SLOVENSKI STANDARD
SIST EN 50174-2:2001

01-februar-2001

Information technology - Cabling installation - Part 2: Installation planning and practices inside buildings

Information technology - Cabling installation -- Part 2: Installation planning and practices inside buildings

Informationstechnik - Installation von Kommunikationsverkabelung -- Teil 2: Installationsplanung und Installationspraktiken in Gebäuden

Technologies de l'information - Installation de câblage -- Partie 2: Planification et pratiques d'installation à l'intérieur des bâtiments

Ta slovenski standard je istoveten z: **EN 50174-2:2000**

ICS:

33.040.50	Vodi, zveze in tokokrogi	Lines, connections and circuits
35.110	Omreževanje	Networking

SIST EN 50174-2:2001 **en**

EUROPEAN STANDARD **EN 50174-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM August 2000

ICS 35.110;91.140.50

English version

Information technology - Cabling installation
Part 2: Installation planning and practices inside buildings

Technologies de l'information -
Installation de câblages
Partie 2: Planification et pratiques
d'installation à l'intérieur des bâtiments

Informationstechnik -
Installation von Kommunikations-
verkabelung
Teil 2: Installationsplanung und
Installationspraktiken in Gebäuden

This European Standard was approved by CENELEC on 2000-08-01. 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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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

Ref. No. EN 50174-2:2000 E

Foreword

This European Standard has been 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 50174-2 on 2000-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at the national level by publication of an identical national standard or by endorsement	(dop)	2001-08-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2003-08-01

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 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 50174-2, contains detailed requirements and guidance relating to the installation planning and practices inside 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, annex A is informative.

Contents

Introduction

Within premises, 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 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.

This part, EN 50174-2, and 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 50174-2, 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, electromagnetic environment, building infrastructure and facilities, etc.

2) design and installation rules for metallic and optical fibre cabling depending on the application, electromagnetic environment, building infrastructure and facilities, etc.

3) requirements on satisfactory operation of the cabling depending on the application, electromagnetic environment, building infrastructure and facilities, 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), 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 **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)	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 telecommunications services including voice services;

b) generic cabling systems designed in accordance with EN 50173 and intended to support a wide range of telecommunications 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.

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

This part of the standard:

c) details the considerations for satisfactory installation and operation of information technology cabling within the environment of a premise building operating a low-voltage electricity distribution system (less than AC 1 000 V rms);

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.

EN 50085-1, *Cable trunking systems and cable ducting systems for electrical installations – Part 1: General requirements.*

EN 50085-2-4 [1)], *Cable trunking systems and cable ducting systems for electrical installations – Part 2-4: Service poles.*

EN 50086-1, *Conduit systems for electrical installations – Part 1: General requirements.*

EN 50173, *Information technology – Generic cabling systems.*

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

EN 50174-3 [2)], *Information technology – Cabling installation - Part 3: Installation planning and practices outside buildings.*

EN 50288 series, *Multi-element metallic cables used in analogue and digital communication and control.*

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

EN 60439-2, *Low-voltage switchgear and controlgear assemblies – Part 2: Particular requirements for busbar trunking systems (busways) (IEC 60439-2:1987 + A1:1991)*

[1)] In preparation by TC 213

[2)] At present committee draft

EN 60825 series, *Safety of laser products (IEC 60825 series).*

EN 60950, *Safety of information technology equipment (IEC 60950:1999, modified).*

EN 61537 [3] *Cable tray and cable ladder systems for electrical installations (IEC 61537).*

EN 61558-1, *Safety of power transformers, power supply units and similar – Part 1: General requirements and tests (IEC 61558-1: 1997, modified).*

HD 384 series, *Electrical installations of buildings (IEC 60364 series)*

HD 384.3 S2, *Electrical installations of buildings - Part 3: Assessment of general characteristics (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 384.4.42 S1, *Electrical installations of buildings - Part 4: Protection for safety - Chapter 42: Protection against thermal effects (IEC 60364-4-42:1980, modified, + A1:1992 + A2:1994).*

HD 384.4.43 S1, *Electrical installations of buildings - Part 4: Protection for safety - Chapter 43: Protection against overcurrent (IEC 60364-4-43:1977, modified).*

HD 384.4.47 S2, *Electrical installations of buildings - Part 4: Protection for safety – Chapter 47: Application of protective matters 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 matters as a function of external influences – Section 482: Protection against fire where particular risks or danger exist.*

HD 384.5 series, *Electrical installation of buildings – Part 5: Selection and erection of electrical equipment (IEC 60364-5 series).*

HD 384.5.52 S1, *Electrical installations of buildings - Part 5: Selection and erection of electrical equipment - Chapter 52: Wiring systems (IEC 60364-5-52:1993, modified).*

HD 384.5.54 S1, *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 61140, *Protection against electric shock – Common aspects for installation and equipment.*

IEC 61312-1, *Protection against lightning electromagnetic impulse - Part 1: General principles.*

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this European standard the following definitions apply.

NOTE The definitions with respect to earthing and bonding are taken from series IEC 60050 and HD 384.2 S1, respectively, and ETS 300 253; reference to these standards is indicated in square brackets.

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). 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 this standard will have an earth connection

[3.2.2 of ETS 300 253:1995]

[3] Approved for circulation as Final Draft

3.1.2
common bonding network (CBN)
principal means for effective bonding and earthing inside a telecommunication building. It is the set of metallic components that are intentionally or incidentally interconnected to form the principal BN in a building. These components include: structural steel or reinforcing rods, metallic plumbing, alternating current (AC) power conduit, protective conductors (PE), cables racks and bonding conductors. The CBN always has a mesh topology and is connected to the earthing network

[3.2.2 of ETS 300 253:1995]

3.1.3
earth electrode
conductive part or group of conductive parts in intimate contact with and providing an electrical connection with earth

[826-04-02 of HD 384.2 S1:1986]

3.1.4
earthing conductor
protective conductor connecting the main earthing terminal or bar to the earth electrode

[826-04-07 of HD 384.2 S1:1986]

3.1.5
earthing network
part of an earthing installation which is restricted to the earth electrodes and their interconnections
[604-04-07 of IEC 60050-604:1989]

3.1.6
electrostatic discharge (ESD)
transfer of electric charge between bodies of different electrostatic potential in proximity or through direct contact

[161-11-22 of IEC 60050-161:1990]

3.1.7
equipotential bonding
electrical connection putting various exposed conductive parts and extraneous conductive parts at a substantially equal potential

[826-04-09 of HD 384.2 S1:1986]

3.1.8
high-voltage
voltage over 1 000 V rms

3.1.9
isolated bonding network (IBN)
bonding network that has a single point of connection ("SPC") to either the common bonding network or another isolated bonding network

NOTE All IBNs considered here will have a connection to earth through the SPC

3.1.10
meshed bonding network (MESH-BN)
bonding network in which all associated equipment frames, racks and cabinets and usually the DC power return conductor , are bonded together as well as at multiple points to the CBN. Consequently, the MESH-BN augments the CBN

[3.2.2 of ETS 300 253:1995]

3.1.11
parallel earthing conductor (PEC)
earthing conductor that is parallel to the cable

3.1.12
PEN conductor
earthed conductor combining the functions of both protective conductor and neutral conductor

[826-04-06 of HD 384.2 S1:1986]

3.1.13
primary protection
primary protection is applied at the location where it can prevent most of the stressful energy from propagating beyond the defined interface

3.1.14
protection
protection is the application of methods and means to prevent the propagation of stressful electrical energy beyond the designed interface. The protection level is normally indicated by a voltage or current rating

[195-06-01 of IEC 60050-195:1998]

3.1.15
protective conductor (PE)
conductor required by some measures for protection against electric shock for electrically connecting any of the following parts:

- exposed conductive parts,
- extraneous conductive parts,
- main earthing terminal,
- earth electrode,
- earthed point of the source or artificial neutral

[826-04-05 of HD 384.2 S1:1986]

3.1.16
resistibility
ability of telecommunication equipment or any network to withstand the effects of certain physical phenomena up to a certain, specified extent and according to a specific criterion

3.1.17
secondary protection
secondary protection is applied subsequent to the primary protection

3.1.18
surge protective device (SPD)
assembly of one or more components intended to limit or divert surges

NOTE The device contains at least one non-linear component

3.2 Abbreviations

AC	alternating current
BN	bonding network
CATV	cabled distribution television
CBN	common bonding network
DC	direct current
EMC	electromagnetic compatibility
EMI	electromagnetic interference
ESD	electrostatic discharge
IBN	isolated bonding network
ISDN	integrated services digital network
ITE	information technology equipment
HV	high-voltage
LV	low-voltage
MESH BN	meshed bonding network
MESH IBN	meshed isolated bonding network
PD	potential difference
PE	protective earthing conductor
PEC	parallel earthing conductor
PEN	conductor combining the functions of both a protective conductor and a neutral conductor.
SPD	surge protective device

4 Safety requirements

4.1 Prerequisite

Provisions shall be taken to ensure that all persons visiting the premises 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.

It is assumed that installation of mains power cabling is undertaken in accordance with the requirements of HD 384 and relevant national or local regulations, respectively.

4.2 Protection against electric shock

4.2.1 Active equipment

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

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

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

4.2.2 Cabling components

Conductive pathway systems, barriers and fittings shall be included in the protection measures against indirect contact (a means of protection against excessive contact voltage). The means of protection is constituted by, for example, the provision of adequate insulation for the cables and terminals which are used (protective insulation).

The requirements of HD 384.4.41 S2, HD 384.4.47 S2 and HD 384.4.482 S1 and relevant national or local regulations, respectively, shall apply.

Termination points for both information technology cables and mains power cables shall be located and oriented in such a way as to prevent ingress of moisture or other contaminants and to reduce the risk of damage to the cables connected to them. Connecting hardware selected for information technology cabling shall not be interchangeable with the sockets or plugs used for mains power distribution.

Closures and combined terminal and distribution devices (fittings) providing facilities for the termination or (and) distribution of both information technology cables and mains power cables shall be designed to provide separate covers for the two cabling types. Alternatively, a single overall cover is allowed provided that the mains power cabling remains protected to prevent electric shock after removal of the cover. This applies for example to a closure containing separate termination points for telecommunications and mains power cabling, but not for termination points where the network power supply is provided within the information technology cabling termination points itself.

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

a) if the closure is metallic, it shall be earthed in accordance with the relevant wiring regulations for protective earth;

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 plates on the closure shall allow separate access to the information technology cabling and the mains power cabling and shall be retained such that the use of a tool is necessary to gain access thereby preventing inadvertent misconnection between the mains power and the information technology cabling;

d) the entry plate for the information technology cables and the mains power cables shall be separate.

4.3 Fire and chemical hazard

The selection of cables shall be based upon the requirements of the relevant European product standards.

NOTE Until these standards are available consultation of national regulations is recommended.

The installation practices shall neither impair the fire behaviour, nor result in the release of dangerous substances of the cabling and associated components.

4.4 Explosive and asphyxiating gases

Lead-acid batteries produce hydrogen and oxygen. If batteries that produce explosive gases are to be installed, provision shall be made for the necessary ventilation and recommended environmental conditions (see HD 384.5.54 S1). National or local regulations shall be complied with.

It is possible for explosive and/or asphyxiating gases to build up in ducts, drawpits, maintenance holes or other closed chambers. Before any worker enters these areas the enclosure shall be well ventilated and the atmosphere shall be tested to detect any potentially hazardous gases.

4.5 Optical fibre hazard

The following practices shall be adopted:

a) exposed optical fibre ends shall be kept away from the skin and eyes;

b) the quantity of optical fibre waste shall be minimised;

c) waste fragments shall be treated with care and collected (not by hand) and disposed of in suitable containers via an approved agency.

The majority of transmission equipment operates using infra-red (non visible) wavelengths. It is difficult to detect such optical signals with the eye or skin directly and it is impossible for the human eye to determine the nature or level of the incident power. Connector end faces, prepared optical fibres or fractured optical fibres shall not be viewed directly unless the power emitted from the optical fibre is known to be safe (as defined within series EN 60825) and under local control.

Closures containing termination points for optical fibre cabling shall be labelled with appropriate warning signs or text.

4.6 Separation requirements for metallic cabling

4.6.1 Metallic information technology cables and mains power cables

Metallic information technology cabling and mains power cabling that share the same cable management system shall be laid according to the requirements specified in 6.5.

Where the requirements of safety and electrical interference demand different limits for either spacing or physical separation, the more stringent requirement shall take precedence.

4.6.2 Cable separation in fire barriers

Where mains power cables (other than single core cables operating at voltages exceeding AC 600 V) pass through a fire barrier it is possible to reduce the physical spacing requirements of 4.6.1 provided that :

a) the total distance over which the reduction in the separation occurs is not greater than the thickness of the fire segregation barrier plus 0,5 m on either side and

b) the information technology cables and mains power cables are enclosed in separate metal trunking or conduit and

c) the requirements for fire barriers are observed and series HD 384.5 is taken into consideration.

5 General installation practices for metallic and optical fibre cabling

5.1 General

Metallic cable management systems and accessories shall be included in the protection measures against electric shock according to 4.2. The method used for the installation of cables into the wall trunking system shall allow for additional cables to be installed in the future without risk of damage.

General EMC requirements and guidance are given in clause 6 and annex A.