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## Fastighetsnät för informationsöverföring – Generella kabelnät – Del 1: Allmänna fordringar samt kontorsfastigheter

*Information technology –  
Generic cabling systems –  
Part 1: General requirements and office areas*

Som svensk standard gäller europastandarden EN 50173-1:2002<sup>\*)</sup>. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50173-1:2002.

### Nationellt förord

Den svenska standarden innehåller två informativa bilagor. Den första bilagan NA innehåller svenska termer som motsvarar de engelska termerna i standardens avsnitt 3. Den andra bilagan innehåller en återgivning av de kabelbeteckningar för balanserade kopparkablar som finns med som information i ISO/IEC 11801, second edition, 2002.

Tidigare utgiven svensk standard SS-EN 50173, utgåva 1, 1995, SS-EN 50173/A1, utgåva 1, 2000 samt SS-EN 50173/A1 C1, utgåva 1, 2000, gäller ej fr o m 2003-11-01.

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<sup>\*)</sup> Corrigendum, Januari 2003, till EN 50173-1:2002 är inarbetat i texten.

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EUROPEAN STANDARD

**EN 50173-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2002

ICS 33.040.50

Supersedes EN 50173:1995 and A1:2000  
Incorporates Corrigendum January 2003

English version

**Information technology -  
Generic cabling systems  
Part 1: General requirements and office areas**

Technologies de l'information -  
Systèmes génériques de câblage  
Partie 1: Spécification générale  
et environnement de bureaux

Informationstechnik -  
Anwendungsneutrale  
Kommunikationskabelanlagen  
Teil 1: Allgemeine Anforderungen  
und Bürobereiche

This European Standard was approved by CENELEC on 2002-11-01. 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, 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 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 50173-1 on 2002-11-01.

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) 2003-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-11-01

The first edition of this European Standard had been developed to enable the application-independent pre-cabling of office premises. Its basic principles, however, are applicable also in various other situations including industrial premises and residential buildings, and TC 215 has started to establish relevant European Standards which address the specific requirements of these environments. In order to point out the commonalities of these cabling design standards, TC 215 has decided to publish them as individual parts of the series EN 50173, thus also acknowledging that nowadays standards users recognize the designation "EN 50173" as a synonym for generic cabling design.

This European Standard, EN 50173-1, supersedes both EN 50173:1995 and EN 50173:1995/A1:2000 and constitutes a complete revision thereof (it is related to, but not identical with, ISO/IEC 11801:2002). Essential changes include the following:

- centralized generic cabling in addition to hierarchical three-level topology,
- new modelling of the horizontal cabling subsystem with an optional consolidation point,
- new channel Classes E and F for balanced cabling and associated component Categories 6 and 7,
- classification of optical fibre cabling channels and associated component requirements,
- limits for all channel parameters based on formulae instead of discrete values at key frequencies,
- maximum channel lengths (horizontal and backbone subsystem) depend upon implementation model,
- requirements for cords and jumpers revised,
- requirements on installation aspects and administration replaced by reference to relevant EN,
- new Annexes with link performance/permanent link performance limits and on electromagnetic characteristics of cabling; Annex with supported applications updated.

Annexes designated "normative" are a part of this standard. Annexes designated "informative" are for information only. In this standard, Annexes A and D are normative, Annexes B, C, E, F and G are informative.

The contents of the corrigendum of January 2003 have been included in this copy.

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## 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. As with other utilities, interruptions to service can have serious impact. Poor quality of service due to lack of design foresight, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organisation's effectiveness.

Historically, the cabling within a premises comprised both application-specific and multipurpose networks. The previous edition of this standard enabled a controlled migration to generic cabling and the reduction in the use of application-specific cabling. The subsequent growth of generic cabling designed in accordance with EN 50173 has supported the development of high data rate applications based upon a defined cabling model. This edition, EN 50173-1, has been revised to reflect these increasing demands.

This European Standard provides:

- a) users with an application independent generic cabling system and an open market for cabling components;
- b) users with a flexible cabling scheme such that modifications are both easy and economical;
- c) building professionals (for example, architects) with guidance allowing the accommodation of cabling before specific requirements are known; i.e., in the initial planning either for construction or refurbishment;
- d) industry and standardisation bodies with a cabling system which supports current products and provides a basis for future product development and applications standardisation.

This European Standard specifies multi-vendor cabling, and is related to:

- standards for cabling components developed by Technical Committees of CENELEC and/or IEC;
- standards for the quality assurance and installation of information technology cabling (series EN 50174) and testing of installed cabling (EN 50346);
- applications developed by the subcommittees of ISO/IEC JTC 1 and study groups of ITU-T.

The applications listed in Annex E have been analysed to determine the requirements for a generic cabling system. These requirements, together with statistics concerning premises geography from different countries and the models described in Clause 6, have been used to develop the requirements for cabling components and to stipulate their arrangement into cabling systems. As a result, generic cabling defined within this European Standard is targeted at, but not limited to, the general office environment.

It is anticipated that the generic cabling system meeting the minimum requirements of this European Standard will have a life expectancy in excess of ten years.

Figure 1 shows the relationships between the standards produced by TC 215 for information technology cabling, namely this generic cabling design standard, cabling installation standards (EN 50174 series), testing of installed cabling (EN 50346) and equipotential bonding requirements (EN 50310).

Building design phase	Generic cabling design phase	Planning phase	Implementation phase	Operation phase
<p>EN 50310</p> <p>5.2: Common bonding network (CBN) within a building</p> <p>6.3: AC distribution system and bonding of the protective conductor (TN-S)</p>	<p>EN 50173-1</p> <p>4: Topology</p> <p>5: Channel performance</p> <p>7: Cable requirements</p> <p>8: Connecting hardware requirements</p> <p>9: Requirements for cords</p> <p>A.1: Link performance limits</p>	<p>EN 50174-1</p> <p>4: Specification considerations</p> <p>5: Quality assurance</p> <p>7: Cabling administration</p> <p><b>and</b></p> <p>EN 50174-2</p> <p>4: Safety requirements</p> <p>5: General installation practices for metallic and optical fibre cabling</p> <p>6: Additional installation practice for metallic cabling</p> <p>7: Additional installation practice for optical fibre cabling</p> <p><b>and</b></p> <p>EN 50174-3</p> <p><b>and</b></p> <p>(for equipotential bonding)</p> <p>EN 50310</p> <p>5.2: Common bonding network (CBN) within a building</p> <p>6.3: AC distribution system and bonding of the protective conductor (TN-S)</p>	<p>EN 50174-1</p> <p>6: Documentation</p> <p>7: Cabling administration</p> <p><b>and</b></p> <p>EN 50174-2</p> <p>4: Safety requirements</p> <p>5: General installation practices for metallic and optical fibre cabling</p> <p>6: Additional installation practice for metallic cabling</p> <p>7: Additional installation practice for optical fibre cabling</p> <p><b>and</b></p> <p>EN 50174-3</p> <p><b>and</b></p> <p>(for equipotential bonding)</p> <p>EN 50310</p> <p><b>and</b></p> <p>EN 50346</p> <p>4: General requirements</p> <p>5: Test parameters for balanced cabling</p> <p>6: Test parameters for optical fibre cabling</p>	<p>EN 50174-1</p> <p>5: Quality assurance</p> <p>7: Cabling administration</p> <p>8: Repair and maintenance</p>

Figure 1 – Relationship between EN 50173-1 and other standards relevant for information technology cabling systems

## **1 Scope and conformance**

### **1.1 Scope**

This European Standard specifies generic cabling for use within premises which may comprise single or multiple buildings on a campus. It covers balanced cabling and optical fibre cabling.

The standard is optimised for premises in which the maximum distance over which telecommunications services have to be distributed is 2 000 m. The principles of this European Standard may also be applied to larger installations.

Cabling defined by this standard supports a wide range of services including voice, data, text, image and video.

This European Standard specifies:

- a) the structure and configuration for generic cabling;
- b) cabling performance requirements;
- c) implementation options.

Safety (electrical safety and protection, fire, etc.) and electromagnetic compatibility (EMC) requirements are outside the scope of this European Standard and are covered by other standards and regulations. However, information given in this European Standard may be of assistance in meeting these standards and regulations.

### **1.2 Conformance**

For a cabling system to conform to this European Standard:

- a) the structure and configuration shall conform to the requirements of Clause 4;
- b) the interfaces to the cabling at the telecommunications outlet shall conform to the requirements of Clause 8 with respect to mating interfaces and performance;
- c) connecting hardware at other places in the cabling structure shall meet the performance requirements specified in Clause 8;
- d) the performance of channels shall conform to the requirements of Clause 5. This shall be achieved by one of the following:
  - a channel design and implementation ensuring that the prescribed channel performance class of Clause 5 is met;
  - attachment of appropriate components to a link design meeting the prescribed performance class of Annex A. Channel performance shall be assured where a channel is created by adding more than one cord to either end of a link meeting the requirements of Annex A;
  - using the reference implementations of Clause 6 and compatible cabling components conforming to the requirements of Clauses 7, 8 and 9, based upon a statistical approach of performance modelling.
- e) local regulations concerning safety shall be met.

Test methods to ensure conformance with the channel and link requirements of Clause 5 and Annex A respectively are specified in EN 50346. The treatment of measured results that fail to meet the requirements of this clause, or lie within the relevant measurement accuracy, shall be clearly documented within a quality plan as described in EN 50174-1.

Installation and administration of cabling in accordance with this European standard should be undertaken in accordance with the EN 50174 series of standards.

This standard does not specify which tests and sampling levels should be adopted. The test parameters to be measured and the sampling levels to be applied for a particular installation should be defined in the installation specification and quality plans for that installation prepared in accordance with EN 50174-1.

Specifications marked "ffs" (for further study) are preliminary and are not required for conformance to this European Standard.

## 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 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 50174-3<sup>1)</sup>, *Information technology – Cabling system installation – Part 3: Installation planning and practices outside buildings*

EN 50288-1, *Multi-element metallic cables used in analogue and digital communication and control – Part 1: Generic specification*

EN 50288-2-1<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 2-1: Sectional specification for screened cables characterized up to 100 MHz – Horizontal and building backbone cables*

EN 50288-2-2<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 2-2: Sectional specification for screened cables characterized up to 100 MHz – Work area and patch cord cables*

EN 50288-3-1<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 3-1: Sectional specification for unscreened cables characterized up to 100 MHz - Horizontal and building backbone cables*

EN 50288-3-2<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 3-2: Sectional specification for unscreened cables characterized up to 100 MHz – Work area and patch cord cables*

EN 50288-4-1<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 4-1: Sectional specification for screened cables characterized up to 600 MHz – Horizontal and building backbone cables*

EN 50288-4-2<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 4-2: Sectional specification for screened cables characterized up to 600 MHz – Work area and patch cord cables*

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1) Approved for formal vote.

2) At approval stage (Unique Acceptance Procedure).

- EN 50288-5-1<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 5-1: Sectional specification for screened cables characterized up to 250 MHz – Horizontal and building backbone cables*
- EN 50288-5-2<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 5-2: Sectional specification for screened cables characterized up to 250 MHz – Work area and patch cord cables*
- EN 50288-6-1<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 6-1: Sectional specification for unscreened cables characterized up to 250 MHz – Horizontal and building backbone cables*
- EN 50288-6-2<sup>2)</sup>, *Multi-element metallic cables used in analogue and digital communication and control – Part 6-2: Sectional specification for unscreened cables characterized up to 250 MHz – Work area and patch cord cables*
- EN 50289-1-6, *Communication cables - Specifications for test methods – Part 1-6: Electrical test methods – Electromagnetic performance*
- EN 50310, *Application of equipotential bonding and earthing in buildings with information technology equipment*
- EN 50346:2002, *Information technology – Cabling installation – Testing of installed cabling*
- EN 60068-2-14, *Environmental testing - Part 2: Tests - Test N: Change of temperature (IEC 60068-2-14:1984 + A1:1986)*
- EN 60068-2-38, *Environmental testing - Part 2: Tests - Test Z/AD: Composite temperature/humidity cyclic test (IEC 60068-2-38:1999)*
- EN 60352-3, *Solderless connections – Part 3: Solderless accessible insulation displacement connections - General requirements, test methods and practical guidance (IEC 60352-3:1993)*
- EN 60352-4, *Solderless connections - Part 4: Solderless non-accessible insulation displacement connections - General requirements, test methods and practical guidance (IEC 60352-4:1994)*
- EN 60352-6, *Solderless connections - Part 6: Solderless insulation piercing connections - General requirements, test methods and practical guidance (IEC 60352-6:1997)*
- EN 60512-2-1, *Connectors for electronic equipment - Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method (IEC 60512-2-1:2002)*
- EN 60512-3-1, *Connectors for electronic equipment - Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance (IEC 60512-3-1:2002)*
- EN 60512-4-1<sup>3)</sup>, *Connectors for electronic equipment - Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof (IEC 60512-4-1:200X)*
- EN 60512-5-2, *Connectors for electronic equipment - Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating (IEC 60512-5-2:2002)*
- EN 60512-25-1, *Connectors for electronic equipment - Tests and measurements - Part 25-1: Test 25a – Crosstalk ratio (IEC 60512-25-1:2001)*
- EN 60512-25-2, *Connectors for electronic equipment – Tests and measurements - Part 25-2: Test 25b: Attenuation/insertion loss (IEC 60512-25-2:2002)*
- EN 60512-25-4, *Connectors for electronic equipment - Tests and measurements - Part 25-4: Test 25d – Propagation delay (IEC 60512-25-4:2001)*
- EN 60512-25-5<sup>3)</sup>, *Connectors for electronic equipment – Tests and measurements – Part 25-5: Test 25e – Return loss (IEC 60512-25-5:200X)*
- EN 60603-7:1996, *Connectors for frequencies below 3 MHz for use with printed boards – Part 7: Detail specification for connectors, 8 way, including fixed and free connectors with common mating features (IEC 60603-7:1996)*

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2) At approval stage (Unique Acceptance Procedure).

3) Approved for Parallel Vote.

- EN 60603-7-4 <sup>4)</sup>, *Connectors for electronic equipment – Part 7-4: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz (Category 6, unshielded) (IEC 60603-7-4:200X)*
- EN 60603-7-5 <sup>4)</sup>, *Connectors for electronic equipment – Part 7-5: Detail specification for 8-way connector, shielded, free and fixed connectors for data transmissions with frequencies up to 250 MHz (Category 6, shielded) (IEC 60603-7-4:200X)*
- EN 60603-7-7:2002, *Connectors for electronic equipment – Part 7-7: Detail specification for 8 way, shielded, free and fixed connectors, for data transmission with frequencies up to 600 MHz [category 7, shielded] (IEC 60603-7-7:2002)*
- EN 60793-1-40, *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation (IEC 60793-1-40:2001)*
- EN 60793-1-41, *Optical fibres – Part 1-41: Measurement methods and test procedures – Bandwidth (IEC 60793-1-41:2001)*
- EN 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength (IEC 60793-1-44:2001)*
- EN 60793-1-49 <sup>3)</sup>, *Optical fibres – Part 1-49: Measurement methods and test procedures – Differential mode delay (IEC 60793-1-49:200X)*
- EN 60793-2-10:2002, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres (IEC 60793-2-10:2002)*
- EN 60793-2-50:2002, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres (IEC 60793-2-50:2002)*
- EN 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General (IEC 60794-1-1:1999)*
- EN 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures (IEC 60794-1-2:1999)*
- EN 60794-3, *Optical fibre cables – Part 3: Sectional specification – Outdoor cables (IEC 60794-3:2001)*
- EN 60811-1-1:1995, *Insulating and sheathing of electric cables – Common test methods – Part 1: General application – Section 1: Measurement of thickness and overall dimensions – Tests for determining the mechanical properties (IEC 60811-1-1:1993)*
- EN 60825-2, *Safety of laser products – Part 2: Safety of optical fibre communication systems (IEC 60825-2:2000)*
- EN 61073-1, *Mechanical splices and fusion splice protectors for optical fibres and cables – Part 1: Generic specification (IEC 61073-1:2000)*
- EN 61280-4-2:1999, *Fibre optic communication subsystem basic test procedures – Part 4-2: Fibre optic cable plant – Single-mode fibre optic cable plant attenuation (IEC 61280-4-2:1999)*
- EN 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibrations (sinusoidal) (IEC 61300-2-1:1995)*
- EN 61300-2-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-2: Tests – Mating durability (IEC 61300-2-2:1995)*
- EN 61300-2-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention (IEC 61300-2-4:1995)*
- EN 61300-2-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-6: Tests – Tensile strength of coupling mechanism (IEC 61300-2-6:1995)*
- EN 61300-2-12, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-12: Tests – Impact (IEC 61300-2-12:1995)*
- EN 61300-2-17, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-17: Tests – Cold (IEC 61300-2-17:1995)*

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<sup>3)</sup> Approved for Parallel Vote.

<sup>4)</sup> At enquiry stage.

- EN 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat – High temperature endurance (IEC 61300-2-18:1995)*
- EN 61300-2-19, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-19: Tests – Damp heat (steady state) (IEC 61300-2-19:1995)*
- EN 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature (IEC 61300-2-22:1995)*
- EN 61300-2-42, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-42: Tests – Static side load for connectors (IEC 61300-2-42:1998)*
- EN 61300-3-6:1997, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss (IEC 61300-3-6:1997)*
- EN 61300-3-34, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-34: Examinations and measurements – Attenuation of random mated connectors (IEC 61300-3-34:2001)*
- EN 61935-2<sup>3)</sup>, *Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 – Part 2: Patch cords and work area cabling (IEC 61935-2:200X)*
- IEC 60793-2:1998, *Optical fibres – Part 2: Product specifications*
- IEC 60794-2:1989, *Optical fibre cables – Part 2: Product specifications*
- IEC 60874-19-1, *Connectors for optical fibres and cables – Part 19-1: Fibre optic patch cord connector type SC-PC (floating duplex) standard terminated on multimode fibre type A1a, A1b – Detail specification*
- IEC/PAS 61076-3-104, *Connectors for electronic equipment - Part 3-104: Detail specification for 8-way, shielded free and fixed connectors, for data transmissions with frequencies up to 600 MHz minimum*

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3) Approved for Parallel Vote.