
**Informacijska tehnologija – Pokabljenje – 3. del: Načrtovanje inštalacij in
tehnike dela zunaj zgradb**

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

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

SIST EN 50174-3:2005

<https://standards.iteh.ai/catalog/standards/sist/542bcd7-ce5f-49ef-a6bb-0a04c23ecc30/sist-en-50174-3-2005>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50174-3:2005

<https://standards.iteh.ai/catalog/standards/sist/542bcd7-ce5f-49ef-a6bb-0a04c23ecc30/sist-en-50174-3-2005>

EUROPEAN STANDARD

EN 50174-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2003

ICS 33.040.50; 35.110

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 -praktiken im Freien

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2003-09-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and 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

This European Standard was prepared by Technical Committee CENELEC TC 215, Electrotechnical aspects of telecommunication equipment, under the framework of the Mandates M/212 on "Telecommunication cables and cabling systems" and M/239 on "Air traffic management equipment and systems".

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50174-3 on 2003-09-01.

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) 2004-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-09-01

This standard comprises three parts. All three parts support the specification, implementation and operation of information technology cabling using both balanced copper and optical fibre cabling components. These components may be combined to provide cabling solutions either in accordance with the design requirements of series EN 50173 or to meet the requirements of one or more application-specific standards (such as EN 50098-1 or EN 50098-2).

This part, EN 50174-3, contains detailed requirements and guidance relating to the installation planning and practices outside buildings and is intended to be used by the personnel directly involved in the planning and installation of information technology cabling. It shall be used during the different implementation phases when installing information technology cabling, i.e. during the planning phase, the design phase and installation phase.

Annexes designated "informative" are given for information only.
In this standard, Annexes A and B are informative.

Content

Introduction	7
1 Scope	9
2 Normative references	9
3 Definitions and abbreviations	10
3.1 Definitions.....	10
3.2 Abbreviations.....	11
4 Safety requirements	12
4.1 Prerequisite	12
4.2 Protection against electric shock.....	12
4.3 Protection from voltages due to the proximity of high voltage systems	13
4.4 Fire and chemical hazard.....	13
4.5 Explosive and asphyxiating gases	13
4.6 Optical fibre hazard	13
4.7 Mechanical hazard	13
4.8 Separation requirements for metallic cabling.....	13
4.9 Closures	13
5 General installation practices for metallic and optical fibre cabling	14
5.1 General	14
5.2 General precautions.....	15
5.3 Pre-installation practices	15
5.4 Preparation of cable routes	16
5.5 Cabling practices.....	17
5.6 Cable management systems.....	18
5.7 Labelling.....	19
5.8 Installation of closures.....	19
5.9 Segregation of services.....	20
5.10 Information technology cabling interconnections between buildings	27
5.11 Pole sharing	27
6 Additional installation practice for metallic cabling	31
6.1 EMC-Considerations	31
6.2 Balanced transmission	31
6.3 Screening	31
6.4 Mains and high voltage power distribution systems (above 1 000 V).....	31
6.5 Protection against very low frequency fields.....	31
6.6 Electrical isolation components.....	31
6.7 Surge protective devices	31
6.8 Protection against lightning	32
6.9 Protection against electrostatic discharge (ESD).....	32
6.10 Corrosion.....	33

iTeh STANDARD PREVIEW
 (standards.iteh.ai)

SIST EN 50174-3:2005

<https://standards.iteh.ai/catalog/standards/sist/542bcd7-ce5f-49ef-a6bb-0a04c23ecc30/sist-en-50174-3-2005>

6.11	Protection against radar emission and broadcast emitters	33
7	Additional installation practices for optical fibre cabling.....	34
7.1	General	34
7.2	Pre-installation procedures	34
7.3	Optical fibre cable practices	34
7.4	Final assembly of closures	34
7.5	Termination practices	34
7.6	Jointing/termination of optical fibres.....	35
7.7	Optical fibre management	36
8	Additional installation practices for specific sites and services	37
8.1	Hospitals.....	37
8.2	Airports	37
8.3	Nuclear areas	37
8.4	Explosive areas	38
8.5	Chemical manufacture /areas /plants.....	38
8.6	Tunnels and bridges including their associated services.....	38
8.7	Waterways, including rivers, canals, streams (natural or ducted / channelled etc.)	38
8.8	Over-ground and underground railways.....	39
Annex A	(informative) Earth potential rise (EPR)	42
Annex B	(informative) Typical examples of protection for information technology cabling	44
Bibliography	46

<https://standards.iteh.ai/catalog/standards/sist/542bcd07-cc5f-49cf-a0bb-0a04c23ecc30/sist-en-50174-3-2005>
 SIST EN 50174-3:2005
 (standards.iteh.ai)

List of figures

Figure 1 - Relationship between series EN 50174 and other design standards8

Figure 2 - Examples of areas covered by this document15

Figure 3 - Example showing the protection of underground information technology cables when located next to power cables21

Figure 4 - Distance between information technology cable and high voltage power lines23

Figure 5 – Example of an underground cable duct entrance for information technology cables into a building25

Figure 6 - Example of the use of a galvanic isolation device27

Figure 7 - Separation distances at the pole.....29

Figure 8 - Separation distance at the poles with lighting devices30

Figure 9 - Clearance not including components of information technology cabling for standard gauge railways40

Figure 10 - Clearance not included components of information technology cabling for protection against falling contact wires.....41

Figure A.1 - Definition of hot zone42

Figure B.1 - Example of connection between inside and outside building44

Figure B.2 - Example at main frame distributor44

Figure B.3 - Example of non-equipotential zones44

Figure B.4 - Example of a hot zone45

iTeh STANDARD PREVIEW
 (standards.iteh.ai)

SIST EN 50174-3:2005
<https://standards.iteh.ai/catalog/standards/sist/542bcd7-ce5f-49ef-a6bb-b6e220b12e2b>

List of tables

Table 1 – Minimum installed clearances above ground for aerial cables	17
Table 2 - Minimum clearances between aerial information technology and overhead power cabling crossing or when running in parallel	20
Table 3 – Minimum distance between buried insulated information technology cables and earthed electrodes of power systems in rural environment	22
Table 4 - Minimum depth of information technology cabling below the ground surface	22
Table 5 - Minimum clearances and protective measures at crossings between information technology cables and various underground services	23
Table 6 - Minimum distance between information technology earthing systems and earthed electrodes of power systems in rural environment	24
Table A.1 – Minimum distance (HV installations less than 25 kV)	43
Table A.2 - Minimum distance (HV installations exceeding 25 kV)	43

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 50174-3:2005

<https://standards.iteh.ai/catalog/standards/sist/542bcd77-ce5f-49ef-a6bb-0a04c23ecc30/sist-en-50174-3-2005>

Introduction

The importance of the information technology cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power supplies. As with other utilities, interruptions to service can have 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 installation of information technology cabling. These are

- a) design - the selection of cabling components and their configuration,
- b) specification - the detailed requirement for the cabling, its accommodation and associated building services addressing specific environment(s) identified within the premises together with the quality assurance requirements to be applied,
- c) implementation - the physical 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, implementation and operational aspects. The design issues are covered in series EN 50173 and / or other application standards.

EN 50174-1 is intended to be used by personnel during the specification phase of the installation together with those responsible for the quality planning and operation of the installation. It contains requirements and guidance for the specification and quality assurance of the information technology cabling by defining

- aspects to be addressed during the specification of the cabling,
- quality assurance documentation and procedures,
- requirements for the documentation and administration of cabling,
- recommendations for repair and maintenance.

EN 50174-2 and this part, EN 50174-3, are intended to be used by the personnel directly involved in the implementation phase of the installation. EN 50174-2 is applicable inside buildings and EN 50174-3 is applicable outside buildings.

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

- 1) planning strategy (road map) and guidance depending on the application and physical environment (climatic, mechanical, electromagnetic, etc.),
- 2) design and installation rules for metallic and optical fibre cabling depending on the application, electromagnetic environment, physical environment, etc.,
- 3) requirements on satisfactory operation of the cabling depending on the application, electromagnetic environment, physical environment, etc.,
- 4) the practices and procedures to be adopted to ensure that the cabling is installed in accordance with the specification.

Figure 1 shows the relationships between the standards produced by TC 215 for information technology cabling, namely cabling design standards (EN 50098 series, EN 50173 series), cabling installation standards (EN 50174 series) and equipotential bonding requirements (EN 50310).

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) 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 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 and EN 50174-3 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 copper cabling 6: Test parameters for optical fibre cabling	EN 50174-1 5: Quality assurance 7: Cabling administration 8: Repair and maintenance

Figure 1 - Relationship between series EN 50174 and other design standards

1 Scope

This European Standard specifies the basic requirements for the planning, implementation and operation of information technology cabling using balanced copper cabling and optical fibre cabling. This standard is applicable to

- a) cabling designed to support particular analogue and digital communications services including voice services;
- b) generic cabling systems designed in accordance with series EN 50173 and intended to support a wide range of communications services.

This standard is intended for those involved in the procurement, installation and operation of information technology cabling. Furthermore this standard is addressed to

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This standard is applicable to certain hazardous environments but does not exclude additional requirements which are applicable in particular circumstances, e.g. in the presence of electricity supply and electrified railways.

This part of the standard

- c) sets out requirements for satisfactory installation and operation of information technology cabling outside buildings; it is not restricted to campus areas,
- d) excludes specific requirements applicable to other cabling systems (e.g. power cabling, coaxial 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.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

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

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

EN 50173-1, *Information technology – Generic cabling systems – Part 1: General requirements and office areas*

EN 50174-1, *Information technology – Cabling installation - Part 1: Specification and quality assurance*

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

EN 50310, *Application of equipotential bonding and earthing in buildings with information technology equipment*

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

EN 60950-21, *Information technology equipment – Safety – Part 21: Remote power feeding (IEC 60950-21:2002)*

EN 61663-1, *Lightning protection – Telecommunication lines – Part 1: Fibre optic installations (IEC 61663-1:1999 + corrigendum Oct. 1999)*

EN 61663-2, *Lightning protection – Telecommunication lines – Part 2: Lines using metallic conductors (IEC 61663-2:2001)*

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 384.4.47 S2, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 47: Application of protective measures for safety – Section 470: General – Section 471: Measures of protection against electric shock (IEC 60364-4-47:1981 + A1:1993, modified)*

HD 384.4.482 S1, *Electrical installations of buildings - Part 4: Protection for safety - Chapter 48: Choice of protective measures as a function of external influences - Section 482: Protection against fire where particular risks or danger exist*

ITU-T K.33, *Limits for people safety related to coupling into telecommunications system from a.c. electric power and a.c. electrified railway installations in fault conditions*

ITU-T K.50, *Safe limits of operation voltages and currents for telecommunication systems powered over the network*

ITU-T K.51, *Safety criteria for telecommunication equipment*

ITU-T K.53, *Values of induced voltages on telecommunication installations to establish telecom and a.c. power and railway operators responsibilities*

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this European Standard the following definitions apply:

3.1.1

bonding network (BN)

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 does not need to be connected to earth, but all BNs considered in the present document will have an earth connection

[3.1.2 of EN 300 253:2002]

3.1.2

campus

premises containing one or more buildings

[3.1.11 of EN 50173-1:2002]

3.1.3

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.53 for typical fault situations

3.1.4

rural area

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

NOTE In a rural environment the earthing systems of the substations have their own earth electrodes which are not normally connected together.

3.1.5

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

iTeh STANDARD PREVIEW

AC	alternating current	(standards.iteh.ai)
BN	bonding network	SIST EN 50174-3:2005
CBN	common bonding network	https://standards.iteh.ai/catalog/standards/sist/542bcd7-cc5f-49ef-a6bb-0a04c23ecc30/sist-en-50174-3-2005
CMS	cable management system	
DC	direct current	
EMC	electromagnetic compatibility	
EPR	earth potential rise	
ESD	electrostatic discharge	
GDT	gas discharge tube	
HV	high-voltage	
LV	low-voltage	
MOV	metal oxide varistor	
PEC	parallel earthing conductor	
SPD	surge protective device	
TVS	transient voltage suppressor	