Information technology — Generic cabling systems — Part 1: General requirements*
- EN 50173-2, *Information technology — Generic cabling systems — Part 2: Office premises*
- EN 50173-3, *Information technology — Generic cabling systems — Part 3: Industrial premises*
- EN 50173-4, *Information technology — Generic cabling systems — Part 4: Homes*
- EN 50173-5, *Information technology — Generic cabling systems — Part 5: Data centres*
- EN 50173-6, *Information technology — Generic cabling systems — Part 6: Distributed building services*
- EN 50174-1, *Information technology — Cabling installation — Part 1: Installation specification and quality assurance*
- EN 50310, *Application of equipotential bonding and earthing in buildings with information technology equipment*
- EN 50346, *Information technology — Cabling installation — Testing of installed cabling*
- EN 50411-2-2, *Fibre organisers and closures to be used in optical fibre communication systems — Product specifications — Part 2-2: Sealed pan fibre splice closures Type 1, for category S & A*
- EN 50411-2-3, *Fibre organisers and closures to be used in optical fibre communication systems — Product specifications — Part 2-3: Sealed inline fibre splice closures Type 1, for category S & A*
- EN 50411-2-4, *Fibre organisers and closures to be used in optical fibre communication systems — Product specifications — Part 2-4: Sealed dome fibre splice closures Type 1, for category S & A*
- EN 50411-2-5, *Fibre organisers and closures to be used in optical fibre communication systems — Product specifications — Part 2-5: Sealed closures for air blown fibre microduct, type 1, for category S & A*
- EN 50411-2-9, *Fibre organisers and closures to be used in optical fibre communication systems — Product specifications — Part 2-9: Non-sealed closures for air blown fibre microduct cable, for category S & A*
- EN 60079-0, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0)*
- EN 60079-14, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14)*
- EN 60079-17, *Explosive atmospheres — Part 17: Electrical installations inspection and maintenance (IEC 60079-17)*
- EN 60332-1-2, *Tests on electric and optical fibre cables under fire conditions — Part 1-2: Test for vertical flame propagation for a single insulated wire or cable — Procedure for 1 kW pre-mixed flame (IEC 60332-1-2)*
- EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*
- EN 60601-1-2, *Medical electrical equipment — Part 1-2: General requirements for basic safety and essential performance — Collateral standard: Electromagnetic compatibility — Requirements and tests (IEC 60601-1-2)*
- EN 60794-1-2:2003, *Optical fibre cables — Part 1-2: Generic specification — Basic optical cable test procedures (IEC 60794-1-2:2003)*
- EN 60794-3, *Optical fibre cables — Part 3: Sectional specification — Outdoor cables (IEC 60794-3)*
- EN 60794-3-10, *Optical fibre cables — Part 3-10: Outdoor cables — Family specification for duct, directly buried and lashed aerial optical telecommunication cables (IEC 60794-3-10)*
- EN 60794-3-11, *Optical fibre cables — Part 3-11: Outdoor cables — Product specification for duct, directly buried and lashed aerial single-mode optical fibre telecommunication cables (IEC 60794-3-11)*
- EN 60794-3-12, *Optical fibre cables — Part 3-12: Outdoor cables — Detailed specification for duct and directly buried optical telecommunication cables for use in premises cabling (IEC 60794-3-12)*

EN 60794-3-20, *Optical fibre cables — Part 3-20: Outdoor cables — Family specification for self-supporting aerial telecommunication cables (IEC 60794-3-20)*

EN 60794-3-21, *Optical fibre cables — Part 3-21: Outdoor cables — Detailed specification for optical self-supporting aerial telecommunication cables for use in premises cabling (IEC 60794-3-21)*

EN 60794-3-30, *Optical fibre cables — Part 3-30: Outdoor cables — Family specification for optical telecommunication cables for lakes, river crossings and coastal application (IEC 60794-3-30)*

EN 60794-3-40, *Optical fibre cables — Part 3-40: Outdoor cables — Family specification for sewer cables and conduits for installation by blowing and/or pulling in non-man accessible storm and sanitary sewers (IEC 60794-3-40)*

EN 60794-3-50, *Optical fibre cables — Part 3-50: Outdoor cables — Family specification for gas pipe cables and subducts for installation by blowing and/or pulling/dragging in gas pipes (IEC 60794-3-50)*

EN 60794-3-60, *Optical fibre cables — Part 3-60: Outdoor cables — Family specification for drinking water pipe cables and subducts for installation by blowing and/or pulling/dragging/floating in drinking water pipes (IEC 60794-3-60)*

EN 60794-4-20, *Optical fibre cables — Part 4-20: Aerial optical cables along electrical power lines — Family specification for ADSS (All Dielectric Self Supported) optical cables (IEC 60794-4-20)*

EN 60794-5-10 ²⁾, *Optical fibre cables — Part 5-10: Family specification for outdoor microduct optical fibre cables, microducts and protected microducts for installation by blowing (IEC 60794-5-10 ²⁾)*

EN 60794-5-20 ²⁾, *Optical fibre cables — Part 5-20: Family specification for outdoor microduct fibre units, microducts and protected microducts for installation by blowing (IEC 60794-5-20 ²⁾)*

EN 60825 (all parts), *Safety of laser products (IEC 60825)*

EN 60825-2, *Safety of laser products — Part 2: Safety of optical fibre communication systems (OFCS) (IEC 60825-2)*

EN 60950 (all parts), *Information technology equipment — Safety (IEC 60950)*

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

EN 61386-1, *Conduit systems for cable management — Part 1: General requirements (IEC 61386-1)*

EN 61386-2X (all parts), *Conduit systems for cable management — Part 2X: Particular requirements (IEC 61386-2X series)*

EN 61534 (all parts), *Powertrack systems (IEC 61534)*

EN 61537, *Cable management — Cable tray systems and cable ladder systems (IEC 61537)*

EN 61643 (all parts), *Low-voltage surge protective devices (IEC 61643)*

EN 61969-1, *Mechanical structures for electronic equipment — Outdoor enclosures — Part 1: Design guidelines (IEC 61969-1)*

EN 61969-2, *Mechanical structures for electronic equipment — Outdoor enclosures — Part 2: Coordination dimensions (IEC 61969-2)*

HD 384/HD 60364 (all parts), *Electrical installations of buildings / Low-voltage electrical installations (IEC 60364 series)*

HD 60364-4-444, *Low-voltage electrical installations — Part 4-444: Protection for safety — Protection against voltage disturbances and electromagnetic disturbances (IEC 60364-4-44:2007 (Clause 444), modified)*

HD 60364-5-534, *Low-voltage electrical installations — Part 5-53: Selection and erection of electrical equipment — Isolation, switching and control — Clause 534: Devices for protection against overvoltages (IEC 60364-5-53:2001/A1:2002 (Clause 534), modified)*

2) In preparation.

HD 60364-5-54, *Low-voltage electrical installations — Part 5-54: Selection and erection of electrical equipment — Earthing arrangements and protective conductors (IEC 60364-5-54)*

ITU-T K.68, *Operator responsibilities in the management of electromagnetic interference by power systems on telecommunication systems*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50174-1 and the following apply.

Where the cabling is designed in accordance with standards in EN 50173 series, the additional definitions of those standards are applicable.

3.1.1

access network

functional elements (equipment and infrastructure) that enable communication between the core network and a customer network

[SOURCE: CLC/TR 50173-99-2:2012, 3.1.1]

3.1.2

access provider

operator or another entity providing the means to enable external telecommunications service provision to a subscriber

3.1.3

anchor wire

guy wire

tensioned cable designed to add stability to a supporting structure for information technology or other cabling

3.1.4

access point

location in pathways where access is intended to be provided

Note 1 to entry: Examples are maintenance holes, hand holes, buried closures, spaces and structures.

3.1.5

campus

premises containing one or more buildings

[SOURCE: EN 50173-1:2011, 3.1.23]

3.1.6

catenary wire

wire hung at a specific tension between supporting structures for information technology cabling

3.1.7

core network

functional elements (that is equipment and infrastructure) that enable communication between operator sites and/or network data centres

3.1.8

hand hole

point off access to a pathway that is too small for a person to enter to perform work but that allows the routing of cables during the cable installation process such that bending and pulling requirements are met

Note 1 to entry: An example of a hand hole within a building is called a drawbox.

3.1.9

high-voltage

voltage over AC 1 000 V r.m.s. or DC 1 500 V

[SOURCE: EN 50174-2:2009/A1:2011, 3.1.13]

3.1.10

hot zone

area around a high-voltage installation (e.g. substation, transformer, pylon) whose earth potential rise in normal operation or when an earth fault occurs, is over the limits given in ITU-T K.68 for typical fault situations

3.1.11

maintenance hole (for telecommunications)

vault/chamber located in the ground or earth as part of an underground conduit system and used to facilitate placing, connectorisation, and maintenance of cables as well as the placing of associated equipment, in which it is expected that a person will enter to perform work

3.1.12

rural area

area which has a low density of local metallic structures in direct electrical contact with soil

Note 1 to entry: In a rural environment the earthing systems of the substations have their own earth electrodes which are not normally connected together.

3.1.13

sacrificial pathway

pathway which has been selected while recognising that, due to its location, any cable(s) and/or pathway system(s) installed within that pathway may be damaged by other trades

3.1.14

segregation

use of earthed electrically conductive barriers or physical separation to prevent electromagnetic interference between external noise sources, including power supply cabling, and information technology cabling

[SOURCE: EN 50174-2:2009/A1:2011, 3.1.27]

3.1.15

service provider

operator of any service that furnishes telecommunications content (transmissions) delivered over access provider facilities

Note 1 to entry: The access provider and the service provider can be a single entity

3.1.16

stay

strut

device designed to add stability to a supporting structure for information technology or other cabling

3.1.17

surge protective device

device intended to protect the electrical apparatus from high transient over-voltages and to limit the duration and the amplitude of the follow-on current

Note 1 to entry: The device contains at least one non-linear component.

[SOURCE: EN 50174-2:2009/A1:2011, 3.1.30]

3.1.18

urban area

area which contains a high density of local metallic structures in direct electrical contact with soil such as water pipes, cables with bare metal sheaths, tracks of tramways or underground or overground traction systems and earth-terminations and structures of buildings, masts and foundations

3.2 Abbreviations

For the purposes of this document, the abbreviations given in EN 50174-1 and the following apply.

Where the cabling is designed in accordance with standards in EN 50173 series, the additional abbreviations of those standards are applicable.

AC	Alternating Current
ADSS	All Dielectric Self Supporting
BEF	Building Entrance Facility
CMS	Cable Management System
CSA	Cross-Sectional Area
DC	Direct Current
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPR	Earth Potential Rise
ESD	Electrostatic Discharge
ffs	for further study
GPS	Global Positioning System
HV	high-voltage
LV	low-voltage
PEC	Parallel Earthing Conductor
SPD	Surge Protective Device

4 Requirements for planning installations of information technology cabling

4.1 Safety

4.1.1 Personnel

Internal procedures, in accordance with local regulations, shall be in place to ensure that all persons are aware of:

- a) the locations and boundaries of hazardous areas;
- b) the procedures to be adopted when working in or in proximity to these hazardous areas;
- c) fire precautions;
- d) escape routes.

4.1.2 Power supply cabling

The proper implementation of the requirements of this European Standard require that electrical installations are undertaken in accordance with the HD 384/HD 60364 series and/or local regulations as appropriate.

4.1.3 Optical fibre cabling

The hazard classification of areas containing optical fibre information technology equipment and optical fibre information technology cabling shall be undertaken in accordance with EN 60825-2 in order to define appropriate installation and labelling practices.

4.1.4 Transmission and terminal equipment

Information technology cabling shall be connected to equipment that incorporates safe signal circuitry complying with the SELV circuit and the TNV requirements as defined in the EN 60950 series.

Equipment connected shall comply with the requirements for protection against electric shock of the relevant product safety standards.

The connection of active equipment to information technology cabling shall not introduce hazards for users or operators of the system.

4.1.5 Cells and batteries

If cells and batteries that produce gases and fumes (e.g. lead-acid batteries that produce hydrogen and oxygen) are to be installed, provision shall be made for the necessary ventilation and recommended environmental conditions (see HD 60364-5-54). Local regulations shall be complied with.

4.1.6 Pathways and pathway systems

The selection of pathways and pathway systems shall enable the installation of fire barriers, if required.

4.1.7 Closures

NOTE The following requirements apply unless specifically allowed otherwise by local regulations.

Closures and combined terminal and distribution devices (fittings) providing facilities for the termination or (and) distribution of both information technology cables and power supply cables shall be designed to provide separate covers for the two cabling types.

Alternatively, a single overall cover is allowed provided that the power supply cabling remains protected to prevent electric shock after removal of the cover.

Where both information technology cabling and power supply cabling are contained within a closure then:

- a) if the closure is metallic, it shall be provided with a protective earth in accordance with 4.1.2;
- b) the compartment in the closure shall have a barrier (either conducting or non-conducting) between the two cable types. If compartment barriers are conductive, they shall be earthed in accordance with the relevant wiring regulations for protective earth;
- c) the front covers on the closure shall allow separate access to the information technology cabling and the power supply cabling and shall be retained such that the use of a tool is necessary to gain access thereby preventing inadvertent connection between the power supply and the information technology cabling;
- d) the entry for the information technology cables and the power supply cables shall be separately removable.