

© Copyright SEK. Reproduction in any form without permission is prohibited.

Fastighetsnät för informationsöverföring – Generella kabelnät – Del 3: Industrier

*Information technology –
Generic cabling systems –
Part 3: Industrial premises*

Som svensk standard gäller europastandarden EN 50173-3:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50173-3:2007.

Nationellt förord

Den svenska standarden innehåller en nationell informativ bilaga NA. Bilaga NA innehåller svenska termer som motsvarar de engelska termerna i standardens avsnitt 3.

Standarden skall användas tillsammans med SS-EN 50173-1, utgåva 2, 2007.

ICS 35.110

Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: SEK, Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00. Telefax: 08 - 444 14 30
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English version

**Information technology -
Generic cabling systems -
Part 3: Industrial premises**

Technologies de l'information -
Systèmes de câblage générique -
Partie 3: Bâtiments du secteur industriel

Informationstechnik -
Anwendungsneutrale
Kommunikationskabelanlagen -
Teil 3: Industriell genutzte Standorte

This European Standard was approved by CENELEC on 2007-09-01. 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

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

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 215, Electrotechnical aspects of telecommunication equipment.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50173-3 on 2007-09-01.

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) 2008-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-09-01

The European Standards EN 50173:1995 and EN 50173-1:2002 have been developed to enable the application-independent cabling to support ICT applications in office premises. Their basic principles, however, are applicable to other types of applications and in other types of premises.

TC 215 has decided to establish relevant European Standards which address the specific requirements of these premises. In order to point out the commonalities of these cabling design standards, these EN are published as individual parts of the series EN 50173, thus also acknowledging that standards users recognize the designation “EN 50173” as a synonym for generic cabling design.

At the time of publication of this European Standard, series EN 50173 comprises the following standards:

EN 50173-1	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

This European Standard, EN 50173-3, contains specific requirements for generic cabling systems intended to be operated in industrial premises, referencing the general requirements of EN 50173-1:2007. It is based upon but is not identical to ISO/IEC 24702:2006, Information technology - Generic cabling - Industrial premises.

Contents

Introduction	5
1 Scope and conformance	9
1.1 Scope.....	9
1.2 Conformance.....	9
2 Normative references	10
3 Definitions and abbreviations.....	10
3.1 Definitions.....	10
3.2 Abbreviations.....	11
4 Structure of the generic cabling system in industrial premises.....	12
4.1 General	12
4.2 Functional elements.....	12
4.3 Cabling subsystems.....	12
4.4 Interconnection of subsystems.....	15
4.5 Accommodation of functional elements	16
4.6 Interfaces	17
4.7 Dimensioning and configuring	17
5 Channel performance in industrial premises.....	19
5.1 General	19
5.2 Environmental performance	20
5.3 Transmission performance.....	20
6 Reference implementations in industrial premises	22
6.1 General	22
6.2 Balanced cabling	22
6.3 Optical fibre cabling	24
7 Cable requirements in industrial premises.....	26
7.1 General	26
7.2 Balanced cables	26
7.3 Optical fibre cables	27
8 Connecting hardware requirements in industrial premises.....	27
8.1 General requirements	27
8.2 Connecting hardware for balanced cabling.....	27
8.3 Connecting hardware for optical fibre cabling.....	28
9 Requirements for cords and jumpers in industrial premises	29
9.1 General	29
9.2 Jumpers	29
9.3 Balanced cords.....	29
9.4 Optical fibre cords.....	29
Annex A (normative) Permanent link performance limits.....	30
Annex B (normative) Reference implementations that do not conform to Clause 4.....	32
Annex C (informative) Alternative cabling implementations	36
Bibliography	38

Figures

Figure 1 - Cabling specified by EN 50173-3 and its relationship to OSI reference model layers 6

Figure 2 - Schematic relationship between the EN 50173 series and other relevant standards 7

Figure 3 - Configuration of apparatus-based functional elements within industrial premises 13

Figure 4 - Structure of generic cabling for industrial environment 13

Figure 5 - Hierarchical structure of generic cabling for industrial premises 15

Figure 6 - Inter-relationship of functional elements in an installation with diversity for protection against failure 15

Figure 7 - Accommodation of functional elements 16

Figure 8 - Test and equipment interfaces 17

Figure 9 - Transmission performance of a channel 19

Figure 10 - Example of a system showing the location of cabling interfaces and extent of associated channel 20

Figure 11 - Intermediate cabling models 23

Figure 12 - Combined optical fibre intermediate/floor channels 25

Figure A.1 - Permanent link options 30

Figure B.1 - Channel configurations with no connections 32

Figure B.2 - Channel configurations with balanced cabling inter-connections 33

Figure B.3 - Channel configurations with balanced cabling bulkhead connections 34

Figure C.1 - Alternative channel configurations 36

Tables

Table 1 - Contextual relationship between EN 50173 series and other standards relevant for information technology cabling systems 8

Table 2 - Intermediate cabling channel equations 23

Table 3 - Channel length equations for plastic and plastic clad silica optical fibre cabling 26

Table B.1 - Channel equations for balanced cabling 34

Table B.2 - Channel equations for bulkhead connections 35

Table C.1 - Alternative channel equations 37

Introduction

The importance of the information technology cabling infrastructure is similar to that of other utilities such as heating, lighting and electricity 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.

Historically, the cabling within premises comprised both application-specific and multipurpose networks. Standards within the EN 50173 series have enabled a controlled migration to generic cabling (with an associated reduction in the use of application-specific cabling) and supported the development of high data rate applications based upon defined cabling models.

This European Standard, EN 50173-3, recognizes the benefit of generic cabling to interconnect several pieces of apparatus within industrial premises (within and between structures and buildings) and is to be read in conjunction with EN 50173-1.

This European Standard provides, for industrial premises:

- a) users with an application independent generic cabling system and an open market for cabling components;
- b) requirements for infrastructures that support critical automation, process control and monitoring applications in a range of industrial environments;
- c) users with a flexible cabling scheme such that modifications are both easy and economical;
- d) building professionals (for example, architects), production and control engineers with guidance allowing the accommodation of cabling both before specific requirements are known, i.e. in the initial planning either for construction or refurbishment, and for further deployment as the requirements of specific industrial areas are defined;
- e) 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:

- the associated standard covering general requirements for generic cabling within premises (EN 50173-1);
- 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 technical bodies of IEC (including the subcommittees of ISO/IEC JTC 1), study groups of ITU-T and CENELEC TC 65CX "Fieldbus".

Within this European Standard the cabling, defined between the interfaces shown in Figure 1, contains passive components only.

The applications listed in EN 50173-1:2007, Annex F, 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, industrial premises.

It is anticipated that the generic cabling system meeting the minimum requirements of this European Standard will have a life expectancy consistent with other infrastructures within industrial premises.

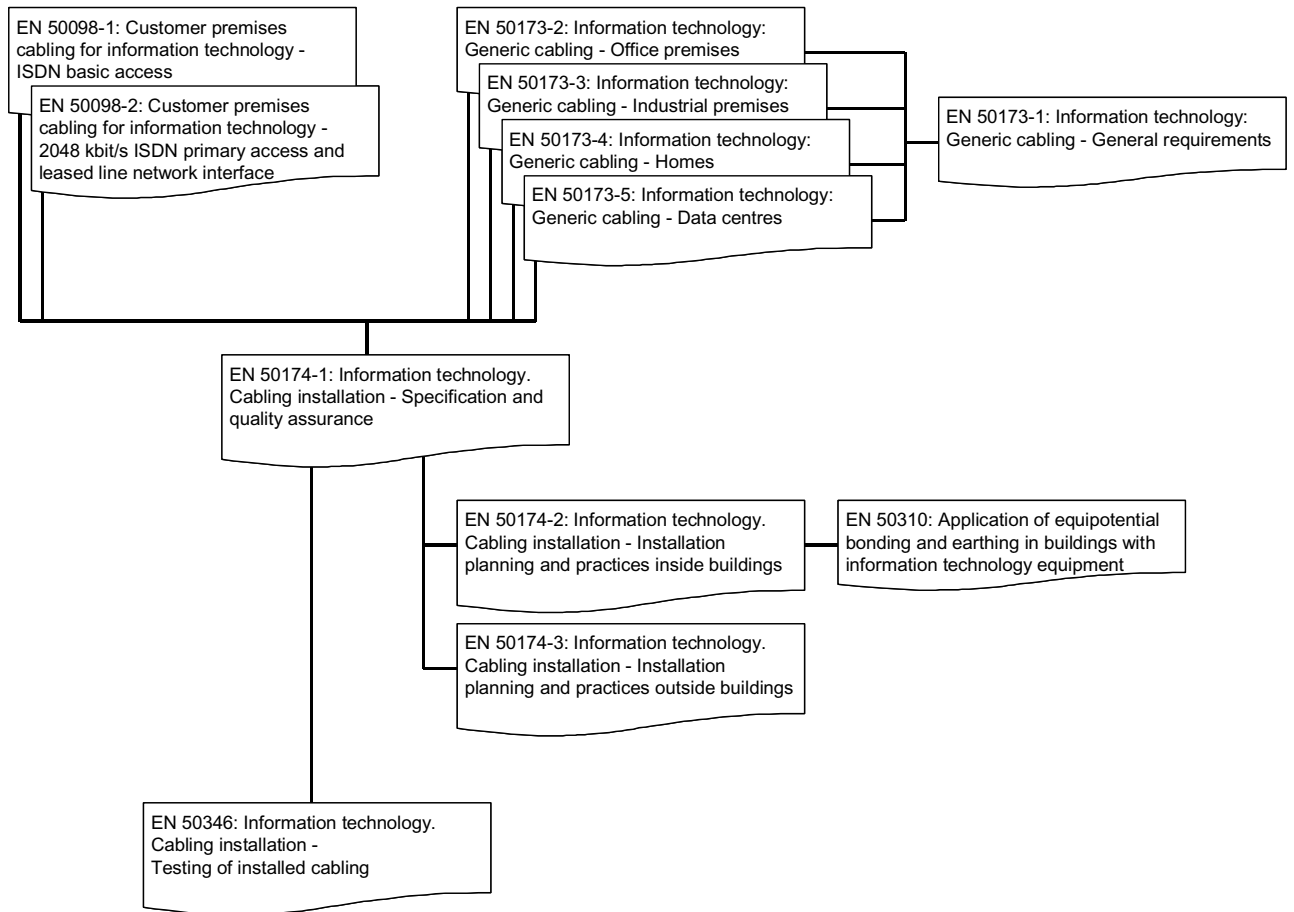


Figure 2 - Schematic relationship between the EN 50173 series and other relevant Standards

Table 1 - Contextual relationship between EN 50173 series and other Standards relevant for information technology cabling systems

Building design phase	Generic cabling design phase	Specification phase	Installation 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 series except EN 50173-4</p> <p>4: Structure</p> <p>5: Channel performance</p> <p>7: Cable requirements</p> <p>8: Connecting hardware requirements</p> <p>9: Requirements for cords and jumpers</p> <p>A: Link performance limits</p> <p>and</p> <p>EN 50173-4</p> <p>4 and 5: Structure</p> <p>6: Channel performance</p> <p>8: Cable requirements</p> <p>9: Connecting hardware requirements</p> <p>10: Requirements for cords and jumpers</p> <p>A: Link performance limits</p>	<p>EN 50174-1</p> <p>4: Requirements for installers</p> <p>5: Requirements for premises owners</p>		<p>EN 50174-1</p> <p>5: Requirements for premises owners</p>
		<p>Planning phase</p>		
		<p>EN 50174-2</p> <p>5: Requirements for planning installations of information technology cabling</p> <p>6: Segregation of metallic information technology and mains power cabling</p> <p>7: Additional considerations</p> <p>and</p> <p>EN 50174-3</p> <p>and</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>		

1 Scope and conformance

1.1 Scope

This European Standard specifies generic cabling that supports a wide range of communications services including automation, process control and monitoring applications for use within industrial premises comprising single or multiple buildings on a campus. It covers balanced cabling and optical fibre cabling.

This European Standard is based upon and references the requirements of EN 50173-1. This European Standard contains additional requirements that are appropriate to industrial premises in which the maximum distance over which communications services have to be distributed is 10 000 m. The principles of this European Standard may also be applied to installations that do not fall within this range.

In addition to the requirements of EN 50173-1, this European Standard specifies:

- a) a modified structure and configuration for generic cabling within industrial premises in which information technology applications are used to support process monitoring and control functions;
- b) implementation options;
- c) additional requirements that reflect the range of operating environments within industrial premises.

Safety (electrical safety and protection, optical power, 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 conform to the requirements of Clause 8;
- d) the performance of channels¹⁾ shall conform to the applicable transmission performance 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 permanent 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 permanent 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 and electromagnetic emissions shall be met.

¹⁾ This term, as defined in EN 50173-1, refers to the passive cabling between the interfaces described in Clauses 4 and 5. Different definitions of the term "channel" as given in other standards are not applicable in this European Standard.

In addition the following requirements of the EN 50174 series of Standards shall be met:

- f) installation specification and quality planning to address:
 - the test parameters to be measured;
 - the sampling levels to be applied;
 - the treatment of channels or links which fail to meet requirements or for which test results lie within the relevant measurement accuracy;
- g) administration;
- h) installation.

Test methods to verify conformance with the channel and link requirements of Clause 5 and Annex A respectively are specified in EN 50346. Neither this Standard nor EN 50174-1 specify the test and sampling levels to be adopted.

Specifications marked "ffs" (for further study) in EN 50173-1 are preliminary and are not required for conformance to this European Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50173-1:2007, *Information technology – Generic cabling systems – Part 1: General requirements*

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

EN 61076-3-106:2006, *Connectors for electronic equipment - Product requirements - Part 3-106: Rectangular connectors - Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface (IEC 61076-3-106:2006)*

EN 61754-20, *Fibre optic connector interfaces – Part 20: Type LC connector family (IEC 61754-20)*