

Information technology — Cabling installation — Testing of installed cabling

ICS 35.110

National foreword

This British Standard is the UK implementation of EN 50346:2002+A2:2009. It supersedes BS EN 50346:2002+A1:2007 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CENELEC text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted by Technical Committee TCT/7, Telecommunications — Installation requirements, to Subcommittee TCT/7/-/1, Cable installation expert panel.

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

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English version

**Information technology -
Cabling installation -
Testing of installed cabling**

Technologies de l'information -
Installation de câblage -
Essai des câblages installés

Informationstechnik -
Installation von
Kommunikationsverkabelung -
Prüfen installierter Verkabelung

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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*.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50346 on 2002-11-01.

The following dates were fixed:

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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-11-01

Annexes designated “normative” are part of the body of the standard.
In this standard, Annex A is normative.

This standard covers the testing of installed balanced and optical fibre cabling conforming to either series EN 50173 (generic cabling) or installed cabling conforming to dedicated, application-specific specifications such as series EN 50098. Thus EN 50346 covers a broader scope than EN 61935-1, which is restricted to the testing of installed balanced cabling according to EN 50173-1.

Foreword to amendment A1

This amendment to the European Standard EN 50346:2002 was prepared by the Technical Committee CENELEC TC 215, Electrotechnical aspects of telecommunication equipment.

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with the amendment have to be withdrawn (dow) 2010-10-01

This amendment has been prepared to reflect optical fibre cabling testing as specified in ISO/IEC 14763-3; furthermore, it introduces an XML schema to ease the exchange and further processing of data captured by field test equipment. As an integral element of this standard, an electronic version of the XML schema is provided in the format of an XSD file.

Foreword to amendment A2

This amendment to the European Standard EN 50346:2002 was prepared by the Technical Committee CENELEC TC 215, Electrotechnical aspects of telecommunication equipment.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A2 to EN 50346:2002 on 2009-05-01.

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- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2010-05-01
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This amendment has been prepared to align Clause 5 with the latest edition of EN 61935-1. In addition, requirements for measuring balanced cabling parameters ACR-F, PSANEXT, PSAACR-F and unbalanced parameters (LCL, TCL and ELTCTL) as well as coaxial cabling have been added. For the convenience of the reader, Clause 5 has been reproduced completely in this amendment.

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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 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.

A series of European Standards have been prepared to support the successful installation of information technology cabling. These are

- for design - EN 50173 series and relevant application standards (for example, EN 50098-1 and EN 50098-2),
- for specification, implementation and operation – EN 50174-1, EN 50174-2 and EN 50174-3.

^{A2} Figure 1 and Table 1 show the schematic and contextual relationships between the standards produced by CLC/TC 215 for information technology cabling.

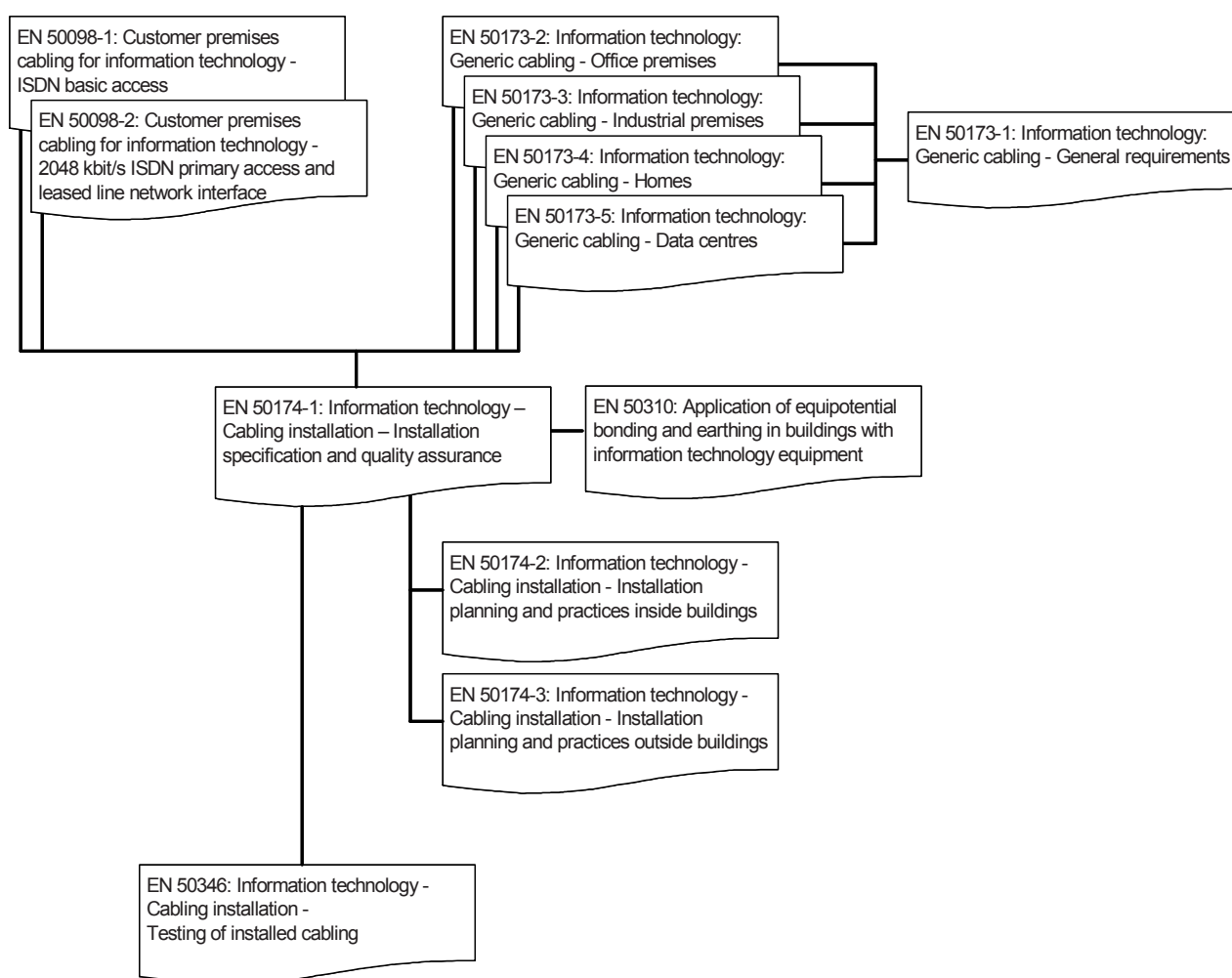


Figure 1 – Schematic relationship between EN 50346 and other relevant standards^{A2}

Table 1 – Contextual relationship between EN 50346 and other standards relevant for information technology cabling systems

Building design phase	Generic cabling design phase	Specification phase	Installation 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 except EN 50173-4 4: Structure 5: Channel performance 7: Cable requirements 8: Connecting hardware requirements 9: Requirements for cords and jumpers A: Link performance limits and EN 50173-4 4 and 5: Structure 6: Channel performance 8: Cable requirements 9: Connecting hardware requirements 10: Requirements for cords and jumpers A: Link performance limits	EN 50174-1 4: Requirements for specifying installations of information technology cabling 5: Requirements for installers of information technology cabling		EN 50174-1 4: Requirements for specifying installations of information technology cabling
		Planning phase		
		EN 50174-2 4: Requirements for planning installations of information technology cabling 6: Segregation of metallic information technology cabling and mains power cabling 7: Electricity distribution systems and lightning protection 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 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 50174-2 5: Requirements for the installation of information technology cabling 6: Segregation of metallic information technology cabling and mains power 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 cabling 6: Test parameters for optical fibre cabling	

A2

This European Standard specifies the requirements for the testing of installed balanced copper and optical fibre cabling. Such testing is commonly undertaken at contract interfaces and the requirements of this standard take the form of defined test procedures ensuring that results obtained are relevant, repeatable and credible.

These test procedures may be

- a) referenced within the installation specification,
- b) used during the implementation phase of the installation,
- c) used during the operational phase to diagnose application failures at the cabling level.

This standard does not define which tests should be applied or the quantity or percentage of installed cabling to be tested. 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.

1 Scope

This standard specifies procedures for testing the transmission performance of installed information technology cabling in premises. These procedures apply to both balanced copper and optical fibre cabling.

These test procedures may be used for

- acceptance testing against agreed cabling performance limits,
- verification of specific application support,
- the investigation of faults.

These test procedures are not suitable for components or cable assemblies such as patch cords and equipment cords.

For each test procedure this standard specifies

- a) test parameter,
- b) the test method(s),
- c) test system,
- d) test equipment,
- e) cabling interface adaptor,
- f) measurement procedure,
- g) calibration,
- h) interpretation of test results,

- i) documentation.

Limits for the parameters under test are specified in relevant cabling and application standards.

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).

A₂ Text deleted **A₂**

A₂ EN 50173-1, *Information technology – Generic cabling systems – Part 1: General requirements*

EN 50289-1-15, *Communication cables – Specifications for test methods – Part 1-15: Electromagnetic performance – Coupling attenuation of links and channels (Laboratory conditions)*

EN 50289-1-16, *Communication cables – Specifications for test methods – Part 1-16: Electromagnetic performance – Coupling attenuation of cable assemblies (Field conditions)* **A₂**

EN 60825-1, *Safety of laser products - Part 1: Equipment classification, requirements and user's guide (IEC 60825-1:1993)*

A₁ Text deleted **A₁**

A₂ EN 61935-1:2009, **A₂** *Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with EN 50173 – Part 1: Installed cabling (IEC 61935-1:2009)*

A₁ ISO/IEC 14763-3, *Information technology – Implementation and operation of customer premises cabling – Part 3: Testing of optical fibre cabling* **A₁**

3 Definitions, abbreviations and symbols

3.1 Definitions

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

3.1.1

calibration

set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system and the corresponding values realised by standards

NOTE 1 The result of a calibration permits either the assignment of values of measurands to the indications or the determination of corrections with respect to indications

NOTE 2 A calibration may also determine other metrological properties such as the effect of influence quantities

NOTE 3 The result of a calibration may be recorded in a document, sometimes called a calibration certificate or a calibration report
[EN ISO 7500-1:1999, modified]

3.1.2

cabling interface adaptor

test cords and other components used to connect test equipment to the cabling under test

3.1.3

connection

mated device or combination of devices including terminations connecting two cables or cable elements

3.1.4

contract interface

point, in time, at which the responsibility for the supply of the cabling infrastructure passes from one organization to another

3.1.5

equipment cord

cable assembly enabling the attachment of transmission equipment and terminal equipment to a link

NOTE In the case of EN 50173-1, the equipment cord used to attach terminal equipment at the telecommunications outlet is termed as the work area cord

3.1.6

fail result

measured value which fails to meet the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement accuracy

3.1.7

local test equipment

test equipment used to perform or control the test procedure

3.1.8

marginal result

measured value which differs from the specified requirement by an amount not exceeding the stated measurement accuracy

3.1.9

normalisation

process of adjusting reference levels within the test system to ensure that the stated test system accuracy is achieved

3.1.10

pass result

measured value which meets the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement accuracy

3.1.11

remote test equipment

test equipment at the opposite end of the cabling under test to the local test equipment

NOTE Not all tests require the use of remote test equipment

3.1.12

termination point

interface enabling connection to the cabling under test

3.1.13

test cord

cable assembly used either to connect test equipment to the cabling under test or as part of a test reference measurement

3.1.14

test operator

person or organisation undertaking the test in accordance with instructions provided by the test system designer

3.1.15

test system

test equipment and cabling interface adaptors necessary to undertake a given test/measurement in accordance with the requirements of this standard

3.1.16

test system designer

person or organisation which supplies and specifies the test system for a given test procedure

NOTE The test system designer could be the supplier of the test equipment in conjunction the necessary cabling interface adaptors. Alternatively the test system designer could be an individual who selects the test equipment and defines the requirements for the cabling interface adaptors

3.2 Abbreviations

ACR	Attenuation to crosstalk ratio
CPR	Coupled power ratio
EQP	Transmission or terminal equipment
ELFEXT	Equal level far end crosstalk loss
FWHM	Full width half maximum
NEXT	Near end crosstalk loss
PSACR	Power sum attenuation crosstalk ratio
PSNEXT	Power sum near end crosstalk loss
TEST EQP	Test equipment

 ACR-F	Attenuation to crosstalk ratio at the far-end
ACR-N	Attenuation to crosstalk ratio at the near-end
ELTCTL	Equal level transverse conversion transfer loss
LCL	Longitudinal conversion loss
PSACR-F	Power sum attenuation to crosstalk ratio at the far-end
PSACR-N	Power sum attenuation to crosstalk ratio at the near-end
PSANEXT	Power sum alien (exogenous) near-end crosstalk loss
PSAACR-F	Power sum attenuation to alien (exogenous) crosstalk ratio at the far-end
TCL	Transfer conversion loss 

3.3 Symbols

□ Termination point

▬ Connection

4 General requirements

4.1 Location of measurement (test) interfaces

4.1.1 Cabling under test

The cabling under test shall be either a channel or a link. Tests applied to channels are generally used for application trouble-shooting. Tests applied to links are generally used to verify the initial performance of the link.

Termination resistors shall be removed from all termination points connected to the cabling under test unless required by the test method.

4.1.2 Channels

A channel is a specific configuration of fixed cabling and flexible cables (jumpers, patch cords and equipment cords) to which transmission/terminal equipment is connected (see Figure 1). Although the equipment cords are terminated at both ends, definitions of channel performance exclude the connection at the transmission/terminal equipment.

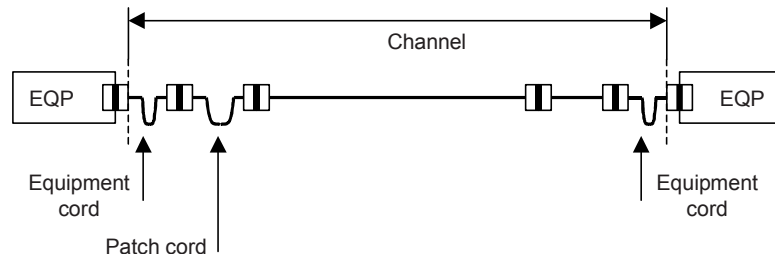


Figure 2 - Example of a cabling channel

4.1.3 Links

A channel contains one or more cabling links interconnected by jumpers and cords. Although each end of a link features a termination point, definitions of link performance include the connection at these termination points (see Figure 2).

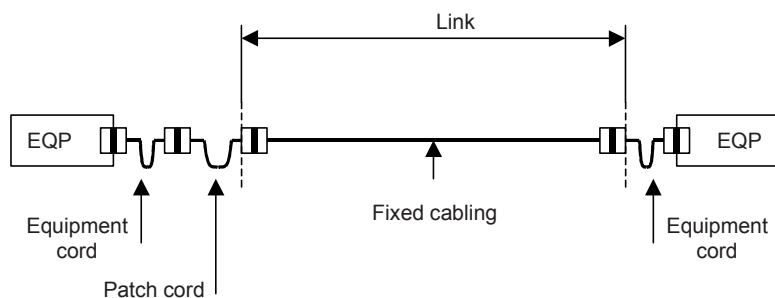


Figure 3 - Example of a cabling link